May 9, 2013

Department of Environment and Conservation
PO Box 8700
St. John's, NL A1B 4J6

Attention: Director – Environmental Assessment Division

RE: Environmental Assessment Registration - File Reference # 200.20.2171

Crosbie Industrial Services Waste Drill Mud Treatment

Submitted To:	Minister of Environment and Conservation
Submitted By:	Crosbie Industrial Services
Project Title:	Drill Mud Treatment- File Reference # 200.20.2171
Location:	422 Logy Bay Rd St. John's, Newfoundland

I trust the attached information is sufficient, however, should you require any additional data please do not hesitate to contact the undersigned at (902) 481-8052 or by email at ssangster@envirosystems.ca

Yours truly,

Scott Sangster
Director of Health Safety and Environment
Envirosystems

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1. General

1.1. Proponent

i. Name of Corporate Body: Crosbie Industrial Services

ii. Address: PO Box 8338
St. John's, NL
A1B 3N7

iii. Chief Executive Officer: Mike Ryan
Chief Executive Officer
11 Brown Ave
Dartmouth, NS
(902) 481-8026

iv. Principal Contact: Scott Sangster
Director of Health, Safety and Environment
11 Brown Ave
Dartmouth, NS
(902) 481-8052

1.2. The Undertaking

Name of Undertaking: Treatment of Waste Drill Mud

Purpose: The purpose of this undertaking is to develop a full treatment option for waste drill muds that allows for the local disposal of the final product. Crosbie Industrial Services would add a pug mill operation along with a lime holding tank to the current holding tanks and water treatment systems at Logy Bay Rd. The pug mill would be used to solidify and stabilize the waste muds so they can be safely disposed of in Newfoundland.

The process has been employed successfully in many locations as a treatment option for waste drill muds.

2. Description of Undertaking

Crosbie Industrial Services currently provides industrial cleaning and waste management services for heavy industrial and municipal clients across the province in Newfoundland. The Logy Bay Rd facility accepts, and treats waste materials from industrial cleaning operations including waste waters which are discharged for disposal.

2.1. Geographical Location

Crosbie Industrial Services facility is located at:

422 Logy Bay Rd
St. John's, Newfoundland

The unit will require an approximate foot print of 30' x 20' or a variation of that with a similar square footage to house the unit, a drive thru loading rack and a lime storage tank. The unit will be placed in the center of the current facility in front of the current water treatment plant to allow for easy access to feedstock

Please refer to the following figures below for an aerial view of the property along with a proposed location as well as a broader view of the facilities geographic location.

Figure 1: Equipment Location at Logy Bay Rd. Facility

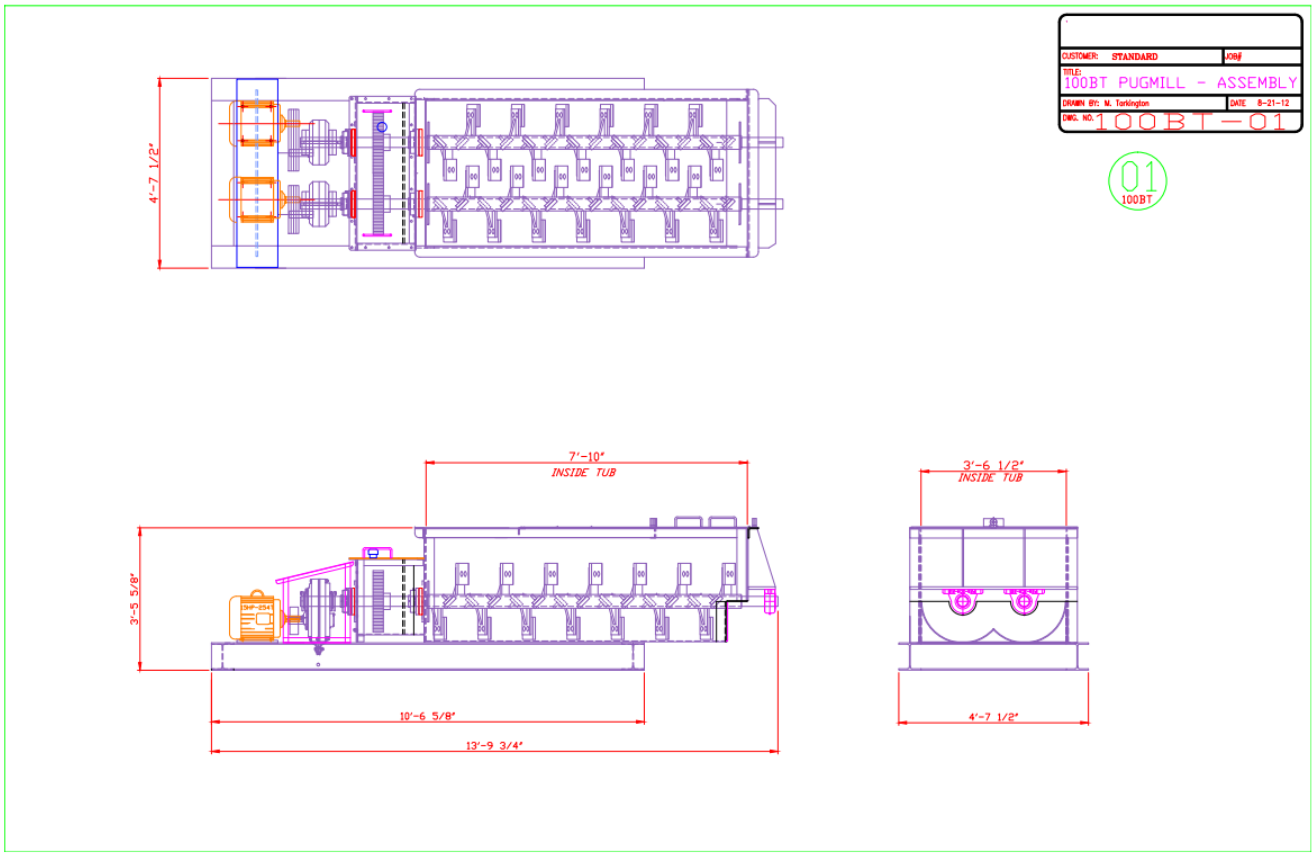
Figure 2: Logy Bay Rd. Facility in Relation to Neighboring Properties

2.2. Physical Features

The Waste Drill Mud Processing unit will consist of three major components:

1. Pugmill - heavy duty continuous mixer. The mixing shafts are large diameter solid steel "thru-shafts" with box enclosure. The box enclosure gives a large flat surface to weld on the paddle shanks. High chrome cast iron tips are bolted onto the shank. The pugmill box is ¼" plate mounted on a full length wide flange beam frame, with motors mounted on a ¾" plate cross member. The pugmill assembly is welded together, with a bolted-on discharge end. Heavy duty double tapered roller bearings in pillow blocks are mounted on the drive end, with outboard mounted ball bearings on the carrier end. Each shaft is powered by its own electric motor and reducer.

Figure 3: Pugmill



2. Stabilizing Agent Storage Tank

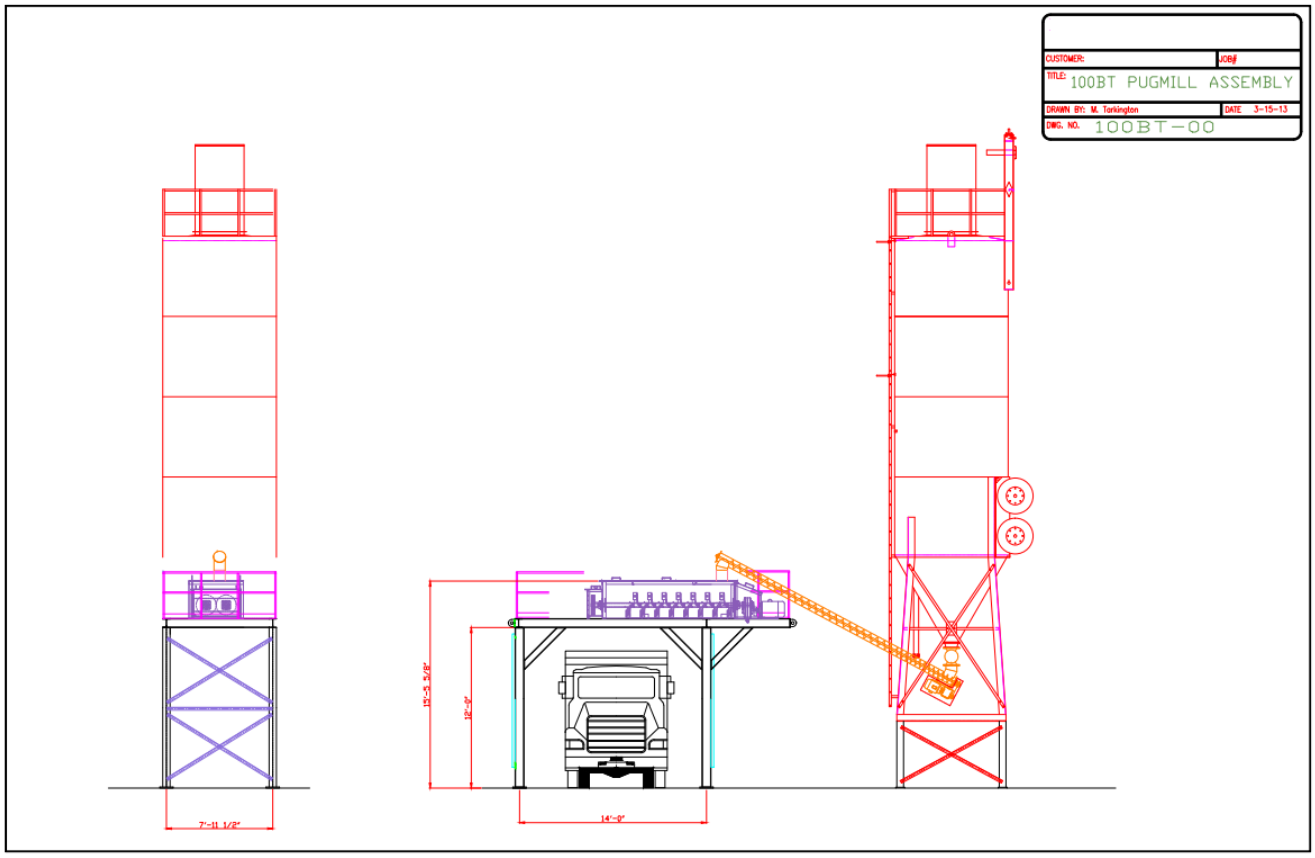
    - 350 bbl Portable Silo
    - 8’-6” Dia. X 42’-0” height
    - 5’-3” Clearance under cone, 11’-10” Clearance under auger discharge
    - 5’ Silo Stand

3. Pugmill Substructure

    - Approximate 13’ discharge height to load “On Road” dump trucks
    - Access ladder
    - Catwalk and handrails

4. Assorted Feed Pumps, Conveyors and Small Tools

Figure 4: Waste Mud Treatment Process Equipment Assembly



The area required for operation will be a 20’ x 30’ foot print located directly in front of the current waste water treatment operation as shown in the above geographic location map.

All processing operations would take place inside an engineered containment with truck access to the discharge point.

2.3. Construction

Construction Period

All components are pre-fabricated and would be delivered to Crosbie Industrial Services. Assembly of parts into the Waste Treatment Processing Unit would take approximately 21 working days.

Construction Date: July 1, 2013

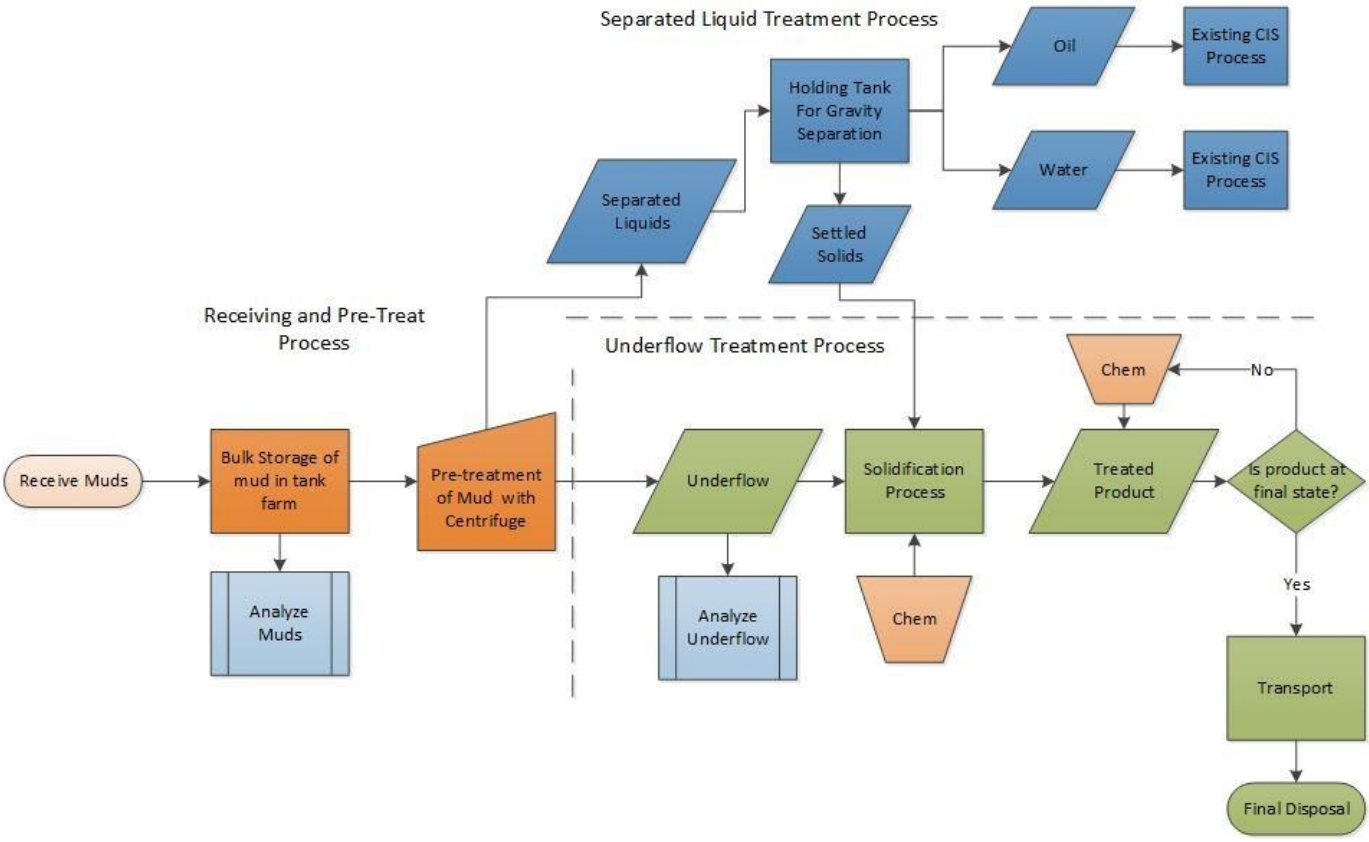
2.4. Operation

Crosbie Industrial Services currently accepts waste drill mud at the Logy Bay Road Facility and holds for out of province disposal. It is estimated that the proposed treatment facility would process between 3500 – 5000 MT of waste drill mud annually. This product, currently held in onsite storage tanks would go through the following process:

- Sample product from tank and analyze for percent liquids and solids to determine solidifying agent mix requirements. The current solidifying agent is CaO.
- Pump product to pretreatment separation currently onsite
- Pump underflow product to pugmill unit
- Inject stabilizing agent into pugmill unit
- Adjust unit speed to ensure product is properly stabilized
- Discharge stabilized and solidified product into waste bins for transportation to disposal site

The following flow chart shows the operational process

Figure 5: Waste Mud Treatment Process Flow Chart



2.5. Pollution Prevention and Waste Management

The solidification / stabilization process will produce a solidified waste solid that contains the remaining contents of the drill mud underflow in a stabilized non-leachable form.

In order to ensure that the correct percentage of stabilizing agent is used, pre-treatment testing is preformed utilizing a retort to determine the percent materials of the upcoming batch of spent drilling mud to be treated. This pre-treatment testing protocol allows Crosbie Industrial to define the required inputs of the batch process.

After a batch of spent drill muds is treated, the final product will undergo a testing protocol before shipping to the approved disposal site.

On a per bin sample basis, Crosbie will perform the following testing internally

- Moisture Content
- pH

On an as required Crosbie Industrial will confirm the solidification process through the following external testing:

- Leachable Organics Content
- Metals Scan

Typical testing results from an external lab are shown in Appendix G

Crosbie Industrial has identified the following approved facility for current disposal:

Envirem Organics Inc.
Killarney Road,
Fredericton, NB

Crosbie Industrial is also working with Newfoundland based operation, Newfoundland Soiltec to receive materials for disposal. Newfoundland Soiltec is currently in the application process for approval to receive this waste stream.

Newfoundland Soiltec
Trans-Canada Highway
St. John's, NL A1B 3N9

Air Emissions and Dust Control

The pugmill treatment process will create a dust through mixing of the material. The covered design of the pugmill minimizes the release of these dust particles. Emissions will be monitored for a period of 3 months upon commissioning to ensure particulate release is minimal.

2.6. Occupations

Construction Phase Employment – Assembly of the pre-fabricated unit will require four employees for a three week period. It will also require a subcontracted crane for a one week period for moving and lifting requirements during assembly.

Operational Employment – Unit operations will require two full time employees to operate pumps and feed systems. It will also require sub-contracted transport of waste bins. Depending on incoming flow this could be 1 -2 trucks per operating day.

The following is a list of the anticipated occupations according to the national Occupational Classification:

NOC 9212 – Supervisor, petroleum, gas and chemical processing and utilities

NOC 7421 – Heavy Duty Equipment Operator

Envirosystems is committed to ensure equal opportunity employment. Please see attached Certificate of Commitment to Employment Equity in Appendix F.

3. Approval of the Undertaking

Department of Environment and Conservation

Crosbie Industrial would like to amend the current Certificate of Approval at the Logy Bay Road facility to include the use of the above waste mud treatment process. Crosbie will be working with Department of Environment and Conservation through department contact Mr. Bas Cleary.

City of St. John's

Crosbie Industrial Service has applied and received approval for a construction permit to assemble the unit at the Logy Bay Rd. facility

4. Schedule

Crosbie Industrial Services has sourced all required equipment to construct the process unit and will be in a position to begin procurement upon approval.

Assembly could begin as early as July 1, 2013 and operation would commence by August 1, 2013

5. Funding

Funding for the Waste Mud Treatment Process will be provided by Crosbie Industrial Service and construction is not dependent upon external grants or loans.

The estimated capital required for construction and commissioning of this process is $1,120,000.00.

6. Conclusion

This site currently receives and stores these products so changes to the site will be minimal. The site is also permitted at present for the treatment of waste water and oil processing.

Crosbie Industrial Services will make all considerations during construction and operation of the Waste Mud Processing operations to ensure that the environment surrounding the Logy Bay Rd facility is not impacted.

A. Appendix – Process Description

Technical background

Drill cuttings are one of inevitable waste streams generated by a drilling process of oil exploration activities. They are heterogeneous in nature, composed of significant percentage of hydrocarbons, water, heavy metals, water soluble salts and silt. Drill cuttings separated from the mud at the shale shakers onsite can be coated with so much mud that they are unsuitable for the next reuse or disposal step or are difficult to handle or transport. If disposed as is, the constituents of the cuttings or the mud coating them (e.g., oil, metals) may leach from the waste material, making them unsuitable for land application or downhole disposal. Current treatment and disposal methods additionally include bioremediation in-situ, bioreactors, re-injection, thermal desorption, mechanical separation, distillation, stabilization and combustion.

Of particular interest to this proposal is a stabilization and solidification method as it has been commercially used for over 30 years in many applications, including treatment of drilling cuttings/muds made with water, oil and synthetic oils. In practice various materials can be added to cuttings to solidify and stabilize them. The processes of solidification and stabilization can be defined as follows:

Solidification refers to techniques that encapsulate the waste in a monolithic solid of high structural integrity. The encapsulation may be of fine waste particles (microencapsulation) or of a large block or container of wastes (macroencapsulation). Solidification does not necessarily involve a chemical interaction between the wastes and the solidifying reagents but may mechanically bind the waste into the monolith. Contaminant migration is restricted by vastly decreasing the surface area exposed to leaching and/or by isolating the wastes within an impervious capsule.

Stabilization refers to those techniques that reduce the hazard potential of a waste by converting the contaminants into their least soluble, mobile, or toxic form. The physical nature and handling characteristics of the waste may or may not be changed by stabilization.

Types of additives used in stabilization and solidification

Historically, cement, fly pulverized ash, lime, and calcium oxide have been used most frequently as solidification/stabilization additives for treating drill cuttings and other types of wet solids. Lately some other material have found their application in stabilization and solidification processes, such as zeolites, silica fume and cement kiln dust.

Crosby Industrial Services is proposing to setup a drilling cuttings treatment system based on Dispersion by Chemical Reaction (DCR) technique, which is an advanced solidification, stabilization and encapsulation method for waste treatment. Unlike some other techniques, DCR results in a complete and irreversible immobilization of non-aqueous fluid phases by transforming them into solid preparation, and with respect to aqueous phases by removing their solubility, through an irreversible chemical and physical fixation of water-leachable harmful substances. A

real and complete detoxification of organic contaminants is achieved through DCR supported chemical and biological processes. Dispersion by chemical reaction involves the use of a dispersing chemical agent, in this case, calcium oxide (CaO) in a chemical reaction with toxic wastes in aqueous or non-aqueous solutions to form an extremely and finely dispersed pulverulent solid matrix. The calcium-oxide treatment agent plays a double role in the treatment of drill cuttings or oil contaminated soil. It assures, firstly, the complete incorporation and dispersion of the organic phase in the DCR process, and then, the chemical fixation of heavy metals in the drill cuttings. The dispersion chemical reaction results in the formation of a water-insoluble (non-bioavailability) product, which in the form of limestone - a natural and harmless basic component of our environment, readily acceptable at local landfill sites for final disposal or bio-remedition.

Implementation Considerations

Not all drilling wastes are amenable to chemical fixation and stabilization treatments. Solidification/stabilization should be adapted for site-specific applications depending on the end-use of the treated material and the chemical characteristics of the waste. Conducting laboratory tests to determine the proper blend of additives to achieve the desired material properties is necessary.

There are limitations on the applicability of stabilization/solidification method. For example, the DCR technique would require the following drill cuttings characteristics in order to produce fully stabilized materials:

- the organics content (oil) less than 45% by weight,
- the solids content greater than 15% by weight,
- no excessive quantities of fine soil particles
- low amount of large particles present.

The right ratio of stabilizer agent(s) to drill cuttings is determined by input streams characterization and laboratory trials, as well as the reaction/mixing time due to the nature and varying drilling mud formulations and eventual drill cuttings content. It is normal to expect that the overall amount of waste going for final disposal will be grater than the original amount of waste due to the amount of additive being used. Typical applications would see somewhere between 10-20% increase in the total waste amount, with rare cases being up to 35% increase in the total amount requiring final disposal.

Drill cutting treatment train

There is a number of treatment steps involved with the proposed process, they are as follows:

1. conditioning and centrifuging of incoming drilling mud/cuttings to reduce liquids content.
2. separation and treatment of oil and water.
3. treatment of solids from the centrifuging process by solidification and stabilization.
4. final landfill disposal upon laboratory quality check.

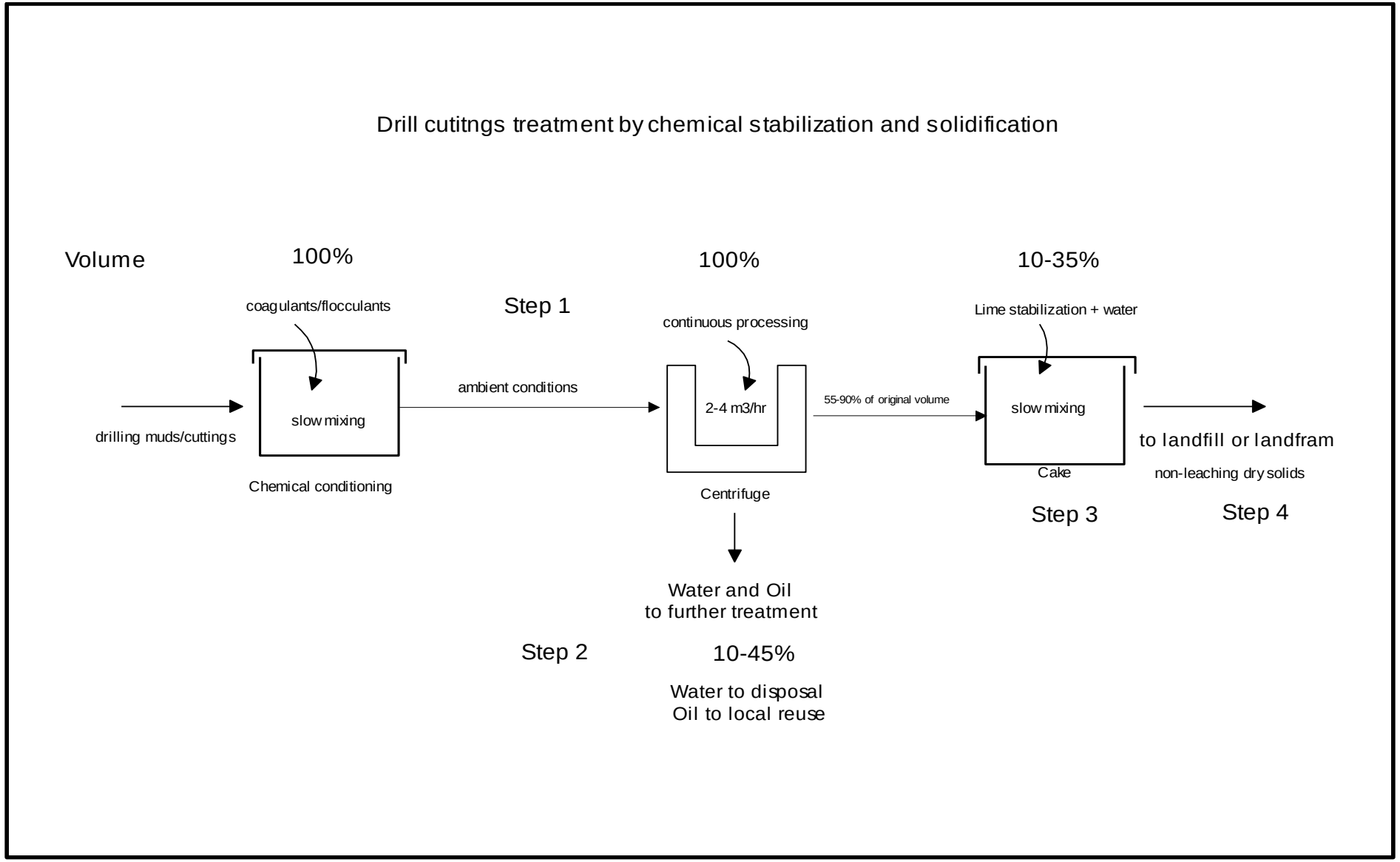


Diagram 1. Flow diagram of the stabilization and solidification process

Details on each step:

A. Purpose of the conditioning and centrifuging process is twofold; to reduce overall amount of waste requiring final disposal and to recover reusable material (recycle of mud or its constituents). This particular step is presently setup at the site and occasionally used to minimize waste amounts. There would be no technical changes required to this process step in order to allow for treatment of drill cuttings/solids by stabilization and solidification.
B. separation and treatment of oil and water has been already present onsite and no addition to its functionality is required. Water and oil are separated by using an oil-water separator and gravity supported settling in existing designated holding tanks. Further purification of each stream is done onsite as well, before final material discharge and/or reuse.
C. stabilization and solidification is applied to the underflow of the centrifuging process, a stream that has a very high amount of solids and residual low amounts of water and oil – typical content of that stream is 60% solids, 20% oil and 20% water (weight %) but can range up to 20% solids, 40% oil and 40% water. The stream is pumped, if technically possible if not then augered into a mixing chamber where a stabilizing and/or binding agent is added, with additional water if necessary, under a predefined ratio to allow for a chemical reaction and encapsulation to take place. Depending on the input stream chemical composition, residence and mixing time in the chamber may vary in order to form a product that is fully stabilized. Given the nature of materials to be used, both drilling cuttings and a binding agent, the mixing chamber will be enclosed to prevent any potential spread of dust in the area as well as air emissions. The resulting material is a dry powder that will be temporarily stored in portable bins until final disposal. Equipment used for this process is readily available on the market, and our intent is to setup a compact station to fit our space allocation and processing rate requirement. The system upper capacity will treat up to 50 m3 of drill cuttings per day, with normal activity being around 10-20 m^3 per day.

Picture 1. stabilized drill cuttings

D. once the stabilized material is made, its quality would be checked by a laboratory to ensure it meets the landfill acceptance criteria, before it is finally disposed of.

Only the stabilization and solidification part of the drill cuttings train is new and requires addition to Crosby Industrial Services existing infrastructure and processes.

Additional information on drill cuttings as well as stabilized and solidified materials laboratory analysis on leachate are found in the Appendices.

Picture 2. Centrifuged drilling mud/cuttings – also know as 'underflow'

Table 1. Selected DCR technology applications, jobs larger than 1,000 tons

Location	Type of waste	End use
Mobil Oil AG Bremen	Diesel fuel in soil	Reuse as an earth construction material
BEB Erdgas U. Erdol GmbH Hanover	Oil drilling mud	Reuse as filler for road construction
Tricil Montreal	Oil drilling mud	Reuse as a filler/soil amendment
German Texaco AG Hamburg	Drilling mud	Recultivation of land
GBS Frankenthal Ingelheim	Oil mud and acid tar	Recultivation of land
Kuwait Petroleum Rotterdam	Hazardous waste pit (oil and bitumen soil)	Reuse of earth as a filler
Preussag AG Edemissen	Hazardous waste pit (oil and heavy oil soil)	Reuse of earth as backfill
AG Weser Shipyard Bremen	Hazardous waste (diesel oil contaminated oil)	Reuse of earth as backfill
Klockner-Hutte Iron Steel Works Bremen	Hazardous waste (diesel oil contaminated oil)	Reuse of earth as backfill
Mobil Oil Wedel	Waste emulsions	Reuse of earth as soil amendment
Now Pipeline Wihelmshaven	Pipeline spills and residues	Recultivation
Department du Finistere Brest	Crude oil/sand/soil	Constriction filler
Naphtachimie Marseille	Oil lagoon sludge	Reuse of earth as a backfill

References:

Jacques Whitford Stantec Limited, July 2009
Cuttings Treatment Technology Evaluation
Environmental Studies Research Funds Report No. 166. St. John's, NL. 100 p

Chris N., Ifeadi: "Treatment of drill cuttings using dispersion by chemical reaction (DCR)", HSE International Conference on Oil and Gas industry in Nigeria, Port Harcourt, Nigeria, 2004.

Ruddiger, Froy: “Assessment of DCR Technology”, Oil & Gas European Magazine, 2/87, Esso AG Hamburg.

BMT Cordah Limited, 2002, "Use of Oily Drilling Wastes in Civil Engineering Applications," report no. COR027/Programme/2002, September (Available at: http://www.bmtcordah.com/_downloads/Use%20of%20Oily%20Drilling%20Wastes%20in%20Engineering.pdf.)

Fleming, C., 2000, "A Discussion of: Chemical Fixation and Solidification (CFS), Solidification/Stabilization, Microencapsulation, and Macroencapsulation," prepared for the API/NOIA Synthetic Based Fluids Research Group, June 15.

Morillon, A., J.F. Vidalie, U. Syahnudi, S. Suripno, and E.K. Hadinoto, 2002, "Drilling and Waste Management," SPE 73931, presented at the SPE International Conference on Health, Safety, and Environment in Oil and Gas Exploration and Production, Kuala Lumpur, Malaysia, March 20-22.

B. Appendix – Certificate of Approval

Newfoundland Labrador

GOVERNMENT
OF
NEWFOUNDLAND AND LABRADOR
Department of Environment and Conservation

CERTIFICATE OF APPROVAL

Pursuant to the *Environmental Protection Act, SNL 2002, Sections 16, 78 and 83.*

Issued:	**April 01, 2011**	**Approval No.:**	**WMS-07-07-017**
Expiration:	**March 31, 2014**	**File No.:**	**830.000.077**

Proponent: **Crosbie Industrial Services Limited**
P.O. Box 8338
St. John's, NL,
A1B 3N7

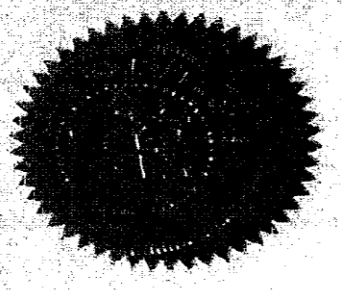
Attention: Mr. Steve Power

Re: **Collection of Liquid Wastes (Province-Wide)**
Fixed Oily Water System (St. John's)
Mobile Oily Water Treatment System (St. John's Based)

Approval is hereby given for the continued province-wide operation of a waste management system operation consisting: a) collection of liquid wastes, b.) collection and storage of oily water; c) permanent oily water treatment unit; and d) mobile oily water treatment unit.

This approval does not release the holder from the obligation to obtain appropriate approvals from other concerned provincial, federal and municipal agencies. Approval from the Department of Environment and Conservation (the Department) shall be obtained prior to any significant change in the design, construction, installation, or operation of the facility, including any future expansion of the works. This certificate shall not be sold, assigned, transferred, leased, mortgaged, sublet or otherwise alienated by the holder without obtaining written prior approval from the Minister.

This approval is subject to the terms and conditions as contained in Appendices 'A, B, C, D and E' attached hereto, as may be revised from time to time by the Department. Appendices 'A, B, C, D and E' forms part and parcel of this certificate of approval. Failure to comply with any of the terms and conditions may render this certificate of approval null and void, may require the proponent to cease all activities associated with this certificate of approval, may place the proponent and its agent(s) in violation of the *Environmental Protection Act*, SNL., 2002, c. E-14-2, and will make the proponent responsible for taking such remedial measures as may be prescribed by the Department. The Department reserves the right to add, delete, modify or revoke this approval at any time.



MINISTER

C. Appendix – Certificate of Recognition

NLCSA
Newfoundland and Labrador
Construction Safety Association

80 Glencoe Drive, Donovan's Industrial Park
Mount Pearl, NL A1N 4S9
Canada

Tel: (709) 739-7000 Fax: (709) 739-7001
Toll Free: 1-888-681-SAFE (7233)
info@nlcsa.com www.nlcsa.com

Letter of Good Standing

Certificate of Recognition™ Program

October 9, 2012

Issued To: Crosbie Industrial Services Limited
P.O. Box 8338
St. Johns, NL, A1B 3N7

Based upon a review of NLCSA records

Crosbie Industrial Services Limited

is an active participant in the Certificate of Recognition™ (COR ™) Program, and is therefore in good standing with the Newfoundland and Labrador Construction Safety Association. This letter is based on the information available to the NLCSA as of the date listed and is valid until the expiration date.

Commencement Date: March 06, 1998 Expiry Date: September 17, 2013

This letter of good standing is issued to a firm actively participating in the NLCSA COR ™ program and whose current standing falls into the category noted below:

Certificate of Recognition™ X

Audit Pending

In Process

Note: NLCSA's records are compiled from information gathered during a firm's participation in NLCSA programs, which information is believed to be correct. This letter is based on information currently available to the NLCSA, and is not certified or warranted for accuracy. NLCSA assumes no responsibility or liability for the information contained in this letter.

Jim McCabe

NLCSA Representative

D. Appendix – Certificate of Insurance

CERTIFICATE OF INSURANCE	ISSUE DATE

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER AND IMPOSES NO LIABILITY ON THE INSURER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED'S FULL NAME AND MAILING ADDRESS	INSURANCE COMPANIES AFFORDING COVERAGE
Envirosystems Inc.; Atlantic Industrial Cleaners Inc.; Atlantic Industrial Services Ltd. 11 Brown Ave Dartmouth, NS B3B 1Z7	CO. 1 ACE INA Insurance Company CO. 2 Liberty Mutual Insurance Company CO. 3 Lloyd's of London CO. 4 Allianz Global Risks US Insurance Company
CERTIFICATE HOLDER – NAME AND ADDRESS	
	ATTN: FAX: CC:

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN. THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES.

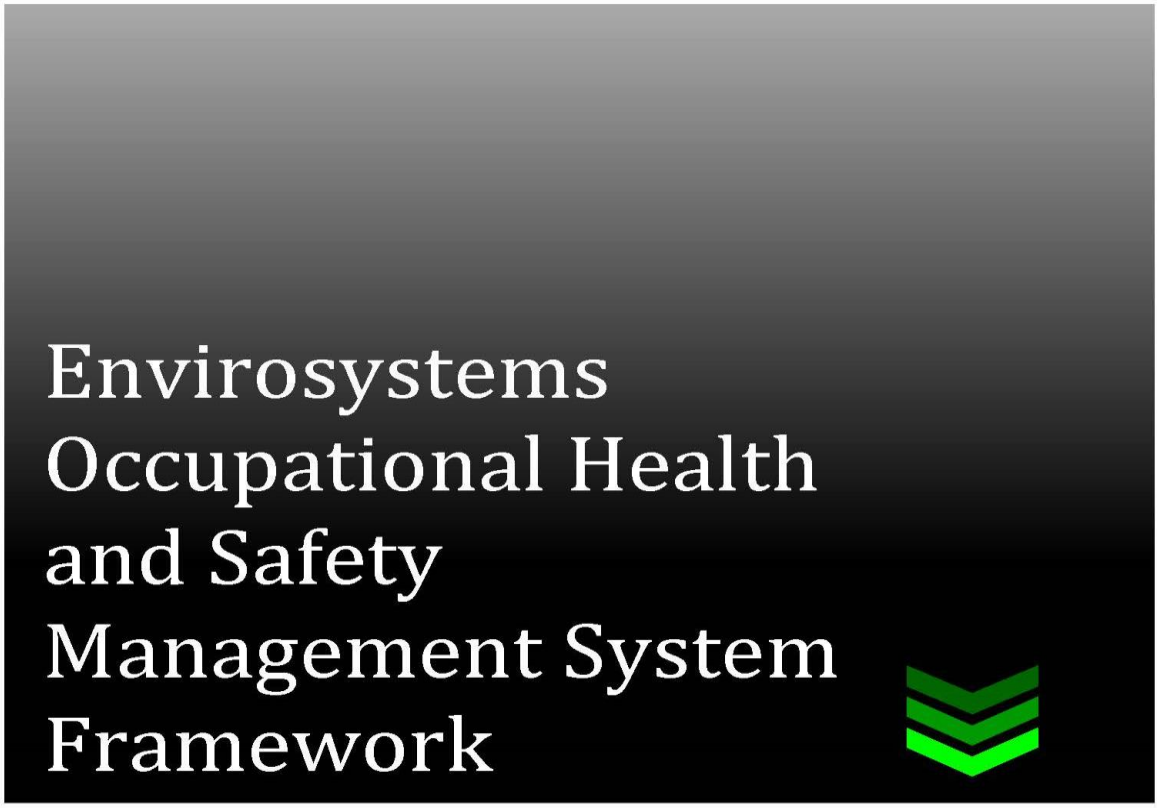
CO #	TYPE OF INSURANCE	POLICY NUMBER	EFFECTIVE DATE (M/D/Y)	EXPIRY DATE (M/D/Y)	CANADIAN FUNDS	
1.	**GENERAL LIABILITY**	CAP575500	October 31, 2012	October 31, 2013	EACH OCCURRENCE	$1,000,000.00
	[X] COMMERCIAL GENERAL LIABILITY				PRODUCTS-COMP/OPS AGGREGATE	$1,000,000.00
					PERSONAL INJURY	$1,000,000.00
					GENERAL AGGREGATE	$1,000,000.00
2.	**AUTOMOBILE LIABILITY** [] ANY AUTO [X] ALL OWNED AUTOS [] SCHEDULED AUTOS [X] HIRED AUTOS [] NON-OWNED AUTOS	AFTOAAQJBG012/ AFTOAAQJBN012	October 31, 2012	October 31, 2013	COMBINED SINGLE LIMIT BODILY INJURY (Any one person) BODILY INJURY (Per accident) PROPERTY DAMAGE	$2,000,000.00
3.	**OTHER** **[X] UMBRELLA LIABILITY**	P02789	October 31, 2012	October 31, 2013	LIMIT	$4,000,000.00
1.	**CONTRACTORS POLLUTION LIABILITY**	CAP575500	October 31, 2012	October 31, 2013	LIMIT SELF INSURED RETENTION	$5,000,000.00 $5,000.00
4.	**CONTRACTORS EQUIPMENT** BROAD FORM [X] BUILDINGS CONTRACTORS - COMMERCIAL	OCI7222036	October 31, 2012	October 31, 2013	AGGREGATE LIMIT OF INSURANCE	$4,000,000.00

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / RESTRICTIONS / SPECIAL ITEMS

- ALL VEHICLES OWNED, REGISTERED, LEASED TO THE NAMED INSURED.
- ALL RISKS OF DIRECT PHYSICAL LOSS OR DAMAGE (EXCEPT AS EXCLUDED)

PRODUCER	CANCELLATION
TREDD INSURANCE BROKERS LTD. 141 Adelaide Street West, Suite 1410 Toronto, ON M5H 3L5 Tel: 416-306-6000 Fax: 416-214-9211	**AUTHORIZED REPRESENTATIVE**

E. Appendix – EH&S Manual TOC



This manual describes the Occupational Health and Safety Management System implemented within Envirosystems. This system is based on the principles of the BSI OHSAS 18001 Standard.

ENVIROSYSTEMS

11 Brown Avenue
Dartmouth, Nova Scotia
B3B 1Z3

2012 Edition

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ENVIROSYSTEMS OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM IS ADMINISTERED BY THE DIRECTOR OF HEALTH, SAFETY AND ENVIRONMENT.

AUTHORITY AND RESPONSIBILITY FOR IMPLEMENTATION OF THE MANAGEMENT SYSTEM IS CONTROLLED BY ENVIROSYSTEMS.

QUESTIONS REGARDING ANY PART OF THIS PROGRAM MAY BE ADDRESSED TO:

SCOTT SANGSTER
DIRECTOR OF HEALTH, SAFETY & ENVIRONMENT
11 BROWN AVENUE
DARTMOUTH, NOVA SCOTIA
B3B 1Z7
PHONE: 902-481-8052
FAX: 902-442-0624

F. Appendix – Certificate of Commitment to Implement Employment Equity

Human Resources and Skills Development Canada / Ressources humaines et Développement des compétences Canada

Labour Branch / Direction générale du travail

Federal Contractors Program / Programme de contrats fédéraux

OFFICIAL USE ONLY
Certificate N° : 020095

Certificate of Commitment to Implement Employment Equity

ORGANIZATION

Legal Name of Organization	Parent company is located outside Canada
ENVIROSYSTEMS Incorporated	☐ Yes ☒ No
Operating Name (if different)	Procurement Business N° : *# 127856987 PG0001*
Employer's North American Industry Classification System (NAICS) Code Number 324190	Total no. employees in Canada (Full-Time/Part-Time/Temporary) ▶ *418*

HEAD OFFICE

Address (street, building, etc.)	City	Province	Postal Code
11 Brown Avenue	*Dartmouth*	*Nova Scotia*	*B3B 1Z7*
	Telephone *1-902-481-1511*	Fax *1-902-481-8051*	

EMPLOYMENT EQUITY CONTACT

Name	Title
Joseph Landry	*Business Development*
Telephone *1-902-481-1511*	E-mail *jlandry@envirosystems.ca*

CERTIFICATION

The above-named organization:

- having a workforce of 100 or more permanent full-time, permanent part-time and/or temporary employees in Canada, AND
- intending to bid on, or being in receipt of, a Government of Canada goods or services contract valued at $200,000.00 or more,

hereby certifies its commitment to implement and/or renew its commitment to employment equity, if awarded the aforementioned contract, in keeping with the Criteria for Implementation under the Federal Contractors Program for Employment Equity.

SIGNATORY

NOTE: The signatory must be the Chief Executive Officer **OR** a prescribed person in a senior management position with authority to act on behalf of the organization.

Name (print)	Title
Michael G Ryan	*CEO*
Signature	Date *September 21, 2009*

RETURN INSTRUCTIONS

IMPORTANT

- **Your organization will be required to implement an Employment Equity Program once awarded a contract of $200,000 or more. You could then be subject to a compliance review which could take up to a year to complete.**
- **Please fax a copy of the signed form to the Labour Branch, at (819) 953-8768.**

LAB 1168 (09-01) E

Canada

G. Appendix – Analysis of Stabilized Material

Report Date: 2012/10/22

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2G0124
Received: 2012/10/16, 10:25

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
CGSB extraction - Init and Final pH	3	N/A	2012/10/12	ATL SOP-00034	CGSB 164-GP-1 MP
CGSB extraction - volume of extractant	3	N/A	2012/10/12	ATL SOP-00034	CGSB 164-GP-1 MP
CGSB extraction - Dry Weight	3	N/A	2012/10/18	ATL SOP-00034	CGSB 164-GP-1 MP
TEH in Leachate (PIRI)	3	2012/10/19	2012/10/20	ATL SOP-00113	Based on Atl. PIRI
Metals Leach. Tot. MS - N-per	3	2012/10/19	2012/10/20	ATL SOP 00059	Based on EPA6020A
Metals Solids Acid Extr. ICPMS (1)	3	2012/10/19	2012/10/19	ATL SOP 00024	Based on EPA6020A
Moisture	3	N/A	2012/10/18	ATL SOP 00001	MOE Handbook 1983
VPH in Leachates (PIRI)	3	2012/10/19	2012/10/19	ATL SOP 00118	Based on Atl. PIRI
VPH in Soil (PIRI)	1	2012/10/17	2012/10/18	ATL SOP 00119	Based on Atl. PIRI
VPH in Soil (PIRI)	2	2012/10/17	2012/10/20	ATL SOP 00119	Based on Atl. PIRI
ModTPH (T1) Calc. for Leachate	3	N/A	2012/10/22		Based on Atl. PIRI

Remarks:

Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

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

(1) Note: Metals naming convention has been changed from "Available" to "Acid Extractable" as part of a national harmonization initiative. Contact your project manager for additional details.

RESULTS OF ANALYSES OF SOIL

Maxxam ID		PF3841	PF3842	PF3843		
Sampling Date		2012/10/15	2012/10/15	2012/10/15		
COC Number		B 165428	B 165428	B 165428		
	Units	**A1**	**B1**	**C1**	**RDL**	**QC Batch**
Charge/Prep Analysis						
Dry Weight	g	50	50	50	0.010	3006437
Volume of Acetic Acid	mL/L	200	200	200	N/A	3007889
Inorganics						
Moisture	%	ND	ND	ND	5	3005564
Initial pH	N/A	13	12	12	N/A	3007868
Final pH	N/A	12	12	12	N/A	3007868

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

ELEMENTS BY ICP/MS (SOIL)

Maxxam ID		PF3841	PF3842	PF3843		
Sampling Date		2012/10/15	2012/10/15	2012/10/15		
COC Number		B 165428	B 165428	B 165428		
	Units	**A1**	**B1**	**C1**	**RDL**	**QC Batch**
Metals						
Leachable Aluminum (Al)	ug/L	ND	ND	ND	100	3007347
Leachable Antimony (Sb)	ug/L	ND	ND	ND	20	3007347
Leachable Arsenic (As)	ug/L	ND	ND	ND	20	3007347
Leachable Barium (Ba)	ug/L	3800	1900	4600	50	3007347
Leachable Beryllium (Be)	ug/L	ND	ND	ND	20	3007347
Leachable Boron (B)	ug/L	ND	ND	ND	500	3007347
Leachable Cadmium (Cd)	ug/L	ND	ND	ND	3.0	3007347
Leachable Calcium (Ca)	ug/L	3000000	3200000	3100000	1000	3007347
Leachable Chromium (Cr)	ug/L	38	42	50	20	3007347
Leachable Cobalt (Co)	ug/L	ND	ND	ND	10	3007347
Leachable Copper (Cu)	ug/L	ND	22	26	20	3007347
Leachable Iron (Fe)	ug/L	ND	ND	ND	500	3007347
Leachable Lead (Pb)	ug/L	180	120	74	5.0	3007347
Leachable Lithium (Li)	ug/L	ND	ND	ND	20	3007347
Leachable Magnesium (Mg)	ug/L	ND	ND	ND	1000	3007347
Leachable Manganese (Mn)	ug/L	ND	ND	ND	20	3007347
Leachable Molybdenum (Mo)	ug/L	ND	ND	ND	20	3007347
Leachable Nickel (Ni)	ug/L	ND	ND	ND	20	3007347
Leachable Potassium (K)	ug/L	4900	5700	9700	1000	3007347
Leachable Selenium (Se)	ug/L	ND	ND	ND	10	3007347
Leachable Silver (Ag)	ug/L	ND	ND	ND	5.0	3007347
Leachable Strontium (Sr)	ug/L	3200	3600	6000	50	3007347
Leachable Thallium (Tl)	ug/L	ND	ND	ND	1.0	3007347
Leachable Tin (Sn)	ug/L	ND	ND	ND	20	3007347
Leachable Uranium (U)	ug/L	ND	ND	ND	1.0	3007347
Leachable Vanadium (V)	ug/L	ND	ND	ND	20	3007347
Leachable Zinc (Zn)	ug/L	ND	ND	ND	50	3007347

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

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		PF3841	PF3842	PF3843		
Sampling Date		2012/10/15	2012/10/15	2012/10/15		
COC Number		B 165428	B 165428	B 165428		
	Units	**A1**	**B1**	**C1**	**RDL**	**QC Batch**
Metals						
Acid Extractable Aluminum (Al)	mg/kg	1200	2000	1900	10	3007111
Acid Extractable Antimony (Sb)	mg/kg	8.5	8.8	4.7	2.0	3007111
Acid Extractable Arsenic (As)	mg/kg	16	17	9.0	2.0	3007111
Acid Extractable Barium (Ba)	mg/kg	3600	2300	3900	50	3007111
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	2.0	3007111
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	ND	2.0	3007111
Acid Extractable Boron (B)	mg/kg	ND	5.4	5.0	5.0	3007111
Acid Extractable Cadmium (Cd)	mg/kg	0.48	0.46	0.42	0.30	3007111
Acid Extractable Chromium (Cr)	mg/kg	15	21	17	2.0	3007111
Acid Extractable Cobalt (Co)	mg/kg	1.6	2.3	1.7	1.0	3007111
Acid Extractable Copper (Cu)	mg/kg	31	28	17	2.0	3007111
Acid Extractable Iron (Fe)	mg/kg	5500	7100	4700	50	3007111
Acid Extractable Lead (Pb)	mg/kg	140	120	76	0.50	3007111
Acid Extractable Lithium (Li)	mg/kg	2.6	4.5	3.9	2.0	3007111
Acid Extractable Manganese (Mn)	mg/kg	300	300	190	2.0	3007111
Acid Extractable Mercury (Hg)	mg/kg	0.54	0.73	0.36	0.10	3007111
Acid Extractable Molybdenum (Mo)	mg/kg	2.5	3.7	2.0	2.0	3007111
Acid Extractable Nickel (Ni)	mg/kg	5.3	7.7	6.4	2.0	3007111
Acid Extractable Rubidium (Rb)	mg/kg	ND	2.9	3.0	2.0	3007111
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	2.0	3007111
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	0.50	3007111
Acid Extractable Strontium (Sr)	mg/kg	260	310	320	5.0	3007111
Acid Extractable Thallium (Tl)	mg/kg	ND	ND	ND	0.10	3007111
Acid Extractable Tin (Sn)	mg/kg	ND	ND	ND	2.0	3007111
Acid Extractable Uranium (U)	mg/kg	0.93	1.1	1.2	0.10	3007111
Acid Extractable Vanadium (V)	mg/kg	9.8	13	11	2.0	3007111
Acid Extractable Zinc (Zn)	mg/kg	49	53	41	5.0	3007111

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

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		PF3841			PF3842		
Sampling Date		2012/10/15			2012/10/15		
COC Number		B 165428			B 165428		
	Units	**A1**	**RDL**	**QC Batch**	**B1**	**RDL**	**QC Batch**
Petroleum Hydrocarbons							
Benzene	mg/kg	ND	0.025	3007413	ND	0.25	3004695
Leachable Benzene	mg/L	ND	0.010	3007610	ND	0.010	3007610
Toluene	mg/kg	ND	0.025	3007413	ND	0.25	3004695
Leachable Toluene	mg/L	ND	0.010	3007610	ND	0.010	3007610
Ethylbenzene	mg/kg	ND	0.025	3007413	ND	0.25	3004695
Leachable Ethylbenzene	mg/L	ND	0.010	3007610	ND	0.010	3007610
Xylene (Total)	mg/kg	ND	0.050	3007413	ND	0.50	3004695
Leachable Xylene (Total)	mg/L	ND	0.020	3007610	ND	0.020	3007610
C6 - C10 (less BTEX)	mg/kg	ND	2.5	3007413	ND	25	3004695
Leachable C6 - C10 (less BTEX)	mg/L	ND	0.10	3007610	ND	0.10	3007610
Leachable >C10-C16 Hydrocarbons	mg/L	0.94	0.20	3007417	0.63	0.20	3007417
Leachable >C16-C21 Hydrocarbons	mg/L	ND	0.20	3007417	ND	0.20	3007417
Leachable >C21-<C32 Hydrocarbons	mg/L	ND	0.50	3007417	ND	0.50	3007417
Leachable Modified TPH (Tier1)	mg/L	0.94	0.50	3004106	0.63	0.50	3004106
Leachable Reached Baseline at C32	mg/L	Yes	N/A	3007417	Yes	N/A	3007417
Leachable Hydrocarbon Resemblance	mg/L	COMMENT (1)	N/A	3007417	COMMENT (1)	N/A	3007417
Surrogate Recovery (%)							
Leachable Isobutylbenzene - Extractable	%	105		3007417	105		3007417
Leachable n-Dotriacontane - Extractable	%	107		3007417	109		3007417
Leachable Isobutylbenzene - Volatile	%	102		3007610	102		3007610
Isobutylbenzene - Volatile	%	26 (2)		3007413	77 (3)		3004695

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Unidentified compound(s) in fuel oil range.
(2) VPH surrogate not within acceptance limits. Analysis was repeated with similar results.
(3) Elevated VPH RDL(s) due to sample dilution.

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		PF3843		
Sampling Date		2012/10/15		
COC Number		B 165428		
	Units	**C1**	**RDL**	**QC Batch**
Petroleum Hydrocarbons				
Benzene	mg/kg	ND	0.025	3007413
Leachable Benzene	mg/L	ND	0.010	3007610
Toluene	mg/kg	ND	0.025	3007413
Leachable Toluene	mg/L	ND	0.010	3007610
Ethylbenzene	mg/kg	ND	0.025	3007413
Leachable Ethylbenzene	mg/L	ND	0.010	3007610
Xylene (Total)	mg/kg	ND	0.050	3007413
Leachable Xylene (Total)	mg/L	ND	0.020	3007610
C6 - C10 (less BTEX)	mg/kg	ND	2.5	3007413
Leachable C6 - C10 (less BTEX)	mg/L	ND	0.10	3007610
Leachable >C10-C16 Hydrocarbons	mg/L	0.58	0.20	3007417
Leachable >C16-C21 Hydrocarbons	mg/L	ND	0.20	3007417
Leachable >C21-<C32 Hydrocarbons	mg/L	ND	0.50	3007417
Leachable Modified TPH (Tier1)	mg/L	0.58	0.50	3004106
Leachable Reached Baseline at C32	mg/L	Yes	N/A	3007417
Leachable Hydrocarbon Resemblance	mg/L	COMMENT (1)	N/A	3007417
Surrogate Recovery (%)				
Leachable Isobutylbenzene - Extractable	%	106		3007417
Leachable n-Dotriacontane - Extractable	%	104		3007417
Leachable Isobutylbenzene - Volatile	%	101		3007610
Isobutylbenzene - Volatile	%	17 (2)		3007413

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Unidentified compound(s) in fuel oil range.
(2) VPH surrogate not within acceptance limits. Analysis was repeated with similar results.

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units
3004695	THL	Matrix Spike [PF3842-02]	Isobutylbenzene - Volatile	2012/10/18		64	%
			Benzene	2012/10/18		83	%
			Toluene	2012/10/18		113	%
			Ethylbenzene	2012/10/18		77	%
			Xylene (Total)	2012/10/18		95	%
		Spiked Blank	Isobutylbenzene - Volatile	2012/10/18		88	%
			Benzene	2012/10/18		80	%
			Toluene	2012/10/18		82	%
			Ethylbenzene	2012/10/18		77	%
			Xylene (Total)	2012/10/18		80	%
		Method Blank	Isobutylbenzene - Volatile	2012/10/18		92	%
			Benzene	2012/10/18	ND, RDL=0.025		mg/kg
			Toluene	2012/10/18	ND, RDL=0.025		mg/kg
			Ethylbenzene	2012/10/18	ND, RDL=0.025		mg/kg
			Xylene (Total)	2012/10/18	ND, RDL=0.050		mg/kg
			C6 - C10 (less BTEX)	2012/10/18	ND, RDL=2.5		mg/kg
		RPD [PF3842-02]	Benzene	2012/10/18	NC		%
			Toluene	2012/10/18	NC		%
			Ethylbenzene	2012/10/18	NC		%
			Xylene (Total)	2012/10/18	NC		%
			C6 - C10 (less BTEX)	2012/10/18	NC		%
3006437	KCA	Method Blank	Dry Weight	2012/10/18	NA, RDL=0.010		g
		RPD [PF3841-02]	Dry Weight	2012/10/18	0		%
3007111	DLB	Matrix Spike [PF3841-02]	Acid Extractable Antimony (Sb)	2012/10/19		NC	%
			Acid Extractable Arsenic (As)	2012/10/19		99	%
			Acid Extractable Barium (Ba)	2012/10/19		NC	%
			Acid Extractable Beryllium (Be)	2012/10/19		98	%
			Acid Extractable Bismuth (Bi)	2012/10/19		99	%
			Acid Extractable Boron (B)	2012/10/19		98	%
			Acid Extractable Cadmium (Cd)	2012/10/19		98	%
			Acid Extractable Chromium (Cr)	2012/10/19		96	%
			Acid Extractable Cobalt (Co)	2012/10/19		97	%
			Acid Extractable Copper (Cu)	2012/10/19		NC	%
			Acid Extractable Lead (Pb)	2012/10/19		NC	%
			Acid Extractable Lithium (Li)	2012/10/19		103	%
			Acid Extractable Manganese (Mn)	2012/10/19		NC	%
			Acid Extractable Mercury (Hg)	2012/10/19		96	%
			Acid Extractable Molybdenum (Mo)	2012/10/19		99	%
			Acid Extractable Nickel (Ni)	2012/10/19		99	%
			Acid Extractable Rubidium (Rb)	2012/10/19		101	%
			Acid Extractable Selenium (Se)	2012/10/19		98	%
			Acid Extractable Silver (Ag)	2012/10/19		98	%
			Acid Extractable Strontium (Sr)	2012/10/19		NC	%
			Acid Extractable Thallium (Tl)	2012/10/19		77	%
			Acid Extractable Tin (Sn)	2012/10/19		102	%
			Acid Extractable Uranium (U)	2012/10/19		97	%
			Acid Extractable Vanadium (V)	2012/10/19		101	%
			Acid Extractable Zinc (Zn)	2012/10/19		NC	%
		Spiked Blank	Acid Extractable Antimony (Sb)	2012/10/19		103	%
			Acid Extractable Arsenic (As)	2012/10/19		98	%
			Acid Extractable Barium (Ba)	2012/10/19		102	%
			Acid Extractable Beryllium (Be)	2012/10/19		97	%
			Acid Extractable Bismuth (Bi)	2012/10/19		101	%

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units
3007111	DLB	Spiked Blank	Acid Extractable Boron (B)	2012/10/19		99	%
			Acid Extractable Cadmium (Cd)	2012/10/19		97	%
			Acid Extractable Chromium (Cr)	2012/10/19		96	%
			Acid Extractable Cobalt (Co)	2012/10/19		97	%
			Acid Extractable Copper (Cu)	2012/10/19		97	%
			Acid Extractable Lead (Pb)	2012/10/19		95	%
			Acid Extractable Lithium (Li)	2012/10/19		101	%
			Acid Extractable Manganese (Mn)	2012/10/19		99	%
			Acid Extractable Mercury (Hg)	2012/10/19		104	%
			Acid Extractable Molybdenum (Mo)	2012/10/19		96	%
			Acid Extractable Nickel (Ni)	2012/10/19		99	%
			Acid Extractable Rubidium (Rb)	2012/10/19		98	%
			Acid Extractable Selenium (Se)	2012/10/19		98	%
			Acid Extractable Silver (Ag)	2012/10/19		95	%
			Acid Extractable Strontium (Sr)	2012/10/19		99	%
			Acid Extractable Thallium (Tl)	2012/10/19		100	%
			Acid Extractable Tin (Sn)	2012/10/19		97	%
			Acid Extractable Uranium (U)	2012/10/19		96	%
			Acid Extractable Vanadium (V)	2012/10/19		96	%
			Acid Extractable Zinc (Zn)	2012/10/19		99	%
		Method Blank	Acid Extractable Aluminum (Al)	2012/10/19	ND, RDL=10		mg/kg
			Acid Extractable Antimony (Sb)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Arsenic (As)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Barium (Ba)	2012/10/19	ND, RDL=5.0		mg/kg
			Acid Extractable Beryllium (Be)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Bismuth (Bi)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Boron (B)	2012/10/19	ND, RDL=5.0		mg/kg
			Acid Extractable Cadmium (Cd)	2012/10/19	ND, RDL=0.30		mg/kg
			Acid Extractable Chromium (Cr)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Cobalt (Co)	2012/10/19	ND, RDL=1.0		mg/kg
			Acid Extractable Copper (Cu)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Iron (Fe)	2012/10/19	ND, RDL=50		mg/kg
			Acid Extractable Lead (Pb)	2012/10/19	ND, RDL=0.50		mg/kg
			Acid Extractable Lithium (Li)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Manganese (Mn)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Mercury (Hg)	2012/10/19	ND, RDL=0.10		mg/kg
			Acid Extractable Molybdenum (Mo)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Nickel (Ni)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Rubidium (Rb)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Selenium (Se)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Silver (Ag)	2012/10/19	ND, RDL=0.50		mg/kg
			Acid Extractable Strontium (Sr)	2012/10/19	ND, RDL=5.0		mg/kg
			Acid Extractable Thallium (Tl)	2012/10/19	ND, RDL=0.10		mg/kg
			Acid Extractable Tin (Sn)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Uranium (U)	2012/10/19	ND, RDL=0.10		mg/kg
			Acid Extractable Vanadium (V)	2012/10/19	ND, RDL=2.0		mg/kg
			Acid Extractable Zinc (Zn)	2012/10/19	ND, RDL=5.0		mg/kg
		RPD [PF3841-02]	Acid Extractable Aluminum (Al)	2012/10/19	1.8		%
			Acid Extractable Antimony (Sb)	2012/10/19	NC		%
			Acid Extractable Arsenic (As)	2012/10/19	0.3		%
			Acid Extractable Barium (Ba)	2012/10/19	0.3		%
			Acid Extractable Beryllium (Be)	2012/10/19	NC		%
			Acid Extractable Bismuth (Bi)	2012/10/19	NC		%
			Acid Extractable Boron (B)	2012/10/19	NC		%
			Acid Extractable Cadmium (Cd)	2012/10/19	NC		%

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	
3007111	DLB	RPD [PF3841-02]	Acid Extractable Chromium (Cr)	2012/10/19	3.7		%	35
			Acid Extractable Cobalt (Co)	2012/10/19	NC		%	35
			Acid Extractable Copper (Cu)	2012/10/19	3.3		%	35

		Acid Extractable Iron (Fe)	2012/10/19	1.3		%	35
		Acid Extractable Lead (Pb)	2012/10/19	3.0		%	35
		Acid Extractable Lithium (Li)	2012/10/19	NC		%	35
		Acid Extractable Manganese (Mn)	2012/10/19	2.0		%	35
		Acid Extractable Mercury (Hg)	2012/10/19	NC		%	35
		Acid Extractable Molybdenum (Mo)	2012/10/19	NC		%	35
		Acid Extractable Nickel (Ni)	2012/10/19	NC		%	35
		Acid Extractable Rubidium (Rb)	2012/10/19	NC		%	35
		Acid Extractable Selenium (Se)	2012/10/19	NC		%	35
		Acid Extractable Silver (Ag)	2012/10/19	NC		%	35
		Acid Extractable Strontium (Sr)	2012/10/19	1.6		%	35
		Acid Extractable Thallium (Tl)	2012/10/19	NC		%	35
		Acid Extractable Tin (Sn)	2012/10/19	NC		%	35
		Acid Extractable Uranium (U)	2012/10/19	0.7		%	35
		Acid Extractable Vanadium (V)	2012/10/19	NC		%	35
		Acid Extractable Zinc (Zn)	2012/10/19	0.5		%	35
3007347 DLB	Spiked Blank	Leachable Aluminum (Al)	2012/10/20		109	%	
		Leachable Antimony (Sb)	2012/10/20		112	%	
		Leachable Arsenic (As)	2012/10/20		106	%	
		Leachable Barium (Ba)	2012/10/20		100	%	
		Leachable Beryllium (Be)	2012/10/20		108	%	
		Leachable Boron (B)	2012/10/20		111	%	
		Leachable Cadmium (Cd)	2012/10/20		109	%	
		Leachable Calcium (Ca)	2012/10/20		107	%	
		Leachable Chromium (Cr)	2012/10/20		106	%	
		Leachable Cobalt (Co)	2012/10/20		106	%	
		Leachable Copper (Cu)	2012/10/20		106	%	
		Leachable Iron (Fe)	2012/10/20		111	%	
		Leachable Lead (Pb)	2012/10/20		103	%	
		Leachable Lithium (Li)	2012/10/20		114	%	
		Leachable Magnesium (Mg)	2012/10/20		111	%	
		Leachable Manganese (Mn)	2012/10/20		109	%	
		Leachable Molybdenum (Mo)	2012/10/20		113	%	
		Leachable Nickel (Ni)	2012/10/20		109	%	
		Leachable Potassium (K)	2012/10/20		107	%	
		Leachable Selenium (Se)	2012/10/20		105	%	
		Leachable Silver (Ag)	2012/10/20		108	%	
		Leachable Strontium (Sr)	2012/10/20		109	%	
		Leachable Thallium (Tl)	2012/10/20		112	%	
		Leachable Tin (Sn)	2012/10/20		112	%	
		Leachable Uranium (U)	2012/10/20		113	%	
		Leachable Vanadium (V)	2012/10/20		106	%	
		Leachable Zinc (Zn)	2012/10/20		110	%	
	Method Blank	Leachable Aluminum (Al)	2012/10/20	ND, RDL=100		ug/L	
		Leachable Antimony (Sb)	2012/10/20	ND, RDL=20		ug/L	
		Leachable Arsenic (As)	2012/10/20	ND, RDL=20		ug/L	
		Leachable Barium (Ba)	2012/10/20	83, RDL=50		ug/L	
		Leachable Beryllium (Be)	2012/10/20	ND, RDL=20		ug/L	
		Leachable Boron (B)	2012/10/20	ND, RDL=500		ug/L	
		Leachable Cadmium (Cd)	2012/10/20	ND, RDL=3.0		ug/L	
		Leachable Calcium (Ca)	2012/10/20	ND, RDL=1000		ug/L	
		Leachable Chromium (Cr)	2012/10/20	ND, RDL=20		ug/L	

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units
3007347 DLB		Method Blank	Leachable Cobalt (Co)	2012/10/20	ND, RDL=10		ug/L
			Leachable Copper (Cu)	2012/10/20	ND, RDL=20		ug/L
			Leachable Iron (Fe)	2012/10/20	ND, RDL=500		ug/L
			Leachable Lead (Pb)	2012/10/20	ND, RDL=5.0		ug/L
			Leachable Lithium (Li)	2012/10/20	ND, RDL=20		ug/L
			Leachable Magnesium (Mg)	2012/10/20	ND, RDL=1000		ug/L
			Leachable Manganese (Mn)	2012/10/20	ND, RDL=20		ug/L
			Leachable Molybdenum (Mo)	2012/10/20	ND, RDL=20		ug/L
			Leachable Nickel (Ni)	2012/10/20	ND, RDL=20		ug/L

		Leachable Potassium (K)	2012/10/20	ND, RDL=1000		ug/L
		Leachable Selenium (Se)	2012/10/20	ND, RDL=10		ug/L
		Leachable Silver (Ag)	2012/10/20	ND, RDL=5.0		ug/L
		Leachable Strontium (Sr)	2012/10/20	ND, RDL=50		ug/L
		Leachable Thallium (Tl)	2012/10/20	ND, RDL=1.0		ug/L
		Leachable Tin (Sn)	2012/10/20	ND, RDL=20		ug/L
		Leachable Uranium (U)	2012/10/20	ND, RDL=1.0		ug/L
		Leachable Vanadium (V)	2012/10/20	ND, RDL=20		ug/L
		Leachable Zinc (Zn)	2012/10/20	67, RDL=50		ug/L
	RPD [PF3841-02]	Leachable Aluminum (Al)	2012/10/20	NC		%
		Leachable Antimony (Sb)	2012/10/20	NC		%
		Leachable Arsenic (As)	2012/10/20	NC		%
		Leachable Barium (Ba)	2012/10/20	2.9		%
		Leachable Beryllium (Be)	2012/10/20	NC		%
		Leachable Boron (B)	2012/10/20	NC		%
		Leachable Cadmium (Cd)	2012/10/20	NC		%
		Leachable Calcium (Ca)	2012/10/20	1.0		%
		Leachable Chromium (Cr)	2012/10/20	NC		%
		Leachable Cobalt (Co)	2012/10/20	NC		%
		Leachable Copper (Cu)	2012/10/20	NC		%
		Leachable Iron (Fe)	2012/10/20	NC		%
		Leachable Lead (Pb)	2012/10/20	3.6		%
		Leachable Lithium (Li)	2012/10/20	NC		%
		Leachable Magnesium (Mg)	2012/10/20	NC		%
		Leachable Manganese (Mn)	2012/10/20	NC		%
		Leachable Molybdenum (Mo)	2012/10/20	NC		%
		Leachable Nickel (Ni)	2012/10/20	NC		%
		Leachable Potassium (K)	2012/10/20	NC		%
		Leachable Selenium (Se)	2012/10/20	NC		%
		Leachable Silver (Ag)	2012/10/20	NC		%
		Leachable Strontium (Sr)	2012/10/20	0.7		%
		Leachable Thallium (Tl)	2012/10/20	NC		%
		Leachable Tin (Sn)	2012/10/20	NC		%
		Leachable Uranium (U)	2012/10/20	NC		%
		Leachable Vanadium (V)	2012/10/20	NC		%
		Leachable Zinc (Zn)	2012/10/20	NC		%
3007413 SHL	Matrix Spike	Isobutylbenzene - Volatile	2012/10/20		80	%
		Benzene	2012/10/20		92	%
		Toluene	2012/10/20		112	%
		Ethylbenzene	2012/10/20		107	%
		Xylene (Total)	2012/10/20		111	%
	Spiked Blank	Isobutylbenzene - Volatile	2012/10/20		88	%
		Benzene	2012/10/20		83	%
		Toluene	2012/10/20		82	%
		Ethylbenzene	2012/10/20		79	%
		Xylene (Total)	2012/10/20		80	%

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units
3007413	SHL	Method Blank	Isobutylbenzene - Volatile	2012/10/19		93	%
			Benzene	2012/10/19	ND, RDL=0.025		mg/kg
			Toluene	2012/10/19	ND, RDL=0.025		mg/kg
			Ethylbenzene	2012/10/19	ND, RDL=0.025		mg/kg
			Xylene (Total)	2012/10/19	ND, RDL=0.050		mg/kg
			C6 - C10 (less BTEX)	2012/10/19	ND, RDL=2.5		mg/kg
		RPD	Benzene	2012/10/20	NC		%
			Toluene	2012/10/20	NC		%
			Ethylbenzene	2012/10/20	NC		%
			Xylene (Total)	2012/10/20	NC		%
			C6 - C10 (less BTEX)	2012/10/20	NC		%
3007417	AJS	Matrix Spike [PF3842-02]	Leachable Isobutylbenzene - Extractable	2012/10/20		108	%
			Leachable n-Dotriacontane - Extractable	2012/10/20		110	%
			Leachable >C10-C16 Hydrocarbons	2012/10/20		83	%
			Leachable >C16-C21 Hydrocarbons	2012/10/20		91	%

		Leachable >C21-<C32 Hydrocarbons	2012/10/20		92	%
	Leachate Blank	Leachable Isobutylbenzene - Extractable	2012/10/19		107	%
		Leachable n-Dotriacontane - Extractable	2012/10/19		112	%
		Leachable >C10-C16 Hydrocarbons	2012/10/19	ND, RDL=0.20		mg/L
		Leachable >C16-C21 Hydrocarbons	2012/10/19	ND, RDL=0.20		mg/L
		Leachable >C21-<C32 Hydrocarbons	2012/10/19	ND, RDL=0.50		mg/L
	Spiked Blank	Leachable Isobutylbenzene - Extractable	2012/10/20		107	%
		Leachable n-Dotriacontane - Extractable	2012/10/20		108	%
		Leachable >C10-C16 Hydrocarbons	2012/10/20		90	%
		Leachable >C16-C21 Hydrocarbons	2012/10/20		101	%
		Leachable >C21-<C32 Hydrocarbons	2012/10/20		102	%
	Method Blank	Leachable Isobutylbenzene - Extractable	2012/10/20		106	%
		Leachable n-Dotriacontane - Extractable	2012/10/20		108	%
		Leachable >C10-C16 Hydrocarbons	2012/10/20	ND, RDL=0.20		mg/L
		Leachable >C16-C21 Hydrocarbons	2012/10/20	ND, RDL=0.20		mg/L
		Leachable >C21-<C32 Hydrocarbons	2012/10/20	ND, RDL=0.50		mg/L
	RPD [PF3841-02]	Leachable >C10-C16 Hydrocarbons	2012/10/20	NC		%
		Leachable >C16-C21 Hydrocarbons	2012/10/20	NC		%
		Leachable >C21-<C32 Hydrocarbons	2012/10/20	NC		%
3007610 TWE	Matrix Spike					
	[PF3842-02]	Leachable Isobutylbenzene - Volatile	2012/10/12		101	%
		Leachable Benzene	2012/10/12		109	%
		Leachable Toluene	2012/10/12		109	%
		Leachable Ethylbenzene	2012/10/12		113	%
		Leachable Xylene (Total)	2012/10/12		117	%
	Spiked Blank	Leachable Isobutylbenzene - Volatile	2012/10/19		100	%
		Leachable Benzene	2012/10/19		106	%
		Leachable Toluene	2012/10/19		109	%
		Leachable Ethylbenzene	2012/10/19		112	%
		Leachable Xylene (Total)	2012/10/19		119	%
	Method Blank	Leachable Isobutylbenzene - Volatile	2012/10/19		102	%
		Leachable Benzene	2012/10/19	ND, RDL=0.010		mg/L
		Leachable Toluene	2012/10/19	ND, RDL=0.010		mg/L
		Leachable Ethylbenzene	2012/10/19	ND, RDL=0.010		mg/L
		Leachable Xylene (Total)	2012/10/19	ND, RDL=0.020		mg/L
		Leachable C6 - C10 (less BTEX)	2012/10/19	ND, RDL=0.10		mg/L
	RPD [PF3841-02]	Leachable Benzene	2012/10/19	NC		%
		Leachable Toluene	2012/10/19	NC		%
		Leachable Ethylbenzene	2012/10/19	NC		%

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC
3007610	TWE	RPD [PF3841-02]	Leachable Xylene (Total)	2012/10/19	NC		%	4
			Leachable C6 - C10 (less BTEX)	2012/10/19	NC		%	4
3007868	KCA	Method Blank	Initial pH	2012/10/12	5.9		N/A	
			Final pH	2012/10/12	5.3		N/A	
		RPD [PF3841-02]	Initial pH	2012/10/12	1.0		%	2
			Final pH	2012/10/12	0		%	2
3007889	KCA	Method Blank	Volume of Acetic Acid	2012/10/12	0.0		mL/L	
		RPD [PF3841-02]	Volume of Acetic Acid	2012/10/12	0		%	2

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit reliable calculation.