Biogénie

LAND TREATMENT UNIT MAINTENANCE
Iqaluit, Nunavut

Final Version
(Y/Ref.: T6018-110009) (O/Ref.: TC1660)

TRANSPORT CANADA

February 2012

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1 EXECUTIVE SUMMARY

In July 2011, Biogenie was mandated to conduct the maintenance of the Land Treatment Unit at the Iqaluit Airport. The work involved confirmatory sampling of the soil under treatment, adding fertilizer, tilling and mixing the soil, removing construction debris from the LTU, and sampling the groundwater of three existing monitoring wells and sampling the surface water from the Bio 1 treatment pad.

Analytical results showed that the soil on the treatment pad still needs to undergo biological treatment as some samples collected do not meet the applicable criteria for Petroleum Hydrocarbons (Fractions 2 and 3) and for Polycyclic Aromatic Hydrocarbons (Naphthalene and Phenanthrene).

Water analyses from the wells yielded impacts by aluminum, copper, and iron for all 3 wells sampled, the duplicate and the sample of raw water collected inside the LTU. In addition, MW-5 also showed an exceedance for zinc. Lead concentrations were also found in exceedance of the applicable criterion in all three wells sampled and the duplicate.

Sample MW-2 also showed impact by benzo(a)pyrene and fluoranthene.

Although all procedures were completed, the soil will still require additional care in order to be properly treated.

2 INTRODUCTION

Biogenie, a division of EnGlobe Corp. (hereinafter called "Biogenie") was retained by Transport Canada (hereinafter called "TC") in July 2011 to perform maintenance on 2 cells of a Land Treatment Unit (LTU) at the Iqaluit Airport.

The original location of the site where the contaminated soil was excavated is unknown to Biogenie and therefore, historical information and data are unavailable.

2.1 AUTHORIZATIONS

Contract number T6018-110009 was awarded to Biogenie on July 20, 2011 by Mrs. Julia O'Brien, Regional Contracting Officer for Transport Canada.

Authorization to execute work on the airport field was obtained from the Iqaluit Airport Manager through a teleconference prior to the commencement of work.

A copy of the Water Licence was obtained from the TC project manager and kept by the technician throughout the execution of the fieldwork.

An authorization from the Operations Superintendent of the City of Iqaluit was also obtained prior to disposal of the construction debris found in the soil undergoing treatment.

3 SITE DESCRIPTION

3.1 LAND USE

The site is located on the airport field, about 1,000 m northwest of the main terminal building and 250 m north of the middle of the airstrip. The site's coordinates are 63.75^{o} latitude, -68.54^{o} longitude.

The landfarm cells consisted of two treatment pads with approximate dimensions of 42 x 36 m (Bio-1) and 92 x 37 m (Bio-2) and an approximate thickness of 1 m each. The pads are only partially filled with soil. A one-piece oil resistant liner was used to protect the soils underlying each cell. The location of the LTU cells is shown in figure 1, appendix A.

Limited data is available with regards to groundwater flow direction. The nearest water body is a small pond located approximately 580 m northwest of the site.

Surrounding infrastructure includes the taxi pavement, the runway, the air terminal building, maintenance garages and storage facilities.

According to the City of Iqaluit's website, the area is classified as a Transportation Facilities zone and it is surrounded by open space and heavy and light industrial areas. Therefore, the criteria retained will be related to industrial land use.

4 SCOPE OF WORK

The main objectives associated with this project essentially consisted in the completion of steps associated with the maintenance of the LTU cells.

The soil required tilling as well as mixing in order to increase bacterial activity and to enhance hydrocarbon degradation. This step also included the collection and disposal of different construction debris including rebar, wood and pieces of concrete at a licensed facility.

The second objective consisted in the addition of fertilizer to the soils in treatment.

The third objective was to conduct sampling campaigns in order to obtain soil samples from both treatment cells and a water sample from each of the three water wells present on site.

4.1 FIELD METHODS

4.1.1 Preparation

The fieldwork was executed by Mathieu Lévesque, Site Superintendent for Biogenie during three site visits conducted between July and September 2011.

A kickoff teleconference was held between the TC Project Manager, the Airport Manager and Biogenie personnel on July 28, 2011 to review the health and safety plan, the airport safety measures and the scope of work.

The Airport Manager was met prior to the first site visit in order to review the safety rules of the site. Polynia Logistics, an Iqaluit-based company, was subcontracted in order to provide escort services for all vehicles traveling on site.

A tailboard meeting was conducted at the beginning of every day of work with all workers present on site in order to review the safety rules of the work site.

4.1.2 Soil Tilling

The entirety of the soil in the cells was tilled using a Komatsu PC 300 LC. The samples were collected as tilling and mixing were performed. The operator was instructed to drop the soil on the pad in a way that allows for maximization of the breakdown of sand aggregates to maximize the increase in the soil's oxygen contents. Fertilizer was added as the work progressed. Bags of fertilizer were opened on the pile in a pattern that guaranteed that fertilizer would be evenly and homogenously spread.

4.1.3 Confirmatory Sampling

The soil under treatment in both cells was sampled in order to obtain an evaluation of the concentrations of contaminants remaining. The larger LTU (Bio-2) was divided into 12 transects of equal dimensions, 18.5 x 15.3 x 1 m while the smaller cell was divided into 8 identical transects of approximately 18 x 10.5 x 1 m. A composite sample was collected using 5 subsamples taken at the center and each corner of each transect for all the parameters except for the volatile compounds (BTEX, PHCs fraction F1 to F4), which were analysed from one single sample. The samples were collected during the tilling of the soil by the excavator, a Komatsu PC 300 LC, in order to benefit from the mixing to obtain representative samples. In order to minimize transportation delays and overall handling, samples were submitted to Exova Accutest Laboratory in Ottawa and analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), petroleum hydrocarbons fractions F1 to F4 (PHCs (F1 through F4)) and heavy metals. A figure depicting the sample locations is presented in Appendix A. The results are presented in tables in appendix B while the certificates of analysis are presented in appendix C.

4.2 GROUNDWATER MONITORING

The first step associated with groundwater monitoring involved obtaining a Photo Ionization Detector (PID) reading of the air located inside the well. Prior to sampling the wells, each well was developed using a Wattera™ inertial pump with HDPE tubing. While purging the well, the equivalent of three static level well volumes of water were removed.

Groundwater monitoring activities included:

- The collection of volatile organic compounds (VOC's) using a PID. VOC's were taken from inside each well casing by placing the organic vapor monitor (OVM) nozzle about 15 to 30 cm below the top of the casing and recording the peak reading on the PID. The PID was calibrated prior to use.

- Measurements of the groundwater's depth were taken using an electronic oil/water Waterra HS-1 interface probe. Prior to use in each well, the interface probe was cleaned using a lab-grade phosphate-free detergent and water solution and rinsed with distilled water to minimize the potential for cross-contamination. Depth measurements were taken from the top of the casing and recorded on logs. A table presenting all data recorded is found in Appendix B.

All groundwater samples were collected using a dedicated disposal bailer. The conductivity, pH, and temperature of the groundwater were measured in the field while samples were collected. All field data collected was recorded on groundwater monitoring logs for each monitoring well.

In wells where no light non-aqueous phase liquids (LNAPLs) were observed and where the groundwater volume was sufficient to allow sampling, one groundwater sample was collected per well.

All samples were kept in laboratory-provided coolers, shipped and submitted under chain-of-custody procedures to Exova for analysis.

4.3 SITE-SPECIFIC CRITERIA

4.3.1 Soil

The objective of the sampling campaign consisted in verifying the conformity of the soil undergoing treatment. The site was evaluated according to the most stringent criteria from the following sets of guidelines.

- Government of Nunavut Environmental Guideline for Site Remediation
- CCME, Canadian Environmental Quality Guidelines
- CCME Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in soil (most current edition)
- CCME Interim Canadian Environmental Quality Criteria for contaminated sites.

All samples were required to be analyzed for BTEX, PAH, TPH, PHCs (F1 through F4) and heavy metals.

Based on the absence of grain-size analysis, the rationale for grain size determination is as follows: as defined by the American Society for Testing and Material (ASTM) in Standard D-2487, fine grain soil is considered to be smaller than 75 µm. Since the technician described the soil as medium to coarse sand, the soil is considered coarse for the purpose of criteria selection.

Since no water body can be found within a range of 500 m from the site under study, the Protection of Aquatic Life of the CCME was not considered an applicable pathway and the set of criteria for Protection of Environmental and Human Health was selected.

The Public Works department of the City of Iqaluit was contacted in order to enquire about the possibility that groundwater found on the airport field would be used for potable water.

The potable water intake is located directly in Geraldine Lake, which is located about 2.5 km away and upgradient from the airport. There is no potential domestic use aquifer in the vicinity of the site and therefore, the potable water pathway was excluded.

Tables I to III present the set of criteria determined to be used for evaluation of the analytical results for soil.

Table I : Soil Tier I Remediation Criteria for PHCs and BTEX – Coarse-Grained Soil, Industrial Land Use

Parameters	CCME Guideline (mg/kg)	Government of Nunavut (mg/kg)	Prevailing Value
Benzene	0.030	0.030	0.030
Toluene	0.37	0.37	0.37
Ethylbenzene	0.082	0.082	0.082
Xylenes	11	11	11
PHC (F1)	320	320	320
PHC (F2)	260	260	260
PHC (F3)	1,700	1,700	1,700
PHC (F4)	3,300	3,300	3,300
PHC (F4G)	3,300	3,300	3,300

F1: C_6 to C_{10}, does not include BTEX
F2: C>10 to C16
F3: C>16 to C34
F4: C>34 to C50
F4G: C>34 to C50+
*: Exclusion of Protection of contaminated groundwater discharge to and adjacent surface water body and protection of potable groundwater

Table II : Soil Tier I Remediation Criteria for Metals – Coarse-Grained Soil, Industrial Land Use

Parameters	CCME Guideline (mg/kg)	Government of Nunavut (mg/kg)	Prevailing Value
Aluminum	-	-	-
Arsenic	12	12	12
Cadmium	22	22	22
Cobalt	300	300	300
Copper	91	91	91
Iron	-	-	-
Lead	600	600	600
Molybdenum	40	40	40
Nickel	50	50	50
Selenium	2.9	2.9	2.9
Silver	40	40	40
Titanium	-	-	-
Zinc	360	360	360

Table III : Soil Tier I Management Criteria for PAHs – Coarse-Grained Soil, Industrial Sites

Parameters	CCME Guideline[1] (mg/kg)	Government of Nunavut (mg/kg)	Prevailing Value
Acenaphthene	-	-	-
Acenaphthylene	-	-	-
Anthracene	32	-	32
Benzo(a)anthracene	10	10	10
Benzo(a)pyrene	72	-	72
Benzo(b)fluoranthene	10	-	10
Benzo(k)fluoranthene	10	-	10
Benzo(g,h,i)pérylene	-	-	-
Chrysene	-	-	-
Dibenzo(a,h)anthracene	10	10	10
Fluoranthene	180	-	180
Fluorene	-	-	-
Indeno(1,2,3-cd)pyrene	10	10	10
Naphthalene	0.013	-	0.013
Phenanthrene	0.046	50	0.046
Pyrene	100	10	100
Méthyl-1 naphtalene	-	-	-
Méthyl-2 naphtalene	-	-	-
Index of Addictive Cancer Risk (IACR)	≤1	-	≤1
Total Potency Equivalents (Benzo (a) Pyrene[2])	0.6	-	0.6
Total Potency Equivalents (Benzo (a) Pyrene[3])	5.3	-	5.3

[1]: These values are based on the CCME's Human health guidelines based on carcinogenic effects of PAHs
[2]: Soil Quality Guidelines Based on an Incremental Lifetime Cancer Risk of 1 in 100,000
[3]: Soil Quality Guidelines Based on an Incremental Lifetime Cancer Risk of 1 in 1,000,000

In addition to Table III, the PAH results were compared to the Index of Addictive Cancer Risk, the Soil Quality guidelines based on an incremental lifetime cancer risk of 1 in 1,000,000 and to the Soil Quality guidelines based on an incremental lifetime cancer risk of 1 in 100,000.

4.3.2 Groundwater Criteria

The analytical results were compared to the CCME criteria in cases where the required criteria were available. As no criteria have been established by the Government of Nunavut, the Alberta Environment criteria were used in order to obtain a benchmark for comparison with the analytical results for which no criteria are provided by the CCMG guidelines.

As mentioned before, the Public Works department of the City of Iqaluit was contacted to enquire about the possibility that groundwater found on the airport field be used for potable water.

The complete set of criteria associated with evaluating the groundwater quality is presented in Tables IV, V and VI hereafter.

Table IV : Groundwater Management Criteria for BTEX and PHC (Fractions F1 and F2), Freshwater, Industrial Sites

Parameters	CCME Guideline[1] (µg/L)	Alberta Environment (µg/L)	Prevailing Value
Benzene	370	690	370
Toluene	2	83	2
Ethylbenzene	90	41	41
Xylenes	-	18	18
PHC (F1)	-	9,800	9,800
PHC (F2)	-	1,300	1,300

Table V : Groundwater Management Criteria for Metals in Freshwater, Industrial Sites

Parameters	CCME Guideline[1] (µg/L)	Alberta Environment (µg/L)	Prevailing Value
Aluminum	5[1]	5[1]	5
Arsenic	5	5	5
Cadmium	0.018[2]	0.018	0.018
Cobalt	-	-	-
Copper	2[2]	5[2]	2
Iron	300	300	300
Lead	1.27[2]	1.2[2]	1.2
Molybdenum	73	-	73
Nickel	55.15[2]	55.15[2]	55.15
Selenium	1	1	1
Silver	0.1	0.1	0.1
Titanium	-	-	-
Zinc	30	30	30

[1]: As pH was not analysed as part of the current mandate, the most stringent criterion from the Surface Water Quality Guidelines for Use in Alberta was used.

[2]: Criterion calculated directly on the CCME Website using a standard water hardness of 48.5 µg/L.

Table VI : Groundwater Management Criteria for PAHs, Industrial Sites

Parameters	CCME Guideline[1] (µg/L)	Alberta Environment (µg/L)	Prevailing Value
Acenaphtene	5.8	5.8	5.8
Acenaphthylene	-	4.6	4.6
Anthracene	0.012	0.012	0.012
Benzo(a)anthracene	0.018	0.018	0.018
Benzo(a)pyrene	0.015	0.015	0.015
Benzo(b)fluoranthene	-	0.48	0.48
Benzo(g,h,i)perylene	-	0.17	0.17
Benzo(k)fluoranthene	-	0.48	0.48
Chrysene	-	1.4	1.4
Fluoranthene	0.04	0.04	0.04
Fluorene	3	3	3
Indeno(1,2,3-c,d)pyrene	-	0.21	0.21
Naphtalene	1.1	1.1	1.1
Phenanthrene	0.4	0.4	0.4
Pyrene	0.025	0.025	0.025

1: As pH was not analysed as part of the current mandate, the most stringent criterion from the Surface Water Quality Guidelines for Use in Alberta was used.

5 ANALYTICAL RESULTS

5.1 DISPOSAL OF DEBRIS AND ADDITION OF FERTILIZER

A total of 50 m^3 of debris was transported by 10 m^3 dump trucks to the City of Iqaluit Solid Waste Facility on August 18th. This debris is described as a mix of concrete and metal.

As mentioned in the field method section, fertilizer was added to the soil ongoing treatment. To obtain an optimal treatment, a use of two kind of fertilizer was necessary. The first one is the DAP (Diammonium Phosphate) who contains diammonium phosphate, nitrogen and fluorides. The second one is the CAN 27-0-0 (Calcium / Ammonium nitrate) who contains calcium and ammonium nitrate only. A total of 330 kg of DAP and 2230 kg of CAN 27-0-0 was spread evenly and homogenously in the soils.

5.2 SOIL CHEMICAL RESULTS

A total of 14 soil samples (12 samples and 2 duplicates) collected from the soil undergoing treatment in the larger cell (named Bio 2-transect # and Bio 2-transect #-tt for the duplicates) and 9 samples (8 samples and 1 duplicate) were collected from the smaller cell (named Bio 1-transect # and Bio 1-transect #-TT for the duplicates). All samples were submitted to Exova Accutest Ltd. Laboratory for BTEX, PHCs (F1 through F4), PAH, metals analysis. The certificates of analysis and chain of custody forms are enclosed in Appendix C. All soil results are provided in tables in Appendix B.

For the portion of soil sampled in the smaller LTU cell, called Bio 1, the soil exceeds the applicable criteria for PHC F2 for all samples (including the duplicate Bio 1-8 TT) with the exception of Bio 1-1 and Bio 1-2. Impacts were also observed for naphthalene and phenanthrene in samples Bio 1-7, Bio 1-8 and Bio 1-8 TT. An impact was also observed for phenanthrene only, in sample Bio 1-6.

On samples collected from the larger LTU cell, PHC F2 impacts were observed in all samples collected from the larger LTU. An impact for PHC (F3) was also observed in sample Bio 2-9. Naphtalene impacts were reported in samples Bio 2-9, its duplicate Bio 2-9 tt and Bio 2-12 and phenanthrene impacts were detected in the following quadrats: Bio 2-3, Bio 2-5, Bio 2-6, Bio 2-7, Bio 2-8, Bio 2-9, Bio 2-9 tt, Bio 2-10, and Bio 2-12.

All soil analyses showed results below the criteria for metals.

5.3 GROUNDWATER ANALYTICAL RESULTS

A total of 5 water samples were collected including one sample for each well as part of the current mandate (MW-1 MW-2, and MW-5), a duplicate sample from well MW-1 (MW-1++), and upon request from the TC representative, an additional sample was collected from the surface water found in one of the treatment cells (Bio 1-RW).

No impacts were found in any of the wells for the BTEX and PHCs analysis package.

Sample MW-2 also showed impact by benzo(a)pyrene and fluoranthene

Water analyses from the wells yielded impacts by aluminum, copper, and iron for all 3 wells sampled, the duplicate and the raw water sample. Lead impacts were detected in all three samples from the wells and the duplicate. In addition, MW-5 also showed an exceedance for cadmium and zinc.

6 QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

6.1 QUALITY ASSURANCE - FIELD

Three duplicates (Bio 1-8 TT, Bio 2-2 tt and Bio 2-9 tt) were collected for soil and 1 duplicate (MW-1++) was collected for groundwater during the round of sampling to meet 10% ratio of duplicate by samples.

All 3 soil field duplicates results for BTEX and PHCs (F1 to F4) and PAHs showed concentrations similar to the original sample and thus did not exceed a relative percent difference (RPD) of 100 % when compared to their corresponding sample results.

The field duplicate collected for groundwater was analyzed for the same parameters as the original and it returned similar results, within 80 % variation from the results of the original sample.

A field blank and a trip blank were collected for soil and analyzed for all parameters. All analyses run to detect the presence of BTEX, PHCs or PAHs returned results below the detection limit.

A field blank and a trip blank were collected for groundwater and analyzed for BTEX. All analyses returned results below the detection limit.

6.2 QUALITY CONTROL – LABORATORY

The quality control program employed by Exova Acutest Laboratory included adherence to laboratory sampling and analysis protocols (e.g., hold times, sample containers, preservatives, detection limits, and approved methodology) and the analysis of laboratory methods blanks, laboratory sample duplicates, surrogate recovery, and chemical spikes. The resulting values were all within acceptable limits for all the parameters analysed.

Based on the review of the quality assurance and quality control results, the data presented in this report is considered to be reliable.

7 CONCLUSIONS AND RECOMMENDATIONS

In July 2011, Biogenie was mandated to complete the maintenance project of the Land Treatment Unit at the Iqaluit Airport and to conduct soil and groundwater sampling to provide an estimate of the contaminants left in the soils undergoing treatment.

The maintenance portion of the contract was successfully completed between August and September, 2011 after removing construction debris, mixing, tilling and adding fertilizer to the soils undergoing treatment.

A total of 2,560 kg of fertilizer was added to the soil ongoing treatment to enhance biological decomposition of the contamination, and about 50 m^3 of construction debris was removed from the treatment pads.

The soil sampled in the smaller LTU cell, Bio-1, exceeds the applicable criteria for the PHC F2 parameter in the following quadrats: Bio 1-3, Bio 1-4, Bio 1-5, Bio 1-6, Bio 1-7, and Bio 1-8 and its duplicate Bio 1-8 TT. Naphtalene impacts were also reported on the following samples: Bio 1-7, Bio 1-8 and Bio 1-8 TT. Additional impacts by Phenanthrene were noted for the following quadrats: Bio 1-6, Bio 1-7, Bio 1-8, Bio 1-8 TT

In all samples collected from the larger LTU cell, PHC F2 impacts were found. PHC F3 impact was also observed in sample Bio 2-9.

Additional impacts by Phenanthrene were noted for the following quadrats: Bio 2-3, Bio 2-5, Bio 2-6, Bio 2-7, Bio 2-8, Bio 2-9, Bio 2-9 tt, Bio 2-10, and Bio 2-12.

Impacts by PAH Naphtalene were also reported in the following samples: Bio 2-9, its duplicate Bio 2-9 tt and in Bio 2-12

Water analyses from the wells yielded impacts by aluminum, copper, and iron for all 3 wells sampled, the duplicate and the raw water sample. Lead impacts were detected in all three

samples from the wells and the duplicate. In addition, MW-5 also showed an exceedance for cadmium and zinc.

Sample MW-2 also showed impact by benzo(a)pyrene and fluoranthene.

Considering the presence of contaminants in soil of both treatment pads Bio 1 and Bio 2, it will be necessary to perform a new monitoring campaign to follow the treatment's evolution.

8 REFERENCES

Alberta Environment, *Alberta Tier 1 Soil and Groundwater Remediation Guidelines December 2010* [Online]: http://environment.gov.ab.ca/info/library/7751.pdf

American Society for Testing and Materials and ASTM Commitee D-18 on Soil and Rock, 1997, *Standards Related to Environmental Site Characterization*, West Conshohocken, PA: ASTM, 1,410 pages.

Department of Environment, March 2009, *Environmental Guideline for Contaminated Site Remediation*, Government of Nunavut [online] http://env.gov.nu.ca/sites/default/files/Guideline%20Contaminated%20Site%20Remediation.pdf (Visited November 1, 2011)

CCME, *Canadian Environmental Quality Guidelines*[online]: http://st-ts.ccme.ca/ (Visited November 22, 2011)

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

Figures

Réf. : Google.

Biogénie

Transport Canada

LTU MAINTENANCE
IQALUIT AIRPORT

IQALUIT AIRPORT
IQALUIT, NUNAVUT

LOCATION PLAN

1 : 12,500

FIGURE 1

Landfarm treatment unit decommissioned

Taxi access road

Airstrip

MW-1

BIO 2-1 *230 ppm*	BIO 2-2 *215 ppm*
BIO 2-3 *228 ppm*	BIO 2-4 *236 ppm*
BIO 2-5 *276 ppm*	BIO 2-6 *273 ppm*
BIO 2-7 *275 ppm*	BIO 2-8 *177 ppm*
BIO 2-9 *636 ppm*	BIO 2-10 *595 ppm*
BIO 2-11 *120 ppm*	BIO 2-12 *266 ppm*

Soil pile

MW-2

MW-3

BIO 1-7 *347 ppm*	BIO 1-5 *327 ppm*	BIO 1-3 *121 ppm*	BIO 1-1 *10 ppm*
BIO 1-8 *454 ppm*	BIO 1-6 *380 ppm*	BIO 1-4 *190 ppm*	BIO 1-2 *43 ppm*

Soil pile

MW-5

LEGEND

- BIO 1-1 — Sampling point (treated soil)
- *121 ppm* — PID reading
- Impacted soil (see tables for detail)
- Existing monitoring well (approximate location)

0 7.5m 15m 22.5m 30m 37.5m

NO.	VERSION	DATE	BY	VERIF.	APPR.
A	FINAL	12-02-23	P.L.	D.R.	P.G.

Transport Canada

LTU MAINTENANCE AT THE IQALUIT AIRPORT

IQALUIT AIRPORT, IQALUIT, NUNAVUT

LTU PLAN AND SOIL ANALYTICAL RESULTS

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):
Metre	1 : 750	FEBRUARY 2012
DRAWN BY: P. LÉGARÉ	VERIFIED BY: D. ROY	APPROVED BY: P. GÉLINAS
PROJECT NO: TC1660_100_101	DRAWING NO: TC1660_100_101-PL	PAGE RS

FIGURE 2

G:\TC1660\FINAL\TC1660_100_101-PL.dwg, RS, 2012-02-24 1:48:42 PM

Landfarm treatment unit decommissioned

MW-1

MW-3

Soil pile

Soil pile

Taxi access road

Airstrip

MW-5

MW-2

LEGEND

- Existing monitoring well (approximate location)
- Impacted monitoring well (see tables for detail)

0 7.5m 15m 22.5m 30m 37.5m

NO.	VERSION	DATE	BY	VERIF.	APPR.
A	FINAL	12-02-24	P.L.	D.R.	P.G.

Transport Canada

LTU MAINTENANCE AT THE IQALUIT AIRPORT

IQALUIT AIRPORT, IQALUIT, NUNAVUT

LTU PLAN AND GROUNDWATER ANALYTICAL RESULTS

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):
Metre	1 : 750	FEBRUARY 2012
DRAWN BY:	VERIFIED BY:	APPROVED BY:
P. LÉGARÉ	D. ROY	P. GÉLINAS
PROJECT NO:	DRAWING NO:	PAGE
TC1660_100_101	TC1660_100_101-PL	RE

FIGURE 3

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APPENDIX C

Analytical Results Tables

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Table I: Soil Chemical Analysis Results - BTEX and PHCs (F1 through F4)

Transport Canada

LTU Maintenance at the Iqaluit Airport
Iqaluit Airport
Iqaluit, Nunavut

Sample Location	Sample ID	Sampling Date	Parameters								
			Benzene	Toluene	Ethylbenzene	Xylenes	PHC (F1)	PHC (F2)	PHC (F3)	PHC (F4)	PID Readings
		yyyy-mm-dd	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	PPM
Bio 1-1	908418	2011-09-01	<0.05[1]	<0.1	<0.1[1]	<0.2	<10	140	300	140	10
Bio 1-2	908419	2011-09-01	<0.05[1]	<0.1	<0.1[1]	<0.2	<10	170	920	370	43
Bio 1-3	908420	2011-09-01	<0.05[1]	<0.1	<0.1[1]	<0.2	20	**600**	580	320	121
Bio 1-4	908421	2011-09-01	<0.05[1]	<0.1	<0.1[1]	<0.2	20	**620**	620	310	190
Bio 1-5	908422	2011-09-01	<0.05[1]	<0.1	<0.1[1]	<0.2	60	**1,290**	770	440	327
Bio 1-6	908423	2011-09-01	<0.05[1]	<0.1	<0.1[1]	0.3	70	**4,290**	1,050	700	380
Bio 1-7	908424	2011-09-01	<0.05[1]	<0.1	<0.1[1]	4.0	115	**1,650**	1,180	740	347
Bio 1-8	908425	2011-09-01	<0.05[1]	<0.1	<0.1[1]	2.9	107	**7,220**	990	600	454
Bio 1-8 TT	908426	2011-09-01	<0.05[1]	<0.1	<0.1[1]	1.3	89	**5,010**	1,230	750	454
Field Blank	908427	2011-09-01	<0.05[1]	<0.1	<0.1[1]	<0.2	<10	<10	<20	<20	N/A
Trip Blank	908428	2011-09-01	<0.05[1]	<0.1	<0.1[1]	<0.2	<10	<10	<20	<20	N/A
Bio 2-1	908749	2011-09-02	<0.05[1]	<0.1	<0.1[1]	<0.2	60	**1,940**	860	500	230
Bio 2-2	908750	2011-09-02	<0.05[1]	<0.1	<0.1[1]	<0.2	50	**2,050**	1,080	660	215
Bio 2-2 tt	908751	2011-09-02	<0.05[1]	<0.1	<0.1[1]	<0.2	60	**1,890**	990	610	215
Bio 2-3	908752	2011-09-02	<0.05[1]	<0.1	<0.1[1]	<0.2	60	**2,200**	1,220	640	228
Bio 2-4	908753	2011-09-02	<0.05[1]	<0.1	<0.1[1]	<0.2	80	**1,550**	930	530	230
Bio 2-5	908754	2011-09-02	<0.05[1]	<0.1	<0.1[1]	0.2	130	**3,380**	1,360	530	276
Bio 2-6	908755	2011-09-02	<0.05[1]	<0.1	<0.1[1]	0.2	120	**1,960**	1,200	610	273
Bio 2-7	908756	2011-09-02	<0.05[1]	<0.1	<0.1[1]	0.2	140	**1,620**	910	470	275
Bio 2-8	908757	2011-09-02	<0.05[1]	<0.1	<0.1[1]	0.7	100	**2,190**	890	350	177
Bio 2-9	908758	2011-09-02	<0.05[1]	<0.1	<0.1[1]	0.8	230	**3,320**	**1,760**	850	636
Bio 2-9 tt	908759	2011-09-02	<0.05[1]	<0.1	<0.1[1]	3.1	210	**2,580**	1,380	720	636
Bio 2-10	908760	2011-09-02	<0.05[1]	<0.1	<0.1[1]	0.3	180	**2,950**	1,450	680	595
Bio 2-11	908761	2011-09-02	<0.05[1]	<0.1	<0.1[1]	<0.2	80	**1,320**	1,020	670	120
Bio 2-12	908762	2011-09-02	<0.05[1]	<0.1	<0.1[1]	<0.2	90	**1,720**	1,330	730	266
Guidelines[2,3]			**0.030**	**0.37**	**0.082**	**11**	**320**	**260**	**1,700**	**3,300**	-

PHC (F1): Petroleum hydrocarbon C_6 to C_{10}, does not include BTEX fractions
PHC (F2): Petroleum hydrocarbon $C_{>10}$ to C_{16}
PHC (F3): Petroleum hydrocarbon $C_{>16}$ to C_{34}
PHC (F4): Petroleum hydrocarbon $C_{>34}$ to C_{50}
PHC (F4G): Petroleum hydrocarbon $C_{>34}$ to C_{50}+
N/A: Not Analyzed
Shaded area indicates sample exceeds applicable guidelines
TT or tt: Field duplicate
1: Detection limit above this criterion; therefore, no conclusion can be drawn from this result
2: Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health CCME 2008, revised 2010
3: Environmental Guideline for Contaminated Site Remediation (2009), Department of Environment, Government of Nunavut, 35 pages.

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Table II: Soil Chemical Analysis Results - Metals

Transport Canada

LTU Maintenance at the Iqaluit Airport
Iqaluit Airport
Iqaluit, Nunavut

Sample Location		**Bio 1-1**	**Bio 1-2**	**Bio 1-3**	**Bio 1-4**	**Bio 1-5**	**Bio 1-6**	**Bio 1-7**	**Bio 1-8**	**Bio 1-8 TT**	**Field Blank**	**Trip Blank**	
Sample ID		908418	908419	908420	908421	908422	908423	908424	908425	908426	908427	908428	**Guidelines[1,2]**
Sampling Date (yyyy-mm-dd)		2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	
Parameters	**Unit**												
Aluminum	mg/kg	5,760	5,350	5,260	5,440	5,390	5,180	5,940	5,270	5,970	3,010	2,820	**-**
Arsenic	mg/kg	2	2	2	2	2	2	2	2	2	<1	<1	**12**
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	1.7	<0.5	<0.5	<0.5	<0.5	<0.5	**22**
Cobalt	mg/kg	7	7	6	7	6	5	7	6	6	7	7	**300**
Copper	mg/kg	17	16	14	16	12	12	16	12	14	21	21	**91**
Iron	mg/kg	29,400	26,500	25,200	27,100	22,800	24,000	23,300	22,800	22,300	15,100	14,600	**-**
Lead	mg/kg	12	9	15	15	17	24	25	18	23	2	1	**600**
Molybdenum	mg/kg	1	1	<1	1	<1	<1	<1	<1	<1	<1	<1	**40**
Nickel	mg/kg	13	12	10	17	10	9	14	11	11	11	9	**50**
Selenium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**2.9**
Silver	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**40**
Titanium	mg/kg	145	154	166	177	201	207	173	187	183	152	145	**-**
Zinc	mg/kg	52	51	48	48	50	48	54	43	53	22	22	**360**

Shaded area indicates sample exceeds applicable guidelines

TT or tt: Field duplicate

\- Not specified

1: Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health CCME 2008, revised 2010

2: Environmental Guideline for Contaminated Site Remediation (2009), Department of Environment, Government of Nunavut, 35 pages.

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Table II: Soil Chemical Analysis Results - Metals

Transport Canada

LTU Maintenance at the Iqaluit Airport
Iqaluit Airport
Iqaluit, Nunavut

Sample Location		**Bio 2-1**	**Bio 2-2**	**Bio 2-2 tt**	**Bio 2-3**	**Bio 2-4**	**Bio 2-5**	**Bio 2-6**	**Bio 2-7**	**Bio 2-8**	**Bio 2-9**	**Bio 2-9 tt**	**Bio 2-10**	**Bio 2-11**	**Bio 2-12**	
Sample ID		908749	908750	908751	908752	908753	908754	908755	908756	908757	908758	908759	908760	908761	908762	**Guidelines[1,2]**
Sampling Date (yyyy-mm-dd)		2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	
Parameters	**Unit**															
Aluminum	mg/kg	4,970	4,980	5,320	4,460	4,750	4,510	4,890	4,830	5,070	4,900	4,680	4,570	5,150	4,770	**-**
Arsenic	mg/kg	1	1	1	2	2	2	2	2	2	2	2	2	2	2	**12**
Cadmium	mg/kg	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**22**
Cobalt	mg/kg	6	5	6	5	6	5	6	5	6	5	5	5	6	5	**300**
Copper	mg/kg	11	13	12	12	13	11	13	11	12	12	12	11	13	12	**91**
Iron	mg/kg	28,900	26,700	26,300	26,600	26,300	23,500	25,400	25,500	25,200	28,000	26,100	25,100	30,600	27,500	**-**
Lead	mg/kg	15	14	13	14	22	15	17	13	23	20	21	17	18	15	**600**
Molybdenum	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**40**
Nickel	mg/kg	11	11	12	11	12	14	10	12	9	9	10	8	10	9	**50**
Selenium	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**2.9**
Silver	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**40**
Titanium	mg/kg	126	189	177	131	163	156	168	122	180	169	169	201	168	165	**-**
Zinc	mg/kg	49	47	47	45	47	43	48	45	50	45	46	42	47	42	**360**

Shaded area indicates sample exceeds applicable guidelines

TT or tt: Field duplicate

\- Not specified

1: Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health CCME 2008, revised 2010

2: Environmental Guideline for Contaminated Site Remediation (2009), Department of Environment, Government of Nunavut, 35 pages.

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Table III: Soil Chemical Analysis Results - Polycyclic Aromatic Hydrocarbons

Transport Canada
LTU Maintenance at the Iqaluit Airport
Iqaluit Airport
Iqaluit, Nunavut

Sample Location		Bio 1-1	Bio 1-2	Bio 1-3	Bio 1-4	Bio 1-5	Bio 1-6	Bio 1-7	Bio 1-8	Bio 1-8 TT	Field Blank	Trip Blank	**Guidelines**	
Sample ID		908418	908419	908420	908421	908422	908423	908424	908425	908426	908427	908428		
Sampling Date (yyyy-mm-dd)		2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01		
Parameters	**Unit**												**CCME[1A]**	**Nunavut[1B]**
Acenaphthene	mg/kg	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	**-**	**-**
Acenaphthylene	mg/kg	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	**-**	**-**
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**32**	**-**
Benzo (a) anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**10**	**-**
Benzo (a) pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**72**	**-**
Benzo (b) fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**10**	**10**
Benzo (k) fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**10**	**-**
Benzo (g,h,i) perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	**-**
Chrysene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**-**	**-**
Dibenzo (a,h) anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**10**	**-**
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**180**	**-**
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1	0.2	0.2	0.2	0.2	<0.1	<0.1	**-**	**10**
Indeno (1,2,3-c,d) pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1[4]	<0.1[4]	<0.1[4]	<0.1[4]	<0.1[4]	<0.1[4]	**10**	**-**
Naphthalene	mg/kg	<0.09[4]	<0.09[4]	<0.09[4]	<0.09[4]	<0.09[4]	<0.09[4]	**2.07**	**0.36**	**0.39**	<0.09[4]	<0.09[4]	**0.013**	**-**
Phenanthrene	mg/kg	<0.1[4]	<0.1[4]	<0.1[4]	<0.1[4]	<0.1[4]	**0.1**	**0.3**	**0.3**	**0.3**	<0.1	<0.1	**0.046**	**10**
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	**100**	**-**
1-Methyl Naphtalene	mg/kg	<0.1	<0.1	0.2	0.1	1.0	2.4	4.0	2.7	2.7	<0.1	<0.1	**-**	**50**
2-Methyl Naphtalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	4.8	0.8	0.8	<0.1	<0.1	**-**	**10**
Total Potency Equivalents (Benzo (a) Pyrene[2])	mg/kg	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	**≤ 1**	**≤ 1**
Total Potency Equivalents (Benzo (a) Pyrene[3])	mg/kg	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	**0.6**	**0.6**
Index of Additive Cancer Risk	mg/kg	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	**5.3**	**5.3**

Shaded area indicates sample exceeds applicable guidelines

TT or tt: Field duplicate

1A: Canadian Soil Guidelines for the Protection of Environmental and Human Health CCME 2008, revised 2010

1B: Environmental Guideline for Contaminated Site Remediation (2009), Department of Environment, Government of Nunavut, 35 pages

2: *Soil Quality Guidelines Based on an Incremental Lifetime Cancer Risk of 1 in 100,000*

3: *Soil Quality Guidelines Based on an Incremental Lifetime Cancer Risk of 1 in 1,000,000*

4: The reported detection limit is above the criterion; therefore, no conclusion can be drawn from this result.

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Table III: Soil Chemical Analysis Results - Polycyclic Aromatic Hydrocarbons

Transport Canada
LTU Maintenance at the Iqaluit Airport
Iqaluit Airport
Iqaluit, Nunavut

Sample Location		Bio 2-1	Bio 2-2	Bio 2-2 tt	Bio 2-3	Bio 2-4	Bio 2-5	Bio 2-6	Bio 2-7	Bio 2-8	Bio 2-9	Bio 2-9 tt	Bio 2-10	Bio 2-11	Bio 2-12	**Guidelines**	
Sample ID		908749	908750	908751	908752	908753	908754	908755	908756	908757	908758	908759	908760	908761	908762		
Sampling Date (yyyy-mm-dd)		2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02		
Parameters	**Unit**															**CCME[1A]**	**Nunavut[1B]**
Acenaphthene	mg/kg	<0.7	<0.4	<0.4	<0.4	<0.1	1.3	0.2	<0.4	<0.1	<0.1	<0.1	<0.07	<0.07	<0.07	-	-
Acenaphthylene	mg/kg	<0.8	<0.4	<0.4	<0.4	<0.2	2.1	<0.2	<0.4	<0.2	<0.2	<0.2	<0.08	<0.08	<0.08	-	-
Anthracene	mg/kg	<1	<0.5	<0.5	<0.5	<0.2	1.9	<0.2	<0.5	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	**32**	-
Benzo (a) anthracene	mg/kg	3	0.6	1.2	1.2	<0.2	9.3	<0.2	0.8	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	**10**	-
Benzo (a) pyrene	mg/kg	3	0.7	1.2	1.1	<0.2	9.7	<0.2	1.0	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	**72**	-
Benzo (b) fluoranthene	mg/kg	<1	<0.5	<0.5	<0.5	<0.2	7.8	<0.2	<0.5	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	**10**	**10**
Benzo (k) fluoranthene	mg/kg	3	0.7	1.1	1.2	<0.2	4.6	<0.2	0.9	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	**10**	-
Benzo (g,h,i) perylene	mg/kg	<1	<0.5	<0.5	<0.5	<0.2	7.1	<0.2	<0.5	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	-	-
Chrysene	mg/kg	7	1.3	2.4	2.2	<0.2	9.7	<0.2	1.7	0.2	0.3	0.2	<0.1	<0.1	<0.1	-	-
Dibenzo (a,h) anthracene	mg/kg	<1	<0.5	<0.5	<0.5	<0.2	2.0	<0.2	<0.5	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	**10**	-
Fluoranthene	mg/kg	2	<0.5	0.7	0.8	<0.2	18.9	<0.2	0.6	0.2	0.3	0.2	0.1	<0.1	<0.1	**180**	-
Fluorene	mg/kg	<1	<0.5	<0.5	<0.5	<0.2	1.6	0.3	<0.5	0.4	0.5	0.4	0.2	<0.1	0.1	-	**10**
Indeno (1,2,3-c,d) pyrene	mg/kg	<1	<0.5	<0.5	<0.5	<0.2	4.3	<0.2	<0.5	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	**10**	-
Naphthalene	mg/kg	<0.9[4]	<0.4[4]	<0.4[4]	<0.4[4]	<0.2[4]	<0.4[4]	<0.2[4]	<0.4[4]	<0.2[4]	**1.4**	**0.9**	<0.09[4]	<0.09[4]	**0.21**	**0.013**	-
Phenanthrene	mg/kg	<1[4]	<0.5[4]	<0.5[4]	**0.7**	<0.2[4]	**3.14**	**0.3**	**0.7**	**0.4**	**0.6**	**0.5**	**0.4**	<0.1[4]	**0.1**	**0.046**	**10**
Pyrene	mg/kg	15	2.9	4.7	4.5	0.4	17.7	0.2	3.4	0.4	0.6	0.5	0.2	<0.1	<0.1	**100**	-
1-Methyl Naphtalene	mg/kg	<1	<0.5	<0.5	<0.5	<0.2	9.4	3.4	1.4	2.6	6.5	5.3	3.4	0.2	0.9	-	**50**
2-Methyl Naphtalene	mg/kg	<1	<0.5	<0.5	<0.5	<0.2	3.2	0.3	<0.5	<0.2	3.3	2.0	0.3	<0.1	0.2	-	**10**
Total Potency Equivalents (Benzo (a) Pyrene[2])	mg/kg	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	**≤ 1**	**≤ 1**
Total Potency Equivalents (Benzo (a) Pyrene[3])	mg/kg	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	**0.6**	**0.6**
Index of Additive Cancer Risk	mg/kg	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	**5.3**	**5.3**

Shaded area indicates sample exceeds applicable guidelines

TT or tt: Field duplicate

1A: Canadian Soil Guidelines for the Protection of Environmental and Human Health CCME 2008, revised 2010

1B: Environmental Guideline for Contaminated Site Remediation (2009), Department of Environment, Government of Nunavut, 35 pages

2: *Soil Quality Guidelines Based on an Incremental Lifetime Cancer Risk of 1 in 100,000*

3: *Soil Quality Guidelines Based on an Incremental Lifetime Cancer Risk of 1 in 1,000,000*

4: The reported detection limit is above the criterion; therefore, no conclusion can be drawn from this result.

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Table IV: Water Chemical Analysis Results - BTEX and PHCs (F1 through F4)

Transport Canada

LTU Maintenance at the Iqaluit Airport
Iqaluit Airport
Iqaluit, Nunavut

Sample Location	Sample ID	Sampling Date	Parameters							
			Benzene	Toluene	Ethylbenzene	Xylenes	PHC (F1)	PHC (F2)	PHC (F3)	PHC (F4)
		yyyy-mm-dd	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
MW-1	907972	2011-08-31	<0.5	<0.5	<0.5	<1.0	<0.1	<0.2	<0.4	<0.4
MW-1 ++	907973	2011-08-31	<0.5	<0.5	<0.5	<1.0	<0.1	<0.2	<0.4	<0.4
MW-2	907974	2011-08-31	<0.5	<0.5	<0.5	<1.0	<0.1	<0.2	<0.4	<0.4
MW-5	907976	2011-08-31	<0.5	<0.5	<0.5	<1.0	<0.1	<0.2	<0.4	<0.4
Bio 1 - RW	908417	2011-09-01	<0.5	<0.5	<0.5	<1.0	<0.1	<0.1	0.3	<0.2
Transport Blanks	907977	2011-08-31	<0.5	<0.5	<0.5	<1.0	-	-	-	-
Field Blanks	907978	2011-08-31	<0.5	<0.5	<0.5	<1.0	-	-	-	-
Guidelines[1, 2]			**370**	**2**	**90**	**18**	**9,800**	**1,300**	**-**	**-**

PHC (F1): Petroleum hydrocarbon C_6 to C_{10}, does not include BTEX fractions

PHC (F2): Petroleum hydrocarbon $C_{>10}$ to C_{16}

PHC (F3): Petroleum hydrocarbon $C_{>16}$ to C_{34}

PHC (F4): Petroleum hydrocarbon $C_{>34}$ to C_{50}

PHC (F4G): Petroleum hydrocarbon C_{50+}

Shaded area indicates sample exceeds applicable guidelines

++: Field duplicate

[1]: *Canadian Water Quality Guidelines for the protection of aquatic life* , CCME, 1998

[2]: *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* , December 2010

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Table V: Water Chemical Analysis Results - Metals

Transport Canada

LTU Maintenance at the Iqaluit Airport
Iqaluit Airport
Iqaluit, Nunavut

Sample Location		**MW-1**	**MW-1 ++**	**MW-2**	**MW-5**	**Bio 1 - RW**	
Sample ID		907972	907973	907974	907976	908417	**Guidelines**[2, 3]
Sampling Date (yyyy-mm-dd)		2011-08-31	2011-08-31	2011-08-31	2011-08-31	2011-09-01	
Parameters	**Unit**						
Aluminum	mg/L	**0.38**	**0.33**	**0.17**	**1.03**	**0.15**	0.005
Arsenic	mg/L	<0.01[1]	<0.01[1]	<0.001	<0.01[1]	<0.001	0.005
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	0.0012	<0.0001	18
Cobalt	mg/L	0.0014	0.0012	0.0009	0.0054	0.0002	-
Copper	mg/L	**0.012**	**0.012**	**0.006**	**0.018**	**0.004**	0.002
Iron	mg/L	**1.15**	**0.79**	**0.82**	**2.6**	**0.42**	0.3
Lead	mg/L	**0.002**	**0.002**	**0.003**	**0.013**	0.001	0.00127
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.073
Nickel	mg/L	<0.005	<0.005	<0.005	0.009	<0.005	0.055
Selenium	mg/L	<0.005[1]	<0.005[1]	<0.001	<0.005[1]	<0.001	0.001
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Titanium	mg/L	<0.01	<0.01	<0.01	0.03	<0.01	-
Zinc	mg/L	<0.01	<0.01	<0.01	**0.04**	<0.01	0.03

Shaded area indicates sample exceeds applicable guidelines

++: Field duplicate

n/s: Not specified

[1]: The detection limit is above criteria.

[2]: Water quality guidelines for the protection of aquatic life

[3]: *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* , December 2010

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Table VI: Water Chemical Analysis Results - Polycyclic Aromatic Hydrocarbons

Transport Canada
LTU maintenance at the Iqaluit Airport
Iqaluit Airport
Iqaluit, Nunavut

Sample Location		MW-1	MW-1 ++	MW-2	MW-5	Bio 1 - RW	**Guidelines**
Sample ID		907972	907973	907974	907976	908417	
Sampling Date (yyyy-mm-dd)		2011-08-31	2011-08-31	2011-08-31	2011-08-31	2011-09-01	
Parameters	**Unit**						**CCME**
1-methylnaphthalene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	-
2-methylnaphthalene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	-
Acenaphthene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	5.8
Acenaphthylene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	-
Anthracene	ug/L	<0.2[1]	<0.2[1]	<0.2[1]	<0.2[1]	<0.2[1]	0.012
Benzo(a)anthracene	ug/L	<0.2[1]	<0.2[1]	<0.2[1]	<0.2[1]	<0.2[1]	0.018
Benzo(a)pyrene	ug/L	<0.01	<0.01	**0.05**	<0.01	<0.01	0.015
Benzo(b)fluoranthene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	-
Benzo(g,h,i)perylene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	-
Benzo(k)fluoranthene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	-
Chrysene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	-
Dibenzo(a,h)anthracene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	-
Fluoranthene	ug/L	<0.2[1]	<0.2[1]	**0.2**	<0.2[1]	<0.2[1]	0.014
Fluorene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	3
Indeno(1,2,3-c,d)pyrene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	-
Naphthalene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	1.1
Phenanthrene	ug/L	<0.2	<0.2	0.2	<0.2	<0.2	0.4
Pyrene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	0.025

Shaded area indicates sample exceeds applicable guidelines

1: The reported detection limit is above the criterion; therefore, no conclusion can be drawn from this result.

++: Field duplicate

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APPENDIX D

Certificates of Analysis

EXOVA ACCUTEST

REPORT OF ANALYSIS

Exova Accutest

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120331
Date: 2011-09-12
Date Submitted: 2011-09-01

Project: TC 1660

P.O. Number:

Chain of Custody Number: **145893**

Matrix: Water

			LAB ID:	907972	907973	907974	907975	907976	GUIDELINE		
			Sample Date:	2011-08-31	2011-08-31	2011-08-31	2011-08-31	2011-08-31			
			Sample ID:	MW-1	MW-1 ++	MW-2	MW-4	MW-5			
PARAMETER	**UNITS**	**MRL**							**TYPE**	**LIMIT**	**UNITS**
Aluminum	mg/L	0.01		0.38	0.33	0.17	0.34	1.03			
Antimony	mg/L	0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			
Arsenic	mg/L	0.001		<0.01	<0.01	<0.001	<0.001	<0.01			
Barium	mg/L	0.01		0.02	0.02	<0.01	0.05	0.06			
Beryllium	mg/L	0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			
Boron	mg/L	0.01		0.12	0.11	0.02	0.02	0.10			
Cadmium	mg/L	0.0001		<0.0001	<0.0001	<0.0001	0.0001	0.0012			
Chromium	mg/L	0.001		0.004	0.004	0.003	0.005	0.008			
Cobalt	mg/L	0.0002		0.0014	0.0012	0.0009	0.0023	0.0054			
Copper	mg/L	0.001		0.012	0.012	0.006	0.028	0.018			
Iron	mg/L	0.03		1.15	0.79	0.82	4.21	2.60			
Lead	mg/L	0.001		0.002	0.002	0.003	0.002	0.013			
Manganese	mg/L	0.01		0.06	0.06	0.15	0.37	3.47			
Mercury	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
Molybdenum	mg/L	0.005		<0.005	<0.005	<0.005	<0.005	<0.005			
Nickel	mg/L	0.005		<0.005	<0.005	<0.005	0.006	0.009			
Selenium	mg/L	0.001		<0.005	<0.005	<0.001	<0.001	<0.005			
Silicon	mg/L	0.1		5.0	4.8	3.9	6.6	10.1			
Silver	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
Strontium	mg/L	0.001		0.278	0.273	0.156	0.257	0.283			
Thallium	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
Titanium	mg/L	0.01		<0.01	<0.01	<0.01	<0.01	0.03			
Vanadium	mg/L	0.001		0.006	0.005	0.004	0.009	<0.005			
Zinc	mg/L	0.01		<0.01	<0.01	<0.01	0.01	0.04			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:
907972: Arsenic and Selenium MRL elevated due to matrix interference.
907973: Arsenic and Selenium MRL elevated due to matrix interference.
907976: Arsenic and Selenium MRL elevated due to matrix interference.

APPROVAL:
Lorna Wilson
Inorganic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

REPORT OF ANALYSIS

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120331
Date: 2011-09-12
Date Submitted: 2011-09-01

Project: TC 1660

P.O. Number:

Chain of Custody Number: **145893**

Matrix: Water

			LAB ID:	907972	907973	907974	907975	907976	GUIDELINE		
			Sample Date:	2011-08-31	2011-08-31	2011-08-31	2011-08-31	2011-08-31			
			Sample ID:	MW-1	MW-1 ++	MW-2	MW-4	MW-5			
PARAMETER	**UNITS**	**MRL**							**TYPE**	**LIMIT**	**UNITS**
VOLATILE ORGANIC COMPOUNDS - VOCs											
Ethylbenzene	ug/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5			
Toluene	ug/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5			
Benzene	ug/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5			
m/p-xylene	ug/L	1		<1.0	<1.0	<1.0	<1.0	<1.0			
o-xylene	ug/L	0.5		<0.5	<0.5	<0.5	<0.5	<0.5			
VOC SURROGATES											
Toluene-d8	%			116	110	112	118	105			
CCME Total Petroleum Hydrocarbons											
F1 (C6-C10)	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
F1-BTEX (C6-C10)	mg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
F2 (C10-C16)	mg/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
F2-Napthalene	mg/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
F3 (C16-C34)	mg/L	0.4		<0.4	<0.4	<0.4	<0.4	<0.4			
F3-PAH	mg/L	0.4		<0.4	<0.4	<0.4	<0.4	<0.4			
F4 (C34-C50)	mg/L	0.4		<0.4	<0.4	<0.4	<0.4	<0.4			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:
907972: F2-F4 MRL elevated (x2) due to insufficient sample volume.
907973: F2-F4 MRL elevated (x2) due to insufficient sample volume.
907974: F2-F4 MRL elevated (x2) due to insufficient sample volume.
907975: F2-F4 MRL elevated (x2) due to insufficient sample volume.
907976: F2-F4 MRL elevated (x2) due to insufficient sample volume.
Methods references and/or additional QA/QC information available on request.

APPROVAL:
Mina Nasiri
Organic Lab Supervisor

REPORT OF ANALYSIS

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120331
Date: 2011-09-12
Date Submitted: 2011-09-01

Project: TC 1660

P.O. Number:

Chain of Custody Number: 145893

Matrix: Water

			LAB ID:	907977	907978				GUIDELINE		
			Sample Date:	2011-08-31	2011-08-31						
			Sample ID:	Transport Blanks	Field Blanks						
PARAMETER	**UNITS**	**MRL**							**TYPE**	**LIMIT**	**UNITS**
VOLATILE ORGANIC COMPOUNDS - VOCs											
Ethylbenzene	ug/L	0.5	<0.5	<0.5							
Toluene	ug/L	0.5	<0.5	<0.5							
Benzene	ug/L	0.5	<0.5	<0.5							
m/p-xylene	ug/L	1	<1.0	<1.0							
o-xylene	ug/L	0.5	<0.5	<0.5							
VOC SURROGATES											
Toluene-d8	%		101	101							
CCME Total Petroleum Hydrocarbons											
F1 (C6-C10)	mg/L	0.1									
F1-BTEX (C6-C10)	mg/L	0.1									
F2 (C10-C16)	mg/L	0.2									
F2-Napthalene	mg/L	0.2									
F3 (C16-C34)	mg/L	0.4									
F3-PAH	mg/L	0.4									
F4 (C34-C50)	mg/L	0.4									

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:
Mina Nasirai
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

EXOVA ACCUTEST

CCME METHOD VERIFICATION REPORT

Exova Accutest

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120331
Date: 2011-09-12
Date Submitted: 2011-09-01

Project: TC 1660

P.O. Number:
Matrix: Water

Samples were analysed by Accutest Method AMCCME2, "Petroleum Hydrocarbons in Water and Soil, CCME/TPH"
This method complies with the reference method for the CCME CWS PHC and is validated for use in the laboratory.
Accutest is accredited by CAEAL (ISO 17025) for all CCME F1-F4 fractions as listed in this report.
Data for QC samples (blank, duplicate, spike) are available on request.

Fractions Analysed Within Acceptable Holding/Analysis Times	HOLD TIME		ANALYSIS TIME		If No then Reasons
	YES	NO	YES	NO	
F1 (C6-C10)	☑	☐	☑	☐	
F2 (C10-C16)	☑	☐	☑	☐	
F3 (C16-C34)	☑	☐	☑	☐	
F4 (C34-C50)	☑	☐	☑	☐	
F4 (C34-C50) gravimetric (when applicable)	☐	☐	☐	☐	

Fraction Specific Information			
F1	**YES**	**NO**	
nC6 and nC10 response factors within 30% of Toluene	☑	☐	
BTEX subtracted from F1 fraction	☑	☐	
If YES was F1-BTEX (C6-C10) reported	☑	☐	
F2	**YES**	**NO**	
nC10, nC16 and nC34 response factors within 10% of their average (F2-F4)	☑	☐	
Linearity within 15 % (F2-F4)	☑	☐	
Naphthalene subtracted from F2 fraction	☑	☐	
If YES was F2-Napthalene reported	☑	☐	
F3	**YES**	**NO**	
PAH (selected compounds) subtracted from F3 fraction	☑	☐	
If YES was F3-PAH reported	☑	☐	
F4	**YES**	**NO**	
C50 response factor within 70% of nC10 + nC16 + nC34 average	☑	☐	
Chromatogram descended to baseline by retention time of C50	☑	☐	
If NO was F4 (C34-C50) gravimetric reported	☐	☐	

APPROVAL:
Mina Nasirai
Organic Lab Supervisor

REPORT OF ANALYSIS

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120331
Date: 2011-09-12
Date Submitted: 2011-09-01

Project: TC 1660

P.O. Number:

Chain of Custody Number: 145893

Matrix: Water

			LAB ID:	907972	907973	907974	907975	907976	GUIDELINE		
			Sample Date:	2011-08-31	2011-08-31	2011-08-31	2011-08-31	2011-08-31			
			Sample ID:	MW-1	MW-1 ++	MW-2	MW-4	MW-5			
PARAMETER	**UNITS**	**MRL**							**TYPE**	**LIMIT**	**UNITS**
POLYNUCLEAR AROMATIC HYDROCARBONS - PAHs											
1-methylnaphthalene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
2-methylnaphthalene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Acenaphthene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Acenaphthylene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Anthracene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Benzo(a)anthracene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Benzo(a)pyrene	ug/L	0.01		<0.01	<0.01	0.05	<0.01	<0.01			
Benzo(b)fluoranthene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Benzo(g,h,i)perylene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Benzo(k)fluoranthene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Chrysene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Dibenzo(a,h)anthracene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Fluoranthene	ug/L	0.2		<0.2	<0.2	0.2	<0.2	<0.2			
Fluorene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Indeno(1,2,3-c,d)pyrene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Naphthalene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Phenanthrene	ug/L	0.2		<0.2	<0.2	0.2	<0.2	<0.2			
Pyrene	ug/L	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasiraï
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

EXOVA ACCUTEST

REPORT OF ANALYSIS

Exova Accutest

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120479
Date: 2011-09-12
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:

Chain of Custody Number: **139668**

Matrix: Groundwater

			LAB ID:	908417					**GUIDELINE**
			Sample Date:	2011-09-01					
			Sample ID:	Bio 1 - RW					
PARAMETER	**UNITS**	**MRL**						**TYPE**	**LIMIT**	**UNITS**
Aluminum	mg/L	0.01	0.15							
Antimony	mg/L	0.0005	<0.0005							
Arsenic	mg/L	0.001	<0.001							
Barium	mg/L	0.01	<0.01							
Beryllium	mg/L	0.0005	<0.0005							
Boron	mg/L	0.01	0.02							
Cadmium	mg/L	0.0001	<0.0001							
Chromium	mg/L	0.005	0.012							
Cobalt	mg/L	0.0002	0.0002							
Copper	mg/L	0.001	0.004							
Iron	mg/L	0.03	0.42							
Lead	mg/L	0.001	0.001							
Manganese	mg/L	0.01	0.06							
Mercury	mg/L	0.0001	<0.0001							
Molybdenum	mg/L	0.005	<0.005							
Nickel	mg/L	0.005	<0.005							
Selenium	mg/L	0.001	<0.001							
Silicon	mg/L	0.1	0.5							
Silver	mg/L	0.0001	<0.0001							
Strontium	mg/L	0.001	0.101							
Thallium	mg/L	0.0001	<0.0001							
Titanium	mg/L	0.01	<0.01							
Vanadium	mg/L	0.001	0.001							
Zinc	mg/L	0.01	<0.01							

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Lorna Wilson
Inorganic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

EXOVA ACCUTEST

REPORT OF ANALYSIS

Exova Accutest

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120479
Date: 2011-09-12
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139668

Matrix: Groundwater

			LAB ID:	908417					**GUIDELINE**
			Sample Date:	2011-09-01					
			Sample ID:	Bio 1 - RW					
PARAMETER	**UNITS**	**MRL**						**TYPE**	**LIMIT**	**UNITS**
VOLATILE ORGANIC COMPOUNDS - VOCs										
Ethylbenzene	ug/L	0.5	<0.5							
Toluene	ug/L	0.5	<0.5							
Benzene	ug/L	0.5	<0.5							
m/p-xylene	ug/L	1	<1.0							
o-xylene	ug/L	0.5	<0.5							
VOC SURROGATES										
Toluene-d8	%		103							
CCME Total Petroleum Hydrocarbons										
F1 (C6-C10)	mg/L	0.1	<0.1							
F1-BTEX (C6-C10)	mg/L	0.1	<0.1							
F2 (C10-C16)	mg/L	0.1	<0.1							
F2-Napthalene	mg/L	0.1	<0.1							
F3 (C16-C34)	mg/L	0.2	0.3							
F3-PAH	mg/L	0.2	0.3							
F4 (C34-C50)	mg/L	0.2	<0.2							

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasirai
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

CCME METHOD VERIFICATION REPORT

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120479
Date: 2011-09-12
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:
Matrix: Groundwater

Samples were analysed by Accutest Method AMCCME2, "Petroleum Hydrocarbons in Water and Soil, CCME/TPH"
This method complies with the reference method for the CCME CWS PHC and is validated for use in the laboratory.
Accutest is accredited by CAEAL (ISO 17025) for all CCME F1-F4 fractions as listed in this report.
Data for QC samples (blank, duplicate, spike) are available on request.

Fractions Analysed Within Acceptable Holding/Analysis Times	HOLD TIME YES	HOLD TIME NO	ANALYSIS TIME YES	ANALYSIS TIME NO	If No then Reasons
F1 (C6-C10)	☑	☐	☑	☐	
F2 (C10-C16)	☑	☐	☑	☐	
F3 (C16-C34)	☑	☐	☑	☐	
F4 (C34-C50)	☑	☐	☑	☐	
F4 (C34-C50) gravimetric (when applicable)	☐	☐	☐	☐	

Fraction Specific Information	YES	NO	If No then Reasons
F1			
nC6 and nC10 response factors within 30% of Toluene	☑	☐	
BTEX subtracted from F1 fraction	☑	☐	
If YES was F1-BTEX (C6-C10) reported	☑	☐	
F2			
nC10, nC16 and nC34 response factors within 10% of their average (F2-F4)	☑	☐	
Linearity within 15 % (F2-F4)	☑	☐	
Naphthalene subtracted from F2 fraction	☑	☐	
If YES was F2-Napthalene reported	☑	☐	
F3			
PAH (selected compounds) subtracted from F3 fraction	☑	☐	
If YES was F3-PAH reported	☑	☐	
F4			
C50 response factor within 70% of nC10 + nC16 + nC34 average	☑	☐	
Chromatogram descended to baseline by retention time of C50	☑	☐	
If NO was F4 (C34-C50) gravimetric reported	☐	☐	

APPROVAL:
Mina Nasira
Organic Lab Supervisor

EXOVA ACCUTEST

REPORT OF ANALYSIS

Exova Accutest

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7

Attention: Mr. Erwan Carrière

Report Number: 1120479
Date: 2011-09-12
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139668

Matrix: Groundwater

			LAB ID:	908417					**GUIDELINE**
			Sample Date:	2011-09-01					
			Sample ID:	Bio 1 - RW					
PARAMETER	**UNITS**	**MRL**						**TYPE**	**LIMIT**	**UNITS**
POLYNUCLEAR AROMATIC HYDROCARBONS - PAHs										
1-methylnaphthalene	ug/L	0.2	<0.2							
2-methylnaphthalene	ug/L	0.2	<0.2							
Acenaphthene	ug/L	0.2	<0.2							
Acenaphthylene	ug/L	0.2	<0.2							
Anthracene	ug/L	0.2	<0.2							
Benzo(a)anthracene	ug/L	0.2	<0.2							
Benzo(a)pyrene	ug/L	0.01	<0.01							
Benzo(b)fluoranthene	ug/L	0.2	<0.2							
Benzo(g,h,i)perylene	ug/L	0.2	<0.2							
Benzo(k)fluoranthene	ug/L	0.2	<0.2							
Chrysene	ug/L	0.2	<0.2							
Dibenzo(a,h)anthracene	ug/L	0.2	<0.2							
Fluoranthene	ug/L	0.2	<0.2							
Fluorene	ug/L	0.2	<0.2							
Indeno(1,2,3-c,d)pyrene	ug/L	0.2	<0.2							
Naphthalene	ug/L	0.2	<0.2							
Phenanthrene	ug/L	0.2	<0.2							
Pyrene	ug/L	0.2	<0.2							

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasirai
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

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Certificate of Analysis

Request number: **11-431733**

Date Received: 2011-09-22

Date Certificate Issued: 2011-10-21

Certificate Version: 2

☑ Official Certificate of Analysis

☐ Preliminary Certificate of Analysis

Client

EXOVA (ACCUTEST-OTTAWA) - Dpt 151

146 Colonnade Road, Unit 8
Ottawa, Ontario, Canada
K2E 7Y1
Telephone : (613) 727-5692
Fax : (613) 727-5222

P.O. Number	Your project ID.	Project Manager
509955	1120480	Kyle Kimmett

Comments

Version 02: Modification of all samples identification at the client's request.

The criteria from the "Politique de protection des sols et de réhabilitation des terrains contaminés" included in this certificate are for information only.
The A criteria for all metals correspond to those of the "Basses-Terres du St-Laurent" region.
The D criteria correspond to the "Règlement sur l'enfouissement des sols contaminés". These criteria are included in this certificate for information only.

This version replaces and cancels all earlier version.

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Certificate of Analysis

Client: **EXOVA (ACCUTEST-OTTAWA) - Dpt 151**

Request Number: 11-431733

P.O. Number	Your Project ID.	Project Manager
509955	1120480	Kyle Kimmett

	Lab. No.	Sample(s) 1986801	1986802	1986803	1986804
	Your Reference	908418 Bio 1-1	908419 Bio 1-2	908420 Bio 1-3	908421 Bio 1-4
	Matrix	Soil	Soil	Soil	Soil
	Sampled by	NA	NA	NA	NA
	Site sampled	NA	NA	NA	NA
	Date sampled	2011-09-01	2011-09-01	2011-09-01	2011-09-01
	Date received	2011-09-22	2011-09-22	2011-09-22	2011-09-22
Parameter(s)	Method Reference				
Titanium (Ti)	Preparation	2011-09-23	2011-09-23	2011-09-23	2011-09-23
Metals by ICP. Results on dry weight. E-A-EN-EN-CHI-PC-MD017 (REF: MA. 200 - Mét 1.2)	Analysis	2011-09-23	2011-09-23	2011-09-23	2011-09-23
	Sequential No.	232436	232436	232436	232436
Titanium	mg/kg	145	154	166	177

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Certificate of Analysis

Client: **EXOVA (ACCUTEST-OTTAWA) - Dpt 151**

Request Number: 11-431733

P.O. Number	Your Project ID.	Project Manager
509955	1120480	Kyle Kimmett

		Sample(s)			
	Lab. No.	**1986805**	**1986806**	**1986807**	**1986808**
	Your Reference	908422 Bio 1-5	908423 Bio 1-6	908424 Bio 1-7	908425 Bio 1-8
	Matrix	Soil	Soil	Soil	Soil
	Sampled by	NA	NA	NA	NA
	Site sampled	NA	NA	NA	NA
	Date sampled	2011-09-01	2011-09-01	2011-09-01	2011-09-01
	Date received	2011-09-22	2011-09-22	2011-09-22	2011-09-22
Parameter(s)	Method Reference				
Titanium (Ti)	Preparation	2011-09-23	2011-09-23	2011-09-23	2011-09-23
Metals by ICP. Results on dry weight. E-A-EN-EN-CHI-PC-MD017 (REF: MA. 200 - Mét 1.2)	Analysis	2011-09-23	2011-09-23	2011-09-23	2011-09-23
	Sequential No.	232436	232436	232436	232436
Titanium	mg/kg	201	207	173	187

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Certificate of Analysis

Client: **EXOVA (ACCUTEST-OTTAWA) - Dpt 151**

Request Number: 11-431733

P.O. Number	Your Project ID.	Project Manager
509955	1120480	Kyle Kimmett

	Lab. No.	Sample(s) 1986809	1986810	1986811
	Your Reference	908426 Bio 1-8 TT	908427 Field Blank	908428 Trip Blank
	Matrix	Soil	Soil	Soil
	Sampled by	NA	NA	NA
	Site sampled	NA	NA	NA
	Date sampled	2011-09-01	2011-09-01	2011-09-01
	Date received	2011-09-22	2011-09-22	2011-09-22
Parameter(s)	Method Reference			
Titanium (Ti)	Preparation	2011-09-23	2011-09-23	2011-09-23
Metals by ICP. Results on dry weight. E-A-EN-EN-CHI-PC-MD017 (REF: MA. 200 - Mét 1.2)	Analysis	2011-09-23	2011-09-23	2011-09-23
	Sequential No.	232436	232436	232436
Titanium	mg/kg	183	152	145

Note: Results pertain only to the samples submitted for analysis.

David Cajolet, chemist

CHIMISTE
David Cajolet
2008-069
QUÉBEC

Terms and conditions: http://www.exova.ca/terms&conditions

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Certificat d'analyses

Client: **EXOVA (ACCUTEST-OTTAWA) - Dpt 151**

Request Number: 11-431733

P.O. Number	Your Project ID.	Project Manager
509955	1120480	Kyle Kimmett

Quality Control Results (CQ)

Parameters (Sequential ID No.)	Units	RDL	Blank	Certified Control Result	Certified Control Expected Range
Titanium (Ti)					
Sequential ID No.: 232436					
Titanium	mg/kg	< 1	< 1	101	80 - 120

Comments

RDL : Reported Detection Limit

REPORT OF ANALYSIS

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120480
Date: 2011-09-13
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139669

Matrix: Soil

			LAB ID:	908418	908419	908420	908421	908422	GUIDELINE		
			Sample Date:	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01			
			Sample ID:	Bio 1-1	Bio 1-2	Bio 1-3	Bio 1-4	Bio 1-5			
PARAMETER	UNITS	MRL							TYPE	LIMIT	UNITS
Moisture	%	0.1	5.7	7.2	7.8	8.0	8.4				
Aluminum	ug/g	5	5760	5350	5260	5440	5390				
Antimony	ug/g	1	<1	<1	<1	<1	<1				
Arsenic	ug/g	1	2	2	2	2	2				
Barium	ug/g	1	38	39	36	38	38				
Beryllium	ug/g	1	<1	<1	<1	<1	<1				
Cadmium	ug/g	0.5	<0.5	<0.5	<0.5	<0.5	<0.5				
Chromium	ug/g	1	36	36	29	45	26				
Cobalt	ug/g	1	7	7	6	7	6				
Copper	ug/g	1	17	16	14	16	12				
Iron	ug/g	5	29400	26500	25200	27100	22800				
Lead	ug/g	1	12	9	15	15	17				
Manganese	ug/g	1	297	261	248	264	229				
Mercury	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Molybdenum	ug/g	1	1	1	<1	1	<1				
Nickel	ug/g	1	13	12	10	17	10				
Selenium	ug/g	1	<1	<1	<1	<1	<1				
Silver	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2				
Strontium	ug/g	1	19	13	15	16	17				
Thallium	ug/g	1	<1	<1	<1	<1	<1				
Vanadium	ug/g	2	72	64	61	62	50				
Zinc	ug/g	2	52	51	48	48	50				

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration
Comment:

APPROVAL:
Lorna Wilson
Inorganic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

REPORT OF ANALYSIS

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120480
Date: 2011-09-13
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139669

Matrix: Soil

			LAB ID:	908423	908424	908425	908426	908427	GUIDELINE		
			Sample Date:	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01			
			Sample ID:	Bio 1-6	Bio 1-7	Bio 1-8	Bio 1-8 TT	Field Blank			
PARAMETER	UNITS	MRL							TYPE	LIMIT	UNITS
Moisture	%	0.1		10.4	7.8	9.0	8.6	<0.1			
Aluminum	ug/g	5		5180	5940	5270	5970	3010			
Antimony	ug/g	1		<1	<1	<1	<1	<1			
Arsenic	ug/g	1		2	2	2	2	<1			
Barium	ug/g	1		34	40	35	47	22			
Beryllium	ug/g	1		<1	<1	<1	<1	<1			
Cadmium	ug/g	0.5		1.7	<0.5	<0.5	<0.5	<0.5			
Chromium	ug/g	1		28	36	30	32	16			
Cobalt	ug/g	1		5	7	6	6	7			
Copper	ug/g	1		12	16	12	14	21			
Iron	ug/g	5		24000	23300	22800	22300	15100			
Lead	ug/g	1		24	25	18	23	2			
Manganese	ug/g	1		197	229	192	218	124			
Mercury	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Molybdenum	ug/g	1		<1	<1	<1	<1	<1			
Nickel	ug/g	1		9	14	11	11	11			
Selenium	ug/g	1		<1	<1	<1	<1	<1			
Silver	ug/g	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
Strontium	ug/g	1		17	22	18	22	12			
Thallium	ug/g	1		<1	<1	<1	<1	<1			
Vanadium	ug/g	2		49	62	50	60	42			
Zinc	ug/g	2		48	54	43	53	22			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Lorna Wilson
Inorganic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

REPORT OF ANALYSIS

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120480
Date: 2011-09-13
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:
Matrix: Soil

Chain of Custody Number: 139669

								GUIDELINE		
		LAB ID:	908428							
		Sample Date:	2011-09-01							
		Sample ID:	Trip Blank							
PARAMETER	**UNITS**	**MRL**						**TYPE**	**LIMIT**	**UNITS**
Moisture	%	0.1	<0.1							
Aluminum	ug/g	5	2820							
Antimony	ug/g	1	<1							
Arsenic	ug/g	1	<1							
Barium	ug/g	1	21							
Beryllium	ug/g	1	<1							
Cadmium	ug/g	0.5	<0.5							
Chromium	ug/g	1	11							
Cobalt	ug/g	1	7							
Copper	ug/g	1	21							
Iron	ug/g	5	14600							
Lead	ug/g	1	1							
Manganese	ug/g	1	119							
Mercury	ug/g	0.1	<0.1							
Molybdenum	ug/g	1	<1							
Nickel	ug/g	1	9							
Selenium	ug/g	1	<1							
Silver	ug/g	0.2	<0.2							
Strontium	ug/g	1	11							
Thallium	ug/g	1	<1							
Vanadium	ug/g	2	38							
Zinc	ug/g	2	22							

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration
Comment:

APPROVAL:
Lorna Wilson
Inorganic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

REPORT OF ANALYSIS

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120480
Date: 2011-09-13
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139669

Matrix: Soil

			LAB ID:	908418	908419	908420	908421	908422	GUIDELINE		
			Sample Date:	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01			
			Sample ID:	Bio 1-1	Bio 1-2	Bio 1-3	Bio 1-4	Bio 1-5			
PARAMETER	UNITS	MRL							TYPE	LIMIT	UNITS
PERCENT MOISTURE											
Moisture	%	0.1	5.7	7.2	7.8	8.0	8.4				
VOLATILE ORGANIC COMPOUNDS - VOCs											
Ethylbenzene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Toluene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Benzene	ug/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
m/p-xylene	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2				
o-xylene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
VOC SURROGATES											
Toluene-d8	%		82	84	86	89	84				
CCME Total Petroleum Hydrocarbons											
F1 (C6-C10)	ug/g	10	<10	<10	20	20	60				
F1-BTEX (C6-C10)	ug/g	10	<10	<10	20	20	60				
F2 (C10-C16)	ug/g	10	140	170	600	620	1290				
F2-Napthalene	ug/g	10	140	170	600	620	1290				
F3 (C16-C34)	ug/g	20	300	920	580	620	770				
F3-PAH	ug/g	20	300	920	580	620	770				
F4 (C34-C50)	ug/g	20	140	370	320	310	440				

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasirai
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120480
Date: 2011-09-13
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139669

Matrix: Soil

			LAB ID:	908423	908424	908425	908426	908427	GUIDELINE		
			Sample Date:	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01			
			Sample ID:	Bio 1-6	Bio 1-7	Bio 1-8	Bio 1-8 TT	Field Blank			
PARAMETER	**UNITS**	**MRL**							**TYPE**	**LIMIT**	**UNITS**
PERCENT MOISTURE											
Moisture	%	0.1		10.4	7.8	9.0	8.6	<0.1			
VOLATILE ORGANIC COMPOUNDS - VOCs											
Ethylbenzene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Toluene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Benzene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05			
m/p-xylene	ug/g	0.2		<0.2	1.2	<0.2	<0.2	<0.2			
o-xylene	ug/g	0.1		0.3	3.8	2.9	1.3	<0.1			
VOC SURROGATES											
Toluene-d8	%			81	97	91	75	83			
CCME Total Petroleum Hydrocarbons											
F1 (C6-C10)	ug/g	10		70	120	110	90	<10			
F1-BTEX (C6-C10)	ug/g	10		70	115	107	89	<10			
F2 (C10-C16)	ug/g	10		4290	1650	7220	5010	<10			
F2-Napthalene	ug/g	10		4290	1650	7220	5010	<10			
F3 (C16-C34)	ug/g	20		1050	1180	990	1230	<20			
F3-PAH	ug/g	20		1050	1180	990	1250	<20			
F4 (C34-C50)	ug/g	20		700	740	600	750	<20			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasirai
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

REPORT OF ANALYSIS

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120480
Date: 2011-09-13
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:
Matrix: Soil

Chain of Custody Number: 139669

								GUIDELINE		
		LAB ID:	908428							
		Sample Date:	2011-09-01							
		Sample ID:	Trip Blank							
PARAMETER	UNITS	MRL						TYPE	LIMIT	UNITS
PERCENT MOISTURE										
Moisture	%	0.1	<0.1							
VOLATILE ORGANIC COMPOUNDS - VOCs										
Ethylbenzene	ug/g	0.1	<0.1							
Toluene	ug/g	0.1	<0.1							
Benzene	ug/g	0.05	<0.05							
m/p-xylene	ug/g	0.2	<0.2							
o-xylene	ug/g	0.1	<0.1							
VOC SURROGATES										
Toluene-d8	%		83							
CCME Total Petroleum Hydrocarbons										
F1 (C6-C10)	ug/g	10	<10							
F1-BTEX (C6-C10)	ug/g	10	<10							
F2 (C10-C16)	ug/g	10	<10							
F2-Napthalene	ug/g	10	<10							
F3 (C16-C34)	ug/g	20	<20							
F3-PAH	ug/g	20	<20							
F4 (C34-C50)	ug/g	20	<20							

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasirai
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

EXOVA ACCUTEST

CCME METHOD VERIFICATION REPORT

Exova Accutest

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120480
Date: 2011-09-13
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:
Matrix: Soil

Samples were analysed by Accutest Method AMCCME2, "Petroleum Hydrocarbons in Water and Soil, CCME/TPH"
This method complies with the reference method for the CCME CWS PHC and is validated for use in the laboratory.
Accutest is accredited by CAEAL (ISO 17025) for all CCME F1-F4 fractions as listed in this report.
Data for QC samples (blank, duplicate, spike) are available on request.

Fractions Analysed Within Acceptable Holding/Analysis Times	HOLD TIME YES	HOLD TIME NO	ANALYSIS TIME YES	ANALYSIS TIME NO	If No then Reasons
F1 (C6-C10)	☑	☐	☑	☐	
F2 (C10-C16)	☑	☐	☑	☐	
F3 (C16-C34)	☑	☐	☑	☐	
F4 (C34-C50)	☑	☐	☑	☐	
F4 (C34-C50) gravimetric (when applicable)	☐	☐	☐	☐	

Fraction Specific Information	YES	NO	If No then Reasons
F1			
nC6 and nC10 response factors within 30% of Toluene	☑	☐	
BTEX subtracted from F1 fraction	☑	☐	
If YES was F1-BTEX (C6-C10) reported	☑	☐	
F2			
nC10, nC16 and nC34 response factors within 10% of their average (F2-F4)	☑	☐	
Linearity within 15 % (F2-F4)	☑	☐	
Naphthalene subtracted from F2 fraction	☑	☐	
If YES was F2-Napthalene reported	☑	☐	
F3			
PAH (selected compounds) subtracted from F3 fraction	☑	☐	
If YES was F3-PAH reported	☑	☐	
F4			
C50 response factor within 70% of nC10 + nC16 + nC34 average	☑	☐	
Chromatogram descended to baseline by retention time of C50	☑	☐	
If NO was F4 (C34-C50) gravimetric reported	☐	☐	

APPROVAL: _____
Mina Nasirai
Organic Lab Supervisor

REPORT OF ANALYSIS

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120480
Date: 2011-09-13
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139669

Matrix: Soil

			LAB ID:	908418	908419	908420	908421	908422	GUIDELINE		
			Sample Date:	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01			
			Sample ID:	Bio 1-1	Bio 1-2	Bio 1-3	Bio 1-4	Bio 1-5			
PARAMETER	**UNITS**	**MRL**							**TYPE**	**LIMIT**	**UNITS**
POLYNUCLEAR AROMATIC HYDROCARBONS - PAHs											
1-methylnaphthalene	ug/g	0.1		<0.1	<0.1	0.2	0.1	1.0			
2-methylnaphthalene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Acenaphthene	ug/g	0.07		<0.07	<0.07	<0.07	<0.07	<0.07			
Acenaphthylene	ug/g	0.08		<0.08	<0.08	<0.08	<0.08	<0.08			
Anthracene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Benzo(a)anthracene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Benzo(a)pyrene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Benzo(b)fluoranthene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Benzo(g,h,i)perylene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Benzo(k)fluoranthene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Chrysene	ug/g	0.1		<0.1	0.1	<0.1	<0.1	<0.1			
Dibenzo(a,h)anthracene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Fluoranthene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Fluorene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	0.1			
Indeno(1,2,3-c,d)pyrene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Naphthalene	ug/g	0.09		<0.09	<0.09	<0.09	<0.09	<0.09			
Phenanthrene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Pyrene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasirai
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120480
Date: 2011-09-13
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139669

Matrix: Soil

			LAB ID:	908423	908424	908425	908426	908427	GUIDELINE		
			Sample Date:	2011-09-01	2011-09-01	2011-09-01	2011-09-01	2011-09-01			
			Sample ID:	Bio 1-6	Bio 1-7	Bio 1-8	Bio 1-8 TT	Field Blank			
PARAMETER	UNITS	MRL							TYPE	LIMIT	UNITS
POLYNUCLEAR AROMATIC HYDROCARBONS - PAHs											
1-methylnaphthalene	ug/g	0.1	2.4	4.0	2.7	2.7	<0.1				
2-methylnaphthalene	ug/g	0.1	0.7	4.8	0.8	0.8	<0.1				
Acenaphthene	ug/g	0.07	<0.07	<0.07	<0.07	<0.07	<0.07				
Acenaphthylene	ug/g	0.08	<0.08	<0.08	<0.08	<0.08	<0.08				
Anthracene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Benzo(a)anthracene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Benzo(a)pyrene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Benzo(b)fluoranthene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Benzo(g,h,i)perylene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Benzo(k)fluoranthene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Chrysene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Dibenzo(a,h)anthracene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Fluoranthene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Fluorene	ug/g	0.1	0.2	0.2	0.2	0.2	<0.1				
Indeno(1,2,3-c,d)pyrene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Naphthalene	ug/g	0.09	<0.09	2.07	0.36	0.39	<0.09				
Phenanthrene	ug/g	0.1	0.1	0.3	0.3	0.3	<0.1				
Pyrene	ug/g	0.1	<0.1	0.1	<0.1	<0.1	<0.1				

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasirai
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

REPORT OF ANALYSIS

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120480
Date: 2011-09-13
Date Submitted: 2011-09-03

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139669

Matrix: Soil

			LAB ID:					GUIDELINE		
			Sample Date:							
			Sample ID:							
PARAMETER	**UNITS**	**MRL**						**TYPE**	**LIMIT**	**UNITS**
POLYNUCLEAR AROMATIC HYDROCARBONS - PAHs										
1-methylnaphthalene	ug/g	0.1	<0.1							
2-methylnaphthalene	ug/g	0.1	<0.1							
Acenaphthene	ug/g	0.07	<0.07							
Acenaphthylene	ug/g	0.08	<0.08							
Anthracene	ug/g	0.1	<0.1							
Benzo(a)anthracene	ug/g	0.1	<0.1							
Benzo(a)pyrene	ug/g	0.1	<0.1							
Benzo(b)fluoranthene	ug/g	0.1	<0.1							
Benzo(g,h,i)perylene	ug/g	0.1	<0.1							
Benzo(k)fluoranthene	ug/g	0.1	<0.1							
Chrysene	ug/g	0.1	<0.1							
Dibenzo(a,h)anthracene	ug/g	0.1	<0.1							
Fluoranthene	ug/g	0.1	<0.1							
Fluorene	ug/g	0.1	<0.1							
Indeno(1,2,3-c,d)pyrene	ug/g	0.1	<0.1							
Naphthalene	ug/g	0.09	<0.09							
Phenanthrene	ug/g	0.1	<0.1							
Pyrene	ug/g	0.1	<0.1							

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasirai
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

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Certificate of Analysis

Request number: **11-431737**

Date Received: 2011-09-22

Date Certificate Issued: 2011-10-21

Certificate Version: 2

☑ Official Certificate of Analysis

☐ Preliminary Certificate of Analysis

Client

EXOVA (ACCUTEST-OTTAWA) - Dpt 151

146 Colonnade Road, Unit 8
Ottawa, Ontario, Canada
K2E 7Y1
Telephone : (613) 727-5692
Fax : (613) 727-5222

P.O. Number	Your project ID.	Project Manager
509956	1120655	Kyle Kimmett

Comments

Version 02: Modification of all samples identification at the client's request.

The criteria from the "Politique de protection des sols et de réhabilitation des terrains contaminés" included in this certificate are for information only.
The A criteria for all metals correspond to those of the "Basses-Terres du St-Laurent" region.
The D criteria correspond to the "Règlement sur l'enfouissement des sols contaminés". These criteria are included in this certificate for information only.

This version replaces and cancels all earlier version.

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Certificate of Analysis

Client: **EXOVA (ACCUTEST-OTTAWA) - Dpt 151**

Request Number: 11-431737

P.O. Number	Your Project ID.	Project Manager
509956	1120655	Kyle Kimmett

		Sample(s)			
	Lab. No.	**1986821**	**1986822**	**1986823**	**1986824**
	Your Reference	908749 Bio 2-1	908750 Bio 2-2	908751 Bio 2-2 tt	908752 Bio 2-3
	Matrix	Soil	Soil	Soil	Soil
	Sampled by	NA	NA	NA	NA
	Site sampled	NA	NA	NA	NA
	Date sampled	2011-09-02	2011-09-02	2011-09-02	2011-09-02
	Date received	2011-09-22	2011-09-22	2011-09-22	2011-09-22
Parameter(s)					
Method Reference					
Titanium (Ti)	Preparation	2011-09-23	2011-09-23	2011-09-23	2011-09-23
Metals by ICP. Results on dry weight. E-A-EN-EN-CHI-PC-MD017 (REF: MA. 200 - Mét 1.2)	Analysis	2011-09-24	2011-09-23	2011-09-23	2011-09-23
	Sequential No.	232453	232437	232437	232437
Titanium	mg/kg	126	189	177	131

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Certificate of Analysis

Client: **EXOVA (ACCUTEST-OTTAWA) - Dpt 151**

Request Number: 11-431737

P.O. Number	Your Project ID.	Project Manager
509956	1120655	Kyle Kimmett

		Sample(s)			
	Lab. No.	**1986825**	**1986826**	**1986827**	**1986828**
	Your Reference	908753 Bio 2-4	908754 Bio 2-5	908755 Bio 2-6	908756 Bio 2-7
	Matrix	Soil	Soil	Soil	Soil
	Sampled by	NA	NA	NA	NA
	Site sampled	NA	NA	NA	NA
	Date sampled	2011-09-02	2011-09-02	2011-09-02	2011-09-02
	Date received	2011-09-22	2011-09-22	2011-09-22	2011-09-22
Parameter(s)	Method Reference				
Titanium (Ti)	Preparation	2011-09-23	2011-09-23	2011-09-23	2011-09-23
Metals by ICP. Results on dry weight. E-A-EN-EN-CHI-PC-MD017 (REF: MA. 200 - Mét 1.2)	Analysis	2011-09-23	2011-09-23	2011-09-23	2011-09-23
	Sequential No.	232437	232437	232437	232437
Titanium	mg/kg	163	156	168	122

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Certificate of Analysis

Client: **EXOVA (ACCUTEST-OTTAWA) - Dpt 151**

Request Number: 11-431737

P.O. Number	Your Project ID.	Project Manager
509956	1120655	Kyle Kimmett

		Sample(s)			
	Lab. No.	**1986829**	**1986830**	**1986831**	**1986832**
	Your Reference	908757 Bio 2-8	908758 Bio 2-9	908759 Bio 2-9 tt	908760 Bio 2-10
	Matrix	Soil	Soil	Soil	Soil
	Sampled by	NA	NA	NA	NA
	Site sampled	NA	NA	NA	NA
	Date sampled	2011-09-02	2011-09-02	2011-09-02	2011-09-02
	Date received	2011-09-22	2011-09-22	2011-09-22	2011-09-22
Parameter(s)	Method Reference				
Titanium (Ti)	Preparation	2011-09-23	2011-09-23	2011-09-23	2011-09-23
Metals by ICP. Results on dry weight. E-A-EN-EN-CHI-PC-MD017 (REF: MA. 200 - Mét 1.2)	Analysis	2011-09-23	2011-09-23	2011-09-24	2011-09-23
	Sequential No.	232437	232437	232453	232437
Titanium	mg/kg	180	169	150	201

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Certificate of Analysis

Client: **EXOVA (ACCUTEST-OTTAWA) - Dpt 151**

Request Number: 11-431737

P.O. Number	Your Project ID.	Project Manager
509956	1120655	Kyle Kimmett

	Sample(s)	
Lab. No.	**1986833**	**1986834**
Your Reference	908761 Bio 2-11	908762 Bio 2-12
Matrix	Soil	Soil
Sampled by	NA	NA
Site sampled	NA	NA
Date sampled	2011-09-02	2011-09-02
Date received	2011-09-22	2011-09-22

Parameter(s) / Method Reference			
Titanium (Ti)	Preparation	2011-09-23	2011-09-23
Metals by ICP. Results on dry weight. E-A-EN-EN-CHI-PC-MD017 (REF: MA. 200 - Mét 1.2)	Analysis	2011-09-23	2011-09-23
	Sequential No.	232437	232437
Titanium	mg/kg	168	165

Note: Results pertain only to the samples submitted for analysis.

David Cajolet, chemist

CHIMISTE
David Cajolet
2008-069
QUÉBEC

Terms and conditions: http://www.exova.ca/terms&conditions

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Certificat d'analyses

Client: **EXOVA (ACCUTEST-OTTAWA) - Dpt 151**

Request Number: 11-431737

P.O. Number	Your Project ID.	Project Manager
509956	1120655	Kyle Kimmett

Quality Control Results (CQ)

Parameters (Sequential ID No.)	Units	RDL	Blank	Certified Control Result	Certified Control Expected Range
Titanium (Ti)					
Sequential ID No.: 232437					
Titanium	mg/kg	< 1	< 1	102	80 - 120
Titanium (Ti)					
Sequential ID No.: 232453					
Titanium	mg/kg	< 1	< 1	101	80 - 120

Comments

RDL : Reported Detection Limit

REPORT OF ANALYSIS

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120655
Date: 2011-09-13
Date Submitted: 2011-09-06

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139667

Matrix: Soil

	LAB ID:	908749	908750	908751	908752	908753	GUIDELINE		
	Sample Date:	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02			
	Sample ID:	Bio 2-1	Bio 2-2	Bio 2-2 tt	Bio 2-3	Bio 2-4			
PARAMETER	**UNITS**	**MRL**					**TYPE**	**LIMIT**	**UNITS**
Moisture	%	0.1	6.2	6.9	6.8	7.0	7.1			
Aluminum	ug/g	5	4970	4980	5320	4460	4750			
Antimony	ug/g	1	<1	<1	<1	<1	<1			
Arsenic	ug/g	1	1	1	1	2	2			
Barium	ug/g	1	29	32	31	28	28			
Beryllium	ug/g	1	<1	<1	<1	<1	<1			
Cadmium	ug/g	0.5	<0.5	0.5	<0.5	<0.5	<0.5			
Chromium	ug/g	1	34	31	31	30	32			
Cobalt	ug/g	1	6	5	6	5	6			
Copper	ug/g	1	11	13	12	12	13			
Iron	ug/g	5	28900	26700	26300	26600	26300			
Lead	ug/g	1	15	14	13	14	22			
Manganese	ug/g	1	232	224	222	207	234			
Mercury	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Molybdenum	ug/g	1	1	<1	<1	<1	<1			
Nickel	ug/g	1	11	11	12	11	12			
Selenium	ug/g	1	<1	<1	<1	<1	<1			
Silver	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2			
Strontium	ug/g	1	13	15	14	16	17			
Thallium	ug/g	1	<1	<1	<1	<1	<1			
Vanadium	ug/g	2	69	54	56	54	54			
Zinc	ug/g	2	49	47	47	45	47			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Loma Wilson
Inorganic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120655
Date: 2011-09-13
Date Submitted: 2011-09-06

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139667

Matrix: Soil

	LAB ID:	908754	908755	908756	908757	908758	GUIDELINE		
	Sample Date:	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02			
	Sample ID:	Bio 2-5	Bio 2-6	Bio 2-7	Bio 2-8	Bio 2-9			
PARAMETER	**UNITS**	**MRL**					**TYPE**	**LIMIT**	**UNITS**
Moisture	%	0.1	8.8	7.2	6.5	7.7	9.4			
Aluminum	ug/g	5	4510	4890	4830	5070	4900			
Antimony	ug/g	1	<1	<1	<1	<1	<1			
Arsenic	ug/g	1	2	2	2	2	2			
Barium	ug/g	1	28	33	33	32	31			
Beryllium	ug/g	1	<1	<1	<1	<1	<1			
Cadmium	ug/g	0.5	<0.5	<0.5	<0.5	<0.5	<0.5			
Chromium	ug/g	1	37	26	31	26	28			
Cobalt	ug/g	1	5	6	5	6	5			
Copper	ug/g	1	11	13	11	12	12			
Iron	ug/g	5	23500	25400	25500	25200	28000			
Lead	ug/g	1	15	17	13	23	20			
Manganese	ug/g	1	218	266	222	210	198			
Mercury	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Molybdenum	ug/g	1	<1	<1	<1	<1	<1			
Nickel	ug/g	1	14	10	12	9	9			
Selenium	ug/g	1	<1	<1	<1	<1	<1			
Silver	ug/g	0.2	<0.2	<0.2	<0.2	<0.2	<0.2			
Strontium	ug/g	1	16	17	16	18	17			
Thallium	ug/g	1	<1	<1	<1	<1	<1			
Vanadium	ug/g	2	51	54	54	53	57			
Zinc	ug/g	2	43	48	45	50	45			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Lorna Wilson
Inorganic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120655
Date: 2011-09-13
Date Submitted: 2011-09-06

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139667

Matrix: Soil

	LAB ID:	908759	908760	908761	908762		GUIDELINE		
	Sample Date:	2011-09-02	2011-09-02	2011-09-02	2011-09-02				
	Sample ID:	Bio 2-9 tt	Bio 2-10	Bio 2-11	Bio 2-12				
PARAMETER	**UNITS**	**MRL**					**TYPE**	**LIMIT**	**UNITS**
Moisture	%	0.1	8.8	7.9	7.3	6.6			
Aluminum	ug/g	5	4680	4570	5150	4770			
Antimony	ug/g	1	<1	<1	<1	<1			
Arsenic	ug/g	1	2	2	2	2			
Barium	ug/g	1	29	29	33	29			
Beryllium	ug/g	1	<1	<1	<1	<1			
Cadmium	ug/g	0.5	<0.5	<0.5	<0.5	<0.5			
Chromium	ug/g	1	28	25	32	28			
Cobalt	ug/g	1	5	5	6	5			
Copper	ug/g	1	12	11	13	12			
Iron	ug/g	5	26100	25100	30600	27500			
Lead	ug/g	1	21	17	18	15			
Manganese	ug/g	1	202	199	251	245			
Mercury	ug/g	0.1	<0.1	<0.1	<0.1	<0.1			
Molybdenum	ug/g	1	<1	<1	<1	<1			
Nickel	ug/g	1	10	8	10	9			
Selenium	ug/g	1	<1	<1	<1	<1			
Silver	ug/g	0.2	<0.2	<0.2	<0.2	<0.2			
Strontium	ug/g	1	17	16	16	14			
Thallium	ug/g	1	<1	<1	<1	<1			
Vanadium	ug/g	2	53	50	64	58			
Zinc	ug/g	2	46	42	47	42			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Lorna Wilson
Inorganic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

REPORT OF ANALYSIS

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120655
Date: 2011-09-13
Date Submitted: 2011-09-06

Project: TC 1660

P.O. Number:

Chain of Custody Number: **139667**

Matrix: Soil

			LAB ID:	908749	908750	908751	908752	908753	GUIDELINE		
			Sample Date:	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02			
			Sample ID:	Bio 2-1	Bio 2-2	Bio 2-2 tt	Bio 2-3	Bio 2-4			
PARAMETER	**UNITS**	**MRL**							**TYPE**	**LIMIT**	**UNITS**
PERCENT MOISTURE											
Moisture	%	0.1		6.2	6.9	6.8	7.0	7.1			
VOLATILE ORGANIC COMPOUNDS - VOCs											
Ethylbenzene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Toluene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
Benzene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05			
m/p-xylene	ug/g	0.2		<0.2	<0.2	<0.2	<0.2	<0.2			
o-xylene	ug/g	0.1		<0.1	<0.1	<0.1	<0.1	<0.1			
VOC SURROGATES											
Toluene-d8	%			84	85	81	81	81			
CCME Total Petroleum Hydrocarbons											
F1 (C6-C10)	ug/g	10		60	50	60	60	80			
F1-BTEX (C6-C10)	ug/g	10		60	50	60	60	80			
F2 (C10-C16)	ug/g	10		1940	2050	1890	2200	1550			
F2-Napthalene	ug/g	10		1940	2050	1890	2200	1550			
F3 (C16-C34)	ug/g	20		860	1080	990	1220	930			
F3-PAH	ug/g	20		830	1080	980	1210	930			
F4 (C34-C50)	ug/g	20		500	660	610	640	530			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasrai
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

REPORT OF ANALYSIS

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120655
Date: 2011-09-13
Date Submitted: 2011-09-06

Project: TC 1660

P.O. Number:

Chain of Custody Number: **139667**

Matrix: Soil

	LAB ID:	908754	908755	908756	908757	908758	GUIDELINE		
	Sample Date:	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02			
	Sample ID:	Bio 2-5	Bio 2-6	Bio 2-7	Bio 2-8	Bio 2-9			
PARAMETER	**UNITS**	**MRL**					**TYPE**	**LIMIT**	**UNITS**
PERCENT MOISTURE									
Moisture	%	0.1	8.8	7.2	6.5	7.7	9.4			
VOLATILE ORGANIC COMPOUNDS - VOCs									
Ethylbenzene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Toluene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Benzene	ug/g	0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
m/p-xylene	ug/g	0.2	<0.2	<0.2	<0.2	0.3	<0.2			
o-xylene	ug/g	0.1	0.2	0.2	0.2	0.4	1.2			
VOC SURROGATES									
Toluene-d8	%		81	81	85	81	82			
CCME Total Petroleum Hydrocarbons									
F1 (C6-C10)	ug/g	10	130	120	140	100	230			
F1-BTEX (C6-C10)	ug/g	10	130	120	140	100	230			
F2 (C10-C16)	ug/g	10	3380	1960	1620	2190	3320			
F2-Napthalene	ug/g	10	3380	1960	1620	2190	3320			
F3 (C16-C34)	ug/g	20	1360	1200	910	890	1760			
F3-PAH	ug/g	20	1280	1200	900	890	1760			
F4 (C34-C50)	ug/g	20	530	610	470	350	850			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

Mina Nasirai
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

REPORT OF ANALYSIS

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120655
Date: 2011-09-13
Date Submitted: 2011-09-06

Project: TC 1660

P.O. Number:
Chain of Custody Number: **139667**
Matrix: Soil

	LAB ID:	908759	908760	908761	908762		GUIDELINE		
	Sample Date:	2011-09-02	2011-09-02	2011-09-02	2011-09-02				
	Sample ID:	Bio 2-9 tt	Bio 2-10	Bio 2-11	Bio 2-12				
PARAMETER	**UNITS**	**MRL**					**TYPE**	**LIMIT**	**UNITS**
PERCENT MOISTURE									
Moisture	%	0.1	8.8	7.9	7.3	6.6			
VOLATILE ORGANIC COMPOUNDS - VOCs									
Ethylbenzene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1			
Toluene	ug/g	0.1	<0.1	<0.1	<0.1	<0.1			
Benzene	ug/g	0.05	<0.05	<0.05	<0.05	<0.05			
m/p-xylene	ug/g	0.2	<0.2	0.3	<0.2	<0.2			
o-xylene	ug/g	0.1	0.8	2.8	<0.1	<0.1			
VOC SURROGATES									
Toluene-d8	%		82	88	80	92			
CCME Total Petroleum Hydrocarbons									
F1 (C6-C10)	ug/g	10	210	180	80	90			
F1-BTEX (C6-C10)	ug/g	10	210	180	80	90			
F2 (C10-C16)	ug/g	10	2580	2950	1320	1720			
F2-Napthalene	ug/g	10	2580	2950	1320	1720			
F3 (C16-C34)	ug/g	20	1380	1450	1020	1330			
F3-PAH	ug/g	20	1380	1450	1020	1330			
F4 (C34-C50)	ug/g	20	720	680	670	730			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration
Comment:

APPROVAL:
Mina Nasirai
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

EXOVA ACCUTEST

CCME METHOD VERIFICATION REPORT

Exova Accutest

Client: **Biogenie**
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: **Mr. Erwan Carrière**

Report Number: 1120655
Date: 2011-09-13
Date Submitted: 2011-09-06

Project: TC 1660

P.O. Number:
Matrix: Soil

Samples were analysed by Accutest Method AMCCME2, "Petroleum Hydrocarbons in Water and Soil, CCME/TPH"
This method complies with the reference method for the CCME CWS PHC and is validated for use in the laboratory.
Accutest is accredited by CAEAL (ISO 17025) for all CCME F1-F4 fractions as listed in this report.
Data for QC samples (blank, duplicate, spike) are available on request.

Fractions Analysed Within Acceptable Holding/Analysis Times	HOLD TIME YES	HOLD TIME NO	ANALYSIS TIME YES	ANALYSIS TIME NO	If No then Reasons
F1 (C6-C10)	☑	☐	☑	☐	
F2 (C10-C16)	☑	☐	☑	☐	
F3 (C16-C34)	☑	☐	☑	☐	
F4 (C34-C50)	☑	☐	☑	☐	
F4 (C34-C50) gravimetric (when applicable)	☐	☐	☐	☐	

Fraction Specific Information	YES	NO	If No then Reasons
F1			
nC6 and nC10 response factors within 30% of Toluene	☑	☐	
BTEX subtracted from F1 fraction	☑	☐	
If YES was F1-BTEX (C6-C10) reported	☑	☐	
F2			
nC10, nC16 and nC34 response factors within 10% of their average (F2-F4)	☑	☐	
Linearity within 15 % (F2-F4)	☑	☐	
Naphthalene subtracted from F2 fraction	☑	☐	
If YES was F2-Napthalene reported	☑	☐	
F3			
PAH (selected compounds) subtracted from F3 fraction	☑	☐	
If YES was F3-PAH reported	☑	☐	
F4			
C50 response factor within 70% of nC10 + nC16 + nC34 average	☑	☐	
Chromatogram descended to baseline by retention time of C50	☑	☐	
If NO was F4 (C34-C50) gravimetric reported	☐	☐	

APPROVAL:
Mina Nasirai
Organic Lab Supervisor

REPORT OF ANALYSIS

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120655
Date: 2011-09-13
Date Submitted: 2011-09-06

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139667

Matrix: Soil

	LAB ID:	908749	908750	908751	908752	908753	GUIDELINE		
	Sample Date:	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02			
	Sample ID:	Bio 2-1	Bio 2-2	Bio 2-2 tt	Bio 2-3	Bio 2-4			
PARAMETER	**UNITS**	**MRL**					**TYPE**	**LIMIT**	**UNITS**
POLYNUCLEAR AROMATIC HYDROCARBONS - PAHs									
1-methylnaphthalene	ug/g	0.1	<1	<0.5	<0.5	<0.5	<0.2			
2-methylnaphthalene	ug/g	0.1	<1	<0.5	<0.5	<0.5	<0.2			
Acenaphthene	ug/g	0.07	<0.7	<0.4	<0.4	<0.4	<0.1			
Acenaphthylene	ug/g	0.08	<0.8	<0.4	<0.4	<0.4	<0.2			
Anthracene	ug/g	0.1	<1	<0.5	<0.5	<0.5	<0.2			
Benzo(a)anthracene	ug/g	0.1	3	0.6	1.2	1.2	<0.2			
Benzo(a)pyrene	ug/g	0.1	3	0.7	1.2	1.1	<0.2			
Benzo(b)fluoranthene	ug/g	0.1	<1	<0.5	<0.5	<0.5	<0.2			
Benzo(g,h,i)perylene	ug/g	0.1	3	0.7	1.1	1.2	<0.2			
Benzo(k)fluoranthene	ug/g	0.1	<1	<0.5	<0.5	<0.5	<0.2			
Chrysene	ug/g	0.1	7	1.3	2.4	2.2	<0.2			
Dibenzo(a,h)anthracene	ug/g	0.1	<1	<0.5	<0.5	<0.5	<0.2			
Fluoranthene	ug/g	0.1	2	<0.5	0.7	0.8	<0.2			
Fluorene	ug/g	0.1	<1	<0.5	<0.5	<0.5	<0.2			
Indeno(1,2,3-c,d)pyrene	ug/g	0.1	<1	<0.5	<0.5	<0.5	<0.2			
Naphthalene	ug/g	0.09	<0.9	<0.4	<0.4	<0.4	<0.2			
Phenanthrene	ug/g	0.1	<1	<0.5	<0.5	0.7	<0.2			
Pyrene	ug/g	0.1	15	2.9	4.7	4.5	0.4			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:
908749: Due to matrix interference 10X dilution factor required for PAH.
908750: Due to matrix interference 5X dilution factor required for PAH.
908751: Due to matrix interference 5X dilution factor required for PAH.
908752: Due to matrix interference 5X dilution factor required for PAH.
908753: Due to matrix interference 2X dilution factor required for PAH.
Methods references and/or additional QA/QC information available on request.

APPROVAL:
Mina Nasiri
Organic Lab Supervisor

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120655
Date: 2011-09-13
Date Submitted: 2011-09-06

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139667

Matrix: Soil

	LAB ID:	908754	908755	908756	908757	908758	GUIDELINE		
	Sample Date:	2011-09-02	2011-09-02	2011-09-02	2011-09-02	2011-09-02			
	Sample ID:	Bio 2-5	Bio 2-6	Bio 2-7	Bio 2-8	Bio 2-9			
PARAMETER	**UNITS**	**MRL**					**TYPE**	**LIMIT**	**UNITS**
POLYNUCLEAR AROMATIC HYDROCARBONS - PAHs									
1-methylnaphthalene	ug/g	0.1	9.4	3.4	1.4	2.6	6.5			
2-methylnaphthalene	ug/g	0.1	3.2	0.3	<0.5	<0.2	3.3			
Acenaphthene	ug/g	0.07	1.3	0.2	<0.4	<0.1	<0.1			
Acenaphthylene	ug/g	0.08	2.1	<0.2	<0.4	<0.2	<0.2			
Anthracene	ug/g	0.1	1.9	<0.2	<0.5	<0.2	<0.2			
Benzo(a)anthracene	ug/g	0.1	9.3	<0.2	0.8	<0.2	<0.2			
Benzo(a)pyrene	ug/g	0.1	9.7	<0.2	1.0	<0.2	<0.2			
Benzo(b)fluoranthene	ug/g	0.1	7.8	<0.2	<0.5	<0.2	<0.2			
Benzo(g,h,i)perylene	ug/g	0.1	4.6	<0.2	0.9	<0.2	<0.2			
Benzo(k)fluoranthene	ug/g	0.1	7.1	<0.2	<0.5	<0.2	<0.2			
Chrysene	ug/g	0.1	9.7	<0.2	1.7	0.2	0.3			
Dibenzo(a,h)anthracene	ug/g	0.1	2.0	<0.2	<0.5	<0.2	<0.2			
Fluoranthene	ug/g	0.1	18.9	<0.2	0.6	0.2	0.3			
Fluorene	ug/g	0.1	1.6	0.3	<0.5	0.4	0.5			
Indeno(1,2,3-c,d)pyrene	ug/g	0.1	4.3	<0.2	<0.5	<0.2	<0.2			
Naphthalene	ug/g	0.09	<0.4	<0.2	<0.4	<0.2	1.4			
Phenanthrene	ug/g	0.1	3.1	0.3	0.7	0.4	0.6			
Pyrene	ug/g	0.1	17.7	0.2	3.4	0.4	0.6			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:
908754: Due to matrix interference 5X dilution factor required for PAH.
908755: Due to matrix interference 2X dilution factor required for PAH.
908756: Due to matrix interference 5X dilution factor required for PAH.
908757: Due to matrix interference 2X dilution factor required for PAH.
908758: Due to matrix interference 2X dilution factor required for PAH.
Methods references and/or additional QA/QC information available on request.

APPROVAL:
Mina Nasrai
Organic Lab Supervisor

Client: Biogenie
4495 Wilfred Hamel, Suite 200

Québec, QC
G1P 2J7
Attention: Mr. Erwan Carrière

Report Number: 1120655
Date: 2011-09-13
Date Submitted: 2011-09-06

Project: TC 1660

P.O. Number:

Chain of Custody Number: 139667

Matrix: Soil

	LAB ID:	908759	908760	908761	908762		GUIDELINE		
	Sample Date:	2011-09-02	2011-09-02	2011-09-02	2011-09-02				
	Sample ID:	Bio 2-9 tt	Bio 2-10	Bio 2-11	Bio 2-12				
PARAMETER	**UNITS**	**MRL**					**TYPE**	**LIMIT**	**UNITS**
POLYNUCLEAR AROMATIC HYDROCARBONS - PAHs									
1-methylnaphthalene	ug/g	0.1	5.3	3.4	0.2	0.9			
2-methylnaphthalene	ug/g	0.1	2.0	0.3	<0.1	0.2			
Acenaphthene	ug/g	0.07	<0.1	<0.07	<0.07	<0.07			
Acenaphthylene	ug/g	0.08	<0.2	<0.08	<0.08	<0.08			
Anthracene	ug/g	0.1	<0.2	<0.1	<0.1	<0.1			
Benzo(a)anthracene	ug/g	0.1	<0.2	<0.1	<0.1	<0.1			
Benzo(a)pyrene	ug/g	0.1	<0.2	<0.1	<0.1	<0.1			
Benzo(b)fluoranthene	ug/g	0.1	<0.2	<0.1	<0.1	<0.1			
Benzo(g,h,i)perylene	ug/g	0.1	<0.2	<0.1	<0.1	<0.1			
Benzo(k)fluoranthene	ug/g	0.1	<0.2	<0.1	<0.1	<0.1			
Chrysene	ug/g	0.1	0.2	<0.1	<0.1	<0.1			
Dibenzo(a,h)anthracene	ug/g	0.1	<0.2	<0.1	<0.1	<0.1			
Fluoranthene	ug/g	0.1	0.2	0.1	<0.1	<0.1			
Fluorene	ug/g	0.1	0.4	0.2	<0.1	0.1			
Indeno(1,2,3-c,d)pyrene	ug/g	0.1	<0.2	<0.1	<0.1	<0.1			
Naphthalene	ug/g	0.09	0.9	<0.09	<0.09	0.21			
Phenanthrene	ug/g	0.1	0.5	0.4	<0.1	0.1			
Pyrene	ug/g	0.1	0.5	0.2	<0.1	<0.1			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:
908759: Due to matrix interference 2X dilution factor required for PAH.

APPROVAL:
Mina Nasiraï
Organic Lab Supervisor

Methods references and/or additional QA/QC information available on request.

APPENDIX E

Pictures

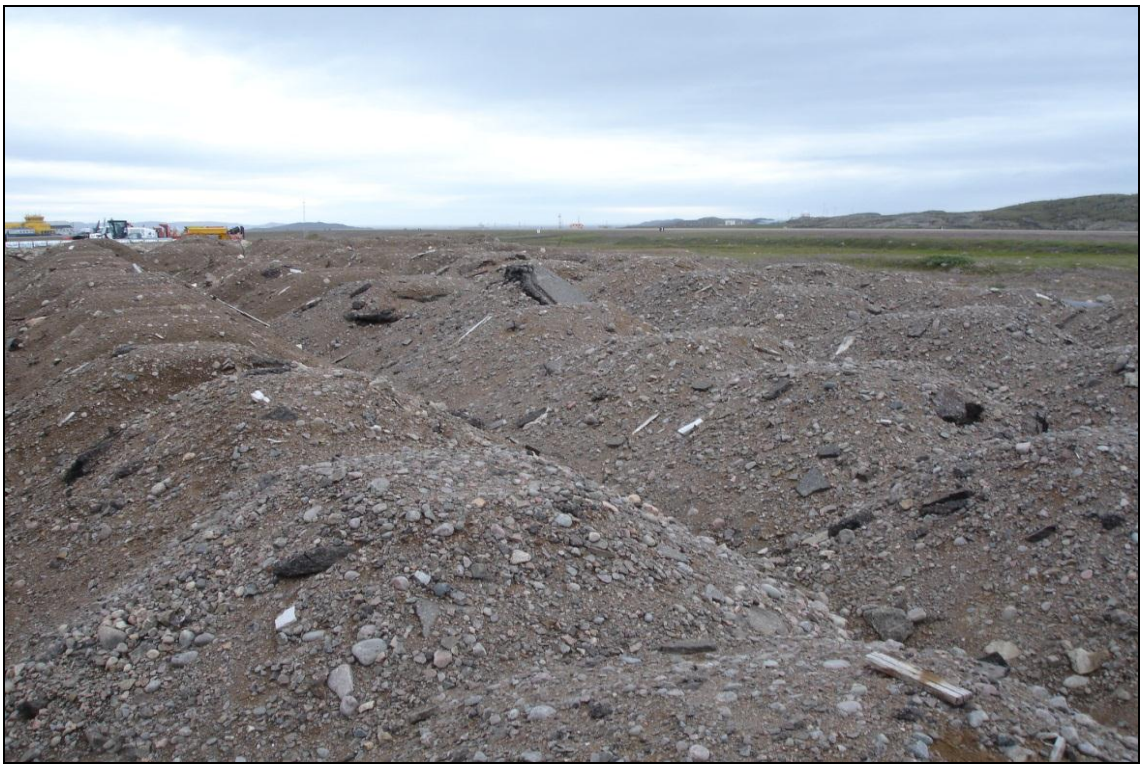

Photo 1 : View towards the south, from the treatment pad.

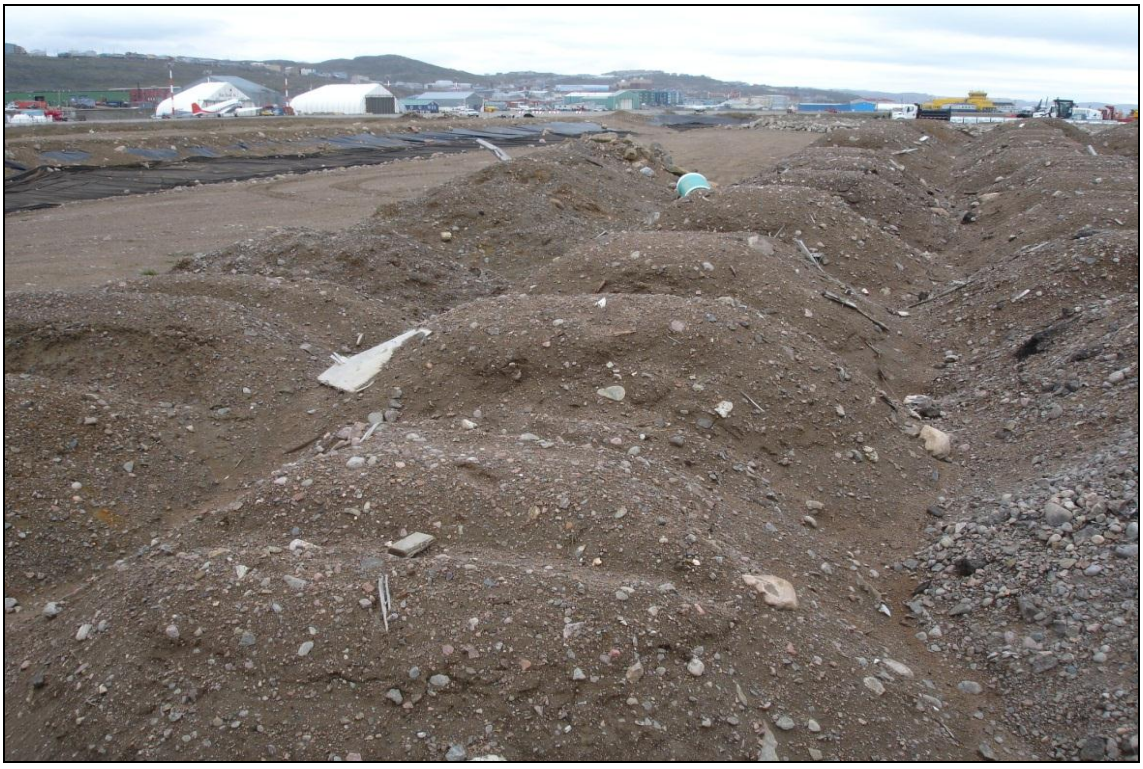

Photo 2 : View towards the east, from the treatment pad.

Photo 3 : View towards the south-west, from the treatment pad.

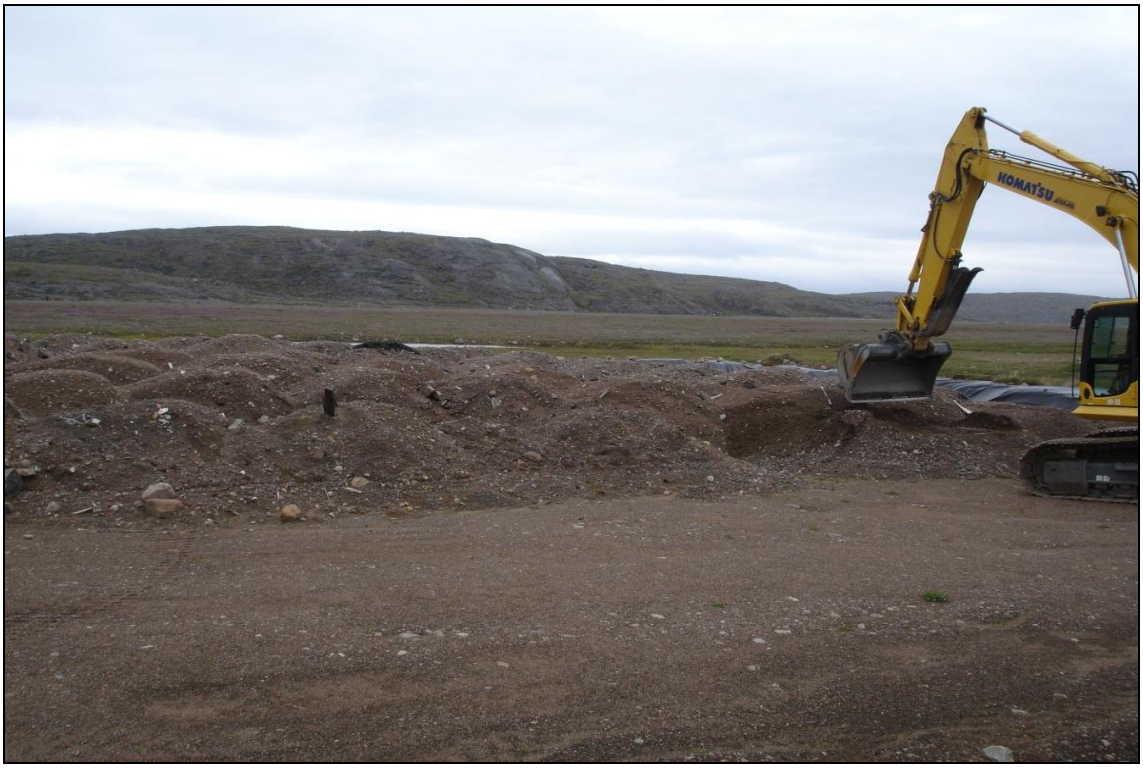

Photo 4 : View towards the north-west, from the treatment pad.

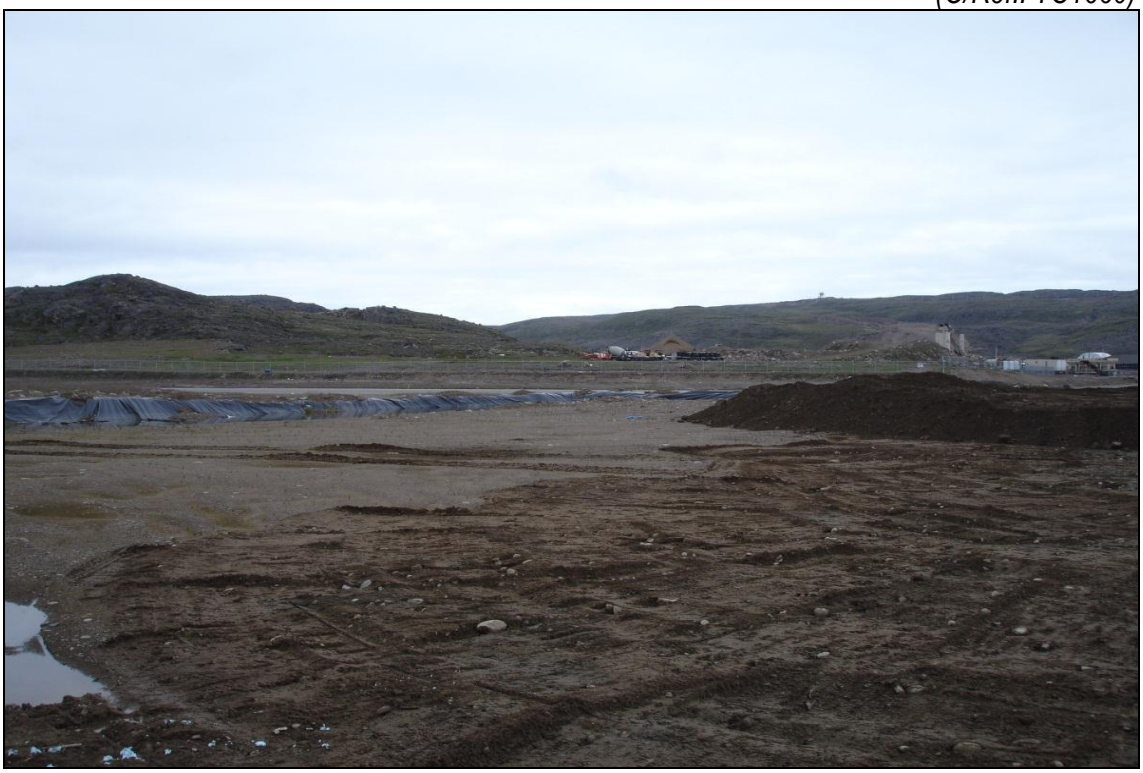

Photo 5 : View towards the north, from the treatment pad.

Photo 6 : View of the backhoe while it mixes and tills in the north corner of the pad.

Photo 7 : View of the fertilizer before the spreading step.

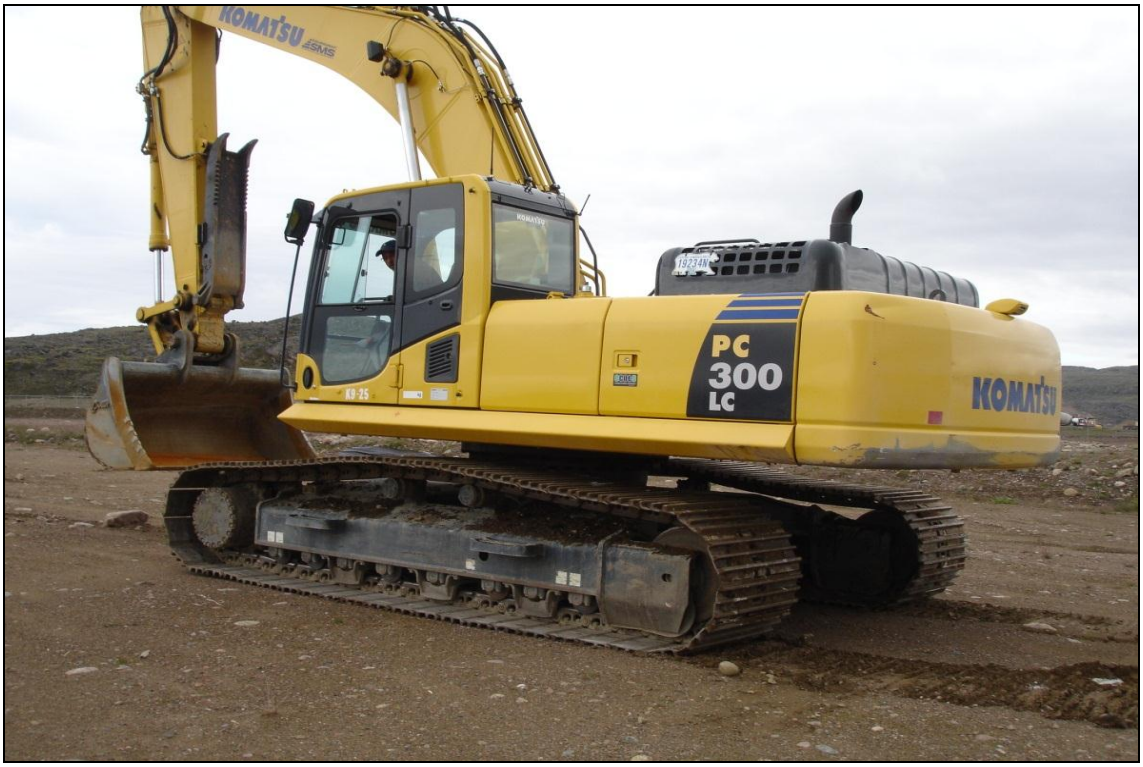

Photo 8 : View of the backhoe used for fieldworks.

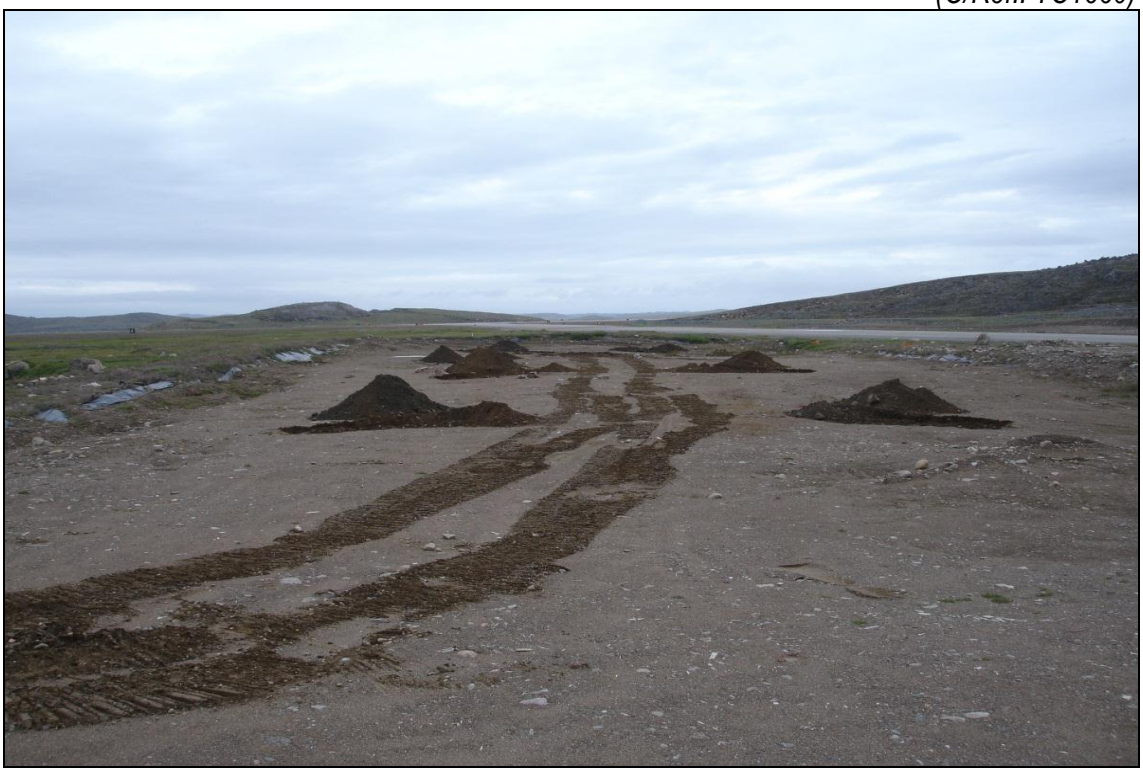

Photo 9 : View of the test pits on the Bio-1 treatment pad.