THE COLLECTION OF LANDFILL MONITORING DATA AT THE FORMER CAM-5 DEW LINE SITE

Mackar Inlet, Nunavut

FINAL REPORT – 2012

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

DEFENCE CONSTRUCTION CANADA

March 2013

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SITE REMEDIATION SOLUTIONS

Biogénie

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DEFENCE CONSTRUCTION CANADA

March 2013

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LICENSEE
NT/NU

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1 OUTLINE

1.1 OBJECTIVE AND SCOPE OF WORK

The objective of the DCC Landfill Monitoring Program is to collect sufficient information to assess the performance of landfills at CAM-5 Mackar Inlet, from a geotechnical and environmental perspective. DCC has specified the requirements for the Landfill Monitoring Program in the document: Terms of Reference –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.

During the 2012 monitoring program a visual inspection was completed at all site landfills to identify erosional features. Soil and groundwater sampling as well as thermal monitoring were conducted at the Tier II facility. Datalogger batteries were also changed at the Tier II facility. Table 1 summarizes the monitoring requirements of the 2012 season. No deviations from the TOR were experienced while completing the 2012 monitoring.

Table I: 2012 Monitoring Requirements for CAM-5 Landfills

Landfill	Visual Inspection	Soil Sampling	Groundwater Sampling	Thermal Monitoring
Lower Site Landfill - South	✓			
Non-Hazardous Waste Landfill	✓			
USAF & Asbestos Landfill	✓			
DCC Tier II Disposal Facility	✓	✓	✓	✓

1.2 FIELD PROGRAM STAFF AND TIMING

The 2012 on-site field program at CAM-5 Mackar Inlet took place from August 28 to 30, 2012. Biogenie sub-contracted Sila Remediation Inc. (Sila) from Igloolik, Nunavut to perform the field work. The Sila field program was executed by Mr. Brandon MacKay and two Inuit representatives.

The team was made up of the following individuals:

- Brandon MacKay, Site Technician.

- Dwayne Allukpik, Field Assistant.
- Joe Koaha, Wildlife Monitor.

1.3 2012 WEATHER CONDITIONS

Seasonably warmer weather conditions were observed during the two days of the 2012 CAM-5 monitoring event, consisting of morning lows of 0-2°C and daytime highs of 5-8°C. Skies were partly cloudy with little to no wind and light precipitation in the evening of August 28th, 2012.

Further details on weather conditions for each landfill at the time of the visual inspection are provided in the "Visual Inspection" sections of the report (Sections 3.2, 4.2, 5.2 and 6.2).

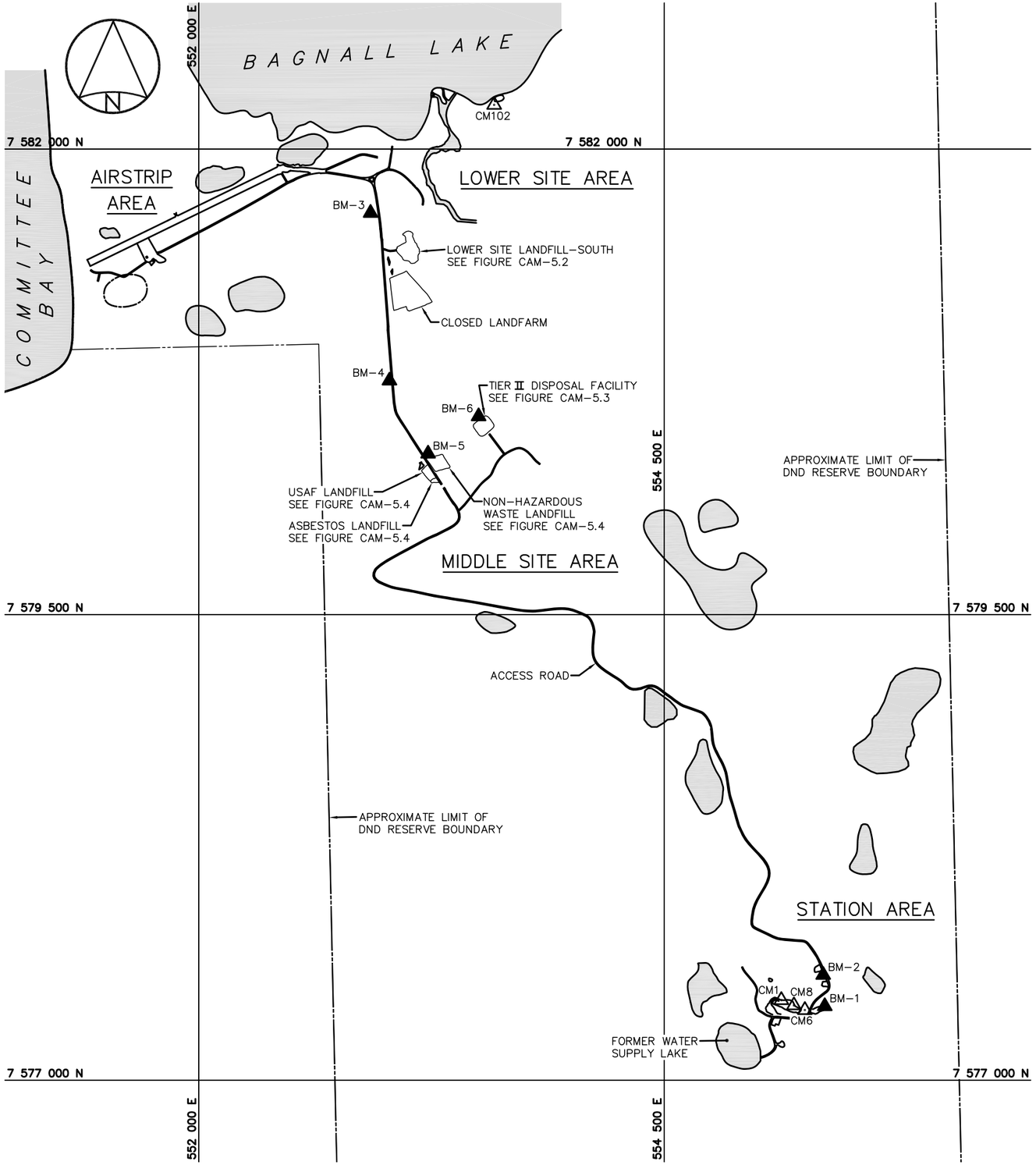
1.4 REPORT FORMAT

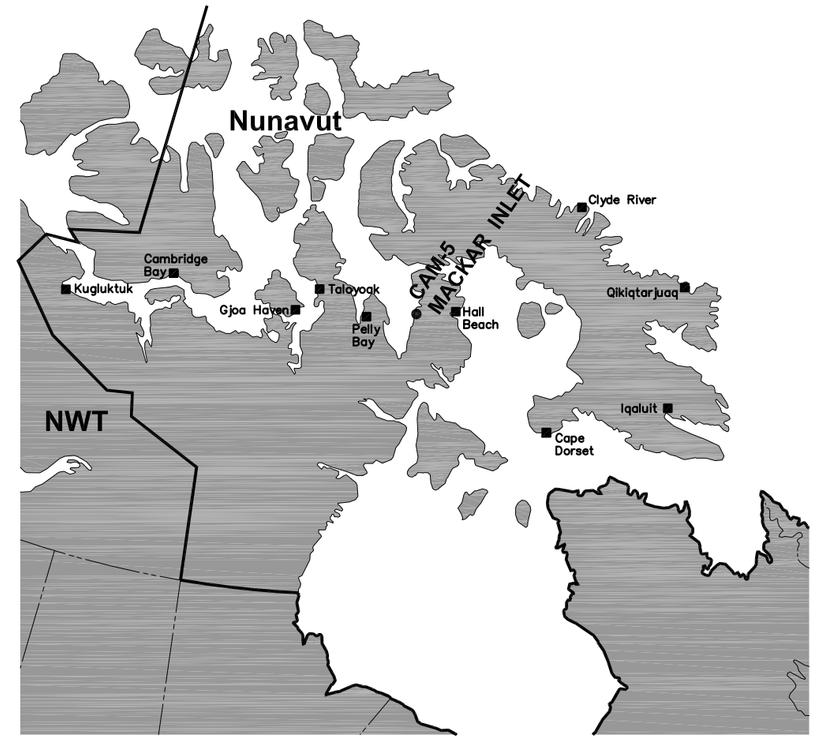
This report describes the work carried out in August 2012 at four landfill sites at CAM-5 Mackar Inlet. Results from soil and groundwater sampling, thermal monitoring and visual inspection of the sites are also presented in the formats described in the TOR (Reference A). An electronic version of the report and its component tables, figures and data files is 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 2012 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 summary and inspection reports (where applicable).
- Summary of 2012 soil analytical data (where applicable).
- Summary of 2012 groundwater analytical data (where applicable).
- Monitoring well development/sampling reports (where applicable).

For the photographic record, the printed copy of the report includes an index and thumbnail images of photos for each of the landfill areas. The full resolution photos are included in electronic format in the Addendum DVD-ROM to this report. Certificates of Analysis, QA/QC analytical results and field notes are attached in the Appendices.





LOCATION OF MACKAR INLET WITHIN NUNAVUT TERRITORY

SCALE: NTS

LEGEND

- CM1 — SURVEY CONTROL MONUMENT
- BM-1 — PERMANENT BENCHMARK LOCATION (6)
- APPROXIMATE LOCATION OF PROPERTY BOUNDARY
- ARCHAEOLOGICAL FEATURE
- BODY OF WATER

0 250m 500m 750m 1,000m 1,250m

NO.	VERSION	DATE	PAR	VERIF.	APPR.
A	FINAL	13-02-12	P.L.	B.M.	A.L.

Construction de Défense Canada
Defence Construction Canada

COLLECTION OF
LANDFILL MONITORING DATA
CAM-5, MACKAR INLET, NUNAVUT

LOCATION PLAN

SITE REMEDIATION SOLUTIONS

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MEASUREMENT UNIT	SCALE:	DATE (month-year):
Meter	1 : 25,000	FEBRUARY 2013
DRAWN BY: P. LÉGARÉ	VERIFIED BY: B. MACKAY	APPROVED BY: A. LECLAIR P. Eng
PROJECT NO: CD2655_200_203	DRAWING NO: CD2655_200_203-CAM-5_1	PAGE CAM-5.1

FIGURE CAM-5.1

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2 METHODOLOGY

2.1 VISUAL INSPECTION

Data and information collected during the visual inspection of the CAM-5 landfills are included in the visual inspection data sheets. These data sheets include such inspection data 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 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 Olympus TG-820 iHS 12 megapixel (MP) digital camera. Full resolution digital jpg copies are available on the DVD-ROM appended with this report. The photo log, including the local coordinates from where the photo was taken, orientation (relative to map north), feature of note and picture numbers are included with each landfill report. Panoramic photographs were “stitched” using Adobe Photoshop.

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 93 (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. 93 (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").

For the 2012 monitoring event, four soil sampling stations were visited. A surface (0-15 cm depth) and subsurface sample (40-50 cm depth below surface) were taken at each sampling station. No frozen ground or frost was encountered at the soil stations during the August 2012 sampling.

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 by DCC. Table II below summarizes the soil sampling at CAM-5 during the August, 2012 field program.

Table II: Summary of Soil Sampling at CAM-5, August 2012

Landfill Site	Soil Sample Locations			
Tier II Disposal Facility	MW-5	MW-6	MW-7	MW-8

Notes:
Soil samples annotated as "MW" were collected as per the TOR (Reference A) between 2-4 metres from monitoring wells. All soil samples were collected from two depths (0-15 cm and 40-50 cm). For 2012 sampling, total number of soil samples = 11 samples (four samples x two depths + two QA/QC (Intra + Inter-laboratory comparison) + one for Owner's Representative (ESG Archives).

2.3 GROUNDWATER SAMPLING

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

- CCME EPC-NCS62E Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites - Volume I: Main Report, Dec 93 (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 93 (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. Turbidity readings were also collected at each station. The samples were not acidified and were not filtered (as directed in the TOR).

The 2012 field program included sampling four monitoring wells at CAM-5, although two wells lacked sufficient water for sampling. A summary of the groundwater sampling undertaken at CAM-5 is summarized in Table III.

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

Table III: Summary of Groundwater Sampling at CAM-5, August 2012

Landfill Site	**Groundwater Sample Locations**			
Tier II Disposal Facility	MW-5	MW-6	MW-7	MW-8

Notes:
All monitoring wells were inspected and found to be in good condition with no significant concerns identified.
For 2012 sampling, total number of water samples = three samples (two monitoring well samples + one QA/QC (intra-laboratory duplicates + one field blank) + one travel blank (TPH only).

2.4 THERMAL MONITORING

The 2012 thermal monitoring program at CAM-5 consisted of an inspection of the thermistors and data loggers, the downloading of all datasets, the manual reading of thermistors and the replacement of data logger batteries. Specific detailed information regarding temperature data is contained in the Tier II facility section of this report.

2.5 FIELD NOTES AND DATA

Field notes from the 2012 Landfill Monitoring Program, including soil and water sampling, are included in Appendix B for reference. Notes were written in field books, previously prepared logs or entered directly into a field computer. The notes were scanned to an Adobe pdf document for future reference and back up. Locations of all observations and features for the visual inspection were recorded using Garmin GPSmap 60CSx 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

Sila implemented standard sample collection techniques to decrease the likelihood of compromising collected samples. The methods used for sample collection are summarized in Sections 2.4 and 2.5 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 Field Technician after sample collection. The samples were refrigerated prior to off-site shipment in chilled coolers by First Air Cargo directly to AGAT in Edmonton (via Hall Beach), Maxxam in Montreal (via Hall Beach) and ESG in Kingston (via Iqaluit), where they were checked in by laboratory representatives. All analyses were completed as specified on COC forms.

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 AGAT. Results can be found in Appendix C.
- 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 to ESG.

2.8 PROJECT REFERENCES

The following references are specifically relevant to the 2012 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, CAM-5 Landfill Monitoring 2012*, *September, 2012.*

3 LOWER SITE LANDFILL – SOUTH

3.1 SUMMARY

The visual inspection of the Lower Site Landfill – South was completed from August 29 – 30, 2012. The bulk of the inspection was completed on the 29th, while pictures of the east slope were taken on the 30th to optimize lighting conditions. Soil samples were not collected during the 2012 inspection as per the ToR.

As of 2012, no erosion features with "significant" or "unacceptable" severity ratings were identified in the Preliminary Stability Assessment of the Lower Site Landfill – South. However, of the four landfills investigated at CAM-5, the most severe erosion was observed at the Lower Site Landfill – South including two features with "marginal" severity ratings, Features H (an erosion channel) and F (tensile cracking). The higher rates of erosion are likely the result of the local topography of the Lower Site Landfill – South as well as the presence of a wetland upgradient of the landfill which may promote the flow of water over the landfill cap during the spring melt.

At this time the overall performance of the landfill is rated as acceptable, however, Feature H may present an erosion problem in the future, and will be closely monitored during the 2013 monitoring program. A visual inspection report, including supporting photos and drawings, are presented in the following pages.

3.2 VISUAL INSPECTION REPORT

The Visual Inspection Checklist/Report is included in Table IV of this report and has been completed as per the TOR. For the purpose of describing the location of features and photographs, the Lower Site Landfill – South will be split into the "North" and "South" sections at a line connecting UTM coordinates 512 to 503. Please refer to Figure CAM-5.2 for a sketch of the Lower Site Landfill – South detailing the location of photographs and erosional features.

<u>Weather at Time of Inspection</u>

Seasonally warmer weather conditions were observed while conducting the monitoring at the Lower Site Landfill – South. On August 29th, the investigation was conducted later in the day; the temperature was 6 °C with clear skies and sunshine and little to no wind. The investigation was

completed on the morning of August 30th, the temperature at the time of the investigation was 2°C, skies were partly cloudy, sunny and there was little to no wind.

Settlement

Areas of settlement were noted at three locations on the landfill surface, Features C, D and E. All three features are new observations not indicated on the baseline investigation drawings. Feature C consists of two small depressions (potholes) on the western surface of the south section of the landfill. Feature D consists of a single linear depression orientated parallel to the crest on the west side of the south section and approximately 10m from the crest. Feature E consists of two small depressions (potholes) on the eastern surface of the south section. The features have an acceptable severity rating.

Erosion

Four general areas of erosion (Features A, H, I and J) were noted on the surface, side slopes and/or margins of the Lower Site Landfill – South. Of the four, Feature H was noted during the baseline investigation.

Feature A consists of minor localized erosion between the western toe of the south landfill section and access road and has an acceptable severity rating.

Feature H located in the north landfill section (previously noted in the baseline investigation), consists of a large erosion channel which runs the length of the western toe and deposits material on the armoured north toe. The feature appears to have increased in size since the baseline study conducted in 2011 (based on the provided photographs). The feature appears to be self-armouring however, there is evidence that the erosion is extending east into the landfill. At this time, no debris is exposed and the landfill is still functioning as intended. The severity rating of Feature H is considered marginal.

Feature I, with an acceptable severity rating, consists of minor erosion extending from the landfill surface to the toe, on the north-western slope of the south section of the landfill 27m to the north east of the access road.

Feature J consists of minor erosion on the eastern landfill surface approximately 5m from the east slope of the south section of the landfill. Feature J has an acceptable severity rating.

Frost Action

Evidence of frost action was not noted.

Evidence of Burrowing Animals

Indications of burrowing animals were not noted.

Re-establishment of Vegetation

Evidence of vegetation was not noted on the landfill.

Staining

Rust-coloured staining and bacterial sheen was observed associated with Feature F (discussed below) on the eastern slope.

Seepage Points

Feature K, on the eastern side slope of the landfill (both north and south sections), features two distinct areas of seepage (consisting of surface wetting) with associated bacterial sheen and ponding water. The northern area extends south for 8m from the Type 1 riprap on the north toe of the landfill, while the southern area is central and 15m in length. Each section extends west 2–8m from the landfill toe. There are several areas of pooled water at the toe of the landfill where rutting caused by variations in compaction have filled with water, iron bacteria sheen was present adjacent to one of these pools. It should be noted the landfill is bordered on the east and north sides by muskeg and thus, pooled water is present at the toes.

Debris

There were no observations of exposed debris during the 2012 inspection.

Presence/Condition of Monitoring Instruments

There are no monitoring instruments installed at this landfill.

Other Features of Note

A thin tension crack (Feature B) not noted in the baseline observations, was observed on the side slope of the landfill running parallel to the southern side of the access road.

Previously observed tensile cracking (Feature F) appear to have increased in size relative to pictures provided by the baseline study. Discontinuous tensile cracking extends

50m along the east slope to the Type 1 granular fill on the north toe. Minor slumping has not increased from the baseline study based on photograph 215 provided by AECOM. From observations made on-site, and consultation with those involved with the construction of the regrade, the features identified as “slumping” may in fact be a product of the original construction.

The previously mentioned seepage occurs within 1–3 m of the cracking. Currently, the severity rating of Feature F is considered acceptable with a low probability of failure.

Table IV: Visual Inspection Checklist / Report – Lower Site Landfill - South

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

SITE NAME: CAM-5 Mackar Inlet
LANDFILL DESIGNATION: Lower Site Landfill - South
DATE OF INSPECTION: August 29, 2012
DATE OF PREVIOUS INSPECTION: Date of Baseline Investigation is unknown
INSPECTED BY: B. MacKay
REPORT PREPARED BY: B. MacKay
MONITORING EVENT NUMBER: 2
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.

Checklist Item	Present (Yes/No)	Location	Length (m)	Width (m)	Depth (m)	Extent	Description	Photographic Record	Severity Rating	Additional Comments
Settlement	Yes	Feature C	0.40 - 1.0	0.20 - 0.60	0.10 - 0.20	Occasional	Minor Depressions	5,6	Acceptable	New Observation: Two minor Depression (potholes) on the surface of lobe
		Feature D	6.00	0.15 - 0.40	0.05 - 0.15		Minor Depression	7,8	Acceptable	New Observation: Linear depression
		Feature E	0.50	0.50	0.20		Minor Depressions	11,12	Acceptable	New Observation: Two minor Depression (potholes) on the surface of lobe
Erosion	Yes	Feature A	8.00	4.00	0.30	Occasional	Minor Superficial Erosion	1	Acceptable	New Observation: Minor erosion along west toe and access road, suspected location of culvert or French drain used during remediation contract
		Feature H	60.00	0.10- 4.00	0.05 - 0.25		Large erosion channel	24-28	Marginal	Large erosion channel extending along the western toe of the landfill, with a marginal severity rating
		Feature I	4.00	3.00	0.05-0.10		Minor	32, 33	Acceptable	New Observation: Minor erosion channel on the northwestern toe of the landfill - self armouring
		Feature J	10.00	0.20 - 0.75	0.10		Minor	14, 15	Acceptable	New Observation: Minor erosion channel on the landfill surface extending to the crest of the eastern side slope
Frost Action	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Animal Burrows	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staining	Yes	Feature G	1.00 - 4.00	10.00	N/A	Isolated	Rust coloured staining and bacterial sheen	21	Acceptable	New Observation: Rust coloured staining and bacterial sheen present in ponded water at the toe of east slope of the landfill
Vegetation Stress	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Seepage Points	Yes	Feature G	10.00 - 15.00	2.00 - 5.00	N/A	Occasional	Seepage along toe and slope	17		2 distinct wetted areas on the eastern slope and toe of the lobe, associated with Feature F
Debris Exposed	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Presence/Condition of Monitoring Instruments	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Feature of Note	Yes	Feature B	2	0.005 - 0.02	Unknown	Occasional	Tension crack	2, 3	Acceptable	New Observation: Small tension crack running perpendicular to the landfill toe
		Feature F	0.50 - 50	0.01- 0.02	0.01 - 0.05		Tensile cracking	18 - 20, 22	Marginal	Discontinuous tensile crack running perpendicular to the east slope, from within 1 m to 3 m from the landfill toe. Discontinuous cracks present in conjunction with suspected sloughing
Additional Photographs	Yes	As indicated on CAM-5.2	N/A	N/A	N/A	N/A	General Photographic record	N/A	N/A	No features of note, general photos of the landfill lobe for record keeping purposes
Overall Landfill Performance	Acceptable									

3.3 PRELIMINARY STABILITY ASSESSMENT

The Preliminary Stability Assessment for Lower Site Landfill – South has been completed as per the TOR and is included as Table V hereafter.

Table V: Preliminary Stability Assessment – Lower Site Landfill – South

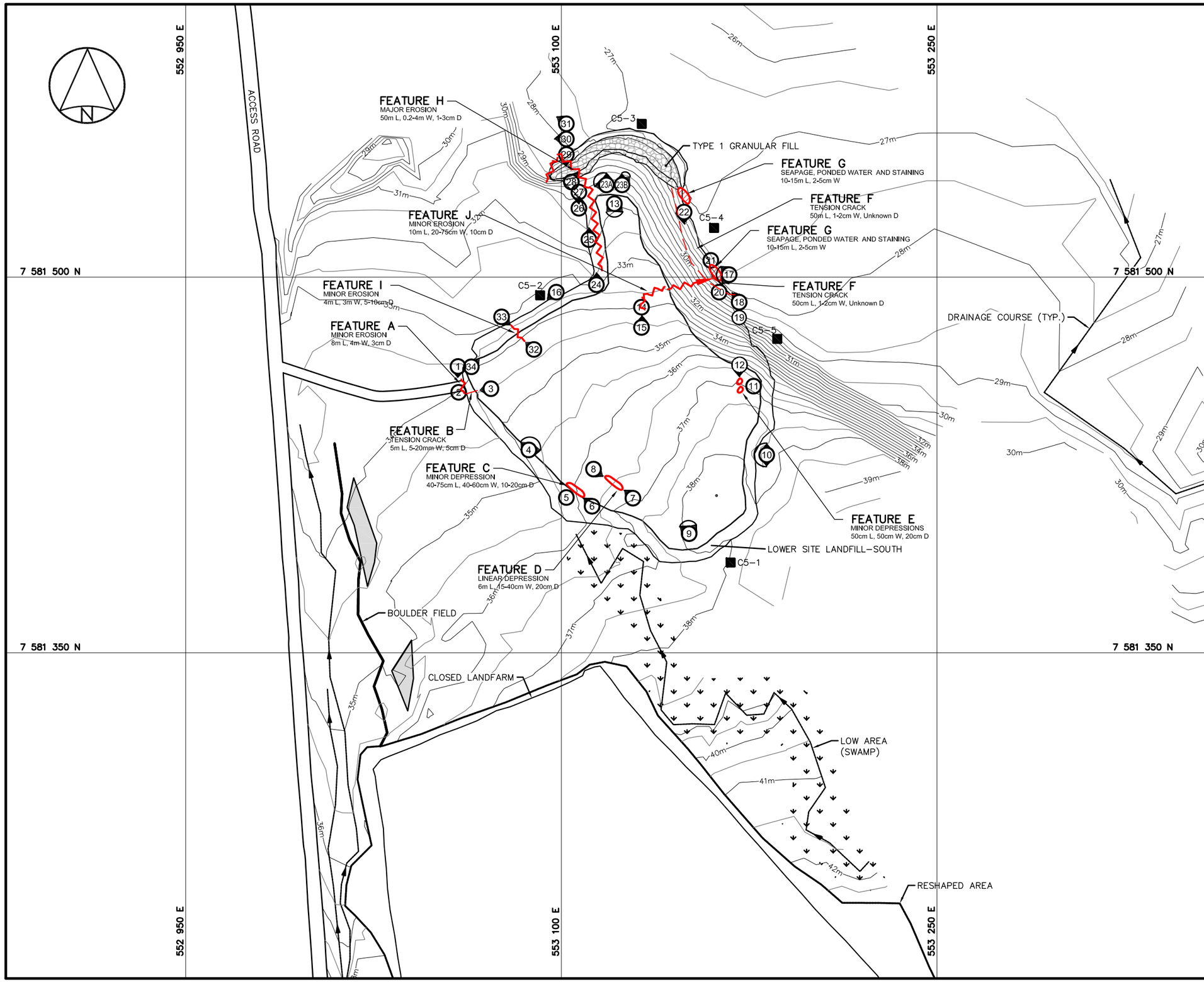
Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Marginal	Occasional
Frost Action	Not observed	None
Staining	Acceptable	Isolated
Vegetation Stress	Not observed	None
Seepage/Ponded Water	Acceptable	Occasional
Debris Exposure	Not observed	None
Overall Landfill Performance	**Acceptable**	

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 landfill is compromised to the extent that 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.

3.4 LOCATION PLAN

The Location Plan for the Lower Site Landfill - South has been completed as per the TOR and is included in the following page as Figure CAM-5.2 Lower Site Landfill – South.



LEGEND

- BODY OF WATER
- SOIL SAMPLE LOCATION
- PHOTOGRAPH LOCATION
- SETTLEMENT (NTS)
- EROSION (NTS)
- CRACK (NTS)
- PONDING
- SEEPAGE (NTS)

0 15m 30m 45m 60m 75m

NO.	VERSION	DATE	PAR	VERIF.	APPR.
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Construction de Défense Canada
Defence Construction Canada

COLLECTION OF LANDFILL MONITORING DATA

CAM-5, MACKAR INLET, NUNAVUT

LOWER SITE LANDFILL - SOUTH

SITE REMEDIATION SOLUTIONS

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MEASUREMENT UNIT	SCALE:	DATE (month-year):
Meter	1 : 1,500	FEBRUARY 2013
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PROJECT NO: CD2655_200_203	DRAWING NO: CD2655_200_203-CAM-5_2	PAGE CAM-5.2

FIGURE CAM-5.2

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3.5 PHOTOGRAPHIC RECORDS

The Photographic Record for Lower Site Landfill – South has been completed as per the TOR and is included as Table VI hereafter. The Photographic Record only contains an index and "thumbnail" photographs. Full-sized photographs are contained in the Addendum DVD-ROM.

Table VI: Landfill Visual Inspection Photo Log – Lower Site Landfill - South

Photo	Thumbnail	Filename	Size (KB)	Date	Vantage Point		Focal Length	Caption
					Easting	Northing		
1		2012-C5-LSLS-1	2340	29/08/2012	553059	7581464	5 mm	**Feature A.** Minor erosion between east toe and former access road, potentially the location of a former culvert during the remediation activities. View S. (8 m x 4 m x 0.30 m)
2		2012-C5-LSLS-2	2380	29/08/2012	553059	7581454	5 mm	**Feature B.** Close-up of tension crack just south of access road on western landfill toe. Crack runs perpendicular to the toe. (2 m x 5-20 mm)
3		2012-C5-LSLS-3	2350	29/08/2012	553072	7581455	5 mm	**Feature B.** View W of tension crack
4		2012-C5-LSLS-4	313	29/08/2012	553087	7581431	5 mm	Panorama view NW - E of north western section of the landfill cap. Taken 36 m SE of Access.
5		2012-C5-LSLS-5	2310	29/08/2012	553102	7581412	5 mm	**Feature C.** Close up of two small depressions on the landfill surface, 5 m from the south western toe at coordinate 510. Eastern depression is 0.75 m x 0.60 m x 0.20 m, western depression is 0.40 m x 0.20 m x 0.10 m
6		2012-C5-LSLS-6	2440	29/08/2012	553102	7581412	5 mm	**Feature C.** View NW of feature.
7		2012-C5-LSLS-7	2460	29/08/2012	553113	7581405	5 mm	**Feature D.** View NW of linear depression on landfill surface. (6 m x 0.15-0.40 m x 0.20 m)
8		2012-C5-LSLS-8	2330	29/08/2012	553112	7581412	5 mm	**Feature D.** View SE of linear depression on landfill surface (6 m x 0.15-0.40 m x 0.20 m)
9		2012-C5-LSLS-9	331	29/08/2012	553151	7581392	5 mm	Panorama view NW - NE of north southern section of the landfill cap.
10		2012-C5-LSLS-10	236	29/08/2012	553182	7581429	5 mm	Panorama view S -N of eastern section of landfill cap. Taken 6 m NE of coordinate 506.
11		2012-C5-LSLS-11	2290	29/08/2012	553178	7581458	5 mm	**Feature E.** Close up of two small depressions (equal in size)on the landfill surface 2m from the eastern crest of the landfill. (0.5 m x 0.5 m x 0.20 m).
12		2012-C5-LSLS-12	2410	29/08/2012	553171	7581465	5 mm	**Feature E.** View S of two small depressions (equal in size) on the landfill surface 2m from the eastern crest of the landfill. (0.5m x 0.5m x 0.20m).
13		2012-C5-LSLS-13	392	29/08/2012	553121	7581529	5 mm	Panorama view SE-SW of northern section of landfill cap. Taken from northern crest of landfill
14		2012-C5-LSLS-14	2280	29/08/2012	553132	7581488	5 mm	**Feature J.** Close up of minor erosion channel which drains N for 5m and then continues 5 m NE to the eastern crest of the landfill.
15		2012-C5-LSLS-15	2410	29/08/2012	553132	7581488	5 mm	**Feature J.** View N of minor erosion channel which drains N for 5m and then continues 5 m NE to the eastern crest of the landfill.
16		2012-C5-LSLS-16	2580	29/08/2012	553098	7581494	5 mm	View SW of North West Landfill toe
17		2012-C5-LSLS-17	892	30/08/2012	553167	7581501	5 mm	Panorama view SW - NW of eastern slope and toe of landfill, **Feature G,** seepage and ponding water are visible in this panorama
18		2012-C5-LSLS-18	2450	30/08/2012	553171	7581490	5 mm	**Feature F.** Discontinuous Tensile cracking visible adjacent to field note book in photo (50 m x 0.02 m x 0.01 m). **Feature K.** Ponded water and 2 distinct wet areas of the landfill cap are visible. View NNE.
19		2012-C5-LSLS-19	2390	30/08/2012	553171	7581490	5 mm	**Feature F.** Close up of tensile cracking.
20		2012-C5-LSLS-20	2280	30/08/2012	553163	7581494	5 mm	**Feature F.** Close up of tensile cracking, 5 M north of photograph 19.
21		2012-C5-LSLS-21	2510	30/08/2012	553166	7581503	5 mm	**Feature G.** Close up of bacterial sheen along landfill toe, associated with southern seepage area on the eastern landfill slope. (5 m x 3 m)
22		2012-C5-LSLS-22	2360	30/08/2012	553149	7581526	5 mm	**Feature F.** View south of tensile cracking and east slope of landfill.
23A		2012-C5-LSLS-23B	557	30/08/2012	553118	7581541	5 mm	Panorama view W - N, of Type 1 granular fill at north landfill toe.
23B		2012-C5-LSLS-23B	603	30/08/2012	553118	7581541	5 mm	Panorama view N - NE, of Type 1 granular fill at north landfill toe.
24		2012-C5-LSLS-24	2430	30/08/2012	553114	7581497	5 mm	**Feature H.** View N of southern end of erosion channel along the western toe of the north section of the landfill. (50 m x 0.20 - 4 m x 0.10 - 0.30 m).
25		2012-C5-LSLS-25	2430	30/08/2012	553111	7581515	5 mm	**Feature H.** View N of erosion channel along the western toe of the north section of the landfill. (50 m x 0.20 - 4 m x 0.10 - 0.30 m).
26		2012-C5-LSLS-26	2380	30/08/2012	553107	7581534	5 mm	**Feature H.** View N of most eroded section of the channel, 5 m from the Type granular fill section at the northern toe. (50 m x 0.20 - 4 m x 0.10 - 0.30 m).
27		2012-C5-LSLS-27	2450	30/08/2012	553107	7581534	5 mm	**Feature H.** View S of most eroded section of the channel, minor sloughing (indicated by field book) is extending the channel east into the landfill cap.
28		2012-C5-LSLS-28	2350	30/08/2012	553104	7581538	5 mm	**Feature H.** View NE of second erosion channel that converges with main channel.
29		2012-C5-LSLS-29	2660	30/08/2012	553102	7581549	5 mm	View S of Type 1 section and northern landfill toe, deposition of material from feature H is visible in the type 1 layer
30		2012-C5-LSLS-30	2700	30/08/2012	553102	7581549	5 mm	View W of surrounding landscape from the northern landfill toe
31		2012-C5-LSLS-31	2720	30/08/2012	553102	7581549	5 mm	View NW of surrounding landscape from the northern landfill toe
32		2012-C5-LSLS-32	2300	30/08/2012	553075	7581470	5 mm	**Feature I.** View NW of minor erosion channel on northwestern toe of the south landfill section. (4 m x 3 m x 0.05-0.10 m)
33		2012-C5-LSLS-33	1810	30/08/2012	553077	7581479	5 mm	**Feature I.** View SE of minor erosion channel on Northwestern toes of landfill. (4 m x 3 m x 0.05-0.10 m)
34		2012-C5-LSLS-34	2580	30/08/2012	553061	7581462	5 mm	View NE of Northwestern landfill toes, taken from entrance to access road.

4 NON-HAZARDOUS WASTE LANDFILL

4.1 SUMMARY

The 2012 monitoring of the Non-Hazardous Waste Landfill (NHWL) conducted on August 29th, 2012, consisted of a visual inspection to identify areas of erosion. As per the ToR no soil or groundwater samples were taken in 2012.

A small hydrocarbon stain (Feature F) was observed on the surface of the NHWL. A new observation, it is suspected the stain may be the result of recent exploration activities at the CAM-5 site, as no other source of oil remains at the CAM-5 site. It is possible the staining is a result hunter activities during the winter months or simply went unnoticed during the baseline activities.

As of the 2012 monitoring event, no features were identified with “significant” or “unacceptable.” Isolated areas of staining (as discussed above), settlement and cracking were observed on the landfill surface or side slopes, all of which have an acceptable severity rating. Erosion channels were observed occasionally on the side slopes of the NHWL as well as the landfill toe. Erosion was observed primarily on the non-armoured portion of the southern side slope. All erosion channels are relatively small in size and appear to be self-armouring and thus have an acceptable severity rating.

Based on the results of the Preliminary Stability Assessment, the NHWL has an acceptable severity rating.

4.2 VISUAL INSPECTION REPORT

The Visual Inspection Checklist/Report has been completed as per the TOR and is included as Table VII of this report. For the purpose of naming (and naming only), the side and corners of the NHWL and the access road were assumed as being in a north – south orientation. Please refer to Figure CAM-5.3 for a sketch of the NHWL detailing the location of photographs and erosional features.

<u>Weather at Time of Inspection</u>

Seasonally warmer weather conditions were observed while conducting the monitoring at the NHWL (conducted on August 29th). The investigation was conducted later in the afternoon; the temperature was 7-8 °C with clear skies and sunshine and little to no wind.

Settlement

A small area of linear settlement Feature G (new observation) was observed adjacent and running parallel to the west crest of the landfill. Based on its size, shape, orientation and location (at the edge of the compacted surface), the depression is likely the result of a compactor remaining in this location for too long when changing directions. The severity rating of Feature G is acceptable.

Erosion

Five areas of erosion were observed at the NHWL during the 2012 monitoring program, two of which were noted during the baseline investigation. Feature A (previously noted) on the South landfill slope, appears to have increased slightly in width and depth based on the AECOM photographic record (picture 183), with a reduction of fine material present in the erosion channel. Feature A appears to be self-armouring and has an acceptable severity rating.

Feature B (previously noted) on the north slope of the NHWL, remains stable in size and is self-armouring. Feature B has an acceptable severity rating.

Feature H (new observation) on the south slope of the NHWL features two small erosion channels that converge at the midpoint of the slope to form a larger (although still minor) erosion channel. Feature H appears to be self-armouring and has an acceptable severity rating.

Feature I (new observation) is a small erosion channel on the south slope of the NHWL. The channel appears to be self-armouring and has an acceptable severity rating.

Feature J (new observation) consists of an area of erosion and deposition (pool and riffle sequence) where the ponded water south of the NHWL drains into the reshaped area at the south west corner of the landfill. The running water does not appear to be eroding the landfill toe at this time but rather the material associated with the reshape; however, the water is currently in contact with the landfill toe. It should be noted that evidence of erosion and deposition were observed at several locations in the reshaped area, these areas are recorded in the photographic log.

Frost Action

Evidence of frost action was not noted.

Evidence of Burrowing Animals

Indications of burrowing animals were not noted.

Re-establishment of Vegetation

Evidence of vegetation was not noted.

Staining

One area of hydrocarbon staining was observed on the landfill cap (Feature F). Similar staining was observed at the Tier II (Feature C) and the USAF landfill (Feature B). Based on the provided documents, these features were not noted during the baseline observations and as such, may be the result of recent exploration activities in the area as they utilize ATVs for travel. The severity rating of the stain is acceptable, although it can be easily removed if required during future monitoring events.

Seepage Points

No seepage points were observed at this landfill, however surface wetting is observed on approximately 30% of the landfill surface, Feature D. It is suspected that the surface wetting was caused by light precipitation on the night of August 28th, 2012, and as such will be considered a "Other Feature of Note."

Debris

There was no evidence of exposed debris at this landfill.

Presence/Condition of Monitoring Instruments

The monitoring well casings are in good condition.

Other Features of Note

A single area of ponded water (Feature E) was noted at the toe of the south side of the landfill. This area of water drains into the reshaped area which has produced Feature J as a result.

A discontinuous tension crack (Feature C) previously noted was observed running ¾ of the length of the north side slope of the NHWL fluctuating between 1–2m from the landfill toe. The tension crack (never larger than 2mm in width) has an acceptable severity rating.

A second tension crack was noted on the south side slope of the NHWL during the baseline investigation; at the time of the 2012 monitoring event this tension crack was not observed.

Feature D, surface wetting as discussed above.

Table VII: Visual Inspection Checklist / Report – Non-Hazardous Waste Landfill

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

SITE NAME: Non-Hazardous Waste Landfill
LANDFILL DESIGNATION: Constructed Facility
DATE OF INSPECTION: August 29, 2012
DATE OF PREVIOUS INSPECTION: Date of Baseline Investigation is unknown
INSPECTED BY: B. MacKay
REPORT PREPARED BY: B. MacKay
MONITORING EVENT: 2
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.

Checklist Item	Present (Yes/No)	Location	Length (m)	Width (m)	Depth (m)	Extent	Description	Photographic Record	Severity Rating	Additional Comments
Settlement	Yes	Feature G	1.25	0.15	0.05	Isolated	Linear depression	26, 27	Acceptable	New Observation: Linear depression running parallel to the west side of the landfill.
Erosion	Yes	Feature A	8.00	0.20 - 0.40	0.05 - 0.10	Occasional	Minor erosion channel	38, 39	Acceptable	Minor self armouring erosion channel.
		Feature B	8.00	0.1	0.05		2 minor erosion channels	15, 16		2 minor erosion channels extending the length of the north slope of the landfill. Appear to be self armouring.
		Feature H	8.00	1.00- 4.00	0.01 - 0.05		2 minor converging erosion channels	35, 36, 37		New Observation: 2 erosion channels 2 m apart at the landfill surface converge to form one 4 m wide channel 3 m from the toe. Self armouring.
		Feature I	8.00	0.05	0.01		Minor erosion channel	33, 34		New Observation: Self armouring erosion channel on the south slope of the landfill.
		Feature J	4.00	0.5	0.05 - 0.10		Minor erosion	32, 43 - 45		New Observation: Water running along toe at SW corner of landfill, within the reshaped area.
Frost Action	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Animal Burrows		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staining	Yes	Feature F	0.60	0.20	N/A	Isolated	Hydrocarbon Stain	6, 7	Acceptable	New Observation: Type A hydrocarbon stain, most likely the result of a vehicle leak.
Vegetation Stress	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Seepage Points	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Debris Exposed	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	Yes	N/A	N/A	N/A	N/A	N/A	Monitoring wells	Various	N/A	Monitoring well casings are in good condition.
Other Feature of Note	Yes	Feature C	28.00	0.01	0.01 - 0.03	Isolated	Tension crack	17	Acceptable	Tension crack extending 3/4s of the length of the northern side of the landfill, ranging 1 - 2 m from the toe.
		Feature D	50.00	10.00	Unknown	Isolated	Surface wetting	25,26	Acceptable	Approximatly 30% of the surface of the NHWL is damp, assumed to be caused by preciptation event on August 28, 2012.
		Feature E	45.00	2.00 - 4.00	0.05 - 0.30	Isolated	Ponded Water	40, 44	Acceptable	Previosuly observed ponded water at south toe of landfill.
Additional Photographs	Yes	As indicated on CAM-5.3	N/A	N/A	N/A	N/A	General Photographic record	N/A	N/A	No features of note, general photos of the landfill lobe for record keeping purposes.
Overall Landfill Performance	Acceptable									

4.3 PRELIMINARY STABILITY ASSESSMENT

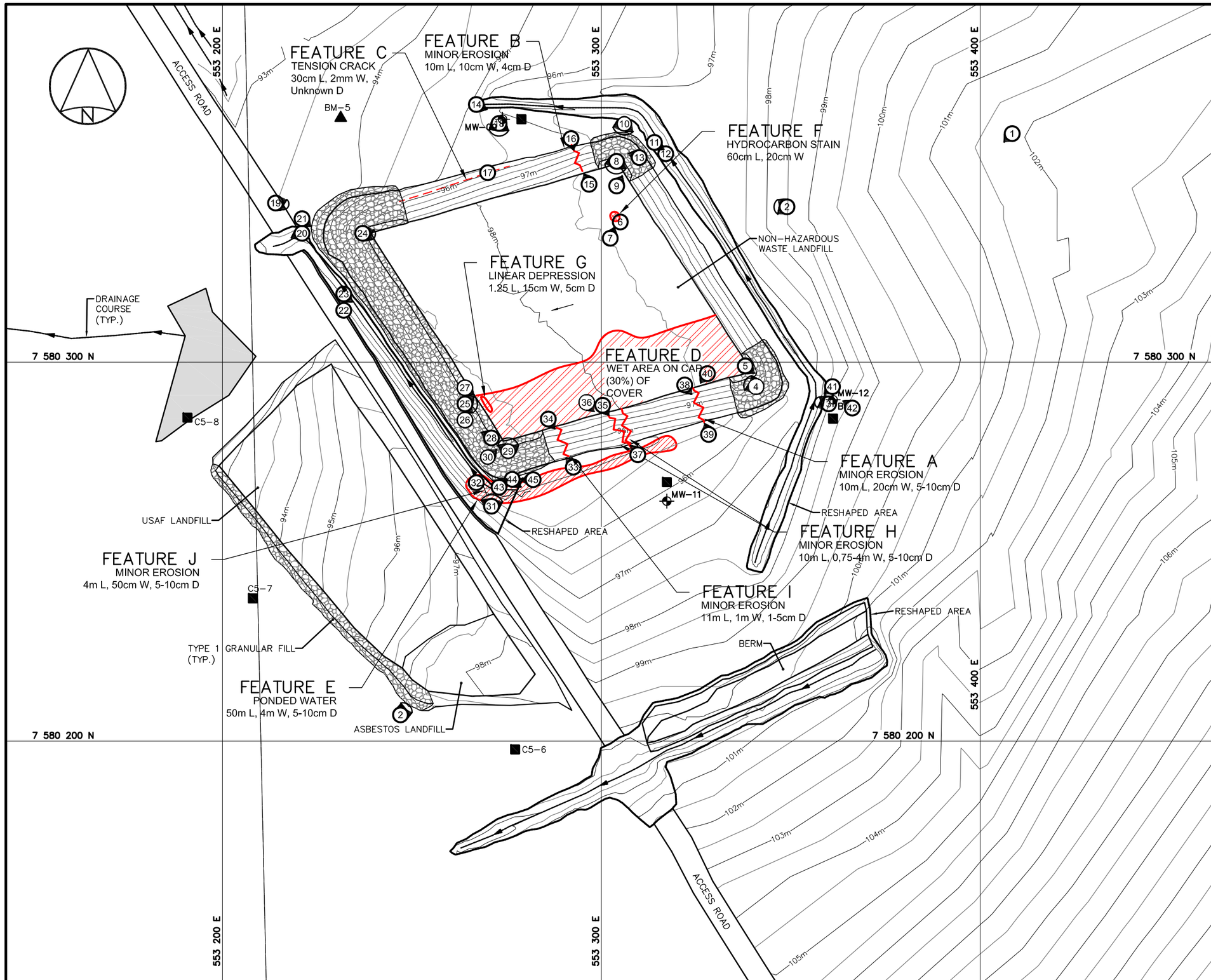
The Preliminary Stability Assessment for NHWL has been completed as per the TOR and is included as Table VIII hereafter.

Table VIII: Preliminary Stability Assessment – Non-Hazardous Waste Landfill

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

4.4 LOCATION PLAN

The Location Plan for the NHWL has been completed as per the TOR and is included in the following page as Figure CAM-5.3 Mackar Inlet – Non-Hazardous Waste Landfill.



LEGEND

- BODY OF WATER
- BM-6 PERMANENT BENCHMARK LOCATION (1)
- MONITORING WELL LOCATION (2)
- B BACKGROUND MONITORING WELL LOCATION (1)
- MONITORING SOIL SAMPLE LOCATION (6)
- 33 PHOTOGRAPH LOCATION
- EROSION (NTS)
- CRACK (NTS)
- PONDING
- STAINING
- SETTLEMENT (NTS)
- WET AREA

NO.	VERSION	DATE	PAR	VERIF.	APPR.
A	FINAL	13-02-12	P.L.	B.M.	A.L.

Construction de Défense Canada
Defence Construction Canada

COLLECTION OF
LANDFILL MONITORING DATA
CAM-5, MACKAR INLET, NUNAVUT

NON-HAZARDOUS WASTE LANDFILL

SITE REMEDIATION SOLUTIONS

Biogenie, a division of EnGlobe Corp.
4495 Wilfrid-Hamel blvd, Suite 200
Quebec, (Quebec) CANADA G1P 2J7
Phone: (418) 653-4422 Fax.: (418) 653-3583

MEASUREMENT UNIT	SCALE:	DATE (month-year):
Meter	1 : 1,500	FEBRUARY 2013
DRAWN BY: P. LÉGARÉ	VERIFIED BY: B. MACKAY	APPROVED BY: A. LECLAIR P. Eng
PROJECT NO: CD2655_200_203	DRAWING NO: CD2655_200_203-CAM-5.3	PAGE CAM-5.3

FIGURE CAM-5.3

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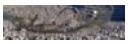
4.5 PHOTOGRAPHIC RECORDS

The Photographic Record for the NHWL has been completed as per the TOR and is included in the following pages as Table IX. The Photographic Record only contains an index and “thumbnail” photographs. Full-sized photographs are contained in the Addendum DVD-ROM.

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

Photo	Thumbnail	Filename	Size (KB)	Date	Vantage Point		Focal Length	Caption
					Easting	Northing		
1		2012-C5-NHWL-1	2590	29/08/2012	553346	7580295	5 mm	View SW of Eastern slope of the landfill
2		2012-C5-NHWL-2	68.7	29/08/2012	553349	7580341	5 mm	Panoramic view SW to NW from east of NHWL. Reshaped area is visible in the foreground
3		2012-C5-NHWL-3	113	29/08/2012	553360	7580289	5 mm	Panoramic view WSW to NW of SE corner of NHWL taken from MW-12
4		2012-C5-NHWL-4	14500	29/08/2012	553341	7580294	5 mm	Panoramic view WSW to NNW of landfill surface.
5		2012-C5-NHWL-5	2400	29/08/2012	553338	7580299	5 mm	View SE of SE corner of landfill, taken from the landfill surface. MW-12 is visible in the background.
6		2012-C5-NHWL-6	2370	29/08/2012	553305	7580337	5 mm	**Feature F.** Close-up of hydrocarbon staining, 15m S of the NE corner. (0.6m x 0.20m)
7		2012-C5-NHWL-7	2400	29/08/2012	553305	7580337	5 mm	**Feature F.** View NNE of hydrocarbon staining, 15m S of the NE corner. (0.6m x 0.20m)
8		2012-C5-NHWL-8	22200	29/08/2012	553304	7580353	5 mm	Panoramic view SE to WSW of landfill cap, taken from the NE corner.
9		2012-C5-NHWL-9	2520	29/08/2012	553304	7580353	5 mm	View NNE of NE corner, taken from landfill surface.
10		2012-C5-NHWL-10	108	29/08/2012	553305	7580358	5 mm	Panoramic view SE to WSW of landfill side slopes, taken 3 m north of the landfill toe.
11		2012-C5-NHWL-11	2650	29/08/2012	553314	7580358	5 mm	View SE of reshaped area, evidence of erosion and deposition is present in the drainage channel, taken 10 m east of the toe of the NE landfill corner
12		2012-C5-NHWL-12	2280	29/08/2012	553317	7580355	5 mm	Close-up of erosion and deposition in drainage channel, soil is damp but no standing water is present in this section of the reshaped area.
13		2012-C5-NHWL-13	2640	29/08/2012	553310	7580354	5 mm	View WNW of reshaped taken 7m NW of landfill toe at the NE corner.
14		2012-C5-NHWL-14	2600	29/08/2012	553267	7580368	5 mm	View ESE of reshaped area taken at the far WNW end of the reshaped area.
15		2012-C5-NHWL-15	2340	29/08/2012	553295	7580351	5 mm	**Feature B.** Minor erosion channel, view NNW from top of landfill cap. Areas of deposition visible at landfill toe - multiple channels. (10m x 0.1 x 0.04)
16		2012-C5-NHWL-16	2420	29/08/2012	553292	7580359	5 mm	**Feature B.** Minor erosion channel, view SSE from landfill toe.
17		2012-C5-NHWL-17	2570	29/08/2012	553270	7580350	5 mm	**Feature C.** Close-up of tension crack Small discontinuous crack runs for approximately 3/4 of the length of the N slope of the landfill, ranging from 1-2m, from the toe.
18		2012-C5-NHWL-18	84.2	29/08/2012	553273	7580363	5 mm	Panoramic view SE - SW of north slope of NWHL.
19		2012-C5-NHWL-19	146	29/08/2012	553214	7580342	5 mm	Panoramic view ENE - SE of NW corner of NHWL, taken 7m NW of landfill toe.
20		2012-C5-NHWL-20	2420	29/08/2012	553221	7580334	5 mm	View WSW of regraded area as it crosses the access road, evidence of deposition are visible within the regrade.
21		2012-C5-NHWL-21	2460	29/08/2012	553221	7580334	5 mm	View SE of regraded area and W slope of NHWL.
22		2012-C5-NHWL-22	2500	29/08/2012	553232	7580318	5 mm	Close-up of erosion and deposition in drainage channel, soil is damp but no standing water is present in this section of the reshaped area.
23		2012-C5-NHWL-23	2400	29/08/2012	553232	7580318	5 mm	View SE of drainage channel, erosion and deposition are visible in the channel.
24		2012-C5-NHWL-24	16100	29/08/2012	553237	7580334	5 mm	Panoramic view ENE - SE of landfill surface of NHWL, taken from top of NW corner
25		2012-C5-NHWL-25	106	29/08/2012	553264	7580289	5 mm	**Feature D.** Panoramic view NE-SE of wetting on landfill surface, approximately 30% of the landfill surface is wet.

Photo	Thumbnail	Filename	Size (KB)	Date	Vantage Point		Focal Length	Caption
					Easting	Northing		
26		2012-C5-NHWL-26	2380	29/08/2012	553264	7580289	5 mm	**Feature G.** Small linear depression 0.75m from W slope of landfill, 11m NW of SW corner. (1.25m x0.15m x 0.05m)
27		2012-C5-NHWL-27	2360	29/08/2012	553264	7580289	5 mm	**Feature G.** View SSE of small linear depression.
28		2012-C5-NHWL-28	2590	29/08/2012	553271	7580280	5 mm	View NW of W side slope of NHWL, taken from the SW corner of the landfill surface.
29		2012-C5-NHWL-29	82	29/08/2012	553271	7580280	5 mm	Panoramic view NW - ENE of landfill surface, taken from the SW corner of the landfill surface.
30		2012-C5-NHWL-30	2650	29/08/2012	553271	7580280	5 mm	View ENE of S side slope of NHWL, taken from the SW corner of the landfill surface.
31		2012-C5-NHWL-31	122	29/08/2012	553271	7580262	5 mm	Panoramic view NW - ENE of SW corner of landfill and side slopes, taken from the access road
32		2012-C5-NHWL-32	2450	29/08/2012	553269	7580267	5 mm	**Feature J.** Close up view of pool and riffle sequence associated with ponding water, causing erosion along the toe of the landfill at the SW corner.
33		2012-C5-NHWL-33	2470	29/08/2012	553293	7580272	5 mm	**Feature I.** Minor erosion on the south slope of the landfill, 1.5m ENE of armour. View NW from the landfill toe. (11m x 1m x 0.01 - 0.05m)
34		2012-C5-NHWL-34	2360	29/08/2012	553286	7580285	5 mm	**Feature I.** Minor erosion on the south slope of the landfill, 1.5m ENE of armour. View SE from the landfill surface. (11m x 1m x 0.01 - 0.05m)
35		2012-C5-NHWL-35	2390	29/08/2012	553300	7580289	5 mm	**Feature H.** 1 (western) of 2 minor erosion channels that converge at the midpoint of the southern slope to form a wider erosion channel. View SE from landfill surface. (10m x 0.75-4m x 0.05-0.10m)
36		2012-C5-NHWL-36	2290	29/08/2012	553297	7580288	5 mm	**Feature H.** 1 (eastern) of 2 minor erosion channels that converge at the midpoint of the southern slope to form a wider erosion channel. View SE from landfill surface. (10m x 0.75-4m x 0.05-0.10m)
37		2012-C5-NHWL-37	2340	29/08/2012	553310	7580276	5 mm	**Feature H.** 2 minor erosion channels that converge at the midpoint of the southern slope to form a wider erosion channel. View NW from Toe. (10m x 0.75-4m x 0.05-0.10m)
38		2012-C5-NHWL-38	2390	29/08/2012	553322	7580294	5 mm	**Feature A.** Minor erosion on the south slope of the landfill. View SE from the landfill surface. (10m x 0.20m x 0.05-0.10m)
39		2012-C5-NHWL-39	2360	29/08/2012	553325	7580286	5 mm	**Feature A.** Minor erosion on the south slope of the landfill. View NW from the landfill toe. (10m x 0.20m x 0.05-0.10m)
40		2012-C5-NHWL-40	2590	29/08/2012	553328	7580297	5 mm	**Feature E.** View SW of water ponding along the south toe of the landfill. (50m x 4m x ~0.05-0.1M)
41		2012-C5-NHWL-41	2490	29/08/2012	553361	7580290	5 mm	View SW of reshaped area from MW-12
42		2012-C5-NHWL-42	2640	29/08/2012	553361	7580290	5 mm	View NW of reshaped area from MW-12
43		2012-C5-NHWL-43	2520	29/08/2012	553273	7580267	5 mm	**Feature J.** View NE of pool and riffle sequence at the landfill toe.
44		2012-C5-NHWL-44	2590	29/08/2012	553276	7580269	5 mm	**Feature J/E.** View SE of ponded water and pool riffle sequence.
45		2012-C5-NHWL-45	156	29/08/2012	553282	7580269	5 mm	**Feature J.** Panoramic view from overhead of pool and riffle sequence and associated erosion/deposition.
46		2012-C5-NHWL-46	5290	30/08/2012	553282	7580269	55 mm	Aerial view of The NHWL as well as the USAF and Asbestos Landfills

5 USAF & ASBESTOS LANDFILLS

5.1 SUMMARY

The 2012 monitoring of the USAF & Asbestos Landfills conducted on August 29, 2012 consisted of a visual inspection to identify areas of erosion conducted. As per the ToR no soil or groundwater samples were taken in 2012.

Much like the NHWL, a small hydrocarbon stain (Feature B) was observed on the surface of the USAF section of the landfill. A new observation, it is suspected the stain may be the result of recent exploration activities at the CAM-5 site, as no other source of oil remains at the CAM-5 site. It is possible the staining is a result of hunter activities during the winter months or simply went unnoticed during the baseline activities. An isolated piece of wooden debris was observed protruding from the landfill section of the landfill (Feature D). Based on the dimensions of the debris it is likely a survey stake used during the construction of the landfill and has an acceptable severity rating.

As of the 2012 monitoring event, no features were identified with “significant” or “unacceptable.” A number of features with acceptable severity ratings were observed on the landfill surface comprised almost entirely of tracks caused by pick-up trucks or heavy equipment.

Based on observations made during the 2012 monitoring program, the USAF & Asbestos landfill have an acceptable performance rating in terms of debris containment. As the majority of the features observed at the landfills are the result of human activities no longer occurring at the site, it is anticipated this landfill will continue to function properly.

5.2 VISUAL INSPECTION REPORT

The visual inspection of the USAF & Asbestos Landfill was conducted on August 29, 2012. The Visual Inspection Checklist/Report has been completed as per the TOR and is included as Table X of this report. Please refer to Figure CAM-5.4 for a sketch of the USAF & Asbestos Landfill detailing the location of photographs and erosional features.

Weather at Time of Inspection

Seasonally warmer weather conditions were observed while conducting the monitoring at the USAF & Asbestos Landfill (conducted on August 29th). The investigation was conducted in the afternoon; the temperature was 7-8 °C with clear skies and sunshine and little to no wind.

Settlement

Two areas of minor settlement were noted, one on the surface of the Asbestos section of the landfill, the other on the USAF lobe. Feature A, north of the access road consists of small linear depressions with an acceptable severity rating. Feature C consists of three small closely spaced depressions (potholes) situated on the west surface of the USAF lobe and has an acceptable severity rating. These areas of settlement were not noted during the baseline investigation.

Erosion

Indications of erosion were not noted during the 2012 monitoring program.

Frost Action

Evidence of frost action was not noted during the 2012 monitoring program.

Evidence of Burrowing Animals

Indications of burrowing animals were not noted during the 2012 monitoring program.

Re-establishment of Vegetation

Evidence of vegetation was not noted during the 2012 monitoring program.

Staining

An area of hydrocarbon staining (Feature B) was noted on the surface of the USAF section of the landfill. The feature has an acceptable severity rating and as mentioned previously, could be removed during future monitoring events.

Seepage Points

Evidence of seepage was not noted during the 2012 monitoring program.

Debris

There was one occurrence of exposed debris on the Asbestos section of the landfill and no occurrences at the USAF section of the landfill. Feature D consists of a small piece of wooden debris of an unknown length just north of the DND landfill sign. The debris appears to be a survey

stake used for construction that was compacted into the landfill cap. The severity rating of Feature D is acceptable.

Presence/Condition of Monitoring Instruments

There are no monitoring instruments installed at this landfill.

Other Features of Note

Indications of vehicle traffic are prevalent on the landfill surface including vehicle tracks and depressions (Feature E). The size of the tracks and depressions are consistent with a pick-up and heavy equipment. Vehicle rutting/tracks is more prevalent at the access from the road (at the east side of the Asbestos lobe) and the north toe of the landfill where rutting is also present on the surrounding tundra. As none of the depressions and tracks caused by vehicle traffic is of a significant depth, Feature E has an acceptable severity rating.

A small pile of granular fertilizer is present at the north east corner of the USAF landfill, Feature F. The feature has an acceptable severity rating and could be spread on the landfill cap during future monitoring events to promote re-vegetation.

Two landfill markers are present on the Asbestos section of the landfill; both signs are in good condition.

Table X: Visual Inspection Checklist / Report – USAF & Asbestos Landfill

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

SITE NAME: CAM-5 Mackar Inlet
LANDFILL DESIGNATION: USAF & Asbestos Landfill
DATE OF INSPECTION: August 29, 2012
DATE OF PREVIOUS INSPECTION: Date of Baseline Investigation is unknown
INSPECTED BY: B. MacKay
REPORT PREPARED BY: B. MacKay
MONITORING EVENT: 1
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.

Checklist Item	Present (Yes/No)	Location	Length (m)	Width (m)	Depth (m)	Extent	Description	Photographic Record	Severity Rating	Additional Comments
Settlement	Yes	Feature A	2.00	0.6	0.2	Isolated	Linear depression	8	Acceptable	New Observation: Linear depression at access to Asbestos landfill, possibly caused by machinery during construction of cap.
		Feature C	0.10, 1.00, 2.00	0.2	0.1	Isolated	Minor depressions	16 - 18	Acceptable	New Observation: 2 linear depressions and 1 small pot hole 5 m from the western toe.
Erosion	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Frost Action		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Animal Burrows		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staining	Yes	Feature B	0.4	0.2	N/A	Isolated	Hydrocarbon Stain	12	Acceptable	New Observation: Hydrocarbon stain potentially caused by leaking equipment.
Vegetation Stress	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Seepage Points		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Debris Exposed	Yes	Feature D	0.05	0.05	Unknown	Isolated	Wood Debris	4	Acceptable	New Observation: Wooden Survey stake, used during construction that was not removed prior to compaction.
		Feature F	0.10	0.15	0.10 (exposed)	Isolated	Landfill plaque	3	Acceptable	New Observation: DIAND Landfill corner mark, permit # N92X741.
Presence/Condition of Monitoring Instruments	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Features of Note	Yes	Feature E	1.00 - 20.00	0.20 - 0.50	0.05 - 0.15	Marginal	Vehicle tracks	7, 9, 10, 20 - 22	Acceptable	New Observation: Vehicle tracks are present at several locations on the landfill surface and rutting is present on the surrounding tundra.
		Feature F	1.00	1.00	0.20	Isolated	Granular fertilizer	24, 25	Acceptable	New Observation: A small pile of granular fertilizer remains at the North-east corner of the regrade, presumably leftover from land farming activities on site and poorly spread on the regrade to promote plant growth.
Additional Photographs	Yes	As indicated on CAM-5.4	N/A	N/A	N/A	N/A	General Photographic record	N/A	N/A	No features of note, general photos of the landfill lobe for record keeping purposes.
Overall Landfill Performance	Acceptable									

5.3 PRELIMINARY STABILITY ASSESSMENT

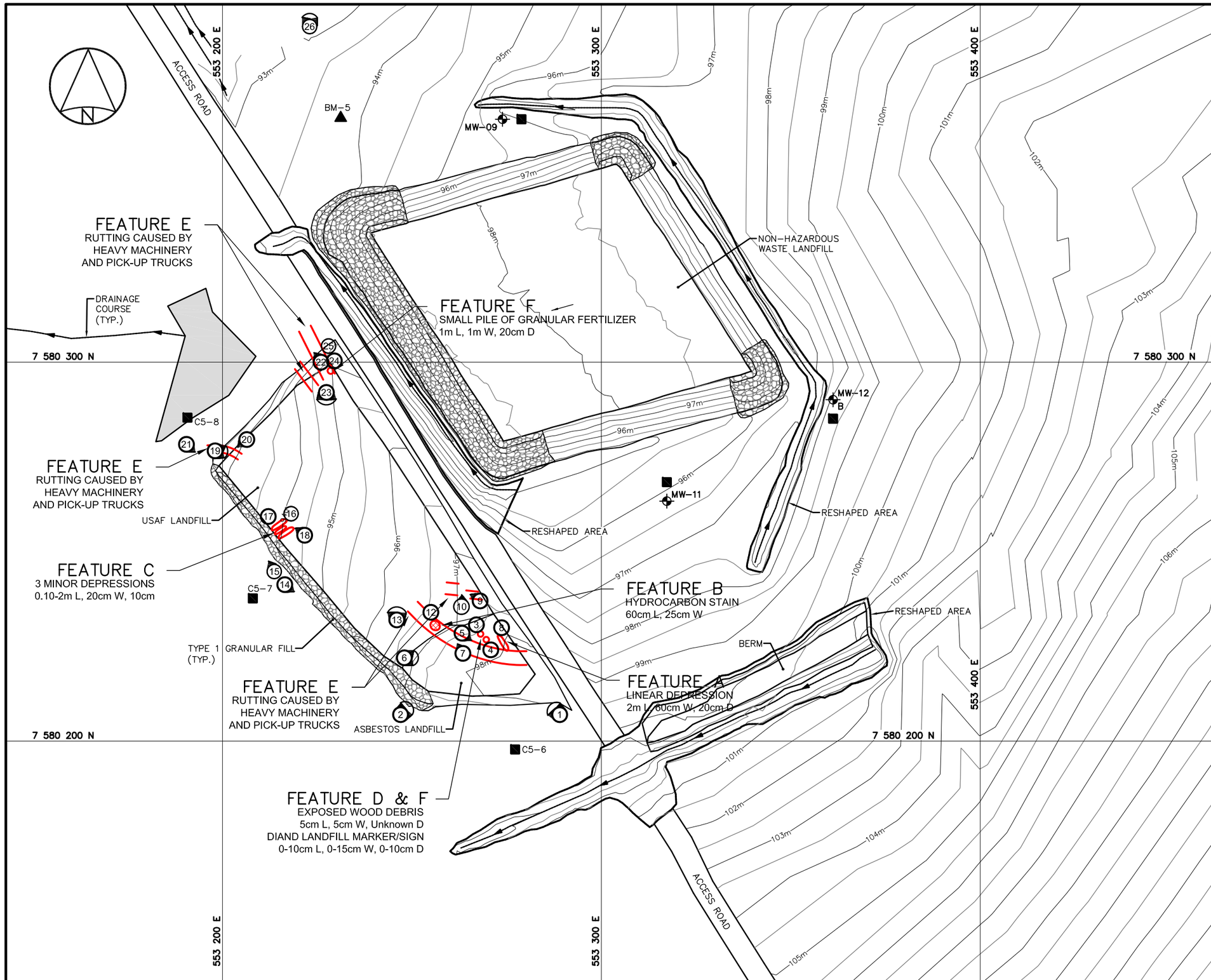
The Preliminary Stability Assessment for the USAF & Asbestos Landfill has been completed as per the TOR and is included as Table XI hereafter.

Table XI: Preliminary Stability Assessment – USAF and Asbestos Landfill

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

5.4 LOCATION PLAN

The Location Plan for the USAF & Asbestos Landfill has been completed as per the TOR and is included in the following page as Figure CAM-5.4 Mackar Inlet – USAF & Asbestos Landfill.



LEGEND

- BODY OF WATER
- BM-6 PERMANENT BENCHMARK LOCATION (1)
- MONITORING WELL LOCATION (2)
- B BACKGROUND MONITORING WELL LOCATION (1)
- MONITORING SOIL SAMPLE LOCATION (6)
- 33 PHOTOGRAPH LOCATION
- SETTLEMENT (NTS)
- RUTTING (NTS)
- STAINING

NO.	VERSION	DATE	PAR	VERIF.	APPR.
A	FINAL	13-02-12	P.L.	B.M.	A.L.

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COLLECTION OF
LANDFILL MONITORING DATA
CAM-5, MACKAR INLET, NUNAVUT

USAF AND ASBESTOS LANDFILLS

SITE REMEDIATION SOLUTIONS

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MEASUREMENT UNIT	SCALE:	DATE (month-year):
Meter	1 : 1,500	FEBRUARY 2013
DRAWN BY: P. LÉGARÉ	VERIFIED BY: B. MACKAY	APPROVED BY: A. LECLAIR P. Eng
PROJECT NO: CD2655_200_203	DRAWING NO: CD2655_200_203-CAM-5.4	PAGE CAM-5.4

FIGURE CAM-5.4

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5.5 PHOTOGRAPHIC RECORDS

The Photographic Record for the USAF & Asbestos Landfill has been completed as per the TOR and is included in the following pages as Table XII. The Photographic Record only contains an index and “thumbnail” photographs. Full-sized photographs are contained in the Addendum DVD-ROM.

Table XII: Landfill Visual Inspection Photo Log – USAF & Asbestos Landfill

Photo	Thumbnail	Filename	Size (KB)	Date	Vantage Point		Focal Length	Caption
					Easting	Northing		
1		2012-C5-USAF-ASB-1	153	29/08/2012	553289	7580207	5 mm	Panoramic view W - N of the Asbestos Landfill cap, taken from SE corner
2		2012-C5-USAF-ASB-2	4880	29/08/2012	553247	7580207	5 mm	Panoramic view N - E of the Asbestos Landfill cap, taken from SW corner
3		2012-C5-USAF-ASB-3	1840	29/08/2012	553267	7580231	5 mm	**Feature F.** Half-buried DND Landfill corner marker
4		2012-C5-USAF-ASB-4	2840	29/08/2012	553262	7580227	5 mm	**Feature D.** Wood debris - survey stake that was not removed prior to compaction of the landfill.
5		2012-C5-USAF-ASB-5	2370	29/08/2012	553228	7580224	5 mm	View SE of DND landfill sign (in good condition) yellow field book indicates the location of Feature D
6		2012-C5-USAF-ASB-6	116	29/08/2012	553248	7580222	5 mm	Panoramic view NE-SE of Asbestos landfill cap from NW corner of Asbestos landfill.
7		2012-C5-USAF-ASB-7	2430	29/08/2012	553263	7580223	5 mm	**Feature E.** View N of heavy equipment tracks. (30m)
8		2012-C5-USAF-ASB-8	2300	29/08/2012	553274	7580230	5 mm	**Feature A.** Close-up of linear depression, north of access. (2m x 0.6m x 0.20m)
9		2012-C5-USAF-ASB-9	2290	29/08/2012	553263	7580239	5 mm	**Feature E.** View NW of truck tire tracks. (3m x 0.20m x 0.10-0.15m)
10		2012-C5-USAF-ASB-10	2370	29/08/2012	5563263	7580235	5 mm	**Feature E.** View N of truck tire tracks. (1-2m x 0.20m x 0.10-0.15m)
12		2012-C5-USAF-ASB-12	2330	29/08/2012	553255	7580234	5 mm	**Feature B.** Hydrocarbon stain (0.60m x 0.25m)
13		2012-C5-USAF-ASB-13	96	29/08/2012	553246	7580232	5 mm	Panoramic view NW-NE of USAF landfill cap
14		2012-C5-USAF-ASB-14	2460	29/08/2012	553214	7580263	5 mm	View SE of W landfill toe and Type 1 riprap
15		2012-C5-USAF-ASB-15	2670	29/08/2012	553214	7580263	5 mm	View NW of W landfill toe and Type 1 riprap
16		2012-C5-USAF-ASB-16	2310	29/08/2012	553216	7580259	5 mm	**Feature C.** Close-up of the smallest depression of three (0.10m x 0.20m x 0.10m)
17		2012-C5-USAF-ASB-17	2310	29/08/2012	553220	7580257	5 mm	**Feature C.** Close-up of the two larger depression of three - located 2m east of small depression (0.10m x 0.20m x 0.10m)
18		2012-C5-USAF-ASB-18	2450	29/08/2012	553219	7580257	5 mm	**Feature C.** View NW of depressions.
19		2012-C5-USAF-ASB-19	5400	29/08/2012	553200	7580276	5 mm	Panoramic view ENE - SE of USAF landfill cap and riprap.
20		2012-C5-USAF-ASB-20	2290	29/08/2012	553204	7580277	5 mm	**Feature E.** View SW of tire tracks extending SW along landfill toe (6m x 0.20m x 0.20m)
21		2012-C5-USAF-ASB-21	2290	29/08/2012	553204	7580275	5 mm	**Feature E.** View SE of tire tracks extending SW along landfill toe (4m x 0.20m x 0.20m)
22		2012-C5-USAF-ASB-22	2290	29/08/2012	553226	7580300	5 mm	**Feature E.** View NNW of tire tracks extending beyond landfill toe (4m x 0.20m x 0.20m)
23		2012-C5-USAF-ASB-23	119	29/08/2012	553228	7580298	5 mm	Panoramic view SE-SW of northern section of landfill cap
24		2012-C5-USAF-ASB-24	2300	29/08/2012	553228	7580300	5 mm	**Feature F.** Small pile of granular fertilizer
25		2012-C5-USAF-ASB-25	2640	29/08/2012	553228	7580300	5 mm	**Feature F.** Small pile of granular fertilizer
26		2012-C5-USAF-ASB-26	194	29/08/2012	553223	7580398	5 mm	Panoramic view NNW-NNE of tire tracks north of the landfill

6 TIER II DISPOSAL FACILITY

6.1 SUMMARY

The 2012 monitoring of the Tier II Disposal Facility conducted on August 29, 2012 consisted of a visual inspection to identify areas of erosion conducted and as per the ToR, soil and groundwater samples were taken as well as thermal monitoring.

TPH was detected at the upgradient soil sampling location (MW-5) as well as one downgradient location (MW-6). At each location TPH was detected at surface (0 -15 cm) and at depth (40 – 50 cm). No TPH soil results were above 100 mg/kg, the highest being 84 mg/kg, well below the site remediation criteria of 2,500 mg/kg. PCB results were below detection limits and no significantly high metal results were detected. Two monitoring wells provided sufficient water for sampling MW-6 and MW-8. TPH and PCBs were below detection limits at both locations, while detected metal concentration was relatively low.

All dataloggers and thermistors were observed to be functioning properly with the exception of VT-3.The dataset of VT-3 recorded temperature irregularities from November 2011 to April 2012. The irregularities were consistent with errors caused by a low battery, which when subjected to low temperatures, will cease to function and then resume operation when temperature increases. As the VT-3 batteries were changed this field season and the thermistor beads were functioning properly, the VT-3 data logger was not removed from site. The status of VT-3 will be reassessed during the 2013 monitoring program.

As of the 2012 monitoring event, the Tier II Facility is showing little to no signs of erosion with no feature with a severity rating of “significant” or “unacceptable” which may be contributed to the Type 1 granular fill layer placed on the side slopes of the facility. The Tier II Disposal Facility overall performance rating is acceptable.

6.2 VISUAL INSPECTION REPORT

The visual inspection of the Tier II Disposal Facility was conducted on August 29, 2012. The Visual Inspection Checklist/Report has been completed as per the TOR and is included as Table XIII of this report. Please refer to Figure CAM-5.5 for a sketch of the Tier II Disposal Facility detailing the location of photographs and erosional features.

Weather at Time of Inspection

The investigation of the Tier II facility was conducted in two days, August 28 – 29th. Soil sampling and some thermistor work was completed late in the day on August 28th, skies were partly cloudy, with no wind and temperature was approximately 10°C. The remainder of the inspection was completed in the morning of August 29th including the remaining thermistor work, groundwater sampling and the visual inspection. Temperatures ranged from 0°C in the early morning to approximately 5°C before noon, skies were partly cloudy with little to no wind.

Settlement

Indications of localized settlement were observed at two locations in close proximity and thus, labelled as the singular Feature A. Feature A consisted of four small circular depressions or “pot holes”, two of which were observed previously along the north crest of the facility while an additional two depressions were observed during the 2012 investigation along the east crest. Each depression is associated with a large cobblestone, which may have impacted material placement or compaction during construction. Feature A has an acceptable severity rating.

Subtle linear depressions are present at regular intervals on the landfill surface. As these features are obviously the result of compaction practices during construction, they have not been recorded as a feature.

Erosion

Evidence of erosion was not noted during the 2012 monitoring program.

Frost Action

Evidence of frost action was not noted during the 2012 monitoring program.

Evidence of Burrowing Animals

Indications of burrowing animals were not noted during the 2012 monitoring program.

Re-establishment of Vegetation

Indications of vegetation were not noted during the 2012 monitoring program.

Staining

A hydrocarbon stain (Feature C) was noted at approximately the middle of the Tier II Facility. The feature has an acceptable severity rating and as mentioned previously, could be removed during future monitoring events.

Iron staining is present on approximately 30% of the Type I granular fill layer. Based on observations, the grid like nature of the staining and an inspection of the borrow source used for some of this material, it was suspected that the iron staining was present prior to placement on the Tier II Facility and thus has not been noted as a feature.

Seepage Points

Evidence of seepage (Feature B) was noted on the south side slope and toe, adjacent to the south west toe, with surface wetting extending 4m x 3m from the toe of the landfill. Despite the wetted areas, no signs of erosion are visible. Feature B has an acceptable severity rating.

Debris

Evidence of debris was not noted during the 2012 monitoring event.

Presence/Condition of Monitoring Instruments

All monitoring well and thermistor installations were found to be in good condition at the facility.

Other Features of Note

Surface wetting was present on approximately 30% of the landfill surface; the wetting was noted as Feature E and has an acceptable severity rating.

Table XIII: Visual Inspection Checklist / Report – Tier II Disposal Facility

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

SITE NAME: CAM-5 Mackar Inlet
LANDFILL DESIGNATION: Tier II Disposal Facility
DATE OF INSPECTION: August 29, 2012
DATE OF PREVIOUS INSPECTION: Date of Baseline Investigation is unknown
INSPECTED BY: B. MacKay
REPORT PREPARED BY: B. MacKay
MONITORING EVENT NUMBER: 1
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.

Checklist Item	Present (Yes/No)	Location	Length (m)	Width (m)	Depth (m)	Extent	Description	Photographic Record	Severity Rating	Additional Comments
Settlement	Yes	Feature A	0.30 - 0.60	0.20 - 0.30	0.05 - 0.10	Isolated	4 areas of settlement (pot holes, 2 areas were observed during the baseline investigation)	26 - 30	Acceptable	Each area of settlement is associated with a large cobble in the landfill cover, which may have interfered with compaction resulting in the small potholes.
Erosion	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Frost Action		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Animal Burrows		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vegetation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staining	Yes	Feature C	0.45	0.3	N/A	Isolated	Hydrocarbon Stain	44, 45	Acceptable	New Observation: Hydrocarbon stain.
Vegetation Stress	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Seepage Points	Yes	Feature B	4.00	3.00	N/A	Isolated	Wet area extending from toe of landfill	15, 16	Acceptable	New Observation: Area of surface wetting on the south slope of the landfill and extending from the toe.
Debris Exposed	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Presence/Condition of Monitoring Instruments	Yes	N/A	N/A	N/A	N/A	N/A	Groundwater monitoring wells and thermistors	Various	N/A	Monitoring wells and thermistor casings are in good condition.
Other Features of Note	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Additional Photographs	Yes	As indicated on CAM-5.5	N/A	N/A	N/A	N/A	General Photographic record	N/A	N/A	N/A
Overall Landfill Performance	Acceptable									

6.3 PRELIMINARY STABILITY ASSESSMENT

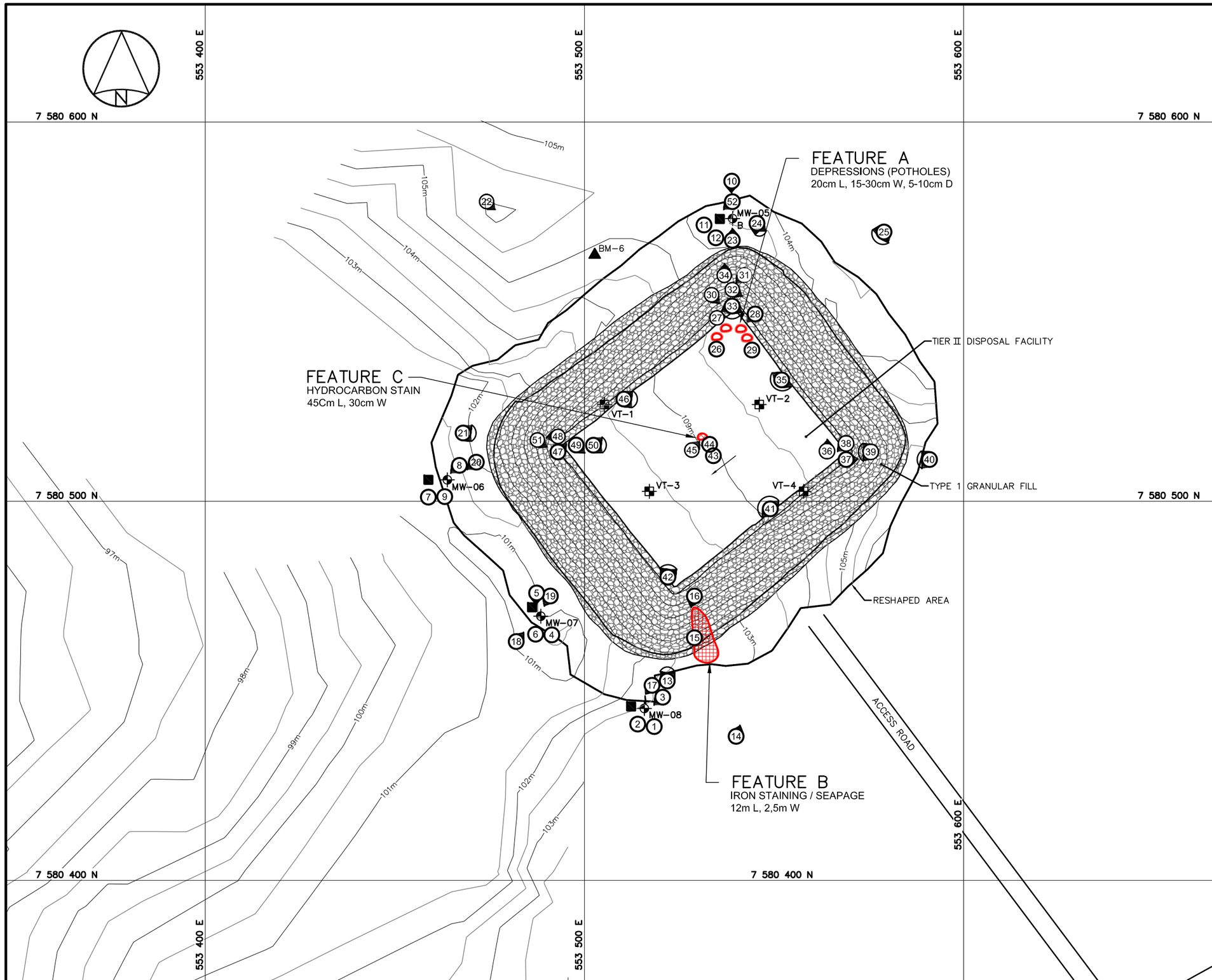
The Preliminary Stability Assessment for the Tier II Disposal Facility has been completed as per the TOR and is included as Table XIV hereafter.

Table XIV: Preliminary Stability Assessment – Tier II Disposal Facility

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

6.4 LOCATION PLAN

The Location Plan for the Tier II Disposal Facility has been completed as per the TOR and is included in the following page as Figure CAM-5.5 Mackar Inlet – Tier II Disposal Facility.



LEGEND

- BM-6 PERMANENT BENCHMARK LOCATION (1)
- MONITORING WELL LOCATION (3)
- B BACKGROUND MONITORING WELL LOCATION (1)
- GROUND TEMPERATURE CABLE LOCATION (4)
- MONITORING SOIL SAMPLE LOCATION (4)
- 33 PHOTOGRAPH LOCATION
- SETTLEMENT (NTS)
- STAINING AND SEAPAGE
- STAINING

0 10m 20m 30m 40m 50m

NO.	VERSION	DATE	PAR	VERIF.	APPR.
A	FINAL	13-02-12	P.L.	B.M.	A.L.

Construction de Défense Canada
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COLLECTION OF
LANDFILL MONITORING DATA
CAM-5, MACKAR INLET, NUNAVUT

TIER II DISPOSAL FACILITY

SITE REMEDIATION SOLUTIONS

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Phone: (418) 653-4422 Fax.: (418) 653-3583

MEASUREMENT UNIT	SCALE:	DATE (month-year):
Meter	1 : 1,500	FEBRUARY 2013
DRAWN BY: P. LÉGARÉ	VERIFIED BY: B. MACKAY	APPROVED BY: A. LECLAIR P. Eng
PROJECT NO: CD2655_200_203	DRAWING NO: CD2655_200_203-CAM-5.5	PAGE CAM-5.5

FIGURE CAM-5.5

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6.5 THERMAL MONITORING DATA

Manual readings and inspection results for each thermistor are presented in the Thermistor Inspection Reports which follow this section. A complete data logger RAW data set for the 2011-2012 period has been forwarded to DCC under separate cover, as per the TOR and is provided in the attached DVD-ROM.

During the 2012 monitoring program, all thermistors were inspected and found to be in good condition, with the exception of VT-3 (discussed in the next paragraph). All data stored in the data loggers from the thermistors was successfully retrieved. Manual resistive and temperature data readings were collected from the thermistor strings as per the TOR. All analogues/thermocouples were observed to be functioning properly at the time of the inspection. Batteries were replaced in all data loggers on August 27, 2012 as specified in the TOR and reinstalled on August 28, 2012. All clocks exhibited slight drift and were synchronized using the Prolog software.

The dataset of VT-3 recorded temperature irregularities from November 2011 to April 2012. The irregularities were consistent with errors caused by a low battery which, when subjected to low temperatures, will cease to function and then resume operation when temperature increases. As the VT-3 batteries were changed this field season and the thermistor beads were functioning properly, the VT-3 data logger was not removed from site. The status of VT-3 will be reassessed during the 2013 monitoring program.

6.6 THERMISTOR ANNUAL MAINTENANCE REPORTS

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

VT-1: Thermistor Inspection Report

Contractor Name:	Biogenie/Sila Remediation	Inspection Date: 2012-08-29	
Prepared By:	Brandon MacKay		

Thermistor Information

Site Name:	CAM-5	Thermistor Location	Tier II Facility		
Thermistor Number	VT-1	Inclination:	Vertical		
Install Date:	2010-09-07	First Date Event	2011-08-15	Last Date Event	2012-08-28
Coordinates and Elevation	N	7580525.5	E	553505.3 Elev	109.1 m
Length of Cable (m)	10.5	Cable Lead Above Ground (m)	3.47	Nodal Points	16
Datalogger Serial #	7110050			Cable Serial Number	VT-10

Thermistor Inspection

	Good	Needs Maintenance
Casing	X	
Cover	X	
Data Logger	X	
Cable	X	
Beads	X	
Battery Installation Date	2012-08-28	
Battery Levels	Main 11.34	Aux 13.63

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	11.13	7.6905
2	12.124	5.9497
3	12.776	4.893
4	13.938	3.152
5	15.313	1.2912
6	16.968	-0.7144
7	17.794	-1.6348
8	18.38	-2.2593

Bead	ohms	Degrees C
9	19.62	-3.5102
10	19.7	-3.5878
11	20.17	-4.037
12	20.48	-4.3268
13	20.93	-4.739
14	21.27	-5.0439
15	21.45	-5.2031
16	21.63	-5.3609

Observations and Proposed Maintenance

Clock was 39 mins and 31 seconds slow. reset using prolog software.
Data logger and thermistor are functioning as intended. casing is in good shape.

VT-2: Thermistor Inspection Report

Contractor Name:	Biogenie	Inspection Date: 2012-08-29			
Prepared By:	Brandon MacKay				
Thermistor Information					
Site Name:	CAM-5	Thermistor Location	Tier II Facility		
Thermistor Number	VT-2	Inclination: Vertical			
Install Date:	2010-09-07	First Date Event	2011-08-15	Last Date Event	2012-08-28
Coordinates and Elevation	N	7580525.5 E		553546.1	Elev 109.59
Length of Cable (m)	8.25	Cable Lead Above Ground (m)	3	Nodal Points	12
Datalogger Serial #	7110073			Cable Serial Number	VT-9

Thermistor Inspection

	Good	Needs Maintenance
Casing	X	
Cover	X	
Data Logger	X	
Cable	X	
Beads	X	
Battery Installation Date	2012-08-28	
Battery Levels	Main 11.34	Aux 13.5

Manual Ground Temperature Readings

Bead	ohms	Degrees C	Bead	ohms	Degrees C
1	11.06	7.8196	9	19.202	-3.0986
2	11.248	7.4748	10	19.753	-3.6391
3	12.205	5.815	11	20.22	-4.084
4	13.483	3.8135	12	20.262	-4.1235
5	14.632	2.1882			
6	16.837	-0.5638			
7	17.715	-1.5489			
8	18.551	-2.4373			

Observations and Proposed Maintenance

Clock was 46 mins slow. reset using prolog software.
Data logger and thermistor are functioning as intended. casing is in good shape.

VT-3: Thermistor Inspection Report

Contractor Name:	Biogenie	Inspection Date: 2012-08-29	
Prepared By:	Brandon MacKay		

Thermistor Information

Site Name:	CAM-5	Thermistor Location	Tier II Facility		
Thermistor Number	VT-3	Inclination: Vertical			
Install Date:	2010-09-07	First Date Event	2011-08-15	Last Date Event	2012-08-28
Coordinates and Elevation	N	7580502.6 E		553517.1 Elev	108.3
Length of Cable (m)	9.25	Cable Lead Above Ground (m)	3.53	Nodal Points	14
Datalogger Serial #	7110076			Cable Serial Number	VT-5

Thermistor Inspection

	Good	Needs Maintenance
Casing	X	
Cover	X	
Data Logger	X	
Cable	X	
Beads	X	
Battery Installation Date	2012-08-28	
Battery Levels	Main 11.34	Aux 13.5

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	8.52	13.2518
2	9.243	11.5365
3	11.036	7.8641
4	11.804	6.492
5	12.939	4.6383
6	14.281	2.6691
7	15.995	0.4366
8	17.438	-1.2441

Bead	ohms	Degrees C
9	18.044	-1.904
10	18.606	-2.4942
11	19.048	-2.9445
12	19.401	-3.2958
13	19.788	-3.6728
14	20.04	-3.9139

Observations and Proposed Maintenance

Irregularities in dataset consisted with problems associated with low battery power. The cold of the winter months reduces the power of the already low battery to the point where it can no longer function properly. when the temperature increases the battery is able to continue functioning. As the battery was changed and manual readings were good. the datalogger was not removed for repair.
Clock was 39 mins and 14 secs slow. reset using prolog software.

VT-4: Thermistor Inspection Report

Contractor Name:	Biogenie	Inspection Date: 2012-08-29			
Prepared By:	Brandon MacKay				

Thermistor Information

Site Name:	CAM-5	Thermistor Location	Tier II Facility		
Thermistor Number:	VT-4	Inclination: Vertical			
Install Date:	2010-09-07	First Date Event	2011-08-15	Last Date Event	2012-08-28
Coordinates and Elevation	N	7580502.6	E	553557.8 Elev	108.48
Length of Cable (m)	10.5	Cable Lead Above Ground (m)	3.9	Nodal Points	16
Datalogger Serial #	7110071			Cable Serial Number	VT-8

Thermistor Inspection

	Good	Needs Maintenance
Casing	X	
Cover	X	
Data Logger	X	
Cable	X	
Beads	X	
Battery Installation Date	2012-08-28	
Battery Levels	Main 11.34	Aux 13.63

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	8.771	12.6383
2	11.006	7.9198
3	12.338	5.596
4	13.392	3.9489
5	14.719	2.071
6	16.708	-0.4142
7	17.649	-1.4768
8	18.407	-2.2875

Bead	ohms	Degrees C
9	19.008	-2.9042
10	19.56	-3.3417
11	20.06	-3.9329
12	20.54	-4.3824
13	21.02	-4.8203
14	21.31	-5.0794
15	21.63	-5.3609
16	21.94	-5.6291

Observations and Proposed Maintenance

Clock was 22 mins slow. reset using prolog software.
Data logger and thermistor are functioning as intended. casing is in good shape.

6.7 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 XV. The Photographic Record only contains an index and "thumbnail" photographs. Full-sized photographs are contained in the Addendum DVD-ROM.

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

Photo (Tier II-)	Thumbnail	Filename	Size (KB)	Date	Vantage Point		Focal Length	Caption
					Easting	Northing		
13		2012-C5-Tier II-13	307	29/08/2012	553520	7580450	5 mm	Panoramic view NW - NE of SW corner of the Tier II, iron staining visible on Type 1 granular fill
14		2012-C5-Tier II-14	2870	29/08/2012	553540	7580438	5 mm	View NNE of S slope of Tier II facility taken from the access road.
15		2012-C5-Tier II-15	2430	29/08/2012	553529	7580464	5 mm	**Feature B.** Iron staining/seepage - wet area extending from the S toe of the landfill, iron staining and surface wetting visible within Type 1 layer. View from 1/4 up the S slope. (4m x 2.5m)
16		2012-C5-Tier II-16	2510	29/08/2012	553529	7580475	5 mm	**Feature B.** View SSW of feature, staining visible Type 1 layer. MW-08 is visible in the background.
17		2012-C5-Tier II-17	2560	29/08/2012	553518	7580449	5 mm	View SW of MW-08
18		2012-C5-Tier II-18	8450	29/08/2012	553482	7580463	5 mm	View NE of W slope of Tier II, MW-07 is visible in the foreground.
19		2012-C5-Tier II-19	2650	29/08/2012	553491	7580475	5 mm	View SW of MW-07
20		2012-C5-Tier II-20	2600	29/08/2012	553469	7580510	5 mm	View SW of MW-08
21		2012-C5-Tier II-21	108	29/08/2012	553468	7580518	5 mm	Panoramic view NE - SE of NW corner of the Tier II
22		2012-C5-Tier II-22	965	29/08/2012	553485	7580585	5 mm	View SE of N slope of the Tier II facility, taken from small rock plateau north NW of the facility.
23		2012-C5-Tier II-23	2830	29/08/2012	553539	7580575	5 mm	View N of MW-05
24		2012-C5-Tier II-24	146	29/08/2012	553545	7580575	5 mm	Panoramic view SE to SSW of NE corner of the landfill, taken from MW-05.
25		2012-C5-Tier II-25	887	29/08/2012	553579	7580571	5 mm	Panoramic view SSE to WNW of E slope of Tier II
26		2012-C5-Tier II-26	2370	29/08/2012	553536	7580551	5 mm	**Feature A.** Close-up of 1 of 4 small depressions (located 3 m SW of NE corner) associated with this feature. (0.30m x 0.20m x 0.05m)
27		2012-C5-Tier II-27	2360	29/08/2012	553536	7580551	5 mm	**Feature A.** Close-up of 1 of 4 small depressions (located 2.5m SW of NE corner) associated with this feature. (0.55m x 0.30m x 0.10m)
28		2012-C5-Tier II-28	2290	29/08/2012	553539	7580552	5 mm	**Feature A.** View SW of 2 of 4 depressions from NE corner (depressions photographed in pictures 26 and 27).
29		2012-C5-Tier II-29	2370	29/08/2012	553540	7580550	5 mm	**Feature A.** Close-up of 2 of 4 small depressions (located 2.5m SW of NE corner) associated with this feature, (0.2m x 0.15m x 0.10m)
30		2012-C5-Tier II-30	2290	29/08/2012	553539	7580552	5 mm	**Feature A.** View SE of 2 of 4 depressions from NE corner, yellow field manual is in center of two depressions (depressions photographed in pictures 29).
31		2012-C5-Tier II-31	2500	29/08/2012	553539	7580552	5 mm	View SW of N crest of Tier II, taken from the NE corner.
32		2012-C5-Tier II-32	2500	29/08/2012	553539	7580552	5 mm	View ESE of NE crest of Tier II, taken from the NE corner.
33		2012-C5-Tier II-33	932	29/08/2012	553539	7580552	5 mm	Panoramic view SE to SW of Tier II cap.
34		2012-C5-Tier II-34	2520	29/08/2012	553539	7580552	5 mm	View N of NE corner from landfill surface, MW-05 is visible in the background.
35		2012-C5-Tier II-35	640	29/08/2012	553552	7580532	5 mm	Panoramic view SE to NW of landfill cap, taken a the midpoint of the E landfill crest.

Photo (Tier II-)	Thumbnail	Filename	Size (KB)	Date	Vantage Point		Focal Length	Caption
					Easting	Northing		
36		2012-C5-Tier II-36	2580	2012-08-29	553569	7580511	5 mm	View N of the E crest/side slope of Tier II, taken from the landfill surface at the SE corner
37		2012-C5-Tier II-37	2390	2012-08-29	553569	7580511	5 mm	View E of SE corner, taken from the landfill surface at the SE corner.
38		2012-C5-Tier II-38	2480	2012-08-29	553569	7580511	5 mm	View SW of the S crest/side slope of the Tier II, taken from the landfill surface at the SE corner.
39		2012-C5-Tier II-39	142	2012-08-29	553569	7580511	5 mm	Panoramic view SW to NW of the landfill surface taken from the landfill surface at the SE corner
40		2012-C5-Tier II-40	151	2012-08-29	553591	7580506	5 mm	Panoramic view SW to NW of the SE corner of the landfill.
41		2012-C5-Tier II-41	555	2012-08-29	553549	7580498	5 mm	Panoramic view
42		2012-C5-Tier II-42	787	2012-08-29	553522	7580480	5 mm	Panoramic view NW to NE of landfill surface from the SW corner.
43		2012-C5-Tier II-43	2290	2012-08-29	553534	7580512	5 mm	Close-up of small linear depressions, the result of compaction practises.
44		2012-C5-Tier II-44	2360	2012-08-29	553533	7580515	5 mm	**Feature C.** Close-up of hydrocarbon stain on Tier II surface, located approximately centre on the landfill surface. (0.45m x 0.30m)
45		2012-C5-Tier II-45	2450	2012-08-29	553533	7580515	5 mm	**Feature C.** View NE of hydrocarbon stain on Tier II surface, VT-02 is visible in the background. (0.45m x 0.30m)
46		2012-C5-Tier II-46	476	2012-08-29	553505	7580525	5 mm	Panoramic view NE -SE of landfill surface, taken from VT-01.
47		2012-C5-Tier II-47	2820	2012-08-29	553493	7580513	5 mm	View NE of N crest and side slope of the Tier II, taken from NW corner
48		2012-C5-Tier II-48	2410	2012-08-29	553493	7580513	5 mm	View W of the NW corner side slope of the Tier II, taken from NW corner
49		2012-C5-Tier II-49	2540	2012-08-29	553493	7580513	5 mm	View SE of the W crest and side slope of the Tier II, taken from NW corner
50		2012-C5-Tier II-50	101	2012-08-29	553493	7580513	5 mm	Panoramic view NE - SE of the landfill surface
51		2012-C5-Tier II-51	658	2012-08-29	553493	7580513	5 mm	View SE of W crest and side slope of the Tier II, taken from NW corner
52		2012-C5-Tier II-52	2520	2012-08-29	553539	7580575	5 mm	View SW of N side slope of Tier 2
53		2012-C5-Tier II-53	5400	2012-08-30	N/A		55 mm	Aerial view of Tier II facility
Soil Sampling								
1		2012-C5-Tier II-1	2380	2012-08-28	553517	7580445	5 mm	**MW-8:** Open test pit
2		2012-C5-Tier II-2	2380	2012-08-28			5 mm	**MW-8:** Closed test pit
3		2012-C5-Tier II-3	2650	2012-08-28	553515	7580445	5 mm	**MW-8:** View SW of sampling location
4		2012-C5-Tier II-4	2370	2012-08-28	553487	7580467	5 mm	**MW-7:** Open test pit
5		2012-C5-Tier II-5	2640	2012-08-28	553488	7580469	5 mm	**MW-7:** View S of sampling location
6		2012-C5-Tier II-6	2360	2012-08-28	553487	7580467	5 mm	**MW-7:** Closed test pit
7		2012-C5-Tier II-7	2440	2012-08-28	553461	7580505	5 mm	**MW-6:** Open test pit
8		2012-C5-Tier II-8	2640	2012-08-28	553463	7580505	5 mm	**MW-6:** View SW of sampling location
9		2012-C5-Tier II-9	2530	2012-08-28	553461	7580505	5 mm	**MW-6:** Closed test pit
10		2012-C5-Tier II-10	2700	2012-08-28	553539	7580574	5 mm	**MW-5:** View S of sampling location
11		2012-C5-Tier II-11	2550	2012-08-28	553537	7580571	5 mm	**MW-5:** Open test pit
12		2012-C5-Tier II-12	2370	2012-08-28	553537	7580571	5 mm	**MW-5:** Closed test pit

6.8 SOIL SAMPLE ANALYTICAL DATA

The soil chemical analysis results and evaluation of the analytical data for the 2012 Tier II Disposal Facility samples are presented in Tables XVI and XVII hereafter. Certificates of analysis and results of field duplicates collected as part of the QA/QC program are presented in Appendix C at the end of this report.

Table XVI: 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]	PHC(F1) C_6-C_{10}	PHC(F2) C_{10}-C_{16}	PHC(F3) C_{16}-C_{34}	TPH C_6-C_{34}
Upgradient Samples																
C5-12-MW-05-A	MW-05	0-15	7.6	3.3	2.2	<0.5	2.8	19	5.2	<0.5	<0.5	<0.05	<10	<10	84	84
C5-12-MW-05-A-D		40-50	7.6	2.8	2.3	<0.5	2.6	17	4.8	<0.5	<0.5	<0.05	<10	<10	70	70
C5-12-MW-05-B		0-15	5	4.5	2.6	<0.5	3	23	11.5	<0.5	<0.5	<0.05	<10	<10	69	69
Downgradient Samples																
C5-12-MW-06-A	MW-06	0-15	6.8	3.2	3	<0.5	2.8	21	4.7	<0.5	<0.5	<0.05	<10	<10	52	52
C5-12-MW-06-B		40-50	8.4	4.7	3.4	<0.5	2.7	26	5.8	<0.5	<0.5	<0.05	<10	<10	25	25
C5-12-MW-07-A	MW-07	0-15	8.1	5.9	4	<0.5	4.3	25	13.1	<0.5	<0.5	<0.05	<10	<10	<10	<10
C5-12-MW-07-B		40-50	7.6	3.4	3	<0.5	2.7	24	3.8	<0.5	<0.5	<0.05	<10	<10	<10	<10
C5-12-MW-08-A	MW-08	0-15	9.4	4.8	3.2	<0.5	2.7	25	6.8	<0.5	<0.5	<0.05	<10	<10	<10	<10
C5-12-MW-08-B		40-50	10.6	5.1	4.2	<0.5	2.8	28	8.1	<0.5	<0.5	<0.05	<10	<10	<10	<10

Table XVII: Evaluation of 2012 Soil Analytical Data – Tier II Disposal Facility

Parameter	2012
Copper	Concentrations ranged between 5-10.6 mg/kg with a mean of 7.9. The highest concentration was observed at sub-surface depth in MW-08, whereas detectable concentrations between 5-9 mg/kg were noted at all other locations.
Nickel	Concentrations ranged between 3.2-5.9 mg/kg with a mean of 4.9. The highest concentration was observed at surface in MW-07, whereas detectable concentrations between 3-5 mg/kg were noted at all other locations.
Cobalt	Concentrations ranged between 2.2-4.2 mg/kg with a mean of 3.2. The highest concentration was observed at sub-surface depth in MW-08 whereas detectable concentrations between 2-4 mg/kg were noted at all other locations.
Cadmium	All reported concentrations were less than the method detection limit (0.5 mg/kg)
Lead	Concentrations ranged between 2.7-4.3 mg/kg with a mean of 3. The highest concentration was observed at surface in MW-07 whereas detectable concentrations between 2-4 mg/kg were noted at all other locations.
Zinc	Concentrations ranged between 19-28 mg/kg with a mean of 24. The highest concentration was observed at surface in MW-08 whereas detectable concentrations between 19-25 mg/kg were noted at all other locations.
Chromium	Concentrations ranged between 3.8-13.1 mg/kg with a mean of 7.4. The highest concentration was observed at surface in MW-07 whereas detectable concentrations between 3-11 mg/kg were noted at all other locations.
Arsenic	All reported concentrations were lower than the method detection limit (0.5 mg/kg)
Mercury	All reported concentrations were lower than the method detection limit (0.5 mg/kg)
PCBs	All reported concentrations were lower than the method detection limit (0.05 mg/kg).
TPH	Concentrations ranged between 25-84 mg/kg with a mean of 29. The highest concentration was observed at surface in MW-05. Concentrations ranged between <10-69 mg/kg with detectable concentrations noted at surface and depth at MW-06 and at depth at MW-05. It is to be noted that Fraction 3 PHCs were responsible for 100% of the TPH concentrations.

6.9 GROUNDWATER SAMPLE ANALYTICAL DATA

The groundwater chemical analysis results and evaluation for the analytical data for the 2012 Tier II Disposal Facility samples are presented in Tables XVIII and XIX hereafter. Certificates of analysis and results for groundwater samples collected as part of the QA/QC program are presented in Appendix C, at the end of this report. Samples were taken from MW-6 and MW-8. MW-7 was dry during the 2012 investigation, while MW-5 lacked sufficient volume to take a sample.

Table XVIII: Tier II Summary Table for Groundwater Analytical Data

Sample #	Location	Groundwater Elevation (masl)	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]	PHC(F1) C_6-C_{10}	PHC(F2) C_{10}-C_{16}	PHC(F3) C_{16}-C_{34}	TPH C_6-C_{34}
Downgradient Samples																
C5-12-MW-06	MW-06	101	0.084	0.205	0.005	0.0027	0.009	0.081	0.207	0.002	<0.000025	<0.01	<0.1	<0.1	<0.1	<0.1
C5-12-MW-08	MW-08	102	0.056	0.047	0.009	0.0001	0.01	0.054	0.081	0.001	<0.000025	<0.01	<0.1	<0.1	<0.1	<0.1

Table XIX: Evaluation of 2012 Groundwater Analytical Data – Tier II Disposal Facility

Parameter	2012
Copper	Concentrations ranged between 0.056-0.084 mg/L, with the highest concentrations noted at MW-06 (0.084 mg/L).
Nickel	Concentrations ranged between 0.047-0.205 mg/L, with the highest concentrations noted at MW-06 (0.205 mg/L).
Cobalt	Concentrations ranged between 0.005-0.009 mg/L, with the highest concentrations noted at MW-08 (0.009 mg/L).
Cadmium	Concentrations ranged between 0.0001-0.0027 mg/L, with the highest concentrations noted at MW-06 (0.0027 mg/L).
Lead	Concentrations ranged between 0.009-0.01 mg/L, with highest concentrations noted at MW-08 (0.01 mg/L).
Zinc	Concentrations ranged between 0.054-0.081 mg/L, with the highest concentrations noted at MW-06 (0.081 mg/L).
Chromium	Concentrations ranged between 0.081-0.207 mg/L, with the highest concentrations noted at MW-06 (0.207 mg/L).
Arsenic	Concentrations ranged between 0.001-0.002 mg/L, with the highest concentrations noted at MW-06 (0.002 mg/L).
Mercury	All reported concentrations were lower than the method detection limit (0.00025 mg/L).
PCBs	All reported concentrations were lower than the method detection limit (0.01 mg/L).
TPH	All reported concentrations were lower than the method detection limit (0.1 mg/L).

6.10 MONITORING WELL SAMPLING / INSPECTION LOGS

The monitoring well sampling logs for MW-5 to MW-8 are presented in this section.

Monitoring Well Sampling Record: MW-5			
Site Name:	CAM-5	Mackar Inlet	Nunavut
Date of Sampling Event	2012-08-29	Time:	14:00
Names of Samplers:	Brandon MacKay		
	Dwayane Allukpik		
Landfill Name:	Tier II		
Monitoring Well ID:	MW-05		
Sample Number:	N/A	Insufficent Water	
Condition of Well:	Good	Lock is in good conditon	
Measured Data			
Vell pipe height above ground (cm) =	59.5		
Diameter of well (cm) =	4	Interior diameter	
Depth of well installation (cm) = (from ground surface)	350		
Length screened section (cm) =	200		
Depth to top of screen (cm) = (from ground surface)	50		
Depth to water surface (cm) = (from top of pipe)	200.0	Measurement method: (meter, tape, etc.)	Interface Meter
Static water level (cm) = (below ground surface)	140.5		
Measured well refusal depth (cm) = (i.e. depth to frozen ground)	201.5	Evidence of sludge or siltation:	No
Thickness of water column (cm) =	1.5		
Static volume of water in well (mL) =	18.8		
Free product thickness (mm) =	N/A	Measurement method: (meter, paste, etc.)	Interface Meter
Purging: (Y/N)	N	Purging/Sampling Equipment:	N/A
Volume Purged Water =	N/A		
Decontamination required: (Y/N)	No, dedicated		
Number washers:	N/A		
Number rinces:	N/A		
Final pH =	N/A		
Final Conductivity (uS/cm) =	N/A		
Final Temperature (°C) =	N/A		

Monitoring Well Sampling Record: MW-6			
Site Name:	CAM-5	Mackar Inlet	Nunavut
Date of Sampling Event	2012-08-29	Time:	13:15
Names of Samplers:	Brandon MacKay		
	Dwayane Allukpik		
Landfill Name:	Tier II		
Monitoring Well ID:	MW-06		
Sample Number:	12-C5-MW-6		
Condition of Well:	Good	Lock is in good conditon	
Measured Data			
Vell pipe height above ground (cm) =	66.5		
Diameter of well (cm) =	4	Interior diameter	
Depth of well installation (cm) = (from ground surface)	350		
Length screened section (cm) =	200		
Depth to top of screen (cm) = (from ground surface)	50		
Depth to water surface (cm) = (from top of pipe)	190	Measurement method: (meter, tape, etc.)	Interface Meter
Static water level (cm) = (below ground surface)	123.5		
Measured well refusal depth (cm) = (i.e. depth to frozen ground)	227	Evidence of sludge or siltation:	No
Thickness of water column (cm) =	37		
Static volume of water in well (mL) =	465		
Free product thickness (mm) =	N/A	Measurement method: (meter, paste, etc.)	Interface Meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Wattera Tubing
Volume Purged Water =	1000 mL		Foot Valve
Decontamination required: (Y/N)	No, dedicated		Oakton Turbidimeter T-100
Number washers:	N/A		WTW 340I ph/conductivity meter
Number rinces:	N/A		
Final pH =	5.32		
Final Conductivity (uS/cm) =	1228		
Final Temperature (°C) =	4.2		

Monitoring Well Sampling Record: MW-7			
Site Name:	CAM-5	Mackar Inlet	Nunavut
Date of Sampling Event	2012-08-29	Time:	13:31
Names of Samplers:	Brandon MacKay		
	Dwayane Allukpik		
Landfill Name:	Tier II		
Monitoring Well ID:	MW-		
Sample Number:	12-C5-MW-		
Condition of Well:	Good	Lock is in good conditon	
Measured Data			
Vell pipe height above ground (cm) =	40		
Diameter of well (cm) =	5		
Depth of well installation (cm) = (from ground surface)	350		
Length screened section (cm) =	200		
Depth to top of screen (cm) = (from ground surface)	50		
Depth to water surface (cm) = (from top of pipe)	Dry	Measurement method: (meter, tape, etc.)	Interface Meter
Static water level (cm) = (below ground surface)	N/A		
Measured well refusal depth (cm) = (i.e. depth to frozen ground)	91	Evidence of sludge or siltation:	No
Thickness of water column (cm) =	N/A		
Static volume of water in well (mL) =	N/A		
Free product thickness (mm) =	N/A	Measurement method: (meter, paste, etc.)	N/A
Purging: (Y/N)	N	Purging/Sampling Equipment:	N/A
Volume Purged Water =	N/A		
Decontamination required: (Y/N)	No, dedicated		
Number washers:	N/A		
Number rinces:	N/A		
Final pH =	N/A		
Final Conductivity (uS/cm) =	N/A		
Final Temperature (°C) =	N/A		

Monitoring Well Sampling Record: MW-8			
Site Name:	CAM-5	Mackar Inlet	Nunavut
Date of Sampling Event	2012-08-29	Time:	13:39
Names of Samplers:	Brandon MacKay		
	Dwayane Allukpik		
Landfill Name:	Tier II		
Monitoring Well ID:	MW-		
Sample Number:	12-C5-MW-8	12-C5-MW-8 (Interlab)	
Condition of Well:	Good	Lock is in good conditon	
Measured Data			
Vell pipe height above ground (cm) =	71		
Diameter of well (cm) =	4	Interior Diameter	
Depth of well installation (cm) = (from ground surface)	350		
Length screened section (cm) =	200		
Depth to top of screen (cm) = (from ground surface)	50		
Depth to water surface (cm) = (from top of pipe)	193.5	Measurement method: (meter, tape, etc.)	Interface Meter
Static water level (cm) = (below ground surface)	122.5		
Measured well refusal depth (cm) = (i.e. depth to frozen ground)	250	Evidence of sludge or siltation:	No
Thickness of water column (cm) =	56.5		
Static volume of water in well (mL) =	709		
Free product thickness (mm) =	N/A	Measurement method: (meter, paste, etc.)	Interface Meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Wattera Tubing
Volume Purged Water =	1250 mL		Foot Valve
Decontamination required: (Y/N)	No, dedicated		Oakton Turbidimeter T-100
Number washers:	N/A		WTW 340I ph/conductivity meter
Number rinces:	N/A		
Final pH =	6.68		
Final Conductivity (uS/cm) =	433		
Final Temperature (°C) =	5.4		

7 QUALITY ASSURANCE / QUALITY CONTROL

The 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. Samples collected during the monitoring program were submitted to laboratories accredited by the Canadian Association for Environmental Analytical Laboratories (CAEAL).

All samples were collected following strict Biogenie sampling procedures. Samples were uniquely labelled and control was maintained through use of chain of custody forms. All samples were collected in laboratory supplied containers and preserved in insulated coolers. Appropriate QA/QC procedures were adhered to at all times.

Blind duplicate samples were submitted to Maxxam for intra-laboratory analysis, with an additional duplicate sample sent to AGAT for interlaboratory comparison purposes. The AGAT laboratory is located in Calgary, Alberta and Maxxam is located in Montreal, Quebec.

The relative percent difference (RPD) is used to evaluate the sample result variability. Average RPD values of less than 100% for soil samples and 30% for groundwater samples 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. Individual RPD values greater than 50% are not considered to reflect acceptable variability. RPD values are not used to evaluate those compounds that are present at concentrations less than five times the method detection limit (MDL).

7.1 SOIL SAMPLES

In case of soil samples, one blind duplicate sample was submitted for intra- and inter-laboratory comparisons. Review of results indicated relatively minor differences in concentrations within the Maxxam and AGAT metals and PHC results when duplicates were compared, and considered to be within acceptable limits. It should be noted that many of individual parameter concentrations were less than five times the MDL. One RPD value (100%) for zinc was at the limit of the acceptable range

when inter-laboratory duplicates were compared. The soil chemical analysis results and the evaluation of analytical data for the 2012 QA/QC samples are presented in Table XVI above.

All of PCB concentrations were below the MDL in the intra- and inter laboratory samples.

Overall, the soil sample results are coherent and within the same range of results for intra- and inter-laboratory samples. In general, the reliability of soil analytical results is considered as good.

7.2 GROUNDWATER SAMPLES

In case of groundwater samples, one travel blank was submitted to the AGAT laboratory to verify the influence of transportation on the groundwater samples. Review of results indicated that the concentrations of all analyzed parameters were below the MDL. The groundwater chemical analysis results and the evaluation of analytical data for the 2012 QA/QC samples are presented in Table XVIII above.

Overall, the groundwater sample results are coherent and the influence of transportation on the analyzed samples can be considered as nil.

8 SUMMARY

As of the 2012 CAM-5 monitoring event all landfills are functioning as designed. Very little signs of erosion were observed at the Tier II facility and all monitoring equipment is in good condition. At the time of sampling, two monitoring wells were dry, but two were able to provide sufficient water to take samples. Data was successfully retrieved from the dataloggers and manual reading of the thermistors indicated they are functioning properly. The dataset provided by VT-3 displayed irregularities often caused by a low battery. All datalogger batteries at the Tier II were replaced during the 2012 monitoring program. The NHWL has a few relatively minor areas of erosion and settlement that are of little consequence to the performance of the landfill, erosion channels appear to be self-armouring. Monitoring wells appear in good condition. The USAF & Asbestos landfill has several areas of settlement and/or rutting that appear to have been caused by heavy machinery/pick-up truck traffic on the surface of the lobe, as heavy equipment and/or pick-up trucks are no longer present on site, the USAF & Asbestos landfill does not pose a concern for erosion and continues to function as designed. The Lower Site Landfill – South displays the single largest erosional feature at the CAM-5 site, Feature H, which is a large erosional channel on the western toe of the north section of the landfill. At this time, the Lower Site Landfill continues to function as designed but as Feature H is a relatively large feature that appears to be increasing in size, it has been designated a marginal severity rating.

No analytical results of note were recorded, although low concentrations of TPH were present at two soil sampling locations at the Tier II facility; the upgradient location (MW-05) and at one downgradient location (MW-06). TPH was detected at surface and depth at both locations and concentrations were below 100 mg/kg. TPH was not detected in groundwater samples. PCBs were below detection for all soil and groundwater samples.

APPENDIX A

Range of the Report and Limitation of Responsibilities

RANGE OF THE REPORT AND LIMITATION OF RESPONSIBILITIES

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.

APPENDIX B

Field Notes

ABRÉVIATIONS ET SYMBOLES

△	Station de triangulation.	C.	Centre.
○	Station de polygonale.	℄	Axe ou ligne de centre
□	Station de stadia.	Cl.	Clou.
B.P.	Borne de pierre.	Bord.	Bordure.
M	Monument.	Puis.	Puisard.
T.F.	Tige de fer.	Reg.	Regard d'égout.
P	Piquet.	Tel.	Poteau de téléphone
P.F.	Point foré.	V.AV.	Visée avant.
R.N.	Repère de nivellement.	V.AR.	Visée arrière.
C.G.	Croix gravée.	P.T.	Point tournant.
—·—·—	Clôture.	H.I.	Hauteur d'instrument.
—x—x—x	Clôture de grillage.		
⌐	Contours d'immeubles.		

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Date Aug 28/2012 Page.....

Tier II → Soil Sampling

Samplers: Brandon + Dwayne

Weather: 10 °C, cloudy
No wind.

Sampling location: MW-08

ID: CS-12-MW-08-A (10cm)
CS-12-MW-08-B (45cm)

Soil: 0-45cm → Sand + Gravel
Time: 19:37

Pic 428: open test Pit
429: closed
430: Sample location
from well → W

GPS: 250

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location: MW-07

ID: CS-12-MW-7-A (10cm)

" - B (45 cm)

+ ESG Sample (A)

+ Duplicate Interlab (B)

Soil: Sand some Gravel

moist @ 5 cm

Time: 19:43

Pic 431-open

432 - Sw. from well

433 - closed

GPS 251

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Location: MW-06

ID: CS-12-MW-06-A (10cm)

" - B (45)

Soil - Sand + cobble, some organic material in first 5cm

Time: 19:57

Pic 434 - open

436 - closed

433 - → W from well

GPS: 252

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location: MW-05

ID: CS-R-MW-05-A (10cm)
" -A-D
" -B (45cm)

Soil : Sand + Organics at (10cm)

Time : 20:16

Pics 436 - From well to S
437 - open
438 - closed

Monitoring well data entered directly into computer

No. Tier II Inspection
Date Aug 29/2012 Page

Inspection by : Brandon
Weather : 0-2 °C
- Partly cloudy
- No Wind

Picture + Feature log

Panorama : SW corner
Pics : 441 - 443 (10:13)
orientation: NW → NE
local : 5m west of MW-8
GPS: 256
Note : Iron staining visible

Feature B:
- Staining/seepage on Type1 layer
- 4 m x 2.5 m
- Iron staining suspected to be from Borrow source
* validate

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Pic 445 → SE ID 15
- taken 2 m up SE Slope GPS: 258
Pic 446 → S ID 16
- 5 m from crest of landfill
GPS 259 MW-8 in pic

Pic 444 ID 14
GPS 257
- SE slope from access road

MW8
GPS: 261
Pic 447 ID 17
- Taken 5 m E of well

Pano: W slope ID: 18
- MW-7 in pic
Pics: 448-449 N → E
GPS: 262
taken 10 m from MW-7

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MW-7
GPS: 263
Pic 450 → W ID. 19
- view SW of well

MW-6 GPS: 265
Pic: 451 → W ID: 20
- 5 m E of MW-7

Pano: NW corner ID 21
Pics: 452 - 454 NE → SE
GPS: 267
- 10 m from Base

Pano: N side slope ID 22
Pics 455/56 GPS 268
- Iron stem

MW-5
Pic 457 → N ID 23
GPS ~~268~~ 269
- 3 m south of well

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Pano: North Corner ID: 24

- Pic: 458 - 460 SE ⇒ SSW

GPS: 270 Taken From MW-5

Pano: E side slope ID: 25

- iron

Pics 461 - 464

GPS: 272 20m from tee

Feature A: Small Depressions

location: NE/N corner

- 2 depressions previously recorded

- 2 New 035

1) 0.30 m x 0.20 m x 0.05 m

6m SW of NE corner

Pic 465 GPS 273 ID 26

close-up

2) 0.55 m x 0.30 m x 0.05 m

5m "

Pic 466 GPS 265 ID 27

close-up

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Pic 469 GPS 274 ID: 28

View SW of Depressions 1 + 2

3 + 4)

6m SW of NE corner

equal in size

Pic 470 GPS 275 close-up ID: 29

Pic 471 GPS 274 from NE corner ID: 30

view SW of N crest.

Pic: 472 - ~~top of NE slope~~ ID 31

: 473 - view SE of E crest ID 32

: 474 - view N of NE corner

ID 34

- All pics taken from NE corner

GPS 274

Pano: Tree line SE - SW

- from NE corner

Pics 475 - 479

GPS 274

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Note on Feature A

- All depressions associated with cobble → compaction

Pano: Tier 11 cap ID 35

- NE crest middle, 6M NE of VT-3

Pics: 481-487 SE - NW

- Pic: 488 → NW of E crest (36)

489 → E of SE corner (37)

490 → SW of S crest (38)

Pano: SW-NW of landfill surface

Pics 491-493

Pics 488-493 → all taken from SE corner GPS: 276

Pano: SE corner SW → NW from toe

Pics: 494-496 ID: 40

GPS 277

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Pano: from mid S slope NW-NE

Pics 497-502 ID 41

GPS 278

Pano: Tier 11 surface from SW corner - NW - NE

Pics 503-506 ID: 42

GPS 279

~~Pano~~

Pic 507 ID 43

- example of linear depression

- run length of Tier 11

- caused by compactor not erosion

Feature C - Hydrocarbon stain

Pic 508 ID 44

- close-up GPS 281

Pic 509 GPS 283 ID 45

- view NW of stain

Dimensions 0.45 m x 0.30 m

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Pi - 15 m SW of UT-02

P Pano: NE - SE of landfill surface
taken from UT-01
Pics 510 - 515 ID 46

Following pics all from NW
corner GPS: 285
- Pic: 516 → NE - N crest ID 47
: 517 → W of NW corner 48
: 518 → SE of W crest 49
Pano: 519 - 522 NE - SE of surface 50

~~Pano: of surface of mid point~~ from

Pano: W crest + side slope ID 51

Pic: View SW of N side slope ID 52
- taken from between Tier II
and NHWL

No. NHWL - visual Inspection
Date Aug 29 Page

Brandon

Weather: 7-8°C
- clear, sunny
- no wind

Pic 529 GPS: 286 ID 6
- SW of E slope

Pano: ~~to~~ SW - NW ID 2
- taken from E of NHWL
Pics 534 - 536 GPS: 287

Pano: WSW - NW of SE corner ID 3
- taken from MW-12
Pics 534 - 536 GPS: 288

Pano: WSW - NNW of landfill surface ID 4
from SE corner
Pics: 537 - 541

Pic 542 GPS 289 ID 5
- view SE of SE corner

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Pi Feature F: Hydrocarbon stain
(0.6 m x 0.20 m)
P - 15 m S of NE corner

Pic 543 GPS 290 ID 6
- close-up of stain
Pic 544 GPS " ID 7
- view N of stain

Pano: landfill cap SE-WSW ID 8
- from NE corner
Pics 545-549 GPS = 291

Pic: 550 - GPS 291 ID 9
- view NNE of NE corner

Pano: SE-WSW of sideslope ID 10
- 3m from toe
Pics 551-553 GPS 292

Pic: 554 GPS: 293 ID = 11
SE of reshaped area

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Pic 555 GPS 295 ID 12
- close-up
- evidence of erosion / deposition in channel

Pic 556 GPS 293 ID 13
- view WNW of reshape

- soil is damp in reshaped area flows N

Pic 557 GPS: 297 ID 14
- view ESE of reshaped
- taken from the NW end.

Feature B
- Minor erosion - channels
(10 m x 0.1 x 0.04)
- deposition at toe
Pic 559 GPS: 298 ID: 15 Top
Pic 560 : 299 16 Bottom

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Feature C - Tension crack
- Disconitrang
length - 3/4 of side
located - 1-2 m from toe
- 0.01 m wide
Pic 561 - closeup ID 17
GPS 300

- Pano: SE - SW of north slope ID 18
- taken from MV-07
Pics 562 - 566 GPS 301

Pano: ENE - SE of NW corner ID 19
Pics 567 - 568 GPS 302
- taken 7m from toe

Pic 569 GPS 303 ID: 20
WSW of regrade
- Deposition visible

Pic 570 GPS: " ID 21
SE of regrade and W slope.

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Pic 571 GPS 304 ID 22
- close-up of deposition/erosion
in drainage channel
: 572 " ID 23
-> SE of deposition/erosion

Deposition : erosion

Pano: ENE - SE of surface ID 24
from NW corner
Pics: 574 - 577 GPS 305

Feature D - surface wetly
- 30% of surface
Pano: of wetly NE - SE
Pics 578 - 580 GPS 307 ID 25

Feature G: linear depression
- 1.25 m x 0.15m x 0.05 m
Pic 581 close-up GPS 308 ID 26
582 - " " 27

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Pic 588 GPS 308 ID 28

→ NW of W side slope

Pano: View NE - ENE of surface 1029
from SW corner

Pics: 583 - 587 GPS 310

Pic 585 - side slope 1030

Tension crack on S slope from
Baseline no longer visible

Pano: ENE - NW of SW corner ID 31
- taken from access road

Pics 589 - 591 GPS 312

Feature J - erosion along landfill
toe in regrade area, where
ponded water is draining into
regrade
11 m x 1 m x 0.01 - 0.05 m
- water is infiltrating sand
- Pool + riffle sequence

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Pic 592 → SW of J GPS 314 ID 32

Pic 603 → NE of Pool + riffle " 43

604 → SE Feature J/E " 44

Pano 606 - 608 of Pool + riffle " 45

GPS 323 - 326

Feature I - minor erosion
on south slope next to armor
(10 m x 1 m - 0.01 - 0.05 m)
- self armoring

Pic 593 - Bottom GPS 315 ID 33

Pic 594 - top GPS 316 ID 34

Feature H - Minor erosion New 0135
2 channel converging into 1 large
channel - self armoring
(10 m x 0.75 - 4 m x 0.05 - .10 m)

Pic 595 Top (1) GPS 317 ID 35

596 Top (2) 318 36

597 Bottom 319 37

- channels 2 m apart before
converging

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Feature A - minor erosion
(10m x 0.20m x 0.05-0.10m)
- self armoring previously observed
Pic 598 GPS 320 Top ID 38
Pic 599 " 321 Bottom ID 39

Feature I - ponded water
Pic 600 → SW GPS 322 ID 40

Pic 601 → SW of reshape
from MW-12 ID 40
Pic 602 → NW " ID 41

No. Asbestos / USAF landfill
Date Aug 29 / 2012 Page

Visual Inspection - Brandt

Weather - 7-8°C no wind.
Sun
Pano: W-N of cap from SW corner ID 1
Pics: 609-611. GPS 327

Pano: N-E SW corner ID 2
Pics: 612-614 GPS 328

Feature F - Brand marker
3m NE of erect sign
Pic 615 GPS 358 ID 3
Pic 628 view SE of PND sign ID 5

Feature D - Survey stake ID 4
2m NW of erect sign

Pano: Asbestos cap NE-SE from ID 6
NW corner of Asb landfill
Pics 618-621 GPS 360

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Feature E - Truck/ Heavey Equipment Tracks

Pic 622 → NW of tracks ID 7

Feature A - New OBS linear Depression
2m x 0.6 x 0.2
15 m N of SE corner

Pic 623 GPS 363 ID 8
taken from Access

Feature E - Truck Tires
(3 m x 0.20 x 0.1 - 0.15)

Pic 624 → NW 363 ID 9
625 → NW 364 10

Feature B: Hydrocarbon stain New OBS
- midway

Pic 627 GPS 368 ID 12

Pano: NW - NE of USAF ID 13
from SW corner

Pics 629 - 631 GPS 368 1

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Pic 632 → SW of W toe ID 14
Pic 633 → NW of W toe ID 15

Feature G: New OBS
3 x Depressions
20m from NW side
and 5 from W
0.1, 1, 2 x 6, 20 x 0.10

Pic 634 GPS 374 close-up small ID 16
635 375 close-up 17
636 375 View NW 18

Pano: ENE - SE of USAF cap ID 19
Pics: 637 - 640 GPS 376

Feature E:
Pic 641 → SW of "E" along toe ID 20
6m x 0.2 x 0.2 GPS 378
Pic 642 → SE " " ID 21
4m x 0.2 x 0.2 GPS 379

Pic 652 → NNE " " ID 22
GPS: 380

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Pano: SE - SW of N section of landfill ID 23
Pics 660 - 663 GPS 381

Feature F - Pile of Fertilizer
1m x 1m x 0.20
Pic 664/665 close/SW GPS 406
ID: 24/25

landfill cap 100% damp
- last nights rain

Pano: NNE - NNW of ruts
North of landfill
Pics 673 - 689 GPS 506 ID 26

No. Lower site landfill - South
Date Aug 29th/2012 Page

Visual inspection - Brandon
Weather: 6°C clear, sunny

Feature A: minor erosion between toe and access New 0135
- Former culvert or french drain?
8m x 4m x 0.30m
Pic 654 → S GPS: 387 ID: 1

Feature B: Tension crack new 0135
2m x 5-20 mm
Pic 655 close-up GPS 390 ID: 2
" 656 → N " ID: 3

Pano: NW - E of NW section of cap
Pics 657 - 660 GPS 391 ID: 4

Feature C: 2x Pot holes
1) 0.4 x 0.2 x 0.1
2) 1 x 0.6 x 0.2
Pic 661 - close-up GPS 405 ID 5
662 → N 405 6

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approx 10m E of waypoint 510 on map

Feature D: linear Depression
6m x 0.15 - 0.40 - 0.20
View NW ID 7
" SW 8

Pano: NW - NE eastern cap ID 9
Pics: 668 - 670 GPS ~~408~~ 506

Pano: S - N " " ID 10
Pics: 671 - 673 GPS 408

Feature E: Pot holes x2 New obs
- 0.5 x 0.5 x 0.20 (Both)
- 2m from east crest
Pic 674 close GPS 409 ID 11
675 → S " 12

Pano 13 GPS 434 SE - SW of
Pics 676-678 North cap

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Feature J: New obs
Minor erosion 6m from E crest
10 x 0.20 - 0.75 x 0.10
Pic 692 - close GPS 435 ID 14
693 → N " 15

Pic 694 GPS 444 → SW of NW Toe ID 16

Pano: of E side slope + Feature G
Feature G ⇒ Seepage + iron banding on east slope
Pics 696 - 700 GPS 445 ID 17
- taken 8m from toe

Feature F: Discontinuous tensile cracking (50m x 0.02 x 0.01)
range from 1m from toe (S)
to 3m from toe (N)

Pic 701 → NE GPS 448 ID: 18
of Feature F + Ponded water

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Pic 702 close-up Feature F GPS 448 10.19

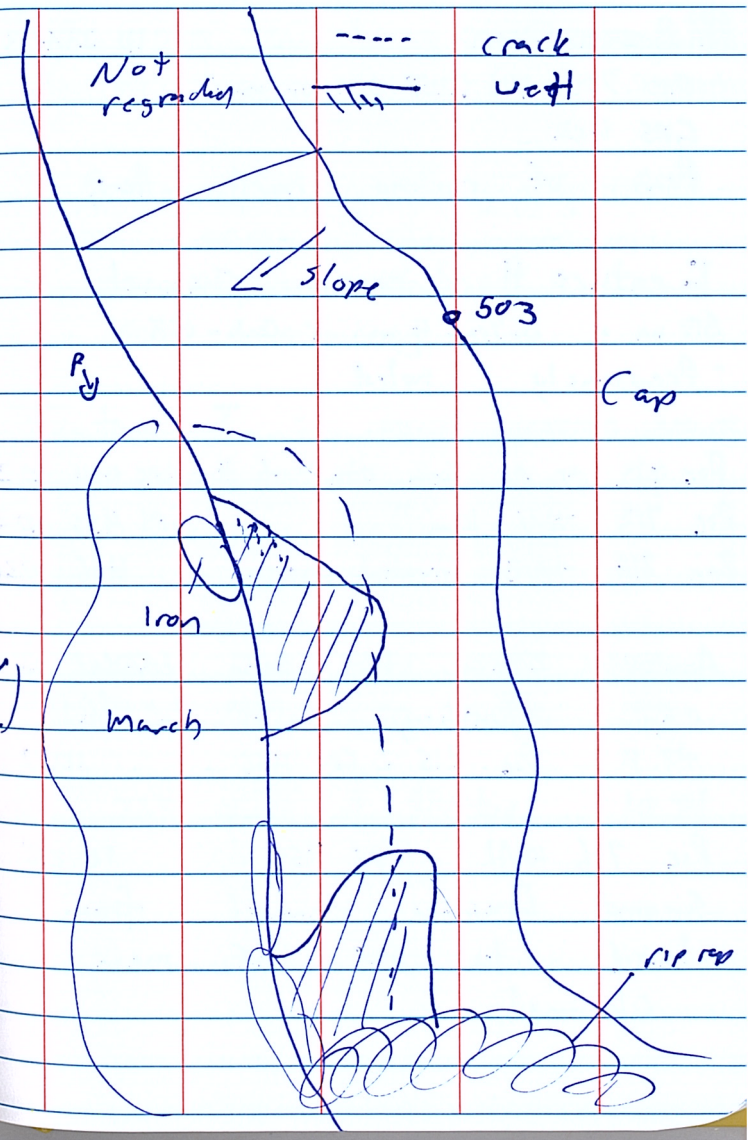
Pic 703 GPS 448 → " 1020

Feature G: Bacterial Sheen on ponded water at East toe 1021 GPS 450

Pic 705 → S of Feature F GPS 451 1022

No. East slope

Date.....Page.....



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~~Pics 707-709~~ ID 23A/13
Pic 706 - 711 (207 - 209 on map)
GPS 452
Pano of rip rap north to E

Feature H - erosion channel
50 m x 0.20 - 4 m x 0.1 - 0.3
- Previously noted

Pic 712 → N from start of H GPS 454 ID 24
Pic 713 → N 10m " GPS 455 ID 25
Pic 714 → NE Greatest erosion 456 ID 26

Approx 25cm has been eroded in cap. sloughing in to landfill → E Pic 715 GPS 456 ID 27

Pic 716 → N GPS 458 ID 28
Second Drainage channel from land to SW of main channel

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Pic 717 from toe → S GPS 460 ID 29
Pic 718/19 land west of landfill ID 30/31

- Sediment is being deposited on armour
- no exposed debris
- self armouring

Feature I : minor erosion NEWOS erosion 20m E of Access on toe runs NE
4 m x 3m x 0.05 - 0.10 m

Pic 721 Top → NW GPS 461 ID 32
Pic 722 Bottom → SE " 462 33

Pic 723 → NE of NW toe ID 34

No.....

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August 30

2°C partly cloudy no wind

- slumping caused by vibrating plate?

No.....

Date.....Page.....

APPENDIX C

Maxxam and AGAT QA/QC Reports and Certificates of Analysis

Attention: Jonathan Martel-Gagnon
BIOGÉNIE S.R.D.C. INC.
1140 LÉVIS
TERREBONNE, PQ
CANADA J6W 5S6

Date du rapport: 2012/09/19

CERTIFICAT D'ANALYSES

 # DE DOSSIER MAXXAM: B250742
Reçu: 2012/09/12, 14:00

Matrice: ROCHE
Nombre d'échantillons reçus: 4

Analyses	Quantité	Date de l' extraction	Date Analysé	Méthode de laboratoire	Référence primaire
Frais de gestion	4	N/A	2012/09/12		
Hydrocarb. pétro. CCME F1 & BTEX	4	2012/09/13	2012/09/14	STL SOP-00131	CCME-PN1310
Hydrocarbures pétroliers (F2-F4)	4	2012/09/14	2012/09/14	STL SOP-00170	CCME-PN1310
Mercure par ICP-MS	1	2012/09/14	2012/09/17	STL SOP-00006	MA.200-Met 1.2
Mercure par ICP-MS	3	2012/09/17	2012/09/17	STL SOP-00006	MA.200-Met 1.2
Métaux extractibles totaux	4	2012/09/17	2012/09/18	STL SOP-00006	MA.200- Mét 1.2
BPC aroclor	4	2012/09/15	2012/09/15	STL SOP-00160	MA. 403 - BPC 2.0

Matrice: SOL
Nombre d'échantillons reçus: 5

Analyses	Quantité	Date de l' extraction	Date Analysé	Méthode de laboratoire	Référence primaire
Frais de gestion	5	N/A	2012/09/12		
Hydrocarb. pétro. CCME F1 & BTEX	4	2012/09/13	2012/09/14	STL SOP-00131	CCME-PN1310
Hydrocarb. pétro. CCME F1 & BTEX	1	2012/09/13	2012/09/17	STL SOP-00131	CCME-PN1310
Hydrocarbures pétroliers (F2-F4)	5	2012/09/13	2012/09/13	STL SOP-00170	CCME-PN1310
Mercure par ICP-MS	1	2012/09/14	2012/09/17	STL SOP-00006	MA.200-Met 1.2
Mercure par ICP-MS	4	2012/09/17	2012/09/17	STL SOP-00006	MA.200-Met 1.2
Métaux extractibles totaux	5	2012/09/17	2012/09/18	STL SOP-00006	MA.200- Mét 1.2
BPC aroclor	5	2012/09/14	2012/09/14	STL SOP-00160	MA. 403 - BPC 2.0

Matrice: EAU
Nombre d'échantillons reçus: 1

Analyses	Quantité	Date de l' extraction	Date Analysé	Méthode de laboratoire	Référence primaire
Contenant supplementaire-archivé	2	N/A	2012/09/13		
Frais de gestion	1	N/A	2012/09/12		
Hydrocarbures pétroliers CCME F1 & BTEX	1	N/A	2012/09/17	STL SOP-00131	CCME-PN1310
Hydrocarbures pétroliers (F2-F4)	1	2012/09/14	2012/09/17	STL SOP-00170	CCME-PN1310
Mercure par ICP-MS	1	2012/09/17	2012/09/17	STL SOP-00006	MA.200- Mét 1.2
Métaux	1	2012/09/17	2012/09/17	STL SOP-00006	MA.200- Mét 1.2
BPC aroclor	1	2012/09/14	2012/09/15	STL SOP-00160	MA. 403 - BPC 2.0

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tél. : (514) 448-9001 Télécopieur : (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

Attention: Jonathan Martel-Gagnon
BIOGÉNIE S.R.D.C. INC.
1140 LÉVIS
TERREBONNE, PQ
CANADA J6W 5S6

Date du rapport: 2012/09/19

CERTIFICAT D'ANALYSES

-2-

* Les données brutes sont utilisées pour le calcul du RPD (% d'écart relatif). L'arrondissement des résultats finaux peut expliquer la variation apparente.

clé de cryptage

Veuillez adresser toute question concernant ce certificat d'analyse à votre chargé(e) de projets

Argyro Frangoulis, Chargée de projets
Email: AFrangoulis@maxxam.ca
Phone# (514) 448-9001 Ext:4229

==========
Maxxam a mis en place des procédures qui protègent contre l'utilisation non autorisée de la signature électronique et emploie les "signataires" requis, conformément à la section 5.10.2 de la norme ISO/CEI 17025:2005(E). Veuillez vous référer à la page des signatures de validation pour obtenir les détails des validations pour chaque division.

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BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

HYDROCARBURES PÉTROLIERS (CCME)

Identification Maxxam		S23450	S23453	S23454	S23456		
Date d'échantillonnage		2012/09/03	2012/09/03	2012/09/04	2012/09/04		
	UNITÉS	**FM12-7-A**	**FM12-11-A**	**FM12-MW-3-A**	**FM12-27-A**	**LDR**	**Lot CQ**
VOLATILS							
Benzène	mg/kg	ND	ND	ND	ND	0.02	1055859
Toluène	mg/kg	ND	ND	ND	ND	0.02	1055859
Ethylbenzène	mg/kg	ND	ND	ND	ND	0.02	1055859
p+m-Xylène	mg/kg	ND	ND	ND	ND	0.04	1055859
o-Xylène	mg/kg	ND	ND	ND	ND	0.02	1055859
Xylènes totaux	mg/kg	ND	ND	ND	ND	0.04	1055859
F1 (C6-C10)	mg/kg	ND	ND	ND	ND	10	1055859
F1 (C6-C10) - BTEX	mg/kg	ND	ND	ND	ND	10	1055859
Récupération des Surrogates (%)							
1,4-Difluorobenzène	%	97	96	98	96	N/A	1055859
4-Bromofluorobenzène	%	97	97	97	97	N/A	1055859
D10-Ethylbenzène	%	109	100	100	104	N/A	1055859
D4-1,2-Dichloroéthane	%	100	101	100	101	N/A	1055859

ND = inférieur à la limite de détection rapportée
N/A = Non Applicable
LDR = Limite de détection rapportée
Lot CQ = Lot Contrôle Qualité

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BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

HYDROCARBURES PAR GCFID (ROCHE)

Identification Maxxam		S23450	S23453	S23454	S23456		
Date d'échantillonnage		2012/09/03	2012/09/03	2012/09/04	2012/09/04		
	UNITÉS	**FM12-7-A**	**FM12-11-A**	**FM12-MW-3-A**	**FM12-27-A**	**LDR**	**Lot CQ**
HYDRO. PÉTROLIERS TOTAUX							
Hydrocarbures pétroliers F2:C10-C16	mg/kg	ND	ND	ND	ND	10	1056469
Hydrocarbures pétroliers F3:C16-C34	mg/kg	ND	ND	ND	ND	10	1056469
Hydrocarbures pétroliers F4:C34-C50	mg/kg	ND	ND	ND	ND	10	1056469
Ligne de base atteinte à C50	mg/kg	OUI	OUI	OUI	OUI	N/A	1056469
Récupération des Surrogates (%)							
O-Terphenyl	%	102	100	102	104	N/A	1056469

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N/A = Non Applicable
LDR = Limite de détection rapportée
Lot CQ = Lot Contrôle Qualité

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BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

MÉTAUX EXTRACTIBLES TOTAUX (ROCHE)

Identification Maxxam		S23450	S23453	S23454	S23456		
Date d'échantillonnage		2012/09/03	2012/09/03	2012/09/04	2012/09/04		
	UNITÉS	**FM12-7-A**	**FM12-11-A**	**FM12-MW-3-A**	**FM12-27-A**	**LDR**	**Lot CQ**
MÉTAUX							
Mercure (Hg)	mg/kg	ND	ND	ND	ND	0.02	1057312
Arsenic (As)	mg/kg	ND	ND	ND	ND	5	1057312
Cadmium (Cd)	mg/kg	ND	ND	ND	ND	0.5	1057312
Cobalt (Co)	mg/kg	ND	ND	ND	ND	2	1057312
Chrome (Cr)	mg/kg	ND	ND	ND	ND	2	1057312
Cuivre (Cu)	mg/kg	ND	ND	ND	ND	2	1057312
Nickel (Ni)	mg/kg	ND	ND	ND	ND	1	1057312
Plomb (Pb)	mg/kg	ND	ND	ND	ND	5	1057312
Zinc (Zn)	mg/kg	ND	ND	ND	ND	10	1057312

ND = inférieur à la limite de détection rapportée
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889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tél. : (514) 448-9001 Télécopieur : (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

BPC (ROCHE)

Identification Maxxam		S23450	S23453	S23454	S23456		
Date d'échantillonnage		2012/09/03	2012/09/03	2012/09/04	2012/09/04		
	UNITÉS	**FM12-7-A**	**FM12-11-A**	**FM12-MW-3-A**	**FM12-27-A**	**LDR**	**Lot CQ**
BPC							
Aroclor 1242	mg/kg	ND	ND	ND	ND	0.10	1056814
Aroclor 1248	mg/kg	ND	ND	ND	ND	0.10	1056814
Aroclor 1254	mg/kg	ND	ND	ND	ND	0.10	1056814
Aroclor 1260	mg/kg	ND	ND	ND	ND	0.10	1056814
BPC Totaux	mg/kg	ND	ND	ND	ND	0.10	1056814
Récupération des Surrogates (%)							
Décachlorobiphényle	%	91	87	108	107	N/A	1056814

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N/A = Non Applicable
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BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

HYDROCARBURES PÉTROLIERS (CCME)

Identification Maxxam					S23449		S23451		S23452			
Date d'échantillonnage					2012/09/03		2012/09/03		2012/09/03			
	UNITÉS	**A**	**B**	**C**	**FM12-4-A**	**CR**	**FM12-15-A**	**CR**	**FM12-19-A**	**CR**	**LDR**	**Lot CQ**
% Humidité	%	-	-	-	3.2		26		5.0		N/A	N/A
VOLATILS												
Benzène	mg/kg	0.1	0.5	5	ND		ND		ND		0.02	1055876
Toluène	mg/kg	0.2	3	30	ND		ND		ND		0.02	1055876
Ethylbenzène	mg/kg	0.2	5	50	ND		ND		ND		0.02	1055876
p+m-Xylène	mg/kg	-	-	-	ND		ND		ND		0.04	1055876
o-Xylène	mg/kg	-	-	-	ND		ND		ND		0.02	1055876
Xylènes totaux	mg/kg	0.2	5	50	ND		ND		ND		0.04	1055876
F1 (C6-C10)	mg/kg	-	-	-	ND		ND		ND		10	1055876
F1 (C6-C10) - BTEX	mg/kg	-	-	-	ND		ND		ND		10	1055876
Récupération des Surrogates (%)												
1,4-Difluorobenzène	%	-	-	-	91		93		95		N/A	1055876
4-Bromofluorobenzène	%	-	-	-	99		100		97		N/A	1055876
D10-Ethylbenzène	%	-	-	-	117		117		120		N/A	1055876
D4-1,2-Dichloroéthane	%	-	-	-	106		105		103		N/A	1055876

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BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

HYDROCARBURES PÉTROLIERS (CCME)

Identification Maxxam					S23455		S23458			
Date d'échantillonnage					2012/09/04		2012/08/28			
	UNITÉS	**A**	**B**	**C**	**FM12-MW-22-A**	**CR**	**C5-12-MW-7-B**	**CR**	**LDR**	**Lot CQ**
% Humidité	%	-	-	-	4.9		1.6		N/A	N/A
VOLATILS										
Benzène	mg/kg	0.1	0.5	5	ND		ND		0.02	1055876
Toluène	mg/kg	0.2	3	30	ND		ND		0.02	1055876
Ethylbenzène	mg/kg	0.2	5	50	ND		ND		0.02	1055876
p+m-Xylène	mg/kg	-	-	-	ND		ND		0.04	1055876
o-Xylène	mg/kg	-	-	-	ND		ND		0.02	1055876
Xylènes totaux	mg/kg	0.2	5	50	ND		ND		0.04	1055876
F1 (C6-C10)	mg/kg	-	-	-	ND		ND		10	1055876
F1 (C6-C10) - BTEX	mg/kg	-	-	-	ND		ND		10	1055876
Récupération des Surrogates (%)										
1,4-Difluorobenzène	%	-	-	-	96		91		N/A	1055876
4-Bromofluorobenzène	%	-	-	-	98		99		N/A	1055876
D10-Ethylbenzène	%	-	-	-	102		123		N/A	1055876
D4-1,2-Dichloroéthane	%	-	-	-	97		107		N/A	1055876

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Lot CQ = Lot Contrôle Qualité

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BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

HYDROCARBURES PAR GCFID (SOL)

Identification Maxxam		S23449	S23451	S23452	S23455	S23458		
Date d'échantillonnage		2012/09/03	2012/09/03	2012/09/03	2012/09/04	2012/08/28		
	UNITÉS	**FM12-4-A**	**FM12-15-A**	**FM12-19-A**	**FM12-MW-22-A**	**C5-12-MW-7-B**	**LDR**	**Lot CQ**
% Humidité	%	3.2	26	5.0	4.9	1.6	N/A	N/A
HYDRO. PÉTROLIERS TOTAUX								
Hydrocarbures pétroliers F2:C10-C16	mg/kg	ND	11	ND	ND	ND	10	1056205
Hydrocarbures pétroliers F3:C16-C34	mg/kg	18	64	12	24	12	10	1056205
Hydrocarbures pétroliers F4:C34-C50	mg/kg	ND	43	ND	ND	ND	10	1056205
Ligne de base atteinte à C50	mg/kg	OUI	OUI	OUI	OUI	OUI	N/A	1056205
Récupération des Surrogates (%)								
O-Terphenyl	%	103	106	105	105	107	N/A	1056205

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BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

MÉTAUX EXTRACTIBLES TOTAUX (SOL)

Identification Maxxam					S23449		S23449		S23451		S23452			
Date d'échantillonnage					2012/09/03		2012/09/03		2012/09/03		2012/09/03			
	UNITÉS	**A**	**B**	**C**	**FM12-4-A**	**CR**	**FM12-4-A Dup. de Lab.**	**CR**	**FM12-15-A**	**CR**	**FM12-19-A**	**CR**	**LDR**	**Lot CQ**
% Humidité	%	-	-	-	3.2		3.2		26		5.0		N/A	N/A
MÉTAUX														
Mercure (Hg)	mg/kg	0.2	2	10	ND		ND		ND		ND		0.02	1057044
Arsenic (As)	mg/kg	6	30	50	ND		ND		ND		ND		5	1057044
Cadmium (Cd)	mg/kg	1.5	5	20	ND		ND		ND		ND		0.5	1057044
Cobalt (Co)	mg/kg	15	50	300	ND		ND		ND		ND		2	1057044
Chrome (Cr)	mg/kg	85	250	800	3	<A	3	<A	9	<A	6	<A	2	1057044
Cuivre (Cu)	mg/kg	40	100	500	ND		ND		5	<A	3	<A	2	1057044
Nickel (Ni)	mg/kg	50	100	500	2	<A	2	<A	7	<A	5	<A	1	1057044
Plomb (Pb)	mg/kg	50	500	1000	ND		ND		ND		ND		5	1057044
Zinc (Zn)	mg/kg	110	500	1500	ND		ND		12	<A	ND		10	1057044

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LDR = Limite de détection rapportée
Lot CQ = Lot Contrôle Qualité

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BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

MÉTAUX EXTRACTIBLES TOTAUX (SOL)

Identification Maxxam					S23455		S23458			
Date d'échantillonnage					2012/09/04		2012/08/28			
	UNITÉS	**A**	**B**	**C**	**FM12-MW-22-A**	**CR**	**C5-12-MW-7-B**	**CR**	**LDR**	**Lot CQ**
% Humidité	%	-	-	-	4.9		1.6		N/A	N/A
MÉTAUX										
Mercure (Hg)	mg/kg	0.2	2	10	ND		ND		0.02	1057044
Arsenic (As)	mg/kg	6	30	50	ND		ND		5	1057044
Cadmium (Cd)	mg/kg	1.5	5	20	ND		ND		0.5	1057044
Cobalt (Co)	mg/kg	15	50	300	ND		ND		2	1057044
Chrome (Cr)	mg/kg	85	250	800	6	<A	3	<A	2	1057044
Cuivre (Cu)	mg/kg	40	100	500	8	<A	5	<A	2	1057044
Nickel (Ni)	mg/kg	50	100	500	6	<A	3	<A	1	1057044
Plomb (Pb)	mg/kg	50	500	1000	7	<A	ND		5	1057044
Zinc (Zn)	mg/kg	110	500	1500	ND		12	<A	10	1057044

ND = inférieur à la limite de détection rapportée
N/A = Non Applicable
LDR = Limite de détection rapportée
Lot CQ = Lot Contrôle Qualité

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tél. : (514) 448-9001 Télécopieur : (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

BPC (SOL)

Identification Maxxam		S23449	S23451	S23452	S23455	S23458		
Date d'échantillonnage		2012/09/03	2012/09/03	2012/09/03	2012/09/04	2012/08/28		
	UNITÉS	**FM12-4-A**	**FM12-15-A**	**FM12-19-A**	**FM12-MW-22-A**	**C5-12-MW-7-B**	**LDR**	**Lot CQ**
% Humidité	%	3.2	26	5.0	4.9	1.6	N/A	N/A
BPC								
Aroclor 1242	mg/kg	ND	ND	ND	ND	ND	0.10	1056279
Aroclor 1248	mg/kg	ND	ND	ND	ND	ND	0.10	1056279
Aroclor 1254	mg/kg	ND	ND	ND	ND	ND	0.10	1056279
Aroclor 1260	mg/kg	ND	ND	ND	ND	ND	0.10	1056279
BPC Totaux	mg/kg	ND	ND	ND	ND	ND	0.10	1056279
Récupération des Surrogates (%)								
Décachlorobiphényle	%	101	95	99	100	109	N/A	1056279

ND = inférieur à la limite de détection rapportée
N/A = Non Applicable
LDR = Limite de détection rapportée
Lot CQ = Lot Contrôle Qualité

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BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

HYDROCARBURES PÉTROLIERS (CCME)

Identification Maxxam		S23457		
Date d'échantillonnage		2012/09/04		
	UNITÉS	**FM12-29**	**LDR**	**Lot CQ**
VOLATILS				
Benzène	ug/L	ND	0.4	1056544
Toluène	ug/L	ND	0.4	1056544
Ethylbenzène	ug/L	ND	0.4	1056544
p+m-Xylène	ug/L	ND	0.8	1056544
o-Xylène	ug/L	ND	0.4	1056544
Xylènes totaux	ug/L	ND	0.8	1056544
F1 (C6-C10)	ug/L	ND	100	1056544
F1 (C6-C10) - BTEX	ug/L	ND	100	1056544
Récupération des Surrogates (%)				
1,4-Difluorobenzène	%	94	N/A	1056544
4-Bromofluorobenzène	%	99	N/A	1056544
D10-Ethylbenzène	%	100	N/A	1056544
D4-1,2-Dichloroéthane	%	100	N/A	1056544

ND = inférieur à la limite de détection rapportée
N/A = Non Applicable
LDR = Limite de détection rapportée
Lot CQ = Lot Contrôle Qualité

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BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

HYDROCARBURES PAR GCFID (EAU)

Identification Maxxam		S23457		
Date d'échantillonnage		2012/09/04		
	UNITÉS	**FM12-29**	**LDR**	**Lot CQ**
HYDRO. PÉTROLIERS TOTAUX				
Hydrocarbures pétroliers F2:C10-C16	ug/L	120	100	1056794
Hydrocarbures pétroliers F3:C16-C34	ug/L	ND	100	1056794
Hydrocarbures pétroliers F4:C34-C50	ug/L	ND	100	1056794
Ligne de base atteinte à C50	ug/L	OUI	N/A	1056794
Récupération des Surrogates (%)				
O-Terphenyl	%	95	N/A	1056794

ND = inférieur à la limite de détection rapportée
N/A = Non Applicable
LDR = Limite de détection rapportée
Lot CQ = Lot Contrôle Qualité

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BIOGÉNIE S.R.D.C. INC.

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MÉTAUX (EAU)

Identification Maxxam		S23457		
Date d'échantillonnage		2012/09/04		
	UNITÉS	**FM12-29**	**LDR**	**Lot CQ**
MÉTAUX				
Mercure (Hg)	mg/L	ND	0.0001	1057042
Arsenic (As)	mg/L	0.003	0.001	1057042
Cadmium (Cd)	mg/L	ND	0.001	1057042
Chrome (Cr)	mg/L	0.013	0.005	1057042
Cobalt (Co)	mg/L	ND	0.02	1057042
Cuivre (Cu)	mg/L	0.012	0.003	1057042
Plomb (Pb)	mg/L	0.002	0.001	1057042
Nickel (Ni)	mg/L	0.01	0.01	1057042
Zinc (Zn)	mg/L	0.086	0.005	1057042

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LDR = Limite de détection rapportée
Lot CQ = Lot Contrôle Qualité

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BIOGÉNIE S.R.D.C. INC.

Dossier Maxxam: B250742
Date du rapport: 2012/09/19

BPC (EAU)

Identification Maxxam		S23457		
Date d'échantillonnage		2012/09/04		
	UNITÉS	**FM12-29**	**LDR**	**Lot CQ**
BPC				
Aroclor 1242	ug/L	ND	0.10	1056374
Aroclor 1248	ug/L	ND	0.10	1056374
Aroclor 1254	ug/L	ND	0.10	1056374
Aroclor 1260	ug/L	ND	0.10	1056374
BPC Totaux	ug/L	ND	0.10	1056374
Récupération des Surrogates (%)				
Décachlorobiphényle	%	109	N/A	1056374

ND = inférieur à la limite de détection rapportée
N/A = Non Applicable
LDR = Limite de détection rapportée
Lot CQ = Lot Contrôle Qualité

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BIOGÉNIE S.R.D.C. INC.

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REMARQUES GÉNÉRALES

État des échantillons à l'arrivée: BON excepté pour
Hydrocarbures pétroliers (F2-F4): Agent de conservation insuffisant, pH ajusté sur réception au laboratoire.: S23457
Métaux: Agent de conservation insuffisant, pH ajusté sur réception au laboratoire.: S23457
Hydrocarb. pétro. CCME F1 & BTEX: Présence d'un espace d'air.: S23450, S23453, S23454, S23456
Hydrocarb. pétro. CCME F1 & BTEX: Délai maximum de conservation dépassé sur réception.: S23449, S23450, S23451, S23452, S23453, S23454, S23455, S23456, S23458
Hydrocarbures pétroliers (F2-F4): Délai maximum de conservation dépassé sur réception.: S23458
BPC aroclor: Délai maximum de conservation dépassé sur réception.: S23458

Tous les résultats sont calculés sur une base sèche excepté lorsque non-applicable.

A,B,C,CR: Ces critères proviennent de l'Annexe 2 de la "Politique de protection des sols et de réhabilitation des terrains contaminés. Pour les analyses de métaux(et métalloides) dans les sols, le critère A désigne la " Teneur de fond Secteur Basses-Terres du Saint-Laurent ".
A,B-eau souterraine: A=Critère pour fin de consommation; B=Critère pour la résurgence dans les eaux de surface ou infiltration dans les égouts.
Ces références ne sont rapportées qu'à titre indicatif et ne doivent être interprétées dans aucun autre contexte.

- = Ce composé ne fait pas parti de la réglementation.

HYDROCARBURES PÉTROLIERS (CCME)

Veuillez noter que les résultats n'ont pas été corrigés ni pour la récupération des échantillons de contrôle qualité, ni pour le blanc de méthode.

Veuillez noter que les échantillons sont analysés par Headspace GC/MS-FID.

Veuillez noter que les résultats ci-dessus ont été corrigés pour le blanc d'instrument.

Une extraction de surface à été utilisé pour l'analyse des échantillons S23450, S23453, S23454 et S23456.

HYDROCARBURES PAR GCFID (ROCHE)

Veuillez noter que les résultats n'ont pas été corrigés pour la récupération des échantillons de contrôle de qualité (blanc fortifié et surrogates).
Veuillez noter que les résultats n'ont pas été corrigés pour le blanc de méthode.

Une extraction de surface à été utilisé pour l'analyse des échantillons S23450, S23453, S23454, S23456.

MÉTAUX EXTRACTIBLES TOTAUX (ROCHE)

Veuillez noter que les résultats n'ont pas été corrigés ni pour la récupération des échantillons de contrôle qualité, ni pour le blanc de méthode.

BPC (ROCHE)

Veuillez noter que les résultats n'ont été corrigés ni pour la récupération des échantillons de contrôle qualité (blanc fortifié et blanc de méthode), ni pour les surrogates.

HYDROCARBURES PÉTROLIERS (CCME)

Veuillez noter que les résultats n'ont pas été corrigés ni pour la récupération des échantillons de contrôle qualité, ni pour le blanc de méthode.

Veuillez noter que les résultats ci-dessus ont été corrigés pour le blanc d'instrument.

Veuillez noter que les échantillons sont analysés par Headspace GC/MS-FID.

HYDROCARBURES PAR GCFID (SOL)

Veuillez noter que les résultats n'ont pas été corrigés pour la récupération des échantillons de contrôle de qualité (blanc fortifié et surrogates).
Veuillez noter que les résultats n'ont pas été corrigés pour le blanc de méthode.

MÉTAUX EXTRACTIBLES TOTAUX (SOL)

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BIOGÉNIE S.R.D.C. INC.

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Veuillez noter que les résultats n'ont pas été corrigés ni pour la récupération des échantillons de contrôle qualité, ni pour le blanc de méthode.

BPC (SOL)

Veuillez noter que les résultats n'ont été corrigés ni pour la récupération des échantillons de contrôle qualité (blanc fortifié et blanc de méthode), ni pour les surrogates.

HYDROCARBURES PÉTROLIERS (CCME)

Veuillez noter que les résultats n'ont pas été corrigés ni pour la récupération des échantillons de contrôle qualité, ni pour le blanc de méthode.

Veuillez noter que les échantillons sont analysés par Headspace GC/MS-FID.

Veuillez noter que les résultats ci-dessus ont été corrigés pour le blanc d'instrument.

HYDROCARBURES PAR GCFID (EAU)

Veuillez noter que les résultats n'ont pas été corrigés pour la récupération des échantillons de contrôle de qualité (blanc fortifié et surrogates).
Veuillez noter que les résultats n'ont pas été corrigés pour le blanc de méthode.

MÉTAUX (EAU)

Veuillez noter que les résultats n'ont pas été corrigés ni pour la récupération des échantillons de contrôle qualité, ni pour le blanc de méthode.

BPC (EAU)

Veuillez noter que les résultats n'ont été corrigés ni pour la récupération des échantillons de contrôle qualité (blanc fortifié et blanc de méthode), ni pour les surrogates.

Les résultats ne se rapportent qu'aux objets soumis à l'essai.

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BIOGÉNIE S.R.D.C. INC.
Attention: Jonathan Martel-Gagnon
Votre # du projet:
P.O. #:
Adresse du site:

Rapport Assurance Qualité

Dossier Maxxam: B250742

Lot Lot Num Init	Type CQ	Groupe	Date Analysé aaaa/mm/jj	Valeur	Réc	UNITÉS
1055859 NTD	Blanc fortifié	1,4-Difluorobenzène	2012/09/14		96	%
		4-Bromofluorobenzène	2012/09/14		98	%
		D10-Ethylbenzène	2012/09/14		110	%
		D4-1,2-Dichloroéthane	2012/09/14		99	%
		Benzène	2012/09/14		95	%
		Toluène	2012/09/14		103	%
		Ethylbenzène	2012/09/14		105	%
		p+m-Xylène	2012/09/14		106	%
		o-Xylène	2012/09/14		108	%
		Xylènes totaux	2012/09/14		107	%
		F1 (C6-C10)	2012/09/14		86	%
	Blanc de méthode	1,4-Difluorobenzène	2012/09/14		97	%
		4-Bromofluorobenzène	2012/09/14		98	%
		D10-Ethylbenzène	2012/09/14		108	%
		D4-1,2-Dichloroéthane	2012/09/14		99	%
		Benzène	2012/09/14	ND, LDR=0.02		mg/kg
		Toluène	2012/09/14	ND, LDR=0.02		mg/kg
		Ethylbenzène	2012/09/14	ND, LDR=0.02		mg/kg
		p+m-Xylène	2012/09/14	ND, LDR=0.04		mg/kg
		o-Xylène	2012/09/14	ND, LDR=0.02		mg/kg
		Xylènes totaux	2012/09/14	ND, LDR=0.04		mg/kg
		F1 (C6-C10)	2012/09/14	ND, LDR=10		mg/kg
		F1 (C6-C10) - BTEX	2012/09/14	ND, LDR=10		mg/kg
1055876 MCP	Blanc fortifié	1,4-Difluorobenzène	2012/09/14		95	%
		4-Bromofluorobenzène	2012/09/14		99	%
		D10-Ethylbenzène	2012/09/14		98	%
		D4-1,2-Dichloroéthane	2012/09/14		102	%
		Benzène	2012/09/14		86	%
		Toluène	2012/09/14		92	%
		Ethylbenzène	2012/09/14		93	%
		p+m-Xylène	2012/09/14		94	%
		o-Xylène	2012/09/14		96	%
		Xylènes totaux	2012/09/14		95	%
		F1 (C6-C10)	2012/09/14		88	%
	Blanc de méthode	1,4-Difluorobenzène	2012/09/14		92	%
		4-Bromofluorobenzène	2012/09/14		99	%
		D10-Ethylbenzène	2012/09/14		117	%
		D4-1,2-Dichloroéthane	2012/09/14		105	%
		Benzène	2012/09/14	ND, LDR=0.02		mg/kg
		Toluène	2012/09/14	ND, LDR=0.02		mg/kg
		Ethylbenzène	2012/09/14	ND, LDR=0.02		mg/kg
		p+m-Xylène	2012/09/14	ND, LDR=0.04		mg/kg
		o-Xylène	2012/09/14	ND, LDR=0.02		mg/kg
		Xylènes totaux	2012/09/14	ND, LDR=0.04		mg/kg
		F1 (C6-C10)	2012/09/14	ND, LDR=10		mg/kg
		F1 (C6-C10) - BTEX	2012/09/14	ND, LDR=10		mg/kg
1056205 FV1	Blanc fortifié	O-Terphenyl	2012/09/13		107	%
		Hydrocarbures pétroliers F2:C10-C16	2012/09/13		102	%
		Hydrocarbures pétroliers F3:C16-C34	2012/09/13		102	%
		Hydrocarbures pétroliers F4:C34-C50	2012/09/13		102	%
	Blanc de méthode	O-Terphenyl	2012/09/13		105	%
		Hydrocarbures pétroliers F2:C10-C16	2012/09/13	10, LDR=10		mg/kg
		Hydrocarbures pétroliers F3:C16-C34	2012/09/13	12, LDR=10		mg/kg
		Hydrocarbures pétroliers F4:C34-C50	2012/09/13	ND, LDR=10		mg/kg
1056279 AK2	Blanc fortifié	Décachlorobiphényle	2012/09/14		106	%

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Rapport Assurance Qualité (Suite)

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Lot Lot Num Init	Type CQ	Groupe	Date Analysé aaaa/mm/jj	Valeur	Réc	UNITÉS
1056279 AK2	Blanc fortifié	Aroclor 1242	2012/09/14		96	%
		Aroclor 1260	2012/09/14		106	%
	Blanc de méthode	Décachlorobiphényle	2012/09/14		110	%
		Aroclor 1242	2012/09/14	ND, LDR=0.10		mg/kg
		Aroclor 1248	2012/09/14	ND, LDR=0.10		mg/kg
		Aroclor 1254	2012/09/14	ND, LDR=0.10		mg/kg
		Aroclor 1260	2012/09/14	ND, LDR=0.10		mg/kg
		BPC Totaux	2012/09/14	ND, LDR=0.10		mg/kg
1056374 AK2	Blanc fortifié	Décachlorobiphényle	2012/09/15		95	%
		Aroclor 1242	2012/09/15		80	%
		Aroclor 1260	2012/09/15		98	%
	Blanc de méthode	Décachlorobiphényle	2012/09/15		107	%
		Aroclor 1242	2012/09/15	ND, LDR=0.10		ug/L
		Aroclor 1248	2012/09/15	ND, LDR=0.10		ug/L
		Aroclor 1254	2012/09/15	ND, LDR=0.10		ug/L
		Aroclor 1260	2012/09/15	ND, LDR=0.10		ug/L
		BPC Totaux	2012/09/15	ND, LDR=0.10		ug/L
1056469 FV1	Blanc fortifié	O-Terphenyl	2012/09/14		113	%
		Hydrocarbures pétroliers F2:C10-C16	2012/09/14		105	%
		Hydrocarbures pétroliers F3:C16-C34	2012/09/14		105	%
		Hydrocarbures pétroliers F4:C34-C50	2012/09/14		105	%
	Blanc de méthode	O-Terphenyl	2012/09/14		98	%
		Hydrocarbures pétroliers F2:C10-C16	2012/09/14	10, LDR=10		mg/kg
		Hydrocarbures pétroliers F3:C16-C34	2012/09/14	ND, LDR=10		mg/kg
		Hydrocarbures pétroliers F4:C34-C50	2012/09/14	ND, LDR=10		mg/kg
1056544 ST1	Blanc fortifié	1,4-Difluorobenzène	2012/09/14		96	%
		4-Bromofluorobenzène	2012/09/14		97	%
		D10-Ethylbenzène	2012/09/14		112	%
		D4-1,2-Dichloroéthane	2012/09/14		100	%
		Benzène	2012/09/14		92	%
		Toluène	2012/09/14		101	%
		Ethylbenzène	2012/09/14		103	%
		p+m-Xylène	2012/09/14		104	%
		o-Xylène	2012/09/14		105	%
		Xylènes totaux	2012/09/14		105	%
		F1 (C6-C10)	2012/09/14		77	%
	Blanc de méthode	1,4-Difluorobenzène	2012/09/14		93	%
		4-Bromofluorobenzène	2012/09/14		98	%
		D10-Ethylbenzène	2012/09/14		106	%
		D4-1,2-Dichloroéthane	2012/09/14		104	%
		Benzène	2012/09/14	ND, LDR=0.4		ug/L
		Toluène	2012/09/14	ND, LDR=0.4		ug/L
		Ethylbenzène	2012/09/14	ND, LDR=0.4		ug/L
		p+m-Xylène	2012/09/14	ND, LDR=0.8		ug/L
		o-Xylène	2012/09/14	ND, LDR=0.4		ug/L
		Xylènes totaux	2012/09/14	ND, LDR=0.8		ug/L
		F1 (C6-C10)	2012/09/14	ND, LDR=100		ug/L
		F1 (C6-C10) - BTEX	2012/09/14	ND, LDR=100		ug/L
1056794 CT2	Blanc fortifié	O-Terphenyl	2012/09/17		112	%
		Hydrocarbures pétroliers F2:C10-C16	2012/09/17		105	%
		Hydrocarbures pétroliers F3:C16-C34	2012/09/17		105	%
		Hydrocarbures pétroliers F4:C34-C50	2012/09/17		105	%
	Blanc de méthode	O-Terphenyl	2012/09/17		96	%
		Hydrocarbures pétroliers F2:C10-C16	2012/09/17	120, LDR=100		ug/L
		Hydrocarbures pétroliers F3:C16-C34	2012/09/17	ND, LDR=100		ug/L

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Rapport Assurance Qualité (Suite)

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Lot Lot Num Init	Type CQ	Groupe	Date Analysé aaaa/mm/jj	Valeur	Réc	UNITÉS
1056794 CT2	Blanc de méthode	Hydrocarbures pétroliers F4:C34-C50	2012/09/17	ND, LDR=100		ug/L
1056814 AK2	Blanc fortifié	Décachlorobiphényle	2012/09/15		99	%
		Aroclor 1242	2012/09/15		90	%
		Aroclor 1260	2012/09/15		106	%
	Blanc de méthode	Décachlorobiphényle	2012/09/15		104	%
		Aroclor 1242	2012/09/15	ND, LDR=0.10		mg/kg
		Aroclor 1248	2012/09/15	ND, LDR=0.10		mg/kg
		Aroclor 1254	2012/09/15	ND, LDR=0.10		mg/kg
		Aroclor 1260	2012/09/15	ND, LDR=0.10		mg/kg
		BPC Totaux	2012/09/15	ND, LDR=0.10		mg/kg
1057042 MCA	ÉTALON CQ	Arsenic (As)	2012/09/17		96	%
		Cadmium (Cd)	2012/09/17		96	%
		Chrome (Cr)	2012/09/17		96	%
		Cobalt (Co)	2012/09/17		99	%
		Cuivre (Cu)	2012/09/17		95	%
		Plomb (Pb)	2012/09/17		97	%
		Nickel (Ni)	2012/09/17		94	%
		Zinc (Zn)	2012/09/17		101	%
	Blanc fortifié	Mercure (Hg)	2012/09/17		90	%
		Arsenic (As)	2012/09/17		97	%
		Cadmium (Cd)	2012/09/17		99	%
		Chrome (Cr)	2012/09/17		100	%
		Cobalt (Co)	2012/09/17		97	%
		Cuivre (Cu)	2012/09/17		96	%
		Plomb (Pb)	2012/09/17		98	%
		Nickel (Ni)	2012/09/17		99	%
		Zinc (Zn)	2012/09/17		101	%
	Blanc de méthode	Mercure (Hg)	2012/09/17	ND, LDR=0.0001		mg/L
		Arsenic (As)	2012/09/17	ND, LDR=0.001		mg/L
		Cadmium (Cd)	2012/09/17	ND, LDR=0.001		mg/L
		Chrome (Cr)	2012/09/17	ND, LDR=0.005		mg/L
		Cobalt (Co)	2012/09/17	ND, LDR=0.02		mg/L
		Cuivre (Cu)	2012/09/17	ND, LDR=0.003		mg/L
		Plomb (Pb)	2012/09/17	ND, LDR=0.001		mg/L
		Nickel (Ni)	2012/09/17	ND, LDR=0.01		mg/L
		Zinc (Zn)	2012/09/17	ND, LDR=0.005		mg/L
1057044 SC5	Blanc fortifié	Mercure (Hg)	2012/09/17		106	%
		Arsenic (As)	2012/09/17		108	%
		Cadmium (Cd)	2012/09/17		112	%
		Cobalt (Co)	2012/09/17		110	%
		Chrome (Cr)	2012/09/17		107	%
		Cuivre (Cu)	2012/09/17		108	%
		Nickel (Ni)	2012/09/17		105	%
		Plomb (Pb)	2012/09/17		78	%
		Zinc (Zn)	2012/09/17		106	%
	Blanc de méthode	Mercure (Hg)	2012/09/17	ND, LDR=0.02		mg/kg
		Arsenic (As)	2012/09/17	ND, LDR=5		mg/kg
		Cadmium (Cd)	2012/09/17	ND, LDR=0.5		mg/kg
		Cobalt (Co)	2012/09/17	ND, LDR=2		mg/kg
		Chrome (Cr)	2012/09/17	ND, LDR=2		mg/kg
		Cuivre (Cu)	2012/09/17	ND, LDR=2		mg/kg
		Nickel (Ni)	2012/09/17	ND, LDR=1		mg/kg
		Plomb (Pb)	2012/09/17	ND, LDR=5		mg/kg
		Zinc (Zn)	2012/09/17	ND, LDR=10		mg/kg
1057312 KK	Blanc fortifié	Arsenic (As)	2012/09/18		104	%

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tél. : (514) 448-9001 Télécopieur : (514) 448-9199 Ligne sans frais : 1-877-4MAXXAM (462-9926)

BIOGÉNIE S.R.D.C. INC.
Attention: Jonathan Martel-Gagnon
Votre # du projet:
P.O. #:
Adresse du site:

Rapport Assurance Qualité (Suite)

Dossier Maxxam: B250742

Lot Num	Lot Init	Type CQ	Groupe	Date Analysé aaaa/mm/jj	Valeur	Réc	UNITÉS
1057312	KK	Blanc fortifié	Cadmium (Cd)	2012/09/18		100	%
			Cobalt (Co)	2012/09/18		99	%
			Chrome (Cr)	2012/09/18		94	%
			Cuivre (Cu)	2012/09/18		103	%
			Nickel (Ni)	2012/09/18		99	%
			Plomb (Pb)	2012/09/18		98	%
			Zinc (Zn)	2012/09/18		101	%
		Blanc de méthode	Arsenic (As)	2012/09/18	ND, LDR=5		mg/kg
			Cadmium (Cd)	2012/09/18	ND, LDR=0.5		mg/kg
			Cobalt (Co)	2012/09/18	ND, LDR=2		mg/kg
			Chrome (Cr)	2012/09/18	ND, LDR=2		mg/kg
			Cuivre (Cu)	2012/09/18	ND, LDR=2		mg/kg
			Nickel (Ni)	2012/09/18	ND, LDR=1		mg/kg
			Plomb (Pb)	2012/09/18	ND, LDR=5		mg/kg
			Zinc (Zn)	2012/09/18	ND, LDR=10		mg/kg

Matériau de référence certifié: Matériau dont une ou plusieurs valeurs des propriétés sont certifiées par une procédure techniquement valide, délivré par un organisme de certification et accompagné d'un certificat. Sert à évaluer l'exactitude d'une méthode analytique.
Blanc fortifié: Blanc auquel a été ajouté une quantité connue d'un ou de plusieurs composés chimiques d'intérêts. Sert à évaluer la récupération des composés d'intérêts.
Blanc de méthode: Une partie aliquote de matrice pure soumise au même processus analytique que les échantillons, du prétraitement au dosage. Sert à évaluer toutes contaminations du laboratoire.
Surrogate: Composé se comportant de façon similaire aux composés analysés et ajouté à l'échantillon avant l'analyse. Sert à évaluer la qualité de l'extraction.
LDR = Limite de détection rapportée
Réc = Récupération

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Page des signatures de validation

Dossier Maxxam: B250742

Les résultats analytiques ainsi que les données de contrôle-qualité contenus dans ce rapport furent vérifiés et validés par les personnes suivantes:

Aomar Kaidi, B.Sc., Chimiste

Abdeslam Siaida, Analyste II

Francois Faucher, B.Sc., Chimiste

Maria Chrifi Alaoui, B.Sc., Chimiste

Steliana Calestru, B.Sc. Chimiste

==========

Maxxam a mis en place des procédures qui protègent contre l'utilisation non autorisée de la signature électronique et emploie les "signataires" requis, conformément à la section 5.10.2 de la norme ISO/CEI 17025:2005(E). Veuillez vous référer à la page des signatures de validation pour obtenir les détails des validations pour chaque division.

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Maxxam Analytics

Calgary: 4000 19st St. NE, T2E 6P8. Ph: (403) 291-3077, Fax: (403) 735-2240, Toll free: (800) 386-7247
Edmonton: 9331 - 48 Street, T6B 2R4. Ph: (780) 465-1212, Fax: (780) 450-4187, Toll free: (877) 485-8889

Chain of Custody

Page: of

12-Sep-12 14:00

Argyro Frangoulis

B250742

RG2 MTL-0008

Invoice To: Require Report? Yes ☐ No ☐

Company Name:
Contact Name:
Address:
Prov: PC:
Contact #s: Ph: Fax:

Report To:

Prov: PC:
Ph: Fax:

DETECTION LIMIT REQUIREMENTS:

Check the applicable criterion and indicate land use

☐ AT1
☐ CCME
☐ OTHER

REPORT DISTRIBUTION:

EMAIL ADDRESS(S):

SERVICE REQUESTED:

☐ RUSH (Please ensure you contact the lab to reserve)
Date Required:
☐ REGULAR Turnaround (5 to 7 Days)

	Sample Identification	Matrix S/W	Date & Time Sampled Year/Month/Day	SOILS (footnotes defined on back): BTEX F1-F4	Sieve (75 micron)	Salinity 4	Regulated Metals (CCME / AT1)1	Assessment ICP Metals2	☐Paint Filter ☐Flashpoint ☐pH (1:1)	TCLP ☐ BTEX ☐ Metals ☐				WATERS (footnotes defined on back): ☐BTEX F1 ☐VOCs	☐BTEX F1-F2 ☐BTEX F1-F4	Routine Water Package ☐Turb ☐F ☐	Total ☐ Preserved ☐ Not Preserved	Dissolved ☐ Preserved ☐ Filtered ☐ Not Preserved ☐ Not Filtered	Mercury ☐Total ☐Dissolved	☐Ammonia ☐TKN ☐COD	☐TOC ☐DOC	OTHER TEST(S): PCB Total Aroclor	Inorganic element: Arsenic, Cadmium Chromium	cobalt, copper, Lead, nickel, zinc, mercury					*HOLD for 60 Days	# of Containers Submitted
																	REGULATED METALS (CCME / AT1)3													
1	FM12-4-A	S	2012/09/03	✓																		✓	✓							
2	FM12-7-A	S	2012/09/03	✓																		✓	✓							
3	FM12-15-A	S	2012/09/03	✓																		✓	✓							
4	FM12-19-A	S	2012/09/03	✓																		✓	✓							
5	FM12-11-A	S	2012/09/03	✓																		✓	✓							
6	FM12-MW-3-A	S	2012/09/04	✓																		✓	✓							
7	FM12-MW-22-A	S	2012/09/04	✓																		✓	✓							
8	FM12-27-A	S	2012/09/04	✓																		✓	✓							
9	FM12-29	W	2012/09/04	✓																		✓	✓							
10	C5-12-MW-7-B	S	2012/08/28	✓																		✓	✓							
11																														
12																														

* All samples are held for 60 calendar days after sample receipt. For long term storage please contact your project manager.

Maxxam Job #:

Relinquished By: Date/Time:
Sign and Print:
COMMENTS/SPECIAL INSTRUCTIONS:

# JARS USED & NOT SUBMITTED	Received By	Temperature			Ice
	CUSTODY SEAL YES / NO				

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

NOM DU CLIENT: **BIOGENIE, DIVISION D'ENGLOBE CORP.**
4495, BOUL W. HAMEL SUITE 200
QUEBEC, QC G1P2J7
(418) 653-4422

À L'ATTENTION DE: **Brandon MacKay**

N° DE PROJET: **Landfill Monitoring**

N° BON DE TRAVAIL: **12Q642658**

ANALYSE DES SOLS VÉRIFIÉ PAR: **Georgi Lazarov, chimiste**

ORGANIQUE DE TRACE VÉRIFIÉ PAR: **Félix Brasseur, chimiste**

ANALYSE DE L'EAU VÉRIFIÉ PAR: **Georgi Lazarov, chimiste**

DATE DU RAPPORT: **2012-11-08**

VERSION*: **2**

NOMBRE DE PAGES: **18**

Si vous desirez de l'information concernant cette analyse, S.V.P. contacter votre chargé de projets au (403) 735-2005

*NOTES
VERSION 2:Ajout de paramètres (2012-11-07)

Nous disposerons des échantillons dans les 30 jours suivants les analyses. S.V.P. Contactez le laboratoire si vous désirez avoir un délai d'entreposage

AGAT Laboratoires

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Certificat d'analyse

N° BON DE TRAVAIL: 12Q642658

N° DE PROJET: Landfill Monitoring

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

Soil Analysis

DATE DE RÉCEPTION: 2012-09-13

DATE DU RAPPORT: 2012-11-08

			DESCRIPTION D'ÉCHANTILLON:	C5-12-MW-05-A	C5-12-MW-05-A-D	C5-12-MW-05-B	C5-12-MW-06-A	C5-12-MW-06-B	C5-12-MW-07-A	C5-12-MW-07-B	C5-12-MW-08-A
			MATRICE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			DATE D'ÉCHANTILLONNAGE:	2012-08-28	2012-08-28	2012-08-28	2012-08-28	2012-08-28	2012-08-28	2012-08-28	2012-08-28
Paramètre	**Unités**	**C / N**	**LDR**	**3715156**	**3715268**	**3715269**	**3715270**	**3715271**	**3715272**	**3715311**	**3715358**
Arsenic	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	5.2	4.8	11.5	4.7	5.8	13.1	3.8	6.8
Cobalt	mg/kg		0.5	2.2	2.3	2.6	3.0	3.4	4.0	3.0	3.2
Copper	mg/kg		0.5	7.6	7.6	5.0	6.8	8.4	8.1	7.6	9.4
Lead	mg/kg		0.5	2.8	2.6	3.0	2.8	2.7	4.3	2.7	2.7
Mercury	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	mg/kg		0.5	3.3	2.8	4.5	3.2	4.7	5.9	3.4	4.8
Zinc	mg/kg		1	19	17	23	21	26	25	24	25

			DESCRIPTION D'ÉCHANTILLON:	C5-12-MW-08-B
			MATRICE:	Soil
			DATE D'ÉCHANTILLONNAGE:	2012-08-28
Paramètre	**Unités**	**C / N**	**LDR**	**3715360**
Arsenic	mg/kg		0.5	<0.5
Cadmium	mg/kg		0.5	<0.5
Chromium	mg/kg		0.5	8.1
Cobalt	mg/kg		0.5	4.2
Copper	mg/kg		0.5	10.6
Lead	mg/kg		0.5	2.8
Mercury	mg/kg		0.5	<0.5
Nickel	mg/kg		0.5	5.1
Zinc	mg/kg		1	28

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

Certifié par:

GLazarov

CHIMISTE Georgi Lazarov 2009-148 QUÉBEC

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Certificat d'analyse

N° BON DE TRAVAIL: 12Q642658

N° DE PROJET: Landfill Monitoring

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE DE RÉCEPTION: 2012-09-13

DATE DU RAPPORT: 2012-11-08

			DESCRIPTION D'ÉCHANTILLON:	C5-12-MW-05-A	C5-12-MW-05-A-D	C5-12-MW-05-B	C5-12-MW-06-A	C5-12-MW-06-B	C5-12-MW-07-A	C5-12-MW-07-B	C5-12-MW-08-A
			MATRICE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			DATE D'ÉCHANTILLONNAGE:	2012-08-28	2012-08-28	2012-08-28	2012-08-28	2012-08-28	2012-08-28	2012-08-28	2012-08-28
Paramètre	**Unités**	**C / N**	**LDR**	**3715156**	**3715268**	**3715269**	**3715270**	**3715271**	**3715272**	**3715311**	**3715358**
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	84	70	69	52	25	<10	<10	<10
C34 - C50 (F4)	mg/kg		10	89	85	75	53	30	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	8.6	10	7.3	4.7	4.2	2.2	1.6	1.8
Surrogate	**Unités**	**Limites**									
Toluene-d8 (BTEX)	%	50-150		101	98	101	97	100	95	98	100
Ethylbenzene-d10 (BTEX)	%	50-150		96	103	110	110	108	102	115	102
o-Terphenyl (F2-F4)	%	50-150		91	90	89	88	89	88	94	95

Certifié par:

CHIMISTE Félix Brasseur 1997-012 QUÉBEC

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Certificat d'analyse

N° BON DE TRAVAIL: 12Q642658

N° DE PROJET: Landfill Monitoring

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE DE RÉCEPTION: 2012-09-13

DATE DU RAPPORT: 2012-11-08

		DESCRIPTION D'ÉCHANTILLON:		**C5-12-MW-08-B**
		MATRICE:		**Soil**
		DATE D'ÉCHANTILLONNAGE:		**2012-08-28**
Paramètre	**Unités**	**C / N**	**LDR**	**3715360**
Benzene	mg/kg		0.005	<0.005
Toluene	mg/kg		0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01
Xylenes	mg/kg		0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10
C10 - C16 (F2)	mg/kg		10	<10
C16 - C34 (F3)	mg/kg		10	<10
C34 - C50 (F4)	mg/kg		10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A
Moisture Content	%		1	1.7
Surrogate	**Unités**	**Limites**		
Toluene-d8 (BTEX)	%	50-150		99
Ethylbenzene-d10 (BTEX)	%	50-150		109
o-Terphenyl (F2-F4)	%	50-150		96

Certifié par:

CHIMISTE Félix Brasseur 1997-012 QUÉBEC

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Certificat d'analyse

N° BON DE TRAVAIL: 12Q642658

N° DE PROJET: Landfill Monitoring

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE DE RÉCEPTION: 2012-09-13

DATE DU RAPPORT: 2012-11-08

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes: se réfère ABTier1 (Ag,F)

3715156-3715360 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions (if requested).
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
Extraction and holding times were met for this sample.

Sample holding time exceeded.

Certifié par:

CHIMISTE Félix Brasseur 1997-012 QUÉBEC

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Certificat d'analyse

N° BON DE TRAVAIL: 12Q642658

N° DE PROJET: Landfill Monitoring

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

Petroleum Hydrocarbons (BTEX/F1-F4) in Water

DATE DE RÉCEPTION: 2012-09-13

DATE DU RAPPORT: 2012-11-08

			DESCRIPTION D'ÉCHANTILLON:	C5-12-MW-06	C5-12-MW-08	Travel Blank
			MATRICE:	Water	Water	Water
			DATE D'ÉCHANTILLONNAGE:	2012-08-29	2012-08-29	2012-08-29
Paramètre	**Unités**	**C / N**	**LDR**	**3715428**	**3715438**	**3715444**
Benzene	mg/L		0.0005	<0.0005	<0.0005	<0.0005
Toluene	mg/L		0.0005	0.001	0.0016	0.0016
Ethylbenzene	mg/L		0.0005	<0.0005	<0.0005	<0.0005
Xylenes	mg/L		0.0005	<0.0005	<0.0005	<0.0005
C6 - C10 (F1)	mg/L		0.1	<0.1	<0.1	<0.1
C6 - C10 (F1 minus BTEX)	mg/L		0.1	<0.1	<0.1	<0.1
C>10 - C16	mg/L		0.1	<0.1	<0.1	<0.1
C>16 - C34	mg/L		0.1	<0.1	<0.1	<0.1
C>34 - C50	mg/L		0.1	<0.1	<0.1	<0.1
Surrogate	**Unités**	**Limites**				
Toluene-d8 (BTEX)	%	50-150		104	104	105
o-Terphenyl (F2-F4)	%	50-150		93	91	93

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

3715428-3715444 The C>6 - C10 fraction is calculated using the toluene response factor.
The C10 - C16 fraction is calculated using the average response factor for nC10, nC16 and nC34.
BTEX has NOT been subtracted from Fraction 1.
Sample is blank corrected.

Sample holding time exceeded.

Certifié par:

CHIMISTE Félix Brasseur 1997-012 QUÉBEC

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Certificat d'analyse

N° BON DE TRAVAIL: 12Q642658

N° DE PROJET: Landfill Monitoring

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

Polychlorinated Biphenyls Analysis - Soil

DATE DE RÉCEPTION: 2012-09-13

DATE DU RAPPORT: 2012-11-08

			DESCRIPTION D'ÉCHANTILLON:	C5-12-MW-05-A	C5-12-MW-05-A-D	C5-12-MW-05-B	C5-12-MW-06-A	C5-12-MW-06-B	C5-12-MW-07-A	C5-12-MW-07-B	C5-12-MW-08-A
			MATRICE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			DATE D'ÉCHANTILLONNAGE:	2012-08-28	2012-08-28	2012-08-28	2012-08-28	2012-08-28	2012-08-28	2012-08-28	2012-08-28
Paramètre	**Unités**	**C / N**	**LDR**	**3715156**	**3715268**	**3715269**	**3715270**	**3715271**	**3715272**	**3715311**	**3715358**
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	**Unités**	**Limites**									
Decachlorobiphenyl	%	50-150		76	76	75	74	74	74	76	76

			DESCRIPTION D'ÉCHANTILLON:	C5-12-MW-08-B
			MATRICE:	Soil
			DATE D'ÉCHANTILLONNAGE:	2012-08-28
Paramètre	**Unités**	**C / N**	**LDR**	**3715360**
Aroclor 1242	mg/kg		0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05
Surrogate	**Unités**	**Limites**		
Decachlorobiphenyl	%	50-150		76

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

3715156-3715360 Results are based on the dry weight of the sample.

Certifié par:

CHIMISTE Félix Brasseur 1997-012 QUÉBEC

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Certificat d'analyse

N° BON DE TRAVAIL: 12Q642658

N° DE PROJET: Landfill Monitoring

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

Polychlorinated Biphenyls Analysis - Water

DATE DE RÉCEPTION: 2012-09-13

DATE DU RAPPORT: 2012-11-08

			DESCRIPTION D'ÉCHANTILLON:	C5-12-MW-06	C5-12-MW-08	Travel Blank
			MATRICE:	Water	Water	Water
			DATE D'ÉCHANTILLONNAGE:	2012-08-29	2012-08-29	2012-08-29
Paramètre	**Unités**	**C / N**	**LDR**	**3715428**	**3715438**	**3715444**
Aroclor 1242	µg/L		0.01	<0.01	<0.01	<0.01
Aroclor 1254	µg/L		0.01	<0.01	<0.01	<0.01
Aroclor 1260	µg/L		0.01	<0.01	<0.01	<0.01
Polychlorinated Biphenyls	µg/L		0.01	<0.01	<0.01	<0.01
Surrogate	**Unités**	**Limites**				
Decachlorobiphenyl	%	50-150		77	76	73

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

Certifié par:

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Certificat d'analyse

N° BON DE TRAVAIL: 12Q642658

N° DE PROJET: Landfill Monitoring

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

Total Petroleum Hydrocarbon Analysis - Soil

DATE DE RÉCEPTION: 2012-09-13

DATE DU RAPPORT: 2012-11-08

			DESCRIPTION D'ÉCHANTILLON:	**C5-12-MW-05-A**	**C5-12-MW-05-A-D**	**C5-12-MW-05-B**	**C5-12-MW-06-A**	**C5-12-MW-06-B**	**C5-12-MW-07-A**	**C5-12-MW-07-B**	**C5-12-MW-08-A**
			MATRICE:	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**
			DATE D'ÉCHANTILLONNAGE:	**2012-08-28**	**2012-08-28**	**2012-08-28**	**2012-08-28**	**2012-08-28**	**2012-08-28**	**2012-08-28**	**2012-08-28**
Paramètre	**Unités**	**C / N**	**LDR**	**3715156**	**3715268**	**3715269**	**3715270**	**3715271**	**3715272**	**3715311**	**3715358**
Total Purgeable Hydrocarbons	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Total Extractable Hydrocarbons	mg/kg		10	60	50	50	30	10	<10	<10	<10
Total Petroleum Hydrocarbons	mg/kg		10	60	50	50	30	10	<10	<10	<10

			DESCRIPTION D'ÉCHANTILLON:	**C5-12-MW-08-B**
			MATRICE:	**Soil**
			DATE D'ÉCHANTILLONNAGE:	**2012-08-28**
Paramètre	**Unités**	**C / N**	**LDR**	**3715360**
Total Purgeable Hydrocarbons	mg/kg		10	<10
Total Extractable Hydrocarbons	mg/kg		10	<10
Total Petroleum Hydrocarbons	mg/kg		10	<10

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

3715156-3715360 Results are based on the dry weight of the sample.
Total Petroleum Hydrocarbons (TPH, n-C5 - n-C32); Calculated based on addition of n-C5 to n-C10 fraction (purgeable method) and n-C10 to n-C32 fraction (TEH extraction).
Total Extractable Hydrocarbons (TEH, n-C10 - n-C32); Calculated based on all extractable compounds using n-eicosane response.
Total Purgeable Hydrocarbons (TPGH, n- C5 - n-C10); Calculated based on all purgeable compounds using toluene response.
Sample is blank corrected.

Sample holding time exceeded.

Certifié par:

CHIMISTE Félix Brasseur 1997-012 QUÉBEC

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Certificat d'analyse

N° BON DE TRAVAIL: 12Q642658

N° DE PROJET: Landfill Monitoring

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

Total Petroleum Hydrocarbon Analysis - Water

DATE DE RÉCEPTION: 2012-09-13

DATE DU RAPPORT: 2012-11-08

			DESCRIPTION D'ÉCHANTILLON:	C5-12-MW-06	C5-12-MW-08	Travel Blank
			MATRICE:	Water	Water	Water
			DATE D'ÉCHANTILLONNAGE:	2012-08-29	2012-08-29	2012-08-29
Paramètre	**Unités**	**C / N**	**LDR**	**3715428**	**3715438**	**3715444**
Total Purgeable Hydrocarbons	mg/L		0.1	<0.1	<0.1	<0.1
Total Extractable Hydrocarbons	mg/L		0.1	<0.1	<0.1	<0.1
Total Petroleum Hydrocarbons	mg/L		0.1	<0.1	<0.1	<0.1
Surrogate	**Unités**	**Limites**				
Toluene-d8 (BTEX)	%	50-150		104	104	105
o-Terphenyl (TEH)	%	50-150		93	91	93

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

3715428-3715444 Total Petroleum Hydrocarbons (TPH, n-C5 - n-C32); Calculated based on addition of n-C5 to n-C10 fraction (purgeable method) and n-C10 to n-C32 fraction (TEH extraction).
Total Extractable Hydrocarbons (TEH, n-C10 - n-C32); Calculated based on all extractable compounds using n-eicosane response.
Total Purgeable Hydrocarbons (TPGH, n- C5 - n-C10); Calculated based on all purgeable compounds using toluene response.
Sample is blank corrected.

Sample holding time exceeded.

Certifié par:

CHIMISTE Félix Brasseur 1997-012 QUÉBEC

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Certificat d'analyse

N° BON DE TRAVAIL: 12Q642658

N° DE PROJET: Landfill Monitoring

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

Water Analysis

DATE DE RÉCEPTION: 2012-09-13

DATE DU RAPPORT: 2012-11-08

			DESCRIPTION D'ÉCHANTILLON:	C5-12-MW-06	C5-12-MW-08	Travel Blank
			MATRICE:	Water	Water	Water
			DATE D'ÉCHANTILLONNAGE:	2012-08-29	2012-08-29	2012-08-29
Paramètre	**Unités**	**C / N**	**LDR**	**3715428**	**3715438**	**3715444**
Dissolved Arsenic	mg/L		0.001	0.001	<0.001	<0.001
Dissolved Cadmium	mg/L		0.000016	0.00224	0.000031	<0.000016
Dissolved Chromium	mg/L		0.001	0.001	0.001	<0.001
Dissolved Copper	mg/L		0.002	0.005	0.013	<0.002
Dissolved Lead	mg/L		0.001	<0.001	0.002	<0.001
Dissolved Mercury	mg/L		0.000025	<0.000025	<0.000025	<0.000025
Dissolved Nickel	mg/L		0.01	0.01	<0.01	<0.01
Dissolved Zinc	mg/L		0.001	0.030	0.005	0.003
Dissolved Cobalt	mg/L		0.001	0.001	<0.001	<0.001

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes
3715428-3715444 < - Values refer to Report Detection Limit.

Certifié par: GLazarov

CHIMISTE Georgi Lazarov 2009-148 QUÉBEC

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Certificat d'analyse

N° BON DE TRAVAIL: 12Q642658

N° DE PROJET: Landfill Monitoring

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

Water Analysis - Total Metals

DATE DE RÉCEPTION: 2012-09-13

DATE DU RAPPORT: 2012-11-08

			DESCRIPTION D'ÉCHANTILLON:	C5-12-MW-06	C5-12-MW-08	Travel Blank
			MATRICE:	Water	Water	Water
			DATE D'ÉCHANTILLONNAGE:	2012-08-29	2012-08-29	2012-08-29
Paramètre	**Unités**	**C / N**	**LDR**	**3715428**	**3715438**	**3715444**
Total Arsenic	mg/L		0.001	0.002	0.001	<0.001
Total Cadmium	mg/L		0.00005	0.00270	0.00012	<0.00005
Total Chromium	mg/L		0.001	0.207	0.081	<0.001
Total Cobalt	mg/L		0.001	0.005	0.009	<0.001
Total Copper	mg/L		0.002	0.084	0.056	<0.002
Total Lead	mg/L		0.001	0.009	0.010	<0.001
Total Mercury	mg/L		0.000025	<0.000025	<0.000025	<0.000025
Total Nickel	mg/L		0.003	0.205	0.047	<0.003
Total Zinc	mg/L		0.001	0.081	0.054	0.001

Commentaires: LDR - Limite de détection rapportée; C / N - Critères Normes

3715428 < - Values refer to Method Detection Limit.

3715438-3715444 < - Values refer to Method Detection Limit.

Certifié par: GLazarov

CHIMISTE Georgi Lazarov 2009-148 QUÉBEC

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Contrôle de qualité

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.
N° BON DE TRAVAIL: 12Q642658
N° DE PROJET: Landfill Monitoring
À L'ATTENTION DE: Brandon MacKay
PRÉLEVÉ PAR:
LIEU DE PRÉLÈVEMENT:

Analyse des Sols

Date du rapport: 2012-11-08			DUPLICATA			MATÉRIAU DE RÉFÉRENCE				BLANC FORTIFIÉ			ÉCH. FORTIFIÉ		
PARAMÈTRE	Lot	N° éch.	Dup #1	Dup #2	% d'écart	Blanc de méthode	% Récup.	Limites		% Récup.	Limites		% Récup.	Limites	
								Inf.	Sup.		Inf.	Sup.		Inf.	Sup.
Soil Analysis															
Arsenic	1896	3711590	7.0	7.0	0.0	< 0.5	93%	80%	120%				94%	80%	120%
Cadmium	1896	3711590	< 0.5	< 0.5	0.0	< 0.5	101%	80%	120%				99%	80%	120%
Chromium	1896	3711590	16.4	15.8	3.7	< 0.5	100%	80%	120%				105%	80%	120%
Cobalt	1896	3711590	7.6	7.7	1.3	< 0.5	101%	80%	120%				94%	80%	120%
Copper	1896	3711590	19.8	20.1	1.5	< 0.5	102%	80%	120%				92%	80%	120%
Lead	1896	3711590	8.9	8.8	1.1	< 0.5	96%	80%	120%				86%	80%	120%
Mercury	1896	3711590	< 0.5	< 0.5	0.0	< 0.5	102%	80%	120%				95%	80%	120%
Nickel	1896	3711590	22.4	22.6	0.9	< 0.5	101%	80%	120%				105%	80%	120%
Zinc	1896	3711590	73	72	1.4	< 1	105%	80%	120%				93%	80%	120%

Certifié par: Glazarov

CHIMISTE Georgi Lazarov 2009-148 QUÉBEC

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Contrôle de qualité

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP. | **N° BON DE TRAVAIL: 12Q642658**

N° DE PROJET: Landfill Monitoring | **À L'ATTENTION DE: Brandon MacKay**

PRÉLEVÉ PAR: | **LIEU DE PRÉLÈVEMENT:**

Analyse organique de trace

Date du rapport: 2012-11-08			DUPLICATA			MATÉRIAU DE RÉFÉRENCE				BLANC FORTIFIÉ			ÉCH. FORTIFIÉ		
PARAMÈTRE	Lot	N° éch.	Dup #1	Dup #2	% d'écart	Blanc de méthode	% Récup.	Limites Inf.	Limites Sup.	% Récup.	Limites Inf.	Limites Sup.	% Récup.	Limites Inf.	Limites Sup.
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	127	3707083	<0.05	<0.05	NA	< 0.05	122%	70%	130%	101%	70%	130%	110%	50%	150%
Aroclor 1254	127	3707083	<0.05	<0.05	NA	< 0.05	130%	70%	130%	104%	70%	130%	107%	50%	150%
Aroclor 1260	127	3707083	<0.05	<0.05	NA	< 0.05	104%	70%	130%	98%	70%	130%	96%	50%	150%
Total Polychlorinated Biphenyls	127	3707083	<0.05	<0.05	NA	< 0.05	119%	70%	130%	109%	70%	130%	114%	50%	150%
Total Petroleum Hydrocarbon Analysis - Soil															
Total Purgeable Hydrocarbons	1991	3722405	110	150	31.0	< 10	95%	80%	120%	95%	80%	120%	79%	60%	140%
Total Extractable Hydrocarbons	506	3725709	<10	<10	NA	< 10	104%	80%	120%	88%	80%	120%	91%	60%	140%
Polychlorinated Biphenyls Analysis - Water															
Aroclor 1242	126	3715581	<0.01	<0.01	NA	< 0.01	105%	70%	130%	99%	70%	130%	100%	50%	150%
Aroclor 1254	126	3715581	<0.01	<0.01	NA	< 0.01	98%	70%	130%	99%	70%	130%	87%	50%	150%
Aroclor 1260	126	3715581	<0.01	<0.01	NA	< 0.01	87%	70%	130%	85%	70%	130%	78%	50%	150%
Polychlorinated Biphenyls	126	3715581	<0.01	<0.01	NA	< 0.01	97%	70%	130%	103%	70%	130%	95%	50%	150%
Total Petroleum Hydrocarbon Analysis - Water															
Total Purgeable Hydrocarbons	597	3716337	<0.1	<0.1	NA	< 0.1	90%	80%	120%	112%	80%	120%	105%	70%	130%
Total Extractable Hydrocarbons	177	3717385	<0.1	<0.1	NA	< 0.1	93%	80%	120%	95%	80%	120%	93%	70%	130%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	1991	3722405	0.024	0.024	NA	< 0.005	102%	80%	120%	97%	80%	120%	94%	60%	140%
Toluene	1991	3722405	<0.05	<0.05	NA	< 0.05	89%	80%	120%	92%	80%	120%	88%	60%	140%
Ethylbenzene	1991	3722405	0.16	0.20	22.0	< 0.01	80%	80%	120%	94%	80%	120%	80%	60%	140%
Xylenes	1991	3722405	1.17	1.35	14.0	< 0.05	81%	80%	120%	96%	80%	120%	85%	60%	140%
C6 - C10 (F1)	1991	3722405	110	150	31.0	< 10	95%	80%	120%	95%	80%	120%	79%	60%	140%
C10 - C16 (F2)	506	3725709	<10	<10	NA	< 10	108%	80%	120%	99%	80%	120%	89%	60%	140%
C16 - C34 (F3)	506	3725709	<10	<10	NA	< 10	108%	80%	120%	96%	80%	120%	92%	60%	140%
C34 - C50 (F4)	506	3725709	<10	<10	NA	< 10	108%	80%	120%	94%	80%	120%	92%	60%	140%
Petroleum Hydrocarbons (BTEX/F1-F4) in Water															
Benzene	597	3716337	<0.0005	<0.0005	NA	< 0.0005	88%	80%	120%	87%	80%	120%	79%	70%	130%
Toluene	597	3716337	<0.0005	<0.0005	NA	< 0.0005	93%	80%	120%	90%	80%	120%	81%	70%	130%
Ethylbenzene	597	3716337	<0.0005	<0.0005	NA	< 0.0005	95%	80%	120%	88%	80%	120%	81%	70%	130%
Xylenes	597	3716337	<0.0005	<0.0005	NA	< 0.0005	98%	80%	120%	92%	80%	120%	84%	70%	130%
C6 - C10 (F1)	597	3716337	<0.1	<0.1	NA	< 0.1	90%	80%	120%	112%	80%	120%	105%	70%	130%
C>10 - C16	177	3717385	< 0.1	< 0.1	NA	< 0.1	98%	80%	120%	96%	80%	120%	98%	70%	130%
C>16 - C34	177	3717385	< 0.1	< 0.1	NA	< 0.1	98%	80%	120%	113%	80%	120%	99%	70%	130%
C>34 - C50	177	3717385	< 0.1	< 0.1	NA	< 0.1	98%	80%	120%						

Certifié par:

CHIMISTE Félix Brasseur 1997-012 QUÉBEC

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Contrôle de qualité

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP. **N° BON DE TRAVAIL: 12Q642658**

N° DE PROJET: Landfill Monitoring **À L'ATTENTION DE: Brandon MacKay**

PRÉLEVÉ PAR: **LIEU DE PRÉLÈVEMENT:**

Analyse de l'eau

Date du rapport: 2012-11-08			DUPLICATA			MATÉRIAU DE RÉFÉRENCE				BLANC FORTIFIÉ			ÉCH. FORTIFIÉ		
PARAMÈTRE	Lot	N° éch.	Dup #1	Dup #2	% d'écart	Blanc de méthode	% Récup.	Limites Inf.	Limites Sup.	% Récup.	Limites Inf.	Limites Sup.	% Récup.	Limites Inf.	Limites Sup.
Water Analysis															
Dissolved Arsenic	782	5428	0.001	0.001	0.0	< 0.001	92%	80%	120%				95%	80%	120%
Dissolved Cadmium	782	5428	0.00224	0.00222	0.9	< 0.000016	97%	80%	120%				98%	80%	120%
Dissolved Chromium	782	5428	0.001	0.001	0.0	< 0.001	99%	80%	120%				96%	80%	120%
Dissolved Copper	782	5428	0.005	0.005	0.0	< 0.002	99%	80%	120%				100%	80%	120%
Dissolved Lead	782	5428	<0.001	<0.001	0.0	< 0.001	104%	80%	120%				100%	80%	120%
Dissolved Mercury	1252	5543	0.000036	0.000035	2.8	< 0.000025	104%	90%	110%	103%	80%	120%	103%	80%	120%
Dissolved Nickel	782	5428	0.01	0.01	0.0	< 0.01	98%	80%	120%				100%	80%	120%
Dissolved Zinc	782	5428	0.030	0.031	3.3	< 0.001	108%	80%	120%				97%	80%	120%
Dissolved Cobalt	782	5428	0.001	0.001	0.0	< 0.001	99%	80%	120%		80%	120%	100%	80%	120%
Water Analysis - Total Metals															
Total Arsenic	815	091	0.005	0.005	0.0	< 0.001	99%	80%	120%				113%	80%	120%
Total Cadmium	815	091	< 0.00005	< 0.00005	0.0	< 0.00005	97%	80%	120%				112%	80%	120%
Total Chromium	815	091	0.001	0.001	0.0	< 0.001	100%	80%	120%				113%	80%	120%
Total Cobalt	815	091	< 0.001	< 0.001	0.0	< 0.001	92%	80%	120%				101%	80%	120%
Total Copper	815	091	0.003	0.003	0.0	< 0.002	91%	80%	120%				98%	80%	120%
Total Lead	815	091	< 0.001	< 0.001	0.0	< 0.001	93%	80%	120%				102%	80%	120%
Total Mercury	1286	5428	<0.	<0.	0.0	< 0.000025	106%	90%	110%	100%	90%	110%	100%	80%	120%
Total Nickel	815	091	0.0066	0.0064	3.1	< 0.003	82%	80%	120%				101%	80%	120%
Total Zinc	815	091	0.005	0.005	0.0	< 0.001	102%	80%	120%				118%	80%	120%
Water Analysis - Total Metals															
Total Arsenic	815	091	0.005	0.005	0.0	< 0.001	99%	80%	120%				113%	80%	120%
Total Cadmium	815	091	< 0.00005	< 0.00005	0.0	< 0.00005	97%	80%	120%				112%	80%	120%
Total Chromium	815	091	0.001	0.001	0.0	< 0.001	100%	80%	120%				113%	80%	120%
Total Cobalt	815	091	< 0.001	< 0.001	0.0	< 0.001	92%	80%	120%				101%	80%	120%
Total Copper	815	091	0.003	0.003	0.0	< 0.002	91%	80%	120%				98%	80%	120%
Total Lead	815	091	< 0.001	< 0.001	0.0	< 0.001	93%	80%	120%				102%	80%	120%
Total Nickel	815	091	0.0066	0.0064	3.1	< 0.003	82%	80%	120%				101%	80%	120%
Total Zinc	815	091	0.005	0.005	0.0	< 0.001	102%	80%	120%				118%	80%	120%

Certifié par: Glazarov CHIMISTE Georgi Lazarov 2009-148 QUÉBEC

La procédure des Laboratoires AGAT concernant les signatures et les signataires se conforme strictement aux exigences d'accréditation ISO 17025:2005 comme le requiert, lorsque applicable, CALA, CCN et MDDEP. Toutes les signatures sur les certificats d'AGAT sont protégées par des mots de passe et les signataires rencontrent les exigences des domaines d'accréditation ainsi que les exigences régionales approuvées par CALA, CCN et MDDEP.

AGAT Laboratoires

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Sommaire de méthode

NOM DU CLIENT: BIOGENIE, DIVISION D'ENGLOBE CORP.

N° BON DE TRAVAIL: 12Q642658

N° DE PROJET: Landfill Monitoring

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

PARAMÈTRE	PRÉPARÉ LE	ANALYSÉ LE	AGAT P.O.N.	RÉFÉRENCE DE LITTÉRATURE	TECHNIQUE ANALYTIQUE
Analyse des Sols					
Arsenic	2012-09-21	2012-09-22	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Cadmium	2012-09-21	2012-09-22	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Chromium	2012-09-21	2012-09-22	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Cobalt	2012-09-21	2012-09-22	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Copper	2012-09-21	2012-09-22	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Lead	2012-09-21	2012-09-22	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Mercury	2012-09-21	2012-09-22	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Nickel	2012-09-21	2012-09-22	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Zinc	2012-09-21	2012-09-22	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS

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PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

PARAMÈTRE	PRÉPARÉ LE	ANALYSÉ LE	AGAT P.O.N.	RÉFÉRENCE DE LITTÉRATURE	TECHNIQUE ANALYTIQUE
Analyse organique de trace					
Benzene	2012-09-19	2012-09-19	TO 0570	EPA SW-846 8260	GC/MS
Toluene	2012-09-19	2012-09-19	TO 0570	EPA SW-846 8260	GC/MS
Ethylbenzene	2012-09-19	2012-09-19	TO 0570	EPA SW-846 8260	GC/MS
Xylenes	2012-09-19	2012-09-19	TO 0570	EPA SW-846 8260	GC/MS
C6 - C10 (F1)	2012-09-19	2012-09-19	TO 0570	CCME Tier 1 Method	GC/FID
C6 - C10 (F1 minus BTEX)	2012-09-19	2012-09-19	TO 0570	CCME Tier 1 Method	GC/FID
C10 - C16 (F2)	2012-09-20	2012-09-21	TO-0560	CCME Tier 1 Method	GC/FID
C16 - C34 (F3)	2012-09-20	2012-09-21	TO-0560	CCME Tier 1 Method	GC/FID
C34 - C50 (F4)	2012-09-20	2012-09-21	TO 0560	CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	2012-09-20	2012-09-21	TO 0560	CCME Tier 1 Method	GC/FID
Moisture Content	2012-09-20	2012-09-21	TO 0560	CCME Tier 1 Method	GRAVIMETRIC
Toluene-d8 (BTEX)	2012-09-19	2012-09-19	TO 0570	EPA SW-846 8260	GC/MS
Ethylbenzene-d10 (BTEX)	2012-09-19	2012-09-19	TO 0570	EPA SW-846 8260	GC/MS
o-Terphenyl (F2-F4)	2012-09-20	2012-09-21	TO 0560	CCME Tier 1 Method	GC/FID
Benzene	2012-09-18	2012-09-19	TO 0540	EPA SW846 8260	GC/MS
Toluene	2012-09-18	2012-09-19	TO 0540	EPA SW846 8260	GC/MS
Ethylbenzene	2012-09-18	2012-09-19	TO 0540	EPA SW846 8260	GC/MS
Xylenes	2012-09-18	2012-09-19	TO 0540	EPA SW846 8260	GC/MS
C6 - C10 (F1)	2012-09-18	2012-09-19	TO 0540	CCME Tier 1 Method	GC/FID
C6 - C10 (F1 minus BTEX)	2012-09-18	2012-09-19	TO 0540	CCME Tier 1 Method	GC/FID
C>10 - C16	2012-09-18	2012-09-19	TO 0511	CCME Tier 1 Method	GC/FID
C>16 - C34	2012-09-18	2012-09-19	TO 0511	CCME Tier 1 Method	GC/FID
C>34 - C50	2012-09-18	2012-09-19	TO 0511	CCME Tier 1 Method	GC/FID
Toluene-d8 (BTEX)	2012-09-18	2012-09-19	TO 0340	EPA SW846 8260	GC/FID
o-Terphenyl (F2-F4)	2012-09-18	2012-09-19	TO 0511	CCME Tier 1 Method	GC/FID
Aroclor 1242	2012-09-19	2012-09-20	TO 0410	EPA 8082	GC/ECD
Aroclor 1254	2012-09-19	2012-09-20	TO 0410	EPA 8082	GC/ECD
Aroclor 1260	2012-09-19	2012-09-20	TO 0410	EPA 8082	GC/ECD
Total Polychlorinated Biphenyls	2012-09-19	2012-09-20	TO 0410	EPA 8082	GC/ECD
Decachlorobiphenyl	2012-09-19	2012-09-20	TO 0410	EPA 8082	GC/ECD
Aroclor 1242	2012-09-18	2012-09-18	TO 0400	EPA 8082, AEC A106.0	GC/ECD
Aroclor 1254	2012-09-18	2012-09-18	TO 0400	EPA 8082, AEC A106.0	GC/ECD
Aroclor 1260	2012-09-18	2012-09-18	TO 0400	EPA 8082, AEC A106.0	GC/ECD
Polychlorinated Biphenyls	2012-09-18	2012-09-18	TO 0400	EPA 8082, AEC A106.0	GC/ECD
Decachlorobiphenyl	2012-09-18	2012-09-18	TO 0400	EPA 8082, AEC A106.0	GC/ECD
Total Purgeable Hydrocarbons	2012-09-19	2012-09-19	TO 0530	EPA SW-846 5035/8015	GC/FID
Total Extractable Hydrocarbons	2012-09-20	2012-09-21	TO 0510	AEC G108.0	GC/FID
Total Petroleum Hydrocarbons	2012-09-21	2012-09-21	TO 0510/0530	EPA SW-846 5035/8015, AEC G108.0	GC/FID
Total Purgeable Hydrocarbons	2012-09-18	2012-09-19	TO 0530	EPA 624 & SW-846 3810	GC/MS
Total Extractable Hydrocarbons	2012-09-18	2012-09-19	TO 0511	AEC A108.0, EPA SW-846 3510	GC/FID
Total Petroleum Hydrocarbons	2012-09-19	2012-09-19	TO 0530	EPA 624 & SW-846 3810/3510, AEC A108.0	GC/MS & GC/FID
Toluene-d8 (BTEX)	2012-09-18	2012-09-19			GC/MS
o-Terphenyl (TEH)	2012-09-18	2012-09-19			GC/FID

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N° DE PROJET: Landfill Monitoring

À L'ATTENTION DE: Brandon MacKay

PRÉLEVÉ PAR:

LIEU DE PRÉLÈVEMENT:

PARAMÈTRE	PRÉPARÉ LE	ANALYSÉ LE	AGAT P.O.N.	RÉFÉRENCE DE LITTÉRATURE	TECHNIQUE ANALYTIQUE
Analyse de l'eau					
Dissolved Arsenic	2012-09-18	2012-09-19	INST 0141	SM 3125 B	ICP/MS
Dissolved Cadmium	2012-09-18	2012-09-19	INST 0141	SM 3125 B	ICP/MS
Dissolved Chromium	2012-09-18	2012-09-19	INST 0141	SM 3125 B	ICP/MS
Dissolved Copper	2012-09-18	2012-09-19	INST 0141	SM 3125 B	ICP/MS
Dissolved Lead	2012-09-18	2012-09-19	INST 0141	SM 3125 B	ICP/MS
Dissolved Mercury	2012-09-20	2012-09-20	INST 0160	SM 3112 B	CV/AA
Dissolved Nickel	2012-09-18	2012-09-19	INST 0141	SM 3125 B	ICP/MS
Dissolved Zinc	2012-09-18	2012-09-19	INST 0141	SM 3125 B	ICP/MS
Dissolved Cobalt	2012-09-18	2012-09-19	INST 0141	SM 3125 B	ICP-MS
Total Arsenic	2012-11-01	2012-11-05	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Cadmium	2012-11-01	2012-11-05	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Chromium	2012-11-01	2012-11-05	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Cobalt	2012-11-01	2012-11-05	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Copper	2012-11-01	2012-11-05	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Lead	2012-11-01	2012-11-05	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Mercury	2012-11-05	2012-11-05	WATR 0200; INST 0160	SM 3030 E; SM 3112 B	ICP-MS
Total Nickel	2012-11-01	2012-11-05	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Zinc	2012-11-01	2012-11-05	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS