ANNUAL SUMMARY REPORT

2010/2011 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NEWFOUNDLAND AND LABRADOR

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EXECUTIVE SUMMARY

Conestoga-Rovers & Associates (CRA) was retained by the Newfoundland and Labrador Department of Environment and Conservation (DOEC) to complete the 2010/11 monitoring and maintenance program at the Come By Chance Secure Landfill (Site) located on Refinery Road in Come By Chance, Newfoundland and Labrador (NL) as shown on Figure 1. Site visits and field activities were completed in accordance with the AMEC Tier II schedule as outlined in the 2004/05 Operations and Maintenance Manual (OMM).

The Come By Chance Secure Landfill covers an area of approximately 19,778 square metres (m^2) located approximately 2.5 km west of the Trans Canada Highway and approximately 4 km south of the Town of Come By Chance, Newfoundland and Labrador (NL). The landfill was constructed between 1994 and 1996 to facilitate the clean-up of hazardous waste associated with the Come By Chance Oil Refinery. Leachate containment is achieved through the use of a redundant liner system consisting of independent primary and secondary liners as well as a drainage pipe system to manage excess fluid and provide a means for leachate discharge. A groundwater drainage system was installed in March 2009 starting at the east side of the landfill and is graded at one percent toward the northeast corner, then along the north side, and eventually discharging beyond the gravel road west of the Site.

The work completed by CRA during the 2010/11 monitoring and maintenance program generally involved sampling of the primary and secondary leachate collection valve chambers in advance of pumping down the chambers by discharging to a nearby ditch, abandonment of two damaged monitor wells, installation of two replacement monitor wells, groundwater and surface water sampling, landfill cover inspection, and groundwater drainage system inspection, clean-out repairs, and cleaning (if required).

The spring/summer Site visit was conducted between July and August 2010 while the fall/winter Site visit was conducted between December 2010 and January 2011. A summary of the 2010/11 monitoring and maintenance program is provided below along with recommendations for future work.

E.1 SAMPLING SCHEDULE

In accordance with the OMM, CRA recommend that future leachate sampling be conducted using the Tier I schedule (once per year) since leachate elevations were

measured at less than 0.3 metres below the top of the valve chambers for the PLCS and SLCS for two consecutive Site visits in 2010.

Monitoring and Maintenance Schedule: In accordance with the OMM, CRA recommend that groundwater, surface water, and leachate sampling be conducted using the Tier I schedule (once per year) since leachate elevations were measured at less than 0.3 metres below the top of the valve chambers for the PLCS and SLCS for two consecutive Site visits in 2010. In addition, the continued maintenance and inspection program for the landfill cover and groundwater drainage system clean-outs should be scheduled to coincide with the sampling program.

E.2 GROUNDWATER AND INSTALLATION OF ADDITIONAL MONITOR WELLS

In general, the BTEX/mTPH, PAH, PCB, VOC, general chemistry, and metals analytical data show groundwater conditions to be similar or in better condition compared to the leachate analytical data; therefore, it does not appear that groundwater condition is being influenced by leachate from the secure landfill. Based on static groundwater levels measured during the 2010 Site visits, it also appears that groundwater infiltration may still be occurring at the northeastern area of the Site.

CRA recommend the installation of three additional monitor wells north and northeast of the secure landfill to confirm groundwater depths with proposed well placements between CO1 and CO2, between CO2 and CO3, and between CO3 and CO4. Information acquired from groundwater levels in these key areas will determine whether or not the groundwater drainage system was installed at the appropriate depth and if groundwater is infiltrating the secondary leachate containment system liner in the northeastern area of the landfill.

E.3 SURFACE WATER

In general, the BTEX/mTPH, PAH, PCB, VOC, and general chemistry analytical data show surface water conditions to be similar or better in quality compared to the leachate analytical data; however, pH was slightly acidic in the leachate compared to the more neutral downgradient surface water pH. In addition, six metals (aluminum, cadmium, copper, iron, lead, and zinc) reported one or more exceedances in the downgradient surface water samples whereas the leachate analytical data did not report any metals exceedances. Surface water data from previous monitoring programs is included in

Appendix E. Based on this information, it does not appear that leachate is seeping from the landfill liners into the downgradient surface water; therefore, the secure landfill liners appear to be performing in accordance with their original intent of acting as a barrier between leachate accumulations within the landfill and surface water in the surrounding area.

CRA recommend that collection of an additional downgradient surface water sample be revised to a location near the landfill gated entrance to minimize potential impacts from nearby vehicular traffic and/or culvert. In addition and whenever possible, CRA also recommend that leachate sampling events be co-ordinated with measurable precipitation in the preceding days to avoid a situation where the sample location is dry (which is a common issue during the summer months).

E.4 LEACHATE AND POTENTIAL INFILTRATION SOURCES

In accordance with the OMM, both pumping events consisted of two Site visits so that a desired flow rate of 15 L/min could be achieved on two successive days. During the first Site visit for leachate pumping in August 2010, it was observed that the PLCS and SLCS valves were in the open position with the discharge hose no longer connected to the PLCS valve. CRA determined in-flow rates by pumping down each valve chamber, measuring the change in head over a fixed period of time, then calculating in-flow. Maintaining these valves in the open position does not create any integrity issues for containment as the hydraulic head in the two leachate valve chambers has not risen above the ground surface, even shortly after the Hurricane Igor precipitation event in September 2010. It was also noted that leachate elevations in the PLCS and SLCS for two consecutive Site visits were less than 0.3 metres below the top of the valve chambers.

A review of the current and historical leachate pumping volumes from the PLCS and SLCS valve chambers demonstrates that pumped leachate volumes have decreased since the installation of the groundwater drainage system. A comparison of the average pumped leachate volumes from the PLCS prior to and following installation of the groundwater drainage system shows a decrease of approximately 50 percent. In addition, a comparison of the average pumped leachate volumes from the SLCS prior to and following installation of the groundwater drainage system shows a decrease of approximately 65 percent. Consequently, it appears the groundwater drainage system has contributed to the reduction of volumes of pumped leachate from the PCLS and SCLS; however, significant volumes of leachate are still present within the two liners that require pumping on a regular basis.

Although pumped leachate volumes have dramatically diminished from the PLCS, significant leachate volumes are still being pumped from the SLCS; this contradicts the OMM, which anticipated that SLCS volumes would also diminish quite dramatically. Therefore, further evaluation of groundwater elevations upgradient from the landfill is key in identifying the potential source of high SLCS infiltration. As noted above, CRA recommend the installation of three monitor wells upgradient from landfill.

E.5 LANDFILL COVER AND VEGETATION CONTROL

Landfill cover inspections were conducted on July 16, 2010 and December 13, 2010, which indicated that minor maintenance is required. The only issue of concern related to maintenance is the cutting of vegetation, typically alders, which have reached 1.5 metres in height, considerably more than the OMM recommended height restriction of 0.3 metres.

Upon reviewing the results of the elevation control survey, it was noted the elevation control points decreased in elevation by an average of 40 millimetres between August and December 2010. The elevation control points may have settled slightly due to their recent installation; therefore, additional measurement data of the elevation control points is required over a longer period of time to determine if landfill cover settlement is occurring.

CRA recommend that all vegetation on the landfill cover that measures over 0.3 metres in height should be cut down. This work can be completed in conjunction with vegetation control in the monitor well locations outside the fenced area of the landfill.

In addition, it was noted that access to two monitor wells (MW93-1 and MW93-1A) was somewhat difficult due to the excessive vegetative growth in the area with alders reaching heights of 1.8 metres. CRA recommend that alders be cut down in this location to better facilitate future field programs (i.e. the transport of field equipment such as water level meters, coolers, sample jars, etc.).

E.6 GROUNDWATER DRAINAGE SYSTEM

Four groundwater drainage system clean-outs were previously installed as part of the original system construction; however, only one (CO1) was still visible for inspection. The four existing clean-outs were modified with PVC fittings that terminated near grade

using 100 mm diameter pipe, which were then completed with standard aluminum flush-mount covers.

Water was not observed discharging from the drainage system into the ditch on the opposite side of the gravel service road during the July 2010 Site visit. An impromptu inspection of the groundwater drainage system on September 25, 2010 confirmed that water was flowing from the discharge on the south side of the gravel service road. The observed water discharge in September 2010 was likely a result of a recent and very high precipitation event (Hurricane Igor) compared to limited precipitation in the weeks prior to the July 2010 Site visit.

Debris or blockages were not present in any of the clean-outs during both Site visits and combined with water flowing from the downgradient discharge, it was determined the groundwater drainage system was functioning properly and cleaning was not required.

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by the Newfoundland and Labrador Department of Environment and Conservation (DOEC) to complete the 2010/11 monitoring and maintenance program at the Come By Chance Secure Landfill (Site) located on Refinery Road in Come By Chance, Newfoundland and Labrador (NL) as shown on Figure 1. Site visits and field activities were completed in accordance with the AMEC Tier II schedule as outlined in the 2004/05 Operations and Maintenance Manual (OMM).

The work generally involved sampling of the primary and secondary leachate collection valve chambers in advance of pumping down the chambers by discharging to a nearby ditch, abandonment of two damaged monitor wells, installation of two replacement monitor wells, groundwater and surface water sampling, landfill cover inspection, and groundwater drainage system inspection, clean-out repairs, and cleaning (if required).

The spring/summer Site visit was conducted between July and August 2010 while the fall/winter Site visit was conducted between December 2010 and January 2011.

2.0 SITE DESCRIPTION

The Come By Chance Secure Landfill covers an area of approximately 19,778 square metres (m^2) located approximately 2.5 km west of the Trans Canada Highway and approximately 4 km south of the Town of Come By Chance (Town), Newfoundland and Labrador (NL). The landfill was constructed between 1994 and 1996 to facilitate the clean-up of hazardous waste associated with the Come By Chance Oil Refinery. Leachate containment is achieved through the use of a redundant liner system consisting of independent primary and secondary liners as well as a drainage pipe system to manage excess fluid and provide a means for leachate discharge.

A groundwater drainage system was installed in March 2009 starting at the east side of the landfill and is graded at one percent toward the northeast corner, then along the north side, and eventually discharging beyond the gravel road west of the Site. The system consists of 140 metres of perforated PVC pipe, 150 mm in diameter, installed in a trench of washed crushed stone measuring approximately 600 mm x 600 mm wrapped in filter fabric and 110 metres of corrugated steel pipe, 200 mm in diameter.

3.0 METHODOLOGY

3.1 MONITOR WELL REPLACEMENT

Two existing stick-up monitor wells (MW93-3 and MW93-3A) located immediately adjacent to the exterior northwest corner of the landfill fencing were previously damaged and unable to be sampled (Refer to Photograph 1 of Appendix A); therefore, two new monitor wells were required to complete groundwater sampling at this location. The two damaged wells were decommissioned in accordance with GD-PPD-024 rev.1 (Appendix D of the Guideline Document for the Management of Impacted Sites).

Logan Geotechnical Services (Logan) was retained by CRA to complete borehole drilling/monitor well installation. Using standard augers, two boreholes, both of which were subsequently converted to 50 mm diameter PVC monitor wells (MW10-1 and MW10-1A), were advanced at the Site on July 16, 2010 (Refer to Photograph 2 of Appendix A). GPS co-ordinates using NAD27 (UTM Zone 21) geo-reference were also recorded for all six monitor well locations (Table 1), which are shown on Figure 2. Monitor well abandonment logs for MW93-3 and MW93-3A along with monitor well logs for MW10-1 and MW10-1A are provided as Appendix B.

3.2 GROUNDWATER SAMPLING

On July 16 and December 13, 2010, static water levels were measured using an electronic product/water interface probe at the on-Site monitor wells (Table 2). The monitor wells were then developed, allowed to recover, and sampled using dedicated, disposable bailers. Seven groundwater samples were collected from the on-Site monitor wells during each sample event, including one field duplicate in July (DUP-01) and one in December (DUP-02) from MW10-1. Note that two monitor well locations (MW93-1 and MW93-2) were difficult to locate due to very high vegetative growth in the area; alders were noted to reach a height of approximately 1.8 metres.

All groundwater samples collected from the four existing monitor wells (MW93-1, MW93-1A, MW93-2, and MW93-2A) as well as the two newly installed monitor wells (MW10-1 and MW10-1A) were submitted for analysis of benzene, toluene, ethylbenzene, xylene (BTEX), modified total petroleum hydrocarbons (mTPH), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), general chemistry, and metals. Groundwater samples were submitted to

Maxxam Analytics Inc. (Maxxam) in Bedford, Nova Scotia for analysis except BTEX/mTPH samples that were submitted to Maxxam in St. John's, NL.

3.3 SURFACE WATER SAMPLING

Surface water sampling was intended to demonstrate background analyte concentrations from the upgradient sample (SURFACE-UP) and assess potential leachate infiltration into surface water by sampling downgradient (SURFACE-DOWN). Therefore, two surface water samples were collected near the Site during the July and December 2010 Site visits, one southeast of the fenced area and upstream (SURFACE-UP) along with one west of the Site beyond the gravel road and downstream (SURFACE-DOWN), both of which were submitted for analysis of BTEX/mTPH, PAHs, PCBs, VOCs, general chemistry, and metals. The original sample location for SURFACE-DOWN was intended to be in the drainage ditch along the gravel access road to the gated entrance of the landfill; however, the ditch was dry. To maintain consistency for the 2010/11 monitoring program, the December 2010 downgradient surface water sample was collected in the same location as the July 2010 sample. All surface water samples were submitted to Maxxam in Bedford, NS for analysis except BTEX/mTPH samples that were submitted to Maxxam in St. John's, NL. GPS co-ordinates using NAD27 (UTM Zone 21) geo-reference were also recorded for the two surface water sample locations (Table 1), which are shown on Figure 2.

3.4 LEACHATE SAMPLING AND PUMPING

CRA collected leachate samples during the July and December 2010 Site visits from the primary and secondary containment leachate systems (PLCS and SLCS, respectively) for BTEX/mTPH, PAHs, PCBs, VOCs, general chemistry, metals, and toxicity. All leachate samples were submitted to Maxxam in Bedford, NS for analysis except BTEX/mTPH samples that were submitted to Maxxam in St. John's, NL; toxicity samples were submitted to Stantec Consulting Ltd. (Stantec) in St. John's, NL. Note that all laboratories are CALA certified for the respective analyses that were completed. GPS co-ordinates using NAD27 (UTM Zone 21) geo-reference were also recorded for the two leachate collection system valve chamber sample locations (Table 1), which are shown on Figure 2. Field data recorded prior to and during the PCLS and SCLS leachate discharge events are presented in Tables 3 and 4, respectively. Refer to Photographs 3 and 4 showing the PLCS valve chamber prior to and following leachate pumping during the summer pumping event.

Leachate analytical data was required to determine if pumping down the PCLS and SCLS valve chambers and discharging into a nearby ditch was permitted under the Provincial Environmental Control Water and Sewer Regulations, Schedule A (2003) for the respective comparison criteria, where available. The tabulated analytical results from each sampling event were presented to DOEC for review and approval. Since the drainage ditch location planned for leachate discharge is within the Town boundaries, approval was also requested from the Town prior to discharging leachate from both collection systems into the nearby ditch.

3.5 LANDFILL COVER INSPECTION AND ELEVATION CONTROL

Landfill cover visual inspections were completed during both Site visits in accordance with the OMM (Refer to Photographs 5 and 6 of Appendix A). Comprehensive landfill cover inspections were conducted during the July and December 2010 Site visits were documented in Table 5, which assessed the following:

- Height of vegetation;
- Condition of landfill vents;
- Condition of slopes
- Condition of lateral drains.
- Evidence or erosion/animal burrows

The ability to accurately measure potential settlement of the landfill cover was not previously incorporated into the landfill construction; therefore, concrete elevation control points were established at four locations on the landfill cover and elevation surveys were conducted during both Site visits (Refer to Photograph 7 of Appendix A). GPS co-ordinates using NAD27 (UTM Zone 21) geo-reference were also recorded for the four elevation control points and landfill vent locations (Table 1), which are shown on Figure 2.

3.6 GROUNDWATER DRAINAGE SYSTEM

Historically, large volumes of leachate from the SCLS were required to be pumped during each Site visit, which was previously suspect to be a result of groundwater infiltration into the secondary liner. Consequently, a groundwater drainage system was installed in 2009 outside the fenced area of the secure landfill along the eastern and northern boundaries at an elevation that was anticipated to intercept groundwater and divert it through the drainage system.

During previous O&M efforts of 2009/10, the clean-outs were not located and during CRA's initial Site visit in July 2010, only one of four clean-outs installed in the system was located (Clean-out #1 located near the centre of the eastern fence boundary). Using As-Built drawings provided by DOEC, the four clean-out locations were confirmed, extended to surface, and covered with aluminum flush-mount covers. GPS co-ordinates using NAD27 (UTM Zone 21) geo-reference were also recorded for the four clean-out locations (Table 1), which are shown on Figure 2. Refer to Photographs 8 and 9 of Appendix A showing a typical clean-out condition prior to and following repairs.

Upon completion of the clean-out modifications, a visual inspection of the groundwater drainage system was conducted.

4.0 GUIDELINE FRAMEWORK

4.1 GROUNDWATER

As specified in the OMM, the Atlantic Risk-Based Corrective Action (RBCA) Version 2.0 (March 2007) Tier I Risk-Based Screening Levels (RBSLs) for a commercial site with non-potable water and coarse-grained soil are the applicable Provincial guidelines for the assessment of BTEX/mTPH in groundwater. In addition, the Ontario Ministry of the Environment (MOE) "Soil, Ground Water, and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", March 9, 2004, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition are the applicable guidelines as specified in the OMM for the assessment of PAHs, PCBs, VOCs, general chemistry, and metals in groundwater.

4.2 SURFACE WATER

As specified in the OMM, the CCME Canadian Water Quality Guidelines (CWQGs) for the Protection of Freshwater Aquatic Life (FAL) (September 2007) are the applicable guidelines for the assessment of PAHs, VOCs, general chemistry, and metals. It is noted that the OMM did not specify guidelines for the assessment of BTEX/mTPH and PCBs in surface water. Guidelines are not available for xylenes, mTPH, and PCBs under the CCME FAL. The British Columbia Contaminated Sites Regulation (B.C. Reg. 375/96) Schedule 6 Generic Numerical Water Standards for Aquatic Life (Aquatic Life Generic Standards - freshwater) (for TPH) and the CCME Protection of Aquatic Life (AL) criteria (freshwater) (for BTE) were used as ecological benchmarks to determine whether surface water conditions downgradient from the Site have been exposed to any adverse risk to the ecological receptor from the hazardous landfill leachate. The freshwater ecological benchmark concentrations for BTE are 4.000 mg/L, 2.000 mg/L, and 0.390 mg/L. The ecological benchmark concentrations for TPH are 1.5 or 0.5 mg/L for gasoline or diesel, respectively. A parameter for Xylene does not currently exist under the CCME AL criteria for aquatic habitats.

4.3 LEACHATE

As specified in the OMM, the Newfoundland and Labrador Regulation 65/03 "Environmental Control Water and Sewage Regulations, 2003, Schedule "A", under the Water Resources Act (May 23, 2003) (Schedule A) are the applicable guidelines for the assessment of petroleum hydrocarbons (as total oils and grease), general chemistry, and

metals in leachate to be discharged into an open ditch. Since the pumped leachate eventually discharges from the ditch adjacent to the landfill and into a stream downgradient from the Site, the leachate was also compared to the CCME CWQGs (FAL) where Provincial regulations do not specify criteria for analytes. In addition, PLCS and SLCS samples from both sampling events were submitted for 96 hour LT50 toxicity analyses. Prior to pumping and discharging the PLCS and SLCS valve chambers, all analytical parameters were reviewed for compliance with these guidelines. Copies of the results were submitted to DOEC and the Town for approval prior to each pumping event.

5.0 ANALYTICAL RESULTS

5.1 GROUNDWATER

Groundwater analytical results for BTEX/mTPH, PAHs, PCBs, VOCs, general chemistry, and metals are presented in Tables 6 to 11, respectively. Sample locations are shown on Figure 2 and Laboratory Certificates of Analyses are included as Appendix C. Additional discussion is presented in Section 6.1 regarding the groundwater analytical results.

5.1.1 BTEX/mTPH IN GROUNDWATER

Laboratory analytical results for BTEX/mTPH from the six groundwater samples (MW93-1, MW93-1A, MW93-2, MW93-2A, MW10-1, and MW10-1A) plus one field duplicate collected during the July (DUP-01) and December (DUP-02) 2010 sampling events are presented in Table 6, all of which reported BTEX/mTPH concentrations as non-detectable or below the applicable guidelines.

Maxxam conducted a laboratory duplicate analysis for groundwater sample MW93-2 in July and December 2010, both of which reported BTEX/mTPH concentrations consistent with the original sample results. In addition, one field duplicate was collected from MW10-1 during each sampling event, both of which also reported BTEX/mTPH concentrations consistent with the original sample results.

5.1.2 PAHs IN GROUNDWATER

Laboratory analytical results for PAHs from the six groundwater samples (MW93-1, MW93-1A, MW93-2, MW93-2A, MW10-1, and MW10-1A) plus one field duplicate collected during the July (DUP-01) and December (DUP-02) 2010 sampling events are presented in Table 7, all of which reported PAH concentrations as non-detectable or below the applicable guidelines.

In addition, one field duplicate was collected from MW10-1 during each sampling event, both of which also reported PAH concentrations consistent with the original sample results.

5.1.3 PCBs IN GROUNDWATER

Laboratory analytical results for PCBs from the six groundwater samples (MW93-1, MW93-1A, MW93-2, MW93-2A, MW10-1, and MW10-1A) plus one field duplicate collected during the July (DUP-01) and December (DUP-02) 2010 sampling events are presented in Table 8, all of which reported PCB concentrations as non-detectable or below the applicable guidelines.

In addition, one field duplicate was collected from MW10-1 during each sampling event, both of which also reported PCB concentrations consistent with the original sample results.

5.1.4 VOCs IN GROUNDWATER

Laboratory analytical results for VOCs from the six groundwater samples (MW93-1, MW93-1A, MW93-2, MW93-2A, MW10-1, and MW10-1A) plus one field duplicate collected during the July (DUP-01) and December (DUP-02) 2010 sampling events are presented in Table 9, all of which reported VOC concentrations as non-detectable or below the applicable guidelines.

In addition, one field duplicate was collected from MW10-1 during each sampling event, both of which also reported VOC concentrations consistent with the original sample results.

5.1.5 GENERAL CHEMISTRY IN GROUNDWATER

Laboratory analytical results for general chemistry from the six groundwater samples (MW93-1, MW93-1A, MW93-2, MW93-2A, MW10-1, and MW10-1A) plus one field duplicate collected during the July (DUP-01) and December (DUP-02) 2010 sampling events are presented in Table 10, all of which reported general chemistry concentrations as non-detectable or below the applicable guidelines.

In addition, one field duplicate was collected from MW10-1 during each sampling event, both of which also reported general chemistry concentrations consistent with the original sample results.

5.1.6 METALS IN GROUNDWATER

Laboratory analytical results for metals from the six groundwater samples (MW93-1, MW93-1A, MW93-2, MW93-2A, MW10-1, and MW10-1A) plus one field duplicate collected during the July (DUP-01) and December (DUP-02) 2010 sampling events are presented in Table 11, all of which reported metals concentrations as non-detectable or below the applicable guidelines except one parameter. Zinc was reported at a concentration that exceeded the Ontario MOE guideline for MW93-2A during the December 2010 sampling event, which was consistent with the previous monitoring report from 2009.

In addition, one field duplicate was collected from MW10-1 during each sampling event, both of which also reported general chemistry concentrations consistent with the original sample results.

5.2 SURFACE WATER

Surface water analytical results for BTEX/mTPH, PAHs, PCBs, VOCs, general chemistry, and metals as compared to applicable guidelines are shown in Tables 12 to 17, respectively. Sample locations are shown on Figure 2 and Laboratory Certificates of Analyses are included as Appendix C. Additional discussion is presented in Section 6.2 regarding the surface water analytical results.

5.2.1 BTEX/mTPH IN SURFACE WATER

Laboratory analytical results for BTEX/mTPH from the two surface water samples (SURFACE-UP and SURFACE-DOWN) collected during the July and December 2010 sampling events are presented in Table 12, both of which reported BTE, and petroleum hydrocarbon concentrations as non-detectable or below the applicable comparison criteria.

5.2.2 PAHs IN SURFACE WATER

Laboratory analytical results for PAHs from the two surface water samples (SURFACE-UP and SURFACE-DOWN) collected during the July and December 2010 sampling events are presented in Table 13, both all of which reported PAH concentrations as non-detectable or below the applicable guidelines.

5.2.3 PCBs IN SURFACE WATER

Laboratory analytical results for PCBs from the two surface water samples (SURFACE-UP and SURFACE-DOWN) collected during the July and December 2010 sampling events are presented in Table 14, all of which reported PCB concentrations as non-detectable. Note that CCME CWQGs (FAL) does not specify a criterion for PCBs.

5.2.4 VOCs IN SURFACE WATER

Laboratory analytical results for VOCs from the two surface water samples (SURFACE-UP and SURFACE-DOWN) collected during the July and December 2010 sampling events are presented in Table 15, both all of which reported VOC concentrations as non-detectable or below the applicable guidelines.

5.2.5 GENERAL CHEMISTRY IN SURFACE WATER

Laboratory analytical results for general chemistry from the two surface water samples (SURFACE-UP and SURFACE-DOWN) collected during the July and December 2010 sampling events are presented in Table 16, both all of which reported general chemistry concentrations as non-detectable or below the applicable guidelines.

In addition, Maxxam conducted a laboratory duplicate analysis for Turbidity on SURFACE-DOWN collected during the July 2010 sampling event and on SURFACE-UP collected during the December 2010 sampling event, both of which reported Turbidity concentrations consistent with the original sample results.

5.2.6 METALS IN SURFACE WATER

Laboratory analytical results for metals from two surface water samples (SURFACE-UP and SURFACE-DOWN) collected during the July and December 2010 sampling events are presented in Table 17, all of which reported metals concentrations as non-detectable or below the applicable guidelines except one or more exceedances for aluminum, cadmium, copper, iron, lead, and zinc.

The upgradient sample collected in July 2010 reported aluminum and cadmium exceedances; however, the downgradient sample collected at the same time reported aluminum, cadmium, copper, and iron exceedances. The summary table below

demonstrates the difference in concentrations between the upgradient reference sample and the downgradient sample.

Summary Table of Upgradient vs. Downgradient Surface Water Sample Exceedances – July 2010			
Analyte	**Upgradient Concentration (µg/L)**	**Downgradient Concentration (µg/L)**	**Difference**
Aluminum	***108***	***527***	4.8 x
Cadmium	***0.03***	***0.04***	1.3 x
Copper	<2.0	***12.7***	6.4 x
Iron	289	***1,820***	6.3 x

#.## Exceeds CCME CWQGs

The upgradient sample collected in December 2010 reported aluminum, cadmium, and iron exceedances; however, the downgradient sample collected at the same time reported aluminum, cadmium, copper, iron, lead, and zinc exceedances. The summary table below demonstrates the percent difference in concentrations between the upgradient reference sample and the downgradient sample.

Summary Table of Upgradient vs. Downgradient Surface Water Sample Exceedances – December 2010			
Analyte	**Upgradient Concentration (µg/L)**	**Downgradient Concentration (µg/L)**	**Difference**
Aluminum	***257***	***5,210***	20.3 x
Cadmium	***0.04***	***0.23***	5.8 x
Copper	<2.0	***32.9***	16.4 x
Iron	***722***	***10,900***	15.1 x
Lead	<0.5	***7.64***	15.3 x
Zinc	10.7	***103***	9.6 x

#.## Exceeds CCME CWQGs

The above-noted exceedances were identified in previous monitoring reports from 2008 and 2009.

5.3 LEACHATE SAMPLING

Leachate analytical results for BTEX/mTPH, PAHs, PCBs, VOCs, general chemistry, and metals are presented in Tables 18 to 23, respectively. Sample locations are shown on Figure 2 and Laboratory Certificates of Analyses are included as Appendix C. In addition, PLCS and SLCS toxicity analytical results for 2010 as reported by Stantec are included as Appendix D. Further discussion is presented in Section 6.3 regarding the leachate analytical results.

5.3.1 BTEX/mTPH IN LEACHATE

Laboratory analytical results for BTEX/mTPH from the two leachate samples (PCLS and SCLS) collected during the July and December 2010 sampling events are presented in Table 18, both of which reported BTEX/mTPH concentrations as non-detectable. TPH concentrations were below the Schedule A criterion for Provincial Environmental Control Water and Sewer regulations. In addition, BTE and TPH concentrations were below the BC and CCME CWQGs FAL criteria, respectively.

5.3.2 PAHs IN LEACHATE

Laboratory analytical results for PAHs from the two leachate samples (PCLS and SCLS) collected during the July and December 2010 sampling events are presented in Table 19, both of which reported PAH concentrations as non-detectable. Provincial regulations or guidelines for PAHs do not exist in consideration of discharging an effluent into a drainage ditch; however, the concentrations of anthracene, phenanthrene, and pyrene reported exceedances compared to the CCME CWQGs (FAL) in the December 2010 round of PLCS sampling. In addition, the pyrene concentration reported an exceedance compared to the CCME CWQGs (FAL) in the July 2010 round of SLCS sampling.

5.3.3 PCBs IN LEACHATE

Laboratory analytical results for PCBs from the two leachate samples (PCLS and SCLS) collected during the July and December 2010 sampling events are presented in Table 20, both of which reported PCB concentrations as non-detectable. Provincial regulations or guidelines for PCBs do not exist in consideration of discharging an effluent into a drainage ditch and the CCME CWQGs (FAL) do not specify criteria for PCBs.

5.3.4 VOCs IN LEACHATE

Laboratory analytical results for VOCs from the two leachate samples (PCLS and SCLS) collected during the July and December 2010 sampling events are presented in Table 21, both of which reported VOC concentrations as non-detectable. Provincial regulations or guidelines for VOCs do not exist in consideration of discharging an effluent into a drainage ditch.

5.3.5 GENERAL CHEMISTRY IN LEACHATE

Laboratory analytical results for general chemistry from the two leachate samples (PCLS and SCLS) collected during the July and December 2010 sampling events are presented in Table 22, both of which reported general chemistry concentrations as non-detectable or below the applicable guidelines except total suspended solids (TSS) during the December 2010 sampling event. This exceedance was consistent with previous sampling events in 2008 and 2009.

Maxxam conducted a laboratory duplicate analysis for two parameters (nitrogen and carbonaceous biological oxygen demand) on the SLCS sample collected during the July 2010 sampling event, both of which reported levels consistent with the original sample results.

5.3.6 METALS IN LEACHATE

Laboratory analytical results for metals from the two leachate samples (PCLS and SCLS) collected during the July and December 2010 sampling events are presented in Table 23, both of which reported metals concentrations as non-detectable or below the Provincila regulations.

5.3.7 TOXICITY IN LEACHATE

Leachate samples from the PCLS and SCLS were also submitted for toxicity analysis, which concluded the effluent from the PLCS and SLCS were non-toxic to rainbow trout.

6.0 DISCUSSION

6.1 GROUNDWATER

A review of groundwater analytical data from the July and December 2010 sampling events were compared to leachate analytical data collected from the PLCS and SLCS to determine if leachate appeared to be impacting groundwater. In general, BTEX/mTPH, PAH, PCB, VOC, general chemistry, and metals analytical data show groundwater conditions to be similar or better compared to leachate analytical data; therefore, it does not appear that groundwater is being influenced by leachate from the secure landfill. Groundwater data from previous monitoring programs is included in Appendix E.

Based on static groundwater levels measured during the 2010 Site visits, groundwater flows in a southwesterly direction toward Come By Chance Cove. In addition, static groundwater elevations for the two Site visits in 2010 from the three sets of monitor wells were compared to the PLCS and SLCS leachate elevations in the valve chambers. The groundwater elevations at MW93-1 and MW93-1A were measured at approximately 0.3 metres above the leachate elevations at PLCS and SLCS valve chambers. In comparison, groundwater elevations at MW93-2, MW93-2A, MW10-1, and MW10-1A measured approximately 2.0 metres below the leachate elevations at PLCS and SLCS valve chambers. Based on this limited evaluation, it appears that groundwater infiltration may still be occurring at the northeastern area of the Site.

6.2 SURFACE WATER

A review of the downgradient surface water analytical data from the July and December 2010 sampling events were compared to leachate analytical data to determine if leachate may be impacting the surface water. In general, the BTEX/mTPH, PAH, PCB, VOC, and general chemistry analytical data show surface water conditions to be similar or better in quality compared to the leachate analytical data; however, pH was slightly acidic in the leachate measuring 6.37 to 7.59 compared to the more neutral downgradient surface water pH that was measured at 7.59 to 7.82. In addition, six metals (aluminum, cadmium, copper, iron, lead, and zinc) reported one or more exceedances in the downgradient surface water samples whereas the leachate analytical data did not report any metals exceedances. Surface water data from previous monitoring programs is included in Appendix E. Based on this information, it does not appear that leachate is seeping from the landfill liners into the downgradient surface water; therefore, the secure landfill liners appear to be performing in accordance with

their original intent of acting as a barrier between leachate accumulations within the landfill and surface water in the surrounding area.

6.3 LEACHATE

Prior to pumping and discharging leachate from the PLCS and SLCS, all analytical parameters were reviewed for compliance with Schedule A. In addition, copies of the results were sent to DOEC and the Town for approval prior to each pumping event. On August 19 and 25, 2010, approvals for discharge were received from DOEC and the Town, respectively, for the August 2010 pumping event. On January 10 and 11, 2011, approvals for discharge were received from DOEC and the Town, respectively, for the January 2011 pumping event. In accordance with the OMM, both pumping events consisted of two Site visits so that a desired flow rate of 15 L/min is achieved on two successive days. Appendix E includes leachate data from past monitoring programs.

During the first leachate pumping event in August 2010, it was observed that the PLCS and SLCS valves were in the open position with the discharge hose no longer connected to the PLCS valve (Refer to Photograph 2 of Appendix A). CRA determined in-flow rates by pumping down each valve chamber, measuring the change in head over a fixed period of time, then calculated in-flow. Maintaining these valves in the open position does not create any integrity issues for containment as the hydraulic head in the two leachate valve chambers has not risen above the ground surface, even shortly after the Hurricane Igor precipitation event in September 2010.

6.3.1 AUGUST 2010 LEACHATE PUMPING EVENT

CRA returned to the Site on August 26, 2010 to initiate the first leachate collection system pumping program. Approximately 7,900 Litres (L) were pumped from the PLCS valve chamber with a final measured in-flow rate of 13.25 L per minute (L/min) while approximately 23,300 L were pumped from the SCLS valve chamber with a final measured in-flow rate of 70.14 L/min. Although the desired maximum in-flow rate of 15 L/min was achieved for the PLCS, the in-flow rate for the SLCS still greatly exceeded the maximum allowable in-flow and additional pumping was required.

CRA completed the leachate collection system pumping program on August 27, 2010. Approximately 4,200 L were pumped from the PLCS valve chamber with a final measured in-flow rate of 10.5 L/min while approximately 11,900 L were pumped from the SCLS valve chamber with a final measured in-flow rate of 11.4 L/min.

6.3.2 JANUARY 2011 LEACHATE PUMPING EVENT

CRA returned to the Site on January 18, 2011 to initiate the second leachate collection system pumping program. Approximately 4,500 L were pumped from the PLCS valve chamber with a final measured in-flow rate of 13.33 L/min while approximately 22,000 L were pumped from the SCLS valve chamber with a final measured in-flow rate of 70.14 L/min. Although the desired maximum in-flow rate of 14.7 L/min was achieved for the PLCS, the in-flow rate for the SLCS still greatly exceeded the maximum allowable in-flow and additional pumping was required.

CRA completed the leachate collection system pumping program on January 19, 2011. Approximately 4,100 Litres (L) were pumped from the PLCS valve chamber with a final measured in-flow rate of 10.0 L/min while approximately 8,200 L were pumped from the SCLS valve chamber with a final measured in-flow rate of 14.5 L/min.

6.3.3 LEACHATE PUMPING EVALUATION

Volumes of leachate pumped and discharged from the PLCS and SLCS were compared to previous pumped volumes. A summary of leachate pumping from November 2000 to January 2011 is presented in the table below.

Summary of Leachate Pumping Volumes (Litres)			
Year	**Month**	**PLCS**	**SLCS**
2000	November	13,000	70,000
2003	November	15,000	56,000
2004	August	NA	45,000
2004	September	15,500	83,000
2004	October	NA	32,000
2006	October	NA	68,000
2007	February	6,000	63,000
2007	July	NA	103,000
2008	November	NA	74,000
Average Pre GWDS		***~12,500***	***66,000***
2009*	August	3,406	19,475
2009	December	4,542	30,699
2010	February	3,406	21,350
2010	August	12,100	35,200

Summary of Leachate Pumping Volumes (Litres)			
Year	**Month**	**PLCS**	**SLCS**
2011	January	8,600	30,200
Average Post GWDS		***~6,400***	***~22,800***

GWDS: Groundwater drainage system installed in March 2009

NA: No leachate present

A review of the current and historical leachate pumping volumes from the PCLS and SCLS valve chambers demonstrates that pumped leachate volumes have decreased since the installation of the groundwater drainage system. A comparison of the average pumped leachate volumes from the PLCS prior to and following installation of the groundwater drainage system shows a decrease of approximately 50 percent. In addition, a comparison of the average pumped leachate volumes from the SLCS prior to and following installation of the groundwater drainage system shows a decrease of approximately 65 percent. Consequently, it appears the groundwater drainage system has contributed to the reduction of volumes of pumped leachate from the PCLS and SCLS; however, significant volumes of leachate are still present within the two liners that require pumping on a regular basis.

6.4 LANDFILL COVER

Landfill cover inspections were conducted on July 16, 2010 and December 13, 2010. Notable items resulting from the landfill cover inspection are outlined below:

- Vegetation height reaching 1.5 metres, typically alders, which exceeds the OMM requirement of maximum vegetation height of 0.3 metres;
- Landfill vents in good condition and not obstructed;
- No evidence of erosion or animal burrows on the landfill cover;
- Slopes in good condition and covered with vegetation with no signs of erosion; and
- Lateral drains dry with occasional areas of standing water.

Landfill cover inspection data from previous monitoring programs is included in Appendix E.

Upon reviewing the results of the elevation control survey, it was noted the elevation control points decreased in elevation by an average of 40 millimetres between August and December 2010. The elevation control points were installed in August 2010 and may have settled slightly due to their recent installation; therefore, additional

measurement data of the elevation control points is required over a larger period of time to determine if landfill cover settlement is occurring.

6.5 GROUNDWATER DRAINAGE SYSTEM

Four groundwater drainage system clean-outs were previously installed as part of the original system construction; however, only one (CO1) was still visible for inspection. Based on information provided by DOEC, the remaining three clean-outs (CO2 to CO4) were located by CRA at depths ranging from 0.3 to 0.9 metres below grade (Refer to Photograph 8 of Appendix A); visual inspections confirmed that water was not present. The four existing clean-outs were modified with PVC fittings that terminated near grade using 100 mm diameter pipe, which were then completed with standard aluminum flush-mount covers (Refer to Photograph 9 of Appendix A).

Water was not observed discharging from the drainage system into the swale on the west side of the gravel service road during the July 2010 Site visit. An impromptu inspection of the groundwater drainage system on September 25, 2010 confirmed that water was flowing from the discharge on the west side of the gravel service road (Refer to Photograph 10 of Appendix A). The observed water discharge in September 2010 was likely a result of a recent and very high precipitation event (Hurricane Igor) compared to limited precipitation in the weeks prior to the July 2010 Site visit.

Debris or blockages were not present in any of the clean-outs during both Site visits and combined with water flowing from the downgradient discharge, it was determined the groundwater drainage system was functioning properly and cleaning was not required.

7.0 SUMMARY AND RECOMMENDATIONS

Conestoga-Rovers & Associates (CRA) was retained by the Newfoundland and Labrador Department of Environment and Conservation (DOEC) to complete the 2010/11 monitoring and maintenance program at the Come By Chance Secure Landfill (Site) located on Refinery Road in Come By Chance, Newfoundland and Labrador (NL) as shown on Figure 1. Site visits and field activities were completed in accordance with the AMEC Tier II schedule as outlined in the 2004/05 Operations and Maintenance Manual (OMM).

The Come By Chance Secure Landfill covers an area of approximately 19,778 square metres (m^2) located approximately 2.5 km west of the Trans Canada Highway and approximately 4 km south of the Town, NL. The landfill was constructed between 1994 and 1996 to facilitate the clean-up of hazardous waste associated with the Come By Chance Oil Refinery. Leachate containment is achieved through the use of a redundant liner system consisting of independent primary and secondary liners as well as a drainage pipe system to manage excess fluid and provide a means for leachate discharge.

A groundwater drainage system was installed in March 2009 starting at the east side of the landfill and is graded at one percent toward the northeast corner, then along the north side, and eventually discharging beyond the gravel road west of the Site.

The work completed by CRA during the 2010/11 monitoring and maintenance program involved sampling of the primary and secondary leachate collection valve chambers in advance of pumping down the chambers by discharging to a nearby ditch, abandonment of two damaged monitor wells, installation of two replacement monitor wells, groundwater and surface water sampling, landfill cover inspection, and groundwater drainage system inspection, and clean-out repairs.

The spring/summer Site visit was conducted between July and August 2010 while the fall/winter Site visit was conducted between December 2010 and January 2011. Information regarding the 2010/11 monitoring and maintenance program is summarized below in Section 7.1 with recommendations provided in Section 7.2.

7.1 2010/11 MONITORING AND MAINTENANCE SUMMARY

7.1.1 GROUNDWATER

In general, the BTEX/mTPH, PAH, PCB, VOC, general chemistry, and metals analytical data show groundwater conditions to be similar or in better condition compared to the leachate analytical data; therefore, it does not appear that groundwater condition is being influenced by leachate from the secure landfill. Based on static groundwater levels measured during the 2010 Site visits, it also appears that groundwater infiltration may still be occurring at the northeastern area of the Site.

7.1.2 SURFACE WATER

In general, the BTEX/mTPH, PAH, PCB, VOC, and general chemistry analytical data show surface water conditions to be similar or better in quality compared to the leachate analytical data; however, pH was slightly acidic in the leachate compared to the more neutral downgradient surface water pH. In addition, six metals (aluminum, cadmium, copper, iron, lead, and zinc) reported one or more exceedances in the downgradient surface water samples whereas the leachate analytical data did not report any metals exceedances. Surface water data from previous monitoring programs is included in Appendix E. Based on this information, it does not appear that leachate is seeping from the landfill liners into the downgradient surface water; therefore, the secure landfill liners appear to be performing in accordance with their original intent of acting as a barrier between leachate accumulations within the landfill and surface water in the surrounding area.

7.1.3 LEACHATE

In accordance with the OMM, both pumping events consisted of two Site visits so that a desired flow rate of 15 L/min could be achieved on two successive days. During the first Site visit for leachate pumping in August 2010, it was observed that the PLCS and SLCS valves were permanently in the open position with the discharge hose no longer connected to the PLCS valve. CRA determined in-flow rates by pumping down each valve chamber, measuring the change in head over a fixed period of time, then calculating in-flow. It was also noted that leachate elevations in the PLCS and SLCS for two consecutive Site visits were less than 0.3 metres below the top of the valve chambers.

A review of the current and historical leachate pumping volumes from the PLCS and SLCS valve chambers demonstrates that pumped leachate volumes have decreased since the installation of the groundwater drainage system. A comparison of the average pumped leachate volumes from the PLCS prior to and following installation of the groundwater drainage system shows a decrease of approximately 50 percent. In addition, a comparison of the average pumped leachate volumes from the SLCS prior to and following installation of the groundwater drainage system shows a decrease of approximately 65 percent. Consequently, it appears the groundwater drainage system has contributed to the reduction of volumes of pumped leachate from the PCLS and SCLS; however, significant volumes of leachate are still present within the two liners that require pumping on a regular basis.

7.1.4 LANDFILL COVER

Landfill cover inspections were conducted on July 16, 2010 and December 13, 2010, which indicated that minor maintenance is required. The only issue of concern related to maintenance is the cutting of vegetation, typically alders, which have reached 1.5 metres in height, considerably more than the OMM recommended height restriction of 0.3 metres.

Upon reviewing the results of the elevation control survey, it was noted the elevation control points decreased in elevation by an average of 40 millimetres between August and December 2010. The elevation control points were installed in August 2010 and may have settled slightly due to their recent installation; therefore, additional measurement data of the elevation control points is required over a longer period of time to determine if landfill cover settlement is occurring.

7.1.5 GROUNDWATER DRAINAGE SYSTEM

Four groundwater drainage system clean-outs were previously installed as part of the original system construction; however, only one (CO1) was still visible for inspection. The four existing clean-outs were modified with PVC fittings that terminated near grade using 100 mm diameter pipe, which were then completed with standard aluminum flush-mount covers.

Water was not observed discharging from the drainage system into the swale on the west side of the gravel service road during the July 2010 Site visit. An impromptu inspection of the groundwater drainage system on September 25, 2010 confirmed that

water was flowing from the discharge on the west side of the gravel service road. The observed water discharge in September 2010 was likely a result of a recent and very high precipitation event (Hurricane Igor) compared to limited precipitation in the weeks prior to the July 2010 Site visit.

Debris or blockages were not present in any of the clean-outs during both Site visits and combined with water flowing from the downgradient discharge, it was determined the groundwater drainage system was functioning properly and cleaning was not required.

7.2 RECOMMENDATIONS

Based on the findings of the 2010/11 monitoring and maintenance program along with data from previous monitoring programs, the following recommendations are offered for consideration by DOEC:

Monitoring and Maintenance Schedule: In accordance with the OMM, CRA recommend that groundwater, surface water, and leachate sampling be conducted using the Tier I schedule (once per year) since leachate elevations were measured at less than 0.3 metres below the top of the valve chambers for the PLCS and SLCS for two consecutive Site visits in 2010. In addition, the continued maintenance and inspection program for the landfill cover and groundwater drainage system clean-outs should be scheduled to coincide with the sampling program.

Installation of Additional Monitor Wells: CRA recommend the installation of three additional monitor wells north and northeast of the secure landfill to confirm groundwater depths with proposed well placements between CO1 and CO2, between CO2 and CO3, and between CO3 and CO4. Information acquired from groundwater levels in these key areas will determine whether or not the groundwater drainage system was installed at the appropriate depth and if groundwater is infiltrating the secondary leachate containment system liner in the northeastern area of the landfill.

Surface Water: CRA recommend that collection of an additional downgradient surface water sample be revised to a location near the landfill gated entrance to minimize potential impacts from nearby vehicular traffic and/or culvert. In addition and whenever possible, CRA also recommend that leachate sampling events be co-ordinated with measurable precipitation in the preceding days to avoid a situation where the sample location is dry (which is a common issue during the summer months).

Identify Potential Infiltration Sources: Although pumped leachate volumes have dramatically diminished from the PLCS, significant leachate volumes are still being pumped from the SLCS; this contradicts the OMM, which anticipated that SLCS volumes would also diminish quite dramatically. Therefore, further evaluation of groundwater elevations upgradient from the landfill is key in identifying the potential source of high SLCS infiltration. As noted above, CRA recommend the installation of three monitor wells upgradient from landfill.

Vegetation Control: CRA recommend that all vegetation on the landfill cover that measures over 0.3 metres in height should be cut down. This work can be completed in conjunction with vegetation control in the monitor well locations outside the fenced area of the landfill.

In addition, it was noted that access to two monitor wells (MW93-1 and MW93-1A) was somewhat difficult due to the excessive vegetative growth in the area with alders reaching heights of 1.8 metres. CRA recommend that alders be cut down in this location to better facilitate future field programs (i.e. the transport of field equipment such as water level meters, coolers, sample jars, etc.).

8.0 REFERENCES

Report entitled "*Annual Summary Report, 2009/2010 Environmental Monitoring and Maintenance Program, Come By Chance Secure Landfill, Come By Chance, Newfoundland*" prepared by Pinchin Leblanc Environmental Limited for Newfoundland and Labrador Department of Environment and Conservation, dated May 2010

Report entitled "*Operations, Maintenance and Monitoring Manual, Come By Chance Secure Landfill, Come By Chance, Newfoundland*" prepared by Pinchin Leblanc Environmental Limited for Newfoundland and Labrador Department of Environment and Conservation, dated May 2010

Report entitled "*Come By Chance Secure Landfill Groundwater Drainage System*" prepared by AMEC Earth and Environmental for Newfoundland and Labrador Department of Environment and Conservation, dated March 2009

9.0 CLOSURE

All of Which is Respectfully Submitted,

CONESTOGA-ROVERS & ASSOCIATES

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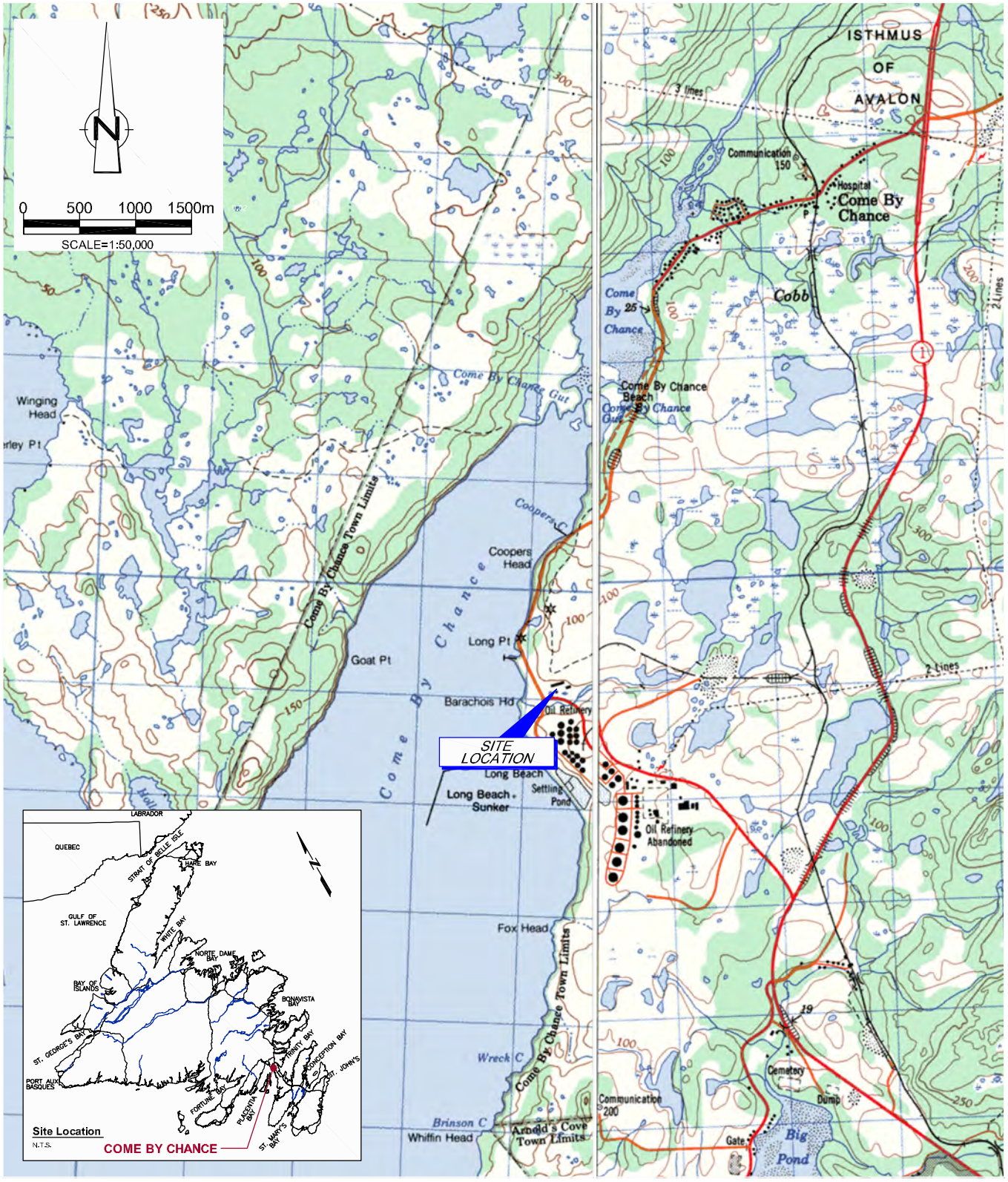

figure 1

SITE LOCATION MAP
2010/11 MONITORING AND MAINTENANCE PROGRAM
DEPT. OF ENVIRONMENT AND CONSERVATION
Come By Chance Secure Landfill, Come By Chance, NL

056680 GN-NL001

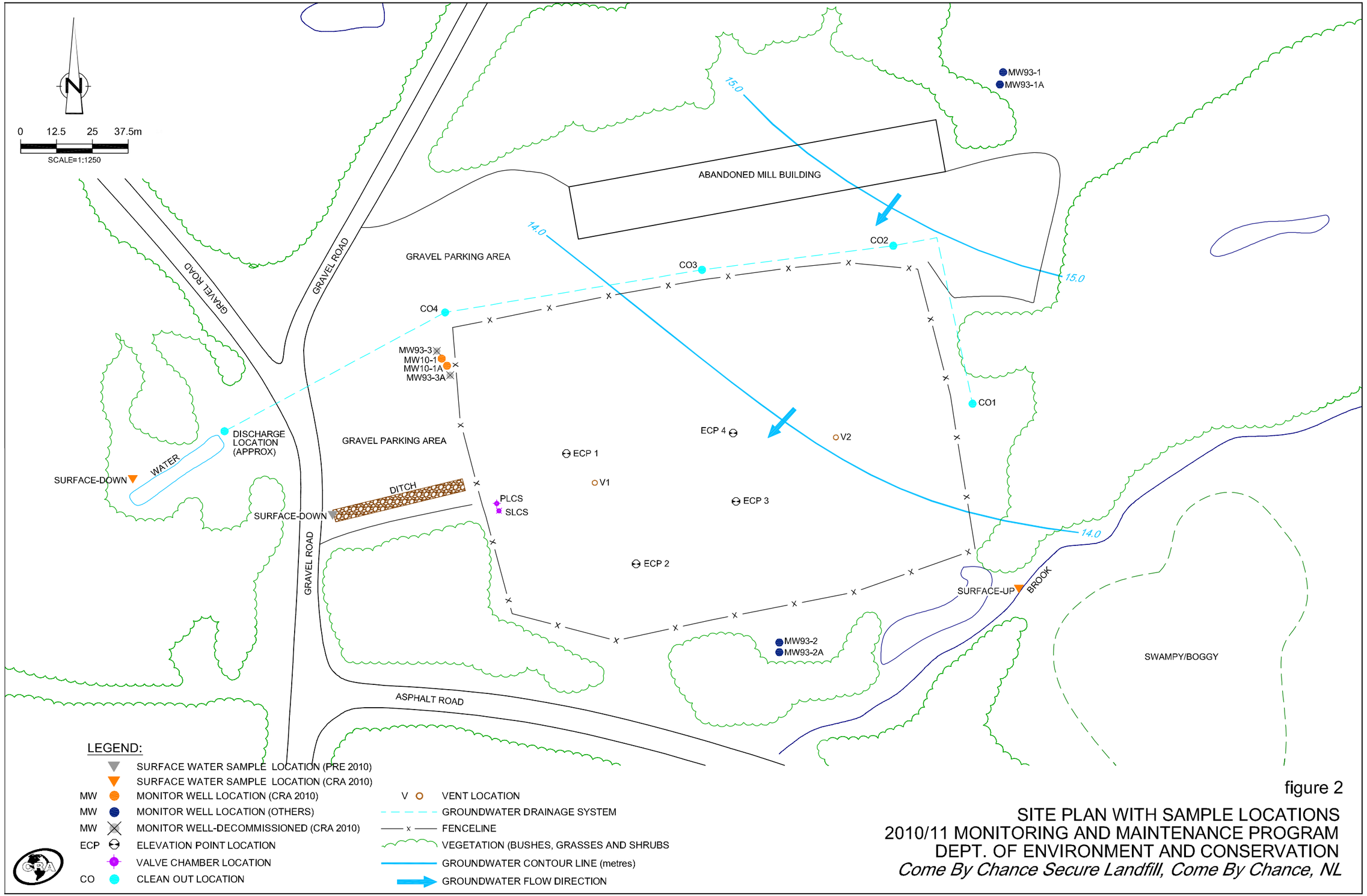

figure 2

SITE PLAN WITH SAMPLE LOCATIONS
2010/11 MONITORING AND MAINTENANCE PROGRAM
DEPT. OF ENVIRONMENT AND CONSERVATION
Come By Chance Secure Landfill, Come By Chance, NL

056680 GN-NL002

TABLE 1

GPS CO-ORDINATES OF KEY SITE FEATURES
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

ID	NORTHING	EASTING
	(m)	(m)
PLCS	5299282.569	724372.496
SLCS	5299280.034	724373.295
MW 93-1	5299421.760	724546.360
MW 93-1A	5299422.020	724548.440
MW 93-2	5299235.085	724470.927
MW 93-2A	5299232.673	724472.066
MW 10-1	5299332.811	724352.601
MW 10-1A	5299330.374	724354.471
SURFACE UP	5299241.840	724543.520
SURFACE DOWN	5299275.880	724268.370
ECP 1	5299300.345	724396.495
ECP 2	5299262.242	724421.331
ECP 3	5299284.519	724455.814
ECP 4	5299308.292	724454.469
CLEAN-OUT 1	5299162.490	724361.549
CLEAN-OUT2	5299172.051	724428.014
CLEAN-OUT 3	5299117.496	724456.616
CLEAN-OUT 4	5299348.991	724353.634
VENT 1	5299290.775	724406.665
VENT 2	5299307.780	724490.445

Notes:

All points recorded using Universal Transverse Mercator Zone 21 as coordinate system

PLCS = Primary Leachate Collection System Valve Chamber
SLCS = Secondary Leachate Collection System Valve Chamber
MW = Monitoring Well
ECP = Elevation Control Point

TABLE 2

STATIC WATER LEVELS
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

MW ID	Ground Surface Elevation	Length of Stick-up	TOC Elevation	Groundwater Depth		Groundwater Elevation	
				Jul 2010	Dec 2010	Jul 2010	Dec 2010
	(masl)	(m)	(masl)	(mbTOC)		(masl)	(masl)
PLCS	15.960	-	15.960	0.55	0.73	15.410	15.230
SLCS	15.955	-	15.955	0.52	0.713	15.435	15.242
MW 93-1	16.300	1.100	17.400	1.703	1.915	15.697	15.485
MW 93-1A	16.310	1.400	17.710	1.638	1.636	16.072	16.074
MW 93-2	14.290	1.100	15.390	2.084	2.147	13.306	13.243
MW 93-2A	14.310	1.100	15.410	1.456	1.375	13.954	14.035
MW 10-1	15.790	0.846	16.636	3.015	3.254	13.621	13.382
MW 10-1A	15.890	0.854	16.744	3.084	3.279	13.660	13.465

Notes:

m = Metres
TOC = Top of Casing
masl = Metres Above Sea Level
mbTOC = Metres Below Top of Casing

TABLE 3

LEACHATE SAMPLING AND PUMPING INFORMATION
PRIMARY LEACHATE COLLECTION SYSTEM
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

PLCS LEACHATE SAMPLING					PLCS PUMPING EVENT				
Date	Weather	Valve Condition	Initial head (mbTOVC)	Analysis Conducted Sample Condition	Date	Weather	Valve Condition	Final Flow Rate (L/min)	Pumping Time (hours)
July 16, 2010	Sunny, +20 °C	Unknown*	0.55	BTEX, TPH, Gen. Chem., Metals, PAH, VOC, PCB, Toxicity	August 26, 2010	Sunny, +24 °C	Open, flowing freely, hose disconnected	13.3	2
					August 27, 2010	Overcast, misty, +15 °C	Open, flowing freely, hose disconnected	10.5	1
December 13, 2010	Sunny, -3 °C	Unknown*	0.71	BTEX, TPH, Gen. Chem., Metals, PAH, VOC, PCB, Toxicity	January 18, 2011	Sunny, -5 °C	Open, flowing freely, hose disconnected	13.3	2
					January 19, 2011	Overcast, +2 °C	Open, flowing freely, hose disconnected	10.0	1

Notes:

Always maintain samples at 4°C
Plan to deliver samples to analytical laboratory within 3 days of sampling
mbTOVC - Metres from water level to top of valve chamber
*PLCS valve chamber completely filled with leachate; therefore, unable to inspect valve
Elevation of Top of PLCS Valve Chamber = 15.960 m

Containers Required For Analysis

BTEX:	3 x 40 mL amber glass vials (filled, with no headspace)
TPH:	2 x 250 mL amber glass
Gen Chem:	1 x 1 L plastic
PAHs:	2 x 250 mL amber glass
VOCs:	3 x 40 mL amber glass vials (filled, with no headspace)
PCBs:	2 x 250 mL glass
Metals:	1 x 50 mL plastic tube or 1 x 250 mL plastic
Toxicity:	2 x 20 L plastic food grade

TABLE 4

LEACHATE SAMPLING AND PUMPING INFORMATION
SECONDARY LEACHATE COLLECTION SYSTEM
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

SLCS LEACHATE SAMPLING					SLCS PUMPING EVENT				
Date	**Weather**	**Valve Condition**	**Initial head (mbTOVC)**	**Analysis Conducted Sample Condition**	**Date**	**Weather**	**Valve Condition**	**Final Flow Rate (L/min)**	**Pumping Time (hours)**
July 16, 2010	Sunny, +20 °C	Unknown*	0.52	BTEX, TPH, Gen. Chem., Metals, PAH, VOC, PCB, Toxicity	August 26, 2010	Sunny, +24 °C	Open, flowing freely, hose connected	70.14	6
					August 27, 2010	Overcast, misty, +15 °C	Open, flowing freely, hose connected	11.4	3
December 13, 2010	Sunny, -3 °C	Unknown*	0.71	BTEX, TPH, Gen. Chem., Metals, PAH, VOC, PCB, Toxicity	January 18, 2011	Sunny, -5 °C	Open, flowing freely, hose connected	14.7	5
					January 19, 2011	Overcast, misty, +15 °C	Open, flowing freely, hose connected	14.5	2

Notes:

Always maintain samples at 4°C
Plan to deliver samples to analytical laboratory within 3 days of sampling
mbTOVC - Metres from water level to top of manhole
*SLCS valve chamber completely filled with leachate; therefore, unable to inspect valve
Elevation of Top of SLCS Valve Chamber = 15.96 m

Containers Required For Analysis

BTEX:	3 x 40 mL amber glass vials (filled, with no headspace)
TPH:	2 x 250 mL amber glass
Gen Chem:	1 x 1 L plastic
PAHs:	2 x 250 mL amber glass
VOCs:	3 x 40 mL amber glass vials (filled, with no headspace)
PCBs:	2 x 250 mL glass
Metals:	1 x 50 mL plastic tube or 1 x 250 mL plastic
Toxicity:	2 x 20 L plastic food grade

TABLE 5

LANDFILL CAP INSPECTION FORM
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Date	Weather	Landfill Cap Inspection					Elevational Survey Control Points			
		Vegetative Height (metres)	Vent Condition	Evidence of Erosion / Animal Burrows	Condition of Slopes	Condition of Lateral Drains	Point 1	Point 2	Point 3	Point 4
July 16, 2010	Sunny, +20 °C	0 - 1.5 m	No damage, not obstructed	None	No erosion, damage noted	Dry, occasional puddles, grassy	20.439	20.442	20.935	21.212
December 13, 2010	Sunny, 3 °C	0 - 1.5 m	No damage, not obstructed	None	No erosion or damage noted	Dry, occasional puddles, grassy	20.390	20.407	20.898	21.164

Notes: Elevations measured using an assumed benchmark of 15.960 m at top of PLCS valve chamber

TABLE 6

GROUNDWATER ANALYTICAL DATA - BTEX/mTPH (mg/L)
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Sample Location	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	Total Petroleum Hydrocarbons (TPH)				
						TPuH C_6-C_{10}	TExH C_{10}-C_{21}	TExH C_{21}-C_{32}	Modified TPH	Comments
MW 93-1	16-Jul-10	<	<	<	<	<	<	<	<	-
MW 93-1A	16-Jul-10	<	<	<	<	<	<	<	<	-
MW 93-1	13-Dec-10	<	<	<	<	<	<	<	<	-
MW 93-1A	13-Dec-10	<	<	<	<	<	<	<	<	-
MW 93-2	16-Jul-10	<	<	<	<	<	<	<	<	-
MW 93-2 Lab Dup	16-Jul-10	-	-	-	-	-	<	<	-	-
MW 93-2A	16-Jul-10	<	<	<	<	<	<	<	<	-
MW 93-2	13-Dec-10	<	<	<	<	<	<	<	<	-
MW 93-2 Lab Dup	13-Dec-10	-	-	-	-	-	<	<	-	-
MW 93-2A	13-Dec-10	<	<	<	<	<	<	<	<	-
MW 93-3	16-Jul-10	<	<	<	<	<	<	<	<	-
MW 93-3A	16-Jul-10	<	<	<	<	<	<	<	<	-
MW 10-1	13-Dec-10	<	<	<	<	<	<	<	<	-
MW 10-1A	13-Dec-10	<	<	<	<	<	<	<	<	-
DUP-01	16-Jul-10	<	<	<	<	<	<	<	<	-
DUP-02	13-Dec-10	<	<	<	<	<	<	<	<	-
RDL		0.001	0.001	0.001	0.002	0.01	0.05	0.1	0.1	-
Atlantic RBCA Tier I RBSLs*		**6.9**	**20**	**20**	**20**	**na**	**na**	**na**	**20**	**Gasoline**
									20	**Diesel / #2 Fuel Oil**
									20	**# 6 Oil**

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
* Atlantic Risk-Based Corrective Action (RBCA) Tier I Risk-Based Screening Level (RBSL) Table values {commercial/non-potable/coarse grained soil}.

RDL = Reportable Detection Limit
< = Parameter below detection limit
- = Not analysed
0.0 = above criteria

TPuH = Total Purgeable Hydrocarbons
TExH = Total Extractable Hydrocarbons
TPH = Total Petroleum Hydrocarbons
Modified TPH = mTPH = TExH + TPuH
TPH = mTPH + BTEX

G = Gasoline
FO = Fuel Oil
LO = Lube Oil
W = Weathered

TABLE 7

GROUNDWATER ANALYTICAL DATA - PAHs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	MW 93-1		MW 93-1A		MW 93-2		MW 93-2A		MW 10-1		MW 10-1A		DUP-01	DUP-02	RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		
1-Methylnaphthalene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.05	13,000
2-Methylnaphthalene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.05	13,000
Acenaphthene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	1,700
Acenaphthylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	2,000
Acridine	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.05	-
Anthracene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	12
Benzo(a)anthracene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	5
Benzo(a)pyrene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	1.9
Benzo(b)fluoranthene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	7
Benzo(g,h,i)perylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	0.2
Benzo(k)fluoranthene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	0.4
Chrysene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	3
Dibenz(a,h)anthracene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	0.25
Fluoranthene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	130
Fluorene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	290
Indeno(1,2,3-cd)pyrene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	0.27
Naphthalene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.20	5,900
Perylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	0.04	0.01	-
Phenanthrene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	63
Pyrene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.01	40
Quinoline	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.05	-

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", March 9, 2004, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit
DUP-01 = Field Duplicate of MW 10-1, First Sampling Event

TABLE 8

GROUNDWATER ANALYTICAL DATA - PCBs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	MW 93-1		MW 93-1A		MW 93-2		MW 93-2A		MW 10-1		MW 10-1A		DUP-01	DUP-02	RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		
Total PCBs	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.05	0.2

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standrads for Use Under Part XV.1 of the Environmental Protection Act", March 9, 2004, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
< = Parameter below detection limit
DUP-01 = Field Duplicate of MW 10-1, First Sampling Event

TABLE 9

GROUNDWATER ANALYTICAL DATA - VOCs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	MW 93-1		MW 93-1A		MW 93-2		MW 93-2A		MW 10-1		MW 10-1A		DUP-01	DUP-02	RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		
Benzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	1,900
Bromodichloromethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	50,000
Bromoform	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	840
Bromomethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	3.00	3.7
Carbon Tetrachloride	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	17
Chlorobenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	500
Chloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	8.00	-
Chloroform	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	430
Chloromethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	8.00	-
Dibromochloromethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	50,000
1,2-Dichlorobenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.50	7,600
1,3-Dichlorobenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	7,600
1,4-Dichlorobenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	7,600
1,1-Dichloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.00	9,000
1,2-Dichloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	17
1,1-Dichloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.50	0.66
cis-1,2-Dichloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.00	70
trans-1,2-Dichloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.00	100
1,2-Dichloropropane	ug/L	<	<	<	<	<	<	<	<	<	<	<	2.00	<	4.00	1.00	9.3
cis-1,3-Dichloropropene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.00	3.8
trans-1,3-Dichloropropene	ug/L	<	<	<	<	<	<	<	<	<	<	<	1.00	<	1.00	1.00	3.8
Ethylbenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	28,000
Methylene Chloride(Dichloromethane)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	3.00	50,000
o-Xylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	5,600
p+m-Xylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.00	5,600
Styrene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	940
Tetrachloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	5
1,1,2,2-Tetrachloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	22
Toluene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	5,900
Trichloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	50
1,1,1-Trichloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	200
1,1,2-Trichloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	16,000
Trichlorofluoromethane (FREON 11)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	8.00	-
Vinyl Chloride	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.50	0.5

Notes:
Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standrads for Use Under Part XV.1 of the Environmental Protection Act", March 9, 2004, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
-= Not analysed/No criteria
< = Parameter below detection limit
DUP-01 = Field Duplicate of MW 10-1, First Sampling Event

TABLE 10

GROUNDWATER ANALYTICAL DATA - GENERAL CHEMISTRY
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	MW 93-1		MW 93-1A		MW 93-2		MW 93-2A	MW 93-2A Lab-Dup	MW 93-2A	MW 10-1		MW 10-1A		DUP-01	DUP-02	RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		
Anion Sum	me/L	5.87	5.52	7.33	7.46	6.30	6.58	6.43	-	1.31	3.87	2.63	3.86	3.08	3.89	2.70	N/A	-
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	229.0	210.0	293.0	297.0	205.0	219.0	212.0	-	14.0	94.0	92.0	94.0	114.0	96.0	95.0	1.00	-
Calculated TDS	mg/L	313.0	313.0	390.0	401.0	346.0	368.0	351.0	-	87.0	215.0	147.0	215.0	171.0	217.0	149.0	1.00	-
Carb. Alkalinity (calc. as CaCO3)	mg/L	3.00	2.00	3.00	2.00	1.00	1.00	1.00	-	<	<	<	<	<	<	<	1.00	-
Cation Sum	me/L	5.62	5.90	7.02	7.19	5.66	6.19	5.70	-	1.15	3.60	2.55	3.61	3.08	3.66	2.57	N/A	-
Hardness (CaCO3)	mg/L	120	120	170	170	240	250	240	-	31	100	110	100	140	100	110	1.00	-
Ion Balance (% Difference)	%	2.18	3.33	2.16	1.84	5.35	3.05	6.02	-	6.50	3.61	1.54	3.35	0.00	3.05	2.47	N/A	-
Langelier Index (@ 20C)	N/A	0.47	0.38	0.62	0.61	0.53	0.54	0.48	-	-3.48	-0.23	-0.79	-0.36	-0.18	-0.31	-0.68	N/A	-
Langelier Index (@ 4C)	N/A	0.22	0.13	0.37	0.36	0.28	0.29	0.24	-	-3.73	-0.48	-1.05	-0.61	-0.43	-0.56	-0.93	N/A	-
Nitrate (N)	mg/L	<	<0.05	<	<0.05	<	<0.05	<	-	0.15	<	0.24	<	0.26	<	0.25	0.05	-
Saturation pH (@ 20C)	N/A	7.64	7.64	7.37	7.32	7.28	7.20	7.27	-	9.25	7.93	7.79	7.92	7.64	7.91	7.77	N/A	-
Saturation pH (@ 4C)	N/A	7.89	7.89	7.62	7.57	7.53	7.45	7.52	-	9.50	8.18	8.05	8.17	7.89	8.16	8.02	N/A	-
Total Alkalinity (Total as CaCO3)	mg/L	230	210	300	300	210	220	210	-	14	95	92	95	110	96	96	30	-
Carbonaceous BOD	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.00	-
Dissolved Chloride (Cl)	mg/L	19	15	11	11	23	21	23	-	14	56	12	56	14	56	12	1	-
Colour	TCU	<	<5	<	<5	<	<5	<	-	79.00	10.00	9.00	7.00	5.00	6.00	13.00	5.00	-
Strong Acid Dissoc. Cyanide (CN)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-
Nitrate + Nitrite	mg/L	<	<	<	<	<	<	<	-	<	<	<	<	<	<	<	0.05	-
Nitrite (N)	mg/L	<	<	<	<	<	<	<	-	<	<	<	<	<	<	<	0.01	2.00
Nitrogen (Ammonia Nitrogen)	mg/L	<	<0.05	<	<0.05	<	<0.05	<	-	0.35	0.14	<0.05	0.15	0.09	0.14	<0.05	0.05	-
Total Organic Carbon (C)	mg/L	2.10	0.90	<5 (1)	<5 (1)	1.50	1.30	1.30	-	16.00	8 (1)	33.00	8 (1)	2.30	8 (1)	18.00	0.50	-
Orthophosphate (P)	mg/L	<	<0.01	<	0.04	<	<0.01	<	-	<0.01	<	<0.01	<	<0.01	<	<0.01	0.01	-
pH	pH	8.11	8.02	7.99	7.93	7.81	7.74	7.75	7.83	5.77	7.70	7.00	7.56	7.46	7.60	7.09	N/A	-
Phenols-4AAP	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	26.00
Reactive Silica (SiO2)	mg/L	7.60	7.60	7.10	6.80	18.00	19.00	18.00	-	6.40	7.00	6.20	7.10	7.60	7.00	6.00	0.50	-
Total Suspended Solids (TSS)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
Dissolved Sulphate (SO4)	mg/L	33	42	53	56	74	76	74	-	31	18	21	19	19	19	21	2	-
Sulphide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-			0.02	-
Turbidity	NTU	61.0	34.0	300.0	470.0	5.4	13.0	3.2	-	100.0	640.0	>1000	520.0	110.0	570.0	540.0	0.1	-
Conductivity	uS/cm	520	500	630	640	570	580	570	570	140	380	250	380	300	380	260	1	-
Total Oil & Grease	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.

* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standrads for Use Under Part XV.1 of the Environmental Protection Act", March 9, 2004, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit
DUP-01 = Field Duplicate of MW 10-1, First Sampling Event
DUP-02 = Field Duplicate of MW 10-1, Second Sampling Event
(1) = Elevated detection limit due to matrix interference

TABLE 11

GROUNDWATER ANALYTICAL DATA - METALS
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	MW 93-1		MW 93-1A	MW 93-1A Lab-Dup	MW 93-1A	MW 93-2		MW 93-2A		MW 10-1		MW 10-1A		DUP-01	DUP-02	RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		
Aluminum (Al)	ug/L	37	17	15	15	31	9	<	<	150	200	38	100	11	160	36	5.0	-
Antimony (Sb)	ug/L	<	<	<	<	<	<	<	<	<	1	<	1	<	1	<	1.0	16,000
Arsenic (As)	ug/L	<	<	<	<	<	2	2	2	<	<	<	<	<	<	<	1.0	480
Barium (Ba)	ug/L	88	70	79	75	73	170	160	180	39	100	36	110	62	110	38	1.0	23,000
Beryllium (Be)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.0	53
Bismuth (Bi)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.0	-
Boron (B)	ug/L	100	99	56	56	57	980	1,100	1,000	24	45	9	42	13	38	9	5.0	50,000
Cadmium (Cd)	ug/L	0.02	0.05	0.03	0.03	0.07	0.15	0.10	0.15	3.50	0.03	<	0.02	0.03	0.03	<	0.0	11
Calcium (Ca)	ug/L	26,000	29,000	40,000	39,000	45,000	69,000	80,000	69,000	9,000	31,000	41,000	31,000	48,000	32,000	42,000	100	-
Chromium (Cr)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.0	2000/110[(1)]
Cobalt (Co)	ug/L	<	<	0.7	0.8	0.4	<	0.4	<	1.4	2.3	1.4	2.5	3.3	2.4	1.4	0.4	100
Copper (Cu)	ug/L	<	<	2	3	<	<	<	<	<	5	9	4	<	5	9	2.0	23
Iron (Fe)	ug/L	<	<	<	<	<	<	<	<	1,900	120	50	82	<	140	59	50	-
Lead (Pb)	ug/L	<	<	<	<	<	<	<	<	0.8	<	<	<	<	<	<	1	32
Magnesium (Mg)	ug/L	14,000	12,000	17,000	17,000	14,000	16,000	13,000	16,000	2,200	5,800	2,300	5,900	3,900	5,900	2,300	100	-
Manganese (Mn)	ug/L	120	81	160	150	57	880	950	890	4,000	390	190	400	380	390	170	2.0	-
Molybdenum (Mo)	ug/L	20	18	15	15	14	<	<	<	<	16	3	14	5	16	3	2.0	7,300
Nickel (Ni)	ug/L	<	<	<	<	<	<	<	<	<	6	6	5	6	6	6	2.0	1,600
Phosphorus (P)	ug/L	<	<	<	<	130	<	150	<	<	<	150	<	<	<	<	100	-
Potassium (K)	ug/L	1,900	2,000	2,500	2,400	2,700	1,200	1,400	1,200	980	6,400	1,100	6,400	1,400	6,400	980	100	-
Selenium (Se)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.0	50
Silver (Ag)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.1	1
Strontium (Sr)	ug/L	230	220	300	290	280	240	230	240	41	98	85	99	100	99	87	2.0	-
Thallium (Tl)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.1	400
Tin (Sn)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.0	-
Titanium (Ti)	ug/L	<	<	<	<	2	<	<	<	2	3	<	2	<	3	<	2.0	-
Uranium (U)	ug/L	0.3	0.2	2.9	2.8	2.8	0.3	0.2	0.3	<	0.4	<	0.4	0.3	0.4	<	0.1	-
Vanadium (V)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.0	200
Zinc (Zn)	ug/L	10	10	<5	12	<5	19	18	17	**1,300**	5	11	5	10	6	11	5.0	1,100

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standrads for Use Under Part XV.1 of the Environmental Protection Act", March 9, 2004, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

RDL = Reportable Detection L **0.0** = above criteria
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit
DUP-01 = Field Duplicate of MW 10-1, First Sampling Event
DUP-02 = Field Duplicate of MW 10-1, Second Sampling Event
(1) Criteria for Total Chromium = 2000 ug/L, Criteria for Chromium (VI) = 110 ug/L

TABLE 12

SURFACE WATER ANALYTICAL DATA - BTEX/mTPH (mg/L)
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Sample Location	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	Total Petroleum Hydrocarbons (TPH)				
						TPuH C_6-C_{10}	TExH C_{10}-C_{21}	TExH C_{21}-C_{32}	Modified TPH	Comments
SURFACE UP	16-Jul-10	<	<	<	<	<	<	<	<	-
SURFACE UP	13-Dec-10	<	<	<	<	<	<	<	<	-
SURACE DOWN	16-Jul-10	<	<	<	<	<	<	<	<	-
SURACE DOWN	13-Dec-10	<	<	<	<	<	<	<	<	-
RDL		0.001	0.001	0.001	0.002	0.01	0.05	0.1	0.1	-
2007 CCME Freshwater Aquatic Life Guidelines [1]		**4.00**	**2.00**	**0.39**	**-**	**-**	**-**	**-**	**-**	**Gasoline**
									-	**Diesel /#2 Fuel Oil**
									-	**#6 Oil**
1997 BC Guidelines for Protection of Aquatic Life [2]		**-**	**-**	**-**	**-**	**1.5**	**0.5**	**-**	**-**	**-**
									-	**-**
									-	**-**

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
1. 2007 CCME Freshwater Aquatic Life Guidelines
2. BC Ministry of Water, Land and Air Protection Guidelines for Protection of Aquatic Life

RDL = Reportable Detection Limit
< = Parameter below detection limit
- = Not analysed
DUP = Laboratory duplicate
0.0 = above criteria

TPuH = Total Purgeable Hydrocarbons
TExH = Total Extractable Hydrocarbons
TPH = Total Petroleum Hydrocarbons
Modified TPH = mTPH = TExH + TPuH
TPH = mTPH + BTEX

G = Gasoline
FO = Fuel Oil
LO = Lube Oil
W = Weathered

TABLE 13

SURFACE WATER ANALYTICAL DATA - PAHs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	SURFACE UP		SURFACE DOWN		RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		
1-Methylnaphthalene	ug/L	<	<	<	<	0.05	-
2-Methylnaphthalene	ug/L	<	<	<	<	0.05	-
Acenaphthene	ug/L	<	<	<	<	0.01	5.8
Acenaphthylene	ug/L	<	<	<	<	0.01	-
Acridine	ug/L	<	<	<	<	0.05	4.4
Anthracene	ug/L	<	<	<	<	0.01	0.012
Benzo(a)anthracene	ug/L	<	<	<	<	0.01	0.018
Benzo(a)pyrene	ug/L	<	<	<	<	0.01	0.015
Benzo(b)fluoranthene	ug/L	<	<	<	<	0.01	-
Benzo(g,h,i)perylene	ug/L	<	<	<	<	0.01	-
Benzo(k)fluoranthene	ug/L	<	<	<	<	0.01	-
Chrysene	ug/L	<	<	<	<	0.01	-
Dibenz(a,h)anthracene	ug/L	<	<	<	<	0.01	-
Fluoranthene	ug/L	<	<	<	<	0.01	0.04
Fluorene	ug/L	<	<	<	<	0.01	3.0
Indeno(1,2,3-cd)pyrene	ug/L	<	<	<	<	0.01	-
Naphthalene	ug/L	<	<	<	<	0.2	1.1
Perylene	ug/L	0.01	<	<	<	0.01	-
Phenanthrene	ug/L	<	<	<	<	0.01	0.4
Pyrene	ug/L	<	<	<	<	0.01	0.025
Quinoline	ug/L	<	<	<	<	0.05	3.4

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
* Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

RDL = Reportable Detection Limit
0.0 = above criteria
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit

TABLE 14

SURFACE WATER ANALYTICAL DATA - TOTAL PCBs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	SURFACE UP		SURFACE DOWN		RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		
Total PCBs	ug/L	<	<	<	<	0.05	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
* Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

RDL = Reportable Detection Limit
SW = Surface Water Sample
< = Parameter below detection limit

0.0 = above criteria

TABLE 15

SURFACE WATER ANALYTICAL DATA - VOCs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	SURFACE UP		SURFACE DOWN		RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		
Benzene	ug/L	<	<	<	<	1	370
Bromodichloromethane	ug/L	<	<	<	<	1	-
Bromoform	ug/L	<	<	<	<	1	-
Bromomethane	ug/L	<	<	<	<	3	-
Carbon Tetrachloride	ug/L	<	<	<	<	1	13.3
Chlorobenzene	ug/L	<	<	<	<	1	1.3
Chloroethane	ug/L	<	<	<	<	8	-
Chloroform	ug/L	<	<	<	<	1	1.8
Chloromethane	ug/L	<	<	<	<	8	-
Dibromochloromethane	ug/L	<	<	<	<	1	-
1,2-Dichlorobenzene	ug/L	<	<	<	<	0.5	0.7
1,3-Dichlorobenzene	ug/L	<	<	<	<	1	150
1,4-Dichlorobenzene	ug/L	<	<	<	<	1	26
1,1-Dichloroethane	ug/L	<	<	<	<	2	-
1,2-Dichloroethane	ug/L	<	<	<	<	1	100
1,1-Dichloroethylene	ug/L	<	<	<	<	0.5	-
cis-1,2-Dichloroethylene	ug/L	<	<	<	<	2	-
trans-1,2-Dichloroethylene	ug/L	<	<	<	<	2	-
1,2-Dichloropropane	ug/L	<	<	<	<	1	-
cis-1,3-Dichloropropene	ug/L	<	<	<	<	2	-
trans-1,3-Dichloropropene	ug/L	<	<	<	<	1	-
Ethylbenzene	ug/L	<	<	<	<	1	90
Methylene Chloride(Dichloromethane)	ug/L	<	<	<	<	3	98.1
o-Xylene	ug/L	<	<	<	<	1	-
p+m-Xylene	ug/L	<	<	<	<	2	-
Styrene	ug/L	<	<	<	<	1	300
Tetrachloroethylene	ug/L	<	<	<	<	1	72
1,1,2,2-Tetrachloroethane	ug/L	<	<	<	<	1	-
Toluene	ug/L	<	<	<	<	1	111
Trichloroethylene	ug/L	<	<	<	<	1	2.0
1,1,1-Trichloroethane	ug/L	<	<	<	<	1	-
1,1,2-Trichloroethane	ug/L	<	<	<	<	1	-
Trichlorofluoromethane (FREON 11)	ug/L	<	<	<	<	8	21
Vinyl Chloride	ug/L	<	<	<	<	0.5	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.

* Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

RDL = Reportable Detection Limit **0.0** = above criteria

SW = Surface Water Sample

-= Not analysed/No criteria

< = Parameter below detection limit

SURFACE WATER ANALYTICAL DATA - GENERAL CHEMISTRY
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	SURFACE UP		SURFACE UP- Lab Dup	SURFACE DOWN	SURFACE DOWN - Lab Dup	SURFACE DOWN	RDL	Criteria*
		16-Jul-10	13-Dec-10	13-Dec-10	16-Jul-10	16-Jul-10	13-Dec-10		
Anion Sum	me/L	1.14	0.34	-	2.69	-	1.53	N/A	-
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	38	6	-	117	-	12	1	-
Calculated TDS	mg/L	62	23	-	140	-	122	1	-
Carb. Alkalinity (calc. as CaCO3)	mg/L	<	<	-	<	-	<	1	-
Cation Sum	me/L	1.05	0.43	-	2.54	-	2.4	N/A	-
Hardness (CaCO3)	mg/L	41	10	-	110	-	70	1	-
Ion Balance (% Difference)	%	4.11	11.7	-	2.87	-	22.1	N/A	-
Langelier Index (@ 20C)	N/A	-1.36	-3.49	-	-0.099	-	-2.64	N/A	-
Langelier Index (@ 4C)	N/A	-1.61	-3.74	-	-0.35	-	-2.89	N/A	-
Nitrate (N)	mg/L	0.17	<	-	<	-	2	0.05	13
Saturation pH (@ 20C)	N/A	8.62	10.1	-	7.69	-	9.01	N/A	-
Saturation pH (@ 4C)	N/A	8.87	10.3	-	7.94	-	9.26	N/A	-
Total Alkalinity (Total as CaCO3)	mg/L	39	39	-	120	-	120	30	-
Carbonaceous BOD	mg/L	-	-	-	-	-	-	5	-
Dissolved Chloride (Cl)	mg/L	5	6	-	1	-	23	1	-
Colour	TCU	38	49	-	39	-	120	5	-
Strong Acid Dissoc. Cyanide (CN)	mg/L	-	-	-	-	-	-	0.002	-
Nitrate + Nitrite	mg/L	0.17	<	-	<	-	2	0.05	-
Nitrite (N)	mg/L	<	<	-	<	-	<	0.01	0.06
Nitrogen (Ammonia Nitrogen)	mg/L	<	<	-	0.19	-	0.06	0.05	-
Total Organic Carbon (C)	mg/L	6	6.4	-	5.4	-	18	0.5	-
Orthophosphate (P)	mg/L	<	<	-	<	-	<	0.01	-
pH	pH	7.26	6.58	-	7.59	-	6.37	N/A	6.5 - 9
Phenols-4AAP	mg/L	-	-	-	-	-	-	0.001	-
Reactive Silica (SiO2)	mg/L	1.5	1.5	-	3.1	-	7.4	0.5	-
Total Suspended Solids (TSS)	mg/L	-	-	-	-	-	-	2	-
Dissolved Sulphate (SO4)	mg/L	11	3	-	15	-	24	2	-
Sulphide	mg/L	-	-	-	-	-	-	0.02	-
Turbidity	NTU	3.8	2.2	2.1	39	37	140	0.1	-
Conductivity	uS/cm	110	43	-	240	-	170	1	-
Total Oil & Grease	mg/L	-	-	-	-	-	-	5	-

Notes:
Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
* Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
-= Not analysed/No criteria
< = Parameter below detection limit

TABLE 17

SURFACE WATER ANALYTICAL DATA - TOTAL METALS
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	SURFACE UP		SURFACE DOWN		RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		
Aluminum (Al)	ug/L	**108**	**257**	**527**	**5,210**	5.0	100(1)
Antimony (Sb)	ug/L	<	<	<	<	1.0	-
Arsenic (As)	ug/L	<	<	1.1	3.3	1.0	5.0
Barium (Ba)	ug/L	22.3	9.4	102.0	289.0	1.0	-
Beryllium (Be)	ug/L	<	<	<	<	1.0	-
Bismuth (Bi)	ug/L	<	<	<	<	2.0	-
Boron (B)	ug/L	9.4	6.9	27.1	9.0	5.0	-
Cadmium (Cd)	ug/L	**0.03**	**0.04**	**0.04**	**0.23**	0.02	0.015/0.036(2)
Calcium (Ca)	ug/L	12,900	2,960	40,100	18,300	100	-
Chromium (Cr)	ug/L	<	<	<	8.0	1.0	8.9/1.0(3)
Cobalt (Co)	ug/L	<	<	0.9	6.7	0.4	-
Copper (Cu)	ug/L	<	<	**12.7**	**32.9**	2.0	2(4)
Iron (Fe)	ug/L	289	**722**	**1,820**	**10,900**	50	300
Lead (Pb)	ug/L	<	<	1.48	**7.64**	0.50	1, 2(5)
Magnesium (Mg)	ug/L	2,140	713	3,320	5,840	100	-
Manganese (Mn)	ug/L	97.9	142.0	481.0	427.0	2.0	-
Molybdenum (Mo)	ug/L	<	<	<	<	2.0	73.00
Nickel (Ni)	ug/L	<	<	3.0	16.7	2.0	25, 65(6)
Phosphorus (P)	ug/L	<	<	120	852	100	-
Potassium (K)	ug/L	588	295	1,080	4,060	100	-
Selenium (Se)	ug/L	<	<	<	<	1.0	1.0
Silver (Ag)	ug/L	<	<	<	<	0.1	0.1
Sodium (Na)	ug/L	4,720	3,680	4,300	11,500	100	-
Strontium (Sr)	ug/L	40.7	9.7	85.4	49.9	2.0	-
Thallium (Tl)	ug/L	<	<	<	<	0.1	0.8
Tin (Sn)	ug/L	<	<	<	<	2.0	-
Titanium (Ti)	ug/L	2.1	7.9	17.2	148.0	2.0	-
Uranium (U)	ug/L	<	<	0.38	0.38	0.10	-
Vanadium (V)	ug/L	<	<	<	0.3	2.0	-
Zinc (Zn)	ug/L	9.2	10.7	25.2	**103**	5.0	30
Hardness (CaCO3)	mg/L	41.0	10.0	110.0	70.0	1.0	-
pH	pH	7.26	6.58	7.59	6.37	-	6.5 - 9

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
* Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

RDL = Reportable Detection Limit
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit
0.0 = above criteria

(1) Aluminum guideline = 5 ug/L at pH < 6.5
= 100 ug/L at pH ≥ 6.5

(2) Cadmium guideline = $10^{\{0.86[\log(\text{hardness})]-3.2\}}$

(4) Copper guideline = 2 ug/L at [$CaCO_3$] = 0-120 mg/L
= 3 ug/L at [$CaCO_3$] = 120-180 mg
= 4 ug/L at [$CaCO_3$] >180 mg/L

(5) Lead guideline = 1 ug/L at [$CaCO_3$] = 0-60 mg/L
= 2 ug/L at [$CaCO_3$] = 60-120 mg/L
= 4 ug/L at [$CaCO_3$] = 120-180 mg/L
= 7 ug/L at [$CaCO_3$] >180 mg/L

(6) Nickel guideline = 25 ug/L at [$CaCO_3$] = 0-60 mg/L
= 65 ug/L at [$CaCO_3$] = 60-120 mg/
= 110 ug/L at [$CaCO_3$] = 120-180 m
= 150 ug/L at [$CaCO_3$] >180 mg/L

TABLE 18

LEACHATE ANALYTICAL DATA - BTEX/MTPH
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Sample Location	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	Total Petroleum Hydrocarbons (TPH)				
						TPuH C_6-C_{10}	TExH C_{10}-C_{21}	TExH C_{21}-C_{32}	Modified TPH	Comments
PLCS	16-Jul-10	<	<	<	<	<	<	<	<	-
PLCS Lab-Dup	16-Jul-10	-	-	-	-	-	<	<	-	-
PLCS	13-Dec-10	<	<	<	<	<	<	<	<	-
PLCS Lab-Dup	13-Dec-10	<	<	<	<	<	-	-	-	-
SLCS	16-Jul-10	<	<	<	<	<	<	<	<	-
SLCS	13-Dec-10	<	<	<	<	<	0.05	<	<	-
RDL		0.001	0.001	0.001	0.002	0.01	0.05	0.1	0.1	-
Schedule A Water & Sewer Regulations [1]		-	-	-	-	-	-	-	15	-
2007 CCME Freshwater Aquatic Life Guidelines [2]		**4.00**	**2.00**	**0.39**	**-**	**-**	**-**	**-**	**-**	**Gasoline**
									-	**Diesel /#2 Fuel Oil**
									-	**#6 Oil**
1997 BC Guidelines for Protection of Freshwater Aquatic Life [3]		**-**	**-**	**-**	**-**	**1.5**	**0.5**	**-**	**-**	**-**
									-	**-**
									-	**-**

Notes:
Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.

1. Schedule A of Environmental Control Water and Sewer Regulations, 2003.
2. 2007 CCME Freshwater Aquatic Life Guidelines
3. BC Ministry of Water, Land and Air Protection Guidelines for Protection of Aquatic Life

PLCS = Primary Leachate Collection System
SLCS = Secondary Leachate Collection System
RDL = Reportable Detection Limit
< = Parameter below detection limit
- = Not analysed
0.0 = above criteria

TPuH = Total Purgeable Hydrocarbons
TExH = Total Extractable Hydrocarbons
TPH = Total Petroleum Hydrocarbons
Modified TPH = mTPH = TExH + TPuH
TPH = mTPH + BTEX

G = Gasoline
FO = Fuel Oil
LO = Lube Oil
W = Weathered

TABLE 19

LEACHATE ANALYTICAL DATA - PAHs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	PLCS		SLCS		RDL	Criteria	
		16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		NL [1]	CCME [2]
1-Methylnaphthalene	ug/L	<	<	<	<	0.05	-	-
2-Methylnaphthalene	ug/L	<	<	0.22	<	0.05	-	-
Acenaphthene	ug/L	<	<	<	<	0.01	-	5.8
Acenaphthylene	ug/L	<	<	<	<	0.01	-	-
Acridine	ug/L	<	<	<	<	0.05	-	4.4
Anthracene	ug/L	<	**0.04**	<	<	0.01	-	0.012
Benzo(a)anthracene	ug/L	<	<	<	<	0.01	-	0.018
Benzo(a)pyrene	ug/L	<	<	<	<	0.01	-	0.015
Benzo(b)fluoranthene	ug/L	<	<	<	<	0.01	-	-
Benzo(g,h,i)perylene	ug/L	<	<	<	<	0.01	-	-
Benzo(k)fluoranthene	ug/L	<	<	<	<	0.01	-	-
Chrysene	ug/L	<	0.02	<	0.01	0.01	-	-
Dibenz(a,h)anthracene	ug/L	<	<	<	<	0.01	-	-
Fluoranthene	ug/L	<	0.04	0.01	<	0.01	-	0.04
Fluorene	ug/L	<	<	<	<	0.01	-	3.0
Indeno(1,2,3-cd)pyrene	ug/L	<	<	<	<	0.01	-	-
Naphthalene	ug/L	<	<	<	<	0.2	-	1.1
Perylene	ug/L	<	<	<	<	0.01	-	-
Phenanthrene	ug/L	<	**0.07**	0.02	0.01	0.01	-	0.4
Pyrene	ug/L	<	**0.17**	**0.06**	<	0.01	-	0.025
Quinoline	ug/L	<	<	<	<	0.05	-	3.4

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
1. NL Environmental Control Water and Sewer Regulations, 2003, under the Water Resources Act, NL Regulation 65/03.
2. CCME Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

PLCS = Primary Leachate Collection System
SLCS = Secondary Leachate Collection System

RDL = Reportable Detection Limit
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit

0.0 = above NL criteria
0.0 = above CCME criteria for surface water

TABLE 20

LEACHATE ANALYTICAL DATA - TOTAL PCBs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	PLCS		SLCS		RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		
Total PCBs	ug/L	<	<	<	<	0.05	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
* Environmental Control Water and Sewer Regulations, 2003, under the Water Resources Act, Newfoundland and Labrador Regulation 65/03.

PLCS = Primary Leachate Collection System
SLCS = Secondary Leachate Collection System

RDL = Reportable Detection Limit
SW = Surface Water Sample
< = Parameter below detection limit

0.0 = above criteria

LEACHATE ANALYTICAL DATA - VOCs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	PLCS		SLCS		RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		
Benzene	ug/L	<	<	<	<	1	-
Bromodichloromethane	ug/L	<	<	<	<	1	-
Bromoform	ug/L	<	<	<	<	1	-
Bromomethane	ug/L	<	<	<	<	3	-
Carbon Tetrachloride	ug/L	<	<	<	<	1	-
Chlorobenzene	ug/L	<	<	<	<	1	-
Chloroethane	ug/L	<	<	<	<	8	-
Chloroform	ug/L	<	<	<	<	1	-
Chloromethane	ug/L	<	<	<	<	8	-
Dibromochloromethane	ug/L	<	<	<	<	1	-
1,2-Dichlorobenzene	ug/L	<	<	<	<	0.5	-
1,3-Dichlorobenzene	ug/L	<	<	<	<	1	-
1,4-Dichlorobenzene	ug/L	<	<	<	<	1	-
1,1-Dichloroethane	ug/L	<	<	<	<	2	-
1,2-Dichloroethane	ug/L	<	<	<	<	1	-
1,1-Dichloroethylene	ug/L	<	<	<	<	0.5	-
cis-1,2-Dichloroethylene	ug/L	<	<	<	<	2	-
trans-1,2-Dichloroethylene	ug/L	<	<	<	<	2	-
1,2-Dichloropropane	ug/L	<	<	<	<	1	-
cis-1,3-Dichloropropene	ug/L	<	<	<	<	2	-
trans-1,3-Dichloropropene	ug/L	<	<	<	<	1	-
Ethylbenzene	ug/L	<	<	<	<	1	-
Methylene Chloride(Dichloromethane)	ug/L	<	<	<	<	3	-
o-Xylene	ug/L	<	<	<	<	1	-
p+m-Xylene	ug/L	<	<	<	<	2	-
Styrene	ug/L	<	<	<	<	1	-
Tetrachloroethylene	ug/L	<	<	<	<	1	-
1,1,2,2-Tetrachloroethane	ug/L	<	<	<	<	1	-
Toluene	ug/L	<	<	<	<	1	-
Trichloroethylene	ug/L	<	<	<	<	1	-
1,1,1-Trichloroethane	ug/L	<	<	<	<	1	-
1,1,2-Trichloroethane	ug/L	<	<	<	<	1	-
Trichlorofluoromethane (FREON 11)	ug/L	<	<	<	<	8	-
Vinyl Chloride	ug/L	<	<	<	<	0.5	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
* Environmental Control Water and Sewer Regulations, 2003, under the Water Resources Act, Newfoundland and Labrador Regulation 65/03.

PLCS = Primary Leachate Collection System
SLCS = Secondary Leachate Collection System

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
-= Not analysed/No criteria
< = Parameter below detection limit

TABLE 22

LEACHATE ANALYTICAL DATA - GENERAL CHEMISTRY
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	PLCS		SLCS	SLCS - Lab Dup	SLCS	RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	16-Jul-10	13-Dec-10		
Anion Sum	me/L	4.86	10.10	8.68	-	10.90	N/A	-
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	176	400	315	-	420	1	-
Calculated TDS	mg/L	263	546	460	-	574	1	1,000
Carb. Alkalinity (calc. as CaCO3)	mg/L	1	1	1	-	2	1	-
Cation Sum	me/L	4.47	10.10	7.81	-	10.40	N/A	-
Hardness (CaCO3)	mg/L	190	190	320	-	320	1	-
Ion Balance (% Difference)	%	4.18	0.00	5.28	-	2.44	N/A	-
Langelier Index (@ 20C)	N/A	0.42	0.86	0.67	-	0.99	N/A	-
Langelier Index (@ 4C)	N/A	0.17	0.61	0.42	-	0.74	N/A	-
Nitrate (N)	mg/L	0.35	0.28	0.35	-	0.10	0.05	10
Saturation pH (@ 20C)	N/A	7.40	6.74	7.00	-	6.73	N/A	-
Saturation pH (@ 4C)	N/A	7.65	6.98	7.25	-	6.98	N/A	-
Total Alkalinity (Total as CaCO3)	mg/L	180	400	320	-	420	30.00	-
Carbonaceous BOD	mg/L	<	<	<	<	<	5.00	20
Dissolved Chloride (Cl)	mg/L	11	29	32	-	43	1	-
Colour	TCU	15	17	12	-	56	5	-
Strong Acid Dissoc. Cyanide (CN)	mg/L	<	<	<	-	<	0.002	25
Nitrate + Nitrite	mg/L	0.37	0.28	0.37	-	0.10	0.05	-
Nitrite (N)	mg/L	0.03	<	0.02	-	<	0.01	-
Nitrogen (Ammonia Nitrogen)	mg/L	<	0.10	0.12	0.12	0.26	0.05	2
Total Organic Carbon (C)	mg/L	6.4	11.0	12.0	-	13.0	0.5	-
Orthophosphate (P)	mg/L	<	<	<	-	<	0.01	-
pH	pH	7.82	7.59	7.67	-	7.72	N/A	5.5 - 9.0
Phenols-4AAP	mg/L	0.01	0.003	0.003	-	<0.01*	0.001	0.10
Reactive Silica (SiO2)	mg/L	8.40	13.00	14.00	-	14.00	0.5	-
Total Suspended Solids (TSS)	mg/L	11	17	5	-	**33**	2.0	30
Dissolved Sulphate (SO4)	mg/L	47	61	69	-	60	2.0	-
Sulphide	mg/L	<	<	<	-	<	0.02	0.50
Turbidity	NTU	1.6	16.0	6.6	-	17.0	0.1	-
Conductivity	uS/cm	440	840	750	-	900	1	-
Total Oil & Grease	mg/L	<	<	<	-	<	5.00	-
Coliform-Fecal	#/100mL	0	0	0	-	- (1)	-	1,000/100 mL
Coliform-Total	#/100mL	>80	>80	>80	-	- (1)	-	5,000/100 mL

Notes:
Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
Coliform analysis completed by Newfoundland and Labrador Government Services in Grand Falls-Windsor, NL

* Environmental Control Water and Sewer Regulations, 2003, under the Water Resources Act, Newfoundland and Labrador Regulation 65/03.

PLCS = Primary Leachate Collection System
SLCS = Secondary Leachate Collection System

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
-= Not analysed/No criteria
< = Parameter below detection limit

LEACHATE ANALYTICAL DATA - TOTAL METALS
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	PLCS		SLCS		RDL	Criteria*
		16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10		
Aluminum (Al)	ug/L	36.8	<	23.1	<	5	-
Antimony (Sb)	ug/L	<	<	<	<	1	-
Arsenic (As)	ug/L	<	<	<	<	1	500
Barium (Ba)	ug/L	13.3	51	18.9	40	1	5,000
Beryllium (Be)	ug/L	<	<	<	<	1	-
Bismuth (Bi)	ug/L	<	<	<	<	2	-
Boron (B)	ug/L	1,170	2,230	1,970	1,870	5	5,000
Cadmium (Cd)	ug/L	<	<	<	<	0.017	50
Calcium (Ca)	ug/L	58,400	138,000	90,900	135,000	100	-
Total Chromium (Cr)	ug/L	<	<	<	<	1	1,000
Chromium VI	mg/L	<	<	<	<	0.001	0.05
Cobalt (Co)	ug/L	<	<	0.49	<	0.4	-
Copper (Cu)	ug/L	2.50	<	<	<	2	300
Iron (Fe)	ug/L	1,790	3,150	1,320	2,240	50	10,000
Lead (Pb)	ug/L	<	<	<	<	5	200
Magnesium (Mg)	ug/L	10,700	24,300	23,500	27,400	100	-
Manganese (Mn)	ug/L	1,130	6,240	3,270	5,120	2	-
Mercury (Hg)	ug/L	<	<	<	<	0.013	5
Molybdenum (Mo)	ug/L	<	<	<	<	2	-
Nickel (Ni)	ug/L	<	<	<	<	2	500
Phosphorus (P)	ug/L	<	<	<	<	100	0.5
Potassium (K)	ug/L	7,270	6,530	<	7,750	100	-
Selenium (Se)	ug/L	<	<	<	<	1	10
Silver (Ag)	ug/L	<	<	<	<	0.1	50
Sodium (Na)	ug/L	9,880	22,500	21,300	25,500	100	-
Strontium (Sr)	ug/L	156	289	282	324	2	-
Thallium (Tl)	ug/L	<	<	<	<	0.1	-
Tin (Sn)	ug/L	<	<	<	<	2	-
Titanium (Ti)	ug/L	<	<	<	<	2	-
Uranium (U)	ug/L	0.25	<	1.11	1	1	-
Vanadium (V)	ug/L	<	<	<	<	2	-
Zinc (Zn)	ug/L	8.10	<	5.20	<	50	500

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
* Environmental Control Water and Sewer Regulations, 2003, under the Water Resources Act, Newfoundland and Labrador Regulation 65/03.

PLCS = Primary Leachate Collection System
SLCS = Secondary Leachate Collection System

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit

APPENDIX A

SITE PHOTOGRAPHS

Photo 1: View, looking north, of the damaged stick-up monitor wells 93-3 and 93-3A.

Photo 2: View, looking northeast, of the newly installed groundwater monitor wells (MW10-1 and MW10-1A).

Photo 3: View of PLCS valve chamber prior to July 2010 sampling event. Note discharge hose floating in the chamber (upper corner).

Photo 4: View of PLCS valve chamber with discharge hose disconnected.

Photo 5: View, looking west, of the typical vegetative overgrowth along the southern slope of the landfill cover.

Photo 6: View, looking east, of the typical vegetative overgrowth along the northern slope of the landfill cover.

Photo 7: View, looking east, of a typical elevational survey control point installed on the landfill cover.

Photo 8: View, looking southeast, showing Clean-out 2 prior to modifications (typical).

Photo 9: View, looking northeast, showing Clean-out 2 after modifications (typical) with painted flushmount cover.

Photo 10: View, looking northeast, showing groundwater discharge from the groundwater drainage system beyond the service road.

APPENDIX B

MONITOR WELL LOGS

Government of Newfoundland and Labrador
Department of Environment and Conservation

Monitor Well Abandonment Log

Date: September 21, 2010

Project Number: 056680-01

Project Name: Monitor Well Decommissioning

Location: Come By Chance Secured Landfill, NL

Form Completed By: H. Anderson

Sub-Contractor: Logan Geotechnical	Well: **MW93-3**
Date Completed: July 16, 2010	Lithology: Silty Sand and Gravel

MONITOR WELL SPECIFICATIONS

Well Depth:	5.49	(m)
Casing Stick-up:	N/A	(m)
Borehole/Pack Diameter:	50/200	(mm)
Screen Length:	0.50	(m)
Sand Pack Length:	4.99	(m)
Static Water Level:	2.262	(m)

MATERIALS REMOVED

Well Protector: Yes Type: Flushmount Enclosure

Casing: 0.50 (m) Screen: 3.45 (m)

Other:

ABANDONMENT PROCEDURE

Grout Pumping Method: Manual Pour

Grout Type: Enviroplug Medium Bentonite Chips

Volume Grout Used: 0.11 m^3

SUMMARY OF MATERIALS USED

Item	Specifications	Volume Used
Asphalt		
Sand		
Bentonite	Wyo-Ben Enviroplug Medium	0.11 m^3
Cement		

ABANDONED BOREHOLE LOG

Description of Material Emplaced	Strata Plot	Emplaced Material Depth *From:* *To:*
0.000		
Native backfill		From 0.00 to 0.30 mbgs
0.03		
Bentonite Seal (PVC Removed)		From 0.30 to 3.95 mbgs
3.95 mbgs		
Bentonite Seal		From 3.95 to 5.49 mbgs
EOH – 5.49 mbgs		

Government of Newfoundland and Labrador
Department of Environment and Conservation

Monitor Well Abandonment Log

Date: September 21, 2010

Project Number: 056680-01

Project Name: Monitor Well Decommissioning

Location: Come By Chance Secured Landfill, Come By Chance, NL

Form Completed By: H. Anderson

Sub-Contractor: Logan Geotechnical	Well: **MW93-3A**
Date Completed: July 16, 2010	Lithology: Silty Sand and Gravel

MONITOR WELL SPECIFICATIONS

Well Depth:	8.49	(m)
Casing Stick-up:	N/A	(m)
Borehole/Pack Diameter:	50/200	(mm)
Screen Length:	6.00	(m)
Sand Pack Length:	7.49	(m)
Static Water Level:	1.240	(m)

MATERIALS REMOVED

Well Protector: Yes Type: Flushmount Enclosure

Casing: 1.80 (m) Screen: (m)

Other:

ABANDONMENT PROCEDURE

Grout Pumping Method: Manual Pour

Grout Type: Enviroplug Medium Bentonite Chips

Volume Grout Used: 0.26 m^3

SUMMARY OF MATERIALS USED

Item	Specifications	Volume Used
Asphalt		
Sand		
Bentonite	Wyo-Ben Enviroplug Medium	0.26 m^3
Cement		

ABANDONED BOREHOLE LOG

Description of Material Emplaced	Strata Plot	Emplaced Material Depth *From:* *To:*
0.000		
Native backfill		From 0.00 to 0.30 mbgs
0.03		
Bentonite Seal (PVC Removed)		From 0.30 to 1.80 mbgs
1.80 mbgs		
		From 1.80 to 8.49 mbgs
Bentonite Seal		
EOH – 8.49 mbgs		

Client: DOEC
Project No: 056680-01
Civic Address: Secure Landfill Site
City & Province: Come By Chance, NL
PID Number: N/A
UTM Easting: N/A
UTM Northing: N/A
Date Started: July 16, 2010
Date Finished: July 16, 2010

Drilling Contractor: Logan Geotechnical
Drill Type: CME 55
Drill Method: Hollow Stem Auger/Coring
Logged By: H. Anderson
TOC Elevation: 16.636 metres
GL Elevation: 15.790 metres
Final Depth: 8.467 metres
Depth to Water Strike: 2.169 metres
Depth to Bedrock 5.500 metres

CONESTOGA-ROVERS & ASSOCIATES

Monitor Well: MW10-1

Depth (m)	Lithology	USCS Classification	Description	Elevation (mamsl)	Sample ID	Sample Type	N-Value/RQD (%)	Recovery (%)	Headspace (ppm/% LEL)	Analysis	Well Construction	Well Details
				15.8								Casing stick-up protector
0.0			**Silty Sand and Gravel** Brown silty sand and gravel, occasional cobbles and boulders, moist to wet at approximately 2.20 mbgs, odourless.	15.0								Groundwater at approx. 2.169 mbgs
1.0				14.0								
2.0				13.0								
3.0				12.0								"No. 20" slot PVC screen
4.0				11.0								
5.0												
6.0			**Bedrock** Severely fractured grey siltstone bedrock.	10.0	RC1	RC	0	25	NA			Bentonite seal
7.0				9.0								
8.0				8.0	RC2	RC	7	43	NA			"No. 2" silica sand pack
												End point
9.0				7.0								

Client: DOEC
Project No: 056680-01
Civic Address: Secure Landfill Site
City & Province: Come By Chance, NL
PID Number: N/A
UTM Easting: N/A
UTM Northing: N/A
Date Started: July 16, 2010
Date Finished: July 16, 2010

Drilling Contractor: Logan Geotechnical
Drill Type: CME 55
Drill Method: Hollow Stem Auger/Coring
Logged By: H. Anderson
TOC Elevation: 16.744 metres
GL Elevation: 15.890 metres
Final Depth: 5.111 metres
Depth to Water Strike: 2.230 metres
Depth to Bedrock 5.100 metres

CONESTOGA-ROVERS & ASSOCIATES

Monitor Well: MW10-1A

Page: 1 of 1

Depth (m)	Lithology	USCS Classification	Description	Elevation (mamsl)	Sample ID	Sample Type	N-Value/RQD (%)	Recovery (%)	Headspace (ppm/% LEL)	Analysis	Well Construction	Well Details
												Casing stick-up protector
0.0			**Silty Sand and Gravel** Brown silty sand and gravel, occasional cobbles and boulders, moist to wet at approximately 2.30 mbgs, odourless.	16.0								Bentonite seal
1.0				15.0								"No. 20" slot PVC screen
2.0				14.0								Groundwater at approx. 2.230 mbgs
3.0				13.0								
4.0				12.0								"No. 2" silica sand pack
5.0				11.0								End point
6.0				10.0								
7.0				9.0								
8.0				8.0								
9.0				7.0								

APPENDIX C

LABORATORY CERTIFICATES OF ANALYSES

Your Project #: 056680-01
Site: COME BY CHANCE LANDFILL
Your C.O.C. #: N/A

Attention: Dave Mccoll
Conestoga-Rovers and Associates Ltd
Mount Pearl/St. John's
PO Box 8353 Stn A
1118 Topsail Rd
St. John's, NL
A1B 3N7

Report Date: 2011/02/24
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B095073
Received: 2010/07/19, 10:40

Sample Matrix: Water
Samples Received: 11

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
TEH in Water (PIRI)	4	2010/07/20	2010/07/26	ATL SOP 00198 R2	Based on Atl. PIRI
TEH in Water (PIRI)	2	2010/07/20	2010/07/27	ATL SOP 00198 R2	Based on Atl. PIRI
TEH in Water (PIRI)	5	2010/07/21	2010/07/22	ATL SOP 00198 R2	Based on Atl. PIRI
VPH in Water (PIRI)	11	2010/07/21	2010/07/21	ATL SOP 00200 R4	Based on Atl. PIRI
ModTPH (T1) Calc. for Water	5	N/A	2010/07/22		Based on Atl. PIRI
ModTPH (T1) Calc. for Water	6	N/A	2010/07/27		Based on Atl. PIRI

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

ROB WHELAN, Project Manager
Email: RWhelan@maxxam.ca
Phone# (709) 754-0203

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

This document is in electronic format, hard copy is available on request.

Maxxam Job #: B095073
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680-01
Project name: COME BY CHANCE LANDFILL

ATLANTIC RBCA HYDROCARBONS (WATER)

Maxxam ID		GN7331	GN7331	GN7332	GN7333	GN7334	GN7335	GN7336		
Sampling Date		2010/07/16	2010/07/16	2010/07/16	2010/07/16	2010/07/16	2010/07/16	2010/07/16		
Received Temperature (°C)		3.3	3.3	3.3	3.3	3.3	3.3	3.3		
	Units	**Primary Liner**	**Primary Liner Lab-Dup**	**Secondary Liner**	**Surface Up**	**Surface Down**	**MW 93-1**	**MW 93-1A**	**RDL**	**QC Batch**
Petroleum Hydrocarbons										
Benzene	mg/L	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	0.001	2212461
Toluene	mg/L	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	0.001	2212461
Ethylbenzene	mg/L	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	0.001	2212461
Xylene (Total)	mg/L	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2212461
C6 - C10 (less BTEX)	mg/L	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2212461
>C10-C21 Hydrocarbons	mg/L	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	0.05	2211442
>C21-<C32 Hydrocarbons	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	2211442
Modified TPH (Tier1)	mg/L	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	0.1	2210277
Surrogate Recovery (%)										
Isobutylbenzene - Extractable	%	65	91	89	62	102	87	93		2211442
Isobutylbenzene - Volatile	%	90		88	84	88	91	87		2212461
n-Dotriacontane - Extractable	%	30(1)	80	68(2)	8.1(3)	80(4)	74(4)	76(4)		2211442

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Isobutylbenzene/n-Dotriacontane recovery(ies) not within acceptance limits. Analysis repeated with similar results.
(2) - Weathered fuel oil fraction. Isobutylbenzene/n-Dotriacontane recovery(ies) not within acceptance limits due to matrix/co-extractive interference.
(3) - Isobutylbenzene/n-Dotriacontane recovery(ies) not within acceptance limits due to sediment interference.
(4) - TEH sample contained sediment.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax:709-754-8612 www.maxxam.ca

Maxxam Job #: B095073
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680-01
Project name: COME BY CHANCE LANDFILL

ATLANTIC RBCA HYDROCARBONS (WATER)

Maxxam ID		GN7337	GN7337	GN7338	GN7339	GN7340	GN7341		
Sampling Date		2010/07/16	2010/07/16	2010/07/16	2010/07/16	2010/07/16	2010/07/16		
Received Temperature (°C)		3.3	3.3	3.3	3.3	3.3	3.3		
	Units	**MW 93-2**	**MW 93-2 Lab-Dup**	**MW 93-2A**	**MW 10-1**	**MW 10-1A**	**DUP-01**	**RDL**	**QC Batch**
Petroleum Hydrocarbons									
Benzene	mg/L	<0.001		<0.001	<0.001	<0.001	<0.001	0.001	2212461
Toluene	mg/L	<0.001		<0.001	<0.001	<0.001	<0.001	0.001	2212461
Ethylbenzene	mg/L	<0.001		<0.001	<0.001	<0.001	<0.001	0.001	2212461
Xylene (Total)	mg/L	<0.002		<0.002	<0.002	<0.002	<0.002	0.002	2212461
C6 - C10 (less BTEX)	mg/L	<0.01		<0.01	<0.01	<0.01	<0.01	0.01	2212461
>C10-C21 Hydrocarbons	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2212612
>C21-<C32 Hydrocarbons	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	2212612
Modified TPH (Tier1)	mg/L	<0.1		<0.1	<0.1	<0.1	<0.1	0.1	2210277
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	93	97	98	54	60	87		2212612
Isobutylbenzene - Volatile	%	84		88	85	92	89		2212461
n-Dotriacontane - Extractable	%	91	95	97	29(1)	7.8(1)	74(2)		2212612

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Isobutylbenzene/n-Dotriacontane recovery(ies) not within acceptance limits due to sediment interference.
(2) - TEH sample contained sediment.

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Maxxam Job #: B095073
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680-01
Project name: COME BY CHANCE LANDFILL

GENERAL COMMENTS

Revised report due to changes in sample IDs 2011-02-24.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax:709-754-8612 www.maxxam.ca

Maxxam Job #: B095073
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680-01
Project name: COME BY CHANCE LANDFILL

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
2211442	Isobutylbenzene - Extractable	2010/07/21	83	30 - 130	92	30 - 130	92	%		
2211442	n-Dotriacontane - Extractable	2010/07/21	66	30 - 130	99	30 - 130	85	%		
2211442	>C10-C21 Hydrocarbons	2010/07/26	72 (1)	30 - 130	112	30 - 130	<0.05	mg/L	NC (2)	40
2211442	>C21-<C32 Hydrocarbons	2010/07/26	77 (1)	30 - 130	117	30 - 130	<0.1	mg/L	NC (2)	40
2212461	Isobutylbenzene - Volatile	2010/07/22	84	70 - 130	90	70 - 130	100	%		
2212461	Benzene	2010/07/21	105	70 - 130	105	70 - 130	<0.001	mg/L	NC	40
2212461	Toluene	2010/07/21	100	70 - 130	105	70 - 130	<0.001	mg/L	NC	40
2212461	Ethylbenzene	2010/07/21	100	70 - 130	105	70 - 130	<0.001	mg/L	2.1	40
2212461	Xylene (Total)	2010/07/21	103	70 - 130	105	70 - 130	<0.002	mg/L	5.7	40
2212461	C6 - C10 (less BTEX)	2010/07/21					<0.01	mg/L	16.2	40
2212612	Isobutylbenzene - Extractable	2010/07/22	100	30 - 130	98	30 - 130	100	%		
2212612	n-Dotriacontane - Extractable	2010/07/22	111	30 - 130	110	30 - 130	100	%		
2212612	>C10-C21 Hydrocarbons	2010/07/22	111 (3)	30 - 130	112	30 - 130	<0.05	mg/L	NC (4)	40
2212612	>C21-<C32 Hydrocarbons	2010/07/22	113 (3)	30 - 130	116	30 - 130	<0.1	mg/L	NC (4)	40

N/A = Not Applicable
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Matrix Spike Parent ID [GN7332-01]
(2) - Duplicate Parent ID [GN7331-01]
(3) - Matrix Spike Parent ID [GN7338-01]
(4) - Duplicate Parent ID [GN7337-01]

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Validation Signature Page

Maxxam Job #: B095073

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Paula Chaplin

PAULA CHAPLIN, Project Manager

==========

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Maxxam Analytics
200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227
www.maxxamanalytics.com E-mail; Clientservicesbedford@maxxamanalytics.com

MAXXAM Chain of Custody Record

COC#: Page 1 of 2

This column for lab use only:

Client Code: 10275

Maxxam Job#: B095073

Cooler Id	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			2	5	3	

Integrity: YES NO

Integrity/Checklist by:

Labelled by:

Location/Bin#:

INVOICE INFORMATION:

Company Name: Conestoga Rovers and Associates

Contact Name: Dave McColl

Address: 1118 Topsail Rd, PO Box 8353 Stn A

St. John's NL A1B 2N7 (Postal Code)

Email: dmccoll@craworld.com

Ph: 709-364-5353 Fax: 709-364-5368

REPORT INFORMATION (if differs from invoice):

Company Name: SAME

Contact Name:

Address:

Postal Code

Email:

Ph: Fax:

PO#: —

Project #: 056680-01

Project Name/Site Location: COME BY CHANCE LANDFILL

Quote: 10-194KG

Site #: —

Task Order#: —

Sampled by: H. ANDERSON/S FORMED

TURNAROUND TIME

Standard [X]

10 day [ ]

If RUSH Specify Date:

Pre-schedule rush work

Charge for # Jars used but not submitted: 0

Guideline Requirements/ Detection Limits/ Special Instructions

1. Please report phosphates as P_2O_5
2. Select samples will be compared to Ontario Ministry of the Environment O.Reg. 153 standards
3. Lab Filtration is required for groundwater samples

* Specify Matrix; Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

	Field Sample Identification	Matrix *	Date/Time Sampled	# & type of bottles	BTEX/TPH MUST (5)	VOCs (3)	PAHs FWAL (1)	PCBs (1)	RCAPMS (DISSOLVED) FWAL	RCAPMS (Total) FWAL (2)	BOD (1)	TSS (1)	Total Oil & Grease (2)	Cyanide (1)	Mercury (1)	Total Phenolics (1)	Sulfides (1)	Chromium III & VI (1)
1	Primary Liner	Leachate	July 16/10	21 (various)	X	X	X	X		X	X	X	X	X	X	X	X	X
2	Secondary Liner	Leachate	"	21 (various)	X	X	X	X		X	X	X	X	X	X	X	X	X
3	Surface Up	Surface	"	12	X	X	X	X		X								
4	Surface Down	Surface	"	12	X	X	X	X		X								
5	MW 93-1	Ground	"	10	X	X	X	X	X									
6	MW 93-1A	Ground	"	10	X	X	X	X	X									
7	MW 93-2	Ground	"	10	X	X	X	X	X									
8	MW 93-2A	Ground	"	10	X	X	X	X	X									
9	MW 93-3	Ground	"	10	X	X	X	X	X									
10	MW 93-3A	Ground	"	10	X	X	X	X	X									

RELINQUISHED BY: (Signature/Print) H. Anderson / H. ANDERSON Date: July 19/10 Time: 11:00 am

RECEIVED BY: (Signature/Print) Date: 2010/07/19 Time: 10:40

White: Maxxam Yellow: Mail Pink: Client

ATL FCD 00149 / Revision 9

Maxxam Analytics International Corporation
200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227
www.maxxamanalytics.com E-mail: Clientservicesbedford@maxxamanalytics.com

MAXXAM Chain of Custody Record

COC#:

This column for lab use only :

Client Code: 16275

Maxxam Job#: B095073

Cooler Id	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			2	5	3	

Integrity: YES NO

Integrity/Checklist by:

Labelled by:

Location/Bin#:

INVOICE INFORMATION:

Company Name: Conestoga Rovers and Associates

Contact Name: Dave McColl

Address: 1118 Topsail Rd, PO Box 8353 Stn A

St. John's NL A1B 2N7 (Postal Code)

Email: dmccoll@craworld.com

Ph: 709-364-5353 Fax: 709-364-5368

REPORT INFORMATION (if differs from invoice):

Company Name: SAME

Contact Name:

Address:

Postal Code

Email:

Ph: Fax:

PO#: —

Project # : 056680-01

ProjectName/Site Location: COME BY CHANCE LANDFILL

Quote: 10-194KG

Site #: —

Task Order#: —

Sampled by: H. ANDERSON / S. FORWARD

TURNAROUND TIME

Standard ☒

10 day ☐

If RUSH Specify Date:

Pre-schedule rush work

Charge for # Jars used but not submitted: 0

Guideline Requirements/ Detection Limits/ Special Instructions

1. Please report phosphates as P_2O_5
2. Select samples will be compared to Ontario Ministry of the Environment O.Reg. 153 standards
3. Lab Filtration is required

* Specify Matrix; Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

Field Sample Identification	Matrix *	Date/Time Sampled	# & type of bottles	BTEX/TPH MUST (5)	VOCs (3)	PAHs FWAL (1)	PCBs (1)	RCAPMS (DISSOLVED) FWAL (2)	RCAPMS (Total) FWAL	BOD	TSS	Total Oil & Grease	Cyanide	Mercury	Total Phenolics	Sulfides	Chromium III & VI
11 DUP-01	Ground	July 6/10	10	x	x	x	x	x									

RELINQUISHED BY: (Signature/Print) H. Anderson / HUBERT ANDERSON Date: July 19/10 Time: 11:00 am

RECEIVED BY: (Signature/Print) Date: 2010/07/19 Time: 1040

White : Maxxam Yellow : Mail Pink : Client ATL FCD 00149 / Revision 9

Your Project #: 056680
Site Location: COME BY CHANCE SECURE LANDFILL
Your C.O.C. #: N/A

Attention: Brian Luffman
Conestoga-Rovers and Associates Ltd
Mount Pearl/St. John's
PO Box 8353 Stn A
1118 Topsail Rd
St. John's, NL
A1B 3N7

Report Date: 2011/01/05

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0I1347
Received: 2010/12/16, 9:30

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Carbonaceous BOD	2	N/A	2010/12/22	ATL SOP 00041 R5	Based on APHA 5210B
Str. Acid Diss. Cyanide water (2)	2	N/A	2010/12/17	ATL SOP 00040 R4	Based on EPA335.3
Hexavalent chromium in water	2	N/A	2010/12/22	ATL SOP 00056 R1	Based on SM3500-Cr-B
Mercury - Total (CVAA,LL)	2	2010/12/21	2010/12/22	ATL SOP 00026 R6	Based on EPA245.1
Phenols (4-AAP)	1	N/A	2010/12/20	ATL SOP 00039 R5	Based on EPA 420.2
Phenols (4-AAP)	1	N/A	2010/12/21	ATL SOP 00039 R5	Based on EPA 420.2
Sulphide (1)	2	N/A	2010/12/20	CAM SOP-00455	SM 4500-S G
Total Oil and Grease - Water	2	2010/12/22	2011/01/05	ATL SOP 00101 R3	Based on EPA1664
Phosphorus Total Colourimetry	2	N/A	2010/12/24	ATL SOP 00057 R2	Based on EPA365.1
Total Suspended Solids	2	N/A	2010/12/17	ATL SOP 00007 R3	based on EPA 160.2

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

(1) This test was performed by Maxxam Analytics Mississauga
(2) Strong acid dissociable cyanide value may include contribution from thiocyanate.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MICHELLE HILL, Project Manager
Email: MHill@maxxam.ca
Phone# (902) 420-0203

==========

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Total cover pages: 1

This document is in electronic format, hard copy is available on request.

Maxxam Job #: B0I1347
Report Date: 2011/01/05

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

RESULTS OF ANALYSES OF WATER

Maxxam ID		IE3322	IE3322			IE3482		
Sampling Date		2010/12/14	2010/12/14			2010/12/14		
	Units	**PRIMARY LINER**	**PRIMARY LINER Lab-Dup**	**RDL**	**QC Batch**	**SECONDARY LINER**	**RDL**	**QC Batch**
Inorganics								
Carbonaceous BOD	mg/L	<5		5	2362431	<5	5	2362431
Chromium (VI)	mg/L	<0.001	<0.001	0.001	2365430	<0.001	0.001	2365430
Strong Acid Dissoc. Cyanide (CN)	mg/L	<0.002		0.002	2362518	<0.002	0.002	2362518
Phenols-4AAP	mg/L	0.003		0.001	2364544	<0.01(1)	0.01	2365649
Total Phosphorus	mg/L	<0.02		0.02	2368190	<0.02	0.02	2368190
Total Suspended Solids	mg/L	17		2	2361912	33	2	2361912
Sulphide	mg/L	<0.02		0.02	2364391	<0.02	0.02	2364391
Petroleum Hydrocarbons								
Total Oil & Grease	mg/L	<5		5	2366551	<5	5	2366551

MERCURY BY COLD VAPOUR AA (WATER)

Maxxam ID		IE3322	IE3482		
Sampling Date		2010/12/14	2010/12/14		
	Units	**PRIMARY LINER**	**SECONDARY LINER**	**RDL**	**QC Batch**
Metals					
Total Mercury (Hg)	ug/L	<0.013	<0.013	0.013	2366115

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Elevated detection limit due to matrix interference.

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Maxxam Job #: B0I1347
Report Date: 2011/01/05

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

GENERAL COMMENTS

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel:902-420-0203 Toll-free:800-565-7227 Fax:902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B0I1347
Report Date: 2011/01/05

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2361912	Total Suspended Solids	2010/12/17					<1	mg/L	NC	25	98	80 - 120
2362431	Carbonaceous BOD	2010/12/22			93	80 - 120	<5	mg/L	NC	25	81	80 - 120
2362518	Strong Acid Dissoc. Cyanide (CN)	2010/12/17	101	80 - 120	105	80 - 120	<0.002	mg/L	NC	25	96	80 - 120
2364391	Sulphide	2010/12/20	93	80 - 120	101	85 - 115	<0.02	mg/L	NC	25		
2364544	Phenols-4AAP	2010/12/20	94	80 - 120	104	80 - 120	<0.001	mg/L	NC	25	105	80 - 120
2365430	Chromium (VI)	2010/12/22	90(1)	80 - 120	98	80 - 120	<0.001	mg/L	NC(2)	25	100	80 - 120
2365649	Phenols-4AAP	2010/12/21	82	80 - 120	103	80 - 120	<0.001	mg/L	0.9	25	102	80 - 120
2366115	Total Mercury (Hg)	2010/12/22	108	80 - 120	108	80 - 120	<0.013	ug/L	NC	25	108	80 - 120
2366551	Total Oil & Grease	2010/12/24	85	70 - 130	85	70 - 130	<5	mg/L	NC	40		
2368190	Total Phosphorus	2010/12/24	115	80 - 120	108	80 - 120	<0.02	mg/L	NC	25		

N/A = Not Applicable
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Matrix Spike Parent ID [IE3322-01]
(2) - Duplicate Parent ID [IE3322-01]

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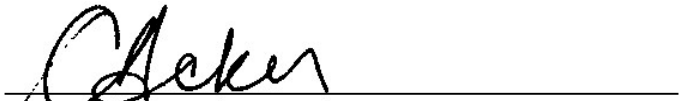
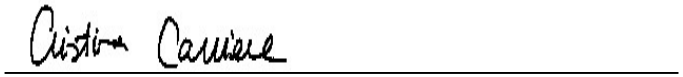
Validation Signature Page

Maxxam Job #: B0I1347

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

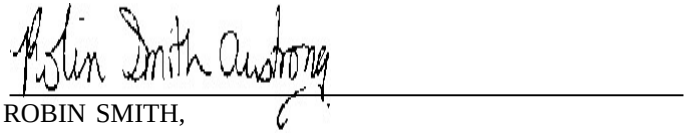


COLLEEN ACKER,



CRISTINA CARRIERE, Scientific Services

KEVIN MACDONALD, Inorganics Supervisor



ROBIN SMITH,

==========

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Maxxam Analytics
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www.maxxamanalytics.com E-mail: Clientservicesbedford@maxxamanalytics.com

MAXXAM Chain of Custody Record

COC#: Page 1 of 2

This column for lab use only :

Client Code: 16275 87

Maxxam Job#: B0I1347

Cooler Id	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			7	1	6	8

Integrity: YES (NO) Integrity Checklist by:

Labelled by: Location/Bin#

INVOICE INFORMATION:

Company Name: Conestoga Rovers and Associates

Contact Name: Brian Luffman

Address: 1118 Topsail Rd, PO Box 8353 Stn A
Postal Code
St. John's NL A1B 2N7

Email: bluffman@craworld.com

Ph: 709-364-5353 Fax: 709-364-5368

REPORT INFORMATION (if differs from invoice):

Company Name:

Contact Name:

Address: SAME
Postal Code

Email:

Ph: Fax:

PO#: N/A

Project #: 056680

ProjectName/Site Location: Come By Chance Secure Landfill

Quote: 10-154KG

Site #: N/A

Task Order#: N/A

Sampled by: S. Forward

TURNAROUND TIME

Standard ■

10 day ☐

If RUSH Specify Date:

Pre-schedule rush work

Charge for # Jars used but not submitted

Guideline Requirements/ Detection Limits/ Special Instructions

1. Please report phosphates as P_2O_5
2. Select samples will be compared to Ontario Ministry of the Environment O.Reg. 153 standards
3. Lab Filtration is required for groundwater samples
4. Please cc Results to: datanl@craworld.com

* Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

	Field Sample Identification	Matrix *	Date/Time Sampled	# & type of bottles	BTEX/TPH MUST	VOCs	PAHs FWAL	PCBs	RCAPMS (DISSOLVED) FWAL	RCAPMS (Total) FWAL	BOD	TSS	Total Oil & Grease	Cyanide	Mercury	Total Phenolics	Sulfides	Chromium III & VI
IE3322-01,02	1 Primary Liner	Leachate	14-Dec-10	9 (Various)							X	X	X	X	X	X	X	X
IE3482-01,02	2 Secondary Liner	Leachate	14-Dec-10	9 (Various)							X	X	X	X	X	X	X	X

RELINQUISHED BY: (Signature/Print) S. Forward Date: Dec 15/2010 Time: 10:00AM

RECEIVED BY: (Signature/Print) Date: 2010.12.15 Time: 12:10

BOD(s) held for Freezing

Your Project #: 056680
Site Location: COME BY CHANCE SECURE LANDFILL
Your C.O.C. #: N/A

Attention: Brian Luffman
Conestoga-Rovers and Associates Ltd
Mount Pearl/St. John's
PO Box 8353 Stn A
1118 Topsail Rd
St. John's, NL
A1B 3N7

Report Date: 2011/02/24
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0I0108
Received: 2010/12/14, 13:30

Sample Matrix: Water
Samples Received: 11

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
TEH in Water (PIRI)	3	2010/12/17	2010/12/20	ATL SOP 00198 R2	Based on Atl. PIRI
TEH in Water (PIRI)	8	2010/12/20	2010/12/21	ATL SOP 00198 R2	Based on Atl. PIRI
VPH in Water (PIRI)	11	2010/12/16	2010/12/22	ATL SOP 00200 R4	Based on Atl. PIRI
ModTPH (T1) Calc. for Water	11	N/A	2010/12/22		Based on Atl. PIRI

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

ROB WHELAN, Project Manager
Email: RWhelan@maxxam.ca
Phone# (709) 754-0203

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

This document is in electronic format, hard copy is available on request.

Maxxam Job #: B0I0108
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

ATLANTIC RBCA HYDROCARBONS (WATER)

Maxxam ID		ID7416	ID7416	ID7426		ID7427		ID7428	ID7429		
Sampling Date		2010/12/13	2010/12/13	2010/12/13		2010/12/13		2010/12/13	2010/12/13		
Received Temperature (°C)		6.0C	6.0C	6.0C		6.0C		6.0C	6.0C		
	Units	**Primary Liner**	**Primary Liner Lab-Dup**	**Secondary Liner**	**QC Batch**	**Surface Up**	**QC Batch**	**Surface Down**	**MW93-1**	**RDL**	**QC Batch**
Petroleum Hydrocarbons											
Benzene	mg/L	<0.001	<0.001	<0.001	2361377	<0.001	2361377	<0.001	<0.001	0.001	2361377
Toluene	mg/L	<0.001	<0.001	<0.001	2361377	<0.001	2361377	<0.001	<0.001	0.001	2361377
Ethylbenzene	mg/L	<0.001	<0.001	<0.001	2361377	<0.001	2361377	<0.001	<0.001	0.001	2361377
Xylene (Total)	mg/L	<0.002	<0.002	<0.002	2361377	<0.002	2361377	<0.002	<0.002	0.002	2361377
C6 - C10 (less BTEX)	mg/L	<0.01	<0.01	<0.01	2361377	<0.01	2361377	<0.01	<0.01	0.01	2361377
>C10-C16 Hydrocarbons	mg/L	<0.05		0.05	2362210	<0.05	2362210	<0.05	<0.05	0.05	2363989
>C16-C21 Hydrocarbons	mg/L	<0.05		<0.05	2362210	<0.05	2362210	<0.05	<0.05	0.05	2363989
>C21-<C32 Hydrocarbons	mg/L	<0.1		<0.1	2362210	<0.1	2362210	<0.1	<0.1	0.1	2363989
Modified TPH (Tier1)	mg/L	<0.1		<0.1	2358314	<0.1	2358573	<0.1	<0.1	0.1	2358573
Reached Baseline at C32	mg/L	YES		YES	2362210	YES	2362210	YES	YES	N/A	2363989
Hydrocarbon Resemblance	mg/L			SEECOMMENT(1)	2362210					N/A	
Surrogate Recovery (%)											
Isobutylbenzene - Extractable	%	96		104	2362210	79	2362210	88	100		2363989
Isobutylbenzene - Volatile	%	98	98	100	2361377	106	2361377	105	100		2361377
n-Dotriacontane - Extractable	%	93		102	2362210	74	2362210	84	91		2363989

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - No resemblance to petroleum products in fuel oil range.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax:709-754-8612 www.maxxam.ca

Maxxam Job #: B0I0108
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

ATLANTIC RBCA HYDROCARBONS (WATER)

Maxxam ID		ID7430	ID7431	ID7432	ID7433	ID7434	ID7435		
Sampling Date		2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13		
Received Temperature (°C)		6.0C	6.0C	6.0C	6.0C	6.0C	6.0C		
	Units	**MW93-1A**	**MW93-2**	**MW93-2A**	**MW10-1**	**MW10-1A**	**DUP-02**	**RDL**	**QC Batch**
Petroleum Hydrocarbons									
Benzene	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	2361377
Toluene	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	2361377
Ethylbenzene	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	2361377
Xylene (Total)	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2361377
C6 - C10 (less BTEX)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361377
>C10-C16 Hydrocarbons	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2363989
>C16-C21 Hydrocarbons	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2363989
>C21-<C32 Hydrocarbons	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	2363989
Modified TPH (Tier1)	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	2358573
Reached Baseline at C32	mg/L	YES	YES	YES	YES	YES	YES	N/A	2363989
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	97	100	84	86	98	88		2363989
Isobutylbenzene - Volatile	%	102	106	108	106	102	108		2361377
n-Dotriacontane - Extractable	%	92(1)	95	77	80(1)	97(1)	81(1)		2363989

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - TEH sample contained sediment.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax:709-754-8612 www.maxxam.ca

Maxxam Job #: B0I0108
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

GENERAL COMMENTS

Revised report due to changes in sample IDs 2011-02-24.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax:709-754-8612 www.maxxam.ca

Maxxam Job #: B0I0108
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
2361377	Isobutylbenzene - Volatile	2010/12/22	108	70 - 130	105	70 - 130	102	%		
2361377	Benzene	2010/12/22	130(1)	70 - 130	120	70 - 130	<0.001	mg/L	NC(2)	40
2361377	Toluene	2010/12/22	130(1)	70 - 130	120	70 - 130	<0.001	mg/L	NC(2)	40
2361377	Ethylbenzene	2010/12/22	130(1)	70 - 130	125	70 - 130	<0.001	mg/L	NC(2)	40
2361377	Xylene (Total)	2010/12/22	133(3, 1)	70 - 130	120	70 - 130	<0.002	mg/L	NC(2)	40
2361377	C6 - C10 (less BTEX)	2010/12/22					<0.01	mg/L	NC(2)	40
2362210	Isobutylbenzene - Extractable	2010/12/20	99	30 - 130	99	30 - 130	105	%		
2362210	n-Dotriacontane - Extractable	2010/12/20	101	30 - 130	102	30 - 130	100	%		
2362210	>C10-C16 Hydrocarbons	2010/12/20	82	N/A	104	N/A	<0.05	mg/L	NC	40
2362210	>C16-C21 Hydrocarbons	2010/12/20	87	N/A	109	N/A	<0.05	mg/L	NC	40
2362210	>C21-<C32 Hydrocarbons	2010/12/20	84	30 - 130	95	30 - 130	<0.1	mg/L	NC	40
2363989	Isobutylbenzene - Extractable	2010/12/21	96	30 - 130	96	30 - 130	98	%		
2363989	n-Dotriacontane - Extractable	2010/12/21	97	30 - 130	101	30 - 130	97	%		
2363989	>C10-C16 Hydrocarbons	2010/12/21	89	N/A	102	N/A	<0.05	mg/L	NC	40
2363989	>C16-C21 Hydrocarbons	2010/12/21	93	N/A	107	N/A	<0.05	mg/L	NC	40
2363989	>C21-<C32 Hydrocarbons	2010/12/21	86	30 - 130	97	30 - 130	<0.1	mg/L	NC	40

N/A = Not Applicable
RPD = Relative Percent Difference
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Matrix Spike Parent ID [ID7426-01]
(2) - Duplicate Parent ID [ID7416-01]
(3) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Analytics International Corporation o/a Maxxam Analytics 49-55 Elizabeth Ave, Suite 101A, St.John's, NL, Canada A1A 1W9 Tel: 709-754-0203 Toll Free: 888-492-7227 Fax:709-754-8612 www.maxxam.ca

Validation Signature Page

Maxxam Job #: B0I0108

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

PAULA CHAPLIN, Project Manager

==========

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Maxxam Analytics International Corporation
200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227
www.maxxamanalytics.com E-mail: Clientservicesbedford@maxxamanalytics.com

MAXXAM Chain of Custody Record

COC#:

This column for lab use only :

Client Code: 16275

Maxxam Job#: B01010S

Cooler Id	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			6	6	5	6

Integrity: YES (NO)

Integrity/Checklist by: PMC

Labelled by: PMC

Location/Bin#:

INVOICE INFORMATION:

Company Name: Conestoga Rovers and Associates

Contact Name: Brian Luffman

Address: 1118 Topsail Rd, PO Box 8353 Stn A

Postal Code: St. John's NL A1B 2N7

Email: bluffman@craworld.com

Ph: 709-364-5353 Fax: 709-364-5368

REPORT INFORMATION (if differs from invoice):

Company Name:

Contact Name:

Address: SAME

Postal Code

Email:

Ph: Fax:

PO#: N/A

Project # : 056680

ProjectName/Site Location: Come By Chance Secure Landfill

Quote: 10-194KG

Site #: N/A

Task Order#: N/A

Sampled by: C. Tucker/S. Forward

TURNAROUND TIME

Standard ■

10 day □

If RUSH Specify Date:

Pre-schedule rush work

Charge for # Jars used but not submitted: 10

Guideline Requirements/ Detection Limits/ Special Instructions

1. Please report phosphates as P_2O_5
2. Select samples will be compared to Ontario Ministry of the Environment O.Reg. 153 standards
3. Lab Filtration is required for groundwater samples
4. Please cc Results to: datanl@craworld.com

* Specify Matrix; Surface/Salt/Ground/Tapwater/Sewage/Effluent/ Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

	Field Sample Identification	Matrix *	Date/Time Sampled	# & type of bottles	BTEX/TPH MUST	VOCs	PAHs FWAL	PCBs	RCAPMS (DISSOLVED) FWAL	RCAPMS (Total) FWAL	BOD	TSS	Total Oil & Grease	Cyanide	Mercury	Total Phenolics	Sulfides	Chromium III & VI
1	Primary Liner	Leachate	13-Dec-10	12 (Various)	X	X	X	X		X								
2	Secondary Liner	Leachate	13-Dec-10	12 (Various)	X	X	X	X		X								
3	Surface Up	Surface	13-Dec-10	12 (Various)	X	X	X	X		X								
4	Surface Down	Surface	13-Dec-10	12 (Various)	X	X	X	X		X								
5	MW 93-1	Ground	13-Dec-10	12 (Various)	X	X	X	X	X									
6	MW 93-1A	Ground	13-Dec-10	12 (Various)	X	X	X	X	X									
7	MW 93-2	Ground	13-Dec-10	12 (Various)	X	X	X	X	X									
8	MW 93-2A	Ground	13-Dec-10	12 (Various)	X	X	X	X	X									
9	MW 94-4	Ground	13-Dec-10	12 (Various)	X	X	X	X	X									
10	MW 94-4A	Ground	13-Dec-10	12 (Various)	X	X	X	X	X									

RELINQUISHED BY: (Signature/Print) Date Time

Cheryl Cook/Cheryl Tucker DEC 14 2010 10:30AM

RECEIVED BY: (Signature/Print) Date Time

2010/12/14 1:30

White : Maxxam Yellow : Mail Pink : Client

ATL FCD 00149 / Revision 9

Maxxam Analytics International Corporation
200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227
www.maxxamanalytics.com E-mail: Clientservicesbedford@maxxamanalytics.com

MAXXAM Chain of Custody Record

COC#:

This column for lab use only :

Client Code: 16275

Maxxam Job#: B0I0108

Cooler Id	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			6	6	5	6

Integrity: YES (NO) Integrity/Checklist by: PMC

Labelled by: PMC Location/Bin#:

INVOICE INFORMATION:

Company Name: Conestoga Rovers and Associates
Contact Name: Brian Luffman
Address: 1118 Topsail Rd, PO Box 8353 Stn A
St. John's NL A1B 2N7 (Postal Code)
Email: bluffman@craworld.com
Ph: 709-364-5353 Fax: 709-364-5368

REPORT INFORMATION (if differs from invoice):

Company Name:
Contact Name:
Address: SAME (Postal Code)
Email:
Ph: Fax:

PO#: N/A
Project # : 056680
ProjectName/Site Location: Come By Chance Secure Landfill
Quote: 10-194KG
Site #: N/A
Task Order#: N/A
Sampled by: C. Tucker/S. Forward

TURNAROUND TIME

Standard ■
10 day □
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted: 10

Guideline Requirements/ Detection Limits/ Special Instructions

1. Please report phosphates as P_2O_5
2. Select samples will be compared to Ontario Ministry of the Environment O.Reg. 153 standards
3. Lab Filtration is required
4. Please cc Results to: datanl@craworld.com

* Specify Matrix; Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

Field Sample Identification	Matrix *	Date/Time Sampled	# & type of bottles	BTEX/TPH MUST	VOCs	PAHs FWAL	PCBs	RCAPMS (DISSOLVED) FWAL	RCAPMS (Total) FWAL	BOD	TSS	Total Oil & Grease	Cyanide	Mercury	Total Phenolics	Sulfides	Chromium III & VI
11 DUP-01	Ground	13-Dec-10	12 (Various)	X	X	X	X	X									

RELINQUISHED BY: (Signature/Print) Date Time
Chris Johnson/Cheryl Tucker Dec 14/2010 11:30 AM

RECEIVED BY: (Signature/Print) Date Time
2010/12/14 1:30

White : Maxxam Yellow : Mail Pink : Client ATL FCD 00149 / Revision 9

Your Project #: 056680
Site Location: COME BY CHANCE SECURE LANDFILL
Your C.O.C. #: N/A

Attention: Brian Luffman
Conestoga-Rovers and Associates Ltd
Mount Pearl/St. John's
PO Box 8353 Stn A
1118 Topsail Rd
St. John's, NL
A1B 3N7

Report Date: 2011/02/24
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0I0761
Received: 2010/12/15, 9:19

Sample Matrix: Water
Samples Received: 11

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Carbonate, Bicarbonate and Hydroxide	7	N/A	2010/12/20	CAM SOP-00102	APHA 4500-CO2 D
Carbonate, Bicarbonate and Hydroxide	4	N/A	2010/12/21	CAM SOP-00102	APHA 4500-CO2 D
Alkalinity	11	N/A	2010/12/16	ATL SOP 00013 R4	Based on EPA310.2
Chloride	11	N/A	2010/12/16	ATL SOP 00014 R6	Based on SM4500-Cl-
Colour	11	N/A	2010/12/17	ATL SOP 00020 R3.	Based on SM2120C
Conductance - water	11	N/A	2010/12/20	ATL SOP 00004 R5/00006 R4	Based on SM2510B
Hardness (calculated as CaCO3)	11	N/A	2010/12/21	ATL SOP 00048	Based on SM2340B
Metals Water Diss. MS	7	N/A	2010/12/17	ATL SOP 00059 R1	Based on EPA6020A
Metals Water Total MS	4	2010/12/16	2010/12/17	ATL SOP 00059 R1	Based on EPA6020A
Ion Balance (% Difference)	11	N/A	2010/12/22		
Anion and Cation Sum	11	N/A	2010/12/22		
Nitrogen Ammonia - water	11	N/A	2010/12/20	ATL SOP 00015 R5	Based on USEPA 350.1
Nitrogen - Nitrate + Nitrite	11	N/A	2010/12/17	ATL SOP 00016 R4	Based on USGS - Enz.
Nitrogen - Nitrite	11	N/A	2010/12/16	ATL SOP 00017 R4	Based on SM4500-NO2B
Nitrogen - Nitrate (as N)	11	N/A	2010/12/17	ATL SOP 00018 R3	Based on ASTMD3867
PAH (FWAL) in Water (A/Q) by GC/MS (SIM)	2	2010/12/17	2010/12/24	ATL SOP-00103 R2	Based on EPA 8270C
PAH (FWAL) in Water (A/Q) by GC/MS (SIM)	9	2010/12/17	2010/12/25	ATL SOP-00103 R2	Based on EPA 8270C
PCBs in water by GC/ECD	9	2010/12/17	2010/12/22	ATL SOP 00107 R3	Based on EPA8082
PCBs in water by GC/ECD	2	2010/12/23	2010/12/29	ATL SOP 00107 R3	Based on EPA8082
pH	11	N/A	2010/12/20	ATL SOP 00003 R5/00005 R7	Based on SM4500H+
Phosphorus - ortho	11	N/A	2010/12/16	ATL SOP 00021 R3	Based on USEPA 365.1
Sat. pH and Langelier Index (@ 20C)	11	N/A	2010/12/22		
Sat. pH and Langelier Index (@ 4C)	11	N/A	2010/12/22		
Reactive Silica	11	N/A	2010/12/17	ATL SOP 00022 R3	Based on EPA 366.0
Sulphate	11	N/A	2010/12/16	ATL SOP 00023 R3	Based on EPA 375.4
Total Dissolved Solids (TDS calc)	11	N/A	2010/12/22		
Organic carbon - Total (TOC)	11	N/A	2010/12/21	ATL SOP 00037 R4	Based on SM5310C
Turbidity	11	N/A	2010/12/18	ATL SOP 00011 R5	based on EPA 180.1
Volatile Organic Compounds in Water	11	2010/12/17	2010/12/18	ATL SOP 00122 R4	Based on EPA624

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

../2

This document is in electronic format, hard copy is available on request.

Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MICHELLE HILL, Project Manager
Email: MHill@maxxam.ca
Phone# (902) 420-0203

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 2

Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

RESULTS OF ANALYSES OF WATER

Maxxam ID		IE1124		IE1143		IE1146	IE1146		
Sampling Date		2010/12/13		2010/12/13		2010/12/13	2010/12/13		
	Units	**PRIMARY LINER**	**RDL**	**SECONDARY LINER**	**RDL**	**SURFACE UP**	**SURFACE UP Lab-Dup**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	me/L	10.1	N/A	10.9	N/A	0.340		N/A	2359338
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	400	1	420	1	6		1	2359335
Calculated TDS	mg/L	546	1	574	1	23		1	2359344
Carb. Alkalinity (calc. as CaCO3)	mg/L	1	1	2	1	<1		1	2359335
Cation Sum	me/L	10.1	N/A	10.4	N/A	0.430		N/A	2359338
Hardness (CaCO3)	mg/L	440	1	450	1	10		1	2359336
Ion Balance (% Difference)	%	0.00	N/A	2.44	N/A	11.7		N/A	2359337
Langelier Index (@ 20C)	N/A	0.855		0.991		-3.49			2359342
Langelier Index (@ 4C)	N/A	0.607		0.743		-3.74			2359343
Nitrate (N)	mg/L	0.28	0.05	0.10	0.05	<0.05		0.05	2359339
Saturation pH (@ 20C)	N/A	6.74		6.73		10.1			2359342
Saturation pH (@ 4C)	N/A	6.98		6.98		10.3			2359343
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	400	30	420	30	6		5	2360803
Dissolved Chloride (Cl)	mg/L	29	1	43	1	6		1	2360807
Colour	TCU	17	5	56	30	49		5	2360816
Nitrate + Nitrite	mg/L	0.28	0.05	0.10	0.05	<0.05		0.05	2360821
Nitrite (N)	mg/L	<0.01	0.01	<0.01	0.01	<0.01		0.01	2360824
Nitrogen (Ammonia Nitrogen)	mg/L	0.10	0.05	0.26	0.05	<0.05		0.05	2364598
Total Organic Carbon (C)	mg/L	11	5	13	5	6.4		0.5	2365464
Orthophosphate (P)	mg/L	<0.01	0.01	<0.01	0.01	<0.01		0.01	2360817
pH	pH	7.59	N/A	7.72	N/A	6.58		N/A	2364137
Reactive Silica (SiO2)	mg/L	13	0.5	14	0.5	1.5		0.5	2360812
Dissolved Sulphate (SO4)	mg/L	61	2	60	2	3		2	2360809
Turbidity	NTU	16	0.1	17	0.1	2.2	2.1	0.1	2363442
Conductivity	uS/cm	840	1	900	1	43		1	2364141

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Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

RESULTS OF ANALYSES OF WATER

Maxxam ID		IE1147		IE1154		IE1155			IE1156		
Sampling Date		2010/12/13		2010/12/13		2010/12/13			2010/12/13		
	Units	**SURFACE DOWN**	**RDL**	**MW 93-1**	**RDL**	**MW 93-1A**	**RDL**	**QC Batch**	**MW 93-2**	**RDL**	**QC Batch**
Calculated Parameters											
Anion Sum	me/L	1.53	N/A	5.52	N/A	7.46	N/A	2359338	6.58	N/A	2359338
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	12	1	210	1	297	1	2359335	219	1	2359335
Calculated TDS	mg/L	122	1	313	1	401	1	2359344	368	1	2359344
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1	1	2	1	2	1	2359335	1	1	2359335
Cation Sum	me/L	2.40	N/A	5.90	N/A	7.19	N/A	2359338	6.19	N/A	2359338
Hardness (CaCO3)	mg/L	70	1	120	1	170	1	2359336	250	1	2359336
Ion Balance (% Difference)	%	22.1	N/A	3.33	N/A	1.84	N/A	2359337	3.05	N/A	2359337
Langelier Index (@ 20C)	N/A	-2.64		0.382		0.608		2359342	0.543		2359342
Langelier Index (@ 4C)	N/A	-2.89		0.133		0.359		2359343	0.294		2359343
Nitrate (N)	mg/L	2.0	0.05	<0.05	0.05	<0.05	0.05	2359339	<0.05	0.05	2359339
Saturation pH (@ 20C)	N/A	9.01		7.64		7.32		2359342	7.20		2359342
Saturation pH (@ 4C)	N/A	9.26		7.89		7.57		2359343	7.45		2359343
Inorganics											
Total Alkalinity (Total as CaCO3)	mg/L	12	5	210	30	300	30	2360803	220	30	2360803
Dissolved Chloride (Cl)	mg/L	23	1	15	1	11	1	2360807	21	1	2360807
Colour	TCU	120	30	<5	5	<5	5	2360816	<5	5	2360816
Nitrate + Nitrite	mg/L	2.0	0.05	<0.05	0.05	<0.05	0.05	2360821	<0.05	0.05	2360821
Nitrite (N)	mg/L	<0.01	0.01	<0.01	0.01	<0.01	0.01	2360824	<0.01	0.01	2360824
Nitrogen (Ammonia Nitrogen)	mg/L	0.06	0.05	<0.05	0.05	<0.05	0.05	2364598	<0.05	0.05	2364598
Total Organic Carbon (C)	mg/L	18	5	0.9	0.5	<5(1)	5	2365464	1.3	0.5	2365464
Orthophosphate (P)	mg/L	<0.01	0.01	<0.01	0.01	0.04	0.01	2360817	<0.01	0.01	2360817
pH	pH	6.37	N/A	8.02	N/A	7.93	N/A	2364137	7.74	N/A	2364137
Reactive Silica (SiO2)	mg/L	7.4	0.5	7.6	0.5	6.8	0.5	2360812	19	0.5	2360812
Dissolved Sulphate (SO4)	mg/L	24	2	42	2	56	2	2360809	76	2	2360809
Turbidity	NTU	140	0.5	34	0.1	470	3	2363442	13	0.1	2363445
Conductivity	uS/cm	170	1	500	1	640	1	2364141	580	1	2364141

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(1) - Elevated detection limit due to matrix interference.

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Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

RESULTS OF ANALYSES OF WATER

Maxxam ID		IE1157			IE1158		IE1159		IE1160		
Sampling Date		2010/12/13			2010/12/13		2010/12/13		2010/12/13		
	Units	**MW 93-2A**	**RDL**	**QC Batch**	**MW 10-1**	**RDL**	**MW 10-1A**	**RDL**	**DUP-02**	**RDL**	**QC Batch**
Calculated Parameters											
Anion Sum	me/L	1.31	N/A	2359338	2.63	N/A	3.08	N/A	2.70	N/A	2359338
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	14	1	2359335	92	1	114	1	95	1	2359335
Calculated TDS	mg/L	87	1	2359344	147	1	171	1	149	1	2359344
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1	1	2359335	<1	1	<1	1	<1	1	2359335
Cation Sum	me/L	1.15	N/A	2359338	2.55	N/A	3.08	N/A	2.57	N/A	2359338
Hardness (CaCO3)	mg/L	31	1	2359336	110	1	140	1	110	1	2359336
Ion Balance (% Difference)	%	6.50	N/A	2359337	1.54	N/A	0.00	N/A	2.47	N/A	2359337
Langelier Index (@ 20C)	N/A	-3.48		2359342	-0.794		-0.180		-0.676		2359342
Langelier Index (@ 4C)	N/A	-3.73		2359343	-1.05		-0.430		-0.927		2359343
Nitrate (N)	mg/L	0.15	0.05	2359339	0.24	0.05	0.26	0.05	0.25	0.05	2359789
Saturation pH (@ 20C)	N/A	9.25		2359342	7.79		7.64		7.77		2359342
Saturation pH (@ 4C)	N/A	9.50		2359343	8.05		7.89		8.02		2359343
Inorganics											
Total Alkalinity (Total as CaCO3)	mg/L	14	5	2360803	92	5	110	30	96	5	2360803
Dissolved Chloride (Cl)	mg/L	14	1	2360807	12	1	14	1	12	1	2360807
Colour	TCU	79	30	2360816	9	5	5	5	13	5	2360816
Nitrate + Nitrite	mg/L	0.15	0.05	2360821	0.24	0.05	0.26	0.05	0.25	0.05	2360821
Nitrite (N)	mg/L	<0.01	0.01	2360824	<0.01	0.01	<0.01	0.01	<0.01	0.01	2360824
Nitrogen (Ammonia Nitrogen)	mg/L	0.35	0.05	2364598	<0.05	0.05	0.09	0.05	<0.05	0.05	2364598
Total Organic Carbon (C)	mg/L	16	5	2365464	33	5	2.3	0.5	18	5	2365464
Orthophosphate (P)	mg/L	<0.01	0.01	2360817	<0.01	0.01	<0.01	0.01	<0.01	0.01	2360817
pH	pH	5.77	N/A	2364162	7.00	N/A	7.46	N/A	7.09	N/A	2364162
Reactive Silica (SiO2)	mg/L	6.4	0.5	2360812	6.2	0.5	7.6	0.5	6.0	0.5	2360812
Dissolved Sulphate (SO4)	mg/L	31	2	2360809	21	2	19	2	21	2	2360809
Turbidity	NTU	100	1	2363445	>1000	10	110	1	540	3	2363445
Conductivity	uS/cm	140	1	2364169	250	1	300	1	260	1	2364169

N/A = Not Applicable
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Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		IE1124	IE1143		IE1146	IE1147	IE1154		
Sampling Date		2010/12/13	2010/12/13		2010/12/13	2010/12/13	2010/12/13		
	Units	**PRIMARY LINER**	**SECONDARY LINER**	**RDL**	**SURFACE UP**	**SURFACE DOWN**	**MW 93-1**	**RDL**	**QC Batch**
Metals									
Dissolved Aluminum (Al)	ug/L						17.2	5.0	2362445
Total Aluminum (Al)	ug/L	<50	<50	50	257	5210		5.0	2362440
Dissolved Antimony (Sb)	ug/L						<1.0	1.0	2362445
Total Antimony (Sb)	ug/L	<10	<10	10	<1.0	<1.0		1.0	2362440
Dissolved Arsenic (As)	ug/L						<1.0	1.0	2362445
Total Arsenic (As)	ug/L	<10	<10	10	<1.0	3.3		1.0	2362440
Dissolved Barium (Ba)	ug/L						70.0	1.0	2362445
Total Barium (Ba)	ug/L	51	40	10	9.4	289		1.0	2362440
Dissolved Beryllium (Be)	ug/L						<1.0	1.0	2362445
Total Beryllium (Be)	ug/L	<10	<10	10	<1.0	<1.0		1.0	2362440
Dissolved Bismuth (Bi)	ug/L						<2.0	2.0	2362445
Total Bismuth (Bi)	ug/L	<20	<20	20	<2.0	<2.0		2.0	2362440
Dissolved Boron (B)	ug/L						99.5	5.0	2362445
Total Boron (B)	ug/L	2230	1870	50	6.9	9.0		5.0	2362440
Dissolved Cadmium (Cd)	ug/L						0.052	0.017	2362445
Total Cadmium (Cd)	ug/L	<0.17	<0.17	0.17	0.040	0.232		0.017	2362440
Dissolved Calcium (Ca)	ug/L						29000	100	2362445
Total Calcium (Ca)	ug/L	138000	135000	1000	2960	18300		100	2362440
Dissolved Chromium (Cr)	ug/L						<1.0	1.0	2362445
Total Chromium (Cr)	ug/L	<10	<10	10	<1.0	8.0		1.0	2362440
Dissolved Cobalt (Co)	ug/L						<0.40	0.40	2362445
Total Cobalt (Co)	ug/L	<4.0	<4.0	4.0	<0.40	6.69		0.40	2362440
Dissolved Copper (Cu)	ug/L						<2.0	2.0	2362445
Total Copper (Cu)	ug/L	<20	<20	20	<2.0	32.9		2.0	2362440
Dissolved Iron (Fe)	ug/L						<50	50	2362445
Total Iron (Fe)	ug/L	3150	2240	500	722	10900		50	2362440
Dissolved Lead (Pb)	ug/L						<0.50	0.50	2362445
Total Lead (Pb)	ug/L	<5.0	<5.0	5.0	<0.50	7.64		0.50	2362440
Dissolved Magnesium (Mg)	ug/L						12100	100	2362445
Total Magnesium (Mg)	ug/L	24300	27400	1000	713	5840		100	2362440
Dissolved Manganese (Mn)	ug/L						81.2	2.0	2362445
Total Manganese (Mn)	ug/L	6240	5120	20	142	427		2.0	2362440
Dissolved Molybdenum (Mo)	ug/L						17.8	2.0	2362445
Total Molybdenum (Mo)	ug/L	<20	<20	20	<2.0	<2.0		2.0	2362440

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		IE1124	IE1143		IE1146	IE1147	IE1154		
Sampling Date		2010/12/13	2010/12/13		2010/12/13	2010/12/13	2010/12/13		
	Units	**PRIMARY LINER**	**SECONDARY LINER**	**RDL**	**SURFACE UP**	**SURFACE DOWN**	**MW 93-1**	**RDL**	**QC Batch**
Dissolved Nickel (Ni)	ug/L						<2.0	2.0	2362445
Total Nickel (Ni)	ug/L	<20	<20	20	<2.0	16.7		2.0	2362440
Dissolved Phosphorus (P)	ug/L						<100	100	2362445
Total Phosphorus (P)	ug/L	<100	<100	100	<100	852		100	2362440
Dissolved Potassium (K)	ug/L						2030	100	2362445
Total Potassium (K)	ug/L	6530	7750	100	295	4060		100	2362440
Dissolved Selenium (Se)	ug/L						<1.0	1.0	2362445
Total Selenium (Se)	ug/L	<10	<10	10	<1.0	<1.0		1.0	2362440
Dissolved Silver (Ag)	ug/L						<0.10	0.10	2362445
Total Silver (Ag)	ug/L	<1.0	<1.0	1.0	<0.10	<0.10		0.10	2362440
Dissolved Sodium (Na)	ug/L						78300	100	2362445
Total Sodium (Na)	ug/L	22500	25500	100	4300	11500		100	2362440
Dissolved Strontium (Sr)	ug/L						222	2.0	2362445
Total Strontium (Sr)	ug/L	289	324	20	9.7	49.9		2.0	2362440
Dissolved Thallium (Tl)	ug/L						<0.10	0.10	2362445
Total Thallium (Tl)	ug/L	<1.0	<1.0	1.0	<0.10	<0.10		0.10	2362440
Dissolved Tin (Sn)	ug/L						<2.0	2.0	2362445
Total Tin (Sn)	ug/L	<20	<20	20	<2.0	<2.0		2.0	2362440
Dissolved Titanium (Ti)	ug/L						<2.0	2.0	2362445
Total Titanium (Ti)	ug/L	<20	<20	20	7.9	148		2.0	2362440
Dissolved Uranium (U)	ug/L						0.19	0.10	2362445
Total Uranium (U)	ug/L	<1.0	1.0	1.0	<0.10	0.34		0.10	2362440
Dissolved Vanadium (V)	ug/L						<2.0	2.0	2362445
Total Vanadium (V)	ug/L	<20	<20	20	2.2	23.0		2.0	2362440
Dissolved Zinc (Zn)	ug/L						10.5	5.0	2362445
Total Zinc (Zn)	ug/L	<50	<50	50	10.7	103		5.0	2362440

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		IE1155	IE1156	IE1157	IE1158	IE1159	IE1160		
Sampling Date		2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13		
	Units	**MW 93-1A**	**MW 93-2**	**MW 93-2A**	**MW 10-1**	**MW 10-1A**	**DUP-02**	**RDL**	**QC Batch**
Metals									
Dissolved Aluminum (Al)	ug/L	30.8	<5.0	145	37.9	11.5	36.0	5.0	2362445
Dissolved Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2362445
Dissolved Arsenic (As)	ug/L	<1.0	1.8	<1.0	<1.0	<1.0	<1.0	1.0	2362445
Dissolved Barium (Ba)	ug/L	72.9	161	38.6	36.3	62.0	37.8	1.0	2362445
Dissolved Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2362445
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2362445
Dissolved Boron (B)	ug/L	57.2	1070	23.6	8.6	13.3	8.6	5.0	2362445
Dissolved Cadmium (Cd)	ug/L	0.070	0.100	3.54	<0.017	0.027	0.020	0.017	2362445
Dissolved Calcium (Ca)	ug/L	44700	79500	9020	40500	47800	41700	100	2362445
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2362445
Dissolved Cobalt (Co)	ug/L	0.43	0.42	1.39	1.42	3.32	1.37	0.40	2362445
Dissolved Copper (Cu)	ug/L	<2.0	<2.0	<2.0	8.6	<2.0	9.0	2.0	2362445
Dissolved Iron (Fe)	ug/L	<50	<50	1930	50	<50	59	50	2362445
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.83	<0.50	<0.50	<0.50	0.50	2362445
Dissolved Magnesium (Mg)	ug/L	14100	13300	2150	2310	3890	2320	100	2362445
Dissolved Manganese (Mn)	ug/L	57.1	948	4010	190	377	174	2.0	2362445
Dissolved Molybdenum (Mo)	ug/L	14.4	<2.0	<2.0	2.8	4.7	2.7	2.0	2362445
Dissolved Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	5.5	6.4	5.8	2.0	2362445
Dissolved Phosphorus (P)	ug/L	130	145	<100	145	<100	<100	100	2362445
Dissolved Potassium (K)	ug/L	2750	1410	984	1060	1360	984	100	2362445
Dissolved Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	2362445
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	2362445
Dissolved Sodium (Na)	ug/L	85700	25000	9290	7230	7630	6290	100	2362445
Dissolved Strontium (Sr)	ug/L	279	228	40.9	84.8	103	86.7	2.0	2362445
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	2362445
Dissolved Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2362445
Dissolved Titanium (Ti)	ug/L	2.3	<2.0	2.1	<2.0	<2.0	<2.0	2.0	2362445
Dissolved Uranium (U)	ug/L	2.79	0.25	<0.10	<0.10	0.29	<0.10	0.10	2362445
Dissolved Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2362445
Dissolved Zinc (Zn)	ug/L	<5.0	17.7	1310	11.0	9.8	10.5	5.0	2362445

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		IE1124	IE1143	IE1146	IE1147	IE1154	IE1154		
Sampling Date		2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13		
	Units	**PRIMARY LINER**	**SECONDARY LINER**	**SURFACE UP**	**SURFACE DOWN**	**MW 93-1**	**MW 93-1 Lab-Dup**	**RDL**	**QC Batch**
Polyaromatic Hydrocarbons									
1-Methylnaphthalene	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2361974
2-Methylnaphthalene	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2361974
Acenaphthene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Acenaphthylene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Acridine	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2361974
Anthracene	ug/L	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Benzo(a)anthracene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Benzo(a)pyrene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Benzo(b)fluoranthene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Benzo(g,h,i)perylene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Benzo(k)fluoranthene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Chrysene	ug/L	0.02	0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Dibenz(a,h)anthracene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Fluoranthene	ug/L	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Fluorene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Indeno(1,2,3-cd)pyrene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Naphthalene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	2361974
Perylene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Phenanthrene	ug/L	0.07	0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Pyrene	ug/L	0.17	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Quinoline	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2361974
Surrogate Recovery (%)									
D10-Anthracene	%	56(1)	39(1)	98	37(1)	72	74		2361974
D14-Terphenyl	%	89	59	112	71	76	78		2361974
D8-Acenaphthylene	%	119	78	115	100	95	85		2361974

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - PAH surrogate(s) not within acceptance limits. Sample past recommended hold time for repeat analysis.

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Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		IE1155	IE1156	IE1157	IE1158	IE1159	IE1160		
Sampling Date		2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13		
	Units	**MW 93-1A**	**MW 93-2**	**MW 93-2A**	**MW 10-1**	**MW 10-1A**	**DUP-02**	**RDL**	**QC Batch**
Polyaromatic Hydrocarbons									
1-Methylnaphthalene	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2361974
2-Methylnaphthalene	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2361974
Acenaphthene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Acenaphthylene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Acridine	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2361974
Anthracene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Benzo(a)anthracene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Benzo(a)pyrene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Benzo(b)fluoranthene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Benzo(g,h,i)perylene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Benzo(k)fluoranthene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Chrysene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Dibenz(a,h)anthracene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Fluoranthene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Fluorene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Indeno(1,2,3-cd)pyrene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Naphthalene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	2361974
Perylene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	0.01	2361974
Phenanthrene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Pyrene	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2361974
Quinoline	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	2361974
Surrogate Recovery (%)									
D10-Anthracene	%	97	80	100	98	80	66		2361974
D14-Terphenyl	%	81(1)	71(1)	71(1)	67(1)	69(1)	53(2)		2361974
D8-Acenaphthylene	%	82	76	77	108	113	94		2361974

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - PAH sample contained sediment.
(2) - PAH sample contained sediment. PAH surrogate(s) not within acceptance limits. Sample past recommended hold time for repeat analysis.

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Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		IE1124	IE1143	IE1146	IE1147	IE1154	IE1155		
Sampling Date		2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13		
	Units	**PRIMARY LINER**	**SECONDARY LINER**	**SURFACE UP**	**SURFACE DOWN**	**MW 93-1**	**MW 93-1A**	**RDL**	**QC Batch**
Chlorobenzenes									
1,2-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	2362100
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
1,4-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Chlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		IE1124	IE1143	IE1146	IE1147	IE1154	IE1155		
Sampling Date		2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13		
	Units	**PRIMARY LINER**	**SECONDARY LINER**	**SURFACE UP**	**SURFACE DOWN**	**MW 93-1**	**MW 93-1A**	**RDL**	**QC Batch**
Volatile Organics									
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
1,1,2,2-Tetrachloroethane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
1,1-Dichloroethane	ug/L	<2	<2	<2	<2	<2	<2	2	2362100
1,1-Dichloroethylene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	2362100
1,2-Dichloroethane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
1,2-Dichloropropane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Benzene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Bromodichloromethane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Bromoform	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Bromomethane	ug/L	<3	<3	<3	<3	<3	<3	3	2362100
Carbon Tetrachloride	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Chloroethane	ug/L	<8	<8	<8	<8	<8	<8	8	2362100
Chloroform	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Chloromethane	ug/L	<8	<8	<8	<8	<8	<8	8	2362100
cis-1,2-Dichloroethylene	ug/L	<2	<2	<2	<2	<2	<2	2	2362100
cis-1,3-Dichloropropene	ug/L	<2	<2	<2	<2	<2	<2	2	2362100
Dibromochloromethane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Ethylene Dibromide	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Methylene Chloride(Dichloromethane)	ug/L	<3	<3	<3	<3	<3	<3	3	2362100
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
p+m-Xylene	ug/L	<2	<2	<2	<2	<2	<2	2	2362100
Styrene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Tetrachloroethylene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Toluene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
trans-1,2-Dichloroethylene	ug/L	<2	<2	<2	<2	<2	<2	2	2362100
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Trichloroethylene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Trichlorofluoromethane (FREON 11)	ug/L	<8	<8	<8	<8	<8	<8	8	2362100
Vinyl Chloride	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	2362100

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		IE1124	IE1143	IE1146	IE1147	IE1154	IE1155		
Sampling Date		2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13		
	Units	**PRIMARY LINER**	**SECONDARY LINER**	**SURFACE UP**	**SURFACE DOWN**	**MW 93-1**	**MW 93-1A**	**RDL**	**QC Batch**
Surrogate Recovery (%)									
4-Bromofluorobenzene	%	96	95	97	97	99	96		2362100
D4-1,2-Dichloroethane	%	94	93	93	94	92	93		2362100
D8-Toluene	%	99	100	99	100	100	100		2362100

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		IE1156	IE1157	IE1158	IE1159	IE1159	IE1160		
Sampling Date		2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13		
	Units	**MW 93-2**	**MW 93-2A**	**MW 10-1**	**MW 10-1A**	**MW 10-1A Lab-Dup**	**DUP-02**	**RDL**	**QC Batch**
Chlorobenzenes									
1,2-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	2362100
1,3-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
1,4-Dichlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Chlorobenzene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		IE1156	IE1157	IE1158	IE1159	IE1159	IE1160		
Sampling Date		2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13		
	Units	**MW 93-2**	**MW 93-2A**	**MW 10-1**	**MW 10-1A**	**MW 10-1A Lab-Dup**	**DUP-02**	**RDL**	**QC Batch**
Volatile Organics									
1,1,1-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
1,1,2,2-Tetrachloroethane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
1,1,2-Trichloroethane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
1,1-Dichloroethane	ug/L	<2	<2	<2	<2	<2	<2	2	2362100
1,1-Dichloroethylene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	2362100
1,2-Dichloroethane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
1,2-Dichloropropane	ug/L	<1	<1	2	4	4	2	1	2362100
Benzene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Bromodichloromethane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Bromoform	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Bromomethane	ug/L	<3	<3	<3	<3	<3	<3	3	2362100
Carbon Tetrachloride	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Chloroethane	ug/L	<8	<8	<8	<8	<8	<8	8	2362100
Chloroform	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Chloromethane	ug/L	<8	<8	<8	<8	<8	<8	8	2362100
cis-1,2-Dichloroethylene	ug/L	<2	<2	<2	<2	<2	<2	2	2362100
cis-1,3-Dichloropropene	ug/L	<2	<2	<2	<2	<2	<2	2	2362100
Dibromochloromethane	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Ethylbenzene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Ethylene Dibromide	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Methylene Chloride(Dichloromethane)	ug/L	<3	<3	<3	<3	<3	<3	3	2362100
o-Xylene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
p+m-Xylene	ug/L	<2	<2	<2	<2	<2	<2	2	2362100
Styrene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Tetrachloroethylene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Toluene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
trans-1,2-Dichloroethylene	ug/L	<2	<2	<2	<2	<2	<2	2	2362100
trans-1,3-Dichloropropene	ug/L	<1	<1	<1	<1	<1	<1	1	2362100
Trichloroethylene	ug/L	<1	<1	1	1	1	1	1	2362100
Trichlorofluoromethane (FREON 11)	ug/L	<8	<8	<8	<8	<8	<8	8	2362100
Vinyl Chloride	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	2362100

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

VOLATILE ORGANICS BY GC/MS (WATER)

Maxxam ID		IE1156	IE1157	IE1158	IE1159	IE1159	IE1160		
Sampling Date		2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13	2010/12/13		
	Units	**MW 93-2**	**MW 93-2A**	**MW 10-1**	**MW 10-1A**	**MW 10-1A Lab-Dup**	**DUP-02**	**RDL**	**QC Batch**
Surrogate Recovery (%)									
4-Bromofluorobenzene	%	97	98	97	97	97	97		2362100
D4-1,2-Dichloroethane	%	92	92	94	93	93	94		2362100
D8-Toluene	%	100	100	100	100	99	99		2362100

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

Maxxam ID		IE1124	IE1143	IE1146	IE1147		IE1154		IE1155		
Sampling Date		2010/12/13	2010/12/13	2010/12/13	2010/12/13		2010/12/13		2010/12/13		
	Units	**PRIMARY LINER**	**SECONDARY LINER**	**SURFACE UP**	**SURFACE DOWN**	**QC Batch**	**MW 93-1**	**QC Batch**	**MW 93-1A**	**RDL**	**QC Batch**
PCBs											
Total PCB	ug/L	<0.05	<0.05	<0.05	<0.05	2362189	<0.05	2367645	<0.05	0.05	2362189
Surrogate Recovery (%)											
Decachlorobiphenyl	%	84	82	75	55	2362189	86(1)	2367645	83(2)		2362189

Maxxam ID		IE1156		IE1157	IE1158	IE1159	IE1160		
Sampling Date		2010/12/13		2010/12/13	2010/12/13	2010/12/13	2010/12/13		
	Units	**MW 93-2**	**QC Batch**	**MW 93-2A**	**MW 10-1**	**MW 10-1A**	**DUP-02**	**RDL**	**QC Batch**
PCBs									
Total PCB	ug/L	<0.05	2367645	<0.05	<0.05	<0.05	<0.05	0.05	2362189
Surrogate Recovery (%)									
Decachlorobiphenyl	%	76(1)	2367645	72	67(2)	80(2)	66(2)		2362189

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - PCB sample contained sediment. PCB sample analysed past recommended hold time as per client request.
(2) - PCB sample contained sediment.

Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

GENERAL COMMENTS

Revised report: Change sample IDs as per client request.

Change sample ID MW 94-4 to read MW 10-1
Change sample ID MW 94-4A to read MW 10-1A
Change sample ID DUP-01 to read DUP-02

2/24/11 MMC

Sample IE1124-01: Elevated reporting limits for trace metals due to sample matrix.

Results for sodium, phosphorus and potassium were reported from the ICP-OES.

Sample IE1143-01: Elevated reporting limits for trace metals due to sample matrix.

Results for sodium, phosphorus and potassium were reported from the ICP-OES.

Sample IE1146-01: Results for sodium, phosphorus and potassium were reported from the ICP-OES. RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample IE1147-01: Results for sodium, phosphorus and potassium were reported from the ICP-OES.

Poor RCAp Ion Balance due to sample matrix. Excess cations due to presence of turbidity.

Sample IE1154-01: Results for sodium, phosphorus and potassium were reported from the ICP-OES.

Sample IE1155-01: Results for sodium, phosphorus and potassium were reported from the ICP-OES.

Sample IE1156-01: Results for sodium, phosphorus and potassium were reported from the ICP-OES.

Sample IE1157-01: Results for sodium, phosphorus and potassium were reported from the ICP-OES. RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample IE1158-01: Results for sodium, phosphorus and potassium were reported from the ICP-OES.

Sample IE1159-01: Results for sodium, phosphorus and potassium were reported from the ICP-OES.

Sample IE1160-01: Results for sodium, phosphorus and potassium were reported from the ICP-OES.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel:902-420-0203 Toll-free:800-565-7227 Fax:902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B0I0761
Report Date: 2011/02/24

Conestoga-Rovers and Associates Ltd
Client Project #: 056680
Project name: COME BY CHANCE SECURE LANDFILL

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2360803	Total Alkalinity (Total as CaCO3)	2010/12/16	NC	80 - 120	108	80 - 120	<5	mg/L	0.7	25	108	80 - 120
2360807	Dissolved Chloride (Cl)	2010/12/16	NC	80 - 120	104	80 - 120	<1	mg/L	0.2	25	103	80 - 120
2360809	Dissolved Sulphate (SO4)	2010/12/16	90	80 - 120	114	80 - 120	<2	mg/L	21.7	25	112	80 - 120
2360812	Reactive Silica (SiO2)	2010/12/17	NC	80 - 120	99	80 - 120	<0.5	mg/L	0.2	25	97	75 - 125
2360816	Colour	2010/12/17					<5	TCU	NC	25	109	80 - 120
2360817	Orthophosphate (P)	2010/12/16	89	80 - 120	100	80 - 120	<0.01	mg/L	NC	25	100	80 - 120
2360821	Nitrate + Nitrite	2010/12/17	NC	80 - 120	98	80 - 120	<0.05	mg/L	0.07	25	101	80 - 120
2360824	Nitrite (N)	2010/12/16	76(1, 2)	80 - 120	100	80 - 120	<0.01	mg/L	NC	25	101	80 - 120
2361974	D10-Anthracene	2010/12/24	78	30 - 130	55	30 - 130	114	%				
2361974	D14-Terphenyl	2010/12/24	72	30 - 130	64	30 - 130	91	%				
2361974	D8-Acenaphthylene	2010/12/24	83	30 - 130	57	30 - 130	79	%				
2361974	1-Methylnaphthalene	2010/12/25	79(3, 4)	30 - 130	105	30 - 130	<0.05	ug/L	NC(5)	40		
2361974	2-Methylnaphthalene	2010/12/25	71(3, 4)	30 - 130	104(6)	30 - 130	<0.05	ug/L	NC(5)	40		
2361974	Acenaphthene	2010/12/25	88(4)	30 - 130	97	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Acenaphthylene	2010/12/25	67(7, 4)	30 - 130	107	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Acridine	2010/12/25	107(4)	30 - 130	86	30 - 130	<0.05	ug/L	NC(5)	40		
2361974	Anthracene	2010/12/25	117(3, 4)	30 - 130	97	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Benzo(a)anthracene	2010/12/25	80(4)	30 - 130	94	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Benzo(a)pyrene	2010/12/25	108(4)	30 - 130	87	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Benzo(b)fluoranthene	2010/12/25	75(4)	30 - 130	109	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Benzo(g,h,i)perylene	2010/12/25	91(4)	30 - 130	82	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Benzo(k)fluoranthene	2010/12/25	101(4)	30 - 130	103	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Chrysene	2010/12/25	82(4)	30 - 130	90	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Dibenz(a,h)anthracene	2010/12/25	100(4)	30 - 130	81	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Fluoranthene	2010/12/25	82(4)	30 - 130	112	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Fluorene	2010/12/25	78(4)	30 - 130	92	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Indeno(1,2,3-cd)pyrene	2010/12/25	123(4)	30 - 130	80	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Naphthalene	2010/12/25	87(4)	30 - 130	103	30 - 130	<0.2	ug/L	NC(5)	40		
2361974	Perylene	2010/12/25	100(4)	30 - 130	71	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Phenanthrene	2010/12/25	83(4)	30 - 130	113	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Pyrene	2010/12/25	84(4)	30 - 130	107	30 - 130	<0.01	ug/L	NC(5)	40		
2361974	Quinoline	2010/12/25	86(4)	30 - 130	85(6)	30 - 130	<0.05	ug/L	NC(5)	40		
2362100	1,2-Dichlorobenzene	2010/12/18	100(8)	70 - 130	97	70 - 130	<0.5	ug/L	NC(9)	40		
2362100	1,3-Dichlorobenzene	2010/12/18	95(8)	70 - 130	96	70 - 130	<1	ug/L	NC(9)	40		
2362100	1,4-Dichlorobenzene	2010/12/18	95(8)	70 - 130	95	70 - 130	<1	ug/L	NC(9)	40		
2362100	Chlorobenzene	2010/12/18	105(8)	70 - 130	103	70 - 130	<1	ug/L	NC(9)	40		
2362100	1,1,1-Trichloroethane	2010/12/18	111(8)	70 - 130	105	70 - 130	<1	ug/L	NC(9)	40		
2362100	1,1,2,2-Tetrachloroethane	2010/12/18	95(8)	70 - 130	92	70 - 130	<1	ug/L	NC(9)	40		
2362100	1,1,2-Trichloroethane	2010/12/18	105(8)	70 - 130	105	70 - 130	<1	ug/L	NC(9)	40		
2362100	1,1-Dichloroethane	2010/12/18	111(8)	70 - 130	110	70 - 130	<2	ug/L	NC(9)	40		

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2362100	1,1-Dichloroethylene	2010/12/18	116(8)	70 - 130	108	70 - 130	<0.5	ug/L	NC(9)	40		
2362100	1,2-Dichloroethane	2010/12/18	95(8)	70 - 130	95	70 - 130	<1	ug/L	NC(9)	40		
2362100	1,2-Dichloropropane	2010/12/18	109(8)	70 - 130	109	70 - 130	<1	ug/L	NC(9)	40		
2362100	4-Bromofluorobenzene	2010/12/18	98	70 - 130	98	70 - 130	97	%				
2362100	Benzene	2010/12/18	111(8)	70 - 130	108	70 - 130	<1	ug/L	NC(9)	40		
2362100	Bromodichloromethane	2010/12/18	100(8)	70 - 130	96	70 - 130	<1	ug/L	NC(9)	40		
2362100	Bromoform	2010/12/18	79(8)	70 - 130	77	70 - 130	<1	ug/L	NC(9)	40		
2362100	Bromomethane	2010/12/18	95(8)	70 - 130	90	70 - 130	<3	ug/L	NC(9)	40		
2362100	Carbon Tetrachloride	2010/12/18	126(8)	70 - 130	116	70 - 130	<1	ug/L	NC(9)	40		
2362100	Chloroethane	2010/12/18	121(8)	70 - 130	118	70 - 130	<8	ug/L	NC(9)	40		
2362100	Chloroform	2010/12/18	111(8)	70 - 130	110	70 - 130	<1	ug/L	NC(9)	40		
2362100	Chloromethane	2010/12/18	116(8)	70 - 130	116	70 - 130	<8	ug/L	NC(9)	40		
2362100	cis-1,2-Dichloroethylene	2010/12/18	110(8)	70 - 130	109	70 - 130	<2	ug/L	NC(9)	40		
2362100	cis-1,3-Dichloropropene	2010/12/18	84(8)	70 - 130	86	70 - 130	<2	ug/L	NC(9)	40		
2362100	D4-1,2-Dichloroethane	2010/12/18	94	70 - 130	93	70 - 130	94	%				
2362100	D8-Toluene	2010/12/18	100	70 - 130	98	70 - 130	99	%				
2362100	Dibromochloromethane	2010/12/18	95(8)	70 - 130	93	70 - 130	<1	ug/L	NC(9)	40		
2362100	Ethylbenzene	2010/12/18	105(8)	70 - 130	101	70 - 130	<1	ug/L	NC(9)	40		
2362100	Ethylene Dibromide	2010/12/18	100(8)	70 - 130	101	70 - 130	<1	ug/L	NC(9)	40		
2362100	Methylene Chloride(Dichloromethane)	2010/12/18	116(8)	70 - 130	122	70 - 130	<3	ug/L	NC(9)	40		
2362100	o-Xylene	2010/12/18	105(8)	70 - 130	102	70 - 130	<1	ug/L	NC(9)	40		
2362100	p+m-Xylene	2010/12/18	105(8)	70 - 130	101	70 - 130	<2	ug/L	NC(9)	40		
2362100	Styrene	2010/12/18	95(8)	70 - 130	101	70 - 130	<1	ug/L	NC(9)	40		
2362100	Tetrachloroethylene	2010/12/18	116(8)	70 - 130	110	70 - 130	<1	ug/L	NC(9)	40		
2362100	Toluene	2010/12/18	105(8)	70 - 130	104	70 - 130	<1	ug/L	NC(9)	40		
2362100	trans-1,2-Dichloroethylene	2010/12/18	111(8)	70 - 130	107	70 - 130	<2	ug/L	NC(9)	40		
2362100	trans-1,3-Dichloropropene	2010/12/18	68(1, 7, 8)	70 - 130	70	70 - 130	<1	ug/L	NC(9)	40		
2362100	Trichloroethylene	2010/12/18	111(8)	70 - 130	110	70 - 130	<1	ug/L	NC(9)	40		
2362100	Trichlorofluoromethane (FREON 11)	2010/12/18	121(8)	70 - 130	114	70 - 130	<8	ug/L	NC(9)	40		
2362100	Vinyl Chloride	2010/12/18	116(8)	70 - 130	113	70 - 130	<0.5	ug/L	NC(9)	40		
2362189	Decachlorobiphenyl	2010/12/22	70	30 - 130	77	30 - 130	74	%				
2362189	Total PCB	2010/12/22	115	70 - 130	115	70 - 130	<0.05	ug/L	NC	40		
2362440	Total Aluminum (Al)	2010/12/17	94	80 - 120	100	80 - 120	<5.0	ug/L	NC	25		
2362440	Total Antimony (Sb)	2010/12/17	112	80 - 120	107	80 - 120	<1.0	ug/L	NC	25		
2362440	Total Arsenic (As)	2010/12/17	98	80 - 120	93	80 - 120	<1.0	ug/L	NC	25		
2362440	Total Barium (Ba)	2010/12/17	NC	80 - 120	99	80 - 120	<1.0	ug/L	3.9	25		
2362440	Total Beryllium (Be)	2010/12/17	105	80 - 120	97	80 - 120	<1.0	ug/L	NC	25		
2362440	Total Bismuth (Bi)	2010/12/17	91	80 - 120	92	80 - 120	<2.0	ug/L	NC	25		
2362440	Total Boron (B)	2010/12/17	101	80 - 120	97	80 - 120	<5.0	ug/L	NC	25		
2362440	Total Cadmium (Cd)	2010/12/17	99	80 - 120	96	80 - 120	<0.017	ug/L	NC	25		

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2362440	Total Calcium (Ca)	2010/12/17	NC	80 - 120	107	80 - 120	<100	ug/L	3.1	25		
2362440	Total Chromium (Cr)	2010/12/17	97	80 - 120	105	80 - 120	<1.0	ug/L	NC	25		
2362440	Total Cobalt (Co)	2010/12/17	97	80 - 120	100	80 - 120	<0.40	ug/L	NC	25		
2362440	Total Copper (Cu)	2010/12/17	98	80 - 120	103	80 - 120	<2.0	ug/L	NC	25		
2362440	Total Iron (Fe)	2010/12/17	107	80 - 120	101	80 - 120	<50	ug/L	NC	25		
2362440	Total Lead (Pb)	2010/12/17	93	80 - 120	95	80 - 120	<0.50	ug/L	NC	25		
2362440	Total Magnesium (Mg)	2010/12/17	NC	80 - 120	99	80 - 120	<100	ug/L	6.1	25		
2362440	Total Manganese (Mn)	2010/12/17	NC	80 - 120	99	80 - 120	<2.0	ug/L	NC	25		
2362440	Total Molybdenum (Mo)	2010/12/17	112	80 - 120	108	80 - 120	<2.0	ug/L	NC	25		
2362440	Total Nickel (Ni)	2010/12/17	95	80 - 120	99	80 - 120	<2.0	ug/L	NC	25		
2362440	Total Phosphorus (P)	2010/12/17	89	80 - 120	90	80 - 120	<100	ug/L	NC	25		
2362440	Total Potassium (K)	2010/12/17	94	80 - 120	93	80 - 120	<100	ug/L	4.0	25		
2362440	Total Selenium (Se)	2010/12/17	104	80 - 120	91	80 - 120	<1.0	ug/L	NC	25		
2362440	Total Silver (Ag)	2010/12/17	95	80 - 120	94	80 - 120	<0.10	ug/L	NC	25		
2362440	Total Sodium (Na)	2010/12/17	NC	80 - 120	96	80 - 120	<100	ug/L	4.2	25		
2362440	Total Strontium (Sr)	2010/12/17	NC	80 - 120	107	80 - 120	<2.0	ug/L	7.4	25		
2362440	Total Thallium (Tl)	2010/12/17	96	80 - 120	95	80 - 120	<0.10	ug/L	NC	25		
2362440	Total Tin (Sn)	2010/12/17	102	80 - 120	101	80 - 120	<2.0	ug/L	NC	25		
2362440	Total Titanium (Ti)	2010/12/17	103	80 - 120	108	80 - 120	<2.0	ug/L	NC	25		
2362440	Total Uranium (U)	2010/12/17	98	80 - 120	102	80 - 120	<0.10	ug/L	NC	25		
2362440	Total Vanadium (V)	2010/12/17	103	80 - 120	108	80 - 120	<2.0	ug/L	NC	25		
2362440	Total Zinc (Zn)	2010/12/17	99	80 - 120	101	80 - 120	<5.0	ug/L	NC	25		
2362445	Dissolved Aluminum (Al)	2010/12/17	88(10)	80 - 120	94	80 - 120	<5.0	ug/L				
2362445	Dissolved Antimony (Sb)	2010/12/17	109(10)	80 - 120	106	80 - 120	<1.0	ug/L				
2362445	Dissolved Arsenic (As)	2010/12/17	103(10)	80 - 120	92	80 - 120	<1.0	ug/L				
2362445	Dissolved Barium (Ba)	2010/12/17	NC(10)	80 - 120	98	80 - 120	<1.0	ug/L				
2362445	Dissolved Beryllium (Be)	2010/12/17	103(10)	80 - 120	101	80 - 120	<1.0	ug/L				
2362445	Dissolved Bismuth (Bi)	2010/12/17	92(10)	80 - 120	91	80 - 120	<2.0	ug/L				
2362445	Dissolved Boron (B)	2010/12/17	NC(10)	80 - 120	98	80 - 120	<5.0	ug/L				
2362445	Dissolved Cadmium (Cd)	2010/12/17	96(10)	80 - 120	93	80 - 120	<0.017	ug/L				
2362445	Dissolved Calcium (Ca)	2010/12/17	NC(10)	80 - 120	102	80 - 120	<100	ug/L	0.03	25		
2362445	Dissolved Chromium (Cr)	2010/12/17	93(10)	80 - 120	100	80 - 120	<1.0	ug/L				
2362445	Dissolved Cobalt (Co)	2010/12/17	98(10)	80 - 120	97	80 - 120	<0.40	ug/L				
2362445	Dissolved Copper (Cu)	2010/12/17	90(10)	80 - 120	96	80 - 120	<2.0	ug/L				
2362445	Dissolved Iron (Fe)	2010/12/17	93(10)	80 - 120	96	80 - 120	<50	ug/L				
2362445	Dissolved Lead (Pb)	2010/12/17	95(10)	80 - 120	95	80 - 120	<0.50	ug/L				
2362445	Dissolved Magnesium (Mg)	2010/12/17	NC(10)	80 - 120	93	80 - 120	<100	ug/L				
2362445	Dissolved Manganese (Mn)	2010/12/17	NC(10)	80 - 120	94	80 - 120	<2.0	ug/L				
2362445	Dissolved Molybdenum (Mo)	2010/12/17	NC(10)	80 - 120	103	80 - 120	<2.0	ug/L				
2362445	Dissolved Nickel (Ni)	2010/12/17	93(10)	80 - 120	93	80 - 120	<2.0	ug/L				

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2362445	Dissolved Phosphorus (P)	2010/12/17	91(10)	80 - 120	91	80 - 120	<100	ug/L				
2362445	Dissolved Potassium (K)	2010/12/17	90(10)	80 - 120	90	80 - 120	<100	ug/L				
2362445	Dissolved Selenium (Se)	2010/12/17	110(10)	80 - 120	97	80 - 120	<1.0	ug/L				
2362445	Dissolved Silver (Ag)	2010/12/17	64(1, 11, 10)	80 - 120	97	80 - 120	<0.10	ug/L				
2362445	Dissolved Sodium (Na)	2010/12/17	NC(10)	80 - 120	94	80 - 120	<100	ug/L				
2362445	Dissolved Strontium (Sr)	2010/12/17	NC(10)	80 - 120	103	80 - 120	<2.0	ug/L				
2362445	Dissolved Thallium (Tl)	2010/12/17	96(10)	80 - 120	96	80 - 120	<0.10	ug/L				
2362445	Dissolved Tin (Sn)	2010/12/17	99(10)	80 - 120	96	80 - 120	<2.0	ug/L				
2362445	Dissolved Titanium (Ti)	2010/12/17	103(10)	80 - 120	96	80 - 120	<2.0	ug/L				
2362445	Dissolved Uranium (U)	2010/12/17	100(10)	80 - 120	95	80 - 120	<0.10	ug/L				
2362445	Dissolved Vanadium (V)	2010/12/17	103(10)	80 - 120	102	80 - 120	<2.0	ug/L				
2362445	Dissolved Zinc (Zn)	2010/12/17	117(10)	80 - 120	107	80 - 120	<5.0	ug/L				
2363442	Turbidity	2010/12/18					<0.1	NTU	4.2(12)	25	97	80 - 120
2363445	Turbidity	2010/12/18					<0.1	NTU	NC	25	95	80 - 120
2364137	pH	2010/12/20					5.36, RDL=N/A	pH	0.9	25	99	80 - 120
2364141	Conductivity	2010/12/20					1, RDL=1	uS/cm	0.4	25	101	80 - 120
2364162	pH	2010/12/20					5.41, RDL=N/A	pH	1.1	25	99	80 - 120
2364169	Conductivity	2010/12/20					1, RDL=1	uS/cm	0.2	25	102	80 - 120
2364598	Nitrogen (Ammonia Nitrogen)	2010/12/20	100	80 - 120	98	80 - 120	<0.05	mg/L	NC	25	97	80 - 120
2365464	Total Organic Carbon (C)	2010/12/21	96	80 - 120	99	80 - 120	<0.5	mg/L	NC	25	100	80 - 120

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
2367645	Decachlorobiphenyl	2010/12/29			93	30 - 130	90	%				
2367645	Total PCB	2010/12/29			119	70 - 130	<0.05	ug/L				

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
(10) - Matrix Spike Parent ID [IE1154-01]
(11) - Low recovery due to sample matrix.
(12) - Duplicate Parent ID [IE1146-01]
(2) - Low spike recovery due to sample matrix. Recovery confirmed by repeat analysis.
(3) - PAH surrogate(s) not within acceptance limits. Sample past recommended hold time for repeat analysis.
(4) - Matrix Spike Parent ID [IE1156-02]
(5) - Duplicate Parent ID [IE1154-02]
(6) - Spike: < 10 % of compounds in multi-component analysis in violation.
(7) - Matrix Spike: < 10 % of compounds in multi-component analysis in violation.
(8) - Matrix Spike Parent ID [IE1160-02]
(9) - Duplicate Parent ID [IE1159-02]

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel:902-420-0203 Toll-free:800-565-7227 Fax:902-420-8612 www.maxxamanalytics.com

Validation Signature Page

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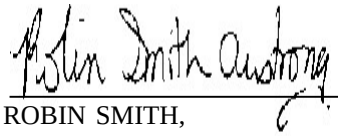
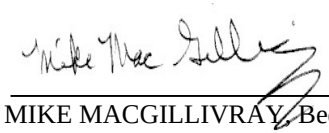
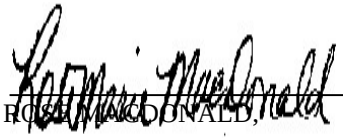
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



ROBIN SMITH,



MIKE MACGILLIVRAY, Bedford Inorg Spvsr



ROBERT MACDONALD, B.Sc.

ALAN STEWART, Scientific Specialist (Organics)

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel:902-420-0203 Toll-free:800-565-7227 Fax:902-420-8612 www.maxxamanalytics.com

APPENDIX D

STANTEC LETHALITY LABORATORY REPORTS

Stantec Consulting Ltd
Science Laboratory
422 Logy Bay Road
St. John's, NL A1A 5C6
Tel: (709) 576-4804
Fax: (709) 576-0008

Registered to ISO 9001:2000
ISO/IEC 17025:2005 Accredited
SCC-Food Scope (No. 268)
CALA – Environmental Scope (No. 2709)

Stantec

July 27, 2010
Job: 10529.
JW Lab Refer No.: B-1362-09 & B-1363-09

Report No.: 03520

CRA
P.O Box 8353
1118 Topsail Rd
St. John's, NL
A1N 3N7
Tel: (709) 364-5353
Fax: (709) 364-5268

Attention: Dave McColl

Dear Mr. McColl,

Reference: Toxicology Testing Results

Please find enclosed the results of the 96 hour bioassays conducted July 19 - 23, 2010. These toxicity tests were performed on the Primary Liner and Secondary Liner. These effluents were collected on July 16, 2010. The samples were received in an acceptable condition.

Test conditions for a single concentration test were followed according to the Reference Method: For Determining Acute Lethality of Effluents to Rainbow Trout (Report EPS 1/RM/13 Second Edition-December 2000 and May 2007 amendment). All test parameters were maintained within the recommended levels outlined in the above protocol.

Since less than 50.00 % of the fish died during the 96 hour period in the 100.00 % effluents for the Primary Liner and Secondary Liner, these effluents are considered to be non toxic to the fish. The LT50's were determined to be greater than 96 hours.

Please call if you have any questions regarding these results.

Sincerely,

STANTEC CONSULTING LTD

Michelle Pye, B.Sc.
Toxicology Lead, Science Laboratory

Attachments:

A- Bench Data Sheet(s)

Reference: Toxicology Testing Results

SAMPLE

JW Lab Refer.No.:	B-1362-09
Company:	CRA
Sample Material:	Primary Liner
Sampling Method:	Not provided
Sample Condition:	Received in acceptable condition
Collected:	July 16, 2010; 5:00 pm
Collected By:	H. Anderson

SAMPLE CHARACTERIZATION

Received (Date and Time):	July 19, 2010; 10:30 am
Volume:	2 x 20 L
Temperature:	14.7 °C
Dissolved Oxygen:	8.3 mg/L
pH:	7.1 pH units
Conductivity:	716 µS/cm
Colour:	Cloudy, orange
Odour:	None
Storage:	0 Hours @ 4.0 ± 2.0 °C

DILUTION WATER CHARACTERIZATION (MONTHLY AVERAGE)

Source:	St. John's Dechlorinated
Dissolved Oxygen:	9.6 ± 0.3 mg/L
Conductivity:	146 ± 16 µS/cm
Hardness:	25 ± 1.1 mg/L
pH:	7.6 ± 0.3 pH units
Date Revised:	July 5, 2010

TEST CONDITIONS

Started (Date and Time):	July 19, 2010; 11:50 am
Ended (Date and Time):	July 23, 2010; 11:50 am
Type of Test:	96 hour static LT_{50} (Pass/Fail)
Volume of Test Solutions:	20 Litres
Photoperiod:	16 Light/08 Dark
Light Intensity:	227 Lux
Aeration Rate:	6.5 ± 1.0 mL/min.L^{-1}
Preaeration Time:	30 mins
Test Temperature:	15 ± 1 °C
Duration:	96 hours

TEST ORGANISM

Species:	Rainbow Trout (*Oncorhynchus mykiss*)		
Source:	Rainbow Springs Hatchery		
Batch Number:	10-07		
Number per Tank:	10		
% Mortality:	0% (7 days prior to testing)		
Mean Fork Length (cm):	3.5 ± 0.1	Range (cm):	3.4 – 3.6
Mean Total Weight (g):	0.4 ± 0.1	Range (g):	0.3 – 0.5
Loading Density:	0.2 g/L		

Reference: Toxicology Testing Results

TEST RESULTS

JW Lab Refer No.:	B-1362-09
Sample Material:	Primary Liner
Collection Date:	July 16, 2010; 5:00 pm
Protocol:	EPS 1/RM/13
Test Type:	LT_{50} (Pass/Fail)
LT_{50} value (static, acute):	> 96 hrs
95% Confidence Intervals:	N/A

Effluent Conc.(%)	Temp(°C)		D.O. (mg/L)		pH (units)		Cond.(µs/cm)		Mortality
	Init.	Final	Init.	Final	Init.	Final	Init.	Final	(%)
100	15.2	15.3	9.2	9.2	7.3	8.1	720	692	0
0	15.3	15.3	9.6	9.5	7.1	7.2	138	150	0

COMMENTS:

- Arrival temperature of 5.5 °C.
- The sample contained a few suspended particles.
- Samples have not been pH adjusted or filtered.
- The above analysis was conducted according to protocols indicated. The above results, which refer to the sample(s) tested only, are for your information and will be held in the strictest of confidence by this firm.
- Sample controls are considered a part of a sample test and as such are subject to the same treatment. (This includes, but is not limited to, aeration and temperature testing requirements.)

REFERENCE TOXICITY TEST DATA (LOG SCALE)

Test Organism:	*Oncorhynchus mykiss*
Toxicant:	Phenol
Fish Batch No.:	10-07
Reference Toxicant Date:	June 28 – July 2, 2010
LC_{50} Value:	1.1 mg/L
95% Confidence Limits:	1.0 – 1.2 mg/L
Historic Mean ± 2 SD (Warning Limits):	1.1 ± 0.1 mg/L

Performed by: Michelle Pye/Trevor Whiteway

Technical Reviewer: Suzette Winter
(Print Name/Signature)

Senior Reviewer: Michelle Pye | MPye
(Print Name/Signature)

Date: July 28, 2010

Reference: Toxicology Testing Results

SAMPLE

JW Lab Refer.No.:	B-1363-09
Company:	CRA
Sample Material:	Secondary Liner
Sampling Method:	Not provided
Sample Condition:	Received in acceptable condition
Collected:	July 16, 2010; 5:30 pm
Collected By:	H. Anderson

SAMPLE CHARACTERIZATION

Received (Date and Time):	July 19, 2010; 10:30 am
Volume:	2 x 20 L
Temperature:	14.8 °C
Dissolved Oxygen:	8.5 mg/L
pH:	7.1 pH units
Conductivity:	947 µS/cm
Colour:	Cloudy, orange
Odour:	None
Storage:	0 Hours @ 4.0 ± 2.0 °C

DILUTION WATER CHARACTERIZATION (MONTHLY AVERAGE)

Source:	St. John's Dechlorinated
Dissolved Oxygen:	9.6 ± 0.3 mg/L
Conductivity:	146 ± 16 µS/cm
Hardness:	25 ± 1.1 mg/L
pH:	7.6 ± 0.3 pH units
Date Revised:	July 5, 2010

TEST CONDITIONS

Started (Date and Time):	July 19, 2010; 11:55 am
Ended (Date and Time):	July 23, 2010; 11:55 am
Type of Test:	96 hour static LT_{50} (Pass/Fail)
Volume of Test Solutions:	20 Litres
Photoperiod:	16 Light/08 Dark
Light Intensity:	235 Lux
Aeration Rate:	6.5 ± 1.0 mL/min.L^{-1}
Preaeration Time:	30 mins
Test Temperature:	15 ± 1 °C
Duration:	96 hours

TEST ORGANISM

Species:	Rainbow Trout (*Oncorhynchus mykiss*)		
Source:	Rainbow Springs Hatchery		
Batch Number:	10-07		
Number per Tank:	10		
% Mortality:	0% (7 days prior to testing)		
Mean Fork Length (cm):	3.5 ± 0.3	Range (cm):	3.2 – 3.9
Mean Total Weight (g):	0.4 ± 0.3	Range (g):	0.2 – 0.8
Loading Density:	0.2 g/L		

Reference: Toxicology Testing Results

TEST RESULTS

JW Lab Refer No.:	B-1363-09
Sample Material:	Secondary Liner
Collection Date:	July 16, 2010; 5:30 pm
Protocol:	EPS 1/RM/13
Test Type:	LT_{50} (Pass/Fail)
LT_{50} value (static, acute):	> 96 hrs
95% Confidence Intervals:	N/A

Effluent Conc.(%)	Temp(°C)		D.O. (mg/L)		pH (units)		Cond.(µs/cm)		Mortality
	Init.	Final	Init.	Final	Init.	Final	Init.	Final	(%)
100	14.8	15.2	9.0	9.6	7.2	8.9	950	893	0
0	15.1	15.3	9.1	9.2	7.2	7.6	137	162	0

COMMENTS:

- Arrival temperature of 5.5 °C.
- The sample contained a few suspended particles.
- Samples have not been pH adjusted or filtered.
- The above analysis was conducted according to protocols indicated. The above results, which refer to the sample(s) tested only, are for your information and will be held in the strictest of confidence by this firm.
- Sample controls are considered a part of a sample test and as such are subject to the same treatment. (This includes, but is not limited to, aeration and temperature testing requirements.)

REFERENCE TOXICITY TEST DATA (LOG SCALE)

Test Organism:	*Oncorhynchus mykiss*
Toxicant:	Phenol
Fish Batch No.:	10-07
Reference Toxicant Date:	June 28 – July 2, 2010
LC_{50} Value:	1.1 mg/L
95% Confidence Limits:	1.0 – 1.2 mg/L
Historic Mean ± 2 SD (Warning Limits):	1.1 ± 0.1 mg/L

Performed by: Michelle Pye/Trevor Whiteway

Technical Reviewer: Suzette Winter
(Print Name/Signature)

Senior Reviewer: Michelle Pye / MBz
(Print Name/Signature)

Date: July 28, 2010

Reference: Toxicology Testing Results

ATTACHMENT A

Bench Data Sheet (s)

Jacques Whitford Environment Limited
Laboratory Division

JWEL Lab Form: Bio-0011
Date: May 30, 2003

LT50 Fish Bioassay Data Sheet

Client: CRA
Dave McColl
1118 Topsail Road PO Box 8353
St. John's, NL
A1N 3N7
(709) 364-5353
(709) 364-5368

Sample ID # B-1362-09
Client # 121510529

Light Intensity: 727 lux
Ammonia (Init.): —
Ammonia (Fin.): —

Sample Material: primary liner
Start Date: 071910
Finish Date: 072310
Date Collected: 071610 Time Collected: 5pm
Date Received: 071910 Time Received: 10:30 am

Preaeration Time: 30 min.
Test Org - Batch #: 10-07
Source: RSH
Test Start Date: 071910
Test Start Time: 11:50 am.

Clarity (I): cloudy
Colour (I): orange
Odour (I): no
Susp. Part. (I): a few
Other (I): coll: H. Anderson, arr: 5.5°C.

Aeration Rate: 6.5 ± mL/min. L-1

Conc: 100% 70L used.
Salinity: 0.2ppt

Conc:
Salinity: 0% control.

Volume: 25 Litres x 2 received
Storage: NA, tempered in wb #1 for 45 min.

Time	Day	Monit By	HR.	Mort #	Temp (°C)	DO (mg/l)	pH	Cond (µS/cm)	Mort #	Temp (°C)	DO (mg/l)	pH	Cond (uS/cm)
11:20	071910	NM	INT	—	14.7	8.3	7.1	716					
11:50	"	"	0	—	15.2	9.2	7.3	720	—	15.3	9.6	7.1	138
8:50	072010	TW	24	—	15.1	9.3	8.5	689	—	15.2	9.4	7.4	155
9:40	072110	NM	48	—	14.9	9.2	8.3	685	—	15.2	9.3	7.5	152
9:42	072210	NM	72	—	15.1	9.3	8.5	690	—	15.3	9.4	7.6	153
11:50	072310	NM	96	—	15.3	9.2	8.1	692	—	15.3	9.5	7.2	150

Fish Behaviour Comments

At 96 hrs all fish alive NB →

Fish Measurements

Fork Length (cm)	Wet Weight (g)
3.4	0.4
3.6	0.5
3.4	0.3
3.5	0.4
3.4	0.3
3.5	0.4
3.5	0.5
3.6	0.5
3.4	0.3
Mean +/- SD	
3.5	0.1	0.4	0.1

Loading Density (g/l): 0.2

LT50: 96hrs.

Pretreatment: Composite ☒ Temp ☒ Other ☐
Dissolved Oxygen ☒ Water Hardness ☐

Comments EPS1 / RM / 13 Second Edition - December 2000

Clarity (F): Same as initial
Colour (F):
Odour (F):
Susp. Part. (F):
Other (F):

Jacques Whitford Environment Limited Laboratory Division	JWEL Lab Form: Bio-0011 Date: May 30, 2003

LT50 Fish Bioassay Data Sheet

Client: CRA
Dave McColl
1118 Topsail Road PO Box 8353
St. John's, NL
A1N 3N7
(709) 364-5353
(709) 364-5368

Sample ID # B-1363-09
Client # 121510529

Light Intensity: 235 lux
Ammonia (Init.): —
Ammonia (Fin.): —

Sample Material: secondary liner
Start Date: 07 19 10
Finish Date: 07 23 10
Date Collected: 07 16 10 Time Collected: 5:30pm
Date Received: 07 19 10 Time Received: 10:30 AM

Preaeration Time: 30 min.
Test Org - Batch #: 10-07
Source: LSH
Test Start Date: 07 19 10
Test Start Time: 11:55 AM

Clarity (I): cloudy
Colour (I): orange
Odour (I): ng
Susp. Part. (I): a few.
Other (I): COA: H. Anderson, on: 5.5°C.

Aeration Rate: 6.5 ± mL/min. L-1

Conc: 100% 2L used
Salinity: 0.2ppt

Conc: 0%
Salinity: control

Volume: 25 Litres x2 received
Storage: NA, tempered in WB #1 for 45 min.

Time	Day	Monit By	HR.	Mort #	Temp (°C)	DO (mg/l)	pH	Cond (µS/cm)	Mort #	Temp (°C)	DO (mg/l)	pH	Cond (uS/cm)
11:25	07 19 10	MP	INT	—	14.8	8.5	7.1	947.					
11:55	←	←	0	—	14.8	9.0	7.2	950	—	15.1	9.1	7.2	137
11:45	07 20 10	MP	24	—	14.9	9.4	8.5	892	—	15.0	9.6	7.4	154
9:35	07 21 10	MP	48	—	15.0	9.3	8.7	894	—	15.1	9.4	7.3	152
7:40	07 22 10	MP	72	—	15.3	9.2	8.6	885	—	15.2	9.3	7.2	165
11:55	07 23 10	MP	96	—	15.2	9.6	8.9	893	—	15.3	9.2	7.6	162

Fish Measurements

Fork Length (cm)	Wet Weight (g)
3.2	0.3
3.3	0.3
3.8	0.5
3.7	0.3
3.3	0.3
3.9	0.8
3.8	0.5
3.3	0.2
3.5	0.4
3.4	0.3
Mean +/- SD	
3.5	0.3	0.4	0.3

Loading Density (g/l): 0.2
LT50: 96hrs.

Fish Behaviour Comments

At 96 hrs 10 fish alive NB →

Pretreatment: Composite ☑ Temp ☑ Other ☐
Dissolved Oxygen ☑ Water Hardness ☐

Clarity (F): Same as initial
Colour (F):
Odour (F):
Susp. Part. (F):
Other (F):

Comments EPS1 / RM / 13 Second Edition - December 2000

Stantec Consulting Ltd
Science Laboratory
422 Logy Bay Road
St. John's, NL A1A 5C6
Tel: (709) 576-4804
Fax: (709) 576-0008

Registered to ISO 9001:2000
ISO/IEC 17025:2005 Accredited
SCC-Food Scope (No. 268)
CALA – Environmental Scope (No. 2709)

Stantec

December 20, 2010
Job: 10529.
JW Lab Refer No.: B-1921-09 & B-1922-09

Report No.: 03695

CRA
P.O Box 8353
1118 Topsail Rd
St. John's, NL
A1N 3N7
Tel: (709) 364-5353
Fax: (709) 364-5268

Attention: **Dave McColl**

Dear Mr. McColl,

Reference: **Toxicology Testing Results**

Please find enclosed the results of the 96 hour bioassays conducted December 14 - 18, 2010. These toxicity tests were performed on the SLCS and PLCS. These effluents were collected on December 13, 2010. The samples were received in an acceptable condition.

Test conditions for a single concentration test were followed according to the Reference Method: For Determining Acute Lethality of Effluents to Rainbow Trout (Report EPS 1/RM/13 Second Edition-December 2000 and May 2007 amendment). All test parameters were maintained within the recommended levels outlined in the above protocol.

Since less than 50.00 % of the fish died during the 96 hour period in the 100.00 % effluents for the SLCS and PLCS, these effluents are considered to be non toxic to the fish. The LT50's were determined to be greater than 96 hours.

Please call if you have any questions regarding these results.

Sincerely,

STANTEC CONSULTING LTD

Michelle Pye

Michelle Pye, B.Sc.
Toxicology Lead, Science Laboratory

Attachments:

A- Bench Data Sheet(s)

Reference: Toxicology Testing Results

SAMPLE

JW Lab Refer.No.:	B-1921-09
Company:	CRA
Sample Material:	SLCS
Sampling Method:	Not provided
Sample Condition:	Received in acceptable condition
Collected:	December 13, 2010; 3:30 pm
Collected By:	Brian Luffman

SAMPLE CHARACTERIZATION

Received (Date and Time):	December 14, 2010; 8:30 am
Volume:	2 x 20 L
Temperature:	14.4 °C
Dissolved Oxygen:	9.3 mg/L
pH:	7.6 pH units
Conductivity:	1001 µS/cm
Colour:	Cloudy, yellow
Odour:	None
Storage:	0 Hours @ 4.0 ± 2.0 °C

DILUTION WATER CHARACTERIZATION (MONTHLY AVERAGE)

Source:	St. John's Dechlorinated
Dissolved Oxygen:	9.6 ± 0.3 mg/L
Conductivity:	156 ± 5 µS/cm
Hardness:	28 ± 6 mg/L
pH:	7.5 ± 0.3 pH units
Date Revised:	December 1, 2010

TEST CONDITIONS

Started (Date and Time):	December 14, 2010; 11:45 am
Ended (Date and Time):	December 18, 2010; 11:45 am
Type of Test:	96 hour static LT_{50} (Pass/Fail)
Volume of Test Solutions:	20 Litres
Photoperiod:	16 Light/08 Dark
Light Intensity:	341 Lux
Aeration Rate:	6.5 ± 1.0 mL/min.L^{-1}
Preaeration Time:	30 mins
Test Temperature:	15 ± 1 °C
Duration:	96 hours

TEST ORGANISM

Species:	Rainbow Trout (*Oncorhynchus mykiss*)		
Source:	Rainbow Springs Hatchery		
Batch Number:	10-13		
Number per Tank:	10		
% Mortality:	0% (7 days prior to testing)		
Mean Fork Length (cm):	4.3 ± 0.5	Range (cm):	3.5 – 5.0
Mean Total Weight (g):	0.8 ± 0.3	Range (g):	0.4 – 1.1
Loading Density:	0.4 g/L		

Reference: Toxicology Testing Results

TEST RESULTS

JW Lab Refer No.:	B-1921-09
Sample Material:	SLCS
Collection Date:	December 13, 2010; 3:30 pm
Protocol:	EPS 1/RM/13
Test Type:	LT_{50} (Pass/Fail)
LT_{50} value (static, acute):	> 96 hrs
95% Confidence Intervals:	N/A

Effluent Conc.(%)	Temp(°C)		D.O. (mg/L)		pH (units)		Cond.(µs/cm)		Mortality
	Init.	Final	Init.	Final	Init.	Final	Init.	Final	(%)
100	14.7	16.0	9.1	9.2	7.5	8.3	1004	685	0
0	15.7	16.1	9.1	9.3	7.8	7.6	163	172	0

COMMENTS:

- Arrival temperature of 5.0 °C.
- The sample did not contain suspended particles.
- Samples have not been pH adjusted or filtered.
- The above analysis was conducted according to protocols indicated. The above results, which refer to the sample(s) tested only, are for your information and will be held in the strictest of confidence by this firm.
- Sample controls are considered a part of a sample test and as such are subject to the same treatment. (This includes, but is not limited to, aeration and temperature testing requirements.)

REFERENCE TOXICITY TEST DATA (LOG SCALE)

Test Organism:	*Oncorhynchus mykiss*
Toxicant:	Phenol
Fish Batch No.:	10-13
Reference Toxicant Date:	November 22 - 26, 2010
LC_{50} Value:	1.1 mg/L
95% Confidence Limits:	1.0 – 1.2 mg/L
Historic Mean ± 2 SD (Warning Limits):	1.1 ± 0.1 mg/L

Performed by: Michelle Pye/Jill Wheaton/Johann Pickett

Technical Reviewer: Dianne Hunt-Hall / DHuntHall
(Print Name/Signature)

Senior Reviewer: Michelle Pye | MPye (Print Name/Signature) Date: Dec 21, 2010

Reference: Toxicology Testing Results

SAMPLE

JW Lab Refer.No.:	B-1922-09
Company:	CRA
Sample Material:	PLCS
Sampling Method:	Not provided
Sample Condition:	Received in acceptable condition
Collected:	December 13, 2010; 3:30 pm
Collected By:	Brain Luffman

SAMPLE CHARACTERIZATION

Received (Date and Time):	December 14, 2010; 8:30 am
Volume:	2 x 20 L
Temperature:	14.0 °C
Dissolved Oxygen:	9.4 mg/L
pH:	7.6 pH units
Conductivity:	938 µS/cm
Colour:	Cloudy, yellow
Odour:	None
Storage:	0 Hours @ 4.0 ± 2.0 °C

DILUTION WATER CHARACTERIZATION (MONTHLY AVERAGE)

Source:	St. John's Dechlorinated
Dissolved Oxygen:	9.6 ± 0.3 mg/L
Conductivity:	156 ± 5 µS/cm
Hardness:	28 ± 6 mg/L
pH:	7.5 ± 0.3 pH units
Date Revised:	December 1, 2010

TEST CONDITIONS

Started (Date and Time):	December 14, 2010; 11:45 am
Ended (Date and Time):	December 18, 2010; 11:45 am
Type of Test:	96 hour static LT_{50} (Pass/Fail)
Volume of Test Solutions:	20 Litres
Photoperiod:	16 Light/08 Dark
Light Intensity:	355 Lux
Aeration Rate:	6.5 ± 1.0 mL/min.L^{-1}
Preaeration Time:	30 mins
Test Temperature:	15 ± 1 °C
Duration:	96 hours

TEST ORGANISM

Species:	Rainbow Trout (*Oncorhynchus mykiss*)		
Source:	Rainbow Springs Hatchery		
Batch Number:	10-13		
Number per Tank:	10		
% Mortality:	0% (7 days prior to testing)		
Mean Fork Length (cm):	4.1 ± 0.5	Range (cm):	3.2 – 4.6
Mean Total Weight (g):	0.8 ± 0.3	Range (g):	0.5 – 1.1
Loading Density:	0.4 g/L		

Reference: Toxicology Testing Results

TEST RESULTS

JW Lab Refer No.:	B-1922-09
Sample Material:	PLCS
Collection Date:	December 13, 2010; 3:30 pm
Protocol:	EPS 1/RM/13
Test Type:	LT_{50} (Pass/Fail)
LT_{50} value (static, acute):	> 96 hrs
95% Confidence Intervals:	N/A

Effluent Conc.(%)	Temp(°C)		D.O. (mg/L)		pH (units)		Cond.(µs/cm)		Mortality
	Init.	Final	Init.	Final	Init.	Final	Init.	Final	(%)
100	14.2	16.1	9.3	9.2	7.5	8.2	936	669	0
0	15.4	16.0	9.1	9.1	7.8	7.6	163	172	0

COMMENTS:

- Arrival temperature of 5.0 °C.
- The sample did not contain suspended particles.
- Samples have not been pH adjusted or filtered.
- The above analysis was conducted according to protocols indicated. The above results, which refer to the sample(s) tested only, are for your information and will be held in the strictest of confidence by this firm.
- Sample controls are considered a part of a sample test and as such are subject to the same treatment. (This includes, but is not limited to, aeration and temperature testing requirements.)

REFERENCE TOXICITY TEST DATA (LOG SCALE)

Test Organism:	*Oncorhynchus mykiss*
Toxicant:	Phenol
Fish Batch No.:	10-13
Reference Toxicant Date:	November 22 - 26, 2010
LC_{50} Value:	1.1 mg/L
95% Confidence Limits:	1.0 – 1.2 mg/L
Historic Mean ± 2 SD (Warning Limits):	1.1 ± 0.1 mg/L

Performed by: Michelle Pye/Johann Pickett/Jill Wheaton

Technical Reviewer: Dianne Hunt-Hall / Dianne Hunt-Hall
(Print Name/Signature)

Senior Reviewer: Michelle Pye / MPye (Print Name/Signature) Date: Dec 21, 2010

Reference: Toxicology Testing Results

ATTACHMENT A

Bench Data Sheet (s)

Jacques Whitford Environment Limited
Laboratory Division

JWEL Lab Form: Bio-0011
Date: May 30, 2003

LT50 Fish Bioassay Data Sheet

Client: CRA
Dave McColl
1118 Topsail Road PO Box 8353
St. John's, NL
A1N 3N7
(709) 364-5353
(709) 364-5368

Sample ID # B-1921-09
Client # 121510529

1W

Light Intensity: 341 lux
Ammonia (Init.):
Ammonia (Fin.): /

Sample Material: ~~sample~~ SLCS
Start Date: 121410
Finish Date: 121810
Date Collected: 121310 Time Collected: 3:30
Date Received: 121410 Time Received: 8:30

Preaeration Time: 30 min.
Test Org - Batch #: 10-13
Source: RSH
Test Start Date: 121410
Test Start Time: 11:45

Clarity (I): cloudy
Colour (I): yellow
Odour (I): no
Susp. Part. (I): no
Other (I): Collected by: B. Luffman Arrival temp: 5.0 °C

Aeration Rate: 6.5 ± mL/min. L-1

Conc: 100% 20L used
Salinity: 0.5 ppt.

Conc: 0%.
Salinity:

Volume: 2x25 Litres
Storage: Tempered @ 15 ± 1°C in a warm waterbath

Time	Day	Monit By	HR.	Mort #	Temp (°C)	DO (mg/l)	pH	Cond (µS/cm)	Mort #	Temp (°C)	DO (mg/l)	pH	Cond (uS/cm)
11:15	121410	JP	INT		14.4	9.3	7.6	1001					
11:45	↓	↓	0	—	14.7	9.1	7.5	1004	—	15.7	9.1	7.8	163
8:40	121510	JP	24	—	15.0	8.9	8.3	967	—	15.1	9.1	7.8	163
9:10	121610	N	48	—	15.2	9.1	8.0	962	—	15.3	9.2	7.7	165
9:15	121710	JP/JW	72	—	15.3	9.2	8.1	965	—	15.2	9.3	7.9	163
11:45	121810	JW	96	—	16.0	9.2	8.3	685	—	16.1	9.3	7.6	172

Fish Behaviour Comments		
	all fish alive @ 96hrs	all fish alive @ 96hrs.

Fish Measurements

Fork Length (cm)	Wet Weight (g)
5.0	1.3
4.5	1.0
4.2	0.8
4.6	1.1
4.1	0.7
4.2	0.8
4.3	0.7
3.5	0.5
3.6	0.4
4.7	1.0
Mean +/- SD	
4.27	0.47
0.83	0.28

Loading Density (g/l): 0.42
LT50: >96hrs

Pretreatment: Composite ☒ Temp ☒ Other ☐
Dissolved Oxygen ☒ Water Hardness ☐

Comments EPS1 / RM / 13 Second Edition - December 2000

Clarity (F): cloudy
Colour (F): yellow
Odour (F): no
Susp. Part. (F): no
Other (F):

Jacques Whitford Environment Limited
Laboratory Division

JWEL Lab Form: Bio-0011
Date: May 30, 2003

LT50 Fish Bioassay Data Sheet

Client: CRA
Dave McColl
1118 Topsail Road PO Box 8353
St. John's, NL
A1N 3N7
(709) 364-5353
(709) 364-5368

Sample ID # B-1922-09
Client # 121510529

Light Intensity: 355 lux
Ammonia (Init.): /
Ammonia (Fin.): /

Sample Material: ~~sample 6~~ PLCS
Start Date: 121410
Finish Date: 121810
Date Collected: 121310 Time Collected: 3:30
Date Received: 121410 Time Received: 8:30

Preaeration Time: 30 min.
Test Org - Batch #: 10-13
Source: RSH
Test Start Date: 121410
Test Start Time: 11:45

Clarity (I): cloudy
Colour (I): yellow
Odour (I): no
Susp. Part. (I): no
Other (I): Collected by: B. Coffman Arrival temp: 5.0°C

Aeration Rate: 6.5 ± mL/min. L-1

Conc: 100 %. 20L used.
Salinity: 0.5 ppt

Conc: 0 %
Salinity:

Volume: 2 x 25 Litres
Storage: tempered at 15±1 °C in a warm waterbath.

Time	Day	Monit By	HR.	Mort #	Temp (°C)	DO (mg/l)	pH	Cond (µS/cm)	Mort #	Temp (°C)	DO (mg/l)	pH	Cond (uS/cm)
11:15	121410	JP	INT		14.0	9.4	7.6	938					
11:45	↓	↓	0	—	14.2	9.3	7.5	936	—	15.4	9.1	7.8	163
8:42	121510	JP	24	—	15.0	8.9	8.4	866	—	15.0	8.5*	7.9	164
9:45	121610	M	48	—	15.2	9.1	8.2	865	—	15.1	8.9	7.8	165
9:17	121710	JP	72	—	15.6	9.2	8.1	872	—	15.0	9.2	7.9	163
11:45	121810	JW	96	—	16.1	9.2	8.2	669	—	16.0	9.1	7.6	172

Fish Behaviour Comments

all fish alive @ 96hrs.

all fish alive @ 96hrs.

*aeration was almost off, readjusted. 121510 JP.

Fish Measurements

Fork Length (cm)	Wet Weight (g)
4.4	0.9
4.4	1.1
3.4	0.3
4.0	0.7
4.6	1.0
3.6	0.5
4.4	0.8
4.5	0.9
4.2	0.8
3.5	0.5
Mean +/- SD	
4.1	0.45	0.75	0.25

Loading Density (g/l): 0.38
LT50: 296hrs

Pretreatment: Composite ☑ Temp ☑ Other ☐
Dissolved Oxygen ☑ Water Hardness ☐

Comments EPS1 / RM / 13 Second Edition - December 2000

Clarity (F): Cloudy
Colour (F): yellow
Odour (F): no
Susp. Part. (F): no
Other (F):

APPENDIX E

PREVIOUS MONITORING DATA

TABLE E1

HISTORICAL STATIC GROUNDWATER LEVELS
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Location	Ground Surface Elevation	Length of Stick-up	TOC Elevation	Groundwater Depth (mbToC)												
				Mar	Jul	Sep	Oct	Jun	Jul	Oct	Dec	Oct	Sep	Mar	Jul	Dec
	(masl)	(m)	(masl)	2004				2006				2007	2008	2009	2010	
PLCS	15.960	--	15.960	--	--	--	--	--	--	--	--	--	--		0.55	0.73
SLCS	15.955	--	15.955	--	--	--	--	--	--	--	--	--	--	--	0.52	0.713
MW 93-1	16.300	1.100	17.400	--	--	--	--	--	--	--	--	--	--	1.975	1.703	1.915
MW 93-1A	16.310	1.400	17.710	0.39	1.88	0.41	0.16	2.06	1.68	2.11	1.84	1.67	2.17	2.50	1.638	1.636
MW 93-2	14.290	1.100	15.390	0.67	0.56	0.58	0.28	1.85	2.16	2.13	--	1.72	2.18	2.20	2.084	2.147
MW 93-2A	14.310	1.100	15.410	--	--	--	--	--	--	--	--	--	--	1.84	1.456	1.375
MW 93-3*	--	--	--	--	--	--	--	--	--	--	--	--	--	1.335	--	--
MW 93-3A*	--	--	--	2.37	Dry	--	1.20	Dry	3.21	3.37	--	3.32	Dry	3.52	--	--
MW 10-1	15.790	0.846	16.636	--	--	--	--	--	--	--	--	--	--	--	3.015	3.254
MW 10-1A	15.890	0.854	16.744	--	--	--	--	--	--	--	--	--	--	--	3.084	3.279

Location	Ground Surface Elevation	Length of Stick-up	TOC Elevation	Groundwater Elevation (masl)												
				Mar	Jul	Sep	Oct	Jun	Jul	Oct	Dec	Oct	Sep	Mar	Jul	Dec
	(masl)	(m)	(masl)	2004				2006				2007	2008	2009	2010	
PLCS	15.960	--	15.960	--	--	--	--	--	--	--	--	--	--		15.410	15.230
SLCS	15.955	--	15.955	--	--	--	--	--	--	--	--	--	--	--	15.435	15.242
MW 93-1	16.300	1.100	17.400	--	--	--	--	--	--	--	--	--	--	15.425	15.697	15.485
MW 93-1A	16.310	1.400	17.710	17.320	15.830	17.300	17.550	15.650	16.030	15.600	15.870	16.040	15.540	15.210	16.072	16.074
MW 93-2	14.290	1.100	15.390	14.720	14.830	14.810	15.110	13.540	13.230	13.260	--	13.670	13.210	13.190	13.306	13.243
MW 93-2A	14.310	1.100	15.410	--	--	--	--	--	--	--	--	--	--	13.570	13.954	14.035
MW 93-3*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW 93-3A*	--	--	15.900	13.530	Dry	--	14.700	Dry	12.690	12.530	--	12.580	Dry	12.380	--	--
MW 10-1	15.790	0.846	16.636	--	--	--	--	--	--	--	--	--	--	--	13.621	13.382
MW 10-1A	15.890	0.854	16.744	--	--	--	--	--	--	--	--	--	--	--	13.660	13.465

Notes:

PLCS = Primary Leachate Collection System Valve Chamber
SLCS = Secondary Leachate Collection System Valve Chamber
MW = Monitor Well

m = Metres
TOC = Top of Casing

masl = Metres Above Sea Level
mbTOC = Metres Below Top of Casing

* = Monitor Well Decommissioned in July 2010

TABLE E2

HISTORICAL GROUNDWATER ANALYTICAL DATA - BTEX/mTPH
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Sample Location	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	Total Petroleum Hydrocarbons (TPH)				
						TPuH C_6-C_{10}	TExH C_{10}-C_{21}	TExH C_{21}-C_{32}	Modified TPH	Comments
MW 93-1	Aug 19, 2009	<	<	<	<	<	<	<	<	-
	Aug 19, 2009[1]	<	<	<	<	<	<	<	<	-
	Jul 16, 2010	<	<	<	<	<	<	<	<	-
	Dec 13, 2010	<	<	<	<	<	<	<	<	-
MW 93-1A	2008 (AMEC)	<(0.2)	<(0.2)	<(0.2)	<(0.6)	<(0.05)[2]	<(0.05)[2]	<(0.05)[2]	<(0.15)[2]	-
	Aug 19, 2009	<	<	<	<	<	<	<	<	-
	Jul 16, 2010	<	<	<	<	<	<	<	<	-
	Dec 13, 2010	<	<	<	<	<	<	<	<	-
MW 93-2	2008 (AMEC)	<(0.2)	<(0.2)	<(0.2)	<(0.6)	<(0.05)[2]	<(0.05)[2]	<(0.05)[2]	<(0.15)[2]	-
	Aug 19, 2009	<	<	<	<	<	<	<	<	-
	Jul 16, 2010	<	<	<	<	<	<	<	<	-
	Jul 16, 2010[3]	-	-	-	-	-	<	<	-	-
	Dec 13, 2010	<	<	<	<	<	<	<	<	-
	Dec 13, 2010[3]	-	-	-	-	-	<	<	-	-
MW 93-2A	Aug 19, 2009	<	<	<	<	<	<	<	<	-
	Jul 16, 2010	<	<	<	<	<	<	<	<	-
	Dec 13, 2010	<	<	<	<	<	<	<	<	-
MW 10-1	Jul 16, 2010	<	<	<	<	<	<	<	<	-
	Jul 16, 2010[1]	<	<	<	<	<	<	<	<	-
	Dec 13, 2010	<	<	<	<	<	<	<	<	-
MW 10-1A	Jul 16, 2010	<	<	<	<	<	<	<	<	-
	Dec 13, 2010	<	<	<	<	<	<	<	<	-
	12/13/2010[1]	<	<	<	<	<	<	<	<	-
RDL		0.001	0.001	0.001	0.002	0.01	0.05	0.1	0.1	-
Atlantic RBCA Tier I RBSLs*		6.9	20	20	20	na	na	na	20	Gasoline
									20	Diesel / #2 Fuel Oil
									20	# 6 Oil

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
1. Field Duplicate
2. Assumed transcript error by factor of 1,000 from Pinchin LeBlanc Environmental Table 2 from March 2010 OMM Report
3. Lab Duplicate

* Atlantic Risk-Based Corrective Action (RBCA) Tier I Risk-Based Screening Level (RBSL) Table values {commercial/non-potable/coarse grained soil}.

RDL = Reportable Detection Limit
< = Parameter below detection limit
- = Not analysed
0.0 = above criteria

TPuH = Total Purgeable Hydrocarbons
TExH = Total Extractable Hydrocarbons
TPH = Total Petroleum Hydrocarbons
Modified TPH = mTPH = TExH + TPuH
TPH = mTPH + BTEX

G = Gasoline
FO = Fuel Oil
LO = Lube Oil
W = Weathered

TABLE E3

HISTORICAL GROUNDWATER ANALYTICAL DATA - PAHs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	MW 93-1					MW 93-1A				MW 93-2				MW 93-2A			MW 10-1				MW 10-1A		RDL	Criteria*
		19-Aug-09	19-Aug-09 Field Dup	19-Aug-09 Lab Dup	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10	19-Aug-09	16-Jul-10	13-Dec-10	16-Jul-10	16-Jul-10 DUP-01	13-Dec-10	13-Dec-10 DUP-02	16-Jul-10	13-Dec-10		
1-Methylnaphthalene	ug/L	<	<	<	<	<	<0.03	<	<	<	<0.03	<	<	<	<	<	<	<	<	<	<	<	<	0.05	13,000
2-Methylnaphthalene	ug/L	<	<	<	<	<	<0.03	<	<	<	<0.03	<	<	<	<	<	<	<	<	<	<	<	<	0.05	13,000
Acenaphthene	ug/L	<	<	<	<	<	<0.04	<	<	<	<0.04	<	<	<	<	<	<	<	<	<	<	<	<	0.01	1,700
Acenaphthylene	ug/L	<	<	<	<	<	<0.03	<	<	<	<0.03	<	<	<	<	<	<	<	<	<	<	<	<	0.01	2,000
Acridine	ug/L	-	-	-	<	<	-	-	<	<	-	-	<	<	-	<	<	<	<	<	<	<	<	0.05	-
Anthracene	ug/L	<	<	<	<	<	<0.01	<	<	<	<0.01	<	<	<	<	<	<	<	<	<	<	<	<	0.01	12
Benzo(a)anthracene	ug/L	<	<	<	<	<	<0.01	<	<	<	<0.01	<	<	<	<	<	<	<	<	<	<	<	<	0.01	5
Benzo(a)pyrene	ug/L	<	0.01	<	<	<	<0.01	<	<	<	<0.01	<	<	<	<	<	<	<	<	<	<	<	<	0.01	1.9
Benzo(b)fluoranthene	ug/L	<	0.02	<	<	<	<0.05	<	<	<	<0.05	<	<	<	<	<	<	<	<	<	<	<	<	0.01	7
Benzo(g,h,i)perylene	ug/L	<	0.02	<	<	<	<0.03	<	<	<	<0.03	<	<	<	<	<	<	<	<	<	<	<	<	0.01	0.2
Benzo(k)fluoranthene	ug/L	<	0.02	<	<	<	<0.05	<	<	<	<0.05	<	<	<	<	<	<	<	<	<	<	<	<	0.01	0.4
Chrysene	ug/L	<	<	<	<	<	<0.04	<	<	<	<0.04	<	<	<	<	<	<	<	<	<	<	<	<	0.01	3
Dibenz(a,h)anthracene	ug/L	<	0.03	<	<	<	-	<	<	<	-	<	<	<	<	<	<	<	<	<	<	<	<	0.01	0.25
Fluoranthene	ug/L	<	<	<	<	<	<0.03	<	<	<	<0.03	<	<	<	<	<	<	<	<	<	<	<	<	0.01	130
Fluorene	ug/L	<	<	<	<	<	<0.03	<	<	<	<0.03	<	<	<	<	<	<	<	<	<	<	<	<	0.01	290
Indeno(1,2,3-cd)pyrene	ug/L	<	0.02	<	<	<	<0.05	<	<	<	<0.05	<	<	<	<	<	<	<	<	<	<	<	<	0.01	0.27
Naphthalene	ug/L	<	<	<	<	<	-	<	<	<	-	<	<	<	<	<	<	<	<	<	<	<	<	0.20	5,900
Perylene	ug/L	<	<	<	<	<	-	<	<	<	-	<	<	<	<	<	<	<	<	<	0.04	<	<	0.01	-
Phenanthrene	ug/L	0.01	<	<	<	<	<0.04	0.01	<	<	<0.04	0.01	<	<	0.01	<	<	<	<	<	<	<	<	0.01	63
Pyrene	ug/L	<	<	<	<	<	<0.01	<	<	<	<0.01	<	<	<	<	<	<	<	<	<	<	<	<	0.01	40
Quinoline	ug/L	-	-	-	<	<	-	-	<	<	-	-	<	<	-	<	<	<	<	<	<	<	<	0.05	-

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", March 9, 2004, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit
<(#) = Parameter below AMEC laboratory detection limit
DUP-01 = Field Duplicate of MW 10-1, First Sampling Event

TABLE E4

GROUNDWATER ANALYTICAL DATA - PCBs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Sample Location	Date Sampled	Total PCBs (ug/L)
MW 93-1	Aug 19, 2009	<
	Aug 19, 2009	<[1]
	Aug 19, 2009	<[2]
	Jul 16, 2010	<
	Dec 13, 2010	<
MW 93-1A	AMEC 2008	<0.04
	Aug 19, 2009	0.1
	Jul 16, 2010	<
	Dec 13, 2010	<
MW 93-2	AMEC 2008	<0.04
	Aug 19, 2009	<
	Jul 16, 2010	<
	Dec 13, 2010	<
MW 93-2A	Aug 19, 2009	0.11
	Jul 16, 2010	<
	Dec 13, 2010	<
MW 10-1	Jul 16, 2010	<
	Jul 16, 2010	<[2]
	Dec 13, 2010	<
MW 10-1A	Jul 16, 2010	<
	Dec 13, 2010	<
	Dec 13, 2010	<[2]
RDL		0.05
Criteria[*] - Ontario MOE		0.2

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
1. Lab Duplicate
2. Field Duplicate
* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standrads for Use Under Part XV.1 of the Ground Water Condition

MW = Monitor Well
DUP-01 = Field Duplicate of MW 10-1, First Sampling Event
DUP-02 = Field Duplicate of MW 10-1, Second Sampling Event

RDL = Reportable Detection Limit
< = Parameter below detection limit
0.0 = above criteria

TABLE E5

HISTORICAL GROUNDWATER ANALYTICAL DATA - VOCs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	MW 93-1					MW 93-1A				MW 93-2				MW 93-2A			MW 10-1				MW 10-1A		RDL	Criteria*
		19-Aug-09	19-Aug-09 Field Dup	19-Aug-09 LabDup	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10	19-Aug-09	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10 DUP-01	13-Dec-10 DUP-01	16-Jul-10	13-Dec-10		
Benzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	1,900
Bromodichloromethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	50,000
Bromoform	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	840
Bromomethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	3.00	3.7
Carbon Tetrachloride	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	17
Chlorobenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	500
Chloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	8.00	-
Chloroform	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	430
Chloromethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	8.00	-
Dibromochloromethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	50,000
1,2-Dichlorobenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.50	7,600
1,3-Dichlorobenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	7,600
1,4-Dichlorobenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	7,600
1,1-Dichloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.00	9,000
1,2-Dichloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	17
1,1-Dichloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.50	0.66
cis-1,2-Dichloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.00	70
trans-1,2-Dichloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.00	100
1,2-Dichloropropane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	4.00	<	2.00	1.00	9.3
cis-1,3-Dichloropropene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.00	3.8
trans-1,3-Dichloropropene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	<	1.00	1.00	3.8
Ethylbenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	28,000
Methylene Chloride(Dichloromethane)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	3.00	50,000
o-Xylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	5,600
p+m-Xylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	2.00	5,600
Styrene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	940
Tetrachloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	5
1,1,2,2-Tetrachloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	22
Toluene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	5,900
Trichloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	50
1,1,1-Trichloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	200
1,1,2-Trichloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	1.00	16,000
Trichlorofluoromethane (FREON 11)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	8.00	-
Vinyl Chloride	ug/L	<	<	<	<	<	0.2	<	<	<	0.2	<	<	<	<	<	<	<	<	<	<	<	<	0.50	0.5

Notes:
Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standrads for Use Under Part XV.1 of the Environmental Protection Act", March 9, 2004, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
-= Not analysed/No criteria
< = Parameter below detection limit
DUP-01 = Field Duplicate of MW 10-1, First Sampling Event
DUP-02 = Field Duplicate of MW 10-1, Second Sampling Event

TABLE E6

HISTORICAL GROUNDWATER ANALYTICAL DATA - GENERAL CHEMISTRY
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	MW 93-1				MW 93-1A				MW 93-2					MW 93-2A					MW 10-1				MW 10-1A		RDL	Criteria*
		19-Aug-09	19-Aug-09 Field Dup	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	19-Aug-09 Lab Dup	16-Jul-10	13-Dec-10	19-Aug-09	19-Aug-09 Lab Dup	16-Jul-10	16-Jul-10 Lab Dup	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10 DUP-01	13-Dec-10 DUP-02	16-Jul-10	13-Dec-10		
Anion Sum	me/L	6.10	7.22	5.87	5.52	-	7.22	7.33	7.46	-	6.90	-	6.30	6.58	2.69	-	6.43	-	1.31	3.87	2.63	3.89	2.70	3.86	3.08	N/A	-
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	236.0	292.0	229.0	210.0	-	285.0	293.0	297.0	-	232.0	-	205.0	219.0	62.0	-	212.0	-	14.0	94.0	92.0	96.0	95.0	94.0	114.0	1.00	-
Calculated TDS	mg/L	338.0	375.0	313.0	313.0	265.0	447.0	390.0	401.0	331.0	380.0	-	346.0	368.0	184.0	-	351.0	-	87.0	215.0	147.0	217.0	149.0	215.0	171.0	1.00	-
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.00	3.00	3.00	2.00	-	3.00	3.00	2.00	-	1.00	-	1.00	1.00	<	-	1.00	-	<	<	<	<	<	<	<	1.00	-
Cation Sum	me/L	6.60	6.77	5.62	5.90	-	9.57	7.02	7.19	-	6.50	-	5.66	6.19	3.43	-	5.70	-	1.15	3.60	2.55	3.66	2.57	3.61	3.08	N/A	-
Hardness (CaCO3)	mg/L	160	160	120	120	205	210	170	170	245	270	-	240	250	120	-	240	-	31	100	110	100	110	100	140	1.00	-
Ion Balance (% Difference)	%	4.00	3.22	2.18	3.33	-	14.00	2.16	1.84	-	2.60	-	5.35	3.05	12.10	-	`	-	6.50	3.61	1.54	3.05	2.47	3.35	0.00	N/A	-
Langelier Index (@ 20C)	N/A	0.50	0.62	0.47	0.38	-	0.70	0.62	0.61	-	0.50	-	0.53	0.54	-1.51	-	0.48	-	-3.48	-0.23	-0.79	-0.31	-0.68	-0.36	-0.18	N/A	-
Langelier Index (@ 4C)	N/A	0.30	0.37	0.22	0.13	-	0.45	0.37	0.36	-	0.30	-	0.28	0.29	-1.76	-	0.24	-	-3.73	-0.48	-1.05	-0.56	-0.93	-0.61	-0.43	N/A	-
Nitrate (N)	mg/L	<	<	<	<0.05	-	<	<	<0.05	-	<	-	<	<0.05	<	-	<	-	0.15	<	0.24	<	0.25	<	0.26	0.05	-
Saturation pH (@ 20C)	N/A	7.50	7.41	7.64	7.64	-	7.31	7.37	7.32	-	7.20	-	7.28	7.20	8.06	-	7.27	-	9.25	7.93	7.79	7.91	7.77	7.92	7.64	N/A	-
Saturation pH (@ 4C)	N/A	7.80	7.66	7.89	7.89	-	7.55	7.62	7.57	-	7.40	-	7.53	7.45	8.31	-	7.52	-	9.50	8.18	8.05	8.16	8.02	8.17	7.89	N/A	-
Total Alkalinity (Total as CaCO3)	mg/L	240	300	230	210	290	290	300	300	205	2,320	-	210	220	62	-	210	-	14	95	92	96	96	95	110	30	-
Carbonaceous BOD	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.00	-
Dissolved Chloride (Cl)	mg/L	36	35	19	15	11	12	11	11	24	24	-	23	21	21	68	23	-	14	56	12	56	12	56	14	1	-
Colour	TCU	<	<	<	<5	-	<	<	<5	-	<	-	<	<5	6.00	21.00	<	-	79.00	10.00	9.00	6.00	13.00	7.00	5.00	5.00	-
Strong Acid Dissoc. Cyanide (CN)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-
Nitrate + Nitrite	mg/L	<	<	<	<	<0.05	<	<	<	<0.05	<	-	<	<	<	5.00	<	-	<	<	<	<	<	<	<	0.05	-
Nitrite (N)	mg/L	<	<	<	<	<0.015	<	<	<	<0.015	<	-	<	<	<	<	<	-	<	<	<	<	<	<	<	0.01	2.00
Nitrogen (Ammonia Nitrogen)	mg/L	0.10	<	<	<0.05	0.02	<	<	<0.05	<0.01	<	<	<	<0.05	0.24	<	<	-	0.35	0.14	<0.05	0.14	<0.05	0.15	0.09	0.05	-
Total Organic Carbon (C)	mg/L	1.20	1.00	2.10	0.90	2.00	<	<5 (1)	<5 (1)	2.00	0.50	0.90	1.50	1.30	6.20	-	1.30	-	16.00	8 (1)	33.00	8 (1)	18.00	8 (1)	2.30	0.50	-
Orthophosphate (P)	mg/L	<	<	<	<0.01	-	<	<	0.04	-	<	-	<	<0.01	<	-	<	-	<0.01	<	<0.01	<	<0.01	<	<0.01	0.01	-
pH	pH	8.00	8.03	8.11	8.02	8.02	8.00	7.99	7.93	7.50	7.70	-	7.81	7.74	6.55	<	7.75	7.83	5.77	7.70	7.00	7.60	7.09	7.56	7.46	N/A	-
Phenols-4AAP	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	26.00
Reactive Silica (SiO2)	mg/L	9.90	10.00	7.60	7.60	-	5.00	7.10	6.80	-	19.00	-	18.00	19.00	12.00	-	18.00	-	6.40	7.00	6.20	7.00	6.00	7.10	7.60	0.50	-
Total Suspended Solids (TSS)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
Dissolved Sulphate (SO4)	mg/L	2	16	33	42	-	55	53	56	-	73	-	74	76	41	12	74	-	31	18	21	19	21	19	19	2	-
Sulphide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-	-	0.02	-
Turbidity	NTU	0.5	1.3	61.0	34.0	-	350.0	300.0	470.0	-	13.0	-	5.4	13.0	84.0	40.0	3.2	-	100.0	640.0	>1000	570.0	540.0	520.0	110.0	0.1	-
Conductivity	uS/cm	580	580	520	500	511	610	630	640	549	560	-	570	580	260	-	570	570	140	380	250	380	260	380	300	1	-
Total Oil & Grease	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.

* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standrads for Use Under Part XV.1 of the Environmental Protection Act", March 9, 2004, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit
<(#) = Parameter below AMEC laboratory detection limit
DUP-01 = Field Duplicate of MW 10-1, First Sampling Event
DUP-02 = Field Duplicate of MW 10-1, Second Sampling Event
(1) = Elevated detection limit due to matrix interference

TABLE E7

HISTORICAL GROUNDWATER ANALYTICAL DATA - METALS
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	MW 93-1				MW 93-1A					MW 93-2				MW 93-2A			MW 10-1				MW 10-1A		RDL	Criteria*
		19-Aug-09	19-Aug-09 Field Dup	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	16-Jul-10	16-Jul-10 Lab Dup	13-Dec-10	AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10	19-Aug-09	16-Jul-10	13-Dec-10	16-Jul-10	13-Dec-10	16-Jul-10 DUP-01	13-Dec-10 DUP-02	16-Jul-10	13-Dec-10		
Aluminum (Al)	ug/L	100	120	37	17	42,000	13,000	15	15	31	484	460	9	<	630	<	150	200	38	160	36	100	11	5.0	-
Antimony (Sb)	ug/L	<	<	<	<	<1	<	<	<	<	<1	<	<	<	<	<	<	1	<	1	<	1	<	1.0	16,000
Arsenic (As)	ug/L	<	<	<	<	36	7	<	<	<	3	2	2	2	<	2	<	<	<	<	<	<	<	1.0	480
Barium (Ba)	ug/L	130	150	88	70	426	240	79	75	73	131	180	170	160	69	180	39	100	36	110	38	110	62	1.0	23,000
Beryllium (Be)	ug/L	<	<	<	<	2	<	<	<	<	<0.1	<	<	<	<	<	<	<	<	<	<	<	<	1.0	53
Bismuth (Bi)	ug/L	<	<	<	<	-	<	<	<	<	<0.5	<	<	<	<	<	<	<	<	<	<	<	<	2.0	-
Boron (B)	ug/L	120	120	100	99	-	58	56	56	57	-	1100	980	1,100	440.0	1,000	24	45	9	38	9	42	13	5.0	50,000
Cadmium (Cd)	ug/L	0.40	<	0.02	0.05	3	<	0.03	0.03	0.07	-	<	0.15	0.10	11	0.15	3.50	0.03	<	0.03	<	0.02	0.03	0.0	11
Calcium (Ca)	ug/L	-	-	26,000	29,000	-	-	40,000	39,000	45,000	-	-	69,000	80,000	-	69,000	9,000	31,000	41,000	32,000	42,000	31,000	48,000	100	-
Chromium (Cr)	ug/L	<	<	<	<	54	39	<	<	<	1	<	<	<	<	<	<	<	<	<	<	<	<	1.0	2000/110[(1)]
Cobalt (Co)	ug/L	<	<	<	<	**110**	**170**	0.7	0.8	0.4	1	<	<	0.4	1	<	1.4	2.3	1.4	2.4	1.4	2.5	3.3	0.4	100
Copper (Cu)	ug/L	6	3	<	<	**370**	**170**	2	3	<	8	5	<	<	6	<	<	5	9	5	9	4	<	2.0	23
Iron (Fe)	ug/L	670	550	<	<	370	37,000	<	<	<	1,300	980	<	<	9900	<	1,900	120	50	140	59	82	<	50	-
Lead (Pb)	ug/L	5	1	<	<	**45**	17	<	<	<	5	2	<	<	6.9	<	0.8	<	<	<	<	<	<	1	32
Magnesium (Mg)	ug/L	-	-	14,000	12,000	-		17,000	17,000	14,000	-	-	16,000	13,000		16,000	2,200	5,800	2,300	5,900	2,300	5,900	3,900	100	-
Manganese (Mn)	ug/L	110	120	120	81	2,620	1200	160	150	57	15,300	1200	880	950	4300	890	4,000	390	190	390	170	400	380	2.0	-
Molybdenum (Mo)	ug/L	6	6	20	18	20	11	15	15	14	2	<	<	<	<	<	<	16	3	16	3	14	5	2.0	7,300
Nickel (Ni)	ug/L	6	<	<	<	154	87	<	<	<	1	<	<	<	<	<	<	6	6	6	6	5	6	2.0	1,600
Phosphorus (P)	ug/L	-	-	<	<	-	-	<	<	130	-	-	<	150	-	<	<	<	150	<	<	<	<	100	-
Potassium (K)	ug/L	-	-	1,900	2,000	-	-	2,500	2,400	2,700	-	-	1,200	1,400	-	1,200	980	6,400	1,100	6,400	980	6,400	1,400	100	-
Selenium (Se)	ug/L	<	<	<	<	<1	<	<	<	<	1	<	<	<	<	<	<	<	<	<	<	<	<	1.0	50
Silver (Ag)	ug/L	<	<	<	<	1	<	<	<	<	-	<	<	<	<	<	<	<	<	<	<	<	<	0.1	1
Strontium (Sr)	ug/L	250	260	230	220	-	300	300	290	280	-	230	240	230	100	240	41	98	85	99	87	99	100	2.0	-
Thallium (Tl)	ug/L	<	<	<	<	-	-	<	<	<	-	<	<	<	<	<	<	<	<	<	<	<	<	0.1	400
Tin (Sn)	ug/L	<	<	<	<	-	<	<	<	<	-	<	<	<	<	<	<	<	<	<	<	<	<	2.0	-
Titanium (Ti)	ug/L	3	3	<	<	-	720	<	<	2	-	21	<	<	20	<	2	3	<	3	<	2	<	2.0	-
Uranium (U)	ug/L	0.2	0.2	0.3	0.2	-	6	2.9	2.8	2.8	-	0	0.3	0.2	0.3	0.3	<	0.4	<	0.4	<	0.4	0.3	0.1	-
Vanadium (V)	ug/L	<	<	<	<	155	28	<	<	<	2	<	<	<	4	<	<	<	<	<	<	<	<	2.0	200
Zinc (Zn)	ug/L	360	32	10	10	443	250	<5	12	<5	33	41	19	18	**1,700**	17	**1,300**	5	11	6	11	5	10	5.0	1,100

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standrads for Use Under Part XV.1 of the Environmental Protection Act", March 9, 2004, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit
<(#) = Parameter below AMEC laboratory detection limit
DUP-01 = Field Duplicate of MW 10-1, First Sampling Event
DUP-02 = Field Duplicate of MW 10-1, Second Sampling Event
(1) Criteria for Total Chromium = 2000 ug/L, Criteria for Chromium (VI) = 110 ug/L

TABLE E8

HISTORICAL SURFACE WATER ANALYTICAL DATA - BTEX/MTPH
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Sample Location	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	Total Petroleum Hydrocarbons (TPH)				
						TPuH C_6-C_{10}	TExH C_{10}-C_{21}	TExH C_{21}-C_{32}	Modified TPH	Comments
SURFACE UP	2008 (AMEC)	<(0.2)	<(0.2)	<(0.2)	<(0.6)	<(0.05)[1]	<(0.05)[1]	<(0.05)[1]	<(0.15)[1]	-
	Aug 19, 2009	<	<	<	<	<	<	<	<	-
	Jul 16, 2010	<	<	<	<	<	<	<	<	-
	Dec 13, 2010	<	<	<	<	<	<	<	<	-
SURACE DOWN	2008 (AMEC)	<(0.2)	<(0.2)	<(0.2)	<(0.6)	<(0.05)[1]	<(0.05)[1]	<(0.05)[1]	<(0.15)[1]	-
	Aug 19, 2009	<	<	<	<	<	<	<	<	-
	Jul 16, 2010	<	<	<	<	<	<	<	<	-
	Dec 13, 2010	<	<	<	<	<	<	<	<	-
RDL		0.001	0.001	0.001	0.002	0.01	0.05	0.1	0.1	-
2007 CCME Freshwater Aquatic Life Guidelines [2]		**4.00**	**2.00**	**0.39**	**-**	**-**	**-**	**-**	**-**	**Gasoline**
									-	**Diesel /#2 Fuel Oil**
									-	**#6 Oil**
1997 BC Guidelines for Protection of Aquatic Life [3]		**-**	**-**	**-**	**-**	**1.5**	**0.5**	**-**	**-**	**-**
									-	**-**
									-	**-**

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
1. Assumed transcript error by factor of 1,000 from Pinchin LeBlanc Environmental Table 2 from March 2010 OMM Report
2. 2007 CCME Freshwater Aquatic Life Guidelines
3. BC Ministry of Water, Land and Air Protection Guidelines for Protection of Aquatic Life

RDL = Reportable Detection Limit
< = Parameter below detection limit
- = Not analysed
DUP = Laboratory duplicate
0.0 = above criteria
<(#) = Parameter below AMEC laboratory detection limit

TPuH = Total Purgeable Hydrocarbons
TExH = Total Extractable Hydrocarbons
TPH = Total Petroleum Hydrocarbons
Modified TPH = mTPH = TExH + TPuH
TPH = mTPH + BTEX

G = Gasoline
FO = Fuel Oil
LO = Lube Oil
W = Weathered

TABLE E9

HISTORICAL SURFACE WATER ANALYTICAL DATA - PAHs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	SURFACE UP				SURFACE DOWN				RDL	Criteria*
		AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10		
1-Methylnaphthalene	ug/L	<0.03	<	<	<	<0.03	<	<	<	0.05	-
2-Methylnaphthalene	ug/L	<0.03	<	<	<	<0.03	<	<	<	0.05	-
Acenaphthene	ug/L	<0.04	<	<	<	<0.04	<	<	<	0.01	5.8
Acenaphthylene	ug/L	<0.03	<	<	<	<0.03	<	<	<	0.01	-
Acridine	ug/L	-	-	<	<			<	<	0.05	4.4
Anthracene	ug/L	<0.01	<	<	<	<0.01	<	<	<	0.01	0.012
Benzo(a)anthracene	ug/L	<0.01	<	<	<	<0.01	<	<	<	0.01	0.018
Benzo(a)pyrene	ug/L	<0.01	<	<	<	<0.01	<	<	<	0.01	0.015
Benzo(b)fluoranthene	ug/L	<0.05	<	<	<	<0.05	<	<	<	0.01	-
Benzo(g,h,i)perylene	ug/L	<0.03	<	<	<	<0.03	<	<	<	0.01	-
Benzo(k)fluoranthene	ug/L	<0.05	<	<	<	<0.05	<	<	<	0.01	-
Chrysene	ug/L	<0.04	<	<	<	<0.04	<	<	<	0.01	-
Dibenz(a,h)anthracene	ug/L	-	<	<	<	NA	<	<	<	0.01	-
Fluoranthene	ug/L	<0.03	<	<	<	<0.03	<	<	<	0.01	0.04
Fluorene	ug/L	<0.03	<	<	<	<0.03	<	<	<	0.01	3.0
Indeno(1,2,3-cd)pyrene	ug/L	<0.05	<	<	<	<0.05	<	<	<	0.01	-
Naphthalene	ug/L	-	<	<	<	NA	<	<	<	0.2	1.1
Perylene	ug/L	-	<	0.01	<	NA	<	<	<	0.01	-
Phenanthrene	ug/L	<0.04	<	<	<	<0.04	0.01	<	<	0.01	0.4
Pyrene	ug/L	<0.01	<	<	<	<0.01	<	<	<	0.01	0.025
Quinoline	ug/L	-	-	<	<	-	-	<	<	0.05	3.4

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
* Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit
<(#) = Parameter below AMEC laboratory detection limit

TABLE E10

HISTORICAL SURFACE WATER ANALYTICAL DATA - PCBs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	SURFACE UP				SURFACE DOWN				RDL	Criteria*
		AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10		
Total PCBs	ug/L	<0.04	0.11	<	<	<0.04	0.13	<	<	0.05	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
< = Parameter below detection limit
< (#) = Parameter below AMEC laboratory detection limit

TABLE E11

HISTORICAL SURFACE WATER ANALYTICAL DATA - VOCs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	SURFACE UP				SURFACE DOWN				RDL	Criteria*
		AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10		
Benzene	ug/L	<	<	<	<	<	<	<	<	1	370
Bromodichloromethane	ug/L	<	<	<	<	<	<	<	<	1	-
Bromoform	ug/L	<	<	<	<	<	<	<	<	1	-
Bromomethane	ug/L	<	<	<	<	<	<	<	<	3	-
Carbon Tetrachloride	ug/L	<	<	<	<	<	<	<	<	1	13.3
Chlorobenzene	ug/L	<	<	<	<	<	<	<	<	1	1.3
Chloroethane	ug/L	<	<	<	<	<	<	<	<	8	-
Chloroform	ug/L	<	<	<	<	<	<	<	<	1	1.8
Chloromethane	ug/L	<	<	<	<	<	<	<	<	8	-
Dibromochloromethane	ug/L	<	<	<	<	<	<	<	<	1	-
1,2-Dichlorobenzene	ug/L	<	<	<	<	<	<	<	<	0.5	0.7
1,3-Dichlorobenzene	ug/L	<	<	<	<	<	<	<	<	1	150
1,4-Dichlorobenzene	ug/L	<	<	<	<	<	<	<	<	1	26
1,1-Dichloroethane	ug/L	<	<	<	<	<	<	<	<	2	-
1,2-Dichloroethane	ug/L	<	<	<	<	<	<	<	<	1	100
1,1-Dichloroethylene	ug/L	<	<	<	<	<	<	<	<	0.5	-
cis-1,2-Dichloroethylene	ug/L	<	<	<	<	<	<	<	<	2	-
trans-1,2-Dichloroethylene	ug/L	<	<	<	<	<	<	<	<	2	-
1,2-Dichloropropane	ug/L	<	<	<	<	<	<	<	<	1	-
cis-1,3-Dichloropropene	ug/L	<	<	<	<	<	<	<	<	2	-
trans-1,3-Dichloropropene	ug/L	<	<	<	<	<	<	<	<	1	-
Ethylbenzene	ug/L	<	<	<	<	<	<	<	<	1	90
Methylene Chloride(Dichloromethane)	ug/L	<	<	<	<	<	<	<	<	3	98.1
o-Xylene	ug/L	<	<	<	<	<	<	<	<	1	-
p+m-Xylene	ug/L	<	<	<	<	<	<	<	<	2	-
Styrene	ug/L	<	<	<	<	<	<	<	<	1	300
Tetrachloroethylene	ug/L	<	<	<	<	<	<	<	<	1	72
1,1,2,2-Tetrachloroethane	ug/L	<	<	<	<	<	<	<	<	1	-
Toluene	ug/L	<	<	<	<	<	<	<	<	1	111
Trichloroethylene	ug/L	<	<	<	<	<	<	<	<	1	2.0
1,1,1-Trichloroethane	ug/L	<	<	<	<	<	<	<	<	1	-
1,1,2-Trichloroethane	ug/L	<	<	<	<	<	<	<	<	1	-
Trichlorofluoromethane (FREON 11)	ug/L	<	<	<	<	<	<	<	<	8	21
Vinyl Chloride	ug/L	0.2	<	<	<	0.2	<	<	<	0.5	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.

* Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit

TABLE E12

HISTORICAL SURFACE WATER ANALYTICAL DATA - GENERAL CHEMISTRY
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	SURFACE UP					SURFACE DOWN					RDL	Criteria*
		AMEC 2008	19/08/2009	16-Jul-10	13-Dec-10	13-Dec-10 Lab Dup	AMEC 2008	19/08/2009	16-Jul-10	16-Jul-10 Lab Dup	13-Dec-10		
Anion Sum	me/L	-	4.8	1.14	0.34	-	-	3.78	2.69	-	1.53	N/A	-
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	118	38	6	-	-	150	117	-	12	1	-
Calculated TDS	mg/L	53	267	62	23	-	145	205	140	-	122	1	-
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	<	<	<	-	-	3	<	-	<	1	-
Cation Sum	me/L	-	4.8	1.05	0.43	-	-	3.8	2.54	-	2.4	N/A	-
Hardness (CaCO3)	mg/L	21.5	100	41	10	-	138	170	110	-	70	1	-
Ion Balance (% Difference)	%	-	0.6	4.11	11.7	-	-	0.26	2.87	-	22.1	N/A	-
Langelier Index (@ 20C)	N/A	-	-0.4	-1.36	-3.49	-	-	0.996	-0.099	-	-2.64	N/A	-
Langelier Index (@ 4C)	N/A	-	-0.7	-1.61	-3.74	-	-	0.746	-0.35	-	-2.89	N/A	-
Nitrate (N)	mg/L	<	<	0.17	<	-	<	<	<	-	2	0.05	13
Saturation pH (@ 20C)	N/A	-	7.8	8.62	10.1	-	-	7.39	7.69	-	9.01	N/A	-
Saturation pH (@ 4C)	N/A	-	8.1	8.87	10.3	-	-	7.64	7.94	-	9.26	N/A	-
Total Alkalinity (Total as CaCO3)	mg/L	24	120	39	39	-	136	150	120	-	120	30	-
Carbonaceous BOD	mg/L	-	-	-	-	-	-	-	-	-	-	5	-
Dissolved Chloride (Cl)	mg/L	8.9	79	5	6	-	3.6	4	1	-	23	1	-
Colour	TCU	-	44	38	49	-	-	23	39	-	120	5	-
Strong Acid Dissoc. Cyanide (CN)	mg/L	-	-	-	-	-	-	-	-	-	-	0.002	-
Nitrate + Nitrite	mg/L	-	<	0.17	<	-	-	<	<	-	2	0.05	-
Nitrite (N)	mg/L	<0.015	<	<	<	-	<0.015	<	<	-	<	0.01	0.06
Nitrogen (Ammonia Nitrogen)	mg/L	-	0.1	<	<	-	-	<	0.19	-	0.06	0.05	-
Total Organic Carbon (C)	mg/L	9.5	5.7	6	6.4	-	9.2	4.3	5.4	-	18	0.5	-
Orthophosphate (P)	mg/L	-	<	<	<	-	-	<	<	-	<	0.01	-
pH	pH	6.9	7.4	7.26	6.58	-	7.48	8.39	7.59	-	6.37	N/A	6.5 - 9
Phenols-4AAP	mg/L	-	-	-	-	-	-	-	-	-	-	0.001	-
Reactive Silica (SiO2)	mg/L	-	6.3	1.5	1.5	-	-	4	3.1	-	7.4	0.5	-
Total Suspended Solids (TSS)	mg/L	-	-	-	-	-	-	-	-	-	-	2	-
Dissolved Sulphate (SO4)	mg/L	-	8	11	3	-	-	29	15	-	24	2	-
Sulphide	mg/L	-	-	-	-	-	-	-	-	-	-	0.02	-
Turbidity	NTU	-	2.9	3.8	2.2	2.1	-	5.2	39	37	140	0.1	-
Conductivity	uS/cm	87	470	110	43	-	275	290	240	-	170	1	-
Total Oil & Grease	mg/L	-	-	-	-	-	-	-	-	-	-	5	-

Notes:
Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

RDL = Reportable Detection Limit **0.0** = above criteria
SW = Surface Water Sample
-= Not analysed/No criteria
< = Parameter below detection limit
< (#) = Parameter below AMEC laboratory detection limit

TABLE E13

HISTORICAL SURFACE WATER ANALYTICAL DATA - METALS
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	SURFACE UP				SURFACE DOWN				RDL	Criteria*
		AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	16-Jul-10	13-Dec-10		
Aluminum (Al)	ug/L	484	18	**108**	**257**	**42,000**	69	**527**	**5,210**	5.0	100[1]
Antimony (Sb)	ug/L	<	<	<	<	<1	<	<	<	1.0	-
Arsenic (As)	ug/L	3	<	<	<	**36**	<	1.1	3.3	1.0	5.0
Barium (Ba)	ug/L	131	26	22.3	9.4	426	82	102	289	1.0	-
Beryllium (Be)	ug/L	<0.1	<	<	<	1.8	<	<	<	1.0	-
Bismuth (Bi)	ug/L	<0.5	<	<	<	<0.1	<	<	<	2.0	-
Boron (B)	ug/L	-	14	9.4	6.9	-	22	27.1	9.0	5.0	-
Cadmium (Cd)	ug/L	**0.273**	<	**0.03**	**0.04**	**2.65**	<	**0.04**	**0.23**	0.02	0.015/0.036[2]
Calcium (Ca)	ug/L	-	-	12,900	2,960	-	-	40,100	18,300	100	-
Chromium (Cr)	ug/L	1	<	<	<	110	<	<	8.0	1.0	8.9/1.0[3]
Cobalt (Co)	ug/L	1	<	<	<	307	<	0.9	6.7	0.4	-
Copper (Cu)	ug/L	8	<	<	<	370	<	**12.7**	**32.9**	2.0	2[4]
Iron (Fe)	ug/L	**1,300**	**1,300**	289	**722**	**59,000**	**380**	**1,820**	**10,900**	50	300
Lead (Pb)	ug/L	5	<	<	<	45	<	1.48	**7.64**	0.50	1, 2[5]
Magnesium (Mg)	ug/L	-	-	2,140	713	-	-	3,320	5,840	100	-
Manganese (Mn)	ug/L	1,260	230	97.9	142.0	2,620	62	481	427	2.0	-
Molybdenum (Mo)	ug/L	2	3.0	<	<	0.09	<	<	<	2.0	73.00
Nickel (Ni)	ug/L	1	<	<	<	2	<	3.0	16.7	2.0	25, 65[6]
Phosphorus (P)	ug/L	-	-	<	<	-	-	120	852	100	-
Potassium (K)	ug/L	-	-	588	295	-	-	1,080	4,060	100	-
Selenium (Se)	ug/L	1	<	<	<	<	<	<	<	1.0	1.0
Silver (Ag)	ug/L	<0.1	<	<	<	0.5	<	<	<	0.1	0.1
Sodium (Na)	ug/L	-	-	4,720	3,680	-	-	4,300	11,500	100	-
Strontium (Sr)	ug/L	-	90	40.7	9.7	-	110	85.4	49.9	2.0	-
Thallium (Tl)	ug/L	-	<	<	<	-	<	<	<	0.1	0.8
Tin (Sn)	ug/L	-	<	<	<	-	<	<	<	2.0	-
Titanium (Ti)	ug/L	-	<	2.1	7.9	-	2.0	17.2	148.0	2.0	-
Uranium (U)	ug/L	-	0.2	<	<	-	0.9	0.38	0.38	0.10	-
Vanadium (V)	ug/L	<2	<	<	<	155	<	<	0.3	2.0	-
Zinc (Zn)	ug/L	33	<	9.2	10.7	**443**	<	25.2	**103**	5.0	30
Hardness (CaCO3)	mg/L	21.5	100	41.0	10.0	138	170	110.0	70.0	1.0	-
pH	pH	6.9	7.4	7.26	6.58	7.48	8.39	7.59	6.37	-	6.5 - 9

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

RDL = Reportable Detection Limit
SW = Surface Water Sample
- = Not analysed/No criteria
< = Parameter below detection limit
0.0 = above criteria

(1) Aluminum guideline = 5 ug/L at pH < 6.5
= 100 ug/L at pH≥ 6.5

(2) Cadmium guideline = $10^{\{0.86[\log(\text{hardness})]-3.2\}}$

(4) Copper guideline = 2 ug/L at [$CaCO_3$] = 0-120 mg/L
= 3 ug/L at [$CaCO_3$] = 120-180 mg/L
= 4 ug/L at [$CaCO_3$] >180 mg/L

(5) Lead guideline = 1 ug/L at [$CaCO_3$] = 0-60 mg/L
= 2 ug/L at [$CaCO_3$] = 60-120 mg/L
= 4 ug/L at [$CaCO_3$] = 120-180 mg/L
= 7 ug/L at [$CaCO_3$] >180 mg/L

(6) Nickel guideline = 25 ug/L at [$CaCO_3$] = 0-60 mg/L
= 65 ug/L at [$CaCO_3$] = 60-120 mg/L
= 110 ug/L at [$CaCO_3$] = 120-180 mg/L
= 150 ug/L at [$CaCO_3$] >180 mg/L

TABLE E14

HISTORICAL LEACHATE ANALYTICAL DATA - BTEX/MTPH
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Sample Location	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	Total Petroleum Hydrocarbons (TPH)				
						TPuH C_6-C_{10}	TExH C_{10}-C_{21}	TExH C_{21}-C_{32}	Modified TPH	Comments
PLCS	Aug 19, 2009	<	<	<	<	<	0.08	0.1	0.2	NR
	Aug 19, 2009[1]	<	<	<	<	<	0.11	0.1	<	NR
	Oct 13, 2009	<	<	<	<	<	0.2	0.1	0.3	WFO
	Jan 26, 2010	<	<	<	<	<	0.09	<	<	WFO
	Jul 16, 2010	<	<	<	<	<	<	<	<	-
	Jul 16, 2010[1]	-	-	-	-	-	<	<	-	-
	Dec 13, 2010	<	<	<	<	<	<	<	<	-
	Dec 13, 2010[1]	<	<	<	<	<	-	-	-	-
SLCS	2008 (AMEC)	<(0.2)	<(0.2)	<(0.2)	<(0.6)	<(0.05)[2]	<(0.05)[2]	<(0.05)[2]	<(0.15)[2]	-
	Aug 19, 2009	<	<	<	<	<	<	<	<	-
	Oct 13, 2009	<	<	<	<	<	0.14	<	0.1	WFO
	Jan 26, 2010	<	<	<	<	<	0.11	<	0.1	WFO
	Jan 26, 2010[3]	<	<	<	<	<	0.11	<	0.1	WFO
	Jul 16, 2010	<	<	<	<	<	<	<	<	-
	Dec 13, 2010	<	<	<	<	<	0.05	<	<	-
RDL		0.001	0.001	0.001	0.002	0.01	0.05	0.1	0.1	-
2007 CCME Freshwater Aquatic Life Guidelines [4]		**4.00**	**2.00**	**0.39**	**-**	**-**	**-**	**-**	**-**	**-**
									-	**-**
									-	**-**
Schedule A Water & Sewer Regulations*		-	-	-	-	-	-	-	**15**	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in St. John's, NL.
* Schedule A of Environmental Control Water and Sewer Regulations, 2003.

1. Lab Duplicate
2. Assumed transcript error by factor of 1,000 from Pinchin LeBlanc Environmental Table 2 from March 2010 OMM Report
3. Field Duplicate
4. 2007 CCME Freshwater Aquatic Life Guidelines

PLCS = Primary Leachate Collection System
SLCS = Secondary Leachate Collection System

RDL = Reportable Detection Limit
< = Parameter below detection limit
- = Not analysed
0.0 = above criteria

TPuH = Total Purgeable Hydrocarbons
TExH = Total Extractable Hydrocarbons
TPH = Total Petroleum Hydrocarbons
Modified TPH = mTPH = TExH + TPuH
TPH = mTPH + BTEX

G = Gasoline
FO = Fuel Oil
LO = Lube Oil
W = Weathered

TABLE E15

HISTORICAL LEACHATE ANALYTICAL DATA - PAHs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	PLCS						SLCS							RDL	Criteria*	
		19-Aug-09	13-Oct-09	25-Jan-10	25-Jan-10 Lab Dup	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	13-Oct-09	25-Jan-10	25-Jan-10 Field Dup	16-Jul-10	13-Dec-10		NL	CCME
1-Methylnaphthalene	ug/L	<	<	<	<	<	<	<0.03	<	<	<	<	<	<	0.05	-	-
2-Methylnaphthalene	ug/L	<	<	<	<	<	<	<0.03	<	<	<	<	0.22	<	0.05	-	-
Acenaphthene	ug/L	<	0.01	0.01	0.02	<	<	<0.04	<	<	0.01	<	<	<	0.01	-	5.8
Acenaphthylene	ug/L	<	<	<	<	<	<	<0.03	<	<	<	<	<	<	0.01	-	-
Acridine	ug/L	-	-	-	-	<	<	-					<	<	0.05	-	4.4
Anthracene	ug/L	<	0.05	0.06	0.06	<	0.04	<0.01	<	0.1	0.06	0.06	<	<	0.01	-	0.012
Benzo(a)anthracene	ug/L	<	0.01	0.02	0.02	<	<	<0.01	<	0.06	0.02	0.03	<	<	0.01	-	0.018
Benzo(a)pyrene	ug/L	<	<	<	<	<	<	<0.01	<	<	<	<	<	<	0.01	-	0.015
Benzo(b)fluoranthene	ug/L	<	<	<	<	<	<	<0.05	<	<	<	<	<	<	0.01	-	-
Benzo(g,h,i)perylene	ug/L	<	<	<	<	<	<	<0.03	<	<	<	<	<	<	0.01	-	-
Benzo(k)fluoranthene	ug/L	<	<	<	<	<	<	<0.05	<	<	<	<	<	<	0.01	-	-
Chrysene	ug/L	<	0.04	0.03	0.03	<	0.02	<0.04	<	0.09	0.04	0.04	<	0.01	0.01	-	-
Dibenz(a,h)anthracene	ug/L	<	<	<	<	<	<	-	<	<	<	<	<	<	0.01	-	-
Fluoranthene	ug/L	<	0.05	0.07	0.06	<	0.04	<0.03	<	0.26	0.11	0.11	0.01	<	0.01	-	0.04
Fluorene	ug/L	<	0.02	0.02	0.02	<	<	<0.03	<	0.02	<	<	<	<	0.01	-	3.0
Indeno(1,2,3-cd)pyrene	ug/L	<	<	<	<	<	<	<0.05	<	<	<	<	<	<	0.01	-	-
Naphthalene	ug/L	<	<	<	<	<	<	-	<	<	<	<	<	<	0.2	-	1.1
Perylene	ug/L	<	<	<	<	<	<	-	<	<	<	<	<	<	0.01	-	-
Phenanthrene	ug/L	<	0.17	0.23	0.2	<	0.07	<0.04	<	0.4	0.13	0.07	0.02	0.01	0.01	-	0.4
Pyrene	ug/L	<	0.36	0.32	0.29	<	0.17	<0.01	<	1.5	0.55	0.55	0.06	<	0.01	-	0.025
Quinoline	ug/L	<	-	-	-	<	<	-	-	-	-	-	<	<	0.05	-	3.4

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.

NL = Environmental Control Water and Sewer Regulations, 2003, under the Water Resources Act, Newfoundland and Labrador Regulation 65/03.

CCME = Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).
PLCS = Primary Leachate Collection System
SLCS = Secondary Leachate Collection System

RDL = Reportable Detection Limit — **0.0** = above NL criteria
SW = Surface Water Sample — 0.0 = above CCME criteria for surface water
- = Not analysed/No criteria
< = Parameter below detection limit
<(#) = Parameter below AMEC laboratory detection limit

TABLE E16

HISTORICAL LEACHATE ANALYTICAL DATA - PCBs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	PLCS					SLCS						RDL	Criteria*
		19-Aug-09	13-Oct-09	26-Jan-10	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	13-Oct-09	26-Jan-10	16-Jul-10	13-Dec-10		
Total PCBs	ug/L	0.16	<	<	<	<	<0.04	<	<	<	<	<	0.05	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.

* Environmental Control Water and Sewer Regulations, 2003, under the Water Resources Act, Newfoundland and Labrador Regulation 65/03.

PLCS = Primary Leachate Collection System
SLCS = Secondary Leachate Collection System

RDL = Reportable Detection Limit
SW = Surface Water Sample

< = Parameter below detection limit
<(#) = Parameter below AMEC laboratory detection limit
0.0 = above criteria

TABLE E17

HISTORICAL LEACHATE ANALYTICAL DATA - VOCs
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	PLCS					SLCS							RDL	Criteria*
		19-Aug-09	13-Oct-09	26-Jan-10	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	13-Oct-09	26-Jan-10	26-Jan-10 Field Dup	16-Jul-10	13-Dec-10		
Benzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
Bromodichloromethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
Bromoform	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
Bromomethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	3	-
Carbon Tetrachloride	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
Chlorobenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
Chloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	8	-
Chloroform	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
Chloromethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	8	-
Dibromochloromethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
1,2-Dichlorobenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	0.5	-
1,3-Dichlorobenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
1,4-Dichlorobenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
1,1-Dichloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	2	-
1,2-Dichloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
1,1-Dichloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	0.5	-
cis-1,2-Dichloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	2	-
trans-1,2-Dichloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	2	-
1,2-Dichloropropane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
cis-1,3-Dichloropropene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	2	-
trans-1,3-Dichloropropene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
Ethylbenzene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
Methylene Chloride(Dichloromethane)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	3	-
o-Xylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
p+m-Xylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	2	-
Styrene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
Tetrachloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
1,1,2,2-Tetrachloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
Toluene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
Trichloroethylene	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
1,1,1-Trichloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
1,1,2-Trichloroethane	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	1	-
Trichlorofluoromethane (FREON 11)	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	8	-
Vinyl Chloride	ug/L	<	<	<	<	<	<	<	<	<	<	<	<	0.5	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.

* Environmental Control Water and Sewer Regulations, 2003, under the Water Resources Act, Newfoundland and Labrador Regulation 65/03.

PLCS = Primary Leachate Collection System
SLCS = Secondary Leachate Collection System

\- = Not analysed/No criteria
< = Parameter below detection limit

RDL = Reportable Detection Limit
SW = Surface Water Sample

0.0 = above criteria

TABLE E18

HISTORICAL LEACHATE ANALYTICAL DATA - GENERAL CHEMISTRY
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	PLCS					SLCS								RDL	Criteria*
		19-Aug-09	13-Oct-09	26-Jan-10	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	13-Oct-09	26-Jan-10	26-Jan-10 Field Dup	26-Jan-10 Lab Dup	16-Jul-10	16-Jul-10 Lab-Dup	13-Dec-10	
Anion Sum	me/L	2.30	12.20	12.20	4.86	10.10	-	10.80	13.70	13.60	13.40	-	8.68	-	10.90	N/A	-
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	90	482	453	176	400	-	428	542	532	509	-	315	-	420	1	-
Calculated TDS	mg/L	133	640	662	263	546	780	598	737	728	716	-	460	-	574	1	1,000
Carb. Alkalinity (calc. as CaCO3)	mg/L	<	<	<	1	1	-	<	<	<	<	-	1	-	2	1	-
Cation Sum	me/L	2.30	11.60	11.90	4.47	10.10	-	10.70	13.90	12.90	13.10	-	7.81	-	10.40	N/A	-
Hardness (CaCO3)	mg/L	71	510	540	190	190	658	410	580	560	570	-	320	-	320	1	-
Ion Balance (% Difference)	%	0.40	2.40	1.30	4.18	0.00	-	0.50	0.70	3.70	1.10	-	5.28	-	2.44	N/A	-
Langelier Index (@ 20C)	N/A	-0.10	0.60	0.60	0.42	0.86	-	0.60	0.40	0.50	0.60	-	0.67	-	0.99	N/A	-
Langelier Index (@ 4C)	N/A	-0.40	0.30	0.30	0.17	0.61	-	0.40	0.20	0.30	0.30	-	0.42	-	0.74	N/A	-
Nitrate (N)	mg/L	0.30	<	0.10	0.35	0.28	<0.05	0.10	<	<	<	-	0.35	-	0.10	0.05	10
Saturation pH (@ 20C)	N/A	8.00	6.60	6.60	7.40	6.74	-	6.80	6.60	6.60	6.60	-	7.00	-	6.73	N/A	-
Saturation pH (@ 4C)	N/A	8.30	6.90	6.90	7.65	6.98	-	7.00	6.80	6.80	6.80	-	7.25	-	6.98	N/A	-
Total Alkalinity (Total as CaCO3)	mg/L	91	480	450	180	400	587	430	540	530	510	520	320	-	420	30.00	-
Carbonaceous BOD	mg/L	-	-	-	<	<	-	-	-	-	-	-	<	<	<	5.00	20
Dissolved Chloride (Cl)	mg/L	8	40	33	11	29	67	40	54	48	48	47	32	-	43	1	-
Colour	TCU	31	35	20	15	17	-	17	19	15	15	16	12	-	56	5	-
Strong Acid Dissoc. Cyanide (CN)	mg/L	-	-	-	<	<	-	-	-	-	-	-	<	-	<	0.002	25
Nitrate + Nitrite	mg/L	0.30	<	0.10	0.37	0.28	-	0.10	<	<	<	-	0.37	-	0.10	0.05	-
Nitrite (N)	mg/L	<	<	<	0.03	<	<0.015	<	<	<	<	-	0.02	-	<	0.01	-
Nitrogen (Ammonia Nitrogen)	mg/L	<	0.30	0.40	<	0.10	0.43	0.40	0.50	0.50	0.50	-	0.12	0.12	0.26	0.05	2
Total Organic Carbon (C)	mg/L	4.7	25.0	16.0	6.4	11.0	25.7	16.0	24.0	19.0	19.0	-	12.0	-	13.0	0.5	-
Orthophosphate (P)	mg/L	<	<	<	<	<	-	<	<	<	<	-	<	-	<	0.01	-
pH	pH	7.90	7.20	7.20	7.82	7.59	6.80	7.40	7.00	7.10	7.10	-	7.67	-	7.72	N/A	5.5 - 9.0
Phenols-4AAP	mg/L	-	-	-	0.01	0.003	-	-	-	-	-	-	0.003	-	<0.01*	0.001	0.10
Reactive Silica (SiO2)	mg/L	4.30	16.00	16.00	8.40	13.00	-	19.00	17.00	17.00	18.00	18.00	14.00	-	14.00	0.5	-
Total Suspended Solids (TSS)	mg/L	-	2	6	11	17	**69**	-	**34**	18	16	-	5	-	**33**	2.0	30
Dissolved Sulphate (SO4)	mg/L	11	66	110	47	61	-	54	64	90	88	88	69	-	60	2.0	-
Sulphide	mg/L	-	-	-	<	<	-	-	-	-	-	-	<	-	<	0.02	0.50
Turbidity	NTU	0.4	62.0	6.8	1.6	16.0	-	140.0	200.0	77.0	65.0	59.0	6.6	-	17.0	0.1	-
Conductivity	uS/cm	220	1000	1000	440	840	1250	980	990	1200	1100	-	750	-	900	1	-
Total Oil & Grease	mg/L	-	-	-	<	<	-	-	-	-	-	-	<	-	<	5.00	-
Coliform-Fecal	#/100mL	-	-	-	0	0	-	-	-	-	-	-	0	-	- [(1)]	-	1,000/100 mL
Coliform-Total	#/100mL	-	-	-	>80	>80	-	-	-	-	-	-	>80	-	- [(1)]	-	5,000/100 mL

Notes:
Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
Coliform analysis completed by Newfoundland and Labrador Government Services in Grand Falls-Windsor, NL
* Environmental Control Water and Sewer Regulations, 2003, under the Water Resources Act, Newfoundland and Labrador Regulation 65/03.

PLCS = Primary Leachate Collection System
SLCS = Secondary Leachate Collection System

RDL = Reportable Detection Limit **0.0** = above criteria
-= Not analysed/No criteria
< = Parameter below detection limit

TABLE E19

HISTORICAL LEACHATE ANALYTICAL DATA - TOTAL METALS
2010/11 MONITORING AND MAINTENANCE PROGRAM
COME BY CHANCE SECURE LANDFILL
COME BY CHANCE, NL

Parameter	Units	PLCS					SLCS							RDL	Criteria*
		19-Aug-09	13-Oct-09	26-Jan-10	16-Jul-10	13-Dec-10	AMEC 2008	19-Aug-09	13-Oct-09	26-Jan-10	26-Jan-10 Field Dup	16-Jul-10	13-Dec-10		
Aluminum (Al)	ug/L	35	<	<	36.8	<	42	<	100	<	<	23.1	<	5	-
Antimony (Sb)	ug/L	<	<	<	<	<	<1	<	<	<	<	<	<	1	-
Arsenic (As)	ug/L	<	<	<	<	<	2	<	<	<	<	<	<	1	500
Barium (Ba)	ug/L	7.0	73	71	13.3	51	69.8	38	93	68	68	18.9	40	1	5,000
Beryllium (Be)	ug/L	<	<	<	<	<	<0.1	<	<	<	<	<	<	1	-
Bismuth (Bi)	ug/L	<	<	<	<	<	1.1	<	<	<	<	<	<	2	-
Boron (B)	ug/L	170	7,400	3,400	1,170	2,230	-	2,800	3,100	2,300	2,400	1,970	1,870	5	5,000
Cadmium (Cd)	ug/L	<	<	<	<	<	1.3	<	<	<	<	<	<	0.017	50
Calcium (Ca)	ug/L	-	-	-	58,400	138,000	-	-	-	-	-	90,900	135,000	100	-
Total Chromium (Cr)	ug/L	<	<	<	<	<	1	<	<	<	<	<	<	1	1,000
Chromium VI	mg/L	-	-	-	<	<	-	-	-	-	-	<	<	0.001	0.05
Cobalt (Co)	ug/L	<	<	<	<	<	<1	<	<	<	<	0.49	<	0.4	-
Copper (Cu)	ug/L	4.0	<	<	2.50	<	1	<	<	<	<	<	<	2	300
Iron (Fe)	ug/L	77	4,900	4,000	1,790	3,150	**29,900**	6,800	**19,000**	8,500	8,300	1,320	2,240	50	10,000
Lead (Pb)	ug/L	<	<	<	<	<	6	<	<	<	<	<	<	5	200
Magnesium (Mg)	ug/L	-	-	-	10,700	24,300	-	-	-	-	-	23,500	27,400	100	-
Manganese (Mn)	ug/L	7.0	9,100	8,800	1,130	6,240	11,000	5,400	10,000	8,900	9,000	3,270	5,120	2	-
Mercury (Hg)	ug/L	-	-	<	<	<	-	-	-	<	<	<	<	0.013	5
Molybdenum (Mo)	ug/L	<	<	<	<	<	2	<	<	<	<	<	<	2	-
Nickel (Ni)	ug/L	<	<	<	<	<	1	<	<	<	<	<	<	2	500
Phosphorus (P)	ug/L	-	-	-	<	<	-	-	-	-	-	<	<	100	0.5
Potassium (K)	ug/L	-	-	-	7,270	6,530	-	-	-	-	-	<	7,750	100	-
Selenium (Se)	ug/L	<	<	<	<	<	1	<	<	<	<	<	<	1	10
Silver (Ag)	ug/L	-	-	-	<	<	-	-	-	-	-	<	<	0.1	50
Sodium (Na)	ug/L	<	<	<	9,880	22,500	0.6	<	<	<	<	21,300	25,500	100	-
Strontium (Sr)	ug/L	52	360	350	156	289	-	280	440	380	390	282	324	2	-
Thallium (Tl)	ug/L	<	<	<	<	<	-	<	<	<	<	<	<	0.1	-
Tin (Sn)	ug/L	<	<	<	<	<	-	<	<	<	<	<	<	2	-
Titanium (Ti)	ug/L	<	<	<	<	<	-	<	<	<	<	<	<	2	-
Uranium (U)	ug/L	0.1	<	<	0.25	<	-	0.8	1	2	2	1.11	1	1	-
Vanadium (V)	ug/L	<	<	<	<	<	4	<	<	<	<	<	<	2	-
Zinc (Zn)	ug/L	<	67.0	<	8.10	<	7	<	<	<	<	5.20	<	50	500

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Environmental Control Water and Sewer Regulations, 2003, under the Water Resources Act, Newfoundland and Labrador Regulation 65/03.

PLCS = Primary Leachate Collection System
SLCS = Secondary Leachate Collection System

RDL = Reportable Detection Limit **0.0** = above criteria