

**FISHERIES AND OCEANS  
CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA) 2012  
PROJECT EFFECTS DETERMINATION REPORT**

**GENERAL INFORMATION**

<b>1. Project Title:</b> Marginal wharf reconstruction and Dredging, Joe Batts Arm, NL	
<b>2 Proponent:</b> Fisheries and Oceans Canada, Small Craft Harbours (DFO SCH)	
<b>3. Other Contacts</b> (Other Proponent, Consultant or Contractor): Public Works and Government Services Canada	<b>4. Role:</b> OGD Consultant
<b>5. Source of Project Information:</b> Eddie Bearns, PWGSC	
<b>6. Project Review Start Date:</b> March 23, 2015	
<b>7. DFO File No.:</b> 15-HNFL-00091	<b>8. PWGSC File No:</b>
<b>9. TC File No.:</b> 8200-02-1016	

**BACKGROUND**

<p><b>10. Background about Proposed Development (including a description of the proposed development):</b></p> <p>An existing breakwater at Joe Batts Arm will be reconstructed. The existing treated timber wharf consists of several sections cribwork measuring 7.3 m wide by 36 metres long and an outer section measuring approx 7.3 meters wide by 83.9 m long. The new treated timber wharf will be reconstructed in the general footprint, but will be shifted approx 15 metres westward.</p>
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**PROJECT REVIEW**

<p><b>11. DFO's rationale for the project review:</b></p> <p>Project is on federal land <input checked="" type="checkbox"/> <u>and</u>;</p> <p><input checked="" type="checkbox"/> DFO is the proponent</p> <p><input type="checkbox"/> DFO to issue <i>Fisheries Act</i> Authorization or <i>Species at Risk Act</i> Permit</p> <p><input type="checkbox"/> DFO to provide financial assistance to another party to enable the project to proceed</p> <p><input type="checkbox"/> DFO to lease or sell federal land to enable the project to proceed</p> <p><input type="checkbox"/> Other</p>	
<b>12. Fisheries Act Sections (if applicable):</b> n/a	
<b>13. Other Authorities</b> Transport Canada, Navigation Protection Program	<b>14. Other Authorities rationale for involvement:</b> Navigation Protection Act

**15. Other Jurisdiction:** NL Department of Environment and Conservation, Water Resources Division  
Service NL

**16. Other Expert Departments Providing Advice:**  
Fisheries and Oceans Canada, Fisheries Protection Program

**17. Areas of Interest of Expert Departments:**  
Fisheries Act

**18. Other Contacts and Responses:** n/a

**19. Scope of Project (details of the project subject to review):**

**Project Description**

**Construction/Installation:**

An existing breakwater wharf in Joe Batts Arm will be reconstructed. The existing treated cribwork structure is located on the west site of the harbor adjacent to an active fish plant and finger pier wharf. The wharf consists of a stem section measuring 7.3 m wide by 36 metres long and an outer section measuring approximately 7.3 meters wide by 83.9 m long. The outer section is angled approximately 135 degrees from the stem. The existing wharf will be demolished and removed in its entirety. A new treated cribwork structure will be constructed in the same general location and shape, but will be shifted approximately 15 metres westward. The new wharf stem will measure approximately 7.3 m by 42 m long and the outer section approximately 7.3 m by 85.4 m long. The angle between the stem section and outer section will decrease to approximately 106 degrees, which will decrease the width of the access channel to the harbour from approximately 33 m to 32 m. To provide safe access to the new wharf deck, the existing service area at the base of the wharf will be expanded, which will require infilling an area within the intertidal zone.

To accommodate the new wharf and ensure safe access/berthage for vessels, approximately 4300 cubic metres of material will be dredged from the project site. Approximately 2600 cubic metres of material will be dredged from the access channel approach on the outside of the breakwater wharf. The remaining 1700 cubic metres of material will be dredged from the harbor basin, including from the footprint of the old wharf.

**Operation**

The Environmental Management System (EMS) with an integrated Environmental Management Plan (EMP) for the Harbour Authority of Joe Batt's Arm will cover operational aspects of environmental management at the harbour (fuelling, waste disposal, activities on the property and water).

**Decommissioning**

This facility is not presently planned to be decommissioned. At the time of decommissioning, Small Craft Harbours will develop a site-specific re-use or reclamation plan that is appropriate for the applicable environmental legislation and Fisheries and Oceans Canada policies.

**Scheduling**

Subject to regulatory approval and DFO SCH operational priorities and funding, this project may commence August 2015.

**20. Location of Project:**

The project site can be accessed from Water Street within the community of Joe Batts Arm. The community of Joe Batts Arm can be accessed via provincial route 414 located on the Baie Verte Peninsula and the project is positioned 49° 14' 49" N and 54°09' 29" W.

## 21. Environment Description:

### **Physical Environment**

The project site is located within a commercially active harbour owned by the Small Craft Harbours Branch of Fisheries and Oceans Canada. The surrounding project site contains a fish plant and marginal wharf, finger pier wharf, breakwater wharf and concrete decked service. There are several permanent residences in close proximity to the project site. The immediate area consists primarily of exposed bedrock and anthropogenic marine infrastructure. The intertidal zone appears predominantly as bedrock, with some cobble and boulder and little evidence of sand or mud. Based on a previous dredging project which occurred at this location in 2009, substrate within a very near the project site consists of bedrock with lesser amounts of pebble-cobble, gravel material.

This ecoregion represents a narrow coastal zone 20-25km in width extending from Bonavista Bay to the Baie Verte Peninsula. Black Spruce and Balsam Fir form a continuous forest except where barrens dominate on the coastal headlands. White Spruce is more common than in Central Newfoundland, but Trembling Aspen is sporadic and rarely forms pure stands. *Alnus crispa* replaces *Alnus rugosa* as the dominant alder on both upland and lowland sites. The vegetation season is shorter and cooler than in Central Newfoundland but the frost-free period is several weeks longer. The summers are relatively dry and warm and soil moisture deficiencies may occur. As with the Central Newfoundland Ecoregion, encroachment of ericaceous shrubs on dry nutrient-poor sites after cutting and fire is a serious silvicultural problem. Also, the quality of growth diminishes with proximity to the coastline. There are no subregions in this ecoregion. The landtypes are similar to those for the Central Newfoundland Ecoregion

Water depth at the proposed project site ranges between 1.2 – 5.4 metres.

### **Biological Environment**

Fauna within the project area is limited to nearshore fish species such as cunner, tomcod, sculpin, winter flounder and lobster. While marine mammals such as seals and whales are common in the general area, it is unlikely they frequent the immediate project area.

### **Species at Risk (Aquatic and Terrestrial)**

Joe Batt's Arm is within the distributional range of the Blue Whale (Atlantic population) and North Atlantic Right Whale; placed on Schedule 1 of the Species at Risk Act by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The proposed project site is not likely to provide any critical, limiting, or sensitive habitat for any of the listed Species at Risk.

**22. Scope of Effects Considered (sections 5(1) and 5(2)):**

**Table 1: Potential Project / Environment Interactions Matrix**

Project Phase / Physical Work/Activity	As per Section 5(1)			Section 5(1c) Aboriginal Interest				Section 5(2)			Due Diligence			
	Fish (Fisheries Act)	Aquatic Species (SARA)	Birds (MBCA)	Health and Socio economic	Physical and cultural heritage	Land use	*HAPA Significance	Health and Socio economic	Physical and cultural heritage	*HAPA Significance	Water (ground, surface, drainage, etc)	Terrestrial / Aquatic Species	Soil	Air Quality
<b>Construction/Installation</b>														
Wharf/shed demolitions	P	-	-	-	-	-	-	-	-	-	P	P	P	P
Wharf reconstruction/extension	P	-	-	-	-	-	-	-	-	-	P	P	-	P
Dredging	P	-	-	-	-	-	-	-	-	-	P	P	P	P
Infilling/parking area expansion	P	-	-	-	-	-	-	-	-	-	P	P	-	P
<b>Operation / Maintenance</b>	P	-	-	-	-	-	-	-	-	-	P	-	-	-
<b>Decommissioning / Abandonment</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*\*structure, site or thing that is of historical, archaeological, paleontological or architectural significance.*

*Legend: P = Potential Effect of Project on Environment; '-' = No Interaction*

### **23. Environmental Effects of Project:**

Potential Project/Environment Interactions and their effects are outlined below:

#### **Fish:**

- Sedimentation as a result of wharf demolition, construction/extension and dredging may negatively impact fish and quality of potential fish habitat at the immediate project site.
- Dredging and extension of wharf will destroy potential fish habitat within project footprint.
- Accidental discharge of heavy machinery fuel/fluids could negatively impact fish and potential fish habitat.

#### **Water:**

- Sedimentation as a result of wharf demolition, construction/extension and dredging may decrease marine water quality at immediate project site.
- Improperly transported/disposed of dredge spoils may result in contamination of groundwater.
- Construction related refuse may be deposited in water-body, decreasing marine water quality.
- Accidental discharge of heavy machinery fuel/fluids may result in a decrease of marine water quality.

#### **Aquatic species:**

- Sedimentation as a result of wharf demolition, construction/extension and dredging may negatively impact aquatic species present at the immediate project site.
- Dredging and extension of wharf will destroy potential fish habitat within project footprint.
- Accidental discharge of heavy machinery fuel/fluids could negatively affect aquatic species present at the immediate project site.

#### **Soil:**

- Exposed soils and stockpiled dredge spoils may erode.
- Improperly transported/disposed of dredge spoils and treated timber may result in contamination of surrounding soils.

#### **Air quality:**

- Construction activities may result in nuisance impacts due to noise and dust.
  - Improper storage/disposal of dredge spoils may result in unpleasant odours and provide annoyance to facility users and nearby residents
-

#### **24. Mitigation Measures for Project (including Habitat Compensation):**

- Minimize duration of in-water work wherever possible
  - Conduct in-water work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat
  - Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation
  - Plan activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals do not enter the watercourse
  - Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance and keep an emergency spill kit on site
  - Ensure that construction materials used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish
  - Develop and implement an Erosion and Sediment Control Plan for the site that minimizes risk of sedimentation of the waterbody during all phases of the project. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear.
  - Remove all construction materials from site upon project completion,
  - Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks.
  - Whenever possible, operate machinery on land above the high water mark, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody,
  - Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water. Waste materials should not be deposited in the tidal waters;
  - Cribbing ballast should be, to the greatest extent possible, free of fine grained materials to help minimize sedimentation of the waterbody and must not be obtained from below the highwater mark.
  - The development of a quarry, if required, must be completed in accordance with applicable provincial legislation and regulations.
  - As part of this projects pre-planning process, several sediment samples were collected from the proposed target dredge area. Several samples exceeded CCME soil quality guidelines for an industrial site. Dredge soils and excavated material are not permitted to be re-used on site or disposed of on private property and must be disposed of at an approved waste disposal site. The proponent is required to adhere to all conditions stipulated by Service NL concerning the disposal of dredge spoils.
  - To avoid accidental spillage of dredge spoils during transportation, it is recommended that dump trucks be equipped with a leak proof liner or a tailgate gasket.
  - Removal of potentially hazardous materials from on-site structures slated for demolition should be completed by qualified individuals, pursuant to applicable health and safety regulations.
  - Any hazardous materials produced as a result of this project are to be transported off-site for disposal/treatment at an approved waste handling facility, pursuant to applicable provincial and federal regulations/legislation.
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**25. Significance of Adverse Environmental Effects of project:**

Significant adverse environmental effects are unlikely, taking into account mitigation measures.

**26. Other Considerations (Public Consultation, Aboriginal Consultation, Follow-up)****Public Consultation**

The proposed project will provide safer and more secure access for vessels utilizing this facility. No negative public concern is expected as a result of this project. As such, public consultation was not deemed necessary as part of this determination.

**Aboriginal Consultation**

Aboriginal fishers are not known to utilize the Joe Batt's Arm SCH facility, nor are there any known aboriginal groups in the surrounding area. As such, aboriginal consultation was not deemed necessary as part of this determination.

**Government Consultation**

Federal and provincial authorities likely to have an interest in the project were consulted by Public Works & Government Services Canada, Environmental Services, during the course of this assessment. A project description was distributed to the following authorities:

- Fisheries and Oceans Canada – Fisheries Protection Program (DFO FPP)
- Transport Canada – Navigation Protection Program (TC NPP)
- Newfoundland and Labrador Department of Environment and Conservation, Water Resources Management Division (NLDOEC WR)
- Service Newfoundland and Labrador (SNL)

DFO FPP determined that 'Serious Harm' to fish could be avoided by following standard mitigations as described within this document.

TC NPP issued an approval under the Navigation Protection Act under File No. 8200-02-1016.

NLDOEC WR is responsible for issuing permits to DFO SCH for the dredging of material in excess of 2000 cubic metres. This permit has not been obtained at the time of writing this report.

SNL has issued an approval for the disposal of dredged sediments and treated timber at the Central Newfoundland Waste Management Facility under File No. GA/GSC/9043.

All expert advice/specialist information provided by the abovenoted departments has been incorporated into this document and may also be found in Appendix C. It is the proponents' responsibility to ensure that all conditions/mitigations stipulated in all regulatory approvals are adhered to.

**Accuracy and Compliance Monitoring**

A follow-up program (as defined in S. 2(1) and as applicable to non-designated projects on federal lands) is a program for determining the effectiveness of any mitigation measures. Site monitoring (accuracy and compliance monitoring) may be conducted to verify whether required mitigation measures were implemented. The proponent must provide site access to Responsible Authority officials and/or its agents upon request.

**27. Other Monitoring and Compliance Requirements (e.g. Fisheries Act or Species at Risk Act requirements)**

n/a

## CONCLUSION

### 28. Conclusion on Significance of Adverse Environmental Effects:

The Federal Authority has evaluated the project in accordance with Section 67 of *Canadian Environmental Assessment Act (CEAA), 2012*. On the basis of this evaluation, the department has determined that the project is not likely to cause significant adverse environmental effects with mitigation and therefore can proceed using mitigative measures as outlined.

29. Prepared by: \_\_\_\_\_



30. Date: May 14, 2015

31. Name: Mark McNeil

32. Title: Environmental Specialist, PWGSC-ES

## DECISION

### 33. Decision Taken

- DFO may exercise its power, duty or function, i.e. may issue the authorization - where the project is not likely to cause significant adverse environmental effects. Confirm below the specific power, duty or function that may be exercised.
- DFO to issue *Fisheries Act* Authorization or *Species at Risk Act* Permit
  - DFO to proceed with project (as proponent)
  - DFO to provide financial assistance for project to proceed
  - DFO to provide federal land for project to proceed
- DFO has decided not to exercise its power, duty or function because the project is likely to cause significant adverse environmental effects.
- DFO to ask the Governor in Council to determine if the significant adverse environmental effects are justified in the circumstances

34. Approved by: \_\_\_\_\_

35. Date: \_\_\_\_\_

36. Name: Paul Curran

37. Title: Regional Engineer, DFO-SCH, NL

38. References: n/a

## TRANSPORT CANADA RECOMMENDATION

### 39. This section must be completed by Transport Canada;

Environmental effects of the project on navigation are taken into consideration as part of the environmental assessment only when the effects are indirect, *i.e.* resulting from a change in the environment affecting navigation. Direct effects on navigation are not considered in the environmental assessment, but any measures necessary to mitigate direct effects will be included as conditions of the *Navigation Protection Act* approval.

- Only direct effects are identified; therefore the effects of the project on navigation are not addressed in this environmental assessment.
- Indirect effects were identified and have been addressed in this environmental assessment.

40. REVIEWED by:  41. Date: May 27, 2015

42. Name: Melissa Ginn

43. Title: Environmental Officer – Environmental Affairs, Transport Canada

44. The above has reviewed the environmental screening report and recommends the determination as indicated above.

45. RECOMMENDED by:  46. Date: May 27, 2015

47. Name: Randy Decker

48. Title: Senior Environmental Assessment Officer  
Environmental Affairs, Transport Canada

49. APPROVED by:  50. Date: May 28, 2015

51. Name: Kevin LeBlanc

52. Title: Regional Manager – Environmental Affairs, Transport Canada

53. The above has reviewed the environmental screening report and approves the recommended environmental effects determination.

## **APPENDICES**

- Appendix A - Topographic Map and Aerial Photographs
    - Appendix B: Site Plan
    - Appendix C: Regulatory approvals/responses
    - Appendix D: Sediment/timber analytical results
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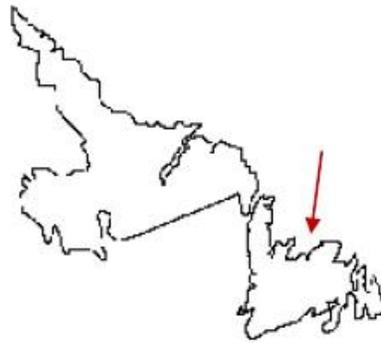
**Appendix A**  
**Topographic Map and Aerial Photos**





**Description**

Figure 1: Topographic Map of Proposed Site  
Location: Joe Batts Arm





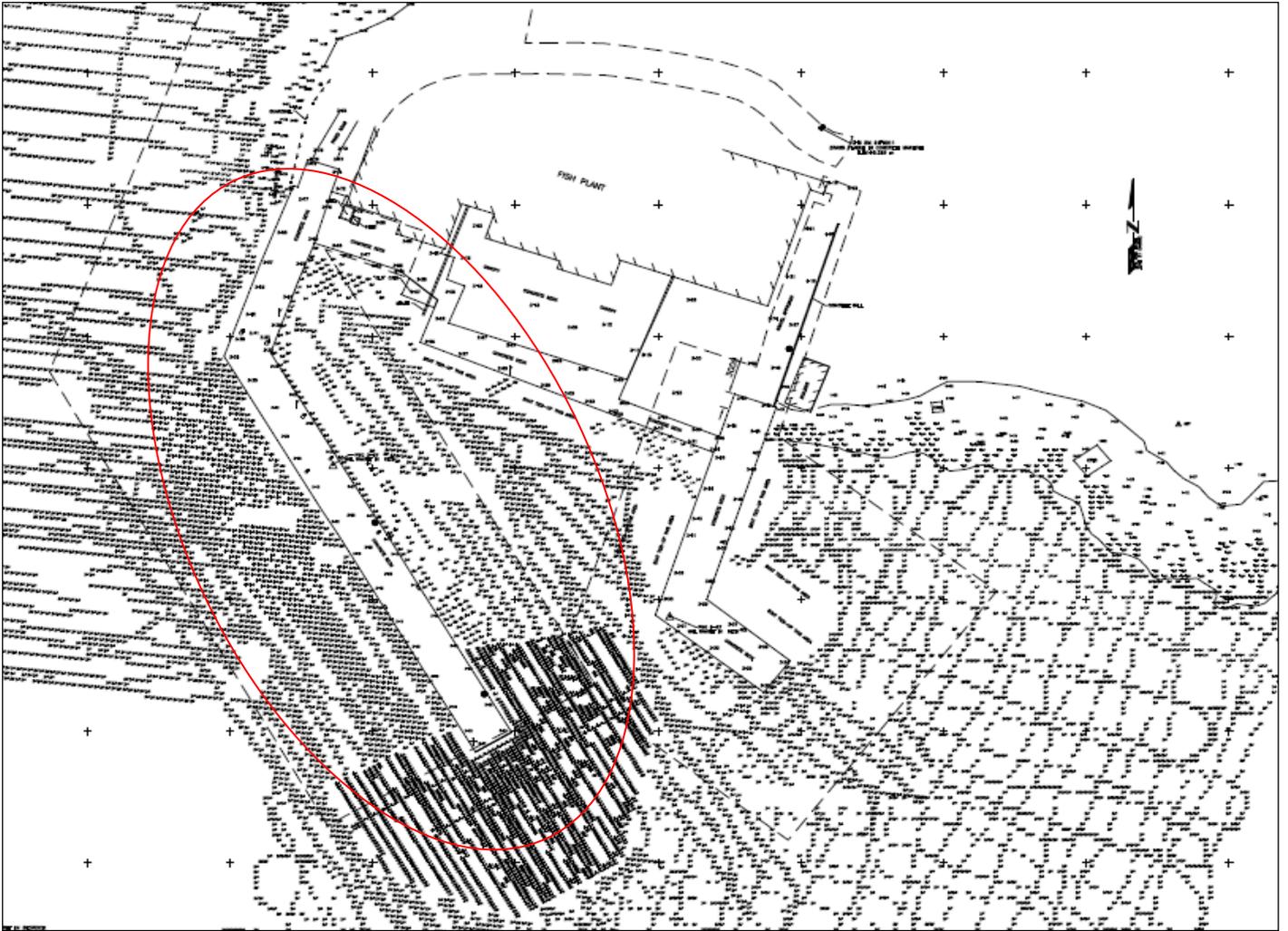
**Figure 2:** Aerial overview of Joe Batts Arm harbour including proposed project site.



**Figure 3:** Aerial close-up of wharf to be reconstructed (in red) and infill area (green). Approximate dredge areas in yellow.

**Appendix B**  
**Site Plan of proposed project**





**Figure 4.** Existing breakwater wharf to be demolished.

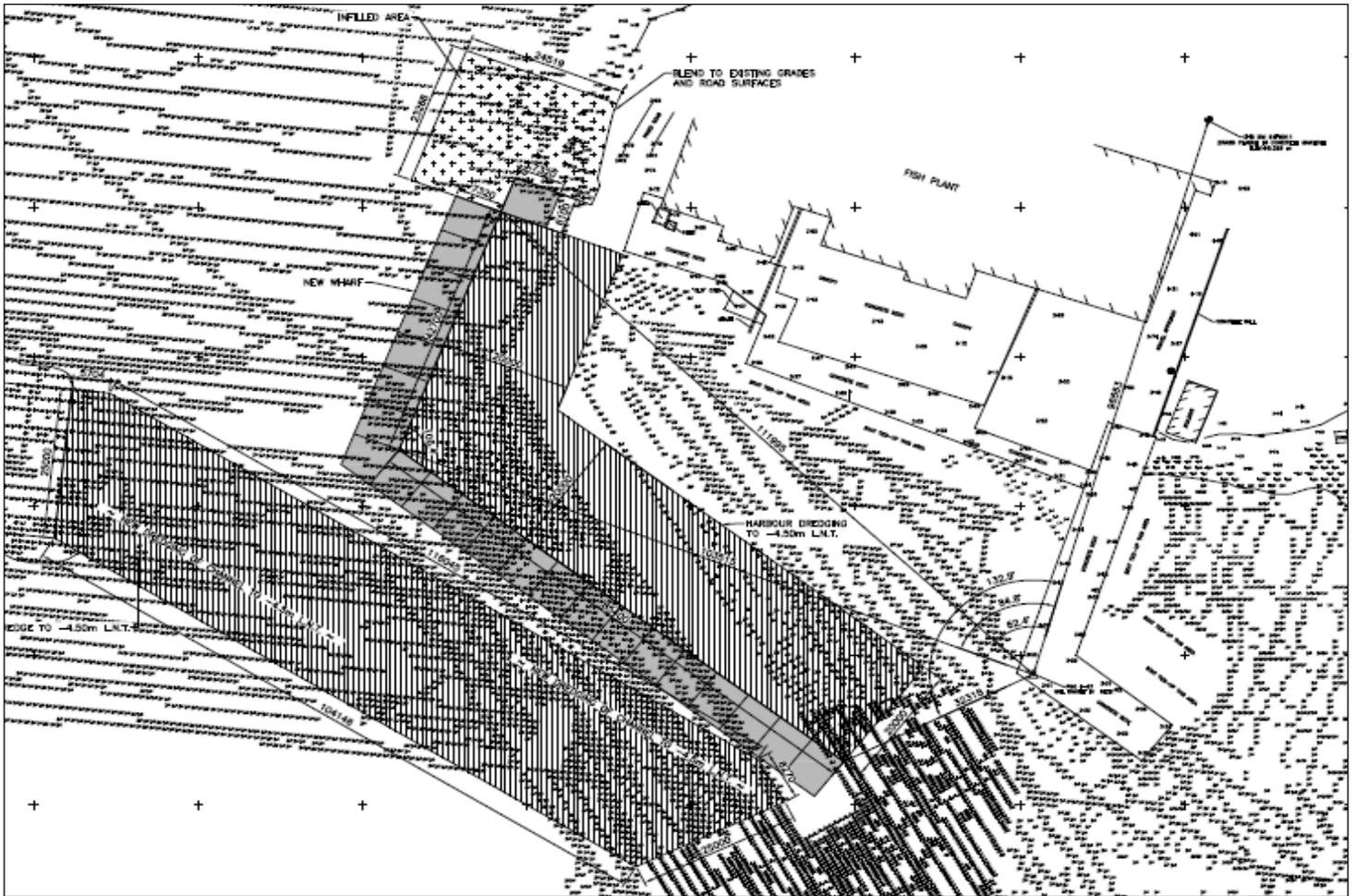


Figure 5. Proposed wharf reconstruction including infill and target dredge areas.

**Appendix C**  
**Regulatory approvals/responses**

**Appendix D**  
**Sediment/timber analytical results**



Your file      Votre référence  
n/a

Our file      Notre référence  
15-HNFL-00091

Paul Curran  
Regional Engineer  
DFO, SCH  
10 Barters Hill  
St. John's, NL A1C 5X1

Dear Mr. Curran:

**Subject: Serious harm to fish can be avoided or mitigated**

The Fisheries Protection Program (the Program) of Fisheries and Oceans Canada received your proposal for the reconstruction of the existing breakwater wharf and associated dredging and infilling in Joe Batts Arm, NL on March 23, 2015.

Based on the information provided, your proposal has been identified as a project where a *Fisheries Act* authorization is not required given that serious harm to fish can be avoided by following standard measures. Proposals in this category are not considered to need an authorization from the Program under the *Fisheries Act* in order to proceed. In order to comply with the Act, it is recommended that you follow our guidance tools which can be found at the following website (<http://www.dfo-mpo.gc.ca/pnw-pppe/measures-mesures/index-eng.html>). It remains your responsibility to meet the other requirements of federal, provincial and municipal agencies.

Should your plans change or if you have omitted some information in your proposal such that your proposal meets the criteria for a site specific review, as described on our website (<http://www.dfo-mpo.gc.ca/pnw-pppe/index-eng.html>), you should complete and submit the request for review form that is also available on the website.

Should you have any questions or concerns about the compliance of your proposal with the *Fisheries Act*, you may wish to engage an environmental professional familiar with measures to avoid impacts to fish and fish habitat (<http://www.dfo-mpo.gc.ca/pnw-pppe/env-pro-eng.html>).

Yours sincerely,

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Michelle M. Roberge  
Team Leader, Triage & Planning

May 28, 2015

**File No: GA/GSC/9042**

Mr. Mark McNeil  
Environmental Services  
Public Works and Government Services Canada  
Suite 204, 1 Regent Square  
Corner Brook, NL A2H 7K6

**RE: Harbour Development, Creosote Treated Timber Disposal, Joe Batts Arm, NL**

Dear Mr. McNeil,

The Government Service Centre has received and reviewed your request of May 20, 2015, regarding the above mentioned project. Based on the results of chemical analyses provided, the Government Service Centre has no objections to the disposal of creosote treated timber at the lined landfill located at the Central Newfoundland Waste Management Facility with prior permission from the owner/operator.

Should you have any questions regarding this matter, please contact the undersigned at 256-1423.

Regards,



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Courtney Hunt, CPHI(C)  
Environmental Protection Officer

Copy: Ed Evans - Central Newfoundland Waste Management

May 28, 2015

File No: GA/GSC/9043

Mr. Mark McNeil  
Environmental Services  
Public Works and Government Services Canada  
Suite 204, 1 Regent Square  
Corner Brook, NL A2H 7K6

**RE: Dredge Material Disposal – Harbour Development, Joe Batts Arm, NL**

Dear Mr. McNeil,

Service NL has received and reviewed your request of May 20, 2015, regarding the above mentioned project. The project proposes removal and disposal of approximately 4300 cubic meters of Class B (sand, gravel and cobble) material.

Based on the results of chemical analysis provided, the Government Service Centre has no objections to the disposal of dredge material at the Central Newfoundland Waste Management Facility. The soil can be utilized for backfill material and any unused material should be stockpiled on site for future use. Prior approval from the owner/operator is required.

Should you have any questions regarding this matter, please feel free to contact the undersigned at 256-1423.

Regards,



Courtney Hunt, CPHI(C)  
Environmental Protection Officer

Copy: Ed Evans – Central Newfoundland Waste Management

Your P.O. #: CALLUP #56  
 Your Project #: R.071033.035  
 Site Location: JOE BATTS ARM - TIMBER SAMPLES  
 Your C.O.C. #: B 144041

**Attention: Cathy Martin**

Public Works & Government Services Canada  
 PO Box 4600  
 10 Barter's Hill  
 St. John's, NL  
 A1C 5T2

**Report Date: 2015/04/16**  
 Report #: R3392120  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B561781**  
**Received: 2015/04/09, 09:42**

Sample Matrix: Soil  
 # Samples Received: 3

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Semivolatile Organic Compounds (TCLP) (1)	3	2015/04/14	2015/04/15	CAM SOP-00301	EPA 8270 m
TCLP - % Solids (1)	3	2015/04/10	2015/04/11	CAM SOP-00401	EPA 1311 Update I m
TCLP - Extraction Fluid (1)	3	N/A	2015/04/11	CAM SOP-00401	EPA 1311 Update I m
TCLP - Initial and final pH (1)	3	N/A	2015/04/11	CAM SOP-00401	EPA 1311 Update I m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

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

(1) This test was performed by Maxxam Analytics Mississauga

**Encryption Key**

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

Heather Macumber, Project Manager  
 Email: HMacumber@maxxam.ca  
 Phone# (902)420-0203 Ext:226

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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 Job #: B561781  
Report Date: 2015/04/16

Public Works & Government Services Canada  
Client Project #: R.071033.035  
Site Location: JOE BATTS ARM - TIMBER SAMPLES  
Your P.O. #: CALLUP #56

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		ABQ314	ABQ315	ABQ316		
Sampling Date		2015/04/07	2015/04/07	2015/04/07		
COC Number		B 144041	B 144041	B 144041		
	Units	JBA TS #1	JBA TS #2	JBA TS #3	RDL	QC Batch
<b>Inorganics</b>						
Final pH	pH	4.97	4.96	4.95		3979266
Initial pH	pH	6.27	6.69	5.75		3979266
TCLP - % Solids	%	100	100	100	0.2	3979264
TCLP Extraction Fluid	N/A	FLUID 1	FLUID 1	FLUID 1		3979265
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

Maxxam Job #: B561781  
Report Date: 2015/04/16

Public Works & Government Services Canada  
Client Project #: R.071033.035  
Site Location: JOE BATTS ARM - TIMBER SAMPLES  
Your P.O. #: CALLUP #56

**SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)**

Maxxam ID		ABQ314	ABQ315		ABQ316		
Sampling Date		2015/04/07	2015/04/07		2015/04/07		
COC Number		B 144041	B 144041		B 144041		
	Units	JBA TS #1	JBA TS #2	RDL	JBA TS #3	RDL	QC Batch
<b>Semivolatile Organics</b>							
Leachable Phenol	ug/L	190	200	20	720	20	3982048
Leachable Aldicarb	ug/L	ND	ND	200	ND	200	3982048
Leachable Atrazine	ug/L	ND	ND	40	ND	40	3982048
Leachable Des-ethyl atrazine	ug/L	ND	ND	40	ND	40	3982048
Leachable Bendiocarb	ug/L	ND	ND	80	ND	80	3982048
Leachable Benzo(a)pyrene	ug/L	ND	0.80	0.80	ND	0.80	3982048
Leachable Bromoxynil	ug/L	ND	ND	40	ND	40	3982048
Leachable Carbaryl	ug/L	ND	ND	200	ND	200	3982048
Leachable Carbofuran	ug/L	ND	ND	200	ND	200	3982048
Leachable Chlorpyrifos (Dursban)	ug/L	ND	ND	40	ND	40	3982048
Leachable m/p-Cresol	ug/L	610	900	20	2600	20	3982048
Leachable o-Cresol	ug/L	320	370	20	960	20	3982048
Leachable Cresol Total	ug/L	940	1300	20	3600	20	3982048
Leachable Cyanazine (Bladex)	ug/L	ND	ND	80	ND	80	3982048
Leachable 2,4-D	ug/L	ND	ND	40	ND	40	3982048
Leachable 2,4-Dichlorophenol	ug/L	ND	ND	20	ND	20	3982048
Leachable Diazinon	ug/L	ND	ND	40	ND	40	3982048
Leachable Dicamba	ug/L	ND	ND	40	ND	40	3982048
Leachable Diclofop-methyl	ug/L	ND	ND	40	ND	40	3982048
Leachable Dimethoate	ug/L	ND	ND	200	ND	200	3982048
Leachable 2,4-Dinitrotoluene	ug/L	ND	ND	80	ND	80	3982048
Leachable Dinoseb	ug/L	ND	ND	40	ND	40	3982048
Leachable Hexachlorobenzene	ug/L	ND	ND	80	ND	80	3982048
Leachable Hexachlorobutadiene	ug/L	ND	ND	80	ND	80	3982048
Leachable Hexachloroethane	ug/L	ND	ND	80	ND	80	3982048
Leachable Malathion	ug/L	ND	ND	200	ND	200	3982048
Leachable Methyl parathion	ug/L	ND	ND	40	ND	40	3982048
Leachable Metolachlor	ug/L	ND	ND	20	ND	20	3982048
Leachable Metribuzin (Sencor)	ug/L	ND	ND	200	ND	200	3982048
Leachable Nitrobenzene	ug/L	ND	ND	80	ND	80	3982048
Leachable Ethyl Parathion	ug/L	ND	ND	40	ND	40	3982048
Leachable Pentachlorophenol	ug/L	ND	ND	20	ND	20	3982048
Leachable Phorate	ug/L	ND	ND	40	ND	40	3982048
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected							

Maxxam Job #: B561781  
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Public Works & Government Services Canada  
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Site Location: JOE BATTS ARM - TIMBER SAMPLES  
Your P.O. #: CALLUP #56

**SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)**

Maxxam ID		ABQ314	ABQ315		ABQ316		
Sampling Date		2015/04/07	2015/04/07		2015/04/07		
COC Number		B 144041	B 144041		B 144041		
	Units	JBA TS #1	JBA TS #2	RDL	JBA TS #3	RDL	QC Batch
Leachable Picloram	ug/L	ND	ND	200	ND	200	3982048
Leachable Pyridine	ug/L	ND	ND	80	ND	80	3982048
Leachable Simazine	ug/L	ND	ND	80	ND	80	3982048
Leachable 2,4,5-T	ug/L	ND	ND	40	ND	40	3982048
Leachable 2,4,5-TP (Silvex)	ug/L	ND	ND	20	ND	20	3982048
Leachable Terbufos	ug/L	ND	ND	28	ND	28	3982048
Leachable 2,3,4,6-Tetrachlorophenol	ug/L	ND	ND	20	ND (1)	35	3982048
Leachable Triallate	ug/L	ND	ND	40	ND	40	3982048
Leachable 2,4,5-Trichlorophenol	ug/L	ND	ND	4.0	ND	4.0	3982048
Leachable 2,4,6-Trichlorophenol	ug/L	ND	ND	20	ND	20	3982048
Leachable Trifluralin	ug/L	ND	ND	40	ND	40	3982048
<b>Surrogate Recovery (%)</b>							
Leachable 2,4,6-Tribromophenol	%	86	79		65		3982048
Leachable 2-Fluorobiphenyl	%	60	59		62		3982048
Leachable 2-Fluorophenol	%	58	57		41		3982048
Leachable D14-Terphenyl (FS)	%	76	70		62		3982048
Leachable D5-Nitrobenzene	%	79	77		60		3982048
Leachable D5-Phenol	%	31	30		20		3982048
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected (1) Detection Limit was raised due to matrix interferences.							

Maxxam Job #: B561781  
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### GENERAL COMMENTS

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

Package 1	1.2°C
-----------	-------

ABNMS-LC ANALYSIS: Due to the nature of the sample, a smaller amount was used for the analysis.

Sample ABQ314-01 : ABNMS-LC ANALYSIS: Due to the nature of the sample, a smaller amount was used for the analysis. Detection limits were adjusted accordingly.

Sample ABQ315-01 : ABNMS-LC ANALYSIS: Due to the nature of the sample, a smaller amount was used for the analysis. Detection limits were adjusted accordingly.

Sample ABQ316-01 : ABNMS-LC ANALYSIS: Due to the nature of the sample, a smaller amount was used for the analysis. Detection limits were adjusted accordingly.

**Results relate only to the items tested.**

Maxxam Job #: B561781  
Report Date: 2015/04/16

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### QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
3982048	WZ	Matrix Spike	Leachable 2,4,6-Tribromophenol	2015/04/15		93	%	10 - 130
			Leachable 2-Fluorobiphenyl	2015/04/15		76	%	30 - 130
			Leachable 2-Fluorophenol	2015/04/15		58	%	10 - 130
			Leachable D14-Terphenyl (FS)	2015/04/15		83	%	30 - 130
			Leachable D5-Nitrobenzene	2015/04/15		89	%	30 - 130
			Leachable D5-Phenol	2015/04/15		32	%	10 - 130
			Leachable Phenol	2015/04/15		35	%	30 - 130
			Leachable Aldicarb	2015/04/15		106	%	30 - 130
			Leachable Atrazine	2015/04/15		101	%	30 - 130
			Leachable Des-ethyl atrazine	2015/04/15		52	%	30 - 130
			Leachable Bendiocarb	2015/04/15		96	%	30 - 130
			Leachable Benzo(a)pyrene	2015/04/15		98	%	30 - 130
			Leachable Bromoxynil	2015/04/15		102	%	10 - 130
			Leachable Carbaryl	2015/04/15		94	%	30 - 130
			Leachable Carbofuran	2015/04/15		95	%	30 - 130
			Leachable Chlorpyrifos (Dursban)	2015/04/15		105	%	30 - 130
			Leachable m/p-Cresol	2015/04/15		71	%	10 - 130
			Leachable o-Cresol	2015/04/15		84	%	10 - 130
			Leachable Cyanazine (Bladex)	2015/04/15		88	%	30 - 130
			Leachable 2,4-D	2015/04/15		84	%	10 - 130
			Leachable 2,4-Dichlorophenol	2015/04/15		90	%	10 - 130
			Leachable Diazinon	2015/04/15		106	%	30 - 130
			Leachable Dicamba	2015/04/15		69	%	10 - 130
			Leachable Diclofop-methyl	2015/04/15		98	%	30 - 130
			Leachable Dimethoate	2015/04/15		91	%	30 - 130
			Leachable 2,4-Dinitrotoluene	2015/04/15		91	%	30 - 130
			Leachable Dinoseb	2015/04/15		94	%	30 - 130
			Leachable Hexachlorobenzene	2015/04/15		95	%	30 - 130
			Leachable Hexachlorobutadiene	2015/04/15		84	%	30 - 130
			Leachable Hexachloroethane	2015/04/15		82	%	30 - 130
			Leachable Malathion	2015/04/15		95	%	30 - 130
			Leachable Methyl parathion	2015/04/15		97	%	30 - 130
			Leachable Metolachlor	2015/04/15		106	%	30 - 130
			Leachable Metribuzin (Sencor)	2015/04/15		78	%	30 - 130
			Leachable Nitrobenzene	2015/04/15		96	%	30 - 130
			Leachable Ethyl Parathion	2015/04/15		93	%	30 - 130
			Leachable Pentachlorophenol	2015/04/15		98	%	30 - 130
			Leachable Phorate	2015/04/15		93	%	30 - 130
			Leachable Picloram	2015/04/15		27	%	10 - 130
			Leachable Pyridine	2015/04/15		28	%	10 - 130
Leachable Simazine	2015/04/15		98	%	30 - 130			
Leachable 2,4,5-T	2015/04/15		98	%	10 - 130			
Leachable 2,4,5-TP (Silvex)	2015/04/15		98	%	10 - 130			
Leachable Terbufos	2015/04/15		95	%	30 - 130			
Leachable 2,3,4,6-Tetrachlorophenol	2015/04/15		101	%	10 - 130			
Leachable Triallate	2015/04/15		102	%	30 - 130			
Leachable 2,4,5-Trichlorophenol	2015/04/15		97	%	10 - 130			
Leachable 2,4,6-Trichlorophenol	2015/04/15		95	%	10 - 130			
Leachable Trifluralin	2015/04/15		129	%	30 - 130			
3982048	WZ	Spiked Blank	Leachable 2,4,6-Tribromophenol	2015/04/15		90	%	10 - 130
			Leachable 2-Fluorobiphenyl	2015/04/15		75	%	30 - 130
			Leachable 2-Fluorophenol	2015/04/15		56	%	10 - 130

Maxxam Job #: B561781  
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Public Works & Government Services Canada  
Client Project #: R.071033.035  
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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Leachable D14-Terphenyl (FS)	2015/04/15		81	%	30 - 130
			Leachable D5-Nitrobenzene	2015/04/15		87	%	30 - 130
			Leachable D5-Phenol	2015/04/15		30	%	10 - 130
			Leachable Phenol	2015/04/15		33	%	30 - 130
			Leachable Aldicarb	2015/04/15		99	%	30 - 130
			Leachable Atrazine	2015/04/15		101	%	30 - 130
			Leachable Des-ethyl atrazine	2015/04/15		52	%	30 - 130
			Leachable Bendiocarb	2015/04/15		92	%	30 - 130
			Leachable Benzo(a)pyrene	2015/04/15		94	%	30 - 130
			Leachable Bromoxynil	2015/04/15		97	%	10 - 130
			Leachable Carbaryl	2015/04/15		89	%	30 - 130
			Leachable Carbofuran	2015/04/15		91	%	30 - 130
			Leachable Chlorpyrifos (Dursban)	2015/04/15		102	%	30 - 130
			Leachable m/p-Cresol	2015/04/15		68	%	10 - 130
			Leachable o-Cresol	2015/04/15		80	%	10 - 130
			Leachable Cyanazine (Bladex)	2015/04/15		86	%	30 - 130
			Leachable 2,4-D	2015/04/15		80	%	10 - 130
			Leachable 2,4-Dichlorophenol	2015/04/15		88	%	10 - 130
			Leachable Diazinon	2015/04/15		103	%	30 - 130
			Leachable Dicamba	2015/04/15		68	%	10 - 130
			Leachable Diclofop-methyl	2015/04/15		94	%	30 - 130
			Leachable Dimethoate	2015/04/15		87	%	30 - 130
			Leachable 2,4-Dinitrotoluene	2015/04/15		89	%	30 - 130
			Leachable Dinoseb	2015/04/15		91	%	30 - 130
			Leachable Hexachlorobenzene	2015/04/15		93	%	30 - 130
			Leachable Hexachlorobutadiene	2015/04/15		84	%	30 - 130
			Leachable Hexachloroethane	2015/04/15		81	%	30 - 130
			Leachable Malathion	2015/04/15		91	%	30 - 130
			Leachable Methyl parathion	2015/04/15		93	%	30 - 130
			Leachable Metolachlor	2015/04/15		104	%	30 - 130
			Leachable Metribuzin (Sencor)	2015/04/15		79	%	30 - 130
			Leachable Nitrobenzene	2015/04/15		94	%	30 - 130
			Leachable Ethyl Parathion	2015/04/15		91	%	30 - 130
			Leachable Pentachlorophenol	2015/04/15		95	%	30 - 130
			Leachable Phorate	2015/04/15		90	%	30 - 130
			Leachable Picloram	2015/04/15		19	%	10 - 130
			Leachable Pyridine	2015/04/15		21	%	10 - 130
			Leachable Simazine	2015/04/15		96	%	30 - 130
			Leachable 2,4,5-T	2015/04/15		93	%	10 - 130
			Leachable 2,4,5-TP (Silvex)	2015/04/15		93	%	10 - 130
			Leachable Terbufos	2015/04/15		92	%	30 - 130
			Leachable 2,3,4,6-Tetrachlorophenol	2015/04/15		98	%	10 - 130
			Leachable Triallate	2015/04/15		100	%	30 - 130
			Leachable 2,4,5-Trichlorophenol	2015/04/15		95	%	10 - 130
			Leachable 2,4,6-Trichlorophenol	2015/04/15		92	%	10 - 130
			Leachable Trifluralin	2015/04/15		127	%	30 - 130
3982048	WZ	Method Blank	Leachable 2,4,6-Tribromophenol	2015/04/15		79	%	10 - 130
			Leachable 2-Fluorobiphenyl	2015/04/15		75	%	30 - 130
			Leachable 2-Fluorophenol	2015/04/15		56	%	10 - 130
			Leachable D14-Terphenyl (FS)	2015/04/15		72	%	30 - 130
			Leachable D5-Nitrobenzene	2015/04/15		80	%	30 - 130
			Leachable D5-Phenol	2015/04/15		30	%	10 - 130

Maxxam Job #: B561781  
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Public Works & Government Services Canada  
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Your P.O. #: CALLUP #56

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Leachable Phenol	2015/04/15	ND, RDL=2.5		ug/L	
			Leachable Aldicarb	2015/04/15	ND, RDL=25		ug/L	
			Leachable Atrazine	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable Des-ethyl atrazine	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable Bendiocarb	2015/04/15	ND, RDL=10		ug/L	
			Leachable Benzo(a)pyrene	2015/04/15	ND, RDL=0.10		ug/L	
			Leachable Bromoxynil	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable Carbaryl	2015/04/15	ND, RDL=25		ug/L	
			Leachable Carbofuran	2015/04/15	ND, RDL=25		ug/L	
			Leachable Chlorpyrifos (Dursban)	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable m/p-Cresol	2015/04/15	ND, RDL=2.5		ug/L	
			Leachable o-Cresol	2015/04/15	ND, RDL=2.5		ug/L	
			Leachable Cresol Total	2015/04/15	ND, RDL=2.5		ug/L	
			Leachable Cyanazine (Bladex)	2015/04/15	ND, RDL=10		ug/L	
			Leachable 2,4-D	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable 2,4-Dichlorophenol	2015/04/15	ND, RDL=2.5		ug/L	
			Leachable Diazinon	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable Dicamba	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable Diclofop-methyl	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable Dimethoate	2015/04/15	ND, RDL=25		ug/L	
			Leachable 2,4-Dinitrotoluene	2015/04/15	ND, RDL=10		ug/L	
			Leachable Dinoseb	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable Hexachlorobenzene	2015/04/15	ND, RDL=10		ug/L	
			Leachable Hexachlorobutadiene	2015/04/15	ND, RDL=10		ug/L	

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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Leachable Hexachloroethane	2015/04/15	ND, RDL=10		ug/L	
			Leachable Malathion	2015/04/15	ND, RDL=25		ug/L	
			Leachable Methyl parathion	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable Metolachlor	2015/04/15	ND, RDL=2.5		ug/L	
			Leachable Metribuzin (Sencor)	2015/04/15	ND, RDL=25		ug/L	
			Leachable Nitrobenzene	2015/04/15	ND, RDL=10		ug/L	
			Leachable Ethyl Parathion	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable Pentachlorophenol	2015/04/15	ND, RDL=2.5		ug/L	
			Leachable Phorate	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable Picloram	2015/04/15	ND, RDL=25		ug/L	
			Leachable Pyridine	2015/04/15	ND, RDL=10		ug/L	
			Leachable Simazine	2015/04/15	ND, RDL=10		ug/L	
			Leachable 2,4,5-T	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable 2,4,5-TP (Silvex)	2015/04/15	ND, RDL=2.5		ug/L	
			Leachable Terbufos	2015/04/15	ND, RDL=3.5		ug/L	
			Leachable 2,3,4,6-Tetrachlorophenol	2015/04/15	ND, RDL=2.5		ug/L	
			Leachable Triallate	2015/04/15	ND, RDL=5.0		ug/L	
			Leachable 2,4,5-Trichlorophenol	2015/04/15	ND, RDL=0.50		ug/L	
			Leachable 2,4,6-Trichlorophenol	2015/04/15	ND, RDL=2.5		ug/L	
			Leachable Trifluralin	2015/04/15	ND, RDL=5.0		ug/L	
3982048	WZ	RPD	Leachable Benzo(a)pyrene	2015/04/15	NC		%	40
			Leachable m/p-Cresol	2015/04/15	NC		%	40
			Leachable o-Cresol	2015/04/15	NC		%	40
			Leachable Cresol Total	2015/04/15	NC		%	40
			Leachable 2,4-Dichlorophenol	2015/04/15	NC		%	40
			Leachable 2,4-Dinitrotoluene	2015/04/15	NC		%	40
			Leachable Hexachlorobenzene	2015/04/15	NC		%	40
			Leachable Hexachlorobutadiene	2015/04/15	NC		%	40
			Leachable Hexachloroethane	2015/04/15	NC		%	40
			Leachable Nitrobenzene	2015/04/15	NC		%	40

Maxxam Job #: B561781  
Report Date: 2015/04/16

Public Works & Government Services Canada  
Client Project #: R.071033.035  
Site Location: JOE BATTS ARM - TIMBER SAMPLES  
Your P.O. #: CALLUP #56

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Leachable Pentachlorophenol	2015/04/15	NC		%	40
			Leachable Pyridine	2015/04/15	NC		%	40
			Leachable 2,3,4,6-Tetrachlorophenol	2015/04/15	NC		%	40
			Leachable 2,4,5-Trichlorophenol	2015/04/15	NC		%	40
			Leachable 2,4,6-Trichlorophenol	2015/04/15	NC		%	40

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

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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

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

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

Maxxam Job #: B561781  
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Public Works & Government Services Canada  
Client Project #: R.071033.035  
Site Location: JOE BATTS ARM - TIMBER SAMPLES  
Your P.O. #: CALLUP #56

### VALIDATION SIGNATURE PAGE

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


\_\_\_\_\_  
Ewa Pranjić, M.Sc., C.Chem, Scientific Specialist

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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.

Your P.O. #: CALL UP #56  
 Your Project #: R.071033.035  
 Site Location: JOE BATT'S ARM  
 Your C.O.C. #: B 144042

**Attention: Cathy Martin**

Public Works & Government Services Canada  
 PO Box 4600  
 10 Barter's Hill  
 St. John's, NL  
 A1C 5T2

**Report Date: 2015/04/17**  
 Report #: R3393558  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B562105**

**Received: 2015/04/08, 13:00**

Sample Matrix: SEDIMENT  
 # Samples Received: 8

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Free (WAD) Cyanide (1)	8	2015/04/15	2015/04/16	CAM SOP-00457	OMOE E3015 m
TEH in Soil (PIRI) (2, 4)	4	2015/04/10	2015/04/13	ATL SOP-00197	Atl. PIRI v3 m
TEH in Soil (PIRI) (1, 4)	4	2015/04/13	2015/04/14	ATL SOP-00197	Atl. PIRI v3 m
Metals Solids Acid Extr. ICPMS (3)	8	2015/04/13	2015/04/13	ATL SOP 00058	EPA 6020A R1 m
Moisture	8	N/A	2015/04/13	ATL SOP-00196	OMOE Handbook 1983 m
PAH in sediment by GC/MS (Low Level) (3)	7	2015/04/13	2015/04/13	ATL SOP 00102	EPA 8270D m
PAH in sediment by GC/MS (Low Level) (3)	1	2015/04/13	2015/04/14	ATL SOP 00102	EPA 8270D m
Low Level PCB in Soil by GC-ECD (3)	8	2015/04/13	2015/04/15	ATL SOP 00106	EPA 8082 m
PCB Aroclor sum (low level soil) (3)	8	N/A	2015/04/15		Auto Calc.
pH (5:1 DI Water Extract) (3)	8	2015/04/13	2015/04/14	ATL SOP 00003	SM 22 4500-H+ B m
VPH in Soil (PIRI) (1)	4	2015/04/10	2015/04/13	ATL SOP 00199	Atl. PIRI v3 m
VPH in Soil (PIRI) (1)	4	2015/04/13	2015/04/15	ATL SOP 00199	Atl. PIRI v3 m
ModTPH (T1) Calc. for Soil (5)	4	N/A	2015/04/13	N/A	Atl. PIRI v3 m
ModTPH (T1) Calc. for Soil (5)	4	N/A	2015/04/15	N/A	Atl. PIRI v3 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

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

(1) This test was performed by Maxxam Analytics Mississauga

(2) Reported on a dry weight basis.

(3) This test was performed by Maxxam Bedford

(4) Soils are reported on a dry weight basis unless otherwise specified.

(5) New RDLs in effect due to release of NS Contaminated Sites Regulations. Reduced RDL based on MDL study performance. Low level analytical run checks being implemented.

**Encryption Key**

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

Heather Macumber, Project Manager

Email: HMacumber@maxxam.ca

Phone# (902)420-0203 Ext:226

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Total Cover Pages : 1

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Maxxam Job #: B562105  
Report Date: 2015/04/17

Public Works & Government Services Canada  
Client Project #: R.071033.035  
Site Location: JOE BATT'S ARM  
Your P.O. #: CALL UP #56  
Sampler Initials: SFD

**RBCA HYDROCARBONS IN SOIL (SEDIMENT)**

Maxxam ID		ABS097	ABS097	ABS098	ABS099		
Sampling Date		2015/04/07	2015/04/07	2015/04/07	2015/04/07		
COC Number		B 144042	B 144042	B 144042	B 144042		
	Units	JOE BATTS ARM #1	JOE BATTS ARM #1 Lab-Dup	JOE BATTS ARM #2	JOE BATTS ARM #3	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>							
Benzene	mg/kg	ND	ND	ND	ND	0.025	3977941
Toluene	mg/kg	ND	ND	ND	ND	0.025	3977941
Ethylbenzene	mg/kg	ND	ND	ND	ND	0.025	3977941
Total Xylenes	mg/kg	ND	ND	ND	ND	0.050	3977941
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	2.5	3977941
>C10-C16 Hydrocarbons	mg/kg	ND	ND	15	21	10	3977961
>C16-C21 Hydrocarbons	mg/kg	ND	ND	ND	30	10	3977961
>C21-<C32 Hydrocarbons	mg/kg	30	23	21	110	15	3977961
Modified TPH (Tier1)	mg/kg	30		36	160	15	3975895
Reached Baseline at C32	mg/kg	No	No	No	No	N/A	3977961
Hydrocarbon Resemblance	mg/kg	COMMENT (1)		COMMENT (2)	COMMENT (2)	N/A	3977961
<b>Surrogate Recovery (%)</b>							
Isobutylbenzene - Extractable	%	97	97	97	97		3977961
n-Dotriacontane - Extractable	%	104	104	103	107		3977961
Isobutylbenzene - Volatile	%	85	84	74	82		3977941
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected N/A = Not Applicable (1) No resemblance to petroleum products in lube oil range. (2) No resemblance to petroleum products in fuel oil /lube oil range.							

Maxxam Job #: B562105  
Report Date: 2015/04/17

Public Works & Government Services Canada  
Client Project #: R.071033.035  
Site Location: JOE BATT'S ARM  
Your P.O. #: CALL UP #56  
Sampler Initials: SFD

**RBCA HYDROCARBONS IN SOIL (SEDIMENT)**

Maxxam ID		ABS100		ABS101	ABS102	ABS103		
Sampling Date		2015/04/07		2015/04/07	2015/04/07	2015/04/07		
COC Number		B 144042		B 144042	B 144042	B 144042		
	Units	JOE BATTS ARM #4	QC Batch	JOE BATTS ARM #5	JOE BATTS ARM #6	JOE BATTS ARM #7	RDL	QC Batch

Petroleum Hydrocarbons								
Benzene	mg/kg	ND	3977941	ND	ND	ND	0.025	3980178
Toluene	mg/kg	ND	3977941	ND	ND	ND	0.025	3980178
Ethylbenzene	mg/kg	ND	3977941	ND	ND	ND	0.025	3980178
Total Xylenes	mg/kg	ND	3977941	ND	ND	ND	0.050	3980178
C6 - C10 (less BTEX)	mg/kg	ND	3977941	ND	ND	ND	2.5	3980178
>C10-C16 Hydrocarbons	mg/kg	ND	3977961	ND	ND	ND	10	3980134
>C16-C21 Hydrocarbons	mg/kg	ND	3977961	ND	ND	ND	10	3980134
>C21-<C32 Hydrocarbons	mg/kg	ND	3977961	45	ND	ND	15	3980134
Modified TPH (Tier1)	mg/kg	ND	3975895	45	ND	ND	15	3975895
Reached Baseline at C32	mg/kg	Yes	3977961	Yes	Yes	Yes	N/A	3980134
Hydrocarbon Resemblance	mg/kg		3977961	COMMENT (1)			N/A	3980134

Surrogate Recovery (%)								
Isobutylbenzene - Extractable	%	95	3977961	96	97	95		3980134
n-Dotriacontane - Extractable	%	101	3977961	103	101	100		3980134
Isobutylbenzene - Volatile	%	86	3977941	114	106	108		3980178

RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 ND = Not detected  
 N/A = Not Applicable  
 (1) One product in lube oil range.

Maxxam Job #: B562105  
Report Date: 2015/04/17

Public Works & Government Services Canada  
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Your P.O. #: CALL UP #56  
Sampler Initials: SFD

**RBCA HYDROCARBONS IN SOIL (SEDIMENT)**

<b>Maxxam ID</b>		ABS104		
<b>Sampling Date</b>		2015/04/07		
<b>COC Number</b>		B 144042		
	<b>Units</b>	<b>JOE BATTS ARM #8</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Petroleum Hydrocarbons</b>				
Benzene	mg/kg	ND	0.025	3980178
Toluene	mg/kg	ND	0.025	3980178
Ethylbenzene	mg/kg	ND	0.025	3980178
Total Xylenes	mg/kg	ND	0.050	3980178
C6 - C10 (less BTEX)	mg/kg	ND	2.5	3980178
>C10-C16 Hydrocarbons	mg/kg	ND	10	3980134
>C16-C21 Hydrocarbons	mg/kg	ND	10	3980134
>C21-<C32 Hydrocarbons	mg/kg	ND	15	3980134
Modified TPH (Tier1)	mg/kg	ND	15	3975895
Reached Baseline at C32	mg/kg	Yes	N/A	3980134
<b>Surrogate Recovery (%)</b>				
Isobutylbenzene - Extractable	%	98		3980134
n-Dotriacontane - Extractable	%	103		3980134
Isobutylbenzene - Volatile	%	88		3980178
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected N/A = Not Applicable				

Maxxam Job #: B562105  
Report Date: 2015/04/17

Public Works & Government Services Canada  
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Site Location: JOE BATT'S ARM  
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Sampler Initials: SFD

**RESULTS OF ANALYSES OF SEDIMENT**

Maxxam ID		ABS097	ABS097		ABS098		
Sampling Date		2015/04/07	2015/04/07		2015/04/07		
COC Number		B 144042	B 144042		B 144042		
	Units	JOE BATTS ARM #1	JOE BATTS ARM #1 Lab-Dup	QC Batch	JOE BATTS ARM #2	RDL	QC Batch
<b>Inorganics</b>							
Free Cyanide	ug/g	ND		3982819	ND	0.01	3982991
Moisture	%	24	23	3977459	19	1.0	3977459
Soluble (5:1) pH	pH	8.15		3981650	8.13	N/A	3981650
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected N/A = Not Applicable							

Maxxam ID		ABS099		ABS100		ABS101		
Sampling Date		2015/04/07		2015/04/07		2015/04/07		
COC Number		B 144042		B 144042		B 144042		
	Units	JOE BATTS ARM #3	QC Batch	JOE BATTS ARM #4	QC Batch	JOE BATTS ARM #5	RDL	QC Batch
<b>Inorganics</b>								
Free Cyanide	ug/g	ND	3982819	ND	3982991	ND	0.01	3982819
Moisture	%	19	3977459	20	3977459	24	1.0	3979568
Soluble (5:1) pH	pH	8.10	3981650	8.14	3981650	8.15	N/A	3981650
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected N/A = Not Applicable								

Maxxam Job #: B562105  
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**RESULTS OF ANALYSES OF SEDIMENT**

Maxxam ID		ABS101		ABS102		ABS103		
Sampling Date		2015/04/07		2015/04/07		2015/04/07		
COC Number		B 144042		B 144042		B 144042		
	Units	JOE BATTS ARM #5 Lab-Dup	QC Batch	JOE BATTS ARM #6	QC Batch	JOE BATTS ARM #7	RDL	QC Batch
<b>Inorganics</b>								
Free Cyanide	ug/g		3982819	ND	3982991	ND	0.01	3982819
Moisture	%		3979568	17	3979568	19	1.0	3979568
Soluble (5:1) pH	pH	8.09	3981650	8.24	3981650	8.27	N/A	3981650
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ND = Not detected N/A = Not Applicable								

Maxxam ID		ABS104		
Sampling Date		2015/04/07		
COC Number		B 144042		
	Units	JOE BATTS ARM #8	RDL	QC Batch
<b>Inorganics</b>				
Free Cyanide	ug/g	ND	0.01	3982819
Moisture	%	21	1.0	3979568
Soluble (5:1) pH	pH	8.05	N/A	3981650
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected N/A = Not Applicable				

Maxxam Job #: B562105  
Report Date: 2015/04/17

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Sampler Initials: SFD

**PCB'S AND DDT BY GC-ECD (SEDIMENT)**

Maxxam ID		ABS097	ABS097	ABS098	ABS099		
Sampling Date		2015/04/07	2015/04/07	2015/04/07	2015/04/07		
COC Number		B 144042	B 144042	B 144042	B 144042		
	Units	JOE BATTS ARM #1	JOE BATTS ARM #1 Lab-Dup	JOE BATTS ARM #2	JOE BATTS ARM #3	RDL	QC Batch

PCBs							
Aroclor 1016	mg/kg	ND	ND	ND	ND	0.010	3979648
Aroclor 1221	mg/kg	ND	ND	ND	ND	0.010	3979648
Aroclor 1232	mg/kg	ND	ND	ND	ND	0.010	3979648
Aroclor 1248	mg/kg	ND	ND	ND	ND	0.010	3979648
Aroclor 1242	mg/kg	ND	ND	ND	ND	0.010	3979648
Aroclor 1254	mg/kg	ND	ND	ND	ND	0.010	3979648
Aroclor 1260	mg/kg	ND	ND	ND	ND	0.010	3979648
Calculated Total PCB	mg/kg	ND		ND	ND	0.010	3975890

Surrogate Recovery (%)							
Decachlorobiphenyl	%	100	94	86	103		3979648

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
ND = Not detected

Maxxam ID		ABS100	ABS101	ABS102	ABS103		
Sampling Date		2015/04/07	2015/04/07	2015/04/07	2015/04/07		
COC Number		B 144042	B 144042	B 144042	B 144042		
	Units	JOE BATTS ARM #4	JOE BATTS ARM #5	JOE BATTS ARM #6	JOE BATTS ARM #7	RDL	QC Batch

PCBs							
Aroclor 1016	mg/kg	ND	ND	ND	ND	0.010	3979648
Aroclor 1221	mg/kg	ND	ND	ND	ND	0.010	3979648
Aroclor 1232	mg/kg	ND	ND	ND	ND	0.010	3979648
Aroclor 1248	mg/kg	ND	ND	ND	ND	0.010	3979648
Aroclor 1242	mg/kg	ND	ND	ND	ND	0.010	3979648
Aroclor 1254	mg/kg	ND	ND	ND	ND	0.010	3979648
Aroclor 1260	mg/kg	ND	ND	ND	ND	0.010	3979648
Calculated Total PCB	mg/kg	ND	ND	ND	ND	0.010	3975890

Surrogate Recovery (%)							
Decachlorobiphenyl	%	100	101	99	87		3979648

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

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**PCB'S AND DDT BY GC-ECD (SEDIMENT)**

<b>Maxxam ID</b>		ABS104		
<b>Sampling Date</b>		2015/04/07		
<b>COC Number</b>		B 144042		
	<b>Units</b>	<b>JOE BATT'S ARM #8</b>	<b>RDL</b>	<b>QC Batch</b>
<b>PCBs</b>				
Aroclor 1016	mg/kg	ND	0.010	3979648
Aroclor 1221	mg/kg	ND	0.010	3979648
Aroclor 1232	mg/kg	ND	0.010	3979648
Aroclor 1248	mg/kg	ND	0.010	3979648
Aroclor 1242	mg/kg	ND	0.010	3979648
Aroclor 1254	mg/kg	ND	0.010	3979648
Aroclor 1260	mg/kg	ND	0.010	3979648
Calculated Total PCB	mg/kg	ND	0.010	3975890
<b>Surrogate Recovery (%)</b>				
Decachlorobiphenyl	%	79		3979648
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected				

Maxxam Job #: B562105  
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Public Works & Government Services Canada  
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**ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)**

Maxxam ID		ABS097	ABS098	ABS099	ABS100		
Sampling Date		2015/04/07	2015/04/07	2015/04/07	2015/04/07		
COC Number		B 144042	B 144042	B 144042	B 144042		
	Units	JOE BATTS ARM #1	JOE BATTS ARM #2	JOE BATTS ARM #3	JOE BATTS ARM #4	RDL	QC Batch

Metals							
Acid Extractable Aluminum (Al)	mg/kg	2800	2800	2800	2800	10	3979553
Acid Extractable Antimony (Sb)	mg/kg	ND	ND	ND	ND	2.0	3979553
Acid Extractable Arsenic (As)	mg/kg	2.2	2.6	3.6	2.4	2.0	3979553
Acid Extractable Barium (Ba)	mg/kg	5.3	5.8	6.6	6.8	5.0	3979553
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	ND	2.0	3979553
Acid Extractable Boron (B)	mg/kg	ND	ND	ND	ND	50	3979553
Acid Extractable Cadmium (Cd)	mg/kg	ND	ND	ND	ND	0.30	3979553
Acid Extractable Chromium (Cr)	mg/kg	5.7	6.5	6.6	6.8	2.0	3979553
Acid Extractable Cobalt (Co)	mg/kg	1.6	1.6	1.8	1.9	1.0	3979553
Acid Extractable Copper (Cu)	mg/kg	4.7	5.9	5.4	5.5	2.0	3979553
Acid Extractable Iron (Fe)	mg/kg	5900	6200	6400	6200	50	3979553
Acid Extractable Lead (Pb)	mg/kg	3.3	4.4	3.6	3.7	0.50	3979553
Acid Extractable Manganese (Mn)	mg/kg	110	120	120	120	2.0	3979553
Acid Extractable Mercury (Hg)	mg/kg	ND	ND	ND	ND	0.10	3979553
Acid Extractable Molybdenum (Mo)	mg/kg	2.1	3.3	ND	2.3	2.0	3979553
Acid Extractable Nickel (Ni)	mg/kg	4.0	4.3	4.6	4.9	2.0	3979553
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	ND	1.0	3979553
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	ND	0.50	3979553
Acid Extractable Strontium (Sr)	mg/kg	18	26	28	23	5.0	3979553
Acid Extractable Thallium (Tl)	mg/kg	ND	ND	ND	ND	0.10	3979553
Acid Extractable Tin (Sn)	mg/kg	ND	ND	ND	ND	2.0	3979553
Acid Extractable Uranium (U)	mg/kg	1.1	1.2	1.2	1.3	0.10	3979553
Acid Extractable Vanadium (V)	mg/kg	8.2	9.2	10	9.5	2.0	3979553
Acid Extractable Zinc (Zn)	mg/kg	24	31	24	30	5.0	3979553

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

Maxxam Job #: B562105  
Report Date: 2015/04/17

Public Works & Government Services Canada  
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Sampler Initials: SFD

**ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)**

Maxxam ID		ABS101	ABS102	ABS103	ABS104		
Sampling Date		2015/04/07	2015/04/07	2015/04/07	2015/04/07		
COC Number		B 144042	B 144042	B 144042	B 144042		
	Units	JOE BATTS ARM #5	JOE BATTS ARM #6	JOE BATTS ARM #7	JOE BATTS ARM #8	RDL	QC Batch

Metals							
Acid Extractable Aluminum (Al)	mg/kg	2600	4100	3300	3800	10	3979553
Acid Extractable Antimony (Sb)	mg/kg	ND	ND	ND	ND	2.0	3979553
Acid Extractable Arsenic (As)	mg/kg	2.7	2.4	3.7	4.7	2.0	3979553
Acid Extractable Barium (Ba)	mg/kg	5.8	20	16	21	5.0	3979553
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	ND	2.0	3979553
Acid Extractable Boron (B)	mg/kg	ND	ND	ND	ND	50	3979553
Acid Extractable Cadmium (Cd)	mg/kg	ND	ND	ND	ND	0.30	3979553
Acid Extractable Chromium (Cr)	mg/kg	6.0	12	9.0	11	2.0	3979553
Acid Extractable Cobalt (Co)	mg/kg	1.5	2.6	2.1	3.3	1.0	3979553
Acid Extractable Copper (Cu)	mg/kg	4.1	6.5	4.5	5.5	2.0	3979553
Acid Extractable Iron (Fe)	mg/kg	5800	8800	7000	8800	50	3979553
Acid Extractable Lead (Pb)	mg/kg	3.6	3.8	3.0	3.6	0.50	3979553
Acid Extractable Manganese (Mn)	mg/kg	120	180	150	180	2.0	3979553
Acid Extractable Mercury (Hg)	mg/kg	ND	ND	ND	ND	0.10	3979553
Acid Extractable Molybdenum (Mo)	mg/kg	ND	5.1	3.2	3.0	2.0	3979553
Acid Extractable Nickel (Ni)	mg/kg	3.9	8.4	6.4	7.6	2.0	3979553
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	ND	1.0	3979553
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	ND	0.50	3979553
Acid Extractable Strontium (Sr)	mg/kg	36	34	37	24	5.0	3979553
Acid Extractable Thallium (Tl)	mg/kg	ND	0.11	0.11	0.10	0.10	3979553
Acid Extractable Tin (Sn)	mg/kg	ND	ND	ND	ND	2.0	3979553
Acid Extractable Uranium (U)	mg/kg	0.82	1.3	1.1	1.0	0.10	3979553
Acid Extractable Vanadium (V)	mg/kg	8.2	16	12	15	2.0	3979553
Acid Extractable Zinc (Zn)	mg/kg	22	24	21	23	5.0	3979553

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

Maxxam Job #: B562105  
Report Date: 2015/04/17

Public Works & Government Services Canada  
Client Project #: R.071033.035  
Site Location: JOE BATT'S ARM  
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Sampler Initials: SFD

**SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)**

Maxxam ID		ABS097	ABS097	ABS098	ABS099		
Sampling Date		2015/04/07	2015/04/07	2015/04/07	2015/04/07		
COC Number		B 144042	B 144042	B 144042	B 144042		
	Units	JOE BATT'S ARM #1	JOE BATT'S ARM #1 Lab-Dup	JOE BATT'S ARM #2	JOE BATT'S ARM #3	RDL	QC Batch

Polyaromatic Hydrocarbons							
1-Methylnaphthalene	mg/kg	ND	0.021	ND	0.0099	0.0050	3979564
2-Methylnaphthalene	mg/kg	ND	0.045	ND	0.018	0.0050	3979564
Acenaphthene	mg/kg	ND	0.30	0.017	0.083	0.0050	3979564
Acenaphthylene	mg/kg	ND	0.0071	0.0061	ND	0.0050	3979564
Anthracene	mg/kg	0.17	0.34 (1)	0.066	0.12	0.0050	3979564
Benzo(a)anthracene	mg/kg	0.68	0.74	0.25	0.38	0.0050	3979564
Benzo(a)pyrene	mg/kg	0.41	0.54	0.14	0.27	0.0050	3979564
Benzo(b)fluoranthene	mg/kg	0.42	0.59	0.16	0.26	0.0050	3979564
Benzo(g,h,i)perylene	mg/kg	0.11	0.23 (1)	0.051	0.12	0.0050	3979564
Benzo(j)fluoranthene	mg/kg	0.20	0.27	0.082	0.14	0.0050	3979564
Benzo(k)fluoranthene	mg/kg	0.22	0.26	0.078	0.15	0.0050	3979564
Chrysene	mg/kg	0.82	0.73	0.19	0.36	0.0050	3979564
Dibenz(a,h)anthracene	mg/kg	0.032	0.064 (1)	0.015	0.031	0.0050	3979564
Fluoranthene	mg/kg	0.46	2.7 (1)	0.97	0.71	0.0050	3979564
Fluorene	mg/kg	0.032	0.33 (1)	0.027	0.12	0.0050	3979564
Indeno(1,2,3-cd)pyrene	mg/kg	0.11	0.24 (1)	0.051	0.11	0.0050	3979564
Naphthalene	mg/kg	0.0068	0.12	0.0073	0.022	0.0050	3979564
Perylene	mg/kg	0.12	0.15	0.041	0.075	0.0050	3979564
Phenanthrene	mg/kg	0.15	2.3 (1)	0.15	0.67	0.0050	3979564
Pyrene	mg/kg	0.23	1.7 (1)	0.53	0.46	0.0050	3979564
Surrogate Recovery (%)							
D10-Anthracene	%	100	94	96	84		3979564
D14-Terphenyl	%	101	98	98	97		3979564
D8-Acenaphthylene	%	84	72	76	73		3979564

RDL = Reportable Detection Limit  
 QC Batch = Quality Control Batch  
 Lab-Dup = Laboratory Initiated Duplicate  
 ND = Not detected  
 (1) Duplicate: results are outside acceptance limit. Analysis was repeated with similar results.

Maxxam Job #: B562105  
Report Date: 2015/04/17

Public Works & Government Services Canada  
Client Project #: R.071033.035  
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Your P.O. #: CALL UP #56  
Sampler Initials: SFD

**SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)**

Maxxam ID		ABS100	ABS101	ABS102	ABS103		
Sampling Date		2015/04/07	2015/04/07	2015/04/07	2015/04/07		
COC Number		B 144042	B 144042	B 144042	B 144042		
	Units	JOE BATTS ARM #4	JOE BATTS ARM #5	JOE BATTS ARM #6	JOE BATTS ARM #7	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>							
1-Methylnaphthalene	mg/kg	0.025	ND	ND	ND	0.0050	3979564
2-Methylnaphthalene	mg/kg	0.044	ND	ND	ND	0.0050	3979564
Acenaphthene	mg/kg	0.42	0.028	ND	ND	0.0050	3979564
Acenaphthylene	mg/kg	0.014	0.0078	ND	ND	0.0050	3979564
Anthracene	mg/kg	0.87	0.045	ND	ND	0.0050	3979564
Benzo(a)anthracene	mg/kg	1.4	0.17	ND	ND	0.0050	3979564
Benzo(a)pyrene	mg/kg	0.92	0.12	ND	ND	0.0050	3979564
Benzo(b)fluoranthene	mg/kg	0.91	0.24	ND	ND	0.0050	3979564
Benzo(g,h,i)perylene	mg/kg	0.39	0.052	ND	ND	0.0050	3979564
Benzo(j)fluoranthene	mg/kg	0.46	0.11	ND	ND	0.0050	3979564
Benzo(k)fluoranthene	mg/kg	0.46	0.11	ND	ND	0.0050	3979564
Chrysene	mg/kg	1.4	0.38	ND	ND	0.0050	3979564
Dibenz(a,h)anthracene	mg/kg	0.11	0.013	ND	ND	0.0050	3979564
Fluoranthene	mg/kg	4.6	1.7	0.017	0.0070	0.0050	3979564
Fluorene	mg/kg	0.49	0.038	ND	ND	0.0050	3979564
Indeno(1,2,3-cd)pyrene	mg/kg	0.39	0.056	ND	ND	0.0050	3979564
Naphthalene	mg/kg	0.077	0.0087	ND	ND	0.0050	3979564
Perylene	mg/kg	0.25	0.032	0.0096	0.0071	0.0050	3979564
Phenanthrene	mg/kg	3.4	0.62	ND	ND	0.0050	3979564
Pyrene	mg/kg	3.0	0.91	0.0079	ND	0.0050	3979564
<b>Surrogate Recovery (%)</b>							
D10-Anthracene	%	102	96	86	82		3979564
D14-Terphenyl	%	106	97	92	90		3979564
D8-Acenaphthylene	%	77	76	77	72		3979564
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected							

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**SEMI-VOLATILE ORGANICS BY GC-MS (SEDIMENT)**

Maxxam ID		ABS104		
Sampling Date		2015/04/07		
COC Number		B 144042		
	Units	JOE BATTS ARM #8	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>				
1-Methylnaphthalene	mg/kg	ND	0.0050	3979564
2-Methylnaphthalene	mg/kg	ND	0.0050	3979564
Acenaphthene	mg/kg	ND	0.0050	3979564
Acenaphthylene	mg/kg	ND	0.0050	3979564
Anthracene	mg/kg	0.0073	0.0050	3979564
Benzo(a)anthracene	mg/kg	0.010	0.0050	3979564
Benzo(a)pyrene	mg/kg	ND	0.0050	3979564
Benzo(b)fluoranthene	mg/kg	ND	0.0050	3979564
Benzo(g,h,i)perylene	mg/kg	ND	0.0050	3979564
Benzo(j)fluoranthene	mg/kg	ND	0.0050	3979564
Benzo(k)fluoranthene	mg/kg	ND	0.0050	3979564
Chrysene	mg/kg	0.0096	0.0050	3979564
Dibenz(a,h)anthracene	mg/kg	ND	0.0050	3979564
Fluoranthene	mg/kg	0.042	0.0050	3979564
Fluorene	mg/kg	ND	0.0050	3979564
Indeno(1,2,3-cd)pyrene	mg/kg	ND	0.0050	3979564
Naphthalene	mg/kg	ND	0.0050	3979564
Perylene	mg/kg	0.0072	0.0050	3979564
Phenanthrene	mg/kg	0.021	0.0050	3979564
Pyrene	mg/kg	0.027	0.0050	3979564
<b>Surrogate Recovery (%)</b>				
D10-Anthracene	%	85		3979564
D14-Terphenyl	%	88		3979564
D8-Acenaphthylene	%	70		3979564
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected				

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### GENERAL COMMENTS

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

Package 1	1.2°C
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**Results relate only to the items tested.**

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**QUALITY ASSURANCE REPORT**

QA/QC				Date				
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	Units	QC Limits
3977459	ACL	RPD [ABS097-01]	Moisture	2015/04/13	3.8		%	25
3977941	MCT	Spiked Blank	Isobutylbenzene - Volatile	2015/04/13		79	%	60 - 130
			Benzene	2015/04/13		118	%	60 - 140
			Toluene	2015/04/13		101	%	60 - 140
			Ethylbenzene	2015/04/13		93	%	60 - 140
			Total Xylenes	2015/04/13		107	%	60 - 140
3977941	MCT	Method Blank	Isobutylbenzene - Volatile	2015/04/13		70	%	60 - 130
			Benzene	2015/04/13	ND, RDL=0.025		mg/kg	
			Toluene	2015/04/13	ND, RDL=0.025		mg/kg	
			Ethylbenzene	2015/04/13	ND, RDL=0.025		mg/kg	
			Total Xylenes	2015/04/13	ND, RDL=0.050		mg/kg	
			C6 - C10 (less BTEX)	2015/04/13	ND, RDL=2.5		mg/kg	
3977941	MCT	RPD [ABS097-01]	Benzene	2015/04/13	NC		%	50
			Toluene	2015/04/13	NC		%	50
			Ethylbenzene	2015/04/13	NC		%	50
			Total Xylenes	2015/04/13	NC		%	50
			C6 - C10 (less BTEX)	2015/04/13	NC		%	50
3977961	SPI	Matrix Spike [ABS097-01]	Isobutylbenzene - Extractable	2015/04/13		96	%	30 - 130
			n-Dotriacontane - Extractable	2015/04/13		113	%	30 - 130
			>C10-C16 Hydrocarbons	2015/04/13		104	%	30 - 130
			>C16-C21 Hydrocarbons	2015/04/13		111	%	30 - 130
			>C21-<C32 Hydrocarbons	2015/04/13		131 (1)	%	30 - 130
3977961	SPI	Spiked Blank	Isobutylbenzene - Extractable	2015/04/13		99	%	30 - 130
			n-Dotriacontane - Extractable	2015/04/13		110	%	30 - 130
			>C10-C16 Hydrocarbons	2015/04/13		103	%	30 - 130
			>C16-C21 Hydrocarbons	2015/04/13		108	%	30 - 130
			>C21-<C32 Hydrocarbons	2015/04/13		116	%	30 - 130
3977961	SPI	Method Blank	Isobutylbenzene - Extractable	2015/04/13		99	%	30 - 130
			n-Dotriacontane - Extractable	2015/04/13		103	%	30 - 130
			>C10-C16 Hydrocarbons	2015/04/13	ND, RDL=10		mg/kg	
			>C16-C21 Hydrocarbons	2015/04/13	ND, RDL=10		mg/kg	
			>C21-<C32 Hydrocarbons	2015/04/13	ND, RDL=15		mg/kg	
3977961	SPI	RPD [ABS097-01]	>C10-C16 Hydrocarbons	2015/04/13	NC		%	50
			>C16-C21 Hydrocarbons	2015/04/13	NC		%	50
			>C21-<C32 Hydrocarbons	2015/04/13	NC		%	50
3979553	DLB	Matrix Spike	Acid Extractable Antimony (Sb)	2015/04/13		102	%	75 - 125
			Acid Extractable Arsenic (As)	2015/04/13		99	%	75 - 125
			Acid Extractable Barium (Ba)	2015/04/13		92	%	75 - 125
			Acid Extractable Beryllium (Be)	2015/04/13		95	%	75 - 125
			Acid Extractable Boron (B)	2015/04/13		86	%	75 - 125
			Acid Extractable Cadmium (Cd)	2015/04/13		96	%	75 - 125
			Acid Extractable Chromium (Cr)	2015/04/13		77	%	75 - 125

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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Acid Extractable Cobalt (Co)	2015/04/13		98	%	75 - 125
			Acid Extractable Copper (Cu)	2015/04/13		NC	%	75 - 125
			Acid Extractable Lead (Pb)	2015/04/13		NC	%	75 - 125
			Acid Extractable Manganese (Mn)	2015/04/13		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2015/04/13		93	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2015/04/13		92	%	75 - 125
			Acid Extractable Nickel (Ni)	2015/04/13		95	%	75 - 125
			Acid Extractable Selenium (Se)	2015/04/13		97	%	75 - 125
			Acid Extractable Silver (Ag)	2015/04/13		99	%	75 - 125
			Acid Extractable Strontium (Sr)	2015/04/13		92	%	75 - 125
			Acid Extractable Thallium (Tl)	2015/04/13		100	%	75 - 125
			Acid Extractable Tin (Sn)	2015/04/13		NC	%	75 - 125
			Acid Extractable Uranium (U)	2015/04/13		101	%	75 - 125
			Acid Extractable Vanadium (V)	2015/04/13		95	%	75 - 125
			Acid Extractable Zinc (Zn)	2015/04/13		NC	%	75 - 125
3979553	DLB	Spiked Blank	Acid Extractable Antimony (Sb)	2015/04/13		97	%	75 - 125
			Acid Extractable Arsenic (As)	2015/04/13		96	%	75 - 125
			Acid Extractable Barium (Ba)	2015/04/13		96	%	75 - 125
			Acid Extractable Beryllium (Be)	2015/04/13		93	%	75 - 125
			Acid Extractable Boron (B)	2015/04/13		89	%	75 - 125
			Acid Extractable Cadmium (Cd)	2015/04/13		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2015/04/13		94	%	75 - 125
			Acid Extractable Cobalt (Co)	2015/04/13		96	%	75 - 125
			Acid Extractable Copper (Cu)	2015/04/13		96	%	75 - 125
			Acid Extractable Lead (Pb)	2015/04/13		99	%	75 - 125
			Acid Extractable Manganese (Mn)	2015/04/13		99	%	75 - 125
			Acid Extractable Mercury (Hg)	2015/04/13		96	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2015/04/13		93	%	75 - 125
			Acid Extractable Nickel (Ni)	2015/04/13		97	%	75 - 125
			Acid Extractable Selenium (Se)	2015/04/13		98	%	75 - 125
			Acid Extractable Silver (Ag)	2015/04/13		97	%	75 - 125
			Acid Extractable Strontium (Sr)	2015/04/13		97	%	75 - 125
			Acid Extractable Thallium (Tl)	2015/04/13		96	%	75 - 125
			Acid Extractable Tin (Sn)	2015/04/13		101	%	75 - 125
			Acid Extractable Uranium (U)	2015/04/13		98	%	75 - 125
			Acid Extractable Vanadium (V)	2015/04/13		95	%	75 - 125
			Acid Extractable Zinc (Zn)	2015/04/13		106	%	75 - 125
3979553	DLB	Method Blank	Acid Extractable Aluminum (Al)	2015/04/13	ND, RDL=10		mg/kg	
			Acid Extractable Antimony (Sb)	2015/04/13	ND, RDL=2.0		mg/kg	
			Acid Extractable Arsenic (As)	2015/04/13	ND, RDL=2.0		mg/kg	
			Acid Extractable Barium (Ba)	2015/04/13	ND, RDL=5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2015/04/13	ND, RDL=2.0		mg/kg	
			Acid Extractable Boron (B)	2015/04/13	ND, RDL=50		mg/kg	

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Acid Extractable Cadmium (Cd)	2015/04/13	ND, RDL=0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2015/04/13	ND, RDL=2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2015/04/13	ND, RDL=1.0		mg/kg	
			Acid Extractable Copper (Cu)	2015/04/13	ND, RDL=2.0		mg/kg	
			Acid Extractable Iron (Fe)	2015/04/13	ND, RDL=50		mg/kg	
			Acid Extractable Lead (Pb)	2015/04/13	0.62, RDL=0.50		mg/kg	
			Acid Extractable Manganese (Mn)	2015/04/13	ND, RDL=2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2015/04/13	ND, RDL=0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2015/04/13	ND, RDL=2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2015/04/13	ND, RDL=2.0		mg/kg	
			Acid Extractable Selenium (Se)	2015/04/13	ND, RDL=1.0		mg/kg	
			Acid Extractable Silver (Ag)	2015/04/13	ND, RDL=0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2015/04/13	ND, RDL=5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2015/04/13	ND, RDL=0.10		mg/kg	
			Acid Extractable Tin (Sn)	2015/04/13	ND, RDL=2.0		mg/kg	
			Acid Extractable Uranium (U)	2015/04/13	ND, RDL=0.10		mg/kg	
			Acid Extractable Vanadium (V)	2015/04/13	ND, RDL=2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2015/04/13	ND, RDL=5.0		mg/kg	
3979553	DLB	RPD	Acid Extractable Aluminum (Al)	2015/04/14	0.12		%	35
			Acid Extractable Antimony (Sb)	2015/04/14	NC		%	35
			Acid Extractable Arsenic (As)	2015/04/14	NC		%	35
			Acid Extractable Barium (Ba)	2015/04/14	NC		%	35
			Acid Extractable Beryllium (Be)	2015/04/14	NC		%	35
			Acid Extractable Boron (B)	2015/04/14	NC		%	35
			Acid Extractable Cadmium (Cd)	2015/04/14	NC		%	35
			Acid Extractable Chromium (Cr)	2015/04/14	NC (2)		%	35
			Acid Extractable Cobalt (Co)	2015/04/14	0.87		%	35
			Acid Extractable Copper (Cu)	2015/04/14	25		%	35
			Acid Extractable Iron (Fe)	2015/04/14	9.7		%	35
			Acid Extractable Lead (Pb)	2015/04/14	3.2		%	35
			Acid Extractable Manganese (Mn)	2015/04/14	6.3		%	35

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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC			Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
Batch	Init	QC Type						
			Acid Extractable Mercury (Hg)	2015/04/14	NC		%	35
			Acid Extractable Molybdenum (Mo)	2015/04/14	NC		%	35
			Acid Extractable Nickel (Ni)	2015/04/14	6.4		%	35
			Acid Extractable Selenium (Se)	2015/04/14	NC		%	35
			Acid Extractable Silver (Ag)	2015/04/14	NC		%	35
			Acid Extractable Strontium (Sr)	2015/04/14	NC		%	35
			Acid Extractable Thallium (Tl)	2015/04/14	NC		%	35
			Acid Extractable Tin (Sn)	2015/04/14	NC		%	35
			Acid Extractable Uranium (U)	2015/04/14	3.0		%	35
			Acid Extractable Vanadium (V)	2015/04/14	0.71		%	35
			Acid Extractable Zinc (Zn)	2015/04/14	28		%	35
3979564	HIN	Matrix Spike [ABS097-01]	D10-Anthracene	2015/04/13		77	%	30 - 130
			D14-Terphenyl	2015/04/13		88	%	30 - 130
			D8-Acenaphthylene	2015/04/13		69	%	30 - 130
			1-Methylnaphthalene	2015/04/13		72	%	30 - 130
			2-Methylnaphthalene	2015/04/13		79	%	30 - 130
			Acenaphthene	2015/04/13		109	%	30 - 130
			Acenaphthylene	2015/04/13		74	%	30 - 130
			Anthracene	2015/04/13		NC	%	30 - 130
			Benzo(a)anthracene	2015/04/13		NC	%	30 - 130
			Benzo(a)pyrene	2015/04/13		NC	%	30 - 130
			Benzo(b)fluoranthene	2015/04/13		NC	%	30 - 130
			Benzo(g,h,i)perylene	2015/04/13		NC	%	30 - 130
			Benzo(j)fluoranthene	2015/04/13		NC	%	30 - 130
			Benzo(k)fluoranthene	2015/04/13		NC	%	30 - 130
			Chrysene	2015/04/13		NC	%	30 - 130
			Dibenz(a,h)anthracene	2015/04/13		67	%	30 - 130
			Fluoranthene	2015/04/13		NC	%	30 - 130
			Fluorene	2015/04/13		112	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2015/04/13		NC	%	30 - 130
			Naphthalene	2015/04/13		85	%	30 - 130
			Perylene	2015/04/13		NC	%	30 - 130
			Phenanthrene	2015/04/13		NC	%	30 - 130
			Pyrene	2015/04/13		NC	%	30 - 130
3979564	HIN	Spiked Blank	D10-Anthracene	2015/04/13		88	%	30 - 130
			D14-Terphenyl	2015/04/13		90	%	30 - 130
			D8-Acenaphthylene	2015/04/13		76	%	30 - 130
			1-Methylnaphthalene	2015/04/13		74	%	30 - 130
			2-Methylnaphthalene	2015/04/13		77	%	30 - 130
			Acenaphthene	2015/04/13		77	%	30 - 130
			Acenaphthylene	2015/04/13		81	%	30 - 130
			Anthracene	2015/04/13		80	%	30 - 130
			Benzo(a)anthracene	2015/04/13		74	%	30 - 130
			Benzo(a)pyrene	2015/04/13		79	%	30 - 130
			Benzo(b)fluoranthene	2015/04/13		81	%	30 - 130
			Benzo(g,h,i)perylene	2015/04/13		70	%	30 - 130
			Benzo(j)fluoranthene	2015/04/13		75	%	30 - 130
			Benzo(k)fluoranthene	2015/04/13		81	%	30 - 130
			Chrysene	2015/04/13		76	%	30 - 130
			Dibenz(a,h)anthracene	2015/04/13		65	%	30 - 130
			Fluoranthene	2015/04/13		80	%	30 - 130

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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Fluorene	2015/04/13		78	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2015/04/13		68	%	30 - 130
			Naphthalene	2015/04/13		79	%	30 - 130
			Perylene	2015/04/13		81	%	30 - 130
			Phenanthrene	2015/04/13		70	%	30 - 130
			Pyrene	2015/04/13		78	%	30 - 130
3979564	HIN	Method Blank	D10-Anthracene	2015/04/13		96	%	30 - 130
			D14-Terphenyl	2015/04/13		98	%	30 - 130
			D8-Acenaphthylene	2015/04/13		76	%	30 - 130
			1-Methylnaphthalene	2015/04/13	ND, RDL=0.0050		mg/kg	
			2-Methylnaphthalene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Acenaphthene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Acenaphthylene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Anthracene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Benzo(a)anthracene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Benzo(a)pyrene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Benzo(b)fluoranthene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Benzo(g,h,i)perylene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Benzo(j)fluoranthene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Benzo(k)fluoranthene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Chrysene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Dibenz(a,h)anthracene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Fluoranthene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Fluorene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Naphthalene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Perylene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Phenanthrene	2015/04/13	ND, RDL=0.0050		mg/kg	
			Pyrene	2015/04/13	ND, RDL=0.0050		mg/kg	

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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC					Date				
Batch	Init	QC Type	Parameter		Analyzed	Value	Recovery	Units	QC Limits
3979564	HIN	RPD [ABS097-01]	1-Methylnaphthalene		2015/04/13	NC		%	50
			2-Methylnaphthalene		2015/04/13	NC		%	50
			Acenaphthene		2015/04/13	NC		%	50
			Acenaphthylene		2015/04/13	NC		%	50
			Anthracene		2015/04/13	65 (3)		%	50
			Benzo(a)anthracene		2015/04/13	8.6		%	50
			Benzo(a)pyrene		2015/04/13	26		%	50
			Benzo(b)fluoranthene		2015/04/13	34		%	50
			Benzo(g,h,i)perylene		2015/04/13	73 (3)		%	50
			Benzo(j)fluoranthene		2015/04/13	28		%	50
			Benzo(k)fluoranthene		2015/04/13	17		%	50
			Chrysene		2015/04/13	11		%	50
			Dibenz(a,h)anthracene		2015/04/13	67 (3)		%	50
			Fluoranthene		2015/04/13	142 (3)		%	50
			Fluorene		2015/04/13	164 (3)		%	50
			Indeno(1,2,3-cd)pyrene		2015/04/13	69 (3)		%	50
			Naphthalene		2015/04/13	NC		%	50
			Perylene		2015/04/13	20		%	50
			Phenanthrene		2015/04/13	176 (3)		%	50
			Pyrene		2015/04/13	152 (3)		%	50
3979568	ACL	RPD	Moisture		2015/04/13	3.3		%	25
3979648	LGE	Matrix Spike [ABS097-01]	Decachlorobiphenyl		2015/04/15		114	%	70 - 130
			Aroclor 1254		2015/04/15		73	%	30 - 130
3979648	LGE	Spiked Blank	Decachlorobiphenyl		2015/04/15		97	%	70 - 130
			Aroclor 1254		2015/04/15		72	%	30 - 130
3979648	LGE	Method Blank	Decachlorobiphenyl		2015/04/15		99	%	70 - 130
			Aroclor 1016		2015/04/15	ND, RDL=0.010		mg/kg	
			Aroclor 1221		2015/04/15	ND, RDL=0.010		mg/kg	
			Aroclor 1232		2015/04/15	ND, RDL=0.010		mg/kg	
			Aroclor 1248		2015/04/15	ND, RDL=0.010		mg/kg	
			Aroclor 1242		2015/04/15	ND, RDL=0.010		mg/kg	
			Aroclor 1254		2015/04/15	ND, RDL=0.010		mg/kg	
			Aroclor 1260		2015/04/15	ND, RDL=0.010		mg/kg	
3979648	LGE	RPD [ABS097-01]	Aroclor 1016		2015/04/15	NC		%	50
			Aroclor 1221		2015/04/15	NC		%	50
			Aroclor 1232		2015/04/15	NC		%	50
			Aroclor 1248		2015/04/15	NC		%	50
			Aroclor 1242		2015/04/15	NC		%	50
			Aroclor 1254		2015/04/15	NC		%	50
			Aroclor 1260		2015/04/15	NC		%	50
3980134	DDE	Matrix Spike	Isobutylbenzene - Extractable		2015/04/14		158 (4)	%	30 - 130
			n-Dotriacontane - Extractable		2015/04/14		192 (5)	%	30 - 130
			>C10-C16 Hydrocarbons		2015/04/14		NC	%	30 - 130

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Your P.O. #: CALL UP #56  
Sampler Initials: SFD

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits	
3980134	DDE	Spiked Blank	>C16-C21 Hydrocarbons	2015/04/14		NC	%	30 - 130	
			>C21-<C32 Hydrocarbons	2015/04/14		NC	%	30 - 130	
			Isobutylbenzene - Extractable	2015/04/14		95	%	30 - 130	
			n-Dotriacontane - Extractable	2015/04/14		105	%	30 - 130	
			>C10-C16 Hydrocarbons	2015/04/14		97	%	30 - 130	
3980134	DDE	Method Blank	>C16-C21 Hydrocarbons	2015/04/14		103	%	30 - 130	
			>C21-<C32 Hydrocarbons	2015/04/14		102	%	30 - 130	
			Isobutylbenzene - Extractable	2015/04/14		100	%	30 - 130	
			n-Dotriacontane - Extractable	2015/04/14		100	%	30 - 130	
			>C10-C16 Hydrocarbons	2015/04/14		ND, RDL=10		mg/kg	
3980134	DDE	RPD	>C16-C21 Hydrocarbons	2015/04/14		ND, RDL=10		mg/kg	
			>C21-<C32 Hydrocarbons	2015/04/14		ND, RDL=15		mg/kg	
			>C10-C16 Hydrocarbons	2015/04/14		5.5	%	50	
3980178	MCT	Spiked Blank	>C16-C21 Hydrocarbons	2015/04/14		3.3	%	50	
			>C21-<C32 Hydrocarbons	2015/04/14		0.079	%	50	
			Isobutylbenzene - Volatile	2015/04/15			105	%	60 - 130
			Benzene	2015/04/15			94	%	60 - 140
			Toluene	2015/04/15			97	%	60 - 140
3980178	MCT	Method Blank	Ethylbenzene	2015/04/15		99	%	60 - 140	
			Total Xylenes	2015/04/15		100	%	60 - 140	
			Isobutylbenzene - Volatile	2015/04/15		101	%	60 - 130	
			Benzene	2015/04/15		ND, RDL=0.025		mg/kg	
			Toluene	2015/04/15		ND, RDL=0.025		mg/kg	
3980178	MCT	RPD	Ethylbenzene	2015/04/15		ND, RDL=0.025		mg/kg	
			Total Xylenes	2015/04/15		ND, RDL=0.050		mg/kg	
			C6 - C10 (less BTEX)	2015/04/15		ND, RDL=2.5		mg/kg	
			Benzene	2015/04/15		NC		%	50
			Toluene	2015/04/15		NC		%	50
3981650	TPE	RPD [ABS101-01]	Ethylbenzene	2015/04/15		NC		%	50
			Total Xylenes	2015/04/15		NC		%	50
			C6 - C10 (less BTEX)	2015/04/15		NC		%	50
			Soluble (5:1) pH	2015/04/14		0.74		%	N/A
			Free Cyanide	2015/04/16			99	%	75 - 125
3982819	XQI	Spiked Blank	Free Cyanide	2015/04/16		103	%	80 - 120	
3982819	XQI	Method Blank	Free Cyanide	2015/04/16		ND, RDL=0.01		ug/g	
3982819	XQI	RPD	Free Cyanide	2015/04/16		NC		%	35
3982991	XQI	Matrix Spike	Free Cyanide	2015/04/16		103	%	75 - 125	
3982991	XQI	Spiked Blank	Free Cyanide	2015/04/16		103	%	80 - 120	
3982991	XQI	Method Blank	Free Cyanide	2015/04/16		ND, RDL=0.01		ug/g	

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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC			Parameter	Date	Value	Recovery	Units	QC Limits
Batch	Init	QC Type		Analyzed				
3982991	XQI	RPD	Free Cyanide	2015/04/16	NC		%	35

N/A = Not Applicable

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

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

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

- (1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
- (2) Poor RPD due to sample inhomogeneity. Result confirmed with repeat digestion and analysis.
- (3) Duplicate: results are outside acceptance limit. Analysis was repeated with similar results.
- (4) Surrogate recovery(ies) not within acceptance limits due to matrix/co-extractive interference.
- (5) If the original sample concentration is greater than 2X the matrix spike level, the matrix spike does not need to be repeated.

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### VALIDATION SIGNATURE PAGE

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



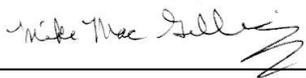
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Cristina Carriere, Scientific Services



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Eric Dearman, Scientific Specialist



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Mike MacGillivray, Scientific Specialist (Inorganics)



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Rose MacDonald, Scientific Specialist (Organics)



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Rob Whelan, Laboratory Manager

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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.