THE COLLECTION OF LANDFILL MONITORING DATA AT THE FORMER FOX-2 DEW LINE SITE

Longstaff Bluff, Nunavut

REVISED FINAL REPORT – 2014

(O/Ref.: CD2655) (Y/Ref.: DLCMON (QIKIQ12)

DEFENCE CONSTRUCTION CANADA

NOVEMBER 2015

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NOVEMBER 2015

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1 OUTLINE

1.1 OBJECTIVE AND SCOPE OF WORK

The objective of the Defence Construction Canada (DCC) Landfill Monitoring Program is to collect sufficient information to assess the performance of landfills at former Distance Early Warning (DEW) Line Sites that have been remediated from a geotechnical and environmental perspective. DCC has specified the requirements for the Landfill Monitoring Program in the document: Terms of Reference (TOR) – Services for the Collection of Landfill Monitoring Data CAM-5 Mackar Inlet, FOX-M Hall Beach, FOX-2 Longstaff Bluff, FOX-3 Dewar Lakes DEW Line Sites Nunavut Territory, Qikiqtaaluk Region DCC Project #: DLCMON(QIKIQ12), March 20, 2012. This report contains a summary of the findings from the 2014 inspection of the FOX-2 Longstaff Bluff site.

Table I below summarizes the monitoring requirements of the 2014 season. No deviations from the TOR were experienced while completing the 2014 monitoring.

Table I: 2014 Monitoring Requirements for FOX-2 Landfills

Landfill	Visual Inspection	Soil Sampling	Groundwater Sampling	Thermal Monitoring
Airstrip Camp Landfill Lobe A	✓	✓		
Hangar Non-Hazardous Waste Landfill	✓	✓	✓	
West Landfill Lobe E	✓	✓		
Tier II Disposal Facility	✓	✓	✓	✓
Upper Site Landfill Lobe A	✓	✓	✓	✓

1.2 FIELD PROGRAM STAFF AND TIMING

The 2014 on-site field program at FOX-2 Longstaff Bluff took place from August 23 to August 26, 2014. Biogénie, a division of EnGlobe Corp. (Biogénie) subcontracted Sila Remediation Inc. (Sila), from Igloolik, Nunavut to perform the fieldwork. The Sila field program was to be executed by Mr. Martin Fleury with the assistance of four local representatives, whose names and responsibilities are detailed below:

- Mr. Martin Fleury, Project Engineer (Englobe);
- Mr. Caleb Qanatsiaq, Field Assistant (Sila);
- Mr. Philip Siakuluk, Field Assistant (Sila);
- Mr. George Inuksuk, Wildlife Monitor (Sila); and
- Mr. David Qanatsiaq, Wildlife Monitor (Sila).

1.3 2014 WEATHER CONDITIONS

Weather conditions at FOX-2 Longstaff Bluff were seasonably average, with temperatures ranging from 3 - 9°C with high winds and no precipitation.

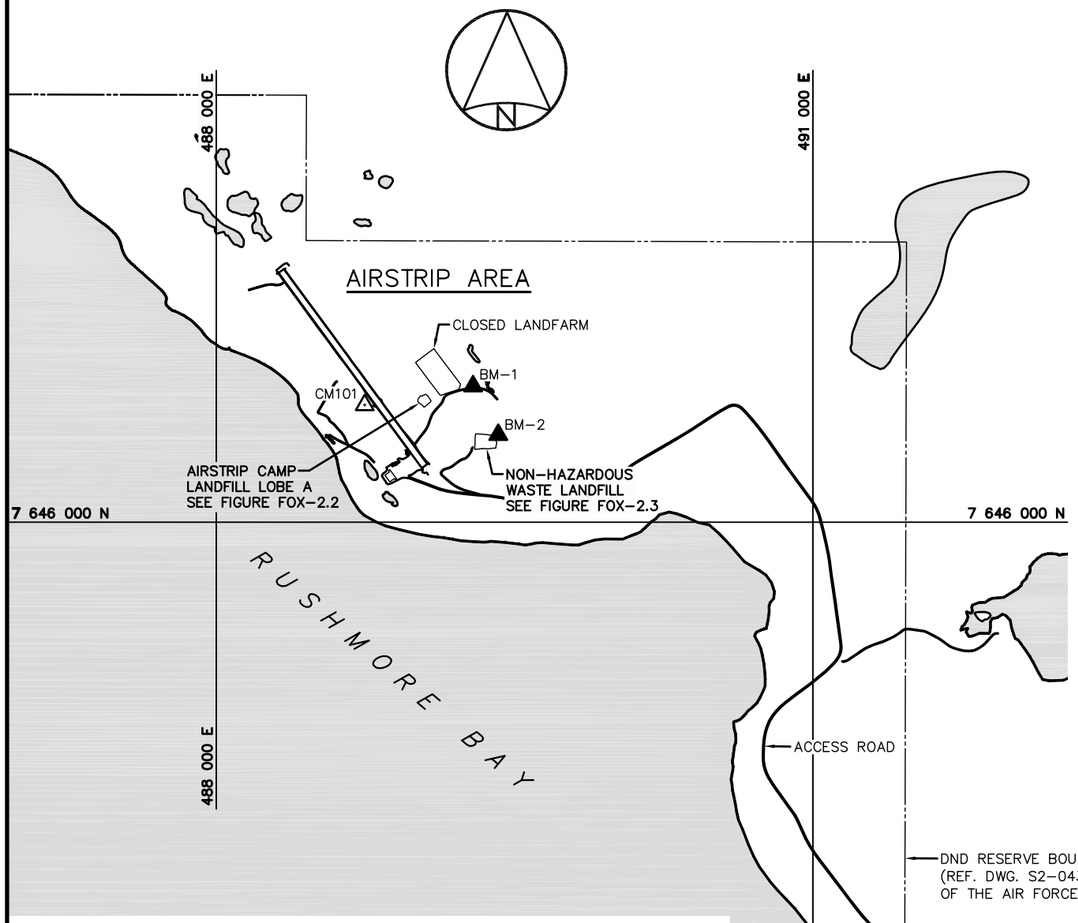
1.4 REPORT FORMAT

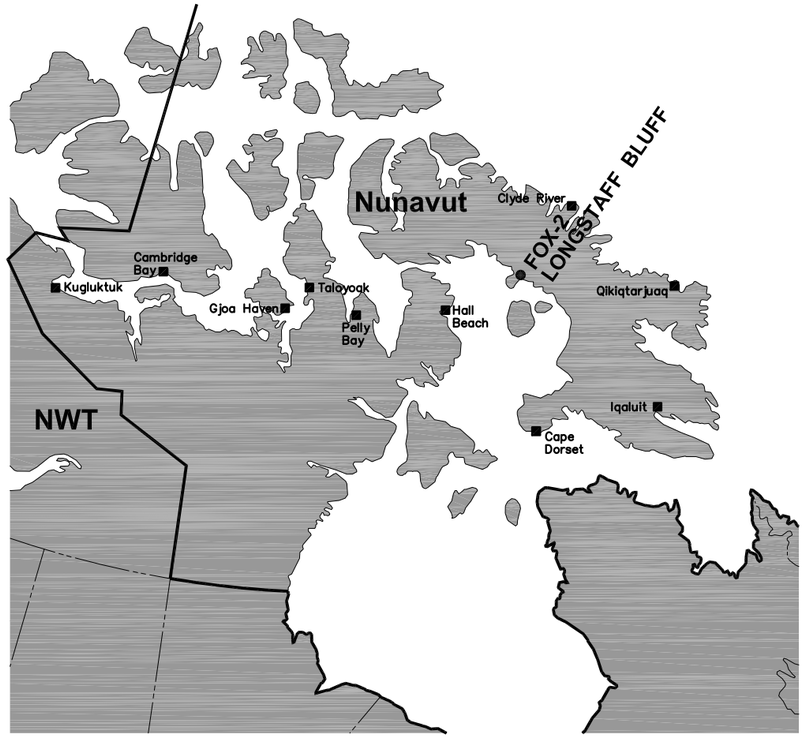
This report describes the work carried out in August 2014 at the five (5) landfill sites at FOX-2 Longstaff Bluff. Results from soil and groundwater sampling, thermal monitoring and visual inspection of the sites are also presented in the formats described in the TOR (Reference A). An electronic version of the report and its associated tables, figures and data files are included in an Addendum DVD-ROM, which is appended to this report.

The report is organized with a separate section for each of the landfill areas. Each section contains all relevant information for that landfill area for the 2014 Landfill Monitoring Program. The following information is provided in each landfill section:

- Visual inspection checklist;
- Visual inspection drawing mark-up;
- A selection of visual inspection photos;
- Thermal monitoring inspection reports (where applicable);
- Summary of 2014 soil analytical data (where applicable);
- Summary of 2014 groundwater analytical data (where applicable); and
- Monitoring well development/sampling reports (where applicable).

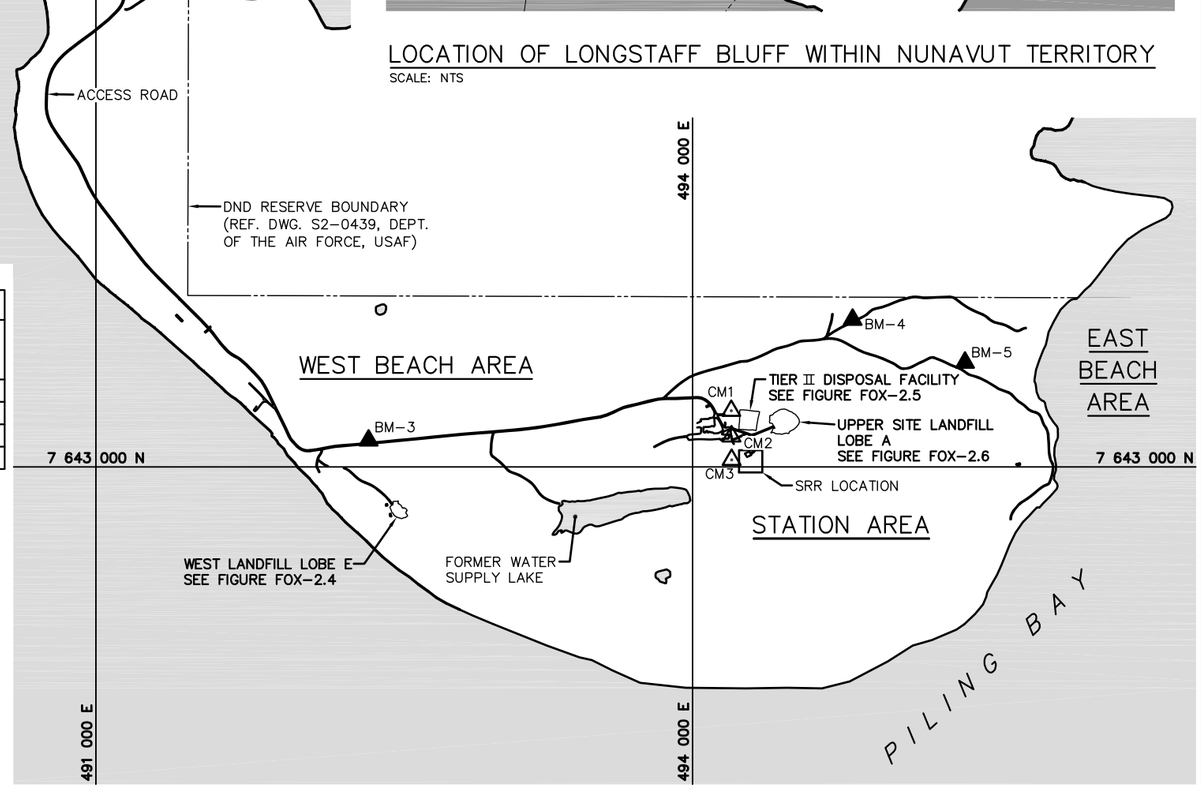
For the photographic records, the printed copy of the report includes an index image of photos for each of the landfill areas. The full resolution photos are included in electronic format in the Addendum DVD-ROM attached to this report. Certificates of Analyses, Quality Assurance/Quality Control (QA/QC) analytical results and field notes are attached in the Annexes.





LOCATION OF LONGSTAFF BLUFF WITHIN NUNAVUT TERRITORY

SCALE: NTS



SURVEY CONTROL MONUMENTS				
NO.	UTM COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
CM1	7 643 282.694	494 194.669	150.604	FOX-2 BASELINE STA. 0+00
CM2	7 643 154.373	494 195.664	155.980	FOX-2 BASELINE STA. N/A
CM3	7 643 035.836	494 196.504	158.975	FOX-2 BASELINE STA. N/A
CM101	7 646 589.787	488 746.333	12.088	FOX-2 BASELINE STA. 12+00

NOTE: BASELINE STATIONS SHOWN ARE IN IMPERIAL UNITS.

PERMANENT BENCHMARK (AS-BUILT)				
NO.	UTM COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
BM-1	7 646 684.430	489 291.060	29.490	25mm DIA. STEEL PIPE
BM-2	7 646 440.000	489 417.870	29.760	25mm DIA. STEEL PIPE
BM-3	7 643 133.590	492 370.950	37.280	25mm DIA. STEEL PIPE
BM-4	7 643 740.820	494 804.820	80.570	25mm DIA. STEEL PIPE
BM-5	7 643 525.070	495 369.930	43.210	25mm DIA. STEEL PIPE

NOTE: COORDINATES AND ELEVATIONS INDICATED ARE TOP OF BENCHMARK PIPE.

LEGEND

- APPROXIMATE LOCATION OF PROPERTY BOUNDARY
- SURVEY CONTROL MONUMENT
- PERMANENT BENCHMARK LOCATION
- BODY OF WATER

0m 300m 600m 900m 1200m 1500m

NO.	VERSION	DATE	BY	VERIF.	APPR.
2	FINAL	15-11-10	P.L.	B.M.	M.F.

Construction de Défense Canada
Defence Construction Canada

COLLECTION OF LANDFILL MONITORING DATA

FOX-2, LONGSTAFF BLUFF, NUNAVUT

OVERALL SITE PLAN

SITE REMEDIATION SOLUTIONS

Biogenie, a division of EnGlobe Corp.
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MEASUREMENT UNIT	SCALE:	DATE (month-year):
Meter	1 : 30,000	NOVEMBER 2015
DRAWN BY:	VERIFIED BY:	APPROVED BY:
L. LA PIERRE	B. MACKAY	M. FLEURY P. Eng.
PROJECT NO:	DRAWING NO:	PAGE
CD2655_410_413	CD2655_410_413_101-FOX-2_A	PL

FIGURE FOX-2.1

G:\CD2655\FINAL-2\CD2655_410_413_101-FOX-2_A.dwg, PL, 2015-11-10 3:48:48 PM

2 METHODOLOGY

2.1 VISUAL INSPECTION

Data and information collected during the visual inspection of the FOX-2 landfills are included in the visual inspection data sheets. These data sheets include inspection data such as the location of settlement, erosion, frost action, sloughing and cracking, animal burrows, vegetation cover and stress, staining, seepage points, exposed debris, and any other features of note.

Each feature was identified with an alphabetical or numerical tag to be used consistently each year in an effort to track changes in conditions for each specific feature.

Digital photos were taken to illustrate the current state of the landfills as well as features of interest. Annotated sketches/diagrams are included in the report for each landfill.

The photos were taken with an Apple Ipad Air. Full resolution digital jpg copies are available on the DVD-ROM appended to this report. The photo log, including the local coordinates from where the photo was taken, orientation (relative to map north), features of note, and picture numbers are included with each landfill report.

2.2 SOIL SAMPLING

The soil sampling methodology conformed to guidance provided in the following Canadian Council of Ministers of the Environment (CCME) documents:

- CCME Guidance Document on the *Management of Contaminated Sites in Canada*, April 1997, CCME PN 1279. (CCME catalogue - http://www.ccme.ca/pdfs/cat_eng.pdf).
- CCME EPC-NCS62E Guidance Manual on *Sampling, Analysis, and Data Management for Contaminated Sites* - Volume I: Main Report, Dec 1993 (CCME catalogue -http://www.ccme.ca/pdfs/cat_eng.pdf).
- CCME EPC-NCS66E Guidance Manual on *Sampling, Analysis, and Data Management for Contaminated Sites* - Volume II: Analytical Method Summaries, Dec. 1993 (CCME catalogue -http://www.ccme.ca/pdfs/cat_eng.pdf).
- Reference method for the *Determination of Petroleum Hydrocarbons in Soil - Tier I Method*, 2001.
- CCME *Subsurface Assessment Handbook for Contaminated Sites*, March 1994, EPC-NCSRP-48E (CCME catalogue -http://www.ccme.ca/pdfs/cat_eng.pdf).

Testpits were dug using a hand shovel down to refusal or permafrost. The shovel was cleaned between testpits. Soil samples were placed directly in the laboratory provided jars/bottles and were not mixed. Disposable nitrile glove were worn and disposed of after each sample collection. Jars/bottles were cleaned prior to placement into the cooler. For the 2014 monitoring event, 21 soil sampling stations were visited. A surface sample (0-15 cm in depth) and subsurface sample (40-50 cm in depth below surface) were taken at each sampling station. Depth samples were not collected at several locations due to the presence of bedrock. When applicable, the presence of bedrock is indicated in the Soil Sampling Analytical Data Summary tables for the various landfills.

As specified in the TOR (Reference A), the following soil sampling procedures were adhered to:

- Where required, the soil samples were collected from locations between a two to four metre radius of the monitoring wells.
- Blind field duplicates (10%) were collected for quality assurance and quality control purposes.
- Duplicate samples (10%) were also taken and sent to a second laboratory for quality control purposes.
- An additional 10% of soil samples taken were sent to the owner's representative (ESG OPS CENTRE) in Kingston for archiving as specified by DCC.

The soil samples were analyzed for requested parameters (TPH [F1-F3], total metals and PCBs) as specified in the TOR. It should be noted that 2 jars containing soil samples were broken during transportation. There is no indication from the laboratory as per which sample was lost. Exova confirmed that they still had enough soil to perform all requested analyses. Table II below summarizes the soil sampling at FOX-2 during the August 2014 field program:

Table II: Summary of Soil Sampling at FOX-2 - August 2014

Landfill Site	Soil Sample Locations			
Airstrip Landfill Lobe A	F2-1	F2-2	F2-3	F2-4
Non-Hazardous Waste Landfill	MW-5	MW-6	MW-7	MW-8
West Landfill	F2-5	F2-6	F2-7	F2-8
	F2-9	-	-	-
Tier II Disposal Facility	MW-9	MW-10	MW-11	MW-12
Upper Site Landfill	MW-13	MW-14	MW-15	MW-16

2.3 GROUNDWATER SAMPLING

The groundwater sampling methodology conformed to guidance provided in the following CCME documents:

- CCME EPC-NCS62E Guidance Manual on *Sampling, Analysis and Data Management for Contaminated Sites* - Volume I: Main Report, Dec 1993 (CCME catalogue - http://www.ccme.ca/pdfs/cat_eng.pdf).
- CCME EPC-NCS66E Guidance Manual on *Sampling, Analysis and Data Management for Contaminated Sites* - Volume II: Analytical Method Summaries, Dec. 1993 (CCME catalogue -http://www.ccme.ca/pdfs/cat_eng.pdf).

Wells were purged as specified and measurements of *in-situ* temperature, conductivity, and pH were taken. Sampling took place when these parameters were stabilized. The samples were not acidified and were not filtered (as directed in the TOR).

The 2014 field program included sampling four (12) monitoring wells at FOX-2; a summary of the groundwater sampling undertaken is summarized in Table III. As samples were not filtered, sediment was present in all but one groundwater sample (MW15) and required a digest which raised the RDL. The RDL for sample collected at MW15 is the usual RDL used by Exova. It should be noted that, although requested in the COC, Exova did not perform PHC Fraction F1 analysis. Concentrations measured in the QA samples sent to Maxxam are presented where applicable.

In sampled wells, no signs of free-phase hydrocarbon product were detected. Monitoring Well Development and Sampling Record forms are included in the appropriate sections in this report.

Table III: Summary of Groundwater Sampling at FOX-2 - August 2014

Landfill Site	Groundwater Sample Locations			
Non-Hazardous Waste Landfill	MW-5 - dry	MW-6 - dry	MW-7 - dry	MW-8
Tier II Disposal Facility	MW-9	MW-10	MW-11	MW-12
Upper Site Landfill	MW-13	MW-14	MW-15	MW-16

2.4 THERMAL MONITORING

The 2014 thermal monitoring program at FOX-2 consisted of an inspection of the thermistors and data loggers, the downloading of all datasets, and the manual reading of thermistors. Specific detailed information regarding temperature data is contained in the Tier II Disposal Facility and Upper Site Landfill Lobe A sections of this report. The datalogger for VT-2 (Tier II disposal facility) was missing. Batteries were changed in all other dataloggers.

2.5 FIELD NOTES AND DATA

Field notes from the 2014 Landfill Monitoring Program, including soil and water sampling, are included in Annex 3 for reference. Notes were written in field books, previously prepared logs, or entered directly into a field computer. The notes were scanned into an Adobe pdf document for future reference and back up. Locations of all observations and features for the visual inspection were recorded using a Garmin GPS eTrex 30 hand-held GPS, which included a combination of continuous tracks and discrete waypoints. Datasets collected from the individual vertical thermistors were downloaded directly to a field laptop computer.

2.6 QUALITY CONTROL

It should be noted that, although samples were sent to Exova and Maxxam laboratories, only Exova's bottles/jars were used.

Sila implemented standard sample collection techniques to decrease the likelihood of compromising collected samples. The methods used for sample collection are summarized in Sections 2.2 and 2.3 of this report. The following measures were taken to minimize sample cross-contamination:

- All samples were placed directly into the appropriate laboratory-supplied containers (for the particular analysis).
- Soil samples were collected with the use of decontaminated sampling equipment and/or nitrile gloves that were used only once.
- Water samples were collected through the use of dedicated Waterra foot valves and tubing.

Chain-of-Custody (COC) forms were completed by the Project Engineer prior to mobilisation and finalised after sample collection. The samples were refrigerated prior to off-site shipment in chilled coolers by First Air Cargo directly to Maxxam Analytics Inc. (Maxxam) in Ottawa, Ontario (via Iqaluit), Exova in Ottawa, Ontario (via Iqaluit), and ESG in Kingston, Ontario (via Iqaluit), where they were checked in by laboratory representatives. All analyses were completed as specified on COC forms.

Annex 1 provides a sample integrity report from Exova. This report indicates that all samples received were acceptable for analysis.

2.7 QA/QC PROCEDURES

Sila used standard QA/QC procedures as specified in the TOR and CCME Guidance Documents for this project. The following is a summary of the analytical QA/QC samples collected:

- 10% Blind Duplicate Samples of soil and water were sent to Exova. Results can be found in Annex 1.
- 10% Inter-laboratory Duplicate Samples were sent to Maxxam (to determine if variation in procedures may cause significant difference in analytical results).
- 10% Archival Samples of soil were sent to ESG.

2.8 PROJECT REFERENCES

The following references are specifically relevant to the 2014 Landfill Monitoring activities:

A. Invitation to Tender - *Contractor Services for the Collection of Landfill Monitoring Data: CAM-5 Mackar Inlet, FOX-M Hall Beach, FOX-2 Longstaff Bluff and FOX-3 Dewar Lakes - DEW Line Sites Nunavut Territory Qikiqtaaluk Region. DCC Project #: DLCMON (QIKIQ12)*, March 20, 2012.

B. Terms of Reference - *Services for the Collection of Landfill Monitoring Data: CAM-5 Mackar Inlet, FOX-M Hall Beach, FOX-2 Longstaff Bluff and FOX-3 Dewar Lakes - DEW Line Sites Nunavut Territory Qikiqtaaluk Region. DCC Project #: DLCMON (QIKIQ12)*, March 20, 2012.

C. *Contractor Services for the Collection of Landfill Monitoring Data: CAM-5 Mackar Inlet, FOX-M Hall Beach, FOX-2 Longstaff Bluff and FOX-3 Dewar Lakes - DEW Line Sites Nunavut Territory Qikiqtaaluk Region*. Technical Proposal - May 2012.

D. *Post-Field Progress Report, FOX-2 DEW Line Sites 2014*, September 2014.

3 AIRSTRIP CAMP LANDFILL LOBE A

3.1 SUMMARY

On August 25, 2014 soil sampling and a visual inspection were completed at the Airstrip Camp Landfill Lobe A.

TPH fraction F3 was detected in surface soil sample at F2-8-2014 (80 mg/kg). No PCBs were detected in the collected soil samples. Elevated concentrations of most metals (with the exception of cadmium) were detected in most soil samples, with emphasis on arsenic, chromium and zinc.

As of 2014, no erosion features with “significant” or “unacceptable” severity ratings were identified in the Preliminary Stability Assessment of the Airstrip Camp Landfill Lobe A. There are isolated occurrences of ponding water at the south and southwest limits of the landfill. Areas of settlement/rough grading identified during the baseline and 2013 inspections were not observed in 2014. No exposed debris was noticed.

At this time, the overall performance of the landfill is rated as acceptable.

The Visual Inspection Checklist is included in Table IV of this report and has been completed as per the TOR. Please refer to Figure FOX-2.2 for a sketch of the Airstrip Camp Landfill Lobe A detailing the location of photographs and features.

Table IV: Visual Inspection Checklist – Airstrip Camp Landfill Lobe A

DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
VISUAL INSPECTION CHECKLIST

INSPECTION REPORT – PAGE 1 of 2

SITE NAME: FOX-2 Longstaff Bluff
LANDFILL DESIGNATION: Airstrip Camp Landfill Lobe A (Regrade Landfill)
DATE OF INSPECTION: August 25, 2014
DATE OF PREVIOUS INSPECTION: August 27, 2013
INSPECTED BY: M. Fleury
REPORT PREPARED BY: M. Fleury
MONITORING EVENT NUMBER: 3
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

TABLE IV: AIRSTRIP CAMP LANDFILL VISUAL INSPECTION (PAGE 2 OF 2)

Checklist Item	Present (Y/N)	Feature Label	Location	Length (m)	Width (m)	Depth (m)	Extent Relative to Area of Landfill (%)	Description	Photographic Reference	Severity Rating	Additional Comments
Settlement	N	A	North portion of the landfill top	N/A	N/A	N/A	N/A	Area of rough grading / settlement observed in baseline and in 2013 inspections	4 and 5	N/A	Not observed during the 2014 inspection.
	N	B	East portion of the landfill top	N/A	N/A	N/A	N/A	Area of rough grading / settlement observed in baseline and in 2013 inspections	3	N/A	Not observed during the 2014 inspection.
	N	C	Southeast limit of the landfill top	N/A	N/A	N/A	N/A	Settlement observed in 2013	2 and 3	N/A	Not observed during the 2014 inspection.
	N	D	Southeast limit of the landfill top	N/A	N/A	N/A	N/A	Settlement observed in 2013	2 and 3	N/A	Not observed during the 2014 inspection.
	N	E	West portion of the landifll top	N/A	N/A	N/A	N/A	Area of rough grading / settlement observed in 2013	N/A	N/A	Not observed during the 2014 inspection.
Erosion	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Frost Action	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Animal Burrows	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staining	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation Stress	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Seepage Points	Y	F	South limit of the landfill	8	4	0.1	1%	Ponding water	23	Acceptable	Thin layer of soil with underlying bedrock. No Signficant Change from Previous Observation.
		G	Southwest limit of the landfill	4	20	0.15	4%	Ponding water	25	Acceptable	Thin layer of soil with underlying bedrock. No Signficant Change from Previous Observation.
Debris Exposed	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Presence / Condition of Monitoring Instruments	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Features of Note	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Legend : N/A Not applicable

3.2 PRELIMINARY STABILITY ASSESSMENT

The Preliminary Stability Assessment for the Airstrip Camp Landfill Lobe A has been completed as per the TOR and is included as Table V hereafter.

Table V: Preliminary Stability Assessment – Airstrip Camp Landfill Lobe A

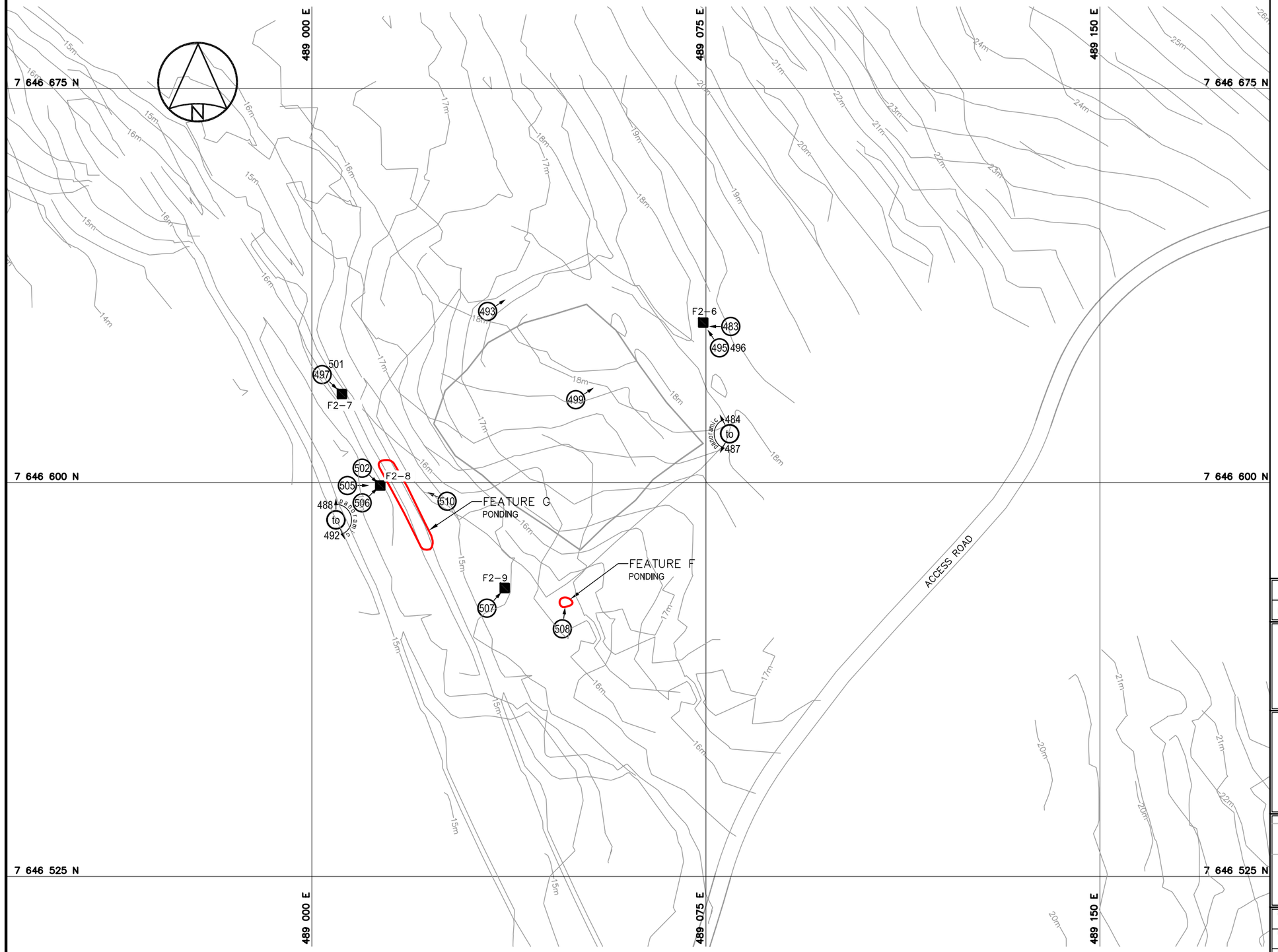
Feature	Severity Rating	Extent
Settlement	Not observed	None
Erosion	Not observed	None
Frost Action	Not observed	None
Staining	Not observed	None
Vegetation Stress	Not observed	None
Seepage/Ponded Water	Acceptable	Isolated
Debris Exposure	Not observed	None
Overall Landfill Performance	**Acceptable**	

Performance/Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to-date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of the landfill is compromised to the extent that the ability to contain waste materials is compromised. Examples may include: • Debris exposed in erosion channels or areas of differential settlement. • Liner exposed. • Slope failure.

Extent	Description
Isolated	Singular feature.
Occasional	Features of note occurring at irregular intervals/locations.
Numerous	Many features of note, impacting less than 50% of the surface area of the landfill.
Extensive	Impacting greater than 50% of the surface area of the landfill.

3.3 LOCATION PLAN

The Location Plan for the Airstrip Camp Landfill Lobe A has been completed as per the TOR and is presented in Figure FOX-2.2.



LEGEND

- SOIL SAMPLING LOCATION
- PONDING
- 483 PHOTOGRAPH VIEWPOINT LOCATION

0m 7,5m 15,0m 22,5m 30,0m 37,5m

NO.	VERSION	DATE	BY	VERIF.	APPR.
2	FINAL	15-11-10	P.L.	B.M.	M.F.

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COLLECTION OF LANDFILL MONITORING DATA

FOX-2, LONGSTAFF BLUFF, NUNAVUT

AIRSTRIP CAMP LANDFILL LOBE A

SITE REMEDIATION SOLUTIONS

Biogenie, a division of EnGlobe Corp.
4495 Wilfrid-Hamel blvd, Suite 200
Quebec, (Quebec) CANADA G1P 2J7
Phone : 418-653-4422 www.biogenie-env.com

MEASUREMENT UNIT	SCALE:	DATE (month-year):
Meter	1 : 750	NOVEMBER 2015
DRAWN BY:	VERIFIED BY:	APPROVED BY:
L. LA PIERRE	B. MACKAY	M. FLEURY P. Eng.
PROJECT NO:	DRAWING NO:	PAGE
CD2655_410_413	CD2655_410_413_101-FOX-2_B	PL

FIGURE FOX-2.2

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3.4 PHOTOGRAPHIC RECORDS

The Photographic Record for Airstrip Camp Landfill Lobe A has been completed as per the TOR and is included as Table VI hereafter. Full-sized photographs are contained in the Addendum DVD-ROM.

Table VI: Visual Inspection Photo Log – Airstrip Camp Landfill Lobe A

Site Name: FOX-2, Longstaff Bluff
Landfill: Airstrip Camp Landfill
Date Inspected: August 25, 2014
Inspected by: Martin Fleury

Photo	Filename	Size (KB)	Date	Vantage Point		Caption
				Easting	Northing	
1	IMG_0483	2 595	2014-08-25	18 W 489074	7646630	West view of F2-6-2014 soil sampling location.
2	IMG_0484	2 176	2014-08-25	18 W 489080	7646609	Panoramic view of the Airstrip Camp Landfill top, Southwest.
3	IMG_0485	2 199	2014-08-25	18 W 489080	7646609	Panoramic view of the Airstrip Camp Landfill top, West - Southwest.
4	IMG_0486	2 172	2014-08-25	18 W 489080	7646609	Panoramic view of the Airstrip Camp Landfill top, West - Northwest.
5	IMG_0487	2 160	2014-08-25	18 W 489080	7646609	Panoramic view of the Airstrip Camp Landfill top, Northwest.
6	IMG_0488	1 969	2014-08-25	18 W 489005	7646593	Panoramic view of the Airstrip Camp Landfill top, North.
7	IMG_0489	1 988	2014-08-25	18 W 489005	7646593	Panoramic view of the Airstrip Camp Landfill top, Northeast.
8	IMG_0490	1 958	2014-08-25	18 W 489005	7646593	Panoramic view of the Airstrip Camp Landfill top, East.
9	IMG_0491	1 932	2014-08-25	18 W 489005	7646593	Panoramic view of the Airstrip Camp Landfill top, Southeast.
10	IMG_0492	1 908	2014-08-25	18 W 489005	7646593	Panoramic view of the Airstrip Camp Landfill top, South - Southeast.
11	IMG_0493	2 590	2014-08-25	18 W 489033	7646633	Northeast view of the Airstrip Camp Landfill northern limit.
12	IMG_0494	3 261	2014-08-25	18 W 489074	7646630	View of the F2-6-2014 soil sampling location.
13	IMG_0495	2 774	2014-08-25	18 W 489074	7646630	Northwest view of the F2-6-2014 soil sampling location.
14	IMG_0496	3 128	2014-08-25	18 W 489074	7646630	Northwest view of the F2-6-2014 soil sampling location.
15	IMG_0497	2 879	2014-08-25	18 W 489006	7646617	Southeast view of F2-7-2014 soil sampling location.
16	IMG_0499	2 920	2014-08-25	18 W 489050	7646616	General Northeast view of the Landfill top.
17	IMG_0500	3 131	2014-08-25	18 W 489006	7646617	View of F2-7-2014 soil sampling location.
18	IMG_0501	3 077	2014-08-25	18 W 489006	7646617	Southeast view of F2-7-2014 soil sampling location.
19	IMG_0502	2 714	2014-08-25	18 W 489013	7646599	Southeast view of F2-8-2014 soil sampling location.
20	IMG_0505	2 574	2014-08-25	18 W 489013	7646599	East view of F2-8-2014 soil sampling location.
21	IMG_0506	3 067	2014-08-25	18 W 489013	7646599	Northeast view of F2-8-2014 soil sampling location.
22	IMG_0507	2 817	2014-08-25	18 W 489037	7646580	Northeast view of F2-9-2014 soil sampling location.
23	IMG_0508	1 883	2014-08-25	18 W 489048	7646577	North view of a ponding water location (Feature F).
24	IMG_0509	2 187	2014-08-25	18 W 489037	7646580	View of F2-9-2014 soil sampling location.
25	IMG_0510	2 505	2014-08-25	18 W 489020	7646594	Northwest view of a ponding water location (Feature G).

3.5 SOIL SAMPLE ANALYTICAL DATA

The soil chemical analysis results for the 2014 Airstrip Camp Landfill Lobe A samples are presented in Table VII hereafter. Certificates of analysis and results of field duplicates collected as part of the QA/QC program are presented in Annex 1 at the end of this report. It should be noted that sample numbers have been altered. Please refer to Annex 1 for the sample ID key.

Table VII: Airstrip Camp Landfill Lobe A Summary Table for Soil Analytical Data

Sample #	Location	Depth [cm]	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]
RDL - Exova			1	1	1	0.5	1	2	1	1	0.1	0.02	10	10	20
Upgradient Soil Samples															
F2-6-A-2014	F2-6	0 - 10	91	96	19	<0.5	10	143	79	39	<0.1	<0.02	<10	<10	<20
F2-6-B-2014		40 - 50	74	62	13	<0.5	4	95	107	21	<0.1	<0.02	<10	<10	<20
Downgradient Soil Samples															
F2-7-A-2014	F2-7	0 - 10	50	52	14	<0.5	9	93	86	39	<0.1	<0.02	<10	<10	<20
F2-7-B-2014		40 - 50	46	48	14	<0.5	9	95	61	31	<0.1	<0.02	<10	<10	<20
F2-8-A-2014	F2-8	0 - 10	50	58	14	<0.5	9	92	93	42	<0.1	<0.02	<10	<10	<20
F2-8-B-2014		40 - 50	55	61	16	<0.5	10	89	101	108	<0.1	<0.02	<10	<10	<20
F2-9-A-2014	F2-9	0 - 10	69	82	24	<0.5	24	132	121	46	<0.1	<0.02	<10	<10	80
F2-9-B-2014		40 - 50	65	85	17	<0.5	11	119	151	35	<0.1	<0.02	<10	<10	<20

4 HANGAR NON-HAZARDOUS WASTE LANDFILL

4.1 SUMMARY

The visual inspection of the Hangar Non-Hazardous Waste Landfill was completed on August 25, 2014. Soil samples and groundwater samples were collected during the 2014 monitoring.

TPH fraction F3 was detected in the surface soil sample at location MW-6 (60 mg/kg). No relatively high metal concentrations or PCBs were detected in the collected soil samples. Elevated concentrations of most metals (with the exception of cadmium) were detected in most soil samples, with emphasis on chromium, nickel and zinc.

Groundwater quantity was sufficient to perform sampling for analysis of all required parameters at MW-8 only. Monitoring wells MW-5 and 7 were either dry or frozen and MW-6 did not have enough to allow sampling. No TPH, PCBs or elevated concentration of metals were detected in the sample collected at MW-8. As samples were not filtered, sediment was present and required a digest which raised the RDL.

As of the 2014 monitoring event, no features were identified as “significant” or “unacceptable.” Occasional areas of minor settlement observed during the 2013 inspection were not observed in 2014. No erosion features or exposed debris were noticed.

At this time, the overall performance of the landfill is rated as acceptable.

The Visual Inspection Checklist has been completed as per the TOR and is included as Table VIII of this report. Please refer to Figure Fox 2.3 for a sketch of the Hangar Non-Hazardous Waste Landfill detailing the location of photographs and features.

Table VIII: Visual Inspection Checklist – Hangar Non-Hazardous Waste Landfill

DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
VISUAL INSPECTION CHECKLIST

INSPECTION REPORT – PAGE 1 of 2

SITE NAME: FOX-2 Longstaff Bluff
LANDFILL DESIGNATION: Hangar Non-Hazardous Waste Landfill (New Landfill)
DATE OF INSPECTION: August 25, 2014
DATE OF PREVIOUS INSPECTION: August 27, 2013
INSPECTED BY: M. Fleury
REPORT PREPARED BY: M. Fleury
MONITORING EVENT: 3
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

TABLE VIII: HANGAR NON-HAZARDOUS WASTE LANDFILL VISUAL INSPECTION (PAGE 2 OF 2)

Checklist Item	Present (Y/N)	Feature Label	Location	Length (m)	Width (m)	Depth (m)	Extent Relative to Area of Landfill (%)	Description	Photographic Reference	Severity Rating	Additional Comments
Settlement	N	A	East portion of the landfill top	N/A	N/A	N/A	N/A	Settlement observed in 2013	N/A	N/A	Not observed during the 2014 inspection.
	N	B	East limit of the landfill top	N/A	N/A	N/A	N/A	Settlement observed in 2013	N/A	N/A	Not observed during the 2014 inspection.
	N	C	North limit of the landfill top	N/A	N/A	N/A	N/A	Settlement observed in 2013	N/A	N/A	Not observed during the 2014 inspection.
Erosion	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Frost Action	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Animal Burrows	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staining	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation Stress	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Seepage Points	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Debris Exposed	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Presence / Condition of Monitoring Instruments	Y	F2-MW-5	East - Northeast side of the landfill	N/A	N/A	N/A	N/A	Groundwater Monitoring Well	1	N/A	Well in good condition - Dry or frozen.
		F2-MW-6	West - Northwest side of the landfill	N/A	N/A	N/A	N/A	Groundwater Monitoring Well	20	N/A	Well in good condition - Dry or frozen.
		F2-MW-7	West side of the landfill	N/A	N/A	N/A	N/A	Groundwater Monitoring Well	18	N/A	Well in good condition - Dry or frozen.
		F2-MW-8	West - Southwest side of the landfill	N/A	N/A	N/A	N/A	Groundwater Monitoring Well	N/A	N/A	Good condition.
Other Features of Note	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Legend : N/A Not applicable

4.2 PRELIMINARY STABILITY ASSESSMENT

The Preliminary Stability Assessment for the Hangar Non-Hazardous Waste Landfill has been completed as per the TOR and is included as Table IX hereafter.

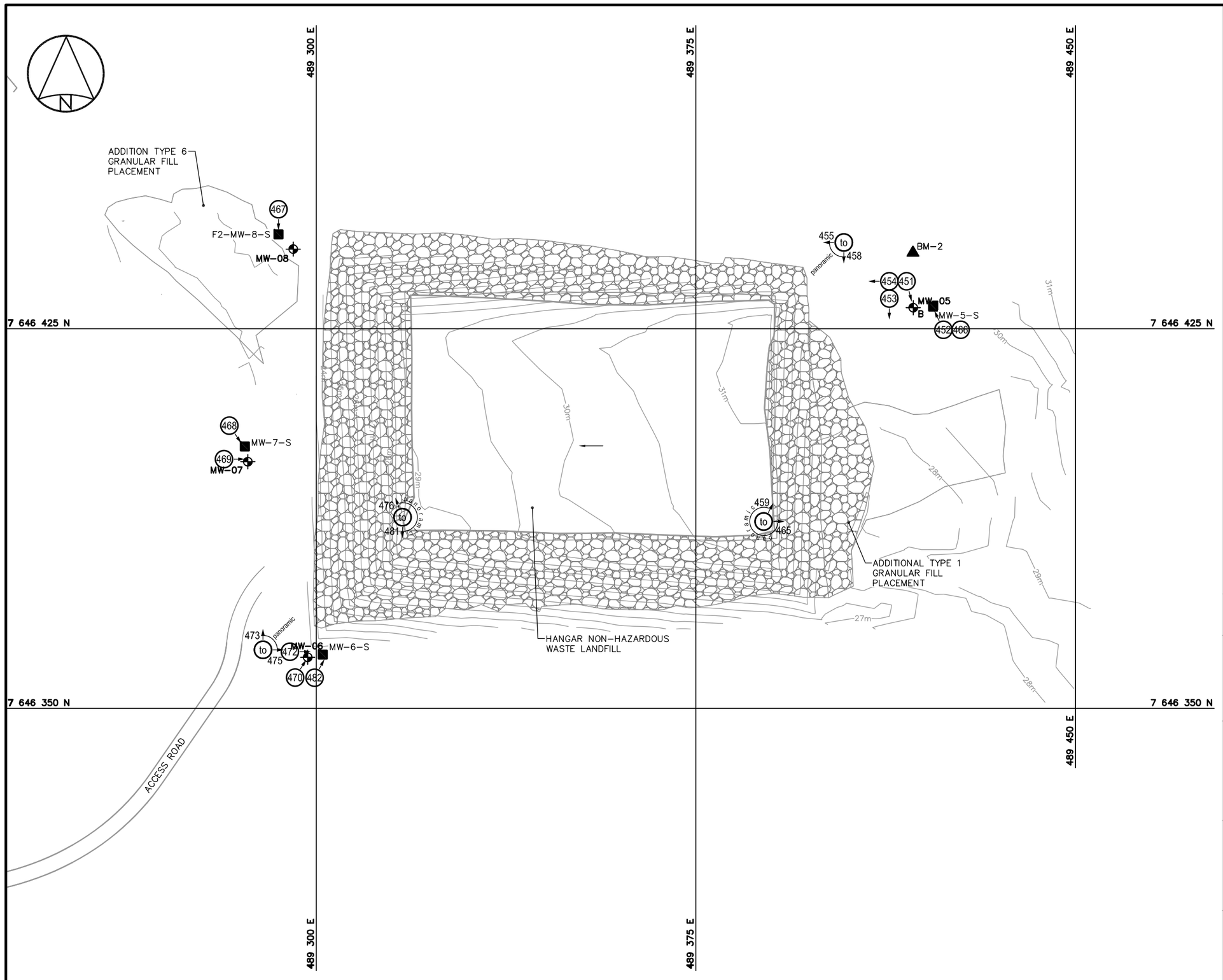
Table IX: Preliminary Stability Assessment – Hangar

Feature	Severity Rating	Extent
Settlement	Not observed	None
Erosion	Not observed	None
Frost Action	Not observed	None
Staining	Not observed	None
Vegetation Stress	Not observed	None
Seepage/Ponded Water	Not observed	None
Debris Exposure	Not observed	None
Overall Landfill Performance	**Acceptable**	

Performance/Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to-date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of the landfill is compromised to the extent that the ability to contain waste materials is compromised. Examples may include: • Debris exposed in erosion channels or areas of differential settlement. • Liner exposed. • Slope failure.
Extent	**Description**
Isolated	Singular feature.
Occasional	Features of note occurring at irregular intervals/locations.
Numerous	Many features of note, impacting less than 50% of the surface area of the landfill.
Extensive	Impacting greater than 50% of the surface area of the landfill.

4.3 LOCATION PLAN

The Location Plan for the Hangar Non-Hazardous Waste Landfill has been completed as per the TOR and is presented in Figure FOX-2.3.



LEGEND

- BM-2 — APPROXIMATE PERMANENT BENCHMARK LOCATION
- MONITORING WELL LOCATION
- B — BACKGROUND MONITORING WELL LOCATION
- SOIL SAMPLING LOCATION
- 467 → PHOTOGRAPH VIEWPOINT LOCATION

0m 7,5m 15,0m 22,5m 30,0m 37,5m

NO.	VERSION	DATE	BY	VERIF.	APPR.
2	FINAL	15-11-10	P.L.	B.M.	M.F.

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COLLECTION OF LANDFILL MONITORING DATA

FOX-2, LONGSTAFF BLUFF, NUNAVUT

HANGAR NON-HAZARDOUS WASTE LANDFILL

SITE REMEDIATION SOLUTIONS

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Quebec, (Quebec) CANADA G1P 2J7
Phone : 418-653-4422 www.biogenie-env.com

MEASUREMENT UNIT	SCALE:	DATE (month-year):
Meter	1 : 750	NOVEMBER 2015
DRAWN BY:	VERIFIED BY:	APPROVED BY:
L. LA PIERRE	B. MACKAY	M. FLEURY P. Eng.
PROJECT NO:	DRAWING NO:	PAGE
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FIGURE FOX-2.3

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4.4 PHOTOGRAPHIC RECORDS

The Photographic Record for the Hangar Non-Hazardous Waste Landfill has been completed as per the TOR and is included in the following pages as Table X. Full-sized photographs are contained in the Addendum DVD-ROM.

Table X: Landfill Visual Inspection Photo Log – Hangar Non-Hazardous Waste Landfill

Site Name: FOX-2, Longstaff Bluff
Landfill: Hangar Non-Hazardous Waste Landfill
Date Inspected: August 25, 2014
Inspected by: Martin Fleury

Photo	Filename	Size (KB)	Date	Vantage Point		Caption
				Easting	Northing	
1	IMG_0451	2 106	2014-08-25	18 W 489418	7646429	Southeast view of MW-5.
2	IMG_0452	2 430	2014-08-25	18 W 489422	7646429	Northwest view of F2-MW-5-S soil sampling location.
3	IMG_0453	2 115	2014-08-25	18 W 489413	7646431	South view of the eastern slope of the Landfill.
4	IMG_0454	2 217	2014-08-25	18 W 489413	7646431	West view of the eastern slope of the Landfill.
5	IMG_0455	1 794	2014-08-25	18 W 489404	7646442	Panoramic view of the Landfill North and East slopes, South.
6	IMG_0456	1 998	2014-08-25	18 W 489404	7646442	Panoramic view of the Landfill North and East slopes, South - Southwest.
7	IMG_0457	2 000	2014-08-25	18 W 489404	7646442	Panoramic view of the Landfill North and East slopes, West - Southwest.
8	IMG_0458	1 771	2014-08-25	18 W 489404	7646442	Panoramic view of the Landfill North and East slopes, West.
9	IMG_0459	2 473	2014-08-25	18 W 489388	7646387	Panoramic view of the Landfill top, North - Northeast.
10	IMG_0460	2 312	2014-08-25	18 W 489388	7646387	Panoramic view of the Landfill top, North.
11	IMG_0461	2 189	2014-08-25	18 W 489388	7646387	Panoramic view of the Landfill top, Northwest.
12	IMG_0462	2 282	2014-08-25	18 W 489388	7646387	Panoramic view of the Landfill top, West.
13	IMG_0463	2 098	2014-08-25	18 W 489388	7646387	Panoramic view of the Landfill Area, Southwest.
14	IMG_0464	2 289	2014-08-25	18 W 489388	7646387	Panoramic view of the Landfill Area, Southeast.
15	IMG_0465	2 452	2014-08-25	18 W 489388	7646387	Panoramic view of the Landfill Area, East.
16	IMG_0466	2 498	2014-08-25	18 W 489422	7646429	Northwest view of F2-MW-5-S soil sampling location.
17	IMG_0467	2 957	2014-08-25	18 W 489293	7646444	South view of F2-MW-8-S soil sampling location.
18	IMG_0468	2 379	2014-08-25	18 W 489286	7646402	Southeast view of F2-MW-7-S soil sampling location.
19	IMG_0469	2 479	2014-08-25	18 W 489286	7646399	East view of MW-7.
20	IMG_0470	2 351	2014-08-25	18 W 489298	7646360	Northeast view of MW-6.
21	IMG_0471	2 302	2014-08-25	18 W 489298	7646360	View of MW-6.
22	IMG_0472	2 455	2014-08-25	18 W 489301	7646361	East view of F2-MW-6-S soil sampling location.
23	IMG_0473	1 891	2014-08-25	18 W 489291	7646362	Panoramic view of the Landfill West and South slopes, North view.
24	IMG_0474	2 193	2014-08-25	18 W 489291	7646362	Panoramic view of the Landfill West and South slopes, Northeast view.
25	IMG_0475	1 947	2014-08-25	18 W 489291	7646362	Panoramic view of the Landfill West and South slopes, East view.
26	IMG_0476	2 372	2014-08-25	18 W 489317	7646388	Panoramic view of the Landfill top, North - Northwest view.
27	IMG_0477	2 517	2014-08-25	18 W 489317	7646388	Panoramic view of the Landfill top, North view.
28	IMG_0478	2 437	2014-08-25	18 W 489317	7646388	Panoramic view of the Landfill top, North - Northeast view.
29	IMG_0479	2 286	2014-08-25	18 W 489317	7646388	Panoramic view of the Landfill top, East - Northeast view.
30	IMG_0480	2 546	2014-08-25	18 W 489317	7646388	Panoramic view of the Landfill top, East view.
31	IMG_0481	2 210	2014-08-25	18 W 489317	7646388	Panoramic view of the Landfill Area, South view.
32	IMG_0482	2 889	2014-08-25	18 W 489301	7646361	Northeast view of F2-MW-6-S soil sampling location.

4.5 SOIL SAMPLE ANALYTICAL DATA

The soil chemical analysis results for the 2014 Hangar Non-Hazardous Waste Landfill samples are presented in Table XI hereafter. Certificates of analyses and results of field duplicates collected as part of the QA/QC program are presented in Annex 1 at the end of this report.

Table XI: Hangar Non-Hazardous Waste Landfill Summary Table for Soil Analytical Data

Sample #	Location	Depth [cm]	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]
RDL - Exova			1	1	1	0.5	1	2	1	1	0.1	0.02	10	10	20
Upgradient Soil Samples															
F2-MW-5-S-A-2014	MW5	0 - 10	25	46	15	<0.5	6	94	103	19	<0.1	<0.02	<10	<10	<20
F2-MW-5-S-B-2014		40 - 50	31	44	13	<0.5	4	93	103	26	<0.1	<0.02	<10	<10	<20
Downgradient Soil Samples															
F2-MW-6-S-A-2014	MW6	0 - 10	59	84	18	<0.5	6	110	165	19	<0.1	<0.02	<10	<10	60
F2-MW-6-S-B-2014		40 - 50	90	99	23	<0.5	8	119	146	36	<0.1	<0.02	<10	<10	<20
F2-MW-7-S-A-2014	MW7	0 - 10	82	107	21	<0.5	11	109	168	27	<0.1	<0.02	<10	<10	<20
F2-MW-7-S-B-2014		40 - 50	56	59	13	<0.5	9	75	103	16	<0.1	<0.02	<10	<10	<20
F2-MW-8-S-A-2014	MW8	0 - 10	77	123	44	<0.5	12	163	140	27	<0.1	<0.02	<10	<10	<20
F2-MW-8-S-B-2014		40 - 50	55	101	27	<0.5	9	126	142	58	<0.1	<0.02	<10	<10	<20

4.6 GROUNDWATER SAMPLE ANALYTICAL DATA

Groundwater could only be sampled at MW-8. As PHC fraction F1 analysis was not performed by Exova, the result from Maxxam (and associated RDL) is presented in Table XII. The groundwater chemical analyses results and evaluation for the analytical data for the 2014 Hangar Non-Hazardous Waste Landfill samples are presented in Table XII hereafter. As samples were not filtered, sediment was present and required a digest which raised the RDL. Certificates of analyses and results for groundwater samples collected as part of the QA/QC program are presented in Annex 1 at the end of this report.

Table XII: Hangar Non-Hazardous Waste Landfill Summary Table for Groundwater Analytical Data

Sample #	Location	Cu [mg/L]	Ni [mg/L]	Co [mg/L]	Cd [mg/L]	Pb [mg/L]	Zn [mg/L]	Cr [mg/L]	As [mg/L]	Hg [mg/L]	PCBs [ug/L]	F1	F2	F3
												C_6-C_{10} [mg/L]	C_{10}-C_{16} [mg/L]	C_{10}-C_{34} [mg/L]
RDL - Exova		0.01	0.01	0.01	0.008	0.01	0.04	0.05	0.02	0.0001	0.1	0.025*	0.1	0.2
Upgradient Groundwater Sample														
F2-MW-5-2014	MW5	Insufficient Water to Sample												
Downgradient Groundwater Samples														
F2-MW-6-2014	MW6	Insufficient Water to Sample												
F2-MW-7-2014	MW7	Insufficient Water to Sample												
F2-MW-8-2014	MW8	0.06	0.28	0.05	<0.008	0.01	0.12	<0.05	0.04	<0.0001	<0.1	<0.025*	<0.1	<0.2

*: RDL and Concentration from Maxxam

4.7 MONITORING WELL SAMPLING / INSPECTION LOGS

The monitoring well sampling logs for MW-5 to MW-8 are presented in this section. Monitoring Wells 5 and 7 were dry while MW-6 did not have enough water to allow sampling. All wells appear in good condition.

Development of Monitoring Wells			
Site Name:	FOX-2	Longstaff Bluff	
Date of Sampling Event:	2014-08-25	Time:	10:15
Names of Samplers:		Martin Fleury	
		Caleb Qanatsiaq	
		Philip Siakuluk	
Landfill Name:	Hangar Non-Hazardous Waste Landfill		
Monitoring Well ID:	MW-5		
Sample Number:	MW-5-2014		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	37		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)	3400		
Length screened section (cm)=	3000		
Depth to top of screen (cm)= (from ground surface)	400		
Depth to water surface (cm)= (from top of pipe)	dry	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm)= (below ground surface)	dry		
Measured well refusal depth BGS (cm)=	133	Evidence of sludge or siltation:	Frozen
Thickness of water column (cm)=	NA		
Static volume of water in well (mL)=	NA		
Free product thickness (mm)=	NA	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	N	Purging/Sampling Equipment:	Waterra tubing
Volume Purged Water (L)=	NA		Foot Valve
Decontamination required: (Y/N)	N	Dedicated Waterra Tubing	
Number washes:	NA		
Number rinses:	NA		
Final pH=	NA		
Final Conductivity (uS/cm)=	NA		
Final Temperature (degC)=	NA		

Development of Monitoring Wells			
Site Name:	FOX-2	Longstaff Bluff	
Date of Sampling Event:	2014-08-25	Time:	11:45
Names of Samplers:		Martin Fleury	
		Caleb Qanatsiaq	
		Philip Siakuluk	
Landfill Name:	Hangar Non-Hazardous Waste Landfill		
Monitoring Well ID:	MW-6		
Sample Number:	MW-6-2014		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	25		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)	3500		
Length screened section (cm)=	3000		
Depth to top of screen (cm)= (from ground surface)	440		
Depth to water surface (cm)= (from top of pipe)	223	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm)= (below ground surface)	198		
Measured well refusal depth BGS (cm)=	215	Evidence of sludge or siltation:	Frozen
Thickness of water column (cm)=	17		
Static volume of water in well (mL)=	340	not enough water for sampling	
Free product thickness (mm)=	NA	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	N	Purging/Sampling Equipment:	Waterra tubing
Volume Purged Water (L)=	NA		Foot Valve
Decontamination required: (Y/N)	N	Dedicated Waterra Tubing	
Number washes:	NA		
Number rinses:	NA		
Final pH=	NA		
Final Conductivity (uS/cm)=	NA		
Final Temperature (degC)=	NA		

Development of Monitoring Wells			
Site Name:	FOX-2	Longstaff Bluff	
Date of Sampling Event:	2014-08-25	Time:	11:25
Names of Samplers:		Martin Fleury	
		Caleb Qanatsiaq	
		Philip Siakuluk	
Landfill Name:	Hangar Non-Hazardous Waste Landfill		
Monitoring Well ID:	MW-7		
Sample Number:	MW-7-2014		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	29		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)	3400		
Length screened section (cm)=	3000		
Depth to top of screen (cm)= (from ground surface)	350		
Depth to water surface (cm)= (from top of pipe)	NA (dry)	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm)= (below ground surface)	NA (dry)		
Measured well refusal depth BGS (cm)=	214	Evidence of sludge or siltation:	Frozen
Thickness of water column (cm)=	NA (dry)		
Static volume of water in well (mL)=	NA (dry)		
Free product thickness (mm)=	NA	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	N	Purging/Sampling Equipment:	Waterra tubing
Volume Purged Water (L)=	NA		Foot Valve
Decontamination required: (Y/N)	N	Dedicated Waterra Tubing	
Number washes:	NA		
Number rinses:	NA		
Final pH=	NA		
Final Conductivity (uS/cm)=	NA		
Final Temperature (degC)=	NA		

Development of Monitoring Wells			
Site Name:	FOX-2	Longstaff Bluff	
Date of Sampling Event:	2014-08-25	Time:	10:45
Names of Samplers:		Martin Fleury	
		Caleb Qanatsiaq	
		Philip Siakuluk	
Landfill Name:	Hangar Non-Hazardous Waste Landfill		
Monitoring Well ID:	MW-8		
Sample Number:	MW-8-2014		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	39		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)	3500		
Length screened section (cm)=	3000		
Depth to top of screen (cm)= (from ground surface)	500		
Depth to water surface (cm)= (from top of pipe)	190	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm)= (below ground surface)	151		
Measured well refusal depth BGS (cm)=	210	Evidence of sludge or siltation:	Frozen
Thickness of water column (cm)=	59		
Static volume of water in well (mL)=	1180		
Free product thickness (mm)=	NA	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra tubing
Volume Purged Water (L)=	1.5		Foot Valve
Decontamination required: (Y/N)	N	Dedicated Waterra Tubing	
Number washes:	NA		
Number rinses:	NA		
Final pH=	6.54		
Final Conductivity (uS/cm)=	461		
Final Temperature (degC)=	1.30		

5 WEST LANDFILL LOBE E

5.1 SUMMARY

On August 24, 2014 soil sampling and a visual inspection were completed at the West Landfill Lobe E.

Soil sampling was conducted at the surface of four (4) of the five (5) soil sampling locations. Surface sample at F2-9 could not be collected due to the presence of bedrock. Depth sample could not be collected at any stations due to the presence of bedrock at 0.1 m for ground surface.

TPH fraction F3 concentration from surface samples collected at F2-3, F2-4 and F2-5 ranged from 100 to 360 mg/kg, with the highest concentration detected at F2-3. No PCBs were detected in the collected soil samples. Relatively high concentrations of copper, nickel and zinc were detected at SS3 (316, 357 and 236 mg/kg, respectively). Elevated levels of nickel and zinc were detected at F2-4 (114 and 176 mg/kg, respectively), while elevated concentrations of zinc and chromium were detected at F2-1 (121 and 167 mg/kg, respectively).

As of the 2014 monitoring event, no features were identified as “significant” or “unacceptable.” An isolated area of minor erosion was observed on the southeast landfill surface. No erosion feature or exposed debris was noticed.

At this time, the overall performance of the landfill is rated as acceptable.

The Visual Inspection Checklist has been completed as per the TOR and is included as Table XIII of this report. Please refer to Figure Fox 2.4 for a sketch of the West Landfill Lobe E detailing the location of photographs and features.

Table XIII: Visual Inspection Checklist – West Landfill Lobe E

DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
VISUAL INSPECTION CHECKLIST

INSPECTION REPORT – PAGE 1 of 2

SITE NAME: FOX-2 Longstaff Bluff
LANDFILL DESIGNATION: West Landfill Lobe E (Regraded Landfill)
DATE OF INSPECTION: August 24, 2014
DATE OF PREVIOUS INSPECTION: August 27, 2013
INSPECTED BY: M. Fleury
REPORT PREPARED BY: M. Fleury
MONITORING EVENT: 3
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

TABLE XIII: WEST LANDFILL VISUAL INSPECTION (PAGE 2 OF 2)

Checklist Item	Present (Y/N)	Feature Label	Location	Length (m)	Width (m)	Depth (m)	Extent Relative to Area of Landfill (%)	Description	Photographic Reference	Severity Rating	Additional Comments
Settlement	N	A	North limit of the landfill top	N/A	N/A	N/A	N/A	Settlement noted during baseline inspection	N/A	N/A	Not observed during the 2014 inspection.
Erosion	Y	F	Southeast end of the landfill	16	0.7	0.15	<1%	Drainage channel	13 and 14	Acceptable	No Significance Change from Previous Observation.
	N	B	North limit of the landfill	N/A	N/A	N/A	N/A	Drainage channel observed in 2013	N/A	N/A	Not observed during the 2014 inspection.
	N	C	West limit of the landfill	N/A	N/A	N/A	N/A	Drainage channel observed in 2013	4 and 7	N/A	Not observed during the 2014 inspection.
	N	D	West limit of the landfill	N/A	N/A	N/A	N/A	Drainage channel observed in 2013	4and7	N/A	Not observed during the 2014 inspection.
	N	E	West limit of the landfill	N/A	N/A	N/A	N/A	Drainage channel observed in 2013	4 and 7	N/A	Not observed during the 2014 inspection.
Frost Action	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Animal Burrows	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staining	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation Stress	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Seepage Points	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Debris Exposed	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Presence / Condition of Monitoring Instruments	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Features of Note	N	G	Northeast limit of the landfill top	N/A	N/A	N/A	N/A	Non-compacted section observed in 2013	N/A	N/A	Not observed during the 2014 inspection.
	Y	H	Near the centre of the landfill	5	2	NA	<1%	Bedrock Outcrop	11	Acceptable	No Significance Change from Previous Observation.
		I	Northeast limit of the landfill	6	3	NA	<1%	Bedrock Outcrop	12	Acceptable	No Significance Change from Previous Observation.

Legend : N/A Not applicable

5.2 PRELIMINARY STABILITY ASSESSMENT

The Preliminary Stability Assessment for the West Landfill Lobe E has been completed as per the TOR and is included as Table XIV hereafter.

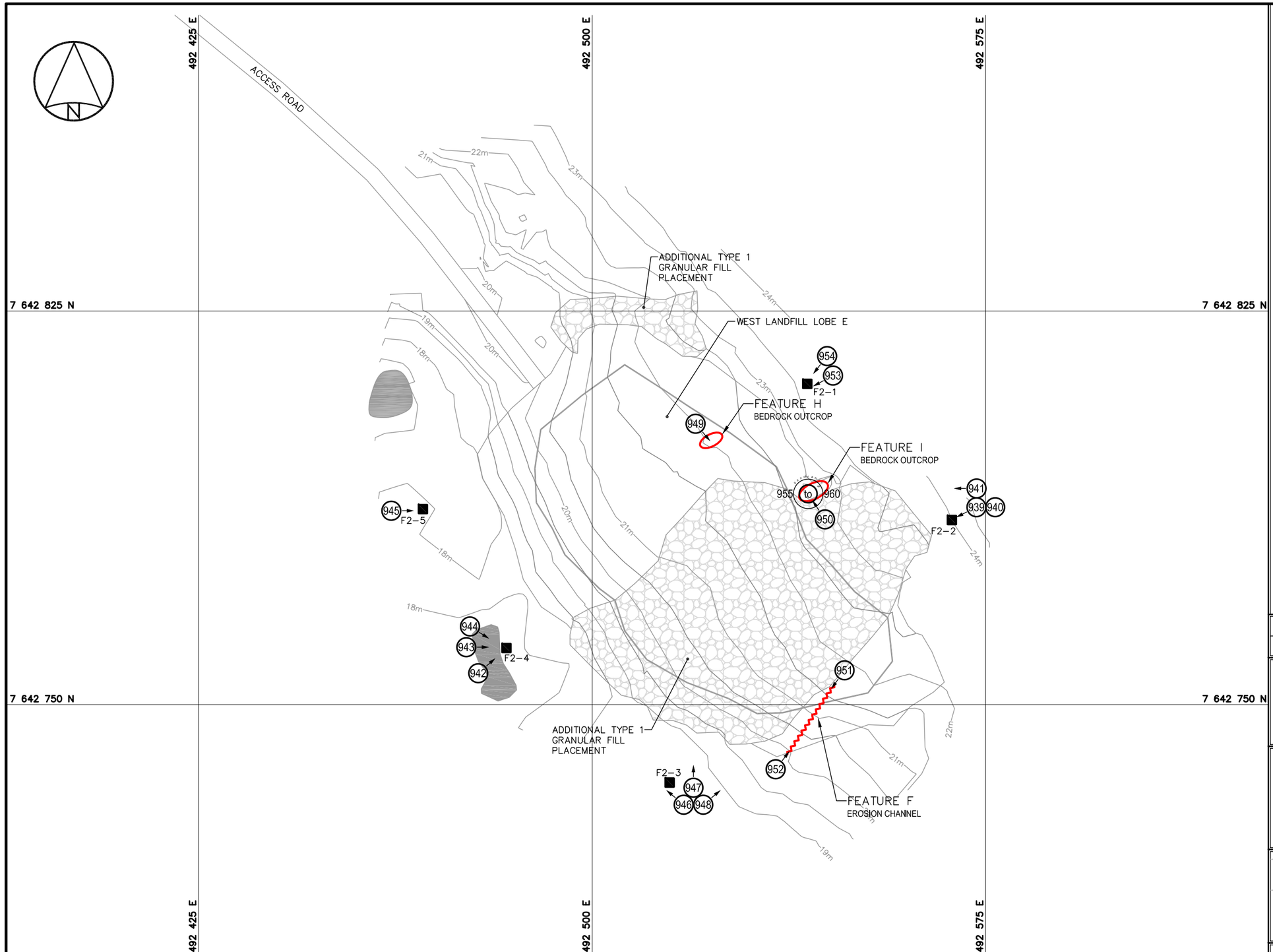
Table XIV: Preliminary Stability Assessment – West Landfill Lobe E

Feature	Severity Rating	Extent
Settlement	Not observed	None
Erosion	Acceptable	Isolated
Frost Action	Not observed	None
Staining	Not observed	None
Vegetation Stress	Not observed	None
Seepage/Ponded Water	Not observed	None
Debris Exposure	Not observed	None
Overall Landfill Performance	**Acceptable**	

Performance/Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to-date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of the landfill is compromised to the extent that the ability to contain waste materials is compromised. Examples may include: • Debris exposed in erosion channels or areas of differential settlement. • Liner exposed. • Slope failure.
Extent	**Description**
Isolated	Singular feature.
Occasional	Features of note occurring at irregular intervals/locations.
Numerous	Many features of note, impacting less than 50% of the surface area of the landfill.
Extensive	Impacting greater than 50% of the surface area of the landfill.

5.3 LOCATION PLAN

The Location Plan for the West Landfill Lobe E has been completed as per the TOR and is presented in Figure FOX-2.4.



LEGEND

- SOIL SAMPLING LOCATION
- BEDROCK OUTCROP
- EROSION (NTS)
- BODY OF WATER
- 954 PHOTOGRAPH VIEWPOINT LOCATION

0m 7,5m 15,0m 22,5m 30,0m 37,5m

NO.	VERSION	DATE	BY	VERIF.	APPR.
2	FINAL	15-11-10	P.L.	B.M.	M.F.

Construction de Défense Canada
Defence Construction Canada

COLLECTION OF LANDFILL MONITORING DATA

FOX-2, LONGSTAFF BLUFF, NUNAVUT

WEST LANDFILL LOBE E

SITE REMEDIATION SOLUTIONS

Biogenie, a division of EnGlobe Corp.
4495 Wilfrid-Hamel blvd, Suite 200
Quebec, (Quebec) CANADA G1P 2J7
Phone : 418-653-4422 www.biogenie-env.com

MEASUREMENT UNIT	SCALE:	DATE (month-year):
Meter	1 : 750	NOVEMBER 2015
DRAWN BY:	VERIFIED BY:	APPROVED BY:
L. LA PIERRE	B. MACKAY	M. FLEURY P. Eng.
PROJECT NO:	DRAWING NO:	PAGE
CD2655_410_413	CD2655_410_413_101-FOX-2_D	PL

FIGURE FOX-2.4

G:\CD2655\FINAL-2\CD2655_410_413_101-FOX-2_D.dwg, PL, 2015-11-10 3:45:27 PM

5.4 PHOTOGRAPHIC RECORDS

The Photographic Record for the West Landfill Lobe E has been completed as per the TOR and is included in the following pages as Table XV. Full-sized photographs are contained in the Addendum DVD-ROM.

Table XV: Landfill Visual Inspection Photo Log – West Landfill Lobe E

Photo	Filename	Size (KB)	Date	Vantage Point		Caption
				Easting	Northing	
1	IMG_0939	2 025	24-08-2014	18 W 492569	7642785	Southwest view of F2-2-2014 soil sampling location.
2	IMG_0940	1 781	24-08-2014	18 W 492569	7642785	Southwest view of southern part of the West Landfill Lobe E.
3	IMG_0941	1 556	24-08-2014	18 W 492569	7642785	West view of Northern part of the West Landfill Lobe E.
4	IMG_0942	1 793	24-08-2014	18 W 492484	7642761	Northeast view of F2-4-2014 soil sampling location.
5	IMG_0943	1 861	24-08-2014	18 W 492484	7642761	East view of F2-4-2014 soil sampling location.
6	IMG_0944	1 762	24-08-2014	18 W 492484	7642761	East Southeast view of F2-4-2014 soil sampling location.
7	IMG_0945	2 342	24-08-2014	18 W 492468	7642787	East view of F2-5-2014 soil sampling location.
8	IMG_0946	1 900	24-08-2014	18 W 492515	7642735	Northwest view of F2-3-2014 soil sampling location.
9	IMG_0947	1 903	24-08-2014	18 W 492515	7642735	North view of the West Landfill Lobe E, top.
10	IMG_0948	1 955	24-08-2014	18 W 492515	7642735	Northeast view of the West Landfill Lobe E, top.
11	IMG_0949	2 052	24-08-2014	18 W 492523	7642800	Southeast view of Bedrock Outcrop (Feature H).
12	IMG_0950	1 991	24-08-2014	18 W 492541	7642790	Northwest view of Bedrock Outcrop (Feature I).
13	IMG_0951	2 417	24-08-2014	18 W 492546	7642754	Southwest view of a drainage channel (Feature F).
14	IMG_0952	2 145	24-08-2014	18 W 492537	7642741	Northeast view of a drainage channel (Feature F).
15	IMG_0953	1 856	24-08-2014	18 W 492541	7642811	West view of F2-1-2014 soil sampling location.
16	IMG_0954	1 601	24-08-2014	18 W 492541	7642811	Southwest view of F2-1-2014 soil sampling location.
17	IMG_0955	1 816	24-08-2014	18 W 492541	7642790	West Landfill - Lobe E general layout picture - Southeast view.
18	IMG_0956	1 753	24-08-2014	18 W 492541	7642790	West Landfill - Lobe E general layout picture - South view.
19	IMG_0957	1 753	24-08-2014	18 W 492541	7642790	West Landfill - Lobe E general layout picture - Southwest view.
20	IMG_0958	1 638	24-08-2014	18 W 492541	7642790	West Landfill - Lobe E general layout picture - West view.
21	IMG_0959	1 477	24-08-2014	18 W 492541	7642790	West Landfill - Lobe E general layout picture - West - Northwest.
22	IMG_0960	1 602	24-08-2014	18 W 492541	7642790	West Landfill - Lobe E general layout picture - Northwest view.

5.5 SOIL SAMPLE ANALYTICAL DATA

Soil sampling was conducted at the surface of four (4) of the five (5) soil sampling locations. Surface sample at SS2 could not be collected due to the presence of bedrock. Depth sample could not be collected at any stations due to the presence of bedrock at 0.1 m for ground surface. The soil chemical analyses results for the 2014 West Landfill Lobe E samples are presented in Table XVI hereafter. Certificates of analyses and results of field duplicates collected as part of the QA/QC program are presented in Annex 1 at the end of this report. It should be noted that sample numbers have been altered. Please refer to Annex 1 for the sample ID key.

Table XVI: West Landfill Lobe E Summary Table for Soil Analytical Data

Sample #	Location	Depth [cm]	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]
RDL - Exova			1	1	1	0.5	1	2	1	1	0.1	0.02	10	10	20
Upgradient Soil Samples															
F2-1-A-2014	F2-1	0 - 10	47	95	19	<0.5	7	121	167	12	<0.1	<0.02	<10	<10	<20
F2-1-B-2014		40 - 50	Not sampled due to bedrock (bedrock reached at 0.1 m below ground surface)												
F2-2-A-2014	F2-2	0 - 10	Not sampled due to bedrock (bedrock outcrop)												
F2-2-B-2014		40 - 50													
Downgradient Soil Samples															
F2-3-A-2014	F2-3	0 - 10	316	357	64	1.6	4	236	17	6	<0.1	<0.02	<10	<10	360
F2-3-B-2014		40 - 50	Not sampled due to bedrock (bedrock reached at 0.1 m below ground surface)												
F2-4-A-2014	F2-4	0 - 10	70	114	27	<0.5	6	176	96	15	<0.1	<0.02	<10	<10	150
F2-4-B-2014		40 - 50	Not sampled due to bedrock (bedrock reached at 0.1 m below ground surface)												
F2-5-A-2014	F2-5	0 - 10	64	56	20	<0.5	7	120	76	77	<0.1	<0.02	<10	<10	100
F2-5-B-2014		40 - 50	Not sampled due to bedrock (bedrock reached at 0.1 m below ground surface)												

6 TIER II DISPOSAL FACILITY

6.1 SUMMARY

The 2014 monitoring of the Tier II Disposal Facility conducted on August 24, 2014 consisted of a visual inspection, soil and groundwater sampling as well as thermal monitoring.

TPH fraction F3 was detected in the surface samples for locations MW-9 and MW-11 (70 and 40 mg/kg, respectively) and in the bottom sample located at MW-11 (30 mg/kg). All metals, with the exception of mercury and cadmium, showed elevated concentration. No PCBs were detected at any of the soil sampling locations. Depth sample at location MW-10 could not be collected due to the presence of bedrock at 0.2 m below ground surface.

Water level was sufficient to allow sampling for PCBs and metal analyses at all but one location (MW-11). However, water was insufficient to complete TPH analysis. No PCBs or relatively high metal results were detected in any of the samples. As samples were not filtered, sediment was present and required a digest which raised the RDL.

Thermal monitoring was conducted at the Tier II Disposal Facility. No datalogger was present at VT-2. All other data loggers were observed to be functioning properly with only minor issues noted at VT-1 (refer to maintenance reports). However, no maintenance is proposed at this time. Batteries were changed in all dataloggers present.

As of the 2014 monitoring event, no features were identified as “significant” or “unacceptable.” No settlement or erosion feature nor exposed debris was noticed.

Overall, the performance rating of the Tier II Disposal Facility is acceptable.

The Visual Inspection Checklist has been completed as per the TOR and is included as Table XVII of this report. Please refer to Figure Fox 2.5 for a sketch of the Tier II Disposal Facility detailing the location of photographs and features.

Table XVII: Visual Inspection Checklist – Tier II Disposal Facility

DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
VISUAL INSPECTION CHECKLIST
INSPECTION REPORT – PAGE 1 of 2

SITE NAME: FOX-2 Longstaff Bluff
LANDFILL DESIGNATION: Tier II Disposal Facility (New Landfill)
DATE OF INSPECTION: August 24, 2014
DATE OF PREVIOUS INSPECTION: August 27, 2013
INSPECTED BY: M. Fleury
REPORT PREPARED BY: M. Fleury
MONITORING EVENT NUMBER: 3
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

TABLE XVII: TIER II DISPOSAL FACILITY VISUAL INSPECTION (PAGE 2 OF 2)

Checklist Item	Present (Y/N)	Feature Label	Location	Length (m)	Width (m)	Depth (m)	Extent Relative to Area of Landfill (%)	Description	Photographic Reference	Severity Rating	Additional Comments
Settlement	N	A	Western landfill surface	N/A	N/A	N/A	N/A	Settlement noted during baseline inspection	1	N/A	Not observed during 2014 inspection.
Erosion	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Frost Action	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Animal Burrows	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staining	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation Stress	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Seepage Points	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Debris Exposed	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Presence / Condition of Monitoring Instruments	Y	F2-MW-9	South side of the landfill	N/A	N/A	N/A	N/A	Groundwater Monitoring Well	27	N/A	Good condition. Casing lifted by frost action.
		F2-MW-10	Northeast corner of the landfill	N/A	N/A	N/A	N/A	Groundwater Monitoring Well	6	N/A	Good condition. Casing lifted by frost action.
		F2-MW-11	Middle north side of the landfill	N/A	N/A	N/A	N/A	Groundwater Monitoring Well	8	N/A	Good Condition. Dry / frozen. Casing lifted by frost action.
		F2-MW-12	Northwest corner of the landfill	N/A	N/A	N/A	N/A	Groundwater Monitoring Well	11	N/A	Good condition.
		F2-VT-1	Southwest limit of the landfill top	N/A	N/A	N/A	N/A	Thermistors - Data Logger	1	N/A	Casing in good condition. Memory was full.
		F2-VT-2	Northwest portion of the landfill top	N/A	N/A	N/A	N/A	Thermistors - Data Logger	2	N/A	Casing in good condition. No Data Logger in the casing.
		F2-VT-3	Northeast portion of the landfill top	N/A	N/A	N/A	N/A	Thermistors - Data Logger	3	N/A	Casing and Data Logger in good condition.
		F2-VT-4	Northeast limit of the landfill top	N/A	N/A	N/A	N/A	Thermistors - Data Logger	N/A	N/A	Casing and Data Logger in good condition.
Other Features of Note	N	B	Middle and west portion of the landfill top	N/A	N/A	N/A	N/A	Areas of rough grading observed in 2013	1, 18, 19	N/A	Not observed during 2014 inspection.

Legend : N/A Not applicable

6.2 PRELIMINARY STABILITY ASSESSMENT

The Preliminary Stability Assessment for the Tier II Disposal Facility has been completed as per the TOR and is included as Table XVIII hereafter.

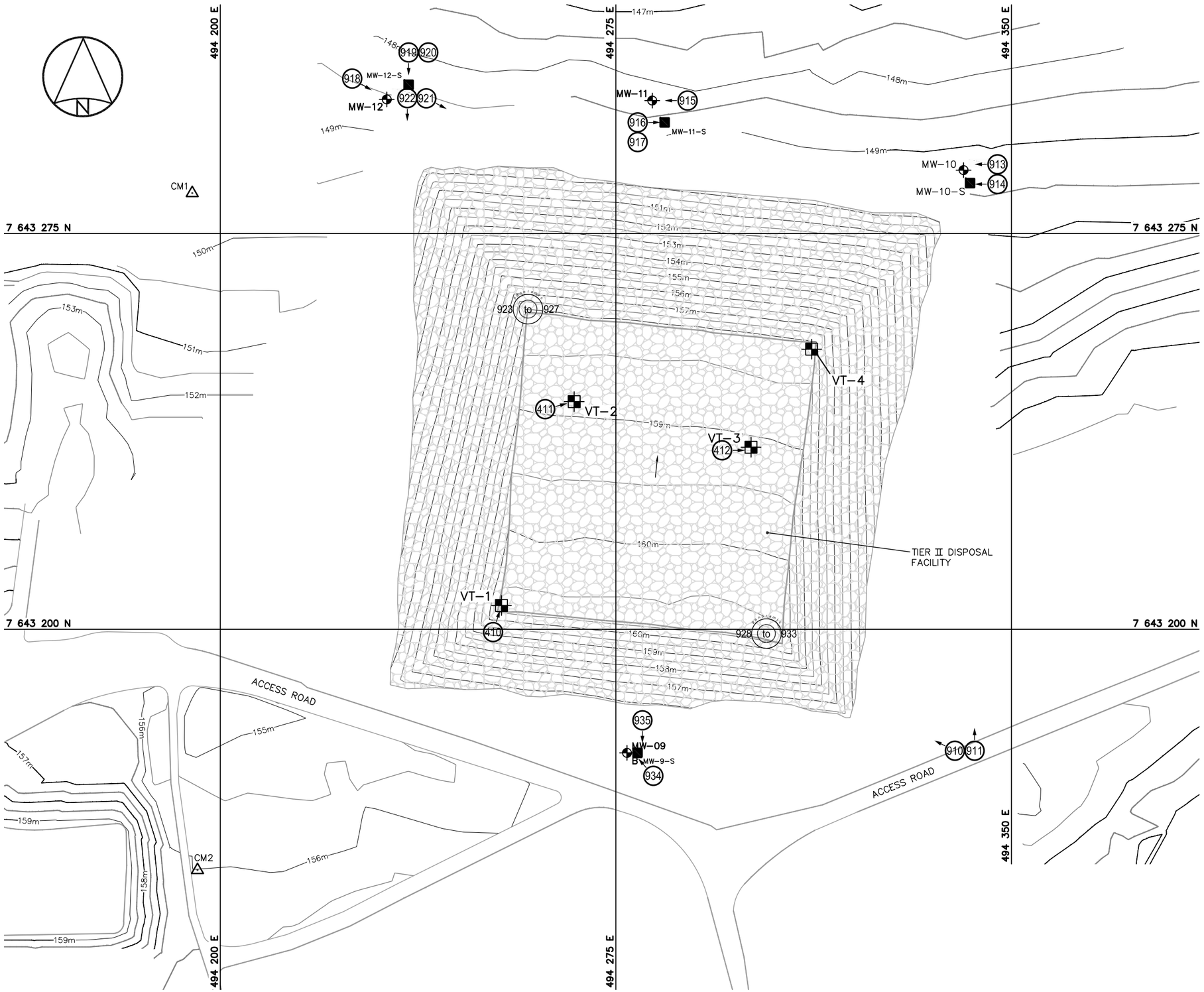
Table XVIII: Preliminary Stability Assessment – Tier II Disposal Facility

Feature	Severity Rating	Extent
Settlement	Not observed	None
Erosion	Not observed	None
Frost Action	Not observed	None
Staining	Not observed	None
Vegetation Stress	Not observed	None
Seepage/Ponded Water	Not observed	None
Debris Exposure	Not observed	None
Overall Landfill Performance	**Acceptable**	

Performance/Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to-date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of the landfill is compromised to the extent that the ability to contain waste materials is compromised. Examples may include: • Debris exposed in erosion channels or areas of differential settlement. • Liner exposed. • Slope failure.
Extent	**Description**
Isolated	Singular feature.
Occasional	Features of note occurring at irregular intervals/locations.
Numerous	Many features of note, impacting less than 50% of the surface area of the landfill.
Extensive	Impacting greater than 50% of the surface area of the landfill.

6.3 LOCATION PLAN

The Location Plan for the Tier II Disposal Facility has been completed as per the TOR and is presented in Figure FOX-2.5.



LEGEND

- CM1 — SURVEY CONTROL MONUMENT
- MONITORING WELL LOCATION
- B — BACKGROUND MONITORING WELL LOCATION
- GROUND TEMPERATURE CABLE LOCATION
- SOIL SAMPLING LOCATION
- 913 — PHOTOGRAPH VIEWPOINT LOCATION

0m 7,5m 15,0m 22,5m 30,0m 37,5m

NO.	VERSION	DATE	BY	VERIF.	APPR.
2	FINAL	15-11-10	P.L.	B.M.	M.F.

Construction de Défense Canada
Defence Construction Canada

COLLECTION OF LANDFILL MONITORING DATA

FOX-2, LONGSTAFF BLUFF, NUNAVUT

TIER II DISPOSAL FACILITY

SITE REMEDIATION SOLUTIONS

Biogenie, a division of EnGlobe Corp.
4495 Wilfrid-Hamel blvd, Suite 200
Quebec, (Quebec) CANADA G1P 2J7
Phone : 418-653-4422 www.biogenie-env.com

MEASUREMENT UNIT	SCALE:	DATE (month-year):
Meter	1 : 750	NOVEMBER 2015
DRAWN BY:	VERIFIED BY:	APPROVED BY:
L. LA PIERRE	B. MACKAY	M. FLEURY P. Eng.
PROJECT NO:	DRAWING NO:	PAGE
CD2655_410_413	CD2655_410_413_101-FOX-2_E	PL

FIGURE FOX-2.5

6.4 THERMISTOR ANNUAL MAINTENANCE REPORTS

The thermistor inspection reports VT-1 to VT-4 are presented in this section.

Contractor Name:	**Sila Remediation Inc.**	Inspection Date:	**23/08/2014**
Prepared By:	**Martin Fleury**		

Thermistor Information

Site Name:	**FOX-2 Longstaff Bluff**	Thermistor Location		**Tier II Disposal Facility**	
Thermistor Number:	**VT-1**	Inclination		**Vertical**	
Install Date:	13/08/2011	First Date Event: 27/08/2013		Last Date Event	23/08/2014
Coordinates and Elevation	N **7643205**	W	**494253**	Elev	**151**
Length of Cable (m)		Cable Lead Above Ground (m)	**1.3**	Nodal Points	**14**
Datalogger Serial #	**7110002**			Cable Serial Number	**111169**

Thermistor Inspection

	Good			
	Yes		No	Problem/Maintenance
Casing	**x**			
Cover	**x**			
Data Logger	**x**			
Cable	**x**			
Beads	**x**			
Battery Installation Date		**13/08/2011**		
Battery Levels	Main	**NA**	Aux	**NA**

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1		
2		
3		
4		
5		
6		
7		
8		

Bead	ohms	Degrees C
9		
10		
11		
12		
13		
14		

Observations and Proposed Maintenance

No manual readings could be made with switchbox (values never got stable) but the sensors displayed representative readings with the Lakewood Software
No maintenance proposed. Memory downloaded and logger restarted
Batteries changed on August 23, 2014. Communication re-established after battery changed.

Contractor Name:	**Sila Remediation Inc.**	Inspection Date:	**23/08/2014**
Prepared By:	**Martin Fleury**		

Thermistor Information

Site Name:	**FOX-2 Longstaff Bluff**	Thermistor Location		**Tier II Disposal Facility**	
Thermistor Number:	**VT-2**	Inclination		**Vertical**	
Install Date:	13/08/2011	First Date Event:	27/08/2013	Last Date Event	23/08/2014
Coordinates and Elevation	N **7643243**	W	**494267**	Elev	**154**
Length of Cable (m)		Cable Lead Above Ground (m)	**3.82**	Nodal Points	**11**
Datalogger Serial #	**NA**			Cable Serial Number	**111168**

Thermistor Inspection

	Good			
	Yes		No	Problem/Maintenance
Casing	x			
Cover	x			
Data Logger			**NA**	No datalogger in casing
Cable	x			
Beads	x			
Battery Installation Date		**NA**		
Battery Levels	Main	**NA**	Aux	**NA**

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	10902	8.1145
2	13052	4.4638
3	14363	2.5556
4	15345	1.2501
5	16433	-0.091
6	17053	-0.8114
7	17733	-1.5685
8	18316	-2.1922

Bead	ohms	Degrees C
9	18214	-2.0847
10	19359	-3.2544
11	20930	-4.739

Observations and Proposed Maintenance

No datalogger in this casing

Contractor Name:	**Sila Remediation Inc.**	Inspection Date:	**23/08/2014**
Prepared By:	**Martin Fleury**		

Thermistor Information

Site Name:	**FOX-2 Longstaff Bluff**	Thermistor Location	**Tier II Disposal Facility**		
Thermistor Number:	**VT-3**	Inclination	**Vertical**		
Install Date:	13/08/2011	First Date Event: 27/08/2013		Last Date Event	23/08/2014
Coordinates and Elevation	N **7643235**	W	**494301**	Elev	**156**
Length of Cable (m)		Cable Lead Above Ground (m) **2.7**		Nodal Points	**11**
Datalogger Serial #	**7110008**			Cable Serial Number	**111169**

Thermistor Inspection

	Good			
	Yes		No	Problem/Maintenance
Casing	**x**			
Cover	**x**			
Data Logger	**x**			
Cable	**x**			
Beads	**x**			
Battery Installation Date		**13/08/2011**		
Battery Levels	Main	**NA**	Aux	**NA**

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	12128	5.9431
2	13928	3.1662
3	15049	1.6335
4	16348	0.0102
5	16878	-0.611
6	17534	-1.3503
7	18159	-2.0264
8	19325	-3.2208

Bead	ohms	Degrees C
9	19731	-3.6178
10	20740	-4.5662
11	21430	-5.1855

Observations and Proposed Maintenance

No connection could be made with computer until batteries replacement
Batteries replaced on August 23, 2014
Memory downloaded and logger restarted

Contractor Name:	**Sila Remediation Inc.**	Inspection Date:	**23/08/2014**
Prepared By:	**Martin Fleury**		

Thermistor Information

Site Name:	**FOX-2 Longstaff Bluff**	Thermistor Location		**Tier II Disposal Facility**	
Thermistor Number:	**VT-4**	Inclination		**Vertical**	
Install Date:	13/08/2011	First Date Event: 27/08/2013		Last Date Event	23/08/2014
Coordinates and Elevation	N **7643253**	W	**494312**	Elev	**154**
Length of Cable (m)	Cable Lead Above Ground (m)	**2.65**	Nodal Points		**14**
Datalogger Serial #			Cable Serial Number		**111170**

Thermistor Inspection

	Good			
	Yes		No	Problem/Maintenance
Casing	**x**			
Cover	**x**			
Data Logger	**x**			
Cable	**x**			
Beads	**x**			
Battery Installation Date		**13/08/2011**		
Battery Levels	Main	**11.74** V (Best)	Aux	**13.14** V (Best)

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	14139	2.8674
2	15466	1.0958
3	16371	-0.0173
4	16742	-0.4537
5	17241	-1.024
6	18480	-2.3636
7	19280	-3.1762
8	19890	-3.7708

Bead	ohms	Degrees C
9	20630	-4.4653
10	75400	-27.3293
13	22780	-6.3352
14	23150	-6.637
15	23220	-6.6935
16	23460	-6.8858

Observations and Proposed Maintenance

Memory downloaded and logger restarted
Batteries replaced on August 23, 2014

6.5 PHOTOGRAPHIC RECORDS

The Photographic Record for the Tier II Disposal Facility has been completed as per the TOR and is included in the following pages as Table XIX. Full-sized photographs are contained in the Addendum DVD-ROM.

Table XIX: Landfill Visual Inspection Photo Log – Tier II Disposal Facility

Site Name: FOX-2, Longstaff Bluff
Landfill: Tier II Disposal Facility
Date Inspected: August 24, 2014
Inspected by: Martin Fleury

Photo	Filename	Size (KB)	Date	Vantage Point		Caption
				Easting	Northing	
1	IMG_0410	2 222	2014-08-24	18 W 494253	7643205	North - Northeast view of VT-1 thermistor casing.
2	IMG_0411	1 912	2014-08-24	18 W 494267	7643243	East - Northeast view of VT-2 thermistor casing.
3	IMG_0412	1 906	2014-08-24	18 W 494301	7643235	East view of VT-3 thermistor casing.
4	IMG_0910	2 049	2014-08-24	18 W 494341	7643177	Northwest view of the southern slope of the Tier II Disposal Facility.
5	IMG_0911	2 309	2014-08-24	18 W 494341	7643177	North view of the eastern slope of the Tier II Disposal Facility.
6	IMG_0913	1 441	2014-08-24	18 W 494341	7643287	West view of F2-MW-10.
7	IMG_0914	2 197	2014-08-24	18 W 494342	7643285	West view of F2-MW-10-S soil sampling.
8	IMG_0915	1 401	2014-08-24	18 W 494282	7643300	West view of MW-11.
9	IMG_0916	2 338	2014-08-24	18 W 494282	7643300	East view of F2-MW-11-S soil sampling location.
10	IMG_0917	2 347	2014-08-24	18 W 494282	7643300	East view of F2-MW-11-S soil sampling location.
11	IMG_0918	2 332	2014-08-24	18 W 494232	7643300	Southeast view of MW-12.
12	IMG_0919	1 792	2014-08-24	18 W 494236	7643303	South view of F2-MW-12-S soil sampling location.
13	IMG_0920	2 065	2014-08-24	18 W 494236	7643303	South view of F2-MW-12-S soil sampling location.
14	IMG_0921	2 164	2014-08-24	18 W 494237	7643301	East - Southeast view of the northern slope of the Tier II Disposal Facility.
15	IMG_0922	1 945	2014-08-24	18 W 494237	7643301	South view of the western slope of the Tier II Disposal Facility.
16	IMG_0923	2 107	2014-08-24	18 W 494258	7643261	Panoramic view of the Tier II Disposal Facility top, East - Northeast.
17	IMG_0924	2 261	2014-08-24	18 W 494258	7643261	Panoramic view of the Tier II Disposal Facility top, East - Southeast.
18	IMG_0925	2 342	2014-08-24	18 W 494258	7643261	Panoramic view of the Tier II Disposal Facility top, South - Southeast.
19	IMG_0926	2 050	2014-08-24	18 W 494258	7643261	Panoramic view of the Tier II Disposal Facility top, South.
20	IMG_0927	1 858	2014-08-24	18 W 494258	7643261	Panoramic view of the Tier II Disposal Facility top, Southwest.
21	IMG_0928	1 857	2014-08-24	18 W 494303	7643199	Panoramic view of the Tier II Disposal Facility top, West.
22	IMG_0929	2 033	2014-08-24	18 W 494303	7643199	Panoramic view of the Tier II Disposal Facility top, Northwest.
23	IMG_0930	2 357	2014-08-24	18 W 494303	7643199	Panoramic view of the Tier II Disposal Facility top, North.
24	IMG_0931	2 322	2014-08-24	18 W 494303	7643199	Panoramic view of the Tier II Disposal Facility top, North - Northeast.
25	IMG_0932	2 142	2014-08-24	18 W 494303	7643199	Panoramic view of the Tier II Disposal Facility top, East.
26	IMG_0933	2 191	2014-08-24	18 W 494303	7643199	Panoramic view of the Tier II Disposal Facility top, Southeast.
27	IMG_0934	2 176	2014-08-24	18 W 494277	7643177	Northwest view of MW-9.
28	IMG_0935	2 102	2014-08-24	18 W 494278	7643177	South view of F2-MW-9-S soil sampling location.

6.6 SOIL SAMPLE ANALYTICAL DATA

Depth sample at location MW-10 could not be collected due to the presence of bedrock at 0.2 m below ground surface. The soil chemical analysis results for the 2014 Tier II Disposal Facility samples are presented in Table XX hereafter. Certificates of analyses and results of field duplicates collected as part of the QA/QC program are presented in Annex 1 at the end of this report.

Table XX: Tier II Summary Table for Soil Analytical Data

Sample #	Location	Depth [cm]	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]
RDL - Exova			1	1	1	0.5	1	2	1	1	0.1	0.02	10	10	20
Upgradient Soil Samples															
F2-MW-9-S-A-2014	MW9	0 - 10	46	46	12	<0.5	9	72	58	40	<0.1	<0.02	<10	<10	70
F2-MW-9-S-B-2014		40 - 50	46	62	11	<0.5	9	72	102	36	<0.1	<0.02	<10	<10	<20
Downgradient Soil Samples															
F2-MW-10-S-A-2014	MW10	0 - 15	71	62	11	<0.5	11	81	96	56	<0.1	<0.02	<10	<10	<20
F2-MW-10-S-B-2014		40 - 50	Not sampled due to bedrock (bedrock reached at 0.2 m below ground surface)												
F2-MW-11-S-A-2014	MW11	0 - 15	65	48	12	<0.5	11	79	61	51	<0.1	<0.02	<10	<10	40
F2-MW-11-S-B-2014		40 - 50	73	48	11	<0.5	12	75	57	47	<0.1	<0.02	<10	<10	30
F2-MW-12-S-A-2014	MW12	0 - 15	72	60	17	<0.5	12	90	58	70	<0.1	<0.02	<10	<10	<20
F2-MW-12-S-B-2014		40 - 50	72	78	20	<0.5	14	104	97	65	<0.1	<0.02	<10	<10	<20

6.7 GROUNDWATER SAMPLE ANALYTICAL DATA

Water level was sufficient to allow sampling for PCBs and metal analyses at all but one location (MW-11). However, water was insufficient to complete TPH analysis. No PCBs or relatively high metal results were detected in any of the samples. The groundwater chemical analyses results and evaluation for the analytical data for the 2014 Tier II Disposal Facility samples are presented in Table XXI hereafter. As samples were not filtered, sediment was present and required a digest which raised the RDL. Certificates of analyses and results for groundwater samples collected as part of the QA/QC program are presented in Annex 1, at the end of this report.

Table XXI: Tier II Summary Table for Groundwater Analytical Data

Sample #	Location	Cu [mg/L]	Ni [mg/L]	Co [mg/L]	Cd [mg/L]	Pb [mg/L]	Zn [mg/L]	Cr [mg/L]	As [mg/L]	Hg [mg/L]	PCBs [ug/L]	F1	F2	F3
												C_6-C_{10} [mg/L]	C_{10}-C_{16} [mg/L]	C_{10}-C_{34} [mg/L]
RDL - Exova		0.01	0.01	0.01	0.008	0.01	0.04	0.05	0.02	0.0001	0.1	NA	0.1	0.2
Upgradient Groundwater Sample														
F2-MW-9-2014	MW9	0.04	0.10	0.02	<0.008	<0.01	0.06	<0.05	<0.02	<0.0001	<0.1	Insufficient Water to Sample		
Downgradient Groundwater Samples														
F2-MW-10-2014	MW10	0.23	0.34	0.07	<0.008	0.08	0.23	0.18	0.11	<0.0001	<0.1	Insufficient Water to Sample		
F2-MW-11-2014	MW11	Insufficient Water to Sample												
F2-MW-12-2014	MW12	0.08	0.12	0.02	<0.008	0.02	0.10	0.05	0.04	<0.0001	<0.1	Insufficient Water to Sample		

6.8 MONITORING WELL SAMPLING / INSPECTION LOGS

The monitoring well sampling logs for MW-9 to MW-12 are presented in this section. It should be noted that the casing at MW9 and 10 heaved due to frost action, while only the screen at MW-11 was impacted by frost action.

Development of Monitoring Wells			
Site Name:	FOX-2	Longstaff Bluff	
Date of Sampling Event:	2014-08-24	Time:	17:00
Names of Samplers:		Martin Fleury	
		Caleb Qanatsiaq	
		Philip Siakuluk	
Landfill Name:	Tier II Disposal Facility		
Monitoring Well ID:	MW-9		
Sample Number:	MW-9-2014		
Condition of Well:	Casing impacted by frost action		
Measured Data			
Well pipe height above ground (cm)=	26		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)	360		
Length screened section (cm)=	300		
Depth to top of screen (cm)= (from ground surface)	52		
Depth to water surface (cm)= (from top of pipe)	111	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm)= (below ground surface)	85		
Measured well refusal depth BGS (cm)=	247	Evidence of sludge or siltation:	Frozen
Thickness of water column (cm)=	162		
Static volume of water in well (mL)=	3240		
Free product thickness (mm)=	NA	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra tubing
Volume Purged Water (L)=	3.5		Foot Valve
Decontamination required: (Y/N)	N	Dedicated Waterra Tubing	
Number washes:	NA		
Number rinses:	NA		
Final pH=	7.45		
Final Conductivity (uS/cm)=	200		
Final Temperature (degC)=	2.28		

Development of Monitoring Wells			
Site Name:	FOX-2	Longstaff Bluff	
Date of Sampling Event:	2014-08-24	Time:	15:30
Names of Samplers:		Martin Fleury	
		Caleb Qanatsiaq	
		Philip Siakuluk	
Landfill Name:	Tier II Disposal Facility		
Monitoring Well ID:	MW-10		
Sample Number:	MW-10-2014		
Condition of Well:	Casing impacted by frost action		
Measured Data			
Well pipe height above ground (cm)=	32		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)	340		
Length screened section (cm)=	300		
Depth to top of screen (cm)= (from ground surface)	40		
Depth to water surface (cm)= (from top of pipe)	219	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm)= (below ground surface)	187		
Measured well refusal depth BGS (cm)=	247	Evidence of sludge or siltation:	Frozen
Thickness of water column (cm)=	60		
Static volume of water in well (mL)=	1200		
Free product thickness (mm)=	NA	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra tubing
Volume Purged Water (L)=	1.5		Foot Valve
Decontamination required: (Y/N)	N	Dedicated Waterra Tubing	
Number washes:	NA		
Number rinses:	NA		
Final pH=	6.07		
Final Conductivity (uS/cm)=	877		
Final Temperature (degC)=	3.62		

Development of Monitoring Wells			
Site Name:	FOX-2	Longstaff Bluff	
Date of Sampling Event:	2014-08-24	Time:	16:10
Names of Samplers:		Martin Fleury	
		Caleb Qanatsiaq	
		Philip Siakuluk	
Landfill Name:	Tier II Disposal Facility		
Monitoring Well ID:	MW-11		
Sample Number:	MW-11-2014		
Condition of Well:	Screen impacted by permafrost action		
Measured Data			
Well pipe height above ground (cm)=	60		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)	330		
Length screened section (cm)=	300		
Depth to top of screen (cm)= (from ground surface)	29		
Depth to water surface (cm)= (from top of pipe)	242	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm)= (below ground surface)	194		
Measured well refusal depth BGS (cm)=	212	Evidence of sludge or siltation:	Frozen
Thickness of water column (cm)=	18	not enough water for sampling	
Static volume of water in well (mL)=	360		
Free product thickness (mm)=	NA	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	N	Purging/Sampling Equipment:	Waterra tubing
Volume Purged Water (L)=	NA		Foot Valve
Decontamination required: (Y/N)	N	Dedicated Waterra Tubing	
Number washes:	NA		
Number rinses:	NA		
Final pH=	NA		
Final Conductivity (uS/cm)=	NA		
Final Temperature (degC)=	NA		

Development of Monitoring Wells			
Site Name:	FOX-2	Longstaff Bluff	
Date of Sampling Event:	2014-08-24	Time:	16:25
Names of Samplers:		Martin Fleury	
		Caleb Qanatsiaq	
		Philip Siakuluk	
Landfill Name:	Tier II Disposal Facility		
Monitoring Well ID:	MW-12		
Sample Number:	MW-12-2014		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	42		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)	350		
Length screened section (cm)=	300		
Depth to top of screen (cm)= (from ground surface)	40		
Depth to water surface (cm)= (from top of pipe)	157	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm)= (below ground surface)	115		
Measured well refusal depth BGS (cm)=	253	Evidence of sludge or siltation:	Frozen
Thickness of water column (cm)=	138		
Static volume of water in well (mL)=	2760		
Free product thickness (mm)=	NA	Measurement method: (meter,	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra tubing
Volume Purged Water (L)=	3		Foot Valve
Decontamination required: (Y/N)	N	Dedicated Waterra Tubing	
Number washes:	NA		
Number rinses:	NA		
Final pH=	6.81		
Final Conductivity (uS/cm)=	445		
Final Temperature (degC)=	2.25		

7 UPPER SITE LANDFILL LOBE A

7.1 SUMMARY

The 2014 monitoring of the Upper Site Landfill Lobe A conducted on August 24, 2014 consisted of a visual inspection, soil and groundwater sampling as well as thermal monitoring.

TPH fraction F3 was detected in both surface and depth samples at MW-14 and MW-15 at concentrations ranging from 30 to 120 mg/kg. PCBs were not detected in any soil samples. With the exception of cadmium, lead and mercury, elevated levels of metals were detected in all soil samples.

Three (3) out of four (4) wells contained enough water to perform groundwater sampling for all parameters. MW-14 and MW-16 lacked the necessary quantity of water to conduct sampling for TPH analysis. The sample collected at MW-15 for TPH analysis by Exova was lost in transportation (broken bottle). No relatively high metal concentrations or PCBs were detected in any of the groundwater samples. As samples were not filtered, sediment was present in all but one groundwater sample (MW15) and required a digest which raised the RDL. The RDL for sample collected at MW15 is the usual RDL used by Exova.

All datalogger batteries were changed on 24 August 2014. Thermal monitoring was conducted at the Upper Site Landfill Lobe A, all data loggers and thermistors were observed to be functioning properly and datasets were successfully retrieved.

As of the 2014 monitoring event, no features were identified as “significant” or “unacceptable.” One area of minor settlement was noticed on the southern slope. Neither erosion feature nor exposed debris was noticed. Overall, the performance rating of the Upper Site Landfill Lobe A is acceptable.

The Visual Inspection Checklist has been completed as per the TOR and is included as Table XXII of this report. Please refer to Figure Fox 2.6 for a sketch of the Upper Site Landfill Lobe A detailing the location of photographs and features.

Table XXII: Visual Inspection Checklist – Upper Site Landfill Lobe A

DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
VISUAL INSPECTION CHECKLIST
INSPECTION REPORT – PAGE 1 of 2

SITE NAME: FOX-2 Longstaff Bluff
LANDFILL DESIGNATION: Upper Site Landfill Lobe A (Regraded Landfill)
DATE OF INSPECTION: August 24, 2014
DATE OF PREVIOUS INSPECTION: August 27, 2013
INSPECTED BY: M. Fleury
REPORT PREPARED BY: M. Fleury
MONITORING EVENT NUMBER: 3
The inspector/reporter represents to the best of his/her knowledge that the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.

TABLE XII: UPPER SITE LANDFILL VISUAL INSPECTION (PAGE 2 OF 2)

Checklist Item	Present (Y/N)	Feature Label	Location	Length (m)	Width (m)	Depth (m)	Extent Relative to Area of Landfill (%)	Description	Photographic Reference	Severity Rating	Additional Comments
Settlement	Y	A + B	Southern slope of the landfill	15	50	N/A	5%	Area of Settlement (includes Features A and B observed previously)	1	Acceptable	Observed with thermistor casing inclination during 2014 inspection. No change from previous observation.
Erosion	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NA	NA	N/A
Frost Action	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Animal Burrows	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staining	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation Stress	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Seepage Points	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Debris Exposed	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Presence / Condition of Monitoring Instruments	Y	F2-MW-13	South side of the access road	N/A	N/A	N/A	N/A	Groundwater Monitoring Well	27	N/A	Good condition.
		F2-MW-14	North side of the landfill	N/A	N/A	N/A	N/A	Groundwater Monitoring Well	15	N/A	Good condition.
		F2-MW-15	Northeast side of the landfill	N/A	N/A	N/A	N/A	Groundwater Monitoring Well	10	N/A	Good condition.
		F2-MW-16	East side of the landfill	N/A	N/A	N/A	N/A	Groundwater Monitoring Well	9	N/A	Casing heaved due to frost action.
		F2-VT-5	Centre West portion of the Landfill top	N/A	N/A	N/A	N/A	Thermistors - Data Logger	3	N/A	Casing inclined to approx. 15° from vertical.
		F2-VT-6	Centre East portion of the Landfill top	N/A	N/A	N/A	N/A	Thermistors - Data Logger	5	N/A	Casing inclined to approx. 10° from vertical.
		F2-VT-7	Southern limit of the landfill top	N/A	N/A	N/A	N/A	Thermistors - Data Logger	1	N/A	Casing inclined to approx. 25° from vertical.
		F2-VT-8	Eastern limit of the landfill top	N/A	N/A	N/A	N/A	Thermistors - Data Logger	7	N/A	Casing inclined to approx. 35° from vertical.
Other Features of Note	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Legend : N/A Not applicable

7.2 PRELIMINARY STABILITY ASSESSMENT

The Preliminary Stability Assessment for the Upper Site Landfill Lobe A has been completed as per the TOR and is included as Table XXIII hereafter.

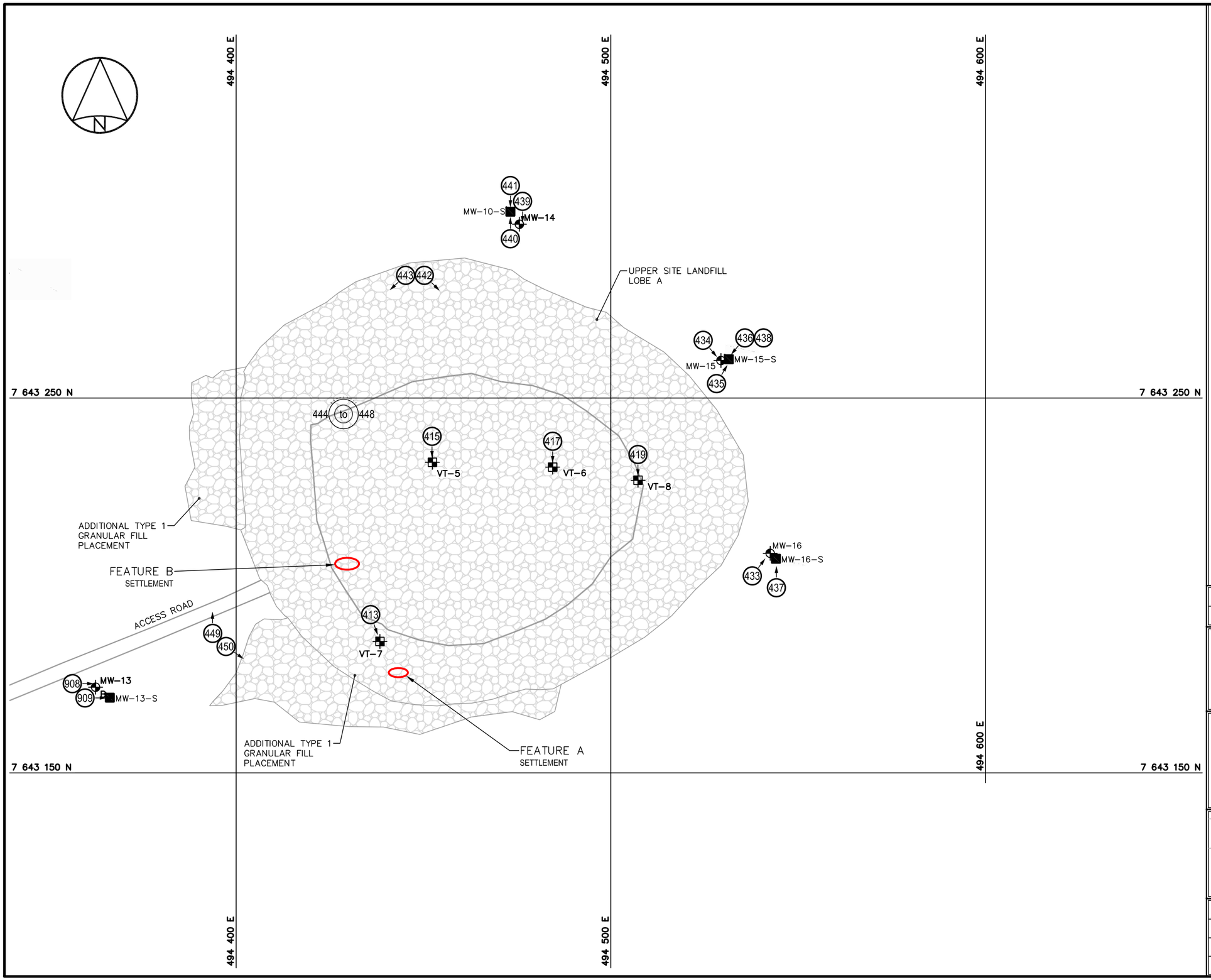
Table XXIII: Preliminary Stability Assessment – Upper Site Landfill Lobe A

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Not observed	None
Frost Action	Not observed	None
Staining	Not observed	None
Vegetation Stress	Not observed	None
Seepage/Ponded Water	Not observed	None
Debris Exposure	Not observed	None
Overall Landfill Performance	**Acceptable**	

Performance/Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to-date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of the landfill is compromised to the extent that the ability to contain waste materials is compromised. Examples may include: • Debris exposed in erosion channels or areas of differential settlement. • Liner exposed. • Slope failure.
Extent	**Description**
Isolated	Singular feature.
Occasional	Features of note occurring at irregular intervals/locations.
Numerous	Many features of note, impacting less than 50% of the surface area of the landfill.
Extensive	Impacting greater than 50% of the surface area of the landfill.

7.3 LOCATION PLAN

The Location Plan for the Upper Site Landfill Lobe A has been completed as per the TOR and and is presented in Figure FOX-2.6.



LEGEND

- MONITORING WELL LOCATION
- BACKGROUND MONITORING WELL LOCATION
- GROUND TEMPERATURE CABLE LOCATION
- SOIL SAMPLING LOCATION
- SETTLEMENT (NTS)
- 434 PHOTOGRAPH VIEWPOINT LOCATION

0m 10m 20m 30m 40m 50m

NO.	VERSION	DATE	BY	VERIF.	APPR.
2	FINAL	15–11–10	P.L.	B.M.	M.F.

Construction de Défense Canada
Defence Construction Canada

COLLECTION OF LANDFILL MONITORING DATA

FOX-2, LONGSTAFF BLUFF, NUNAVUT

UPPER SITE LANDFILL LOBE A

SITE REMEDIATION SOLUTIONS

Biogenie, a division of EnGlobe Corp.
4495 Wilfrid-Hamel blvd, Suite 200
Quebec, (Quebec) CANADA G1P 2J7
Phone : 418-653-4422 www.biogenie-env.com

MEASUREMENT UNIT	SCALE:	DATE (month–year):
Meter	1 : 1,000	NOVEMBER 2015
DRAWN BY:	VERIFIED BY:	APPROVED BY:
P. LÉGARÉ	B. MACKAY	M. FLEURY P. Eng.
PROJECT NO:	DRAWING NO:	PAGE
CD2655_410_413	CD2655_410_413_101-FOX-2_F	PL

FIGURE FOX-2.6

G:\CD2655\FINAL-2\CD2655_410_413_101-FOX-2_F.dwg, PL, 2015-11-10 3:40:40 PM

7.4 THERMISTOR ANNUAL MAINTENANCE REPORTS

The thermistor inspection reports VT-5 to VT-8 are presented in this section.

Contractor Name:	**Sila Remediation Inc.**	Inspection Date:	**24/08/2014**
Prepared By:	**Martin Fleury**		

Thermistor Information

Site Name:	**FOX-2 Longstaff Bluff**	Thermistor Location		**Upper Site Landfill Lobe A**	
Thermistor Number:	**VT-5**	Inclination		**15° from vertical**	
Install Date:	13/08/2011	First Date Event: 27/08/2013		Last Date Event	24/08/2014
Coordinates and Elevation	N **7643237**	W	**494452**	Elev	**155**
Length of Cable (m)		Cable Lead Above Ground (m)	**2.8**	Nodal Points	**11**
Datalogger Serial #	**7110033**			Cable Serial Number	**111160**

Thermistor Inspection

	Good			Problem/Maintenance
	Yes		No	
Casing	**x**			
Cover	**x**			
Data Logger	**x**			
Cable	**x**			
Beads	**x**			
Battery Installation Date		**13/08/2011**		
Battery Levels	Main	**11.34** V (Best)	Aux	**13.38** V (Best)

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	13111	4.3733
2	14009	3.0509
3	15736	0.7562
4	16712	-0.4189
5	17316	-1.1082
6	17962	-1.8162
7	18718	-2.6094
8	19405	-3.2997

Bead	ohms	Degrees C
9	20380	-4.2339
10	21030	-4.8293
11	21750	-5.4652

Observations and Proposed Maintenance

Memory downloaded and logger restarted
Batteries replaced on August 24, 2014

Contractor Name:	**Sila Remediation Inc.**	Inspection Date:	**24/08/2014**
Prepared By:	**Martin Fleury**		

Thermistor Information

Site Name:	**FOX-2 Longstaff Bluff**	Thermistor Location		**Upper Site Landfill Lobe A**	
Thermistor Number:	**VT-6**	Inclination		**10° from vertical**	
Install Date:	13/08/2011	First Date Event: 27/08/2013		Last Date Event	24/08/2014
Coordinates and Elevation	N **7643235**	W	**494484**	Elev	**153**
Length of Cable (m)		Cable Lead Above Ground (m)	**2.8**	Nodal Points	**10**
Datalogger Serial #	**7110035**			Cable Serial Number	**111162**

Thermistor Inspection

	Good			
	Yes		No	Problem/Maintenance
Casing	**x**			
Cover	**x**			
Data Logger	**x**			
Cable	**x**			
Beads	**x**			
Battery Installation Date		**13/08/2011**		
Battery Levels	Main	**11.34** V (Best)	Aux	**13.38** V (Best)

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	13339	4.0282
2	13803	3.3457
3	15118	1.5434
4	16645	-0.3407
5	17264	-1.0499
6	17891	-1.7398
7	18450	-2.3324
8	19220	-3.1166

Bead	ohms	Degrees C
9	20020	-3.8949
10	20750	-4.5753

Observations and Proposed Maintenance

Memory downloaded and logger restarted
Batteries replaced on August 24, 2014

Contractor Name:	**Sila Remediation Inc.**	Inspection Date:	**24/08/2014**
Prepared By:	**Martin Fleury**		

Thermistor Information

Site Name:	**FOX-2 Longstaff Bluff**	Thermistor Location		**Upper Site Landfill Lobe A**	
Thermistor Number:	**VT-7**	Inclination		**25° from vertical**	
Install Date:	13/08/2011	First Date Event: 27/08/2013		Last Date Event	24/08/2014
Coordinates and Elevation	N **7643189**	W	**494438**	Elev	**154**
Length of Cable (m)		Cable Lead Above Ground (m)	**1.65**	Nodal Points	**13**
Datalogger Serial #	**7110034**			Cable Serial Number	**111161**

Thermistor Inspection

	Good			
	Yes		No	Problem/Maintenance
Casing	**x**			
Cover	**x**			
Data Logger	**x**			
Cable	**x**			
Beads	**x**			
Battery Installation Date		**13/08/2011**		
Battery Levels	Main	**11.34** V (Best)	Aux	**13.26** V (Best)

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	15690	0.8136
2	16364	-0.0089
3	16982	-0.7304
4	17562	-1.3812
5	18217	-2.0879
6	18910	-2.8052
7	19361	-3.2563
8	19886	-3.767

Bead	ohms	Degrees C
9	20310	-4.1685
10	20900	-4.7118
11	21370	-5.1326
12	21660	-5.387
13	21880	-5.5775

Observations and Proposed Maintenance

Memory downloaded and logger restarted
Batteries replaced on August 24, 2014

Contractor Name:	**Sila Remediation Inc.**	Inspection Date:	**24/08/2014**
Prepared By:	**Martin Fleury**		

Thermistor Information

Site Name:	**FOX-2 Longstaff Bluff**	Thermistor Location		**Upper Site Landfill Lobe A**	
Thermistor Number:	**VT-8**	Inclination		**35° from vertical**	
Install Date:	13/08/2011	First Date Event: 27/08/2013		Last Date Event	24/08/2014
Coordinates and Elevation	N **7643232**	W	**494507**	Elev	**151**
Length of Cable (m)		Cable Lead Above Ground (m)	**2.65**	Nodal Points	**14**
Datalogger Serial #	**7110010**			Cable Serial Number	**111158**

Thermistor Inspection

	Good			Problem/Maintenance
	Yes		No	
Casing	**x**			
Cover	**x**			
Data Logger	**x**			
Cable	**x**			
Beads	**x**			
Battery Installation Date		**13/08/2011**		
Battery Levels	Main	**11.34** V (Best)	Aux	**13.5** V (Best)

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	15640	0.8762
2	16106	0.3014
3	16862	-0.5926
4	17406	-1.2086
5	18057	-1.9179
6	18662	-2.5519
7	19444	-3.3381
8	19932	-3.811

Bead	ohms	Degrees C
9	20520	-4.3639
10	21110	-4.9011
11	21580	-5.3172
12	22180	-5.8339
13	22540	-6.1365
14	22850	-6.3927

Observations and Proposed Maintenance

Memory downloaded and logger restarted

Batteries replaced on August 24, 2014

7.5 PHOTOGRAPHIC RECORDS

The Photographic Record for the Upper Site Landfill Lobe A has been completed as per the TOR and is included in the following pages as Table XXIV. Full-sized photographs are contained in the Addendum DVD-ROM.

Table XXIV: Landfill Visual Inspection Photo Log – Upper Site Landfill Lobe A

Site Name: FOX-2, Longstaff Bluff
Landfill: Upper Site Landfill Lobe A
Date Inspected: August 24, 2014
Inspected by: Martin Fleury

Photo	Filename	Size (KB)	Date	Vantage Point		Caption
				Easting	Northing	
1	IMG_0413	1 791	2014-08-24	18 W 494438	7643189	South - Southeast view of VT-7 thermistor casing.
2	IMG_0414	2 078	2014-08-24	18 W 494438	7643189	View of VT-7 data logger box.
3	IMG_0415	2 212	2014-08-24	18 W 494452	7643237	South view of VT-5 thermistor casing.
4	IMG_0416	1 984	2014-08-24	18 W 494452	7643237	View of VT-5 data logger box.
5	IMG_0417	2 190	2014-08-24	18 W 494484	7643235	South view of VT-6 thermistor casing.
6	IMG_0418	1 784	2014-08-24	18 W 494484	7643235	View of VT-6 data logger box.
7	IMG_0419	2 229	2014-08-24	18 W 494507	7643232	South view of VT-8 thermistor casing.
8	IMG_0420	1 967	2014-08-24	18 W 494507	7643232	View of VT-8 data logger box.
9	IMG_0433	2 223	2014-08-24	18 W 494543	7643212	Northeast view of MW-16.
10	IMG_0434	2 077	2014-08-24	18 W 494529	7643264	Southeast view of MW-15.
11	IMG_0435	2 081	2014-08-24	18 W 494531	7643264	Northeast view of F2-MW-15-S soil sampling location.
12	IMG_0436	2 949	2014-08-24	18 W 494531	7643264	Southwest view of F2-MW-15-S soil sampling location.
13	IMG_0437	2 430	2014-08-24	18 W 494544	7643211	North view of F2-MW-16-S soil sampling location.
14	IMG_0438	2 957	2014-08-24	18 W 494531	7643264	Southwest view of F2-MW-15-S soil sampling location.
15	IMG_0439	1 682	2014-08-24	18 W 494476	7643300	South view of MW-14.
16	IMG_0440	2 050	2014-08-24	18 W 494473	7643303	North view of F2-MW-14-S sampling location.
17	IMG_0441	2 076	2014-08-24	18 W 494473	7643303	South view of F2-MW-14-S sampling location.
18	IMG_0442	2 201	2014-08-24	18 W 494448	7643286	Southeast view of the northern slope of the Upper Site Landfill Lobe A.
19	IMG_0443	2 179	2014-08-24	18 W 494448	7643286	West -Southwest view of the northern slope of the Upper Site Landfill Lobe A.
20	IMG_0444	2 213	2014-08-24	18 W 494429	7643250	Panoramic view of the Upper Site Landfill Lobe A top, East - Northeast.
21	IMG_0445	2 403	2014-08-24	18 W 494429	7643250	Panoramic view of the Upper Site Landfill Lobe A top, East - Southeast.
22	IMG_0446	2 432	2014-08-24	18 W 494429	7643250	Panoramic view of the Upper Site Landfill Lobe A top, Southeast.
23	IMG_0447	2 220	2014-08-24	18 W 494429	7643250	Panoramic view of the Upper Site Landfill Lobe A top, South.
24	IMG_0448	2 630	2014-08-24	18 W 494429	7643250	Panoramic view of the Upper Site Landfill Lobe A top, South - Southwest.
25	IMG_0449	2 068	2014-08-24	18 W 494395	7643189	North View of the Western slope of the Upper Site Landfill Lobe A.
26	IMG_0450	2 500	2014-08-24	18 W 494395	7643189	Southeast view of the Western slope of the Upper Site Landfill Lobe A.
27	IMG_0908	1 892	2014-08-24	18 W 494362	7643177	East view of MW-13.
28	IMG_0909	2 555	2014-08-24	18 W 494366	7643174	East view of F2-MW-13-S soil sampling location.

7.6 SOIL SAMPLE ANALYTICAL DATA

The soil chemical analyses results for the 2014 Upper Site Landfill Lobe A samples are presented in Table XXV hereafter. Certificates of analyses and results of field duplicates collected as part of the QA/QC program are presented in Annex 1 at the end of this report.

Table XXV: Upper Site Landfill Lobe A Summary Table for Soil Analytical Data

Sample #	Location	Depth [cm]	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]
RDL - Exova			1	1	1	0.5	1	2	1	1	0.1	0.02	10	10	20
Upgradient Soil Samples															
F2-MW-13-S-A-2014	MW13	0 - 10	42	38	12	<0.5	8	69	52	35	<0.1	<0.02	<10	<10	<20
F2-MW-13-S-B-2014		40 - 50	43	50	12	<0.5	8	76	82	36	<0.1	<0.02	<10	<10	<20
Downgradient Soil Samples															
F2-MW-14-S-A-2014	MW14	0 - 10	44	52	12	<0.5	8	71	78	35	<0.1	<0.02	<10	<10	120
F2-MW-14-S-B-2014		40 - 50	55	55	13	<0.5	8	79	73	41	<0.1	<0.02	<10	<10	30
F2-MW-15-S-A-2014	MW15	0 - 10	62	47	15	<0.5	9	91	46	35	<0.1	<0.02	<10	<10	100
F2-MW-15-S-B-2014		40 - 50	50	50	14	<0.5	8	81	66	34	<0.1	<0.02	<10	<10	50
F2-MW-16-S-A-2014	MW16	0 - 10	63	47	11	<0.5	9	84	56	41	<0.1	<0.02	<10	<10	<20
F2-MW-16-S-B-2014		40 - 50	73	63	29	<0.5	10	92	86	46	<0.1	<0.02	<10	<10	<20

7.7 GROUNDWATER SAMPLE ANALYTICAL DATA

Three (3) out of four (4) wells contained enough water to perform groundwater sampling for all parameters. MW-14 and MW-16 lacked the necessary quantity of water to conduct sampling for TPH analysis. The sample collected at MW-15 for TPH analysis by Exova was lost in transportation (broken bottle). TPH results (and associated RDL) presented for MW-15 are from the QA duplicate sent to Maxxam. As samples were not filtered, sediment was present in all but one groundwater sample (MW15) and required a digest which raised the RDL. The RDL for sample collected at MW15 is the usual RDL used by Exova.

The groundwater chemical analyses results and evaluation for the analytical data for the 2014 Upper Site Landfill Lobe A samples are presented in Table XXVI hereafter. Certificates of analyses and results for groundwater samples collected as part of the QA/QC program are presented in Annex 1 at the end of this report.

Table XXVI: Upper Site Landfill Lobe A Summary Table for Groundwater Analytical Data

Sample #	Location	Cu [mg/L]	Ni [mg/L]	Co [mg/L]	Cd [mg/L]	Pb [mg/L]	Zn [mg/L]	Cr [mg/L]	As [mg/L]	Hg [mg/L]	PCBs [ug/L]	F1	F2	F3
												C_6-C_{10} [mg/L]	C_{10}-C_{16} [mg/L]	C_{10}-C_{34} [mg/L]
RDL - Exova*		0.01	0.01	0.01	0.008	0.01	0.04	0.05	0.02	0.0001	0.1	NA	0.1	0.2
Upgradient Groundwater Sample														
F2-MW-13-2014	MW13	Insufficient Water to Sample												
Downgradient Groundwater Samples														
F2-MW-14-2014	MW14	0.26	0.28	0.06	<0.008	0.03	0.55	0.20	0.06	<0.0001	<0.1	Insufficient Water to Sample		
F2-MW-15-2014	MW15	0.018	0.042	0.0105	0.0007**	0.004	0.03	0.002	<0.001	<0.0001	<0.1	<0.025***	<0.1***	<0.2***
	RDL**	0.001**	0.005**	0.0020**	0.0001**	0.001**	0.01**	0.001**	0.001**	0.0001**	0.1**	0.025*	0.1*	0.2*
F2-MW-16-2014	MW16	0.43	0.35	0.09	<0.008	0.06	4.37	0.32	0.22	<0.0001	<0.1	Insufficient Water to Sample		

*: RDL adapted for analysis performed with digest due to turbidity in sample
**: RDL: Usual RDL from Exova
***: RDL and Concentration from Maxxam (Bottle to Exova broke during shipping)

7.8 MONITORING WELL SAMPLING / INSPECTION LOGS

The monitoring well sampling logs for MW-13 to MW-16 are presented in this section. It should be noted that the casing at MW-16 heaved due to frost action.

Development of Monitoring Wells			
Site Name:	FOX-2	Longstaff Bluff	
Date of Sampling Event:	2014-08-24	Time:	15:10
Names of Samplers:		Martin Fleury	
		Caleb Qanatsiaq	
		Philip Siakuluk	
Landfill Name:	Upper Site Landfill Lobe A		
Monitoring Well ID:	MW-13		
Sample Number:	MW-13-2014		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	34		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)	350		
Length screened section (cm)=	300		
Depth to top of screen (cm)= (from ground surface)	40		
Depth to water surface (cm)= (from top of pipe)	NA (dry)	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm)= (below ground surface)	NA		
Measured well refusal depth BGS (cm)=	432		
Thickness of water column (cm)=	NA		
Static volume of water in well (mL)=	NA		
Free product thickness (mm)=	NA	Measurement method: (meter,	Interface meter
Purging: (Y/N)	N		
Volume Purged Water (L)=	NA		
Decontamination required: (Y/N)	N		
Number washes:	NA		
Number rinses:	NA		
Final pH=	NA		
Final Conductivity (uS/cm)=	NA		
Final Temperature (degC)=	NA		

Development of Monitoring Wells			
Site Name:	FOX-2	Longstaff Bluff	
Date of Sampling Event:	2014-08-24	Time:	14:30
Names of Samplers:		Martin Fleury	
		Caleb Qanatsiaq	
		Philip Siakuluk	
Landfill Name:	Upper Site Landfill Lobe A		
Monitoring Well ID:	MW-14		
Sample Number:	MW-14-2014		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	32		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)	350		
Length screened section (cm)=	300		
Depth to top of screen (cm)= (from ground surface)	40		
Depth to water surface (cm)= (from top of pipe)	152	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm)= (below ground surface)	120		
Measured well refusal depth BGS (cm)=	292	Evidence of sludge or siltation:	Freezing
Thickness of water column (cm)=	172		
Static volume of water in well (mL)=	3440		
Free product thickness (mm)=	NA	Measurement method: (meter,	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra tubing
Volume Purged Water (L)=	3.5		Foot Valve
Decontamination required: (Y/N)	N	Dedicated Waterra Tubing	
Number washes:	NA		
Number rinses:	NA		
Final pH=	8.00		
Final Conductivity (uS/cm)=	750		
Final Temperature (degC)=	2.65		

Development of Monitoring Wells			
Site Name:	FOX-2	Longstaff Bluff	
Date of Sampling Event:	2014-08-24	Time:	13:10
Names of Samplers:		Martin Fleury	
		Caleb Qanatsiaq	
		Philip Siakuluk	
Landfill Name:	Upper Site Landfill Lobe A		
Monitoring Well ID:	MW-15		
Sample Number:	MW-15-2014		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	42		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)	320		
Length screened section (cm)=	300		
Depth to top of screen (cm)= (from ground surface)	320		
Depth to water surface (cm)= (from top of pipe)	202	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm)= (below ground surface)	178		
Measured well refusal depth BGS (cm)=	318		
Thickness of water column (cm)=	140		
Static volume of water in well (mL)=	2800		
Free product thickness (mm)=	NA	Measurement method: (meter,	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra tubing
Volume Purged Water (L)=	3		Foot Valve
Decontamination required: (Y/N)	N	Dedicated Waterra Tubing	
Number washes:	NA		
Number rinses:	NA		
Final pH=	7,94		
Final Conductivity (uS/cm)=	144		
Final Temperature (degC)=	2,45		

Development of Monitoring Wells			
Site Name:	FOX-2	Longstaff Bluff	
Date of Sampling Event:	2014-08-24	Time:	12:50
Names of Samplers:		Martin Fleury	
		Caleb Qanatsiaq	
		Philip Siakuluk	
Landfill Name:	Upper Site Landfill Lobe A		
Monitoring Well ID:	MW-16		
Sample Number:	MW-16-2014		
Condition of Well:	Casing heaved due to frost action		
Measured Data			
Well pipe height above ground (cm)=	34		
Diameter of well (cm)=	5		
Depth of well installation (cm)= (from ground surface)	340		
Length screened section (cm)=	300		
Depth to top of screen (cm)= (from ground surface)	73		
Depth to water surface (cm)= (from top of pipe)	91	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm)= (below ground surface)	57		
Measured well refusal depth BGS (cm)=	226	Evidence of sludge or siltation:	Frozen
Thickness of water column (cm)=	169		
Static volume of water in well (mL)=	3380		
Free product thickness (mm)=	NA	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra tubing
Volume Purged Water (L)=	3.5		Foot Valve
Decontamination required: (Y/N)	N	Dedicated Waterra Tubing	
Number washes:	NA		
Number rinses:	NA		
Final pH=	7.34		
Final Conductivity (uS/cm)=	290		
Final Temperature (degC)=	2.15		

ANNEX 1 Certificates of Analysis and QA/QC reports

ADDENDUM TO CERTIFICATE OF ANALYSIS AND CHAIN OF COSTODY

It should be noted that the following certificate of analysis (COA) and related chain of custody (COC's) contains some sample names inversion. In consequence, the sampling station labels shown in the COA and COC's should be read as following:

Sample label shown in COA	Laboratory I.D.	Correct sample identification
F2-1-A-2014	1131191	F2-7-A-2014
F2-1-B-2014	1131192	F2-7-B-2014
F2-2-A-2014	1131193	F2-8-A-2014
F2-2-B-2014	1131194	F2-8-B-2014
F2-3-A-2014	1131195	F2-9-A-2014
F2-3-B-2014	1131196	F2-9-B-2014
F2-4-A-2014	1131197	F2-6-A-2014
F2-4-B-2014	1131198	F2-6-B-2014
F2-6-A-2014	1131204	F2-4-A-2014
F2-7-A-2014	1131205	F2-3-A-2014
F2-8-A-2014	1131206	F2-1-A-2014

Exova
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T: +1 (613) 727-5692
F: +1 (613) 727-5222
E: sales@exova.com
W: www.exova.com

Sample Integrity Scorecard

Summary				
	Total Reports	**Total Pass**	**Total Failed**	**% Passed**
Process	**5**	**0**	**5**	**0**
Data Quality	**5**	**1**	**4**	**20**

Ottawa Workorder: 1418941 (Fox-3)

Process

Were the sample containers packaged well? Yes If No, please explain:
Was the COC received? Yes
Was the COC filled in adequately and legibly? **No please explain: No quotation included on COC**
Was the COC received without damage? Yes If No, please explain:
Were the sample containers clearly labelled? Yes If No, please explain:

Data Quality

Were the samples received within recommended holding times? Yes
Were samples received in containers appropriate to the matrix and analysis required? **No Most samples did have the correct containers but ideally we should have two jars per soil sample and for 3 of the samples we only received one jar.**
Were the expected number of samples received? **No * If No, please explain: 6 samples were not received.**
Were all samples received intact (not damaged/broken)? Yes * If No, please explain:
For water samples only, were they received without a noticeable layer of sediment? N/A If No, please explain:
Was sufficient sample volume received? Yes If No, please explain:

Non-Conformances

Process: 1 Data Quality: 2 *Total: 3*

Ottawa Workorder: 1418943 (Fox-2)

Process

Were the sample containers packaged well? Yes If No, please explain:
Was the COC received? Yes
Was the COC filled in adequately and legibly? **No please explain: No quotation included on COC**
Was the COC received without damage? Yes If No, please explain:
Were the sample containers clearly labelled? Yes If No, please explain:

Data Quality

Were the samples received within recommended holding times? Yes
Were samples received in containers appropriate to the matrix and analysis required? Yes
Were the expected number of samples received? Yes If No, please explain:
Were all samples received intact (not damaged/broken**)? No * If No, please explain: 2 soil jars were received broken**
For water samples only, were they received without a noticeable layer of sediment? N/A If No, please explain:
Was sufficient sample volume received? Yes If No, please explain:

Non-Conformances

Process: 1 Data Quality: 1 *Total: 2*

Ottawa Workorder: 1418944 (Fox-2)

Process

Were the sample containers packaged well? Yes If No, please explain:
Was the COC received? Yes
Was the COC filled in adequately and legibly? **No please explain: No quotation included on COC**

Was the COC received without damage? Yes If No, please explain:
Were the sample containers clearly labelled? Yes If No, please explain:

Data Quality

Were the samples received within recommended holding times? Yes
Were samples received in containers appropriate to the matrix and analysis required? Yes
Were the expected number of samples received? Yes
Were all samples received intact (not damaged/broken)? Yes * If No, please explain:
For water samples only, were they received without a noticeable layer of sediment? N/A If No, please explain:
Was sufficient sample volume received? Yes If No, please explain:

Non-Conformances

Process: 1 Data Quality: 0 *Total: 1*

Ottawa Workorder: 1418982 (Fox-2)

Process

Were the sample containers packaged well? Yes If No, please explain:
Was the COC received? Yes
Was the COC filled in adequately and legibly? **No please explain: No quotation included on COC**
Was the COC received without damage? Yes If No, please explain:
Were the sample containers clearly labelled? Yes If No, please explain:

Data Quality

Were the samples received within recommended holding times? Yes
Were samples received in containers appropriate to the matrix and analysis required? Yes
Were the expected number of samples received? Yes * If No, please explain:
Were all samples received intact (not damaged/broken)? No * If No, please explain: **One of the 1L amber bottles broke during shipping.**
For water samples only, were they received without a noticeable layer of sediment? Yes If No, please explain:
Was sufficient sample volume received? **No If No, please explain: While the appropriate bottles were received there were many bottles with insufficient sample volumes. The lab did the best with what they were given.**

Non-Conformances

Process: 1 Data Quality: 2 *Total: 3*

Ottawa Workorder: 1421066 (Fox-3)

Process

Were the sample containers packaged well? Yes If No, please explain:
Was the COC received? Yes
Was the COC filled in adequately and legibly? **No please explain: No quotation included on COC**
Was the COC received without damage? Yes If No, please explain:
Were the sample containers clearly labelled? Yes If No, please explain:

Data Quality

Were the samples received within recommended holding times? Yes
Were samples received in containers appropriate to the matrix and analysis required? **No Many of the samples only had two of the required 5 bottles. Out of 9 sample sets only 2 had the appropriate bottles.**
Were the expected number of samples received? Yes * If No, please explain:
Were all samples received intact (not damaged/broken)? Yes * If No, please explain:
For water samples only, were they received without a noticeable layer of sediment? **No If No, please explain: One of the metals bottles had sediment which required the MRL's to be raised.**
Was sufficient sample volume received? **No If No, please explain: There were many bottles with insufficient sample volumes. The lab did the best with what they were given.**

Non-Conformances

Process: 1 Data Quality: 3 *Total: 4*

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Certificate of Analysis

Client: Sila Remediation Inc.
200-4495 Boul. Wilfrid-Hamel
Québec, QC
G1P 2J7
Attention: Mr. Jean-Pierre Pelletier
PO#:
Invoice to: Sila Remediation Inc.

Report Number: 1418943
Date Submitted: 2014-09-04
Date Reported: 2015-02-19
Project: Dew Line Monitoring Fox-2
COC #: 789358

Dear Jean-Pierre Pelletier:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

Revision 1: Sample ID for RN#1131169 amended to F2-MW-13-S-A-2014 as per client request.

APPROVAL:

Charlie (Long) Qu
Laboratory Supervisor, Organics

All analysis is completed in Ottawa, Ontario (unless otherwise indicated).

Exova Ottawa is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on our CALA scope of accreditation. It can be found at http://www.cala.ca/scopes/2602.pdf.

Exova (Ottawa) is certified and accredited for specific parameters by OMAFRA, Ontario Ministry of Agriculture, Food and Rural Affairs (for farm soils). Licensed by Ontario MOE for specific tests in drinking water.

Exova (Mississauga) is accredited for specific parameters by SCC, Standards Council of Canada (to ISO 17025)

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Exova recommends consulting the official provincial or federal guideline as required.

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Group	Analyte	MRL	Units	Guideline	Lab I.D. / Sample Matrix / Sample Type / Sampling Date / Sample I.D.			
					1131169 Soil 2014-08-24 F2-MW-13-S-A-2014	1131170 Soil 2014-08-24 F2-MW-13-S-B-2014	1131171 Soil 2014-08-24 F2-MW-14-S-A-2014	1131172 Soil 2014-08-24 F2-MW-14-S-B-2014
General Chemistry	Moisture	0.1	%		11.6	10.8	25.4	10.9
Hydrocarbons	F1 (C6-C10)	10	ug/g		<10	<10	<10	<10
	F2 (C10-C16)	10	ug/g		<10	<10	<10	<10
	F3 (C16-C34)	20	ug/g		<20	<20	120	30
Mercury	Hg	0.1	ug/g		<0.1	<0.1	<0.1	<0.1
Metals	As	1	ug/g		35	36	35	41
	Cd	0.5	ug/g		<0.5	<0.5	<0.5	<0.5
	Co	1	ug/g		12	12	12	13
	Cr	1	ug/g		52	82	78	73
	Cu	1	ug/g		42	43	44	55
	Ni	1	ug/g		38	50	52	55
	Pb	1	ug/g		8	8	8	8
	Zn	2	ug/g		69	76	71	79
PCBs	Polychlorinated Biphenyls (PCBs)	0.02	ug/g		<0.02	<0.02	<0.02	<0.02

Guideline = *** = Guideline Exceedence**
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Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

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Project: Dew Line Monitoring Fox-2
COC #: 789358

Group	Analyte	MRL	Units	Guideline	Lab I.D. / Sample Matrix / Sample Type / Sampling Date / Sample I.D.			
					1131173 Soil 2014-08-24 F2-MW-15-S-A-2014	1131174 Soil 2014-08-24 F2-MW-15-S-B-2014	1131175 Soil 2014-08-24 F2-MW-16-S-A-2014	1131176 Soil 2014-08-24 F2-MW-16-S-B-2014
General Chemistry	Moisture	0.1	%		17.4	13.2	14.7	8.4
Hydrocarbons	F1 (C6-C10)	10	ug/g		<10	<10	<10	<10
	F2 (C10-C16)	10	ug/g		<10	<10	<10	<10
	F3 (C16-C34)	20	ug/g		100	50	<20	<20
Mercury	Hg	0.1	ug/g		<0.1	<0.1	<0.1	<0.1
Metals	As	1	ug/g		35	34	41	46
	Cd	0.5	ug/g		<0.5	<0.5	<0.5	<0.5
	Co	1	ug/g		15	14	11	29
	Cr	1	ug/g		46	66	56	86
	Cu	1	ug/g		62	50	63	73
	Ni	1	ug/g		47	50	47	63
	Pb	1	ug/g		9	8	9	10
	Zn	2	ug/g		91	81	84	92
PCBs	Polychlorinated Biphenyls (PCBs)	0.02	ug/g		<0.02	<0.02	<0.02	<0.02

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COC #: 789358

				Lab I.D.	1131177	1131178	1131179	1131180
				Sample Matrix	Soil	Soil	Soil	Soil
				Sample Type				
				Sampling Date	2014-08-24	2014-08-24	2014-08-24	2014-08-24
				Sample I.D.	F2-MW-5-S-A-2014	F2-MW-5-S-B-2014	F2-MW-6-S-A-2014	F2-MW-6-S-B-2014
Group	**Analyte**	**MRL**	**Units**	**Guideline**				
General Chemistry	Moisture	0.1	%		8.8	6.2	9.3	4.8
Hydrocarbons	F1 (C6-C10)	10	ug/g		<10	<10	<10	<10
	F2 (C10-C16)	10	ug/g		<10	<10	<10	<10
	F3 (C16-C34)	20	ug/g		<20	<20	60	<20
Mercury	Hg	0.1	ug/g		<0.1	<0.1	<0.1	<0.1
Metals	As	1	ug/g		19	26	19	36
	Cd	0.5	ug/g		<0.5	<0.5	<0.5	<0.5
	Co	1	ug/g		15	13	18	23
	Cr	1	ug/g		103	103	165	146
	Cu	1	ug/g		25	31	59	90
	Ni	1	ug/g		46	44	84	99
	Pb	1	ug/g		6	4	6	8
	Zn	2	ug/g		94	93	110	119
PCBs	Polychlorinated Biphenyls (PCBs)	0.02	ug/g		<0.02	<0.02	<0.02	<0.02

Guideline = *** = Guideline Exceedence**

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Date Submitted: 2014-09-04
Date Reported: 2015-02-19
Project: Dew Line Monitoring Fox-2
COC #: 789358

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1131181 Soil 2014-08-24 F2-DUP-1-2014	1131182 Soil 2014-08-24 F2-DUP-4-2014	1131183 Soil 2014-08-24 F2-DUP-7-2014	1131184 Soil 2014-08-24 F2-DUP-10-2014
General Chemistry	Moisture	0.1	%			13.9	6.9	6.1	8.2
Hydrocarbons	F1 (C6-C10)	10	ug/g			<10	<10	<10	<10
	F2 (C10-C16)	10	ug/g			<10	<10	<10	<10
	F3 (C16-C34)	20	ug/g			40	<20	<20	<20
Mercury	Hg	0.1	ug/g			<0.1	<0.1	<0.1	<0.1
Metals	As	1	ug/g			44	14	30	34
	Cd	0.5	ug/g			<0.5	<0.5	<0.5	<0.5
	Co	1	ug/g			14	14	36	18
	Cr	1	ug/g			50	105	102	80
	Cu	1	ug/g			54	22	70	70
	Ni	1	ug/g			45	46	110	71
	Pb	1	ug/g			9	4	11	12
	Zn	2	ug/g			78	94	162	110
PCBs	Polychlorinated Biphenyls (PCBs)	0.02	ug/g			<0.02	<0.02	<0.02	<0.02

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Project: Dew Line Monitoring Fox-2
COC #: 789358

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. 1131185 Soil 2014-08-24 F2-DUP-13-2014
General Chemistry	Moisture	0.1	%		4.1
Hydrocarbons	F1 (C6-C10)	10	ug/g		<10
	F2 (C10-C16)	10	ug/g		<10
	F3 (C16-C34)	20	ug/g		<20
Mercury	Hg	0.1	ug/g		<0.1
Metals	As	1	ug/g		27
	Cd	0.5	ug/g		<0.5
	Co	1	ug/g		17
	Cr	1	ug/g		78
	Cu	1	ug/g		72
	Ni	1	ug/g		76
	Pb	1	ug/g		9
	Zn	2	ug/g		125
PCBs	Polychlorinated Biphenyls (PCBs)	0.02	ug/g		<0.02

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200-4495 Boul. Wilfrid-Hamel
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G1P 2J7
Attention: Mr. Jean-Pierre Pelletier
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Report Number: 1418943
Date Submitted: 2014-09-04
Date Reported: 2015-02-19
Project: Dew Line Monitoring Fox-2
COC #: 789358

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No: 208523 **Analysis Date:** 2014-09-07 **Method:** SW846 8081A/8082A			
Polychlorinated Biphenyls (PCBs)	<0.02 ug/g	85	50-120
Run No: 275801 **Analysis Date:** 2014-09-08 **Method:** EPA 200.8			
As	<1 ug/g	98	70-130
Cd	<0.5 ug/g	82	70-130
Co	<1 ug/g	89	70-130
Cr	<1 ug/g	90	70-130
Cu	<1 ug/g	91	70-130
Ni	<1 ug/g	91	70-130
Pb	<1 ug/g	85	70-130
Zn	<2 ug/g	90	70-130
Run No: 275861 **Analysis Date:** 2014-09-09 **Method:** EPA 200.8			
As	<1 ug/g	100	70-130
Cd	<0.5 ug/g	93	70-130
Co	<1 ug/g	94	70-130

Guideline = *** = Guideline Exceedence**
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Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: Sila Remediation Inc.
200-4495 Boul. Wilfrid-Hamel
Québec, QC
G1P 2J7
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Date Submitted: 2014-09-04
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Project: Dew Line Monitoring Fox-2
COC #: 789358

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Cr	<1 ug/g	95	70-130
Cu	<1 ug/g	95	70-130
Ni	<1 ug/g	93	70-130
Pb	<1 ug/g	96	70-130
Zn	<2 ug/g	98	70-130
Run No: 275875 **Analysis Date:** 2014-09-09 **Method:** M SM3112B-3500B			
Hg	<0.1 ug/g	92	76-123
Run No: 275877 **Analysis Date:** 2014-09-09 **Method:** M SM3112B-3500B			
Hg	<0.1 ug/g	89	76-123
Run No: 275948 **Analysis Date:** 2014-09-10 **Method:** M SM3112B-3500B			
Hg	<0.1 ug/g	87	76-123
Run No: 275958 **Analysis Date:** 2014-09-10 **Method:** EPA 200.8			
As	<1 ug/g	100	70-130
Cd	<0.5 ug/g	93	70-130
Co	<1 ug/g	98	70-130
Cr	<1 ug/g	101	70-130
Cu	<1 ug/g	99	70-130

Guideline = *** = Guideline Exceedence**
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Client: Sila Remediation Inc.
200-4495 Boul. Wilfrid-Hamel
Québec, QC
G1P 2J7
Attention: Mr. Jean-Pierre Pelletier
PO#:
Invoice to: Sila Remediation Inc.

Report Number: 1418943
Date Submitted: 2014-09-04
Date Reported: 2015-02-19
Project: Dew Line Monitoring Fox-2
COC #: 789358

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Ni	<1 ug/g	100	70-130
Pb	<1 ug/g	95	70-130
Zn	<2 ug/g	98	70-130
Run No: 276008 **Analysis Date:** 2014-09-11 **Method:** CCME			
F1 (C6-C10)	<10 ug/g	95	80-120
Run No: 276013 **Analysis Date:** 2014-09-11 **Method:** C SM2540B			
Moisture	<0.1 %	100	80-120
Run No: 276027 **Analysis Date:** 2014-09-11 **Method:** CCME			
F2 (C10-C16)	<10 ug/g	87	50-120
F3 (C16-C34)	<20 ug/g	87	50-120
Run No: 276125 **Analysis Date:** 2014-09-12 **Method:** CCME			
F2 (C10-C16)	<10 ug/g	88	50-120
F3 (C16-C34)	<20 ug/g	88	50-120
Run No: 276129 **Analysis Date:** 2014-09-12 **Method:** C SM2540B			
Moisture	<0.1 %	99	80-120

Guideline = *** = Guideline Exceedence**
All analysis completed in Ottawa, Ontario (unless otherwise indicated by ** which indicates analysis was completed in Mississauga, Ontario).
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EXOVA ENVIRONMENTAL ONTARIO

Certificate of Analysis

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200-4495 Boul. Wilfrid-Hamel
Québec, QC
G1P 2J7
Attention: Mr. Jean-Pierre Pelletier
PO#:
Invoice to: Sila Remediation Inc.

Report Number: 1418982
Date Submitted: 2014-09-01
Date Reported: 2014-09-09
Project: FOX-2
COC #: 789387

Dear Jean-Pierre Pelletier:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____

Lorna Wilson
Laboratory Supervisor, Inorganics

APPROVAL: _____

Charlie (Long) Qu
Laboratory Supervisor, Organics

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Exova (Mississauga) is accredited for specific parameters by:
SCC, Standards Council of Canada (to ISO 17025)

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Attention: Mr. Jean-Pierre Pelletier
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Invoice to: Sila Remediation Inc.

Report Number: 1418982
Date Submitted: 2014-09-01
Date Reported: 2014-09-09
Project: FOX-2
COC #: 789387

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1131312 Water 2014-08-25 F2-MW-8-2014	1131313 Water 2014-08-24 F2-MW-9-2014	1131314 Water 2014-08-24 F2-MW-10-2014	1131315 Water 2014-08-24 F2-MW-12-2014
Hydrocarbons	F2 (C10-C16)	100	ug/L			<100			
	F3 (C16-C34)	200	ug/L			<200			
	F4 (C34-C50)	200	ug/L			<200			
Mercury	Hg Total	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
Metals	As	0.02	mg/L			0.04	<0.02	0.11	0.04
	Cd	0.008	mg/L			<0.008	<0.008	<0.008	<0.008
	Co	0.01	mg/L			0.05	0.02	0.07	0.02
	Cr	0.05	mg/L			<0.05	<0.05	0.18	0.05
	Cu	0.01	mg/L			0.06	0.04	0.23	0.08
	Ni	0.01	mg/L			0.28	0.10	0.34	0.12
	Pb	0.01	mg/L			0.01	<0.01	0.08	0.02
	Zn	0.04	mg/L			0.12	0.06	0.23	0.10
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L			<0.1	<0.1	<0.1	<0.1

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1131316 Water 2014-08-24 F2-MW-14-2014	1131317 Water 2014-08-24 F2-MW-15-2014	1131318 Water 2014-08-24 F2-MW-16-2014	1131319 Water 2014-08-24 F2-DUP-A-2014
Mercury	Hg Total	0.0001	mg/L			<0.0001	<0.0001	<0.0001	<0.0001
Metals	As	0.001	mg/L				<0.001		
		0.02	mg/L			0.06		0.22	<0.02
	Cd	0.0001	mg/L				0.0007		
		0.008	mg/L			<0.008		<0.008	<0.008
	Co	0.0002	mg/L				0.0105		

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Client: Sila Remediation Inc.
200-4495 Boul. Wilfrid-Hamel
Québec, QC
G1P 2J7
Attention: Mr. Jean-Pierre Pelletier
PO#:
Invoice to: Sila Remediation Inc.

Report Number: 1418982
Date Submitted: 2014-09-01
Date Reported: 2014-09-09
Project: FOX-2
COC #: 789387

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1131316 Water 2014-08-24 F2-MW-14-2014	1131317 Water 2014-08-24 F2-MW-15-2014	1131318 Water 2014-08-24 F2-MW-16-2014	1131319 Water 2014-08-24 F2-DUP-A-2014
Metals	Co	0.01	mg/L			0.06		0.09	0.01
	Cr	0.001	mg/L				0.002		
		0.05	mg/L			0.20		0.32	<0.05
	Cu	0.001	mg/L				0.018		
		0.01	mg/L			0.26		0.43	0.04
	Ni	0.005	mg/L				0.042		
		0.01	mg/L			0.28		0.35	0.07
	Pb	0.001	mg/L				0.004		
		0.01	mg/L			0.03		0.06	<0.01
	Zn	0.01	mg/L				0.03		
		0.04	mg/L			0.55		4.37	0.06
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L			<0.1	<0.1	<0.1	<0.1

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1131320 Water 2014-08-24 F2-DUP-D-2014
Mercury	Hg Total	0.0001	mg/L			<0.0001
Metals	As	0.02	mg/L			0.03
	Cd	0.008	mg/L			<0.008
	Co	0.01	mg/L			0.05
	Cr	0.05	mg/L			<0.05
	Cu	0.01	mg/L			0.06
	Ni	0.01	mg/L			0.27

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Report Number: 1418982
Date Submitted: 2014-09-01
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Project: FOX-2
COC #: 789387

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. 1131320 Water 2014-08-24 F2-DUP-D-2014
Metals	Pb	0.01	mg/L		0.01
	Zn	0.04	mg/L		0.11
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L		<0.1

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Report Number: 1418982
Date Submitted: 2014-09-01
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COC #: 789387

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 249261 **Analysis Date** 2014-09-05 **Method** P 8081A			
Polychlorinated Biphenyls (PCBs)	<0.1 ug/L	102	50-120
Run No 275660 **Analysis Date** 2014-09-05 **Method** EPA 200.8			
As	<0.001 mg/L	101	93-106
Cd	<0.0001 mg/L	99	93-107
Co	<0.0002 mg/L	102	94-106
Cr	<0.001 mg/L	100	94-106
Cu	<0.001 mg/L	102	93-106
Ni	<0.005 mg/L	103	94-106
Pb	<0.001 mg/L	104	70-130
Zn	<0.01 mg/L	101	94-106
Run No 275719 **Analysis Date** 2014-09-06 **Method** M SM3112B-3500B			
Hg Total	<0.0001 mg/L		
Run No 275758 **Analysis Date** 2014-09-08 **Method** O CCME Reg 153			
F2 (C10-C16)	<100 ug/L	73	50-120

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Report Number: 1418982
Date Submitted: 2014-09-01
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Project: FOX-2
COC #: 789387

QC Summary

Analyte	Blank	QC % Rec	QC Limits
F3 (C16-C34)	<200 ug/L	73	50-120
F4 (C34-C50)	<200 ug/L	73	50-120
Run No 275800 **Analysis Date** 2014-09-08 **Method** EPA 200.8			
As	<0.02 mg/L	109	70-130
Cd	<0.008 mg/L	92	70-130
Co	<0.01 mg/L	96	70-130
Cr	<0.05 mg/L	99	70-130
Cu	<0.01 mg/L	97	70-130
Ni	<0.01 mg/L	99	70-130
Pb	<0.01 mg/L	89	70-130
Zn	<0.04 mg/L	100	70-130

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Report Number: 1418982
Date Submitted: 2014-09-01
Date Reported: 2014-09-09
Project: FOX-2
COC #: 789387

Sample Comment Summary

Sample ID: 1131312	F2-MW-8-2014	Metals analysis performed on aqua-regia digest of sample material.
Sample ID: 1131313	F2-MW-9-2014	Metals analysis performed on aqua-regia digest of sample material.
Sample ID: 1131314	F2-MW-10-2014	Metals analysis performed on aqua-regia digest of sample material.
Sample ID: 1131315	F2-MW-12-2014	Metals analysis performed on aqua-regia digest of sample material.
Sample ID: 1131316	F2-MW-14-2014	Metals analysis performed on aqua-regia digest of sample material.
Sample ID: 1131318	F2-MW-16-2014	Metals analysis performed on aqua-regia digest of sample material.
Sample ID: 1131319	F2-DUP-A-2014	Metals analysis performed on aqua-regia digest of sample material.
Sample ID: 1131320	F2-DUP-D-2014	Metals analysis performed on aqua-regia digest of sample material.

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EXOVA ENVIRONMENTAL ONTARIO

Certificate of Analysis

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200-4495 Boul. Wilfrid-Hamel
Québec, QC
G1P 2J7
Attention: Mr. Jean-Pierre Pelletier
PO#:
Invoice to: Sila Remediation Inc.

Report Number: 1418944
Date Submitted: 2014-09-04
Date Reported: 2014-09-12
Project: Dew Line Monitoring Fox-2
COC #: 789357

Dear Jean-Pierre Pelletier:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____

Lorna Wilson
Laboratory Supervisor, Inorganics

APPROVAL: _____

Charlie (Long) Qu
Laboratory Supervisor, Organics

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Québec, QC
G1P 2J7
Attention: Mr. Jean-Pierre Pelletier
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Invoice to: Sila Remediation Inc.

Report Number: 1418944
Date Submitted: 2014-09-04
Date Reported: 2014-09-12
Project: Dew Line Monitoring Fox-2
COC #: 789357

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1131191 Soil 2014-08-25 F2-1-A-2014	1131192 Soil 2014-08-25 F2-1-B-2014	1131193 Soil 2014-08-25 F2-2-A-2014	1131194 Soil 2014-08-25 F2-2-B-2014
General Chemistry	Moisture	0.1	%			8.6	10.6	7.3	11.4
Hydrocarbons	F1 (C6-C10)	10	ug/g			<10	<10	<10	<10
	F2 (C10-C16)	10	ug/g			<10	<10	<10	<10
	F3 (C16-C34)	20	ug/g			<20	<20	<20	<20
Mercury	Hg	0.1	ug/g			<0.1	<0.1	<0.1	<0.1
Metals	As	1	ug/g			39	31	42	108
	Cd	0.5	ug/g			<0.5	<0.5	<0.5	<0.5
	Co	1	ug/g			14	14	14	16
	Cr	1	ug/g			86	61	93	101
	Cu	1	ug/g			50	46	50	55
	Ni	1	ug/g			52	48	58	61
	Pb	1	ug/g			9	9	9	10
	Zn	2	ug/g			93	95	92	89
PCBs	Polychlorinated Biphenyls (PCBs)	0.02	ug/g			<0.02	<0.02	<0.02	<0.02

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Attention: Mr. Jean-Pierre Pelletier
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Report Number: 1418944
Date Submitted: 2014-09-04
Date Reported: 2014-09-12
Project: Dew Line Monitoring Fox-2
COC #: 789357

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1131195 Soil 2014-08-25 F2-3-A-2014	1131196 Soil 2014-08-25 F2-3-B-2014	1131197 Soil 2014-08-25 F2-4-A-2014	1131198 Soil 2014-08-25 F2-4-B-2014
General Chemistry	Moisture	0.1	%			10.1	9.6	4.2	14.1
Hydrocarbons	F1 (C6-C10)	10	ug/g			<10	<10	<10	<10
	F2 (C10-C16)	10	ug/g			<10	<10	<10	<10
	F3 (C16-C34)	20	ug/g			80	<20	<20	<20
Mercury	Hg	0.1	ug/g			<0.1	<0.1	<0.1	<0.1
Metals	As	1	ug/g			46	35	39	21
	Cd	0.5	ug/g			<0.5	<0.5	<0.5	<0.5
	Co	1	ug/g			24	17	19	13
	Cr	1	ug/g			121	151	79	107
	Cu	1	ug/g			69	65	91	74
	Ni	1	ug/g			82	85	96	62
	Pb	1	ug/g			24	11	10	4
	Zn	2	ug/g			132	119	143	95
PCBs	Polychlorinated Biphenyls (PCBs)	0.02	ug/g			<0.02	<0.02	<0.02	<0.02

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Report Number: 1418944
Date Submitted: 2014-09-04
Date Reported: 2014-09-12
Project: Dew Line Monitoring Fox-2
COC #: 789357

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1131199 Soil 2014-08-25 F2-MW-7-S-A-2014	1131200 Soil 2014-08-25 F2-MW-7-S-B-2014	1131201 Soil 2014-08-25 F2-MW-8-S-A-2014	1131202 Soil 2014-08-25 F2-MW-8-S-B-2014
General Chemistry	Moisture	0.1	%			7.2	5.0	11.7	5.2
Hydrocarbons	F1 (C6-C10)	10	ug/g			<10	<10	<10	<10
	F2 (C10-C16)	10	ug/g			<10	<10	<10	<10
	F3 (C16-C34)	20	ug/g			<20	<20	<20	<20
Mercury	Hg	0.1	ug/g			<0.1	<0.1	<0.1	<0.1
Metals	As	1	ug/g			27	16	27	58
	Cd	0.5	ug/g			<0.5	<0.5	<0.5	<0.5
	Co	1	ug/g			21	13	44	27
	Cr	1	ug/g			168	103	140	142
	Cu	1	ug/g			82	56	77	55
	Ni	1	ug/g			107	59	123	101
	Pb	1	ug/g			11	9	12	9
	Zn	2	ug/g			109	75	163	126
PCBs	Polychlorinated Biphenyls (PCBs)	0.02	ug/g			<0.02	<0.02	<0.02	<0.02

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Report Number: 1418944
Date Submitted: 2014-09-04
Date Reported: 2014-09-12
Project: Dew Line Monitoring Fox-2
COC #: 789357

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1131203 Soil 2014-08-24 F2-5-A-2015	1131204 Soil 2014-08-24 F2-6-A-2015	1131205 Soil 2014-08-24 F2-7-A-2015	1131206 Soil 2014-08-24 F2-8-A-2015
General Chemistry	Moisture	0.1	%			34.7	73.9	76.5	5.3
Hydrocarbons	F1 (C6-C10)	10	ug/g			<10	<10	<10	<10
	F2 (C10-C16)	10	ug/g			<10	<10	<10	<10
	F3 (C16-C34)	20	ug/g			100	150	360	<20
Mercury	Hg	0.1	ug/g			<0.1	<0.1	<0.1	<0.1
Metals	As	1	ug/g			77	15	6	12
	Cd	0.5	ug/g			<0.5	<0.5	1.6	<0.5
	Co	1	ug/g			20	27	64	19
	Cr	1	ug/g			76	96	17	167
	Cu	1	ug/g			64	70	316	47
	Ni	1	ug/g			56	114	357	95
	Pb	1	ug/g			7	6	4	7
	Zn	2	ug/g			120	176	236	121
PCBs	Polychlorinated Biphenyls (PCBs)	0.02	ug/g			<0.02	<0.02	<0.02	<0.02

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MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: Sila Remediation Inc.
200-4495 Boul. Wilfrid-Hamel
Québec, QC
G1P 2J7
Attention: Mr. Jean-Pierre Pelletier
PO#:
Invoice to: Sila Remediation Inc.

Report Number: 1418944
Date Submitted: 2014-09-04
Date Reported: 2014-09-12
Project: Dew Line Monitoring Fox-2
COC #: 789357

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1131207 Soil 2014-08-24 F2-MW-9-S-A-2014	1131208 Soil 2014-08-24 F2-MW-9-S-B-2014	1131209 Soil 2014-08-24 F2-MW-10-S-A-2014	1131210 Soil 2014-08-24 F2-MW-11-S-A-2014
General Chemistry	Moisture	0.1	%			12.8	14.6	15.6	12.0
Hydrocarbons	F1 (C6-C10)	10	ug/g			<10	<10	<10	<10
	F2 (C10-C16)	10	ug/g			<10	<10	<10	<10
	F3 (C16-C34)	20	ug/g			70	<20	<20	40
Mercury	Hg	0.1	ug/g			<0.1	<0.1	<0.1	<0.1
Metals	As	1	ug/g			40	36	56	51
	Cd	0.5	ug/g			<0.5	<0.5	<0.5	<0.5
	Co	1	ug/g			12	11	11	12
	Cr	1	ug/g			58	102	96	61
	Cu	1	ug/g			46	46	71	65
	Ni	1	ug/g			46	62	62	48
	Pb	1	ug/g			9	9	11	11
	Zn	2	ug/g			72	72	81	79
PCBs	Polychlorinated Biphenyls (PCBs)	0.02	ug/g			<0.02	<0.02	<0.02	<0.02

Guideline = *** = Guideline Exceedence**
** = Analysis completed at Mississauga, Ontario.
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

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200-4495 Boul. Wilfrid-Hamel
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Attention: Mr. Jean-Pierre Pelletier
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Report Number: 1418944
Date Submitted: 2014-09-04
Date Reported: 2014-09-12
Project: Dew Line Monitoring Fox-2
COC #: 789357

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1131211 Soil 2014-08-24 F2-MW-11-S-B-2014	1131212 Soil 2014-08-24 F2-MW-12-S-A-2014	1131213 Soil 2014-08-24 F2-MW-12-S-B-2014
General Chemistry	Moisture	0.1	%			12.9	7.5	7.5
Hydrocarbons	F1 (C6-C10)	10	ug/g			<10	<10	<10
	F2 (C10-C16)	10	ug/g			<10	<10	<10
	F3 (C16-C34)	20	ug/g			30	<20	<20
Mercury	Hg	0.1	ug/g			<0.1	<0.1	<0.1
Metals	As	1	ug/g			47	70	65
	Cd	0.5	ug/g			<0.5	<0.5	<0.5
	Co	1	ug/g			11	17	20
	Cr	1	ug/g			57	58	97
	Cu	1	ug/g			73	72	72
	Ni	1	ug/g			48	60	78
	Pb	1	ug/g			12	12	14
	Zn	2	ug/g			75	90	104
PCBs	Polychlorinated Biphenyls (PCBs)	0.02	ug/g			<0.02	<0.02	<0.02

Guideline = *** = Guideline Exceedence**
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200-4495 Boul. Wilfrid-Hamel
Québec, QC
G1P 2J7
Attention: Mr. Jean-Pierre Pelletier
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Report Number: 1418944
Date Submitted: 2014-09-04
Date Reported: 2014-09-12
Project: Dew Line Monitoring Fox-2
COC #: 789357

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 208523 **Analysis Date** 2014-09-09 **Method** SW846 8081A/8082A			
Polychlorinated Biphenyls (PCBs)	<0.02 ug/g	85	50-120
Run No 275861 **Analysis Date** 2014-09-09 **Method** EPA 200.8			
As	<1 ug/g	100	70-130
Cd	<0.5 ug/g	93	70-130
Co	<1 ug/g	94	70-130
Cr	<1 ug/g	95	70-130
Cu	<1 ug/g	95	70-130
Ni	<1 ug/g	93	70-130
Pb	<1 ug/g	96	70-130
Zn	<2 ug/g	98	70-130
Run No 275877 **Analysis Date** 2014-09-09 **Method** M SM3112B-3500B			
Hg	<0.1 ug/g	89	70-130
Run No 275948 **Analysis Date** 2014-09-10 **Method** M SM3112B-3500B			
Hg	<0.1 ug/g	87	70-130

Guideline = *** = Guideline Exceedence**
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Methods references and/or additional QA/QC information available on request.

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Client: Sila Remediation Inc.
200-4495 Boul. Wilfrid-Hamel
Québec, QC
G1P 2J7
Attention: Mr. Jean-Pierre Pelletier
PO#:
Invoice to: Sila Remediation Inc.

Report Number: 1418944
Date Submitted: 2014-09-04
Date Reported: 2014-09-12
Project: Dew Line Monitoring Fox-2
COC #: 789357

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 275958 **Analysis Date** 2014-09-10 **Method** EPA 200.8			
As	<1 ug/g	100	70-130
Cd	<0.5 ug/g	91	70-130
Co	<1 ug/g	98	70-130
Cr	<1 ug/g	101	70-130
Cu	<1 ug/g	99	70-130
Ni	<1 ug/g	100	70-130
Pb	<1 ug/g	95	70-130
Zn	<2 ug/g	98	70-130
Run No 276008 **Analysis Date** 2014-09-11 **Method** CCME			
F1 (C6-C10)	<10 ug/g	95	80-120
Run No 276053 **Analysis Date** 2014-09-11 **Method** M SM3112B-3500B			
Hg	<0.1 ug/g	87	70-130
Run No 276089 **Analysis Date** 2014-09-12 **Method** CCME			
F2 (C10-C16)	<10 ug/g	89	50-120
F3 (C16-C34)	<20 ug/g	89	50-120
Run No 276091 **Analysis Date** 2014-09-12 **Method** C SM2540B			

Guideline = *** = Guideline Exceedence**
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Client: Sila Remediation Inc.
200-4495 Boul. Wilfrid-Hamel
Québec, QC
G1P 2J7
Attention: Mr. Jean-Pierre Pelletier
PO#:
Invoice to: Sila Remediation Inc.

Report Number: 1418944
Date Submitted: 2014-09-04
Date Reported: 2014-09-12
Project: Dew Line Monitoring Fox-2
COC #: 789357

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Moisture	<0.1 %	99	80-120
Run No 276092 **Analysis Date** 2014-09-11 **Method** CCME			
F1 (C6-C10)	<10 ug/g	96	80-120

Guideline = *** = Guideline Exceedence**
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Your Project #: MB4G1542
Your C.O.C. #: B4G1542

Attention: SUB CONTRACTOR
MAXXAM ANALYTICS
CAMPOBELLO
6740 CAMPOBELLO ROAD
MISSISSAUGA, ON
CANADA L5N 2L8

Report Date: 2014/09/11
Report #: R1640183
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B478781
Received: 2014/09/06, 11:00

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cadmium - low level CCME (Total)	2	2014/09/06	2014/09/11	AB SOP-00014 / AB SOP-00043	EPA 200.8 R5.4 m
Elements by ICP - Total	2	2014/09/09	2014/09/09	AB SOP-00014 / AB SOP-00042	EPA 200.7 CFR 2012 m
Elements by ICPMS - Total	2	2014/09/09	2014/09/10	AB SOP-00014 / AB SOP-00043	EPA 200.8 R5.4 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

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

Cynny Hagen, Project Manager Assistant
Email: CHagen@maxxam.ca
Phone# (403) 735-2273

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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

Maxxam Job #: B478781
Report Date: 2014/09/11

MAXXAM ANALYTICS
Client Project #: MB4G1542

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		KN5488	KN5489		
Sampling Date		2014/08/24	2014/08/25		
COC Number		B4G1542	B4G1542		
	UNITS	**F2-DUP-B-2014 (XK5042)**	**F2-DUP-E-2014 (XK5043)**	**RDL**	**QC Batch**
Low Level Elements					
Total Cadmium (Cd)	ug/L	1.2	0.31	0.020	7627879
Elements					
Total Aluminum (Al)	mg/L	2.8	6.0	0.0030	7630480
Total Antimony (Sb)	mg/L	<0.00060	<0.00060	0.00060	7630480
Total Arsenic (As)	mg/L	0.0052	0.028	0.00020	7630480
Total Barium (Ba)	mg/L	0.028	0.062	0.010	7630498
Total Beryllium (Be)	mg/L	<0.0010	<0.0010	0.0010	7630480
Total Boron (B)	mg/L	<0.020	0.024	0.020	7630498
Total Calcium (Ca)	mg/L	11	36	0.30	7630498
Total Chromium (Cr)	mg/L	0.061	0.032	0.0010	7630480
Total Cobalt (Co)	mg/L	0.016	0.045	0.00030	7630480
Total Copper (Cu)	mg/L	0.054	0.057	0.00020	7630480
Total Iron (Fe)	mg/L	4.6	13	0.060	7630498
Total Lead (Pb)	mg/L	0.014	0.013	0.00020	7630480
Total Lithium (Li)	mg/L	<0.020	0.065	0.020	7630498
Total Magnesium (Mg)	mg/L	6.2	15	0.20	7630498
Total Manganese (Mn)	mg/L	0.13	0.19	0.0040	7630498
Total Molybdenum (Mo)	mg/L	0.0032	0.0017	0.00020	7630480
Total Nickel (Ni)	mg/L	0.090	0.26	0.00050	7630480
Total Phosphorus (P)	mg/L	<0.10	0.18	0.10	7630498
Total Potassium (K)	mg/L	2.6	6.7	0.30	7630498
Total Selenium (Se)	mg/L	0.00044	0.00079	0.00020	7630480
Total Silicon (Si)	mg/L	7.1	14	0.10	7630498
Total Silver (Ag)	mg/L	<0.00010	<0.00010	0.00010	7630480
Total Sodium (Na)	mg/L	3.2	7.1	0.50	7630498
Total Strontium (Sr)	mg/L	0.026	0.048	0.020	7630498
Total Sulphur (S)	mg/L	13	40	0.20	7630498
Total Thallium (Tl)	mg/L	<0.00020	<0.00020	0.00020	7630480
Total Tin (Sn)	mg/L	<0.0010	<0.0010	0.0010	7630480
Total Titanium (Ti)	mg/L	0.16	0.52	0.0010	7630480
Total Uranium (U)	mg/L	0.0012	0.00097	0.00010	7630480
Total Vanadium (V)	mg/L	0.0065	0.019	0.0010	7630480

RDL = Reportable Detection Limit

MAXXAM ANALYTICS
Client Project #: MB4G1542

Maxxam Job #: B478781
Report Date: 2014/09/11

REGULATED METALS (CCME/AT1) - TOTAL

Maxxam ID		KN5488	KN5489		
Sampling Date		2014/08/24	2014/08/25		
COC Number		B4G1542	B4G1542		
	UNITS	**F2-DUP-B-2014 (XK5042)**	**F2-DUP-E-2014 (XK5043)**	**RDL**	**QC Batch**
Total Zinc (Zn)	mg/L	0.088	0.12	0.0030	7630480

RDL = Reportable Detection Limit

Maxxam Job #: B478781
Report Date: 2014/09/11

MAXXAM ANALYTICS
Client Project #: MB4G1542

Package 1	5.0°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Results relate only to the items tested.

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB4G1542
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: CB478781

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7630480	KA3	Matrix Spike	Total Aluminum (Al)	2014/09/10		NC	%	80 - 120
			Total Antimony (Sb)	2014/09/10		114	%	80 - 120
			Total Arsenic (As)	2014/09/10		118	%	80 - 120
			Total Beryllium (Be)	2014/09/10		95	%	80 - 120
			Total Chromium (Cr)	2014/09/10		116	%	80 - 120
			Total Cobalt (Co)	2014/09/10		116	%	80 - 120
			Total Copper (Cu)	2014/09/10		113	%	80 - 120
			Total Lead (Pb)	2014/09/10		116	%	80 - 120
			Total Molybdenum (Mo)	2014/09/10		105	%	80 - 120
			Total Nickel (Ni)	2014/09/10		113	%	80 - 120
			Total Selenium (Se)	2014/09/10		116	%	80 - 120
			Total Silver (Ag)	2014/09/10		112	%	80 - 120
			Total Thallium (Tl)	2014/09/10		118	%	80 - 120
			Total Tin (Sn)	2014/09/10		116	%	80 - 120
			Total Titanium (Ti)	2014/09/10		115	%	80 - 120
			Total Uranium (U)	2014/09/10		115	%	80 - 120
			Total Vanadium (V)	2014/09/10		102	%	80 - 120
			Total Zinc (Zn)	2014/09/10		103	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2014/09/09		103	%	80 - 120
			Total Antimony (Sb)	2014/09/09		107	%	80 - 120
			Total Arsenic (As)	2014/09/09		108	%	80 - 120
			Total Beryllium (Be)	2014/09/09		117	%	80 - 120
			Total Chromium (Cr)	2014/09/09		108	%	80 - 120
			Total Cobalt (Co)	2014/09/09		110	%	80 - 120
			Total Copper (Cu)	2014/09/09		109	%	80 - 120
			Total Lead (Pb)	2014/09/09		109	%	80 - 120
			Total Molybdenum (Mo)	2014/09/09		112	%	80 - 120
			Total Nickel (Ni)	2014/09/09		107	%	80 - 120
			Total Selenium (Se)	2014/09/09		112	%	80 - 120
			Total Silver (Ag)	2014/09/09		102	%	80 - 120
			Total Thallium (Tl)	2014/09/09		109	%	80 - 120
			Total Tin (Sn)	2014/09/09		109	%	80 - 120
			Total Titanium (Ti)	2014/09/09		108	%	80 - 120
			Total Uranium (U)	2014/09/09		108	%	80 - 120
			Total Vanadium (V)	2014/09/09		112	%	80 - 120
			Total Zinc (Zn)	2014/09/09		112	%	80 - 120
		Method Blank	Total Aluminum (Al)	2014/09/09	<0.0030		mg/L	
			Total Antimony (Sb)	2014/09/09	<0.00060		mg/L	
			Total Arsenic (As)	2014/09/09	<0.00020		mg/L	
			Total Beryllium (Be)	2014/09/09	<0.0010		mg/L	
			Total Chromium (Cr)	2014/09/09	<0.0010		mg/L	
			Total Cobalt (Co)	2014/09/09	<0.00030		mg/L	
			Total Copper (Cu)	2014/09/09	<0.00020		mg/L	
			Total Lead (Pb)	2014/09/09	<0.00020		mg/L	
			Total Molybdenum (Mo)	2014/09/09	<0.00020		mg/L	
			Total Nickel (Ni)	2014/09/09	<0.00050		mg/L	
			Total Selenium (Se)	2014/09/09	<0.00020		mg/L	
			Total Silver (Ag)	2014/09/09	<0.00010		mg/L	
			Total Thallium (Tl)	2014/09/09	<0.00020		mg/L	
			Total Tin (Sn)	2014/09/09	<0.0010		mg/L	
			Total Titanium (Ti)	2014/09/09	<0.0010		mg/L	
			Total Uranium (U)	2014/09/09	<0.00010		mg/L	
			Total Vanadium (V)	2014/09/09	<0.0010		mg/L	
			Total Zinc (Zn)	2014/09/09	<0.0030		mg/L	
		RPD	Total Aluminum (Al)	2014/09/10	17.5		%	20

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB4G1542
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: CB478781

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7630480	KA3	RPD	Total Antimony (Sb)	2014/09/10	NC		%	20
			Total Arsenic (As)	2014/09/10	NC		%	20
			Total Beryllium (Be)	2014/09/10	NC		%	20
			Total Chromium (Cr)	2014/09/10	NC		%	20
			Total Cobalt (Co)	2014/09/10	NC		%	20
			Total Copper (Cu)	2014/09/10	0.3		%	20
			Total Lead (Pb)	2014/09/10	NC		%	20
			Total Molybdenum (Mo)	2014/09/10	NC		%	20
			Total Nickel (Ni)	2014/09/10	NC		%	20
			Total Selenium (Se)	2014/09/10	NC		%	20
			Total Silver (Ag)	2014/09/10	NC		%	20
			Total Thallium (Tl)	2014/09/10	NC		%	20
			Total Tin (Sn)	2014/09/10	NC		%	20
			Total Titanium (Ti)	2014/09/10	7.2		%	20
			Total Uranium (U)	2014/09/10	3.7		%	20
			Total Vanadium (V)	2014/09/10	NC		%	20
			Total Zinc (Zn)	2014/09/10	NC		%	20
7630498	MAP	Matrix Spike	Total Barium (Ba)	2014/09/09		98	%	80 - 120
			Total Boron (B)	2014/09/09		100	%	80 - 120
			Total Calcium (Ca)	2014/09/09		NC	%	80 - 120
			Total Iron (Fe)	2014/09/09		NC	%	80 - 120
			Total Lithium (Li)	2014/09/09		100	%	80 - 120
			Total Magnesium (Mg)	2014/09/09		NC	%	80 - 120
			Total Manganese (Mn)	2014/09/09		101	%	80 - 120
			Total Phosphorus (P)	2014/09/09		100	%	80 - 120
			Total Potassium (K)	2014/09/09		98	%	80 - 120
			Total Silicon (Si)	2014/09/09		NC	%	80 - 120
			Total Sodium (Na)	2014/09/09		102	%	80 - 120
			Total Strontium (Sr)	2014/09/09		NC	%	80 - 120
		Spiked Blank	Total Barium (Ba)	2014/09/09		98	%	80 - 120
			Total Boron (B)	2014/09/09		100	%	80 - 120
			Total Calcium (Ca)	2014/09/09		104	%	80 - 120
			Total Iron (Fe)	2014/09/09		105	%	80 - 120
			Total Lithium (Li)	2014/09/09		100	%	80 - 120
			Total Magnesium (Mg)	2014/09/09		99	%	80 - 120
			Total Manganese (Mn)	2014/09/09		102	%	80 - 120
			Total Phosphorus (P)	2014/09/09		97	%	80 - 120
			Total Potassium (K)	2014/09/09		96	%	80 - 120
			Total Silicon (Si)	2014/09/09		101	%	80 - 120
			Total Sodium (Na)	2014/09/09		101	%	80 - 120
			Total Strontium (Sr)	2014/09/09		100	%	80 - 120
		Method Blank	Total Barium (Ba)	2014/09/09	<0.010		mg/L	
			Total Boron (B)	2014/09/09	<0.020		mg/L	
			Total Calcium (Ca)	2014/09/09	<0.30		mg/L	
			Total Iron (Fe)	2014/09/09	<0.060		mg/L	
			Total Lithium (Li)	2014/09/09	<0.020		mg/L	
			Total Magnesium (Mg)	2014/09/09	<0.20		mg/L	
			Total Manganese (Mn)	2014/09/09	<0.0040		mg/L	
			Total Phosphorus (P)	2014/09/09	<0.10		mg/L	
			Total Potassium (K)	2014/09/09	<0.30		mg/L	
			Total Silicon (Si)	2014/09/09	<0.10		mg/L	
			Total Sodium (Na)	2014/09/09	<0.50		mg/L	
			Total Strontium (Sr)	2014/09/09	<0.020		mg/L	
			Total Sulphur (S)	2014/09/09	<0.20		mg/L	
		RPD	Total Barium (Ba)	2014/09/09	1.9		%	20

MAXXAM ANALYTICS
Attention: SUB CONTRACTOR
Client Project #: MB4G1542
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: CB478781

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	UNITS	QC Limits
7630498	MAP	RPD	Total Boron (B)	2014/09/09	NC		%	20
			Total Calcium (Ca)	2014/09/09	1.6		%	20
			Total Iron (Fe)	2014/09/09	5.6		%	20
			Total Lithium (Li)	2014/09/09	NC		%	20
			Total Magnesium (Mg)	2014/09/09	2.0		%	20
			Total Manganese (Mn)	2014/09/09	2.1		%	20
			Total Phosphorus (P)	2014/09/09	NC		%	20
			Total Potassium (K)	2014/09/09	1.5		%	20
			Total Silicon (Si)	2014/09/09	7.6		%	20
			Total Sodium (Na)	2014/09/09	1.7		%	20
			Total Strontium (Sr)	2014/09/09	2.2		%	20
			Total Sulphur (S)	2014/09/09	1.5		%	20

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 sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
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 too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Validation Signature Page

Maxxam Job #: B478781

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

Peng Liang, Analyst II

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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.

Site#: FOX-2
Site Location: LONG STAFF BLUFF
Your C.O.C. #: 23243

Attention:Jean-Pierre Pelletier

Biogenie Inc
Quebec
1170, rue Levis
Terrebonne, QC
CANADA J6W 5S6

Report Date: 2014/09/12
Report #: R3155070
Version: 1

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4G1542
Received: 2014/09/03, 13:10

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Petroleum Hydro. CCME F1 & BTEX in Soil	5	2014/09/05	2014/09/08	OTT SOP-00002	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil	5	2014/09/05	2014/09/06	OTT SOP-00001	CCME CWS
Strong Acid Leachable Metals by ICPMS (1)	5	2014/09/09	2014/09/11	CAM SOP-00447	EPA 6020 m
MOISTURE	5	N/A	2014/09/08	CAM SOP-00445	McKeague 2nd ed 1978
Polychlorinated Biphenyl in Soil (1)	5	2014/09/09	2014/09/09	CAM SOP-00309	EPA 8082 m

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Petroleum Hydro. CCME F1 & BTEX in Water (1)	2	N/A	2014/09/07	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1)	2	2014/09/06	2014/09/07	CAM SOP-00316	CCME PHC-CWS m
Mercury (low level) (1)	2	2014/09/08	2014/09/09	CAM SOP-00453	EPA 7470 m
Polychlorinated Biphenyl (PCB) (1)	1	2014/09/08	2014/09/10	CAM SOP-00309	EPA 8082 m
Polychlorinated Biphenyl (PCB) (1)	1	2014/09/08	2014/09/11	CAM SOP-00309	EPA 8082 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Analytics Mississauga

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Parnian Baber, Project Manager
Email: pbaber@maxxam.ca
Phone# (613) 274-0573

==========

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Maxxam Job #: B4G1542
Report Date: 2014/09/12

Biogenie Inc
Site Location: LONG STAFF BLUFF
Sampler Initials: MF

RESULTS OF ANALYSES OF SOIL

Maxxam ID		XK5037	XK5038	XK5039	XK5040	XK5041		
Sampling Date		2014/08/24	2014/08/25	2014/08/25	2014/08/25	2014/08/25		
COC Number		23243	23243	23243	23243	23243		
	Units	**F2-DUP-2-2014**	**F2-DUP-5-2014**	**F2-DUP-8-2014**	**F2-DUP-11-2014**	**F2-DUP-14-2014**	**RDL**	**QC Batch**
Inorganics								
Moisture	%	13	8.3	8.8	6.2	6.1	0.2	3737495

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4G1542
Report Date: 2014/09/12

Biogenie Inc
Site Location: LONG STAFF BLUFF
Sampler Initials: MF

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		XK5037	XK5038	XK5039	XK5040	XK5041		
Sampling Date		2014/08/24	2014/08/25	2014/08/25	2014/08/25	2014/08/25		
COC Number		23243	23243	23243	23243	23243		
	Units	**F2-DUP-2-2014**	**F2-DUP-5-2014**	**F2-DUP-8-2014**	**F2-DUP-11-2014**	**F2-DUP-14-2014**	**RDL**	**QC Batch**
Metals								
Acid Extractable Antimony (Sb)	ug/g	0.36	ND	0.26	ND	0.51	0.20	3741441
Acid Extractable Arsenic (As)	ug/g	45	22	43	33	32	1.0	3741441
Acid Extractable Barium (Ba)	ug/g	89	120	85	96	75	0.50	3741441
Acid Extractable Beryllium (Be)	ug/g	0.47	0.63	1.5	0.49	0.80	0.20	3741441
Acid Extractable Boron (B)	ug/g	ND	ND	ND	ND	ND	5.0	3741441
Acid Extractable Cadmium (Cd)	ug/g	0.15	ND	0.36	0.14	0.31	0.10	3741441
Acid Extractable Chromium (Cr)	ug/g	44	83	83	82	71	1.0	3741441
Acid Extractable Cobalt (Co)	ug/g	15	17	52	18	20	0.10	3741441
Acid Extractable Copper (Cu)	ug/g	57	28	110	67	100	0.50	3741441
Acid Extractable Lead (Pb)	ug/g	10	6.9	16	11	10	1.0	3741441
Acid Extractable Molybdenum (Mo)	ug/g	2.5	0.96	1.5	0.83	1.7	0.50	3741441
Acid Extractable Nickel (Ni)	ug/g	44	42	160	69	100	0.50	3741441
Acid Extractable Selenium (Se)	ug/g	0.72	ND	0.52	ND	0.54	0.50	3741441
Acid Extractable Silver (Ag)	ug/g	ND	ND	ND	ND	ND	0.20	3741441
Acid Extractable Thallium (Tl)	ug/g	0.45	0.30	0.52	0.18	0.50	0.050	3741441
Acid Extractable Uranium (U)	ug/g	2.8	3.0	4.9	3.1	3.1	0.050	3741441
Acid Extractable Vanadium (V)	ug/g	39	66	66	64	59	5.0	3741441
Acid Extractable Zinc (Zn)	ug/g	81	110	240	120	140	5.0	3741441
Acid Extractable Mercury (Hg)	ug/g	ND	ND	ND	ND	ND	0.050	3741441

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B4G1542
Report Date: 2014/09/12

Biogenie Inc
Site Location: LONG STAFF BLUFF
Sampler Initials: MF

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		XK5037	XK5038	XK5039	XK5040	XK5041		
Sampling Date		2014/08/24	2014/08/25	2014/08/25	2014/08/25	2014/08/25		
COC Number		23243	23243	23243	23243	23243		
	Units	**F2-DUP-2-2014**	**F2-DUP-5-2014**	**F2-DUP-8-2014**	**F2-DUP-11-2014**	**F2-DUP-14-2014**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons								
Benzene	ug/g	ND	ND	ND	ND	ND	0.005	3737266
Toluene	ug/g	ND	ND	ND	ND	ND	0.02	3737266
Ethylbenzene	ug/g	ND	ND	ND	ND	ND	0.01	3737266
o-Xylene	ug/g	ND	ND	ND	ND	ND	0.02	3737266
p+m-Xylene	ug/g	ND	ND	ND	ND	ND	0.04	3737266
Total Xylenes	ug/g	ND	ND	ND	ND	ND	0.04	3737266
F1 (C6-C10)	ug/g	ND	ND	ND	ND	ND	10	3737266
F1 (C6-C10) - BTEX	ug/g	ND	ND	ND	ND	ND	10	3737266
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	ND	ND	ND	ND	ND	10	3737494
F3 (C16-C34 Hydrocarbons)	ug/g	11	ND	ND	ND	ND	10	3737494
F4 (C34-C50 Hydrocarbons)	ug/g	ND	ND	ND	ND	ND	10	3737494
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes		3737494
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	125	130	129	122	119		3737266
4-Bromofluorobenzene	%	84	73	71	72	69		3737266
D10-Ethylbenzene	%	90	89	93	92	96		3737266
D4-1,2-Dichloroethane	%	117	119	122	118	122		3737266
o-Terphenyl	%	81	81	79	80	80		3737494

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B4G1542
Report Date: 2014/09/12

Biogenie Inc
Site Location: LONG STAFF BLUFF
Sampler Initials: MF

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		XK5037	XK5038	XK5039	XK5040	XK5041		
Sampling Date		2014/08/24	2014/08/25	2014/08/25	2014/08/25	2014/08/25		
COC Number		23243	23243	23243	23243	23243		
	Units	**F2-DUP-2-2014**	**F2-DUP-5-2014**	**F2-DUP-8-2014**	**F2-DUP-11-2014**	**F2-DUP-14-2014**	**RDL**	**QC Batch**
PCBs								
Aroclor 1242	ug/g	ND	ND	ND	ND	ND	0.010	3740733
Aroclor 1248	ug/g	ND	ND	ND	ND	ND	0.010	3740733
Aroclor 1254	ug/g	ND	ND	ND	ND	ND	0.010	3740733
Aroclor 1260	ug/g	ND	ND	ND	ND	ND	0.010	3740733
Total PCB	ug/g	ND	ND	ND	ND	ND	0.010	3740733
Surrogate Recovery (%)								
Decachlorobiphenyl	%	93	89	92	96	104		3740733

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B4G1542
Report Date: 2014/09/12

Biogenie Inc
Site Location: LONG STAFF BLUFF
Sampler Initials: MF

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		XK5042	XK5043		
Sampling Date		2014/08/24	2014/08/25		
COC Number		23243	23243		
	Units	**F2-DUP-B-2014**	**F2-DUP-E-2014**	**RDL**	**QC Batch**
Metals					
Mercury (Hg)	ug/L	ND	ND	0.01	3739875

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B4G1542
Report Date: 2014/09/12

Biogenie Inc
Site Location: LONG STAFF BLUFF
Sampler Initials: MF

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		XK5042	XK5043		
Sampling Date		2014/08/24	2014/08/25		
COC Number		23243	23243		
	Units	**F2-DUP-B-2014**	**F2-DUP-E-2014**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons					
Benzene	ug/L	ND	ND	0.20	3738749
Toluene	ug/L	ND	ND	0.20	3738749
Ethylbenzene	ug/L	ND	ND	0.20	3738749
o-Xylene	ug/L	ND	ND	0.20	3738749
p+m-Xylene	ug/L	ND	ND	0.40	3738749
Total Xylenes	ug/L	ND	ND	0.40	3738749
F1 (C6-C10)	ug/L	ND	ND	25	3738749
F1 (C6-C10) - BTEX	ug/L	ND	ND	25	3738749
F2-F4 Hydrocarbons					
F2 (C10-C16 Hydrocarbons)	ug/L	ND	ND	100	3738651
F3 (C16-C34 Hydrocarbons)	ug/L	ND	ND	200	3738651
F4 (C34-C50 Hydrocarbons)	ug/L	ND	ND	200	3738651
Reached Baseline at C50	ug/L	Yes	Yes		3738651
Surrogate Recovery (%)					
1,4-Difluorobenzene	%	103	103		3738749
4-Bromofluorobenzene	%	96	95		3738749
D10-Ethylbenzene	%	121	111		3738749
D4-1,2-Dichloroethane	%	91	89		3738749
o-Terphenyl	%	98	98		3738651

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B4G1542
Report Date: 2014/09/12

Biogenie Inc
Site Location: LONG STAFF BLUFF
Sampler Initials: MF

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

Maxxam ID		XK5042	XK5043		
Sampling Date		2014/08/24	2014/08/25		
COC Number		23243	23243		
	Units	**F2-DUP-B-2014**	**F2-DUP-E-2014**	**RDL**	**QC Batch**
PCBs					
Aroclor 1016	ug/L	ND	ND	0.01	3739832
Aroclor 1221	ug/L	ND	ND	0.01	3739832
Aroclor 1232	ug/L	ND	ND	0.01	3739832
Aroclor 1262	ug/L	ND	ND	0.01	3739832
Aroclor 1268	ug/L	ND	ND	0.01	3739832
Aroclor 1242	ug/L	ND	ND	0.01	3739832
Aroclor 1248	ug/L	ND	ND	0.01	3739832
Aroclor 1254	ug/L	ND	ND	0.01	3739832
Aroclor 1260	ug/L	ND	ND	0.01	3739832
Total PCB	ug/L	ND	ND	0.01	3739832
Surrogate Recovery (%)					
Decachlorobiphenyl	%	94	100		3739832

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B4G1542
Report Date: 2014/09/12

Biogenie Inc
Site Location: LONG STAFF BLUFF
Sampler Initials: MF

GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B4G1542
Report Date: 2014/09/12

Biogenie Inc
Site Location: LONG STAFF BLUFF
Sampler Initials: MF

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3737266	LGA	Matrix Spike	1,4-Difluorobenzene	2014/09/08		126	%	60 - 140
			4-Bromofluorobenzene	2014/09/08		86	%	60 - 140
			D10-Ethylbenzene	2014/09/08		95	%	30 - 130
			D4-1,2-Dichloroethane	2014/09/08		129	%	60 - 140
			Benzene	2014/09/08		78	%	60 - 140
			Toluene	2014/09/08		75	%	60 - 140
			Ethylbenzene	2014/09/08		78	%	60 - 140
			o-Xylene	2014/09/08		81	%	60 - 140
			p+m-Xylene	2014/09/08		70	%	60 - 140
			F1 (C6-C10)	2014/09/08		91	%	60 - 140
3737266	LGA	Spiked Blank	1,4-Difluorobenzene	2014/09/06		130	%	60 - 140
			4-Bromofluorobenzene	2014/09/06		77	%	60 - 140
			D10-Ethylbenzene	2014/09/06		99	%	30 - 130
			D4-1,2-Dichloroethane	2014/09/06		123	%	60 - 140
			Benzene	2014/09/06		88	%	60 - 140
			Toluene	2014/09/06		79	%	60 - 140
			Ethylbenzene	2014/09/06		75	%	60 - 140
			o-Xylene	2014/09/06		78	%	60 - 140
			p+m-Xylene	2014/09/06		71	%	60 - 140
			F1 (C6-C10)	2014/09/06		93	%	80 - 120
3737266	LGA	Method Blank	1,4-Difluorobenzene	2014/09/06		126	%	60 - 140
			4-Bromofluorobenzene	2014/09/06		70	%	60 - 140
			D10-Ethylbenzene	2014/09/06		104	%	30 - 130
			D4-1,2-Dichloroethane	2014/09/06		127	%	60 - 140
			Benzene	2014/09/06	ND , RDL=0.005		ug/g	
			Toluene	2014/09/06	ND , RDL=0.02		ug/g	
			Ethylbenzene	2014/09/06	ND , RDL=0.01		ug/g	
			o-Xylene	2014/09/06	ND , RDL=0.02		ug/g	
			p+m-Xylene	2014/09/06	ND , RDL=0.04		ug/g	
			Total Xylenes	2014/09/06	ND , RDL=0.04		ug/g	
			F1 (C6-C10)	2014/09/06	ND , RDL=10		ug/g	
			F1 (C6-C10) - BTEX	2014/09/06	ND , RDL=10		ug/g	
3737266	LGA	RPD	Benzene	2014/09/08	NC		%	50
			Toluene	2014/09/08	NC		%	50
			Ethylbenzene	2014/09/08	NC		%	50
			o-Xylene	2014/09/08	NC		%	50
			p+m-Xylene	2014/09/08	NC		%	50
			Total Xylenes	2014/09/08	NC		%	50
			F1 (C6-C10)	2014/09/08	NC		%	50
			F1 (C6-C10) - BTEX	2014/09/08	NC		%	50
3737494	AH1	Matrix Spike	o-Terphenyl	2014/09/06		71	%	30 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/06		103	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2014/09/06		103	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2014/09/06		103	%	50 - 130

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Maxxam Job #: B4G1542
Report Date: 2014/09/12

Biogenie Inc
Site Location: LONG STAFF BLUFF
Sampler Initials: MF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3737494	AH1	Spiked Blank	o-Terphenyl	2014/09/06		76	%	30 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/06		86	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2014/09/06		86	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2014/09/06		86	%	80 - 120
3737494	AH1	Method Blank	o-Terphenyl	2014/09/06		81	%	30 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/06	ND , RDL=10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2014/09/06	ND , RDL=10		ug/g	
			F4 (C34-C50 Hydrocarbons)	2014/09/06	ND , RDL=10		ug/g	
3737494	AH1	RPD	F2 (C10-C16 Hydrocarbons)	2014/09/06	44		%	50
			F3 (C16-C34 Hydrocarbons)	2014/09/06	45		%	50
			F4 (C34-C50 Hydrocarbons)	2014/09/06	NC		%	50
3737495	LHR	RPD	Moisture	2014/09/08	13		%	50
3738651	DPO	Matrix Spike	o-Terphenyl	2014/09/06		101	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/06		NC	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2014/09/06		113	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2014/09/06		120	%	50 - 130
3738651	DPO	Spiked Blank	o-Terphenyl	2014/09/06		102	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/06		103	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2014/09/06		107	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2014/09/06		111	%	60 - 130
3738651	DPO	Method Blank	o-Terphenyl	2014/09/06		99	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/09/06	ND , RDL=100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2014/09/06	ND , RDL=200		ug/L	
			F4 (C34-C50 Hydrocarbons)	2014/09/06	ND , RDL=200		ug/L	
3738651	DPO	RPD	F2 (C10-C16 Hydrocarbons)	2014/09/07	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2014/09/07	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2014/09/07	NC		%	30
3738749	SHK	Matrix Spike [XK5043-01]	1,4-Difluorobenzene	2014/09/07		101	%	70 - 130
			4-Bromofluorobenzene	2014/09/07		102	%	70 - 130
			D10-Ethylbenzene	2014/09/07		123	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/07		89	%	70 - 130
			Benzene	2014/09/07		115	%	70 - 130
			Toluene	2014/09/07		117	%	70 - 130
			Ethylbenzene	2014/09/07		130	%	70 - 130
			o-Xylene	2014/09/07		125	%	70 - 130
			p+m-Xylene	2014/09/07		120	%	70 - 130
			F1 (C6-C10)	2014/09/07		88	%	70 - 130
3738749	SHK	Spiked Blank	1,4-Difluorobenzene	2014/09/09		100	%	70 - 130
			4-Bromofluorobenzene	2014/09/09		102	%	70 - 130
			D10-Ethylbenzene	2014/09/09		105	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/09		90	%	70 - 130
			Benzene	2014/09/09		100	%	70 - 130
			Toluene	2014/09/09		102	%	70 - 130
			Ethylbenzene	2014/09/09		111	%	70 - 130
			o-Xylene	2014/09/09		109	%	70 - 130
			p+m-Xylene	2014/09/09		102	%	70 - 130
			F1 (C6-C10)	2014/09/09		106	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3738749	SHK	Method Blank	1,4-Difluorobenzene	2014/09/07		101	%	70 - 130
			4-Bromofluorobenzene	2014/09/07		99	%	70 - 130
			D10-Ethylbenzene	2014/09/07		97	%	70 - 130
			D4-1,2-Dichloroethane	2014/09/07		91	%	70 - 130
			Benzene	2014/09/07	ND , RDL=0.20		ug/L	
			Toluene	2014/09/07	ND , RDL=0.20		ug/L	
			Ethylbenzene	2014/09/07	ND , RDL=0.20		ug/L	
			o-Xylene	2014/09/07	ND , RDL=0.20		ug/L	
			p+m-Xylene	2014/09/07	ND , RDL=0.40		ug/L	
			Total Xylenes	2014/09/07	ND , RDL=0.40		ug/L	
			F1 (C6-C10)	2014/09/07	ND , RDL=25		ug/L	
			F1 (C6-C10) - BTEX	2014/09/07	ND , RDL=25		ug/L	
3738749	SHK	RPD [XK5043-01]	Benzene	2014/09/07	NC		%	30
			Toluene	2014/09/07	NC		%	30
			Ethylbenzene	2014/09/07	NC		%	30
			o-Xylene	2014/09/07	NC		%	30
			p+m-Xylene	2014/09/07	NC		%	30
			Total Xylenes	2014/09/07	NC		%	30
			F1 (C6-C10)	2014/09/07	NC		%	30
			F1 (C6-C10) - BTEX	2014/09/07	NC		%	30
3739832	SHG	Matrix Spike	Decachlorobiphenyl	2014/09/10		105	%	60 - 130
			Aroclor 1260	2014/09/10		95	%	60 - 130
			Total PCB	2014/09/10		95	%	60 - 130
3739832	SHG	Spiked Blank	Decachlorobiphenyl	2014/09/10		107	%	60 - 130
			Aroclor 1260	2014/09/10		98	%	60 - 130
			Total PCB	2014/09/10		98	%	60 - 130
3739832	SHG	Method Blank	Aroclor 1016	2014/09/10	ND , RDL=0.01		ug/L	
			Aroclor 1221	2014/09/10	ND , RDL=0.01		ug/L	
			Aroclor 1232	2014/09/10	ND , RDL=0.01		ug/L	
			Aroclor 1262	2014/09/10	ND , RDL=0.01		ug/L	
			Aroclor 1268	2014/09/10	ND , RDL=0.01		ug/L	
			Decachlorobiphenyl	2014/09/10		109	%	60 - 130
			Aroclor 1242	2014/09/10	ND , RDL=0.01		ug/L	
			Aroclor 1248	2014/09/10	ND , RDL=0.01		ug/L	
			Aroclor 1254	2014/09/10	ND , RDL=0.01		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Aroclor 1260	2014/09/10	ND , RDL=0.01		ug/L	
			Total PCB	2014/09/10	ND , RDL=0.01		ug/L	
3739832	SHG	RPD	Aroclor 1016	2014/09/10	NC		%	40
			Aroclor 1221	2014/09/10	NC		%	40
			Aroclor 1232	2014/09/10	NC		%	40
			Aroclor 1262	2014/09/10	NC		%	40
			Aroclor 1268	2014/09/10	NC		%	40
			Aroclor 1242	2014/09/10	NC		%	40
			Aroclor 1248	2014/09/10	NC		%	40
			Aroclor 1254	2014/09/10	NC		%	40
			Aroclor 1260	2014/09/10	NC		%	40
			Total PCB	2014/09/10	NC		%	40
3739875	RON	Matrix Spike	Mercury (Hg)	2014/09/09		95	%	75 - 125
3739875	RON	Spiked Blank	Mercury (Hg)	2014/09/09		91	%	80 - 120
3739875	RON	Method Blank	Mercury (Hg)	2014/09/09	ND , RDL=0.01		ug/L	
3739875	RON	RPD	Mercury (Hg)	2014/09/09	NC		%	20
3740733	LPG	Matrix Spike	Decachlorobiphenyl	2014/09/09		95	%	60 - 130
			Aroclor 1260	2014/09/09		114	%	60 - 130
			Total PCB	2014/09/09		114	%	60 - 130
3740733	LPG	Spiked Blank	Decachlorobiphenyl	2014/09/09		94	%	60 - 130
			Aroclor 1260	2014/09/09		115	%	60 - 130
			Total PCB	2014/09/09		115	%	60 - 130
3740733	LPG	Method Blank	Decachlorobiphenyl	2014/09/09		88	%	60 - 130
			Aroclor 1242	2014/09/09	ND , RDL=0.010		ug/g	
			Aroclor 1248	2014/09/09	ND , RDL=0.010		ug/g	
			Aroclor 1254	2014/09/09	ND , RDL=0.010		ug/g	
			Aroclor 1260	2014/09/09	ND , RDL=0.010		ug/g	
			Total PCB	2014/09/09	ND , RDL=0.010		ug/g	
3740733	LPG	RPD	Aroclor 1242	2014/09/09	NC		%	50
			Aroclor 1248	2014/09/09	NC		%	50
			Aroclor 1254	2014/09/09	NC		%	50
			Aroclor 1260	2014/09/09	NC		%	50
			Total PCB	2014/09/09	NC		%	50
3741441	GBU	Matrix Spike	Acid Extractable Antimony (Sb)	2014/09/11		103	%	75 - 125
			Acid Extractable Arsenic (As)	2014/09/11		100	%	75 - 125
			Acid Extractable Barium (Ba)	2014/09/11		99	%	75 - 125
			Acid Extractable Beryllium (Be)	2014/09/11		104	%	75 - 125
			Acid Extractable Boron (B)	2014/09/11		103	%	75 - 125
			Acid Extractable Cadmium (Cd)	2014/09/11		98	%	75 - 125
			Acid Extractable Chromium (Cr)	2014/09/11		104	%	75 - 125
			Acid Extractable Cobalt (Co)	2014/09/11		101	%	75 - 125
			Acid Extractable Copper (Cu)	2014/09/11		100	%	75 - 125
			Acid Extractable Lead (Pb)	2014/09/11		99	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2014/09/11		102	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Acid Extractable Nickel (Ni)	2014/09/11		100	%	75 - 125
			Acid Extractable Selenium (Se)	2014/09/11		101	%	75 - 125
			Acid Extractable Silver (Ag)	2014/09/11		103	%	75 - 125
			Acid Extractable Thallium (Tl)	2014/09/11		94	%	75 - 125
			Acid Extractable Uranium (U)	2014/09/11		101	%	75 - 125
			Acid Extractable Vanadium (V)	2014/09/11		108	%	75 - 125
			Acid Extractable Zinc (Zn)	2014/09/11		102	%	75 - 125
			Acid Extractable Mercury (Hg)	2014/09/11		100	%	75 - 125
3741441	GBU	Spiked Blank	Acid Extractable Antimony (Sb)	2014/09/11		106	%	80 - 120
			Acid Extractable Arsenic (As)	2014/09/11		105	%	80 - 120
			Acid Extractable Barium (Ba)	2014/09/11		102	%	80 - 120
			Acid Extractable Beryllium (Be)	2014/09/11		106	%	80 - 120
			Acid Extractable Boron (B)	2014/09/11		107	%	80 - 120
			Acid Extractable Cadmium (Cd)	2014/09/11		102	%	80 - 120
			Acid Extractable Chromium (Cr)	2014/09/11		105	%	80 - 120
			Acid Extractable Cobalt (Co)	2014/09/11		108	%	80 - 120
			Acid Extractable Copper (Cu)	2014/09/11		106	%	80 - 120
			Acid Extractable Lead (Pb)	2014/09/11		103	%	80 - 120
			Acid Extractable Molybdenum (Mo)	2014/09/11		105	%	80 - 120
			Acid Extractable Nickel (Ni)	2014/09/11		104	%	80 - 120
			Acid Extractable Selenium (Se)	2014/09/11		103	%	80 - 120
			Acid Extractable Silver (Ag)	2014/09/11		105	%	80 - 120
			Acid Extractable Thallium (Tl)	2014/09/11		99	%	80 - 120
			Acid Extractable Uranium (U)	2014/09/11		105	%	80 - 120
			Acid Extractable Vanadium (V)	2014/09/11		105	%	80 - 120
			Acid Extractable Zinc (Zn)	2014/09/11		102	%	80 - 120
			Acid Extractable Mercury (Hg)	2014/09/11		103	%	80 - 120
3741441	GBU	Method Blank	Acid Extractable Antimony (Sb)	2014/09/11	ND , RDL=0.20		ug/g	
			Acid Extractable Arsenic (As)	2014/09/11	ND , RDL=1.0		ug/g	
			Acid Extractable Barium (Ba)	2014/09/11	ND , RDL=0.50		ug/g	
			Acid Extractable Beryllium (Be)	2014/09/11	ND , RDL=0.20		ug/g	
			Acid Extractable Boron (B)	2014/09/11	ND , RDL=5.0		ug/g	
			Acid Extractable Cadmium (Cd)	2014/09/11	ND , RDL=0.10		ug/g	
			Acid Extractable Chromium (Cr)	2014/09/11	ND , RDL=1.0		ug/g	
			Acid Extractable Cobalt (Co)	2014/09/11	ND , RDL=0.10		ug/g	
			Acid Extractable Copper (Cu)	2014/09/11	ND , RDL=0.50		ug/g	
			Acid Extractable Lead (Pb)	2014/09/11	ND , RDL=1.0		ug/g	
			Acid Extractable Molybdenum (Mo)	2014/09/11	ND , RDL=0.50		ug/g	
			Acid Extractable Nickel (Ni)	2014/09/11	ND , RDL=0.50		ug/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Acid Extractable Selenium (Se)	2014/09/11	ND , RDL=0.50		ug/g	
			Acid Extractable Silver (Ag)	2014/09/11	ND , RDL=0.20		ug/g	
			Acid Extractable Thallium (Tl)	2014/09/11	ND , RDL=0.050		ug/g	
			Acid Extractable Uranium (U)	2014/09/11	ND , RDL=0.050		ug/g	
			Acid Extractable Vanadium (V)	2014/09/11	ND , RDL=5.0		ug/g	
			Acid Extractable Zinc (Zn)	2014/09/11	ND , RDL=5.0		ug/g	
			Acid Extractable Mercury (Hg)	2014/09/11	ND , RDL=0.050		ug/g	
3741441	GBU	RPD	Acid Extractable Antimony (Sb)	2014/09/11	NC		%	30
			Acid Extractable Arsenic (As)	2014/09/11	NC		%	30
			Acid Extractable Barium (Ba)	2014/09/11	1.1		%	30
			Acid Extractable Beryllium (Be)	2014/09/11	NC		%	30
			Acid Extractable Boron (B)	2014/09/11	NC		%	30
			Acid Extractable Cadmium (Cd)	2014/09/11	NC		%	30
			Acid Extractable Chromium (Cr)	2014/09/11	NC		%	30
			Acid Extractable Cobalt (Co)	2014/09/11	19		%	30
			Acid Extractable Copper (Cu)	2014/09/11	NC		%	30
			Acid Extractable Lead (Pb)	2014/09/11	NC		%	30
			Acid Extractable Molybdenum (Mo)	2014/09/11	NC		%	30
			Acid Extractable Nickel (Ni)	2014/09/11	NC		%	30
			Acid Extractable Selenium (Se)	2014/09/11	NC		%	30
			Acid Extractable Silver (Ag)	2014/09/11	NC		%	30
			Acid Extractable Thallium (Tl)	2014/09/11	NC		%	30
			Acid Extractable Uranium (U)	2014/09/11	NC		%	30
			Acid Extractable Vanadium (V)	2014/09/11	NC		%	30
			Acid Extractable Zinc (Zn)	2014/09/11	NC		%	30
			Acid Extractable Mercury (Hg)	2014/09/11	NC		%	30

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 sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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 too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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VALIDATION SIGNATURE PAGE

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

Cristina Carriere, Scientific Services

Medhat Riskallah, Manager, Hydrocarbon Department

Paul Rubinato, Analyst, Maxxam Analytics

Suzana Popovic, Supervisor, Hydrocarbons

Steve Roberts, Lab Supervisor, Ottawa

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.

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ANNEX 2 QA/QC Discussion

QUALITY ASSURANCE / QUALITY CONTROL

Quality Assurance/Quality Control (QA/QC) program was implemented to monitor the quality of the analytical results. The main objective of this QA/QC program is to insure that sampling data and analysis results are complete, precise, exact, representative and comparable. The review consisted of evaluating sample collection/handling methodology, general laboratory comments, field (blind) duplicate samples, and inter-laboratory duplicate samples.

1. LABORATORIES

Samples collected during the monitoring program were submitted to laboratories accredited by the Canadian Association for Laboratory Accreditation (CALA):

- **Main Laboratory**
  Exova
  146 Colonnade Road #8
  Ottawa, Ontario
  K2E 7Y1
  CALA Registration number: 2602

- **Quality Assurance Laboratory**
  Maxxam Analytics International Corporation
  o/a Maxxam Analytics Campobello
  6740 Campobello Road
  L5N 2L8
  CALA Registration number: 2996

2. FIELD QA/QC

Standard sample collection techniques were implemented to decrease the likelihood of compromising collected samples, such as:

- Pre-cleaned sample containers were provided by the laboratory.
- Monitoring equipment was decontaminated between sampling stations and dedicated sampling systems were utilized.
- Soil samples were placed directly in the laboratory provided jars/bottles and were not mixed.
- Disposable nitrile glove were worn and disposed of after each sample collection.
- Jars/bottles were cleaned prior to placement into the cooler.
- Water samples were collected through the use of dedicated Waterra foot valves and tubing.

- Ice Packs or bagged ice (Ziplock bags) were used to ensure that sample temperature would be kept below 10℃ during transportation.
- Samples were kept at the laboratory at temperatures below 4℃.

Correspondences from Exova concerning the integrity of the samples are provided in Annex 1. These documents indicate that all samples received were acceptable for analysis.

The following is a summary of the analytical QA/QC procedure implemented in the field:

- 10% field Blind Duplicate Samples of soil and water were sent to Exova: five blind duplicate soil sample (F2-DUP-1, 4, 7, 10, 13-2014) and two blind duplicate groundwater sample (F2-DUP-A, D-2014) were submitted, as an independent check on data reproducibility, and to assess the field QA/QC protocols.
- 10% Inter-laboratory Duplicate Samples were sent to Maxxam: five blind duplicate soil sample (F2-DUP-2, 5, 8, 11, 14-2014) and two blind duplicate groundwater sample (F2-DUP-B, E-2014) were submitted (to determine if variation in procedures may cause significant difference in analytical results).
- 10% Archival Samples of soil were sent to ESG.

3. LABORATORIES QA/QC

Quality assurance documents from Exova only provide a summary of the QA/QC results. The quantity of samples per batch per analysis is not provided.
Quality assurance documents from Maxxam indicate that:

- The soil samples analyzed for metals, PCBs and PHCs were done in 1 single batch per parameter group:
    - Batch 3741441 for metals
    - Batch 3740733 for PCBs
    - Batch 3737266 for PHC fraction F1
    - Batch 3737494 for PHC fraction F2-F3
- The water samples analyzed was done in the following batches:
    - Batch 7630480 for most metals
        - Batch 7627879 for cadmium
        - Batch 3739875 for mercury
    - Batch 3739832 for PCBs
    - Batch 3738749 for PHC fraction F1
    - Batch 3738651 for PHC fraction F2-F3

4. DATA MANAGEMENT AND INTERPRETATION

4.1. FIELD WORK

The relative percent difference (RPD) is used to evaluate the sample result variability. Average RPD values of 30% for each parameter analyzed from the same laboratory are considered an indication of acceptable duplicate sample variability. For groundwater samples, an RPD of greater than 30% may reflect difference in sample turbidity or variance in the sample procedures. These performance criteria are applicable when the concentrations of the original and duplicate sample are five times or greater than the laboratory method detection limit, since the uncertainty increases dramatically as the concentration approaches the detection limit. Table I provides the detection limit for each parameter and the associated minimum concentration to be reached in order to be eligible for RPD calculation.

Table I: Minimum Concentration for QA/QC RPD Calculation

		Soil			Water		
Parameter	**Laboratory**	**Units**	**MDL**	**RPD Minimum***	**Units**	**MDL**	**RPD Minimum***
As	Exova	mg/kg	1.0	5.0	mg/L	0.02000	0.1000
	Maxxam	mg/kg	1.0	5.0	mg/L	0.00020	0.0010
Cd	Exova	mg/kg	0.50	2.5	mg/L	0.008000	0.04000
	Maxxam	mg/kg	0.10	0.5	mg/L	0.000020	0.00010
Cr	Exova	mg/kg	1.0	5.0	mg/L	0.050	0.250
	Maxxam	mg/kg	1.0	5.0	mg/L	0.001	0.005
Co	Exova	mg/kg	1.0	5.0	mg/L	0.0100	0.0500
	Maxxam	mg/kg	0.1	0.5	mg/L	0.0003	0.0015
Cu	Exova	mg/kg	1.0	5.0	mg/L	0.0100	0.0500
	Maxxam	mg/kg	0.5	2.5	mg/L	0.0002	0.0010
Pb	Exova	mg/kg	1.0	5.0	mg/L	0.0100	0.0500
	Maxxam	mg/kg	1.0	5.0	mg/L	0.0002	0.0010
Ni	Exova	mg/kg	1.0	5.0	mg/L	0.0100	0.0500
	Maxxam	mg/kg	0.5	2.5	mg/L	0.0005	0.0025
Zn	Exova	mg/kg	2	10.0	mg/L	0.040	0.200
	Maxxam	mg/kg	5	25.0	mg/L	0.003	0.015
Hg	Exova	mg/kg	0.10	0.5	mg/L	0.0001	0.0005
	Maxxam	mg/kg	0.05	0.3	mg/L	0.0100	0.0500
Total PCBs	Exova	mg/kg	0.02	0.1	ug/L	0.10	0.50
	Maxxam	mg/kg	0.01	0.1	ug/L	0.01	0.05
PHC F1	Exova	mg/kg	10	50.0	mg/L	NA	NA
	Maxxam	mg/kg	25	125.0	mg/L	0.025	0.125
PHC F2	Exova	mg/kg	10	50.0	mg/L	0.1	0.5
	Maxxam	mg/kg	100	500.0	mg/L	0.1	0.5
PHC F3	Exova	mg/kg	20	100.0	mg/L	0.1	0.5
	Maxxam	mg/kg	200	1000.0	mg/L	0.2	1.0

* : The RPD Minimum is the minimum concentration to be reached for QA/QC Relative Percent Difference Calculation
NA: Not Available

4.1.1. SOIL SAMPLES

Five blind duplicate soil samples were submitted for intra- and inter-laboratory comparisons. The original and duplicate intra- and inter-laboratory metal, PCB and PHC soil sample results are summarized in Tables II along with the calculated RPD for each parameter. As noted in the tables, several of the results from the original and/or duplicate samples were below or within five times the laboratory method detection limits, and therefore RPD values were not calculated for these parameters.

Review of results indicated relatively minor differences in metal concentrations within the intra-laboratory duplicate samples, with several individual parameter RPD values generally falling just above the acceptable range (between 30 and 40%). RPD for nickel and chromium in samples F2-MW-7-S-A-2014 and F2-DUP-7-2014 are above the acceptable limit of 30% (40 and 71%, respectively).

Results from the inter-laboratory duplicate samples indicated greater concentration differences for various parameters in three samples. In sample F2-DUP-11-2014, the concentration of nickel (69 mg/kg) and chromium (82 mg/kg) is very close to those reported for the intra-laboratory duplicate F2-DUP-10-2014 (71 and 80 mg/kg, respectively). The concentration of chromium in sample F2-DUP-2-2014 (44 mg/kg) is also very close to the concentration of chromium in the intra-laboratory duplicate F2-DUP-1-2014 (50 mg/kg). These similar concentrations in the duplicates could potentially be due to lack of sample uniformity. No other explanation can be provided at this time for the other deviations.

4.1.2. WATER SAMPLES

Two blind duplicate groundwater samples (F2-DUP-A-2014 / F2-DUP-D-2014) were submitted for intra-laboratory and two duplicates were also sent for inter-laboratory comparisons (F2-DUP-B-2014 / F2-DUP-E-2014). The original and duplicate intra- and inter-laboratory metal, PCB and PHC sample results are summarized in Table III, along with the calculated RPD for each parameter. As noted in the table, all calculated RPD values were within acceptable parameters.

4.2. LABORATORIES

QA/QC results from both laboratories do not raise any concern. QA/QC results from both laboratories are included with the certificates of analysis provided in Annexe 1.

4.2.1. BLANKS

All blanks from both laboratories, for both matrices and for all parameters were below the detection limits.

4.2.2. ANALYTICAL DUPLICATES

All analytical duplicates from both laboratories, for both matrices and for all parameters had RSD's at or below 20%.

4.2.3. CONTROL SAMPLES

All control samples from both laboratories, for both matrices and for all parameters had concentrations between the upper and lower concentration established for each parameter.

Table II: FOX-2 Soil Chemical Analysis Results - Quality Assurance Samples

Sample #	Laboratory	Parameters												
		Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	F1 C_6-C_{10} [mg/kg]	F2 C_{10}-C_{16} [mg/kg]	F3 C_{16}-C_{34} [mg/kg]
RDL - Exova		1.0	1.0	1.0	0.50	1.0	2	1	1	0.1	0.02	10	10	20
RPD Minimum - Exova		5.0	5.0	5.0	2.50	5.0	10	5	5	0.5	0.1	50	50	100
RDL - Maxxam		0.5	0.5	0.1	0.10	1.0	5	1	1	0.05	0.01	10	10	10
RPD Minimum - Maxxam		2.5	2.5	0.5	0.50	5.0	25	5	5	0.25	0.05	50	50	50
Intra-Lab Duplicate Samples														
F2-6-A-2014	Exova	91.0	96.0	19.0	<0.5	10.0	143	79	39	<0.1	<0.02	<10	<10	<20
F2-DUP-13-2014		72.0	76.0	17.0	<0.5	9.0	125	78	27	<0.1	<0.02	<10	<10	<20
Relative % Difference		23.3	23.3	11.1	N/A	10.5	13	1	36	N/A	N/A	N/A	N/A	N/A
F2-MW-14-S-B-2014	Exova	55.0	55.0	13.0	<0.5	8.0	79	73	41	<0.1	<0.02	<10	<10	30
F2-DUP-1-2014		54.0	45.0	14.0	<0.5	9.0	78	50	44	<0.1	<0.02	<10	<10	40
Relative % Difference		1.8	20.0	7.4	N/A	11.8	1	37	7	N/A	N/A	N/A	N/A	N/A
F2-MW-5-S-A-2014	Exova	25.0	46.0	15.0	<0.5	6.0	94	103	19	<0.1	<0.02	<10	<10	<20
F2-DUP-4-2014		22.0	46.0	14.0	<0.5	4.0	94	105	14	<0.1	<0.02	<10	<10	<20
Relative % Difference		12.8	0.0	6.9	N/A	N/A	0	2	30	N/A	N/A	N/A	N/A	N/A
F2-MW-7-S-A-2014	Exova	82.0	107.0	21.0	<0.5	11.0	109	168	27	<0.1	<0.02	<10	<10	<20
F2-DUP-10-2014		70.0	71.0	18.0	<0.5	12.0	110	80	34	<0.1	<0.02	<10	<10	<20
Relative % Difference		15.8	40.4	15.4	N/A	8.7	1	71	23	N/A	N/A	N/A	N/A	N/A
F2-MW-8-S-A-2014	Exova	77.0	123.0	44.0	<0.5	12.0	163	140	27	<0.1	<0.02	<10	<10	<20
F2-DUP-7-2014		70.0	110.0	36.0	<0.5	11.0	162	102	30	<0.1	<0.02	<10	<10	<20
Relative % Difference		9.5	11.2	20.0	N/A	8.7	1	31	11	N/A	N/A	N/A	N/A	N/A
Inter-Lab Duplicate Samples														
F2-MW-14-S-B-2014	Exova	55.0	55.0	13.0	<0.5	8.0	79	73	41	<0.1	<0.02	<10	<10	30
F2-DUP-2-2014	Maxxam	57.0	44.0	15.0	0.15	10.0	81	44	45	<0.05	<0.01	<10	<10	11
Relative % Difference		3.6	22.2	14.3	N/A	22.2	3	50	9	N/A	N/A	N/A	N/A	N/A
F2-MW-5-S-A-2014	Exova	25.0	46.0	15.0	<0.5	6.0	94	103	19	<0.1	<0.02	<10	<10	<20
F2-DUP-5-2014	Maxxam	28.0	42.0	17.0	<0.1	6.9	110	83	22	<0.05	<0.01	<10	<10	<10
Relative % Difference		11.3	9.1	12.5	N/A	14.0	15.7	21.5	15	N/A	N/A	N/A	N/A	N/A
F2-MW-8-S-A-2014	Exova	77.0	123.0	44.0	<0.5	12.0	163	140	27	<0.1	<0.02	<10	<10	<20
F2-DUP-8-2014	Maxxam	110.0	160.0	52.0	0.36	16.0	240	83	43	<0.05	<0.01	<10	<10	<10
Relative % Difference		35.3	26.1	16.7	N/A	28.6	38	51	46	N/A	N/A	N/A	N/A	N/A
F2-MW-7-S-A-2014	Exova	82.0	107.0	21.0	<0.5	11.0	109	168	27	<0.1	<0.02	<10	<10	<20
F2-DUP-11-2014	Maxxam	67.0	69.0	18.0	0.14	11.0	120	82	33	<0.05	<0.01	<10	<10	<10
Relative % Difference		20.1	43.2	15.4	N/A	0.0	10	69	20	N/A	N/A	N/A	N/A	N/A
F2-6-A-2014	Exova	91.0	96.0	19.0	<0.5	10.0	143	79	39	<0.1	<0.02	<10	<10	<20
F2-DUP-14-2014	Maxxam	100.0	100.0	20.0	0.31	10.0	140	71	32	<0.05	<0.01	<10	<10	<10
Relative % Difference		9.4	4.1	5.1	N/A	0.0	2	10.7	20	N/A	N/A	N/A	N/A	N/A

Number exceeding the 30% RPD reference
Value for RPD minimum calculation

Table III: FOX-2 Groundwater Chemical Analysis Results - Quality Control Samples

Sample #	Laboratory	Parameters												
		Cu [mg/L]	Ni [mg/L]	Co [mg/L]	Cd [mg/L]	Pb [mg/L]	Zn [mg/L]	Cr [mg/L]	As [mg/L]	Hg [mg/L]	PCBs [ug/L]	F1 C_6-C_{10} [mg/L]	F2 C_{10}-C_{16} [mg/L]	F3 C_{10}-C_{34} [mg/L]
RDL - Exova		0.0100	0.0100	0.0100	0.00800	0.0100	0.040	0.050	0.0200	0.0001	0.10	NA	100.0	200.0
RPD Minimum - Exova		0.0500	0.0500	0.0500	0.04000	0.0500	0.200	0.250	0.1000	0.0005	0.50	NA	500.0	1000.0
RDL - Maxxam		0.0002	0.0005	0.0030	0.02000	0.0002	0.003	0.001	0.0002	0.0100	0.01	0.025	0.1	0.2
RPD Minimum - Maxxam		0.0010	0.0025	0.0150	0.10000	0.0010	0.015	0.005	0.0010	0.0500	0.05	0.125	0.5	1.0
Intra-Lab Duplicate Samples														
F2-MW-15-2014	Exova	0.0180	0.0420	0.0105	0.00070	0.0040	0.030	0.002	<0.0001	<0.0001	<0,1	Insufficient water		
F2-DUP-A-2014		0.0400	0.0700	0.0100	<0.008	<0,01	0.060	<0,05	<0.02	<0.0001	<0,1	Insufficient water		
Relative % Difference		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
F2-MW-8-2014	Exova	0.0600	0.2800	0.0500	<0.008	0.0100	0.120	<0.05	0.0200	<0.0001	<0.1	NA	<0.1	<0.2
F2-DUP-D-2014		0.0600	0.2700	0.0500	<0.008	0.0100	0.110	<0,05	0.0300	<0.0001	<0,1	Insufficient water		
Relative % Difference		0.0	3.6	0.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inter-Lab Duplicate Samples														
F2-MW-15-2014	Exova	0.0180	0.0420	0.0105	0.00070	0.0040	0.030	0.002	<0.0001	<0.0001	<0,1	-	-	-
F2-DUP-B-2014	Maxxam	0.0540	0.0900	0.0160	0.00120	0.0140	0.088	0.061	0.0052	<0.01	<0.01	<0.025	<0.1	<0.2
Relative % Difference		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
F2-MW-8-2014	Exova	0.0600	0.2750	0.0500	<0.008	0.0100	0.115	<0.05	0.0350	<0.0001	<0.1	NA	<0.1	<0.2
F2-DUP-E-2014	Maxxam	0.0570	0.2600	0.0450	0.00031	0.0130	0.120	0.032	0.0280	<0.01	<0.01	<0.025	<0.1	<0.2
Relative % Difference		5.1	5.6	10.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Number exceeding the 30% RPD reference

ANNEX 3 Field Notes and COC Forms

Airstrip Camp L.F.
(Lobe A)

~~F2-4-2014~~ → f2-6-2014 (MF 2015-06-29): Gps pt 284
pics 483
(N320°)
atteint 0.¼m
(Bedrock) → 494 to 496

Sampled ~~F2-4-2014~~ → f2-6-2014 (MF 2015-06-29)
(A + B)

1 + Dups ~~15~~ 13 - 14 and 15

- general layout
  - Gps pt 285
    pics 484 to 487
  - Gps pt 286
    pics 488 to 492

- Gps pt 287
pic 493 (N80°)

F2-7-2014 (MF 2015-06-29)

~~F2-1-2014~~ : Gps pt 288
pics 497+500+501
(N180°)

Sampled ~~F2-1-2014~~ < A / B

~~F2-7-2014~~ (MF 2015-06-29)

- General layout
- Gps pt 289
pic 499 (N20°)

f2-8-2014 (MF 2015-06-29)

- ~~F2-2-2014~~ : Gps pt 290
pics 502+505+506

F2-8-2014 (MF 2015-06-29)

Sampled ~~F2-2-2014~~ < A / B
(Stopped @ 0.45m on 10cm)

F2-9-2014 (MF 2015-06-29)

- ~~F2-3-2014~~ GPS 291

pics 507 (N70°)
+ 509

Sampled ~~F2-3-2014~~ F2-9-2014 (MF 2015-06-29) A B

- feat 1: ponding water
GPS 292
pic 508 (N350°)
(8m x 4m)

- feat 2: ponding water
GPS 293
pics 510 + 502 + 506
(4m x 20 m +/-)

Hangsri nan Hazardous
Waste L.F.

MW-5 : Gps pt 271
Pic 451
(N 170°)

- Condition = good
- protector cap = 0.45m AGS
- Screen = 0.13m AGS
- Total depth = 1.37m BGS
- water table = dry (frozen)

Soil Gps pt 272
Pics 452 (N 320°)
+ 466

Sampled F2-MW-5-S-A
B
+ Dup-4
5
6 } horizon A

- general layout
  - Gps pt 273
    pics 453-454
  - Gps pt 274
    pics 455 to 458
  - Gps pt 275
    pics 459 to 465

MW-8 Gps pt 276

- general condition = good but protector is full of water AGS
- protector top = 0.52m AGS
- Screen top = 0.39m AGS
- well bottom = 2.10m BGS
- water table = 1.51m BGS

- initial parameters
T° = 1.30°C PH = 6.54
conductivity = 461 μS/cm
- Purge 1 volume of well
- Final parameters
T° = 0.86°C PH = 6.11
conductivity = 312 μS/cm
- Sampled F2-MW-8-2014
F2-Dup-D
F2-Dup-F
F2 Dup-F
/Soil Sampling GPS pt 277
pic 467 (N 210°)

Sampled FZ-MW-8-S < A / B

FZ-Dup-7
FZ-Dup-8
FZ-Dup-9

MW-7: (soil) Gps pt. 278
pt 5468 / N279

Sampled FZ-MW-7-S < A / B
+ Dups 10-11 and 12 (A)

Ground water: Gps pt. 279
pt 469

- protector top = 0.5m AGS
- Screen top < 0.79 m AGS
- total depth BGS = 2.14m
- water table depth BGS = dry. (-frozen?)

MW-6: GPS pt 280
pics 470-471
(N30°)

- general condition = good
- protector top = 0.5m AGS
- screen top = 0.25m AGS
- well bottom depth BGS = 2.15
- water table depth = 1.98m
- water @ wm = 0.17m
(dry)

// Soil Sampling
GPS pt 280
pics 472 (N60°)
+482
Sampled FZ-MW-6-S-2014
(A - B)

General layout pics:

- GPS pt 7 or pics 473 to 475
- GPS pt 283 pics 476 to 481
- No feature to note

2014-08-23

FSX-2/

Tilt Disposed

Data loggers

VT-1: CTS 232
pic 410

visual condition
→ good remarked
height stick = 1.08m
Serial # 111169

- no connection made with computer
- manual readings

channel	K Ω
1-16	changing all the time no good readings

Batteries replacement

- the connection worked after batteries replacement
- data download
- measured voltage

channel	voltage
1	0.9548 V
2	0.9365 V
3	0.9181 V
4	0.8960 V
5	0.8621 V
6	0.8451 V
7	0.8298
8	-4.6171 V
9	0.7997 V

ch	voltage
10	0.7855 V
11	0.7798 V
12	0.7698 V
13	0.7643 V
14	0.7508 V

data are logging
wright (memory 40%)
restarting memory
height of cable AGS = 1.30 m

VT-2 GPS 233
PIC 411

no datta logger on this
Protector
Serial # = 111168 ?

manual readings

Ch	Resistance (kΩ
1	10,902
2	13,052
3	14,363
4	15 345
5	16, 433
6	17, 053
7	17, 733
8	18, 316
9	18, 214
10	19, 359
11	20, 93

- height of cable AGS = 3.82 m
- condition of resistor-gard

VT-3 GPS 234

PIC 412

- Condition is good (unlocked)
- No connection to computer
- Serial # 111166
- manual readings

channel	resistance (kΩ)
1	12,128
2	13,928
3	15,649
4	16,348
5	16,870
6	17,532
7	18,159
8	19,325
9	19,731
10	20,74
11	21,43

- replace batteries
- height of cable AGS = 7.70 m
- download is now possible
  memory = 40%.

Readings

channel	volts
1	1.1232
2	1.0402
3	0.9932
4	0.9433
5	0.9248
6	0.9017
7	0.0810
8	-3.4801
9	0.8293
10	0.8054
11	0.7876

- Restart memory (reading well)

VT-4: GPS 235

pic

condition = good

Serial #: 111170

- Data download readings:

channel	volts
1	1.0311
2	0.9757
3	0.9433
4	0.9302
5	0.9090
6	0.8718
7	0.8473
8	-4.0259
9	0.8083
10	0.7888
13	0.7485
14	0.7404
15	0.7316
16	0.7268

- manual readings

channel	resistance (kΩ)
1	14,139
2	15,464
3	14.371
4	16,742
5	17.241
6	18,480
7	19,28
8	19.89
9	20,63
10	7,540
13	22.78
14	23,15
15	23,22
16	23,46

Cable length AG
= 2.65 m

- Replacing batteries
- restarting memory (was at 40%)

old = 11,34V main
13,14 AUX

Trail II landfill

Gps pt 287 (general view)

pics 910 and 911 (iphone)

(N300°) (N10°)

MW-10 : Gps pt 252
PIC 913 (N 290°)

- Protector height AGS = 0.67m
- Screen top height AGS = 0.32m
- total well depth BGS = 2.47m
- water table depth BGS = 1.89m
- condition = good but water into the protector
- water column = 0.60m
- initial parameters
  T° = 3.26°C pH = 7.68
  conductivity = 945 µS/cm
- purge ≥ 1 volume of well
- final parameters
  T° = 3.62°C pH = 6.02
  conduct = 877 µS/cm
- sampled as MW-10-2014

Soil sampling : PIC 914 (N 220°)
Gps pt 253
could not go deeper that 0.2m bedrock
Sampled FZ-MW-10-S-A-2014

MW-11 : Gps pt 254
PIC 915 (N 310°)

- Protector top height AGS = 0.60m
- Screen top height AGS = 0.48m
- total well depth BGS = 2.60m - 0.48m
- water table depth BGS = 2.42m - 0.49m
  dry
- Protector is straight but screen is kinked and there is water into protector

Soil sampling :
Gps pt = 255 (N 110°) PICS 916 + 917
total depth = 0.3 m => bedrock
Sampled FZ-MW-11-S-2014 A B

MW-12 : Gps pt 255
PIC 918 (N 160°)

- Protector height AGS = 0.60m
- Screen top height AGS = 0.42m
- water table depth = 1.57m - 0.42m
- Total well depth (BGS) = 2.45m - 0.47m
- water column = 1.38m

- initial parameters: t° = 2.75 / pH = 6.92
  conduct. = 457 µS/cm
- purge ≈ 1 volume of well
- final parameters
  t° = 2.25°C pH = 6.81
  conduct = 445 µS/cm
- Sampling MW-12-2014
- well is in good general condition

Soil Sampling : Gps pt 256
PTC 911 (N 290°)
test pit reached 0,25m (bedrock) + 920
- Sampled FZ-MW-12-S-2014 (A, B)

general layout Gps pt 257
PTCS [redacted] 921-924
(N 170°) (N 230°)
- Gps pt 258 → PTCS [redacted] 923 to 927
- Gps pt 259 → PTCS [redacted] 928 to 933

- MW-9 : Gps pt 2600
PTC [redacted] 934 (N 0°)
- protector height AGS = 0,66cm
- Screen top height AGS = 0,21cm
- bottom of well depth BGS = 2,47m
- water table depth BGS = 0,85m
- water column = 1,62m
- initial parameters : pH = 7,52
  t°C = 2,0c conductivity = 299 µS/cm
- purge ≈ 1 volume of well
- final parameters
  t°C = 2,28C pH = 7,45
  conductivity = 200 µS/cm
- Sampled FZ-MW-9-2014

~~Water~~ Soil Samples
Gps pt 2601 → 935
PTC [redacted] (N 330°)
Sampled FZ-MW-9-S-2014 (A, B)

2014-03-24

~~FOX-2~~ → upper landfill

VT-7 : GPS pt 236

Serial# 111161 pics 413 - 414

- general condition: +/- 25° inclinated
  good for the rest
- data download OK
- readings:

channel	volts	channel	volts
1	0.9694	8	-4.0154
2	0.9444	9	0.0174
3	0.917	10	0.8006
4	0.9022	11	0.7871
5	0.8806	12	0.7788
6	0.8594	13	0.7755
7	0.8444		

memory = 40%
batteries = 11.34 v (main)
13.26 v (Aux)
Best for both

- manual readings

channel	resistance (K Ω)
1	15.696
2	16.364
3	16.982
4	17.562
5	18.217
6	18.910
7	19.361
8	19.886
9	20.31
10	20.90
11	21.37
12	21.66
13	21.98

- Restart monitor

- replace batteries
- looks to work good
- lenght of cable A GS = 1.65 m

VT-5 : GPS pt 237
Seriall # 11116 pics 415 - 416

- general condition = good (inclinated at +/- 15°)
- download data ok

readings

channel	volts	channel	volts
1	1.0739	7	0.8635
2	1.0372	8	-3.5244
3	0.9665	9	0.8146
4	0.9321	10	0.7968
5	0.9107	11	0.7303
6	0.8993		

memory = 40%.

batteries = 11,34 V main
13,38 V Aux
best for both

- manual readings

channel	resistance (K Ω)
1	13,111
2	14,009
3	15,736
4	16,717
5	17,316
6	17,962
7	18,718
8	19,405
9	20,38
10	21,03
11	21,75
12	———
13	———

- restart logger memory
- works good
- lenght of cable AGS = 2,80 m

Vt-6 : GPS pt 230
pics 417-418

- Serial # 111162
- general condition = good (inclinated to +/- 10°)
- data download → OK
- readings

channel	volts
1	1.0636
2	1.0463
3	0.9901
4	0.9337
5	0.9119
6	0.8907
7	0.8718
8	-3.3500
9	0.8245
10	0.8046

manual readings

channel	resistance KΩ
1	13,339
2	13,803
3	15,118
4	16,645
5	17,264
6	17,891
7	18,45
8	19,22
9	20,02
10	20,75

- memory = 40%.
- batteries = 11,34V (main) best
  13,38V (AUX) best
- memory 10 start
- looks to work good
- lenght of cable AGS = 2,80m

VT-8 GPS pt 239
pics 419-420
Serial # 111158
- general condition;
  inclinated at +/- 35°
- data download OK
- memory = 40%.
- batteries = 11,34V (main)
  13,50 (AUX)
  (best for both)

- readings

sensors	volts
1	0.9706
2	0.9530
3	0.9259
4	0.9076
5	0.8858
6	0.8651
7	0.8425
8	-1.0442
9	0.8108
10	0.7952
11	0.7811
12	0.7658
13	0.7570
14	0.7485

channel	resistance (KΩ)
1	15.640
2	16.106
3	16.862
4	17.406
5	18.057
6	18.602
7	19.444
8	19.932
9	20.52
10	21.11
11	21.58
12	22.18
13	22.54
14	22.95

- lenght of cable AGS = 2.00 m
- replacing batteries → works good
-

MW-16: GPS pt 240
Protector = 0.50m AGS pic 433 (N 60°)

- Total depth BGS = 2.26m
- Screen top height AGS = 0.34m
- Water table depth BGS = 0.57m
- initial parameters:
  T° = 3.03 pH = 8.11
  Resistivity = 000 µS/cm
- purges 1 volume of well
- final parameters
  T°C = 2.45°C pH = 7.84
  Resistivity = 290 µS/cm
- Sampling MW-16-2014

Soil sampling: GPS pt. 248
pic 437
(N)

Samples
F2-MW-16-S-2014 < A / B } 0.25m max

MW-15 GPS pt 241
Pic - 434 (N 220°)

- good condition
- Screen top height AGS = 1.42
- Total well dept BGS = 3.18m
- Water table depth BGS =
  3.18 m - 1.40m = 1.78m
- initial parameters
  T = 2.52° (conductivity = 140 (μS/cm))
  ph = 0.18
- Purge volume of well
- Soil Sampling GPS pt 242
  MW-15-S-2014 PICS 435 + 436 + 438
  (N 270°) (+ 90°)
  A B
  0.3 m deph to Bedrock

Sampling wata MW-15-2014

Find parameters:

T°: 2.45°C pH: 7.94

Conductivity: 1414 µS/cm

- protector height = 0.64m (AGS)

Sampling Dup-A
Dup-B
Dup-C

MW-14-2014 GPS pt 244

PTC 439 (N260°)

height of protector AGS = 0.50

height of screen top AGS = 0.32m

total well depth BGS = 2.92m

Water table depth BGS = 1.70m

· water column = 1.22m
· initial parameters
t° = 2.75°C pH = 8.61
conduct. = 415 μS/cm
· purging

/ Soil sampling
test pit reached 0.4m
(bedrock)
Sampled MW-14-S < A / B
GPS pt. 245 + Dup 1 / Dup 2 / Dup 3

/ Ground water final
parameters; t° = 2.65°C
conduct. = 750 μS/cm pH = 8.00

Sample MW-14-704

pics 440 + 441 (N 200°)

Visual Inspection

pics 442 (N 140°)
443 (N 290°)
gps pt 246

pics 444 to 448
gps pt 247

pics 449 + 450
(N 40°) (N 150°)
gps pt 248

fox-2/2014-08-24

MW-13: Gps pt 249
pic 908 (iphone) (N100°)

- height of protector: 0.62m AGS
- height of screen top: 0.34m AGS
- total well depth BGS = 4.32m
- water table BGS = dry

Soil Sampling (test-pit depth = 0.35m) to Bedrock

pic 909 (N100°)
Gps pt 250
Sampling MW-13-S-2014 A/B

PCL II landfill

Gps pt 281 (general view)
pics 910 and 911 (iphone)
(N300°) (N10°)

West Landfill

Fox-2
2014-08-24

Sampling points - F2-5-2014
Gps 266
sampled only (A) - 0.2m pics ~~943~~ 945
- ~~F2-6-2014~~ F2-4-2014

Sampled only (A) - 0.15m Gps pt 266
pics 942 to 944 ~~pics 84~~
- ~~F2-7-2014~~ F2-3-2014

Sampled only A Gps pt 264
pics 946 to 948 ~~pics 940~~
- ~~F2-8-2014~~ F2-1-2014

Gps pt 265
Sampled only A pics ~~946~~ 953 & 954
- ~~F2-9-2014~~ F2-2-2014

Gps pt 266
No sampling possible pics ~~939~~ 939 to 941

(CHF 2015-06-29)

- feat 1: bedrock outcrop
  Gps pt 267
  pic ~~944~~ 949
  (5m x 2m)

- feat 2: bedrock outcrop (6m x 3m)
  Gps pt 268
  pic ~~950~~ 950 (N350°) 1m high

- feat 3: drainage channel
  Gps pts 269-270
  (16cm x 0.30m) 0.15m deep
  pics ~~948~~ 951 (N230°)
  ~~949~~ 952 (N80°)

general layout:

Gps pt 268

pics 955 to 960

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DEMAND D'ANALYSE

Numéro Demande : (Interne)

Nom du Client: Sila Remediation			
Adresse (Certificat): PO Box 37		Adresse (Facturation, si différente): 100-4495, boul. Wilfrid-Hamel	
Ville: Igloolik, NU	Code postal: X0A 0L0	Ville: Québec (Qc)	Code postal: G1P 2J7
Téléphone: 418-653-4422	Télécopieur: 418-653-3583	Téléphone: 450-961-3535	Télécopieur: 450-961-0220
Courriel: martin.fleury@lvm.ca		Courriel: jean-pierre.pelletier@lvm.ca	
Lot ou Description du projet : DEW LINE MONITORING		Chargé de projet : JEAN-PIERRE PELLETIER	
Bon de commande :		Numéro de soumission :	
Lieu d'échantillonnage : FOX-2		Échantillonneur : MARTIN FLEURY	
Spécifications requises (au besoin) :		Certificat d'analyse : ☐ Français ☒ Anglais ☐ Fax ☒ Courriel (pdf)	

Paramètres demandés (√)

	Votre Référence Échantillon (MF 2015-06-29)	Date & Heure d'échantillonnage	PCB's Total Aroclor	métaux *	~~TPH(C10-C50)~~	TPH(F1-F3)	Nature (voir code)	Nbr Contenants	T [°C] - interne
1.	~~F2-1-A-2014~~ → F2-7-A-2014	2014-08-25	X	X		X	S	2	
2.	~~F2-1-B-2014~~ → F2-7-B-2014		X	X		X			
3.	~~F2-2-A-2014~~ → F2-8-A-2014		X	X		X			
4.	~~F2-2-B-2014~~ → F2-8-B-2014		X	X		X			
5.	~~F2-3-A-2014~~ → F2-9-A-2014		X	X		X			
6.	~~F2-3-B-2014~~ → F2-9-B-2014		X	X		X			
7.	~~F2-4-A-2014~~ → F2-6-A-2014		X	X		X			
8.	~~F2-4-B-2014~~ → F2-6-B-2014	↓	X	X		X	↓	↓	

Code de natures : E: Eau / EP: Eau potable / ES: Eau souterraine / EA: Eau de surface / EB: Eau de baignade / EU: Eau usée / EM: Eau mine
A: Air / AL: Aliment / LX: Lixiviat / S: Sol / SE: Sédiment / B: Boue / H: Huile / F: Frottis / EC: Écouvillon / PH: Produit pharmaceutique / Z: Autre (définir)

Remarques : * As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg

Martin Fleury
Signature du client
J'autorise le laboratoire à effectuer les analyses spécifiées sur cette Demande d'analyse

délais normaux
Date à laquelle les résultats sont requis

[✓] Cocher si d'autres pages sont jointes pour la présente Demande d'analyse (1 de 7)

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DEMAND D'ANALYSE

Numéro Demande : (Interne)

Nom du Client	Sila Remediation
Adresse (Certificat)	Adresse (Facturation, si différente)
Ville / Code postal	Ville / Code postal
Téléphone / Télécopieur	Téléphone / Télécopieur
Courriel	Courriel
Lot ou Description du projet :	Chargé de projet :
Bon de commande :	Numéro de soumission :
Lieu d'échantillonnage : Fox-2	Échantillonneur :
Spécifications requises (au besoin) :	Certificat d'analyse : ☐ Français ☐ Anglais ☐ Fax ☐ Courriel (pdf)

Votre Référence Échantillon	Date & Heure d'échantillonnage	Paramètres demandés (√)																				Nature (voir code)	Nbr Contenants	T [°C] - interne
		PCB's - Total Aroclor	TPH (F1-F3)	métaux *																				
1. F2-MW-7-S-A-2014	2014-08-25	X	X	X																		S	2	
2. F2-MW-7-S-B-2014	↓	X	X	X																		↓	↓	
3. F2-MW-8-S-A-2014		X	X	X																				
4. F2-MW-8-S-B-2014	→	X	X	X																				
5. F2-5-A-2014	2014-08-24	X	X	X																				
6. ~~F2-6-A-2014~~ F2-4-A-2014		X	X	X																				
7. ~~F2-7-A-2014~~ F2-3-A-2014		X	X	X																				
8. ~~F2-8-A-2014~~ F2-1-A-2014	↓	X	X	X																		↓	↓	

(HF 2015-06-29)

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Signature du client
J'autorise le laboratoire à effectuer les analyses spécifiées sur cette Demande d'analyse

Date à laquelle les résultats sont requis

☐ Cocher si d'autres pages sont jointes pour la présente Demande d'analyse (2 de 2)

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Numéro Demande : (Interne)

DEMAND D'ANALYSE

Nom du Client	Sila Remediation		
Adresse (Certificat)		Adresse (Facturation, si différente)	
Ville	Code postal	Ville	Code postal
Téléphone	Télécopieur	Téléphone	Télécopieur
Courriel		Courriel	
Lot ou Description du projet :		Chargé de projet :	
Bon de commande :		Numéro de soumission :	
Lieu d'échantillonnage : Fox-2		Échantillonneur :	
Spécifications requises (au besoin) :		Certificat d'analyse : ☐ Français ☐ Anglais	☐ Fax ☐ Courriel (pdf)

Votre Référence Échantillon	Date & Heure d'échantillonnage	Paramètres demandés (√)																					Nature (voir code)	*Nbr Contenants*	T [°C] - interne
		PCBs - total / Aroclors	MH (F1-F3)	metals *																					
1. F2-MW-9-S-A-2014	2014-08-24	X	X	X																			S	2	
2. F2-MW-9-S-B-2014		X	X	X																					
3. F2-MW-10-S-A-2014		X	X	X																					
4. F2-MW-11-S-A-2014		X	X	X																					
5. F2-MW-11-S-B-2014		X	X	X																					
6. F2-MW-12-S-A-2014		X	X	X																					
7. F2-MW-12-S-B-2014	"	X	X	X																			"	"	
8.																									

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Remarques :
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Signature du client
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Date à laquelle les résultats sont requis

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DEMAND D'ANALYSE

Nom du Client	Sila Remediation		
Adresse (Certificat)		Adresse (Facturation, si différente)	
Ville	Code postal	Ville	Code postal
Téléphone	Télécopieur	Téléphone	Télécopieur
Courriel		Courriel	
Lot ou Description du projet :		Chargé de projet :	
Bon de commande :		Numéro de soumission :	
Lieu d'échantillonnage :	Fox-2	Échantillonneur :	
Spécifications requises (au besoin) :		Certificat d'analyse : ☐ Français ☐ Anglais	☐ Fax ☐ Courriel (pdf)

Votre Référence Échantillon	Date & Heure d'échantillonnage	Paramètres demandés (√)																				Nature (voir code)	Nbr Contenants	T [°C] - interne
		PCB's - total Aroclors	TPH (F1 - F3)	metals ✱																				
1. F2-MW-13-S-A-2014	2014-08-24	X	X	X																		S	2	
2. F2-MW-13-S-B-2014		X	X	X																				
3. F2-MW-14-S-A-2014		X	X	X																				
4. F2-MW-14-S-B-2014		X	X	X																				
5. F2-MW-15-S-A-2014		X	X	X																				
6. F2-MW-15-S-B-2014		X	X	X																				
7. F2-MW-16-S-A-2014		X	X	X																				
8. F2-MW-16-S-B-2014		X	X	X																				

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Remarques : ✱ As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg

Signature du client
J'autorise le laboratoire à effectuer les analyses spécifiées sur cette Demande d'analyse

Date à laquelle les résultats sont requis

[1 Cocher si d'autres pages sont jointes pour la présente Demande d'analyse
(4 de 7)

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Numéro Demande :
(Interne)

DEMAND D'ANALYSE

Nom du Client: Sila Remediation

Adresse (Certificat)		Adresse (Facturation, si différente)	
Ville	Code postal	Ville	Code postal
Téléphone	Télécopieur	Téléphone	Télécopieur
Courriel		Courriel	
Lot ou Description du projet :		Chargé de projet :	
Bon de commande :		Numéro de soumission :	
Lieu d'échantillonnage : FOX-2		Échantillonneur :	
Spécifications requises (au besoin) :		Certificat d'analyse : ☐ Français ☐ Anglais	☐ Fax ☐ Courriel (pdf)

Votre Référence Échantillon	Date & Heure d'échantillonnage	Paramètres demandés (√)																				Nature (voir code)	Nbr Contenants	T [°C] - interne
		PCBs - Total Aroclor	TPH (C6-C32)	metals *	TPH (C10-C34)																			
1. F2-MW-5-2014	—	X		X	X																	ES	~~2~~	
2. F2-MW-6-2014	—	~~X~~		~~X~~	~~X~~																	ES	~~2~~	
3. F2-MW-7-2014	—	~~X~~		~~X~~	~~X~~																	ES	~~2~~	
4. F2-MW-8-2014	2014-08-25	X		X	X																	ES	4	
5. F2-MW-5-S-A-2014		X	X	X																		S	2	
6. F2-MW-5-S-B-2014		X	X	X																		S	2	
7. F2-MW-6-S-A-2014		X	X	X																		S	2	
8. F2-MW-6-S-B-2014		X	X	X																		S	2	

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Remarques : * As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg (total concentrations)

Signature du client
J'autorise le laboratoire à effectuer les analyses spécifiées sur cette Demande d'analyse

Date à laquelle les résultats sont requis

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Numéro Demande : (Interne)

DEMAND D'ANALYSE

Nom du Client: Sila Remediation	
Adresse (Certificat)	Adresse (Facturation, si différente)
Ville / Code postal	Ville / Code postal
Téléphone / Télécopieur	Téléphone / Télécopieur
Courriel	Courriel
Lot ou Description du projet :	Chargé de projet : JEAN-PIERRE PELLETIER
Bon de commande :	Numéro de soumission :
Lieu d'échantillonnage : Fox-2	Échantillonneur : MARTIN FLEURY
Spécifications requises (au besoin) :	Certificat d'analyse : ☐ Français ☒ Anglais ☐ Fax ☒ Courriel (pdf)

	Votre Référence Échantillon	Date & Heure d'échantillonnage	Paramètres demandés (√): PCBS total / Aroclor	metals *	TPH (C10-C50)																		Nature (voir code)	Nbr Contenants	T [°C] - interne
✓ 1.	F2-MW-9-2014	2014-08-24	X	X	X																		ES	5	
✓ 2.	F2-MW-10-2014	↓	X	X	X																		↓	5	
3.	~~F2-MW-11-2014~~	↓	~~X~~	~~X~~	~~X~~																		↓	0	
✓ 4.	F2-MW-12-2014	↓	X	X	X																		↓		
5.	~~F2-[illegible]-2014~~	↓	~~X~~	~~X~~	~~X~~																		↓	0	
✓ 6.	F2-MW-14-2014	↓	X	X	X																		↓	5	
✓ 7.	F2-MW-15-2014	↓	X	X	X																		↓	5	
✓ 8.	F2-MW-16-2014	↓	X	X	X																		↓	5	

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Remarques: * As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg (total concentrations)

Signature du client
J'autorise le laboratoire à effectuer les analyses spécifiées sur cette Demande d'analyse

Date à laquelle les résultats sont requis.

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www.exova.ca

DEMAND D'ANALYSE

Numéro Demande : (Interne)

Nom du Client: Sla Remediation	
Adresse (Certificat)	Adresse (Facturation, si différente)
Villie / Code postal	Ville / Code postal
Téléphone / Télécopieur	Téléphone / Télécopieur
Courriel	Courriel
Lot ou Description du projet :	Chargé de projet :
Bon de commande :	Numéro de soumission :
Lieu d'échantillonnage : Fox-2	Échantillonneur :
Spécifications requises (au besoin) :	Certificat d'analyse : ☐ Français ☐ Anglais ☐ Fax ☐ Courriel (pdf)

	Votre Référence Échantillon	Date & Heure d'échantillonnage	PCBs-total Aroclor	TPH (F1-F3)	metals *	TPH (C10-C50)	Nature (voir code)	Nbr Contenants	T [°C] - interne
1.	F2-Dup-A-2014	2014-08-24	X		X	X	ES	5	
2.	F2-Dup-1-2014	2014-08-24	X	X	X		S	2	
3.	F2-Dup-4-2014	2014-08-25	X	X	X		S	2	
4.	F2-Dup-7-2014	2014-08-25	X	X	X		S	2	
5.	F2-Dup-10-2014	2014-08-25	X	X	X		S	2	
6. [Dup13]	F2-Dup-13-2014	2014-08-25	X	X	X		S	2	
7.	[illegible]								
8.	F2-Dup-D-2014	2014-08-25	X		X	X	ES	4	

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Remarques : * As, Cd, Cr, Co, Cu, Pb, Ni, Zn, Hg (total concentrations)

Signature du client
J'autorise le laboratoire à effectuer les analyses spécifiées sur cette Demande d'analyse

Date à laquelle les résultats sont requis

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Maxxam Analytics Inc

49-55 Elizabeth Avenue, Suite 101A, St. John's, NL A1A 1W9 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227
www.maxxamanalytics.com

CHAIN OF CUSTODY RECORD

23243

3-Sep-14 13:10
Parnian Baber

B4G1542
KP2 OTT-002

INVOICE INFORMATION:
Company Name: Sila Remediation
Contact Name: Guillaume Robert
Address: PO Box 37
Igloolik, NU X0A 0L0
Email:
Ph: 418-653-4422 Fax: 418-653-3583

REPORT INFORMATION (if differs from invoice):
Company Name: Sila Remediation
Contact Name: Jean-Pierre Pelletier
Address: 600-4495, Wilfrid-Hamel blvd. Québec (Qc) G1P 2J7
Email: jean-pierre.pelletier@lvm.ca
Ph: 418-626-7054 Fax: 418-647-2540

PO #:
Project #:
Proj. Name: fox-2
Location: Longstaff Bluff
Quotation#:
Submitted By: MARTIN-PLEURY
Site Task #: F

Client Code:

Specify Guideline Requirements:

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

Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles
F2-Dup-2-2014	Soil	2014-08-24	2
F2-Dup-5-2014	Soil	2014-08-25	2
F2-Dup-8-2014	Soil	2014-08-25	2
F2-Dup-11-2014	Soil	2014-08-25	2
F2-Dup-14-2014	Soil	2014-08-25	2
F2-Dup-B-2014	GroundW.	2014-08-24	5
F2-Dup-E-2014	G.water	2014-08-25	5

Sample Identification	Field Filtered & Preserved	Lab Filtration Required	RCAp-30 Choose Total or Diss Metals	RCAp-MS Choose Total or Diss Metals	Metals Water: Total Digest (Default Method)	Metals Water: Dissolved	Mercury is not included in soil or water metals scan	Metals Soil: Available Metals Digest Default Method (HNO3/H2O2)	Metals Soil: Total Digest - for sediments (HNO3/HF/HCLO4)	Metals Soil: Tin (required for CCME soils)	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron (required for CCME Agricultural)	TPH ~~MOST (BTEX, C6-C50)~~ (C6-C32)	Soil (Potable), TPH MUST, NS Fuel Oil Spill Policy Low Level BTEX & C6-C50	NB Potable Water BTEX, VPH, Low Level TEH	TPH Fractionation (F1-F3)	PAH's	PCB's total Aroclor	VOC's EPA 624,8260	Other Analysis or Comments/Hazards
F2-Dup-2-2014							X									X		X		As, Cd, Cr, Co, Cu, Pb, Ni, Zn
F2-Dup-5-2014							X									X		X		
F2-Dup-8-2014							X									X		X		
F2-Dup-11-2014							X									X		X		
F2-Dup-14-2014							X									X		X		
F2-Dup-B-2014							X						X					X		
F2-Dup-E-2014							X						X					X		

REC'D IN OTTAWA
onice packs
custody seal present,

DUE DATE:
STANDARD: [X]
RUSH Due Date:
For extra cost rush, specify Due Date. Rush analysis must be scheduled prior to sample submission.
Client will be contacted if Rush date cannot be met.

RELINQUISHED BY: (Signature/Print)	RECEIVED BY: (Signature/Print)	DATE / TIME	PURPOSE OF CHANGE / REMARKS
	Kelsey Piton Kelsey Piton	2014/09/03 13:10	7,6,6

TEMP @ Maxxam Receipt: 5,5,5 6,7,6 7,8,0 5,7,5
INTEGRITY Init: ____ Yes No

(1 del)

KEENVRDCOC St.John's 05/05

ANNEX 4 Range of the Report and Limitation of Responsibilities

SCOPE OF THE REPORT AND LIMITATION OF LIABILITY

A – Recipient and Use

This report ("Report") was prepared by Biogenie, a division of EnGlobe Corp., ("Biogenie") at the request and for the sole benefit of the Client ("Client"), and is intended to be used exclusively by the Client.

B –Site Conditions

Any description of the target site ("Site"), soil and/or groundwater included in the Report is only provided as an indication to the Client, and unless otherwise specifically mentioned in the Report such description shall not at any time and under any circumstances be used for purposes other than to gain a better understanding of the Site and to fulfil the requirements of the mandate assigned to Biogenie by the Client ("Mandate").

All information, including but not limiting the comprehensiveness of the data, charts, descriptions, drawings, tables, analysis results, compilations, and any conclusion and recommendation included in the Report, shall arise from the direct observation of the Site during a specific period, namely the fulfilment of the Mandate, and from the interpretation of such information and data available during the same period.

The content of the Report shall not apply in any way or to any part of the Site or to any parameter, material or analysis excluded from the Mandate.

Biogenie shall not be held responsible for the presence of any substance or material of a different nature, or of a similar nature but with different concentrations, as those indicated in the Report, and this in any part or parts of the Site excluded from the Mandate.

The content of the Report, including its conclusions and recommendations, shall not apply to any period preceding or following the Mandate. The physiochemical conditions of the Site, and the type and degree of contamination identified on the Site, may vary within a given period depending on a number of factors, especially the current activities taking place on the Site and/or on lands adjacent to the Site.

A review of the Report and/or changes in the parameters, conclusions and/or recommendations may prove to be necessary in the event of a change in the Site conditions or the discovery of pertinent information subsequent to the production of the Report.

C - Legislation, Regulations, Guidelines and Policies

The interpretation of the data and observations concerning the Site, as well as the conclusions and recommendations resulting from these, shall take into account the laws, regulations, standards, policies and/or guidelines applicable to the Project and that are in effect at the time of the fulfilment of the Mandate. In the event no current law, regulation, policy, guideline or standard applies to the project, Biogenie shall take into account proven environmental and professional rules and practices when drawing up the Report.

Any change in the legislation, regulations, standards, policies and/or guidelines applicable to the project may result in the need to review the Report and/or modify its parameters, conclusions and/or recommendations.

D – Use of Report

The Report is intended for the exclusive use of the Client and shall only be used for the purpose it was meant for.

The content of the Report and its conclusions and recommendations only apply to the Site and may not, at any time and under any circumstances, apply to any land adjacent to the Site or to any other land located in the vicinity of the Site.

Any reproduction in any form whatsoever and any distribution or use of the Report, in whole or in part, by a person other that the Client, is strictly forbidden without the prior written consent of Biogenie. Biogenie makes no declaration and pledges no responsibility towards any person other than the Client with regard to the content of the Report and the conclusions and recommendations expressed therein.

Biogenie is in no way responsible for any loss, fine or penalty, or for any expense, damage or other prejudice of any type whatsoever, sustained by a person other than the Client as a result of the unauthorized use of the Report.

No provision of the Report shall be construed as or considered to be a legal opinion of Biogenie’s.