

# **Designated Substances Survey (DSS) of the Fuel Transfer Building (FTB) at Cambridge Bay Airport, Nunavut**

## **Final Report**



Prepared for:

**Dillon Consulting Limited**  
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R3T 0Y4

Prepared by:

**Pacific Environmental Consulting**  
November 16, 2012  
Pacific Ref: 13476 R01

## **Designated Substances Survey of the Fuel Transfer Building (FTB) at Cambridge Bay Airport, Nunavut**

### **1.0 Introduction**

Dillon Consulting Ltd (Dillon) was engaged by Public Works Government Services to conduct a Designated Substances Survey and non-hazardous materials survey for a Fuel Transfer Building (FTB) located at the Cambridge Bay Airport which is scheduled for demolition. The airport is located on Victoria Island, Nunavut. Pacific Environmental Consulting (PEC) was contracted by Dillon to perform this work in order to support PWGSC in the tendering process. The site investigation and sampling were conducted on August 29, 2012.

### **2.0 Site History and Description**

The building is a one-storey, single room, structure and is approximately 20 years old. The Fuel Transfer Building (FTB) is scheduled for demolition as part of an upgrade to the airport apron area. The building, which has a peaked roof, was used for storage of all the equipment used for plane fuelling (Photo 1). The FTB consists of steel walls with a slab on grade concrete floor. The building dimensions are approximately 6.1m (20'-0") long x 2.5m (8'-3") wide and 2.8m (~9'-0") to the peak of the roof. Fuels used in this building include Avgas and Jet B fuel. Four fuel lines extending from the east side of the building will also be included in the demolition. All of the redundant piping scheduled for removal and disposal is located above ground.

### **3.0 Investigation and Sampling Methodology**

#### **Visual Investigation**

A visual investigation was conducted of all areas of the building. The visual investigation included a thorough assessment of all building materials for hazardous materials. Representative samples of building materials suspected of containing asbestos were collected for analysis (See Appendix C for site plan with sample locations). All observations were documented on site with photographs and written notes.

The area of the building encompassed by the profile galvanized sheets was derived from calculations as follows; the building is 6.1m long x 2.5m wide and the galvanized sheeting was assumed to be style 34/1000 with a gauge of 13. Weight per ft<sup>2</sup> was then generated using the value of 3.84lbs/ft<sup>2</sup> derived from a standard sheet metal gauge size chart.

The concrete slab was determined to be 15.25m<sup>2</sup> (160 ft<sup>2</sup>) and 0.1m (4") thick as advised by on site personnel. This develops into 1.52m<sup>3</sup> or 3,530kg of concrete to be demolished and disposed.

The piping to be handled and removed is 17.75m of 4" diameter Schedule 40 steel pipe; 83.48m of 2" dia. Schedule 40 steel pipe; and 4m of 3" dia. steel in the light pole.

#### **.1 Asbestos Bulk Sampling**

Seven bulk samples of materials suspected of containing asbestos were collected. These samples were analyzed by Maxxam Analytics, a CALA certified laboratory in Burnaby, British Columbia, in accordance with the National Institute of Occupational Safety and Health (NIOSH) analytical method 9002 (see attached bulk sample results spreadsheet).

## .2 Lead in Paint Sampling

Two bulk samples of paint potentially containing lead were collected. These samples were analyzed by Maxxam Analytics, a CALA certified laboratory in Burnaby, British Columbia for lead content. Lead analysis was conducted using Inductively Coupled Plasma/Mass Spectroscopy (ICPMS).

## .3 Toxicity Characteristic Leaching Procedure (TCLP) Analysis

One extra paint sample (13476-T1) was collected from the fuel lines and was submitted to Maxxam Analytics in Burnaby, British Columbia for leachate analysis.

## .4 Lead in Surface Dust

A sample of dust suspected of containing lead was collected from the concrete floor of the FTB below a capped, Avgas pipe valve. Lead is known to be a constituent of Avgas.

## .5 Mercury

All areas of the building were inspected for the presence of mercury containing instruments such as thermostats.

## .6 Polychlorinated Biphenyls (PCBs)

One bulk sample of paint potentially containing PCBs was collected and analyzed by Maxxam Analytics, a CALA certified laboratory in Burnaby, British Columbia for PCB content. PCB analysis was conducted using GC-ECD analysis.

The building was also inspected for the presence of PCB containing fluorescent light fixtures.

## .7 Chemicals

The building was inspected for the presence of miscellaneous chemicals.

## .8 Regulatory Guidelines

The regulatory standards and guidelines used in determining handling and removal of hazardous materials are considered standard references and reflect the most stringent requirements with respect to the hazardous materials to which they apply, and are as follows;

**Lead content in Paint:** - Government of Nunavut Definition of Lead Containing Paint which is currently 500µg/g.

**NOTE:** It should be noted that many jurisdictions have, since 2011, reduced the value of lead in paint (above which value a surface coating is considered lead-based), from 600µg/g to 90µg/g (e.g. Canadian Hazardous Products Act as amended in 2011 and the WorkSafeBC Occupational Health and Safety Regulation).

**Lead in surface dust on floors:** - Canadian Hazardous Products Act as amended in 2011; WorkSafeBC Occupational Health and Safety Regulation (current edition) and guidance document *“Lead Containing Paints and Coatings; Preventing Exposure in the Construction Industry.”*, 2012; and the USEPA, Housing and Urban Development Guidelines.

**Toxicity Characteristic Leachate Procedure (TCLP);** - Environment Canada – Interprovincial Movement of Hazardous Waste and Hazardous Recyclable Material Regulation

Please note that the disposal of all hazardous materials must be at a licensed facility and waste manifest documentation must be completed to ensure the integrity of that process.

#### 4.0 **Sample Results**

The Canadian Hazardous Products Act (and WorkSafeBC standard) determines the maximum allowable lead content in surface coatings above which a surface coating is considered lead-based. This standard in both instances is 90µg/g (90mg/kg; 0.009%; or 90ppm). This standard appears to be the universally applied standard in Canada.

Leachate testing on lead-based surface coatings was performed using the Toxic Characteristic Leachate Procedure (TCLP) protocol. This protocol establishes whether items with lead-based surface coatings can be disposed of as regular demolition debris or are to be considered as Hazardous/Special Waste. The standard is 5.0mg/L.

##### .1 **Asbestos Bulk Sampling**

Asbestos was not detected in any of the samples of building materials that were collected (see Table 1). Refer to the attached laboratory sample results in Appendix B.

**Table 1 - Asbestos Bulk Sampling Results**

Sample ID	Sampling Location	Material	Asbestos Present
13476 – 1	Interior – Along Joints	Insulation	No
13476 – 2	Interior – Along Ceiling Joints	Caulking	No
13476 – 3	Interior – Concrete on Floor	Concrete	No
13476 – 4	Interior – Along Ceiling Joist	Caulking	No
13476 – 5	Interior – Around Doors and Windows	Sealant	No
13476 – 6	Exterior – Around Wiring Pipe	Sealant	No
13476 – 7	Interior – Inside Door	Insulation	No

##### .2 **Lead in Paint Sample Results**

The Canadian Hazardous Products Act, Surface Coating Materials Regulations, Section 4 defines lead based paint as any paint which contains greater than 90 mg/kg of lead or 0.009%.

However; Subsection (1) of Section 4 of the Surface Coating Materials Regulations does not apply to a surface coating material that is used:

- (a) as an anti-corrosive or an anti-weathering coating applied on the interior or exterior surface of any building or equipment that is used for an agricultural or industrial purpose;
- (b) as an anti-corrosive or an anti-weathering coating applied on any structure, other than a building, that is used for an agricultural, industrial or public purpose;

Lead at levels in excess of the guidelines contained within the Government of Nunavut Definition of Lead Containing Paint was detected in the silver paint applied to the fuel lines (Sample 13476 – L1) extending from the FTB (Photo 2). Refer to Table 2 below and the attached laboratory sample results in Appendix B.

**Table 2 - Lead Concentration in Paint Samples**

Sample Number	Sample Location	Lead (µg/g)
13476 – L1	Exterior – Fuel Lines – Silver Paint	<b><u>27,600</u></b>
13476 – L2	Exterior – Light Pole – Yellow Paint	275
<b>Government of Nunavut Definition of Lead Containing Paint</b>		<b>500</b>

**Bold and underlined** indicates that the sample is above the referenced guideline(s) for Lead content in paint.

Length of piping with lead paint is 101.23m (345 feet). Contaminated waste generated from saw-cutting is approximately 15kg.

The limit of lead leachate in the Hazardous Constituents Controlled Under Leachate Test and Regulated Limits is 5.0 mg/L as stated in the Interprovincial Movement of Hazardous Waste and Hazardous Recyclable Material Regulations. Sample number 13476 – T1 was determined to be **non-leachable**. Refer to Table 3 and the attached laboratory sample results in Appendix B.

**Table 3 – TCLP Analysis Results**

Sample Number	Sample Location	Lead (mg/L)
13476 – T1	Exterior – Fuel Lines – Silver Paint	1.53
<b>Environment Canada – Interprovincial Movement of Hazardous Waste and Hazardous Recyclable Material Regulation</b>		<b>5</b>

### .3 Lead in Surface Dust

Sample 13476 – SW1 collected from the concrete floor of the FTB, below the capped Avgas pipe (Photo 3), contains lead in excess of the WorkSafeBC standard  $200\mu\text{g}/\text{ft}^2$  for industrial settings (this standard is derived from the United States Environmental Protection Agency (USEPA) standard for industrial settings and is most commonly used). Therefore all the surface dust on the concrete floor of the FTB should be considered lead-containing as per the following reasoning;

1. It is our understanding that the FTB has been in operation for approximately 20 years. It is reasonable therefore to assume over that time period that the lead in the aviation fuel has precipitated out and collected as dust on the floor of the FTB.
2. It is also reasonable to assume that as the dust has accumulated it has been tracked by localized activity throughout the FTB.
3. There is no evidence available to Pacific Environmental Consulting that indicates any kind of lead clean-up has been performed over this period. In the absence of this evidence it is reasonable to assume that any accumulations have remained in place.

**Table 4 – Lead Wipe Sample Results**

Sample Number	Sample Location	Lead in Floor Dust ( $\mu\text{g}/\text{ft}^2$ )
13476 – SW1	Interior – Floor Below Avgas Valve	<b><u>763</u></b>
<b>USEPA Standard</b>		<b>200</b>

**Bold and underlined** indicates that the sample is above the USEPA standard for lead in floor dust.

Approximate quantity of floor area to be cleaned is  $160\text{ft}^2$ . Contaminated waste generated will be approximately 20kg. Amount of concrete to be demolished and removed is approximately  $1.525\text{m}^3$  (3,530kg). The concrete floor was observed to be unsealed, i.e. no surface coatings. When the concrete has been cleaned to achieve the desired result of  $<200\mu\text{g}/\text{ft}^2$  the concrete can then be disposed of as regular demolition waste.

### .4 Polychlorinated Biphenyls (PCBs)

Sample 13476 – P1 collected from the fuel lines extending from the FTB has a PCB level below the Environment Canada – Interprovincial Movement of Hazardous Waste and Hazardous Recyclable Material Regulation level of 50 mg/kg. Therefore the paint may be considered non-PCB containing. Refer to the attached laboratory sample results in Appendix B.

**Table 5 - PCB Concentration in Paint**

Sample Number	Sample Location	PCB (mg/kg)
13476 – P1	Exterior – Fuel Lines – Silver Paint	0.43
<b>Environment Canada – Interprovincial Movement of Hazardous Waste and Hazardous Recyclable Material Regulation</b>		<b>50</b>

### .5 Mercury

Two lamps suspected of being mercury vapour lamps were observed in the FTB (Photo 4). At the time of the investigation the lamp casings could not be removed to inspect the light bulbs and no clear label indicating the presence of mercury in the bulbs was observed. The mercury

contained within the mercury lamps is classified as a Special Waste material and must be disposed of in accordance with Federal regulations. The mercury can be recovered from the lamps at a licensed facility, and recycled. Lamps may also be carefully salvaged and removed and re-used in other locations until the end of their lifespan.

Fluorescent light tubes also contain minor amounts of mercury vapour. No fluorescent lights were observed.

## **.6 Chemicals**

Two bags of silica based oil absorbent were observed within the FTB and these should be salvaged, removed and stored for reuse. While there is silica content within this material it is not considered a substance of concern.

Fuel filling hose must be thoroughly flushed prior to disposal. Flushed water must be collected and sampled for lead content prior to disposal.

Used oil filters can be disposed of at an approved oil recycling depot.

## **.7 Non-hazardous wastes**

Non-hazardous wastes were identified during the site inspection and are as follows;

The steel walls and roof of the Fuel Transfer Building, which is 6.1m long x 2.5m wide and is clad with galvanized sheeting was assumed to be style 34/1000 with a gauge of 13. Weight per ft<sup>2</sup> was then generated using the value of 3.84lbs/ft<sup>2</sup> derived from a standard sheet metal gauge size chart.

The concrete slab was determined to be 15.25m<sup>2</sup> (160 ft<sup>2</sup>) and 0.1m (4") thick as advised by on site personnel. This develops into 1.52m<sup>3</sup> or 3,530kg of concrete to be demolished and disposed.

The approximate total weight of electrical wiring, hose reel, associated fastenings, and light pole is 145kg.

Non-hazardous waste	Quantity	Unit	Estimated Weight
Building galvanized sheets	640	ft <sup>2</sup>	1116.82kg
Concrete	1.52	m <sup>3</sup>	3,530kg
Miscellaneous items (i.e. electrical cabling, Hose Reel, fastenings, light pole)			145kg

## **.8 Quality Assurance/Quality Control**

Sampling methodology never includes QA/QC at the sampling level but internal QA/QC practices require that periodically 5-10% of bulk samples, air samples and spore samples are randomly re-analyzed. Since all analysis was performed by Maxxam Analytics we have relied upon Maxxam Analytics internal QA/QC methodology which is contained within the requirement for their continued certification with the Canadian Analytical Laboratories Association CALA. Maxxam's Reportable Detection Limits (RDL) are within acceptable limits for all analytes where RDL is applicable.

## **7.0 Conclusions and Recommendations**

No asbestos-containing materials were found in the interior or exterior of the FTB.

Lead-based silver paint (as defined by the Government of Nunavut Definition of Lead Containing Paint) was identified on the fuel line piping. However; it was determined that the paint was non-leachable as defined by Environment Canada's Interprovincial Movement of Hazardous Waste and Hazardous Recyclable Material Regulation and therefore can be accepted at most scrap metal waste facilities provided the receiving facility is advised of the presence of the lead-based paint. The required removal of small areas of lead-based paint to facilitate handling and transport of this piping has been discussed in Section 6.0 Rationale. The amount of double-bagged sealed contaminated waste generated will be approximately 15kg.

Surface dust on the FTB concrete floor was also determined to be lead-containing. The concrete floor was observed to be unsealed. The lead containing dust should be removed using HEPA equipped vacuums and the use of Personal Protective Equipment (disposable coveralls, steel-toed rubber boots, and respiratory protection equipped with HEPA filter cartridges). The dust should be removed from site by sealing it and used coveralls, used HEPA filter cartridges and polyethylene drop sheets by double-bagging in waste bags designed for the purpose and disposed of through the same carrier, as Hazardous Waste. This remediation process is expected to generate no more than 20kg's of double-bagged, sealed waste.

The paint on the fuel lines was determined to be non-PCB-containing.

Two suspected mercury lamps were observed inside the FTB. Prior to the demolition of the building the lamps should be salvaged, removed, and stored for reuse. No fluorescent light fixtures were observed within the building.

Two bags of silica based oil absorbent were observed within the FTB and should be salvaged, removed and stored for reuse.

## **8.0 Limitations**

This report has been prepared in accordance with established Industrial Hygiene practices. It is intended for the exclusive use of Dillon Consulting Ltd and PWGSC to assist them in complying with the current accepted industry standards for the pre-demolition assessment and remediation of hazardous materials in compliance with standard Federal and Provincial regulations and current Industrial Hygiene best practices. The use of this document for any other purposes is at the sole risk of the user.



## 9.0 **Statement of Qualifications**

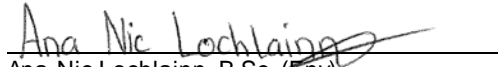
**Pacific Environmental Consulting** has been providing consulting services in the environmental and industrial hygiene fields, since 1990. Our industrial hygiene expertise ensures that all projects are performed in accordance with relevant Occupational Health & Safety regulations and Industrial Hygiene best practices. Our personnel include the following:

- Industrial Hygienists (CIH, ROH)
- Professional Engineers (PEng)
- Registered Professional Biologist (RPBio)
- Canadian Registered Safety Professional (CRSP)
- Certified Health and Safety Consultant (CHSC)
- Occupational Health and Safety Technicians.

Our company also carries Comprehensive General Liability Insurance and Environmental Errors & Omissions Liability Insurance.

Yours truly,

**Pacific Environmental Consulting**

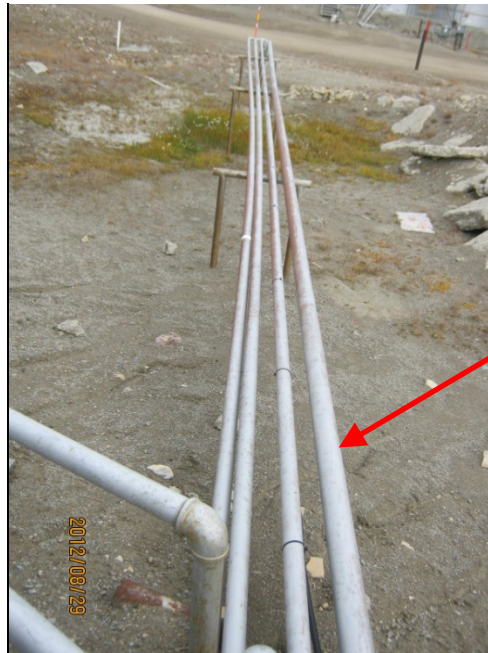
  
Ana Nic Lochlainn, B.Sc. (Env)  
Environmental Scientist  
Field Investigation and Report

  
Norman Richardson, ASCT, CRSP, CHSC  
Senior Operations Manager  
Report Review

Ref: 13476 L01

**Appendix A: Photographs:**

<b>Photo 1</b>	<b>Date:</b> Aug 29, 2012	<b>Location:</b> FTB, Interior
<b>Description:</b> Fueling equipment stored in the FTB as indicated by red arrow.		



<b>Photo 2</b>	<b>Date:</b> Aug 29, 2012	<b>Location:</b> FTB, Exterior Facing South
<b>Description:</b> Lead containing silver paint on fuel lines as indicated by red arrow.		



<b>Photo 3</b>	<b>Date:</b> Aug 29, 2012	<b>Location:</b> FTB, Interior
<b>Description:</b> Lead containing dust on the concrete floor as indicated by red arrow		



<b>Photo 4</b>	<b>Date:</b> Aug 29, 2012	<b>Location:</b> FTB, Interior
<b>Description:</b> Suspected mercury lamps as indicated by red arrows		

**Appendix B: Laboratory Reports**

Please find included the following reports:

Maxxam Analytics

- Asbestos Bulk Sample Results;
- Lead Paint Sample Results;
- TCLP Sample Results;
- Lead Swab Sample Results;
- PCB Sample Results;



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Maxxam Job #: B278280  
Report Date: 2012/09/11

PACIFIC ENVIRONMENTAL  
Client Project #: 13476

#### ASBESTOS IDENTIFICATION (BULK)

Maxxam ID		EJ1082	EJ1083	EJ1084	EJ1085	EJ1086	EJ1091	EJ1092		
Sampling Date		2012/08/29	2012/08/29	2012/08/29	2012/08/29	2012/08/29	2012/08/29	2012/08/29		
	UNITS	13476-1	13476-2	13476-3	13476-4	13476-5	13476-6	13476-7	RDL	QC Batch
<b>Asbestos Type</b>										
Actinolite	% vol/vol	ND	ND	ND	ND	ND	ND	ND	N/A	6158502
Amosite	% vol/vol	ND	ND	ND	ND	ND	ND	ND	N/A	6158502
Anthophyllite	% vol/vol	ND	ND	ND	ND	ND	ND	ND	N/A	6158502
Chrysotile	% vol/vol	ND	ND	ND	ND	ND	ND	ND	N/A	6158502
Crocidolite	% vol/vol	ND	ND	ND	ND	ND	ND	ND	N/A	6158502
Tremolite	% vol/vol	ND	ND	ND	ND	ND	ND	ND	N/A	6158502
<b>Others</b>										
Cellulose	% vol/vol	ND	ND	ND	ND	ND	0.5-10	90-99	N/A	6158502
Filler	% vol/vol	>99	>99	>99	>99	>99	90-99	0.5-10	N/A	6158502
Glass Fibres	% vol/vol	ND	ND	ND	ND	ND	ND	ND	N/A	6158502
Hair	% vol/vol	ND	ND	ND	ND	ND	ND	ND	N/A	6158502
Other Fibers	% vol/vol	ND	ND	ND	ND	ND	ND	ND	N/A	6158502

#### POLYCHLORINATED BIPHENYLS BY GC-ECD (PAINT)

Maxxam ID		EJ1080		
Sampling Date		2012/08/29		
	UNITS	13476-P1	RDL	QC Batch
<b>Polychlorinated Biphenyls</b>				
Aroclor 1242	mg/kg	<0.43 <sub>(1)</sub>	0.43	6140285
Aroclor 1248	mg/kg	<0.43 <sub>(1)</sub>	0.43	6140285
Aroclor 1254	mg/kg	0.43 <sub>(1)</sub>	0.43	6140285
Aroclor 1260	mg/kg	<0.43 <sub>(1)</sub>	0.43	6140285
Total PCB	mg/kg	0.43 <sub>(1)</sub>	0.43	6140285
<b>Surrogate Recovery (%)</b>				
Hexabromobiphenyl (sur.)	%	72		6140285

N/A = Not Applicable

ND = Not detected

RDL = Reportable Detection Limit

(1) - RDL raised due to limited initial sample amount.



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#### ELEMENTS BY ATOMIC SPECTROSCOPY (PAINT)

Maxxam ID		EJ1079		
Sampling Date		2012/08/29		
	<b>UNITS</b>	<b>13476-T1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>TCLP Extraction Procedure</b>				
Initial pH of Sample	pH Units	SEE NOTE(1)	N/A	6139033
pH after HCl	pH Units	SEE NOTE(1)	N/A	6139033
Final pH of Leachate	pH Units	4.99	N/A	6139033
pH of Leaching Fluid	pH Units	4.90	N/A	6139033

#### ELEMENTS BY ATOMIC SPECTROSCOPY (SWAB)

Maxxam ID		EJ1081		
Sampling Date		2012/08/29		
	<b>UNITS</b>	<b>13476-SW1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Total Metals by ICP</b>				
Total Lead (Pb)	ug	763	2.0	6140769

#### TCLP METALS (PAINT)

Maxxam ID		EJ1079		
Sampling Date		2012/08/29		
	<b>UNITS</b>	<b>13476-T1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Metals</b>				
LEACHATE Lead (Pb)	mg/L	1.53	0.10	6141275

N/A = Not Applicable

RDL = Reportable Detection Limit

(1) - Insufficient sample to perform the preliminary evaluation and do the leachate, buffer solution #1 was used



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LEAD IN PAINT CHIPS (PAINT)

Maxxam ID		EJ1077	EJ1078		
Sampling Date		2012/08/29	2012/08/29		
	UNITS	13476-L1	13476-L2	RDL	QC Batch
Total Metals by ICP					
Total Lead (Pb)	ug/g	27600	275	2.0	6148476

RDL = Reportable Detection Limit





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#### General Comments

For Asbestos:

ND = Not detected. Below reportable detection limit of 0.5%

All samples are homogeneous

Site Location: Not Provided

Sample EJ1082-01: 1 layer: Yellow spongy material

Sample EJ1083-01: 1 layer: Bluish rubbery material

Sample EJ1084-01: 1 layer: Grey rocks

Sample EJ1085-01: 1 layer: Grey mix

Sample EJ1086-01: 1 layer: Greyish mix

Sample EJ1091-01: 1 layer: Grey fibrous mix

Sample EJ1092-01: 1 layer: Brown fibrous mix







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# QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
6139033	Initial pH of Sample	2012/09/05					4.90, RDL=N/A	pH Units	3.8	20		
6139033	Final pH of Leachate	2012/09/05					4.90, RDL=N/A	pH Units	1.1	20		
6139033	pH of Leaching Fluid	2012/09/05					4.90, RDL=N/A	pH Units	0	20		
6139033	pH after HCl	2012/09/05							0.5	20		
6140285	Hexabromobiphenyl (sur.)	2012/09/06	109	60 - 130	108	60 - 130	112	%				
6140285	Aroclor 1254	2012/09/06	95	70 - 110	99	70 - 110	<0.030	mg/kg	NC	50		
6140285	Aroclor 1242	2012/09/06					<0.030	mg/kg	NC	50		
6140285	Aroclor 1248	2012/09/06					<0.030	mg/kg	NC	50		
6140285	Aroclor 1260	2012/09/06					<0.030	mg/kg	NC	50		
6140285	Total PCB	2012/09/06					<0.030	mg/kg	NC	50		
6140769	Total Lead (Pb)	2012/09/05			97	80 - 120	<2.0	ug				
6141275	LEACHATE Lead (Pb)	2012/09/05	101	75 - 125	98	75 - 125	<0.10	mg/L	NC	35		
6148476	Total Lead (Pb)	2012/09/07					<2.0	ug/g	1.7	35	106	80 - 120

N/A = Not Applicable

RDL = Reportable Detection Limit

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.

Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.



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Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

DRAFT



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### Validation Signature Page

Maxxam Job #: B278280

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

A handwritten signature in black ink, appearing to read "Rob Reinert", is written over a horizontal line.

Rob Reinert, Data Validation Coordinator

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



Maxxam		Maxxam Analytics International Corporation aka Maxxam Analytics		CHAIN OF CUSTODY RECORD		Page 1 of 2							
INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:							
Company Name:	#3221 PACIFIC ENVIRONMENTAL	Company Name:	Same	Quotation #:	B01268	MAXXAM JOB #:	3278280						
Contact Name:	Wendy Ork	Contact Name:	Ana Nic Lochlainn	P.O. #:		BOTTLE ORDER #:							
Address:	1336 Main Street North Vancouver BC V7J 1C3	Address:		Project #:	13476	CHAIN OF CUSTODY #:							
Phone:	(604)980-3577 Fax: (604)980-2188	Phone:	778-899-0436 Fax:	Project Name:		PROJECT MANAGER:	Lancy Luangkhanding						
Email:	Wendy@pac-bc.com	Email:		Site #:		CR324035-02-01							
REGULATORY CRITERIA:		SPECIAL INSTRUCTIONS:		ANALYSIS REQUESTED (Please be specific):		TURNAROUND TIME (TAT) REQUIRED:							
		As Quoted		Regular (Standard) TAT: (will be applied if Rush TAT is not specified) Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and DDTs/Furans are > 3 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission): Date Required: Time Required:		<input type="checkbox"/> Rush Confirmation Number:							
Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form													
SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM													
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water 7 (Y/N)	Metals Field Filtered 7 (Y/N)	Lead Paint Chips	TCLP Lead Leachate	Lead by ICP - Ghost Wipe	PCB in Paint	Asbestos	# of Bottles	Comments
1 EJ1077	13476 - L1	29/08/12		Paint			✓						
2 78	13476 - L2						✓						
3 79	13476 - T1							✓					
4 80	13476 - P1									✓			
5 81	13476 - SW1			Swab				✓					
6 82	13476 - 1			Bulk							✓		
7 83	13476 - 2										✓		
8 84	13476 - 3										✓		
9 85	13476 - 4										✓		
10 86	13476 - 5										✓		
*RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time:	# Jars Used and Not Submitted	Laboratory Use Only		Test Result: <input type="checkbox"/> Temperature (°C) on Receipt: NA Dry Seal Intact on Receipt: <input type="checkbox"/> Yes <input type="checkbox"/> No		
A Nic Lochlainn		12/08/13		Laurel B. Thayer		10/08/13	15:15						

\*IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

Maxxam Analytics International Corporation aka Maxxam Analytics

Maxxam		Maxxam Analytics International Corporation o/a Maxxam Analytics		CHAIN OF CUSTODY RECORD		Page 2 of 2	
<b>INVOICE INFORMATION:</b> Company Name: #3221 PACIFIC ENVIRONMENTAL Contact Name: Wendy Ok Address: 1336 Main Street North Vancouver BC V7J 1C3 Phone: (604)980-3577 Fax: (604)980-2168 Email: Wendy@pac-bc.com		<b>REPORT INFORMATION (if differs from invoice):</b> Company Name: Same Contact Name: Ann Nic Leblainn Address: Same Phone: Fax:		<b>PROJECT INFORMATION:</b> Quotation #: B01268 P.O. #: Project #: Project Name: Site #: Sampled By:		<b>Laboratory Use Only:</b> MAXXAM JOB #: B278280 BOTTLE ORDER #: CHAIN OF CUSTODY #: PROJECT MANAGER: Lancy Luangthamrong C0324095-03-01	
<b>REGULATORY CRITERIA:</b> Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form.		<b>SPECIAL INSTRUCTIONS:</b> As Quoted		<b>ANALYSIS REQUESTED (Please be specific):</b> Regulated Drinking Water ? (Y/N) Minute Fluid Filtered ? (Y/N) Lead Paint Chips TCLP Lead Leachate Lead by ICP - Ghost Wipe Asbestos		<b>TURNAROUND TIME (TAT) REQUIRED:</b> PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Regular (Standard) TAT: (will be applied if Rush TAT is not specified) Standard TAT = 5-7 Working days for most tests Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 8 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission) Date Required: Time Required: Rush Confirmation Number: (call job for #)	
<b>SAMPLES MUST BE KEPT COOL (&lt; 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM</b>							
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix			
1 EJ091	13476-6	21/08/12		Bulk			
2 92	13476-7	"		"			
3							
4							
5							
6							
7							
8							
9							
10							
<b>RELINQUISHED BY: (Signature/Print)</b> A. Nic Leblainn		<b>Date: (YY/MM/DD)</b> 12/08/12	<b>Time:</b> 15:15	<b>RECEIVED BY: (Signature/Print)</b> Maxxam Analytics		<b>Date: (YY/MM/DD)</b> 10/08/12	<b>Time:</b> 15:15
<b># Jars Used and Not Submitted</b>		<b>Time Sensitive</b>		<b>Temperature (°C) at Receipt</b>		<b>Laboratory Use Only</b> Priority Seal Intact on Container? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No White Maxxam Yellow Check	
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.							



**Appendix C: Site Plan with Sample Locations:**

