



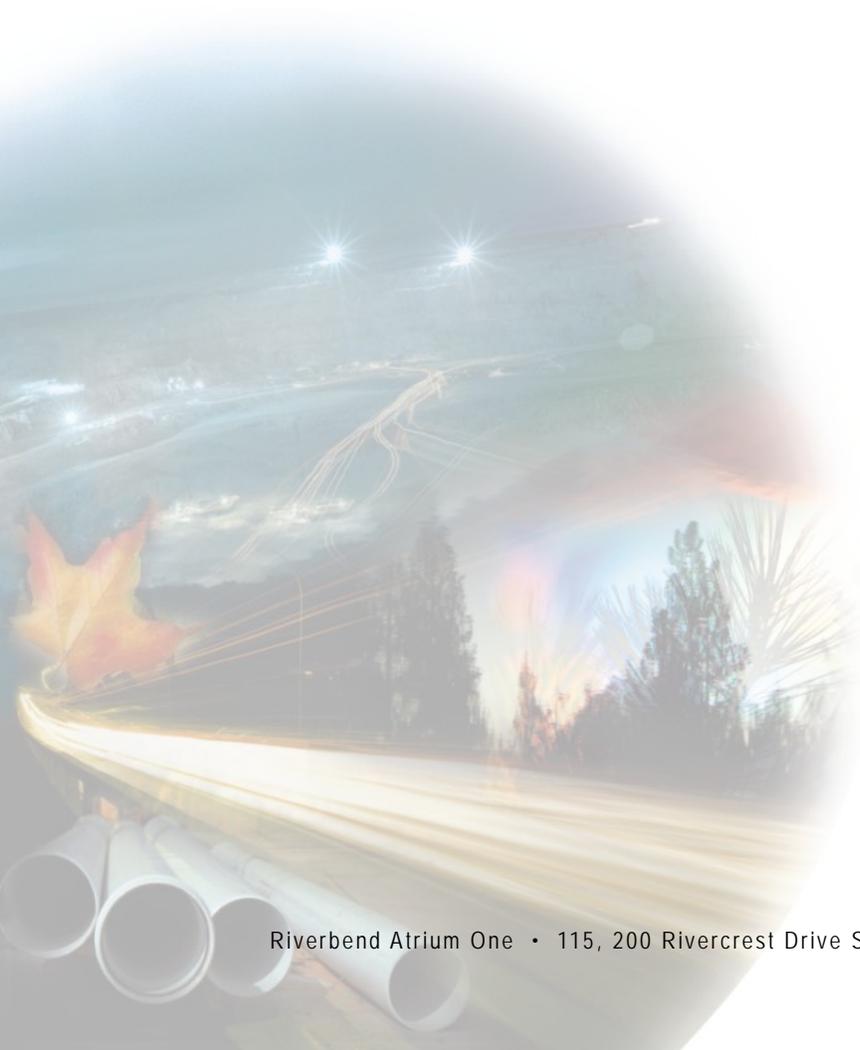
Parks Canada Agency

ISSUED FOR USE

CONTAMINATED SITE ASSESSMENT
INITIAL AND DETAILED TESTING PROGRAMS
WOOD BUFFALO NATIONAL PARK
VARIOUS LOCATIONS IN THE COMMUNITY OF GARDEN RIVER, ALBERTA

C22101178

February 2009



EBA Engineering Consultants Ltd.
p. 403.203.3355 • f. 403.203.3301

Riverbend Atrium One • 115, 200 Rivercrest Drive SE • Calgary, Alberta T2C 2X5 • CANADA



EXECUTIVE SUMMARY

Foreword

Parks Canada Agency (PCA) retained EBA Engineering Consultants Ltd. (EBA) to conduct a Phase II environmental site assessment (ESA) of various locations in the community of Garden River (part of Little Red River Cree Nation) located at the western edge of Wood Buffalo National Park in Alberta.

The objectives of the Phase II ESA were to characterize soil and groundwater quality at the subject site relative to potential sources of environmental impairment identified during a Phase I ESA conducted by EBA (March 2006), and a Phase I ESA conducted by AMEC Earth and Environmental (AMEC) (November 2006) for the subject site. This Phase II ESA was conducted in general accordance with the Canadian Standards Association (CSA) Standard Z769-00 (published in March 2000). The subject site includes the following locations:

1. Garden River Landfill.
2. Garden River Old Dump.
3. Former Septic Tile Field.
4. Garden River Airstrip.
5. Garden River Public Works Yard.
6. Fifth Meridian Market.
7. Northlands School Historic Above-ground Storage Tank (AST).
8. Church.
9. Garden River Trading (Charlie Rose).

The objectives of the Phase II ESA are as follows:

- To determine the hydrological parameters of the site.
- To determine/evaluate the extent and nature of soil and groundwater contamination identified by previous reports at the facilities and fuel storage sites.
- To evaluate the environmental condition of the sites subsurface, using the Federal Contaminated Sites Program.
- To provide information sufficient to develop a remediation action plan where required.

Findings and Conclusions

A. Hydrological Parameters

The soil at this site is generally composed of coarse-textured fluvial deposits from the nearby Peace River. The average hydraulic conductivity for groundwater at the site is approximately 4×10^{-6} m/s and the estimated linear flow velocity generally ranged from 0.4 m/year to 4.8 m/year. This site is considered to have a high potential for transport and leaching.

B. Soil and Groundwater Quality

Soil samples collected from the Former Septic Tile Field, Fifth Meridian Market and Northlands School Historic AST, Church, and Garden River Trading (Charlie Rose) assessment areas met 2007 Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health and/or 2008 Alberta Tier 1 Soil and Groundwater Remediation Guidelines (residential/parkland, coarse-textured surface soils). One soil sample collected at a depth of 7.6 m in the Garden River Old Dump exceeded the applicable guideline for selenium.

One surface soil sample collected from the Garden River Landfill, near scrapped cars on the northern boundary, exceeded the applicable guidelines for petroleum hydrocarbon (PHC) fraction F3 and copper. The detected concentrations were approximately three times greater than the applicable guidelines. Groundwater samples from this assessment area exceeded applicable guidelines for pyrene, benzo(a)anthracene, cadmium, manganese, selenium, and zinc.

One soil sample collected from the Garden River Airstrip, adjacent to fuel drums near the eastern end, exceeded the applicable guidelines for PHC fractions F1 and F2. This sample had a high combustible vapour concentration (CVC) [5% lower explosive limit (LEL), Table 1]. Groundwater samples from this assessment area exceeded applicable guidelines for cadmium, iron, manganese, selenium, and zinc.

Ten soil samples collected from the Garden River Public Works Yard exceeded applicable guidelines for one or more PHC fractions F1, F2, F3, and F4. The samples were collected east and south of the Public Works building adjacent to the waste oil AST and the propane tanks, north of the Public Works trailer near the propane tank and barrel storage areas, and in the equipment parking area. The groundwater sample collected adjacent to the barrel storage area had high concentrations of iron and manganese.

Groundwater samples collected from Garden River Old Dump, Northlands School Historic AST, Former Septic Tile Field, Garden River Trading (Charlie Rose) AST, and Fifth Meridian Market AST exceeded applicable guidelines for one or more of cadmium, iron, manganese, selenium, and zinc. Most exceedances were low except for the Garden River Old Dump, which had high exceedances for cadmium, iron, manganese, selenium, and zinc, and the Northlands School Historic AST area which had a high exceedance for manganese.

C. National Classification System for Contaminated Sites (NCSCS)

- The Public Works Yard has a total NCSCS score of 75.8 and is ranked as a Class 1 Site, which has a high priority for action.
- The Garden River Airstrip has a total NCSCS score of 75.2 and is ranked as a Class 1 Site, which has a high priority for action.
- The Garden River Landfill has a total NCSCS score of 68.5 and is ranked as a Class 2 Site, which has a medium priority for action.
- The Garden River Old Dump has a total NCSCS score of 63.9 and is ranked as a Class 2 Site, which has a medium priority for action.
- The Northlands School Historic AST has a total NCSCS score of 52.1 is ranked as a Class 2 Site, which has a medium priority for action.
- The Former Septic Field has a total NCSCS score of 50.5 and is ranked as a Class 2 Site, which has a medium priority for action.
- The Garden River Trading (Charlie Rose) AST has a total NCSCS score of 47.2 and is ranked as a Class 3 Site, which has a low priority for action.
- The Fifth Meridian Market AST has a total NCSCS score of 47.2 and is ranked as a Class 3 Site, which has a low priority for action.
- The Church Historic AST was not assessed using NCSCS since there were no detected exceedances.

Recommendations

Guidance for landfill operations is available from Alberta Environmental (AENV) Protection Code of Practice for Landfills. For this site, EBA recommends that the solid waste material, which is encountered within the upper metre of the area of the current and former landfill locations, should be sealed/capped by means of placing impermeable soil/material on the surface of the same areas. Furthermore, the mentioned solid waste materials should be removed out of proposed building footprints prior to any future development of the landfill locations.

Soil with PHC impacts is found at nine assessment locations in Garden River Public Works Yard. These corresponded to locations with present waste oil AST, propane tanks, and equipment storage and use. EBA's proposed drilling plan was limited by site conditions; therefore, only estimates of the area and volume of impacted soil can be made. The area of soil with PHC impacts was estimated to be 1,800 m². The volume of impacted soil estimated to be approximately 4,000 m³. A remediation action plan (RAP), which is included in Appendix D, is proposed for this volume of impacted soil in the Public Works Yard.

Soil with PHC impacts at the Garden River Airstrip is associated with fuel storage at the eastern edge of the airstrip and likely represents small isolated spills related to refuelling. The volume of impacted soil is estimated to be approximately 500 m³. A RAP, which is included in Appendix E, is proposed for this volume of impacted soils at the Airstrip.



TABLE OF CONTENTS

	PAGE
EXECUTIVE SUMMARY	i
1.0 INTRODUCTION	1
1.1 General.....	1
1.2 Authorization.....	1
1.3 Qualifications of Assessors.....	1
1.4 Background and Site Description.....	2
1.5 Previous Assessments	2
2.0 SCOPE OF WORK AND METHODS	5
2.1 Contaminated Site Assessment Scope of Work	5
2.2 Methods.....	6
2.2.1 Utility Locates	11
2.2.2 On-site Safety Meeting and Pre-job Hazard Assessment (PJHA)	11
2.2.3 Drilling and Groundwater Monitoring Well Installation Program.....	11
2.2.4 Field Screening.....	12
2.2.5 Soil Sampling and Analytical Testing.....	12
2.2.6 Groundwater Monitoring, Sampling, and Analytical Testing.....	12
2.2.7 Reference Guidelines	13
2.2.8 Quality Assurance/Quality Control (QA/QC) Methods.....	13
3.0 RESULTS	14
3.1 Field Observations.....	14
3.1.1 Soil Stratigraphy and Observations	14
3.1.2 Soil Vapour Concentrations	15
3.2 Groundwater Monitoring	15
3.3 Analytical Results	16
3.3.1 Analytical Results – Soils.....	16
Analytical Results – Groundwater.....	18
4.0 CONCLUSIONS	20
4.1 Hydrological Parameters.....	21
4.2 General Soil and Groundwater Quality	21
4.3 Garden River Landfill	21
4.4 Garden River Old Dump	22



TABLE OF CONTENTS

	PAGE
4.5 Garden River Airstrip	22
4.6 Garden River Public Works Yard	22
5.0 RECOMMENDATIONS.....	23
6.0 LIMITATIONS OF REPORT	24
7.0 CLOSURE.....	25

TABLES

Table 1	Soil Analytical Results
Table 2	Groundwater Monitoring Results
Table 3	Groundwater Analytical Results

FIGURES

Figure 1	Site Location Plan
Figure 2	Site Plan Showing Assessment Areas
Figure 3	Garden River Landfill Site Plan
Figure 4	Garden River Old Dump Site Plan
Figure 5	Former Septic Tile Field Site Plan
Figure 6	Garden River Airstrip Site Plan
Figure 7	Garden River Public Works Yard Site Plan
Figure 8	Fifth Meridian Market and Northlands School Historic AST Site Plan
Figure 9	Church Site Plan
Figure 10	Garden River Trading Site Plan

TABLE OF CONTENTS

PHOTOGRAPHS

- Photo 1 Garden River Landfill looking northeast from 08SS26 (August 26, 2008)
- Photo 2 Garden River Old Dump looking south towards 08MW05 area (August 26, 2008)
- Photo 3 Garden River Airstrip looking east-southeast at 08SS36 (August 26, 2008)
- Photo 4 Garden River Public Works yard looking northeast from 08MW20 (August 26, 2008)
- Photo 5 Garden River Public Works yard looking southwest from 08SS40 (August 26, 2008)
- Photo 6 Garden River Public Works yard looking northeast from 08MW21 (August 26, 2008)
- Photo 7 Fifth Meridian Market looking east at AST (August 26, 2008)
- Photo 8 Fifth Meridian Market looking southeast at AST (August 26, 2008)
- Photo 9 Church assessment area showing former AST area (August 26, 2008)
- Photo 10 Garden River Trading (Charlie Rose) looking north at the AST (August 26, 2008)

APPENDICES

- Appendix A Borehole Logs
- Appendix B Analytical Data
- Appendix C Hydraulic Conductivity Results
- Appendix D Quality Control/Quality Assurance of Field Sampling Program
- Appendix E Remediation Action Plan – Public Works Yard
- Appendix F Remediation Action Plan – Airstrip
- Appendix G CCME National Classification System for Contaminated Sites
- Appendix H Geo-environmental Report – General Conditions

1.0 INTRODUCTION

1.1 GENERAL

Parks Canada Agency (PCA) retained EBA Engineering Consultants Ltd. (EBA) to conduct a contaminated site assessment of the Garden River Indian Reserve (part of Little Red River Cree Nation) located at the western edge of Wood Buffalo National Park in Alberta.

The objectives of the assessment were to characterize soil and groundwater quality at the subject site relative to potential sources of environmental impairment identified during a Phase I environmental site assessment (ESA) conducted by EBA in March 2006, followed by a Phase I ESA conducted by AMEC Earth and Environmental (AMEC) in November 2006 (see Section 2.0). The contaminated site assessment was conducted in general accordance with the Canadian Standards Association (CSA) Standard Z769-00 (published in March 2000).

EBA understands the contaminant assessment being conducted as a part of PCA's due diligence.

1.2 AUTHORIZATION

Ms. Naomie Fevry, contracts and material management officer with PCA, provided written authorization to proceed with the present study to Mr. Nayef Mahgoub of EBA on December 14, 2007.

1.3 QUALIFICATIONS OF ASSESSORS

Mr. Jack Sambirsky, Dip. CCEP, supervised the drilling and monitoring well installation, and conducted the soil and groundwater monitoring/sampling activities on site. Mr. Sambirsky is an environmental technologist for EBA's Calgary operations and has over 10 years of experience in environmental consulting.

Ms. Cathy Hamlen, Ph.D., A.Ag., interpreted the results and prepared the report. Ms. Hamlen is a soil scientist with a Ph.D. in soil physics from the University of Guelph. Ms. Hamlen has 5 years consulting experience in Alberta.

Mr. Nayef Mahgoub, P.Eng., interpreted the results and reviewed the report. Mr. Mahgoub is a project engineer for EBA's environment practice and has over 12 years of experience in environmental consulting. He is registered as a Professional Engineer in Alberta and Ontario.

Mr. Herb Ziervogel, P.Eng., conducted the final report review. Mr. Ziervogel is a senior environmental engineer with a degree in geological engineering from the University of Manitoba. Mr. Ziervogel has over 19 years of experience in geo-environmental and ESAs. He is registered as a Professional Engineer in Alberta, Northwest Territories, and Nunavut.

1.4 BACKGROUND AND SITE DESCRIPTION

The subject site comprised various locations in the community of Garden River, located within the western section of Wood Buffalo National Park, Alberta. The main community is situated in Township 111 and Township 112, Range 24, West of the Fourth Meridian. The area of the site is approximately 36 km².

The subject site is a mixture of residential, commercial, and institutional properties within the Reserve. Figure 1 shows the site location plan and Figure 2 shows the general site plan.

1.5 PREVIOUS ASSESSMENTS

EBA completed a Phase I ESA for the subject site in March 2006. AMEC completed a Phase I ESA in November 2006. Based on the results of both Phase I ESA studies, EBA assessed the potential for on-site and off-site impacts. Table A presents the potential on-site environmental concerns identified during the Phase I ESAs conducted for the site.

TABLE A: POTENTIAL ON-SITE SOURCE SUMMARY			
No.	Potential On-site Source	Information Source	EBA Evaluation
1	Garden River Public Works Yard	Observation during site inspection.	Potential to impact soil and groundwater quality at the subject site, due to hydrocarbon product storage, above-ground storage tank (AST) with staining in its vicinity, used batteries, and boneyard.
2	Fifth Meridian AST and former AST	Observation during site inspection.	Potential to impact soil and groundwater quality at the subject site due to former storage tank, as well as present AST containing gasoline.
3	Signs of surficial stains near the Church/Historic AST	Observation during site inspection.	Potential to impact soil and groundwater quality at the subject site due to former fuel storage tank.
4	Garden River Trading (Charlie Rose) AST	Observation during site inspection.	Potential to impact soil and groundwater quality at the subject site due to AST containing gasoline.
5	Historical ASTs at the Old Northland School	Observation during site inspection.	Potential to impact soil and groundwater quality at the subject site due to former storage tank.
6	Garden River Airstrip fuel drum storage	Observation during site inspection.	Potential to impact soil and groundwater quality at the subject site due to jet fuel drum storage.
7	Historic Septic Tile Field east of St. Gloria School	Observation during site inspection.	Potential to impact soil and groundwater quality at the subject site from nutrients, coliforms, total dissolved solids (TDS), and chemical oxygen demand (COD).

TABLE A: POTENTIAL ON-SITE SOURCE SUMMARY (CONTINUED)			
No.	Potential On-site Source	Information Source	EBA Evaluation
8 and 9	Garden River Landfill and Garden River Old Dump	Observation during site inspection	Potential to impact soil and groundwater quality at the subject site due to landfill leachate.
10	Former ATCO power plant	Observation during site inspection	Large area has been excavated and this is likely due to contamination present at the site.

Table B presents the potential off-site environmental concerns identified during the Phase I ESAs.

TABLE B: POTENTIAL OFF-SITE SOURCE SUMMARY			
No.	Potential Off-site Source	Information Source	EBA Evaluation
1	New ATCO power plant site	Observations during site inspection.	Potential to impact soil and groundwater quality at the subject site due to hydrocarbon product storage and/or handling; the site is very new and unlikely to be a present concern.

EBA sampled surface soil at 10 locations during the Phase I ESA with locations and UTM coordinates as follows:

Location	UTM Coordinate (12U)	Tests
Diesel Tank Public Works Yard	0333994/6511561	BTEX, F1 to F4
Oil Drums Public Works Yard	0333996/6511583	BTEX, F1 to F4
Boneyard Public Works Yard	0334030/6511554	Metals
Drum Storage Airport	0333816/6511750	BTEX, F1 to F4
Drum Storage Airport	0333918/6511750	BTEX, F1 to F4
Drum Storage Airport	0333973/6511751	BTEX, F1 to F4
Drum Storage Airport	0333973/6511798	BTEX, F1 to F4
Battery Storage Public Works Yard	0334012/6511588	Metals
Fifth Meridian Market AST	0332983/ 6510560	BTEX, F1 to F4
Charlie Rose AST	0333007/ 6510476	BTEX, F1 to F4

Three soil samples exceeded the applicable criteria for hydrocarbons and one soil sample exceeded the CCME residential criteria for nickel (sample 3 with nickel concentration of 180 mg/kg). Hydrocarbon results are presented in Table C as follows:

TABLE C: HYDROCARBON CONCENTRATIONS IN SOIL									
Sample	Location	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Xylenes (ppm)	F1	F2	F3	F4
1	Diesel Tank PW	<0.05	0.24	<0.1	40	1,500	22,000	15,000	<5
2	Oil Drums PW	<0.005	<0.01	<0.01	<0.01	<5	490	38,000	9,900
4	Drum Storage	<0.005	<0.01	<0.01	<0.01	<5	<5	24	<5
5	Drum Storage	<0.005	<0.01	<0.01	<0.01	<5	<5	5	<5
6	Drum Storage	<0.005	<0.01	<0.01	<0.01	<5	41	7	<5
7	Drum Storage	0.15	20	8.9	420	6,200	6,100	27	18
9	Fifth Meridian AST	0.006	0.05	<0.01	0.16	<5	9	260	55
10	Charlie Rose AST	<0.005	<0.01	<0.01	0.02	<5	9	140	21
Coarse-grained Alberta Tier 1 Natural Area		0.13	0.16	0.36	49	130	230	400	2,800
Coarse-grained Alberta Tier 1 Residential		0.048	0.16	0.36	14	30	150	400	2,800
Bold: Exceeds one or more criteria for coarse-grained surface soil									

EBA also recommended the following for consideration:

- If abandoned water wells are located on the subject site, then they must be decommissioned in accordance with current regulations prior to site development.
- Organic materials have the potential to generate methane gas. Therefore, these materials should be removed (i.e., low lying areas, historical drainage channels) off site.

Based on the concerns identified during the Phase I ESA investigations, EBA and AMEC recommended that further environmental investigation of the potential on-site and off-site sources was warranted. PCA indicated that possible impacts associated with the former/new ATCO power plant sites (No. 10 of Table A and No. 1 of Table B) were remediated and reported on by others; therefore, the ATCO power plants will not be addressed in further environmental investigations. As a result, it was agreed that only nine locations, out of the total of 11 locations listed in Table A and Table B, will be addressed by this investigation.

2.0 SCOPE OF WORK AND METHODS

The scope of work was based on proposals submitted to PCA, dated November 2007 and May 2008 (EBA File: PC22101178).

The objectives of the contaminated site assessment are:

- To determine/evaluate the extent and nature of potential soil and groundwater contamination identified by previous reports at the facilities and fuel storage locations;
- To determine the hydrological parameters of the site;
- To evaluate the environmental condition of the subsurface, using the Federal Contaminated Sites Program, including the National Classification System (NCS) [formerly the Federal Contaminated Sites Action Plan (FCSAP)] scores; and
- To provide information sufficient to develop a remediation action plan (RAP) for the site where required.

The objectives were based on the findings of previous Phase I ESAs and discussions with PCA personnel. Investigation of the potential for organic containing materials in low lying areas (i.e., sloughs) was not considered as part of this investigation.

2.1 CONTAMINATED SITE ASSESSMENT SCOPE OF WORK

To meet the objectives stated in Section 2.0, the scope of work for the contaminated site assessment included the following tasks:

- Prepared a work plan outlining the required tasks;
- Conducted an on-site tailgate safety meeting and a pre-job hazard assessment (PJHA) prior to any fieldwork;
- Coordinated utility locates (above-ground utilities and underground utilities) using Alberta One-Call, Shaw Cable, and a private utility locator;
- Coordinated borehole drilling (27) and monitoring well installation (23) within a selection of the boreholes;
- Conducted surface soil sampling (34) at various locations;
- Conducted soil field screening and sampling for laboratory analysis;
- Conducted groundwater field screening and sampling;
- Submitted soil samples and groundwater samples to a laboratory for chemical analyses;
- Coordinated the surveying of the groundwater monitoring wells;
- Conducted K tests on three groundwater monitoring wells;
- Conducted a basic site sensitivity analyses to determine the appropriate environmental guidelines that apply to the subject site;

- Interpreted the collected data; and
- Prepared this contaminated site assessment report.

The laboratory analyses were completed by ALS Laboratory Group (ALS) of Calgary, Alberta.

2.2 METHODS

Table D summarizes the drilling and soil and groundwater sampling methods, depths, analyses, and sample locations for each of the nine assessment locations of the subject site.

TABLE D: DRILLING PROGRAM – APPROACH AND ANALYTICAL REQUIREMENTS FOR MARCH AND AUGUST 2008 FIELDWORK

Project Objective	Approach	Boreholes, Monitoring Wells, Soil Samples			Analytical Requirements		
		Total Number of Boreholes	Number of Boreholes Completed as Wells	Number of Surface Soil Samples	Analyses	Number of Soil Samples	Number of Groundwater Samples
Characterization of soil and groundwater on the subject site due to the use as Garden River Landfill (FCSI No. 00022827).	Drilling boreholes with monitoring well installations, and collecting surface soil samples.	3	3 (08MW01, 08MW02, 08MW03)	5 (08SS24, 08SS25, 08SS26, 08SS27, 08SS28)	Metals	10†	6
					Petroleum hydrocarbons (PHCs) including benzene, toluene, ethylbenzene, and xylenes (BTEX), F1 (C ₆ to C ₁₀), F2 (C ₁₁ to C ₁₆), F3 (C ₁₇ to C ₃₄), and F4 (C ₃₅ and greater), VOC, PAH.	11	6
					Detailed salinity/routine water chemistry	6	6
					Particle size	1	N/A
Characterization of soil and groundwater on the subject site due to the use as Garden River Old Dump (FCSI No. 15841002).	Drilling boreholes with monitoring well installations, and collecting surface soil samples.	6	6 (08MW04, 08MW04B, 08MW05A, 08MW05B, 08MW06A, 08MW06B)	5 (08SS45, 08SS46, 08SS47, 08SS48, 08SS49)	Metals	10†	6
					PHCs including BTEX, F1 (C ₆ to C ₁₀), F2 (C ₁₁ to C ₁₆), F3 (C ₁₇ to C ₃₄), and F4 (C ₃₅ and greater), VOC, PAH.	11	6
					Detailed salinity/routine water chemistry	7	6
					Particle size	2	N/A

TABLE D: DRILLING PROGRAM – APPROACH AND ANALYTICAL REQUIREMENTS (CONTINUED)

Project Objective	Approach	Boreholes, Monitoring Wells, Soil Samples			Analytical Requirements		
		Total Number of Boreholes	Number of Boreholes Completed as Wells	Number of Surface Soil Samples	Analyses	Number of Soil Samples	Number of Groundwater Samples
Characterization of soil and groundwater on the subject site due to the Former Septic Tile Field (FCSI No. 00022830).	Drilling boreholes with monitoring well installations, and collecting surface soil samples.	4	4 (08MW07A, 08MW07B, 08MW08, 08MW09)	5 (08SS50, 08SS51, 08SS52, 08SS53, 08SS54)	Metals	11 [†]	5
					PHCs including BTEX, F1 (C ₆ to C ₁₀), F2 (C ₁₁ to C ₁₆), F3 (C ₁₇ to C ₃₄), and F4 (C ₃₅ and greater)	12	3
					Detailed salinity/routine water chemistry	7	5
					Particle size	1	N/A
Characterization of soil and groundwater due to the use as Garden River Airstrip (FCSI No. 00022199).	Drilling boreholes with monitoring well installations, and collecting surface soil samples.	3	3 (08MW10, 08MW11, 08MW12)	8 (08SS29, 08SS30, 08SS31, 08SS32, 08SS33, 08SS34, 08SS35, 08SS36)	Metals	15 [†]	5
					PHCs including BTEX, F1 (C ₆ to C ₁₀), F2 (C ₁₁ to C ₁₆), F3 (C ₁₇ to C ₃₄), and F4 (C ₃₅ and greater)	15	3
					Detailed salinity/routine water chemistry	1	5
					Particle size	3	N/A

TABLE D: DRILLING PROGRAM – APPROACH AND ANALYTICAL REQUIREMENTS (CONTINUED)

Project Objective	Approach	Boreholes, Monitoring Wells, Soil Samples			Analytical Requirements		
		Total Number of Boreholes	Number of Boreholes Completed as Wells	Number of Surface Soil Samples	Analyses	Number of Soil Samples	Number of Groundwater Samples
Characterization of soil and groundwater due to the use as Garden River Public Works Yard (FCSI No. 00022200).	Drilling boreholes with monitoring well installation, and collecting surface soil samples.	4	4 (08MW20, 08MW21, 08MW22, 08MW23)	8 (08SS37, 08SS38, 08SS39, 08SS40, 08SS41, 08SS42, 08SS43, 08SS44)	Metal(s)	11†	4
					PHCs including BTEX, F1 (C ₆ to C ₁₀), F2 (C ₁₁ to C ₁₆), F3 (C ₁₇ to C ₃₄), and F4 (C ₃₅ and greater)	17	5
					Detailed salinity/routine water chemistry	4	4
					Particle size	3	N/A
Characterization of soil and groundwater on the subject site due to the Fifth Meridian Market AST (FCSI No. 00022201) and Northlands School Historic AST (FCSI No. 00022828).	Drilling boreholes with monitoring well installations, and collecting surface soil samples.	4	2 (08MW16, 08MW18)	3 (08SS55, 08SS56, 08SS57)	Metals	8†	2
					PHCs including BTEX, F1 (C ₆ to C ₁₀), F2 (C ₁₁ to C ₁₆), F3 (C ₁₇ to C ₃₄), and F4 (C ₃₅ and greater)	11	2
					Detailed salinity/routine water chemistry	2	2
					Particle size	1	N/A

TABLE D: DRILLING PROGRAM – APPROACH AND ANALYTICAL REQUIREMENTS (CONTINUED)

Project Objective	Approach	Boreholes, Monitoring Wells, Soil Samples			Analytical Requirements		
		Total Number of Boreholes	Number of Boreholes Completed as Wells	Number of Surface Soil Samples	Analyses	Number of Soil Samples	Number of Groundwater Samples
Characterization of soil due to the Church Historic AST.	Drilling borehole and collecting surface soil samples.	1	None	2 (08SS61, 08SS62)	Metals	3†	None
					PHCs including BTEX, F1 (C ₆ to C ₁₀), F2 (C ₁₁ to C ₁₆), F3 (C ₁₇ to C ₃₄), and F4 (C ₃₅ and greater)	4	None
					Detailed salinity/routine water chemistry	2	None
					Particle size	1	N/A
Characterization of soil and groundwater due to the Garden River Trading (Charlie Rose) AST (FCSI No. 00022202).	Drilling boreholes with monitoring well installation, and collecting surface soil samples.	2	1 (08MW14)	2 (08SS59, 08SS60)	Metal(s)	3†	1
					PHCs including BTEX, F1 (C ₆ to C ₁₀), F2 (C ₁₁ to C ₁₆), F3 (C ₁₇ to C ₃₄), and F4 (C ₃₅ and greater)	5	1
					Detailed salinity/routine water chemistry	1	1
					Particle size	2	N/A

Notes:
 † Includes samples for lead analysis only.

2.2.1 Utility Locates

EBA coordinated utility locates for the assessment locations listed in Table D (Drilling Program) of Section 2.2, using private and public utility locators. The client representatives and Public Works personnel identified above-ground and underground facilities including, but not limited to, pipelines, telecommunications lines, power lines, and potential buried objects. Facility locating was completed prior to EBA beginning any ground disturbance activity at the site.

Line locates were completed for the Garden River Landfill, Garden River Old Dump, Former Septic Tile Field, and Garden River Airstrip on March 17, 2008. These locations were assessed during the winter drilling program.

Line locates were completed for the Garden River Public Works Yard, Fifth Meridian Market and Northlands School, the Church, and the Garden River Trading (Charlie Rose) on August 25, 2008. These locations were assessed during the summer drilling program. According to Garden River Public Works personnel, underground water and sewer lines made of polyvinyl chloride (PVC) without attached tracing wires would be found in these assessment locations. Since contact with one of these PVC lines was possible, a stand-by plumber and assistant were present on site with required repair equipment and materials during the summer drilling program.

2.2.2 On-site Safety Meeting and Pre-job Hazard Assessment (PJHA)

EBA conducted tailgate safety meetings with all contractors on site, which included a PJHA, prior to initiating work at the subject site.

2.2.3 Drilling and Groundwater Monitoring Well Installation Program

Mobile Augers and Research Ltd. (Mobile Augers) of Edmonton, Alberta, drilled 16 boreholes between March 18, 2008 and March 22, 2008 (winter drilling program) and 11 boreholes between August 26, 2008 and August 27, 2008 (summer drilling program). Boreholes were drilled using a 15 cm diameter solid stem augers to a maximum depth of 11.4 m below grade (mbg). EBA logged soils according to the Unified Soil Classification System (USCS), with additional comments on combustible vapour concentrations (CVCs), and unusual stains and/or debris. The on-site personnel did not smell the soil in accordance with EBA's Safe Work Policy. Figure 2 shows a site plan of the community features and assessment areas listed in Table D. Figure 3 through Figure 10 show site plans of each assessment area with the approximate locations of the monitoring wells, boreholes, and surface soil samples. The borehole logs and a key to the USCS are presented in Appendix A.

EBA installed groundwater monitoring wells in 23 of the 27 boreholes. A slotted 51 mm PVC standpipe was inserted from the bottom of the borehole to between approximately 3.1 mbg to 8.2 mbg, and solid PVC pipe was used for the remainder of the well to the surface. Silica sand was placed in the borehole annulus from the base of the borehole to

0.3 m above the slotted interval of the standpipe. To reduce the possibility of inflow of surface water into the standpipe, the annulus of each monitoring well, above the slotted section, was sealed with bentonite chips to grade. Sand was placed above the bentonite to surface and the monitoring wells were secured with a stick up steel casing founded in concrete. The well completion details are summarized in the borehole logs presented in Appendix A.

2.2.4 Field Screening

Soil samples were generally collected from the auger at regular intervals (approximately 0.5 m) and/or at changes in soil stratigraphy. Bagged soil samples were screened for CVCs using a GasTech TankTechtor™ (GasTech™) portable gas detector calibrated to hexane and operated in methane elimination mode.

2.2.5 Soil Sampling and Analytical Testing

Based on the measured soil CVCs and visual observations made during drilling, soil samples were selected and placed in laboratory supplied 250 mL glass jars with Teflon™-lined lids, kept on ice in coolers, and transported to ALS Laboratories in Edmonton under chain-of-custody (CoC) for laboratory analyses.

The analytical program was developed based on the findings of a Phase I ESA conducted by EBA for the subject site dated March 2006 (EBA File: 5101390), and the findings of a Phase I ESA conducted by AMEC for the subject site dated November 2006. The soil analytical results are summarized in Table 1 and are discussed in Section 3.3.1. The analytical methodologies are referenced with ALS laboratory reports in Appendix B. The reader is directed to these references for further details on specific analytical methods. The soil samples were analyzed for the parameters as indicated in Table D, Section 2.2.

2.2.6 Groundwater Monitoring, Sampling, and Analytical Testing

Groundwater monitoring wells were surveyed by Maltais Geomatics. Elevations are geodetic ground and are referred to ASCM 889402, and coordinates are UTM Zone 11 (NAD'83). All monitoring wells were surveyed to determine the relative groundwater elevations and groundwater flow direction.

On March 21, 2008 and August 29, 2008, EBA monitored the groundwater monitoring wells for well headspace CVCs and liquid levels. CVCs were measured using a GasTech™ Model 1238 ME (operated in methane elimination mode calibrated to hexane). Groundwater levels were measured using a Heron interface probe. Monitoring results are presented in Table 2 and discussed in Section 3.2.

Subsequent to monitoring, the groundwater monitoring wells were purged to a minimum of three well volumes, or until dry, and allowed to recover prior to sampling. Groundwater samples were collected on March 24, 2008 and August 29, 2008 using dedicated disposable bailers, stored in laboratory supplied containers, appropriately field

filtered and preserved, and kept cool in a cooler. The samples were transported to ALS under CoC.

EBA developed the analytical testing program based on the recommendations from the 2006 EBA Phase I ESA and 2006 AMEC Phase I ESA. Groundwater analytical results are summarized in Table 3 and discussed in Section 3.3.2. The analytical methodologies are referenced with ALS's laboratory reports in Appendix B.

2.2.7 Reference Guidelines

Laboratory results for soils parameters were compared to the Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME, 2007) and to Alberta Environment (AENV) Alberta Tier 1 Soil and Groundwater Remediation Guidelines (AENV, 2008) for residential/parkland land use. Soil samples were submitted for particle size analysis to establish whether the surface soils are fine or coarse textured (Section 3.3.1).

Laboratory results for groundwater parameters were compared to the Health Canada Guidelines for Canadian Drinking Water Quality (CDWQ) – Summary Table (Health Canada, 2008), CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2007), and to AENV Tier 1 Soil and Groundwater Remediation Guidelines (AENV, 2008) for residential/parkland land use.

2.2.8 Quality Assurance/Quality Control (QA/QC) Methods

EBA's soil and groundwater quality assurance/quality control (QA/QC) procedures include reviewing the data collected for appropriateness and completeness, following the appropriate field protocol.

The field procedures for QA/QC involved the following:

- Soils:
 - Changing nitrile gloves between sample collections.
 - Using sample containers provided by the laboratory.
 - Filling sample containers for PHC and volatile organic compound (VOC) analysis with minimal headspace (air) when the containers were closed.
 - Documenting field and sampling activities.
- Groundwater:
 - Using a dedicated disposable bailer for each monitoring well to collect groundwater samples.
 - Changing nitrile gloves between wells.
 - Using sample containers provided by the laboratory.

- Filling the sample bottles supplied by ALS directly from the bailer, minimizing air contact. Sample containers for PHCs and VOCs were filled with no headspace (air bubbles) when the containers were closed. The samples were filtered and preserved, if required, according to the laboratory instruction.
- Documenting field and sampling activities.

EBA also verified QA/QC of ALS by submitting duplicate samples for soil analyses and groundwater analyses.

3.0 RESULTS

3.1 FIELD OBSERVATIONS

This section describes the field observations noted during drilling, soil sampling, site monitoring, and groundwater sampling. Figure 2 shows the Garden River Site Plan and eight assessment areas (one assessment area shows two locations, the Fifth Meridian market and the Northlands School Historic AST). Figure 3 through Figure 10 display each assessment area and show the locations of borehole and/or monitoring well and surface samples.

Soil analytical laboratory data is presented in Table 1, groundwater monitoring data is presented in Table 2, and groundwater analytical laboratory data is presented in Table 3. Borehole logs and well completion details are given in Appendix A. Table A4 at the end of Appendix A summarizes details of the surface soil samples collected on August 26, 2008 and August 27, 2008. Appendix B provides ALS certificates of analysis for soil and groundwater.

3.1.1 Soil Stratigraphy and Observations

The stratigraphy observed at assessment locations north of Garden Creek (at the Garden River Landfill, Old Dump, Public Works Yard, Airstrip, and Former Septic Tile Field) is generally between 1 m and 5 m of sand, overlying a clayey silt layer (approximately 0.25 m thick), overlying sand. Note that the upper 1 m depth of soil at the Garden River Landfill (08MW01 to 08MW03) contained solid waste (e.g., wires, glass, plastic, wood), and lumber was found in the upper 3 m depth of the Garden River Old Dump (08MW04 and 08MW05). No soil staining was encountered within the indicated boreholes, but oil staining was observed in the Garden River Public Works Yard.

The stratigraphy observed at assessment locations south of Garden Creek (at the Fifth Meridian Market and former Northlands School, the Church, and the Garden River Trading – Charlie Rose) was generally clayey silt deposits to approximately 4 m depth, overlying sand deposits. No soil staining was encountered on these areas.

3.1.2 Soil Vapour Concentrations

The CVC readings were used to screen for PHCs in soil. The CVCs for each soil sample are noted on the borehole logs and the table summarizing surface soil samples (Table A4 of Appendix A). Most CVCs measured in the field ranged from less than the instrument detection limit to 100 parts per million (ppm). The highest CVC, 5% lower explosive limit (LEL), was measured in a surface soil sample (08SS36) collected from the eastern end of the Garden River Airstrip, where fuel drums were located. EBA personnel could not avoid noticing a diesel smell at this location. A stained surface soil sample (08SS41) collected from the Public Works Yard, north of the waste oil ASTs, had a CVC of 500 ppm. Soil samples from these locations were selected for laboratory analysis.

The CVCs measured below 6 mbg in the Fifth Meridian Market and Historic Northlands School assessment areas were generally 200 ppm to 325 ppm. At the nearby Church assessment area, the maximum CVC was 200 ppm at 4.3 mbg. Soil samples were selected for laboratory analysis.

3.2 GROUNDWATER MONITORING

The CVCs measured in the headspace of the monitoring wells were used to screen for VOC in groundwater. The CVC values were generally 50 ppm or less (Table 3). The maximum CVC, 125 ppm (08MW21), and the second highest, 100 ppm (08MW22), were measured in Garden River Public Works Yard. Another CVC of 100 ppm (08MW16) was measured in the Fifth Meridian Market area.

Groundwater levels in 08MW01 through 08MW12 were measured on March 21, 2008 and on August 29, 2008 (Table 2). In 08MW14 through 08MW23, groundwater levels were measured only on August 29, 2008, following installation of these wells during the summer drilling program. The water levels were very similar or identical between the two monitoring events. Groundwater levels ranged from 9.66 mbg (08MW01) to 5.57 mbg (08MW02). Throughout the site, groundwater ranged from a highest elevation of 234.86 m at the Garden River Landfill of (08MW02) to a lowest elevation of 226.55 m near the banks of Peace River (08MW14). Free phase hydrocarbons or sheen was not detected in any monitoring well during monitoring, purging, or sampling activities.

Groundwater contours are displayed on Figure 3 through Figure 6 (the Garden River Landfill, Garden River Old Dump, Former Septic Tile Field, and the Garden River Airstrip locations, respectively). These contour maps were prepared based on the groundwater elevation information obtained on March 21, 2008 (Table 2). At Garden River Landfill, the interpreted direction of groundwater flow is to the northeast. At the Garden River Old Dump, the flow is to the south, towards the Peace River. At the Former Septic Tile Field, it is to the east. At the Garden River Airstrip, it is to the west. Groundwater elevations were measured only few days after monitoring well installation; therefore, it is possible that groundwater levels in the wells has not yet reached equilibrium and that the interpreted groundwater flow direction may not reflect stable conditions. The estimated hydraulic gradients at these sites are presented in Table E.

TABLE E: K TEST RESULTS AND INTERPRETATIONS

Monitoring Well	Hydraulic Gradient (m/m)	Hydraulic Conductivity (m/s)		Estimated Linear Flow Velocity ¹ (m/yr)
		Bouwer and Rice	Hvorslev	
08MW01	0.1	1.12 x 10 ⁻⁶	1.98 x 10 ⁻⁶	59.8
08MW06B	0.001	1.58 x 10 ⁻⁶	2.46 x 10 ⁻⁶	0.4
08MW07B	0.003	2.71 x 10 ⁻⁶	4.84 x 10 ⁻⁶	2.3
08MW10	0.007	5.83 x 10 ⁻⁷	1.37 x 10 ⁻⁶	1.5
08MW20	0.008	7.01 x 10 ⁻⁶	3.82 x 10 ⁻⁶	4.8
Notes:				
¹ Estimated using the Hvorslev hydraulic conductivity value.				

K tests were performed on monitoring wells 08MW01, 08MW06B, 08MW07B, and 08MW10 on March 21, 2008, and on monitoring well 08MW20 on August 30, 2008. The results of the K tests are presented in Appendix C and are summarized in Table E. The average hydraulic conductivity (Hvorslev) of the site is 3.79 x 10⁻⁶ m/s. Using the more conservative (Hvorslev) hydraulic conductivity and assuming an effective porosity of 20%, calculated linear flow velocities ranged from 59.8 m/year to 0.4 m/year.

3.3 ANALYTICAL RESULTS

The analytical results are discussed in the following sections relative to referenced guidelines. The laboratory results and comparative guidelines for soil are summarized in Table 1. The laboratory results and comparative guidelines for groundwater are summarized in Table 3.

Duplicate soil samples were collected from Garden River Airstrip (08SS33), Garden River Public Works yard (08MW22), Fifth Meridian Market and Northlands School Historic AST (08MW16 and 08MW17), Church (08BH19), and Garden River Trading (08SS59). An assessment of the duplicate samples is presented in Appendix D. Most relative percent differences (RPDs) between analytical values are below 75%, and show acceptable QA/QC for field methodology.

Duplicate groundwater samples were collected from Garden River Public Works Yard (08MW21). The analytical results were all below laboratory detection limits, and an assessment of field methodology QA/QC for groundwater is not possible.

3.3.1 Analytical Results – Soils

Approximately half of the analytical results for particle size had greater than 50% sand content and are described as coarse-textured material (Table 1). Thus, the guidelines which apply to this site are for coarse-textured soils.

Measured concentrations of BTEX, chlorinated aliphatics, volatile hydrocarbons, and carcinogenic polyaromatic hydrocarbons (PAHs) were less than applicable guidelines and most were below the laboratory detection limits. One or more of the PHC fractions F1, F2, F3, and F4 were greater than applicable guidelines in ten samples collected from the Garden River Public Works Yard, one sample from Garden River Landfill, and one sample from Garden River Airstrip, as summarized in Table F. The sample from the Garden River Airstrip also had a combustible vapour concentration of 5% LEL.

Generally, the measured concentrations of metals were below applicable guidelines. One sample collected from Garden River Old Dump exceeded the applicable guideline for selenium and one sample collected from Garden River Landfill exceeded the applicable guideline for copper. All electrical conductivity (EC) and sodium adsorption ratios (SARs) were less than the comparative guidelines.

TABLE F: SUMMARY OF SOIL CONCENTRATIONS GREATER THAN GUIDELINES (mg/kg)				
Parameter	Guidelines	Exceedances		Location
		Sample ID	Concentration (mg/kg)	
F1	24 mg/kg (AENV)	08SS36 08SS41	540 310	Garden River Airstrip; Garden River Public Works yard.
F2	130 mg/kg (AENV)	08SS36 08MW22 (D) ¹ 08SS40 08SS41 08SS42 08SS43 08SS44	3,200 540 (450) ¹ 820 9,000 150 840 420	Garden River Airstrip; Garden River Public Works yard.
F3	300 mg/kg (AENV)	08SS24 08MW21 08MW22 (D) ¹ 08SS37 08SS39 08SS40 08SS41 08SS42 08SS43 08SS44	810 8,000 14,000 (12,000) ¹ 2,100 20,000 11,000 24,000 16,000 29,000 11,000	Garden River Landfill; Garden River Public Works yard.
F4	2,800 mg/kg (AENV)	08MW21 08MW22 (D) ¹ 08SS39 08SS40	5,200 10,000 (12,000) ¹ 23,000 8,900	Garden River Public Works yard.

TABLE F: SUMMARY OF SOIL CONCENTRATIONS GREATER THAN GUIDELINES (mg/kg)

Parameter	Guidelines	Exceedances		Location
		Sample ID	Concentration (mg/kg)	
		08SS41	10,000	
		08SS42	16,000	
		08SS43	20,000	
		08SS44	8,800	
Copper	63 mg/kg (CCME, AENV)	08SS24	204	Garden River Landfill.
Selenium	1 mg/kg (CCME, AENV)	08MW04B	1.58	Garden River Old Dump.
Note:				
¹ (D) signifies a duplicate sample, and the duplicated soil analytical result is given in brackets.				

3.3.2 Analytical Results – Groundwater

All measured concentrations of monoaromatic hydrocarbons, such as benzene, ethylbenzene, xylenes, PHC fractions F1 and F2, and chlorinated aliphatics were below the applicable guidelines and most were less than laboratory detection limits (Table 3). The concentrations of benzo(a)anthracene and/or pyrene exceeded the applicable guidelines in 08MW01 and 08MW03 (Garden River Landfill).

The concentrations of most dissolved metals met the applicable guidelines. The concentration of iron exceeded the applicable guidelines in one monitoring well from the Garden River Old Dump (08MW05B) and in one monitoring well from the Garden River Public Works Yard (08MW20).

In many of the groundwater samples, the concentrations of selenium exceeded the CCME guideline for the protection of aquatic life. Two groundwater samples from the Garden River Landfill exceeded the CCME criteria for freshwater aquatic life. The method detection limit for cadmium was, however, greater than the criteria itself. The concentrations of manganese also exceeded the CCME guideline in at least one sample from most of the monitoring wells. Generally the manganese exceedances occurred during the March sampling event, but not the August sampling event. Since manganese is a redox sensitive metal and will prevail as dissolved ions when dissolved oxygen is virtually absent, it is assumed that anoxic conditions existed in March. The concentrations of zinc throughout the site also exceeded the CCME guidelines during the March groundwater sampling event.

The groundwater samples which exceeded the applicable guidelines are summarized below in Table G.

TABLE G: SUMMARY OF GROUNDWATER CONCENTRATIONS GREATER THAN GUIDELINES (MG/L)

Parameter	Guidelines	Exceedances		Location
		Sample ID	Concentration (mg/L)	
Pyrene	0.000025 mg/L (CCME, AENV)	08MW01	0.00003	Garden River Landfill
		08MW03	0.00005	
Benzo(a)anthracene	0.000018 mg/L (CCME, AENV)	08MW01	0.00002	Garden River Landfill
Iron	0.3 mg/L (CCME, Health Canada, AENV)	08MW05B	2.03, 1.51	Garden River Old Dump Garden River Public Works.
		08MW20	2.63	
Cadmium	0.000097 mg/L with hardness of. 350 mg/L (CCME)	08MW01	0.0015	Garden River Landfill;
		08MW02	0.0009	
Manganese	0.05 mg/L (Health Canada, AENV)	08MW01	0.142	Garden River Landfill;
		08MW02	0.137	
		08MW03	0.145	
		08MW04B	0.259, 0.538	Garden River Old Dump;
		08MW05B	0.294, 0.636	
		08MW06B	0.226	Former Septic Tile Field;
		08MW07B	0.010	
		08MW08	0.170	Garden River Airstrip;
		08MW09	0.145	
		08MW10	0.124	
		08MW12	0.101	Northlands School AST; Garden River Public Works Yard.
		08MW16	1.58	
		08MW20	0.598	
08MW22	0.157			
08MW23	0.176			
Zinc	0.03 mg/L (CCME, AENV)	08MW01	0.10	Garden River Landfill;
		08MW02	0.117	
		08MW03	0.103	Garden River Old Dump;
		08MW04B	0.0938	
		08MW05B	0.061	
		08MW06B	0.039, 0.033	Former Septic Tile Field;
		08MW07B	0.045	
		08MW08	0.055	Garden River Airstrip;
		08MW09	0.041	
		08MW10	0.066	
		08MW11	0.096	Garden River Trading
		08MW12	0.074	
		08MW14	0.033	

TABLE G: SUMMARY OF GROUNDWATER CONCENTRATIONS GREATER THAN GUIDELINES (MG/L)

Parameter	Guidelines	Exceedances		Location
		Sample ID	Concentration (mg/L)	
Selenium	0.001 mg/L (CCME, AENV)	08MW01	0.0017, 0.0016	Garden River Landfill;
		08MW02	0.0016, 0.0020	
		08MW03	0.0047, 0.0028	
		08MW04B	0.0108, 0.0012	Garden River Old Dump;
		08MW11	0.0061, 0.0214	Garden River Airstrip;
		08MW12	0.0066	Garden River Trading Fifth Meridian Market,
		08MW14	0.0160	
		08MW16	0.0179	
		08MW18	0.0287	Garden River Public Works Yard.
		08MW20	0.0028	
		08MW21	0.0031	
		08MW22	0.0051	
		08MW23	0.0030	

4.0 CONCLUSIONS

The subject site includes the following locations:

1. Garden River Landfill.
2. Garden River Old Dump.
3. Former Septic Tile Field.
4. Garden River Airstrip.
5. Garden River Public Works Yard.
6. Fifth Meridian Market.
7. Northlands School Historic AST.
8. Church.
9. Garden River Trading (Charlie Rose).

The objectives of the contaminated site assessment were as follows:

- To determine/evaluate the extent and nature of soil and groundwater potential contamination identified by previous reports at the facilities and fuel storage locations.
- To determine the hydrological parameters of the site.

- To evaluate the environmental condition of the site's subsurface, using the Federal Contaminated Sites Program.
- To provide information sufficient to develop a RAP where required.

For the last five assessment areas, PVC sewer and water pipe lines without tracing wires were reportedly present. Therefore, the public and private utility locators were not able to perform underground utility locates on March 18, 2008 for the winter drilling program. These assessment areas were located in consultation with client representatives and Public Works personnel on August 26, 2008 and were assessed during the summer drilling program, with the fulltime presence of an equipped plumber.

4.1 HYDROLOGICAL PARAMETERS

The soil at this site is generally composed of coarse-textured fluvial deposits from the Peace River. The average hydraulic conductivity in groundwater at the site was approximately 4×10^{-6} m/s. The estimated linear flow velocity ranged from 0.4 m/year to 4.8 m/year, except in Garden River Landfill where high hydraulic gradients led to predictions of approximately 60 m/year.

4.2 GENERAL SOIL AND GROUNDWATER QUALITY

Soil analytical results for BTEX, PHC fractions F1 through F4, EC, SAR, metals, chlorinated aliphatics, volatile hydrocarbons, and carcinogenic PAHs were below the applicable guidelines at the Former Septic Tile Field, Garden River Trading, Fifth Meridian Market and Northlands School Historic AST, and the Church AST. Soil analytical results which exceeded applicable guidelines will be discussed in later sections..

The concentration of dissolved benzo(a)anthracene and/or pyrene exceeded applicable guidelines in two monitoring wells from the Garden River Landfill. The concentration of dissolved iron exceeded the applicable guideline in one well from the Garden River Old Dump and one well from the Garden River Public Works yard.

The groundwater analytical results for cadmium, manganese, selenium, and/or zinc exceeded the applicable guidelines in all monitoring wells. It is suspected that most of these exceedances are naturally occurring, but this cannot be confirmed without comparisons from control areas near the site and longer term assessments of these chemicals in the groundwater. Only monitoring wells with relatively high concentrations of the metals will be discussed in the following sections.

The groundwater analytical results for pyrene, benzo(a)anthracene, and iron which exceeded the applicable guidelines will be discussed in the following sections.

4.3 GARDEN RIVER LANDFILL

One surface soil sample, 08SS24, collected near scrapped cars on the northern boundary of Garden River Landfill exceeded the applicable guidelines for F3 and copper. The detected concentrations were approximately three times greater than the applicable guidelines.

The dissolved concentrations of pyrene and benzo(a)anthracene exceeded applicable guidelines in monitoring well 08MW01, located near the southeast corner of the open excavation at the landfill area. This sample also had a high concentration of cadmium, 15% higher than the applicable guideline. The measured concentration of pyrene also exceeded the applicable guideline in 08MW02, located towards the west side of the assessment area. The interpreted direction of groundwater flow at Garden River Landfill is towards the northeast.

4.4 GARDEN RIVER OLD DUMP

One soil sample collected from the 7.6 m depth of 08MW04B, near the summer trail to the river, exceeded the applicable guideline for selenium. The concentrations of dissolved selenium and manganese in that monitoring well were also high. Further north, in 08MW05B, the concentration of dissolved manganese was 13 times higher than the applicable guideline, and the concentration of dissolved iron exceeded the applicable guideline. The concentration of cadmium in 08MW06B, near the north end of the site, was about 20 times higher than the applicable guideline. Continued monitoring of groundwater in throughout this assessment area would help confirm whether these represent trends in groundwater quality.

4.5 GARDEN RIVER AIRSTRIP

One surface soil sample, 08SS36, collected near the eastern end of Garden River Airstrip adjacent to fuel storage drums, exceeded the applicable guidelines for F1 and F2. This sample had a high CVC (5% LEL, see Table 1). The concentrations of dissolved cadmium, manganese, selenium and zinc in groundwater samples exceeded the applicable guidelines. The interpreted direction of groundwater flow at Garden River Airstrip is from east to west.

Based on field observations, the exceedance at the airstrip likely represents isolated spills caused by fuelling planes at the airstrip. It is estimated that there could be 100 cubic metres of impacted soil at 08SS36. Fuel drums may have been stored at other locations in the past and it may be reasonable to assume that three or four other fuel storage locations also may have minor fuel impacts. For the airstrip, this could represent up to 500 m³ of impacts as a conservative estimate but specific locations are not known at this time.

4.6 GARDEN RIVER PUBLIC WORKS YARD

Ten soil samples collected from Garden River Public Works Yard exceeded applicable guidelines for one or more PHC fraction F1, F2, F3, and F4. The samples were collected from locations north of the Public Works trailer (08SS37), east and south of the Public Works building (08SS39, 08SS40, 08SS41, 08SS42, and the surface of 08MW21 and 08MW22), and in the equipment parking area (08SS43 and 08SS44). The concentrations of dissolved iron and manganese exceeded the applicable guidelines and were high in 08MW20, north of the Public Works trailer near 08SS37.

EBA's proposed drilling plan was limited by site utilities; therefore, this assessment can only provide an estimate of the area and volume of impacted soil. The area of impacts north of

the Public Works trailer is approximately 140 m². The area of impacts east and south of the Public Works building is approximately 1,300 m². The area of impacts at the equipment parking area is approximately 370 m². The total area of impacted soil in Garden River Public Works Yard is estimated to be 1,800 m². The area of impacts is based on surface soil analytical results and field observations of staining in these areas. The impacts are likely a result of mishandling of fuels, lubricating oils and similar products at this location over a number of years. Four deeper boreholes (installed as monitoring wells) found no evidence of PHC impacts in soil or groundwater at depth. CVC readings throughout the soil profile of these boreholes was generally low. For the majority of stained areas, it is likely that the impacts are surficial only but to be conservative, it should be assumed that at some locations, the impacts are deeper.

Soil samples collected at a depth of 8.5 m in the impacted areas met the applicable guidelines for PHC fractions F1, F2, F3, and F4. Assuming impacts extend to at least 1.5 m across the site, the extent of surficial soil impacts at the site are 2,700 m³. We should assume that at some locations, the impacts are at greater depths. Allowing for a 50% contingency, the volume of PHC impacted soil at this location is estimated at 4,000 m³.

5.0 RECOMMENDATIONS

Each assessment site was assessed using 2008 CCME National Classification System for Contaminated Sites (NCSCS). The following summarizes the NCSCS assessment:

- The Public Works Yard has a total NCSCS score of 75.8 and is ranked as a Class 1 Site, which has a high priority for action.
- The Garden River Airstrip has a total NCSCS score of 75.2 and is ranked as a Class 1 Site, which has a high priority for action.
- The Garden River Landfill has a total NCSCS score of 68.5 and is ranked as a Class 2 Site, which has a medium priority for action.
- The Garden River Old Dump has a total NCSCS score of 63.9 and is ranked as a Class 2 Site, which has a medium priority for action.
- The Northlands School Historic AST has a total NCSCS score of 52.1 and is ranked as a Class 2 Site, which has a medium priority for action.
- The Former Septic Field has a total NCSCS score of 50.5 and is ranked as a Class 2 Site, which has a medium priority for action.
- The Garden River Trading (Charlie Rose) AST has a total NCSCS score of 47.2 and is ranked as a Class 3 Site, which has a low priority for action.
- The Fifth Meridian Market AST has a total NCSCS score of 47.2 and is ranked as a Class 3 Site, which has a low priority for action.
- The Church Historic AST was not assessed using NCSCS since there were no detected exceedances.

Guidance for landfill operations is detailed in AENV's Protection Code of Practice for Landfills¹. The solid waste materials encountered within the upper metre of the area of the current and former landfill locations should be sealed/capped by means of placing impermeable soil/material on the surface of the same areas. Setbacks according to regulations should be observed for these two landfill sites.

There were hydrocarbon impacts in the soil throughout the Garden River Public Works yard. Impacts were associated with ASTs, and equipment storage, and barrel storage. The estimated volume of hydrocarbon impacted soil is 4,000 m³. A RAP for this assessment area is provided in Appendix D.

There were hydrocarbon soil impacts at locations adjacent to the fuel drum storage at the east end of the Garden River Airstrip. The conservative estimate of impacted soil volume is 500 m³. A RAP for this assessment area is provided in Appendix E.

6.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Parks Canada Agency and their agents. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Parks Canada Agency, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in EBA's Services Agreement and in the Geo-environment Report - General Conditions provided in Appendix F of this report.

¹ <http://www.qp.gov.ab.ca/documents/codes/LANDFILL.CFM>

7.0 CLOSURE

We trust the information herein satisfies your present requirements. Should you have any questions, please contact the undersigned directly.

Respectfully submitted,
EBA Engineering Consultants Ltd.



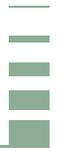
February 17, 2009

Nayef Mahgoub, P.Eng.
Environmental Engineer
CAELUM Group, Environment Practice
Direct Line: 403.203.3305 x222
nmahgoub@eba.ca

Herb ZierVogel, P.Eng.
Senior Environmental Engineer
Environment Practice
Direct Line: 780.451.2130 x267
hziervogel@eba.ca

/dlm

PERMIT TO PRACTICE	
EBA ENGINEERING CONSULTANTS LTD.	
Signature	
Date	<u>Feb 19/09</u>
PERMIT NUMBER: P245	
The Association of Professional Engineers, Geologists and Geophysicists of Alberta	



TABLES

TABLE 1: SOIL ANALYTICAL RESULTS																									
Parameters	Units	Guidelines ¹	Guidelines ²	Garden River Landfill												Garden River Old Dump									
				08MW01		08MW02		08MW03		08SS24	08SS25	08SS26	08SS27	08SS28	08MW04	08MW04B	08MW05	08MW05B	08MW06		08SS45	08SS46	08SS47	08SS48	08SS49
				0.8 m	9.2 m	0.8 m	4.6 m	0.8 m	9.2 m	0 - 0.6 m	0 - 0.6 m	0 - 0.6 m	0 - 0.6 m	0 - 0.6 m	0.8 m	7.6 m	0.8 m	7.6 m	0.8 m	7.6 m	0 - 0.6 m	0 - 0.6 m			
Physical Observations																									
Material Type		NG	NG																						
Field Texture		NG	NG	Sand		Sand	Clayey Silt	Sand		Sand	Silty Sand	Silty Sand	Silty Sand	Silty Sand	Silty Sand	Sand	Sandy Silt		Clayey Silt	Sand	Silty Sand	Silty Sand	Silty Sand		
Colour		NG	NG	ReBr		ReBr	Gr	Br		Br	Br	Br	Br	Br	Br	Gr	Gr	LiOBr	LiGr	LiGr	Br	Br	Br		
Measured Headspace Vapours	% LEL/ppm	NG	NG	10 ppm	100 ppm	ND	50 ppm	25 ppm	20 ppm	50 ppm	5 ppm	10 ppm	10 ppm	20 ppm	GrBr	Gr	ND	ND	50 ppm	50 ppm	20 ppm	30 ppm	25 ppm	25 ppm	
Soil Staining		NG	NG																						
Hydrocarbons																									
Benzene	mg/kg	0.073	0.030	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.039	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
Toluene	mg/kg	0.49	0.37	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Ethylbenzene	mg/kg	0.21	0.082	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Xylenes	mg/kg	12	11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02		
F1 (C ₆ to C ₁₀)	mg/kg	24	NG	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		
F2 (C ₁₀ to C ₁₄)	mg/kg	130	NG	<5	<5	<5	<5	<5	<5	<20	<20	<20	<20	<20	<5	<5	<5	<5	<5	<5	<20	<20	<20		
F3 (C ₁₄ to C ₁₈)	mg/kg	300	NG	7	<5	6	7	6	<5	810	<20	<20	<20	<20	6	10	7	7	7	<5	<20	<20	<20		
F4 (C ₁₈ to C ₂₄)	mg/kg	2,800	NG	<5	<5	<5	<5	<5	<5	50	<20	<20	<20	<20	<5	<5	<5	<5	<5	<5	<20	<20	<20		
F4 (C ₂₄)HGT ³	mg/kg	2,800	NG																						
Chromatograph to baseline at nC ₂₀		NG	NG							Yes	Yes	Yes	Yes	Yes							Yes	Yes	Yes		
Total Pungable Hydrocarbons (TPH)	mg/kg	NG	NG	<5	<5	<5	<5	<5	<5						<5	<5	<5	<5	<5	<5	<20	<20	<20		
Total Hydrocarbons (TEH)	mg/kg	NG	NG	7	<5	6	7	6	<5	860	<20	<20	<20	<20	6	10	7	7	7	<5	<20	<20	<20		
Soil Moisture Content	%	NG	NG	5.3	5	12	15	16	12	18	9.0	10	6.5	7.1	11	27	16	10	24	8.8	8.1	7.8	7.8		
Routine																									
pH	pH-unit	6 to 8.5	6 to 8	7.78	7.94	6.44	7.48	7.42	7.88							7.12	7.82	7.43	7.89	7.73	8.05				
Electrical Conductivity (EC)	dS/m	**	**	2	0.33	0.44	0.27	0.35	0.23							0.19	0.27	0.39	0.23	0.25	0.28				
Sodium Adsorption Ratio (SAR)	Ratio	**	**	5	0.68	0.56	0.56	0.7	0.6	0.36						0.42	0.6	0.31	0.47	0.33	0.49				
Saturation	%	NG	NG	28.7	26.7	46	27.3	45	30.7							40.7	60	50	29.3	56	27.3				
Soluble Salts																									
Calcium (Ca)	mg/kg	NG	NG	13	16	15	12	25	9							10	15	32	8	21	9				
Magnesium (Mg)	mg/kg	NG	NG	1.6	3.3	3	2.1	3	2							2	6	5	1.9	4	2.4				
Sodium (Na)	mg/kg	NG	NG	5.2	4.9	6.3	5.2	8	2.5							3.6	9	5	3	5	3.4				
Potassium (K)	mg/kg	NG	NG	0.9	1.1	1.7	1.4	1.5	1.1							1.5	3	2	1.2	<1	1.5				
Chloride (Cl)	mg/kg	NG	NG	<6	7	<9	5	<9	<6							<8	<10	<6	<10	<5	<5				
Sulphate (SO ₄)	mg/kg	NG	NG	8	25	23	11	15	4							3	20	18	9	4	10				
Calcium (Ca)	meq/L	NG	NG	2.2	2.99	1.66	2.14	2.72	1.45							1.18	1.24	3.15	1.32	1.88	1.68				
Magnesium (Mg)	meq/L	NG	NG	0.46	1.01	0.6	0.63	0.6	0.54							0.5	0.89	0.78	0.55	0.65	0.72				
Sodium (Na)	meq/L	NG	NG	0.79	0.79	0.59	0.83	0.78	0.36							0.39	0.62	0.44	0.45	0.38	0.54				
Potassium (K)	meq/L	NG	NG	0.08	0.11	0.1	0.13	0.08	0.09							0.09	0.14	0.1	0.1	<0.05	0.14				
Chloride (Cl)	meq/L	NG	NG	<0.56	0.76	<0.56	<0.56	<0.56	<0.56							<0.56	<0.56	<0.56	<0.56	<0.56	<0.56				
Sulphate (SO ₄)	meq/L	NG	NG	0.55	1.97	1.04	0.82	0.67	0.24							0.14	0.69	0.74	0.61	0.15	0.78				
Particle Size Analysis																									
MUST PSA % > 75um	%	NG	NG																						
Metals																									
Antimony (Sb)	mg/kg	20	20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2							<0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.2	<0.2		
Arsenic (As)	mg/kg	17	12	3.47	3.50	10.7	5.91	10.4	3.12	5.7						6.5	10.3	7.90	10.4	1.57	9.32	2.71			
Barium (Ba)	mg/kg	500	500	127	79.2	134	122	160	65.9	442						152	168	224	250	37.8	319	54.5			
Beryllium (Be)	mg/kg	5	4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1						<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1	<1		
Cadmium (Cd)	mg/kg	10	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5						<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5		
Chromium (Cr)	mg/kg	64	64	7.04	5.73	17.0	8.69	17.9	5.21	15.7						10.1	12.9	18.3	14.8	4.18	14.7	5.16			
Cobalt (Co)	mg/kg	20	50	4.3	2.8	8.9	4.7	8.0	2.8	7.0						5.0	7.9	10.8	8.6	1.9	7.9	2.7			
Copper (Cu)	mg/kg	63	63	8.7	4.7	23.2	10.6	22.2	4.9	204						10	22.8	27.3	26.8	3.1	25.1	5.2			
Lead (Pb)	mg/kg	140	140	5.6	<5.0	9.5	<5.0	8.8	<5.0	9.0	7.0	10				<5	9.0	10.3	10.7	<5.0	9.6	<5.0	10		
Mercury (Hg)	mg/kg	6.6	6.6	<0.050	<0.050	0.066	<0.050	0.065	<0.050	<0.05						<0.05	0.061	0.056	0.084	<0.050	0.068	<0.050	<0.05		
Molybdenum (Mo)	mg/kg	4	10	<1.0	<1.0	1.1	<1.0	1.2	<1.0	<1						<1	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1		
Nickel (Ni)	mg/kg	50	50	13.1	7.9	25.9	14.8	27.0	8.6	15						14	30.2	33.3	29.9	4.8	25.7	7.9			
Selenium (Se)	mg/kg	1	1	<0.50	<0.50	0.51	<0.50	0.50	<0.50	0.3						<0.5	<0.50	1.58	<0.50	<0.50	<0.50	<0.50	0.4		
Silver (Ag)	mg/kg	20	20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1						<1	<0.20	<0.20	0.23	<0.20	0.22	<0.20	<1		
Thallium (Tl)	mg/kg	1	1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1						<1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1		
Tin (Sn)	mg/kg	5	50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5						<5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5		
Uranium (U)	mg/kg	23	23	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2						<2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2		
Vanadium (V)	mg/kg	130	130	14.0	9.1	28.9	16.8	27.3	9.9	30						23	24.8	28.5	27.5	6.0	27.2	9.2			
Zinc (Zn)	mg/kg	200	200	40.4	22.4	67.7	45.7	62.8	23.4	140						50	81.1	89.9	83.2	13.3	78.2	22.1			
Chlorinated Aliphatics																									
1,1-Dichloroethene	mg/kg	0.021	5							<0.01													<0.01		
Methylene Chloride	mg/kg	0																							

TABLE 1: SOIL ANALYTICAL RESULTS																													
Parameters	Units	Guidelines ¹	Guidelines ²	Former Septic Tile Field												Garden River Airstrip													
				08MW07	08MW07B	08MW08		08MW09		08SS50	08SS51	08SS52	08SS52D	08SS53	08SS54	08MW10	08MW11		08MW12		08SS29	08SS30	08SS31	08SS32	08SS33	08SS33D	08SS34	08SS35	08SS36
				3.1 m	7.6 m	3.1 m	7.6 m	3.1 m	7.6 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.1 m	9.2 m	0-0.1 m	7.6 m	0-0.1 m	9.2 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m
Physical Observations																													
Material Type		NG	NG																										
Field Texture		NG	NG	Sand	Sand	Silty Sand	Silty Clay	Silty Sand	Sand	Silty Sand	Silty Sand	Silty Sand	Silty Sand	Silty Sand	Silty Sand	Sandy Silt													
Colour		NG	NG	Br		Br		Br	GrBr	Br	Br	Br	Br	Br	Br	ReBr													
Measured Headspace Vapours	% LEL/ppm	NG	NG	25 ppm	ND	50 ppm	ND	100 ppm	75 ppm	ND	15 ppm	30 ppm	30 ppm	ND	ND	25 ppm													
Soil Staining		NG	NG																										
Hydrocarbons																													
Benzene	mg/kg	0.073	0.030	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg	0.49	0.37	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	mg/kg	0.21	0.082	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg	12	11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	0.46	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
F1 (C ₆ to C ₁₀)	mg/kg	24	NG	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	540
F2 (C ₁₀ to C ₁₄)	mg/kg	130	NG	<5	<5	<5	<5	<5	<5	<20	<20	<20	<20	<20	<20	<5	<5	<5	<5	<5	<20	<20	<20	<20	<20	<20	<20	<20	3,200
F3 (C ₁₆ to C ₃₄)	mg/kg	300	NG	<5	5	<5	<5	<5	110	20	<20	<20	<20	30	<20	100	6	<5	<5	<5	20	<20	<20	<20	<20	<20	<20	<20	40
F4 (C ₃₄ to C ₅₀)	mg/kg	2,800	NG	<5	<5	<5	<5	<5	33	<20	<20	<20	30	<20	<20	<5	<5	<5	<5	<5	<20	<20	<20	<20	<20	<20	<20	<20	<20
F4 (C ₃₄)HGT ³	mg/kg	2,800	NG																										
Chromatograph to baseline at n _{C50}		NG	NG							Yes	Yes	Yes	Yes	Yes	Yes							Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Total Purgable Hydrocarbons (TPH)	mg/kg	NG	NG	<5	<5	<5	<5	<5	<5	140	20	<20	<20	30	<20	100	6	<5	<5	<5	20	<20	<20	<20	<20	<20	<20	<20	3,800
Total Hydrocarbons (TEH)	mg/kg	NG	NG	<5	<5	<5	<5	<5	<5	140	20	<20	<20	30	<20	100	6	<5	<5	<5	20	<20	<20	<20	<20	<20	<20	<20	3,800
Soil Moisture Content	%	NG	NG	5.3	3.7	5.8	5.1	5.6	14	6.7	7.3	7.5	7.6	7.3	6.5	9.5	20	11	2.7	13	18	7.2	12	6.3	8.6	9.3	11	4.9	7.6
Routine																													
pH	pH-unit	6 to 8.5	6 to 8	7.74	7.94	7.84	7.88	7.84	7.94							7.6													7.0
Electrical Conductivity (EC)	dS/m	**	**	0.27	0.24	0.32	0.28	0.24	0.24							0.26													0.28
Sodium Adsorption Ratio (SAR)	Ratio	**	**	0.46	0.67	2.28	1.22	0.54	0.69							0.1													0.1
Saturation	%	NG	NG	39.3	32	34.7	28	33.3	24							39.1													52.6
Soluble Salts																													
Calcium (Ca)	mg/kg	NG	NG	13	8	7	7	8	6							23													32
Magnesium (Mg)	mg/kg	NG	NG	4	2	2	2	3	1.7							3													5
Sodium (Na)	mg/kg	NG	NG	4.6	4.8	15.1	7.4	4.1	3.6							1.6													2
Potassium (K)	mg/kg	NG	NG	1.7	1.3	1.1	1.2	1	1							1.1													7
Chloride (Cl)	mg/kg	NG	NG	<8	<6	<7	<6	<7	<5							<8													<10
Sulphate (SO ₄)	mg/kg	NG	NG	9	7	13	8	5	6							4													7
Calcium (Ca)	meq/L	NG	NG	1.67	1.26	0.97	1.16	1.16	1.2							3.0													3.0
Magnesium (Mg)	meq/L	NG	NG	0.79	0.63	0.42	0.6	0.82	0.59							0.73													0.8
Sodium (Na)	meq/L	NG	NG	0.51	0.65	1.9	1.15	0.53	0.66							0.18													0.14
Potassium (K)	meq/L	NG	NG	0.11	0.11	0.08	0.11	0.08	0.1							0.07													0.36
Chloride (Cl)	meq/L	NG	NG	<0.56	<0.56	<0.56	<0.56	<0.56	<0.56							<0.56													<0.56
Sulphate (SO ₄)	meq/L	NG	NG	0.46	0.42	0.78	0.58	0.32	0.56							0.22													0.28
Particle Size Analysis																													
MUST PSA % > 75um	%	NG	NG													13													9
Metals																													
Antimony (Sb)	mg/kg	20	20	<0.20	<0.20	<0.20	0.35	<0.20	<0.20	<0.2						<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Arsenic (As)	mg/kg	17	12	7.39	5.37	7.79	4.54	6.44	3.16	8.4						7.35	4.56	6.58	2.84	10.4	3.61								4.2
Barium (Ba)	mg/kg	500	500	238	99.1	212	78.1	167	60.3	236						69.8	89.5	150	56.0	169	97.1								309
Beryllium (Be)	mg/kg	5	4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1
Cadmium (Cd)	mg/kg	10	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5						<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
Chromium (Cr)	mg/kg	64	64	8.11	6.43	9.82	5.36	8.23	3.97	21.1						11.7	7.67	8.94	4.79	19.5	7.53								18.6
Cobalt (Co)	mg/kg	20	50	4.9	4.0	6.0	3.6	4.5	2.6	8						9	7	7	4.1	5.3	2.4							9	
Copper (Cu)	mg/kg	63	63	11.4	7.2	14.4	6.7	9.3	4.5	14						14.7	7.1	11.6	4.5	24.9	7.5							9	
Lead (Pb)	mg/kg	140	140	5.6	<5.0	6.6	<5.0	<5.0	<5.0	10						5.6	<5.0	5.1	<5.0	9.3	<5.0								7
Mercury (Hg)	mg/kg	6.6	6.6	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.05						<0.050	<0.050	<0.050	<0.050	0.067	<0.050								<0.05
Molybdenum (Mo)	mg/kg	4	10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1						<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1
Nickel (Ni)	mg/kg	50	50	15.4	11.3	17.8	11.0	14.2	6.9	20						19.8	13.0	16.2	7.0	29.9	12.2								14
Selenium (Se)	mg/kg	1	1	<0.50	<0.50	<0.50	<0.50																						

TABLE 1: SOIL ANALYTICAL RESULTS																				
Parameters	Units	Guidelines ¹	Guidelines ²	Garden River Public Works																
				08MW20		08MW21		08MW22	08MW22D	08MW22	08MW23		08SS37	08SS38	08SS39	08SS40	08SS41	08SS42	08SS43	08SS44
				0.6 m	9.2 m	0.6 m	8.5 m	0.6 m	0.6 m	8.5 m	0.6 m	6.1 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m	0-0.6 m
Physical Observations																				
Material Type		NG	NG																	
Field Texture		NG	NG	Silty Sand	Sand	Silty Sand	Gravelly Sand	Silty Sand	Silty Sand	Sand	Silty Sand	Sand	Silty Sand	Silty Sand	Silty Sand	Silty Sand	Silty Sand	Silty Sand	Silty Sand	
Colour		NG	NG	LiYeBr	LiGrBr	Br	Br	Br	Br	Br	GrBr	Br	Br	Br	Br	Br	Br	Br	Br	
Measured Headspace Vapours	% LEL/ppm	NG	NG	50 ppm	125 ppm	100 ppm	50 ppm	75 ppm	75 ppm	75 ppm	50 ppm	50 ppm	25 ppm	5 ppm	50 ppm	150 ppm	500 ppm	25 ppm	50 ppm	
Soil Staining		NG	NG								Oil			Oil	Oil	Oil	Staining	Staining	Oil	
Hydrocarbons																				
Benzene	mg/kg	0.073	0.030	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Toluene	mg/kg	0.49	0.37	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Ethylbenzene	mg/kg	0.21	0.082	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Xylenes	mg/kg	12	11	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
F1 (C ₉ to C ₁₀)	mg/kg	24	NG	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	6	310	<5	11	
F2 (C ₁₀ to C ₁₄)	mg/kg	130	NG	<20	<20	110	<20	540	450	<20	<20	<20	<20	<20	90	820	9,000	150	840	
F3 (C ₁₄ to C ₃₄)	mg/kg	300	NG	<20	<20	8,000	<20	14,000	12,000	<20	20	<20	2,100	<20	20,000	11,000	24,000	16,000	29,000	
F4 (C ₃₄ to C ₅₀)	mg/kg	2,800	NG	<20	<20	1,200	<20	2,600	2,300	<20	60	<20	100	<20	6,200	1,300	810	2,200	2,100	
F4 (C ₃₄ -)HGT ³	mg/kg	2,800	NG			5,200		10,000	12,000						23,000	8,900	10,000	16,000	20,000	
Chromatograph to baseline at nC ₃₀		NG	NG	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	
Total Purgeable Hydrocarbons (TPH)	mg/kg	NG	NG																	
Total Hydrocarbons (TEH)	mg/kg	NG	NG	<20	<20	9,300	<20	17,000	15,000	<20	80	<20	2,200	<20	26,000	13,000	34,000	18,000	32,000	
Soil Moisture Content	%	NG	NG	7.1	16	7.9	17	11	10	19	2.9	3.7	7.4	2.8	5.0	10	7.3	4.0	7.7	
Routine																				
pH	pH-unit	6 to 8.5	6 to 8			7.6				8.2								7.1	7.2	
Electrical Conductivity (EC)	dS/m	**	2			0.44				0.20								0.42	0.41	
Sodium Adsorption Ratio (SAR)	Ratio	**	5			0.4				0.3								0.3	0.3	
Saturation	%	NG	NG			34.3				32.5								37.9	38.5	
Soluble Salts																				
Calcium (Ca)	mg/kg	NG	NG			23				10								33	31	
Magnesium (Mg)	mg/kg	NG	NG			5				2								4	5	
Sodium (Na)	mg/kg	NG	NG			4.4				2.6								3.8	4.0	
Potassium (K)	mg/kg	NG	NG			1.3				1.0								1.0	1.1	
Chloride (Cl)	mg/kg	NG	NG			11				<6								<8	8	
Sulphate (SO ₄)	mg/kg	NG	NG			23				9								13	55	
Calcium (Ca)	meq/L	NG	NG			3.4				1.6								4.4	4.1	
Magnesium (Mg)	meq/L	NG	NG			1.2				0.56								0.92	1.2	
Sodium (Na)	meq/L	NG	NG			0.55				0.35								0.43	0.46	
Potassium (K)	meq/L	NG	NG			0.10				0.08								0.07	0.07	
Chloride (Cl)	meq/L	NG	NG			0.86				<0.56								<0.56	0.6	
Sulphate (SO ₄)	meq/L	NG	NG			1.4				0.55								0.72	3.00	
Particle Size Analysis																				
MUST PSA % > 75um	%	NG	NG				90				75			76						
Metals																				
Antimony (Sb)	mg/kg	20	20	<0.2		<0.2				<0.2	<0.2			<0.2	<0.2				<0.2	
Arsenic (As)	mg/kg	17	12	7.3		8.6				6.3	6.6			5.9	6.9			8.0	7.7	
Barium (Ba)	mg/kg	500	500	196		160				132	152			142	188			199	182	
Beryllium (Be)	mg/kg	5	4	<1		<1				<1	<1			<1	<1			<1	<1	
Cadmium (Cd)	mg/kg	10	10	<0.5		<0.5				<0.5	<0.5			<0.5	<0.5			<0.5	<0.5	
Chromium (Cr)	mg/kg	64	64	14.9		17.8				9.7	11.4			10.0	14.9			16.1	22.2	
Cobalt (Co)	mg/kg	20	50	7		7				5	5			5	6			7	7	
Copper (Cu)	mg/kg	63	63	14		16				13	14			11	13			16	11	
Lead (Pb)	mg/kg	140	140	7		8				7	7			5	8			8	9	
Mercury (Hg)	mg/kg	6.6	6.6	<0.05		<0.05				<0.05	<0.05			<0.05	<0.05			<0.05	<0.05	
Molybdenum (Mo)	mg/kg	4	10	1		<1				1	1			<1	<1			1	<1	
Nickel (Ni)	mg/kg	50	50	19		21				15	16			16	18			20	18	
Selenium (Se)	mg/kg	1	1	0.4		0.7				0.3	0.3			0.3	0.4			0.4	0.4	
Silver (Ag)	mg/kg	20	20	<1		<1				<1	<1			<1	<1			<1	<1	
Thallium (Tl)	mg/kg	1	1	<1		<1				<1	<1			<1	<1			<1	<1	
Tin (Sn)	mg/kg	5	50	<5		<5				<5	<5			<5	<5			<5	<5	
Uranium (U)	mg/kg	23	23	<2		<2				<2	<2			<2	<2			<2	<2	
Vanadium (V)	mg/kg	130	130	30		33				22	24			23	31			33	42	
Zinc (Zn)	mg/kg	200	200	60		60				80	90			50	60			90	70	
Chlorinated Aliphatics																				
1,1-Dichloroethene	mg/kg	0.021	5																	
Methylene Chloride	mg/kg	0.095	5																	
trans-1,2-Dichloroethene	mg/kg	NG	5																	
1,1-Dichloroethane	mg/kg	NG	5																	
Chloroform	mg/kg	0.0010	5																	
1,1,1-Trichloroethane	mg/kg	NG	5																	
Carbon Tetrachloride	mg/kg	0.00056	5																	
Trichloroethene	mg/kg	0.012	5																	
1,2-Dichloropropane	mg/kg	NG	5																	
cis-1,3-Dichloropropene	mg/kg	NG	5																	
trans-1,3-Dichloropropene	mg/kg	NG	5																	
1,1,2-Trichloroethane	mg/kg	NG	5																	
1,2-Dichloroethane	mg/kg	0.0027	5																	
Tetrachloroethylene	mg/kg	0.16	5																	
1,1,2,2-Tetrachloroethane	mg/kg	NG	5																	
Volatile Hydrocarbons (EPA)																				
Thiophene	mg/kg	NG	NG																	
Chlorobenzene	mg/kg	0.018	2																	
Styrene	mg/kg	NG	5																	
1,3-Dichlorobenzene	mg/kg	NG	2																	
1,4-Dichlorobenzene	mg/kg	0.098	2																	
1,2-Dichlorobenzene	mg/kg	0.18	2																	
Carcinogenic Polyaromatic Hydrocarbons (PAHs)																				
Naphthalene	mg/kg	0.018	0.6																	
Quinoline	mg/kg	NG	NG																	
Phenanthrene	mg/kg	0.061	5																	

TABLE 2: GROUNDWATER MONITORING RESULTS														
Monitoring Well ID	Borehole Depth (mbg)	Ground Surface Elevation (m)	Top of Casing (TOC) Elevation (m)	Height of Stickup (m)	Slotted Interval (mBG)		Groundwater levels (mBTOC)	Groundwater levels (mbg)	Groundwater levels (mBTOC)	Groundwater levels (mbg)	Slotted Interval Elevation		Groundwater Elevation* (m)	Groundwater Elevation* (m)
					Top (m)	Bottom (m)	21-Mar-08		29-Aug-08		Top (m)	Bottom (m)	21-Mar-08	29-Aug-08
Garden River Landfill														
08MW01	11.3	241.37	242.29	0.92	8.2	11.3	10.06	9.14	10.58	9.66	233.17	230.07	232.23	231.71
08MW02	6.7	240.73	241.87	1.14	3.7	6.7	7.01	5.87	7.01	5.87	237.03	234.03	234.86	234.86
08MW03	11.3	241.38	242.47	1.09		11.3	10.68	9.59	10.66	9.57			231.79	231.81
Garden River Old Dump														
08MW04	6.1	238.84	240.03	1.19	3.1	6.1	dry	dry	dry	dry	235.74	232.74	dry	dry
08MW04B	9.8	238.88	240.16	1.29	6.7	9.8	9.28	8.00	9.31	8.02	232.18	229.08	230.88	230.85
08MW05	6.1	239.09	240.31	1.22	3.1	6.1	dry	dry	dry	dry	235.99	232.99	dry	dry
08MW05B	9.8	239.07	240.27	1.20	6.7	9.8	9.34	8.14	9.35	8.16	232.37	229.27	230.93	230.92
08MW06	8.4	239.06	240.34	1.28	6.4	8.4	dry	dry	9.27	7.99	232.66	230.66	dry	dry
08MW06B	9.8	238.95	240.29	1.34	6.7	9.8	9.32	7.98	9.29	7.95	232.25	229.15	230.97	231.00
Former Septic Tile Field														
08MW07	6.1	239.12	239.00	-0.12	3.1	6.1	dry	dry	5.87	5.99	236.02	233.02	dry	dry
08MW07B	9.2	239.21	239.04	-0.17	6.1	9.2	7.85	8.03	7.85	8.02	233.11	230.01	231.19	231.19
08MW08	9.8	239.33	239.22	-0.11	6.7	9.8	8.10	8.21	8.01	8.13	232.63	229.53	231.12	231.20
08MW09	9.2	239.14	239.03	-0.11	6.1	9.2	7.89	8.00	damaged	damaged	233.04	229.94	231.14	#VALUE!
Garden River Airstrip														
08MW10	9.8	240.87	242.08	1.20	6.7	9.8	10.16	8.96	10.12	8.92	234.17	231.07	231.91	231.95
08MW11	9.8	240.98	242.26	1.27	6.7	9.8	10.35	9.08	10.35	9.08	234.28	231.18	231.91	231.90
08MW12	9.8	241.33	242.57	1.24	6.7	9.8	10.23	8.99	10.00	8.76	234.63	231.53	232.34	232.57
Garden River Trading (Charlie Rose)														
08MW14	10.1	235.73	235.62	-0.11	6.9	9.9			9.07	9.19	228.83	225.83		226.55
Fifth Meridian Market														
08MW16	9.9	236.50	236.39	-0.10	6.9	9.9			9.21	9.31	229.60	226.60		227.18
08MW18	9.9	235.99	235.91	-0.08	6.9	9.9			8.96	9.04	229.09	226.09		226.94
Garden River Public Works														
08MW20	11.4	240.72	240.66	-0.06	8.4	11.4			9.16	9.22	232.32	229.32		231.50
08MW21	9.8	240.19	240.13	-0.06	6.9	9.9			8.60	8.67	233.29	230.29		231.52
08MW22	9.7	240.17	240.06	-0.10	6.9	9.9			8.54	8.64	233.27	230.27		231.52
08MW23	9.9	239.82	239.76	-0.06	6.9	9.9			8.41	8.47	232.92	229.92		231.34
Notes:														
mbg - Metres beneath ground level.														
mBTOC - Metres below top of casing.														
Blank cell - No data.														
Bold - Groundwater elevation is above the screen elevation.														

TABLE 3: GROUNDWATER ANALYTICAL RESULTS

Parameters	Units	Comparative Guidelines ¹	Comparative Guidelines ²	Comparative Guidelines ³	Garden River Landfill					
					08MW01		08MW02		08MW03	
					24-Mar-08	31-Aug-08	24-Mar-08	31-Aug-08	24-Mar-08	31-Aug-08
Routine Parameters										
Combustible Vapour Concentration (field)	ppm	NG	NG	NG		20		20		20
pH (lab)	pH	6.5 to 8.5	6.5 to 8.5	6.5 to 9.0	7.81		7.79		7.81	
pH (field)	pH	NG	NG	NG	6.51	6.57	6.55	6.59	6.67	6.63
Electrical Conductivity (EC) (lab)	µS/cm	NG	NG	NG	692		681		635	
Electrical Conductivity (EC) (field)	µS/cm	NG	NG	NG	801	682	899	675	917	636
Temperature (Field)	Degrees C	NG	NG	NG	1.88	13.1	2.38	11.8	2.08	11.1
Alkalinity Total (as CaCO ₃)	mg/L	NG	NG	NG	358		348		329	
Total Dissolved Solids	mg/L	500	500	NG	388		376		355	
Hardness	mg/L	NG	NG	NG	359		350		338	
Calcium (Ca)	mg/L	NG	NG	NG	106	115	103	106	99.7	96.5
Magnesium (Mg)	mg/L	NG	NG	NG	22.8	25.6	22.5	23.7	21.7	22.4
Potassium (K)	mg/L	NG	NG	NG	2.54	3.5	2.25	2.3	2.87	
Sodium (Na)	mg/L	200	200	NG	10.6	11.1	10.2	7.1	8.9	
Chloride (Cl)	mg/L	230	250	NG	7.8		7.6		4.4	
Sulphate (SO ₄)	mg/L	500	500	NG	21.7		20		19.3	
Bicarbonate (HCO ₃)	mg/L	NG	NG	NG	436		424		402	
Carbonate (CO ₃)	mg/L	NG	NG	NG	<5		<5		<5	
Hydroxide	mg/L	NG	NG	NG	<5		<5		<5	
Nitrite + Nitrate - N	mg/L	NG	NG	NG	0.5		0.48		0.24	
Nitrate - N ³	mg/L	3	10	3	0.5		0.48		0.24	
Nitrite - N	mg/L	NG	1	0.018	<0.05		<0.05		<0.05	
Ionic Balance	%	NG	NG	NG	98		98.4		101	
Volatile Hydrocarbons										
Benzene	mg/L	0.005	0.005	0.37	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thiophene	mg/L	NG	NG	NG		<0.001		<0.001		<0.001
Toluene	mg/L	0.024	0.024	0.002	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chlorobenzene	mg/L	0.0013	NG	0.0013		<0.001		<0.001		<0.001
Ethylbenzene	mg/L	0.0024	0.0024	0.09	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	0.3	0.3	0.18	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Styrene	mg/L	0.072	NG	0.072		<0.001		<0.001		<0.001
F1 (C ₆ to C ₁₀)	mg/L	0.81	NG	NG	<0.1		<0.1		<0.1	
F2 (C ₁₀ to C ₁₆)	mg/L	1.1	NG	NG	<0.05		<0.05		<0.05	
1,3-Dichlorobenzene	mg/L	NG	NG	0.15		<0.001		<0.001		<0.001
1,4-Dichlorobenzene	mg/L	0.001	0.005	0.026		<0.001		<0.001		<0.001
1,2-Dichlorobenzene	mg/L	0.0007	0.2	0.0007		<0.001		<0.001		<0.001
Naphthalene	mg/L	0.0011	NG	0.0011		<0.00001		<0.00001		<0.00001
Quinoline	mg/L	NG	NG	NG		<0.00001		<0.00001		<0.00001
Acenaphthene	mg/L	0.0058	NG	0.0058		<0.00001		<0.00001		<0.00001
Fluorene	mg/L	0.003	NG	0.003		<0.00001		<0.00001		<0.00001
Phenanthrene	mg/L	0.0004	NG	0.0004		<0.00001		<0.00001		<0.00001
Anthracene	mg/L	0.000012	NG	0.000012		0.00001		<0.00001		<0.00001
Acridine	mg/L	NG	NG	NG		0.00001		<0.00001		<0.00001
Fluoranthene	mg/L	0.003	NG	0.00004		0.00002		<0.00001		<0.00001
Pyrene	mg/L	0.000025	NG	0.000025		0.00003		<0.00001		0.00005
Benzo(a)anthracene	mg/L	0.000018	NG	0.000018		0.00002		<0.00001		<0.00001
Chrysene	mg/L	0.0014	NG	0.0014		0.00002		<0.00001		<0.00001
Benzo(b&k)fluoranthene	mg/L	0.00048	NG	0.00048		0.00003		<0.00001		<0.00001
Benzo(k)fluoranthene	mg/L	0.00048	NG	0.00048		0.00001		<0.00001		<0.00001
Benzo(a)pyrene	mg/L	0.000015	0.00001	0.000015		0.00001		<0.00001		<0.00001
Indeno(1,2,3-cd)pyrene	mg/L	0.00021	NG	0.00021		0.00001		<0.00001		<0.00001
Dibenzo(a,h)anthracene	mg/L	0.00026	NG	0.00026		0.00001		<0.00001		<0.00001
Chlorinated Aliphatics										
1,1-Dichloroethene	mg/L	0.014	NG	NG		<0.001		<0.001		<0.001
Methylene Chloride	mg/L	0.05	NG	0.0981		<0.001		<0.001		<0.001
trans-1,2-Dichloroethene	mg/L	NG	NG	NG		<0.001		<0.001		<0.001
1,1-Dichloroethane	mg/L	NG	NG	NG		<0.001		<0.001		<0.001
Chloroform	mg/L	0.0018	NG	0.0018		<0.001		<0.001		<0.001
1,2-Dichloroethane	mg/L	0.005	0.005	0.1		<0.001		<0.001		<0.001
1,1,1-Trichloroethane	mg/L	NG	NG	NG		<0.001		<0.001		<0.001
Carbon Tetrachloride	mg/L	0.00056	0.005	0.0133		<0.001		<0.001		<0.001
Trichloroethene	mg/L	0.005	0.005	0.021		<0.001		<0.001		<0.001
1,2-Dichloropropane	mg/L	NG	NG	NG		<0.001		<0.001		<0.001
cis-1,3-Dichloropropene	mg/L	NG	NG	NG		<0.001		<0.001		<0.001
trans-1,3-Dichloropropene	mg/L	NG	NG	NG		<0.001		<0.001		<0.001
1,1,2-Trichloroethane	mg/L	NG	NG	NG		<0.001		<0.001		<0.001
Tetrachloroethylene	mg/L	0.03	0.03	0.111		<0.001		<0.001		<0.001
1,1,2,2-Tetrachloroethane	mg/L	NG	NG	NG		<0.002		<0.002		<0.002
Dissolved Metals										
Aluminum (Al)	mg/L	NG	0.1	0.1	<0.0050	<0.01	<0.0050	<0.01	0.0293	<0.01
Antimony (Sb)	mg/L	0.006	0.006	NG	<0.00010	<0.0004	0.0001	<0.0004	0.00016	<0.0004
Arsenic (As)	mg/L	0.005	0.010	0.005	0.00116	<0.0004	0.00116	<0.0004	0.00279	<0.0004
Barium (Ba)	mg/L	1	1	NG	0.383	0.430	0.373	0.445	0.357	0.451
Beryllium (Be)	mg/L	NG	NG	NG	<0.00050	<0.001	<0.00050	<0.001	<0.00050	<0.001
Bismuth (Bi)	mg/L	NG	NG	NG	<0.00050		<0.00050		<0.00050	
Boron (B)	mg/L	5	5	NG	0.024	<0.05	0.025	<0.05	0.02	<0.05
Cadmium (Cd)	mg/L	0.005	0.005	0.000097	0.000053	0.0015	0.000053	0.0009	0.000053	<0.0001
Chromium (Cr)	mg/L	0.05	0.05	0.21	0.00063	<0.005	0.00243	<0.005	0.00051	<0.005
Cobalt (Co)	mg/L	NG	NG	NG	0.00065	<0.002	0.00064	<0.002	0.00059	<0.002
Copper (Cu)	mg/L	1	1	0.026	0.00566	0.006	0.00117	0.002	0.00703	0.004
Iron (Fe)	mg/L	0.3	0.3	0.3	0.153	<0.005	0.174	0.005	0.208	0.014
Lead (Pb)	mg/L	0.01	0.01	0.0095	<0.00010	<0.0001	<0.00010	<0.0001	0.00018	<0.0001
Lithium (Li)	mg/L	NG	NG	NG		0.633		0.020		0.612
Manganese(Mn)	mg/L	0.05	0.05	NG	0.142	0.033	0.137	0.022	0.145	0.010
Mercury (Hg)-Dissolved	mg/L	0.001	0.001	NG		<0.00010		<0.00010		<0.00010
Molybdenum (Mo)	mg/L	NG	NG	0.073	0.00139	<0.005	0.00135	<0.005	0.00154	<0.005
Nickel (Ni)	mg/L	NG	NG	0.15	0.00121	0.006	0.00112	0.004	0.00131	<0.002
Selenium (Se)	mg/L	0.001	0.01	0.001	0.0017	0.0016	0.0016	0.0020	0.0047	0.0028
Silver (Ag)	mg/L	NG	NG	NG	<0.000010	0.0001	<0.000010	<0.0001	<0.000010	<0.0001
Strontium (Sr)	mg/L	NG	NG	NG	0.287		0.287		0.264	
Thallium (Tl)	mg/L	NG	NG	NG	<0.00010	<0.0001	<0.00010	<0.0001	<0.00010	<0.0001
Tin (Sn)	mg/L	NG	NG	NG	<0.00010	<0.05	<0.00010	<0.05	<0.00010	<0.05
Titanium (Ti)	mg/L	NG	NG	NG	<0.0010	<0.001	<0.0010	<0.001	0.0011	<0.001
Uranium (U)	mg/L	0.02	0.02	NG	0.00341	0.0042	0.00339	0.0042	0.00572	0.0040
Vanadium (V)	mg/L	NG	NG	NG	<0.0010	<0.001	<0.0010	<0.001	<0.0010	<0.001
Zinc (Zn)	mg/L	0.03	5.0	0.03	0.10	0.023	0.117	0.004	0.103	0.018
Laboratory Identification No.					L612590-1	L676397-1	L612590-2	L676397-2	L612590-3	L676397-3

Notes:

¹ Alberta Environment (AENV), August 2008. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Referenced Guidelines apply to coarse texture of soils under residential/parkland land use.

² Health Canada. May 2008. Guidelines for Canadian Drinking Water Quality - Summary Table.

³ Canadian Council of Ministers of the Environment. 2007. Canadian water quality guidelines for the protection of aquatic life - Summary Table. In In Canadian Environmental Quality Guidelines 1999.

NG - No guideline established.

ND - Not detected.

Blank - Not analyzed.

Bold - Greater than highest referenced guideline.



TABLE 3: GROUNDWATER ANALYTICAL RESULTS

Parameters	Units	Comparative Guidelines ¹	Comparative Guidelines ²	Comparative Guidelines ³	Garden River Old Dump					
					08MW04B		08MW05B		08MW06B	
					24-Mar-08	31-Aug-08	24-Mar-08	31-Aug-08	24-Mar-08	31-Aug-08
Routine Parameters										
Combustible Vapour Concentration (field)	ppm	NG	NG	NG		25		ND		10
pH (lab)	pH	6.5 to 8.5	6.5 to 8.5	6.5 to 9.0	7.74		7.71		7.73	
pH (field)	pH	NG	NG	NG	6.41	6.73	6.54	6.91	6.49	6.77
Electrical Conductivity (EC) (lab)	µS/cm	NG	NG	NG	739		752		786	
Electrical Conductivity (EC) (field)	µS/cm	NG	NG	NG	728	750	775	737	746	776
Temperature (Field)	Degrees C	NG	NG	NG	2.1	13.8	2.2	13.7	2.7	13.6
Alkalinity Total (as CaCO ₃)	mg/L	NG	NG	NG	356		355		371	
Total Dissolved Solids	mg/L	500	500	NG	420		428		449	
Hardness	mg/L	NG	NG	NG	394		381		398	
Calcium (Ca)	mg/L	NG	NG	NG	111	78.2	107	114	110	117
Magnesium (Mg)	mg/L	NG	NG	NG	28.4	24.5	27.7	29.0	30	31.4
Potassium (K)	mg/L	NG	NG	NG	3.73	1.3	3.33	3.8	3.32	5.1
Sodium (Na)	mg/L	200	200	NG	8.6	55.7	10.6	10.7	11	12.9
Chloride (Cl)	mg/L	230	250	NG	4.4		4.7		4.2	
Sulphate (SO ₄)	mg/L	500	500	NG	48		57.2		64.1	
Bicarbonate (HCO ₃)	mg/L	NG	NG	NG	435		433		452	
Carbonate (CO ₃)	mg/L	NG	NG	NG	<5		<5		<5	
Hydroxide	mg/L	NG	NG	NG	<5		<5		<5	
Nitrite + Nitrate - N	mg/L	NG	NG	NG	0.55		0.9		0.81	
Nitrate - N ³	mg/L	3	10	3	0.55		0.9		0.81	
Nitrite - N	mg/L	NG	1	0.018	<0.05		<0.05		<0.05	
Ionic Balance	%	NG	NG	NG	101		96.2		95.6	
Volatile Hydrocarbons										
Benzene	mg/L	0.005	0.005	0.37	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thiophene	mg/L	NG	NG	NG		<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	mg/L	0.024	0.024	0.002	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chlorobenzene	mg/L	0.0013	NG	0.0013		<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	mg/L	0.0024	0.0024	0.09	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	0.3	0.3	0.18	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Styrene	mg/L	0.072	NG	0.072		<0.001	<0.001	<0.001	<0.001	<0.001
F1 (C ₆ to C ₁₀)	mg/L	0.81	NG	NG	<0.1		<0.1		<0.1	
F2 (C ₁₀ to C ₁₆)	mg/L	1.1	NG	NG	<0.05		<0.05		<0.05	
1,3-Dichlorobenzene	mg/L	NG	NG	0.15		<0.001	<0.001	<0.001	<0.001	<0.001
1,4-Dichlorobenzene	mg/L	0.001	0.005	0.026		<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichlorobenzene	mg/L	0.0007	0.2	0.0007		<0.001	<0.001	<0.001	<0.001	<0.001
Naphthalene	mg/L	0.0011	NG	0.0011		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Quinoline	mg/L	NG	NG	NG		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Acenaphthene	mg/L	0.0058	NG	0.0058		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Fluorene	mg/L	0.003	NG	0.003		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Phenanthrene	mg/L	0.0004	NG	0.0004		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Anthracene	mg/L	0.000012	NG	0.000012		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Acridine	mg/L	NG	NG	NG		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Fluoranthene	mg/L	0.003	NG	0.00004		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Pyrene	mg/L	0.000025	NG	0.000025		<0.00001	0.00002		<0.00001	<0.00001
Benzo(a)anthracene	mg/L	0.000018	NG	0.000018		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Chrysene	mg/L	0.0014	NG	0.0014		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Benzo(b&k)fluoranthene	mg/L	0.00048	NG	0.00048		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Benzo(k)fluoranthene	mg/L	0.00048	NG	0.00048		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Benzo(a)pyrene	mg/L	0.000015	0.00001	0.000015		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Indeno(1,2,3-cd)pyrene	mg/L	0.00021	NG	0.00021		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Dibenzo(a,h)anthracene	mg/L	0.00026	NG	0.00026		<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Chlorinated Aliphatics										
1,1-Dichloroethene	mg/L	0.014	NG	NG		<0.001	<0.001	<0.001	<0.001	<0.001
Methylene Chloride	mg/L	0.05	NG	0.0981		<0.001	<0.001	<0.001	<0.001	<0.001
trans-1,2-Dichloroethene	mg/L	NG	NG	NG		<0.001	<0.001	<0.001	<0.001	<0.001
1,1-Dichloroethane	mg/L	NG	NG	NG		<0.001	<0.001	<0.001	<0.001	<0.001
Chloroform	mg/L	0.0018	NG	0.0018		<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichloroethane	mg/L	0.005	0.005	0.1		<0.001	<0.001	<0.001	<0.001	<0.001
1,1,1-Trichloroethane	mg/L	NG	NG	NG		<0.001	<0.001	<0.001	<0.001	<0.001
Carbon Tetrachloride	mg/L	0.00056	0.005	0.0133		<0.001	<0.001	<0.001	<0.001	<0.001
Trichloroethene	mg/L	0.005	0.005	0.021		<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichloropropane	mg/L	NG	NG	NG		<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,3-Dichloropropene	mg/L	NG	NG	NG		<0.001	<0.001	<0.001	<0.001	<0.001
trans-1,3-Dichloropropene	mg/L	NG	NG	NG		<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-Trichloroethane	mg/L	NG	NG	NG		<0.001	<0.001	<0.001	<0.001	<0.001
Tetrachloroethylene	mg/L	0.03	0.03	0.111		<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2,2-Tetrachloroethane	mg/L	NG	NG	NG		<0.002	<0.002	<0.002	<0.002	<0.002
Dissolved Metals										
Aluminum (Al)	mg/L	NG	0.1	0.1	<0.0050	<0.01	<0.025	<0.01	<0.025	<0.01
Antimony (Sb)	mg/L	0.006	0.006	NG	<0.00010	0.0005	<0.00050	<0.0004	<0.00050	<0.0004
Arsenic (As)	mg/L	0.005	0.010	0.005	0.00133	0.0014	0.00398	0.0034	0.00115	<0.0004
Barium (Ba)	mg/L	1	1	NG	0.329	0.061	0.381	0.420	0.355	0.352
Beryllium (Be)	mg/L	NG	NG	NG	<0.00050	<0.001	<0.0025	<0.001	<0.0025	<0.001
Bismuth (Bi)	mg/L	NG	NG	NG	<0.00050		<0.0025		<0.0025	
Boron (B)	mg/L	5	5	NG	0.016	<0.05	<0.050	<0.05	<0.050	<0.05
Cadmium (Cd)	mg/L	0.005	0.005	0.000097	<0.000050	<0.0001	<0.00025	<0.0001	<0.00025	0.0021
Chromium (Cr)	mg/L	0.05	0.05	0.21	<0.00050	<0.005	<0.0025	<0.005	<0.0025	<0.005
Cobalt (Co)	mg/L	NG	NG	NG	0.00143	<0.002	0.00188	0.002	0.0018	<0.002
Copper (Cu)	mg/L	1	1	0.026	0.00327	0.003	0.0177	0.004	0.00742	0.009
Iron (Fe)	mg/L	0.3	0.3	0.3	<0.030	<0.005	2.03	1.51	0.044	0.013
Lead (Pb)	mg/L	0.01	0.01	0.0095	<0.00010	<0.0001	<0.00050	0.0001	<0.00050	0.0002
Lithium (Li)	mg/L	NG	NG	NG		0.536		0.542		0.360
Manganese (Mn)	mg/L	0.05	0.05	NG	0.259	0.538	0.294	0.636	0.226	0.043
Mercury (Hg)-Dissolved	mg/L	0.001	0.001	NG		<0.00010		<0.00010		<0.00010
Molybdenum (Mo)	mg/L	NG	NG	0.073	0.000868	0.015	0.00095	<0.005	0.00076	<0.005
Nickel (Ni)	mg/L	NG	NG	0.15	0.00183	0.006	0.0033	0.004	0.0028	0.004
Selenium (Se)	mg/L	0.001	0.01	0.001	0.0108	0.0012	<0.0050	0.0006	<0.0050	0.0037
Silver (Ag)	mg/L	NG	NG	NG	<0.000010	<0.0001	<0.000050	<0.0001	<0.000050	<0.0001
Strontium (Sr)	mg/L	NG	NG	NG	0.272		0.171		0.165	
Thallium (Tl)	mg/L	NG	NG	NG	<0.00010	<0.0001	<0.00050	<0.0001	<0.00050	<0.0001
Tin (Sn)	mg/L	NG	NG	NG	<0.00010	<0.05	<0.00050	<0.05	<0.00050	<0.05
Titanium (Ti)	mg/L	NG	NG	NG	0.0011	0.001	<0.0050	<0.001	<0.0050	<0.001
Uranium (U)	mg/L	0.02	0.02	NG	0.00383	0.0097	0.00354	0.0034	0.00483	0.0053
Vanadium (V)	mg/L	NG	NG	NG	<0.0010	<0.001	<0.0050	<0.001	<0.0050	<0.001
Zinc (Zn)	mg/L	0.03	5.0	0.03	0.0938	0.026	0.061	0.019	0.039	0.033
Laboratory Identification No.					L612590-4	L676397-4	L612590-5	L676397-5	L612590-6	L676397-6

Notes:

¹ Alberta Environment (AENV), August 2008. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Referenced Guidelines apply to coarse texture of soils under residential/parkland land use.

² Health Canada. May 2008. Guidelines for Canadian Drinking Water Quality - Summary Table.

³ Canadian Council of Ministers of the Environment. 2007. Canadian water quality guidelines for the protection of aquatic life - Summary Table. In In Canadian Environmental Quality Guidelines 1999.

NG - No guideline established.

ND - Not detected.

Blank - Not analyzed.

Bold - Greater than lowest referenced guideline.

TABLE 3: GROUNDWATER ANALYTICAL RESULTS

Parameters	Units	Comparative Guidelines ¹	Comparative Guidelines ²	Comparative Guidelines ³	Former Septic Tile Field					
					08MW07B		08MW08		08MW09	
					24-Mar-08	31-Aug-08	24-Mar-08	31-Aug-08	24-Mar-08	damaged
Routine Parameters										
Combustible Vapour Concentration (field)	ppm	NG	NG	NG		25		10		
pH (lab)	pH	6.5 to 8.5	6.5 to 8.5	6.5 to 9.0	7.88		7.83		7.78	
pH (field)	pH	NG	NG	NG	6.51	6.84	6.58	6.83	6.49	
Electrical Conductivity (EC) (lab)	µS/cm	NG	NG	NG	638		644		696	
Electrical Conductivity (EC) (field)	µS/cm	NG	NG	NG	807	599	741	654	731	
Temperature (Field)	Degrees C	NG	NG	NG	2	13.8	2.1	13.5	2	
Alkalinity Total (as CaCO ₃)	mg/L	NG	NG	NG	322		316		350	
Total Dissolved Solids	mg/L	500	500	NG	356		359		388	
Hardness	mg/L	NG	NG	NG	325		324		362	
Calcium (Ca)	mg/L	NG	NG	NG	92.4	94.2	90.2	97.5	101	
Magnesium (Mg)	mg/L	NG	NG	NG	22.8	23.0	24.1	25.1	26.6	
Potassium (K)	mg/L	NG	NG	NG	3.94	3.9	4.07	4.1	3.2	
Sodium (Na)	mg/L	200	200	NG	8.7	7.7	10.6	10.4	6.5	
Chloride (Cl)	mg/L	230	250	NG	2.8		3.7		4.2	
Sulphate (SO ₄)	mg/L	500	500	NG	31.5		35.8		33.8	
Bicarbonate (HCO ₃)	mg/L	NG	NG	NG	392		385		427	
Carbonate (CO ₃)	mg/L	NG	NG	NG	<5		<5		<5	
Hydroxide	mg/L	NG	NG	NG	<5		<5		<5	
Nitrite + Nitrate - N	mg/L	NG	NG	NG	0.23		0.15		0.53	
Nitrate - N ³	mg/L	3	10	3	0.23		0.15		0.53	
Nitrite - N	mg/L	NG	1	0.018	<0.05		<0.05		<0.05	
Ionic Balance	%	NG	NG	NG	97.1		98.3		96.6	
Volatile Hydrocarbons										
Benzene	mg/L	0.005	0.005	0.37	<0.00050		<0.00050		<0.00050	
Thiophene	mg/L	NG	NG	NG						
Toluene	mg/L	0.024	0.024	0.002	<0.00050		<0.00050		<0.00050	
Chlorobenzene	mg/L	0.0013	NG	0.0013						
Ethylbenzene	mg/L	0.0024	0.0024	0.09	<0.00050		<0.00050		<0.00050	
Xylenes	mg/L	0.3	0.3	0.18	<0.00050		<0.00050		<0.00050	
Styrene	mg/L	0.072	NG	0.072						
F1 (C ₆ to C ₁₀)	mg/L	0.81	NG	NG	<0.1		<0.1		<0.1	
F2 (C ₁₀ to C ₁₆)	mg/L	1.1	NG	NG	<0.05		<0.05		<0.05	
1,3-Dichlorobenzene	mg/L	NG	NG	0.15						
1,4-Dichlorobenzene	mg/L	0.001	0.005	0.026						
1,2-Dichlorobenzene	mg/L	0.0007	0.2	0.0						
Naphthalene	mg/L	0.0011	NG	0.0011						
Quinoline	mg/L	NG	NG	NG						
Acenaphthene	mg/L	0.0058	NG	0.0058						
Fluorene	mg/L	0.003	NG	0.003						
Phenanthrene	mg/L	0.0004	NG	0.0004						
Anthracene	mg/L	0.000012	NG	0.000012						
Acridine	mg/L	NG	NG	NG						
Fluoranthene	mg/L	0.003	NG	0.00004						
Pyrene	mg/L	0.000025	NG	0.000025						
Benzo(a)anthracene	mg/L	0.000018	NG	0.000018						
Chrysene	mg/L	0.0014	NG	0.0014						
Benzo(b&f)fluoranthene	mg/L	0.00048	NG	0.00048						
Benzo(k)fluoranthene	mg/L	0.00048	NG	0.00048						
Benzo(a)pyrene	mg/L	0.000015	0.00001	0.000015						
Indeno(1,2,3-cd)pyrene	mg/L	0.00021	NG	0.0002						
Dibenzo(a,h)anthracene	mg/L	0.00026	NG	0.00026						
Chlorinated Aliphatics										
1,1-Dichloroethene	mg/L	0.014	NG	NG						
Methylene Chloride	mg/L	0.05	NG	0.0981						
trans-1,2-Dichloroethene	mg/L	NG	NG	NG						
1,1-Dichloroethane	mg/L	NG	NG	NG						
Chloroform	mg/L	0.0018	NG	0.0018						
1,2-Dichloroethane	mg/L	0.005	0.005	0.1						
1,1,1-Trichloroethane	mg/L	NG	NG	NG						
Carbon Tetrachloride	mg/L	0.00056	0.005	0.0133						
Trichloroethene	mg/L	0.005	0.005	0.021						
1,2-Dichloropropane	mg/L	NG	NG	NG						
cis-1,3-Dichloropropene	mg/L	NG	NG	NG						
trans-1,3-Dichloropropene	mg/L	NG	NG	NG						
1,1,2-Trichloroethane	mg/L	NG	NG	NG						
Tetrachloroethylene	mg/L	0.03	0.03	0.111						
1,1,2,2-Tetrachloroethane	mg/L	NG	NG	NG						
Dissolved Metals										
Aluminum (Al)	mg/L	NG	0.1	0.1	<0.025	<0.01	<0.025	0.01	<0.025	
Antimony (Sb)	mg/L	0.006	0.006	NG	<0.00050	<0.0004	<0.00050	<0.0004	<0.00050	
Arsenic (As)	mg/L	0.005	0.010	0.005	<0.00050	<0.0004	<0.00050	<0.0004	<0.00050	
Barium (Ba)	mg/L	1	1	NG	0.299	0.329	0.278	0.360	0.343	
Beryllium (Be)	mg/L	NG	NG	NG	<0.0025	<0.001	<0.0025	<0.001	<0.0025	
Bismuth (Bi)	mg/L	NG	NG	NG	<0.0025		<0.0025		<0.0025	
Boron (B)	mg/L	5	5	NG	<0.050	<0.05	<0.050	<0.05	<0.050	
Cadmium (Cd)	mg/L	0.005	0.005	0.000097	<0.00025	<0.0001	<0.00025	<0.0001	<0.00025	
Chromium (Cr)	mg/L	0.05	0.05	0.21	<0.0025	<0.005	<0.0025	<0.005	<0.0025	
Cobalt (Co)	mg/L	NG	NG	NG	<0.00050	<0.002	<0.00050	<0.002	0.00117	
Copper (Cu)	mg/L	1	1	0.026	0.00556	0.003	0.00299	0.004	0.00283	
Iron (Fe)	mg/L	0.3	0.3	0.3	<0.030	<0.005	<0.030	0.006	<0.030	
Lead (Pb)	mg/L	0.01	0.01	0.0095	<0.00050	<0.0001	<0.00050	<0.0001	<0.00050	
Lithium (Li)	mg/L	NG	NG	NG		0.347		0.367		
Manganese(Mn)	mg/L	0.05	0.05	NG	0.0272	0.101	0.0365	0.170	0.145	
Mercury (Hg)-Dissolved	mg/L	0.001	0.001	NG		<0.00010		<0.00010		
Molybdenum (Mo)	mg/L	NG	NG	0.073	0.00084	<0.005	0.00081	<0.005	0.00132	
Nickel (Ni)	mg/L	NG	NG	0.15	<0.0025	0.002	<0.0025	0.002	<0.0025	
Selenium (Se)	mg/L	0.001	0.01	0.001	<0.0050	0.0042	<0.0050	0.0027	<0.0050	
Silver (Ag)	mg/L	NG	NG	NG	<0.000050	<0.0001	<0.000050	<0.0001	<0.000050	
Strontium (Sr)	mg/L	NG	NG	NG	0.127		0.148		0.195	
Thallium (Tl)	mg/L	NG	NG	NG	<0.00050	<0.0001	<0.00050	<0.0001	<0.00050	
Tin (Sn)	mg/L	NG	NG	NG	<0.00050	<0.05	<0.00050	<0.05	<0.00050	
Titanium (Ti)	mg/L	NG	NG	NG	<0.0050	<0.001	<0.0050	<0.001	<0.0050	
Uranium (U)	mg/L	0.02	0.02	NG	0.00281	0.0027	0.00271	0.0027	0.00329	
Vanadium (V)	mg/L	NG	NG	NG	<0.0050	<0.001	<0.0050	<0.001	<0.0050	
Zinc (Zn)	mg/L	0.03	5.0	0.03	0.045	0.013	0.055	0.026	0.041	
Laboratory Identification No.					L612590-7	L676397-7	L612590-8	L676397-8	L612590-9	

Notes:

¹ Alberta Environment (AENV), August 2008. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Referenced Guidelines apply to coarse texture of soils under residential/parkland land use.

² Health Canada. May 2008. Guidelines for Canadian Drinking Water Quality - Summary Table.

³ Canadian Council of Ministers of the Environment. 2007. Canadian water quality guidelines for the protection of aquatic life - Summary Table. In In Canadian Environmental Quality Guidelines 1999.

NG - No guideline established.

ND - Not detected.

Blank - Not analyzed.

Bold - Greater than highest referenced guideline.

TABLE 3: GROUNDWATER ANALYTICAL RESULTS

Parameters	Units	Comparative Guidelines ¹	Comparative Guidelines ²	Comparative Guidelines ³	Garden River Airstrip					
					08MW10		08MW11		08MW12	
					24-Mar-08	31-Aug-08	24-Mar-08	31-Aug-08	24-Mar-08	31-Aug-08
Routine Parameters										
Combustible Vapour Concentration (field)	ppm	NG	NG	NG		60		50		10
pH (lab)	pH	6.5 to 8.5	6.5 to 8.5	6.5 to 9.0	7.93		7.9		7.92	
pH (field)	pH	NG	NG	NG	6.61	6.96	6.31	6.95	6.37	6.95
Electrical Conductivity (EC) (lab)	µS/cm	NG	NG	NG	647		559		583	
Electrical Conductivity (EC) (field)	µS/cm	NG	NG	NG	737	477	761	565	780	517
Temperature (Field)	Degrees C	NG	NG	NG	1.8	12.8	1.8	12.3	1.5	12.8
Alkalinity Total (as CaCO ₃)	mg/L	NG	NG	NG	301		299		298	
Total Dissolved Solids	mg/L	500	500	NG	363		311		322	
Hardness	mg/L	NG	NG	NG	322		299		309	
Calcium (Ca)	mg/L	NG	NG	NG	92.8	83.1	82.4	87.6	87.1	
Magnesium (Mg)	mg/L	NG	NG	NG	21.9	15.5	22.7	22.4	22.2	
Potassium (K)	mg/L	NG	NG	NG	4.25	4.8	2.98	2.9	3.16	
Sodium (Na)	mg/L	200	200	NG	7.7	3.2	5.7	4.1	4.7	
Chloride (Cl)	mg/L	230	250	NG	3.9		1.5		1.9	
Sulphate (SO ₄)	mg/L	500	500	NG	51.4		16.4		23.3	
Bicarbonate (HCO ₃)	mg/L	NG	NG	NG	368		365		363	
Carbonate (CO ₃)	mg/L	NG	NG	NG	<5		<5		<5	
Hydroxide	mg/L	NG	NG	NG	<5		<5		<5	
Nitrite + Nitrate - N	mg/L	NG	NG	NG	0.17		0.08		0.1	
Nitrate - N ³	mg/L	3	10	3	0.17		0.08		0.1	
Nitrite - N	mg/L	NG	1	0.018	<0.05		<0.05		<0.05	
Ionic Balance	%	NG	NG	NG	95.2		99		99.4	
Volatile Hydrocarbons										
Benzene	mg/L	0.005	0.005	0.37	<0.00050		<0.00050		<0.00050	
Thiophene	mg/L	NG	NG	NG						
Toluene	mg/L	0.024	0.024	0.002	<0.00050		<0.00050		<0.00050	
Chlorobenzene	mg/L	0.0013	NG	0.0013						
Ethylbenzene	mg/L	0.0024	0.0024	0.09	<0.00050		<0.00050		<0.00050	
Xylenes	mg/L	0.3	0.3	0.18	<0.00050		<0.00050		<0.00050	
Styrene	mg/L	0.072	NG	0.072						
F1 (C ₆ to C ₁₀)	mg/L	0.81	NG	NG	<0.1		<0.1		<0.1	
F2 (C ₁₀ to C ₁₆)	mg/L	1.1	NG	NG	<0.05		<0.05		<0.05	
1,3-Dichlorobenzene	mg/L	NG	NG	0.15						
1,4-Dichlorobenzene	mg/L	0.001	0.005	0.026						
1,2-Dichlorobenzene	mg/L	0.0007	0.2	0.0007						
Naphthalene	mg/L	0.0011	NG	0.0011						
Quinoline	mg/L	NG	NG	NG						
Acenaphthene	mg/L	0.0058	NG	0.0058						
Fluorene	mg/L	0.003	NG	0.003						
Phenanthrene	mg/L	0.0004	NG	0.0004						
Anthracene	mg/L	0.000012	NG	0.000012						
Acridine	mg/L	NG	NG	NG						
Fluoranthene	mg/L	0.003	NG	0.00004						
Pyrene	mg/L	0.000025	NG	0.000025						
Benzo(a)anthracene	mg/L	0.000018	NG	0.000018						
Chrysene	mg/L	0.0014	NG	0.0014						
Benzo(b&f)fluoranthene	mg/L	0.00048	NG	0.00048						
Benzo(k)fluoranthene	mg/L	0.00048	NG	0.00048						
Benzo(a)pyrene	mg/L	0.000015	0.00001	0.000015						
Indeno(1,2,3-cd)pyrene	mg/L	0.00021	NG	0.00021						
Dibenzo(a,h)anthracene	mg/L	0.00026	NG	0.00026						
Chlorinated Aliphatics										
1,1-Dichloroethene	mg/L	0.014	NG	NG						
Methylene Chloride	mg/L	0.05	NG	0.0981						
trans-1,2-Dichloroethene	mg/L	NG	NG	NG						
1,1-Dichloroethane	mg/L	NG	NG	NG						
Chloroform	mg/L	0.0018	NG	0.0018						
1,2-Dichloroethane	mg/L	0.005	0.005	0.1						
1,1,1-Trichloroethane	mg/L	NG	NG	NG						
Carbon Tetrachloride	mg/L	0.00056	0.005	0.0133						
Trichloroethene	mg/L	0.005	0.005	0.021						
1,2-Dichloropropane	mg/L	NG	NG	NG						
cis-1,3-Dichloropropene	mg/L	NG	NG	NG						
trans-1,3-Dichloropropene	mg/L	NG	NG	NG						
1,1,2-Trichloroethane	mg/L	NG	NG	NG						
Tetrachloroethylene	mg/L	0.03	0.03	0.111						
1,1,2,2-Tetrachloroethane	mg/L	NG	NG	NG						
Dissolved Metals										
Aluminum (Al)	mg/L	NG	0.1	0.1	<0.025	<0.01	<0.025	<0.01	<0.025	
Antimony (Sb)	mg/L	0.006	0.006	NG	<0.00050	<0.0004	<0.00050	<0.0004	<0.00050	
Arsenic (As)	mg/L	0.005	0.010	0.005	<0.00050	<0.0004	<0.00050	<0.0004	<0.00050	
Barium (Ba)	mg/L	1	1	NG	0.529	0.579	0.372	0.428	0.449	
Beryllium (Be)	mg/L	NG	NG	NG	<0.0025	<0.001	<0.0025	<0.001	<0.0025	
Bismuth (Bi)	mg/L	NG	NG	NG	<0.0025		<0.0025		<0.0025	
Boron (B)	mg/L	5	5	NG	<0.050	<0.05	<0.050	<0.05	<0.050	
Cadmium (Cd)	mg/L	0.005	0.005	0.000097	<0.00025	<0.0001	<0.00025	<0.0001	<0.00025	
Chromium (Cr)	mg/L	0.05	0.05	0.21	<0.0025	<0.005	<0.0025	<0.005	<0.0025	
Cobalt (Co)	mg/L	NG	NG	NG	0.00058	<0.002	<0.00050	<0.002	0.00054	
Copper (Cu)	mg/L	1	1	0.026	0.0049	0.003	0.00602	0.003	0.00146	
Iron (Fe)	mg/L	0.3	0.3	0.3	<0.030	<0.005	<0.030	<0.005	<0.030	
Lead (Pb)	mg/L	0.01	0.01	0.0095	<0.00050	<0.0001	<0.00050	<0.0001	<0.00050	
Lithium (Li)	mg/L	NG	NG	NG		0.429		0.393		
Manganese(Mn)	mg/L	0.05	0.05	NG	0.124	0.010	0.0355	0.013	0.101	
Mercury (Hg)-Dissolved	mg/L	0.001	0.001	NG		<0.00010		<0.00010		
Molybdenum (Mo)	mg/L	NG	NG	0.073	0.00236	<0.005	0.00176	<0.005	0.00224	
Nickel (Ni)	mg/L	NG	NG	0.15	<0.0025	<0.002	<0.0025	0.002	<0.0025	
Selenium (Se)	mg/L	0.001	0.01	0.001	<0.0050	<0.0004	0.0061	0.0214	0.0066	
Silver (Ag)	mg/L	NG	NG	NG	<0.000050	<0.0001	<0.000050	<0.0001	<0.000050	
Strontium (Sr)	mg/L	NG	NG	NG	0.151		0.225		0.222	
Thallium (Tl)	mg/L	NG	NG	NG	<0.00050	<0.0001	<0.00050	<0.0001	<0.00050	
Tin (Sn)	mg/L	NG	NG	NG	0.00064	<0.05	<0.00050	<0.05	0.00056	
Titanium (Ti)	mg/L	NG	NG	NG	<0.0050	<0.001	<0.0050	<0.001	<0.0050	
Uranium (U)	mg/L	0.02	0.02	NG	0.00232	0.0009	0.00305	0.0040	0.0025	
Vanadium (V)	mg/L	NG	NG	NG	<0.0050	<0.001	<0.0050	<0.001	<0.0050	
Zinc (Zn)	mg/L	0.03	5.0	0.03	0.066	0.015	0.096	0.013	0.074	
Laboratory Identification No.					L612590-10	L676397-9	L612590-11	L676397-10	L612590-12	

Notes:

¹ Alberta Environment (AENV), August 2008. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Referenced Guidelines apply to coarse texture of soils under residential/parkland land use.

² Health Canada. May 2008. Guidelines for Canadian Drinking Water Quality - Summary Table.

³ Canadian Council of Ministers of the Environment. 2007. Canadian water quality guidelines for the protection of aquatic life - Summary Table. In Canadian Environmental Quality Guidelines 1999.

NG - No guideline established.

ND - Not detected.

Blank - Not analyzed.

bold - Greater than highest referenced guideline.

TABLE 3: GROUNDWATER ANALYTICAL RESULTS							
Parameters	Units	Comparative Guidelines ¹	Comparative Guidelines ²	Comparative Guidelines ³	GR Trading	Fifth Meridian Market	
					08MW14	08MW16	08MW18
					31-Aug-08	31-Aug-08	31-Aug-08
Routine Parameters							
Combustible Vapour Concentration (field)	ppm	NG	NG	NG	10	100	25
pH (lab)	pH	6.5 to 8.5	6.5 to 8.5	6.5 to 9.0		7.6	7.6
pH (field)	pH	NG	NG	NG	7.02	6.92	6.76
Electrical Conductivity (EC) (lab)	µS/cm	NG	NG	NG		834	959
Electrical Conductivity (EC) (field)	µS/cm	NG	NG	NG	646	811	918
Temperature (Field)	Degrees C	NG	NG	NG	12.9	13.4	12.8
Alkalinity Total (as CaCO ₃)	mg/L	NG	NG	NG		430	459
Total Dissolved Solids	mg/L	500	500	NG		478	561
Hardness	mg/L	NG	NG	NG		444	531
Calcium (Ca)	mg/L	NG	NG	NG	107	132	157
Magnesium (Mg)	mg/L	NG	NG	NG	22.2	27.9	33.7
Potassium (K)	mg/L	NG	NG	NG	3.6	2.2	1.9
Sodium (Na)	mg/L	200	200	NG	10.4	4	7
Chloride (Cl)	mg/L	230	250	NG		2	3
Sulphate (SO ₄)	mg/L	500	500	NG		52.3	80.0
Bicarbonate (HCO ₃)	mg/L	NG	NG	NG		525	560
Carbonate (CO ₃)	mg/L	NG	NG	NG		<5	<5
Hydroxide	mg/L	NG	NG	NG		<5	<5
Nitrite + Nitrate - N	mg/L	NG	NG	NG		<0.1	0.6
Nitrate - N ³	mg/L	3	10	3		<0.1	0.6
Nitrite - N	mg/L	NG	1	0.018		<0.05	<0.05
Ionic Balance	%	NG	NG	NG		93.5	99.9
Volatile Hydrocarbons							
Benzene	mg/L	0.005	0.005	0.37	<0.00050		<0.00050
Thiophene	mg/L	NG	NG	NG			
Toluene	mg/L	0.024	0.024	0.002	<0.00050	<0.00050	<0.00050
Chlorobenzene	mg/L	0.0013	NG	0.0013			
Ethylbenzene	mg/L	0.0024	0.0024	0.09	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	0.3	0.3	0.18	<0.00050	<0.00050	<0.00050
Styrene	mg/L	0.072	NG	0.072			
F1 (C ₆ to C ₁₀)	mg/L	0.81	NG	NG	<0.1	<0.1	<0.1
F2 (C ₁₀ to C ₁₆)	mg/L	1.1	NG	NG	<0.2	<0.2	<0.2
1,3-Dichlorobenzene	mg/L	NG	NG	0.15			
1,4-Dichlorobenzene	mg/L	0.001	0.005	0.026			
1,2-Dichlorobenzene	mg/L	0.0007	0.2	0.0007			
Naphthalene	mg/L	0.0011	NG	0.0011			
Quinoline	mg/L	NG	NG	NG			
Acenaphthene	mg/L	0.0058	NG	0.0058			
Fluorene	mg/L	0.003	NG	0.003			
Phenanthrene	mg/L	0.0004	NG	0.0004			
Anthracene	mg/L	0.000012	NG	0.000012			
Acridine	mg/L	NG	NG	NG			
Fluoranthene	mg/L	0.003	NG	0.00004			
Pyrene	mg/L	0.000025	NG	0.000025			
Benzo(a)anthracene	mg/L	0.000018	NG	0.000018			
Chrysene	mg/L	0.0014	NG	0.0014			
Benzo(b&j)fluoranthene	mg/L	0.00048	NG	0.00048			
Benzo(k)fluoranthene	mg/L	0.00048	NG	0.00048			
Benzo(a)pyrene	mg/L	0.000015	0.00001	0.000015			
Indeno(1,2,3-cd)pyrene	mg/L	0.00021	NG	0.00021			
Dibenzo(a,h)anthracene	mg/L	0.00026	NG	0.00026			
Chlorinated Aliphatics							
1,1-Dichloroethene	mg/L	0.014	NG	NG			
Methylene Chloride	mg/L	0.05	NG	0.0981			
trans-1,2-Dichloroethene	mg/L	NG	NG	NG			
1,1-Dichloroethane	mg/L	NG	NG	NG			
Chloroform	mg/L	0.0018	NG	0.0018			
1,2-Dichloroethane	mg/L	0.005	0.005	0.1			
1,1,1-Trichloroethane	mg/L	NG	NG	NG			
Carbon Tetrachloride	mg/L	0.00056	0.005	0.0133			
Trichloroethene	mg/L	0.005	0.005	0.021			
1,2-Dichloropropane	mg/L	NG	NG	NG			
cis-1,3-Dichloropropene	mg/L	NG	NG	NG			
trans-1,3-Dichloropropene	mg/L	NG	NG	NG			
1,1,2-Trichloroethane	mg/L	NG	NG	NG			
Tetrachloroethylene	mg/L	0.03	0.03	0.111			
1,1,2,2-Tetrachloroethane	mg/L	NG	NG	NG			
Dissolved Metals							
Aluminum (Al)	mg/L	NG	0.1	0.1	<0.01	<0.01	<0.01
Antimony (Sb)	mg/L	0.006	0.006	NG	<0.0004	<0.0004	<0.0004
Arsenic (As)	mg/L	0.005	0.010	0.005	<0.0004	<0.0004	<0.0004
Barium (Ba)	mg/L	1	1	NG	0.130	0.064	0.060
Beryllium (Be)	mg/L	NG	NG	NG	<0.001	<0.001	<0.001
Bismuth (Bi)	mg/L	NG	NG	NG			
Boron (B)	mg/L	5	5	NG	<0.05	0.07	0.09
Cadmium (Cd)	mg/L	0.005	0.005	0.000097	<0.0001	0.0001	0.0001
Chromium (Cr),	mg/L	0.05	0.05	0.21	<0.005	<0.005	<0.005
Cobalt (Co)	mg/L	NG	NG	NG	<0.002	0.003	<0.002
Copper (Cu)	mg/L	1	1	0.026	0.007	0.003	0.004
Iron (Fe)	mg/L	0.3	0.3	0.3	0.005	<0.005	<0.005
Lead (Pb)	mg/L	0.01	0.01	0.0095	0.0001	<0.0001	<0.0001
Lithium (Li)	mg/L	NG	NG	NG	0.842	0.446	0.432
Manganese (Mn)	mg/L	0.05	0.05	NG	<0.001	1.58	0.045
Mercury (Hg)-Dissolved	mg/L	0.001	0.001	NG	<0.00010	<0.00010	<0.00010
Molybdenum (Mo)	mg/L	NG	NG	0.073	<0.005	<0.005	<0.005
Nickel (Ni)	mg/L	NG	NG	0.15	0.002	0.013	0.002
Selenium (Se)	mg/L	0.001	0.01	0.001	0.0160	0.0179	0.0287
Silver (Ag)	mg/L	NG	NG	NG	<0.0001	<0.0001	<0.0001
Strontium (Sr)	mg/L	NG	NG	NG			
Thallium (Tl)	mg/L	NG	NG	NG	<0.0001	0.0001	<0.0001
Tin (Sn)	mg/L	NG	NG	NG	<0.05	<0.05	<0.05
Titanium (Ti)	mg/L	NG	NG	NG	<0.001	<0.001	<0.001
Uranium (U)	mg/L	0.02	0.02	NG	0.0031	0.0092	0.0071
Vanadium (V)	mg/L	NG	NG	NG	<0.001	<0.001	<0.001
Zinc (Zn)	mg/L	0.03	5.0	0.03	0.033	0.015	0.015
Laboratory Identification No.					L676397-12	L676397-13	L676397-14
Notes:							
¹ Alberta Environment (AENV), August 2008. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Referenced Guidelines apply to coarse texture of soils under residential/parkland land use.							
² Health Canada, May 2008. Guidelines for Canadian Drinking Water Quality - Summary Table.							
³ Canadian Council of Ministers of the Environment. 2007. Canadian water quality guidelines for the protection of aquatic life - Summary Table. In Canadian Environmental Quality Guidelines 1999.							
NG - No guideline established.							
ND - Not detected.							
Blank - Not analyzed.							
Bold - Greater than highest referenced guideline.							

TABLE 3: GROUNDWATER ANALYTICAL RESULTS

Parameters	Units	Comparative Guidelines ¹	Comparative Guidelines ²	Comparative Guidelines ³	Garden River Public Works Yard				
					08MW20	08MW21	08MW21D	08MW22	08MW23
					31-Aug-08	31-Aug-08	31-Aug-08	31-Aug-08	31-Aug-08
Routine Parameters									
Combustible Vapour Concentration (field)	ppm	NG	NG	NG	25	125		100	5
pH (lab)	pH	6.5 to 8.5	6.5 to 8.5	6.5 to 9.0	7.9			7.8	
pH (field)	pH	NG	NG	NG	6.87	6.85		6.79	6.82
Electrical Conductivity (EC) (lab)	µS/cm	NG	NG	NG	658			722	
Electrical Conductivity (EC) (field)	µS/cm	NG	NG	NG	673	729		720	706
Temperature (Field)	Degrees C	NG	NG	NG	14.7	14.7		14.3	6.7
Alkalinity Total (as CaCO ₃)	mg/L	NG	NG	NG	314			352	
Total Dissolved Solids	mg/L	500	500	NG	370			405	
Hardness	mg/L	NG	NG	NG	361			370	
Calcium (Ca)	mg/L	NG	NG	NG	98.6	109		102	105
Magnesium (Mg)	mg/L	NG	NG	NG	27.9	30.4		27.9	28.3
Potassium (K)	mg/L	NG	NG	NG	2.0	3.7		2.4	3.6
Sodium (Na)	mg/L	200	200	NG	5	9.3		6	8.4
Chloride (Cl)	mg/L	230	250	NG	3			3	
Sulphate (SO ₄)	mg/L	500	500	NG	44.5			44.6	
Bicarbonate (HCO ₃)	mg/L	NG	NG	NG	383			429	
Carbonate (CO ₃)	mg/L	NG	NG	NG	<5			<5	
Hydroxide	mg/L	NG	NG	NG	<5			<5	
Nitrite + Nitrate - N	mg/L	NG	NG	NG	0.2			1.6	
Nitrate - N ³	mg/L	3	10	3	0.2			1.6	
Nitrite - N	mg/L	NG	1	0.018	<0.05			<0.05	
Ionic Balance	%	NG	NG	NG	103			94.2	
Volatile Hydrocarbons									
Benzene	mg/L	0.005	0.005	0.37	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thiophene	mg/L	NG	NG	NG					
Toluene	mg/L	0.024	0.024	0.002	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chlorobenzene	mg/L	0.0013	NG	0.0013					
Ethylbenzene	mg/L	0.0024	0.0024	0.09	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Xylenes	mg/L	0.3	0.3	0.18	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Styrene	mg/L	0.072	NG	0.072					
F1 (C ₆ to C ₁₀)	mg/L	0.81	NG	NG	<0.1	<0.1	<0.1	<0.1	<0.1
F2 (C ₁₀ to C ₁₆)	mg/L	1.1	NG	NG	<0.2	<0.2	<0.2	<0.2	<0.2
1,3-Dichlorobenzene	mg/L	NG	NG	0.15					
1,4-Dichlorobenzene	mg/L	0.001	0.005	0.026					
1,2-Dichlorobenzene	mg/L	0.0007	0.2	0.0007					
Naphthalene	mg/L	0.0011	NG	0.0011					
Quinoline	mg/L	NG	NG	NG					
Acenaphthene	mg/L	0.0058	NG	0.0058					
Fluorene	mg/L	0.003	NG	0.003					
Phenanthrene	mg/L	0.0004	NG	0.0004					
Anthracene	mg/L	0.000012	NG	0.000012					
Acridine	mg/L	NG	NG	NG					
Fluoranthene	mg/L	0.003	NG	0.00004					
Pyrene	mg/L	0.000025	NG	0.000025					
Benzo(a)anthracene	mg/L	0.000018	NG	0.000018					
Chrysene	mg/L	0.0014	NG	0.0014					
Benzo(b&j)fluoranthene	mg/L	0.00048	NG	0.00048					
Benzo(k)fluoranthene	mg/L	0.00048	NG	0.00048					
Benzo(a)pyrene	mg/L	0.000015	0.00001	0.000015					
Indeno(1,2,3-cd)pyrene	mg/L	0.00021	NG	0.00021					
Dibenzo(a,h)anthracene	mg/L	0.00026	NG	0.00026					
Chlorinated Aliphatics									
1,1-Dichloroethene	mg/L	0.014	NG	NG					
Methylene Chloride	mg/L	0.05	NG	0.0981					
trans-1,2-Dichloroethene	mg/L	NG	NG	NG					
1,1-Dichloroethane	mg/L	NG	NG	NG					
Chloroform	mg/L	0.0018	NG	0.0018					
1,2-Dichloroethane	mg/L	0.005	0.005	0.1					
1,1,1-Trichloroethane	mg/L	NG	NG	NG					
Carbon Tetrachloride	mg/L	0.00056	0.005	0.0133					
Trichloroethene	mg/L	0.005	0.005	0.021					
1,2-Dichloropropane	mg/L	NG	NG	NG					
cis-1,3-Dichloropropene	mg/L	NG	NG	NG					
trans-1,3-Dichloropropene	mg/L	NG	NG	NG					
1,1,2-Trichloroethane	mg/L	NG	NG	NG					
Tetrachloroethylene	mg/L	0.03	0.03	0.111					
1,1,2,2-Tetrachloroethane	mg/L	NG	NG	NG					
Dissolved Metals									
Aluminum (Al)	mg/L	NG	0.1	0.1	<0.01	0.10		<0.01	<0.01
Antimony (Sb)	mg/L	0.006	0.006	NG	<0.0004	<0.0004		<0.0004	<0.0004
Arsenic (As)	mg/L	0.005	0.010	0.005	0.0015	<0.0004		<0.0004	<0.0004
Barium (Ba)	mg/L	1	1	NG	0.342	0.434		0.360	0.344
Beryllium (Be)	mg/L	NG	NG	NG	<0.001	<0.001		<0.001	<0.001
Bismuth (Bi)	mg/L	NG	NG	NG					
Boron (B)	mg/L	5	5	NG	<0.05	0.06		<0.05	<0.05
Cadmium (Cd)	mg/L	0.005	0.005	0.000097	<0.0001	<0.0001		<0.0001	<0.0001
Chromium (Cr)	mg/L	0.05	0.05	0.21	<0.005	<0.005		<0.005	<0.005
Cobalt (Co)	mg/L	NG	NG	NG	0.002	<0.002		<0.002	<0.002
Copper (Cu)	mg/L	1	1	0.026	0.003	0.004		0.004	0.004
Iron (Fe)	mg/L	0.3	0.3	0.3	2.63	0.007		<0.005	<0.005
Lead (Pb)	mg/L	0.01	0.01	0.0095	<0.0001	0.0002		0.0001	0.0003
Lithium (Li)	mg/L	NG	NG	NG	0.481	0.429		0.430	0.445
Manganese (Mn)	mg/L	0.05	0.05	NG	0.598	0.036		0.157	0.176
Mercury (Hg)-Dissolved	mg/L	0.001	0.001	NG	<0.00010	<0.00010		<0.00010	<0.00010
Molybdenum (Mo)	mg/L	NG	NG	0.073	<0.005	<0.005		<0.005	<0.005
Nickel (Ni)	mg/L	NG	NG	0.15	0.005	0.002		0.004	0.004
Selenium (Se)	mg/L	0.001	0.01	0.001	0.0028	0.0031		0.0051	0.0030
Silver (Ag)	mg/L	NG	NG	NG	<0.0001	<0.0001		<0.0001	<0.0001
Strontium (Sr)	mg/L	NG	NG	NG					
Thallium (Tl)	mg/L	NG	NG	NG	<0.0001	<0.0001		<0.0001	<0.0001
Tin (Sn)	mg/L	NG	NG	NG	<0.05	<0.05		<0.05	<0.05
Titanium (Ti)	mg/L	NG	NG	NG	<0.001	<0.001		<0.001	<0.001
Uranium (U)	mg/L	0.02	0.02	NG	0.0035	0.0036		0.0042	0.0040
Vanadium (V)	mg/L	NG	NG	NG	<0.001	<0.001		<0.001	<0.001
Zinc (Zn)	mg/L	0.03	5.0	0.03	0.017	0.015		0.018	0.015
Laboratory Identification No.					L676397-15	L676397-16	L676397-19	L676397-17	L676397-18

Notes:

¹ Alberta Environment (AENV), August 2008. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Referenced Guidelines apply to coarse texture of soils under residential/ parkland land use.

² Health Canada, May 2008. Guidelines for Canadian Drinking Water Quality - Summary Table.

³ Canadian Council of Ministers of the Environment. 2007. Canadian water quality guidelines for the protection of aquatic life - Summary Table. In Canadian Environmental Quality Guidelines 1999.

NG - No guideline established.

ND - Not detected.

Blank - Not analyzed.

Bold - Greater than highest referenced guideline.





FIGURES



— SITE LOCATION

Image © 2008 DigitalGlobe
Image © 2008 TerraMetrics

C:\Riverband\Drafting\C221\C22101178\C22101178-Fig.1.dwg [FIGURE 1] April 07, 2008 - 9:39:35 am (BY: MAUREEN MARSH)

Note: Background imagery courtesy of Google Earth and is shown for visual presentation purposes only.

CLIENT



Public Works and
Government Services
Canada

Travaux publics et
Services gouvernementaux
Canada

**PHASE II ENVIRONMENTAL SITE ASSESSMENT
GARDEN RIVER INDIAN RESERVATION, AB**

SITE LOCATION PLAN

**EBA Engineering
Consultants Ltd.**



PROJECT NO.
C22101178

DWN
MM

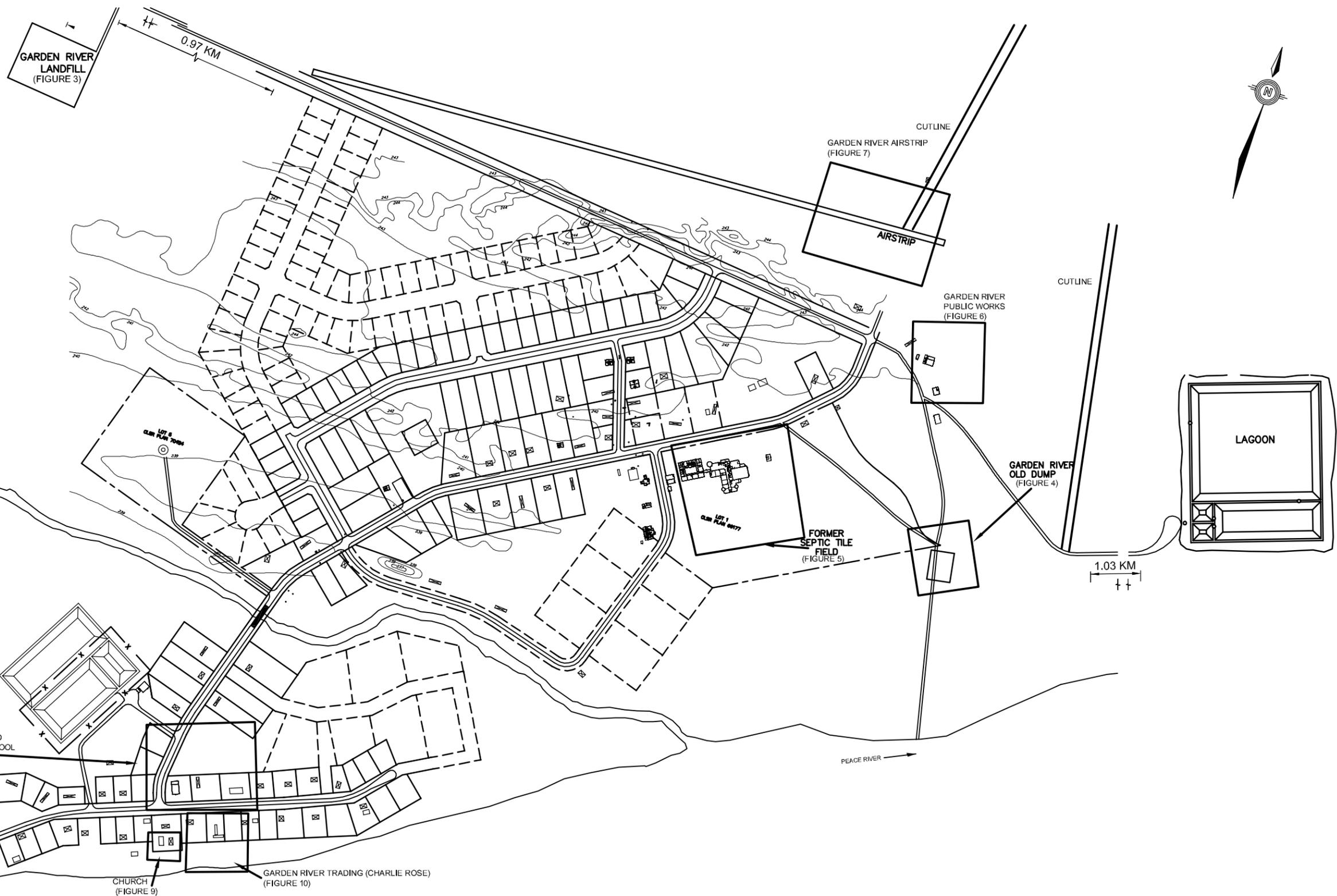
CKD
JC

REV
0

OFFICE
RIV

DATE
April 2008

Figure 1



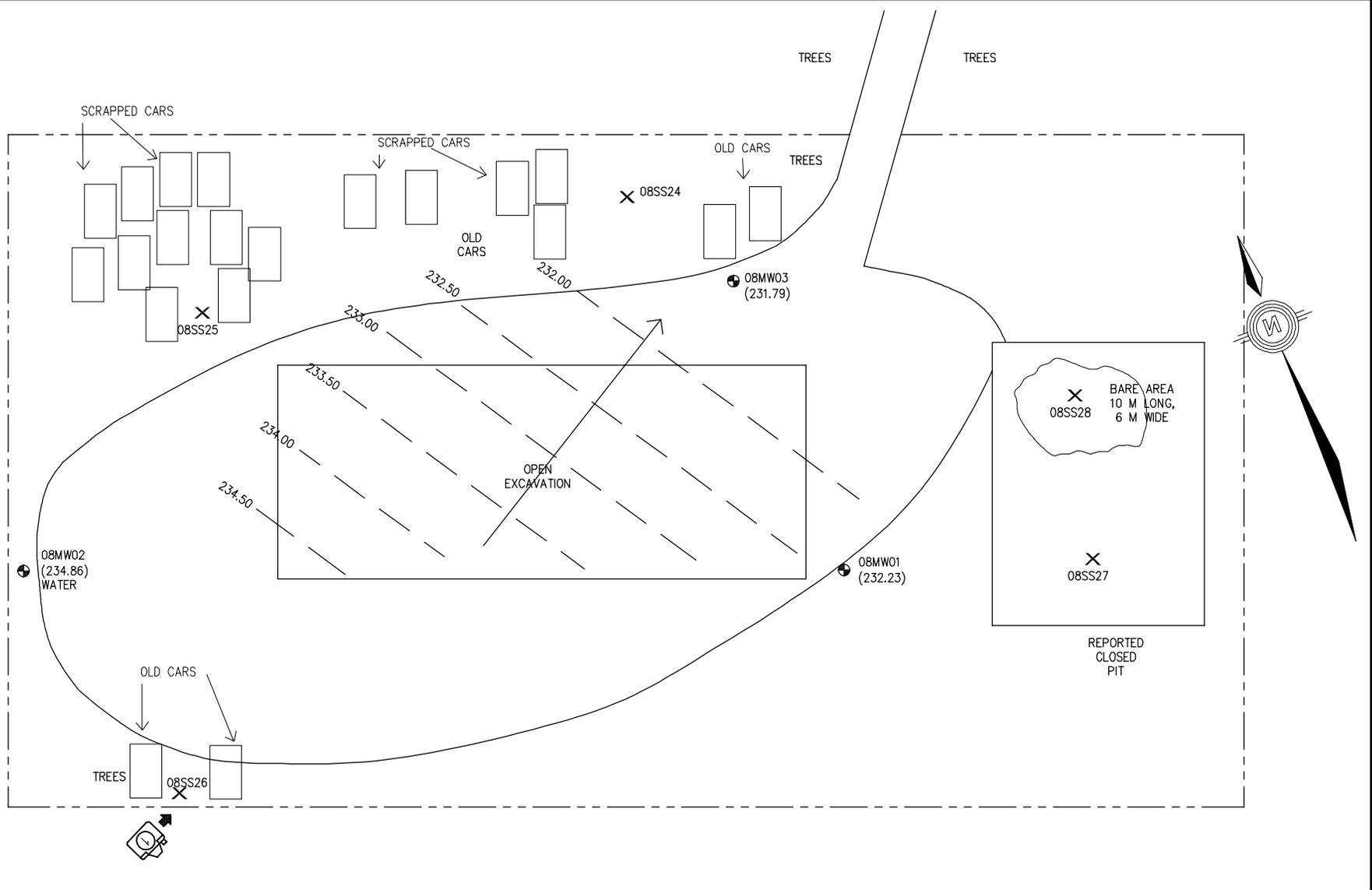
\\eba.local.corp\Riv\external\Drafting\C22101178\AutoCAD\C22101178-Fig 2.dwg [FIGURE 2] February 13, 2009 - 10:14:09 am (BY: TIGISTIKIROS)

LEGEND:
 - - - - - FENCE
 = = = = = ROAD

Scale: 1: 6000 (metres)

CLIENT Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada		CONTAMINATED SITE ASSESSMENT GARDEN RIVER INDIAN RESERVATION, AB		
SITE PLAN SHOWING ASSESSMENT AREAS				
PROJECT NO. C22101178	DWN RH/HK	CKD JC/CH	REV 0	Figure 2
OFFICE RIV	DATE February 2009			

**EBA Engineering
 Consultants Ltd.**

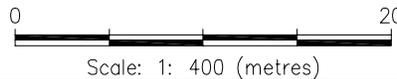


LEGEND

- ⊕ (08BH##) MONITORING WELL LOCATION
- × (08SS.##) SHALLOW SOIL SAMPLE LOCATION
- (###.##) GROUNDWATER ELEVATION
- ###.## GROUNDWATER ELEVATION CONTOUR
- INTERPRETED GROUNDWATER FLOW DIRECTION
- 📷 PHOTO DIRECTION AND NUMBER

NOTE

MONITORING WELL LOCATIONS ARE ON SCALE AND OTHER FEATURES ON THE DRAWING ARE NOT TO SCALE



CLIENT



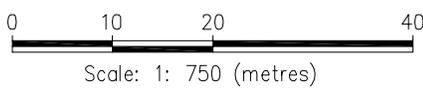
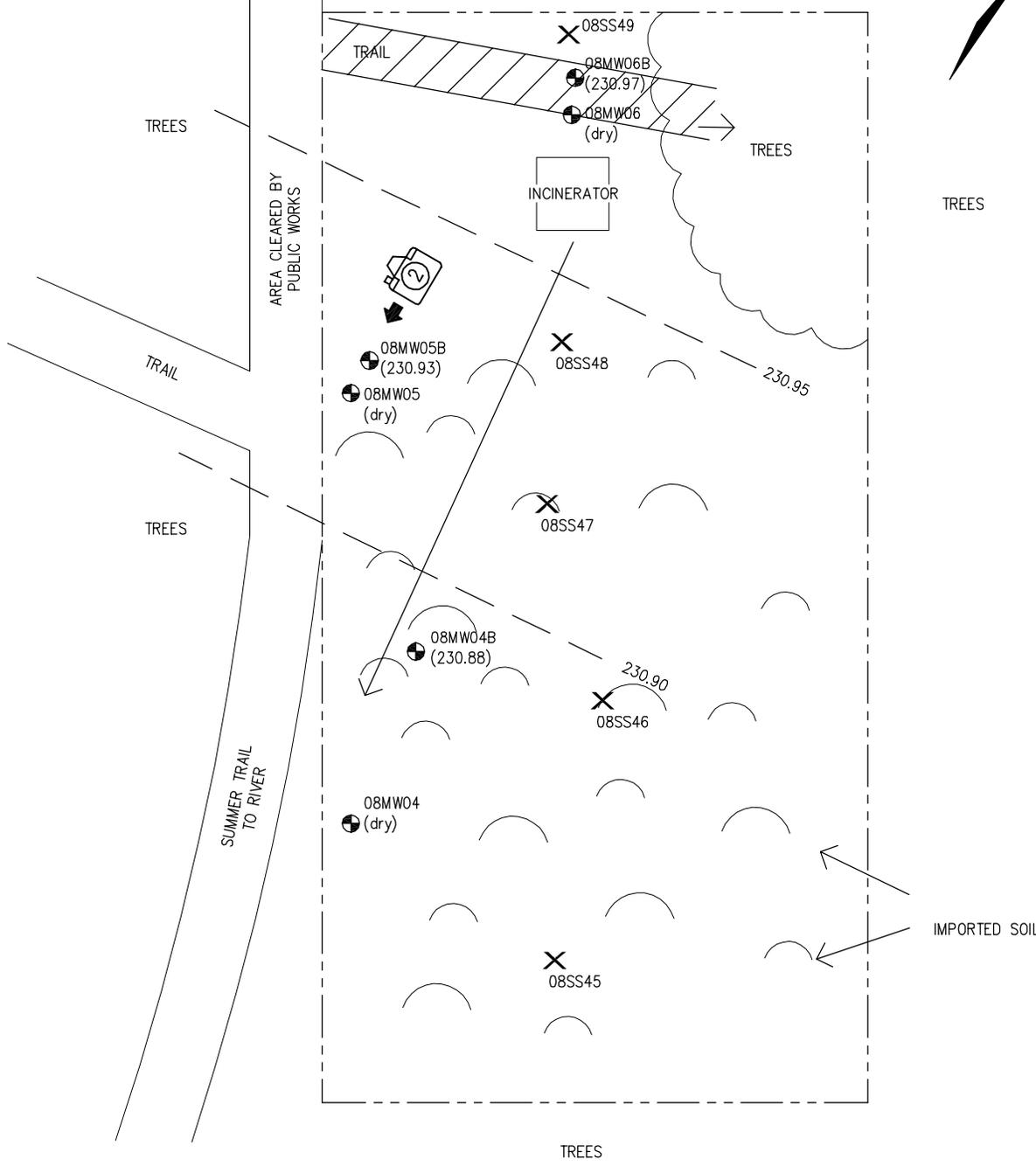
**CONTAMINATED SITE ASSESSMENT
GARDEN RIVER INDIAN RESERVATION, AB**

GARDEN RIVER LANDFILL SITE PLAN



PROJECT NO. C22101178	DWN MM/HK	CKD JC/KC	REV 0
OFFICE EBA-RIV	DATE February 2009		

Figure 3



NOTE
MONITORING WELL LOCATIONS ARE ON SCALE AND OTHER FEATURES ON THE DRAWING ARE NOT TO SCALE

\\eba.local\corp\Riverbend\Drain\G22101178\AutoCAD\C22101178-Figs-3-10.dwg [FIGURE 4] February '09, 10:46:00 am (BY: TIGESTIKPROS)

LEGEND:

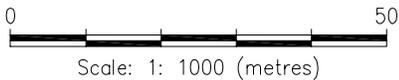
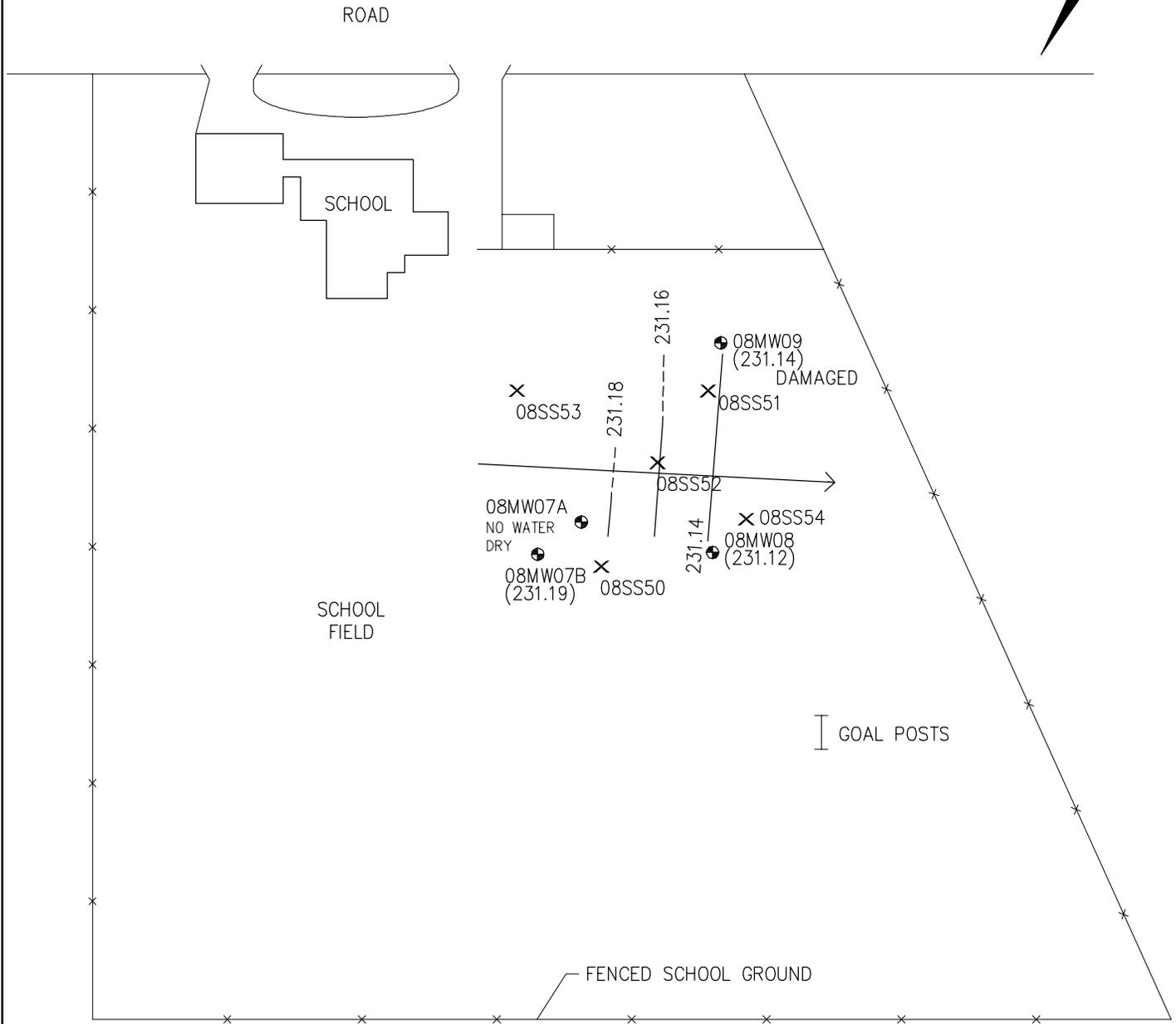
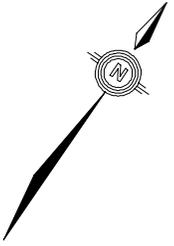
- 08MW## - MONITORING WELL LOCATION
- × 08SS## - SHALLOW SOIL SAMPLE LOCATION
- (###.##) - GROUNDWATER ELEVATION
- ###.## GROUNDWATER ELEVATION CONTOUR
- - INTERPRETED GROUNDWATER FLOW DIRECTION
- ← [camera icon] - PHOTO DIRECTION AND NUMBER

CLIENT

Public Works and
Government Services
Canada

Travaux publics et
Services gouvernementaux
Canada

CONTAMINATED SITE ASSESSMENT				
GARDEN RIVER INDIAN RESERVATION, AB				
GARDEN RIVER OLD DUMP SITE PLAN				
PROJECT NO. C22101178	DWN MM/HK	CKD JC/CH	REV 0	Figure 4
OFFICE RIV	DATE February 2009			



NOTE
MONITORING WELL LOCATIONS ARE ON SCALE AND
OTHER FEATURES ON THE DRAWING ARE NOT TO SCALE

\\eba.local\corp\Riverbend\Drafting\C221\C22101178\AutoCAD\C22101178-Figs 3-10.dwg [FIGURE 5] February 13, 2009 - 10:57:20 am (BY: TIGISTIKFROS)

LEGEND:

- 08MW##- MONITORING WELL LOCATION
- × 08SS## - SHALLOW SOIL SAMPLE LOCATION
- (###.##)- GROUNDWATER ELEVATION
- ###.## GROUNDWATER ELEVATION CONTOUR
- - INTERPRETED GROUNDWATER FLOW DIRECTION

CLIENT

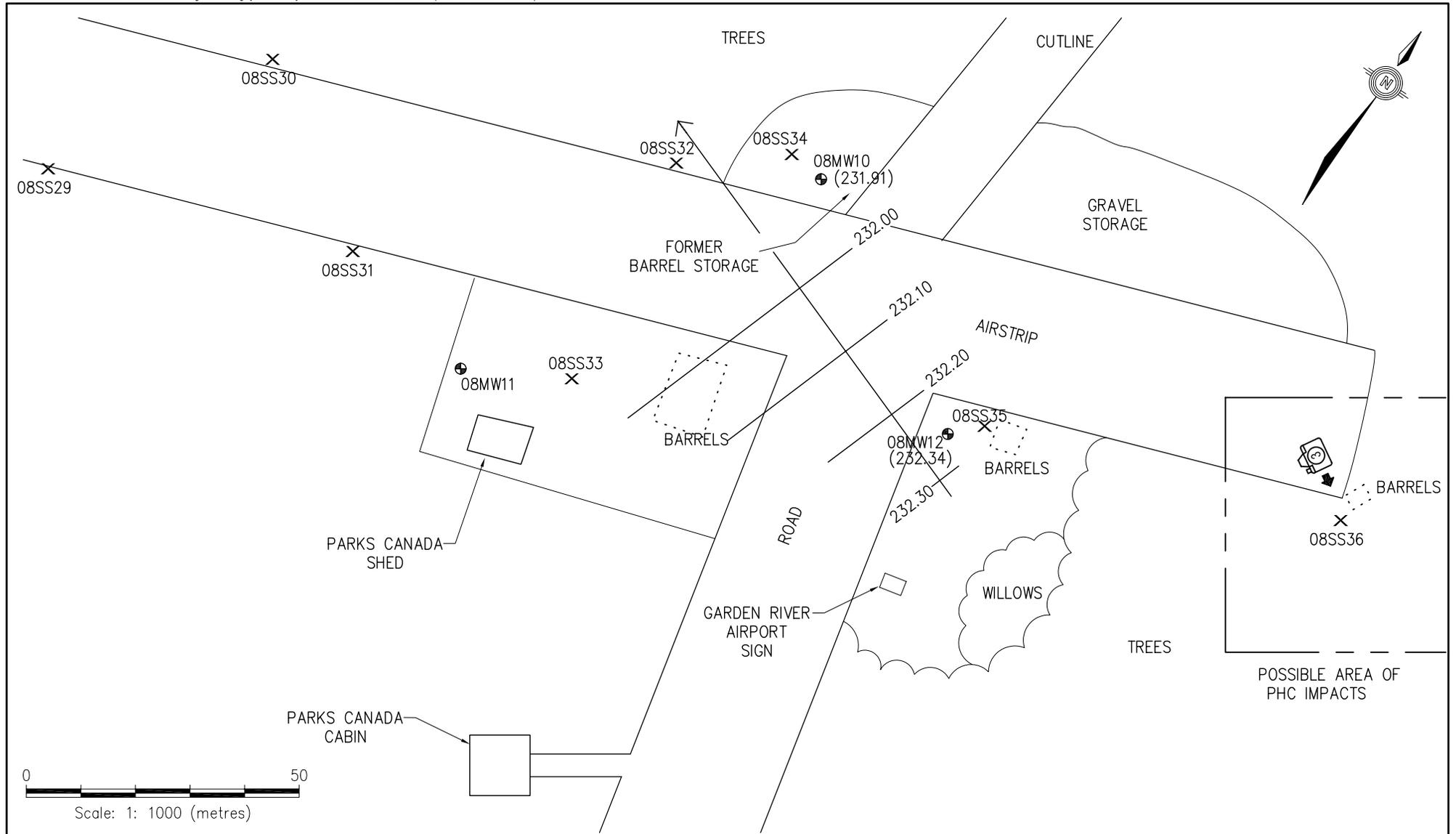


**CONTAMINATED SITE ASSESSMENT
GARDEN RIVER INDIAN RESERVATION, AB**

FORMER SEPTIC TILE FIELD SITE PLAN

PROJECT NO. C22101178	DWN MM/HK	CKD JC/CH	REV 0
OFFICE RIV	DATE February 2009		

Figure 5



LEGEND:

- ⊕ 08MW## - MONITORING WELL LOCATION
- × 08SS## - SHALLOW SOIL SAMPLE LOCATION
- (###.##) - GROUNDWATER ELEVATION
- ###.## GROUNDWATER ELEVATION CONTOUR
- - INTERPRETED GROUNDWATER FLOW DIRECTION
- ← ① - PHOTO DIRECTION AND NUMBER

NOTE

MONITORING WELL LOCATIONS ARE ON SCALE AND OTHER FEATURES ON THE DRAWING ARE NOT TO SCALE

CLIENT



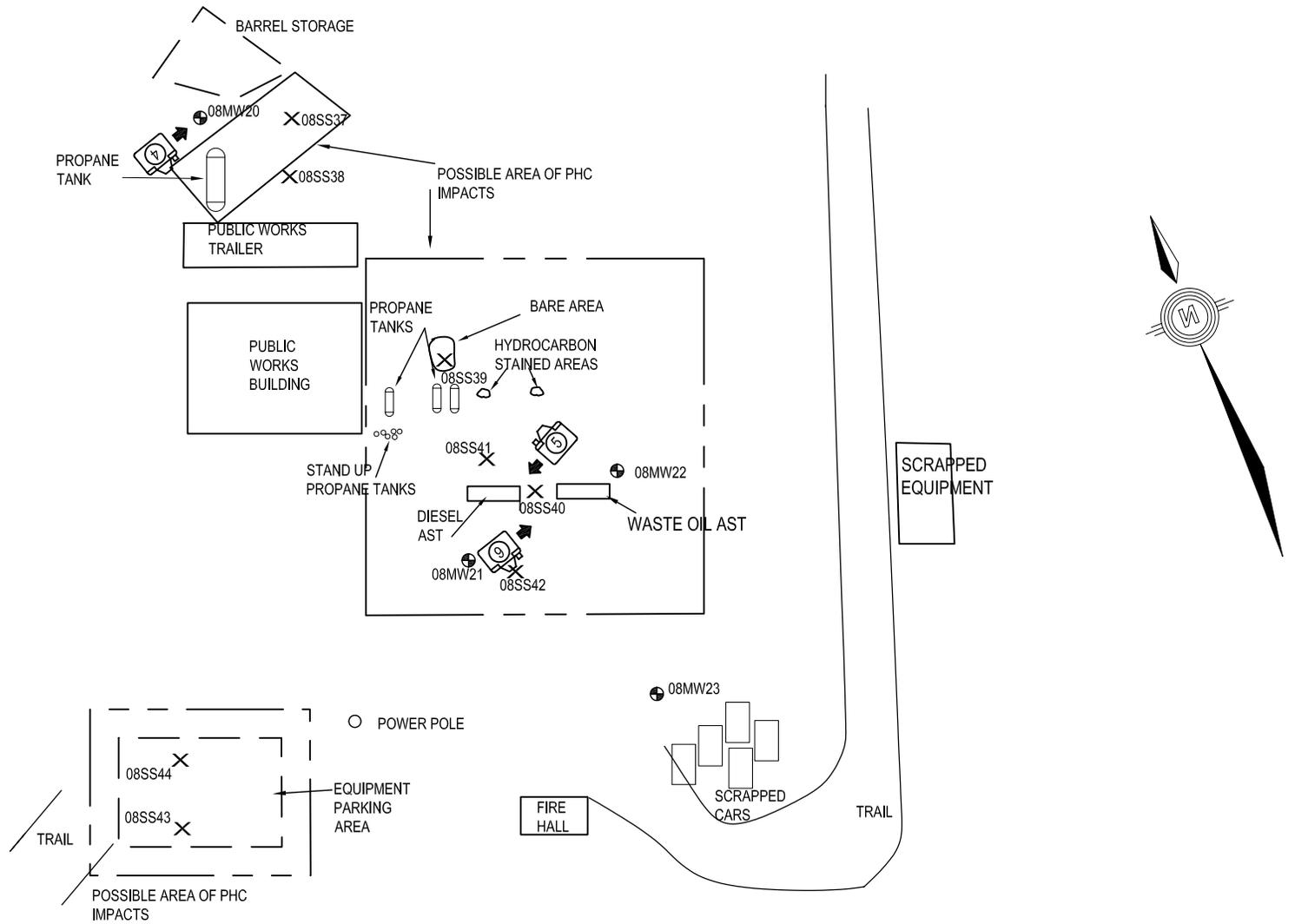
**CONTAMINATED SITE ASSESSMENT
GARDEN RIVER INDIAN RESERVATION, AB**

**GARDEN RIVER AIRSTRIP SITE PLAN SHOWING
GROUNDWATER ELEVATIONS**

**EBA Engineering
Consultants Ltd.**

PROJECT NO. C22101178	DWN MM/HK	CKD JC/CH	REV 0
OFFICE RIV	DATE October 2008		

Figure 6



LEGEND

- ⊕ (08BH##) MONITORING WELL LOCATION
- ✕ (08SS.##) SHALLOW SOIL SAMPLE LOCATION
- 📷 PHOTO DIRECTION AND NUMBER

NOTE

MONITORING WELL LOCATIONS ARE ON SCALE AND OTHER FEATURES ON THE DRAWING ARE NOT TO SCALE



CLIENT

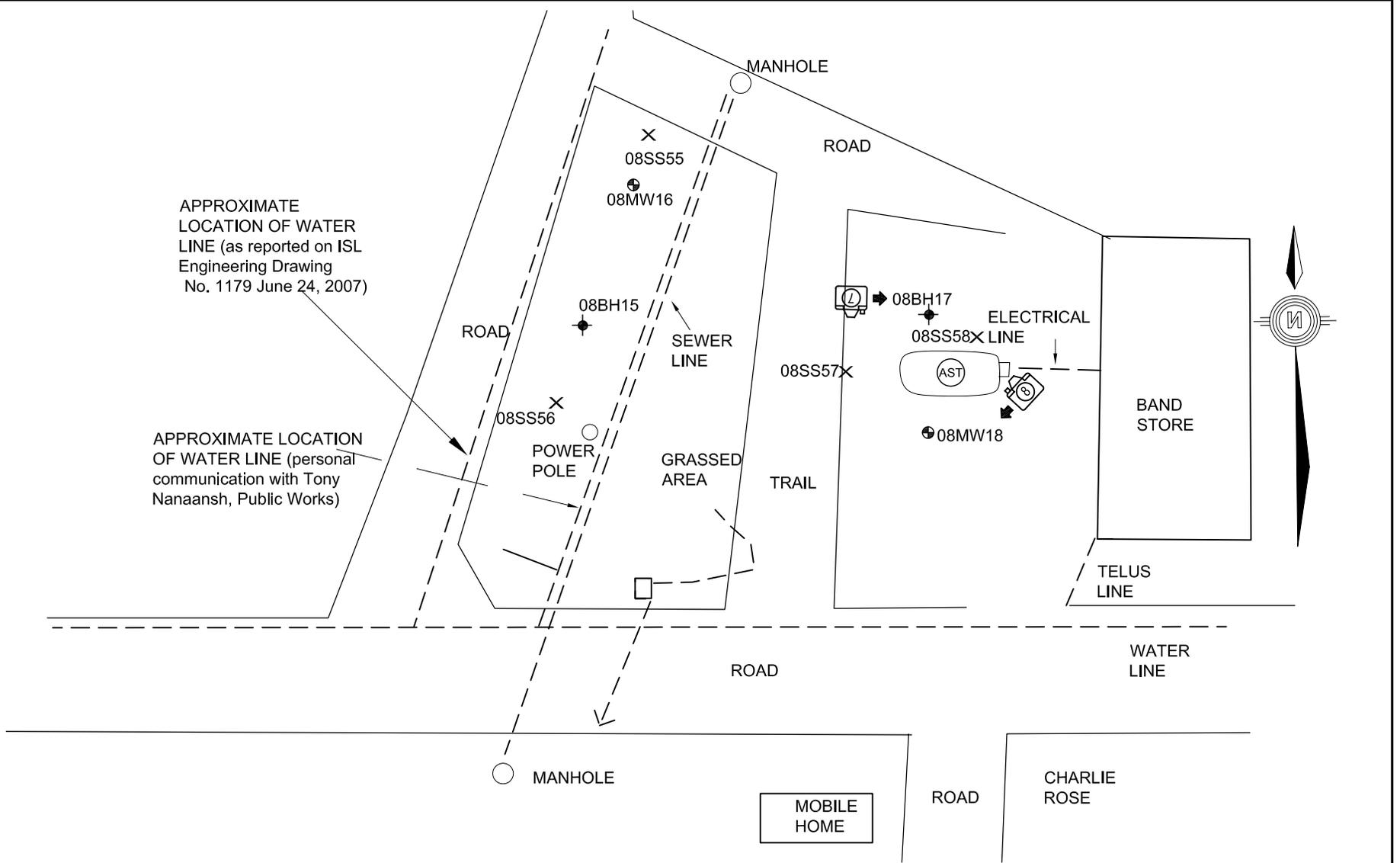
Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

**CONTAMINATED SITE ASSESSMENT
GARDEN RIVER INDIAN RESERVATION, AB**

GARDEN RIVER PUBLIC WORKS YARD SITE PLAN

PROJECT NO. C22101178	DWN MM/HK	CKD JC/KC	REV 0	Figure 7
OFFICE EBA-RIV	DATE October 2008			

EBA Engineering Consultants Ltd.



LEGEND

- ⊕ (08BH##) MONITORING WELL LOCATION
- (08BH##) BOREHOLE LOCATION
- × (08SS.##) SHALLOW SOIL SAMPLE LOCATION
- (###.##) GROUNDWATER ELEVATION
- ###.## GROUNDWATER ELEVATION CONTOUR
- INTERPRETED GROUNDWATER FLOW DIRECTION
- 📷 PHOTOGRAPH DIRECTION AND NUMBER

NOTE

MONITORING WELL LOCATIONS ARE ON SCALE AND OTHER FEATURES ON THE DRAWING ARE NOT TO SCALE

0 25

Scale: 1: 500 (metres)

CLIENT

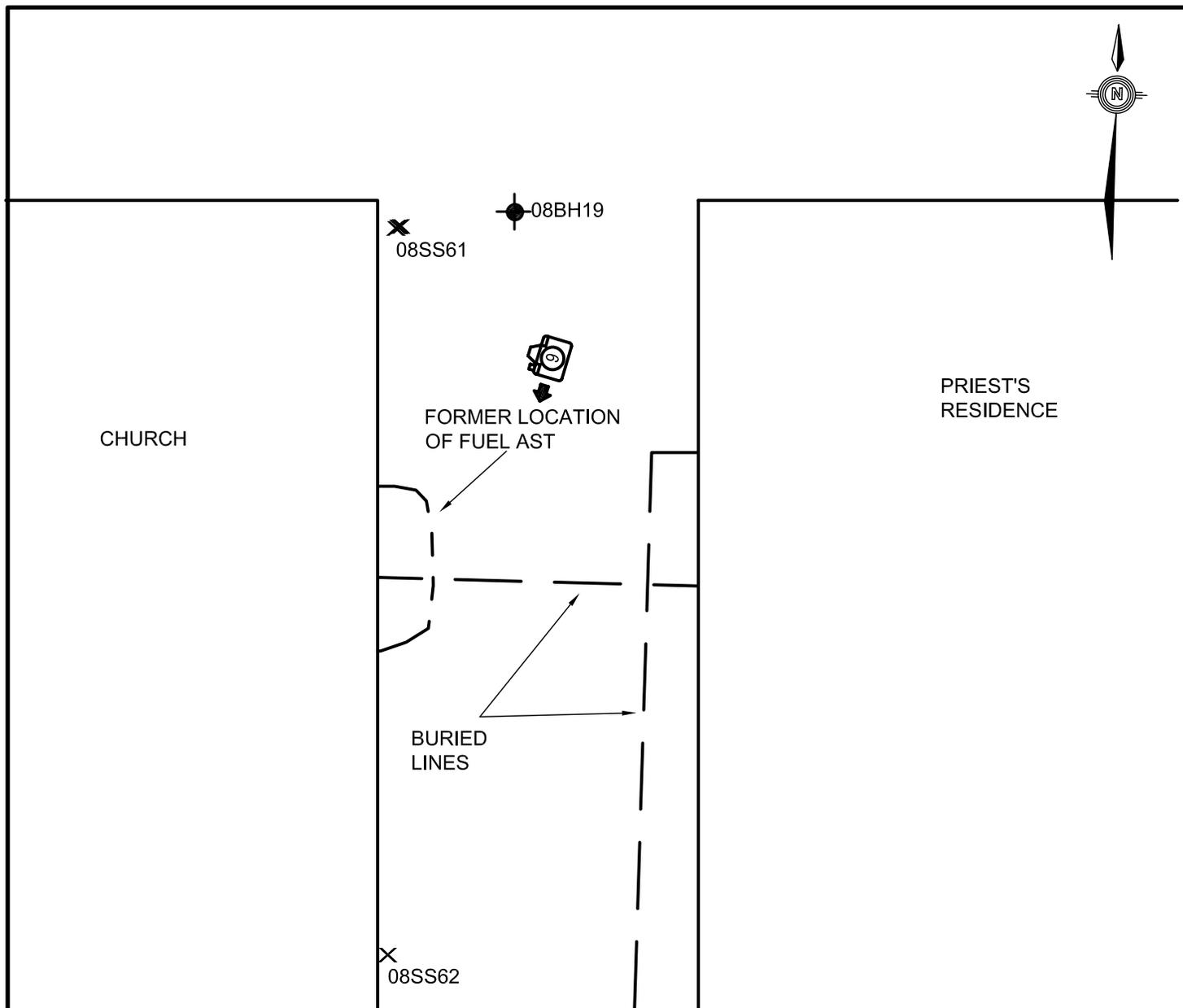
Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

EBA Engineering Consultants Ltd.

**CONTAMINATED SITE ASSESSMENT
GARDEN RIVER INDIAN RESERVATION, AB**

**FIFTH MERIDIAN MARKET AST AND NORTHLANDS
SCHOOL HISTORIC AST SITE PLAN**

PROJECT NO. C22101178	DWN MM/HK	CKD JC/KC	REV 0	Figure 8
OFFICE EBA-RIV	DATE October 2008			



LEGEND

- (08BH##) BOREHOLE LOCATION
- (08SS.##) SHALLOW SOIL SAMPLE LOCATION
- PHOTOGRAPH DIRECTION AND NUMBER

NOTE

MONITORING WELL LOCATIONS ARE ON SCALE AND OTHER FEATURES ON THE DRAWING ARE NOT TO SCALE

G:\C22101178\AutoCAD\C22101178-Figs 3-10.dwg [FIGURE 9] October 22, 2008 - 7:09:51 am (BY: HEIDI KOMMICK)



CLIENT



Public Works and
Government Services
Canada

Travaux publics et
Services gouvernementaux
Canada

**CONTAMINATED SITE ASSESSMENT
GARDEN RIVER INDIAN RESERVATION, AB**

CHURCH SITE PLAN

**EBA Engineering
Consultants Ltd.**



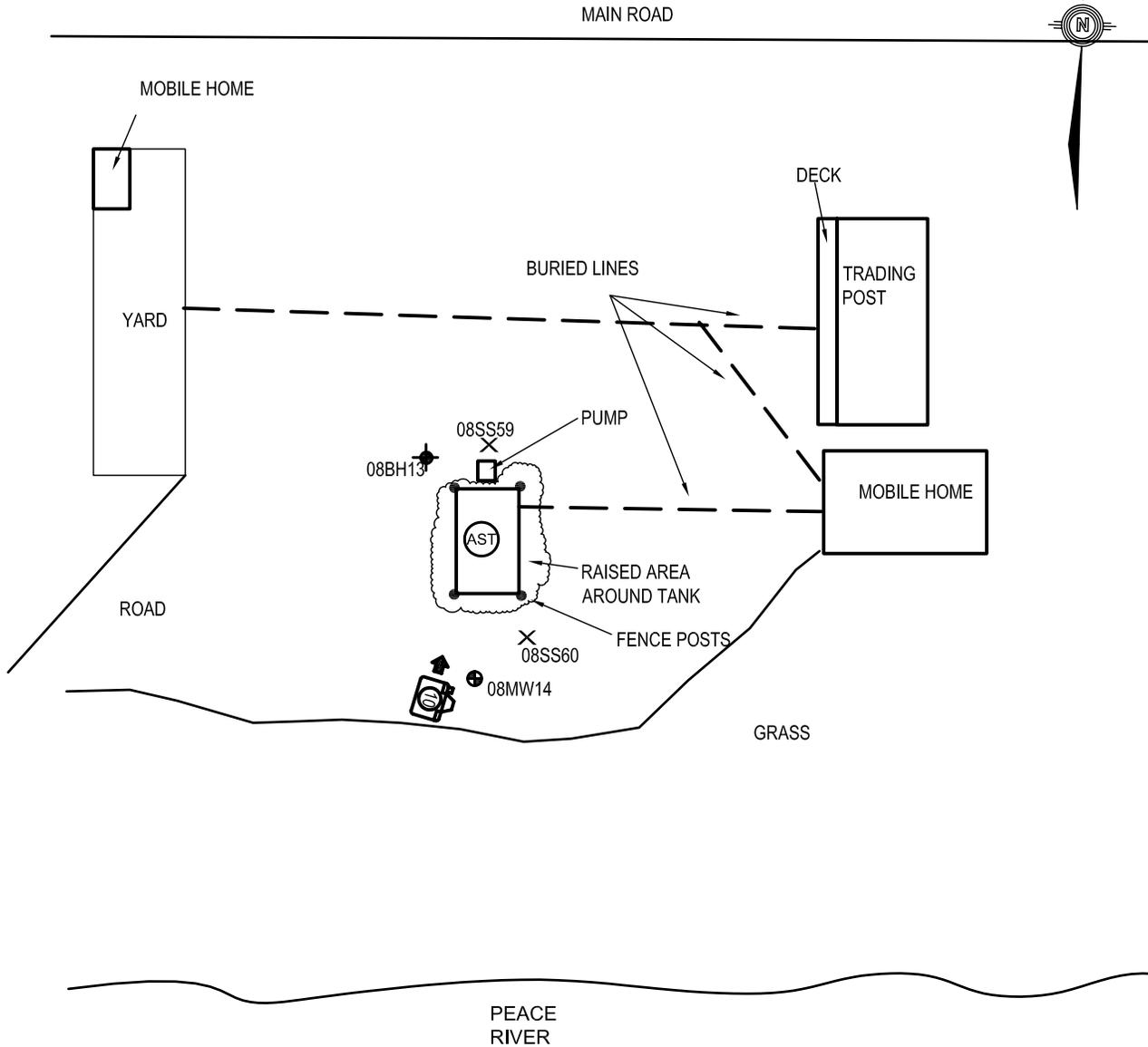
PROJECT NO.
C22101178

OFFICE
RIV

DWN MM/HK	CKD JC/CH	REV 0
--------------	--------------	----------

DATE
September 2008

Figure 9



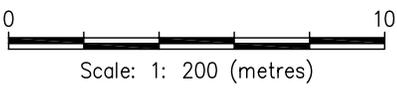
LEGEND

- (08BH##) BOREHOLE LOCATION
- MW## MONITORING WELL LOCATION
- (08SS.##) SHALLOW SOIL SAMPLE LOCATION
- PHOTOGRAPH DIRECTION AND NUMBER

NOTE

MONITORING WELL LOCATIONS ARE ON SCALE AND OTHER FEATURES ON THE DRAWING ARE NOT TO SCALE

G:\C22101178\AutoCAD\C22101178-Figs-3-10.dwg [FIGURE 10] October 22, 2008 - 7:10:08 am (BY: HEIDI KOMMICK)



CLIENT

Public Works and
Government Services
Canada

Travaux publics et
Services gouvernementaux
Canada

**CONTAMINATED SITE ASSESSMENT
GARDEN RIVER INDIAN RESERVATION, AB**

GARDEN RIVER TRADING (CHARLIE ROSE) SITE PLAN

**EBA Engineering
Consultants Ltd.**

PROJECT NO. C22101178	DWN MM/HK	CKD JC/CH	REV 0
	DATE October 2008		
OFFICE RIV			

Figure 10



PHOTOGRAPHS

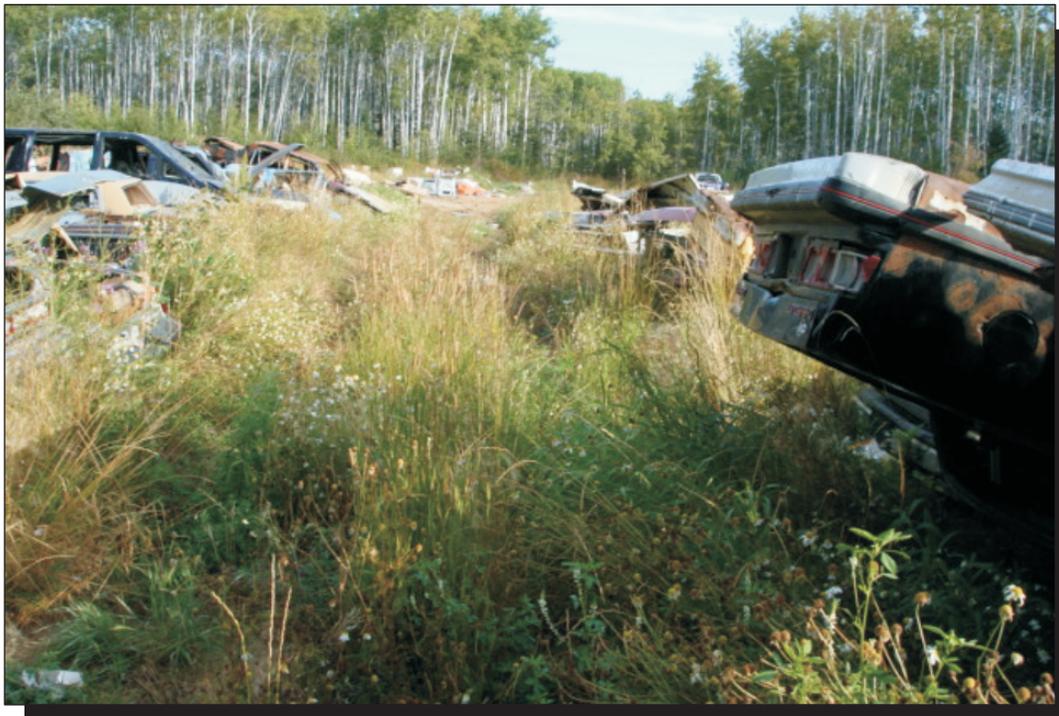


Photo 1

Garden River Landfill looking northeast from 08SS26 (August 26, 2008).



Photo 2

Garden River Old Dump looking south towards 08MW05 area (August 26, 2008)



Photo 3
Garden River Airstrip looking east-southeast at 08SS36 (August 26, 2008).



Photo 4
Garden River Public Works yard looking northeast from 08MW20 (August 26, 2008)



Photo 5
Garden River Public Works yard looking southwest from 08SS40 (August 26, 2008).



Photo 6
Garden River Public Works yard looking northeast from 08MW21 (August 26, 2008).



Photo 7
Fifth Meridian Market looking east at AST (August 26, 2008).



Photo 8
Fifth Meridian Market looking southeast at AST (August 26, 2008).



Photo 9
Church assessment area showing former AST area (August 26, 2008).



Photo 10
Garden River Trading (Charlie Rose) looking north at the AST (August 26, 2008).



APPENDIX A

APPENDIX A BOREHOLE LOGS

UNIFIED SOIL CLASSIFICATION†

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES	CLASSIFICATION CRITERIA	
COARSE-GRAINED SOILS <small>More than 50% retained on No. 200 sieve*</small>	GRAVELS <small>50% or more of coarse fraction retained on No. 4 sieve</small>	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}} > D_{10}$ Greater than 4 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting both criteria for GW Atterberg limits plot below 'A' line or plasticity index less than 4 Atterberg limits plot above 'A' line and plasticity index greater than 7
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures	
		GRAVELS WITH FINES	GC	Clayey gravels, gravel-sand clay mixtures	
		GRAVELS WITH FINES	GP	Poorly-graded gravels and gravel-sand mixtures, little or no fines	
	SANDS <small>More than 50% of coarse fraction passes No. 4 sieve</small>	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}} > D_{10}$ Greater than 6 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting both criteria for SW Atterberg limits plot below 'A' line or plasticity index less than 4 Atterberg limits plot above 'A' line and plasticity index greater than 7
			SW	Poorly-graded sands and gravelly sands, little or no fines	
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures	
			SC	Clayey sands, sand-clay mixtures	
			SM	Silty sands, sand-silt mixtures	
			SC	Clayey sands, sand-clay mixtures	
FINE-GRAINED SOILS <small>50% or more passes No. 200 sieve*</small>	SILTS AND CLAYS <small>Liquid limit 50% or less</small>	ML	Inorganic silts, very fine sand, rock flour, silty or clayey fine sands		
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
		OL	Organic silts and organic silty clays of low plasticity		
	SILTS AND CLAYS <small>Liquid limit greater than 50%</small>	MH	Inorganic silts, micaceous or distomaceous fine sands or silts, elastic silts		
		CH	Inorganic silts of high plasticity, fat clays		
		OH	Organic clays of medium to high plasticity		
		MH	Inorganic silts, micaceous or distomaceous fine sands or silts, elastic silts		
		OH	Organic clays of medium to high plasticity		
HIGHLY ORGANIC SOILS	PT	Peat, muck and other highly organic soils	*Based on the material passing the 3 in. (75 mm) sieve †ASTM Designation D 2487, for identification procedure see D 2488		

GROUND ICE DESCRIPTION

ICE NOT VISIBLE				VISIBLE ICE LESS THAN 50% BY VOLUME			
GROUP SYMBOLS	SYMBOLS	SUBGROUP DESCRIPTION	IMAGE	GROUP SYMBOLS	SYMBOLS	SUBGROUP DESCRIPTION	IMAGE
N	NI	Poorly-bonded or friable		V	Vx	Individual ice crystals or inclusions	
	Nbn	No excess ice, well-bonded			Vc	Ice coatings on particles	
	Nbe	Excess ice, well-bonded			Vr	Random or irregularly oriented ice formations	
					Vs	Stratified or distinctly oriented ice formations	
				VISIBLE ICE GREATER THAN 50% BY VOLUME			
ICE	ICE + Soil Type	Ice with soil inclusions					
	ICE	Ice without soil inclusions (greater than 25 mm (1 in.) thick)					

NOTE:

- Dual symbols are used to indicate borderline or mixed ice classifications
- Visual estimates of ice contents indicated on borehole logs $\pm 5\%$
- This system of ground ice description has been modified from NRC Technical Memo 79, Guide to the Field Description of Permafrost for Engineering Purposes

LEGEND
Soil Ice

TERMS USED ON BOREHOLE LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (major portion retained on 0.075mm sieve): Includes (1) clean gravels and sands, and (2) silty or clayey gravels and sands. Condition is rated according to relative density, as inferred from laboratory or in situ tests.

DESCRIPTIVE TERM	RELATIVE DENSITY	N (blows per 0.3m)
Very Loose	0 to 20%	0 to 4
Loose	20 to 40%	4 to 10
Compact	40 to 75%	10 to 30
Dense	75 to 90%	30 to 50
Very Dense	90 to 100%	greater than 50

The number of blows, N, on a 51mm O.D. split spoon sampler of a 63.5kg weight falling 0.76m, required to drive the sampler a distance of 0.3m from 0.15m to 0.45m.

FINE GRAINED SOILS (major portion passing 0.075mm sieve): Includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as estimated from laboratory or in situ tests.

DESCRIPTIVE TERM	UNCONFINED COMPRESSIVE STRENGTH (kPa)
Very Soft	Less Than 25
Soft	25 to 50
Firm	50 to 100
Stiff	100 to 200
Very Stiff	200 to 400
Hard	Greater Than 400

NOTE: Slickensided and fissured clays may have lower unconfined compressive strengths than shown above, because of planes of weakness or cracks in the soil.

GENERAL DESCRIPTIVE TERMS

Slickensided	- having inclined planes of weakness that are slick and glossy in appearance.
Fissured	- containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
Laminated	- composed of thin layers of varying colour and texture.
Interbedded	- composed of alternate layers of different soil types.
Calcareous	- containing appreciable quantities of calcium carbonate.
Well Graded	- having wide range in grain sizes and substantial amounts of intermediate particle sizes.
Poorly graded	- predominantly of one grain size, or having a range of sizes with some intermediate size missing.

CONTAMINATED SITE ASSESSMENT & PHASE 2	SPARKS CANADA AGENCY	PROJECT NO. - BOREHOLE NO.
WOOD BUFFALO NATIONAL PARK	6" SOLID STEM AUGER	C22101178-08BH13
COMMUNITY OF GARDEN RIVER, AB		

SAMPLE TYPE	DISTURBED	NO RECOVERY	SPT	A-CASING	SHELBY TUBE	CORE
BACKFILL TYPE	BENTONITE	PEA GRAVEL	SLOUGH	GROUT	DRILL CUTTINGS	SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	COMMENTS	SOIL VAPOURS (ppm)				Depth (ft)
				200	400	600	800	
0	CLAYEY SILT - trace sand, firm, low plastic, massive, poorly graded, moist, grey brown.		BAG, 2 JARS					0
1	- laminated layers of grey and brown at 1.0 m.		BAG					3
2			BAG					6
3	- coal seams, iron staining at 3.0 m.		BAG					10
4			BAG					13
4	SILTY SAND - trace clay, uniform, loose, well graded, light greyish brown.		BAG, 2 JARS					15
5	SAND - trace silt, trace clay, uniform, loose, poorly graded, reddish brown.		BAG					16
6			BAG					20
6			BAG, 2 JARS					20
7			BAG					23
7			BAG					23
8			BAG					26
8			BAG					26
9	- some gravel, free water at 8.5 m.		BAG, 2 JARS					28
9			BAG					30
10	END OF HOLE AT 9.9 m. NOTES: - backfilled with cuttings and bentonite.		BAG					33
11								36
12								39
13								42
14								46

EBA Engineering Consultants Ltd.	LOGGED BY: JS	COMPLETION DEPTH: 9.9m
	REVIEWED BY:	COMPLETE: 8/27/2008
	DRAWING NO: 08BH13	Page 1 of 1

CONTAMINATED SITE ASSESSMENT & PHASE 2 E	SPARKS CANADA AGENCY	PROJECT NO. - BOREHOLE NO.
WOOD BUFFALO NATIONAL PARK	6" SOLID STEM AUGER	C22101178-08BH15
COMMUNITY OF GARDEN RIVER, AB		

SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	COMMENTS	SOIL VAPOURS (ppm)				Depth (ft)	
				200	400	600	800		
0	CLAYEY SILT - some sand, firm, low plastic, massive, well graded, dry, brown. - light reddish brown from 0.4 m to 0.6 m. - moist, grey brown at 0.6 m. - laminated layers of grey and brown at 1.0 m.	<input checked="" type="checkbox"/>	BAG, 2 JARS					0	
1		<input checked="" type="checkbox"/>	BAG					5	
2		<input checked="" type="checkbox"/>	BAG					10	
3		<input checked="" type="checkbox"/>	BAG					15	
4		<input checked="" type="checkbox"/>	BAG, 2 JARS					20	
5		<input checked="" type="checkbox"/>	BAG					25	
6		SAND - trace silt, trace clay, uniform, loose, moist, yellowish brown.	<input checked="" type="checkbox"/>	BAG, 2 JARS					30
7			<input checked="" type="checkbox"/>	BAG					35
8			<input checked="" type="checkbox"/>	BAG					40
9			<input checked="" type="checkbox"/>	BAG, 2 JARS					45
10	END OF HOLE AT 9.9 m. NOTES: - backfilled with cuttings and bentonite.	<input checked="" type="checkbox"/>	BAG					46	
11		<input checked="" type="checkbox"/>	BAG					46	
12									
13									
14									

 EBA Engineering Consultants Ltd.	LOGGED BY: JS	COMPLETION DEPTH: 9.9m
	REVIEWED BY:	COMPLETE: 8/27/2008
	DRAWING NO: 08BH15	Page 1 of 1

CONTAMINATED SITE ASSESSMENT & PHASE 2	SPARKS CANADA AGENCY	PROJECT NO. - BOREHOLE NO.
WOOD BUFFALO NATIONAL PARK	6" SOLID STEM AUGER	C22101178-08BH17
COMMUNITY OF GARDEN RIVER, AB		

SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	COMMENTS	SOIL VAPOURS (ppm)				Depth (ft)
				200	400	600	800	
0	CLAYEY SILT - trace sand, stiff, low plastic, massive, poorly graded, moist, dark brown.		BAG, 2 JARS					0
1	- laminated layers of grey and brown from 1.0 m to 2.5 m.		BAG					5
2			BAG					
3	- light olive brown, coal seams, iron mottles, iron staining at 2.5 m.		BAG					10
4			BAG					
5	SAND - trace silt, trace clay, uniform, loose, moist, light yellowish brown.		BAG, 2 JARS					15
6			BAG					
7			BAG					20
8			BAG, 2 JARS					25
9	- free water at 8.5 m.		BAG					30
10	END OF HOLE AT 9.9 m. NOTES: - backfilled with cuttings and bentonite.		BAG, 2 JARS					35
11			BAG					40
12								45
13								46

 EBA Engineering Consultants Ltd.	LOGGED BY: JS	COMPLETION DEPTH: 9.9m
	REVIEWED BY:	COMPLETE: 8/27/2008
	DRAWING NO: 08BH17	Page 1 of 1

CONTAMINATED SITE ASSESSMENT & PHASE 2 E	SPARKS CANADA AGENCY	PROJECT NO. - BOREHOLE NO.
WOOD BUFFALO NATIONAL PARK	6" SOLID STEM AUGER	C22101178-08BH19
COMMUNITY OF GARDEN RIVER, AB		

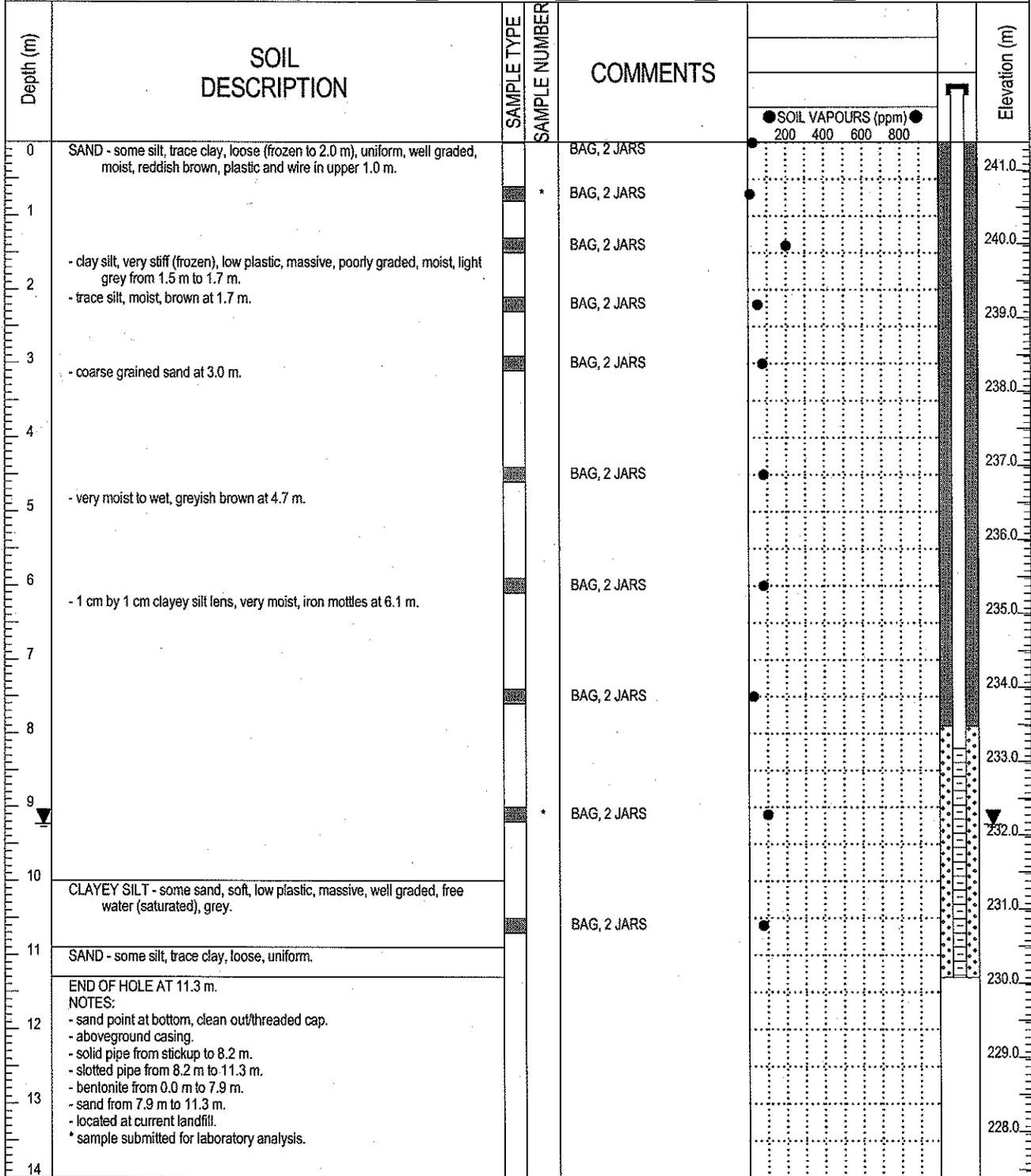
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	COMMENTS	SOIL VAPOURS (ppm)				Depth (ft)
				200	400	600	800	
0	CLAYEY SILT - some sand, firm, low plastic, massive, poorly graded, moist, grey brown.	BAG, 2 JARS						0
1	- laminated layers of grey and brown at 1.0 m.	BAG						3
2	- iron staining at 2.4 m.	BAG						6
3	- grey at 3.5 m.	BAG						9
4	SANDY SILT - trace clay, soft, low plastic, massive, well graded, grey. - saturated at 4.3 m.	BAG, 2 JARS						13
5	SILTY SAND - trace clay, uniform, loose, well graded, very wet.	BAG						16
6	SAND - trace silt, trace clay, uniform, loose, poorly graded, yellowish brown.	BAG						19
7	SILT - some sand, trace clay, very soft, massive, poorly graded, saturated, grey.	BAG, 2 JARS						23
8		BAG						26
9		BAG						29
10	END OF HOLE AT 9.9 m. NOTES: - backfilled with cuttings and bentonite.	BAG, 2 JARS						33
11		BAG						36
12		BAG						39
13		BAG, 2 JARS						42
14		BAG						46

 EBA Engineering Consultants Ltd.	LOGGED BY: JS	COMPLETION DEPTH: 9.9m
	REVIEWED BY:	COMPLETE: 8/27/2008
	DRAWING NO: 08BH19	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW01
GARDEN RIVER, AB	6512137.677N; 679381.5566E; Zone 11	ELEVATION: 241.3734m

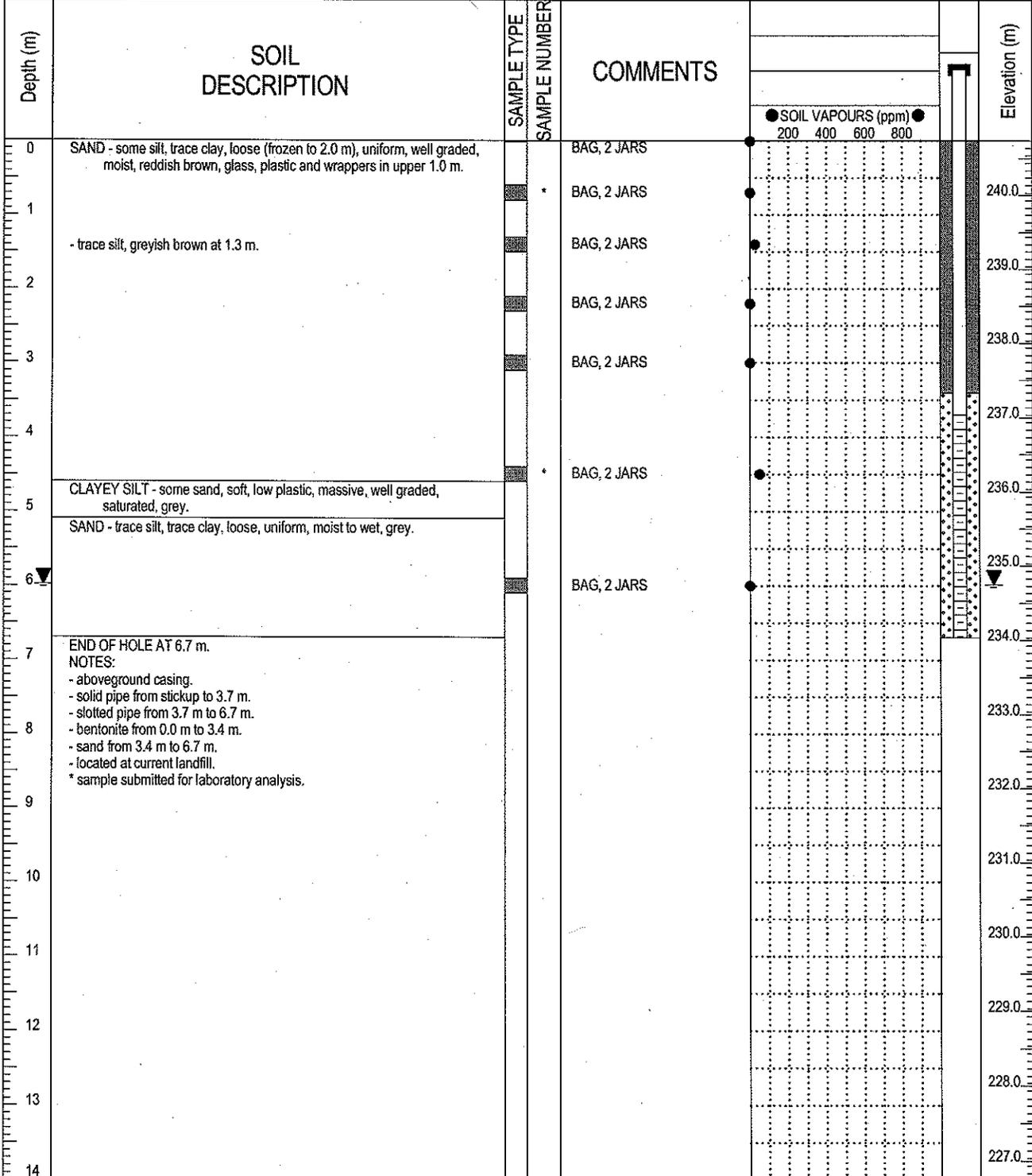
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input checked="" type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



	LOGGED BY: JS	COMPLETION DEPTH: 11.3m
	REVIEWED BY:	COMPLETE: 3/19/2008
	DRAWING NO: 08MW01	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW02
GARDEN RIVER, AB	6512137.755N; 679325.4967E; Zone 11	ELEVATION: 240.7326m

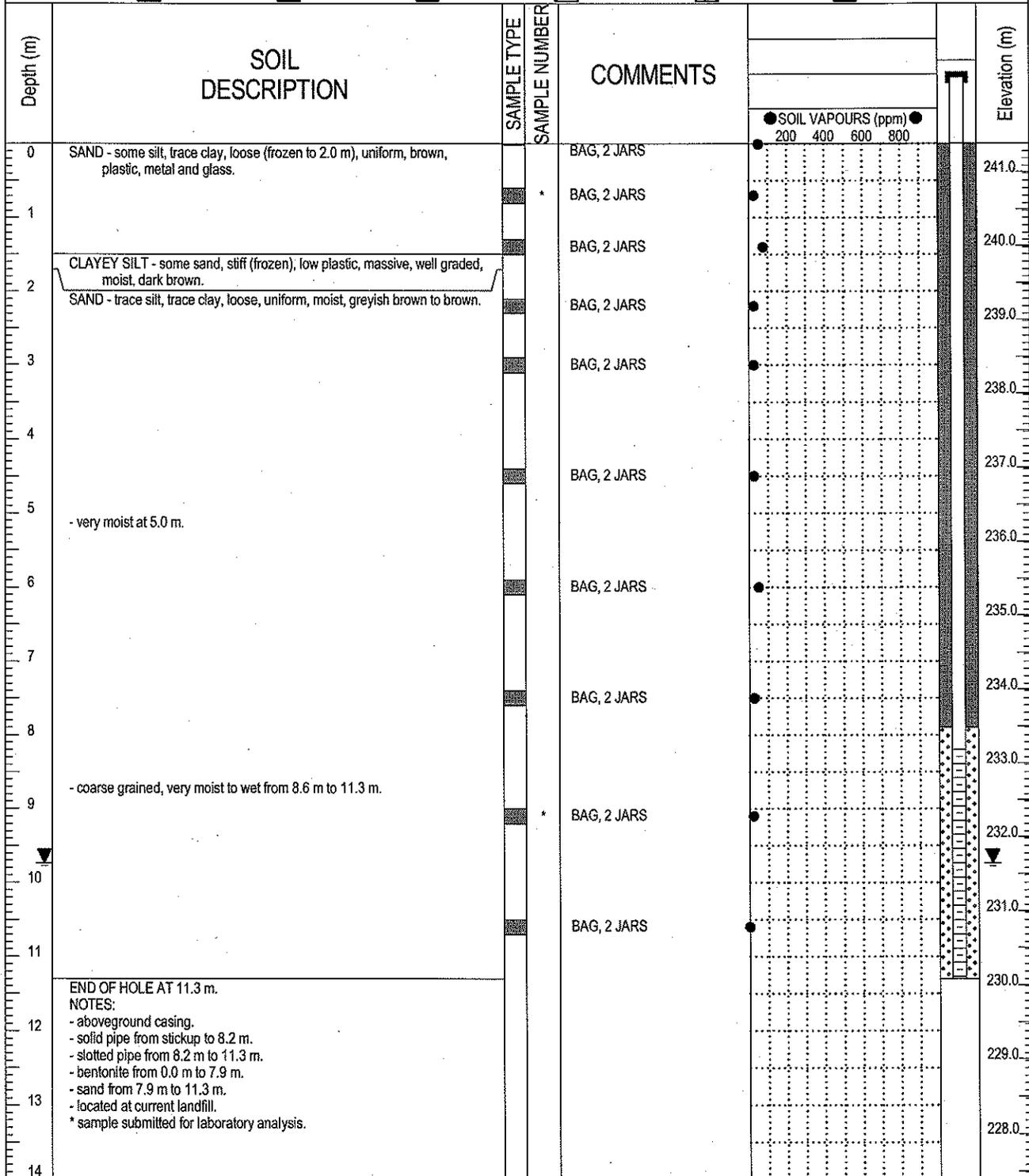
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input checked="" type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input checked="" type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



	LOGGED BY: JS	COMPLETION DEPTH: 6.7m
	REVIEWED BY:	COMPLETE: 3/18/2008
	DRAWING NO: 08MW02	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW03
GARDEN RIVER, AB	6512157.932N; 679374.2361E; Zone 11	ELEVATION: 241.3799m

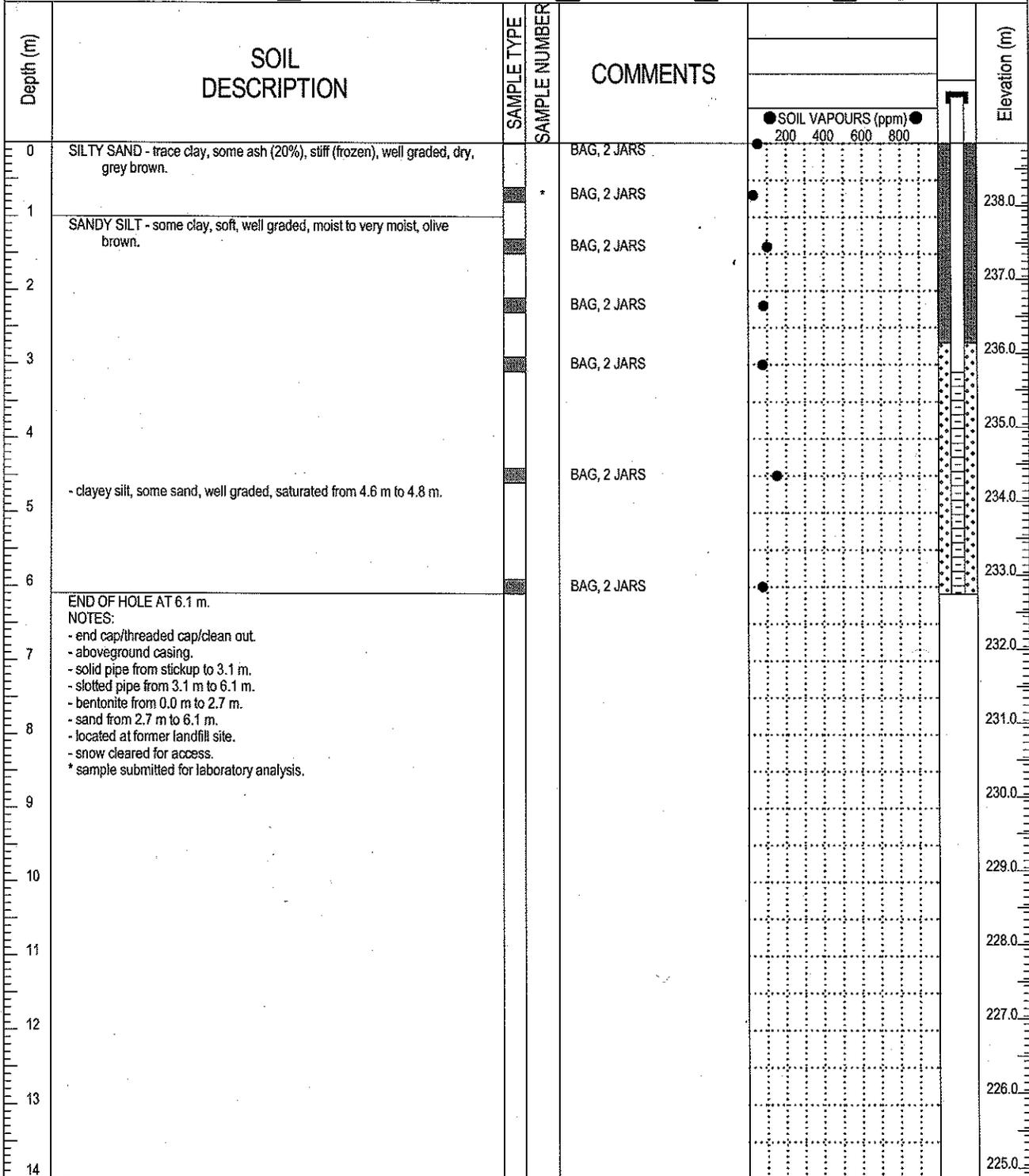
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input checked="" type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



	LOGGED BY: JS	COMPLETION DEPTH: 11.3m
	REVIEWED BY:	COMPLETE: 3/19/2008
	DRAWING NO: 08MW03	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW04
GARDEN RIVER, AB	6511925.497N; 681596.2257E; Zone 11	ELEVATION: 238.8412m

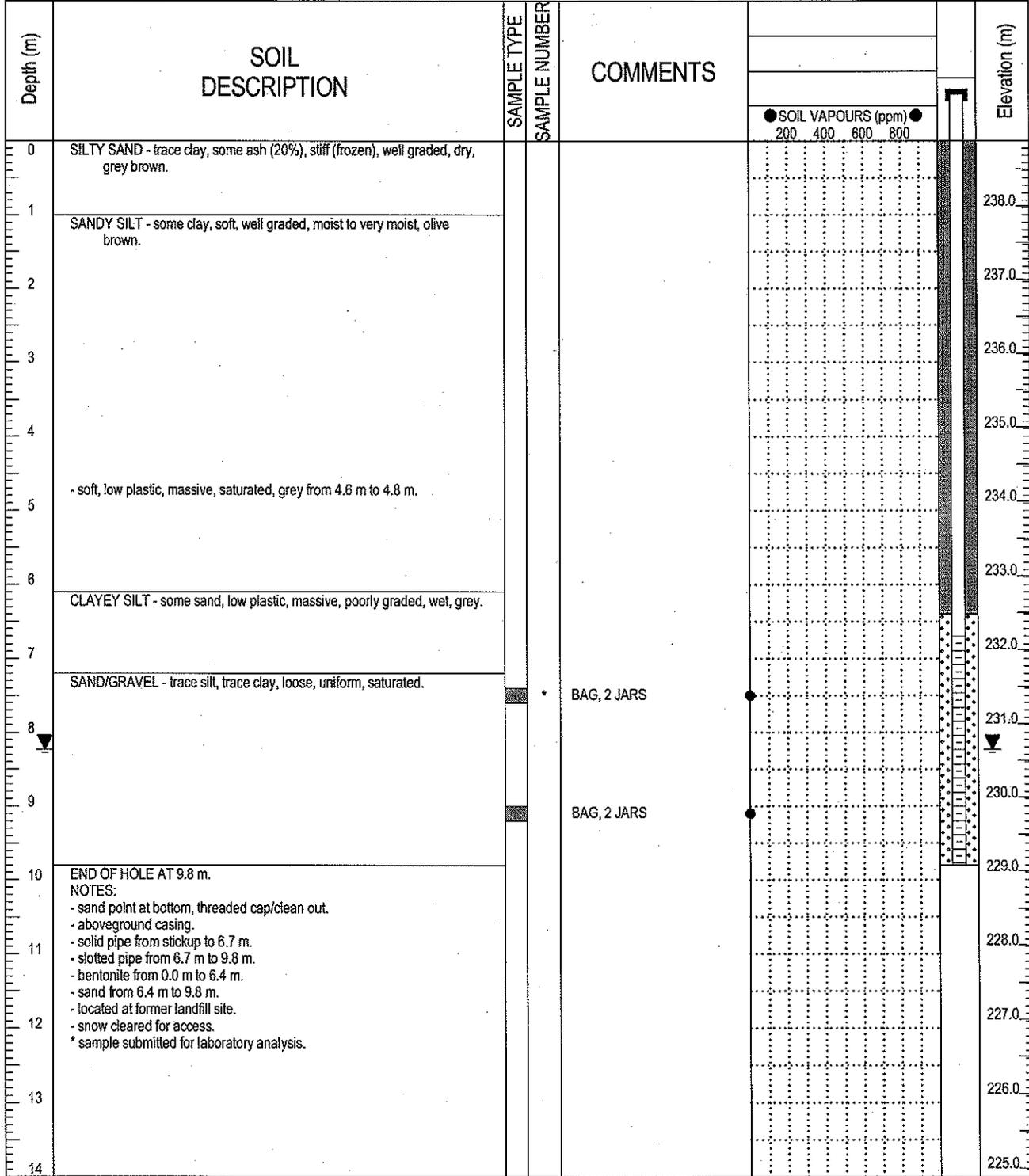
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



	LOGGED BY: JS	COMPLETION DEPTH: 6.1m
	REVIEWED BY:	COMPLETE: 3/19/2008
	DRAWING NO: 08MW04	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW04B
GARDEN RIVER, AB	6511924.557N; 681597.5407E; Zone 11	ELEVATION: 238.877m

SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



 EBA Engineering Consultants Ltd.	LOGGED BY: JS	COMPLETION DEPTH: 9.8m
	REVIEWED BY:	COMPLETE: 3/20/2008
	DRAWING NO: 08MW04B	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW05
GARDEN RIVER, AB	6511959.332N; 681591.0148E; Zone 11	ELEVATION: 239.0892m

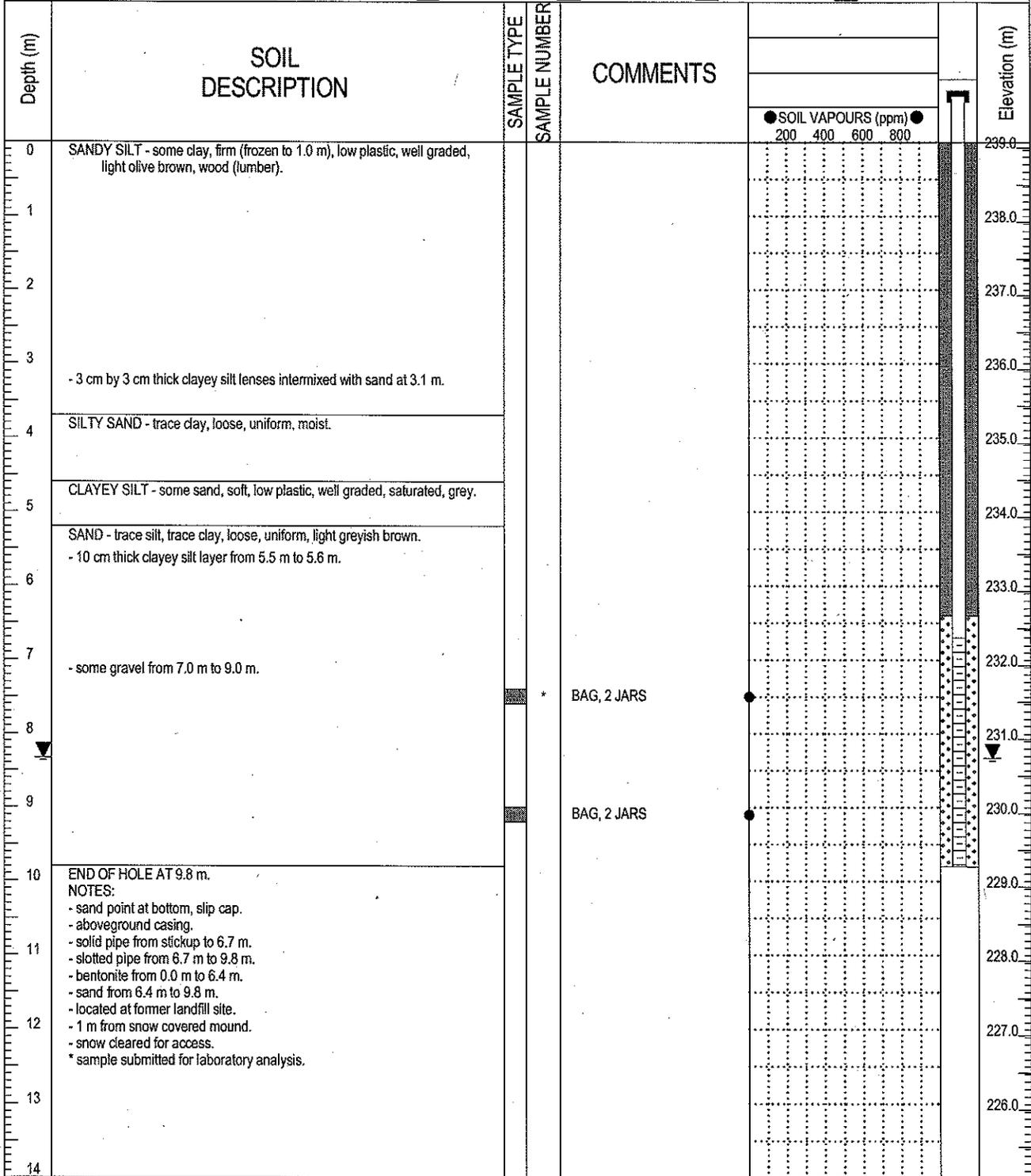
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input checked="" type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input checked="" type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input checked="" type="checkbox"/> DRILL CUTTINGS	<input checked="" type="checkbox"/> SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	COMMENTS	SOIL VAPOURS (ppm)	Elevation (m)
0	SANDY SILT - some clay, firm (frozen to 1.0 m), low plastic, well graded, light olive brown, wood (lumber).			BAG, 2 JARS	● 200 400 600 800 ●	239.0
1			*	BAG, 2 JARS		238.0
2				BAG, 2 JARS		237.0
3				BAG, 2 JARS		236.0
4	- 3 cm by 3 cm thick clayey silt lenses intermixed with sand at 3.1 m. SILTY SAND - trace clay, loose, uniform, moist.			BAG, 2 JARS		235.0
5	CLAYEY SILT - some sand, soft, low plastic, well graded, saturated, grey.			BAG, 2 JARS		234.0
6	SAND - trace silt, trace clay, loose, uniform, light greyish brown. - 10 cm thick clayey silt layer from 5.5 m to 5.6 m.			BAG, 2 JARS		233.0
7	END OF HOLE AT 6.1 m. NOTES: - end cap/threaded cap/clean out. - aboveground casing. - solid pipe from stickup to 3.1 m. - slotted pipe from 3.1 m to 6.1 m. - bentonite from 0.0 m to 2.7 m. - sand from 2.7 m to 6.1 m. - located at former landfill site. - 1 m from snow covered mound. - snow cleared for access. * sample submitted for laboratory analysis.					232.0
8						231.0
9						230.0
10						229.0
11						228.0
12						227.0
13						226.0
14						226.0

 EBA Engineering Consultants Ltd.	LOGGED BY: JS	COMPLETION DEPTH: 6.1m
	REVIEWED BY:	COMPLETE: 3/19/2008
	DRAWING NO: 08MW05	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW05B
GARDEN RIVER, AB	6511956.6N; 681591.9637E; Zone 11	ELEVATION: 239.0744m

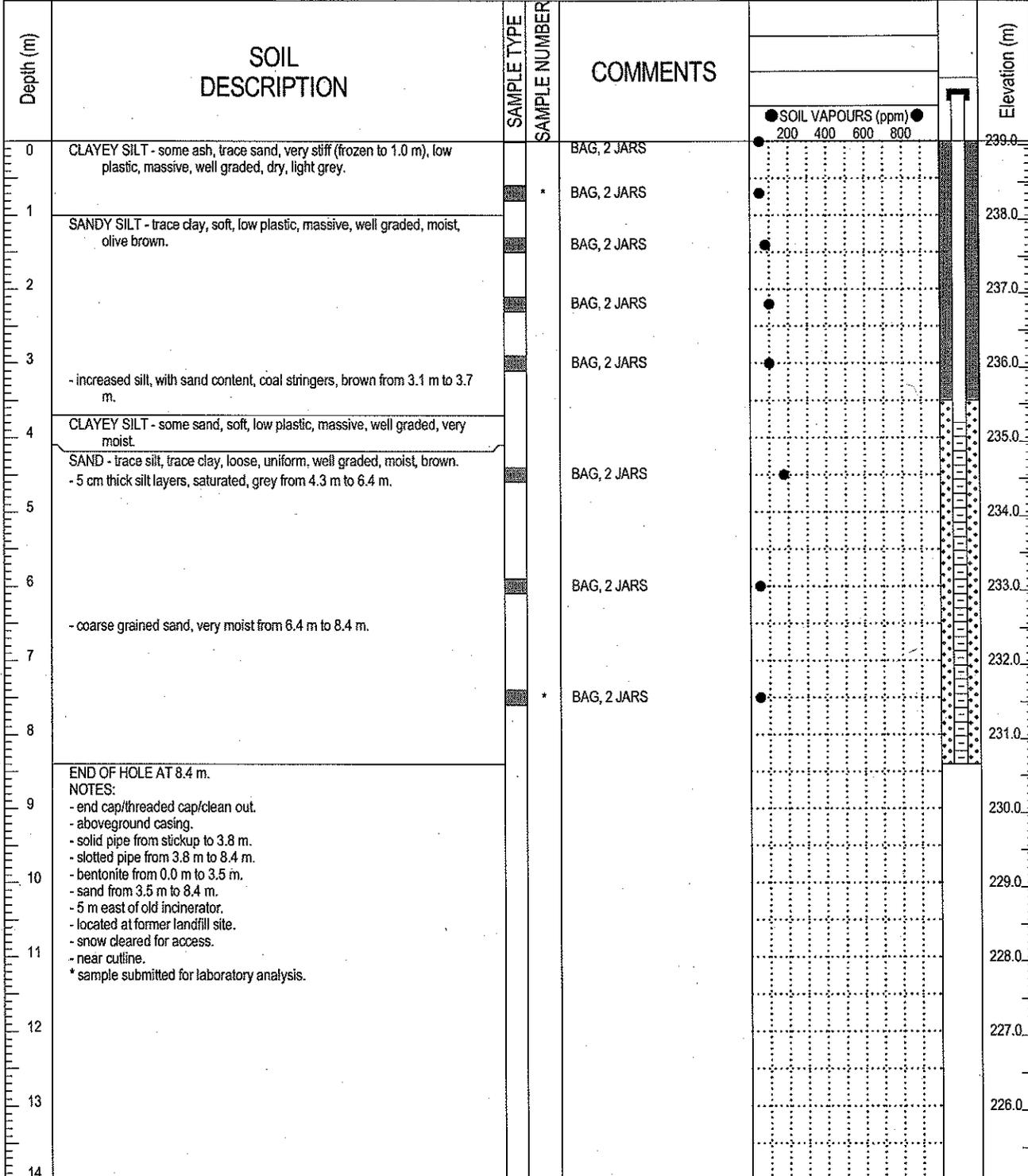
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



 EBA Engineering Consultants Ltd.	LOGGED BY: JS	COMPLETION DEPTH: 9.8m
	REVIEWED BY:	COMPLETE: 3/20/2008
	DRAWING NO: 08MW05B	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW06
GARDEN RIVER, AB	6511987.141N; 681614.8296E; Zone 11	ELEVATION: 239.0565m

SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input checked="" type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



	LOGGED BY: JS	COMPLETION DEPTH: 8.4m
	REVIEWED BY:	COMPLETE: 3/19/2008
	DRAWING NO: 08MW06	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW06B
GARDEN RIVER, AB	6511989.071N; 681615.3663E; Zone 11	ELEVATION: 238.9504m

SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input checked="" type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input checked="" type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	COMMENTS	SOIL VAPOURS (ppm)	Elevation (m)
0	CLAYEY SILT - some ash, trace sand, very stiff (frozen to 1.0 m), low plastic, massive, well graded, dry, light grey.			● 200 400 600 800 ●	238.0
1	SANDY SILT - trace clay, soft, low plastic, massive, well graded, moist, olive brown.				237.0
2					236.0
3	- increased silt with sand content, coal stringers, brown from 3.1 m to 3.7 m.				235.0
4	CLAYEY SILT - some sand, soft, low plastic, massive, well graded, very moist.				234.0
5	SAND - trace silt, trace clay, loose, uniform, well graded, moist, brown. - 5 cm thick silt layers, saturated, grey from 4.3 m to 6.4 m.				233.0
6					232.0
7	- coarse grained sand, some gravel, very moist from 6.4 m to 9.8 m.				231.0
8					230.0
9	- free water in hole at 9.2 m.	BAG, 2 JARS		●	229.0
10	END OF HOLE AT 9.8 m. NOTES: - sand point at bottom, threaded cap/clean out. - aboveground casing. - solid pipe from stickup to 6.7 m. - slotted pipe from 6.7 m to 9.8 m. - bentonite from 0.0 m to 6.1 m. - sand from 6.1 m to 9.8 m. - 4 m east of old incinerator. - located at former landfill site. - snow cleared for access. - near outline.				228.0
11					227.0
12					226.0
13					225.0
14					

 EBA Engineering Consultants Ltd.	LOGGED BY: JS	COMPLETION DEPTH: 9.8m
	REVIEWED BY:	COMPLETE: 3/20/2008
	DRAWING NO: 08MW06B	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW07
GARDEN RIVER, AB	6511934.964N; 681358.7766E; Zone 11	ELEVATION: 239.0031m

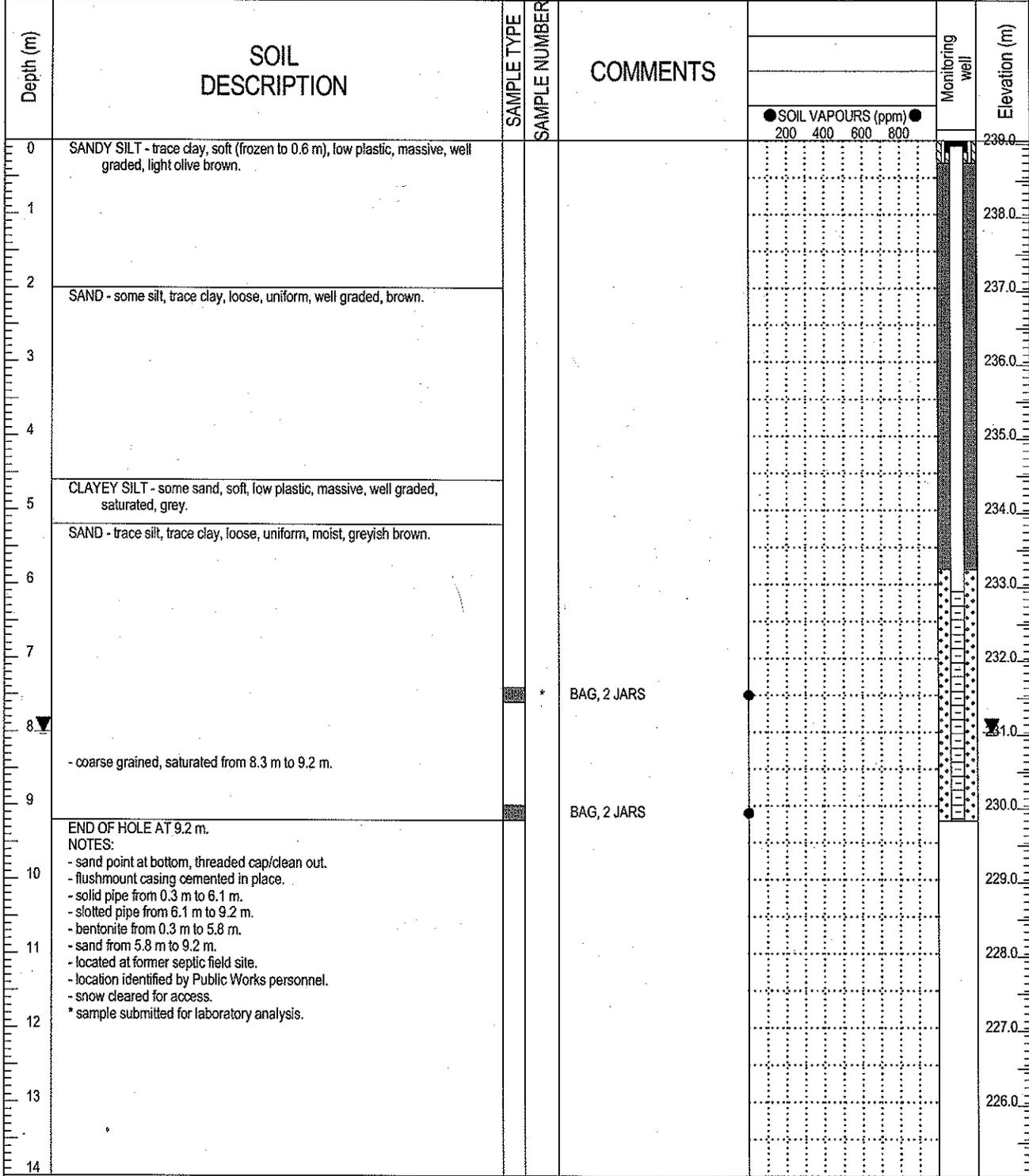
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input checked="" type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input checked="" type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input checked="" type="checkbox"/> DRILL CUTTINGS	<input checked="" type="checkbox"/> SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	COMMENTS	SOIL VAPOURS (ppm)				Monitoring well	Elevation (m)
					200	400	600	800		
0	SANDY SILT - trace clay, soft (frozen to 0.6 m), low plastic, massive, well graded, light olive brown.			BAG, 2 JARS						239.0
1				BAG, 2 JARS						238.0
2	SAND - some silt, trace clay, loose, uniform, well graded, brown.			BAG, 2 JARS						237.0
3				BAG, 2 JARS						236.0
4				BAG, 2 JARS						235.0
5	CLAYEY SILT - some sand, soft, low plastic, massive, well graded, saturated, grey.			BAG, 2 JARS						234.0
6	SAND - trace silt, trace clay, loose, uniform, moist, greyish brown.			BAG, 2 JARS						233.0
7	END OF HOLE AT 6.1 m. NOTES: - end cap/threaded cap/clean out. - flushmount casing cemented in place. - solid pipe from 0.2 m to 3.1 m. - slotted pipe from 3.1 m to 6.1 m. - bentonite from 0.2 m to 2.7 m. - sand from 2.7 m to 6.1 m. - located at former septic field site. - located identified by Public Works personnel. - snow cleared for access. * sample submitted for laboratory analysis.									232.0
8										231.0
9										230.0
10										229.0
11										228.0
12										227.0
13										226.0
14										

 EBA Engineering Consultants Ltd.	LOGGED BY: JS	COMPLETION DEPTH: 6.1m
	REVIEWED BY:	COMPLETE: 3/19/2008
	DRAWING NO: 08MW07	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW07B
GARDEN RIVER, AB	6511934.816N; 681360.6319E; Zone 11	ELEVATION: 239.0409m

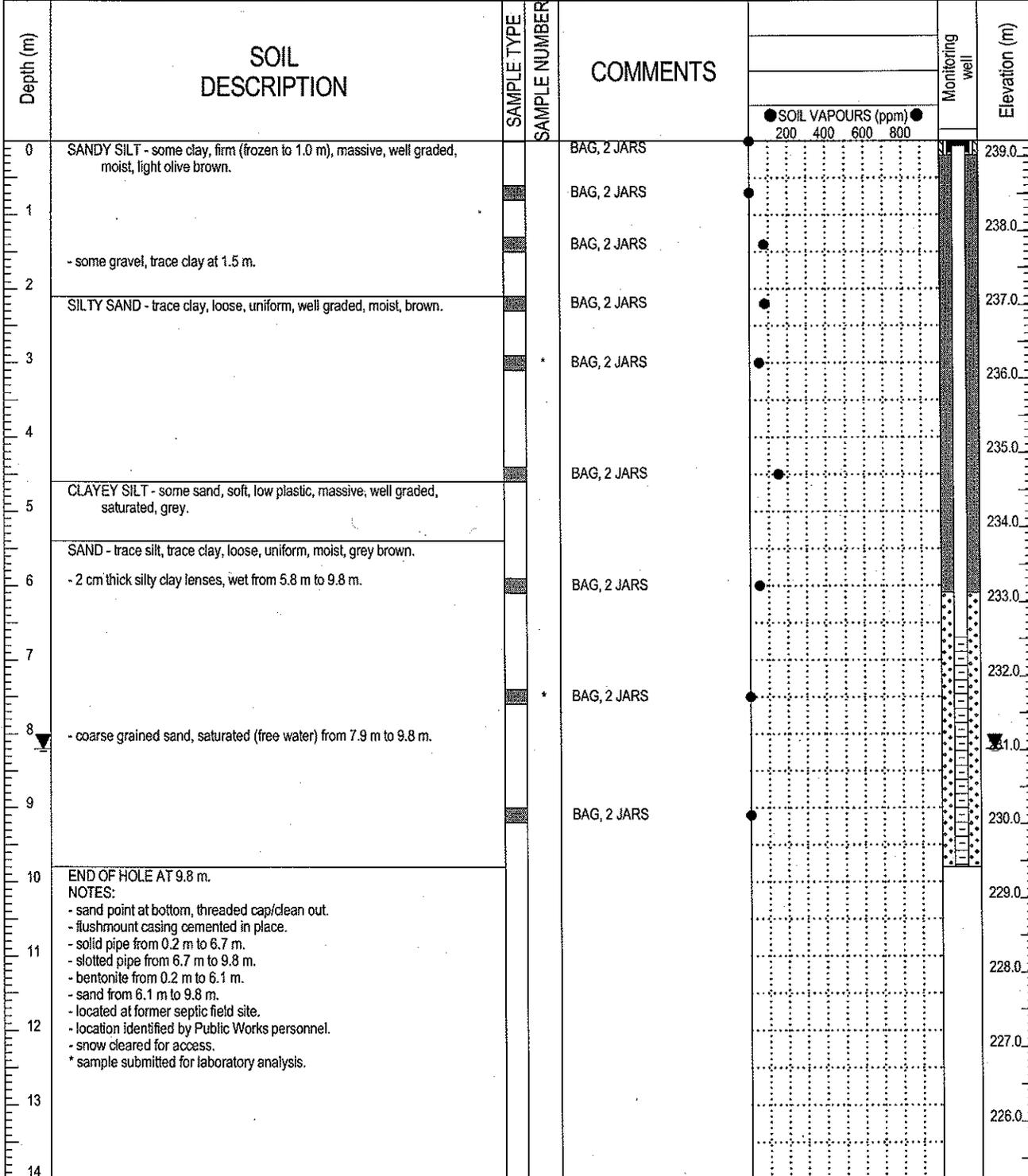
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



	LOGGED BY: JS	COMPLETION DEPTH: 9.2m
	REVIEWED BY:	COMPLETE: 3/20/2008
	DRAWING NO: 08MW07B	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW08
GARDEN RIVER, AB	6511935.374N; 681387.1719E; Zone 11	ELEVATION: 239.2167m

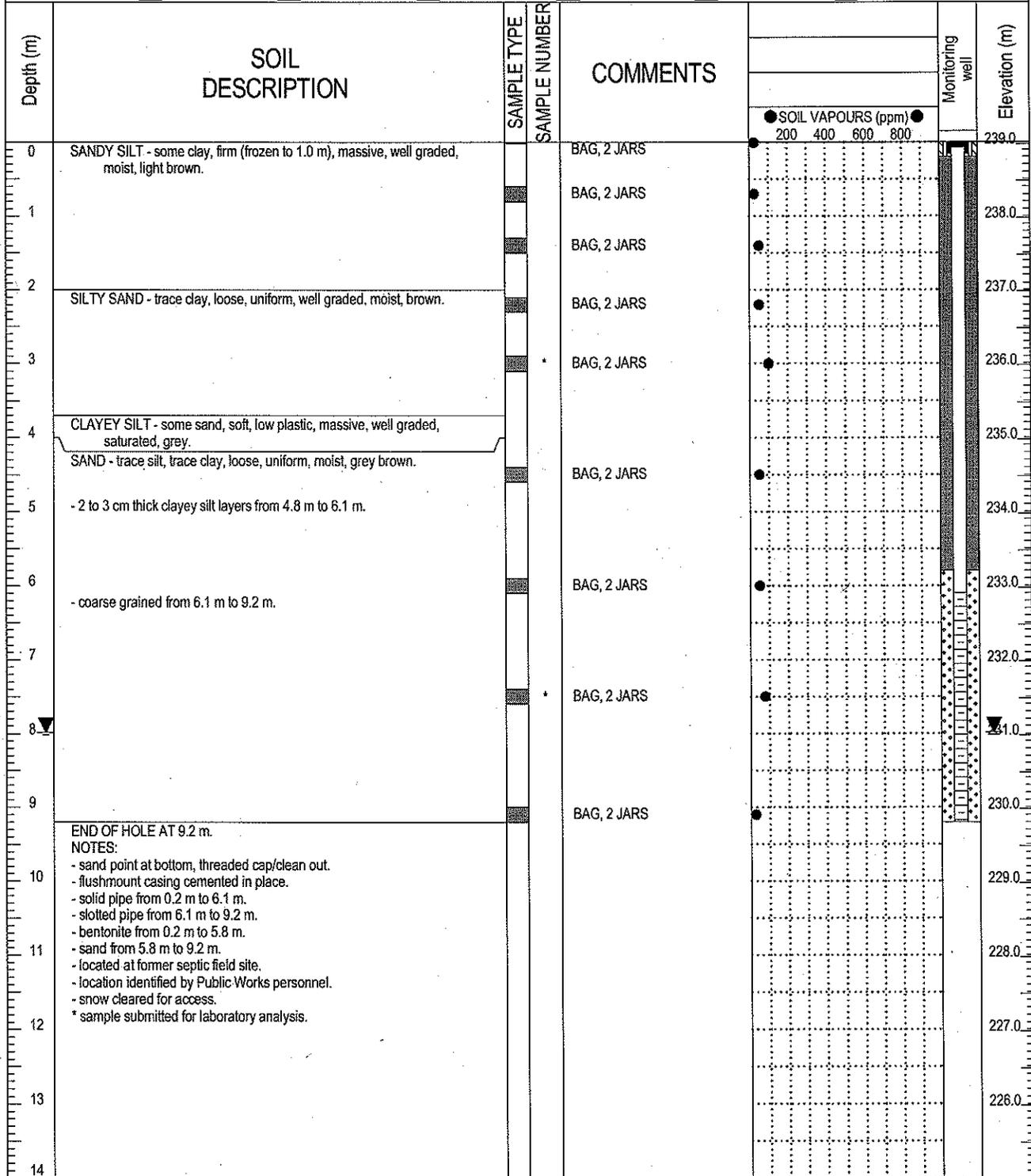
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input checked="" type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input checked="" type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



 EBA Engineering Consultants Ltd.	LOGGED BY: JS	COMPLETION DEPTH: 9.8m
	REVIEWED BY:	COMPLETE: 3/20/2008
	DRAWING NO: 08MW08	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW09
GARDEN RIVER, AB	6511968.45N; 681389.7407E; Zone 11	ELEVATION: 239.0257m

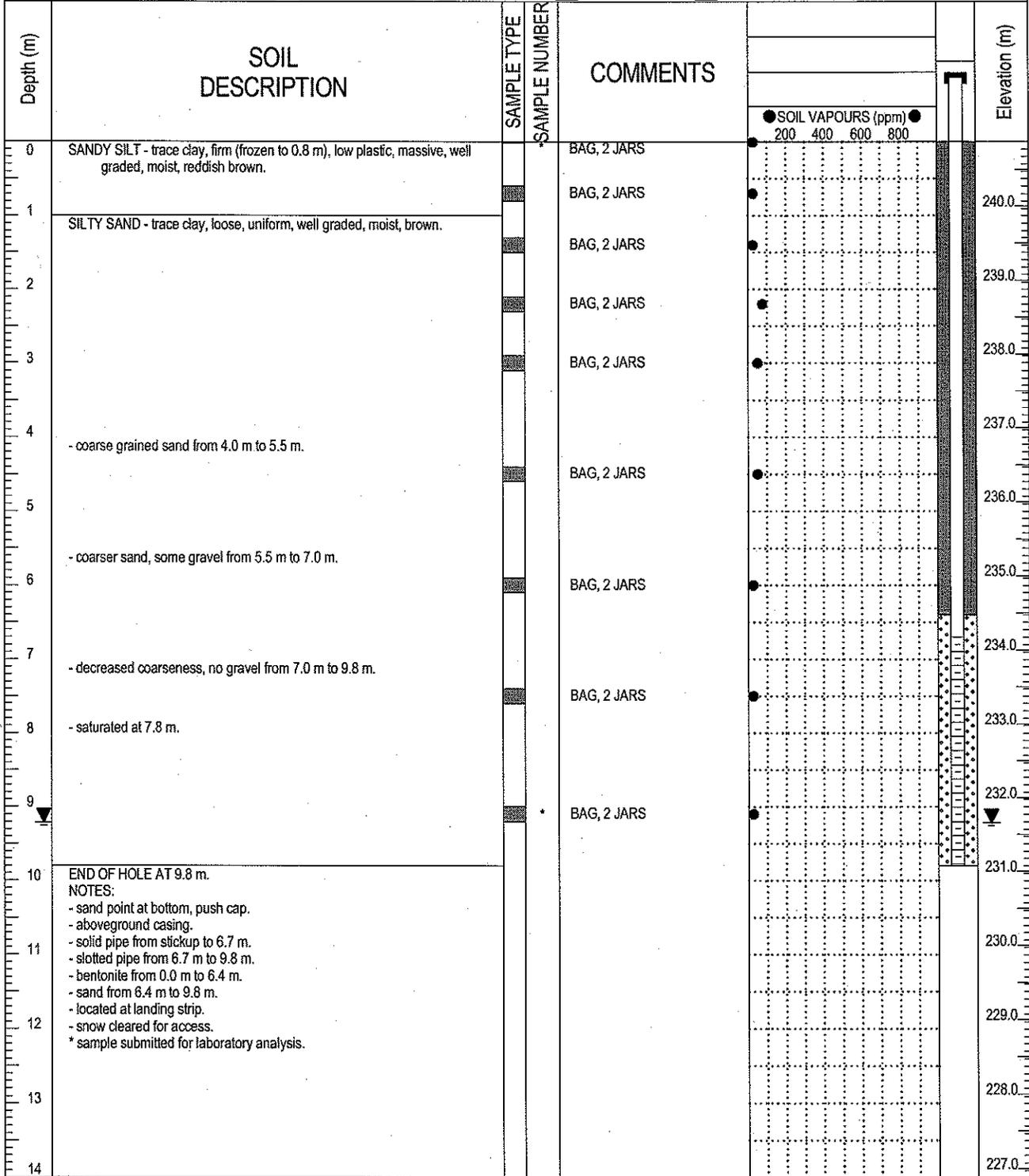
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



	LOGGED BY: JS	COMPLETION DEPTH: 9.2m
	REVIEWED BY:	COMPLETE: 3/20/2008
	DRAWING NO: 08MW09	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW10
GARDEN RIVER, AB	6512475.265N; 681364.3781E; Zone 11	ELEVATION: 240.8725m

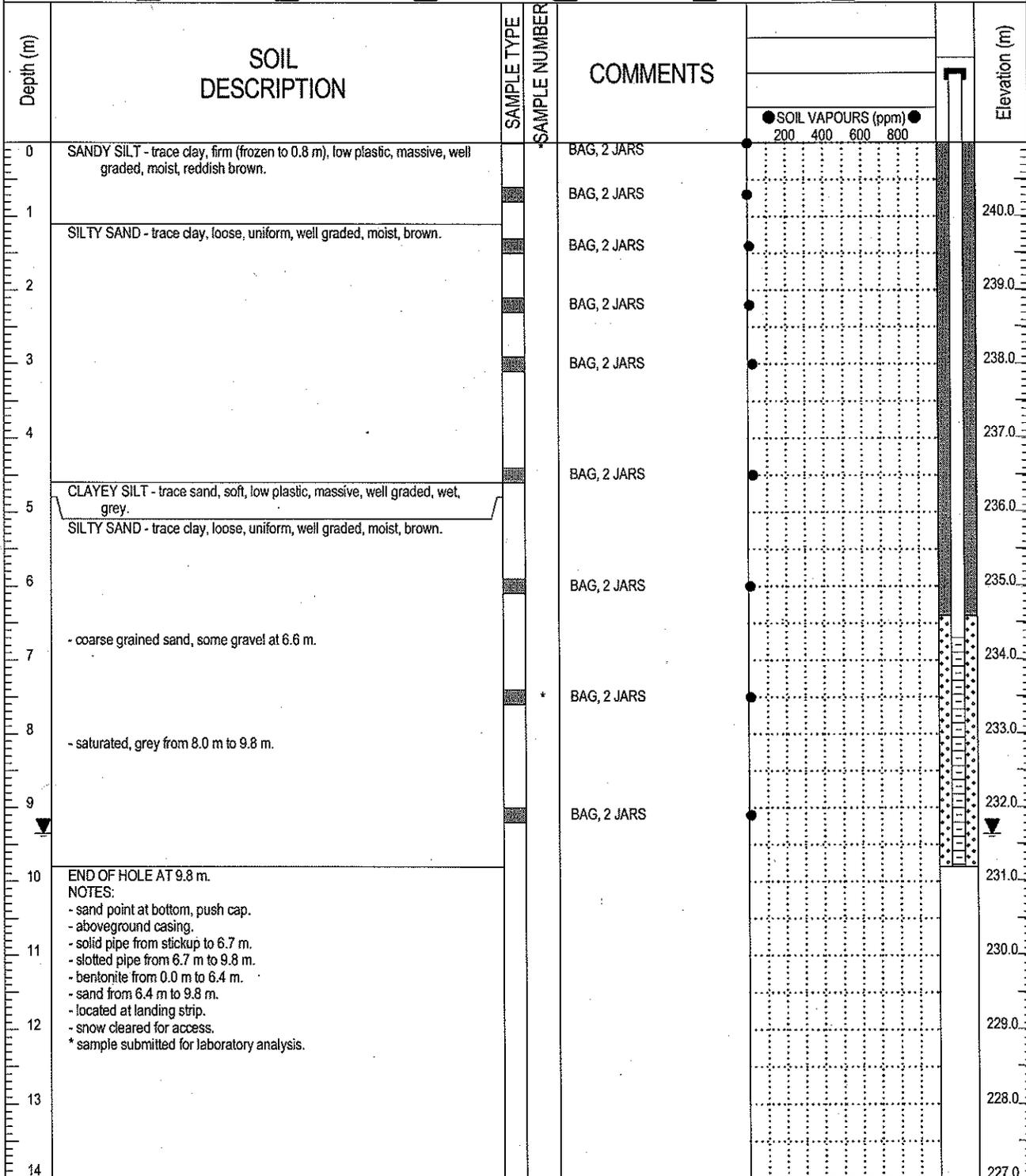
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



	LOGGED BY: JS	COMPLETION DEPTH: 9.8m
	REVIEWED BY:	COMPLETE: 3/21/2008
	DRAWING NO: 08MW10	Page 1 of 1

PHASE 2 ENVIRONMENTAL SITE ASSESSMENT	PARKS CANADA	PROJECT NO. - BOREHOLE NO.
LITTLE RED RIVER CREE NATION	SOLID STEM/HOLLOW STEM AUGER	C22101178-08MW11
GARDEN RIVER, AB	6512421.745N; 681309.559E; Zone 11	ELEVATION: 240.9826m

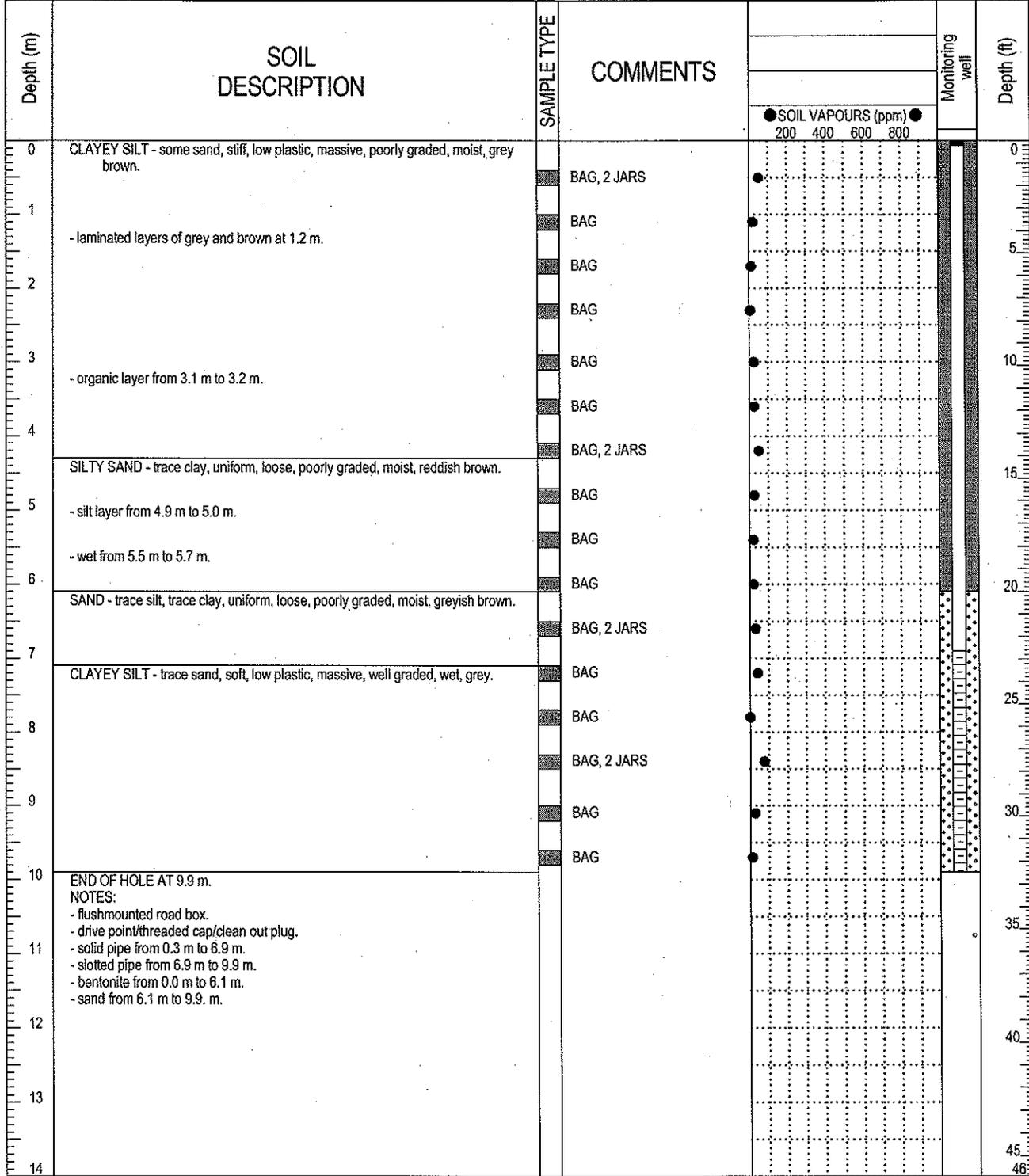
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



	LOGGED BY: JS	COMPLETION DEPTH: 9.8m
	REVIEWED BY:	COMPLETE: 3/21/2008
	DRAWING NO: 08MW11	Page 1 of 1

CONTAMINATED SITE ASSESSMENT & PHASE 2	SPARKS CANADA AGENCY	PROJECT NO. - BOREHOLE NO.
WOOD BUFFALO NATIONAL PARK	6" SOLID STEM AUGER	C22101178-08MW14
COMMUNITY OF GARDEN RIVER, AB		

SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND

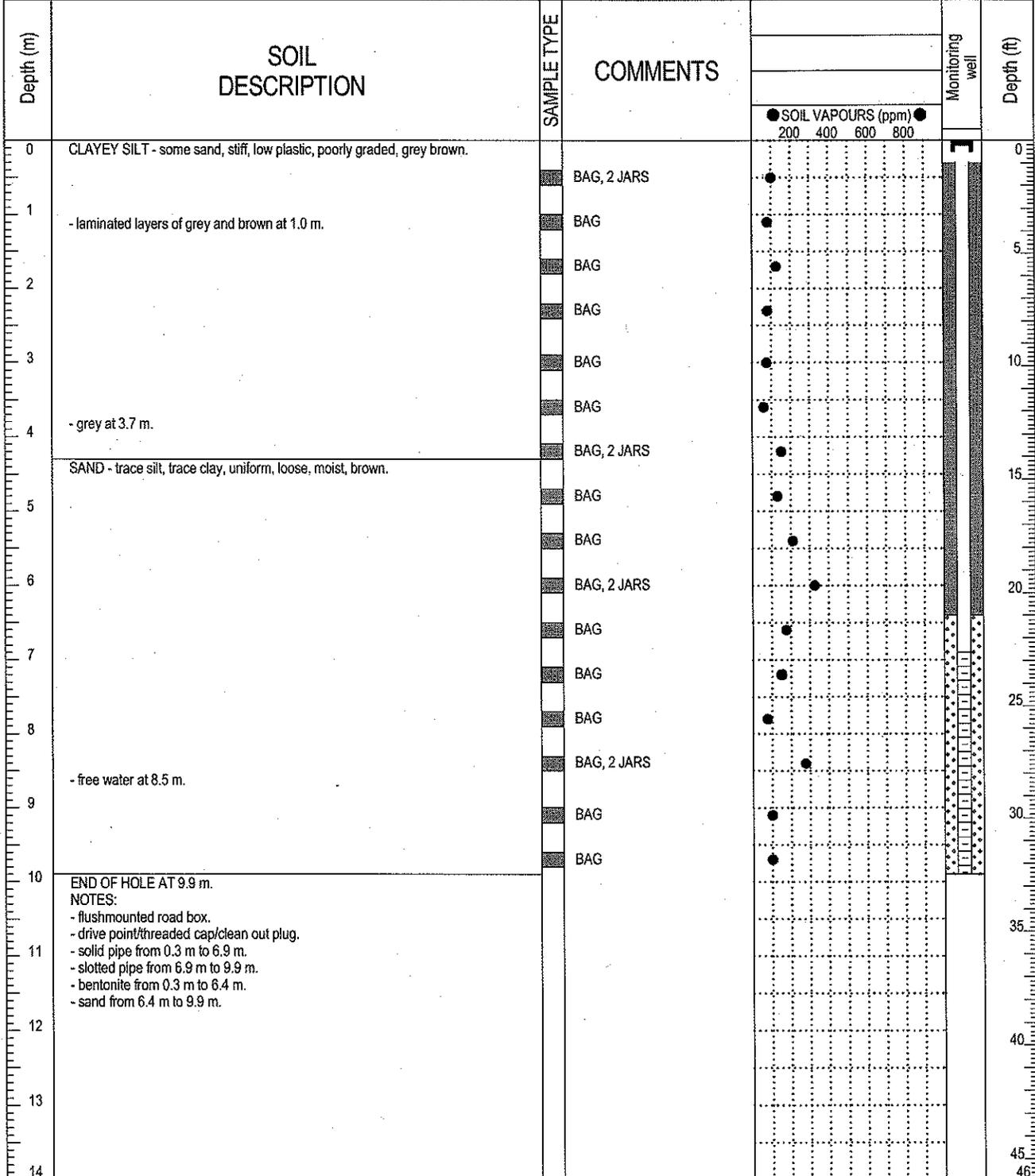


 **EBA Engineering Consultants Ltd.**

LOGGED BY: JS	COMPLETION DEPTH: 9.9m
REVIEWED BY:	COMPLETE: 8/27/2008
DRAWING NO: 08MW14	Page 1 of 1

CONTAMINATED SITE ASSESSMENT & PHASE 2	PARKS CANADA AGENCY	PROJECT NO. - BOREHOLE NO.
WOOD BUFFALO NATIONAL PARK	6" SOLID STEM AUGER	C22101178-08MW16
COMMUNITY OF GARDEN RIVER, AB		

SAMPLE TYPE	DISTURBED	NO RECOVERY	SPT	A-CASING	SHELBY TUBE	CORE
BACKFILL TYPE	BENTONITE	PEA GRAVEL	SLOUGH	GROUT	DRILL CUTTINGS	SAND

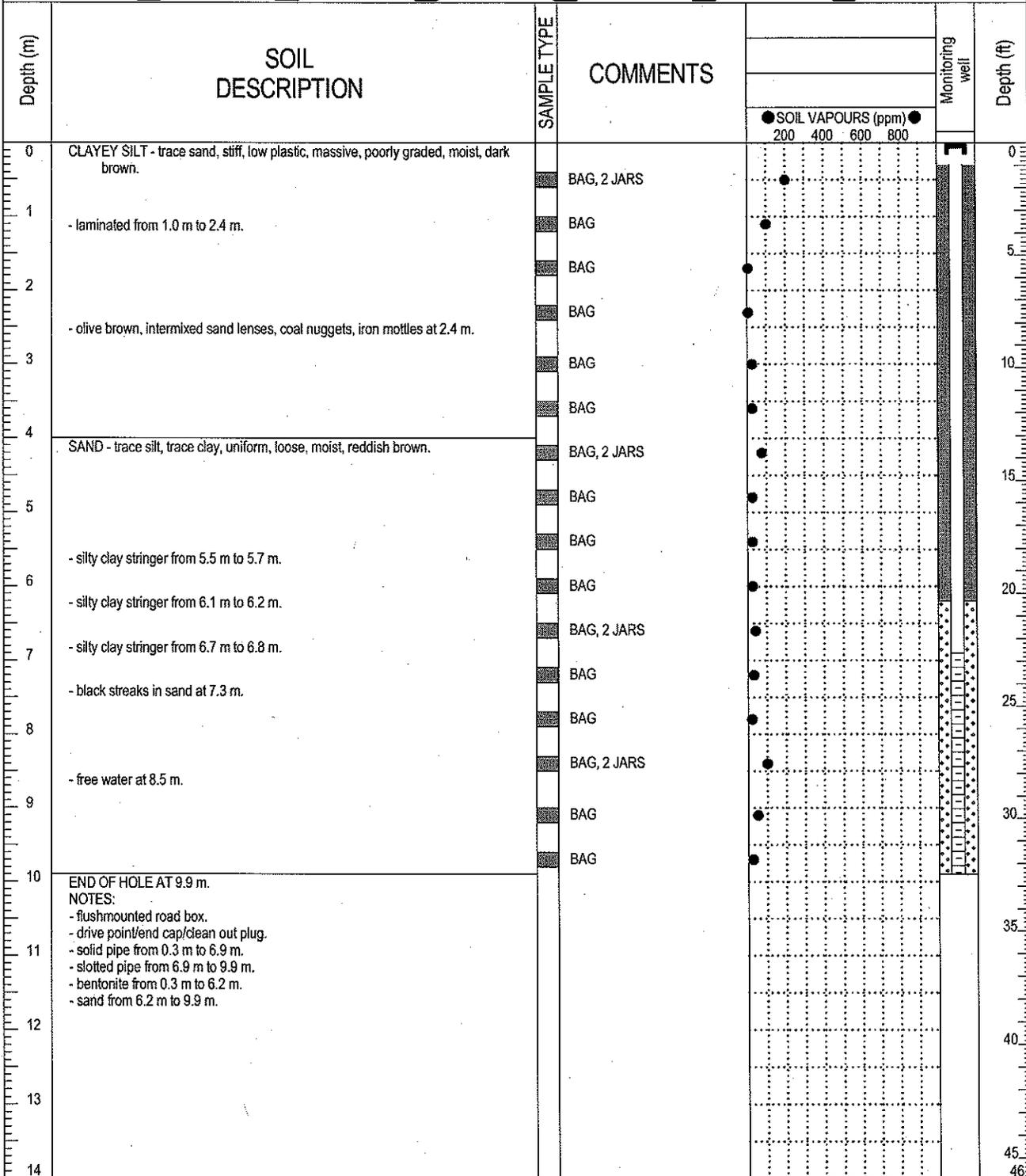


EBA Engineering Consultants Ltd.

LOGGED BY: JS	COMPLETION DEPTH: 9.9m
REVIEWED BY:	COMPLETE: 8/27/2008
DRAWING NO: 08MW16	Page 1 of 1

CONTAMINATED SITE ASSESSMENT & PHASE 2 EBA	SPARKS CANADA AGENCY	PROJECT NO. - BOREHOLE NO.
WOOD BUFFALO NATIONAL PARK	6" SOLID STEM AUGER	C22101178-08MW18
COMMUNITY OF GARDEN RIVER, AB		

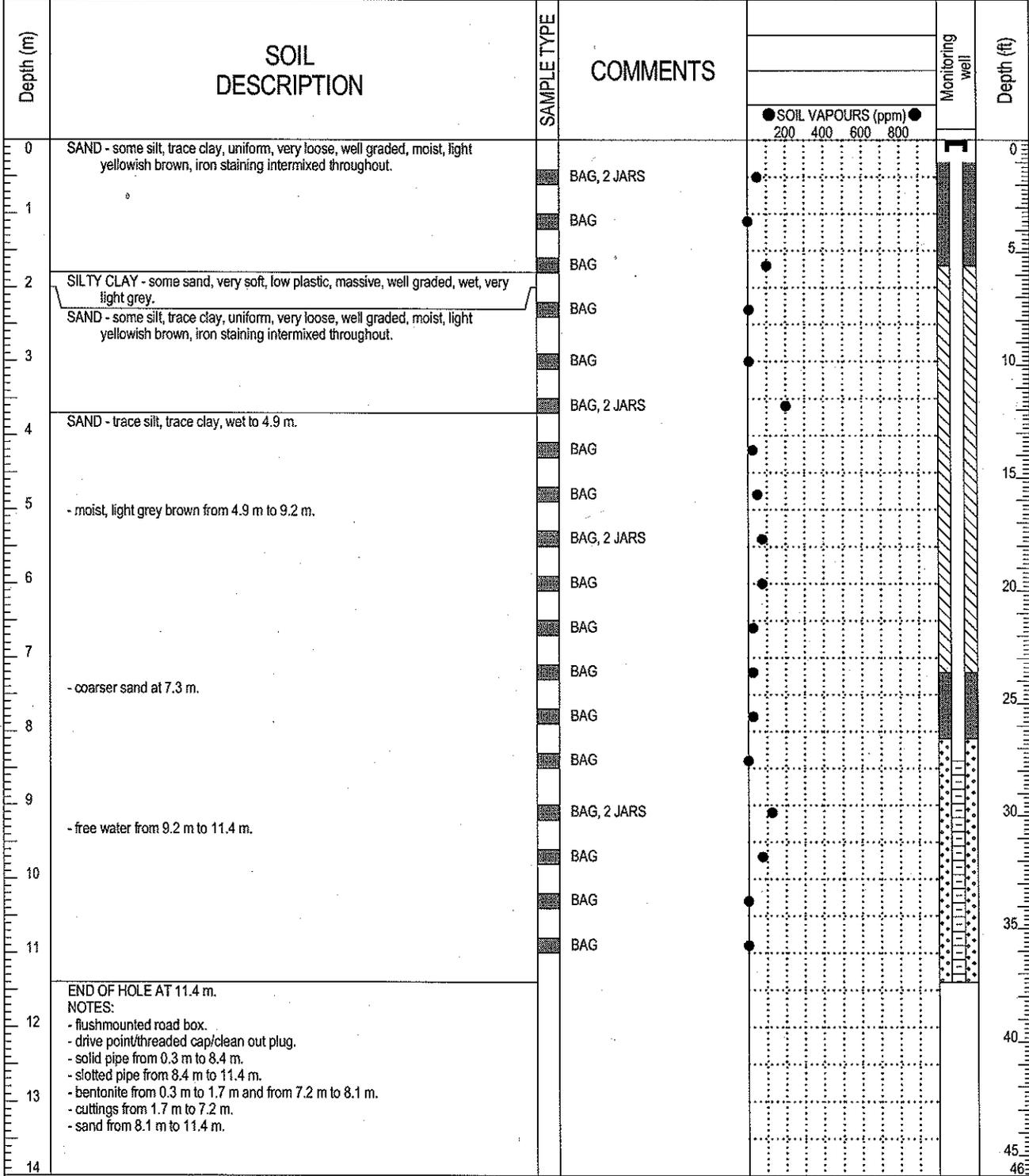
SAMPLE TYPE	DISTURBED	NO RECOVERY	SPT	A-CASING	SHELBY TUBE	CORE
BACKFILL TYPE	BENTONITE	PEA GRAVEL	SLOUGH	GROUT	DRILL CUTTINGS	SAND



	LOGGED BY: JS	COMPLETION DEPTH: 9.9m
	REVIEWED BY:	COMPLETE: 8/27/2008
	DRAWING NO: 08MW18	Page 1 of 1

CONTAMINATED SITE ASSESSMENT & PHASE 2 E	SPARKS CANADA AGENCY	PROJECT NO. - BOREHOLE NO.
WOOD BUFFALO NATIONAL PARK	6" SOLID STEM AUGER	C22101178-08MW20
COMMUNITY OF GARDEN RIVER, AB		

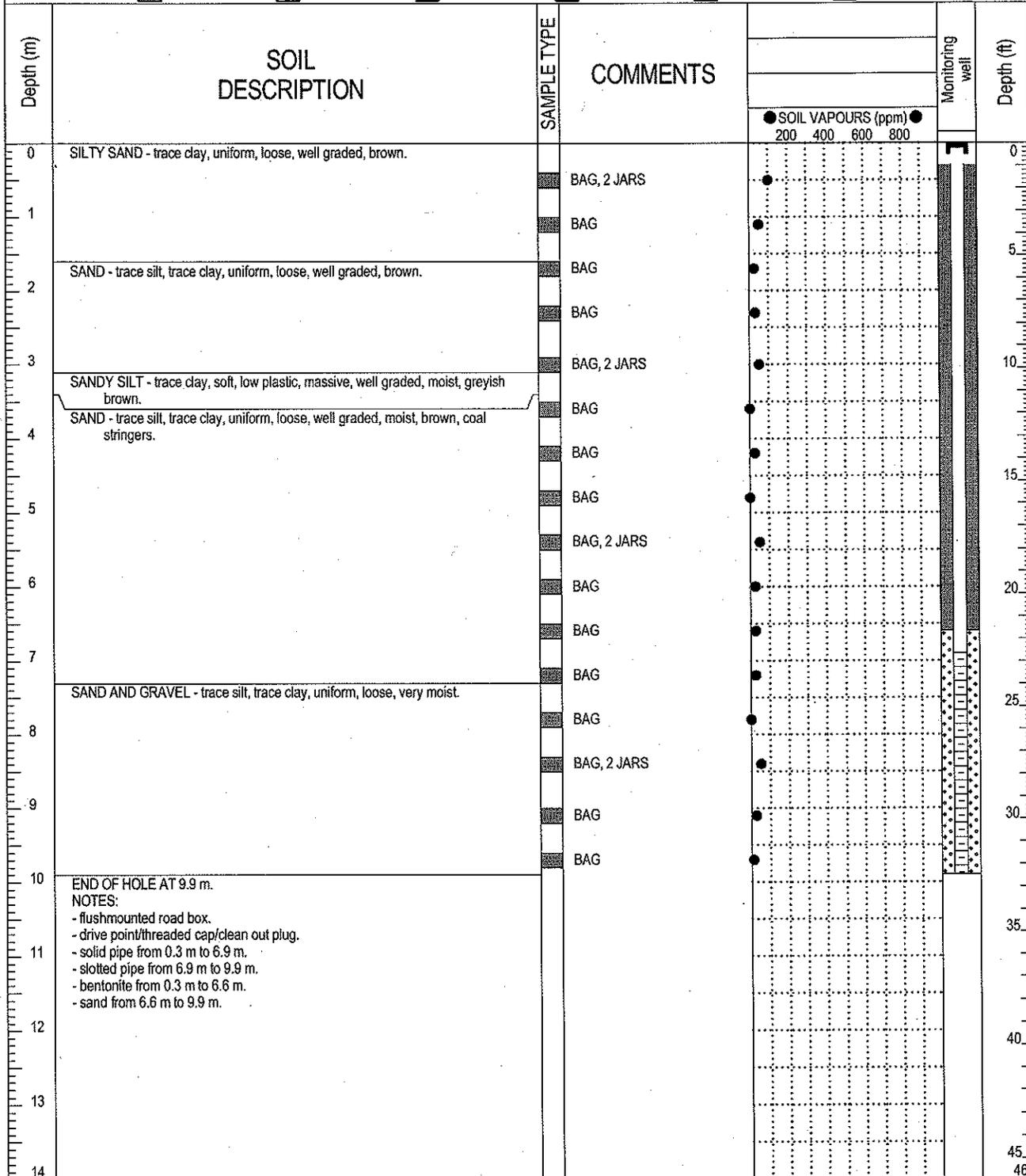
SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



	LOGGED BY: JS	COMPLETION DEPTH: 11.4m
	REVIEWED BY:	COMPLETE: 8/26/2008
	DRAWING NO: 08MW20	Page 1 of 1

CONTAMINATED SITE ASSESSMENT & PHASE 2	SPARKS CANADA AGENCY	PROJECT NO. - BOREHOLE NO.
WOOD BUFFALO NATIONAL PARK	6" SOLID STEM AUGER	C22101178-08MW21
COMMUNITY OF GARDEN RIVER, AB		

SAMPLE TYPE	DISTURBED	NO RECOVERY	SPT	A-CASING	SHELBY TUBE	CORE
BACKFILL TYPE	BENTONITE	PEA GRAVEL	SLOUGH	GROUT	DRILL CUTTINGS	SAND

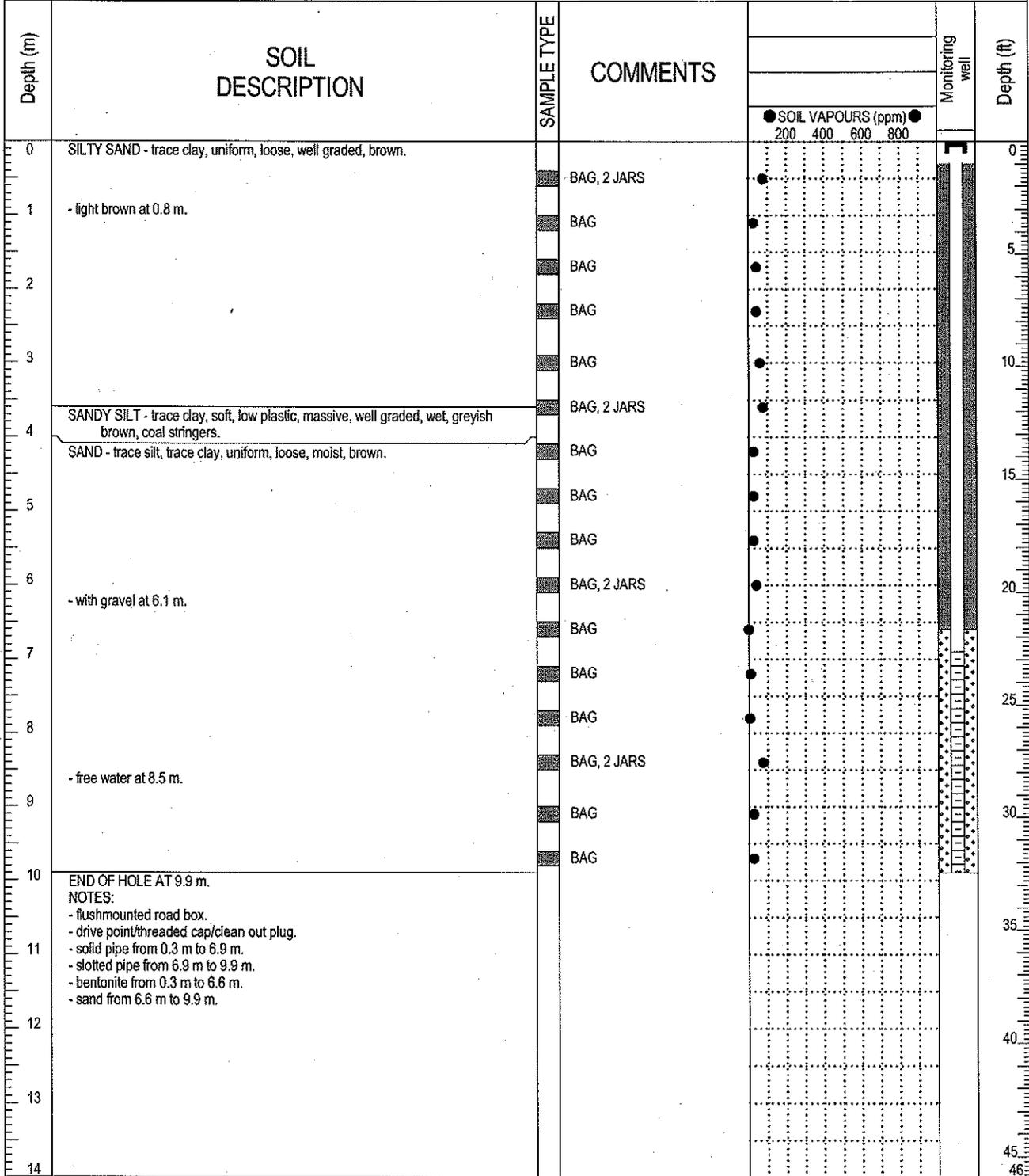


EBA Engineering Consultants Ltd.

LOGGED BY: JS	COMPLETION DEPTH: 9.9m
REVIEWED BY:	COMPLETE: 8/26/2008
DRAWING NO: 08MW21	Page 1 of 1

CONTAMINATED SITE ASSESSMENT & PHASE 2	SPARKS CANADA AGENCY	PROJECT NO. - BOREHOLE NO.
WOOD BUFFALO NATIONAL PARK	6" SOLID STEM AUGER	C22101178-08MW22
COMMUNITY OF GARDEN RIVER, AB		

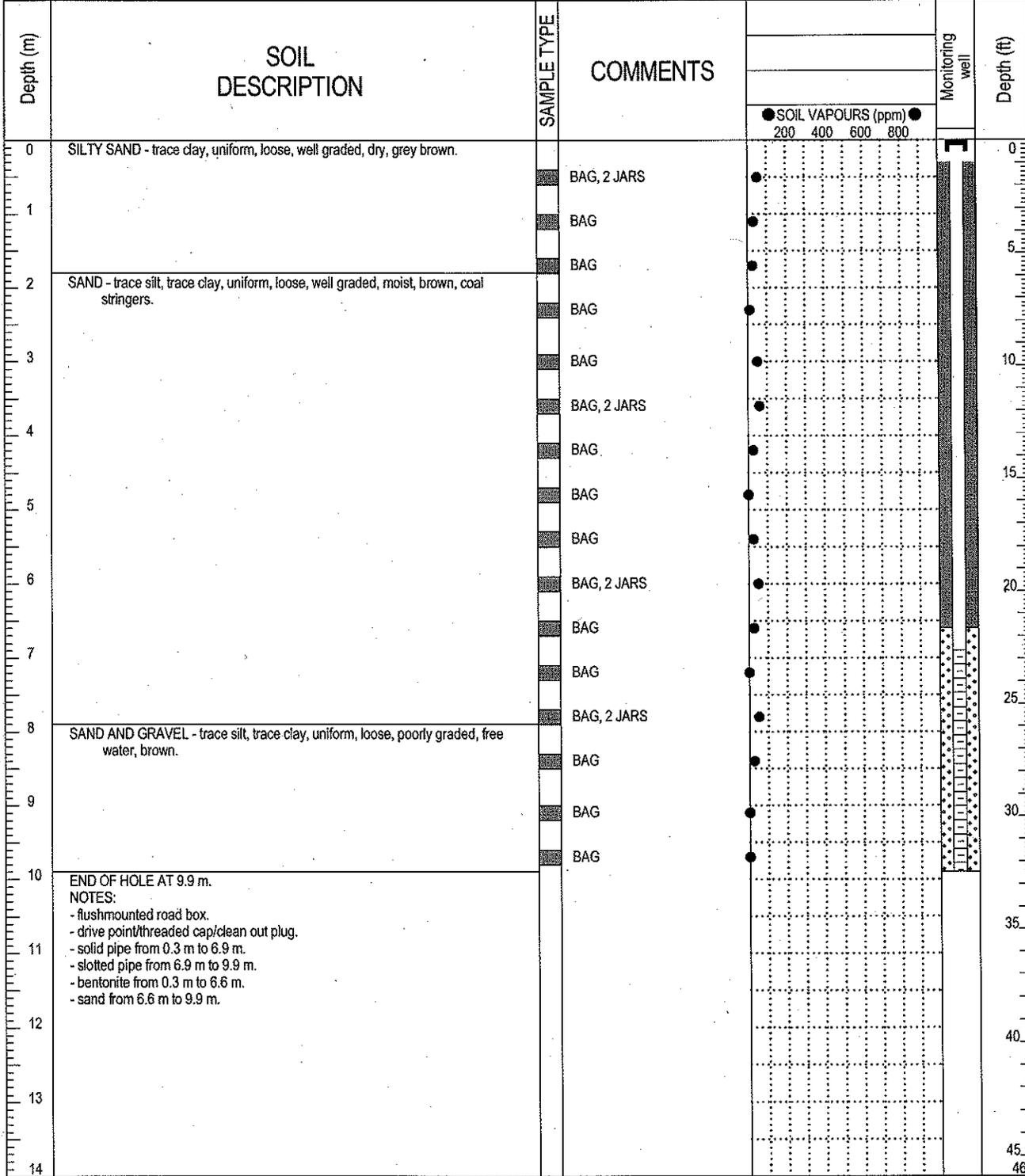
SAMPLE TYPE	DISTURBED	NO RECOVERY	SPT	A-CASING	SHELBY TUBE	CORE
BACKFILL TYPE	BENTONITE	PEA GRAVEL	SLOUGH	GROUT	DRILL CUTTINGS	SAND



	LOGGED BY: JS	COMPLETION DEPTH: 9.9m
	REVIEWED BY:	COMPLETE: 8/26/2008
	DRAWING NO: 08MW22	Page 1 of 1

CONTAMINATED SITE ASSESSMENT & PHASE 2	SPARKS CANADA AGENCY	PROJECT NO. - BOREHOLE NO.
WOOD BUFFALO NATIONAL PARK	6" SOLID STEM AUGER	C22101178-08MW23
COMMUNITY OF GARDEN RIVER, AB		

SAMPLE TYPE	DISTURBED	NO RECOVERY	SPT	A-CASING	SHELBY TUBE	CORE
BACKFILL TYPE	BENTONITE	PEA GRAVEL	SLOUGH	GROUT	DRILL CUTTINGS	SAND



EBA Engineering Consultants Ltd.

LOGGED BY: JS	COMPLETION DEPTH: 9.9m
REVIEWED BY:	COMPLETE: 8/26/2008
DRAWING NO: 08MW23	Page 1 of 1

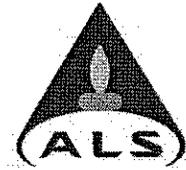
TABLE A4: SUMMARY OF SURFACE SOIL SAMPLES			
Assessment Area	Surface Sample Number	Soil Characteristics	Combustible Vapour Concentration
Garden River Landfill	08SS24	Sand, trace silt, trace clay; 10% garbage	50 ppm
	08SS25	Silty sand, trace clay;	50 ppm
	08SS26	Silty sand, trace clay;	50 ppm
	08SS27	Silty sand, trace clay;	50 ppm
	08SS28	Silty sand, trace clay;	50 ppm
Garden River Airstrip	08SS29	Silty sand, trace clay;	ND
	08SS30	Silty sand, trace clay;	ND
	08SS31	Silty sand, trace clay;	25 ppm
	08SS32	Silty sand, trace clay;	25 ppm
	08SS33	Silty sand, trace clay;	ND
	08SS34	Silty sand, trace clay;	ND
	08SS35	Silty sand, trace clay;	10 ppm
	08SS36	Silty sand, trace clay; diesel fuel odour.	5% LEL
Garden River Public Works Yard	08SS37	Silty sand, trace clay; oil stain.	25 ppm
	08SS38	Silty sand, trace clay.	5 ppm
	08SS39	Silty sand, trace clay; oil stain.	50 ppm
	08SS40	Silty sand, trace clay; oil stain.	150 ppm
	08SS41	Silty sand, trace clay; stained area.	500 ppm
	08SS42	Silty sand, trace clay; stained area.	25 ppm
	08SS43	Silty sand, trace clay; oil stain	50 ppm
	08SS44	Silty sand, trace clay; oil stain.	50 ppm
Garden River Old Dump	08SS45	Silty sand, some clay.	20 ppm
	08SS46	Silty sand, some clay.	30 ppm
	08SS47	Silty sand, some clay.	25 ppm
	08SS48	Silty sand, some clay.	25 ppm
	08SS49	Silty sand, some clay.	25 ppm
Former Septic Tile Field	08SS50	Silty sand, trace silt;	ND
	08SS51	Silty sand, trace silt;	15 ppm
	08SS52	Silty sand, trace silt;	30 ppm
	08SS53	Silty sand, trace silt;	ND
	08SS54	Silty sand, trace silt;	ND

TABLE 4: SUMMARY OF SURFACE SOIL SAMPLES (CONTINUED)			
Assessment Area	Surface Sample Number	Soil Characteristics	Combustible Vapour Concentration
Northlands School	08SS55	Clayey silt, some sand.	50 ppm
	08SS56	Clayey silt, some sand.	10 ppm
5 th Meridian Market	08SS57	Clayey silt, some sand.	50 ppm
	08SS58	Clayey silt, some sand.	75 ppm
Garden River Trading	08SS59	Clayey silt, some sand.	75 ppm
	08SS60	Clayey silt, some sand.	ND
Church	08SS61	Clayey silt, some sand.	10 ppm
	08SS62	Clayey silt, some sand.	5 ppm



APPENDIX B

APPENDIX B ANALYTICAL DATA



Environmental Division

Certificate of Analysis

EBA ENG CONSULTANTS LTD
ATTN: KRISTEN OSTERMANN
115, 200 RIVERCREST DR SE
CALGARY AB T2C 2X5

Reported On: 21-OCT-08 03:48 PM
Revision: 2

Lab Work Order #: L676396

Date Received: 31-AUG-08

Project P.O. #:
Job Reference: C22101178
Legal Site Desc:
CofC Numbers: 08-041277, 08-041278, 08-041279, 08-041280, 08-041281, 08-041282, 08-041283, 08-041284, 08-041285, 08-041286, 08-041287, 08-041288, 08-041289, 08-041290, 08-042138, 08-042139, 08-042140,
Other Information: 08-042141, 08-042142

Comments: 21-OCT-08 Updated sample id on -68, 123, 127 and 130
21-OCT-08 Recheck completed on -123 for F2-F4, results confirmed.

CATHERINE EVARISTO-CORDERO
Senior Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS Canada Ltd. (formerly ETL Chemspec Analytical Ltd.)
Part of the **ALS Laboratory Group**

9936-67 Avenue, Edmonton, AB T6E 0P5
Phone: +1 780 413 5227 **Fax:** +1 780 437 2311 www.alsglobal.com
A Campbell Brothers Limited Company

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-1 08MW20 @ 0.6								
Sampled By: JACK on 26-AUG-08 @ 13:15								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	108		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	95		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	7.1		0.1	%		02-SEP-08	SHL	R717303
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	7.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	196		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	7		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	14.9		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	14		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	19		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	7		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	30		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	60		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-15 08MW20 @ 9.2								
Sampled By: JACK on 26-AUG-08 @ 14:42								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	106		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	95		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	16		0.1	%		02-SEP-08	SHL	R717303

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-19 08MW21 @ 0.6								
Sampled By: JACK on 26-AUG-08 @ 13:15								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		09-SEP-08		
F1-BTEX	<5		5	mg/kg		09-SEP-08		
F2 (C10-C16)	110		20	mg/kg		09-SEP-08		
F3 (C16-C34)	8000		20	mg/kg		09-SEP-08		
F4 (C34-C50)	1200		20	mg/kg		09-SEP-08		
F4G-SG (GHH-Silica)	5200		500	mg/kg		09-SEP-08		
Total Hydrocarbons (C6-C50)	9300		20	mg/kg		09-SEP-08		
Chromatogram to baseline at nC50	NO					09-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	78		25-175	%	05-SEP-08	07-SEP-08	YZH	R720022
Surr: Hexatriacontane	187	SOL:MI	25-175	%	05-SEP-08	07-SEP-08	YZH	R720022
Prep/Analysis Dates					05-SEP-08	07-SEP-08	YZH	R720022
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	7.9		0.1	%		02-SEP-08	SHL	R717303
F4G Prep/Analysis Dates					09-SEP-08	09-SEP-08	VN	R720646
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	8.6		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	160		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	7		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	17.8		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	16		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	21		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	8		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.7		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	33		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	60		10	mg/kg		06-SEP-08	QLI	R718976
Detail Salinity in mg/kg								
Chloride (Cl)	11		7	mg/kg		05-SEP-08		
Calcium (Ca)	23		2	mg/kg		05-SEP-08		
Magnesium (Mg)	5		1	mg/kg		05-SEP-08		
Potassium (K)	1.3		0.7	mg/kg		05-SEP-08		
Sodium (Na)	4.4		0.7	mg/kg		05-SEP-08		
Sulfate (SO4)	23		2	mg/kg		05-SEP-08		
Detailed Salinity								
Sulphate (SO4)	66		6	mg/L		05-SEP-08	EOC	R718988
pH and EC (Saturated Paste)								

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-32 08MW21 @ 8.5								
Sampled By: JACK on 26-AUG-08 @ 15:00								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	102		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	93		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	17		0.1	%		02-SEP-08	SHL	R717303
MUST PSA % > 75um	90		1	%		08-SEP-08	SRJ	R719890

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-35 08MW22 @ 0.6								
Sampled By: JACK on 26-AUG-08 @ 15:20								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		09-SEP-08		
F1-BTEX	<5		5	mg/kg		09-SEP-08		
F2 (C10-C16)	540		20	mg/kg		09-SEP-08		
F3 (C16-C34)	14000		20	mg/kg		09-SEP-08		
F4 (C34-C50)	2600		20	mg/kg		09-SEP-08		
F4G-SG (GHH-Silica)	10000		500	mg/kg		09-SEP-08		
Total Hydrocarbons (C6-C50)	17000		20	mg/kg		09-SEP-08		
Chromatogram to baseline at nC50	NO					09-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	73		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	168		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	11		0.1	%		02-SEP-08	SHL	R717303
F4G Prep/Analysis Dates					09-SEP-08	09-SEP-08	VN	R720646
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	6.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	132		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	5		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	9.7		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	13		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	15		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	6		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	22		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	80		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-48 08MW22 @ 8.5								
Sampled By: JACK on 26-AUG-08 @ 16:40								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	107		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	101		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	19		0.1	%		02-SEP-08	SHL	R717303
Detail Salinity in mg/kg								
Chloride (Cl)	<6		6	mg/kg		05-SEP-08		
Calcium (Ca)	10		2	mg/kg		05-SEP-08		
Magnesium (Mg)	2		1	mg/kg		05-SEP-08		
Potassium (K)	1.0		0.6	mg/kg		05-SEP-08		
Sodium (Na)	2.6		0.6	mg/kg		05-SEP-08		
Sulfate (SO4)	9		2	mg/kg		05-SEP-08		
Detailed Salinity								
Sulphate (SO4)	26		6	mg/L		05-SEP-08	EOC	R718988
pH and EC (Saturated Paste)								
% Saturation	32.5		0.1	%		05-SEP-08	SRJ	R718749
pH in Saturated Paste	8.2		0.1	pH		05-SEP-08	SRJ	R718749
Conductivity Sat. Paste	0.20		0.01	dS m-1		05-SEP-08	SRJ	R718749
Salinity calculation check								
SAR								
Calcium (Ca)	31		5	mg/L		05-SEP-08	EOC	R718988
Potassium (K)	3		2	mg/L		05-SEP-08	EOC	R718988
Magnesium (Mg)	7		3	mg/L		05-SEP-08	EOC	R718988
Sodium (Na)	8		2	mg/L		05-SEP-08	EOC	R718988
SAR	0.3		0.1	SAR		05-SEP-08	EOC	R718988
Chloride (Cl) (Saturated Paste)								
Chloride (Cl)	<20		20	mg/L		05-SEP-08	KFA	R718996

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-51 08MW23 @ 0.6								
Sampled By: JACK on 26-AUG-08 @ 16:00								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	60		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	80		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	97		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	103		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	2.9		0.1	%		02-SEP-08	SHL	R717303
MUST PSA % > 75um	75		1	%		08-SEP-08	SRJ	R719890
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	5.9		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	142		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	5		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	10.0		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	11		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	16		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	5		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	23		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	50		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-60 08MW23 @ 6.1								
Sampled By: JACK on 26-AUG-08 @ 17:10								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	113		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	105		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	3.7		0.1	%		02-SEP-08	SHL	R717303

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-67 08MW22D @ 0.6								
Sampled By: JACK on 26-AUG-08 @ 15:20								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		09-SEP-08		
F1-BTEX	<5		5	mg/kg		09-SEP-08		
F2 (C10-C16)	450		20	mg/kg		09-SEP-08		
F3 (C16-C34)	12000		20	mg/kg		09-SEP-08		
F4 (C34-C50)	2300		20	mg/kg		09-SEP-08		
F4G-SG (GHH-Silica)	12000		500	mg/kg		09-SEP-08		
Total Hydrocarbons (C6-C50)	15000		20	mg/kg		09-SEP-08		
Chromatogram to baseline at nC50	NO					09-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	64		25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Surr: Hexatriacontane	371	SOL:MI	25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Prep/Analysis Dates					04-SEP-08	04-SEP-08	CVC	R719181
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
% Moisture	10		0.1	%		02-SEP-08	SHL	R717303
F4G Prep/Analysis Dates					09-SEP-08	09-SEP-08	VN	R720646
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	6.6		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	152		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	5		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	11.4		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	14		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	16		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	7		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	24		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	90		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-68 08BH13 @ 0.6								
Sampled By: JACK on 27-AUG-08 @ 15:20								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	70	RAMB	20	mg/kg		05-SEP-08		
F4 (C34-C50)	40	RAMB	20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	110		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	130		25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Surr: Hexatriacontane	145		25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Prep/Analysis Dates					04-SEP-08	04-SEP-08	CVC	R719181
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	03-SEP-08	03-SEP-08	SPA	R717641
Toluene	0.03		0.01	mg/kg	03-SEP-08	03-SEP-08	SPA	R717641
Ethylbenzene	<0.01		0.01	mg/kg	03-SEP-08	03-SEP-08	SPA	R717641
Xylenes	0.04		0.02	mg/kg	03-SEP-08	03-SEP-08	SPA	R717641
% Moisture	17		0.1	%		02-SEP-08	SHL	R717303
Lead (Pb)	16		5	mg/kg		06-SEP-08	QLI	R718976
Detail Salinity in mg/kg								
Chloride (Cl)	<10		10	mg/kg		05-SEP-08		
Calcium (Ca)	43		3	mg/kg		05-SEP-08		
Magnesium (Mg)	11		2	mg/kg		05-SEP-08		
Potassium (K)	12		1	mg/kg		05-SEP-08		
Sodium (Na)	12		1	mg/kg		05-SEP-08		
Sulfate (SO4)	23		4	mg/kg		05-SEP-08		
Detailed Salinity								
Sulphate (SO4)	34		6	mg/L		05-SEP-08	EOC	R718988
pH and EC (Saturated Paste)								
% Saturation	68.3		0.1	%		04-SEP-08	SRJ	R717998
pH in Saturated Paste	6.7		0.1	pH		04-SEP-08	SRJ	R717998
Conductivity Sat. Paste	0.32		0.01	dS m-1		04-SEP-08	SRJ	R717998
Salinity calculation check								
SAR								
Calcium (Ca)	63		5	mg/L		05-SEP-08	EOC	R718988
Potassium (K)	18		2	mg/L		05-SEP-08	EOC	R718988
Magnesium (Mg)	16		3	mg/L		05-SEP-08	EOC	R718988
Sodium (Na)	18		2	mg/L		05-SEP-08	EOC	R718988
SAR	0.5		0.1	SAR		05-SEP-08	EOC	R718988
Chloride (Cl) (Saturated Paste)								
Chloride (Cl)	<20		20	mg/L		04-SEP-08	KFA	R718391

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-96 08MW14 @ 8.5								
Sampled By: JACK on 27-AUG-08 @ 10:38								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20	RAMB	20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20	RAMB	20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	121		25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Surr: Hexatriacontane	117		25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Prep/Analysis Dates					04-SEP-08	04-SEP-08	CVC	R719181
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	11		0.1	%		02-SEP-08	ADE	R717289
MUST PSA % > 75um	96		1	%		08-SEP-08	SRJ	R719890

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-123 08MW16 @ 6.1								
Sampled By: JACK on 27-AUG-08 @ 11:40								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	30		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	30		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	108		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	103		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	0.04		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	3.3		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	5.0		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	79		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	4		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	16.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	7		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	3		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	13		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	15		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	30		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-127 08MW16 @ 8.5								
Sampled By: JACK on 27-AUG-08 @ 11:50								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	96		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	96		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	0.04		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	15		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	2.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	55		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	3		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	3.8		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	4		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	6		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.5		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	8		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	20		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-130 08MW16D @ 6.1								
Sampled By: JACK on 27-AUG-08 @ 11:40								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	40		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	40		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	103		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	95		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	0.04		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	3.4		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	4.7		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	115		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	4		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	5.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	6		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	10		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	15		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	30		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-137 08BH17 @ 4.3								
Sampled By: JACK on 27-AUG-08 @ 14:25								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	109		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	98		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
% Moisture	3.9		0.1	%		02-SEP-08	ADE	R717289
MUST PSA % > 75um	89		1	%		08-SEP-08	SRJ	R719890
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	5.9		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	109		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	4		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	6.9		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	8		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	11		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	17		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	40		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-145 08BH17 @ 9.2								
Sampled By: JACK on 27-AUG-08 @ 15:15								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	110		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	99		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	18		0.1	%		02-SEP-08	ADE	R717289

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-147 08BH17D @ 4.3								
Sampled By: JACK on 27-AUG-08 @ 14:25								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	95		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	94		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	7.6		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	5.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	88		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	4		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	7.1		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	8		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	10		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	17		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	40		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-148 08MW18 @ 0.6								
Sampled By: JACK on 27-AUG-08 @ 20:15								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	40		20	mg/kg		08-SEP-08		
F4 (C34-C50)	20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	60		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	103		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	97		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	21		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	11.9		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	428		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	0.6		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	15		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	38.8		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	33		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	42		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	20		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	1.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	68		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	170		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-169 08BH19 @ 4.3								
Sampled By: JACK on 27-AUG-08 @ 16:30								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	107		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	98		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	20		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	8.7		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	227		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	6		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	14.4		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	16		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	19		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	8		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	30		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	80		10	mg/kg		06-SEP-08	QLI	R718976
Detail Salinity in mg/kg								
Chloride (Cl)	<7		7	mg/kg		05-SEP-08		
Calcium (Ca)	21		2	mg/kg		05-SEP-08		
Magnesium (Mg)	4		1	mg/kg		05-SEP-08		
Potassium (K)	<0.7		0.7	mg/kg		05-SEP-08		
Sodium (Na)	3.3		0.7	mg/kg		05-SEP-08		
Sulfate (SO4)	16		2	mg/kg		05-SEP-08		
Detailed Salinity								
Sulphate (SO4)	44		6	mg/L		05-SEP-08	EOC	R718988
pH and EC (Saturated Paste)								
% Saturation	36.2		0.1	%		04-SEP-08	SRJ	R717998
pH in Saturated Paste	7.3		0.1	pH		04-SEP-08	SRJ	R717998

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-169 08BH19 @ 4.3 Sampled By: JACK on 27-AUG-08 @ 16:30 Matrix: SOIL								
Detailed Salinity								
pH and EC (Saturated Paste)								
Conductivity Sat. Paste	0.29		0.01	dS m-1		04-SEP-08	SRJ	R717998
Salinity calculation check								
SAR								
Calcium (Ca)	57		5	mg/L		05-SEP-08	EOC	R718988
Potassium (K)	<2		2	mg/L		05-SEP-08	EOC	R718988
Magnesium (Mg)	11		3	mg/L		05-SEP-08	EOC	R718988
Sodium (Na)	9		2	mg/L		05-SEP-08	EOC	R718988
SAR	0.3		0.1	SAR		05-SEP-08	EOC	R718988
Chloride (Cl) (Saturated Paste)								
Chloride (Cl)	<20		20	mg/L		04-SEP-08	KFA	R718391

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-179 08BH19D @ 4.3								
Sampled By: JACK on 27-AUG-08 @ 16:30								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	115		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	111		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	20		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	14.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	285		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	0.6		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	7		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	20.3		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	25		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	2		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	25		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	11		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.6		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	38		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	110		10	mg/kg		06-SEP-08	QLI	R718976
Detail Salinity in mg/kg								
Chloride (Cl)	18		9	mg/kg		05-SEP-08		
Calcium (Ca)	26		2	mg/kg		05-SEP-08		
Magnesium (Mg)	6		1	mg/kg		05-SEP-08		
Potassium (K)	1.7		0.9	mg/kg		05-SEP-08		
Sodium (Na)	5.4		0.9	mg/kg		05-SEP-08		
Sulfate (SO4)	32		3	mg/kg		05-SEP-08		
Detailed Salinity								
Sulphate (SO4)	73		6	mg/L		05-SEP-08	EOC	R718988
pH and EC (Saturated Paste)								
% Saturation	43.7		0.1	%		04-SEP-08	SRJ	R717998
pH in Saturated Paste	7.6		0.1	pH		04-SEP-08	SRJ	R717998

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-179 08BH19D @ 4.3								
Sampled By: JACK on 27-AUG-08 @ 16:30								
Matrix: SOIL								
Detailed Salinity								
pH and EC (Saturated Paste)								
Conductivity Sat. Paste	0.41		0.01	dS m-1		04-SEP-08	SRJ	R717998
Salinity calculation check								
SAR								
Calcium (Ca)	59		5	mg/L		05-SEP-08	EOC	R718988
Potassium (K)	4		2	mg/L		05-SEP-08	EOC	R718988
Magnesium (Mg)	14		3	mg/L		05-SEP-08	EOC	R718988
Sodium (Na)	12		2	mg/L		05-SEP-08	EOC	R718988
SAR	0.4		0.1	SAR		05-SEP-08	EOC	R718988
Chloride (Cl) (Saturated Paste)								
Chloride (Cl)	40		20	mg/L		04-SEP-08	KFA	R718391

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-180 08SS24								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F2-Naphth	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	810		20	mg/kg		08-SEP-08		
F3-PAH	810		20	mg/kg		08-SEP-08		
F4 (C34-C50)	50		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	860		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	109		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	111		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	0.039		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	0.03		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	18		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	5.7		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	442		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	7		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	15.7		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	204		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	15		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	9		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	30		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	140		10	mg/kg		06-SEP-08	QLI	R718976
CCME PAHs								
Naphthalene	0.02		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Quinoline	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Phenanthrene	0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Pyrene	0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(a)anthracene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(b&j)fluoranthene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(k)fluoranthene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(a)pyrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Indeno(1,2,3-cd)pyrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier	D.L	Units	Extracted	Analyzed	By	Batch
676396-180	08SS24								
Sampled By: JACK on 28-AUG-08									
Matrix: SOIL									
CCME PAHs									
	Dibenzo(a,h)anthracene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Surr:	Nitrobenzene d5	46		20-140	%	05-SEP-08	07-SEP-08	PCL	R719239
Surr:	2-Fluorobiphenyl	62		34-136	%	05-SEP-08	07-SEP-08	PCL	R719239
Surr:	p-Terphenyl d14	65		41-150	%	05-SEP-08	07-SEP-08	PCL	R719239
CCME Volatile HydroCarbon									
EPA 5030/8015&8260-P&T GC-MS									
	Thiophene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	Chlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	Styrene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	1,3-Dichlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	1,4-Dichlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	1,2-Dichlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Surr:	1,2-Dichloroethane d4	108		77-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr:	Toluene d8	102		71-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr:	4-Bromofluorobenzene	85		62-130	%	03-SEP-08	04-SEP-08	DDU	R718196
CCME Chlorinated Aliphatics									
	1,1-Dichloroethene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	Methylene Chloride	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	trans-1,2-Dichloroethene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	1,1-Dichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	Chloroform	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	1,1,1-Trichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	Carbon Tetrachloride	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	Trichloroethene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	1,2-Dichloropropane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	cis-1,3-Dichloropropene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	trans-1,3-Dichloropropene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	1,1,2-Trichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	1,2-Dichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	Tetrachloroethylene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
	1,1,2,2-Tetrachloroethane	<0.02		0.02	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Surr:	1,2-Dichloroethane d4	108		77-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr:	Toluene d8	102		71-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr:	4-Bromofluorobenzene	85		62-130	%	03-SEP-08	04-SEP-08	DDU	R718196

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-181 08SS25								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	113		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	110		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	9.0		0.1	%		02-SEP-08	ADE	R717289
Lead (Pb)	7		5	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-182 08SS26								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	102		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	107		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	10		0.1	%		02-SEP-08	ADE	R717289
Lead (Pb)	10		5	mg/kg		06-SEP-08	QLI	R718976
MUST PSA % > 75um	25		1	%		08-SEP-08	SRJ	R719890

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-183 08SS27								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F2-Naphth	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		08-SEP-08		
F3-PAH	<20		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	99		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	102		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	6.5		0.1	%		02-SEP-08	ADE	R717289
CCME PAHs								
Naphthalene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Quinoline	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Phenanthrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Pyrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(a)anthracene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(b&j)fluoranthene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(k)fluoranthene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(a)pyrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Indeno(1,2,3-cd)pyrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Dibenzo(a,h)anthracene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Surr: Nitrobenzene d5	64		20-140	%	05-SEP-08	07-SEP-08	PCL	R719239
Surr: 2-Fluorobiphenyl	70		34-136	%	05-SEP-08	07-SEP-08	PCL	R719239
Surr: p-Terphenyl d14	78		41-150	%	05-SEP-08	07-SEP-08	PCL	R719239
CCME Volatile HydroCarbon								
EPA 5030/8015&8260-P&T GC-MS								
Thiophene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Chlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Styrene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,3-Dichlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,4-Dichlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,2-Dichlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Surr: 1,2-Dichloroethane d4	106		77-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr: Toluene d8	101		71-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr: 4-Bromofluorobenzene	87		62-130	%	03-SEP-08	04-SEP-08	DDU	R718196
CCME Chlorinated Aliphatics								
1,1-Dichloroethene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Methylene Chloride	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
trans-1,2-Dichloroethene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,1-Dichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-183 08SS27								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME Volatile HydroCarbon								
CCME Chlorinated Aliphatics								
Chloroform	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,1,1-Trichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Carbon Tetrachloride	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Trichloroethene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,2-Dichloropropane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
cis-1,3-Dichloropropene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
trans-1,3-Dichloropropene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,1,2-Trichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,2-Dichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Tetrachloroethylene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,1,2,2-Tetrachloroethane	<0.02		0.02	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Surr: 1,2-Dichloroethane d4	106		77-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr: Toluene d8	101		71-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr: 4-Bromofluorobenzene	87		62-130	%	03-SEP-08	04-SEP-08	DDU	R718196

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-184 08SS28								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	91		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	96		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	7.1		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	6.5		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	152		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	5		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	10.1		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	10		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	14		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	23		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	50		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-185 08SS29								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	103		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	105		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	7.2		0.1	%		02-SEP-08	ADE	R717289
Lead (Pb)	7		5	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-186 08SS30								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	106		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	99		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	12		0.1	%		02-SEP-08	ADE	R717289
Lead (Pb)	7		5	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-187 08SS31								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	96		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	101		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	6.3		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	8.8		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	167		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	8		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	20.1		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	14		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	20		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	9		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.5		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	37		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	70		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-188 08SS32								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	30		20	mg/kg		05-SEP-08		
F4 (C34-C50)	30		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	60		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	102		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	103		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	8.6		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	8.5		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	195		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	8		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	21.1		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	17		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	21		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	10		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	39		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	70		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-189 08SS33								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	91		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	94		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	9.3		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	8.7		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	194		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	9		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	23.9		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	14		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	20		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	9		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	42		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	70		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-190 08SS34								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	102		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	99		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	4.9		0.1	%		02-SEP-08	ADE	R717289
Lead (Pb)	8		5	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-191 08SS35								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	92		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	92		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	7.6		0.1	%		02-SEP-08	ADE	R717289
Lead (Pb)	7		5	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-192 08SS36								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	540		5	mg/kg		08-SEP-08		
F1-BTEX	540		5	mg/kg		08-SEP-08		
F2 (C10-C16)	3200		20	mg/kg		08-SEP-08		
F3 (C16-C34)	40		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	3800		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	52		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	90		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	2.7		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	22		0.1	%		02-SEP-08	ADE	R717289
MUST PSA % > 75um	9		1	%		08-SEP-08	SRJ	R719890
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	4.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	309		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	7		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	18.6		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	9		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	14		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	7		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	32		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	80		10	mg/kg		06-SEP-08	QLI	R718976
Detail Salinity in mg/kg								
Chloride (Cl)	<10		10	mg/kg		05-SEP-08		
Calcium (Ca)	32		3	mg/kg		05-SEP-08		
Magnesium (Mg)	5		2	mg/kg		05-SEP-08		
Potassium (K)	7		1	mg/kg		05-SEP-08		
Sodium (Na)	2		1	mg/kg		05-SEP-08		
Sulfate (SO4)	7		3	mg/kg		05-SEP-08		
Detailed Salinity								
Sulphate (SO4)	14		6	mg/L		05-SEP-08	EOC	R718988
pH and EC (Saturated Paste)								
% Saturation	52.6		0.1	%		04-SEP-08	SRJ	R717998

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-192 08SS36								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
Detailed Salinity								
pH and EC (Saturated Paste)								
pH in Saturated Paste	7.0		0.1	pH		04-SEP-08	SRJ	R717998
Conductivity Sat. Paste	0.28		0.01	dS m-1		04-SEP-08	SRJ	R717998
Salinity calculation check								
SAR								
Calcium (Ca)	60		5	mg/L		05-SEP-08	EOC	R718988
Potassium (K)	14		2	mg/L		05-SEP-08	EOC	R718988
Magnesium (Mg)	9		3	mg/L		05-SEP-08	EOC	R718988
Sodium (Na)	3		2	mg/L		05-SEP-08	EOC	R718988
SAR	0.1		0.1	SAR		05-SEP-08	EOC	R718988
Chloride (Cl) (Saturated Paste)								
Chloride (Cl)	<20		20	mg/L		04-SEP-08	KFA	R718391

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-193 08SS33D								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	100		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	104		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	11		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	6.6		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	173		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	9		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	22.0		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	9		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	17		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	8		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	38		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	60		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-194 08SS37								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	2100		20	mg/kg		05-SEP-08		
F4 (C34-C50)	100		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	2200		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	103		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	96		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Toluene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	04-SEP-08	SDL	R718740
% Moisture	7.4		0.1	%		02-SEP-08	ADE	R717289
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	6.9		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	188		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	6		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	14.9		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	13		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	18		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	8		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	31		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	60		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-195 08SS38								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	97		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	106		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	2.8		0.1	%		02-SEP-08	ADE	R717440
MUST PSA % > 75um	76		1	%		08-SEP-08	SRJ	R719890

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-196 08SS39								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		09-SEP-08		
F1-BTEX	<5		5	mg/kg		09-SEP-08		
F2 (C10-C16)	90		20	mg/kg		09-SEP-08		
F3 (C16-C34)	20000		20	mg/kg		09-SEP-08		
F4 (C34-C50)	6200		20	mg/kg		09-SEP-08		
F4G-SG (GHH-Silica)	23000		500	mg/kg		09-SEP-08		
Total Hydrocarbons (C6-C50)	26000		20	mg/kg		09-SEP-08		
Chromatogram to baseline at nC50	NO					09-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	71		25-175	%	05-SEP-08	07-SEP-08	YZH	R720022
Surr: Hexatriacontane	0	SDO:RNA	25-175	%	05-SEP-08	07-SEP-08	YZH	R720022
Prep/Analysis Dates					05-SEP-08	07-SEP-08	YZH	R720022
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	5.0		0.1	%		02-SEP-08	ADE	R717440
F4G Prep/Analysis Dates					09-SEP-08	09-SEP-08	VN	R720646
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	8.0		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	199		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	7		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	16.1		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	16		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	20		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	8		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	33		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	90		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-197 08SS40								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	6		5	mg/kg		09-SEP-08		
F1-BTEX	6		5	mg/kg		09-SEP-08		
F2 (C10-C16)	820		20	mg/kg		09-SEP-08		
F3 (C16-C34)	11000		20	mg/kg		09-SEP-08		
F4 (C34-C50)	1300		20	mg/kg		09-SEP-08		
F4G-SG (GHH-Silica)	8900		500	mg/kg		09-SEP-08		
Total Hydrocarbons (C6-C50)	13000		20	mg/kg		09-SEP-08		
Chromatogram to baseline at nC50	NO					09-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	70		25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Surr: Hexatriacontane	287	SOL:MI	25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Prep/Analysis Dates					04-SEP-08	04-SEP-08	CVC	R719181
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	10		0.1	%		02-SEP-08	ADE	R717440
F4G Prep/Analysis Dates					09-SEP-08	09-SEP-08	VN	R720646
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	7.7		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	182		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	7		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	22.2		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	11		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	18		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	9		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	42		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	70		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L	Units	Extracted	Analyzed	By	Batch
676396-198 08SS41								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	310		5	mg/kg		09-SEP-08		
F1-BTEX	310		5	mg/kg		09-SEP-08		
F2 (C10-C16)	9000		20	mg/kg		09-SEP-08		
F3 (C16-C34)	24000		20	mg/kg		09-SEP-08		
F4 (C34-C50)	810		20	mg/kg		09-SEP-08		
F4G-SG (GHH-Silica)	10000		500	mg/kg		09-SEP-08		
Total Hydrocarbons (C6-C50)	34000		20	mg/kg		09-SEP-08		
Chromatogram to baseline at nC50	NO					09-SEP-08		
CCME Total Extractable Hydrocarbons								
Sum: 2-Bromobenzotrifluoride	241	SOL:MI	25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Sum: Hexatriacontane	405	SOL:MI	25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Prep/Analysis Dates					04-SEP-08	04-SEP-08	CVC	R719181
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	7.3		0.1	%		02-SEP-08	ADE	R717440
F4G Prep/Analysis Dates					09-SEP-08	09-SEP-08	VN	R720646
Detail Salinity in mg/kg								
Chloride (Cl)	<8		8	mg/kg		05-SEP-08		
Calcium (Ca)	33		2	mg/kg		05-SEP-08		
Magnesium (Mg)	4		1	mg/kg		05-SEP-08		
Potassium (K)	1.0		0.8	mg/kg		05-SEP-08		
Sodium (Na)	3.8		0.8	mg/kg		05-SEP-08		
Sulfate (SO4)	13		2	mg/kg		05-SEP-08		
Detailed Salinity								
Sulphate (SO4)	35		6	mg/L		05-SEP-08	EOC	R718988
pH and EC (Saturated Paste)								
% Saturation	37.9		0.1	%		04-SEP-08	SRJ	R717998
pH in Saturated Paste	7.1		0.1	pH		04-SEP-08	SRJ	R717998
Conductivity Sat. Paste	0.42		0.01	dS m-1		04-SEP-08	SRJ	R717998
Salinity calculation check								
SAR								
Calcium (Ca)	88		5	mg/L		05-SEP-08	EOC	R718988
Potassium (K)	3		2	mg/L		05-SEP-08	EOC	R718988
Magnesium (Mg)	11		3	mg/L		05-SEP-08	EOC	R718988
Sodium (Na)	10		2	mg/L		05-SEP-08	EOC	R718988
SAR	0.3		0.1	SAR		05-SEP-08	EOC	R718988
Chloride (Cl) (Saturated Paste)								
Chloride (Cl)	<20		20	mg/L		04-SEP-08	KFA	R718391

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-199 08SS42								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		09-SEP-08		
F1-BTEX	<5		5	mg/kg		09-SEP-08		
F2 (C10-C16)	150		20	mg/kg		09-SEP-08		
F3 (C16-C34)	16000		20	mg/kg		09-SEP-08		
F4 (C34-C50)	2200		20	mg/kg		09-SEP-08		
F4G-SG (GHH-Silica)	16000		500	mg/kg		09-SEP-08		
Total Hydrocarbons (C6-C50)	18000		20	mg/kg		09-SEP-08		
Chromatogram to baseline at nC50	NO					09-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	66		25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Surr: Hexatriacontane	384	SOL:MI	25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Prep/Analysis Dates					04-SEP-08	04-SEP-08	CVC	R719181
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	4.0		0.1	%		02-SEP-08	ADE	R717440
F4G Prep/Analysis Dates					09-SEP-08	09-SEP-08	VN	R720646
Lead (Pb)	7		5	mg/kg		06-SEP-08	QLI	R718976
Detail Salinity in mg/kg								
Chloride (Cl)	8		8	mg/kg		05-SEP-08		
Calcium (Ca)	31		2	mg/kg		05-SEP-08		
Magnesium (Mg)	5		1	mg/kg		05-SEP-08		
Potassium (K)	1.1		0.8	mg/kg		05-SEP-08		
Sodium (Na)	4.0		0.8	mg/kg		05-SEP-08		
Sulfate (SO4)	55		2	mg/kg		05-SEP-08		
Detailed Salinity								
Sulphate (SO4)	144		6	mg/L		05-SEP-08	EOC	R718988
pH and EC (Saturated Paste)								
% Saturation	38.5		0.1	%		04-SEP-08	SRJ	R717998
pH in Saturated Paste	7.2		0.1	pH		04-SEP-08	SRJ	R717998
Conductivity Sat. Paste	0.41		0.01	dS m-1		04-SEP-08	SRJ	R717998
Salinity calculation check								
SAR								
Calcium (Ca)	81		5	mg/L		05-SEP-08	EOC	R718988
Potassium (K)	3		2	mg/L		05-SEP-08	EOC	R718988
Magnesium (Mg)	14		3	mg/L		05-SEP-08	EOC	R718988
Sodium (Na)	11		2	mg/L		05-SEP-08	EOC	R718988
SAR	0.3		0.1	SAR		05-SEP-08	EOC	R718988
Chloride (Cl) (Saturated Paste)								
Chloride (Cl)	20		20	mg/L		04-SEP-08	KFA	R718391

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-200 08SS43								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	11		5	mg/kg		09-SEP-08		
F1-BTEX	11		5	mg/kg		09-SEP-08		
F2 (C10-C16)	840		20	mg/kg		09-SEP-08		
F3 (C16-C34)	29000		20	mg/kg		09-SEP-08		
F4 (C34-C50)	2100		20	mg/kg		09-SEP-08		
F4G-SG (GHH-Silica)	20000		500	mg/kg		09-SEP-08		
Total Hydrocarbons (C6-C50)	32000		20	mg/kg		09-SEP-08		
Chromatogram to baseline at nC50	NO					09-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	75		25-175	%	05-SEP-08	07-SEP-08	YZH	R720022
Surr: Hexatriacontane	0	SDO:RNA	25-175	%	05-SEP-08	07-SEP-08	YZH	R720022
Prep/Analysis Dates					05-SEP-08	07-SEP-08	YZH	R720022
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
Xylenes	0.02		0.02	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
% Moisture	7.7		0.1	%		02-SEP-08	ADE	R717440
F4G Prep/Analysis Dates					09-SEP-08	09-SEP-08	VN	R720646
Lead (Pb)	9		5	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-201 08SS44								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	10		5	mg/kg		09-SEP-08		
F1-BTEX	10		5	mg/kg		09-SEP-08		
F2 (C10-C16)	420		20	mg/kg		09-SEP-08		
F3 (C16-C34)	11000		20	mg/kg		09-SEP-08		
F4 (C34-C50)	1200		20	mg/kg		09-SEP-08		
F4G-SG (GHH-Silica)	8800		500	mg/kg		09-SEP-08		
Total Hydrocarbons (C6-C50)	13000		20	mg/kg		09-SEP-08		
Chromatogram to baseline at nC50	NO					09-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	78		25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Surr: Hexatriacontane	243	SOL:MI	25-175	%	04-SEP-08	04-SEP-08	CVC	R719181
Prep/Analysis Dates					04-SEP-08	04-SEP-08	CVC	R719181
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
Xylenes	0.03		0.02	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
% Moisture	7.4		0.1	%		02-SEP-08	ADE	R717440
F4G Prep/Analysis Dates					09-SEP-08	09-SEP-08	VN	R720646
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	7.0		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	201		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	7		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	16.3		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	18		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	2		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	18		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	10		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	31		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	90		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-202 08SS45								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	99		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	108		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	03-SEP-08	03-SEP-08	SPA	R718455
% Moisture	8.1		0.1	%		02-SEP-08	ADE	R717440
Lead (Pb)	10		5	mg/kg		06-SEP-08	QLI	R718976
MUST PSA % > 75um	12		1	%		08-SEP-08	SRJ	R719890

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-203 08SS46								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F2-Naphth	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		08-SEP-08		
F3-PAH	<20		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	99		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	85		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	7.8		0.1	%		02-SEP-08	ADE	R717440
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	5.8		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	270		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	8		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	19.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	12		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	16		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	10		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	36		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	90		10	mg/kg		06-SEP-08	QLI	R718976
CCME PAHs								
Naphthalene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Quinoline	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Phenanthrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Pyrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(a)anthracene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(b&j)fluoranthene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(k)fluoranthene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(a)pyrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Indeno(1,2,3-cd)pyrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-204 08SS47								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	98		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	101		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	7.8		0.1	%		02-SEP-08	ADE	R717440
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	10.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	255		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	8		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	20.9		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	22		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	24		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	11		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.6		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	40		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	90		10	mg/kg		06-SEP-08	QLI	R718976
CCME Volatile HydroCarbon								
EPA 5030/8015&8260-P&T GC-MS								
Thiophene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Chlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Styrene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,3-Dichlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,4-Dichlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,2-Dichlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Surr: 1,2-Dichloroethane d4	107		77-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr: Toluene d8	102		71-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr: 4-Bromofluorobenzene	86		62-130	%	03-SEP-08	04-SEP-08	DDU	R718196
CCME Chlorinated Aliphatics								
1,1-Dichloroethene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-204 08SS47								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME Volatile HydroCarbon								
CCME Chlorinated Aliphatics								
Methylene Chloride	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
trans-1,2-Dichloroethene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,1-Dichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Chloroform	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,1,1-Trichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Carbon Tetrachloride	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Trichloroethene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,2-Dichloropropane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
cis-1,3-Dichloropropene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
trans-1,3-Dichloropropene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,1,2-Trichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,2-Dichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Tetrachloroethylene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,1,2,2-Tetrachloroethane	<0.02		0.02	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Surr: 1,2-Dichloroethane d4	107		77-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr: Toluene d8	102		71-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr: 4-Bromofluorobenzene	86		62-130	%	03-SEP-08	04-SEP-08	DDU	R718196

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-205 08SS48								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	91		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	85		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	10		0.1	%		02-SEP-08	ADE	R717440
Detail Salinity in mg/kg								
Chloride (Cl)	<9		9	mg/kg		05-SEP-08		
Calcium (Ca)	29		2	mg/kg		05-SEP-08		
Magnesium (Mg)	7		1	mg/kg		05-SEP-08		
Potassium (K)	<0.9		0.9	mg/kg		05-SEP-08		
Sodium (Na)	4.5		0.9	mg/kg		05-SEP-08		
Sulfate (SO4)	7		3	mg/kg		05-SEP-08		
Detailed Salinity								
Sulphate (SO4)	15		6	mg/L		05-SEP-08	EOC	R718988
pH and EC (Saturated Paste)								
% Saturation	44.3		0.1	%		04-SEP-08	SRJ	R717998
pH in Saturated Paste	7.3		0.1	pH		04-SEP-08	SRJ	R717998
Conductivity Sat. Paste	0.33		0.01	dS m-1		04-SEP-08	SRJ	R717998
Salinity calculation check								
SAR								
Calcium (Ca)	66		5	mg/L		05-SEP-08	EOC	R718988
Potassium (K)	<2		2	mg/L		05-SEP-08	EOC	R718988
Magnesium (Mg)	16		3	mg/L		05-SEP-08	EOC	R718988
Sodium (Na)	10		2	mg/L		05-SEP-08	EOC	R718988
SAR	0.3		0.1	SAR		05-SEP-08	EOC	R718988
Chloride (Cl) (Saturated Paste)								
Chloride (Cl)	<20		20	mg/L		04-SEP-08	KFA	R718391

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-206 08SS49								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F2-Naphth	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		08-SEP-08		
F3-PAH	<20		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	97		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	105		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	11		0.1	%		02-SEP-08	ADE	R717440
Lead (Pb)	10		5	mg/kg		06-SEP-08	QLI	R718976
CCME PAHs								
Naphthalene	<0.01	RAMB	0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Quinoline	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Phenanthrene	0.02		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Pyrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(a)anthracene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(b&j)fluoranthene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(k)fluoranthene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Benzo(a)pyrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Indeno(1,2,3-cd)pyrene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Dibenzo(a,h)anthracene	<0.01		0.01	mg/kg	05-SEP-08	07-SEP-08	PCL	R719239
Surr: Nitrobenzene d5	63		20-140	%	05-SEP-08	07-SEP-08	PCL	R719239
Surr: 2-Fluorobiphenyl	76		34-136	%	05-SEP-08	07-SEP-08	PCL	R719239
Surr: p-Terphenyl d14	81		41-150	%	05-SEP-08	07-SEP-08	PCL	R719239
CCME Volatile HydroCarbon								
EPA 5030/8015&8260-P&T GC-MS								
Thiophene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Chlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Styrene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,3-Dichlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,4-Dichlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,2-Dichlorobenzene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Surr: 1,2-Dichloroethane d4	104		77-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr: Toluene d8	101		71-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr: 4-Bromofluorobenzene	86		62-130	%	03-SEP-08	04-SEP-08	DDU	R718196
CCME Chlorinated Aliphatics								
1,1-Dichloroethene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Methylene Chloride	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
trans-1,2-Dichloroethene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,1-Dichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-206 08SS49								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME Volatile HydroCarbon								
CCME Chlorinated Aliphatics								
Chloroform	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,1,1-Trichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Carbon Tetrachloride	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Trichloroethene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,2-Dichloropropane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
cis-1,3-Dichloropropene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
trans-1,3-Dichloropropene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,1,2-Trichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,2-Dichloroethane	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Tetrachloroethylene	<0.01		0.01	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
1,1,2,2-Tetrachloroethane	<0.02		0.02	mg/kg	03-SEP-08	04-SEP-08	DDU	R718196
Surr: 1,2-Dichloroethane d4	104		77-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr: Toluene d8	101		71-120	%	03-SEP-08	04-SEP-08	DDU	R718196
Surr: 4-Bromofluorobenzene	86		62-130	%	03-SEP-08	04-SEP-08	DDU	R718196

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-207 08SS50								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	89		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	99		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	6.7		0.1	%		02-SEP-08	ADE	R717440
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	8.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	236		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	8		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	21.1		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	14		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	20		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	10		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.6		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	40		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	70		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-208 08SS51								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	100		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	109		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	7.3		0.1	%		02-SEP-08	ADE	R717440
Lead (Pb)	9		5	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-209 08SS52								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	87		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	95		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	7.5		0.1	%		02-SEP-08	ADE	R717440
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	6.7		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	272		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	9		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	20.4		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	12		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	16		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	11		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	40		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	70		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-210 08SS53								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	30		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	30		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	99		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	94		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	7.3		0.1	%		02-SEP-08	ADE	R717440
Lead (Pb)	10		5	mg/kg		06-SEP-08	QLI	R718976
MUST PSA % > 75um	13		1	%		08-SEP-08	SRJ	R719890

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-211 08SS54								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	93		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	102		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	6.5		0.1	%		02-SEP-08	ADE	R717440
Detail Salinity in mg/kg								
Chloride (Cl)	<8		8	mg/kg		05-SEP-08		
Calcium (Ca)	23		2	mg/kg		05-SEP-08		
Magnesium (Mg)	3		1	mg/kg		05-SEP-08		
Potassium (K)	1.1		0.8	mg/kg		05-SEP-08		
Sodium (Na)	1.6		0.8	mg/kg		05-SEP-08		
Sulfate (SO4)	4		2	mg/kg		05-SEP-08		
Detailed Salinity								
Sulphate (SO4)	11		6	mg/L		05-SEP-08	EOC	R718988
pH and EC (Saturated Paste)								
% Saturation	39.1		0.1	%		04-SEP-08	SRJ	R717998
pH in Saturated Paste	7.6		0.1	pH		04-SEP-08	SRJ	R717998
Conductivity Sat. Paste	0.26		0.01	dS m-1		04-SEP-08	SRJ	R717998
Salinity calculation check								
SAR								
Calcium (Ca)	59		5	mg/L		05-SEP-08	EOC	R718988
Potassium (K)	3		2	mg/L		05-SEP-08	EOC	R718988
Magnesium (Mg)	9		3	mg/L		05-SEP-08	EOC	R718988
Sodium (Na)	4		2	mg/L		05-SEP-08	EOC	R718988
SAR	0.1		0.1	SAR		05-SEP-08	EOC	R718988
Chloride (Cl) (Saturated Paste)								
Chloride (Cl)	<20		20	mg/L		04-SEP-08	KFA	R718391

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-212 08SS52D								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	30		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	30		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	91		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Surr: Hexatriacontane	91		25-175	%	04-SEP-08	04-SEP-08	YZH	R718768
Prep/Analysis Dates					04-SEP-08	04-SEP-08	YZH	R718768
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	7.6		0.1	%		02-SEP-08	ADE	R717440
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	6.3		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	219		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	7		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	19.8		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	11		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	16		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	9		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.4		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	37		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	70		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L	Units	Extracted	Analyzed	By	Batch
676396-213 08SS56								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		05-SEP-08		
F1-BTEX	<5		5	mg/kg		05-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		05-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		05-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		05-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		05-SEP-08		
Chromatogram to baseline at nC50	YES					05-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	92		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Surr: Hexatriacontane	105		25-175	%	02-SEP-08	03-SEP-08	VN	R718666
Prep/Analysis Dates					02-SEP-08	03-SEP-08	VN	R718666
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	20		0.1	%		02-SEP-08	ADE	R717440
Detail Salinity in mg/kg								
Chloride (Cl)	<10		10	mg/kg		05-SEP-08		
Calcium (Ca)	50		4	mg/kg		05-SEP-08		
Magnesium (Mg)	11		2	mg/kg		05-SEP-08		
Potassium (K)	6		1	mg/kg		05-SEP-08		
Sodium (Na)	6		1	mg/kg		05-SEP-08		
Sulfate (SO4)	19		4	mg/kg		05-SEP-08		
Detailed Salinity								
Sulphate (SO4)	26		6	mg/L		05-SEP-08	EOC	R718988
pH and EC (Saturated Paste)								
% Saturation	73.5		0.1	%		04-SEP-08	SRJ	R717998
pH in Saturated Paste	7.2		0.1	pH		04-SEP-08	SRJ	R717998
Conductivity Sat. Paste	0.33		0.01	dS m-1		04-SEP-08	SRJ	R717998
Salinity calculation check								
SAR								
Calcium (Ca)	68		5	mg/L		05-SEP-08	EOC	R718988
Potassium (K)	8		2	mg/L		05-SEP-08	EOC	R718988
Magnesium (Mg)	15		3	mg/L		05-SEP-08	EOC	R718988
Sodium (Na)	8		2	mg/L		05-SEP-08	EOC	R718988
SAR	0.2		0.1	SAR		05-SEP-08	EOC	R718988
Chloride (Cl) (Saturated Paste)								
Chloride (Cl)	<20		20	mg/L		04-SEP-08	KFA	R718391

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-214 08SS57								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	20		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	20		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	102		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	95		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	22		0.1	%		02-SEP-08	ADE	R717440
Detail Salinity in mg/kg								
Chloride (Cl)	10		10	mg/kg		05-SEP-08		
Calcium (Ca)	23		3	mg/kg		05-SEP-08		
Magnesium (Mg)	5		2	mg/kg		05-SEP-08		
Potassium (K)	2		1	mg/kg		05-SEP-08		
Sodium (Na)	8		1	mg/kg		05-SEP-08		
Sulfate (SO4)	11		4	mg/kg		05-SEP-08		
Detailed Salinity								
Sulphate (SO4)	18		6	mg/L		05-SEP-08	EOC	R718988
pH and EC (Saturated Paste)								
% Saturation	62.1		0.1	%		04-SEP-08	SRJ	R717998
pH in Saturated Paste	7.1		0.1	pH		04-SEP-08	SRJ	R717998
Conductivity Sat. Paste	0.21		0.01	dS m-1		04-SEP-08	SRJ	R717998
Salinity calculation check								
SAR								
Calcium (Ca)	37		5	mg/L		05-SEP-08	EOC	R718988
Potassium (K)	3		2	mg/L		05-SEP-08	EOC	R718988
Magnesium (Mg)	9		3	mg/L		05-SEP-08	EOC	R718988
Sodium (Na)	12		2	mg/L		05-SEP-08	EOC	R718988
SAR	0.5		0.1	SAR		05-SEP-08	EOC	R718988
Chloride (Cl) (Saturated Paste)								
Chloride (Cl)	20		20	mg/L		04-SEP-08	KFA	R718391

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676396-215 08SS58								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	90		20	mg/kg		08-SEP-08		
F4 (C34-C50)	30		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	120		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	104		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	102		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	0.008		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	0.08		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	0.17		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	20		0.1	%		02-SEP-08	ADE	R717440
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	10.5		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	388		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	<0.5		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	12		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	31.7		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	31		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	36		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	16		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	1.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	56		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	130		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-216 08SS55								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	70		20	mg/kg		08-SEP-08		
F4 (C34-C50)	40		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	110		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	100		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	105		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	15		0.1	%		02-SEP-08	ADE	R717440
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	10.6		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	397		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	0.7		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	13		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	31.4		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	30		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	38		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	17		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	1.1		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	54		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	160		10	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-217 08SS59								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	90		20	mg/kg		08-SEP-08		
F4 (C34-C50)	50		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	140		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	84		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	100		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	0.08		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	0.02		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	0.12		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	23		0.1	%		02-SEP-08	ADE	R717440
Lead (Pb)	15		5	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-218 08SS59D								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	300		20	mg/kg		08-SEP-08		
F4 (C34-C50)	110		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	410		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	89		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Surr: Hexatriacontane	97		25-175	%	04-SEP-08	05-SEP-08	YZH	R720042
Prep/Analysis Dates					04-SEP-08	05-SEP-08	YZH	R720042
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	0.04		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	0.05		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	20		0.1	%		02-SEP-08	ADE	R717440
Lead (Pb)	23		5	mg/kg		06-SEP-08	QLI	R718976

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-219 08SS60								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	<20	RAMB	20	mg/kg		08-SEP-08		
F4 (C34-C50)	30		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	30		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	106		25-175	%	05-SEP-08	05-SEP-08	0	R720057
Surr: Hexatriacontane	101		25-175	%	05-SEP-08	05-SEP-08	0	R720057
Prep/Analysis Dates					05-SEP-08	05-SEP-08	0	R720057
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	18		0.1	%		02-SEP-08	ADE	R717440
MUST PSA % > 75um	9		1	%		08-SEP-08	SRJ	R719890

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-220 08SS61								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		09-SEP-08		
F1-BTEX	<5		5	mg/kg		09-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		09-SEP-08		
F3 (C16-C34)	50		20	mg/kg		09-SEP-08		
F4 (C34-C50)	90		20	mg/kg		09-SEP-08		
F4G-SG (GHH-Silica)	<500		500	mg/kg		09-SEP-08		
Total Hydrocarbons (C6-C50)	140		20	mg/kg		09-SEP-08		
Chromatogram to baseline at nC50	NO					09-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	108		25-175	%	05-SEP-08	05-SEP-08	0	R720057
Surr: Hexatriacontane	105		25-175	%	05-SEP-08	05-SEP-08	0	R720057
Prep/Analysis Dates					05-SEP-08	05-SEP-08	0	R720057
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	20		0.1	%		02-SEP-08	ADE	R717440
F4G Prep/Analysis Dates					09-SEP-08	09-SEP-08	VN	R720646
MUST PSA % > 75um	20		1	%		08-SEP-08	SRJ	R719890

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676396-221 08SS62								
Sampled By: JACK on 28-AUG-08								
Matrix: SOIL								
CCME BTEX, TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		08-SEP-08		
F1-BTEX	<5		5	mg/kg		08-SEP-08		
F2 (C10-C16)	<20		20	mg/kg		08-SEP-08		
F3 (C16-C34)	<20		20	mg/kg		08-SEP-08		
F4 (C34-C50)	<20		20	mg/kg		08-SEP-08		
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		08-SEP-08		
Chromatogram to baseline at nC50	YES					08-SEP-08		
CCME Total Extractable Hydrocarbons								
Surr: 2-Bromobenzotrifluoride	111		25-175	%	05-SEP-08	05-SEP-08	0	R720057
Surr: Hexatriacontane	106		25-175	%	05-SEP-08	05-SEP-08	0	R720057
Prep/Analysis Dates					05-SEP-08	05-SEP-08	0	R720057
CCME BTEX								
Benzene	<0.005		0.005	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Toluene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Ethylbenzene	<0.01		0.01	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
Xylenes	<0.02		0.02	mg/kg	02-SEP-08	03-SEP-08	SPA	R718455
% Moisture	31		0.1	%		02-SEP-08	ADE	R717440
Metals in Soil - CCME List								
Silver (Ag)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Arsenic (As)	7.0		0.2	mg/kg		06-SEP-08	QLI	R718976
Barium (Ba)	341		5	mg/kg		06-SEP-08	QLI	R718976
Beryllium (Be)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Cadmium (Cd)	1.4		0.5	mg/kg		06-SEP-08	QLI	R718976
Cobalt (Co)	8		1	mg/kg		06-SEP-08	QLI	R718976
Chromium (Cr)	19.0		0.5	mg/kg		06-SEP-08	QLI	R718976
Copper (Cu)	20		2	mg/kg		06-SEP-08	QLI	R718976
Mercury (Hg)	<0.05		0.05	mg/kg		06-SEP-08	QLI	R718976
Molybdenum (Mo)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Nickel (Ni)	25		2	mg/kg		06-SEP-08	QLI	R718976
Lead (Pb)	14		5	mg/kg		06-SEP-08	QLI	R718976
Antimony (Sb)	<0.2		0.2	mg/kg		06-SEP-08	QLI	R718976
Selenium (Se)	0.9		0.2	mg/kg		06-SEP-08	QLI	R718976
Tin (Sn)	<5		5	mg/kg		06-SEP-08	QLI	R718976
Thallium (Tl)	<1		1	mg/kg		06-SEP-08	QLI	R718976
Uranium (U)	<2		2	mg/kg		06-SEP-08	QLI	R718976
Vanadium (V)	31		1	mg/kg		06-SEP-08	QLI	R718976
Zinc (Zn)	170		10	mg/kg		06-SEP-08	QLI	R718976

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
RAMB	Result Adjusted For Method Blank
SDO:RNA	Surrogate diluted out:% recovery not available
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
CL-SAR-ED	Soil	Chloride (Cl) (Saturated Paste)		APHA 4500 Cl E-Colorimetry
ETL-BTX,TVH-CCME-ED	Soil	CCME BTEX	EPA 5030	CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TVH,TEH-CCME-ED	Soil	CCME Total Hydrocarbons		CCME CWS-PHC Dec-2000 - Pub# 1310
Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.				
Hydrocarbon results are expressed on a dry weight basis.				
In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.				
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.				
In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.				
Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:				
1. All extraction and analysis holding times were met.				
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.				
3. Linearity of gasoline response within 15% throughout the calibration range.				
Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:				
1. All extraction and analysis holding times were met.				
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.				
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.				
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.				
F2-4-TMB-ED	Soil	CCME Total Extractable Hydrocarbons		CCME CWS-PHC Dec-2000 - Pub# 1310
F4G-TMB-ED	Soil	CCME Gravimetric Heavy Hydrocarbons (SG)		CCME CWS-PHC Dec-2000 - Pub# 1310
METAL-CCME-ED	Soil	Metals in Soil - CCME List	EPA 3050	EPA 6020
PAH-CCME-ED	Soil	CCME PAHs	EPA 3540C	EPA 3540/8270-GC/MS
PB-ED	Soil	Lead (Pb)	EPA 3050	EPA 6020
PREP-MOISTURE-ED	Soil	% Moisture		Oven dry 105C-Gravimetric
PSA-MUST-ED	Soil	MUST PSA D50 > 75um		ASTM D422-63-HYDROMETER/SIEVE
SAL-MG/KG-CALC-ED	Soil	Detail Salinity in mg/kg		Manual Calculation
SALINITY-INTCHECK-ED	Soil	Salinity calculation check		CSSS 18.4-Calculation
SAR-CALC-ED	Soil	SAR		CSSS 18.4-Calculation
SAT/PH/EC-ED	Soil	pH and EC (Saturated Paste)		CSSS 18.2, 16.2, 18.3
SO4-SAR-ED	Soil	Sulfate (SO4) in saturated paste		APHA 3120 B-ICP-OES
VOC-CLALI-CCME-ED	Soil	CCME Chlorinated Aliphatics	EPA 5030	SW 846 8260-GC-MS
VOC-MAH-CCME-ED	Soil	EPA 5030/8015&8260-P&T GC-MS	EPA 5030	SW 846 8260-GC-MS

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Reference Information

Chain of Custody numbers:

08-041277	08-041278	08-041279	08-041280	08-041281
08-041282	08-041283	08-041284	08-041285	08-041286
08-041287	08-041288	08-041289	08-041290	08-042138
08-042139	08-042140	08-042141	08-042142	

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
ED	ALS LABORATORY GROUP - EDMONTON, ALBERTA, CANADA		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds. The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.
 mg/kg (units) - unit of concentration based on mass, parts per million
 mg/L (units) - unit of concentration based on volume, parts per million
 < - Less than
 D.L. - Detection Limit
 N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
 UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
 UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.
 Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

ALS LABORATORY GROUP SOIL SALINITY CONVERSION

L676396

Lab ID	Sample ID				Lab ID	Sample ID			
876396-19	08MW21 @ 0.6				L676396-48	08MW22 @ 8.5			
Sample Date: 26-AUG-08					Sample Date: 26-AUG-08				
Matrix: SOIL					Matrix: SOIL				
	Result mg/L	% Sat	Meq/L	Dry Soil mg/kg		Result mg/L	% Sat	Meq/L	Dry Soil mg/kg
Chloride (Cl)	30	34.3	0.86	11	Chloride (Cl)	<20	32.5	<0.56	<6
Sulphate (SO4)	66	34.3	1.37	23	Sulphate (SO4)	26	32.5	0.55	9
Calcium (Ca)	68	34.3	3.38	23	Calcium (Ca)	31	32.5	1.57	10
Potassium (K)	4	34.3	0.10	1.3	Potassium (K)	3	32.5	0.08	1.0
Magnesium (Mg)	14	34.3	1.19	5	Magnesium (Mg)	7	32.5	0.56	2
Sodium (Na)	13	34.3	0.55	4.4	Sodium (Na)	8	32.5	0.35	2.6
876396-68	08BH13 @ 0.6				L676396-169	08BH19 @ 4.3			
Sample Date: 27-AUG-08					Sample Date: 27-AUG-08				
Matrix: SOIL					Matrix: SOIL				
	Result mg/L	% Sat	Meq/L	Dry Soil mg/kg		Result mg/L	% Sat	Meq/L	Dry Soil mg/kg
Chloride (Cl)	<20	68.3	<0.56	<10	Chloride (Cl)	<20	36.2	<0.56	<7
Sulphate (SO4)	34	68.3	0.71	23	Sulphate (SO4)	44	36.2	0.91	16
Calcium (Ca)	63	68.3	3.16	43	Calcium (Ca)	57	36.2	2.84	21
Potassium (K)	18	68.3	0.45	12	Potassium (K)	<2	36.2	<0.05	<0.7
Magnesium (Mg)	16	68.3	1.34	11	Magnesium (Mg)	11	36.2	0.87	4
Sodium (Na)	18	68.3	0.78	12	Sodium (Na)	9	36.2	0.40	3.3
876396-179	08BH19D @ 4.3				L676396-192	08SS36			
Sample Date: 27-AUG-08					Sample Date: 28-AUG-08				
Matrix: SOIL					Matrix: SOIL				
	Result mg/L	% Sat	Meq/L	Dry Soil mg/kg		Result mg/L	% Sat	Meq/L	Dry Soil mg/kg
Chloride (Cl)	40	43.7	1.18	18	Chloride (Cl)	<20	52.6	<0.56	<10
Sulphate (SO4)	73	43.7	1.53	32	Sulphate (SO4)	14	52.6	0.28	7
Calcium (Ca)	59	43.7	2.92	26	Calcium (Ca)	60	52.6	3.00	32
Potassium (K)	4	43.7	0.10	1.7	Potassium (K)	14	52.6	0.36	7
Magnesium (Mg)	14	43.7	1.19	6	Magnesium (Mg)	9	52.6	0.78	5
Sodium (Na)	12	43.7	0.54	5.4	Sodium (Na)	3	52.6	0.14	2
<p>"Calculations are as per: Methods of Analysis for Soils, Plants and Waters Homer D. Chapman and Parker F. Pratt University of California, Riverside, Cl. August, 1961."</p>									

ALS LABORATORY GROUP SOIL SALINITY CONVERSION

L676396

Lab ID	Sample ID				Lab ID	Sample ID				
676396-198	08SS41				L676396-199	08SS42				
Sample Date: 28-AUG-08					Sample Date: 28-AUG-08					
Matrix: SOIL					Matrix: SOIL					
		Result mg/L	% Sat	Meq/L	Dry Soil mg/kg		Result mg/L	% Sat	Meq/L	Dry Soil mg/kg
Chloride (Cl)		<20	37.9	<0.56	<8	Chloride (Cl)	20	38.5	0.62	8
Sulphate (SO4)		35	37.9	0.72	13	Sulphate (SO4)	144	38.5	3.00	55
Calcium (Ca)		88	37.9	4.40	33	Calcium (Ca)	81	38.5	4.06	31
Potassium (K)		3	37.9	0.07	1.0	Potassium (K)	3	38.5	0.07	1.1
Magnesium (Mg)		11	37.9	0.92	4	Magnesium (Mg)	14	38.5	1.17	5
Sodium (Na)		10	37.9	0.43	3.8	Sodium (Na)	11	38.5	0.46	4.0
676396-205	08SS48				L676396-211	08SS54				
Sample Date: 28-AUG-08					Sample Date: 28-AUG-08					
Matrix: SOIL					Matrix: SOIL					
		Result mg/L	% Sat	Meq/L	Dry Soil mg/kg		Result mg/L	% Sat	Meq/L	Dry Soil mg/kg
Chloride (Cl)		<20	44.3	<0.56	<9	Chloride (Cl)	<20	39.1	<0.56	<8
Sulphate (SO4)		15	44.3	0.32	7	Sulphate (SO4)	11	39.1	0.22	4
Calcium (Ca)		66	44.3	3.31	29	Calcium (Ca)	59	39.1	2.96	23
Potassium (K)		<2	44.3	<0.05	<0.9	Potassium (K)	3	39.1	0.07	1.1
Magnesium (Mg)		16	44.3	1.32	7	Magnesium (Mg)	9	39.1	0.73	3
Sodium (Na)		10	44.3	0.45	4.5	Sodium (Na)	4	39.1	0.18	1.6
676396-213	08SS56				L676396-214	08SS57				
Sample Date: 28-AUG-08					Sample Date: 28-AUG-08					
Matrix: SOIL					Matrix: SOIL					
		Result mg/L	% Sat	Meq/L	Dry Soil mg/kg		Result mg/L	% Sat	Meq/L	Dry Soil mg/kg
Chloride (Cl)		<20	73.5	<0.56	<10	Chloride (Cl)	20	62.1	0.65	10
Sulphate (SO4)		26	73.5	0.53	19	Sulphate (SO4)	18	62.1	0.36	11
Calcium (Ca)		68	73.5	3.38	50	Calcium (Ca)	37	62.1	1.86	23
Potassium (K)		8	73.5	0.20	6	Potassium (K)	3	62.1	0.09	2
Magnesium (Mg)		15	73.5	1.22	11	Magnesium (Mg)	9	62.1	0.70	5
Sodium (Na)		8	73.5	0.34	6	Sodium (Na)	12	62.1	0.53	8
<p>"Calculations are as per: Methods of Analysis for Soils, Plants and Waters Homer D. Chapman and Parker F. Pratt University of California, Riverside, Cl. August, 1961."</p>										



Environmental Division

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 1 of 17

Client: EBA ENG CONSULTANTS LTD
115, 200 RIVERCREST DR SE
CALGARY AB T2C 2X5
Contact: KRISTEN OSTERMANN

Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed	
-SAR-ED Soil								
Batch R718391								
WG829083-2 DUP	L676396-198	<20	<20	RPD-NA	mg/L	N/A	15	04-SEP-08
Chloride (Cl)								
WG829083-5 DUP	L676999-1	<20	<20	RPD-NA	mg/L	N/A	15	04-SEP-08
Chloride (Cl)								
WG829083-1 IRM	SALINITY_SOIL3	104			%	70-130		04-SEP-08
Chloride (Cl)								
WG829083-4 IRM	SALINITY_SOIL3	106			%	70-130		04-SEP-08
Chloride (Cl)								
WG829083-3 MS	L676396-199	109			%	84-131		04-SEP-08
Chloride (Cl)								
WG829083-6 MS	L676999-17	95			%	84-131		04-SEP-08
Chloride (Cl)								
Batch R718996								
WG830061-2 DUP	L676396-48	<20	<20	RPD-NA	mg/L	N/A	15	05-SEP-08
Chloride (Cl)								
WG830061-1 IRM	SALINITY_SOIL3	95			%	70-130		05-SEP-08
Chloride (Cl)								
WG830061-3 MS	L639194-69	108			%	84-131		05-SEP-08
Chloride (Cl)								
L-BTX,TVH-CCME-ED Soil								
Batch R717641								
WG827757-1 DUP	L676396-68	<0.005	<0.005	RPD-NA	mg/kg	N/A	40	03-SEP-08
Benzene								
Ethylbenzene		<0.01	<0.01	RPD-NA	mg/kg	N/A	49	03-SEP-08
Toluene		0.03	0.02	J	mg/kg	0.01	0.04	03-SEP-08
TVH: (C6-C10 / No BTEX Correction)		<5	<5	RPD-NA	mg/kg	N/A	64	03-SEP-08
Xylenes		0.04	0.04	J	mg/kg	0.00	0.08	03-SEP-08
WG828671-2 LCS		107			%	55-145		02-SEP-08
Benzene								
Ethylbenzene		83			%	52-125		02-SEP-08
Toluene		98			%	31-105		02-SEP-08
TVH: (C6-C10 / No BTEX Correction)		88			%	70-130		02-SEP-08
Xylenes		73			%	28-106		02-SEP-08
WG828671-1 MB		<0.005			mg/kg	0.005		02-SEP-08
Benzene								
Ethylbenzene		<0.01			mg/kg	0.01		02-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 2 of 17

t	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
L-BTX,TVH-CCME-ED Soil								
atch R717641								
WG828671-1 MB								
	Toluene		<0.01		mg/kg		0.01	02-SEP-08
	TVH: (C6-C10 / No BTEX Correction)		<5		mg/kg		5	02-SEP-08
	Xylenes		<0.02		mg/kg		0.02	02-SEP-08
atch R718455								
WG827978-1 DUP								
		L676353-16						
	Benzene	<0.005	<0.005	RPD-NA	mg/kg	N/A	40	03-SEP-08
	Ethylbenzene	0.02	<0.01	DUP-H	mg/kg	N/A	49	03-SEP-08
	Toluene	0.07	<0.01	DUP-H	mg/kg	N/A	53	03-SEP-08
	TVH: (C6-C10 / No BTEX Correction)	<5	<5	RPD-NA	mg/kg	N/A	64	03-SEP-08
	Xylenes	0.18	<0.02	DUP-H	mg/kg	N/A	54	03-SEP-08
WG827978-2 DUP								
		L676396-195						
	Benzene	<0.005	<0.005	RPD-NA	mg/kg	N/A	40	03-SEP-08
	Ethylbenzene	<0.01	<0.01	RPD-NA	mg/kg	N/A	49	03-SEP-08
	Toluene	<0.01	<0.01	RPD-NA	mg/kg	N/A	53	03-SEP-08
	TVH: (C6-C10 / No BTEX Correction)	<5	<5	RPD-NA	mg/kg	N/A	64	03-SEP-08
	Xylenes	<0.02	<0.02	RPD-NA	mg/kg	N/A	54	03-SEP-08
WG827978-3 DUP								
		L676396-221						
	Benzene	<0.005	<0.005	RPD-NA	mg/kg	N/A	40	03-SEP-08
	Ethylbenzene	<0.01	<0.01	RPD-NA	mg/kg	N/A	49	03-SEP-08
	Toluene	<0.01	<0.01	RPD-NA	mg/kg	N/A	53	03-SEP-08
	TVH: (C6-C10 / No BTEX Correction)	<5	<5	RPD-NA	mg/kg	N/A	64	03-SEP-08
	Xylenes	<0.02	<0.02	RPD-NA	mg/kg	N/A	54	03-SEP-08
WG829615-2 LCS								
	Benzene		107		%		55-145	03-SEP-08
	Ethylbenzene		84		%		52-125	03-SEP-08
	Toluene		98		%		31-105	03-SEP-08
	TVH: (C6-C10 / No BTEX Correction)		92		%		70-130	03-SEP-08
	Xylenes		73		%		28-106	03-SEP-08
WG827757-2 MB								
	Benzene		<0.005		mg/kg		0.005	03-SEP-08
	Ethylbenzene		<0.01		mg/kg		0.01	03-SEP-08
	Toluene		<0.01		mg/kg		0.01	03-SEP-08
	TVH: (C6-C10 / No BTEX Correction)		<5		mg/kg		5	03-SEP-08
	Xylenes		<0.02		mg/kg		0.02	03-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 3 of 17

Item	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
L-BTX,TVH-CCME-ED Soil								
Batch R718455								
WG829615-1 MB								
Benzene			<0.005		mg/kg		0.005	03-SEP-08
Ethylbenzene			<0.01		mg/kg		0.01	03-SEP-08
Toluene			<0.01		mg/kg		0.01	03-SEP-08
TVH: (C6-C10 / No BTEX Correction)			<5		mg/kg		5	03-SEP-08
Xylenes			<0.02		mg/kg		0.02	03-SEP-08
Batch R718740								
WG827796-1 DUP L676396-96								
Benzene		<0.005	<0.005	RPD-NA	mg/kg	N/A	40	04-SEP-08
Ethylbenzene		<0.01	<0.01	RPD-NA	mg/kg	N/A	49	04-SEP-08
Toluene		<0.01	<0.01	RPD-NA	mg/kg	N/A	53	04-SEP-08
TVH: (C6-C10 / No BTEX Correction)		<5	<5	RPD-NA	mg/kg	N/A	64	04-SEP-08
Xylenes		<0.02	<0.02	RPD-NA	mg/kg	N/A	54	04-SEP-08
WG827796-3 DUP L676396-179								
Benzene		<0.005	<0.005	RPD-NA	mg/kg	N/A	40	04-SEP-08
Ethylbenzene		<0.01	<0.01	RPD-NA	mg/kg	N/A	49	04-SEP-08
Toluene		<0.01	<0.01	RPD-NA	mg/kg	N/A	53	04-SEP-08
TVH: (C6-C10 / No BTEX Correction)		<5	<5	RPD-NA	mg/kg	N/A	64	04-SEP-08
Xylenes		<0.02	<0.02	RPD-NA	mg/kg	N/A	54	04-SEP-08
WG829925-2 LCS								
Benzene			88		%		55-145	04-SEP-08
Ethylbenzene			79		%		52-125	04-SEP-08
Toluene			87		%		31-105	04-SEP-08
TVH: (C6-C10 / No BTEX Correction)			101		%		70-130	04-SEP-08
Xylenes			74		%		28-106	04-SEP-08
WG827796-2 MB								
Benzene			<0.005		mg/kg		0.005	04-SEP-08
Ethylbenzene			<0.01		mg/kg		0.01	04-SEP-08
Toluene			<0.01		mg/kg		0.01	04-SEP-08
TVH: (C6-C10 / No BTEX Correction)			<5		mg/kg		5	04-SEP-08
Xylenes			<0.02		mg/kg		0.02	04-SEP-08
WG829925-1 MB								
Benzene			<0.005		mg/kg		0.005	04-SEP-08
Ethylbenzene			<0.01		mg/kg		0.01	04-SEP-08
Toluene			<0.01		mg/kg		0.01	04-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 4 of 17

t	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
L-BTX,TVH-CCME-ED	Soil							
atch	R718740							
WG829925-1	MB							
TVH: (C6-C10 / No BTEX Correction)			<5		mg/kg		5	04-SEP-08
Xylenes			<0.02		mg/kg		0.02	04-SEP-08
4-TMB-ED	Soil							
atch	R718666							
WG829619-2	LCS							
TEH: (C10-C16)			69		%		55-145	03-SEP-08
TEH: (C16-C34)			69		%		55-145	03-SEP-08
TEH: (C34-C50)			69		%		55-145	03-SEP-08
WG829619-1	MB							
TEH: (C10-C16)			<20		mg/kg		20	03-SEP-08
TEH: (C16-C34)			<20		mg/kg		20	03-SEP-08
TEH: (C34-C50)			<20		mg/kg		20	03-SEP-08
atch	R718768							
WG829653-3	DUP	L676396-208						
TEH: (C10-C16)		<20	<20	RPD-NA	mg/kg	N/A	39	04-SEP-08
TEH: (C16-C34)		<20	<20	RPD-NA	mg/kg	N/A	39	04-SEP-08
TEH: (C34-C50)		<20	<20	RPD-NA	mg/kg	N/A	39	04-SEP-08
WG829653-2	LCS							
TEH: (C10-C16)			86		%		55-145	04-SEP-08
TEH: (C16-C34)			86		%		55-145	04-SEP-08
TEH: (C34-C50)			86		%		55-145	04-SEP-08
WG829653-1	MB							
TEH: (C10-C16)			<20		mg/kg		20	04-SEP-08
TEH: (C16-C34)			<20		mg/kg		20	04-SEP-08
TEH: (C34-C50)			<20		mg/kg		20	04-SEP-08
atch	R719181							
WG830303-3	DUP	L676396-68						
TEH: (C10-C16)		<20	<20	RPD-NA	mg/kg	N/A	39	04-SEP-08
TEH: (C16-C34)		70	80	J	mg/kg	0	80	04-SEP-08
TEH: (C34-C50)		40	60	J	mg/kg	20	80	04-SEP-08
WG830303-2	LCS							
TEH: (C10-C16)			93		%		55-145	04-SEP-08
TEH: (C16-C34)			93		%		55-145	04-SEP-08
TEH: (C34-C50)			93		%		55-145	04-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 5 of 17

Item	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
4-TMB-ED Soil								
Batch R719181								
WG830303-1 MB								
TEH: (C10-C16)			<20		mg/kg		20	04-SEP-08
TEH: (C16-C34)			40	A	mg/kg		20	04-SEP-08
TEH: (C34-C50)			30	A	mg/kg		20	04-SEP-08
COMMENTS: Interpret positive sample results of less than 5x the DL with caution.								
Batch R720022								
WG831089-3 DUP L677119-8								
TEH: (C10-C16)		<20	<20	RPD-NA	mg/kg	N/A	39	07-SEP-08
TEH: (C16-C34)		30	30	J	mg/kg	0	80	07-SEP-08
TEH: (C34-C50)		30	40	J	mg/kg	0	80	07-SEP-08
WG831089-2 LCS								
TEH: (C10-C16)			106		%		55-145	07-SEP-08
TEH: (C16-C34)			106		%		55-145	07-SEP-08
TEH: (C34-C50)			106		%		55-145	07-SEP-08
WG831089-1 MB								
TEH: (C10-C16)			<20		mg/kg		20	07-SEP-08
TEH: (C16-C34)			<20		mg/kg		20	07-SEP-08
TEH: (C34-C50)			<20		mg/kg		20	07-SEP-08
Batch R720042								
WG831024-3 DUP L676396-180								
TEH: (C10-C16)		<20	<20	RPD-NA	mg/kg	N/A	39	05-SEP-08
TEH: (C16-C34)		810	700		mg/kg	15	39	05-SEP-08
TEH: (C34-C50)		50	40	J	mg/kg	10	80	05-SEP-08
WG831024-2 LCS								
TEH: (C10-C16)			80		%		55-145	05-SEP-08
TEH: (C16-C34)			80		%		55-145	05-SEP-08
TEH: (C34-C50)			80		%		55-145	05-SEP-08
WG831024-1 MB								
TEH: (C10-C16)			<20		mg/kg		20	05-SEP-08
TEH: (C16-C34)			<20		mg/kg		20	05-SEP-08
TEH: (C34-C50)			<20		mg/kg		20	05-SEP-08
Batch R720057								
WG831243-3 DUP L677114-1								
TEH: (C10-C16)		<20	<20	RPD-NA	mg/kg	N/A	39	05-SEP-08
TEH: (C16-C34)		<20	<20	RPD-NA	mg/kg	N/A	39	05-SEP-08
TEH: (C34-C50)		<20	<20	RPD-NA	mg/kg	N/A	39	05-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 6 of 17

t	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
4-TMB-ED	Soil							
Batch	R720057							
WG831243-2	LCS							
TEH: (C10-C16)			91		%		55-145	05-SEP-08
TEH: (C16-C34)			91		%		55-145	05-SEP-08
TEH: (C34-C50)			91		%		55-145	05-SEP-08
WG831243-1	MB							
TEH: (C10-C16)			<20		mg/kg		20	05-SEP-08
TEH: (C16-C34)			<20		mg/kg		20	05-SEP-08
TEH: (C34-C50)			<20		mg/kg		20	05-SEP-08
TAL-CCME-ED	Soil							
Batch	R718976							
WG828702-2	CRM	2702_SOIL						
Arsenic (As)			102		%		92-111	06-SEP-08
Barium (Ba)			111		%		90-123	06-SEP-08
Beryllium (Be)			94		%		80-126	06-SEP-08
Chromium (Cr)			102		%		86-119	06-SEP-08
Cobalt (Co)			105		%		90-120	06-SEP-08
Copper (Cu)			105		%		91-118	06-SEP-08
Lead (Pb)			102		%		90-126	06-SEP-08
Mercury (Hg)			89		%		37-185	06-SEP-08
Molybdenum (Mo)			106		%		87-124	06-SEP-08
Nickel (Ni)			101		%		89-121	06-SEP-08
Selenium (Se)			109		%		78-123	06-SEP-08
Silver (Ag)			85		%		47-158	06-SEP-08
Tin (Sn)			109		%		73-139	06-SEP-08
Uranium (U)			96		%		89-128	06-SEP-08
Vanadium (V)			99		%		86-116	06-SEP-08
Zinc (Zn)			104		%		81-112	06-SEP-08
Cadmium (Cd)			103		%		87-117	09-SEP-08
WG828702-3	DUP	L676396-1						
Antimony (Sb)		<0.2	<0.2	RPD-NA	mg/kg	N/A	41	06-SEP-08
Arsenic (As)		7.3	7.4		mg/kg	1.3	15	06-SEP-08
Barium (Ba)		196	182		mg/kg	7.7	22	06-SEP-08
Beryllium (Be)		<1	<1	RPD-NA	mg/kg	N/A	26	06-SEP-08
Cadmium (Cd)		<0.5	<0.5	RPD-NA	mg/kg	N/A	23	06-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 7 of 17

Item	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TAL-CCME-ED		Soil						
Batch R718976								
WG828702-3	DUP	L676396-1						
Chromium (Cr)		14.9	14.7		mg/kg	1.2	19	06-SEP-08
Cobalt (Co)		7	6	J	mg/kg	0	4	06-SEP-08
Copper (Cu)		14	14	J	mg/kg	0	8	06-SEP-08
Lead (Pb)		7	7	J	mg/kg	0	20	06-SEP-08
Mercury (Hg)		<0.05	<0.05	RPD-NA	mg/kg	N/A	25	06-SEP-08
Molybdenum (Mo)		1	1	J	mg/kg	0	4	06-SEP-08
Nickel (Ni)		19	18	J	mg/kg	0	8	06-SEP-08
Selenium (Se)		0.4	0.3	J	mg/kg	0.0	0.8	06-SEP-08
Silver (Ag)		<1	<1	RPD-NA	mg/kg	N/A	33	06-SEP-08
Thallium (Tl)		<1	<1	RPD-NA	mg/kg	N/A	27	06-SEP-08
Tin (Sn)		<5	<5	RPD-NA	mg/kg	N/A	31	06-SEP-08
Uranium (U)		<2	<2	RPD-NA	mg/kg	N/A	16	06-SEP-08
Vanadium (V)		30	29		mg/kg	2.0	23	06-SEP-08
Zinc (Zn)		60	60	J	mg/kg	0	40	06-SEP-08
WG828702-5	DUP	L676396-193						
Antimony (Sb)		<0.2	<0.2	RPD-NA	mg/kg	N/A	41	06-SEP-08
Arsenic (As)		6.6	5.8		mg/kg	13	15	06-SEP-08
Barium (Ba)		173	155		mg/kg	11	22	06-SEP-08
Beryllium (Be)		<1	<1	RPD-NA	mg/kg	N/A	26	06-SEP-08
Cadmium (Cd)		<0.5	<0.5	RPD-NA	mg/kg	N/A	23	06-SEP-08
Chromium (Cr)		22.0	19.5		mg/kg	12	19	06-SEP-08
Cobalt (Co)		9	8	J	mg/kg	1	4	06-SEP-08
Copper (Cu)		9	8	J	mg/kg	1	8	06-SEP-08
Lead (Pb)		8	7	J	mg/kg	1	20	06-SEP-08
Mercury (Hg)		<0.05	<0.05	RPD-NA	mg/kg	N/A	25	06-SEP-08
Molybdenum (Mo)		<1	<1	RPD-NA	mg/kg	N/A	25	06-SEP-08
Nickel (Ni)		17	15	J	mg/kg	2	8	06-SEP-08
Selenium (Se)		0.3	0.3	J	mg/kg	0.1	0.8	06-SEP-08
Silver (Ag)		<1	<1	RPD-NA	mg/kg	N/A	33	06-SEP-08
Thallium (Tl)		<1	<1	RPD-NA	mg/kg	N/A	27	06-SEP-08
Tin (Sn)		<5	<5	RPD-NA	mg/kg	N/A	31	06-SEP-08
Uranium (U)		<2	<2	RPD-NA	mg/kg	N/A	16	06-SEP-08
Vanadium (V)		38	33		mg/kg	15	23	06-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 8 of 17

Item	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TAL-CCME-ED Soil								
Batch R718976								
WG828702-5	DUP	L676396-193						
Zinc (Zn)		60	50	J	mg/kg	10	40	06-SEP-08
WG828702-1	MB							
Antimony (Sb)			<0.2		mg/kg		1	06-SEP-08
Arsenic (As)			<0.2		mg/kg		1	06-SEP-08
Barium (Ba)			<5		mg/kg		25	06-SEP-08
Beryllium (Be)			<1		mg/kg		1	06-SEP-08
Cadmium (Cd)			<0.5		mg/kg		2.5	06-SEP-08
Chromium (Cr)			<0.5		mg/kg		2.5	06-SEP-08
Cobalt (Co)			<1		mg/kg		5	06-SEP-08
Copper (Cu)			<2		mg/kg		10	06-SEP-08
Lead (Pb)			<5		mg/kg		25	06-SEP-08
Mercury (Hg)			<0.05		mg/kg		0.25	06-SEP-08
Molybdenum (Mo)			<1		mg/kg		5	06-SEP-08
Nickel (Ni)			<2		mg/kg		10	06-SEP-08
Selenium (Se)			<0.2		mg/kg		1	06-SEP-08
Silver (Ag)			<1		mg/kg		5	06-SEP-08
Thallium (Tl)			<1		mg/kg		5	06-SEP-08
Tin (Sn)			<5		mg/kg		25	06-SEP-08
Uranium (U)			<2		mg/kg		2	06-SEP-08
Vanadium (V)			<1		mg/kg		5	06-SEP-08
Zinc (Zn)			<10		mg/kg		50	06-SEP-08
WG828702-4	MS	L676396-1						
Antimony (Sb)			105		%		90-118	06-SEP-08
Arsenic (As)			99		%		91-114	06-SEP-08
Barium (Ba)			99		%		56-151	06-SEP-08
Beryllium (Be)			99		%		82-121	06-SEP-08
Cadmium (Cd)			102		%		92-117	06-SEP-08
Chromium (Cr)			98		%		85-117	06-SEP-08
Cobalt (Co)			94		%		87-112	06-SEP-08
Copper (Cu)			93		%		80-116	06-SEP-08
Lead (Pb)			96		%		83-119	06-SEP-08
Molybdenum (Mo)			101		%		91-122	06-SEP-08
Nickel (Ni)			89		%		83-112	06-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 9 of 17

Item	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TAL-CCME-ED		Soil						
Batch	R718976							
WG828702-4	MS	L676396-1						
Selenium (Se)			102		%		90-120	06-SEP-08
Silver (Ag)			20		%		18-114	06-SEP-08
Thallium (Tl)			97		%		83-126	06-SEP-08
Tin (Sn)			103		%		92-118	06-SEP-08
Uranium (U)			97		%		86-117	06-SEP-08
Vanadium (V)			100		%		84-117	06-SEP-08
Zinc (Zn)			98		%		85-118	06-SEP-08
Mercury (Hg)			43		%		48-138	09-SEP-08
WG828702-6	MS	L676396-193						
Antimony (Sb)			105		%		90-118	06-SEP-08
Arsenic (As)			98		%		91-114	06-SEP-08
Barium (Ba)			89		%		56-151	06-SEP-08
Beryllium (Be)			99		%		82-121	06-SEP-08
Cadmium (Cd)			104		%		92-117	06-SEP-08
Chromium (Cr)			101		%		85-117	06-SEP-08
Cobalt (Co)			95		%		87-112	06-SEP-08
Copper (Cu)			97		%		80-116	06-SEP-08
Lead (Pb)			98		%		83-119	06-SEP-08
Molybdenum (Mo)			102		%		91-122	06-SEP-08
Nickel (Ni)			90		%		83-112	06-SEP-08
Selenium (Se)			103		%		90-120	06-SEP-08
Thallium (Tl)			101		%		83-126	06-SEP-08
Tin (Sn)			103		%		92-118	06-SEP-08
Uranium (U)			99		%		86-117	06-SEP-08
Vanadium (V)			100		%		84-117	06-SEP-08
Zinc (Zn)			101		%		85-118	06-SEP-08
Mercury (Hg)			62		%		48-138	09-SEP-08
Silver (Ag)			23		%		18-114	09-SEP-08
H-CCME-ED		Soil						
Batch	R719239							
WG829889-2	DUP	L677421-1						
Benzo(a)anthracene		0.02	0.01	J	mg/kg	0.01	0.04	07-SEP-08
Benzo(a)pyrene		0.02	0.02	J	mg/kg	0.01	0.04	07-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 10 of 17

t	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
H-CCME-ED		Soil						
Batch R719239								
WG829889-2	DUP	L677421-1						
Benzo(b&j)fluoranthene		0.03	0.03	J	mg/kg	0.01	0.04	07-SEP-08
Benzo(k)fluoranthene		0.01	<0.01	RPD-NA	mg/kg	N/A	26	07-SEP-08
Dibenzo(a,h)anthracene		<0.01	<0.01	RPD-NA	mg/kg	N/A	40	07-SEP-08
Indeno(1,2,3-cd)pyrene		0.01	<0.01	RPD-NA	mg/kg	N/A	35	07-SEP-08
Naphthalene		<0.01	<0.01	RPD-NA	mg/kg	N/A	25	07-SEP-08
Phenanthrene		0.04	0.02	J	mg/kg	0.01	0.04	07-SEP-08
Pyrene		0.04	0.02	J	mg/kg	0.01	0.04	07-SEP-08
Quinoline		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	07-SEP-08
WG829889-1	MB		<0.01		mg/kg		0.01	06-SEP-08
Benzo(a)anthracene			<0.01		mg/kg		0.01	06-SEP-08
Benzo(a)pyrene			<0.01		mg/kg		0.01	06-SEP-08
Benzo(b&j)fluoranthene			<0.01		mg/kg		0.01	06-SEP-08
Benzo(k)fluoranthene			<0.01		mg/kg		0.01	06-SEP-08
Dibenzo(a,h)anthracene			<0.01		mg/kg		0.01	06-SEP-08
Indeno(1,2,3-cd)pyrene			<0.01		mg/kg		0.01	06-SEP-08
Naphthalene			<0.01		mg/kg		0.01	06-SEP-08
Phenanthrene			<0.01		mg/kg		0.01	06-SEP-08
Pyrene			<0.01		mg/kg		0.01	06-SEP-08
Quinoline			<0.01		mg/kg		0.01	06-SEP-08
-ED		Soil						
Batch R718976								
WG828702-2	CRM	2702_SOIL						
Lead (Pb)			102		%		90-126	06-SEP-08
WG828702-1	MB		<5		mg/kg		25	06-SEP-08
Lead (Pb)								
EP-MOISTURE-ED		Soil						
Batch R717289								
WG827800-1	DUP	L676396-96						
% Moisture		11	10		%	4.3	20	02-SEP-08
WG827800-2	DUP	L676396-179						
% Moisture		20	21		%	7.3	20	02-SEP-08
WG827800-3	DUP	L676396-194						
% Moisture		7.4	7.9		%	6.8	20	02-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 11 of 17

Item	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EP-MOISTURE-ED Soil								
Batch	R717303							
WG827760-1	DUP	L676396-35						
% Moisture		11	10		%	1.0	20	02-SEP-08
Batch	R717440							
WG827983-1	DUP	L676353-16						
% Moisture		5.0	4.6		%	8.4	20	02-SEP-08
WG827983-2	DUP	L676396-195						
% Moisture		2.8	2.6		%	6.1	20	02-SEP-08
WG827983-3	DUP	L676396-221						
% Moisture		31	29		%	5.1	20	02-SEP-08
A-MUST-ED Soil								
Batch	R719890							
WG830352-1	DUP	L676396-202						
MUST PSA % > 75um		12	12		%	3.5	10	08-SEP-08
R-CALC-ED Soil								
Batch	R718988							
WG830009-2	DUP	L676396-198						
Calcium (Ca)		88	97		mg/L	9.7	16	05-SEP-08
Magnesium (Mg)		11	12	J	mg/L	1	12	05-SEP-08
Potassium (K)		3	3	J	mg/L	1	8	05-SEP-08
Sodium (Na)		10	11	J	mg/L	1	8	05-SEP-08
WG830009-4	DUP	L676396-48						
Calcium (Ca)		31	32	J	mg/L	0	20	05-SEP-08
Magnesium (Mg)		7	7	J	mg/L	0	12	05-SEP-08
Potassium (K)		3	3	J	mg/L	0	8	05-SEP-08
Sodium (Na)		8	8	J	mg/L	0	8	05-SEP-08
WG830009-1	IRM	SALINITY_SOIL3						
Calcium (Ca)			112		%		70-130	05-SEP-08
Magnesium (Mg)			115		%		70-130	05-SEP-08
Potassium (K)			118		%		72-128	05-SEP-08
Sodium (Na)			107		%		71-129	05-SEP-08
WG830009-6	IRM	SALINITY_SOIL3						
Calcium (Ca)			92		%		70-130	05-SEP-08
Magnesium (Mg)			91		%		70-130	05-SEP-08
Potassium (K)			93		%		72-128	05-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 12 of 17

t	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
R-CALC-ED		Soil						
Batch R718988								
WG830009-6	IRM	SALINITY_SOIL3						
Sodium (Na)			86		%		71-129	05-SEP-08
WG830009-3	MS	L676396-198						
Calcium (Ca)			99		%		88-115	05-SEP-08
Magnesium (Mg)			109		%		88-116	05-SEP-08
Potassium (K)			96		%		87-113	05-SEP-08
Sodium (Na)			101		%		85-116	05-SEP-08
WG830009-5	MS	L676396-48						
Calcium (Ca)			101		%		88-115	05-SEP-08
Magnesium (Mg)			107		%		88-116	05-SEP-08
Potassium (K)			94		%		87-113	05-SEP-08
Sodium (Na)			96		%		85-116	05-SEP-08
T/PH/EC-ED		Soil						
Batch R717998								
WG828464-2	DUP	L676396-198						
% Saturation			37.9	36.2	%	4.7	9.8	04-SEP-08
Conductivity Sat. Paste			0.42	0.42	dS m-1	1.4	10	04-SEP-08
pH in Saturated Paste			7.1	7.1	pH	0.1	0.26	04-SEP-08
WG828464-1	IRM	SALINITY_SOIL3						
% Saturation				110	%		70-130	04-SEP-08
Conductivity Sat. Paste				109	%		73-127	04-SEP-08
pH in Saturated Paste				6.7	pH		5-8.3	04-SEP-08
WG828464-3	LCS							
pH in Saturated Paste				4.0	pH		3.9-4.1	04-SEP-08
WG828464-4	LCS							
pH in Saturated Paste				7.0	pH		6.9-7.1	04-SEP-08
WG828464-5	LCS							
pH in Saturated Paste				9.9	pH		9.9-10.1	04-SEP-08
WG828464-6	LCS							
Conductivity Sat. Paste				108	%		98-112	04-SEP-08
WG828464-7	LCS							
Conductivity Sat. Paste				105	%		96-109	04-SEP-08
WG828464-8	LCS							
Conductivity Sat. Paste				100	%		94-112	04-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 13 of 17

t	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
T/PH/EC-ED		Soil						
batch	R718749							
WG829201-2	DUP	L676396-48						
% Saturation		32.5	32.0		%	1.6	9.8	05-SEP-08
Conductivity Sat. Paste		0.20	0.20		dS m-1	0.50	10	05-SEP-08
pH in Saturated Paste		8.2	8.2	J	pH	0.0	0.26	05-SEP-08
WG829201-1	IRM	SALINITY_SOIL3						
% Saturation			105		%		70-130	05-SEP-08
Conductivity Sat. Paste			101		%		73-127	05-SEP-08
pH in Saturated Paste			6.3		pH		5-8.3	05-SEP-08
WG829201-3	LCS							
pH in Saturated Paste			4.0		pH		3.9-4.1	05-SEP-08
WG829201-4	LCS							
pH in Saturated Paste			7.0		pH		6.9-7.1	05-SEP-08
WG829201-5	LCS							
pH in Saturated Paste			9.9		pH		9.9-10.1	05-SEP-08
WG829201-6	LCS							
Conductivity Sat. Paste			105		%		98-112	05-SEP-08
WG829201-7	LCS							
Conductivity Sat. Paste			102		%		96-109	05-SEP-08
WG829201-8	LCS							
Conductivity Sat. Paste			100		%		94-112	05-SEP-08
4-SAR-ED		Soil						
batch	R718988							
WG830009-2	DUP	L676396-198						
Sulphate (SO4)		35	40	J	mg/L	5	24	05-SEP-08
WG830009-4	DUP	L676396-48						
Sulphate (SO4)		26	26	J	mg/L	0	24	05-SEP-08
WG830009-1	IRM	SALINITY_SOIL3						
Sulphate (SO4)			115		%		68-132	05-SEP-08
WG830009-6	IRM	SALINITY_SOIL3						
Sulphate (SO4)			90		%		68-132	05-SEP-08
WG830009-3	MS	L676396-198						
Sulphate (SO4)			94		%		73-130	05-SEP-08
WG830009-5	MS	L676396-48						
Sulphate (SO4)			90		%		73-130	05-SEP-08
C-CLALI-CCME-ED	Soil							

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 14 of 17

Item	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-CLALI-CCME-ED	Soil							
Batch	R718196							
WG828918-1	DUP	L676396-204						
1,1,1-Trichloroethane		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
1,1,2,2-Tetrachloroethane		<0.02	<0.02	RPD-NA	mg/kg	N/A	39	04-SEP-08
1,1,2-Trichloroethane		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
1,1-Dichloroethane		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
1,1-Dichloroethene		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
1,2-Dichloroethane		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
1,2-Dichloropropane		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
Carbon Tetrachloride		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
Chloroform		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
cis-1,3-Dichloropropene		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
Methylene Chloride		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
Tetrachloroethylene		<0.01	<0.01	RPD-NA	mg/kg	N/A	50	04-SEP-08
trans-1,2-Dichloroethene		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
trans-1,3-Dichloropropene		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
Trichloroethene		<0.01	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
WG829335-2	LCS							
1,1,1-Trichloroethane			97		%		70-130	03-SEP-08
1,1-Dichloroethene			80		%		70-130	03-SEP-08
1,2-Dichloroethane			123		%		70-130	03-SEP-08
Carbon Tetrachloride			100		%		70-130	03-SEP-08
Chloroform			97		%		70-130	03-SEP-08
Methylene Chloride			89		%		70-130	03-SEP-08
Trichloroethene			106		%		70-130	03-SEP-08
WG829335-1	MB							
1,1,1-Trichloroethane			<0.01		mg/kg		0.01	03-SEP-08
1,1,2,2-Tetrachloroethane			<0.02		mg/kg		0.02	03-SEP-08
1,1,2-Trichloroethane			<0.01		mg/kg		0.01	03-SEP-08
1,1-Dichloroethane			<0.01		mg/kg		0.01	03-SEP-08
1,1-Dichloroethene			<0.01		mg/kg		0.01	03-SEP-08
1,2-Dichloroethane			<0.01		mg/kg		0.01	03-SEP-08
1,2-Dichloropropane			<0.01		mg/kg		0.01	03-SEP-08
Carbon Tetrachloride			<0.01		mg/kg		0.01	03-SEP-08
Chloroform			<0.01		mg/kg		0.01	03-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 15 of 17

t	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-CLALI-CCME-ED		Soil						
Batch		R718196						
WG829335-1		MB						
	cis-1,3-Dichloropropene		<0.01		mg/kg		0.01	03-SEP-08
	Methylene Chloride		<0.01		mg/kg		0.01	03-SEP-08
	Tetrachloroethylene		<0.01		mg/kg		0.01	03-SEP-08
	trans-1,2-Dichloroethene		<0.01		mg/kg		0.01	03-SEP-08
	trans-1,3-Dichloropropene		<0.01		mg/kg		0.01	03-SEP-08
	Trichloroethene		<0.01		mg/kg		0.01	03-SEP-08
C-MAH-CCME-ED		Soil						
Batch		R718196						
WG828918-1		DUP						
	1,2-Dichlorobenzene	L676396-204	<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
	1,3-Dichlorobenzene		<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
	1,4-Dichlorobenzene		<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
	Chlorobenzene		<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
	Styrene		<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
	Thiophene		<0.01	RPD-NA	mg/kg	N/A	39	04-SEP-08
WG829335-2		LCS						
	1,4-Dichlorobenzene		92		%		70-130	03-SEP-08
	Benzene		96		%		70-130	03-SEP-08
	Ethylbenzene		114		%		70-130	03-SEP-08
	m+p-Xylenes		120		%		70-130	03-SEP-08
	o-Xylene		123		%		70-130	03-SEP-08
	Styrene		105		%		70-130	03-SEP-08
	Toluene		90		%		70-130	03-SEP-08
WG829335-1		MB						
	1,2-Dichlorobenzene		<0.01		mg/kg		0.01	03-SEP-08
	1,3-Dichlorobenzene		<0.01		mg/kg		0.01	03-SEP-08
	1,4-Dichlorobenzene		<0.01		mg/kg		0.01	03-SEP-08
	Benzene		<0.005		mg/kg		0.005	03-SEP-08
	Chlorobenzene		<0.01		mg/kg		0.01	03-SEP-08
	Ethylbenzene		<0.01		mg/kg		0.01	03-SEP-08
	m+p-Xylenes		<0.01		mg/kg		0.01	03-SEP-08
	o-Xylene		<0.01		mg/kg		0.01	03-SEP-08
	Styrene		<0.01		mg/kg		0.01	03-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 16 of 17

t	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-MAH-CCME-ED	Soil							
atch	R718196							
WG829335-1	MB							
Thiophene			<0.01		mg/kg		0.01	03-SEP-08
Toluene			<0.01		mg/kg		0.01	03-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676396

Report Date: 21-OCT-08

Page 17 of 17

Legend:

Limit 99% Confidence Interval (Laboratory Control Limits)
DUP Duplicate
RPD Relative Percent Difference
N/A Not Available
LCS Laboratory Control Sample
SRM Standard Reference Material
MS Matrix Spike
MSD Matrix Spike Duplicate
ADE Average Desorption Efficiency
MB Method Blank
IRM Internal Reference Material
CRM Certified Reference Material
CCV Continuing Calibration Verification
CVS Calibration Verification Standard
LCSD Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

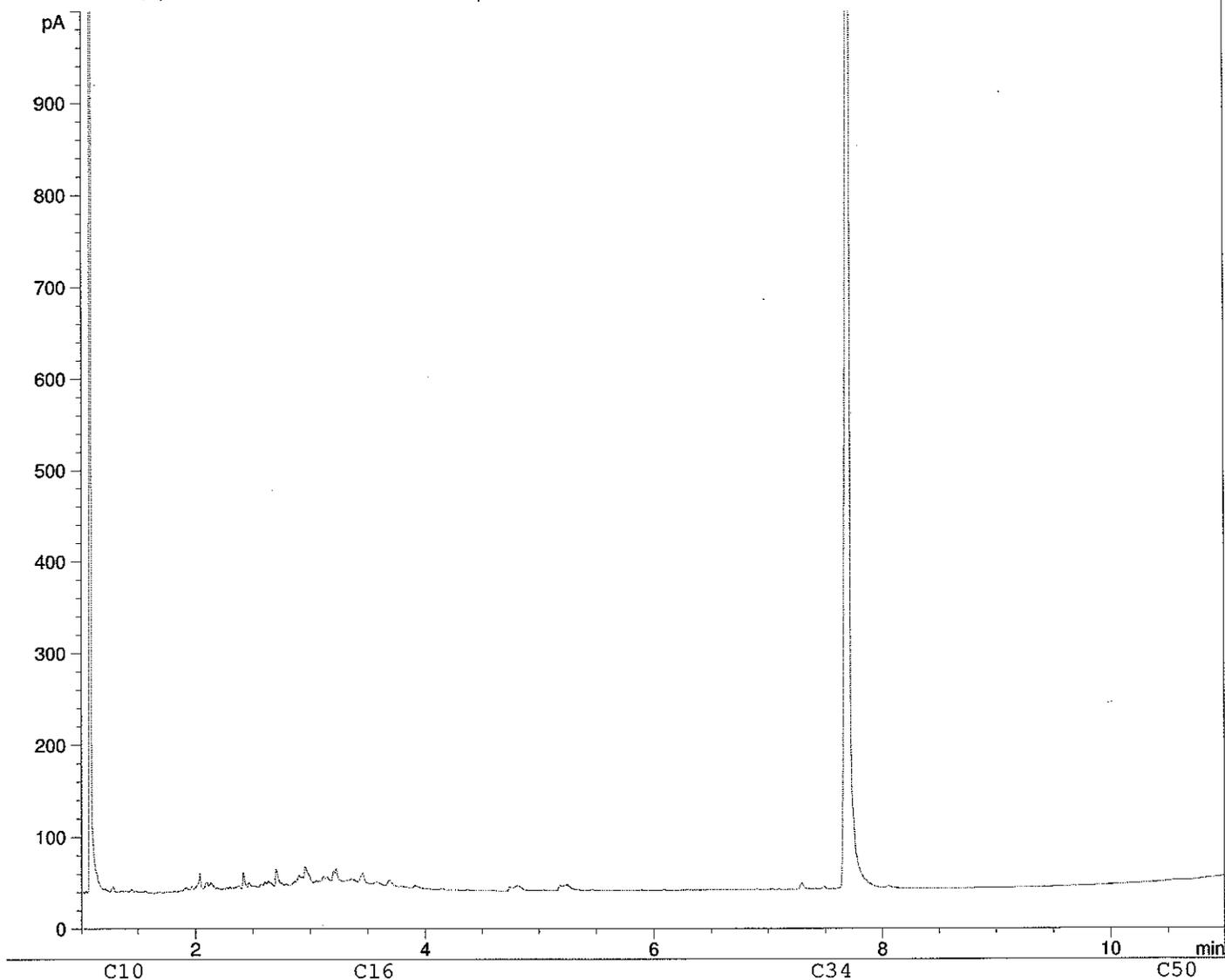
Qualifier	Description
A	Method Blank exceeds ALS DQO. Refer to narrative comments for further information.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Client ID: 08BH16 @ 6.1
 Sample ID: L676396-123 30
 Injection Date: 9/4/2008 1:52:20 AM
 Instrument: 6890



Total Extractable Hydrocarbons

FID2 B, (I:\ALSED.GCFID5\0903B\0903BK16.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

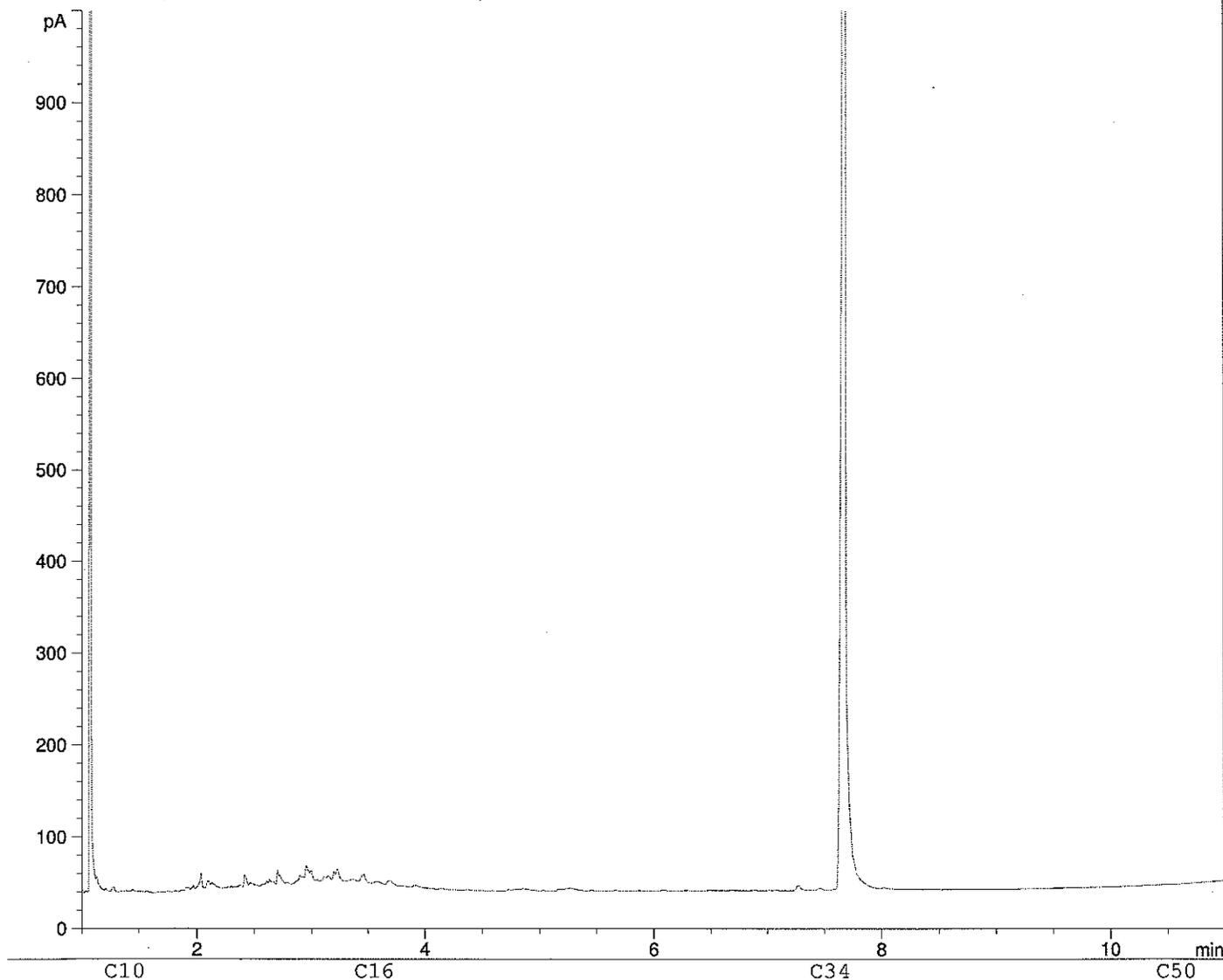
V.M.&P. Naphtha	3	10
Mineral Spirits	4	14
#2 Diesel	10	21
JP5, Jet A	10	28
Heavy Diesel	14	28
Gas Oil, Fuel Oil	14	30
Lubricating Oils	14	30

Adapted from: Drews, A.W.; ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08BH16D @ 6.1
 Sample ID: L676396-130 30
 Injection Date: 9/4/2008 2:36:33 AM
 Instrument: 6890



Total Extractable Hydrocarbons
 FID2 B, (I:\ALSED.GCFID5\0903B\0903BK18.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

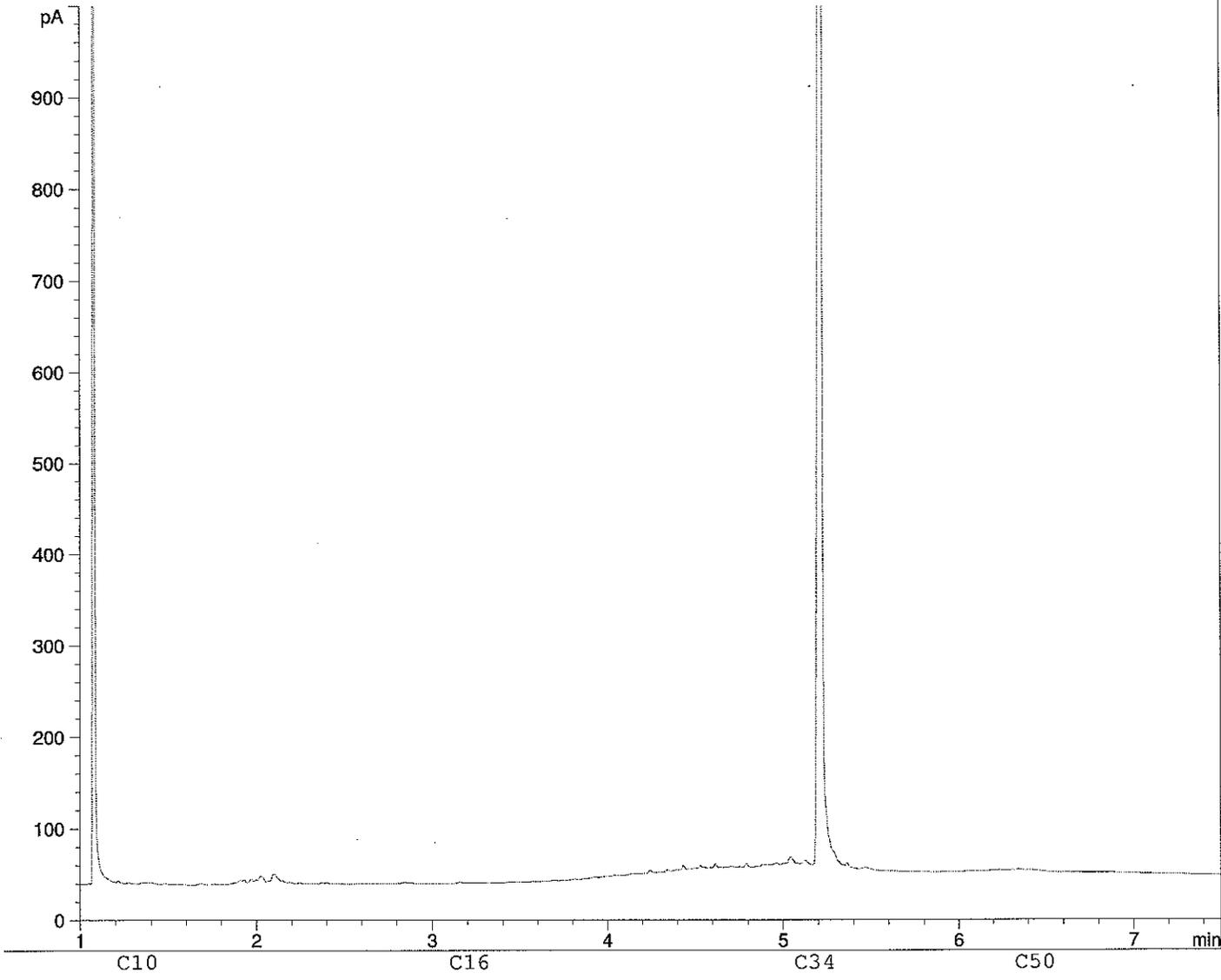
V.M.&P. Naphtha: Carbon 3 to 10
 Mineral Spirits: Carbon 6 to 14
 #2 Diesel: Carbon 10 to 21
 JP5, Jet A: Carbon 10 to 17
 Heavy Diesel: Carbon 12 to 27
 Gas Oil, Fuel Oil: Carbon 10 to 30
 Lubricating Oils: Carbon 12 to 30

Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08BH18 @ 0.6
 Sample ID: L676396-148 30
 Injection Date: 9/6/2008 12:30:30 AM
 Instrument: 6890



Total Extractable Hydrocarbons
 FID2 B, (I:\ALSED.GCFID5\0905\0905BK14.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

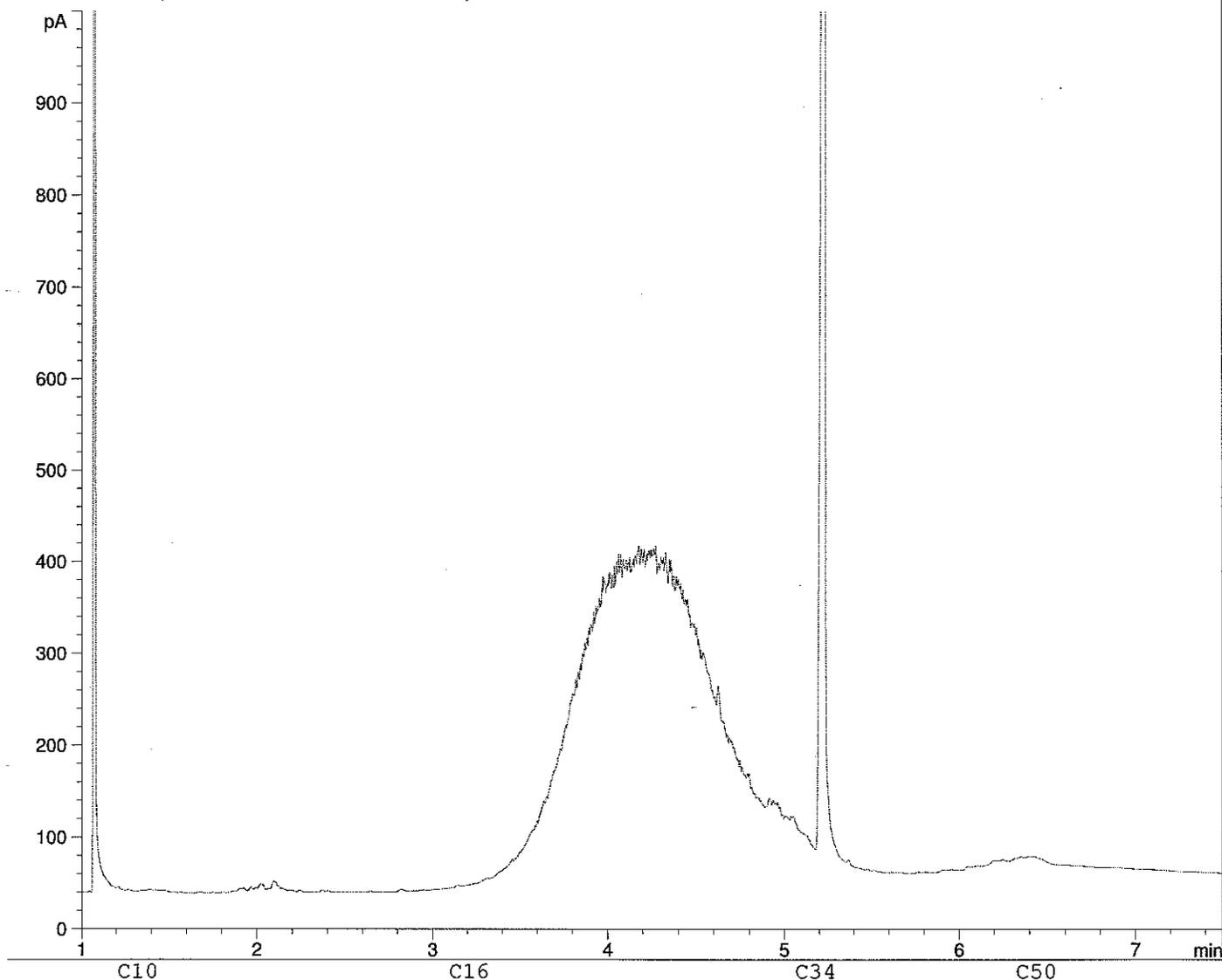
V.M.&P. Naphtha	3	10
Mineral Spirits	3	14
#2 Diesel	9	21
JP5, Jet A	9	17
Heavy Diesel	15	27
Gas Oil, Fuel Oil	9	30
Lubricating Oils	9	30

Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS24
 Sample ID: L676396-180 30
 Injection Date: 9/6/2008 1:06:32 AM
 Instrument: 6890



Total Extractable Hydrocarbons
 FID2 B, (I:\ALSED.GCFID5\0905\0905BK16.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

VM.&P. Naphtha	←	→																											
Mineral Spirits																													
#2 Diesel																													
JP5, Jet A																													
Heavy Diesel																													
Gas Oil, Fuel Oil																													
Lubricating Oils																													

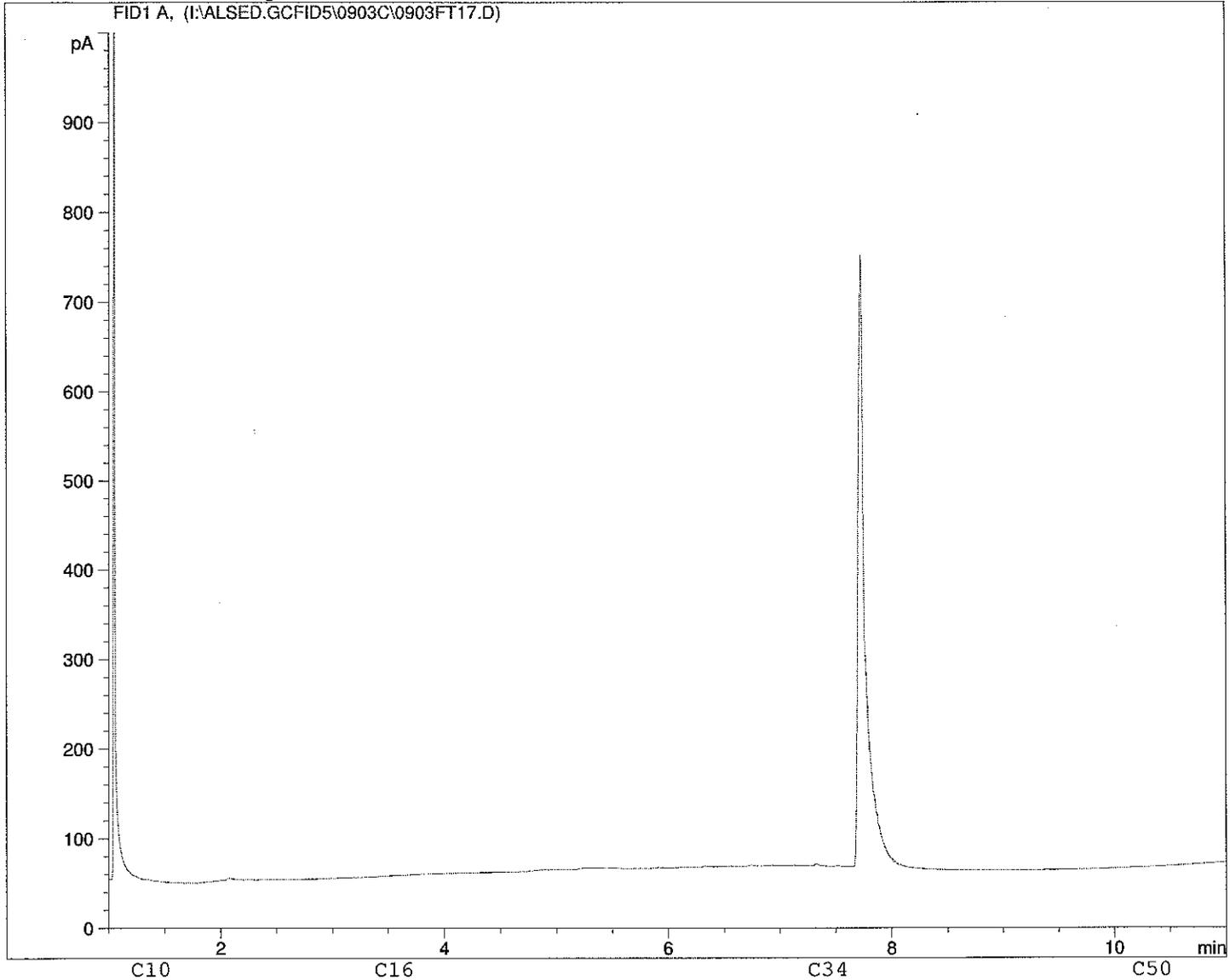
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS29
 Sample ID: L676396-185 30
 Injection Date: 9/4/2008 2:14:24 AM
 Instrument: 6890



Total Extractable Hydrocarbons

FID1 A, (I:\ALSED.GCFID5\0903C\0903FT17.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

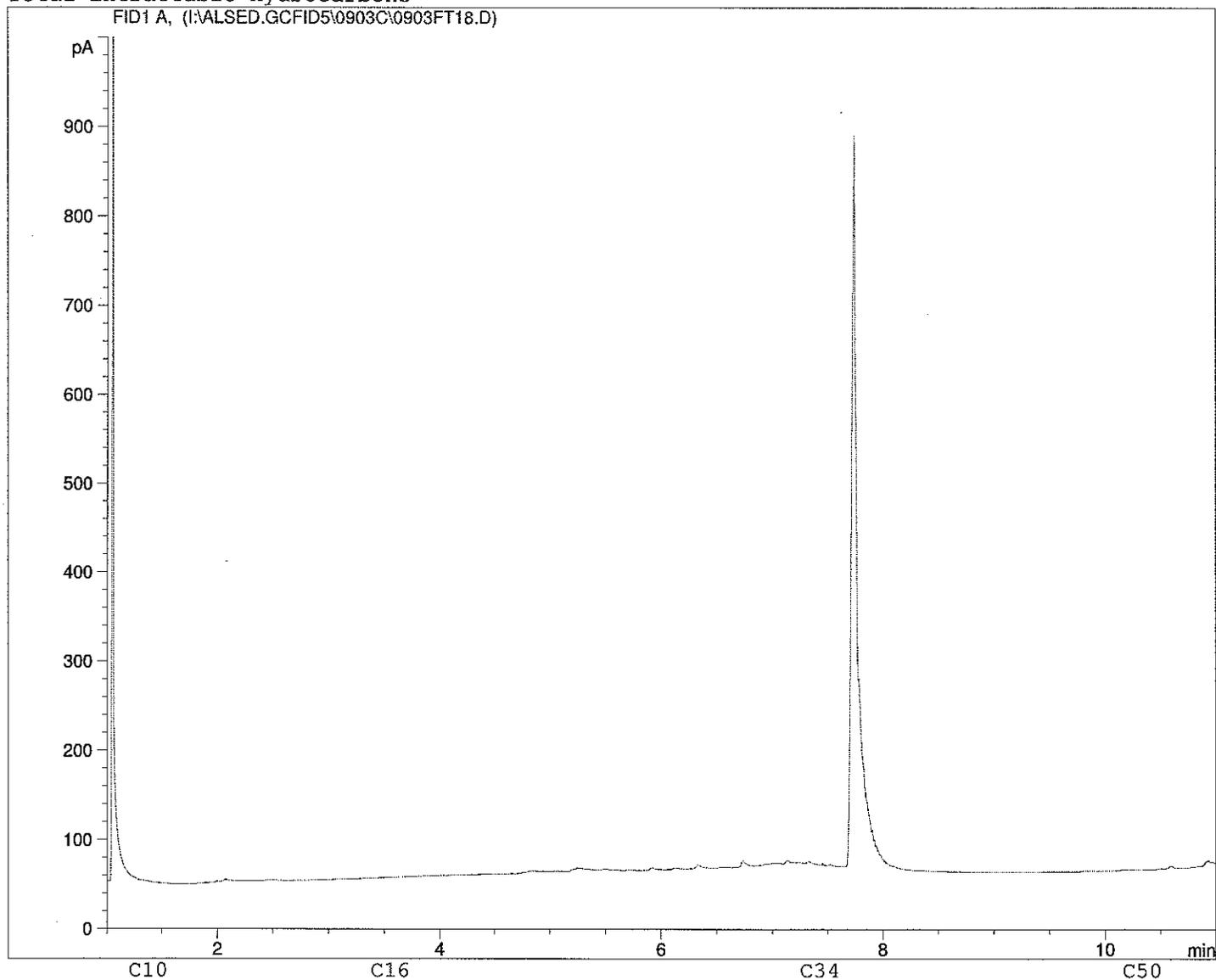
Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

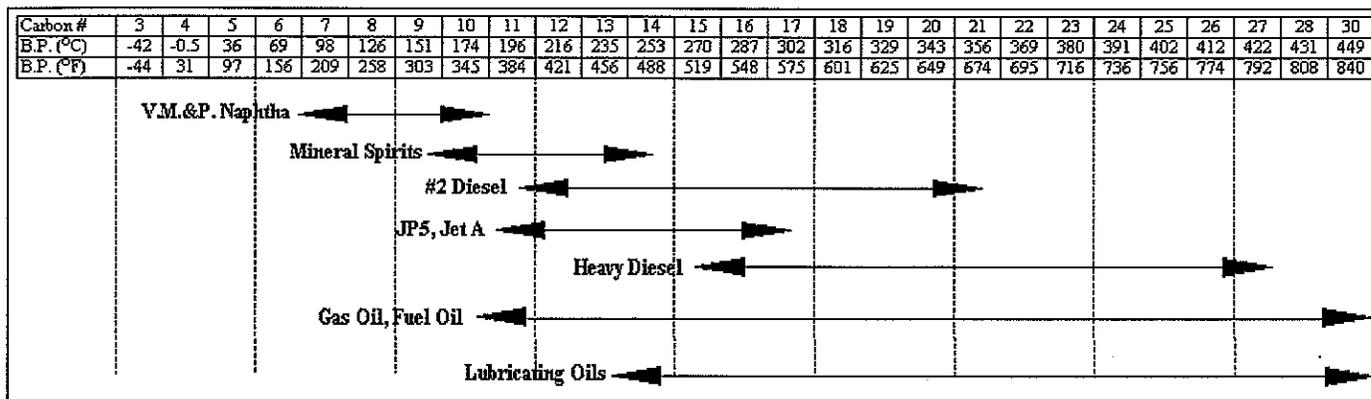
Client ID: 08SS32
 Sample ID: L676396-188 30
 Injection Date: 9/4/2008 2:36:34 AM
 Instrument: 6890



Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products



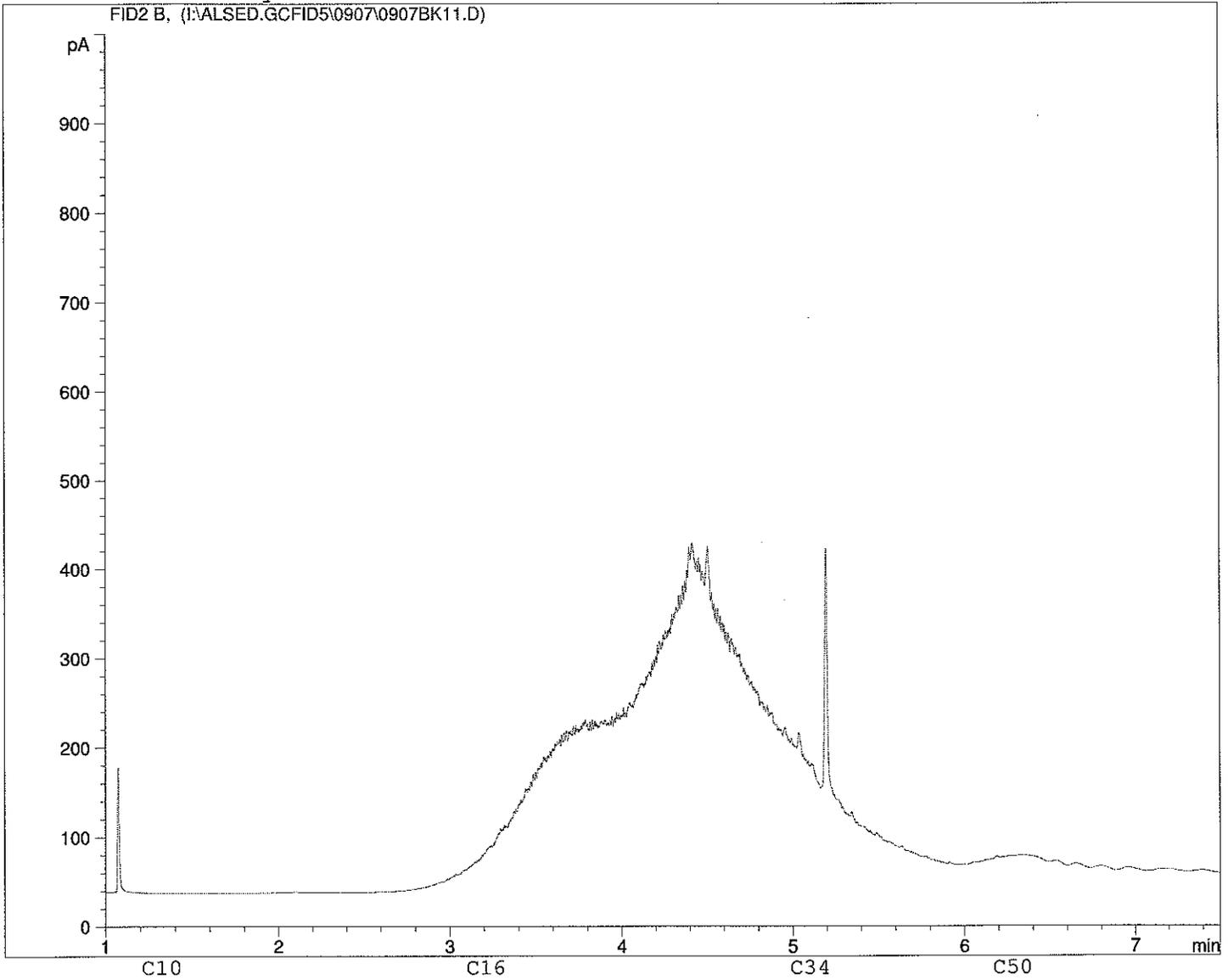
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08MW21 @ 0.6
 Sample ID: L676396-19 300
 Injection Date: 9/7/2008 8:54:05 PM
 Instrument: 6890



Total Extractable Hydrocarbons

FID2 B, (I:\ALSED.GCFID5\0907\0907BK11.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

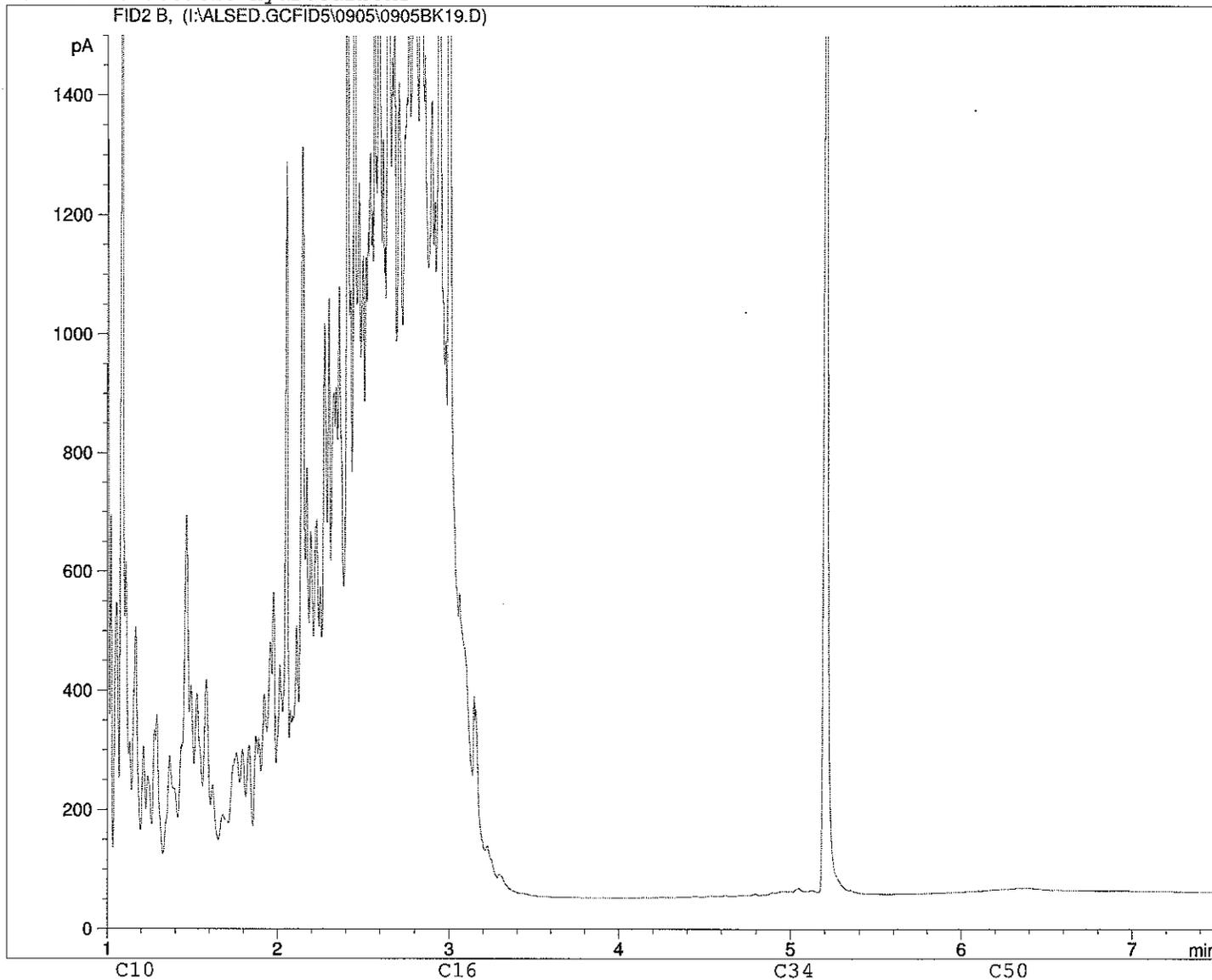
VM.&P. Naphtha	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
Mineral Spirits	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
#2 Diesel	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
JP5, Jet A	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
Heavy Diesel	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
Gas Oil, Fuel Oil	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
Lubricating Oils	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30

Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS36
 Sample ID: L676396-192 30
 Injection Date: 9/6/2008 2:00:18 AM
 Instrument: 6890



Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

VM.&P. Naphtha	3	10
Mineral Spirits	6	16
#2 Diesel	10	28
JP5, Jet A	12	20
Heavy Diesel	16	36
Gas Oil, Fuel Oil	20	40
Lubricating Oils	24	40

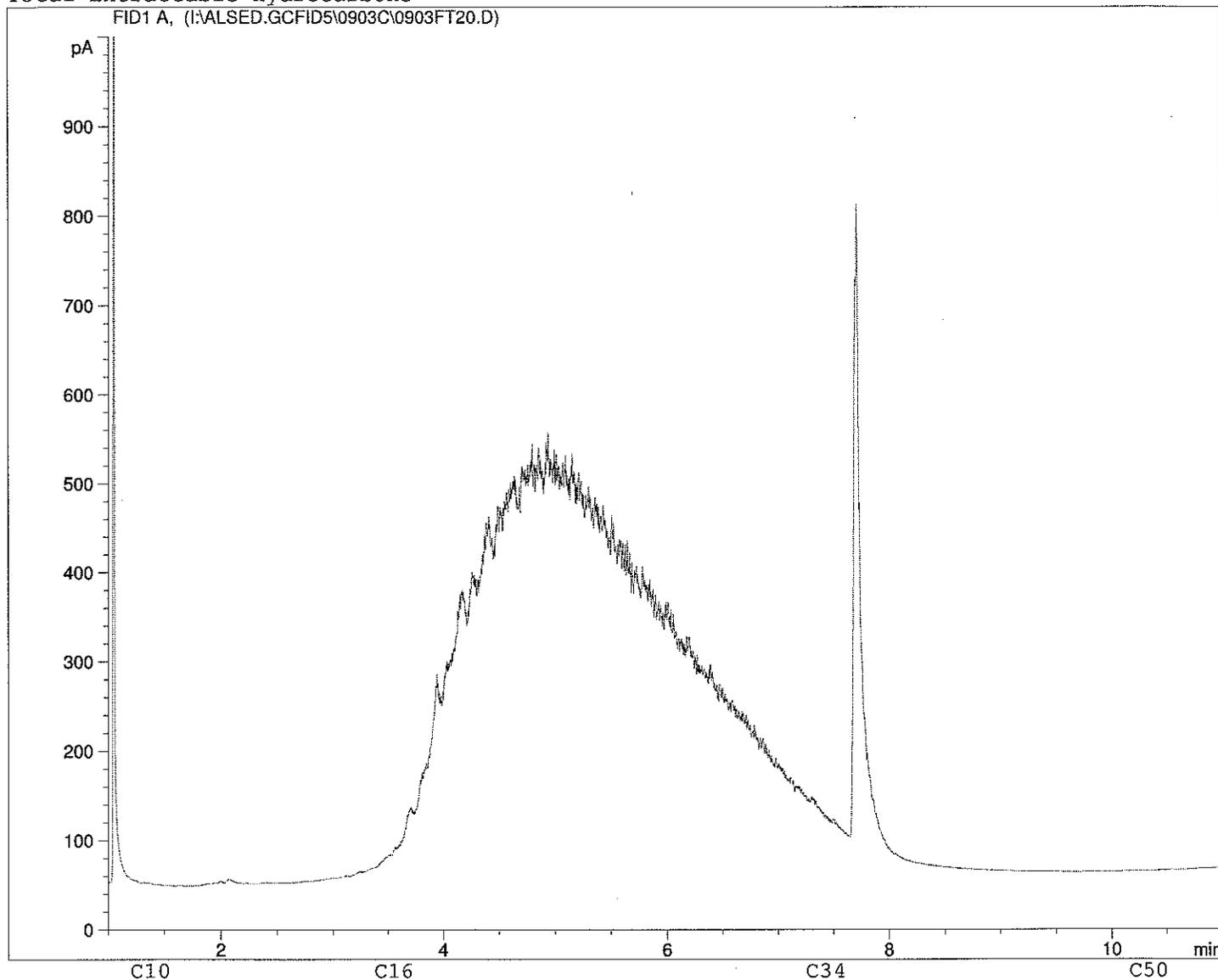
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS37
 Sample ID: L676396-194 30
 Injection Date: 9/4/2008 3:20:55 AM
 Instrument: 6890

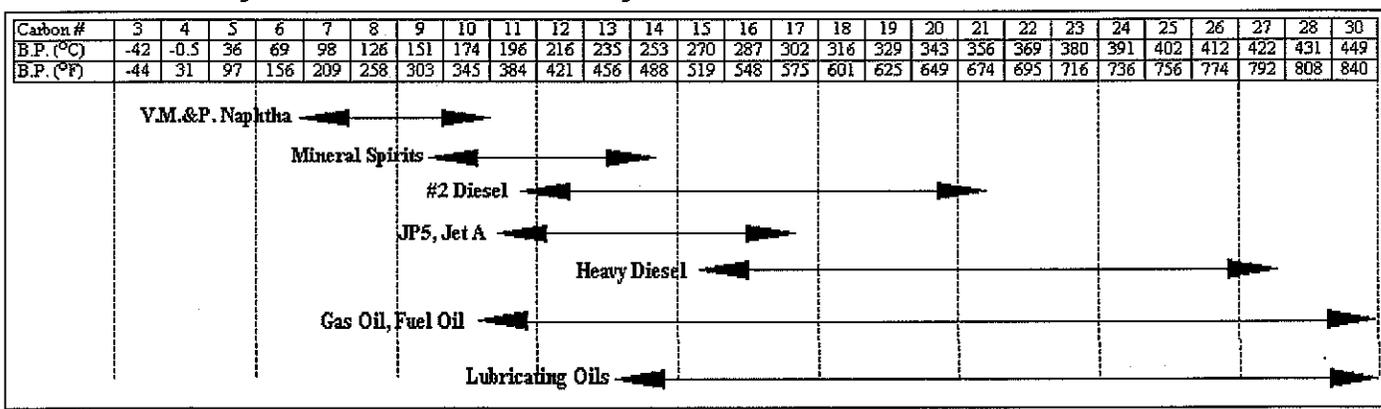


Total Extractable Hydrocarbons

FID1 A, (I:\ALSED.GCFID5\0903C\0903FT20.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

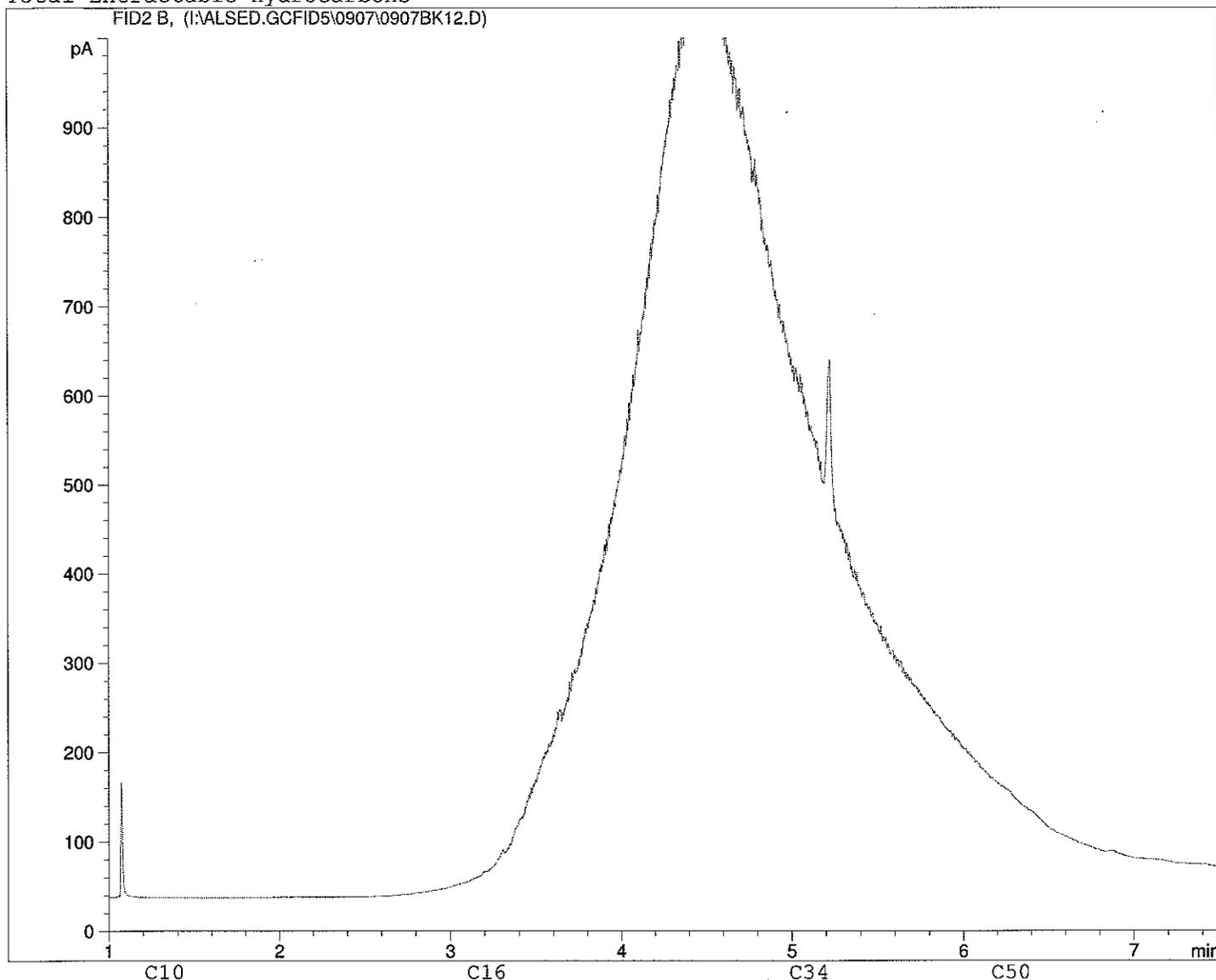


Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS39
 Sample ID: L676396-196 300
 Injection Date: 9/7/2008 9:12:01 PM
 Instrument: 6890



Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

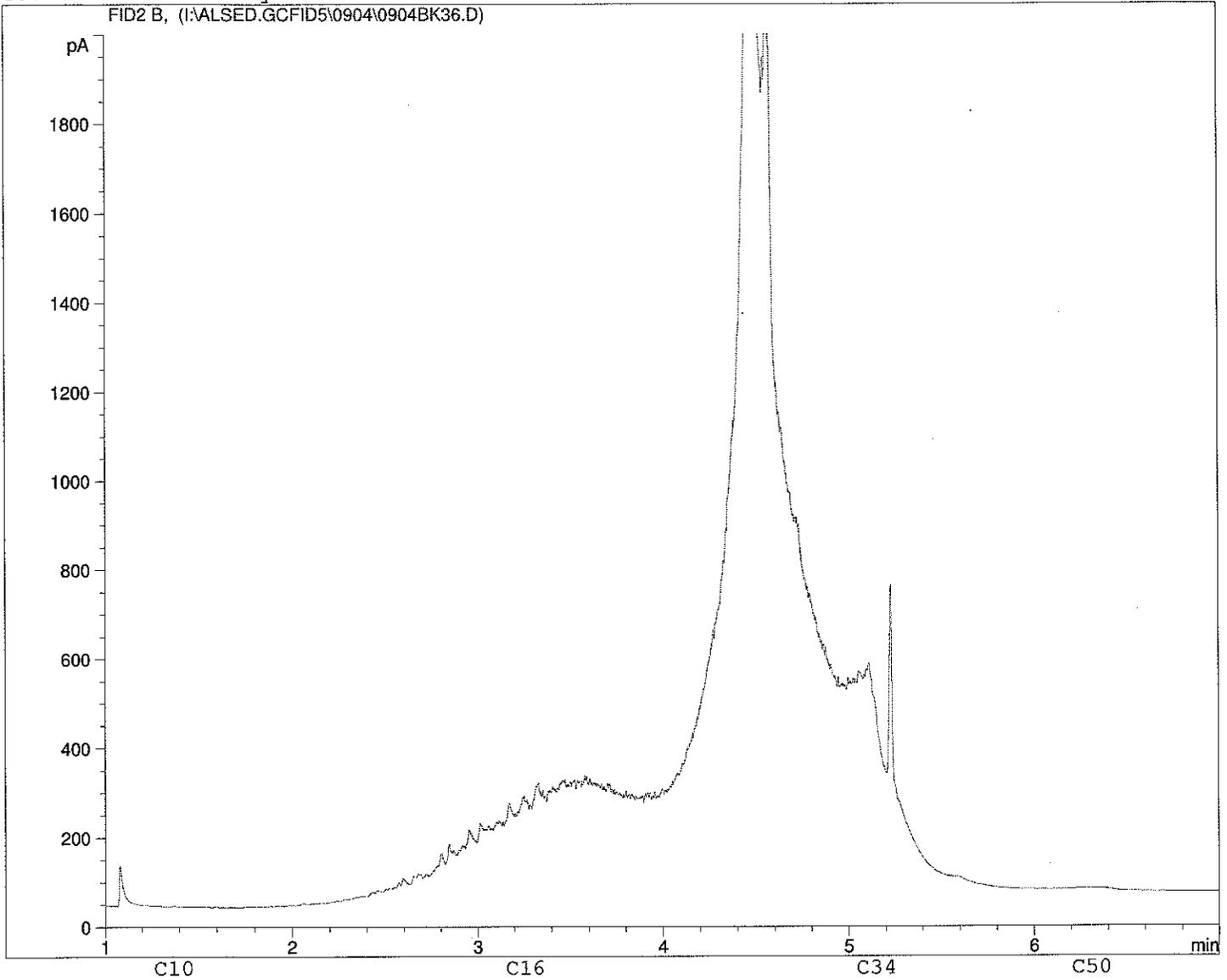
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS40
 Sample ID: L676396-197 150
 Injection Date: 9/5/2008 6:20:59 AM
 Instrument: 6890

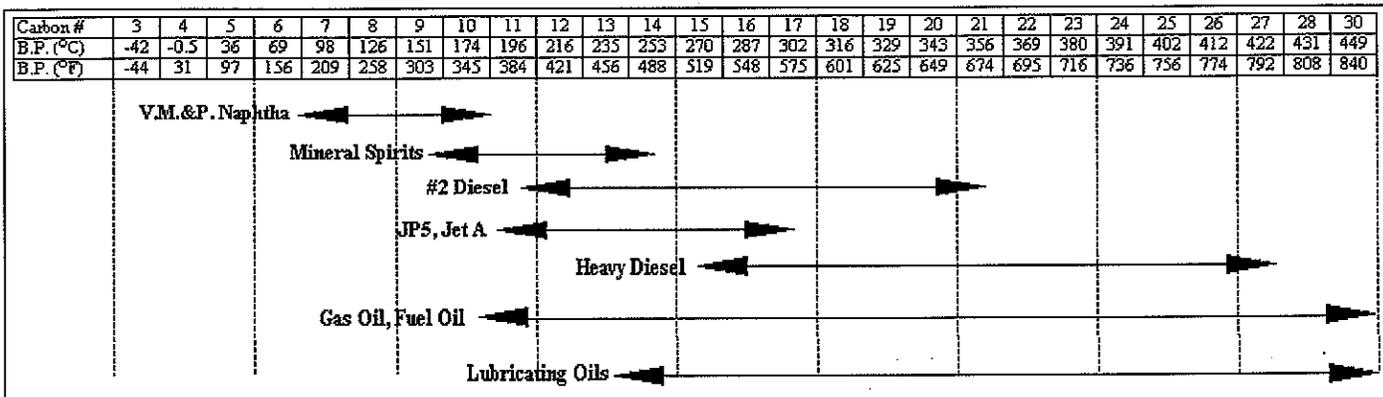


Total Extractable Hydrocarbons

FID2 B, (I:\ALSED.GCFID5\0904\0904BK36.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

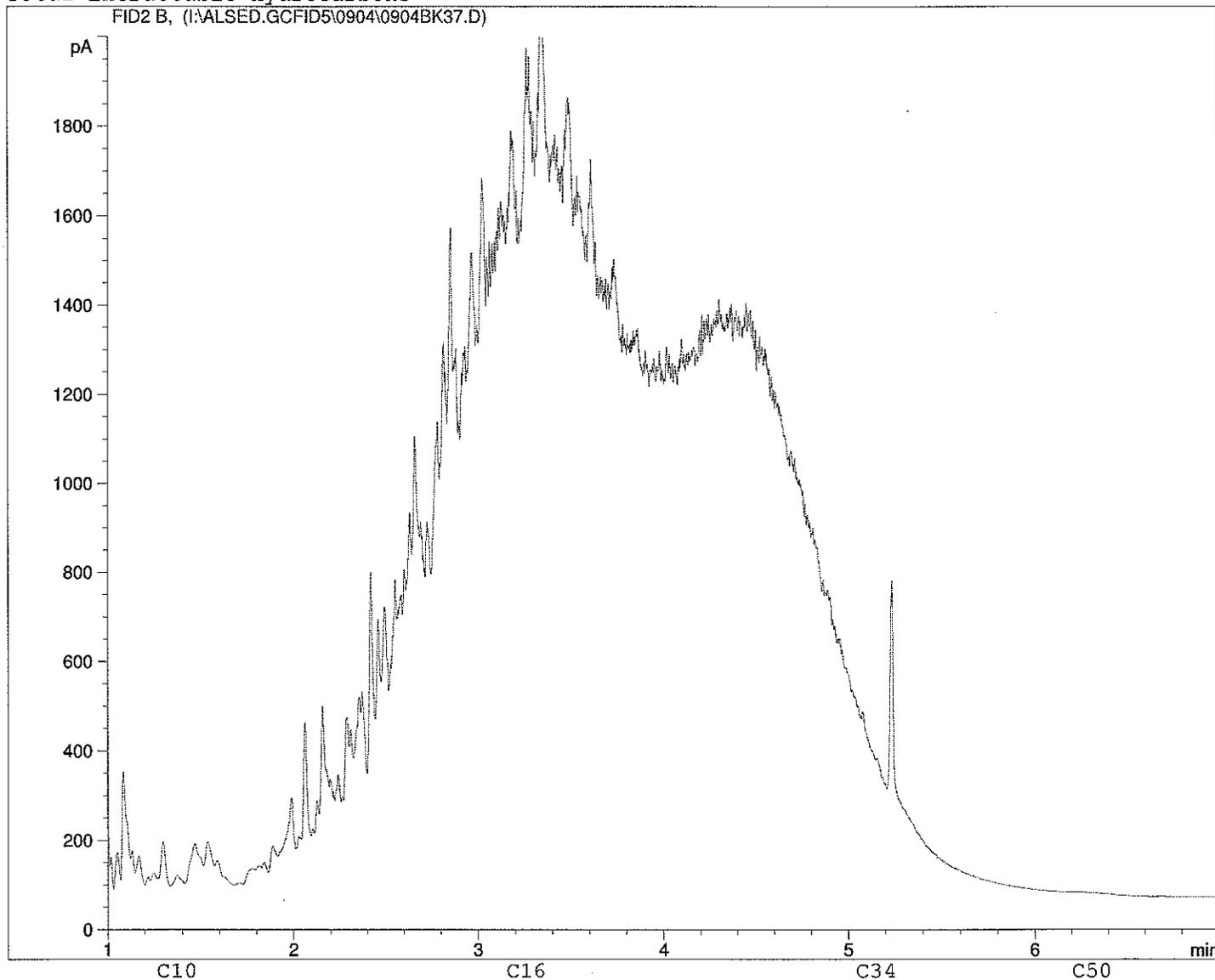


Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

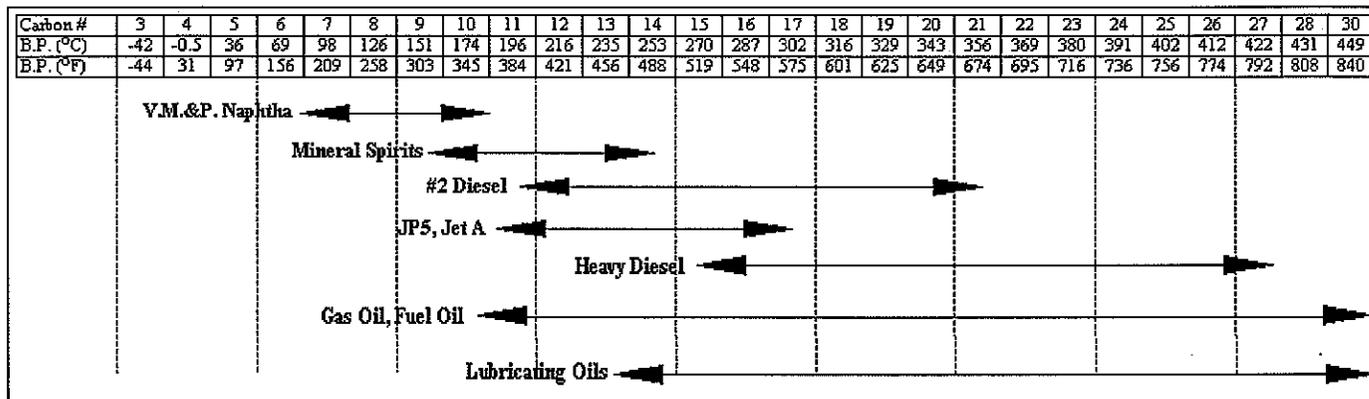
Client ID: 08SS41
 Sample ID: L676396-198 150
 Injection Date: 9/5/2008 6:38:53 AM
 Instrument: 6890



Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products



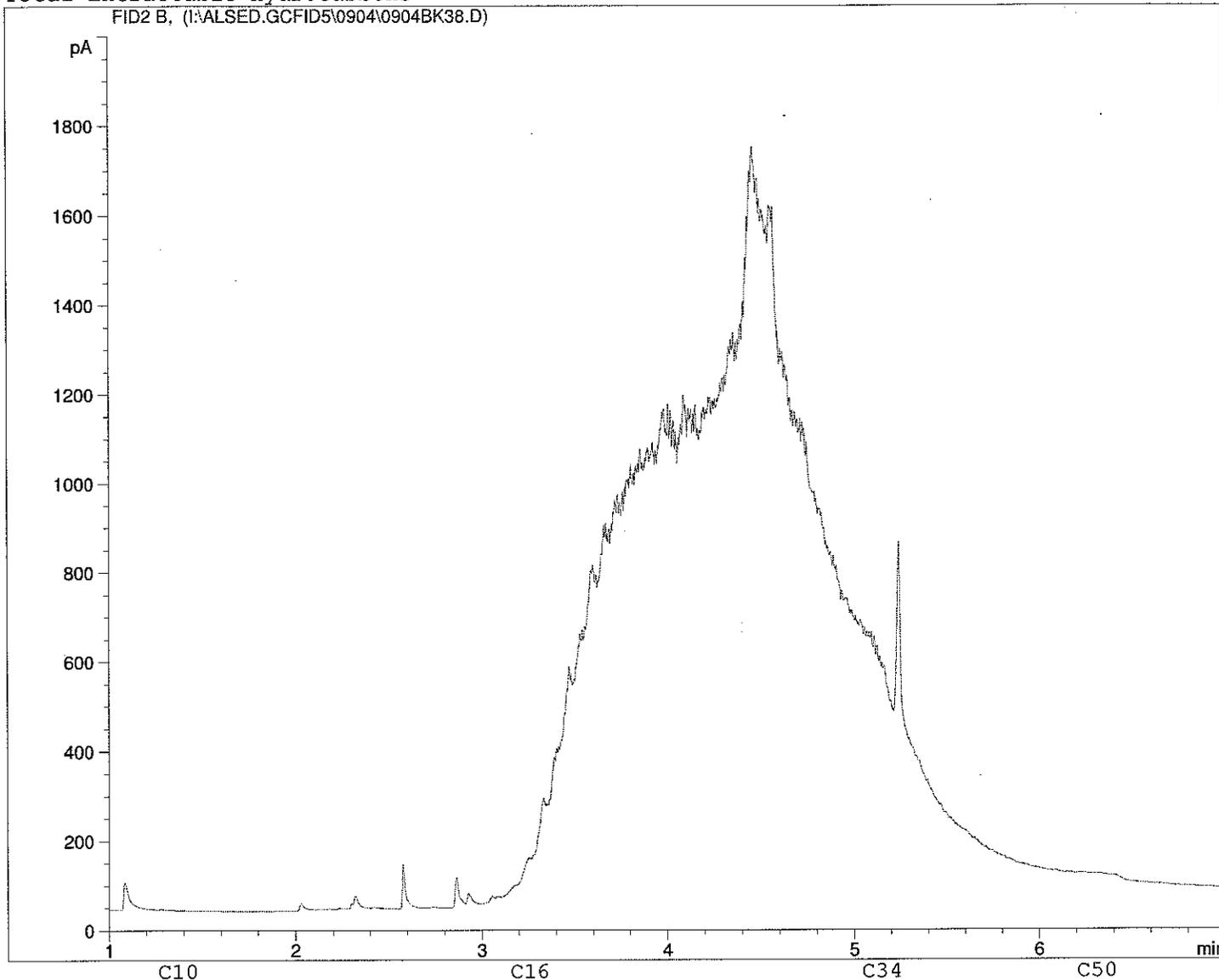
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989; p XVIII

Client ID: 08SS42
 Sample ID: L676396-199 150
 Injection Date: 9/5/2008 6:57:03 AM
 Instrument: 6890

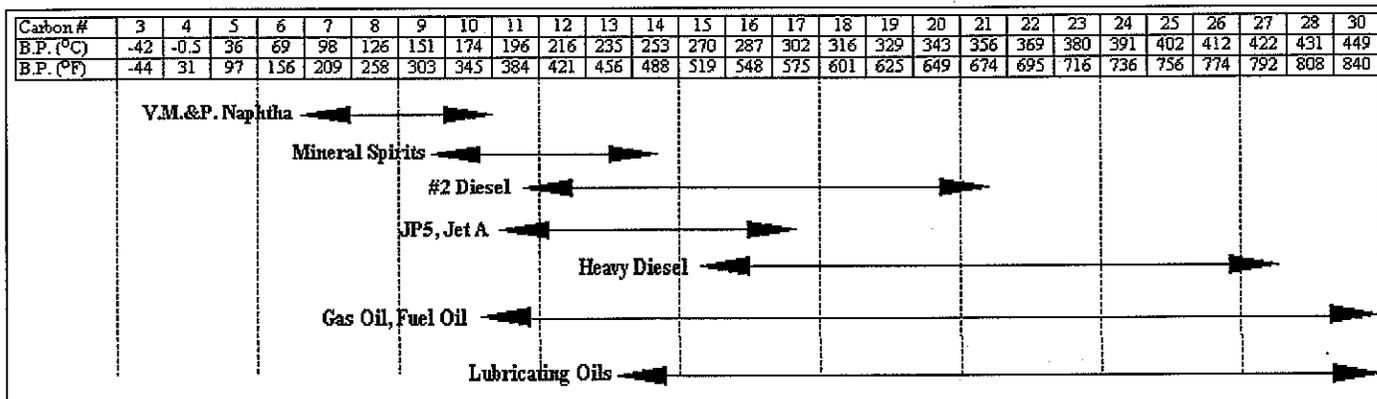


Total Extractable Hydrocarbons

FID2 B, (I\ALSED.GCFID5\0904\0904BK38.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

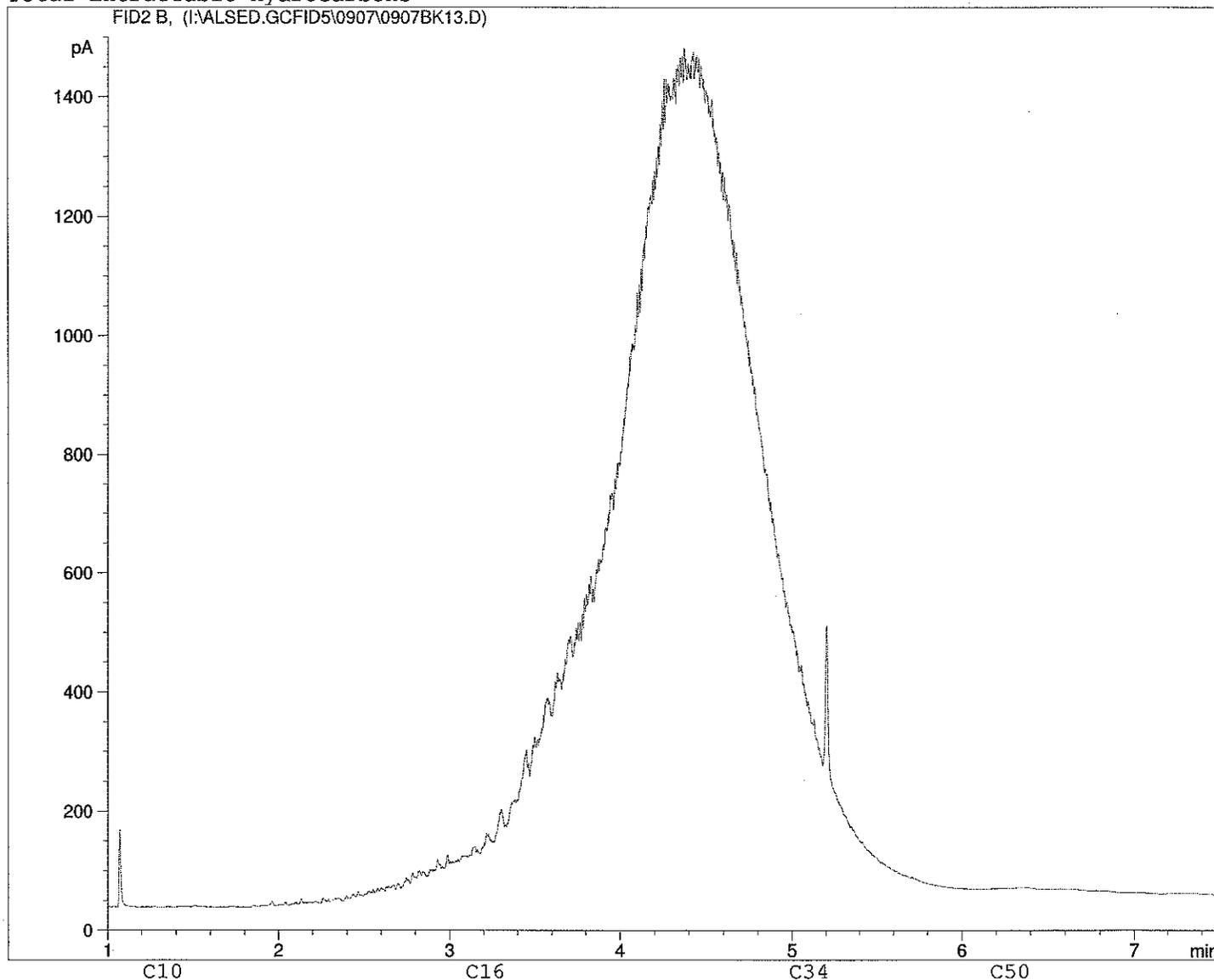


Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS43
 Sample ID: L676396-200 300
 Injection Date: 9/7/2008 9:30:10 PM
 Instrument: 6890



Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

VM.&P. Naphtha	←	→																											
Mineral Spirits																													
#2 Diesel																													
JP5, Jet A																													
Heavy Diesel																													
Gas Oil, Fuel Oil																													
Lubricating Oils																													

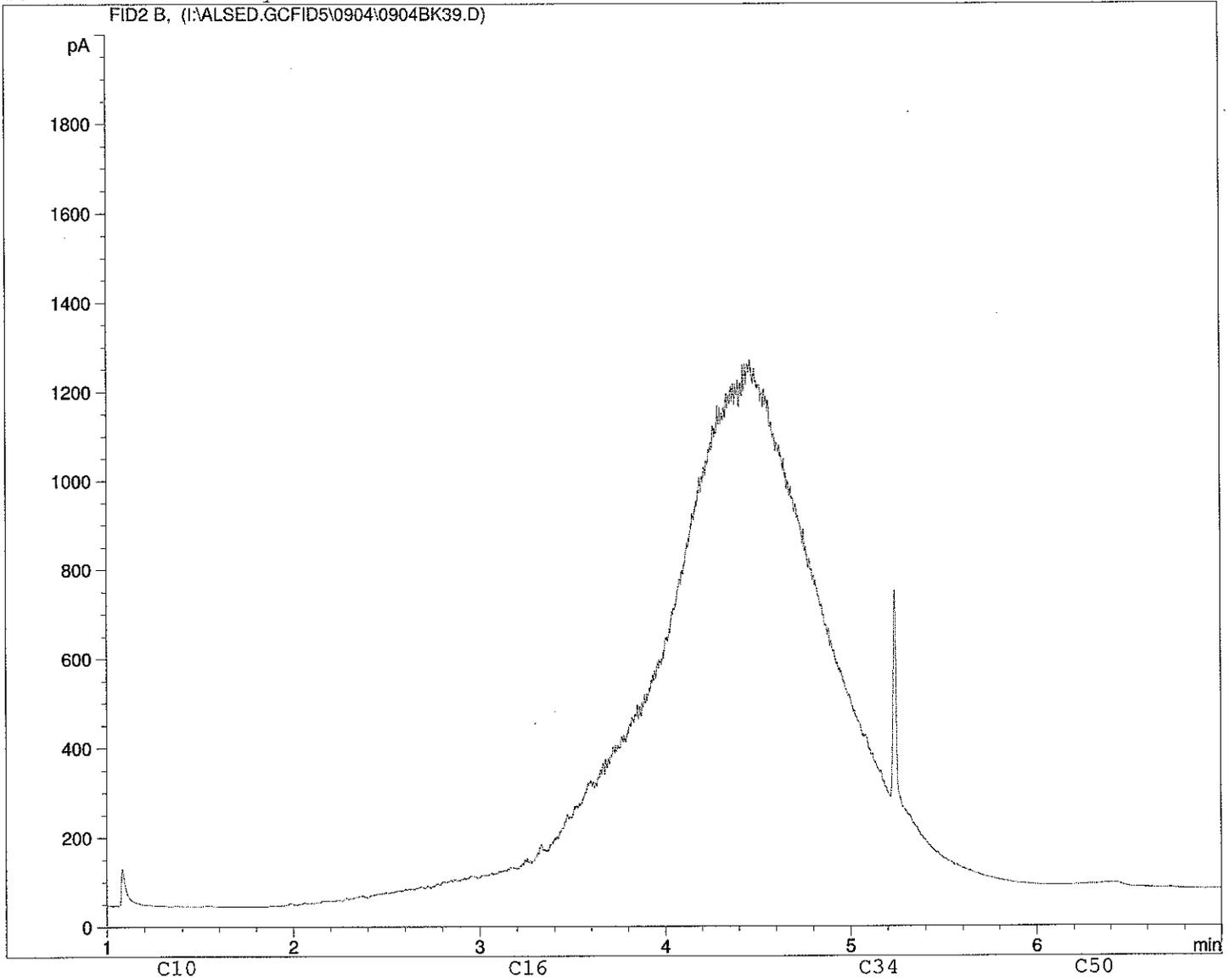
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS44
 Sample ID: L676396-201 150
 Injection Date: 9/5/2008 7:15:00 AM
 Instrument: 6890



Total Extractable Hydrocarbons

FID2 B, (I:\ALSED.GCFID5\0904\0904BK39.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

VM.&P. Naphtha	←	→																											
Mineral Spirits																													
#2 Diesel																													
JP5, Jet A																													
Heavy Diesel																													
Gas Oil, Fuel Oil																													
Lubricating Oils																													

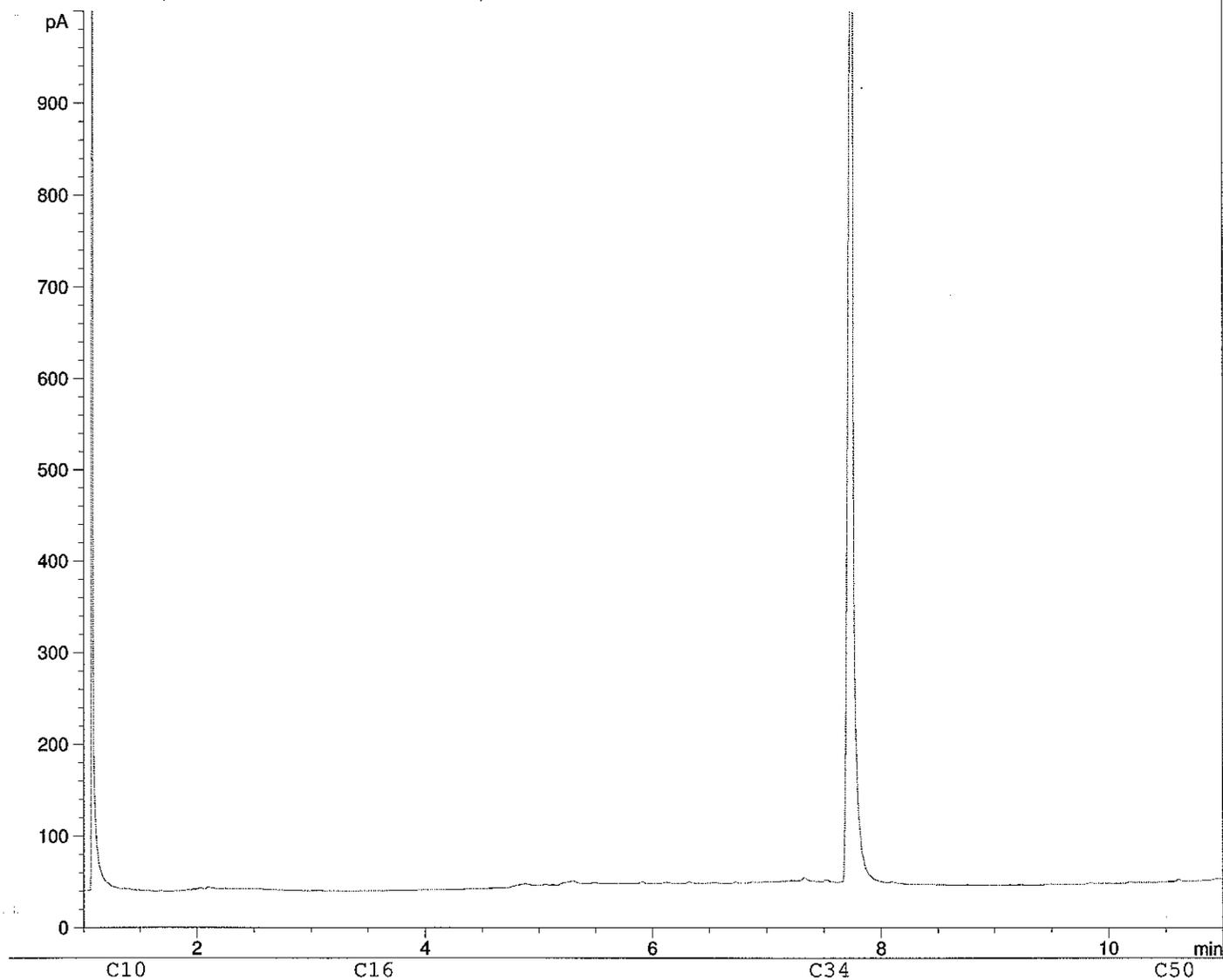
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS50
 Sample ID: L676396-207 30
 Injection Date: 9/4/2008 7:24:19 AM
 Instrument: 6890

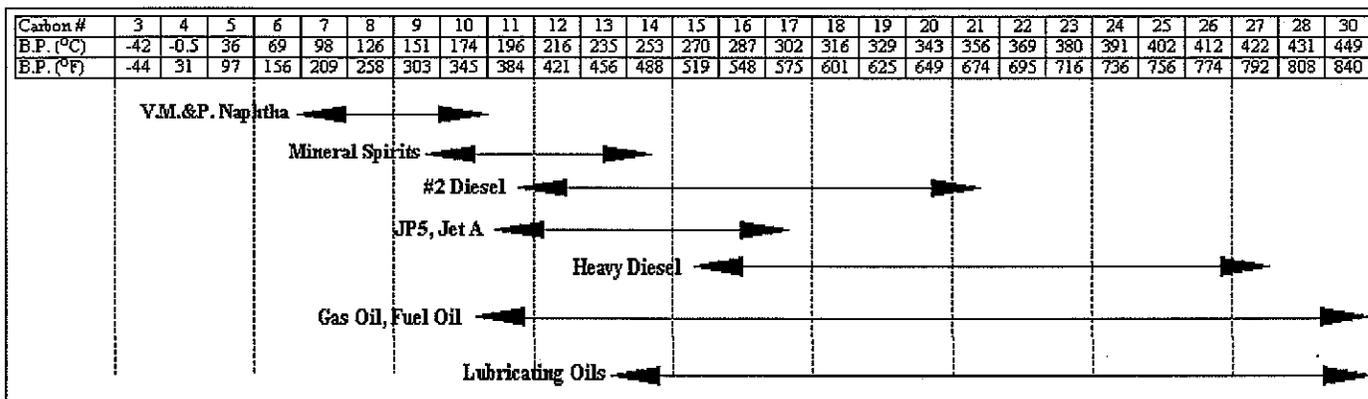


Total Extractable Hydrocarbons

FID2 B, (I:\ALSED.GCFID5\0903B\0903BK31.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products



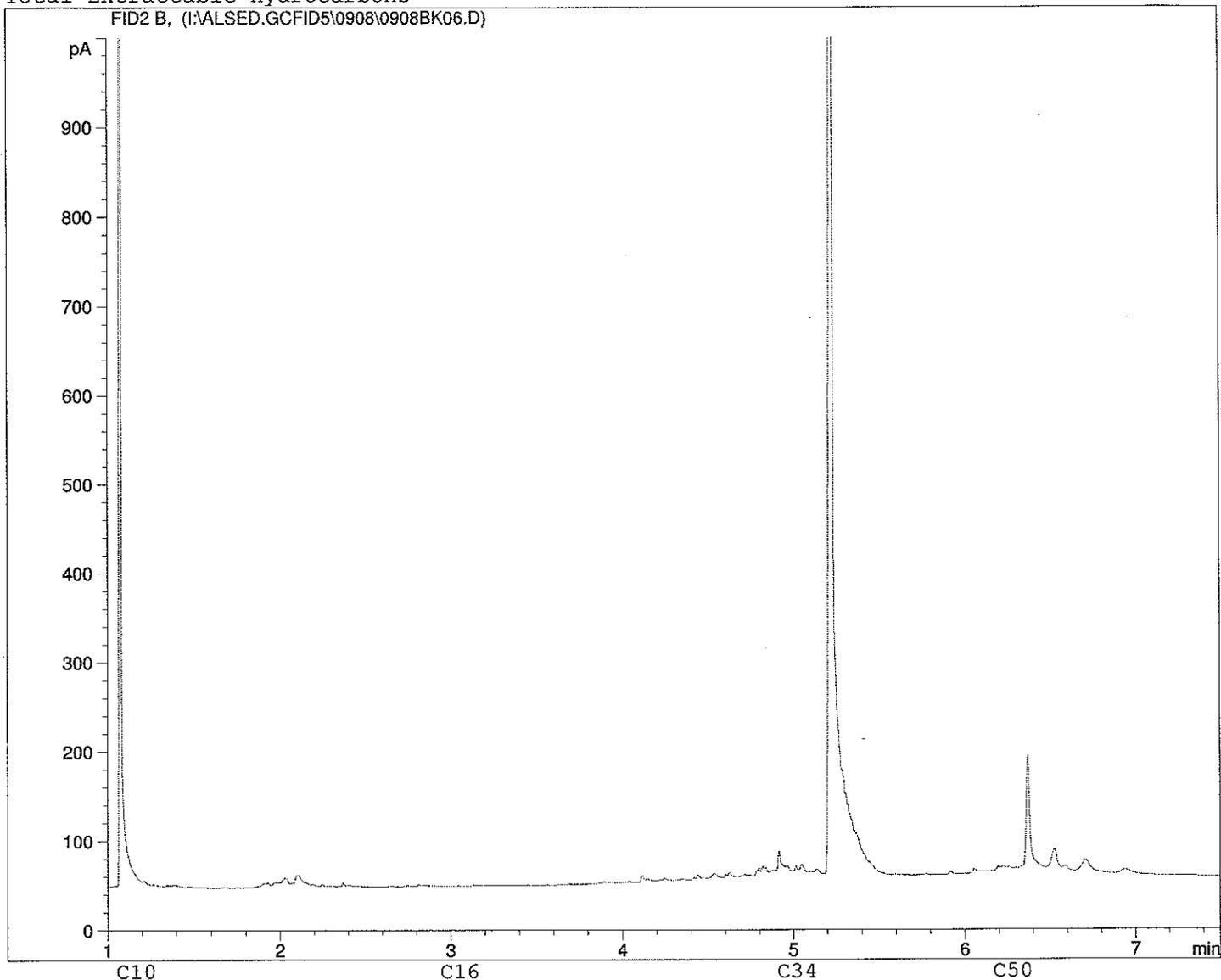
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS53
 Sample ID: L676396-210 30
 Injection Date: 9/8/2008 7:19:59 PM
 Instrument: 6890



Total Extractable Hydrocarbons

FID2 B, (I:\ALSED.GCFID5\0908\0908BK06.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

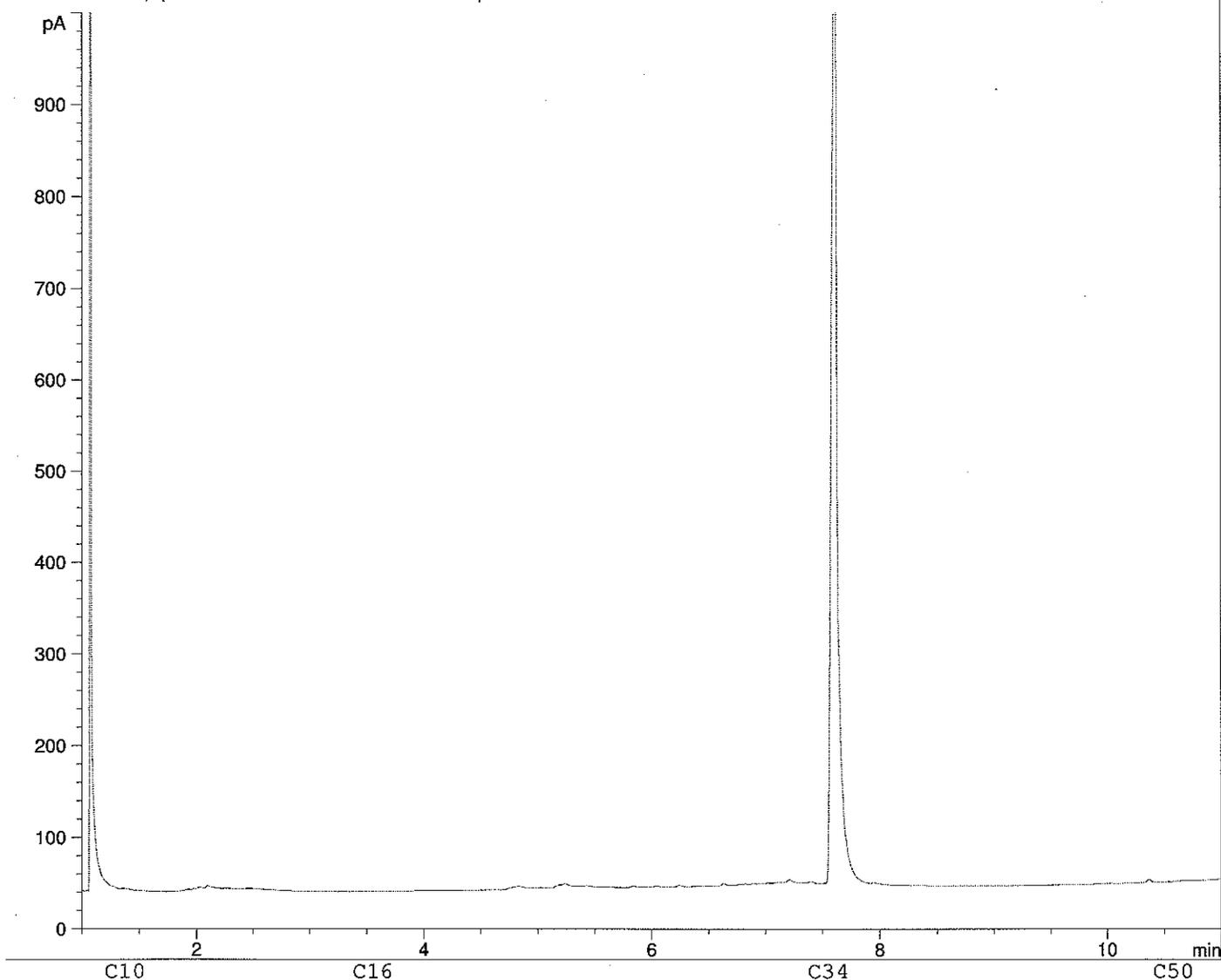
VM.&P. Naphtha	←	→																											
Mineral Spirits					←	→																							
#2 Diesel										←	→																		
JP5, Jet A																													
Heavy Diesel																													
Gas Oil, Fuel Oil																													
Lubricating Oils																													

Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS52D
 Sample ID: L676396-212 30
 Injection Date: 9/4/2008 8:30:45 AM
 Instrument: 6890



Total Extractable Hydrocarbons
 FID2 B, (I:\ALSED.GCFID5\0903B\0903BK34.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

V.M.&P. Naphtha	3	10
Mineral Spirits	4	14
#2 Diesel	10	20
JP5, Jet A	10	18
Heavy Diesel	12	28
Gas Oil, Fuel Oil	12	30
Lubricating Oils	14	30

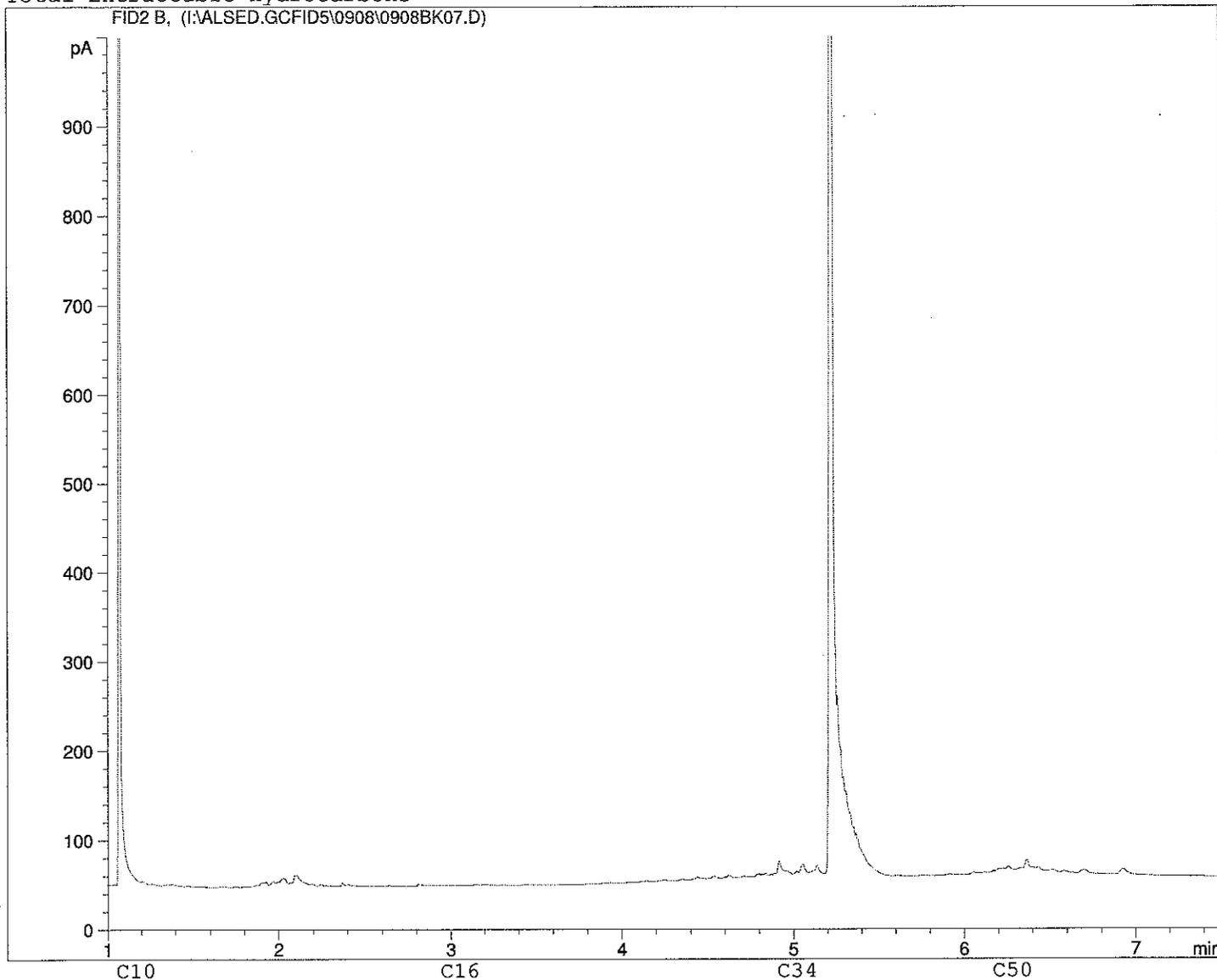
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS57
 Sample ID: L676396-214 30
 Injection Date: 9/8/2008 7:38:03 PM
 Instrument: 6890



Total Extractable Hydrocarbons

FID2 B, (I:\ALSED.GCFID5\0908\0908BK07.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

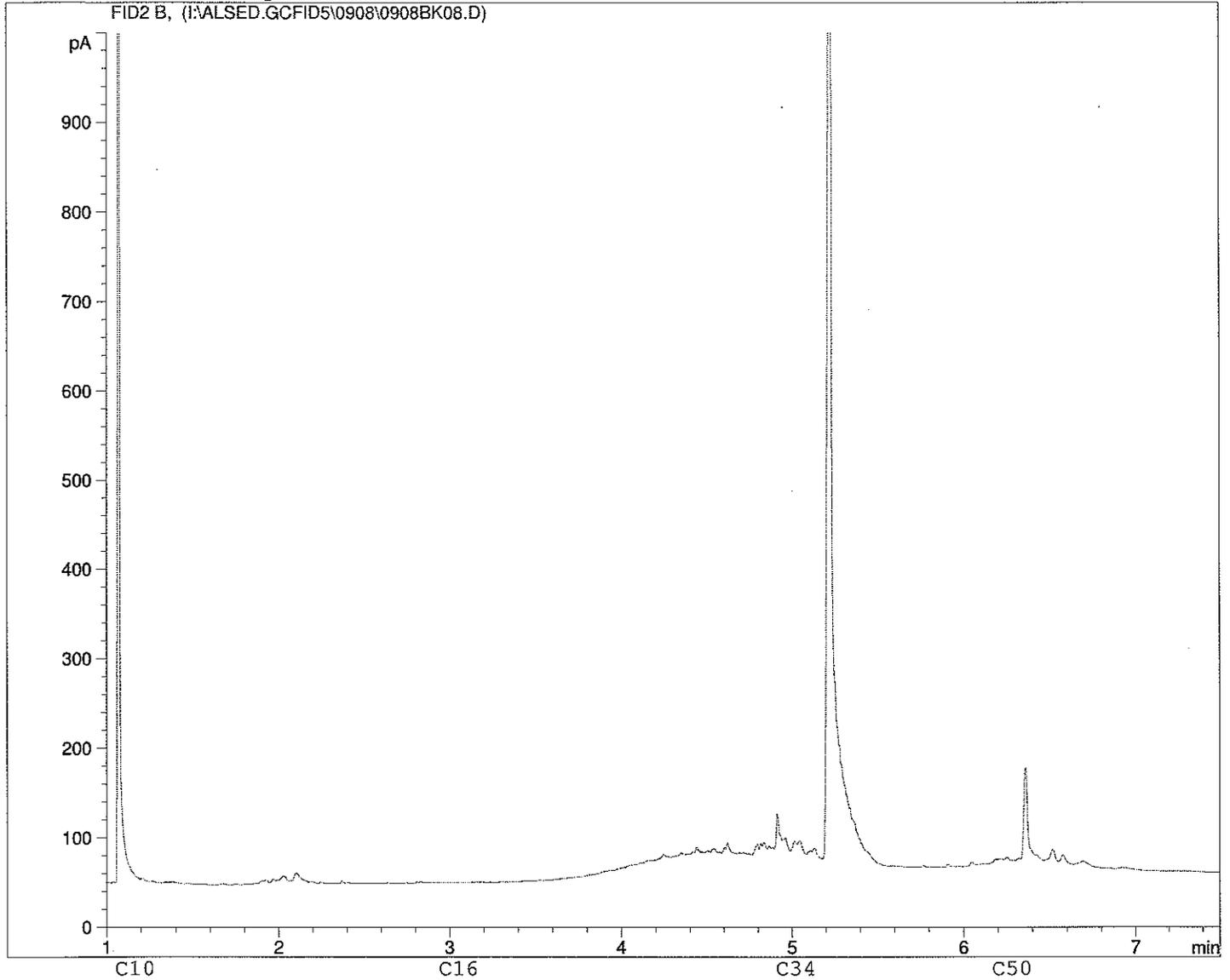
V.M.&P. Naphtha	←	→
Mineral Spirits	←	→
#2 Diesel	←	→
JP5, Jet A	←	→
Heavy Diesel	←	→
Gas Oil, Fuel Oil	←	→
Lubricating Oils	←	→

Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS58
 Sample ID: L676396-215 30
 Injection Date: 9/8/2008 7:56:12 PM
 Instrument: 6890



Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

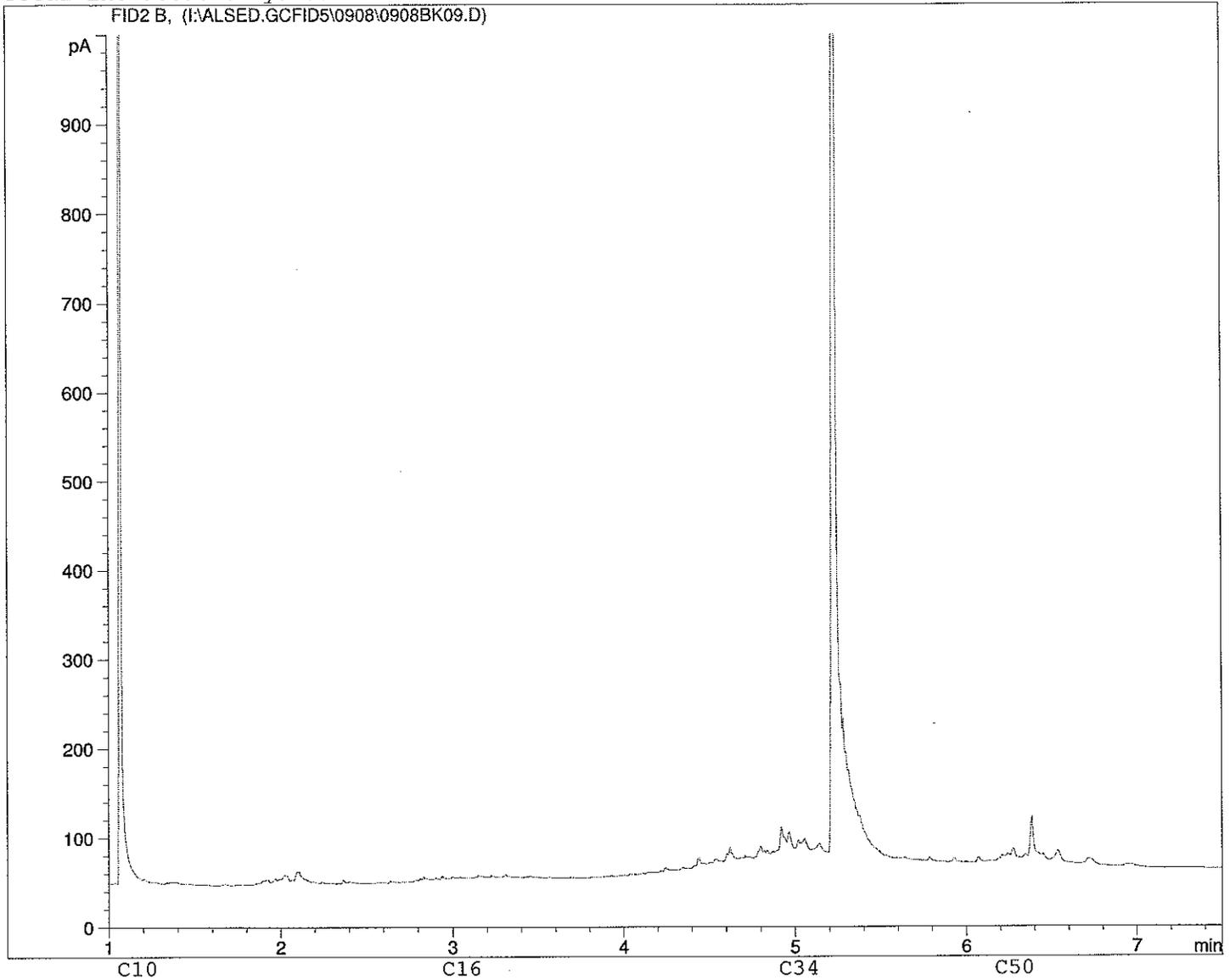
V.M.&P. Naphtha	3	10
Mineral Spirits	3	14
#2 Diesel	10	21
JP5, Jet A	10	17
Heavy Diesel	14	27
Gas Oil, Fuel Oil	10	30
Lubricating Oils	14	30

Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS55
 Sample ID: L676396-216 30
 Injection Date: 9/8/2008 8:14:16 PM
 Instrument: 6890



Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

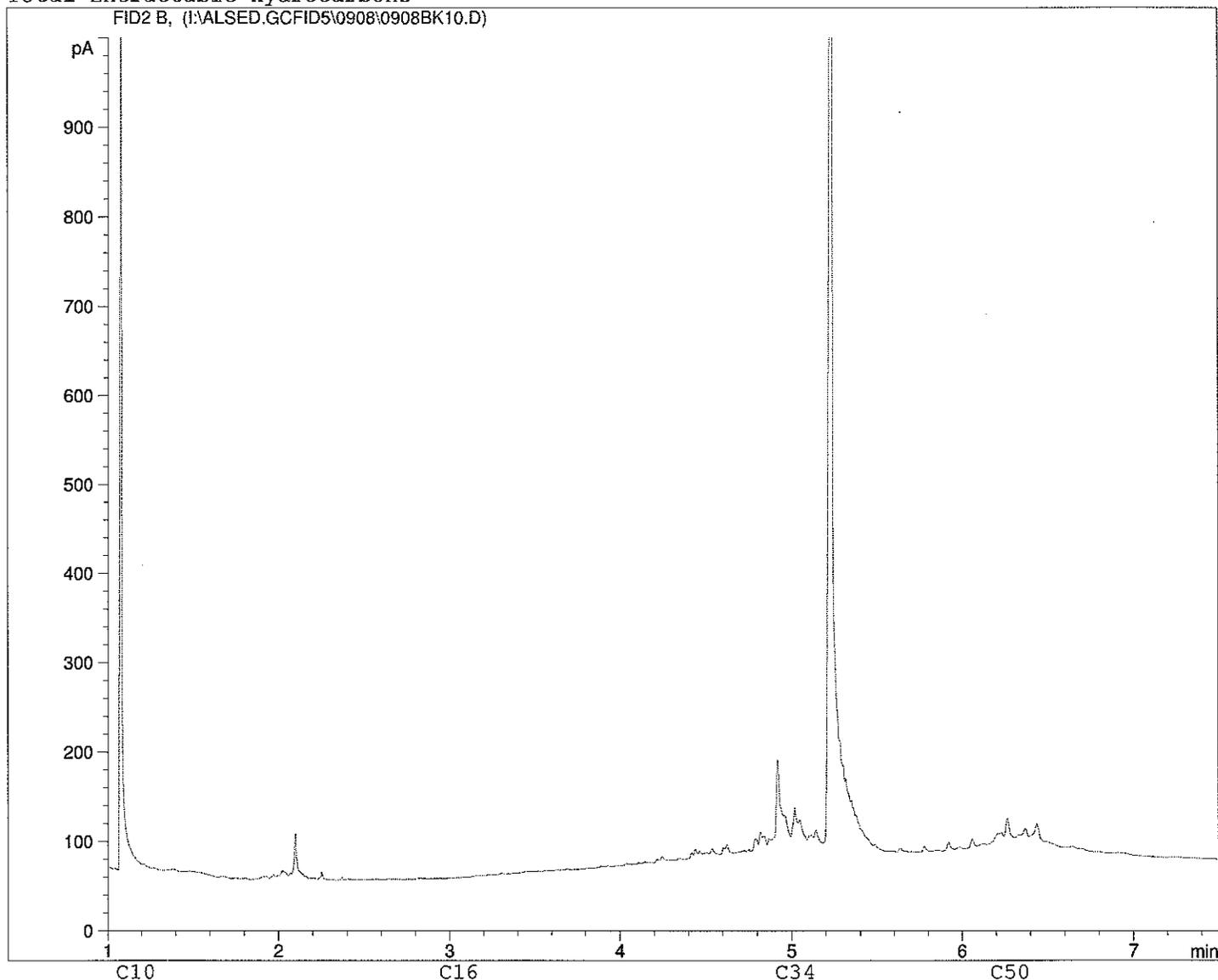
VM.&P. Naphtha	3	10
Mineral Spirits	3	15
#2 Diesel	10	25
JP5, Jet A	10	30
Heavy Diesel	15	35
Gas Oil, Fuel Oil	15	40
Lubricating Oils	15	45

Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS59
 Sample ID: L676396-217 30
 Injection Date: 9/8/2008 8:32:29 PM
 Instrument: 6890



Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

VM.&P. Naphtha	←	→
Mineral Spirits	←	→
#2 Diesel	←	→
JP5, Jet A	←	→
Heavy Diesel	←	→
Gas Oil, Fuel Oil	←	→
Lubricating Oils	←	→

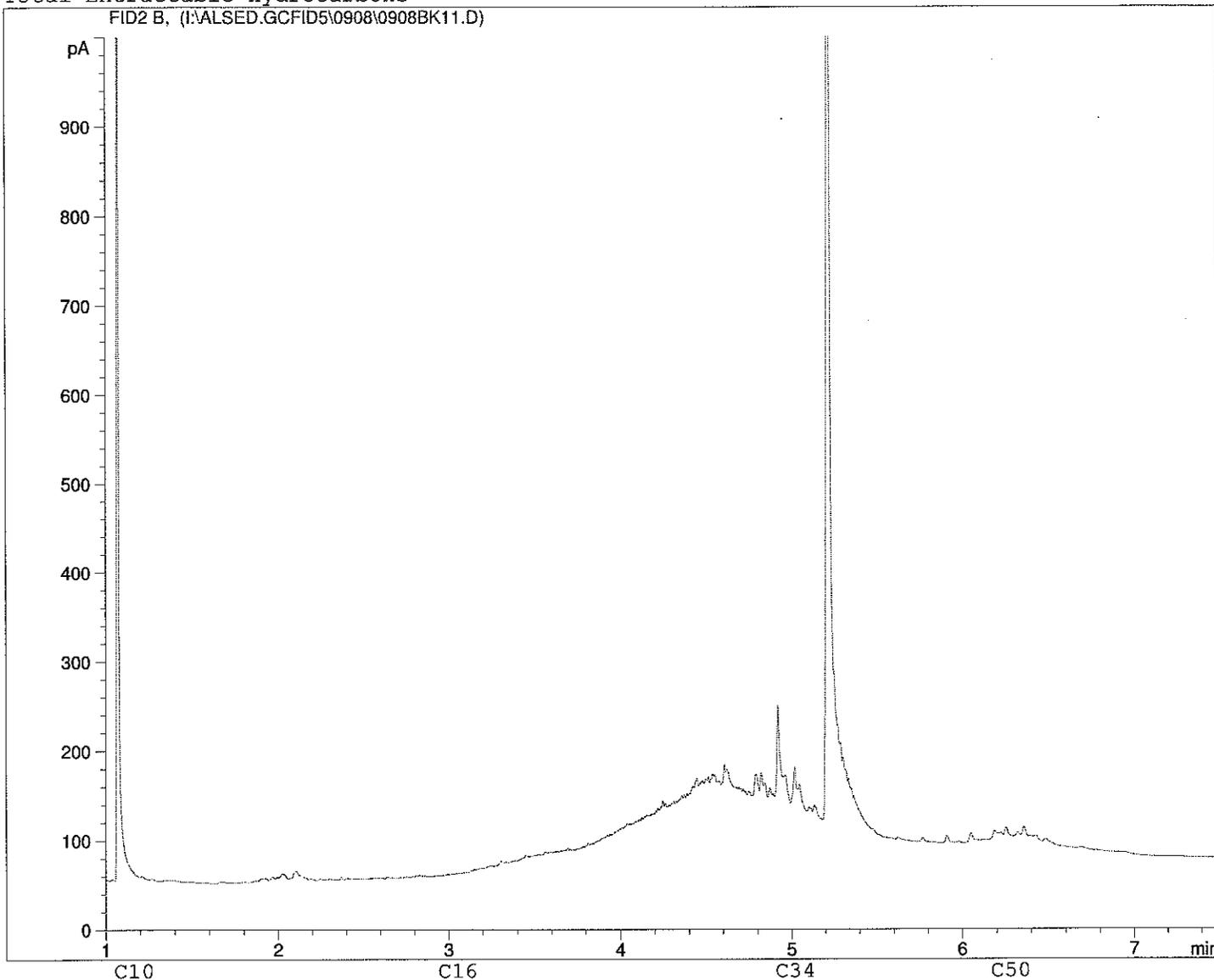
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS59D
 Sample ID: L676396-218
 Injection Date: 9/8/2008 8:50:32 PM
 Instrument: 6890



Total Extractable Hydrocarbons

FID2 B, (I:\ALSED.GCFID5\0908\0908BK11.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

V.M.&P. Naphtha: Carbon 3 to 10
 Mineral Spirits: Carbon 3 to 14
 #2 Diesel: Carbon 10 to 21
 JP5, Jet A: Carbon 10 to 17
 Heavy Diesel: Carbon 12 to 26
 Gas Oil, Fuel Oil: Carbon 10 to 30
 Lubricating Oils: Carbon 12 to 30

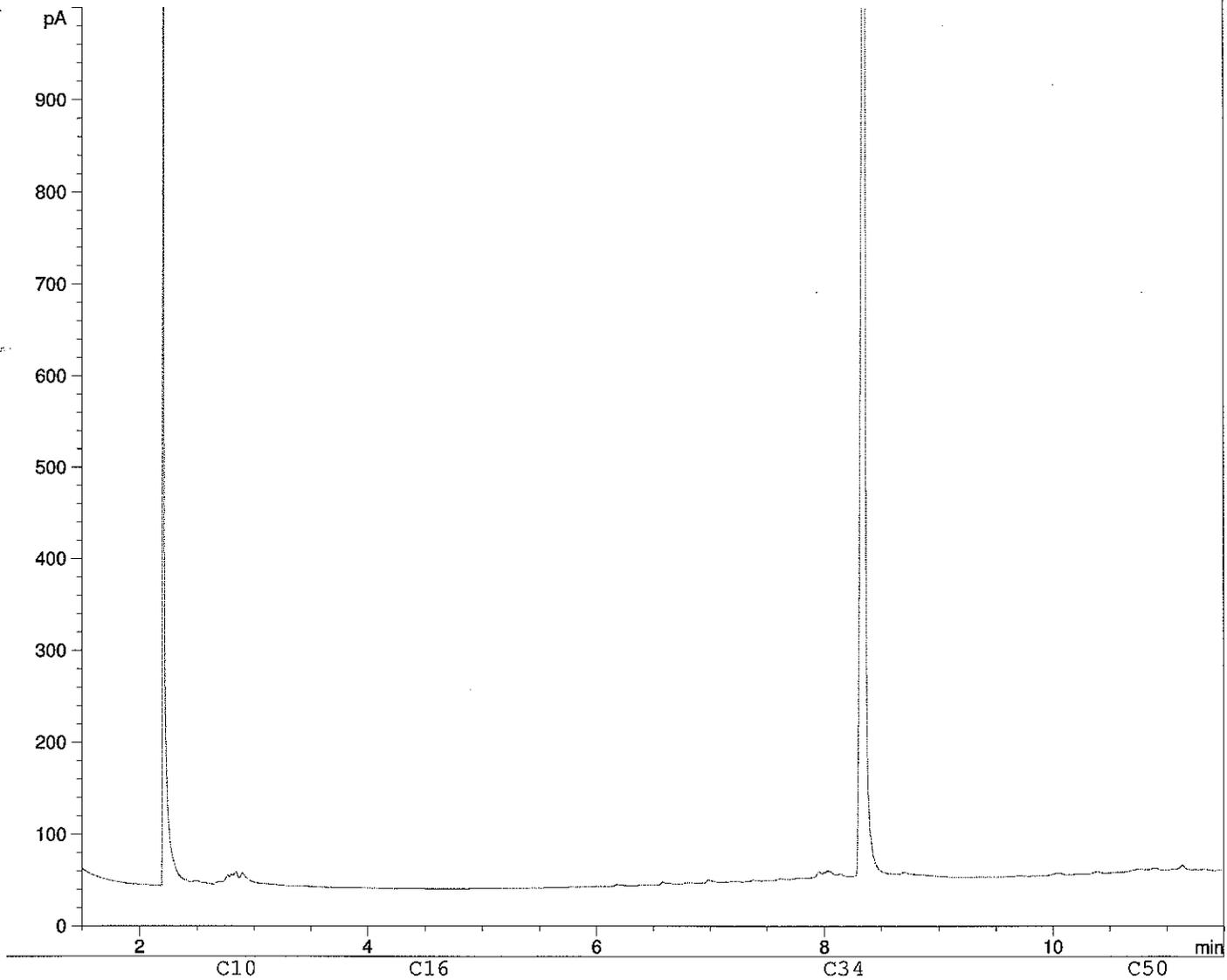
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS60
 Sample ID: L676396-219 30
 Injection Date: 9/6/2008 5:29:19 AM
 Instrument: 6890

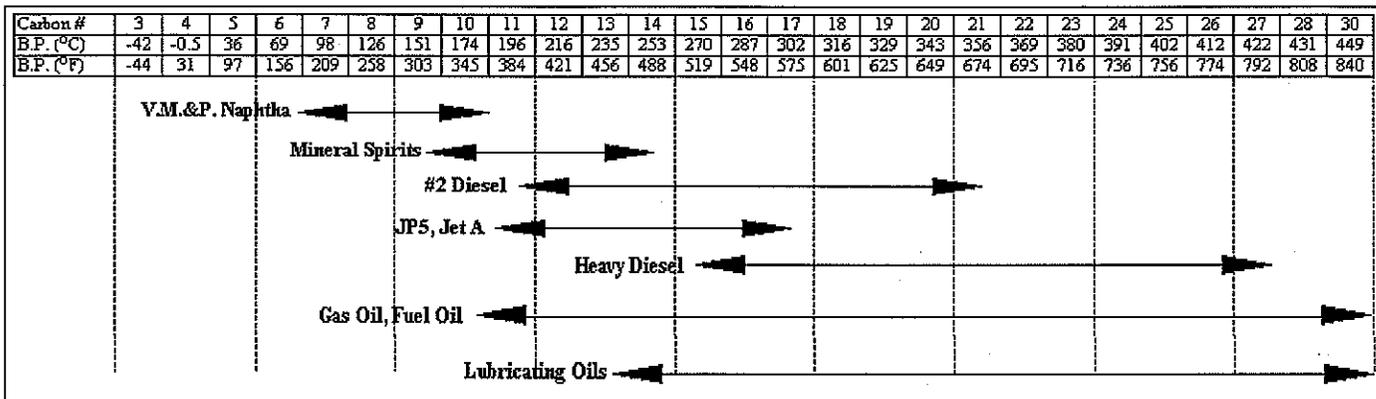


Total Extractable Hydrocarbons

FID1 A, (I:\ALSED.GCFID4\0905\0905FT000022.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products



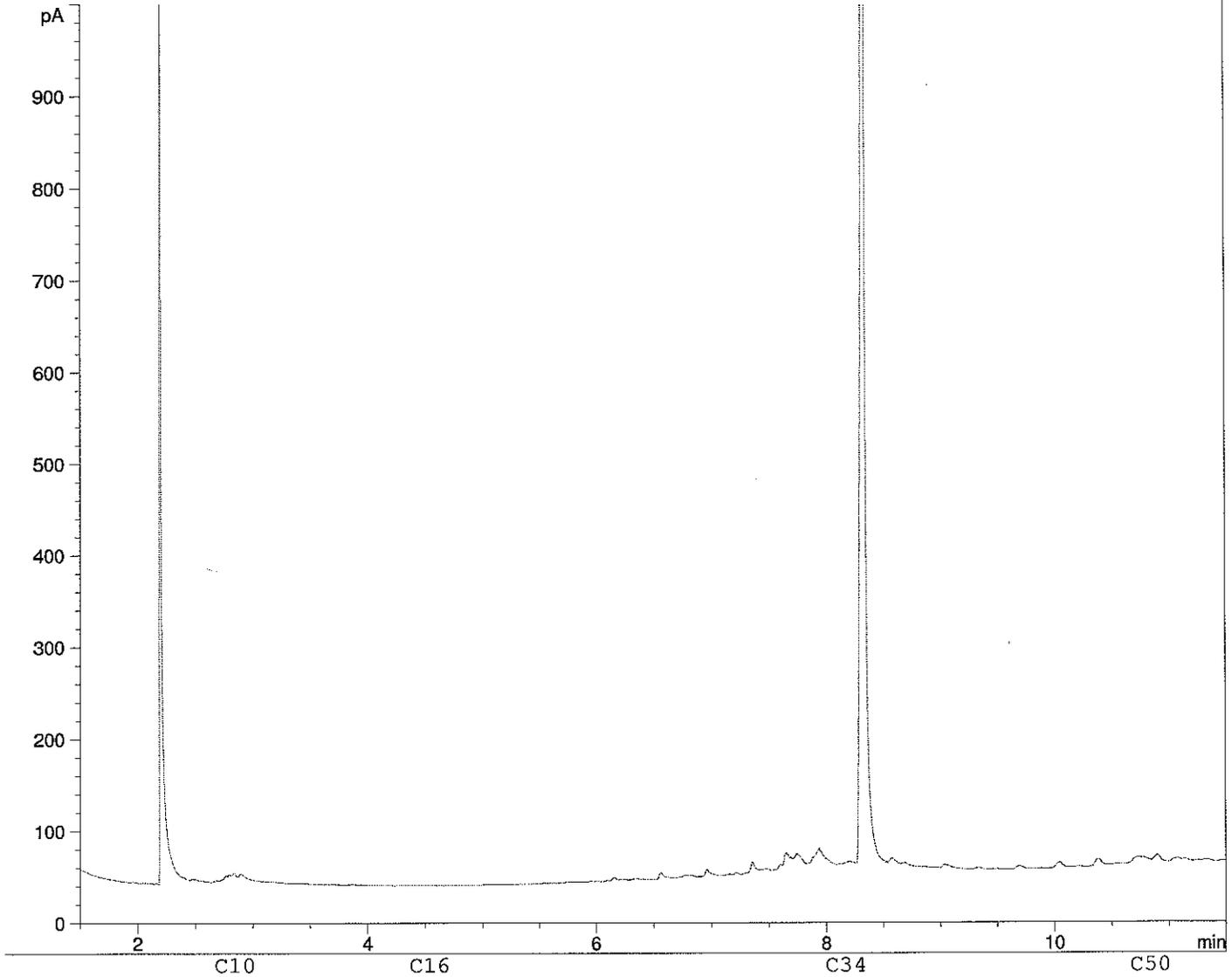
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08SS61
 Sample ID: L676396-220 20
 Injection Date: 9/6/2008 5:54:23 AM
 Instrument: 6890

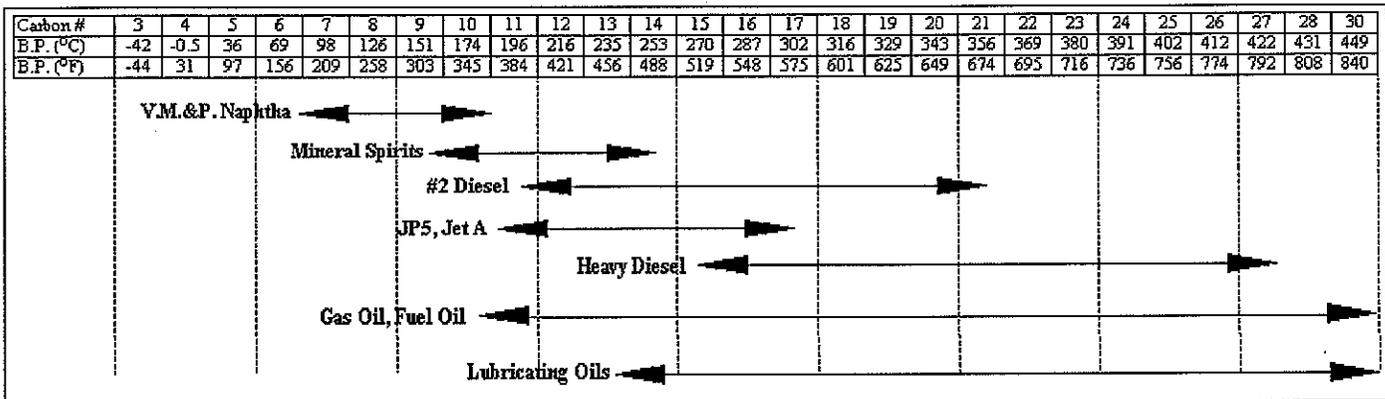


Total Extractable Hydrocarbons

FID1 A, (I:\ALSED.GCFID4\0905\0905FT000023.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

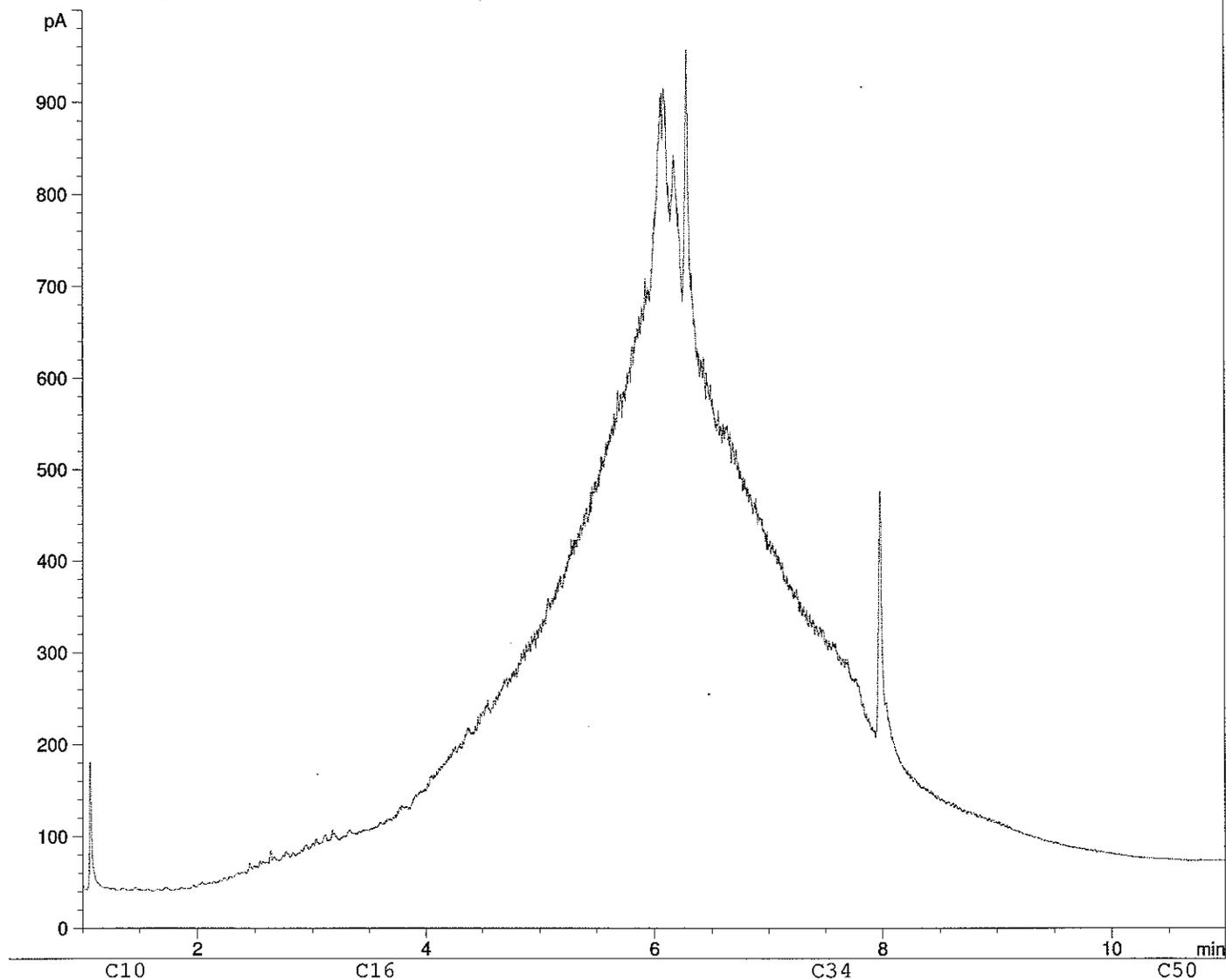


Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08MW22 @ 0.6
 Sample ID: L676396-35 150
 Injection Date: 9/4/2008 4:43:11 PM
 Instrument: 6890



Total Extractable Hydrocarbons
 FID2 B, (H:\ALSED.GCFID5\0904B\0904BK01.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

VM.&P. Naphtha	←	→																											
Mineral Spirits																													
#2 Diesel																													
JP5, Jet A																													
Heavy Diesel																													
Gas Oil, Fuel Oil																													
Lubricating Oils																													

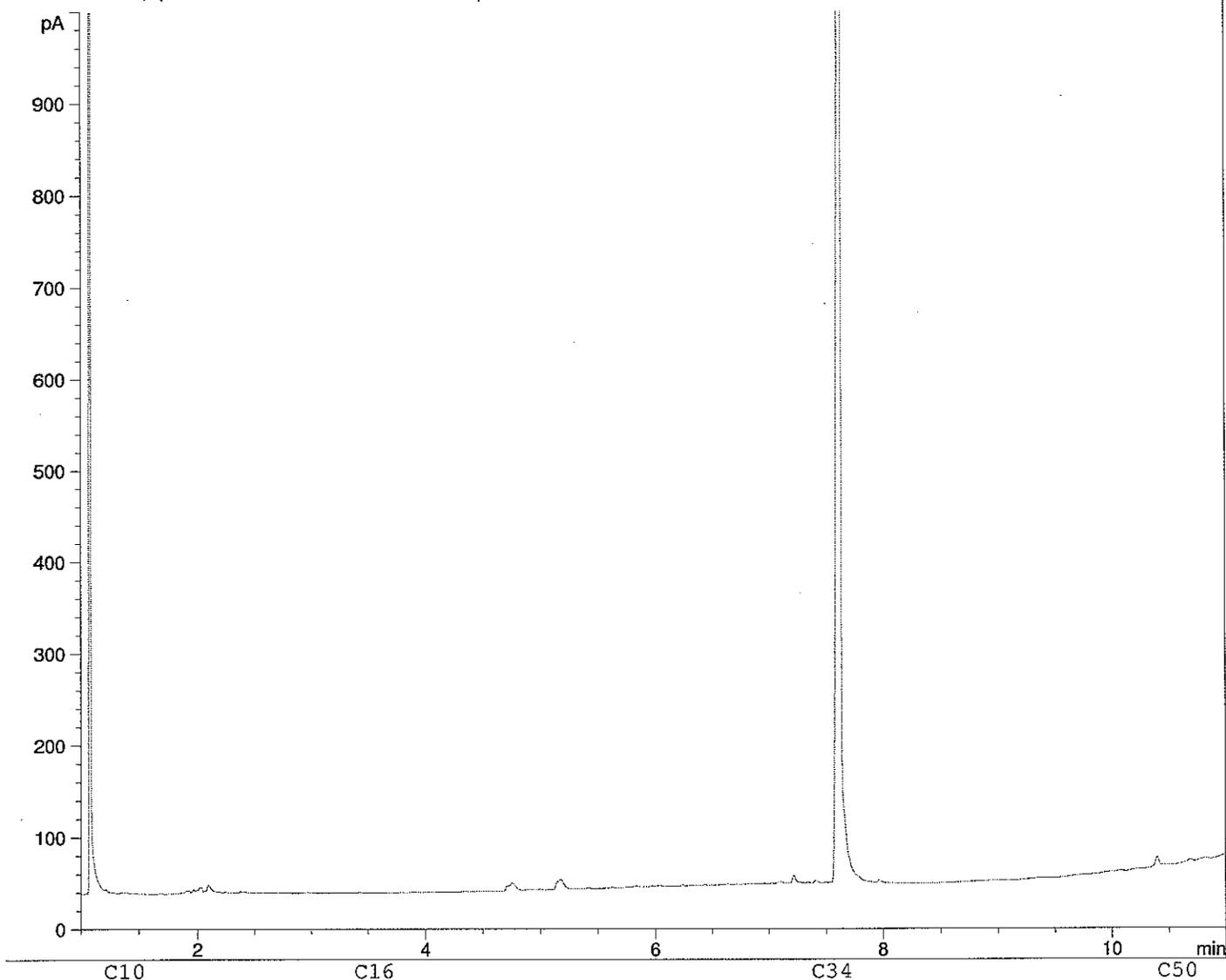
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08MW23 @ 0.6
 Sample ID: L676396-51 30
 Injection Date: 9/4/2008 1:07:58 AM
 Instrument: 6890



Total Extractable Hydrocarbons

FID2 B, (I:\ALSED.GCFID5\0903B\0903BK14.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

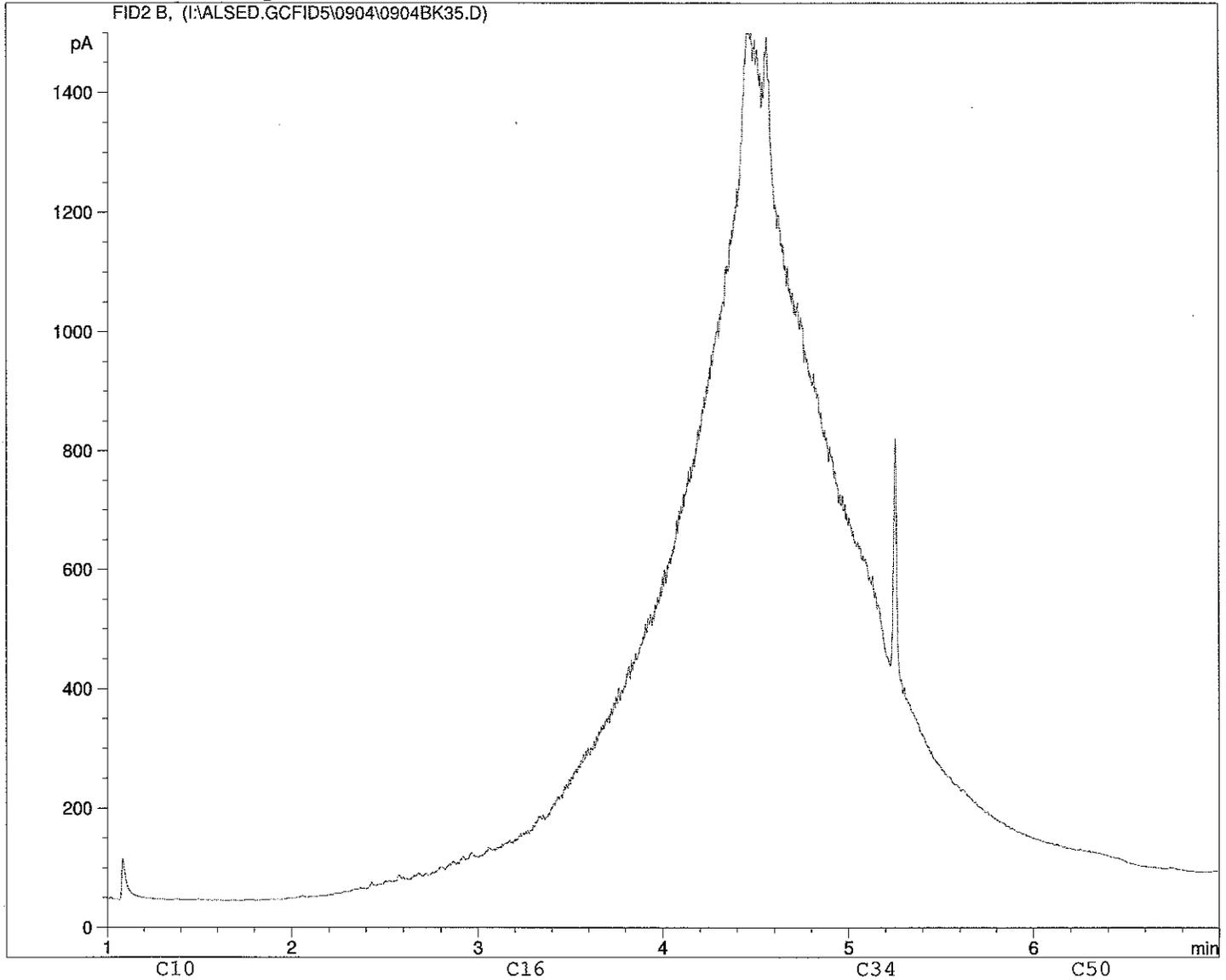
V.M.&P. Naphtha	←	→																											
Mineral Spirits																													
#2 Diesel																													
JP5, Jet A																													
Heavy Diesel																													
Gas Oil, Fuel Oil																													
Lubricating Oils																													

Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08MW22D @ 0.6
 Sample ID: L676396-67 150
 Injection Date: 9/5/2008 6:03:01 AM
 Instrument: 6890



Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

VM.&P. Naphtha	3	10
Mineral Spirits	4	14
#2 Diesel	9	21
JP5, Jet A	10	18
Heavy Diesel	12	28
Gas Oil, Fuel Oil	14	30
Lubricating Oils	16	30

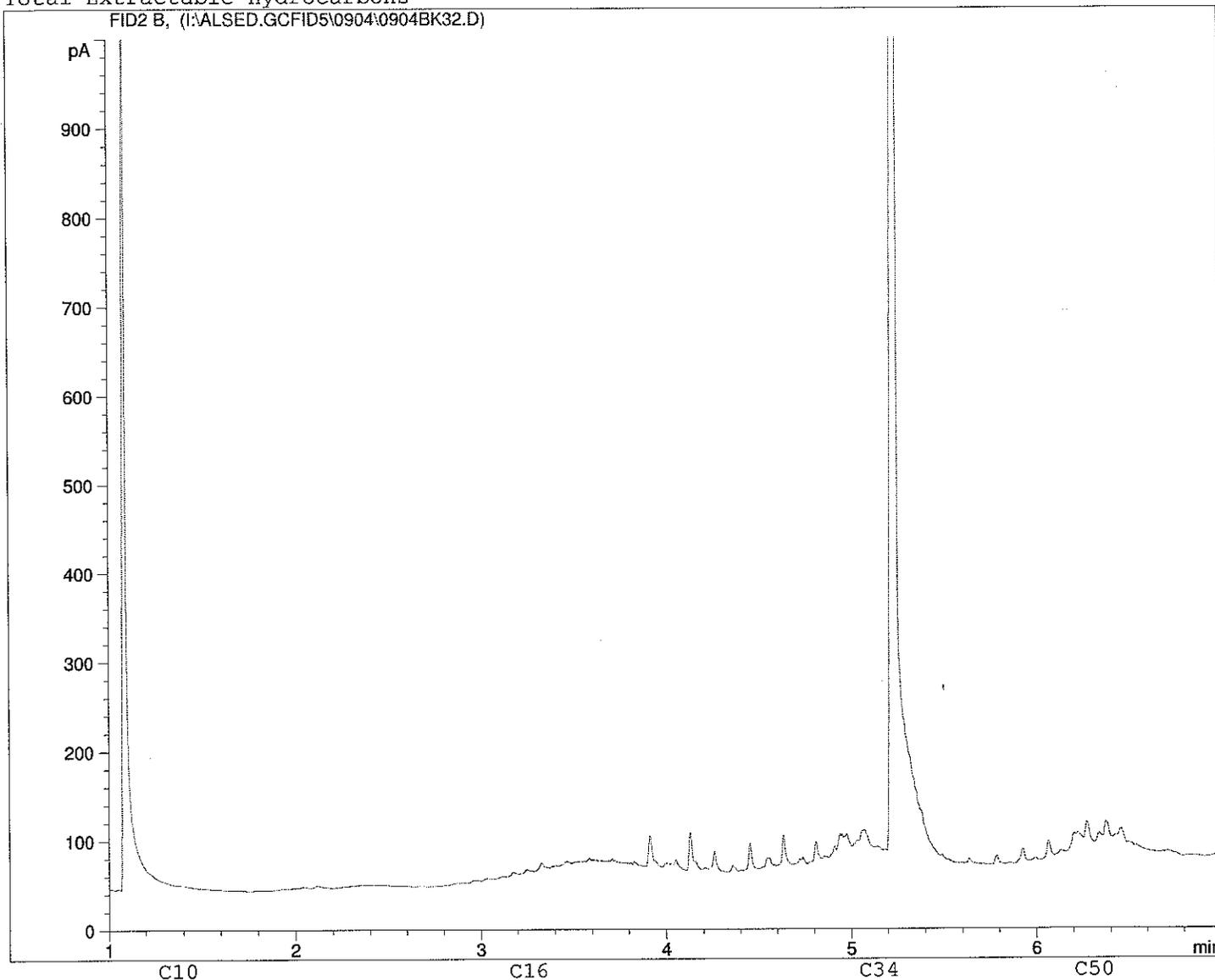
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 08MW13 @ 0.6
 Sample ID: L676396-68 30
 Injection Date: 9/5/2008 5:08:56 AM
 Instrument: 6890



Total Extractable Hydrocarbons

FID2 B, (I:\ALSED.GCFID5\0904\0904BK32.D)



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon#	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

VM.&P. Naphtha	←	→
Mineral Spirits	←	→
#2 Diesel	←	→
JP5, Jet A	←	→
Heavy Diesel	←	→
Gas Oil, Fuel Oil	←	→
Lubricating Oils	←	→

Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII



Environmental Division

Report to:		Report Format / Distribution			Service Requested: (rush - subject)																																																																															
Company: EBA		Standard: <input checked="" type="checkbox"/> Other: <input type="checkbox"/>			<input checked="" type="checkbox"/> Regular (Default)																																																																															
Contact: BRANT SANG		Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital <input type="checkbox"/>			Priority (2-3 Business Days) - 50%																																																																															
Address: 115,200 Rivercrest Drive SE		Email 1: htsang@eba.ca			Emergency (1 Business Day) - 100%																																																																															
Calgary		Email 2: AMahgoub@eba.ca			For Emergency < 1 Day, ASAP or 1																																																																															
Phone: 403-203-3305		Fax: 403-203-3301			Analysis Requ																																																																															
Invoice To: Same as Report? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No?		Client / Project Information:			(Indicate Filtered or Preser																																																																															
Company:		Job #: C22101178			<table border="1"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																																																																															
Contact:		PO / AFE:																																																																																		
Address:		Legal Site Description:																																																																																		
Phone:		Quote #: Test Samples																																																																																		
Fax:		ALS Contact:																																																																																		
Lab Work Order # (lab use only)		Sampler: Jack			<table border="1"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																																																																															
11076396		Date			Time																																																																															
Sample #		Sample Identification (This description will appear on the report)			Sample Type																																																																															
	08 MW20 at 0.6	Aug 26/08	1:15	Soil	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																																																																														
	08 MW20 at 1.2	Aug 26/08	1:25	Soil	<input checked="" type="checkbox"/>																																																																															
	08 MW20 at 1.8	Aug 26/08	1:30	Soil	<input checked="" type="checkbox"/>																																																																															
	08 MW20 at 2.4	Aug 26/08	1:40	Soil	<input checked="" type="checkbox"/>																																																																															
	08 MW20 at 3.1	Aug 26/08	1:50	Soil	<input checked="" type="checkbox"/>																																																																															
	08 MW20 at 3.7	Aug 26/08	2:00	Soil	<input checked="" type="checkbox"/>																																																																															
	08 MW20 at 4.3	Aug 26/08	2:10	Soil	<input checked="" type="checkbox"/>																																																																															
	08 MW20 at 4.9	Aug 26/08	2:15	Soil	<input checked="" type="checkbox"/>																																																																															
	08 MW20 at 5.5	Aug 26/08	2:20	Soil	<input checked="" type="checkbox"/>																																																																															
	08 MW20 at 6.1	Aug 26/08	2:25	Soil	<input checked="" type="checkbox"/>																																																																															
	08 MW20 at 6.7	Aug 26/08	2:30	Soil	<input checked="" type="checkbox"/>																																																																															
	08 MW20 at 7.3	Aug 26/08	2:30	Soil	<input checked="" type="checkbox"/>																																																																															

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION	
Released by: Jack Lambert	Date & Time: Aug 31/08 3:50	Received by: S	Date: 31 Aug 08	Time: 10:17	Temperature: 13.2°C	Verified by:
Date & Time:		Date & Time:		Date & Time:		



Environmental Division

Report to:	Report Format / Distribution	Service Requested: (rush - subject)
Company: EBA	Standard: <input checked="" type="checkbox"/> Other: <input type="checkbox"/>	<input checked="" type="checkbox"/> Regular (Default)
Contact: Brian Tsang	Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital <input type="checkbox"/>	Priority (2-3 Business Days) - 50%
Address: 115, 200 Rivercrest Drive SE	Email 1: btsang@eba.ca	Emergency (1 Business Day) - 10%
Calgary	Email 2: A.Mahgoub@eba.ca	For Emergency < 1 Day, ASAP or
Phone: 403-203-3355 Fax: 403-203-3301		Analysis Req

Invoice To: Same as Report? <input checked="" type="checkbox"/> No? <input type="checkbox"/>	Client / Project Information:	(Indicate Filtered or Preserved)
Company:	Job #: C22101178	
Contact:	PO / AFE:	
Address:	Legal Site Description:	
Phone:	Quote #:	

Lab Work Order # (lab use only)	Test Samples	ALS Contact:	Sampler: JACK
---------------------------------	---------------------	--------------	----------------------

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	BTEX	Fit to FH	Hold	Metals	Detailed Salinity
	08 MW 20 at 7.9	Aug 26/08	2:35	Soil			X		
	08 MW 20 at 8.5	Aug 26/08	2:40	Soil			X		
	08 MW 20 at 9.2	Aug 26/08	2:42	Soil	X				
	08 MW 20 at 9.8	Aug 26/08	2:43	Soil			X		
	08 MW 20 at 10.4	Aug 26/08	2:44	Soil			X		
	08 MW 20 at 11.0	Aug 26/08	2:45	Soil			X		
	08 MW 21 at 0.6	Aug 26/08	1:15	Soil	X			X	X
	08 MW 21 at 1.2	Aug 26/08	1:20	Soil			X		
	08 MW 21 at 1.8	Aug 26/08	1:25	Soil			X		
	08 MW 21 at 2.4	Aug 26/08	1:30	Soil			X		
	08 MW 21 at 3.1	Aug 26/08	1:35	Soil			X		
	08 MW 21 at 3.7	Aug 26/08	1:40	Soil			X		

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION		
Released by: <i>[Signature]</i>	Date & Time: Aug 21/08 3:50	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:



Environmental Division

Report to:		Report Format / Distribution			Service Requested: (rush - subje																																											
Company: EBA		Standard: <input checked="" type="checkbox"/> Other:			<input checked="" type="checkbox"/> Regular (Default)																																											
Contact: Brian Tsang		Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital			Priority (2-3 Business Days) - 50%																																											
Address: 115 Rivercrest Drive SE		Email 1: btsang@eba.ca			Emergency (1 Business Day) - 10%																																											
Calgary		Email 2: 1.Mahgoub@eba.ca			For Emergency < 1 Day, ASAP or																																											
Phone: 403-203-3355 Fax: 403-203-3301					Analysis Req																																											
Invoice To: Same as Report? <input checked="" type="radio"/> No? <input type="radio"/>		Client / Project Information:			(Indicate Filtered or Prese																																											
Company:		Job #: C22101178			<table border="1"> <tr> <td>BTEX FI-P4</td> <td>Metals</td> <td>Grain Size</td> <td>Hold</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>				BTEX FI-P4	Metals	Grain Size	Hold																																				
BTEX FI-P4	Metals	Grain Size	Hold																																													
Contact:		PO / AFE:																																														
Address:		Legal Site Description:																																														
Phone:		Quote #: Test Samples																																														
Fax:		ALS Contact:																																														
Lab Work Order # (lab use only)		Sampler: Jack																																														
Sample #	Sample Identification (This description will appear on the report)		Date	Time	Sample Type	BTEX FI-P4	Metals	Grain Size	Hold																																							
	08 MW 21 at	4.3	Aug 26/08	1:45	Soil				X																																							
	08 MW 21 at	4.9	Aug 26/08	1:50	Soil				X																																							
	08 MW 21 at	5.5	Aug 26/08	1:55	Soil				X																																							
	08 MW 21 at	6.1	Aug 26/08	2:00	Soil				X																																							
	08 MW 21 at	6.7	Aug 26/08	2:30	Soil				X																																							
	08 MW 21 at	7.3	Aug 26/08	2:40	Soil				X																																							
	08 MW 21 at	7.9	Aug 26/08	2:50	Soil				X																																							
	08 MW 21 at	8.5	Aug 26/08	3:00	Soil	X		X																																								
	08 MW 21 at	9.2	Aug 26/08	3:05	Soil				X																																							
	08 MW 21 at	9.8	Aug 26/08	3:10	Soil				X																																							
	08 MW 22 at	1.1 0.6	Aug 26/08	3:20	Soil	X	X																																									
	08 MW 22 at	1.1 1.2	Aug 26/08	3:30	Soil	X	X		X																																							

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report cop

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	
<i>Jack Samuels</i>	Aug 31/08							



Environmental Division

Report to:	Report Format / Distribution	Service Requested: (rush - subje
Company: <u>EBA</u>	Standard: <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Other:	<input checked="" type="checkbox"/> Regular (Default)
Contact: <u>BTsang</u>	Select: PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital	Priority (2-3 Business Days) - 50%
Address: <u>115, 200 Rivercrest Drive SE</u>	Email 1: <u>btsang@eba.ca</u>	Emergency (1 Business Day) - 10%
<u>Calgary</u>	Email 2: <u>n.mahgoub@eba.ca</u>	For Emergency < 1 Day, ASAP or
Phone: <u>403-203-3355</u> Fax: <u>403-203-3301</u>		Analysis Rec

Invoice To: Same as Report? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No?	Client / Project Information:	(Indicate Filtered or Pres
Company:	Job #: <u>C22101178</u>	
Contact:	PO / AFE:	
Address:	Legal Site Description:	
Phone:	Quote #: <u>Test Samples</u>	

Lab Work Order # (lab use only)	ALS Contact:	Sampler: <u>Jack</u>
------------------------------------	-----------------	----------------------

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type					
	08								
	<u>08 MW 18 at 6.1</u>	<u>Aug 27/08</u>	<u>8:50</u>	<u>Soil</u>	<u>X</u>				
	<u>08 MW 18 at 6.7</u>		<u>9:00</u>		<u>X</u>				
	<u>08 MW 18 at 7.3</u>		<u>9:10</u>		<u>X</u>				
	<u>08 MW 18 at 7.9</u>		<u>9:20</u>		<u>X</u>				
	<u>08 MW 18 at 8.5</u>		<u>9:25</u>		<u>X</u>				
	<u>08 MW 18 at 9.2</u>		<u>9:30</u>		<u>X</u>				
	<u>08 MW 18 at 9.8</u>		<u>9:42</u>		<u>X</u>				
	<u>08 BH 19 at 0.6</u>		<u>4:04</u>		<u>X</u>				
	<u>08 BH 19 at 1.2</u>		<u>4:10</u>		<u>X</u>				
	<u>08 BH 19 at 1.8</u>		<u>4:15</u>		<u>X</u>				
	<u>08 BH 19 at 2.4</u>		<u>4:20</u>		<u>X</u>				
	<u>08 BH 19 at 3.1</u>		<u>4:25</u>		<u>X</u>				

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION	
Released by: <u>[Signature]</u>	Date & Time: <u>Aug 27/08 3:50</u>	Received by:	Date:	Time:	Temperature:	Verified by:
						Date & Time:



Environmental Division

Report to:		Report Format / Distribution			Service Requested: (rush - subje		
Company: <u>EBA</u>		Standard: <input checked="" type="checkbox"/> Standard Other: <input type="checkbox"/>			<input checked="" type="checkbox"/> Regular (Default)		
Contact: <u>Brian Tsang</u>		Select: PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/>			Priority (2-3 Business Days) - 50%		
Address: <u>115, 200 Rivercrest Drive SE</u>		Email 1: <u>brtsang@eba.ca</u>			Emergency (1 Business Day) - 10		
Phone: <u>403-203-3355</u> Fax: <u>403-203-3301</u>		Email 2: <u>jsamborsky@eba.ca</u>			For Emergency < 1 Day, ASAP or		
Invoice To: Same as Report? <input checked="" type="checkbox"/> No?		Client / Project Information:			Analysis Req		
Company:		Job # <u>C22101178</u>			(Indicate Filtered or Pres		
Contact:		PO / AFE:					
Address:		Legal Site Description:					
Phone:		Quote #: <u>TES Samples</u>					
Lab Work Order # (lab use only)		ALS Contact:	Sampler: <u>Jack</u>				
Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	traced	BIEX-EPY	Notes
	08BH						
	08BH17 at 9.2	<u>Aug 27/08</u>	3:15	Soil	X	X	
	08BH17 at 9.8		3:10		X		
	08BH17d at 4.3m		2:25			X	X
	08 MW 18 at 0.6m		8:15			X	X
	08 MW 18 at 1.2		8:20		X		
	08 MW 18 at 1.8		8:25		X		
	08 MW 18 at 2.4		8:30		X		
	08 MW 18 at 3.1		8:35		X		
	08 MW 18 at 3.7		8:40		X		
	08 MW 18 at 4.3		8:45		X		
	08 MW 18 at 4.9		8:46		X		
	08 MW 18 at 5.5		8:48		X		
Special Instructions / Regulations / Hazardous Details							
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.							
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy							
SHIPMENT RELEASE (client use)				SHIPMENT RECEPTION (lab use only)		SHIPMENT VERIFICATION	
Released by: <u>[Signature]</u>	Date & Time: <u>Aug 31/08 3:50</u>	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:



Environmental Division

Report to:	Report Format / Distribution	Service Requested: (rush - subject)
Company: <u>EBA</u>	Standard: <u> </u> Other: <u> </u>	<input checked="" type="checkbox"/> Regular (Default)
Contact: <u>C2210178 Brian Tsang</u>	Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital <input type="checkbox"/>	Priority (2-3 Business Days) - 50%
Address: <u>15,200 Rivercrest Drive SE</u>	Email 1: <u>btsang@eba.ca</u>	Emergency (1 Business Day) - 10%
<u>Cuba</u>	Email 2: <u>amaghour@eba.ca</u>	For Emergency < 1 Day, ASAP or
Phone: <u>403-203-3355</u> Fax: <u>403-203-3301</u>		Analysis Requested

Invoice To: Same as Report? <input checked="" type="checkbox"/> Yes / No? <input type="checkbox"/>	Client / Project Information:	(Indicate Filtered or Preserved)
Company:	Job #: <u>C2210178</u>	
Contact:	PO / AFE:	
Address:	Legal Site Description:	
Phone:	Quote # <u>Test Samples</u>	

Lab Work Order # (lab use only)	ALS Contact:	Sampler: <u>JACK</u>
---	---------------------	-----------------------------

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	Hold	BTEX FLIP	Metals	Grain Size
	08 BH17 at 1.8	<u>Aug 27/08</u>	<u>2:10</u>	<u>Soil</u>	<input checked="" type="checkbox"/>			
	08 BH17 at 2.4		<u>2:12</u>		<input checked="" type="checkbox"/>			
	08 BH17 at 3.1		<u>2:15</u>		<input checked="" type="checkbox"/>			
	08 BH17 at 3.7		<u>2:20</u>		<input checked="" type="checkbox"/>			
	08 BH17 at 4.3		<u>2:25</u>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	08 BH17 at 4.9		<u>2:30</u>		<input checked="" type="checkbox"/>			
	08 BH17 at 5.5		<u>2:35</u>		<input checked="" type="checkbox"/>			
	08 BH17 at 6.1		<u>2:40</u>		<input checked="" type="checkbox"/>			
	08 BH17 at 6.7		<u>2:45</u>		<input checked="" type="checkbox"/>			
	08 BH17 at 7.3		<u>2:50</u>		<input checked="" type="checkbox"/>			
	08 BH17 at 7.9		<u>3:00</u>		<input checked="" type="checkbox"/>			
	08 BH17 at 8.5		<u>3:10</u>		<input checked="" type="checkbox"/>			

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION		
Released by: <u>Jack Samuels</u>	Date & Time: <u>Aug 31/08 3:50</u>	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:



Environmental Division

Report to:	Report Format / Distribution	Service Requested: (rush - subje
Company: EBA	Standard: <input checked="" type="checkbox"/> Other: <input type="checkbox"/>	<input checked="" type="checkbox"/> Regular (Default)
Contact: Brian Tsang	Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital <input type="checkbox"/>	Priority (2-3 Business Days) - 50%
Address: 115,200 River West Drive SE	Email 1: btsang@eba.ca	Emergency (1 Business Day) - 10
Calgary	Email 2: n.mahgoub@eba.ca	For Emergency < 1 Day. ASAP or
Phone: 403-203-3355 Fax: 403-203-3301		Analysis Rec

Invoice To: Same as Report? <input checked="" type="checkbox"/> No? <input type="checkbox"/>	Client / Project Information:	(Indicate Filtered or Pres
Company:	Job #: C2210178	
Contact:	PO / AFE:	
Address:	Legal Site Description:	
Phone:	Quote #: Test Samples	

Lab Work Order # (lab use only)	ALS Contact:	Sampler: Jack	HOLD	BTEX FI-PY	Metals
---------------------------------	--------------	----------------------	-------------	-------------------	---------------

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type			
	08 MW16 at 4.9	Aug 27/08	11:30	Soil	X		
	08 MW16 at 5.5		11:35		X		
	08 MW16 at 6.1		11:40		X	X	X
	08 MW16 at 6.7		11:42		X		
	08 MW16 at 7.3		11:45		X		
	08 MW16 at 7.9		11:48		X		
	08 MW16 at 8.5		11:50		X	X	X
	08 MW16 at 9.2		11:55		X		
	08 MW16 at 9.2		12:00		X		
	08 MW16 at 6.1m		11:40		X	X	X
	08 BH17 at 0.6m		2:00		X		
	08 BH17 at 1.2m		2:05		X		

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report cop

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATIO		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:
<i>[Signature]</i>	Aug 31/08 3:50						



Environmental Division

Report to:	Report Format / Distribution	Service Requested: (rush - subject)
Company: <u>EBT</u>	Standard: <input checked="" type="checkbox"/> Other: <input type="checkbox"/>	<input checked="" type="checkbox"/> Regular (Default)
Contact: <u>BTSang</u>	Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital <input type="checkbox"/>	Priority (2-3 Business Days) - 50%
Address: <u>115, 200 Rivercrest Drive SE</u>	Email 1: <u>btsang@ebta.ca</u>	Emergency (1 Business Day) - 10%
<u>Calgary</u>	Email 2: <u>n.mahgoub@ebta.ca</u>	For Emergency < 1 Day, ASAP or
Phone: <u>403-203-3365</u> Fax: <u>403-203-3301</u>		Analysis Rec

Invoice To: Same as Report? <input checked="" type="radio"/> Yes <input type="radio"/> No?	Client / Project Information:	(Indicate Filtered or Present)
Company:	Job #: <u>C22101178</u>	
Contact:	PO / AFE:	
Address:	Legal Site Description:	
Phone:	Quote #: <u>TEST SAMPLES</u>	

Lab Work Order # (lab use only)	ALS Contact:	Sampler: <u>JACK</u>
---	---------------------	-----------------------------

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type					
	<u>08 BH15 at 7.3</u>	<u>Aug 27/08</u>	<u>1:40</u>	<u>Soil</u>	<u>X</u>				
	<u>08 BH15 at 7.9</u>		<u>1:45</u>		<u>X</u>				
	<u>08 BH15 at 8.5</u>		<u>1:50</u>		<u>X</u>				
	<u>08 BH15 at 9.2</u>		<u>1:55</u>		<u>X</u>				
	<u>08 BH15 at 9.8</u>		<u>2:00</u>		<u>X</u>				
	<u>08 MW16 at 0.6</u>		<u>11:00</u>		<u>X</u>				
	<u>08 MW16 at 1.2</u>		<u>11:05</u>		<u>X</u>				
	<u>08 MW16 at 1.8</u>		<u>11:10</u>		<u>X</u>				
	<u>08 MW16 at 2.4</u>		<u>11:15</u>		<u>X</u>				
	<u>08 MW16 at 3.1</u>		<u>11:20</u>		<u>X</u>				
	<u>08 MW16 at 3.7</u>		<u>11:24</u>		<u>X</u>				
	<u>08 MW16 at 4.3</u>	<u>↓</u>	<u>11:25</u>	<u>↓</u>	<u>X</u>				

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION		
Released by: <u>[Signature]</u>	Date & Time: <u>Aug 31/08 3:50</u>		Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:



Environmental Division

Report to:	Report Format / Distribution	Service Requested: (rush - subject)
Company: EBA	Standard: <input checked="" type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Regular (Default)
Contact: Brian Tsang	Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital	Priority (2-3 Business Days) - 50%
Address: 115, 200 River Street Drive SE Calgary	Email 1: btsang@eba.ca	Emergency (1 Business Day) - 100%
Phone: 403-203-3355 Fax: 403-203-3301	Email 2: n.mahgoub@eba.ca	For Emergency < 1 Day, ASAP or

Invoice To: Same as Report? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No?	Client / Project Information:	(Indicate Filtered or Preserved)
Company:	Job #: C22101178	
Contact:	PO / AFE:	
Address:	Legal Site Description:	
Phone:	Quote #: Test Samples	

Lab Work Order # (lab use only)	ALS Contact:	Sampler: SACK
---------------------------------	--------------	----------------------

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	Hold
	08 MW 14 at 9.2m	Aug 27/08	10:40	Soil	X
	08 MW 14 at 9.8m	Aug 27/08	10:45	Soil	X
	08 MW BH Sat 0.6	Aug 27/08	12:50	Soil	X
	08 MW BH Sat 1.2	Aug 27/08	1:00	Soil	X
	08 MW BH Sat 1.8	Aug 27/08	1:10	Soil	X
	08 MW BH Sat 2.4	Aug 27/08	1:15	Soil	X
	08 MW BH Sat 3.1	Aug 27/08	1:20	Soil	X
	08 MW BH Sat 3.7	Aug 27/08	1:25	Soil	X
	08 BH Sat 4.3	Aug 27/08	1:30	Soil	X
	08 BH Sat 4.9	Aug 27/08	1:35	Soil	X
	08 BH Sat 5.5	Aug 27/08	1:38	Soil	X
	08 BH Sat 6.1	Aug 27/08	1:39	Soil	X

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION	
Released by: <i>[Signature]</i>	Date & Time: Aug 31/08 3:50	Received by:	Date:	Time:	Temperature:	Verified by:



Environmental Division

Report to:		Report Format / Distribution			Service Requested: (rush - subje																																																				
Company: EPA		Standard: _____ Other: _____			<input checked="" type="checkbox"/> Regular (Default)																																																				
Contact: Brian Tsang		Select: PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/>			Priority (2-3 Business Days) - 50%																																																				
Address: 115,200 Rivercrest Drive SE		Email 1: btsang@alga.ca			Emergency (1 Business Day) - 10																																																				
Calgary		Email 2: amargoub@alga.ca			For Emergency < 1 Day, ASAP or																																																				
Phone: 403.203.3355		Fax: 403-3301			Analysis Rec																																																				
Invoice To: Same as Report? <input checked="" type="radio"/> Yes <input type="radio"/> No?		Client / Project Information:			(Indicate Filtered or Pres																																																				
Company:		Job #: C2710178			<table border="1"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																																																				
Contact:		PO / AFE:																																																							
Address:		Legal Site Description:																																																							
Phone:		Fax:																																																							
		Quote #: Test Samples																																																							
Lab Work Order # (lab use only)		ALS Contact:	Sampler: JACK																																																						
Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	Hold	BIEX F1-F4	Grain Size																																																		
	08 MW 14 at 1.2	Aug 27/08	9:45	Soil	<input checked="" type="checkbox"/>																																																				
	08 MW 14 at 1.8	Aug 27/08	9:50	Soil	<input checked="" type="checkbox"/>																																																				
	08 MW 14 at 2.4	Aug 27/08	10:00	Soil	<input checked="" type="checkbox"/>																																																				
	08 MW 14 at 3.1	Aug 27/08	10:05	Soil	<input checked="" type="checkbox"/>																																																				
	08 MW 14 at 3.7	Aug 27/08	10:10	Soil	<input checked="" type="checkbox"/>																																																				
	08 MW 14 at 4.3	Aug 27/08	10:15	Soil	<input checked="" type="checkbox"/>																																																				
	08 MW 14 at 4.9	Aug 27/08	10:20	Soil	<input checked="" type="checkbox"/>																																																				
	08 MW 14 at 5.5	Aug 27/08	10:25	Soil	<input checked="" type="checkbox"/>																																																				
	08 MW 14 at 6.1	Aug 27/08	10:30	Soil	<input checked="" type="checkbox"/>																																																				
	08 MW 14 at 6.7	Aug 27/08	10:35	Soil	<input checked="" type="checkbox"/>																																																				
	08 MW 14 at 7.3	Aug 27/08	10:38	Soil	<input checked="" type="checkbox"/>																																																				
	08 MW 14 at 8.5	Aug 27/08	10:38	Soil	<input checked="" type="checkbox"/>																																																				

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

SHIPMENT RELEASE (client use)				SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION			
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:				
<i>[Signature]</i>	Aug 31/08 3:50										



Environmental Division

Report to:	Report Format / Distribution	Service Requested: (rush - subje
Company: EBA	Standard: <input checked="" type="checkbox"/> Standard Other: <input type="checkbox"/>	<input checked="" type="checkbox"/> Regular (Default)
Contact: Brian Tsang	Select: PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/>	Priority (2-3 Business Days) - 50%
Address: 115200 Rivercrest Drive SE Calgary	Email 1: btsang@ebara.ca	Emergency (1 Business Day) - 10%
Phone: 403-203-3355 Fax: 403-203-3301	Email 2: A.Mahgoub@ebara.ca	For Emergency < 1 Day, ASAP or

Invoice To: Same as Report? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No?	Client / Project Information:	(Indicate Filtered or Pres
Company:	Job #: cz210178	
Contact:	PO / AFE:	
Address:	Legal Site Description:	
Phone:	Quote #: Test samples	

Lab Work Order # (lab use only)	ALS Contact:	Sampler: JACK
------------------------------------	--------------	----------------------

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type					
	08 MW 13 at 3.7	Aug 26/08	3:36	Soil	X				
	08 MW 13 at 4.3		3:38	Soil	X				
	08 MW 13 at 4.9		3:40	Soil	X				
	08 MW 13 at 5.5		3:45	Soil	X				
	08 MW 13 at 6.1		3:48	Soil	X				
	08 MW 13 at 6.7		3:49	Soil	X				
	08 MW 13 at 7.3		3:50	Soil	X				
	08 MW 13 at 7.9		3:52	Soil	X				
	08 MW 13 at 8.5		3:55	Soil	X				
	08 MW 13 at 9.2		3:56	Soil	X				
	08 MW 13 at 9.8		4:00	Soil	X				
	08 MW 14 at 0.6		9:45	Soil	X				

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION	
Released by: <i>Jack Samlitz</i>	Date & Time: Aug 31/08 3:50	Received by:	Date:	Time:	Temperature:	Verified by:
						Date & Time:



Environmental Division

Report to:		Report Format / Distribution			Service Requested: (rush - subje				
Company: EBA		Standard: <input checked="" type="checkbox"/> Other: <input type="checkbox"/>			<input checked="" type="checkbox"/> Regular (Default)				
Contact: Brian Tsang		Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital <input type="checkbox"/>			Priority (2-3 Business Days) - 50%				
Address: 115, 200 Westcrest Drive SE		Email 1: hitsang@eba.ca			Emergency (1 Business Day) - 10				
Culgoose		Email 2: rmahgenub@eba.ca			For Emergency < 1 Day, ASAP or				
Phone: 403-203-3355 Fax: 403-203-3301					Analysis Re				
Invoice To: Same as Report? <input checked="" type="checkbox"/> / No? <input type="checkbox"/>		Client / Project Information:			(Indicate Filtered or Pres				
Company:		Job #: C22101178							
Contact:		PO / AFE:							
Address:		Legal Site Description:							
Phone:		Quote #: Test Samples							
Lab Work Order # (lab use only)		ALS Contact:			Sampler: Jack				
Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	Hold	BTEX FI-G4	Metals	Lead	Deter./Salinity
	08 MW 23 at 6.7 m	Aug 26/08	5:20	Soil	X				
	08 MW 23 at 7.3 m	Aug 26/08	5:25	Soil	X				
	08 MW 23 at 7.9 m	Aug 26/08	5:30	Soil	X				
	08 MW 23 at 8.5 m	Aug 26/08	5:35	Soil	X				
	08 MW 23 at 9.2 m	Aug 26/08	5:40	Soil	X				
	08 MW 23 at 9.8 m	Aug 26/08	5:45	Soil	X				
	08 MW 22 d at 0.6 m	Aug 26/08	3:20	Soil	X	X	X		
	08 MW 13 at 0.6 m	Aug 27/08	3:20	Soil	X	X		X	X
	08 MW 13 at 1.2 m	Aug 27/08	3:25	Soil	X				
	08 MW 13 at 1.8 m	Aug 27/08	3:30	Soil	X				
	08 MW 13 at 2.4 m	Aug 27/08	3:32	Soil	X				
	08 MW 13 at 3.1 m	Aug 27/08	3:35	Soil	X				
Special Instructions / Regulations / Hazardous Details									
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.									
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report co									
SHIPMENT RELEASE (client use)				SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:		
<i>Jack Lamb</i>	Aug 31/08 3:50								



Environmental Division

Report to:		Report Format / Distribution			Service Requested: (rush - subject)																																					
Company: EBA		Standard: <input checked="" type="checkbox"/> Other: <input type="checkbox"/>			<input checked="" type="checkbox"/> Regular (Default)																																					
Contact: 115,200 Rives Crest Drive SE Calgary		Select: PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/>			Priority (2-3 Business Days) - 50%																																					
Address: Brian Tsang		Email 1: btsang@eba.ca			Emergency (1 Business Day) - 10%																																					
Phone: 403-203-3355 Fax: 403-203-3301		Email 2: anna.hgaub@eba.ca			For Emergency < 1 Day, ASAP or																																					
Invoice To: Same as Report? <input checked="" type="radio"/> No? <input type="radio"/>		Client / Project Information:			(Indicate Filtered or Present)																																					
Company:		Job #: C2210178			<table border="1"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																																					
Contact:		PO / AFE:																																								
Address:		Legal Site Description:																																								
Phone:		Quote #: Test Samples																																								
Lab Work Order # (lab use only)		ALS Contact:			Sampler: JACK																																					
Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	Hold	BTEX FI-PH	Grain Size	Metals																																		
	08 MW 22 at 9.2	Aug 26/08	3:40	Soil	X																																					
	08 MW 22 at 9.8	Aug 26/08	3:50	Soil	X																																					
	08 MW 23 at 0.6	Aug 26/08	4:00	Soil		X	X	X																																		
	08 MW 23 at 1.2	Aug 26/08	4:10	Soil	X																																					
	08 MW 23 at 1.8	Aug 26/08	4:20	Soil	X																																					
	08 MW 23 at 2.4	Aug 26/08	4:30	Soil	X																																					
	08 MW 23 at 3.1	Aug 26/08	4:35	Soil	X																																					
	08 MW 23 at 3.7	Aug 26/08	4:40	Soil	X																																					
	08 MW 23 at 4.3	Aug 26/08	4:45	Soil	X																																					
	08 MW 23 at 4.9	Aug 26/08	4:50	Soil	X																																					
	08 MW 23 at 5.5	Aug 26/08	5:00	Soil	X																																					
	08 MW 23 at 6.1	Aug 26/08	5:10	Soil		X																																				

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION	
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:
<i>[Signature]</i>	Aug 31/08 3:50					



Environmental Division

Report to:		Report Format / Distribution			Service Requested: (rush - subject)																																			
Company: <u>EBA</u>		Standard: <input checked="" type="checkbox"/> Other: <input type="checkbox"/>			<input checked="" type="checkbox"/> Regular (Default)																																			
Contact: <u>Btsang</u>		Select: PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/>			Priority (2-3 Business Days) - 50%																																			
Address: <u>115, 200 Rivercrest Drive SE</u>		Email 1: <u>btsang@aba.ca</u>			Emergency (1 Business Day) - 10%																																			
<u>Calgary</u>		Email 2: <u>n.mahgoub@aba.ca</u>			For Emergency < 1 Day, ASAP or																																			
Phone: <u>403-203-3355</u> Fax: <u>403-203-3301</u>					Analysis Req																																			
Invoice To: Same as Report? <input checked="" type="radio"/> Yes / No? <input type="radio"/>		Client / Project Information:			(Indicate Filtered or Preserved)																																			
Company:		Job #: <u>C27101178</u>			<table border="1"> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>																																			
Contact:		PO / AFE:																																						
Address:		Legal Site Description:																																						
Phone:		Quote #: <u>Test samples</u>																																						
Lab Work Order # (lab use only):		ALS Contact:			Sampler: <u>JAC</u>																																			
Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	BTEX H-F	Metals	Detailed Sampling	Hold																																
	<u>08BH19 at 4.3m</u>	<u>Aug 27/08</u>	<u>4:30</u>	<u>Soil</u>	<u>X</u>	<u>X</u>	<u>X</u>																																	
	<u>08BH19 at 4.9</u>							<u>X</u>																																
	<u>08BH19 at 5.5</u>							<u>X</u>																																
	<u>08BH19 at 6.1</u>							<u>X</u>																																
	<u>08BH19 at 6.7</u>							<u>X</u>																																
	<u>08BH19 at 7.3</u>							<u>X</u>																																
	<u>08BH19 at 7.9</u>							<u>X</u>																																
	<u>08BH19 at 8.5</u>							<u>X</u>																																
	<u>08BH19 at 9.2</u>							<u>X</u>																																
	<u>08BH19 at 9.8</u>							<u>X</u>																																
	<u>08BH19d at 4.3m</u>		<u>4:30</u>		<u>X</u>	<u>X</u>	<u>X</u>																																	
Special Instructions / Regulations / Hazardous Details																																								
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.																																								
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy																																								
SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION																																		
Released by: <u>[Signature]</u>	Date & Time: <u>3:50</u>	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:																																	



Environmental Division

Report to:		Report Format / Distribution		Service Requested: (rush - subje																									
Company: EBA		Standard: <input checked="" type="checkbox"/> Other:		<input checked="" type="checkbox"/> Regular (Default)																									
Contact: Brian Tsang		Select: PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital		Priority (2-3 Business Days) - 50%																									
Address: 115, 200 Rivercrest Drive S.E.		Email 1: Sambir Singh @ EBA		Emergency (1 Business Day) - 10%																									
Calgary		Email 2: B.Tsang @ EBA		For Emergency < 1 Day, ASAP or																									
Phone: 403-203-3355		Fax: 403-203-3301		Analysis Req																									
Invoice To: Same as Report? <input checked="" type="checkbox"/> No?		Client / Project Information:		(Indicate Filtered or Pres																									
Company:		Job #: C22101178		<table border="1"> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>																									
Contact:		PO / AFE:																											
Address:		Legal Site Description:																											
Phone:		Fax:																											
Lab Work Order # (lab use only)		Quote #: TEST Samples																											
ALS Contact:		Sampler: JAC																											
Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type																									
					BTEX FI-FY	metals	VOCS	PAHs	lead	STAIN SIZE																			
	0855 24	Aug 23/08		Soil	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																					
	0855 25				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>																				
	0855 26				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																			
	0855 27				<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																					
	0855 28				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																							
	0855 29				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>																				
	0855 30				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>																				
	0855 31				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																							
	0855 32				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																							
	0855 33				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																							
	0855 34				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>																				
	0855 35				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>																				

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report cop

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATIO	
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:
Paul Sambir Singh	Aug 31/08 3:50					



Environmental Division

Report to:	Report Format / Distribution	Service Requested: (rush - subject)
Company: EBA	Standard: <input checked="" type="checkbox"/> Other: <input type="checkbox"/>	<input checked="" type="checkbox"/> Regular (Default)
Contact: Brian Tsang	Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital <input type="checkbox"/>	Priority (2-3 Business Days) - 50%
Address: 115, 200 R. West Crest Drive SE	Email 1: btsang@albacanada.ca	Emergency (1 Business Day) - 10%
Phone: 403-203-3355 Fax: 403-203-3341	Email 2: aman@albacanada.ca	For Emergency < 1 Day, ASAP or
Invoice To: Same as Report? <input checked="" type="checkbox"/> No? <input type="checkbox"/>	Client / Project Information:	Analysis Req
Company:	Job #: C22101178	(Indicate Filtered or Preserved)
Contact:	PO / AFE:	
Address:	Legal Site Description:	
Phone:	Quote #: TEST SAMPLES	

Lab Work Order # (lab use only)	ALS Contact:	Sampler: JACK
---------------------------------	--------------	----------------------

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	BTEX H-F4	Metals	Grain Size	Detailed Salinity	Lead	PAN
	085536	Aug 28/08		Soil	X	X	X	X		
	085533d				X	X				
	085537				X	X				
	085538				X		X			
	085539				X	X				
	085540				X	X				
	085541				X			X		
	085542				X			X	X	
	085543				X				X	
	085544				X	X				
	085545				X		X		X	
	085546				X	X				X

Special instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION	
Released by: Jack Stankovic	Date & Time: Aug 31/08 3:50	Received by:	Date:	Time:	Temperature:	Verified by:
						Date & Time:



Environmental Division

Report to: Company: <u>EBA</u> Contact: <u>Brian Tsang</u> Address: <u>115,200 Rivercrest Drive SE</u> <u>Culver</u> Phone: <u>403-203-3355</u> Fax: <u>403-203-3301</u>	Report Format / Distribution Standard: <input checked="" type="checkbox"/> Other: Select: PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital Email 1: <u>btsang@ebara.com</u> Email 2: <u>n.mahgoub@ebara.com</u>	Service Requested: (rush - subject) <input checked="" type="checkbox"/> Regular (Default) Priority (2-3 Business Days) - 50% Emergency (1 Business Day) - 10% For Emergency < 1 Day, ASAP or
--	--	---

Invoice To: Same as Report? <input checked="" type="checkbox"/> Yes / No?	Client / Project Information: Job #: <u>C22101178</u> PO / AFE: Legal Site Description: Quote #: <u>Test Samples</u>	(Indicate Filtered or Preserved)
--	---	----------------------------------

Lab Work Order # (lab use only)	ALS Contact:	Sampler: <u>JACK</u>
---------------------------------	--------------	----------------------

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	BTEX F1-F4	Metals	VOCs	detected Solvents	Lead	PATTS	GRAIN SIZE
	<u>0855 47</u>	<u>Aug 28</u>		<u>SOI</u>	X	X	X				
	<u>0855 48</u>				X			X			
	<u>0855 49</u>				X		X		X	X	
	<u>0855 50</u>				X	X					
	<u>0855 51</u>				X				X		
	<u>0855 52</u>				X	X					X
	<u>0855 53</u>				X				X		X
	<u>0855 54</u>				X			X			
	<u>0855 52 d</u>				X	X					
	<u>0855 56</u>				X			X			
	<u>0855 57</u>				X			X			
	<u>0855 58</u>				X	X					

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION		
Released by: <u>JACK STAMBEFF</u>	Date & Time: <u>Aug 31/03</u>	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:



Environmental Division

Report to:		Report Format / Distribution			Service Requested: (rush - subject)																																																
Company: <u>EPA</u>		Standard: <u> </u> Other: <u> </u>			<input checked="" type="checkbox"/> Regular (Default)																																																
Contact: <u>Brian Tsang</u>		Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital <input type="checkbox"/>			Priority (2-3 Business Days) - 50%																																																
Address: <u>115, 200 Rivercrest Drive SE</u>		Email 1: <u>btsang@eba.ca</u>			Emergency (1 Business Day) - 10%																																																
Phone: <u>403-203-3355</u> Fax: <u>403-203-3301</u>		Email 2: <u>l.matsaub@eba.ca</u>			For Emergency < 1 Day, ASAP or																																																
Invoice To: Same as Report? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No?		Client / Project Information:			Analysis Rec (Indicate Filtered or Pres)																																																
Company:		Job #: <u>C22101178</u>			<table border="1"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																																																
Contact:		PO / AFE:																																																			
Address:		Legal Site Description:																																																			
Phone:		Quote #: <u>TEST SAMPLES</u>																																																			
Lab Work Order # (lab use only)		ALS Contact:			Sampler: <u>JAK</u>																																																
Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	BTEX-FI-FY	Metals	Lead	Grain Size																																													
	<u>085555</u>	<u>Aug 28/08</u>		<u>Soil</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																																															
	<u>085559</u>	<u>Aug 29/08</u>		<u>Soil</u>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>																																														
	<u>085559a</u>	<u>Aug 29/08</u>		<u>Soil</u>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>																																														
	<u>085560</u>	<u>Aug 29/08</u>		<u>Soil</u>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>																																													
	<u>085561</u>	<u>Aug 29/08</u>		<u>Soil</u>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>																																													
	<u>08562</u>	<u>Aug 29/08</u>		<u>Soil</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																																															
Special Instructions / Regulations / Hazardous Details																																																					
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.																																																					
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy																																																					
SHIPMENT RELEASE (client use)				SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION																																														
Released by: <u>[Signature]</u>	Date & Time: <u>Aug 31/08</u>	Received by: <u>[Signature]</u>	Date: <u>350</u>	Time:	Temperature:	Verified by:	Date & Time:																																														



Environmental Division

Certificate of Analysis

EBA ENG CONSULTANTS LTD

ATTN: BRIAN TSANG

115, 200 RIVERCREST DR SE

CALGARY AB T2C 2X5

Reported On: 02-FEB-09 03:29 PM

Lab Work Order #: **L676397**

Date Received: **31-AUG-08**

Project P.O. #:

Job Reference: C22101178

Legal Site Desc:

CofC Numbers: 08-042155, 08-042156

Other Information:

Comments:

CATHERINE EVARISTO-CORDERO
Senior Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS Canada Ltd. (formerly ETL Chemspec Analytical Ltd.)
Part of the **ALS Laboratory Group**

9936-67 Avenue, Edmonton, AB T6E 0P5
Phone: +1 780 413 5227 Fax: +1 780 437 2311 www.alsglobal.com
A Campbell Brothers Limited Company

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676397-1 08MW01								
Sampled By: JACK on 29-AUG-08 @ 13:00								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Major Metals								
Calcium (Ca)	115		0.5	mg/L		03-SEP-08	BOC	R717793
Potassium (K)	3.5		0.1	mg/L		03-SEP-08	BOC	R717793
Magnesium (Mg)	25.6		0.01	mg/L		03-SEP-08	BOC	R717793
Sodium (Na)	11.1		0.5	mg/L		03-SEP-08	BOC	R717793
Iron (Fe)	<0.005		0.005	mg/L		03-SEP-08	BOC	R717793
Manganese (Mn)	0.033		0.001	mg/L		03-SEP-08	BOC	R717793
Dissolved Trace Metals								
Silver (Ag)	0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminum (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Boron (B)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.430		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	0.0015		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.006		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.633		0.003	mg/L		04-SEP-08	SYF	R718417
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	0.006		0.002	mg/L		04-SEP-08	SYF	R718417
Lead (Pb)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	0.0016		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0042		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.023		0.002	mg/L		04-SEP-08	SYF	R718417
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
CCME PAHs								
Naphthalene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Quinoline	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Acenaphthene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Fluorene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Phenanthrene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Anthracene	0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Acridine	0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Fluoranthene	0.00002		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Pyrene	0.00003		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(a)anthracene	0.00002		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Chrysene	0.00002		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(b&j)fluoranthene	0.00003		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(k)fluoranthene	0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(a)pyrene	0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Indeno(1,2,3-cd)pyrene	0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Dibenzo(a,h)anthracene	0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Surr: Nitrobenzene d5	77		24-132	%	04-SEP-08	05-SEP-08	SDH	R718728
Surr: 2-Fluorobiphenyl	66		37-123	%	04-SEP-08	05-SEP-08	SDH	R718728

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676397-1	08MW01								
Sampled By: JACK on 29-AUG-08 @ 13:00									
Matrix: WATER									
CCME PAHs									
Surr:	p-Terphenyl d14	78		41-143	%	04-SEP-08	05-SEP-08	SDH	R718728
CCME Volatile HydroCarbon									
CCME Chlorinated Aliphatics									
	1,1-Dichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Methylene Chloride	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	trans-1,2-Dichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,1-Dichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Chloroform	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,2-Dichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,1,1-Trichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Carbon Tetrachloride	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Trichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,2-Dichloropropane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	cis-1,3-Dichloropropene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	trans-1,3-Dichloropropene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,1,2-Trichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Tetrachloroethylene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,1,2,2-Tetrachloroethane	<0.002		0.002	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	1,2-Dichloroethane d4	82		77-119	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	Toluene d8	93		68-120	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	4-Bromofluorobenzene	86		63-125	%	05-SEP-08	05-SEP-08	DDU	R718665
CCME monoaromatic hydrocarbons									
	Benzene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Thiophene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Toluene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Chlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Ethylbenzene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	m+p-Xylenes	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	o-Xylene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Styrene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,3-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,4-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,2-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	1,2-Dichloroethane d4	82		77-119	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	Toluene d8	93		68-120	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	4-Bromofluorobenzene	86		63-125	%	05-SEP-08	05-SEP-08	DDU	R718665
676397-2	08MW02								
Sampled By: JACK on 29-AUG-08 @ 13:10									
Matrix: WATER									
Dissolved Metals - CCME									
Dissolved Major Metals									
	Calcium (Ca)	106		0.5	mg/L		03-SEP-08	BOC	R717793
	Potassium (K)	2.3		0.1	mg/L		03-SEP-08	BOC	R717793
	Magnesium (Mg)	23.7		0.01	mg/L		03-SEP-08	BOC	R717793
	Sodium (Na)	7.1		0.5	mg/L		03-SEP-08	BOC	R717793
	Iron (Fe)	0.005		0.005	mg/L		03-SEP-08	BOC	R717793
	Manganese (Mn)	0.022		0.001	mg/L		03-SEP-08	BOC	R717793
Dissolved Trace Metals									
	Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
	Aluminum (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676397-2 08MW02								
Sampled By: JACK on 29-AUG-08 @ 13:10								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Trace Metals								
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Boron (B)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.445		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	0.0009		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.002		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.020		0.003	mg/L		04-SEP-08	SYF	R718417
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	0.004		0.002	mg/L		04-SEP-08	SYF	R718417
Lead (Pb)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	0.0020		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0042		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.004		0.002	mg/L		04-SEP-08	SYF	R718417
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
CCME PAHs								
Naphthalene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Quinoline	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Acenaphthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Fluorene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Phenanthrene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Anthracene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Acridine	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Fluoranthene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Pyrene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(a)anthracene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Chrysene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(b&j)fluoranthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(k)fluoranthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(a)pyrene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Indeno(1,2,3-cd)pyrene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Dibenzo(a,h)anthracene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Surr: Nitrobenzene d5	83		24-132	%	04-SEP-08	05-SEP-08	SDH	R718728
Surr: 2-Fluorobiphenyl	74		37-123	%	04-SEP-08	05-SEP-08	SDH	R718728
Surr: p-Terphenyl d14	81		41-143	%	04-SEP-08	05-SEP-08	SDH	R718728
CCME Volatile HydroCarbon								
CCME Chlorinated Aliphatics								
1,1-Dichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Methylene Chloride	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
trans-1,2-Dichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1-Dichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Chloroform	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,2-Dichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676397-2 08MW02								
Sampled By: JACK on 29-AUG-08 @ 13:10								
Matrix: WATER								
CCME Volatile HydroCarbon								
CCME Chlorinated Aliphatics								
1,1,1-Trichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Carbon Tetrachloride	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Trichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,2-Dichloropropane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
cis-1,3-Dichloropropene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
trans-1,3-Dichloropropene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1,2-Trichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Tetrachloroethylene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1,2,2-Tetrachloroethane	<0.002		0.002	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Surr: 1,2-Dichloroethane d4	85		77-119	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr: Toluene d8	92		68-120	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr: 4-Bromofluorobenzene	84		63-125	%	05-SEP-08	05-SEP-08	DDU	R718665
CCME monoaromatic hydrocarbons								
Benzene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Thiophene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Toluene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Chlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Ethylbenzene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
m+p-Xylenes	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
o-Xylene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Styrene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,3-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,4-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,2-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Surr: 1,2-Dichloroethane d4	85		77-119	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr: Toluene d8	92		68-120	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr: 4-Bromofluorobenzene	84		63-125	%	05-SEP-08	05-SEP-08	DDU	R718665
676397-3 08MW03								
Sampled By: JACK on 29-AUG-08 @ 13:30								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Major Metals								
Calcium (Ca)	96.5		0.5	mg/L		03-SEP-08	BOC	R717793
Potassium (K)	3.1		0.1	mg/L		03-SEP-08	BOC	R717793
Magnesium (Mg)	22.4		0.01	mg/L		03-SEP-08	BOC	R717793
Sodium (Na)	8.7		0.5	mg/L		03-SEP-08	BOC	R717793
Iron (Fe)	0.014		0.005	mg/L		03-SEP-08	BOC	R717793
Manganese (Mn)	0.010		0.001	mg/L		03-SEP-08	BOC	R717793
Dissolved Trace Metals								
Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminium (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Boron (B)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.451		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.004		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.612		0.003	mg/L		04-SEP-08	SYF	R718417

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676397-3 08MW03								
Sampled By: JACK on 29-AUG-08 @ 13:30								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Trace Metals								
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Lead (Pb)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	0.0028		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0040		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.018		0.002	mg/L		04-SEP-08	SYF	R718417
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
CCME PAHs								
Naphthalene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Quinoline	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Acenaphthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Fluorene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Phenanthrene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Anthracene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Acridine	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Fluoranthene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Pyrene	0.00005		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(a)anthracene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Chrysene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(b&j)fluoranthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(k)fluoranthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(a)pyrene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Indeno(1,2,3-cd)pyrene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Dibenzo(a,h)anthracene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Surr: Nitrobenzene d5	81		24-132	%	04-SEP-08	05-SEP-08	SDH	R718728
Surr: 2-Fluorobiphenyl	71		37-123	%	04-SEP-08	05-SEP-08	SDH	R718728
Surr: p-Terphenyl d14	76		41-143	%	04-SEP-08	05-SEP-08	SDH	R718728
CCME Volatile HydroCarbon								
CCME Chlorinated Aliphatics								
1,1-Dichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Methylene Chloride	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
trans-1,2-Dichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1-Dichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Chloroform	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,2-Dichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1,1-Trichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Carbon Tetrachloride	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Trichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,2-Dichloropropane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
cis-1,3-Dichloropropene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
trans-1,3-Dichloropropene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1,2-Trichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Tetrachloroethylene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1,2,2-Tetrachloroethane	<0.002		0.002	mg/L	05-SEP-08	05-SEP-08	DDU	R718665

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676397-3	08MW03								
Sampled By: JACK on 29-AUG-08 @ 13:30									
Matrix: WATER									
CCME Volatile HydroCarbon									
CCME Chlorinated Aliphatics									
Surr:	1,2-Dichloroethane d4	85		77-119	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	Toluene d8	91		68-120	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	4-Bromofluorobenzene	86		63-125	%	05-SEP-08	05-SEP-08	DDU	R718665
CCME monoaromatic hydrocarbons									
	Benzene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Thiophene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Toluene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Chlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Ethylbenzene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	m+p-Xylenes	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	o-Xylene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Styrene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,3-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,4-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,2-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	1,2-Dichloroethane d4	85		77-119	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	Toluene d8	91		68-120	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	4-Bromofluorobenzene	86		63-125	%	05-SEP-08	05-SEP-08	DDU	R718665
676397-4	08MW04B								
Sampled By: JACK on 29-AUG-08 @ 13:40									
Matrix: WATER									
Dissolved Metals - CCME									
Dissolved Major Metals									
	Calcium (Ca)	78.2		0.5	mg/L		03-SEP-08	BOC	R717793
	Potassium (K)	1.3		0.1	mg/L		03-SEP-08	BOC	R717793
	Magnesium (Mg)	24.5		0.01	mg/L		03-SEP-08	BOC	R717793
	Sodium (Na)	55.7		0.5	mg/L		03-SEP-08	BOC	R717793
	Iron (Fe)	<0.005		0.005	mg/L		03-SEP-08	BOC	R717793
	Manganese (Mn)	0.538		0.001	mg/L		03-SEP-08	BOC	R717793
Dissolved Trace Metals									
	Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
	Aluminum (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417
	Arsenic (As)	0.0014		0.0004	mg/L		04-SEP-08	SYF	R718417
	Boron (B)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
	Barium (Ba)	0.061		0.003	mg/L		04-SEP-08	SYF	R718417
	Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
	Cadmium (Cd)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
	Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
	Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
	Copper (Cu)	0.003		0.001	mg/L		04-SEP-08	SYF	R718417
	Lithium (Li)	0.536		0.003	mg/L		04-SEP-08	SYF	R718417
	Molybdenum (Mo)	0.015		0.005	mg/L		04-SEP-08	SYF	R718417
	Nickel (Ni)	0.006		0.002	mg/L		04-SEP-08	SYF	R718417
	Lead (Pb)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
	Antimony (Sb)	0.0005		0.0004	mg/L		04-SEP-08	SYF	R718417
	Selenium (Se)	0.0012		0.0004	mg/L		04-SEP-08	SYF	R718417
	Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
	Titanium (Ti)	0.001		0.001	mg/L		04-SEP-08	SYF	R718417
	Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
	Uranium (U)	0.0097		0.0001	mg/L		04-SEP-08	SYF	R718417

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676397-4 08MW04B								
Sampled By: JACK on 29-AUG-08 @ 13:40								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Trace Metals								
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.026		0.002	mg/L		04-SEP-08	SYF	R718417
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
CCME PAHs								
Naphthalene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Quinoline	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Acenaphthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Fluorene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Phenanthrene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Anthracene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Acridine	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Fluoranthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Pyrene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(a)anthracene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Chrysene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(b&j)fluoranthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(k)fluoranthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(a)pyrene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Indeno(1,2,3-cd)pyrene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Dibenzo(a,h)anthracene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Surr: Nitrobenzene d5	76		24-132	%	04-SEP-08	05-SEP-08	SDH	R718728
Surr: 2-Fluorobiphenyl	74		37-123	%	04-SEP-08	05-SEP-08	SDH	R718728
Surr: p-Terphenyl d14	81		41-143	%	04-SEP-08	05-SEP-08	SDH	R718728
CCME Volatile HydroCarbon								
CCME Chlorinated Aliphatics								
1,1-Dichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Methylene Chloride	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
trans-1,2-Dichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1-Dichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Chloroform	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,2-Dichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1,1-Trichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Carbon Tetrachloride	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Trichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,2-Dichloropropane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
cis-1,3-Dichloropropene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
trans-1,3-Dichloropropene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1,2-Trichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Tetrachloroethylene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1,2,2-Tetrachloroethane	<0.002		0.002	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Surr: 1,2-Dichloroethane d4	84		77-119	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr: Toluene d8	91		68-120	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr: 4-Bromofluorobenzene	84		63-125	%	05-SEP-08	05-SEP-08	DDU	R718665
CCME monoaromatic hydrocarbons								
Benzene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Thiophene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Toluene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Chlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Ethylbenzene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676397-4 08MW04B								
Sampled By: JACK on 29-AUG-08 @ 13:40								
Matrix: WATER								
CCME Volatile HydroCarbon								
CCME monoaromatic hydrocarbons								
m+p-Xylenes	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
o-Xylene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Styrene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,3-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,4-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,2-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Surr: 1,2-Dichloroethane d4	84		77-119	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr: Toluene d8	91		68-120	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr: 4-Bromofluorobenzene	84		63-125	%	05-SEP-08	05-SEP-08	DDU	R718665
676397-5 08MW05B								
Sampled By: JACK on 29-AUG-08 @ 13:50								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Major Metals								
Calcium (Ca)	114		0.5	mg/L		03-SEP-08	BOC	R717793
Potassium (K)	3.8		0.1	mg/L		03-SEP-08	BOC	R717793
Magnesium (Mg)	29.0		0.01	mg/L		03-SEP-08	BOC	R717793
Sodium (Na)	10.7		0.5	mg/L		03-SEP-08	BOC	R717793
Iron (Fe)	1.51		0.005	mg/L		03-SEP-08	BOC	R717793
Manganese (Mn)	0.636		0.001	mg/L		03-SEP-08	BOC	R717793
Dissolved Trace Metals								
Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminum (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	0.0034		0.0004	mg/L		04-SEP-08	SYF	R718417
Boron (B)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.420		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.004		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.542		0.003	mg/L		04-SEP-08	SYF	R718417
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	0.004		0.002	mg/L		04-SEP-08	SYF	R718417
Lead (Pb)	0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	0.0006		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0034		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.019		0.002	mg/L		04-SEP-08	SYF	R718417
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
CCME PAHs								
Naphthalene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Quinoline	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Acenaphthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L	Units	Extracted	Analyzed	By	Batch
676397-5 08MW05B								
Sampled By: JACK on 29-AUG-08 @ 13:50								
Matrix: WATER								
CCME PAHs								
Fluorene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Phenanthrene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Anthracene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Acridine	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Fluoranthene	<0.00001	RAMB	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Pyrene	0.00002		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(a)anthracene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Chrysene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(b&j)fluoranthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(k)fluoranthene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Benzo(a)pyrene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Indeno(1,2,3-cd)pyrene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Dibenzo(a,h)anthracene	<0.00001		0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Surr: Nitrobenzene d5	85		24-132	%	04-SEP-08	05-SEP-08	SDH	R718728
Surr: 2-Fluorobiphenyl	77		37-123	%	04-SEP-08	05-SEP-08	SDH	R718728
Surr: p-Terphenyl d14	87		41-143	%	04-SEP-08	05-SEP-08	SDH	R718728
CCME Volatile HydroCarbon								
CCME Chlorinated Aliphatics								
1,1-Dichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Methylene Chloride	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
trans-1,2-Dichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1-Dichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Chloroform	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,2-Dichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1,1-Trichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Carbon Tetrachloride	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Trichloroethene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,2-Dichloropropane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
cis-1,3-Dichloropropene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
trans-1,3-Dichloropropene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1,2-Trichloroethane	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Tetrachloroethylene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,1,2,2-Tetrachloroethane	<0.002		0.002	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Surr: 1,2-Dichloroethane d4	86		77-119	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr: Toluene d8	93		68-120	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr: 4-Bromofluorobenzene	83		63-125	%	05-SEP-08	05-SEP-08	DDU	R718665
CCME monoaromatic hydrocarbons								
Benzene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Thiophene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Toluene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Chlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Ethylbenzene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
m+p-Xylenes	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
o-Xylene	<0.00050		0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Styrene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,3-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,4-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
1,2-Dichlorobenzene	<0.001		0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Surr: 1,2-Dichloroethane d4	86		77-119	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr: Toluene d8	93		68-120	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr: 4-Bromofluorobenzene	83		63-125	%	05-SEP-08	05-SEP-08	DDU	R718665

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676397-5	08MW05B								
Sampled By: JACK on 29-AUG-08 @ 13:50									
Matrix: WATER									
CCME Volatile HydroCarbon									
676397-6	08MW06B								
Sampled By: JACK on 29-AUG-08 @ 14:00									
Matrix: WATER									
Dissolved Metals - CCME									
Dissolved Major Metals									
Calcium (Ca)	117	0.5		mg/L		04-SEP-08		BOC	R718461
Potassium (K)	5.1	0.1		mg/L		04-SEP-08		BOC	R718461
Magnesium (Mg)	31.4	0.01		mg/L		04-SEP-08		BOC	R718461
Sodium (Na)	12.9	0.5		mg/L		04-SEP-08		BOC	R718461
Iron (Fe)	0.013	0.005		mg/L		04-SEP-08		BOC	R718461
Manganese (Mn)	0.043	0.001		mg/L		04-SEP-08		BOC	R718461
Dissolved Trace Metals									
Silver (Ag)	<0.0001	0.0001		mg/L		04-SEP-08		SYF	R718417
Aluminum (Al)	<0.01	0.01		mg/L		04-SEP-08		SYF	R718417
Arsenic (As)	<0.0004	0.0004		mg/L		04-SEP-08		SYF	R718417
Boron (B)	<0.05	0.05		mg/L		04-SEP-08		SYF	R718417
Barium (Ba)	0.352	0.003		mg/L		04-SEP-08		SYF	R718417
Beryllium (Be)	<0.001	0.001		mg/L		04-SEP-08		SYF	R718417
Cadmium (Cd)	0.0021	0.0001		mg/L		04-SEP-08		SYF	R718417
Cobalt (Co)	<0.002	0.002		mg/L		04-SEP-08		SYF	R718417
Chromium (Cr)	<0.005	0.005		mg/L		04-SEP-08		SYF	R718417
Copper (Cu)	0.009	0.001		mg/L		04-SEP-08		SYF	R718417
Lithium (Li)	0.360	0.003		mg/L		04-SEP-08		SYF	R718417
Molybdenum (Mo)	<0.005	0.005		mg/L		04-SEP-08		SYF	R718417
Nickel (Ni)	0.004	0.002		mg/L		04-SEP-08		SYF	R718417
Lead (Pb)	0.0002	0.0001		mg/L		04-SEP-08		SYF	R718417
Antimony (Sb)	<0.0004	0.0004		mg/L		04-SEP-08		SYF	R718417
Selenium (Se)	0.0037	0.0004		mg/L		04-SEP-08		SYF	R718417
Tin (Sn)	<0.05	0.05		mg/L		04-SEP-08		SYF	R718417
Titanium (Ti)	<0.001	0.001		mg/L		04-SEP-08		SYF	R718417
Thallium (Tl)	<0.0001	0.0001		mg/L		04-SEP-08		SYF	R718417
Uranium (U)	0.0053	0.0001		mg/L		04-SEP-08		SYF	R718417
Vanadium (V)	<0.001	0.001		mg/L		04-SEP-08		SYF	R718417
Zinc (Zn)	0.033	0.002		mg/L		04-SEP-08		SYF	R718417
Mercury (Hg) - Dissolved									
Mercury (Hg)-Dissolved	<0.00010	0.00010		mg/L		08-SEP-08		DEO	R719896
CCME PAHs									
Naphthalene	<0.00001	RAMB	0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728
Quinoline	<0.00001		0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728
Acenaphthene	<0.00001		0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728
Fluorene	<0.00001	RAMB	0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728
Phenanthrene	<0.00001	RAMB	0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728
Anthracene	<0.00001		0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728
Acridine	<0.00001		0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728
Fluoranthene	<0.00001	RAMB	0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728
Pyrene	<0.00001	RAMB	0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728
Benzo(a)anthracene	<0.00001		0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728
Chrysene	<0.00001		0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728
Benzo(b&j)fluoranthene	<0.00001		0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728
Benzo(k)fluoranthene	<0.00001		0.00001	mg/L		04-SEP-08	05-SEP-08	SDH	R718728

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676397-6 08MW06B								
Sampled By: JACK on 29-AUG-08 @ 14:00								
Matrix: WATER								
CCME PAHs								
	Benzo(a)pyrene	<0.00001	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
	Indeno(1,2,3-cd)pyrene	<0.00001	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
	Dibenzo(a,h)anthracene	<0.00001	0.00001	mg/L	04-SEP-08	05-SEP-08	SDH	R718728
Surr:	Nitrobenzene d5	86	24-132	%	04-SEP-08	05-SEP-08	SDH	R718728
Surr:	2-Fluorobiphenyl	76	37-123	%	04-SEP-08	05-SEP-08	SDH	R718728
Surr:	p-Terphenyl d14	88	41-143	%	04-SEP-08	05-SEP-08	SDH	R718728
CCME Volatile HydroCarbon								
CCME Chlorinated Aliphatics								
	1,1-Dichloroethene	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Methylene Chloride	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	trans-1,2-Dichloroethene	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,1-Dichloroethane	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Chloroform	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,2-Dichloroethane	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,1,1-Trichloroethane	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Carbon Tetrachloride	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Trichloroethene	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,2-Dichloropropane	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	cis-1,3-Dichloropropene	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	trans-1,3-Dichloropropene	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,1,2-Trichloroethane	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Tetrachloroethylene	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,1,2,2-Tetrachloroethane	<0.002	0.002	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	1,2-Dichloroethane d4	85	77-119	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	Toluene d8	94	68-120	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	4-Bromofluorobenzene	83	63-125	%	05-SEP-08	05-SEP-08	DDU	R718665
CCME monoaromatic hydrocarbons								
	Benzene	<0.00050	0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Thiophene	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Toluene	<0.00050	0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Chlorobenzene	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Ethylbenzene	<0.00050	0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	m+p-Xylenes	<0.00050	0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	o-Xylene	<0.00050	0.00050	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	Styrene	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,3-Dichlorobenzene	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,4-Dichlorobenzene	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
	1,2-Dichlorobenzene	<0.001	0.001	mg/L	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	1,2-Dichloroethane d4	85	77-119	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	Toluene d8	94	68-120	%	05-SEP-08	05-SEP-08	DDU	R718665
Surr:	4-Bromofluorobenzene	83	63-125	%	05-SEP-08	05-SEP-08	DDU	R718665
676397-7 08MW07B								
Sampled By: JACK on 29-AUG-08 @ 14:10								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Major Metals								
	Calcium (Ca)	94.2	0.5	mg/L		03-SEP-08	BOC	R717793
	Potassium (K)	3.9	0.1	mg/L		03-SEP-08	BOC	R717793
	Magnesium (Mg)	23.0	0.01	mg/L		03-SEP-08	BOC	R717793
	Sodium (Na)	7.7	0.5	mg/L		03-SEP-08	BOC	R717793

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676397-7 08MW07B								
Sampled By: JACK on 29-AUG-08 @ 14:10								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Major Metals								
Iron (Fe)	<0.005		0.005	mg/L		03-SEP-08	BOC	R717793
Manganese (Mn)	0.101		0.001	mg/L		03-SEP-08	BOC	R717793
Dissolved Trace Metals								
Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminum (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Boron (B)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.329		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.003		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.347		0.003	mg/L		04-SEP-08	SYF	R718417
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Lead (Pb)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	0.0042		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0027		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.013		0.002	mg/L		04-SEP-08	SYF	R718417
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
676397-8 08MW08								
Sampled By: JACK on 29-AUG-08 @ 14:20								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Major Metals								
Calcium (Ca)	97.5		0.5	mg/L		03-SEP-08	BOC	R717793
Potassium (K)	4.1		0.1	mg/L		03-SEP-08	BOC	R717793
Magnesium (Mg)	25.1		0.01	mg/L		03-SEP-08	BOC	R717793
Sodium (Na)	10.4		0.5	mg/L		03-SEP-08	BOC	R717793
Iron (Fe)	0.006		0.005	mg/L		03-SEP-08	BOC	R717793
Manganese (Mn)	0.170		0.001	mg/L		03-SEP-08	BOC	R717793
Dissolved Trace Metals								
Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminum (Al)	0.01		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Boron (B)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.360		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.004		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.367		0.003	mg/L		04-SEP-08	SYF	R718417

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676397-8 08MW08								
Sampled By: JACK on 29-AUG-08 @ 14:20								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Trace Metals								
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Lead (Pb)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	0.0027		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0027		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.026		0.002	mg/L		04-SEP-08	SYF	R718417
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
676397-9 08MW10								
Sampled By: JACK on 29-AUG-08 @ 14:30								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Major Metals								
Calcium (Ca)	83.1		0.5	mg/L		03-SEP-08	BOC	R717793
Potassium (K)	4.8		0.1	mg/L		03-SEP-08	BOC	R717793
Magnesium (Mg)	15.5		0.01	mg/L		03-SEP-08	BOC	R717793
Sodium (Na)	3.2		0.5	mg/L		03-SEP-08	BOC	R717793
Iron (Fe)	<0.005		0.005	mg/L		03-SEP-08	BOC	R717793
Manganese (Mn)	0.010		0.001	mg/L		03-SEP-08	BOC	R717793
Dissolved Trace Metals								
Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminum (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Boron (B)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.579		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.003		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.429		0.003	mg/L		04-SEP-08	SYF	R718417
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Lead (Pb)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0009		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.015		0.002	mg/L		04-SEP-08	SYF	R718417
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676397-9 08MW10 Sampled By: JACK on 29-AUG-08 @ 14:30 Matrix: WATER								
676397-10 08MW11 Sampled By: JACK on 29-AUG-08 @ 14:40 Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Major Metals								
Calcium (Ca)	87.6		0.5	mg/L		03-SEP-08	BOC	R717793
Potassium (K)	2.9		0.1	mg/L		03-SEP-08	BOC	R717793
Magnesium (Mg)	22.4		0.01	mg/L		03-SEP-08	BOC	R717793
Sodium (Na)	4.1		0.5	mg/L		03-SEP-08	BOC	R717793
Iron (Fe)	<0.005		0.005	mg/L		03-SEP-08	BOC	R717793
Manganese (Mn)	0.013		0.001	mg/L		03-SEP-08	BOC	R717793
Dissolved Trace Metals								
Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminum (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Boron (B)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.428		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.003		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.393		0.003	mg/L		04-SEP-08	SYF	R718417
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Lead (Pb)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	0.0214		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0040		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.013		0.002	mg/L		04-SEP-08	SYF	R718417
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
676397-12 08MW14 Sampled By: JACK on 29-AUG-08 @ 15:30 Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Toluene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
EthylBenzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Xylenes	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1(C6-C10)	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1-BTEX	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F2 (>C10-C16)								
F2 (>C10-C16)	<0.2	DLHS	0.2	mg/L	03-SEP-08	04-SEP-08	YZH	R720050
Surr: 2-Bromobenzotrifluoride	104		47-153	%	03-SEP-08	04-SEP-08	YZH	R720050

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676397-12 08MW14 Sampled By: JACK on 29-AUG-08 @ 15:30 Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Major Metals								
Calcium (Ca)	107		0.5	mg/L		03-SEP-08	BOC	R717793
Potassium (K)	3.6		0.1	mg/L		03-SEP-08	BOC	R717793
Magnesium (Mg)	22.2		0.01	mg/L		03-SEP-08	BOC	R717793
Sodium (Na)	10.4		0.5	mg/L		03-SEP-08	BOC	R717793
Iron (Fe)	0.005		0.005	mg/L		03-SEP-08	BOC	R717793
Manganese (Mn)	<0.001		0.001	mg/L		03-SEP-08	BOC	R717793
Dissolved Trace Metals								
Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminum (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Boron (B)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.130		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.007		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.842		0.003	mg/L		04-SEP-08	SYF	R718417
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Lead (Pb)	0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	0.0160		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0031		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.033		0.002	mg/L		04-SEP-08	SYF	R718417
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
676397-13 08MW16 Sampled By: JACK on 29-AUG-08 @ 16:00 Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Toluene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
EthylBenzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Xylenes	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1(C6-C10)	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1-BTEX	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F2 (>C10-C16)								
F2 (>C10-C16)	<2	DLHS	0.2	mg/L	03-SEP-08	04-SEP-08	YZH	R720050
Surr: 2-Bromobenzotrifluoride	127		47-153	%	03-SEP-08	04-SEP-08	YZH	R720050
Dissolved Metals - CCME								
Dissolved Trace Metals								
Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminum (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676397-14 08MW18								
Sampled By: JACK on 29-AUG-08 @ 16:30								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Toluene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
EthylBenzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Xylenes	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1(C6-C10)	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1-BTEX	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F2 (>C10-C16)								
F2 (>C10-C16)	<0.2	DLHS	0.2	mg/L	03-SEP-08	04-SEP-08	YZH	R720050
Surr: 2-Bromobenzotrifluoride	115		47-153	%	03-SEP-08	04-SEP-08	YZH	R720050
Dissolved Metals - CCME								
Dissolved Trace Metals								
Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminum (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Boron (B)	0.09		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.060		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.004		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.432		0.003	mg/L		04-SEP-08	SYF	R718417
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	0.005		0.002	mg/L		04-SEP-08	SYF	R718417
Lead (Pb)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	0.0287		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0071		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.015		0.002	mg/L		04-SEP-08	SYF	R718417
Iron (Fe)-Dissolved	<0.005		0.005	mg/L		03-SEP-08	BOC	R717793
Manganese (Mn)-Dissolved	0.045		0.001	mg/L		04-SEP-08	BOC	R718461
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
Routine Water Analysis								
Chloride (Cl)								
Chloride (Cl)	3		1	mg/L		02-SEP-08	KFA	R717243
ICP metals and SO4 for routine water								
Calcium (Ca)	157		0.5	mg/L		02-SEP-08	EOC	R717578
Potassium (K)	1.9		0.5	mg/L		02-SEP-08	EOC	R717578
Magnesium (Mg)	33.7		0.1	mg/L		02-SEP-08	EOC	R717578
Sodium (Na)	7		1	mg/L		02-SEP-08	EOC	R717578
Sulfate (SO4)	80.0		0.5	mg/L		02-SEP-08	EOC	R717578
Ion Balance Calculation								
Ion Balance	99.9			%		03-SEP-08		
TDS (Calculated)	561			mg/L		03-SEP-08		
Hardness (as CaCO3)	531			mg/L		03-SEP-08		

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676397-15 08MW20 Sampled By: JACK on 29-AUG-08 @ 17:30 Matrix: WATER								
Dissolved Metals - CCME								
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
Routine Water Analysis								
Chloride (Cl)								
Chloride (Cl)	3		1	mg/L		02-SEP-08	KFA	R717243
ICP metals and SO4 for routine water								
Calcium (Ca)	98.6		0.5	mg/L		02-SEP-08	EOC	R717578
Potassium (K)	2.0		0.5	mg/L		02-SEP-08	EOC	R717578
Magnesium (Mg)	27.9		0.1	mg/L		02-SEP-08	EOC	R717578
Sodium (Na)	5		1	mg/L		02-SEP-08	EOC	R717578
Sulfate (SO4)	44.5		0.5	mg/L		02-SEP-08	EOC	R717578
Ion Balance Calculation								
Ion Balance	103			%		03-SEP-08		
TDS (Calculated)	370			mg/L		03-SEP-08		
Hardness (as CaCO3)	361			mg/L		03-SEP-08		
Nitrate+Nitrite-N	0.2		0.1	mg/L		02-SEP-08	JXD	R717354
Nitrate-N	0.2		0.1	mg/L		02-SEP-08	JXD	R717354
Nitrite-N	<0.05		0.05	mg/L		02-SEP-08	JXD	R717354
pH, Conductivity and Total Alkalinity								
pH	7.9		0.1	pH		02-SEP-08	CLTT	R717081
Conductivity (EC)	658		0.2	uS/cm		02-SEP-08	CLTT	R717081
Bicarbonate (HCO3)	383		5	mg/L		02-SEP-08	CLTT	R717081
Carbonate (CO3)	<5		5	mg/L		02-SEP-08	CLTT	R717081
Hydroxide (OH)	<5		5	mg/L		02-SEP-08	CLTT	R717081
Alkalinity, Total (as CaCO3)	314		5	mg/L		02-SEP-08	CLTT	R717081
676397-16 08MW21 Sampled By: JACK on 29-AUG-08 @ 18:00 Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Toluene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
EthylBenzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Xylenes	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1(C6-C10)	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1-BTEX	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F2 (>C10-C16)								
F2 (>C10-C16)	<0.2	DLHS	0.2	mg/L	03-SEP-08	04-SEP-08	YZH	R720050
Surr: 2-Bromobenzotrifluoride	107		47-153	%	03-SEP-08	04-SEP-08	YZH	R720050
Dissolved Metals - CCME								
Dissolved Major Metals								
Calcium (Ca)	109		0.5	mg/L		03-SEP-08	BOC	R717793
Potassium (K)	3.7		0.1	mg/L		03-SEP-08	BOC	R717793
Magnesium (Mg)	30.4		0.01	mg/L		03-SEP-08	BOC	R717793
Sodium (Na)	9.3		0.5	mg/L		03-SEP-08	BOC	R717793
Iron (Fe)	0.007		0.005	mg/L		03-SEP-08	BOC	R717793
Manganese (Mn)	0.036		0.001	mg/L		03-SEP-08	BOC	R717793
Dissolved Trace Metals								
Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminum (Al)	0.10		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676397-16 08MW21								
Sampled By: JACK on 29-AUG-08 @ 18:00								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Trace Metals								
Boron (B)	0.06		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.434		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.004		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.429		0.003	mg/L		04-SEP-08	SYF	R718417
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Lead (Pb)	0.0002		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	0.0031		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0036		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.015		0.002	mg/L		04-SEP-08	SYF	R718417
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
676397-17 08MW22								
Sampled By: JACK on 29-AUG-08 @ 18:30								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Toluene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
EthylBenzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Xylenes	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1(C6-C10)	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1-BTEX	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F2 (>C10-C16)								
F2 (>C10-C16)	<0.2	DLHS	0.2	mg/L	03-SEP-08	04-SEP-08	YZH	R720050
Surr: 2-Bromobenzotrifluoride	114		47-153	%	03-SEP-08	04-SEP-08	YZH	R720050
Dissolved Metals - CCME								
Dissolved Trace Metals								
Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminum (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Boron (B)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.360		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.004		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.430		0.003	mg/L		04-SEP-08	SYF	R718417
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	0.004		0.002	mg/L		04-SEP-08	SYF	R718417

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
676397-17 08MW22								
Sampled By: JACK on 29-AUG-08 @ 18:30								
Matrix: WATER								
Dissolved Metals - CCME								
Dissolved Trace Metals								
Lead (Pb)	0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	0.0051		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0042		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.018		0.002	mg/L		04-SEP-08	SYF	R718417
Iron (Fe)-Dissolved	<0.005		0.005	mg/L		03-SEP-08	BOC	R717793
Manganese (Mn)-Dissolved	0.157		0.001	mg/L		03-SEP-08	BOC	R717793
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
Routine Water Analysis								
Chloride (Cl)								
Chloride (Cl)	4		1	mg/L		02-SEP-08	KFA	R717243
ICP metals and SO4 for routine water								
Calcium (Ca)	102		0.5	mg/L		02-SEP-08	EOC	R717578
Potassium (K)	2.4		0.5	mg/L		02-SEP-08	EOC	R717578
Magnesium (Mg)	27.9		0.1	mg/L		02-SEP-08	EOC	R717578
Sodium (Na)	6		1	mg/L		02-SEP-08	EOC	R717578
Sulfate (SO4)	44.6		0.5	mg/L		02-SEP-08	EOC	R717578
Ion Balance Calculation								
Ion Balance	94.2			%		03-SEP-08		
TDS (Calculated)	405			mg/L		03-SEP-08		
Hardness (as CaCO3)	370			mg/L		03-SEP-08		
Nitrate+Nitrite-N	1.6		0.1	mg/L		02-SEP-08	JXD	R717354
Nitrate-N	1.6		0.1	mg/L		02-SEP-08	JXD	R717354
Nitrite-N	<0.05		0.05	mg/L		02-SEP-08	JXD	R717354
pH, Conductivity and Total Alkalinity								
pH	7.8		0.1	pH		02-SEP-08	CLTT	R717081
Conductivity (EC)	722		0.2	uS/cm		02-SEP-08	CLTT	R717081
Bicarbonate (HCO3)	429		5	mg/L		02-SEP-08	CLTT	R717081
Carbonate (CO3)	<5		5	mg/L		02-SEP-08	CLTT	R717081
Hydroxide (OH)	<5		5	mg/L		02-SEP-08	CLTT	R717081
Alkalinity, Total (as CaCO3)	352		5	mg/L		02-SEP-08	CLTT	R717081
676397-18 08MW23								
Sampled By: JACK on 29-AUG-08 @ 19:00								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Toluene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
EthylBenzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Xylenes	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1(C6-C10)	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1-BTEX	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F2 (>C10-C16)								
F2 (>C10-C16)	<0.2	DLHS	0.2	mg/L	03-SEP-08	04-SEP-08	YZH	R720050

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
676397-18 08MW23 Sampled By: JACK on 29-AUG-08 @ 19:00 Matrix: WATER BTEX, F1 (C6-C10) and F2 (>C10-C16) F2 (>C10-C16)								
Surr: 2-Bromobenzotrifluoride	114		47-153	%	03-SEP-08	04-SEP-08	YZH	R720050
Dissolved Metals - CCME								
Dissolved Major Metals								
Calcium (Ca)	105		0.5	mg/L		03-SEP-08	BOC	R717793
Potassium (K)	3.6		0.1	mg/L		03-SEP-08	BOC	R717793
Magnesium (Mg)	28.3		0.01	mg/L		03-SEP-08	BOC	R717793
Sodium (Na)	8.4		0.5	mg/L		03-SEP-08	BOC	R717793
Iron (Fe)	<0.005		0.005	mg/L		03-SEP-08	BOC	R717793
Manganese (Mn)	0.176		0.001	mg/L		03-SEP-08	BOC	R717793
Dissolved Trace Metals								
Silver (Ag)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Aluminum (Al)	<0.01		0.01	mg/L		04-SEP-08	SYF	R718417
Arsenic (As)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Boron (B)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Barium (Ba)	0.344		0.003	mg/L		04-SEP-08	SYF	R718417
Beryllium (Be)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Cadmium (Cd)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Cobalt (Co)	<0.002		0.002	mg/L		04-SEP-08	SYF	R718417
Chromium (Cr)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Copper (Cu)	0.004		0.001	mg/L		04-SEP-08	SYF	R718417
Lithium (Li)	0.445		0.003	mg/L		04-SEP-08	SYF	R718417
Molybdenum (Mo)	<0.005		0.005	mg/L		04-SEP-08	SYF	R718417
Nickel (Ni)	0.004		0.002	mg/L		04-SEP-08	SYF	R718417
Lead (Pb)	0.0003		0.0001	mg/L		04-SEP-08	SYF	R718417
Antimony (Sb)	<0.0004		0.0004	mg/L		04-SEP-08	SYF	R718417
Selenium (Se)	0.0030		0.0004	mg/L		04-SEP-08	SYF	R718417
Tin (Sn)	<0.05		0.05	mg/L		04-SEP-08	SYF	R718417
Titanium (Ti)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Thallium (Tl)	<0.0001		0.0001	mg/L		04-SEP-08	SYF	R718417
Uranium (U)	0.0040		0.0001	mg/L		04-SEP-08	SYF	R718417
Vanadium (V)	<0.001		0.001	mg/L		04-SEP-08	SYF	R718417
Zinc (Zn)	0.015		0.002	mg/L		04-SEP-08	SYF	R718417
Mercury (Hg) - Dissolved								
Mercury (Hg)-Dissolved	<0.00010		0.00010	mg/L		08-SEP-08	DEO	R719896
676397-19 08MW21D Sampled By: JACK on 29-AUG-08 @ 18:20 Matrix: WATER BTEX, F1 (C6-C10) and F2 (>C10-C16) BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Toluene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
EthylBenzene	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
Xylenes	<0.00050		0.00050	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1(C6-C10)	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F1-BTEX	<0.1		0.1	mg/L	02-SEP-08	02-SEP-08	DDU	R717545
F2 (>C10-C16)								
F2 (>C10-C16)	<0.2	DLHS	0.2	mg/L	03-SEP-08	04-SEP-08	YZH	R720050
Surr: 2-Bromobenzotrifluoride	109		47-153	%	03-SEP-08	04-SEP-08	YZH	R720050

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHS	Detection Limit Adjusted: Insufficient volume; sample contains high sediment limiting volume analyzed.
RAMB	Result Adjusted For Method Blank

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
BTX,F1-ED	Water	BTEX and F1 (C6-C10)	EPA 5030	EPA 5030/8015&8260-P&T GC-MS & FID
CL-ED	Water	Chloride (Cl)		APHA 4500 Cl E-Colorimetry
ETL-ROUTINE-ICP-ED	Water	ICP metals and SO4 for routine water		APHA 3120 B-ICP-OES
F2-ED	Water	F2 (>C10-C16)		EPA 3510/CCME PHC CWS-GC-FID
FE-DIS-ED	Water	Iron (Fe)-Dissolved		EPA 200.7
HG-D-CVAA-ED	Water	Mercury (Hg) - Dissolved		EPA 245.7 / EPA 245.1
IONBALANCE-ED	Water	Ion Balance Calculation		APHA 1030E
MET1-DIS-CCME-ED	Water	Dissolved Trace Metals		EPA 6020
MET2-DIS-ED	Water	Dissolved Major Metals		EPA 200.7
MN-DIS-ED	Water	Manganese (Mn)-Dissolved		EPA 200.7
N2N3-ED	Water	Nitrate+Nitrite-N		APHA 4500 NO3-H - COLORIMETRY
NO2-ED	Water	Nitrite-N		APHA 4500 NO2B-Colorimetry
NO3-ED	Water	Nitrate-N		APHA 4500 NO3H-Colorimetry
PAH-CCME-ED	Water	CCME PAHs	EPA 3510	EPA 3510/8270-GC/MS
PH/EC/ALK-ED	Water	pH, Conductivity and Total Alkalinity		APHA 4500-H, 2510, 2320
VOC-CLALI-CCME-ED	Water	CCME Chlorinated Aliphatics	EPA 5030	EPA 5021/8260-GC-MS
VOC-MAH-CCME-ED	Water	CCME monoaromatic hydrocarbons	EPA 5030	EPA 5021/8260-GC-MS

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

08-042155 08-042156

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
ED	ALS LABORATORY GROUP - EDMONTON, ALBERTA, CANADA		

Reference Information

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million.

mg/L (units) - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



Environmental Division

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 1 of 13

Client: EBA ENG CONSULTANTS LTD
115, 200 RIVERCREST DR SE
CALGARY AB T2C 2X5
Contact: BRIAN TSANG

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX,F1-ED		Water						
Batch	R717545							
WG828508-2	LCS							
Benzene			79		%		37-114	02-SEP-08
Toluene			87		%		38-115	02-SEP-08
EthylBenzene			85		%		38-109	02-SEP-08
Xylenes			86		%		35-112	02-SEP-08
F1(C6-C10)			67		%		21-187	02-SEP-08
WG828508-1	MB							
Benzene			<0.00050		mg/L		0.0005	02-SEP-08
Toluene			<0.00050		mg/L		0.0005	02-SEP-08
EthylBenzene			<0.00050		mg/L		0.0005	02-SEP-08
Xylenes			<0.00050		mg/L		0.0005	02-SEP-08
F1(C6-C10)			<0.1		mg/L		0.1	02-SEP-08
WG828117-2	MS	L676397-18						
Benzene			76		%		26-114	02-SEP-08
Toluene			86		%		29-113	02-SEP-08
EthylBenzene			84		%		28-107	02-SEP-08
Xylenes			84		%		28-105	02-SEP-08
WG828117-3	MS	L676397-18						
F1(C6-C10)			70		%		33-158	02-SEP-08
Batch	R719255							
WG830345-1	DUP	L676397-23						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	05-SEP-08
Toluene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	32	05-SEP-08
EthylBenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	24	05-SEP-08
Xylenes		<0.00050	<0.00050	RPD-NA	mg/L	N/A	26	05-SEP-08
F1(C6-C10)		<0.1	<0.1	RPD-NA	mg/L	N/A	24	05-SEP-08
WG830571-2	LCS							
Benzene			79		%		37-114	05-SEP-08
Toluene			80		%		38-115	05-SEP-08
EthylBenzene			71		%		38-109	05-SEP-08
Xylenes			74		%		35-112	05-SEP-08
F1(C6-C10)			73		%		21-187	05-SEP-08
WG830571-1	MB							
Benzene			<0.00050		mg/L		0.0005	05-SEP-08
Toluene			<0.00050		mg/L		0.0005	05-SEP-08
EthylBenzene			<0.00050		mg/L		0.0005	05-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 2 of 13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX,F1-ED Water								
Batch R719255								
WG830571-1	MB							
Xylenes			<0.00050		mg/L		0.0005	05-SEP-08
F1(C6-C10)			<0.1		mg/L		0.1	05-SEP-08
WG830345-2 MS L677126-3								
Benzene			95		%		26-114	05-SEP-08
Toluene			75		%		29-113	05-SEP-08
EthylBenzene			52		%		28-107	05-SEP-08
Xylenes			55		%		28-105	05-SEP-08
WG830345-3 MS L677126-3								
F1(C6-C10)			39		%		33-158	05-SEP-08
CLE-ED Water								
Batch R717243								
WG827860-2 LCS								
Chloride (Cl)			101		%		94-109	02-SEP-08
WG827860-3 LCS								
Chloride (Cl)			102		%		93-113	02-SEP-08
WG827860-1 MB								
Chloride (Cl)			<1		mg/L		1	02-SEP-08
WG827860-5 MS L676390-28								
Chloride (Cl)			108		%		87-117	02-SEP-08
WG827860-7 MS L676414-5								
Chloride (Cl)			106		%		87-117	02-SEP-08
ETL-ROUTINE-ICP-ED Water								
Batch R717578								
WG828028-3 CRM ION-915 WATER								
Calcium (Ca)			103		%		96-116	02-SEP-08
Magnesium (Mg)			105		%		91-113	02-SEP-08
Sulfate (SO4)			106		%		87-118	02-SEP-08
WG828028-2 LCS								
Calcium (Ca)			101		%		86-106	02-SEP-08
Potassium (K)			99		%		86-106	02-SEP-08
Magnesium (Mg)			108		%		88-108	02-SEP-08
Sodium (Na)			101		%		86-106	02-SEP-08
WG828028-1 MB								
Calcium (Ca)			<0.5		mg/L		2.5	02-SEP-08
Potassium (K)			<0.5		mg/L		2.5	02-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 3 of 13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ETL-ROUTINE-ICP-ED		Water						
Batch	R717578							
WG828028-1	MB							
Magnesium (Mg)			<0.1		mg/L		0.5	02-SEP-08
Sodium (Na)			<1		mg/L		5	02-SEP-08
Sulfate (SO4)			<0.5		mg/L		2.5	02-SEP-08
WG828028-5	MS	L676390-20						
Calcium (Ca)			102		%		88-116	02-SEP-08
Potassium (K)			96		%		83-115	02-SEP-08
Magnesium (Mg)			97		%		91-117	02-SEP-08
Sodium (Na)			99		%		81-116	02-SEP-08
Sulfate (SO4)			94		%		82-111	02-SEP-08
WG828028-7	MS	L676390-40						
Calcium (Ca)			93		%		88-116	02-SEP-08
Potassium (K)			94		%		83-115	02-SEP-08
Magnesium (Mg)			97		%		91-117	02-SEP-08
Sodium (Na)			96		%		81-116	02-SEP-08
Sulfate (SO4)			94		%		82-111	02-SEP-08
WG828028-9	MS	L676519-6						
Calcium (Ca)			96		%		88-116	02-SEP-08
Potassium (K)			92		%		83-115	02-SEP-08
Magnesium (Mg)			97		%		91-117	02-SEP-08
Sodium (Na)			95		%		81-116	02-SEP-08
Sulfate (SO4)			93		%		82-111	02-SEP-08
F2-ED		Water						
Batch	R719935							
WG830348-3	DUP	L676397-22						
F2 (>C10-C16)			<0.05		mg/L	RPD-NA	N/A	04-SEP-08
WG830348-2	LCS							
F2 (>C10-C16)			83		%		38-152	04-SEP-08
WG830348-1	MB							
F2 (>C10-C16)			<0.05		mg/L		0.05	04-SEP-08
Batch	R720050							
WG830057-2	LCS							
F2 (>C10-C16)			81		%		38-152	04-SEP-08
WG830057-1	MB							
F2 (>C10-C16)			<0.05		mg/L		0.05	04-SEP-08
FE-DIS-ED		Water						

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 4 of 13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed	
FE-DIS-ED Water									
Batch R717793									
WG828652-2 CRM		EU-H-2 OPTWATER							
Iron (Fe)-Dissolved			107		%		80-120	03-SEP-08	
WG828652-1 MB			<0.005		mg/L		0.005	03-SEP-08	
HG-D-CVAA-ED Water									
Batch R719896									
WG830918-4 DUP		L676397-8							
Mercury (Hg)-Dissolved			<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	08-SEP-08
WG830918-2 LCS			91		%		80-120	08-SEP-08	
WG830918-3 LCSD		WG830918-2							
Mercury (Hg)-Dissolved			91	91	%	1.0	20	08-SEP-08	
WG830918-1 MB			<0.00010		mg/L		0.0001	08-SEP-08	
WG830918-5 MS		L676397-8							
Mercury (Hg)-Dissolved			93		%		70-130	08-SEP-08	
MET1-DIS-CCME-ED Water									
Batch R718417									
WG828560-2 CRM		1643E WATER							
Aluminum (Al)			97		%		80-120	03-SEP-08	
Arsenic (As)			98		%		80-120	03-SEP-08	
Boron (B)			98		%		80-120	03-SEP-08	
Barium (Ba)			98		%		80-120	03-SEP-08	
Beryllium (Be)			96		%		80-120	03-SEP-08	
Cadmium (Cd)			102		%		80-120	03-SEP-08	
Cobalt (Co)			98		%		80-120	03-SEP-08	
Chromium (Cr)			100		%		80-120	03-SEP-08	
Copper (Cu)			101		%		80-120	03-SEP-08	
Lithium (Li)			100		%		80-120	03-SEP-08	
Molybdenum (Mo)			103		%		80-120	03-SEP-08	
Nickel (Ni)			93		%		80-120	03-SEP-08	
Lead (Pb)			105		%		80-120	03-SEP-08	
Antimony (Sb)			102		%		80-120	03-SEP-08	
Selenium (Se)			102		%		80-120	03-SEP-08	
Thallium (Tl)			103		%		80-120	03-SEP-08	
Vanadium (V)			99		%		80-120	03-SEP-08	

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 5 of 13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET1-DIS-CCME-ED	Water							
Batch	R718417							
WG828560-2	CRM	1643E WATER						
Zinc (Zn)			103		%		80-120	03-SEP-08
WG828560-3	DUP	L676397-10						
Silver (Ag)		<0.0001	<0.0001	RPD-NA	mg/L	N/A	26	04-SEP-08
Aluminum (Al)		<0.01	<0.01	RPD-NA	mg/L	N/A	14	04-SEP-08
Arsenic (As)		<0.0004	<0.0004	RPD-NA	mg/L	N/A	10	04-SEP-08
Boron (B)		<0.05	<0.05	RPD-NA	mg/L	N/A	10	04-SEP-08
Barium (Ba)		0.428	0.434		mg/L	1.3	9.8	04-SEP-08
Beryllium (Be)		<0.001	<0.001	RPD-NA	mg/L	N/A	10	04-SEP-08
Cadmium (Cd)		<0.0001	<0.0001	RPD-NA	mg/L	N/A	12	04-SEP-08
Cobalt (Co)		<0.002	<0.002	RPD-NA	mg/L	N/A	6.7	04-SEP-08
Chromium (Cr)		<0.005	<0.005	RPD-NA	mg/L	N/A	16	04-SEP-08
Copper (Cu)		0.003	0.003	J	mg/L	0.000	0.004	04-SEP-08
Lithium (Li)		0.393	0.399		mg/L	1.5	10	04-SEP-08
Molybdenum (Mo)		<0.005	<0.005	RPD-NA	mg/L	N/A	9.7	04-SEP-08
Nickel (Ni)		0.002	0.003	J	mg/L	0.001	0.008	04-SEP-08
Lead (Pb)		<0.0001	<0.0001	RPD-NA	mg/L	N/A	10	04-SEP-08
Antimony (Sb)		<0.0004	<0.0004	RPD-NA	mg/L	N/A	9.8	04-SEP-08
Selenium (Se)		0.0214	0.0211		mg/L	1.3	15	04-SEP-08
Tin (Sn)		<0.05	<0.05	RPD-NA	mg/L	N/A	10	04-SEP-08
Titanium (Ti)		<0.001	<0.001	RPD-NA	mg/L	N/A	22	04-SEP-08
Thallium (Tl)		<0.0001	<0.0001	RPD-NA	mg/L	N/A	11	04-SEP-08
Uranium (U)		0.0040	0.0040		mg/L	0.53	10	04-SEP-08
Vanadium (V)		<0.001	<0.001	RPD-NA	mg/L	N/A	23	04-SEP-08
Zinc (Zn)		0.013	0.014	J	mg/L	0.001	0.008	04-SEP-08
WG828560-1	MB							
Silver (Ag)			<0.0001		mg/L		0.0005	03-SEP-08
Aluminum (Al)			<0.01		mg/L		0.05	03-SEP-08
Arsenic (As)			<0.0004		mg/L		0.002	03-SEP-08
Boron (B)			<0.05		mg/L		0.25	03-SEP-08
Barium (Ba)			<0.003		mg/L		0.015	03-SEP-08
Beryllium (Be)			<0.001		mg/L		0.001	03-SEP-08
Cadmium (Cd)			<0.0001		mg/L		0.0005	03-SEP-08
Cobalt (Co)			<0.002		mg/L		0.01	03-SEP-08
Chromium (Cr)			<0.005		mg/L		0.025	03-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 6 of 13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET1-DIS-CCME-ED	Water							
Batch	R718417							
WG828560-1	MB							
Copper (Cu)			<0.001		mg/L		0.005	03-SEP-08
Lithium (Li)			<0.003		mg/L		0.015	03-SEP-08
Molybdenum (Mo)			<0.005		mg/L		0.025	03-SEP-08
Nickel (Ni)			<0.002		mg/L		0.01	03-SEP-08
Lead (Pb)			<0.0001		mg/L		0.0005	03-SEP-08
Antimony (Sb)			<0.0004		mg/L		0.002	03-SEP-08
Selenium (Se)			<0.0004		mg/L		0.002	03-SEP-08
Tin (Sn)			<0.05		mg/L		0.25	03-SEP-08
Titanium (Ti)			<0.001		mg/L		0.005	03-SEP-08
Thallium (Tl)			<0.0001		mg/L		0.0005	03-SEP-08
Uranium (U)			<0.0001		mg/L		0.0005	03-SEP-08
Vanadium (V)			<0.001		mg/L		0.005	03-SEP-08
Zinc (Zn)			<0.002		mg/L		0.01	03-SEP-08
WG828560-4	MS	L676397-10						
Silver (Ag)			92		%		22-143	04-SEP-08
Aluminum (Al)			99		%		79-120	04-SEP-08
Arsenic (As)			95		%		90-113	04-SEP-08
Boron (B)			98		%		75-121	04-SEP-08
Beryllium (Be)			103		%		76-125	04-SEP-08
Cadmium (Cd)			100		%		86-112	04-SEP-08
Cobalt (Co)			91		%		86-113	04-SEP-08
Chromium (Cr)			99		%		80-113	04-SEP-08
Copper (Cu)			92		%		88-108	04-SEP-08
Molybdenum (Mo)			96		%		81-116	04-SEP-08
Nickel (Ni)			95		%		86-110	04-SEP-08
Lead (Pb)			97		%		86-116	04-SEP-08
Antimony (Sb)			102		%		85-116	04-SEP-08
Selenium (Se)			103		%		82-127	04-SEP-08
Tin (Sn)			100		%		91-118	04-SEP-08
Titanium (Ti)			99		%		85-118	04-SEP-08
Thallium (Tl)			99		%		84-118	04-SEP-08
Uranium (U)			98		%		85-124	04-SEP-08
Vanadium (V)			99		%		86-115	04-SEP-08
Zinc (Zn)			102		%		74-125	04-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 7 of 13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET2-DIS-ED		Water						
Batch	R717793							
WG828652-2	CRM	EU-H-2 OPTWATER						
Calcium (Ca)			103		%		80-120	03-SEP-08
Potassium (K)			101		%		80-120	03-SEP-08
Magnesium (Mg)			104		%		80-120	03-SEP-08
Sodium (Na)			105		%		80-120	03-SEP-08
Iron (Fe)			107		%		80-120	03-SEP-08
Manganese (Mn)			109		%		80-120	03-SEP-08
WG828652-3	DUP	L676397-5						
Calcium (Ca)		114	110		mg/L	3.5	12	03-SEP-08
Potassium (K)		3.8	3.6		mg/L	3.0	11	03-SEP-08
Magnesium (Mg)		29.0	28.4		mg/L	2.1	9.5	03-SEP-08
Sodium (Na)		10.7	10.5		mg/L	1.8	10	03-SEP-08
Iron (Fe)		1.51	1.47		mg/L	2.8	9.8	03-SEP-08
Manganese (Mn)		0.636	0.621		mg/L	2.3	10	03-SEP-08
WG828652-1	MB							
Calcium (Ca)			<0.5		mg/L		2.5	03-SEP-08
Potassium (K)			<0.1		mg/L		0.5	03-SEP-08
Magnesium (Mg)			<0.01		mg/L		0.05	03-SEP-08
Sodium (Na)			<0.5		mg/L		2.5	03-SEP-08
Iron (Fe)			<0.005		mg/L		0.025	03-SEP-08
Manganese (Mn)			<0.001		mg/L		0.005	03-SEP-08
WG828652-4	MS	L676397-5						
Calcium (Ca)			87	E	%		70-130	03-SEP-08
Potassium (K)			94		%		70-130	03-SEP-08
Magnesium (Mg)			100		%		70-130	03-SEP-08
Sodium (Na)			99		%		70-130	03-SEP-08
Iron (Fe)			104		%		70-130	03-SEP-08
Manganese (Mn)			100		%		70-130	03-SEP-08
WG828652-6	MS	L675927-1						
Calcium (Ca)			101		%		70-130	03-SEP-08
Potassium (K)			92		%		70-130	03-SEP-08
Magnesium (Mg)			93		%		70-130	03-SEP-08
Sodium (Na)			93		%		70-130	03-SEP-08
Iron (Fe)			105		%		70-130	03-SEP-08
Manganese (Mn)			104		%		70-130	03-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 8 of 13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET2-DIS-ED		Water						
Batch R717793								
WG828652-8	MS	L675929-1						
Calcium (Ca)			111		%		70-130	03-SEP-08
Potassium (K)			103		%		70-130	03-SEP-08
Magnesium (Mg)			102		%		70-130	03-SEP-08
Sodium (Na)			104		%		70-130	03-SEP-08
Iron (Fe)			115		%		70-130	03-SEP-08
Manganese (Mn)			113		%		70-130	03-SEP-08
Batch R718461								
WG829266-2	CRM	EU-H-2 OPTWATER						
Calcium (Ca)			114		%		80-120	04-SEP-08
Magnesium (Mg)			115		%		80-120	04-SEP-08
Sodium (Na)			118		%		80-120	04-SEP-08
Potassium (K)			104		%		80-120	04-SEP-08
Iron (Fe)			101		%		80-120	04-SEP-08
Manganese (Mn)			103		%		80-120	04-SEP-08
WG829266-1	MB							
Calcium (Ca)			<0.5		mg/L		2.5	04-SEP-08
Potassium (K)			<0.1		mg/L		0.5	04-SEP-08
Magnesium (Mg)			<0.01		mg/L		0.05	04-SEP-08
Sodium (Na)			<0.5		mg/L		2.5	04-SEP-08
Iron (Fe)			<0.005		mg/L		0.025	04-SEP-08
Manganese (Mn)			<0.001		mg/L		0.005	04-SEP-08
WG829266-4	MS	L677011-1						
Calcium (Ca)			73	E	%		70-130	04-SEP-08
Potassium (K)			122		%		70-130	04-SEP-08
Magnesium (Mg)			106		%		70-130	04-SEP-08
Sodium (Na)			114		%		70-130	04-SEP-08
Iron (Fe)			114		%		70-130	04-SEP-08
Manganese (Mn)			110		%		70-130	04-SEP-08
MN-DIS-ED		Water						
Batch R717793								
WG828652-2	CRM	EU-H-2 OPTWATER						
Manganese (Mn)-Dissolved			109		%		80-120	03-SEP-08
WG828652-1	MB							
Manganese (Mn)-Dissolved			<0.001		mg/L		0.001	03-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 9 of 13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MN-DIS-ED	Water							
Batch	R718461							
WG829266-2	CRM	EU-H-2 OPTWATER						
Manganese (Mn)-Dissolved			103		%		80-120	04-SEP-08
WG829266-1	MB							
Manganese (Mn)-Dissolved			<0.001		mg/L		0.001	04-SEP-08
N2N3-ED	Water							
Batch	R717354							
WG827726-3	LCS							
Nitrate+Nitrite-N			101		%		87-113	02-SEP-08
WG827726-2	MB							
Nitrate+Nitrite-N			<0.1		mg/L		0.1	02-SEP-08
WG827726-5	MS	L676390-22						
Nitrate+Nitrite-N			98		%		84-118	02-SEP-08
WG827726-7	MS	L676414-5						
Nitrate+Nitrite-N			95		%		84-118	02-SEP-08
NO2-ED	Water							
Batch	R717354							
WG827726-3	LCS							
Nitrite-N			102		%		94-114	02-SEP-08
WG827726-2	MB							
Nitrite-N			<0.05		mg/L		0.05	02-SEP-08
WG827726-5	MS	L676390-22						
Nitrite-N			108		%		88-113	02-SEP-08
WG827726-7	MS	L676414-5						
Nitrite-N			105		%		88-113	02-SEP-08
PAH-CCME-ED	Water							
Batch	R718728							
WG828970-3	LCS							
Naphthalene			76		%		42-119	05-SEP-08
Quinoline			91		%		53-121	05-SEP-08
Acenaphthene			87		%		49-124	05-SEP-08
Fluorene			90		%		53-126	05-SEP-08
Phenanthrene			94		%		57-128	05-SEP-08
Anthracene			92		%		55-125	05-SEP-08
Acridine			96		%		56-127	05-SEP-08
Fluoranthene			96		%		55-129	05-SEP-08
Pyrene			95		%		54-131	05-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 10 of 13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-CCME-ED		Water						
Batch	R718728							
WG828970-3	LCS							
Benzo(a)anthracene			96		%		58-129	05-SEP-08
Chrysene			94		%		62-128	05-SEP-08
Benzo(b&j)fluoranthene			96		%		56-129	05-SEP-08
Benzo(k)fluoranthene			91		%		56-129	05-SEP-08
Benzo(a)pyrene			95		%		47-132	05-SEP-08
Indeno(1,2,3-cd)pyrene			90		%		49-135	05-SEP-08
Dibenzo(a,h)anthracene			87		%		48-134	05-SEP-08
WG828970-2	MB							
Naphthalene			0.00001		mg/L		0.00001	05-SEP-08
Quinoline			<0.00001		mg/L		0.00001	05-SEP-08
Acenaphthene			0.00001		mg/L		0.00001	05-SEP-08
Fluorene			0.00002	A	mg/L		0.00001	05-SEP-08
Phenanthrene			0.00004	A	mg/L		0.00001	05-SEP-08
Anthracene			<0.00001		mg/L		0.00001	05-SEP-08
Acridine			<0.00001		mg/L		0.00001	05-SEP-08
Fluoranthene			<0.00001		mg/L		0.00001	05-SEP-08
Pyrene			<0.00001		mg/L		0.00001	05-SEP-08
Benzo(a)anthracene			<0.00001		mg/L		0.00001	05-SEP-08
Chrysene			<0.00001		mg/L		0.00001	05-SEP-08
Benzo(b&j)fluoranthene			<0.00001		mg/L		0.00001	05-SEP-08
Benzo(k)fluoranthene			<0.00001		mg/L		0.00001	05-SEP-08
Benzo(a)pyrene			<0.00001		mg/L		0.00001	05-SEP-08
Indeno(1,2,3-cd)pyrene			<0.00001		mg/L		0.00001	05-SEP-08
Dibenzo(a,h)anthracene			<0.00001		mg/L		0.00001	05-SEP-08

COMMENTS: Blank hits are less than 5 times the method detection limit and do not adversely affect data quality.

PH/EC/ALK-ED		Water						
Batch	R717081							
WG827577-5	DUP	L676397-13						
pH		7.6	7.6	J	pH	0.0	0.2	02-SEP-08
Conductivity (EC)		834	829		uS/cm	0.59	7.1	02-SEP-08
Bicarbonate (HCO3)		525	513		mg/L	2.2	26	02-SEP-08
Carbonate (CO3)		<5	<5	RPD-NA	mg/L	N/A	26	02-SEP-08
Hydroxide (OH)		<5	<5	RPD-NA	mg/L	N/A	26	02-SEP-08
Alkalinity, Total (as CaCO3)		430	420		mg/L	2.2	6.5	02-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 11 of 13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH/EC/ALK-ED		Water						
Batch R717081								
WG827577-2	LCS							
Conductivity (EC)			102		%		94-106	02-SEP-08
WG827577-3	LCS							
pH			7.0		pH		6.9-7.1	02-SEP-08
WG827577-4	LCS							
Alkalinity, Total (as CaCO3)			100		%		90-110	02-SEP-08
WG827577-1	MB							
Bicarbonate (HCO3)			<5		mg/L		5	02-SEP-08
Carbonate (CO3)			<5		mg/L		5	02-SEP-08
Hydroxide (OH)			<5		mg/L		5	02-SEP-08
Alkalinity, Total (as CaCO3)			<5		mg/L		5	02-SEP-08
VOC-CLALI-CCME-ED		Water						
Batch R718665								
WG829939-2	LCS							
1,1-Dichloroethene			78		%		70-130	05-SEP-08
Methylene Chloride			90		%		70-130	05-SEP-08
Chloroform			91		%		70-130	05-SEP-08
1,2-Dichloroethane			118		%		70-130	05-SEP-08
1,1,1-Trichloroethane			95		%		70-130	05-SEP-08
Carbon Tetrachloride			95		%		70-130	05-SEP-08
Trichloroethene			100		%		70-130	05-SEP-08
WG829939-1	MB							
1,1-Dichloroethene			<0.001		mg/L		0.001	05-SEP-08
Methylene Chloride			<0.001		mg/L		0.001	05-SEP-08
trans-1,2-Dichloroethene			<0.001		mg/L		0.001	05-SEP-08
1,1-Dichloroethane			<0.001		mg/L		0.001	05-SEP-08
Chloroform			<0.001		mg/L		0.001	05-SEP-08
1,2-Dichloroethane			<0.001		mg/L		0.001	05-SEP-08
1,1,1-Trichloroethane			<0.001		mg/L		0.001	05-SEP-08
Carbon Tetrachloride			<0.001		mg/L		0.001	05-SEP-08
Trichloroethene			<0.001		mg/L		0.001	05-SEP-08
1,2-Dichloropropane			<0.001		mg/L		0.001	05-SEP-08
cis-1,3-Dichloropropene			<0.001		mg/L		0.001	05-SEP-08
trans-1,3-Dichloropropene			<0.001		mg/L		0.001	05-SEP-08
1,1,2-Trichloroethane			<0.001		mg/L		0.001	05-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 12 of 13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-CLALI-CCME-ED Water								
Batch R718665								
WG829939-1 MB								
Tetrachloroethylene			<0.001		mg/L		0.001	05-SEP-08
1,1,2,2-Tetrachloroethane			<0.002		mg/L		0.002	05-SEP-08
VOC-MAH-CCME-ED Water								
Batch R718665								
WG829939-2 LCS								
Benzene			94		%		70-130	05-SEP-08
Toluene			89		%		70-130	05-SEP-08
Ethylbenzene			89		%		70-130	05-SEP-08
m+p-Xylenes			121		%		70-130	05-SEP-08
o-Xylene			118		%		70-130	05-SEP-08
Styrene			101		%		70-130	05-SEP-08
1,4-Dichlorobenzene			87		%		70-130	05-SEP-08
WG829939-1 MB								
Benzene			<0.00050		mg/L		0.0005	05-SEP-08
Thiophene			<0.001		mg/L		0.001	05-SEP-08
Toluene			<0.00050		mg/L		0.0005	05-SEP-08
Chlorobenzene			<0.001		mg/L		0.001	05-SEP-08
Ethylbenzene			<0.00050		mg/L		0.0005	05-SEP-08
m+p-Xylenes			<0.00050		mg/L		0.0005	05-SEP-08
o-Xylene			<0.00050		mg/L		0.0005	05-SEP-08
Styrene			<0.001		mg/L		0.001	05-SEP-08
1,3-Dichlorobenzene			<0.001		mg/L		0.001	05-SEP-08
1,4-Dichlorobenzene			<0.001		mg/L		0.001	05-SEP-08
1,2-Dichlorobenzene			<0.001		mg/L		0.001	05-SEP-08

ALS Laboratory Group Quality Control Report

Workorder: L676397

Report Date: 02-FEB-09

Page 13 of 13

Legend:

Limit	99% Confidence Interval (Laboratory Control Limits)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
A	Method Blank exceeds ALS DQO. Refer to narrative comments for further information.
E	Matrix Spike recovery outside ALS DQO due to analyte background in sample.
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.



Environmental Division

Report to:	Report Format / Distribution	Service Requested: (rush - subject to availability)
Company: BBA	Standard: <input checked="" type="checkbox"/> Other: <input type="checkbox"/>	<input checked="" type="checkbox"/> Regular (Default)
Contact: Brian Tsang	Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital <input type="checkbox"/>	Priority (2-3 Business Days) - 50% Surcharge
Address: 115,200 Rivercrest Drive S.E. Calgary	Email 1: btsang@bba.ca	Emergency (1 Business Day) - 100% Surcharge
Phone: 403-203-3355 Fax: 403-203-3301	Email 2: n.margoub@bba.ca	For Emergency < 1 Day, ASAP or Weekend - Contact ALS

Invoice To: Same as Report? <input checked="" type="checkbox"/> No? <input type="checkbox"/>	Client / Project Information:	Analysis Request
Company:	Job #: C72101173	(Indicate Filtered or Preserved, F/P)
Contact:	PO / AFE:	
Address:	Legal Site Description:	
Phone:	Quote #: Test Samples	

Lab Work Order # (lab use only)	ALS Contact:	Sampler:
4676397		Sub

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	Dissolved Metals	PAH	UDC	BTEX FI-F2	Number of Containers
08 MW01		Aug 29/08	1:00	Water	X	X	X		6
08 MW02		Aug 29/08	1:10	Water	X	X	X		6
08 MW03		Aug 29/08	1:30	Water	X	X	X		6
08 MW04B		Aug 29/08	1:40	Water	X	X	X		6
08 MW05B		Aug 29/08	1:50	Water	X	X	X		6
08 MW06B		Aug 29/08	2:00	Water	X	X	X		6
08 MW07B		Aug 29/08	2:10	Water	X				1
08 MW08		Aug 29/08	2:20	Water	X				1
08 MW10		Aug 29/08	2:30	Water	X				1
08 MW11		Aug 29/08	2:40	Water	X				1
08 MW12		Aug 29/08	2:00	Water	X				1
08 MW14		Aug 29/08	3:30	Water	X		X		6

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)			
Released by: <i>Jack Sambrook</i>	Date & Time: <i>Aug 31 3:50</i>	Received by: <i>[Signature]</i>	Date: <i>31 AUG 08</i>	Time: <i>16:20</i>	Temperature: <i>11.3°C</i>	Verified by:	Date & Time:	Observations: Yes / No? If Yes attach SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY



Environmental Division

Report to:		Report Format / Distribution		Service Requested: (rush - subject to availability)						
Company: EBA		Standard: <input checked="" type="checkbox"/> Other:		<input checked="" type="checkbox"/> Regular (Default)						
Contact: Brian Tsang		Select: PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital		Priority (2-3 Business Days) - 50% Surcharge						
Address: 115, 200 Riverside Drive SE.		Email 1: btsang@eba.ca		Emergency (1 Business Day) - 100% Surcharge						
City: Calgary		Email 2: A.Mahgoub@eba.ca		For Emergency < 1 Day, ASAP or Weekend - Contact ALS						
Phone: 403-203-3355		Fax: 403-203-3301		Analysis Request						
Invoice To: Same as Report? <input checked="" type="checkbox"/> No? <input type="checkbox"/>		Client / Project Information:		(Indicate Filtered or Preserved, F/P)						
Company:		Job #: C22101173		F/P						
Contact:		PO / AFE:		Dis. Metals						
Address:		Legal Site Description:		PAH's						
Phone:		Quote #: Test Samples		VOC's						
Fax:		ALS Contact:		BTEX FI-F2						
Lab Work Order # (lab use only)		Sampler: Sack		Routine						
Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	Dis. Metals	PAH's	VOC's	BTEX FI-F2	Routine	Number of Containers
	08 MW 16	Aug 29/08	4:00	water	X		X	X		7
	08 MW 18	Aug 29/08	4:30	water	X		X	X		7
	08 MW 20	Aug 29/08	5:30	water	X		X	X		7
	08 MW 21	Aug 29/08	6:00	water	X		X			6
	08 MW 22	Aug 29/08	6:30	water	X		X	X		7
	08 MW 23	Aug 29/08	7:00	water	X		X			6
	08 MW 21d	Aug 27/08	6:20	water			X			5
Special Instructions / Regulations / Hazardous Details										
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.										
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.										
SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF		
<i>Jack Lamblich</i>	Aug 31/08 3:50									

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

ANALYTICAL REPORT

EBA ENG CONSULTANTS LTD

ATTN: NAYEF MAHGOUB

115, 200 RIVERCREST DR SE

CALGARY AB T2C 2X5

Reported On: 28-MAR-08 05:16 PM

Lab Work Order #: **L612590**

Date Received: **24-MAR-08**

Project P.O. #:

Job Reference: C22101178

Legal Site Desc:

CofC Numbers: C081194

Other Information:

Comments:

STEPHANIE ERIN HOEPPNER
General Manager, Calgary

For any questions about this report please contact your Account Manager:

PATRICIA MEGAN GOODSON

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS Canada Ltd. (formerly ETL Chemspec Analytical Ltd.)

Part of the **ALS Laboratory Group**

Bay 2, 1313-44 Ave. N.E., Calgary, AB T2E 6L5

Phone: +1 403 291 9897 Fax: +1 403 291 0298 www.alsglobal.com

A Campbell Brothers Limited Company

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-1 08MW01								
Sampled By: JACK SAMBIRSKY on 22-MAR-08 @ 08:00								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
F2 (>C10-C16)	<0.05		0.05	mg/L	26-MAR-08	27-MAR-08	JUN	R645372
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Toluene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
EthylBenzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Xylenes	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1(C6-C10)	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1-BTEX	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Major Ions & Trace Dissolved Metals								
Chloride (Cl)	7.8		0.1	mg/L		27-MAR-08	JF	R644388
Nitrate and Nitrite as N	0.50		0.07	mg/L		25-MAR-08		
Nitrate-N	0.50		0.05	mg/L		24-MAR-08	JF	R644388
Nitrite-N	<0.05		0.05	mg/L		24-MAR-08	JF	R644388
Sulphate (SO4)	21.7		0.5	mg/L		24-MAR-08	JF	R644388
pH, Conductivity and Total Alkalinity								
pH	7.81		0.01	pH		24-MAR-08	MAT	R644357
Conductivity (EC)	692		3	uS/cm		24-MAR-08	MAT	R644357
Bicarbonate (HCO3)	436		5	mg/L		24-MAR-08	MAT	R644357
Carbonate (CO3)	<5		5	mg/L		24-MAR-08	MAT	R644357
Hydroxide (OH)	<5		5	mg/L		24-MAR-08	MAT	R644357
Alkalinity, Total (as CaCO3)	358		5	mg/L		24-MAR-08	MAT	R644357
Ion Balance Calculation								
Ion Balance	98.0			%		27-MAR-08		
TDS (Calculated)	388			mg/L		27-MAR-08		
Hardness (as CaCO3)	359			mg/L		27-MAR-08		
Dissolved Metals by ICPOES								
Calcium (Ca)-Dissolved	106		0.1	mg/L		27-MAR-08	EHP	R644948
Iron (Fe)-Dissolved	0.153		0.03	mg/L		27-MAR-08	EHP	R644948
Magnesium (Mg)-Dissolved	22.8		0.1	mg/L		27-MAR-08	EHP	R644948
Potassium (K)-Dissolved	2.54		0.5	mg/L		27-MAR-08	EHP	R644948
Sodium (Na)-Dissolved	10.6		1	mg/L		27-MAR-08	EHP	R644948
Dissolved Metals by ICPMS								
Aluminum (Al)-Dissolved	<0.0050	DLA	0.005	mg/L		27-MAR-08	MAT	R645225
Antimony (Sb)-Dissolved	<0.00010	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Arsenic (As)-Dissolved	0.00116	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Barium (Ba)-Dissolved	0.383	DLA	0.00005	mg/L		27-MAR-08	MAT	R645225
Beryllium (Be)-Dissolved	<0.00050	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Bismuth (Bi)-Dissolved	<0.00050	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Boron (B)-Dissolved	0.024	DLA	0.01	mg/L		27-MAR-08	MAT	R645225
Cadmium (Cd)-Dissolved	0.000053	DLA	0.00005	mg/L		27-MAR-08	MAT	R645225
Chromium (Cr)-Dissolved	0.00063	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Cobalt (Co)-Dissolved	0.00065	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Copper (Cu)-Dissolved	0.00566	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Lead (Pb)-Dissolved	<0.00010	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Manganese (Mn)-Dissolved	0.142	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Molybdenum (Mo)-Dissolved	0.00139	DLA	0.00005	mg/L		27-MAR-08	MAT	R645225
Nickel (Ni)-Dissolved	0.00121	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Selenium (Se)-Dissolved	0.0017	DLA	0.001	mg/L		27-MAR-08	MAT	R645225
Silver (Ag)-Dissolved	<0.000010	DLA	0.00001	mg/L		27-MAR-08	MAT	R645225
Strontium (Sr)-Dissolved	0.287	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-1 08MW01								
Sampled By: JACK SAMBIRSKY on 22-MAR-08 @ 08:00								
Matrix: WATER								
Major Ions & Trace Dissolved Metals								
Dissolved Metals by ICPMS								
Titanium (Ti)-Dissolved	<0.0010	DLA	0.001	mg/L		27-MAR-08	MAT	R645225
Thallium (Tl)-Dissolved	<0.00010	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Tin (Sn)-Dissolved	<0.00010	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Uranium (U)-Dissolved	0.00341	DLA	0.00001	mg/L		27-MAR-08	MAT	R645225
Vanadium (V)-Dissolved	<0.0010	DLA	0.001	mg/L		27-MAR-08	MAT	R645225
Zinc (Zn)-Dissolved	0.100	DLA	0.005	mg/L		27-MAR-08	MAT	R645225

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-2 08MW02								
Sampled By: JACK SAMBIRSKY on 22-MAR-08 @ 08:20								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
F2 (>C10-C16)	<0.05		0.05	mg/L	26-MAR-08	27-MAR-08	JUN	R645372
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Toluene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
EthylBenzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Xylenes	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1(C6-C10)	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1-BTEX	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Major Ions & Trace Dissolved Metals								
Chloride (Cl)	7.6		0.1	mg/L		27-MAR-08	JF	R644388
Nitrate and Nitrite as N	0.48		0.07	mg/L		25-MAR-08		
Nitrate-N	0.48		0.05	mg/L		24-MAR-08	JF	R644388
Nitrite-N	<0.05		0.05	mg/L		24-MAR-08	JF	R644388
Sulphate (SO4)	20.0		0.5	mg/L		24-MAR-08	JF	R644388
pH, Conductivity and Total Alkalinity								
pH	7.79		0.01	pH		24-MAR-08	MAT	R644357
Conductivity (EC)	681		3	uS/cm		24-MAR-08	MAT	R644357
Bicarbonate (HCO3)	424		5	mg/L		24-MAR-08	MAT	R644357
Carbonate (CO3)	<5		5	mg/L		24-MAR-08	MAT	R644357
Hydroxide (OH)	<5		5	mg/L		24-MAR-08	MAT	R644357
Alkalinity, Total (as CaCO3)	348		5	mg/L		24-MAR-08	MAT	R644357
Ion Balance Calculation								
Ion Balance	98.4			%		27-MAR-08		
TDS (Calculated)	376			mg/L		27-MAR-08		
Hardness (as CaCO3)	350			mg/L		27-MAR-08		
Dissolved Metals by ICPOES								
Calcium (Ca)-Dissolved	103		0.1	mg/L		27-MAR-08	EHP	R644948
Iron (Fe)-Dissolved	0.174		0.03	mg/L		27-MAR-08	EHP	R644948
Magnesium (Mg)-Dissolved	22.5		0.1	mg/L		27-MAR-08	EHP	R644948
Potassium (K)-Dissolved	2.25		0.5	mg/L		27-MAR-08	EHP	R644948
Sodium (Na)-Dissolved	10.2		1	mg/L		27-MAR-08	EHP	R644948
Dissolved Metals by ICPMS								
Aluminum (Al)-Dissolved	<0.0050	DLA	0.005	mg/L		27-MAR-08	MAT	R645225
Antimony (Sb)-Dissolved	0.00010	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Arsenic (As)-Dissolved	0.00116	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Barium (Ba)-Dissolved	0.373	DLA	0.00005	mg/L		27-MAR-08	MAT	R645225
Beryllium (Be)-Dissolved	<0.00050	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Bismuth (Bi)-Dissolved	<0.00050	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Boron (B)-Dissolved	0.025	DLA	0.01	mg/L		27-MAR-08	MAT	R645225
Cadmium (Cd)-Dissolved	0.000053	DLA	0.00005	mg/L		27-MAR-08	MAT	R645225
Chromium (Cr)-Dissolved	0.00243	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Cobalt (Co)-Dissolved	0.00064	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Copper (Cu)-Dissolved	0.00117	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Lead (Pb)-Dissolved	<0.00010	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Manganese (Mn)-Dissolved	0.137	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Molybdenum (Mo)-Dissolved	0.00135	DLA	0.00005	mg/L		27-MAR-08	MAT	R645225
Nickel (Ni)-Dissolved	0.00112	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Selenium (Se)-Dissolved	0.0016	DLA	0.001	mg/L		27-MAR-08	MAT	R645225
Silver (Ag)-Dissolved	<0.000010	DLA	0.00001	mg/L		27-MAR-08	MAT	R645225
Strontium (Sr)-Dissolved	0.287	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-2 08MW02								
Sampled By: JACK SAMBIRSKY on 22-MAR-08 @ 08:20								
Matrix: WATER								
Major Ions & Trace Dissolved Metals								
Dissolved Metals by ICPMS								
Titanium (Ti)-Dissolved	<0.0010	DLA	0.001	mg/L		27-MAR-08	MAT	R645225
Thallium (Tl)-Dissolved	<0.00010	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Tin (Sn)-Dissolved	<0.00010	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Uranium (U)-Dissolved	0.00339	DLA	0.00001	mg/L		27-MAR-08	MAT	R645225
Vanadium (V)-Dissolved	<0.0010	DLA	0.001	mg/L		27-MAR-08	MAT	R645225
Zinc (Zn)-Dissolved	0.117	DLA	0.005	mg/L		27-MAR-08	MAT	R645225

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-3 08MW03								
Sampled By: JACK SAMBIRSKY on 22-MAR-08 @ 08:40								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
F2 (>C10-C16)	<0.05		0.05	mg/L	26-MAR-08	27-MAR-08	JUN	R645372
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	JDV	R644808
Toluene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	JDV	R644808
EthylBenzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	JDV	R644808
Xylenes	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	JDV	R644808
F1(C6-C10)	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	JDV	R644808
F1-BTEX	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	JDV	R644808
Major Ions & Trace Dissolved Metals								
Chloride (Cl)	4.4		0.1	mg/L		27-MAR-08	JF	R644388
Nitrate and Nitrite as N	0.24		0.07	mg/L		25-MAR-08		
Nitrate-N	0.24		0.05	mg/L		24-MAR-08	JF	R644388
Nitrite-N	<0.05		0.05	mg/L		24-MAR-08	JF	R644388
Sulphate (SO4)	19.3		0.5	mg/L		24-MAR-08	JF	R644388
pH, Conductivity and Total Alkalinity								
pH	7.81		0.01	pH		24-MAR-08	MAT	R644357
Conductivity (EC)	635		3	uS/cm		24-MAR-08	MAT	R644357
Bicarbonate (HCO3)	402		5	mg/L		24-MAR-08	MAT	R644357
Carbonate (CO3)	<5		5	mg/L		24-MAR-08	MAT	R644357
Hydroxide (OH)	<5		5	mg/L		24-MAR-08	MAT	R644357
Alkalinity, Total (as CaCO3)	329		5	mg/L		24-MAR-08	MAT	R644357
Ion Balance Calculation								
Ion Balance	101			%		27-MAR-08		
TDS (Calculated)	355			mg/L		27-MAR-08		
Hardness (as CaCO3)	338			mg/L		27-MAR-08		
Dissolved Metals by ICPOES								
Calcium (Ca)-Dissolved	99.7		0.1	mg/L		27-MAR-08	EHP	R644948
Iron (Fe)-Dissolved	0.208		0.03	mg/L		27-MAR-08	EHP	R644948
Magnesium (Mg)-Dissolved	21.7		0.1	mg/L		27-MAR-08	EHP	R644948
Potassium (K)-Dissolved	2.87		0.5	mg/L		27-MAR-08	EHP	R644948
Sodium (Na)-Dissolved	8.9		1	mg/L		27-MAR-08	EHP	R644948
Dissolved Metals by ICPMS								
Aluminum (Al)-Dissolved	0.0293	DLA	0.005	mg/L		27-MAR-08	MAT	R645225
Antimony (Sb)-Dissolved	0.00016	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Arsenic (As)-Dissolved	0.00279	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Barium (Ba)-Dissolved	0.357	DLA	0.00005	mg/L		27-MAR-08	MAT	R645225
Beryllium (Be)-Dissolved	<0.00050	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Bismuth (Bi)-Dissolved	<0.00050	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Boron (B)-Dissolved	0.020	DLA	0.01	mg/L		27-MAR-08	MAT	R645225
Cadmium (Cd)-Dissolved	0.000053	DLA	0.00005	mg/L		27-MAR-08	MAT	R645225
Chromium (Cr)-Dissolved	0.00051	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Cobalt (Co)-Dissolved	0.00059	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Copper (Cu)-Dissolved	0.00703	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Lead (Pb)-Dissolved	0.00018	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Manganese (Mn)-Dissolved	0.145	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Molybdenum (Mo)-Dissolved	0.00154	DLA	0.00005	mg/L		27-MAR-08	MAT	R645225
Nickel (Ni)-Dissolved	0.00131	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Selenium (Se)-Dissolved	0.0047	DLA	0.001	mg/L		27-MAR-08	MAT	R645225
Silver (Ag)-Dissolved	<0.000010	DLA	0.00001	mg/L		27-MAR-08	MAT	R645225
Strontium (Sr)-Dissolved	0.264	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-4 08MW04B								
Sampled By: JACK SAMBIRSKY on 21-MAR-08 @ 17:00								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
F2 (>C10-C16)	<0.05		0.05	mg/L	27-MAR-08	28-MAR-08	JUN	R645372
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Toluene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
EthylBenzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Xylenes	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1(C6-C10)	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1-BTEX	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Major Ions & Trace Dissolved Metals								
Chloride (Cl)	4.4		0.1	mg/L		27-MAR-08	JF	R644388
Nitrate and Nitrite as N	0.55		0.07	mg/L		25-MAR-08		
Nitrate-N	0.55		0.05	mg/L		24-MAR-08	JF	R644388
Nitrite-N	<0.05		0.05	mg/L		24-MAR-08	JF	R644388
Sulphate (SO4)	48.0		0.5	mg/L		24-MAR-08	JF	R644388
pH, Conductivity and Total Alkalinity								
pH	7.74		0.01	pH		24-MAR-08	MAT	R644357
Conductivity (EC)	739		3	uS/cm		24-MAR-08	MAT	R644357
Bicarbonate (HCO3)	435		5	mg/L		24-MAR-08	MAT	R644357
Carbonate (CO3)	<5		5	mg/L		24-MAR-08	MAT	R644357
Hydroxide (OH)	<5		5	mg/L		24-MAR-08	MAT	R644357
Alkalinity, Total (as CaCO3)	356		5	mg/L		24-MAR-08	MAT	R644357
Ion Balance Calculation								
Ion Balance	101			%		27-MAR-08		
TDS (Calculated)	420			mg/L		27-MAR-08		
Hardness (as CaCO3)	394			mg/L		27-MAR-08		
Dissolved Metals by ICPOES								
Calcium (Ca)-Dissolved	111		0.1	mg/L		27-MAR-08	EHP	R644948
Iron (Fe)-Dissolved	<0.030		0.03	mg/L		27-MAR-08	EHP	R644948
Magnesium (Mg)-Dissolved	28.4		0.1	mg/L		27-MAR-08	EHP	R644948
Potassium (K)-Dissolved	3.73		0.5	mg/L		27-MAR-08	EHP	R644948
Sodium (Na)-Dissolved	8.6		1	mg/L		27-MAR-08	EHP	R644948
Dissolved Metals by ICPMS								
Aluminum (Al)-Dissolved	<0.0050	DLA	0.005	mg/L		27-MAR-08	MAT	R645225
Antimony (Sb)-Dissolved	<0.00010	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Arsenic (As)-Dissolved	0.00133	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Barium (Ba)-Dissolved	0.329	DLA	0.00005	mg/L		27-MAR-08	MAT	R645225
Beryllium (Be)-Dissolved	<0.00050	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Bismuth (Bi)-Dissolved	<0.00050	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Boron (B)-Dissolved	0.016	DLA	0.01	mg/L		27-MAR-08	MAT	R645225
Cadmium (Cd)-Dissolved	<0.000050	DLA	0.00005	mg/L		27-MAR-08	MAT	R645225
Chromium (Cr)-Dissolved	<0.00050	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Cobalt (Co)-Dissolved	0.00143	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Copper (Cu)-Dissolved	0.00327	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Lead (Pb)-Dissolved	<0.00010	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Manganese (Mn)-Dissolved	0.259	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Molybdenum (Mo)-Dissolved	0.000868	DLA	0.00005	mg/L		27-MAR-08	MAT	R645225
Nickel (Ni)-Dissolved	0.00183	DLA	0.0005	mg/L		27-MAR-08	MAT	R645225
Selenium (Se)-Dissolved	0.0108	DLA	0.001	mg/L		27-MAR-08	MAT	R645225
Silver (Ag)-Dissolved	<0.000010	DLA	0.00001	mg/L		27-MAR-08	MAT	R645225
Strontium (Sr)-Dissolved	0.272	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-4 08MW04B								
Sampled By: JACK SAMBIRSKY on 21-MAR-08 @ 17:00								
Matrix: WATER								
Major Ions & Trace Dissolved Metals								
Dissolved Metals by ICPMS								
Titanium (Ti)-Dissolved	0.0011	DLA	0.001	mg/L		27-MAR-08	MAT	R645225
Thallium (Tl)-Dissolved	<0.00010	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Tin (Sn)-Dissolved	<0.00010	DLA	0.0001	mg/L		27-MAR-08	MAT	R645225
Uranium (U)-Dissolved	0.00383	DLA	0.00001	mg/L		27-MAR-08	MAT	R645225
Vanadium (V)-Dissolved	<0.0010	DLA	0.001	mg/L		27-MAR-08	MAT	R645225
Zinc (Zn)-Dissolved	0.0938	DLA	0.005	mg/L		27-MAR-08	MAT	R645225

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-5 08MW05B								
Sampled By: JACK SAMBIRSKY on 21-MAR-08 @ 17:30								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
F2 (>C10-C16)	<0.05		0.05	mg/L	27-MAR-08	28-MAR-08	JUN	R645372
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	JDV	R644808
Toluene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	JDV	R644808
EthylBenzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	JDV	R644808
Xylenes	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	JDV	R644808
F1(C6-C10)	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	JDV	R644808
F1-BTEX	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	JDV	R644808
Major Ions & Trace Dissolved Metals								
Chloride (Cl)	4.7		0.1	mg/L		27-MAR-08	JF	R644388
Nitrate and Nitrite as N	0.90		0.07	mg/L		25-MAR-08		
Nitrate-N	0.90		0.05	mg/L		24-MAR-08	JF	R644388
Nitrite-N	<0.05		0.05	mg/L		24-MAR-08	JF	R644388
Sulphate (SO4)	57.2		0.5	mg/L		24-MAR-08	JF	R644388
pH, Conductivity and Total Alkalinity								
pH	7.71		0.01	pH		24-MAR-08	MAT	R644357
Conductivity (EC)	752		3	uS/cm		24-MAR-08	MAT	R644357
Bicarbonate (HCO3)	433		5	mg/L		24-MAR-08	MAT	R644357
Carbonate (CO3)	<5		5	mg/L		24-MAR-08	MAT	R644357
Hydroxide (OH)	<5		5	mg/L		24-MAR-08	MAT	R644357
Alkalinity, Total (as CaCO3)	355		5	mg/L		24-MAR-08	MAT	R644357
Ion Balance Calculation								
Ion Balance	96.2			%		28-MAR-08		
TDS (Calculated)	428			mg/L		28-MAR-08		
Hardness (as CaCO3)	381			mg/L		28-MAR-08		
Dissolved Metals by ICPOES								
Calcium (Ca)-Dissolved	107		0.1	mg/L		26-MAR-08	EHP	R644511
Iron (Fe)-Dissolved	2.03		0.03	mg/L		26-MAR-08	EHP	R644511
Magnesium (Mg)-Dissolved	27.7		0.1	mg/L		26-MAR-08	EHP	R644511
Potassium (K)-Dissolved	3.33		0.5	mg/L		26-MAR-08	EHP	R644511
Sodium (Na)-Dissolved	10.6		1	mg/L		26-MAR-08	EHP	R644511
Dissolved Metals by ICPMS								
Aluminum (Al)-Dissolved	<0.025	DLA	0.025	mg/L		28-MAR-08	SHT	R645756
Antimony (Sb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Arsenic (As)-Dissolved	0.00398	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Barium (Ba)-Dissolved	0.381	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Beryllium (Be)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Bismuth (Bi)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Boron (B)-Dissolved	<0.050	DLA	0.05	mg/L		28-MAR-08	SHT	R645756
Cadmium (Cd)-Dissolved	<0.00025	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Chromium (Cr)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Cobalt (Co)-Dissolved	0.00188	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Copper (Cu)-Dissolved	0.0177	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Lead (Pb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Manganese (Mn)-Dissolved	0.294	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Molybdenum (Mo)-Dissolved	0.00095	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Nickel (Ni)-Dissolved	0.0033	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Selenium (Se)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Silver (Ag)-Dissolved	<0.000050	DLA	0.00005	mg/L		28-MAR-08	SHT	R645756
Strontium (Sr)-Dissolved	0.171	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-5 08MW05B								
Sampled By: JACK SAMBIRSKY on 21-MAR-08 @ 17:30								
Matrix: WATER								
Major Ions & Trace Dissolved Metals								
Dissolved Metals by ICPMS								
Titanium (Ti)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Thallium (Tl)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Tin (Sn)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Uranium (U)-Dissolved	0.00354	DLA	0.00005	mg/L		28-MAR-08	SHT	R645756
Vanadium (V)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Zinc (Zn)-Dissolved	0.061	DLA	0.025	mg/L		28-MAR-08	SHT	R645756

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-6 08MW06B								
Sampled By: JACK SAMBIRSKY on 21-MAR-08 @ 18:00								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
F2 (>C10-C16)	<0.05		0.05	mg/L	27-MAR-08	28-MAR-08	JUN	R645372
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Toluene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
EthylBenzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Xylenes	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1(C6-C10)	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1-BTEX	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Major Ions & Trace Dissolved Metals								
Chloride (Cl)	4.2		0.1	mg/L		27-MAR-08	JF	R644388
Nitrate and Nitrite as N	0.81		0.07	mg/L		25-MAR-08		
Nitrate-N	0.81		0.05	mg/L		24-MAR-08	JF	R644388
Nitrite-N	<0.05		0.05	mg/L		24-MAR-08	JF	R644388
Sulphate (SO4)	64.1		0.5	mg/L		24-MAR-08	JF	R644388
pH, Conductivity and Total Alkalinity								
pH	7.73		0.01	pH		24-MAR-08	MAT	R644357
Conductivity (EC)	786		3	uS/cm		24-MAR-08	MAT	R644357
Bicarbonate (HCO3)	452		5	mg/L		24-MAR-08	MAT	R644357
Carbonate (CO3)	<5		5	mg/L		24-MAR-08	MAT	R644357
Hydroxide (OH)	<5		5	mg/L		24-MAR-08	MAT	R644357
Alkalinity, Total (as CaCO3)	371		5	mg/L		24-MAR-08	MAT	R644357
Ion Balance Calculation								
Ion Balance	95.6			%		28-MAR-08		
TDS (Calculated)	449			mg/L		28-MAR-08		
Hardness (as CaCO3)	398			mg/L		28-MAR-08		
Dissolved Metals by ICPOES								
Calcium (Ca)-Dissolved	110		0.1	mg/L		26-MAR-08	EHP	R644511
Iron (Fe)-Dissolved	0.044		0.03	mg/L		26-MAR-08	EHP	R644511
Magnesium (Mg)-Dissolved	30.0		0.1	mg/L		26-MAR-08	EHP	R644511
Potassium (K)-Dissolved	3.32		0.5	mg/L		26-MAR-08	EHP	R644511
Sodium (Na)-Dissolved	11.0		1	mg/L		26-MAR-08	EHP	R644511
Dissolved Metals by ICPMS								
Aluminum (Al)-Dissolved	<0.025	DLA	0.025	mg/L		28-MAR-08	SHT	R645756
Antimony (Sb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Arsenic (As)-Dissolved	0.00115	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Barium (Ba)-Dissolved	0.355	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Beryllium (Be)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Bismuth (Bi)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Boron (B)-Dissolved	<0.050	DLA	0.05	mg/L		28-MAR-08	SHT	R645756
Cadmium (Cd)-Dissolved	<0.00025	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Chromium (Cr)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Cobalt (Co)-Dissolved	0.00180	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Copper (Cu)-Dissolved	0.00742	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Lead (Pb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Manganese (Mn)-Dissolved	0.226	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Molybdenum (Mo)-Dissolved	0.00076	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Nickel (Ni)-Dissolved	0.0028	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Selenium (Se)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Silver (Ag)-Dissolved	<0.000050	DLA	0.00005	mg/L		28-MAR-08	SHT	R645756
Strontium (Sr)-Dissolved	0.165	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-7 08MW07B								
Sampled By: JACK SAMBIRSKY on 22-MAR-08 @ 09:00								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
F2 (>C10-C16)	<0.05		0.05	mg/L	27-MAR-08	28-MAR-08	JUN	R645372
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Toluene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
EthylBenzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Xylenes	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1(C6-C10)	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1-BTEX	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Major Ions & Trace Dissolved Metals								
Chloride (Cl)	2.8		0.1	mg/L		27-MAR-08	JF	R644388
Nitrate and Nitrite as N	0.23		0.07	mg/L		25-MAR-08		
Nitrate-N	0.23		0.05	mg/L		24-MAR-08	JF	R644388
Nitrite-N	<0.05		0.05	mg/L		24-MAR-08	JF	R644388
Sulphate (SO4)	31.5		0.5	mg/L		24-MAR-08	JF	R644388
pH, Conductivity and Total Alkalinity								
pH	7.88		0.01	pH		24-MAR-08	MAT	R644357
Conductivity (EC)	638		3	uS/cm		24-MAR-08	MAT	R644357
Bicarbonate (HCO3)	392		5	mg/L		24-MAR-08	MAT	R644357
Carbonate (CO3)	<5		5	mg/L		24-MAR-08	MAT	R644357
Hydroxide (OH)	<5		5	mg/L		24-MAR-08	MAT	R644357
Alkalinity, Total (as CaCO3)	322		5	mg/L		24-MAR-08	MAT	R644357
Ion Balance Calculation								
Ion Balance	97.1			%		28-MAR-08		
TDS (Calculated)	356			mg/L		28-MAR-08		
Hardness (as CaCO3)	325			mg/L		28-MAR-08		
Dissolved Metals by ICPOES								
Calcium (Ca)-Dissolved	92.4		0.1	mg/L		26-MAR-08	EHP	R644511
Iron (Fe)-Dissolved	<0.030		0.03	mg/L		26-MAR-08	EHP	R644511
Magnesium (Mg)-Dissolved	22.8		0.1	mg/L		26-MAR-08	EHP	R644511
Potassium (K)-Dissolved	3.94		0.5	mg/L		26-MAR-08	EHP	R644511
Sodium (Na)-Dissolved	8.7		1	mg/L		26-MAR-08	EHP	R644511
Dissolved Metals by ICPMS								
Aluminum (Al)-Dissolved	<0.025	DLA	0.025	mg/L		28-MAR-08	SHT	R645756
Antimony (Sb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Arsenic (As)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Barium (Ba)-Dissolved	0.299	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Beryllium (Be)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Bismuth (Bi)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Boron (B)-Dissolved	<0.050	DLA	0.05	mg/L		28-MAR-08	SHT	R645756
Cadmium (Cd)-Dissolved	<0.00025	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Chromium (Cr)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Cobalt (Co)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Copper (Cu)-Dissolved	0.00556	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Lead (Pb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Manganese (Mn)-Dissolved	0.0272	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Molybdenum (Mo)-Dissolved	0.00084	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Nickel (Ni)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Selenium (Se)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Silver (Ag)-Dissolved	<0.000050	DLA	0.00005	mg/L		28-MAR-08	SHT	R645756
Strontium (Sr)-Dissolved	0.127	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-8 08MW08								
Sampled By: JACK SAMBIRSKY on 22-MAR-08 @ 09:20								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
F2 (>C10-C16)	<0.05		0.05	mg/L	27-MAR-08	28-MAR-08	JUN	R645372
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Toluene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
EthylBenzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Xylenes	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1(C6-C10)	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1-BTEX	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Major Ions & Trace Dissolved Metals								
Chloride (Cl)	3.7		0.1	mg/L		27-MAR-08	JF	R644388
Nitrate and Nitrite as N	0.15		0.07	mg/L		25-MAR-08		
Nitrate-N	0.15		0.05	mg/L		24-MAR-08	JF	R644388
Nitrite-N	<0.05		0.05	mg/L		24-MAR-08	JF	R644388
Sulphate (SO4)	35.8		0.5	mg/L		24-MAR-08	JF	R644388
pH, Conductivity and Total Alkalinity								
pH	7.83		0.01	pH		24-MAR-08	MAT	R644357
Conductivity (EC)	644		3	uS/cm		24-MAR-08	MAT	R644357
Bicarbonate (HCO3)	385		5	mg/L		24-MAR-08	MAT	R644357
Carbonate (CO3)	<5		5	mg/L		24-MAR-08	MAT	R644357
Hydroxide (OH)	<5		5	mg/L		24-MAR-08	MAT	R644357
Alkalinity, Total (as CaCO3)	316		5	mg/L		24-MAR-08	MAT	R644357
Ion Balance Calculation								
Ion Balance	98.3			%		28-MAR-08		
TDS (Calculated)	359			mg/L		28-MAR-08		
Hardness (as CaCO3)	324			mg/L		28-MAR-08		
Dissolved Metals by ICPOES								
Calcium (Ca)-Dissolved	90.2		0.1	mg/L		26-MAR-08	EHP	R644511
Iron (Fe)-Dissolved	<0.030		0.03	mg/L		26-MAR-08	EHP	R644511
Magnesium (Mg)-Dissolved	24.1		0.1	mg/L		26-MAR-08	EHP	R644511
Potassium (K)-Dissolved	4.07		0.5	mg/L		26-MAR-08	EHP	R644511
Sodium (Na)-Dissolved	10.6		1	mg/L		26-MAR-08	EHP	R644511
Dissolved Metals by ICPMS								
Aluminum (Al)-Dissolved	<0.025	DLA	0.025	mg/L		28-MAR-08	SHT	R645756
Antimony (Sb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Arsenic (As)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Barium (Ba)-Dissolved	0.278	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Beryllium (Be)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Bismuth (Bi)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Boron (B)-Dissolved	<0.050	DLA	0.05	mg/L		28-MAR-08	SHT	R645756
Cadmium (Cd)-Dissolved	<0.00025	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Chromium (Cr)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Cobalt (Co)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Copper (Cu)-Dissolved	0.00299	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Lead (Pb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Manganese (Mn)-Dissolved	0.0365	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Molybdenum (Mo)-Dissolved	0.00081	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Nickel (Ni)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Selenium (Se)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Silver (Ag)-Dissolved	<0.000050	DLA	0.00005	mg/L		28-MAR-08	SHT	R645756
Strontium (Sr)-Dissolved	0.148	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-8 08MW08								
Sampled By: JACK SAMBIRSKY on 22-MAR-08 @ 09:20								
Matrix: WATER								
Major Ions & Trace Dissolved Metals								
Dissolved Metals by ICPMS								
Titanium (Ti)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Thallium (Tl)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Tin (Sn)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Uranium (U)-Dissolved	0.00271	DLA	0.00005	mg/L		28-MAR-08	SHT	R645756
Vanadium (V)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Zinc (Zn)-Dissolved	0.055	DLA	0.025	mg/L		28-MAR-08	SHT	R645756

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-9 08MW09								
Sampled By: JACK SAMBIRSKY on 22-MAR-08 @ 09:40								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
F2 (>C10-C16)	<0.05		0.05	mg/L	27-MAR-08	28-MAR-08	JUN	R645372
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Toluene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
EthylBenzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Xylenes	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1(C6-C10)	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1-BTEX	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Major Ions & Trace Dissolved Metals								
Chloride (Cl)	4.2		0.1	mg/L		27-MAR-08	JF	R644388
Nitrate and Nitrite as N	0.53		0.07	mg/L		25-MAR-08		
Nitrate-N	0.53		0.05	mg/L		24-MAR-08	JF	R644388
Nitrite-N	<0.05		0.05	mg/L		24-MAR-08	JF	R644388
Sulphate (SO4)	33.8		0.5	mg/L		24-MAR-08	JF	R644388
pH, Conductivity and Total Alkalinity								
pH	7.78		0.01	pH		24-MAR-08	MAT	R644357
Conductivity (EC)	696		3	uS/cm		24-MAR-08	MAT	R644357
Bicarbonate (HCO3)	427		5	mg/L		24-MAR-08	MAT	R644357
Carbonate (CO3)	<5		5	mg/L		24-MAR-08	MAT	R644357
Hydroxide (OH)	<5		5	mg/L		24-MAR-08	MAT	R644357
Alkalinity, Total (as CaCO3)	350		5	mg/L		24-MAR-08	MAT	R644357
Ion Balance Calculation								
Ion Balance	96.6			%		28-MAR-08		
TDS (Calculated)	388			mg/L		28-MAR-08		
Hardness (as CaCO3)	362			mg/L		28-MAR-08		
Dissolved Metals by ICPOES								
Calcium (Ca)-Dissolved	101		0.1	mg/L		26-MAR-08	EHP	R644511
Iron (Fe)-Dissolved	<0.030		0.03	mg/L		26-MAR-08	EHP	R644511
Magnesium (Mg)-Dissolved	26.6		0.1	mg/L		26-MAR-08	EHP	R644511
Potassium (K)-Dissolved	3.20		0.5	mg/L		26-MAR-08	EHP	R644511
Sodium (Na)-Dissolved	6.5		1	mg/L		26-MAR-08	EHP	R644511
Dissolved Metals by ICPMS								
Aluminum (Al)-Dissolved	<0.025	DLA	0.025	mg/L		28-MAR-08	SHT	R645756
Antimony (Sb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Arsenic (As)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Barium (Ba)-Dissolved	0.343	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Beryllium (Be)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Bismuth (Bi)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Boron (B)-Dissolved	<0.050	DLA	0.05	mg/L		28-MAR-08	SHT	R645756
Cadmium (Cd)-Dissolved	<0.00025	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Chromium (Cr)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Cobalt (Co)-Dissolved	0.00117	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Copper (Cu)-Dissolved	0.00283	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Lead (Pb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Manganese (Mn)-Dissolved	0.145	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Molybdenum (Mo)-Dissolved	0.00132	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Nickel (Ni)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Selenium (Se)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Silver (Ag)-Dissolved	<0.000050	DLA	0.00005	mg/L		28-MAR-08	SHT	R645756
Strontium (Sr)-Dissolved	0.195	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-10 08MW10								
Sampled By: JACK SAMBIRSKY on 21-MAR-08 @ 18:30								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
F2 (>C10-C16)	<0.05		0.05	mg/L	27-MAR-08	28-MAR-08	JUN	R645372
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Toluene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
EthylBenzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Xylenes	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1(C6-C10)	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1-BTEX	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Major Ions & Trace Dissolved Metals								
Chloride (Cl)	3.9		0.1	mg/L		27-MAR-08	JF	R644388
Nitrate and Nitrite as N	0.17		0.07	mg/L		25-MAR-08		
Nitrate-N	0.17		0.05	mg/L		24-MAR-08	JF	R644388
Nitrite-N	<0.05		0.05	mg/L		24-MAR-08	JF	R644388
Sulphate (SO4)	51.4		0.5	mg/L		24-MAR-08	JF	R644388
pH, Conductivity and Total Alkalinity								
pH	7.93		0.01	pH		24-MAR-08	MAT	R644357
Conductivity (EC)	647		3	uS/cm		24-MAR-08	MAT	R644357
Bicarbonate (HCO3)	368		5	mg/L		24-MAR-08	MAT	R644357
Carbonate (CO3)	<5		5	mg/L		24-MAR-08	MAT	R644357
Hydroxide (OH)	<5		5	mg/L		24-MAR-08	MAT	R644357
Alkalinity, Total (as CaCO3)	301		5	mg/L		24-MAR-08	MAT	R644357
Ion Balance Calculation								
Ion Balance	95.2			%		28-MAR-08		
TDS (Calculated)	363			mg/L		28-MAR-08		
Hardness (as CaCO3)	322			mg/L		28-MAR-08		
Dissolved Metals by ICPOES								
Calcium (Ca)-Dissolved	92.8		0.1	mg/L		26-MAR-08	EHP	R644511
Iron (Fe)-Dissolved	<0.030		0.03	mg/L		26-MAR-08	EHP	R644511
Magnesium (Mg)-Dissolved	21.9		0.1	mg/L		26-MAR-08	EHP	R644511
Potassium (K)-Dissolved	4.25		0.5	mg/L		26-MAR-08	EHP	R644511
Sodium (Na)-Dissolved	7.7		1	mg/L		26-MAR-08	EHP	R644511
Dissolved Metals by ICPMS								
Aluminum (Al)-Dissolved	<0.025	DLA	0.025	mg/L		28-MAR-08	SHT	R645756
Antimony (Sb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Arsenic (As)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Barium (Ba)-Dissolved	0.529	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Beryllium (Be)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Bismuth (Bi)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Boron (B)-Dissolved	<0.050	DLA	0.05	mg/L		28-MAR-08	SHT	R645756
Cadmium (Cd)-Dissolved	<0.00025	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Chromium (Cr)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Cobalt (Co)-Dissolved	0.00058	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Copper (Cu)-Dissolved	0.00490	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Lead (Pb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Manganese (Mn)-Dissolved	0.124	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Molybdenum (Mo)-Dissolved	0.00236	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Nickel (Ni)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Selenium (Se)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Silver (Ag)-Dissolved	<0.000050	DLA	0.00005	mg/L		28-MAR-08	SHT	R645756
Strontium (Sr)-Dissolved	0.151	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-11 08MW11								
Sampled By: JACK SAMBIRSKY on 21-MAR-08 @ 18:45								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
F2 (>C10-C16)	<0.05		0.05	mg/L	27-MAR-08	28-MAR-08	JUN	R645372
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Toluene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
EthylBenzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Xylenes	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1(C6-C10)	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1-BTEX	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Major Ions & Trace Dissolved Metals								
Chloride (Cl)	1.5		0.1	mg/L		27-MAR-08	JF	R644388
Nitrate and Nitrite as N	0.08		0.07	mg/L		25-MAR-08		
Nitrate-N	0.08		0.05	mg/L		24-MAR-08	JF	R644388
Nitrite-N	<0.05		0.05	mg/L		24-MAR-08	JF	R644388
Sulphate (SO4)	16.4		0.5	mg/L		24-MAR-08	JF	R644388
pH, Conductivity and Total Alkalinity								
pH	7.90		0.01	pH		24-MAR-08	MAT	R644357
Conductivity (EC)	559		3	uS/cm		24-MAR-08	MAT	R644357
Bicarbonate (HCO3)	365		5	mg/L		24-MAR-08	MAT	R644357
Carbonate (CO3)	<5		5	mg/L		24-MAR-08	MAT	R644357
Hydroxide (OH)	<5		5	mg/L		24-MAR-08	MAT	R644357
Alkalinity, Total (as CaCO3)	299		5	mg/L		24-MAR-08	MAT	R644357
Ion Balance Calculation								
Ion Balance	99.0			%		28-MAR-08		
TDS (Calculated)	311			mg/L		28-MAR-08		
Hardness (as CaCO3)	299			mg/L		28-MAR-08		
Dissolved Metals by ICPOES								
Calcium (Ca)-Dissolved	82.4		0.1	mg/L		26-MAR-08	EHP	R644511
Iron (Fe)-Dissolved	<0.030		0.03	mg/L		26-MAR-08	EHP	R644511
Magnesium (Mg)-Dissolved	22.7		0.1	mg/L		26-MAR-08	EHP	R644511
Potassium (K)-Dissolved	2.98		0.5	mg/L		26-MAR-08	EHP	R644511
Sodium (Na)-Dissolved	5.7		1	mg/L		26-MAR-08	EHP	R644511
Dissolved Metals by ICPMS								
Aluminum (Al)-Dissolved	<0.025	DLA	0.025	mg/L		28-MAR-08	SHT	R645756
Antimony (Sb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Arsenic (As)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Barium (Ba)-Dissolved	0.372	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Beryllium (Be)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Bismuth (Bi)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Boron (B)-Dissolved	<0.050	DLA	0.05	mg/L		28-MAR-08	SHT	R645756
Cadmium (Cd)-Dissolved	<0.00025	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Chromium (Cr)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Cobalt (Co)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Copper (Cu)-Dissolved	0.00602	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Lead (Pb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Manganese (Mn)-Dissolved	0.0355	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Molybdenum (Mo)-Dissolved	0.00176	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Nickel (Ni)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Selenium (Se)-Dissolved	0.0061	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Silver (Ag)-Dissolved	<0.000050	DLA	0.00005	mg/L		28-MAR-08	SHT	R645756
Strontium (Sr)-Dissolved	0.225	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-11 08MW11								
Sampled By: JACK SAMBIRSKY on 21-MAR-08 @ 18:45								
Matrix: WATER								
Major Ions & Trace Dissolved Metals								
Dissolved Metals by ICPMS								
Titanium (Ti)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Thallium (Tl)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Tin (Sn)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Uranium (U)-Dissolved	0.00305	DLA	0.00005	mg/L		28-MAR-08	SHT	R645756
Vanadium (V)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Zinc (Zn)-Dissolved	0.096	DLA	0.025	mg/L		28-MAR-08	SHT	R645756

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-12 08MW12								
Sampled By: JACK SAMBIRSKY on 21-MAR-08 @ 19:00								
Matrix: WATER								
BTEX, F1 (C6-C10) and F2 (>C10-C16)								
F2 (>C10-C16)	<0.05		0.05	mg/L	27-MAR-08	28-MAR-08	JUN	R645372
BTEX and F1 (C6-C10)								
Benzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Toluene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
EthylBenzene	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Xylenes	<0.00050		0.0005	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1(C6-C10)	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
F1-BTEX	<0.1		0.1	mg/L	25-MAR-08	25-MAR-08	LSV	R644571
Major Ions & Trace Dissolved Metals								
Chloride (Cl)	1.9		0.1	mg/L		27-MAR-08	JF	R644388
Nitrate and Nitrite as N	0.10		0.07	mg/L		25-MAR-08		
Nitrate-N	0.10		0.05	mg/L		24-MAR-08	JF	R644388
Nitrite-N	<0.05		0.05	mg/L		24-MAR-08	JF	R644388
Sulphate (SO4)	23.3		0.5	mg/L		24-MAR-08	JF	R644388
pH, Conductivity and Total Alkalinity								
pH	7.92		0.01	pH		24-MAR-08	MAT	R644357
Conductivity (EC)	583		3	uS/cm		24-MAR-08	MAT	R644357
Bicarbonate (HCO3)	363		5	mg/L		24-MAR-08	MAT	R644357
Carbonate (CO3)	<5		5	mg/L		24-MAR-08	MAT	R644357
Hydroxide (OH)	<5		5	mg/L		24-MAR-08	MAT	R644357
Alkalinity, Total (as CaCO3)	298		5	mg/L		24-MAR-08	MAT	R644357
Ion Balance Calculation								
Ion Balance	99.4			%		28-MAR-08		
TDS (Calculated)	322			mg/L		28-MAR-08		
Hardness (as CaCO3)	309			mg/L		28-MAR-08		
Dissolved Metals by ICPOES								
Calcium (Ca)-Dissolved	87.1		0.1	mg/L		26-MAR-08	EHP	R644511
Iron (Fe)-Dissolved	<0.030		0.03	mg/L		26-MAR-08	EHP	R644511
Magnesium (Mg)-Dissolved	22.2		0.1	mg/L		26-MAR-08	EHP	R644511
Potassium (K)-Dissolved	3.16		0.5	mg/L		26-MAR-08	EHP	R644511
Sodium (Na)-Dissolved	4.7		1	mg/L		26-MAR-08	EHP	R644511
Dissolved Metals by ICPMS								
Aluminum (Al)-Dissolved	<0.025	DLA	0.025	mg/L		28-MAR-08	SHT	R645756
Antimony (Sb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Arsenic (As)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Barium (Ba)-Dissolved	0.449	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Beryllium (Be)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Bismuth (Bi)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Boron (B)-Dissolved	<0.050	DLA	0.05	mg/L		28-MAR-08	SHT	R645756
Cadmium (Cd)-Dissolved	<0.00025	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Chromium (Cr)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Cobalt (Co)-Dissolved	0.00054	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Copper (Cu)-Dissolved	0.00146	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Lead (Pb)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Manganese (Mn)-Dissolved	0.101	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Molybdenum (Mo)-Dissolved	0.00224	DLA	0.00025	mg/L		28-MAR-08	SHT	R645756
Nickel (Ni)-Dissolved	<0.0025	DLA	0.0025	mg/L		28-MAR-08	SHT	R645756
Selenium (Se)-Dissolved	0.0066	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Silver (Ag)-Dissolved	<0.000050	DLA	0.00005	mg/L		28-MAR-08	SHT	R645756
Strontium (Sr)-Dissolved	0.222	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L612590-12 08MW12								
Sampled By: JACK SAMBIRSKY on 21-MAR-08 @ 19:00								
Matrix: WATER								
Major Ions & Trace Dissolved Metals								
Dissolved Metals by ICPMS								
Titanium (Ti)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Thallium (Tl)-Dissolved	<0.00050	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Tin (Sn)-Dissolved	0.00056	DLA	0.0005	mg/L		28-MAR-08	SHT	R645756
Uranium (U)-Dissolved	0.00250	DLA	0.00005	mg/L		28-MAR-08	SHT	R645756
Vanadium (V)-Dissolved	<0.0050	DLA	0.005	mg/L		28-MAR-08	SHT	R645756
Zinc (Zn)-Dissolved	0.074	DLA	0.025	mg/L		28-MAR-08	SHT	R645756
* Refer to Referenced Information for Qualifiers (if any) and Methodology.								

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLA	Detection Limit Adjusted For Dilution

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
BTX,F1-CL	Water	BTEX and F1 (C6-C10)	EPA 5030B	EPA 5030/8015& 8260-P&T GC-MS/FID
CL-CL	Water	Chloride (Cl)		APHA 4110 B-Ion Chromatography
F2-CL	Water	F2	EPA 3550B	EPA 3510/8000-GC-FID
IONBALANCE-CL	Water	Ion Balance Calculation		APHA 1030E
MET-DIS-ICP-CL	Water	Dissolved Metals by ICPOES		EPA SW-846 3005A/6010B
his analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).				
MET-DIS-LOW-MS-CL	Water	Dissolved Metals by ICPMS		EPA SW-846 3005A/6020A
N2N3-CALC-CL	Water	Nitrate+Nitrite		CALCULATION
NO2-CL	Water	Nitrite-N		APHA 4110 B-Ion Chromatography
NO3-IC-CL	Water	Nitrate-N		APHA 4110 B-Ion Chromatography
PH/EC/ALK-CL	Water	pH, Conductivity and Total Alkalinity		APHA 4500H,2510,2320
SO4-CL	Water	Sulfate (SO4)		APHA 4110 B-Ion Chromatography

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

C081194

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
CL	ALS LABORATORY GROUP - CALGARY, ALBERTA, CANADA		

Reference Information

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds. The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

< - Less than

D.L. - Detection Limit

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

ALS Routine Water Chemistry Report

L612590

Lab ID	Sample ID				Lab ID	Sample ID				
L612590-1	08MW01				L612590-2	08MW02				
Sample Date: 22-MAR-08					Sample Date: 22-MAR-08					
Matrix: WATER					Matrix: WATER					
		Result	UNITS	MEQ/L	MEQ %		Result	UNITS	MEQ/L	MEQ %
Ion Balance		98.0	%			Ion Balance	98.4	%		
Routine Anions						Routine Anions				
Bicarbonate		436	mg/L	7.15	46	Bicarbonate	424	mg/L	6.95	46
Carbonate		<5	mg/L	0	0	Carbonate	<5	mg/L	0	0
Hydroxide		<5	mg/L	0	0	Hydroxide	<5	mg/L	0	0
Chloride		7.8	mg/L	0.22	1	Chloride	7.6	mg/L	0.21	1
Sulfate		21.7	mg/L	0.45	3	Sulfate	20.0	mg/L	0.42	3
Nitrate+Nitrite-N			mg/L	0.04	0	Nitrate+Nitrite-N		mg/L	0.03	0
Anion Sum				7.85	51	Anion Sum			7.61	50
Routine Cations						Routine Cations				
Calcium		106	mg/L	5.29	34	Calcium	103	mg/L	5.14	34
Magnesium		22.8	mg/L	1.88	12	Magnesium	22.5	mg/L	1.85	12
Sodium		10.6	mg/L	0.46	3	Sodium	10.2	mg/L	0.44	3
Potassium		2.54	mg/L	0.06	0	Potassium	2.25	mg/L	0.06	0
Ammonium		0	mg/L	0	0	Ammonium	0	mg/L	0	0
Cation Surr				7.69	49	Cation Surr			7.49	50
L612590-3	08MW03				L612590-4	08MW04B				
Sample Date: 22-MAR-08					Sample Date: 21-MAR-08					
Matrix: WATER					Matrix: WATER					
		Result	UNITS	MEQ/L	MEQ %		Result	UNITS	MEQ/L	MEQ %
Ion Balance		101	%			Ion Balance	101	%		
Routine Anions						Routine Anions				
Bicarbonate		402	mg/L	6.59	46	Bicarbonate	435	mg/L	7.13	43
Carbonate		<5	mg/L	0	0	Carbonate	<5	mg/L	0	0
Hydroxide		<5	mg/L	0	0	Hydroxide	<5	mg/L	0	0
Chloride		4.4	mg/L	0.12	1	Chloride	4.4	mg/L	0.12	1
Sulfate		19.3	mg/L	0.40	3	Sulfate	48.0	mg/L	1	6
Nitrate+Nitrite-N			mg/L	0.02	0	Nitrate+Nitrite-N		mg/L	0.04	0
Anion Sum				7.13	50	Anion Sum			8.29	50
Routine Cations						Routine Cations				
Calcium		99.7	mg/L	4.98	35	Calcium	111	mg/L	5.54	33
Magnesium		21.7	mg/L	1.79	12	Magnesium	28.4	mg/L	2.34	14
Sodium		8.9	mg/L	0.39	3	Sodium	8.6	mg/L	0.37	2
Potassium		2.87	mg/L	0.07	1	Potassium	3.73	mg/L	0.1	1
Ammonium		0	mg/L	0	0	Ammonium	0	mg/L	0	0
Cation Surr				7.22	50	Cation Surr			8.35	50

ALS Routine Water Chemistry Report

L612590

Lab ID	Sample ID				Lab ID	Sample ID				
L612590-5	08MW05B				L612590-6	08MW06B				
Sample Date: 21-MAR-08					Sample Date: 21-MAR-08					
Matrix: WATER					Matrix: WATER					
		Result	UNITS	MEQ/L	MEQ %		Result	UNITS	MEQ/L	MEQ %
			%					%		
Ion Balance		96.2				Ion Balance	95.6			
Routine Anions						Routine Anions				
Bicarbonate		433	mg/L	7.10	43	Bicarbonate	452	mg/L	7.41	42
Carbonate		<5	mg/L	0	0	Carbonate	<5	mg/L	0	0
Hydroxide		<5	mg/L	0	0	Hydroxide	<5	mg/L	0	0
Chloride		4.7	mg/L	0.13	1	Chloride	4.2	mg/L	0.12	1
Sulfate		57.2	mg/L	1.19	7	Sulfate	64.1	mg/L	1.33	8
Nitrate+Nitrite-N			mg/L	0.06	0	Nitrate+Nitrite-N		mg/L	0.06	0
Anion Sum				8.48	51	Anion Sum			8.92	51
Routine Cations						Routine Cations				
Calcium		107	mg/L	5.34	32	Calcium	110	mg/L	5.49	31
Magnesium		27.7	mg/L	2.28	14	Magnesium	30.0	mg/L	2.47	14
Sodium		10.6	mg/L	0.46	3	Sodium	11.0	mg/L	0.48	3
Potassium		3.33	mg/L	0.09	1	Potassium	3.32	mg/L	0.08	0
Ammonium		0	mg/L	0	0	Ammonium	0	mg/L	0	0
Cation Surr				8.17	49	Cation Surr			8.52	49
L612590-7	08MW07B				L612590-8	08MW08				
Sample Date: 22-MAR-08					Sample Date: 22-MAR-08					
Matrix: WATER					Matrix: WATER					
		Result	UNITS	MEQ/L	MEQ %		Result	UNITS	MEQ/L	MEQ %
			%					%		
Ion Balance		97.1				Ion Balance	98.3			
Routine Anions						Routine Anions				
Bicarbonate		392	mg/L	6.42	45	Bicarbonate	385	mg/L	6.31	44
Carbonate		<5	mg/L	0	0	Carbonate	<5	mg/L	0	0
Hydroxide		<5	mg/L	0	0	Hydroxide	<5	mg/L	0	0
Chloride		2.8	mg/L	0.08	1	Chloride	3.7	mg/L	0.10	1
Sulfate		31.5	mg/L	0.66	5	Sulfate	35.8	mg/L	0.75	5
Nitrate+Nitrite-N			mg/L	0.02	0	Nitrate+Nitrite-N		mg/L	0.01	0
Anion Sum				7.18	51	Anion Sum			7.17	50
Routine Cations						Routine Cations				
Calcium		92.4	mg/L	4.61	33	Calcium	90.2	mg/L	4.50	32
Magnesium		22.8	mg/L	1.88	13	Magnesium	24.1	mg/L	1.98	14
Sodium		8.7	mg/L	0.38	3	Sodium	10.6	mg/L	0.46	3
Potassium		3.94	mg/L	0.10	1	Potassium	4.07	mg/L	0.10	1
Ammonium		0	mg/L	0	0	Ammonium	0	mg/L	0	0
Cation Surr				6.97	49	Cation Surr			7.05	50

ALS Routine Water Chemistry Report

L612590

Lab ID	Sample ID				Lab ID	Sample ID				
L612590-9	08MW09				L612590-10	08MW10				
Sample Date: 22-MAR-08					Sample Date: 21-MAR-08					
Matrix: WATER					Matrix: WATER					
		Result	UNITS	MEQ/L	MEQ %		Result	UNITS	MEQ/L	MEQ %
Ion Balance		96.6	%			Ion Balance	95.2	%		
Routine Anions						Routine Anions				
Bicarbonate		427	mg/L	7.00	45	Bicarbonate	368	mg/L	6.03	43
Carbonate		<5	mg/L	0	0	Carbonate	<5	mg/L	0	0
Hydroxide		<5	mg/L	0	0	Hydroxide	<5	mg/L	0	0
Chloride		4.2	mg/L	0.12	1	Chloride	3.9	mg/L	0.11	1
Sulfate		33.8	mg/L	0.70	5	Sulfate	51.4	mg/L	1.07	8
Nitrate+Nitrite-N			mg/L	0.04	0	Nitrate+Nitrite-N		mg/L	0.01	0
Anion Sum				7.86	51	Anion Sum			7.22	51
Routine Cations						Routine Cations				
Calcium		101	mg/L	5.04	33	Calcium	92.8	mg/L	4.63	33
Magnesium		26.6	mg/L	2.19	14	Magnesium	21.9	mg/L	1.80	13
Sodium		6.5	mg/L	0.28	2	Sodium	7.7	mg/L	0.33	2
Potassium		3.20	mg/L	0.08	1	Potassium	4.25	mg/L	0.11	1
Ammonium		0	mg/L	0	0	Ammonium	0	mg/L	0	0
Cation Surr				7.59	49	Cation Surr			6.88	49
L612590-11	08MW11				L612590-12	08MW12				
Sample Date: 21-MAR-08					Sample Date: 21-MAR-08					
Matrix: WATER					Matrix: WATER					
		Result	UNITS	MEQ/L	MEQ %		Result	UNITS	MEQ/L	MEQ %
Ion Balance		99.0	%			Ion Balance	99.4	%		
Routine Anions						Routine Anions				
Bicarbonate		365	mg/L	5.98	47	Bicarbonate	363	mg/L	5.95	46
Carbonate		<5	mg/L	0	0	Carbonate	<5	mg/L	0	0
Hydroxide		<5	mg/L	0	0	Hydroxide	<5	mg/L	0	0
Chloride		1.5	mg/L	0.04	0	Chloride	1.9	mg/L	0.05	0
Sulfate		16.4	mg/L	0.34	3	Sulfate	23.3	mg/L	0.49	4
Nitrate+Nitrite-N			mg/L	0.01	0	Nitrate+Nitrite-N		mg/L	0.01	0
Anion Sum				6.37	50	Anion Sum			6.49	50
Routine Cations						Routine Cations				
Calcium		82.4	mg/L	4.11	32	Calcium	87.1	mg/L	4.35	34
Magnesium		22.7	mg/L	1.87	15	Magnesium	22.2	mg/L	1.83	14
Sodium		5.7	mg/L	0.25	2	Sodium	4.7	mg/L	0.20	2
Potassium		2.98	mg/L	0.08	1	Potassium	3.16	mg/L	0.08	1
Ammonium		0	mg/L	0	0	Ammonium	0	mg/L	0	0
Cation Surr				6.30	50	Cation Surr			6.46	50



Environmental Division

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 1 of 19

Client: EBA ENG CONSULTANTS LTD
115, 200 RIVERCREST DR SE
CALGARY AB T2C 2X5

Contact: NAYEF MAHGOUB

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX,F1-CL		Water						
Batch	R644571							
WG744574-4	LCS							
Benzene			105		%		81-120	25-MAR-08
EthylBenzene			106		%		82-120	25-MAR-08
Toluene			110		%		82-119	25-MAR-08
F1(C6-C10)			89		%		80-119	25-MAR-08
Xylenes			107		%		81-124	25-MAR-08
WG744574-1	MB							
Benzene			<0.00050		mg/L		0.0005	25-MAR-08
EthylBenzene			<0.00050		mg/L		0.0005	25-MAR-08
Toluene			<0.00050		mg/L		0.0005	25-MAR-08
F1(C6-C10)			<0.1		mg/L		0.1	25-MAR-08
Xylenes			<0.00050		mg/L		0.0005	25-MAR-08
WG744574-3	MS	L612590-4						
Benzene			97		%		74-127	25-MAR-08
EthylBenzene			94		%		67-132	25-MAR-08
Toluene			100		%		68-131	25-MAR-08
F1(C6-C10)			78		%		66-127	25-MAR-08
Xylenes			96		%		68-136	25-MAR-08
Batch	R644808							
WG744590-2	DUP	L612461-2						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	26-MAR-08
EthylBenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	26	26-MAR-08
Toluene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	26	26-MAR-08
F1(C6-C10)		<0.1	<0.1	RPD-NA	mg/L	N/A	26	26-MAR-08
Xylenes		<0.00050	<0.00050	RPD-NA	mg/L	N/A	26	26-MAR-08
WG744590-4	LCS							
Benzene			114		%		81-120	26-MAR-08
EthylBenzene			107		%		82-120	26-MAR-08
Toluene			109		%		82-119	26-MAR-08
F1(C6-C10)			90		%		80-119	26-MAR-08
Xylenes			113		%		81-124	26-MAR-08
WG744590-1	MB							
Benzene			<0.00050		mg/L		0.0005	25-MAR-08
EthylBenzene			<0.00050		mg/L		0.0005	25-MAR-08
Toluene			<0.00050		mg/L		0.0005	25-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 2 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<u>BTX,F1-CL</u>		<u>Water</u>						
Batch	R644808							
WG744590-1	MB							
F1(C6-C10)			<0.1		mg/L		0.1	25-MAR-08
Xylenes			<0.00050		mg/L		0.0005	25-MAR-08
<u>CL-CL</u>		<u>Water</u>						
Batch	R644388							
WG744189-7	DUP	L612590-12						
Chloride (Cl)		1.9	1.9		mg/L	3.3	13	24-MAR-08
<u>F2-CL</u>		<u>Water</u>						
Batch	R645372							
WG745291-12	DUP	L612617-1						
F2 (>C10-C16)		<0.05	<0.05	RPD-NA	mg/L	N/A	33	28-MAR-08
WG745291-3	DUP	L612422-9						
F2 (>C10-C16)		<0.05	<0.05	RPD-NA	mg/L	N/A	33	27-MAR-08
WG745291-7	DUP	L612422-30						
F2 (>C10-C16)		<0.05	<0.05	RPD-NA	mg/L	N/A	33	27-MAR-08
WG745291-11	MB							
F2 (>C10-C16)			<0.05		mg/L		0.05	28-MAR-08
WG745291-2	MB							
F2 (>C10-C16)			<0.05		mg/L		0.05	26-MAR-08
WG745291-6	MB							
F2 (>C10-C16)			<0.05		mg/L		0.05	27-MAR-08
WG745291-14	MS	L612590-9						
F2 (>C10-C16)			100		%		61-140	28-MAR-08
WG745291-4	MS	L612422-10						
F2 (>C10-C16)			111		%		61-140	27-MAR-08
WG745291-9	MS	L612422-31						
F2 (>C10-C16)			99		%		61-140	27-MAR-08
<u>MET-DIS-ICP-CL</u>		<u>Water</u>						
Batch	R644511							
WG744485-3	CRM	QCS-A						
Aluminum (Al)-Dissolved			98		%		85-115	26-MAR-08
Antimony (Sb)-Dissolved			97		%		85-115	26-MAR-08
Arsenic (As)-Dissolved			99		%		85-115	26-MAR-08
Barium (Ba)-Dissolved			97		%		85-115	26-MAR-08
Beryllium (Be)-Dissolved			99		%		85-115	26-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 3 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-CL		Water						
Batch	R644511							
WG744485-3	CRM	QCS-A						
Bismuth (Bi)-Dissolved			98		%		85-115	26-MAR-08
Boron (B)-Dissolved			99		%		85-115	26-MAR-08
Cadmium (Cd)-Dissolved			98		%		85-115	26-MAR-08
Calcium (Ca)-Dissolved			99		%		85-115	26-MAR-08
Chromium (Cr)-Dissolved			99		%		85-115	26-MAR-08
Cobalt (Co)-Dissolved			99		%		85-115	26-MAR-08
Copper (Cu)-Dissolved			99		%		85-115	26-MAR-08
Iron (Fe)-Dissolved			99		%		85-115	26-MAR-08
Lead (Pb)-Dissolved			97		%		85-115	26-MAR-08
Lithium (Li)-Dissolved			99		%		85-115	26-MAR-08
Magnesium (Mg)-Dissolved			95		%		85-115	26-MAR-08
Manganese (Mn)-Dissolved			96		%		85-115	26-MAR-08
Molybdenum (Mo)-Dissolved			98		%		85-115	26-MAR-08
Nickel (Ni)-Dissolved			99		%		85-115	26-MAR-08
Phosphorus (P)-Dissolved			97		%		85-115	26-MAR-08
Potassium (K)-Dissolved			99		%		85-115	26-MAR-08
Selenium (Se)-Dissolved			98		%		85-115	26-MAR-08
Silicon (Si)-Dissolved			103		%		85-115	26-MAR-08
Silver (Ag)-Dissolved			95		%		85-115	26-MAR-08
Sodium (Na)-Dissolved			98		%		85-115	26-MAR-08
Strontium (Sr)-Dissolved			96		%		85-115	26-MAR-08
Thallium (Tl)-Dissolved			98		%		85-115	26-MAR-08
Tin (Sn)-Dissolved			97		%		85-115	26-MAR-08
Titanium (Ti)-Dissolved			99		%		85-115	26-MAR-08
Vanadium (V)-Dissolved			99		%		85-115	26-MAR-08
Zinc (Zn)-Dissolved			103		%		85-115	26-MAR-08
WG744485-6	DUP	L612425-3						
Aluminum (Al)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Antimony (Sb)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Arsenic (As)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Barium (Ba)-Dissolved		1.53	1.51		mg/L	1.1	26	26-MAR-08
Beryllium (Be)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	26	26-MAR-08
Bismuth (Bi)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 4 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-CL		Water						
Batch	R644511							
WG744485-6	DUP	L612425-3						
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	26	26-MAR-08
Cadmium (Cd)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Calcium (Ca)-Dissolved		89.7	88.7		mg/L	1.1	26	26-MAR-08
Chromium (Cr)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Cobalt (Co)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Copper (Cu)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Iron (Fe)-Dissolved		5.32	5.24		mg/L	1.4	26	26-MAR-08
Lead (Pb)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	26	26-MAR-08
Lithium (Li)-Dissolved		0.017	0.017	J	mg/L	0.000	0.04	26-MAR-08
Magnesium (Mg)-Dissolved		42.2	41.9		mg/L	0.76	26	26-MAR-08
Manganese (Mn)-Dissolved		0.747	0.738		mg/L	1.2	26	26-MAR-08
Molybdenum (Mo)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	26-MAR-08
Nickel (Ni)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	26	26-MAR-08
Phosphorus (P)-Dissolved		<0.30	<0.30	RPD-NA	mg/L	N/A	26	26-MAR-08
Potassium (K)-Dissolved		2.63	2.60	J	mg/L	0.03	2	26-MAR-08
Selenium (Se)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Silicon (Si)-Dissolved		5.88	5.81		mg/L	1.2	26	26-MAR-08
Silver (Ag)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Sodium (Na)-Dissolved		23.0	22.7		mg/L	1.2	26	26-MAR-08
Strontium (Sr)-Dissolved		0.627	0.620		mg/L	1.0	26	26-MAR-08
Sulfur (S)-Dissolved		4.9	4.8	J	mg/L	0.0	4	26-MAR-08
Thallium (Tl)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Tin (Sn)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	26-MAR-08
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Vanadium (V)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	26-MAR-08
Zinc (Zn)-Dissolved		0.0097	0.0090	J	mg/L	0.0007	0.02	26-MAR-08
WG744485-7	DUP	L612590-5						
Aluminum (Al)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Antimony (Sb)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Arsenic (As)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Barium (Ba)-Dissolved		0.392	0.393		mg/L	0.36	26	26-MAR-08
Beryllium (Be)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	26	26-MAR-08
Bismuth (Bi)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 5 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<u>MET-DIS-ICP-CL</u>		<u>Water</u>						
Batch	R644511							
WG744485-7	DUP	L612590-5						
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	26	26-MAR-08
Cadmium (Cd)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Calcium (Ca)-Dissolved		107	107		mg/L	0.059	26	26-MAR-08
Chromium (Cr)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Cobalt (Co)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Copper (Cu)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Iron (Fe)-Dissolved		2.03	2.04		mg/L	0.40	26	26-MAR-08
Lead (Pb)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	26	26-MAR-08
Lithium (Li)-Dissolved		0.020	0.020	J	mg/L	0.000	0.04	26-MAR-08
Magnesium (Mg)-Dissolved		27.7	28.1		mg/L	1.5	26	26-MAR-08
Manganese (Mn)-Dissolved		0.602	0.604		mg/L	0.38	26	26-MAR-08
Molybdenum (Mo)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	26-MAR-08
Nickel (Ni)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	26	26-MAR-08
Phosphorus (P)-Dissolved		<0.30	<0.30	RPD-NA	mg/L	N/A	26	26-MAR-08
Potassium (K)-Dissolved		3.33	3.34	J	mg/L	0.01	2	26-MAR-08
Selenium (Se)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Silicon (Si)-Dissolved		6.27	6.33		mg/L	0.97	26	26-MAR-08
Silver (Ag)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Sodium (Na)-Dissolved		10.6	10.6		mg/L	0.11	26	26-MAR-08
Strontium (Sr)-Dissolved		0.312	0.313		mg/L	0.31	26	26-MAR-08
Sulfur (S)-Dissolved		17.9	18.3		mg/L	1.8	26	26-MAR-08
Thallium (Tl)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Tin (Sn)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	26-MAR-08
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Vanadium (V)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	26-MAR-08
Zinc (Zn)-Dissolved		0.0986	0.0996		mg/L	0.94	26	26-MAR-08
WG744485-9	DUP	L612842-1						
Aluminum (Al)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Antimony (Sb)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Arsenic (As)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Barium (Ba)-Dissolved		0.048	0.049	J	mg/L	0.001	0.04	26-MAR-08
Beryllium (Be)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	26	26-MAR-08
Bismuth (Bi)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 6 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<u>MET-DIS-ICP-CL</u>		<u>Water</u>						
Batch	R644511							
WG744485-9	DUP	L612842-1						
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	26	26-MAR-08
Cadmium (Cd)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Calcium (Ca)-Dissolved		41.4	41.5		mg/L	0.33	26	26-MAR-08
Chromium (Cr)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Cobalt (Co)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Copper (Cu)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Iron (Fe)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	26-MAR-08
Lead (Pb)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	26	26-MAR-08
Lithium (Li)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Magnesium (Mg)-Dissolved		14.2	14.4		mg/L	1.8	26	26-MAR-08
Manganese (Mn)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	26	26-MAR-08
Molybdenum (Mo)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	26-MAR-08
Nickel (Ni)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	26	26-MAR-08
Phosphorus (P)-Dissolved		<0.30	<0.30	RPD-NA	mg/L	N/A	26	26-MAR-08
Potassium (K)-Dissolved		2.01	2.04	J	mg/L	0.03	2	26-MAR-08
Selenium (Se)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Silicon (Si)-Dissolved		0.098	0.098	J	mg/L	0.001	0.2	26-MAR-08
Silver (Ag)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Sodium (Na)-Dissolved		18.0	18.1		mg/L	0.50	26	26-MAR-08
Strontium (Sr)-Dissolved		0.199	0.201		mg/L	1.1	26	26-MAR-08
Sulfur (S)-Dissolved		23.9	23.8		mg/L	0.57	26	26-MAR-08
Thallium (Tl)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	26-MAR-08
Tin (Sn)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	26-MAR-08
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	26-MAR-08
Vanadium (V)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	26-MAR-08
Zinc (Zn)-Dissolved		0.0107	0.0100	J	mg/L	0.0007	0.02	26-MAR-08
WG744485-1	MB							
Aluminum (Al)-Dissolved			<0.20		mg/L		0.2	26-MAR-08
Antimony (Sb)-Dissolved			<0.20		mg/L		0.2	26-MAR-08
Arsenic (As)-Dissolved			<0.20		mg/L		0.2	26-MAR-08
Barium (Ba)-Dissolved			<0.010		mg/L		0.01	26-MAR-08
Beryllium (Be)-Dissolved			<0.0050		mg/L		0.005	26-MAR-08
Bismuth (Bi)-Dissolved			<0.20		mg/L		0.2	26-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 7 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<u>MET-DIS-ICP-CL</u>								
	<u>Water</u>							
Batch	R644511							
WG744485-1	MB							
Boron (B)-Dissolved			<0.10		mg/L		0.1	26-MAR-08
Cadmium (Cd)-Dissolved			<0.010		mg/L		0.01	26-MAR-08
Calcium (Ca)-Dissolved			<0.10		mg/L		0.1	26-MAR-08
Chromium (Cr)-Dissolved			<0.010		mg/L		0.01	26-MAR-08
Cobalt (Co)-Dissolved			<0.010		mg/L		0.01	26-MAR-08
Copper (Cu)-Dissolved			<0.010		mg/L		0.01	26-MAR-08
Iron (Fe)-Dissolved			<0.030		mg/L		0.03	26-MAR-08
Lead (Pb)-Dissolved			<0.050		mg/L		0.05	26-MAR-08
Lithium (Li)-Dissolved			<0.010		mg/L		0.01	26-MAR-08
Magnesium (Mg)-Dissolved			<0.10		mg/L		0.1	26-MAR-08
Manganese (Mn)-Dissolved			<0.0050		mg/L		0.005	26-MAR-08
Molybdenum (Mo)-Dissolved			<0.030		mg/L		0.03	26-MAR-08
Nickel (Ni)-Dissolved			<0.050		mg/L		0.05	26-MAR-08
Phosphorus (P)-Dissolved			<0.30		mg/L		0.3	26-MAR-08
Potassium (K)-Dissolved			<0.50		mg/L		0.5	26-MAR-08
Selenium (Se)-Dissolved			<0.20		mg/L		0.2	26-MAR-08
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	26-MAR-08
Silver (Ag)-Dissolved			<0.010		mg/L		0.01	26-MAR-08
Sodium (Na)-Dissolved			<1.0		mg/L		1	26-MAR-08
Strontium (Sr)-Dissolved			<0.0050		mg/L		0.005	26-MAR-08
Sulfur (S)-Dissolved			<1.0		mg/L		1	26-MAR-08
Thallium (Tl)-Dissolved			<0.20		mg/L		0.2	26-MAR-08
Tin (Sn)-Dissolved			<0.030		mg/L		0.03	26-MAR-08
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	26-MAR-08
Vanadium (V)-Dissolved			<0.030		mg/L		0.03	26-MAR-08
Zinc (Zn)-Dissolved			<0.0050		mg/L		0.005	26-MAR-08
Batch	R644948							
WG744861-6	CRM							
		QCS-A						
Aluminum (Al)-Dissolved			100		%		85-115	27-MAR-08
Antimony (Sb)-Dissolved			98		%		85-115	27-MAR-08
Arsenic (As)-Dissolved			101		%		85-115	27-MAR-08
Barium (Ba)-Dissolved			99		%		85-115	27-MAR-08
Beryllium (Be)-Dissolved			101		%		85-115	27-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 8 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<u>MET-DIS-ICP-CL</u>	<u>Water</u>							
Batch	R644948							
WG744861-6 CRM		QCS-A						
Bismuth (Bi)-Dissolved			100		%		85-115	27-MAR-08
Boron (B)-Dissolved			101		%		85-115	27-MAR-08
Cadmium (Cd)-Dissolved			101		%		85-115	27-MAR-08
Calcium (Ca)-Dissolved			103		%		85-115	27-MAR-08
Chromium (Cr)-Dissolved			102		%		85-115	27-MAR-08
Cobalt (Co)-Dissolved			100		%		85-115	27-MAR-08
Copper (Cu)-Dissolved			98		%		85-115	27-MAR-08
Iron (Fe)-Dissolved			101		%		85-115	27-MAR-08
Lead (Pb)-Dissolved			99		%		85-115	27-MAR-08
Lithium (Li)-Dissolved			94		%		85-115	27-MAR-08
Magnesium (Mg)-Dissolved			95		%		85-115	27-MAR-08
Manganese (Mn)-Dissolved			101		%		85-115	27-MAR-08
Molybdenum (Mo)-Dissolved			100		%		85-115	27-MAR-08
Nickel (Ni)-Dissolved			101		%		85-115	27-MAR-08
Phosphorus (P)-Dissolved			99		%		85-115	27-MAR-08
Potassium (K)-Dissolved			99		%		85-115	27-MAR-08
Selenium (Se)-Dissolved			99		%		85-115	27-MAR-08
Silicon (Si)-Dissolved			104		%		85-115	27-MAR-08
Silver (Ag)-Dissolved			99		%		85-115	27-MAR-08
Sodium (Na)-Dissolved			98		%		85-115	27-MAR-08
Strontium (Sr)-Dissolved			99		%		85-115	27-MAR-08
Thallium (Tl)-Dissolved			99		%		85-115	27-MAR-08
Tin (Sn)-Dissolved			100		%		85-115	27-MAR-08
Titanium (Ti)-Dissolved			101		%		85-115	27-MAR-08
Vanadium (V)-Dissolved			102		%		85-115	27-MAR-08
Zinc (Zn)-Dissolved			102		%		85-115	27-MAR-08
WG744861-8 DUP		L612590-2						
Aluminum (Al)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	27-MAR-08
Antimony (Sb)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	27-MAR-08
Arsenic (As)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	27-MAR-08
Barium (Ba)-Dissolved		0.414	0.416		mg/L	0.64	26	27-MAR-08
Beryllium (Be)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	26	27-MAR-08
Bismuth (Bi)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	27-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 9 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-CL		Water						
Batch	R644948							
WG744861-8	DUP	L612590-2						
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	26	27-MAR-08
Cadmium (Cd)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	27-MAR-08
Calcium (Ca)-Dissolved		103	104		mg/L	1.2	26	27-MAR-08
Chromium (Cr)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	27-MAR-08
Cobalt (Co)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	27-MAR-08
Copper (Cu)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	27-MAR-08
Iron (Fe)-Dissolved		0.174	0.175	J	mg/L	0.001	0.12	27-MAR-08
Lead (Pb)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	26	27-MAR-08
Lithium (Li)-Dissolved		0.017	0.017	J	mg/L	0.000	0.04	27-MAR-08
Magnesium (Mg)-Dissolved		22.5	22.7		mg/L	0.86	26	27-MAR-08
Manganese (Mn)-Dissolved		0.165	0.167		mg/L	1.1	26	27-MAR-08
Molybdenum (Mo)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	27-MAR-08
Nickel (Ni)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	26	27-MAR-08
Phosphorus (P)-Dissolved		<0.30	<0.30	RPD-NA	mg/L	N/A	26	27-MAR-08
Potassium (K)-Dissolved		2.25	2.29	J	mg/L	0.04	2	27-MAR-08
Selenium (Se)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	27-MAR-08
Silicon (Si)-Dissolved		6.40	6.44		mg/L	0.52	26	27-MAR-08
Silver (Ag)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	27-MAR-08
Sodium (Na)-Dissolved		10.2	10.3		mg/L	0.75	26	27-MAR-08
Strontium (Sr)-Dissolved		0.307	0.309		mg/L	0.78	26	27-MAR-08
Sulfur (S)-Dissolved		7.0	7.0	J	mg/L	0.0	4	27-MAR-08
Thallium (Tl)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	27-MAR-08
Tin (Sn)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	27-MAR-08
Titanium (Ti)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	27-MAR-08
Vanadium (V)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	27-MAR-08
Zinc (Zn)-Dissolved		0.0962	0.0958		mg/L	0.51	26	27-MAR-08
WG744861-9	DUP	L612966-8						
Aluminum (Al)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	27-MAR-08
Antimony (Sb)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	27-MAR-08
Arsenic (As)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	27-MAR-08
Barium (Ba)-Dissolved		0.152	0.150		mg/L	1.2	26	27-MAR-08
Beryllium (Be)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	26	27-MAR-08
Bismuth (Bi)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	27-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 10 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<u>MET-DIS-ICP-CL</u>		<u>Water</u>						
Batch	R644948							
WG744861-9	DUP	L612966-8						
Boron (B)-Dissolved		0.61	0.61	J	mg/L	0.00	0.4	27-MAR-08
Cadmium (Cd)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	27-MAR-08
Calcium (Ca)-Dissolved		267	263		mg/L	1.4	26	27-MAR-08
Chromium (Cr)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	27-MAR-08
Cobalt (Co)-Dissolved		0.018	0.018	J	mg/L	0.000	0.04	27-MAR-08
Copper (Cu)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	27-MAR-08
Iron (Fe)-Dissolved		5.56	5.46		mg/L	1.9	26	27-MAR-08
Lead (Pb)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	26	27-MAR-08
Lithium (Li)-Dissolved		0.051	0.049	J	mg/L	0.002	0.04	27-MAR-08
Magnesium (Mg)-Dissolved		92.7	92.2		mg/L	0.58	26	27-MAR-08
Manganese (Mn)-Dissolved		2.06	2.04		mg/L	1.1	26	27-MAR-08
Molybdenum (Mo)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	27-MAR-08
Nickel (Ni)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	26	27-MAR-08
Phosphorus (P)-Dissolved		<0.30	<0.30	RPD-NA	mg/L	N/A	26	27-MAR-08
Potassium (K)-Dissolved		45.5	43.7		mg/L	4.0	26	27-MAR-08
Selenium (Se)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	27-MAR-08
Silicon (Si)-Dissolved		7.13	7.02		mg/L	1.6	26	27-MAR-08
Silver (Ag)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	26	27-MAR-08
Sodium (Na)-Dissolved		387	379		mg/L	2.2	26	27-MAR-08
Strontium (Sr)-Dissolved		1.36	1.35		mg/L	1.3	26	27-MAR-08
Sulfur (S)-Dissolved		186	186		mg/L	0.094	26	27-MAR-08
Thallium (Tl)-Dissolved		<0.20	<0.20	RPD-NA	mg/L	N/A	26	27-MAR-08
Tin (Sn)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	27-MAR-08
Titanium (Ti)-Dissolved		0.010	<0.010	RPD-NA	mg/L	N/A	26	27-MAR-08
Vanadium (V)-Dissolved		<0.030	<0.030	RPD-NA	mg/L	N/A	26	27-MAR-08
Zinc (Zn)-Dissolved		0.0835	0.0832		mg/L	0.36	26	27-MAR-08
WG744861-1	MB							
Aluminum (Al)-Dissolved			<0.20		mg/L		0.2	27-MAR-08
Antimony (Sb)-Dissolved			<0.20		mg/L		0.2	27-MAR-08
Arsenic (As)-Dissolved			<0.20		mg/L		0.2	27-MAR-08
Barium (Ba)-Dissolved			<0.010		mg/L		0.01	27-MAR-08
Beryllium (Be)-Dissolved			<0.0050		mg/L		0.005	27-MAR-08
Bismuth (Bi)-Dissolved			<0.20		mg/L		0.2	27-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 11 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<u>MET-DIS-ICP-CL</u>		<u>Water</u>						
Batch	R644948							
WG744861-1	MB							
Boron (B)-Dissolved			<0.10		mg/L		0.1	27-MAR-08
Cadmium (Cd)-Dissolved			<0.010		mg/L		0.01	27-MAR-08
Calcium (Ca)-Dissolved			<0.10		mg/L		0.1	27-MAR-08
Chromium (Cr)-Dissolved			<0.010		mg/L		0.01	27-MAR-08
Cobalt (Co)-Dissolved			<0.010		mg/L		0.01	27-MAR-08
Copper (Cu)-Dissolved			<0.010		mg/L		0.01	27-MAR-08
Iron (Fe)-Dissolved			<0.030		mg/L		0.03	27-MAR-08
Lead (Pb)-Dissolved			<0.050		mg/L		0.05	27-MAR-08
Lithium (Li)-Dissolved			<0.010		mg/L		0.01	27-MAR-08
Magnesium (Mg)-Dissolved			<0.10		mg/L		0.1	27-MAR-08
Manganese (Mn)-Dissolved			<0.0050		mg/L		0.005	27-MAR-08
Molybdenum (Mo)-Dissolved			<0.030		mg/L		0.03	27-MAR-08
Nickel (Ni)-Dissolved			<0.050		mg/L		0.05	27-MAR-08
Phosphorus (P)-Dissolved			<0.30		mg/L		0.3	27-MAR-08
Potassium (K)-Dissolved			<0.50		mg/L		0.5	27-MAR-08
Selenium (Se)-Dissolved			<0.20		mg/L		0.2	27-MAR-08
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	27-MAR-08
Silver (Ag)-Dissolved			<0.010		mg/L		0.01	27-MAR-08
Sodium (Na)-Dissolved			<1.0		mg/L		1	27-MAR-08
Strontium (Sr)-Dissolved			<0.0050		mg/L		0.005	27-MAR-08
Sulfur (S)-Dissolved			<1.0		mg/L		1	27-MAR-08
Thallium (Tl)-Dissolved			<0.20		mg/L		0.2	27-MAR-08
Tin (Sn)-Dissolved			<0.030		mg/L		0.03	27-MAR-08
Titanium (Ti)-Dissolved			<0.010		mg/L		0.01	27-MAR-08
Vanadium (V)-Dissolved			<0.030		mg/L		0.03	27-MAR-08
Zinc (Zn)-Dissolved			<0.0050		mg/L		0.005	27-MAR-08

MET-DIS-LOW-MS-CL **Water**

Batch	R645225							
WG745105-6	DUP							
Aluminum (Al)-Dissolved	L612590-4	<0.0050		RPD-NA	mg/L	N/A	26	27-MAR-08
Antimony (Sb)-Dissolved	<0.00010	<0.00010		RPD-NA	mg/L	N/A	26	27-MAR-08
Arsenic (As)-Dissolved	0.00133	0.00135			mg/L	1.8	26	27-MAR-08
Barium (Ba)-Dissolved	0.329	0.324			mg/L	1.4	26	27-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 12 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-CL		Water						
Batch	R645225							
WG745105-6	DUP	L612590-4						
Beryllium (Be)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	26	27-MAR-08
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	26	27-MAR-08
Boron (B)-Dissolved		0.016	0.015	J	mg/L	0.001	0.04	27-MAR-08
Cadmium (Cd)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	26	27-MAR-08
Calcium (Ca)-Dissolved		93.6	92.3		mg/L	1.5	26	27-MAR-08
Chromium (Cr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	26	27-MAR-08
Cobalt (Co)-Dissolved		0.00143	0.00137		mg/L	4.2	26	27-MAR-08
Copper (Cu)-Dissolved		0.00327	0.00318		mg/L	2.9	26	27-MAR-08
Lead (Pb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	26	27-MAR-08
Lithium (Li)-Dissolved		0.0211	0.0209	J	mg/L	0.0002	0.02	27-MAR-08
Magnesium (Mg)-Dissolved		24.6	24.5		mg/L	0.61	26	27-MAR-08
Manganese (Mn)-Dissolved		0.259	0.253		mg/L	2.4	26	27-MAR-08
Molybdenum (Mo)-Dissolved		0.000868	0.000792		mg/L	9.0	26	27-MAR-08
Nickel (Ni)-Dissolved		0.00183	0.00199	J	mg/L	0.00016	0.002	27-MAR-08
Potassium (K)-Dissolved		3.02	3.04		mg/L	0.61	26	27-MAR-08
Selenium (Se)-Dissolved		0.0108	0.0104		mg/L	3.6	26	27-MAR-08
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	26	27-MAR-08
Sodium (Na)-Dissolved		7.10	7.00		mg/L	1.5	26	27-MAR-08
Strontium (Sr)-Dissolved		0.272	0.270		mg/L	0.70	26	27-MAR-08
Thallium (Tl)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	26	27-MAR-08
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	26	27-MAR-08
Titanium (Ti)-Dissolved		0.0011	<0.0010	RPD-NA	mg/L	N/A	26	27-MAR-08
Uranium (U)-Dissolved		0.00383	0.00377		mg/L	1.4	26	27-MAR-08
Vanadium (V)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	26	27-MAR-08
Zinc (Zn)-Dissolved		0.0938	0.0928		mg/L	1.1	26	27-MAR-08
WG745105-1	MB							
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	27-MAR-08
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-08
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-08
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	27-MAR-08
Beryllium (Be)-Dissolved			<0.00050		mg/L		0.0005	27-MAR-08
Bismuth (Bi)-Dissolved			<0.00050		mg/L		0.0005	27-MAR-08
Boron (B)-Dissolved			<0.010		mg/L		0.01	27-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 13 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<u>MET-DIS-LOW-MS-CL</u>								
	<u>Water</u>							
Batch	R645225							
WG745105-1	MB							
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	27-MAR-08
Calcium (Ca)-Dissolved			<0.030		mg/L		0.03	27-MAR-08
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	27-MAR-08
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-08
Copper (Cu)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-08
Lead (Pb)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-08
Lithium (Li)-Dissolved			<0.0050		mg/L		0.005	27-MAR-08
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	27-MAR-08
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-08
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	27-MAR-08
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	27-MAR-08
Potassium (K)-Dissolved			<0.050		mg/L		0.05	27-MAR-08
Selenium (Se)-Dissolved			<0.0010		mg/L		0.001	27-MAR-08
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	27-MAR-08
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	27-MAR-08
Strontium (Sr)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-08
Thallium (Tl)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-08
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-08
Titanium (Ti)-Dissolved			<0.0010		mg/L		0.001	27-MAR-08
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	27-MAR-08
Vanadium (V)-Dissolved			<0.0010		mg/L		0.001	27-MAR-08
Zinc (Zn)-Dissolved			<0.0050		mg/L		0.005	27-MAR-08
Batch	R645756							
WG745860-2	CRM	CVS						
Aluminum (Al)-Dissolved			105		%		85-115	28-MAR-08
Antimony (Sb)-Dissolved			106		%		85-115	28-MAR-08
Arsenic (As)-Dissolved			102		%		85-115	28-MAR-08
Barium (Ba)-Dissolved			98		%		85-115	28-MAR-08
Beryllium (Be)-Dissolved			109		%		85-115	28-MAR-08
Bismuth (Bi)-Dissolved			94		%		85-115	28-MAR-08
Boron (B)-Dissolved			103		%		85-115	28-MAR-08
Cadmium (Cd)-Dissolved			103		%		85-115	28-MAR-08
Calcium (Ca)-Dissolved			100		%		85-115	28-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 14 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<u>MET-DIS-LOW-MS-CL</u>		<u>Water</u>						
Batch	R645756							
WG745860-2	CRM	CVS						
Chromium (Cr)-Dissolved			100		%		85-115	28-MAR-08
Cobalt (Co)-Dissolved			101		%		85-115	28-MAR-08
Copper (Cu)-Dissolved			107		%		85-115	28-MAR-08
Lead (Pb)-Dissolved			97		%		85-115	28-MAR-08
Lithium (Li)-Dissolved			108		%		85-115	28-MAR-08
Magnesium (Mg)-Dissolved			101		%		85-115	28-MAR-08
Manganese (Mn)-Dissolved			105		%		85-115	28-MAR-08
Molybdenum (Mo)-Dissolved			104		%		85-115	28-MAR-08
Nickel (Ni)-Dissolved			109		%		85-115	28-MAR-08
Potassium (K)-Dissolved			101		%		85-115	28-MAR-08
Selenium (Se)-Dissolved			100		%		85-115	28-MAR-08
Silver (Ag)-Dissolved			111		%		85-115	28-MAR-08
Sodium (Na)-Dissolved			103		%		85-115	28-MAR-08
Strontium (Sr)-Dissolved			101		%		85-115	28-MAR-08
Thallium (Tl)-Dissolved			96		%		85-115	28-MAR-08
Tin (Sn)-Dissolved			95		%		85-115	28-MAR-08
Titanium (Ti)-Dissolved			109		%		85-115	28-MAR-08
Uranium (U)-Dissolved			95		%		85-115	28-MAR-08
Vanadium (V)-Dissolved			101		%		85-115	28-MAR-08
Zinc (Zn)-Dissolved			99		%		85-115	28-MAR-08
WG745860-4	DUP	L612590-10						
Aluminum (Al)-Dissolved		<0.025	<0.025	RPD-NA	mg/L	N/A	26	28-MAR-08
Antimony (Sb)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	26	28-MAR-08
Arsenic (As)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	26	28-MAR-08
Barium (Ba)-Dissolved		0.529	0.519		mg/L	1.8	26	28-MAR-08
Beryllium (Be)-Dissolved		<0.0025	<0.0025	RPD-NA	mg/L	N/A	26	28-MAR-08
Bismuth (Bi)-Dissolved		<0.0025	<0.0025	RPD-NA	mg/L	N/A	26	28-MAR-08
Boron (B)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	26	28-MAR-08
Cadmium (Cd)-Dissolved		<0.00025	<0.00025	RPD-NA	mg/L	N/A	26	28-MAR-08
Calcium (Ca)-Dissolved		59.5	63.7		mg/L	6.9	26	28-MAR-08
Chromium (Cr)-Dissolved		<0.0025	<0.0025	RPD-NA	mg/L	N/A	26	28-MAR-08
Cobalt (Co)-Dissolved		0.00058	0.00061	J	mg/L	0.00003	0.002	28-MAR-08
Copper (Cu)-Dissolved		0.00490	0.00497	J	mg/L	0.00007	0.002	28-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 15 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-LOW-MS-CL		Water						
Batch	R645756							
WG745860-4	DUP	L612590-10						
Lead (Pb)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	26	28-MAR-08
Lithium (Li)-Dissolved		<0.025	<0.025	RPD-NA	mg/L	N/A	26	28-MAR-08
Magnesium (Mg)-Dissolved		14.4	15.3		mg/L	5.6	26	28-MAR-08
Manganese (Mn)-Dissolved		0.124	0.133		mg/L	6.8	26	28-MAR-08
Molybdenum (Mo)-Dissolved		0.00236	0.00253	J	mg/L	0.00016	0.001	28-MAR-08
Nickel (Ni)-Dissolved		<0.0025	<0.0025	RPD-NA	mg/L	N/A	26	28-MAR-08
Potassium (K)-Dissolved		2.74	2.94		mg/L	6.9	26	28-MAR-08
Selenium (Se)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	26	28-MAR-08
Silver (Ag)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	26	28-MAR-08
Sodium (Na)-Dissolved		4.77	5.22		mg/L	9.0	26	28-MAR-08
Strontium (Sr)-Dissolved		0.151	0.164		mg/L	8.1	26	28-MAR-08
Thallium (Tl)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	26	28-MAR-08
Tin (Sn)-Dissolved		0.00064	0.00067	J	mg/L	0.00004	0.002	28-MAR-08
Titanium (Ti)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	26	28-MAR-08
Uranium (U)-Dissolved		0.00232	0.00221		mg/L	4.6	26	28-MAR-08
Vanadium (V)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	26	28-MAR-08
Zinc (Zn)-Dissolved		0.066	0.072	J	mg/L	0.006	0.1	28-MAR-08
WG745860-1	MB							
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	28-MAR-08
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	28-MAR-08
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	28-MAR-08
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	28-MAR-08
Beryllium (Be)-Dissolved			<0.00050		mg/L		0.0005	28-MAR-08
Bismuth (Bi)-Dissolved			<0.00050		mg/L		0.0005	28-MAR-08
Boron (B)-Dissolved			<0.010		mg/L		0.01	28-MAR-08
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	28-MAR-08
Calcium (Ca)-Dissolved			<0.030		mg/L		0.03	28-MAR-08
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	28-MAR-08
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	28-MAR-08
Copper (Cu)-Dissolved			<0.00010		mg/L		0.0001	28-MAR-08
Lead (Pb)-Dissolved			<0.00010		mg/L		0.0001	28-MAR-08
Lithium (Li)-Dissolved			<0.0050		mg/L		0.005	28-MAR-08
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	28-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 16 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<u>MET-DIS-LOW-MS-CL</u>		<u>Water</u>						
Batch	R645756							
WG745860-1	MB							
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	28-MAR-08
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	28-MAR-08
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	28-MAR-08
Potassium (K)-Dissolved			<0.050		mg/L		0.05	28-MAR-08
Selenium (Se)-Dissolved			<0.0010		mg/L		0.001	28-MAR-08
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	28-MAR-08
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	28-MAR-08
Strontium (Sr)-Dissolved			<0.00010		mg/L		0.0001	28-MAR-08
Thallium (Tl)-Dissolved			<0.00010		mg/L		0.0001	28-MAR-08
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	28-MAR-08
Titanium (Ti)-Dissolved			<0.0010		mg/L		0.001	28-MAR-08
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	28-MAR-08
Vanadium (V)-Dissolved			<0.0010		mg/L		0.001	28-MAR-08
Zinc (Zn)-Dissolved			<0.0050		mg/L		0.005	28-MAR-08
<u>NO2-CL</u>		<u>Water</u>						
Batch	R644388							
WG744189-6	DUP	L612590-1						
Nitrite-N		<0.05	<0.05	RPD-NA	mg/L	N/A	16	24-MAR-08
WG744189-2	LCS							
Nitrite-N			103		%		89-111	24-MAR-08
WG744189-1	MB							
Nitrite-N			<0.05		mg/L		0.05	24-MAR-08
<u>NO3-IC-CL</u>		<u>Water</u>						
Batch	R644388							
WG744189-3	DUP	L612425-11						
Nitrate-N		<0.05	<0.05	RPD-NA	mg/L	N/A	16	24-MAR-08
WG744189-5	DUP	L612499-12						
Nitrate-N		0.23	0.24	J	mg/L	0.01	0.2	24-MAR-08
WG744189-6	DUP	L612590-1						
Nitrate-N		0.50	0.53		mg/L	5.4	16	24-MAR-08
WG744189-7	DUP	L612590-12						
Nitrate-N		0.10	0.12	J	mg/L	0.02	0.2	24-MAR-08
WG744189-2	LCS							
Nitrate-N			99		%		89-109	24-MAR-08
WG744189-1	MB							

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 17 of 19

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<u>NO3-IC-CL</u>								
<u>Water</u>								
Batch	R644388							
WG744189-1	MB							
Nitrate-N			<0.05		mg/L		0.05	24-MAR-08
WG744189-4	MS	L612425-11						
Nitrate-N			96		%		76-117	24-MAR-08
<u>PH/EC/ALK-CL</u>								
<u>Water</u>								
Batch	R644357							
WG744284-3	DUP	L612545-2						
Alkalinity, Total (as CaCO3)		1050	1050		mg/L	0.061	6.5	24-MAR-08
Bicarbonate (HCO3)		1280	1280		mg/L	0.061	6.5	24-MAR-08
Carbonate (CO3)		<5	<5	RPD-NA	mg/L	N/A	6.5	24-MAR-08
Conductivity (EC)		65200	65000		uS/cm	0.31	9.8	24-MAR-08
Hydroxide (OH)		<5	<5	RPD-NA	mg/L	N/A	6.5	24-MAR-08
pH		7.90	7.92	J	pH	0.02	0.2	24-MAR-08
WG744284-4	DUP	L612590-12						
Alkalinity, Total (as CaCO3)		298	297		mg/L	0.35	6.5	24-MAR-08
Bicarbonate (HCO3)		363	362		mg/L	0.35	6.5	24-MAR-08
Carbonate (CO3)		<5	<5	RPD-NA	mg/L	N/A	6.5	24-MAR-08
Conductivity (EC)		583	584		uS/cm	0.17	9.8	24-MAR-08
Hydroxide (OH)		<5	<5	RPD-NA	mg/L	N/A	6.5	24-MAR-08
pH		7.92	7.91	J	pH	0.01	0.2	24-MAR-08
WG744284-1	LCS							
Alkalinity, Total (as CaCO3)			95		%		90-108	24-MAR-08
Conductivity (EC)			102		%		90-108	24-MAR-08
pH			7.01		pH		6.86-7.16	24-MAR-08
<u>SO4-CL</u>								
<u>Water</u>								
Batch	R644388							
WG744189-3	DUP	L612425-11						
Sulphate (SO4)		<0.5	<0.5	RPD-NA	mg/L	N/A	13	24-MAR-08
WG744189-6	DUP	L612590-1						
Sulphate (SO4)		21.7	21.5		mg/L	0.81	13	24-MAR-08
WG744189-7	DUP	L612590-12						
Sulphate (SO4)		23.3	23.2		mg/L	0.52	13	24-MAR-08
WG744189-2	LCS							
Sulphate (SO4)			102		%		91-110	24-MAR-08
WG744189-1	MB							
Sulphate (SO4)			<0.5		mg/L		0.5	24-MAR-08

ALS Laboratory Group Quality Control Report

Workorder: L612590

Report Date: 28-MAR-08

Page 19 of 19

Legend:

Limit 99% Confidence Interval (Laboratory Control Limits)
DUP Duplicate
RPD Relative Percent Difference
N/A Not Available
LCS Laboratory Control Sample
SRM Standard Reference Material
MS Matrix Spike
MSD Matrix Spike Duplicate
ADE Average Desorption Efficiency
MB Method Blank
IRM Internal Reference Material
CRM Certified Reference Material
CCV Continuing Calibration Verification
CVS Calibration Verification Standard
LCSD Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.



Environmental Division

www.alsenviro.com

REPORT TO:		REPORT FORMAT / DISTRIBUTION			SERVICE REQUESTED										
COMPANY: EBA		STANDARD _____ OTHER _____			<input checked="" type="checkbox"/> REGULAR SERVICE (DEFAULT)										
CONTACT: Mayer Mahgoub		PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> CUSTOM _____ FAX _____			RUSH SERVICE (2-3 DAYS)										
ADDRESS: 115, 200 Rivercrest Drive SE		EMAIL 1: nmahgoub@eba.ca			PRIORITY SERVICE (1 DAY or ASAP)										
Calgary, Alberta		EMAIL 2: jsambirsky@eba.ca			EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS										
PHONE: 203-3355 FAX: 203-3301		ANALYSIS REQUEST													
INVOICE TO: SAME AS REPORT? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →													
COMPANY:		CLIENT / PROJECT INFORMATION:													
CONTACT:		JOB #: C22101178													
ADDRESS:		PO / AFE:													
		Legal Site Description:													
PHONE: _____ FAX: _____		QUOTE #:													
Lab Work Order # (Not for use on COC)		Test Samples			SAMPLER (Initials): Jack Sambirsky										
Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	BTEX F1-F2	ROW	Dissolved Metals						HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
1	08 MW 01	March 22	8:00	Water	X	X	X								7
2	08 MW 02	March 22	8:20	Water	X	X	X								7
3	08 MW 03	March 22	8:40	Water	X	X	X								7
4	08 MW 04B	March 21	5:00	Water	X	X	X								7
5	08 MW 05B	March 21	5:30	Water	X	X	X								7
6	08 MW 06B	March 21	6:00	Water	X	X	X								7
7	08 MW 07B	March 22	9:00	Water	X	X	X								7
8	08 MW 08	March 22	9:20	Water	X	X	X								7
9	08 MW 09	March 22	9:40	Water	X	X	X								7
10	08 MW 10	March 21	6:30	Water	X	X	X								7
GUIDELINES / REGULATIONS				SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS											
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY .															
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the reverse page of the white report copy.															
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)											
<i>Jack Sambirsky</i>		<i>Joe [Signature]</i>	March 24/08	TEMPERATURE	SAMPLES RECEIVED IN GOOD CONDITION? (YES) NO										
			09:15	7°C	(if no provide details) <input checked="" type="checkbox"/>										



APPENDIX C

APPENDIX C HYDRAULIC CONDUCTIVITY RESULTS



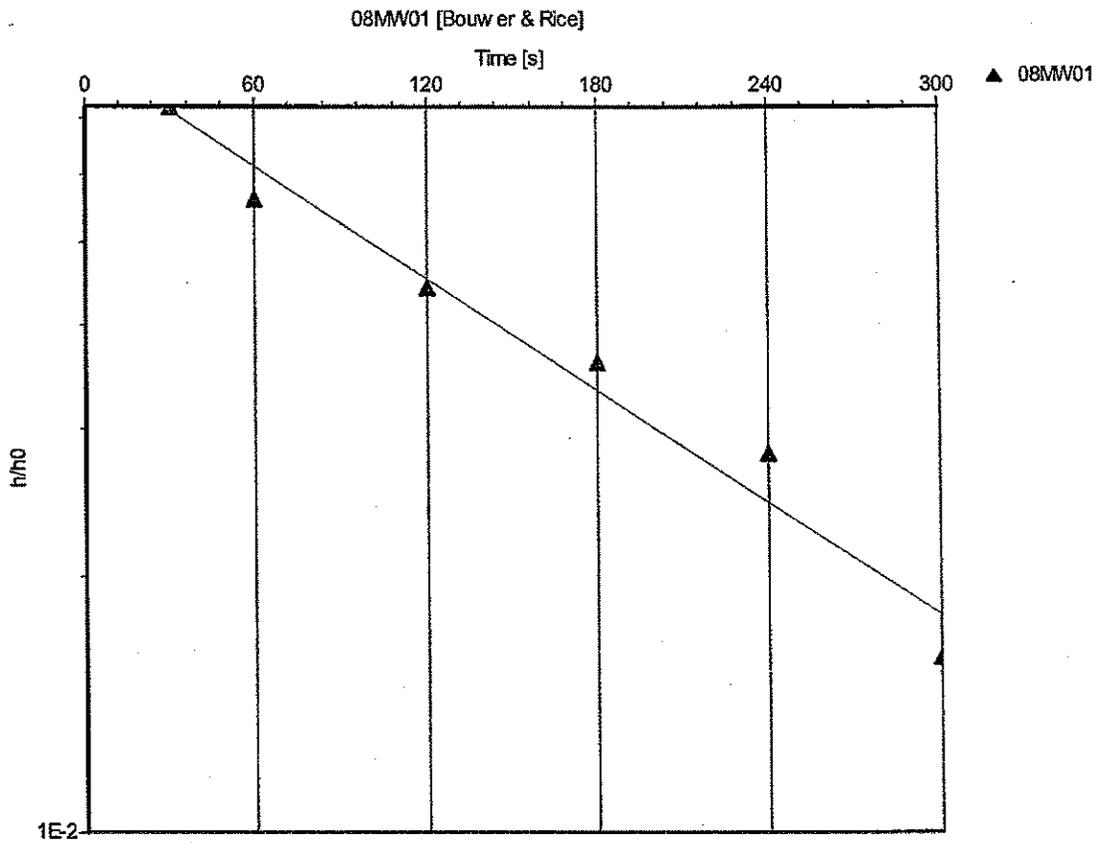
EBA Engineering Consultants Ltd. Slug Test Analysis Report

115, 200 Rivercrest Drive SE
Calgary, AB
(403) 203-3305

Project: Wood Buffalo Park

Number: C22101178

Client: Public Works and Government Services Canada



Slug Test: 08MW01

Analysis Method: Bouwer & Rice

Analysis Results: Conductivity: 1.12E-6 [m/s]

<u>Test parameters:</u>	Test Well:	08MW01	Aquifer Thickness:	1.295 [m]
	Casing radius:	0.0254 [m]	Gravel Pack Porosity (%):	25
	Screen length:	3.1 [m]		
	Boring radius:	0.0762 [m]		
	r _(eff) :	0.044 [m]		

Comments:

Evaluated by: Jan Czárnecki

Evaluation Date: 4/3/2008



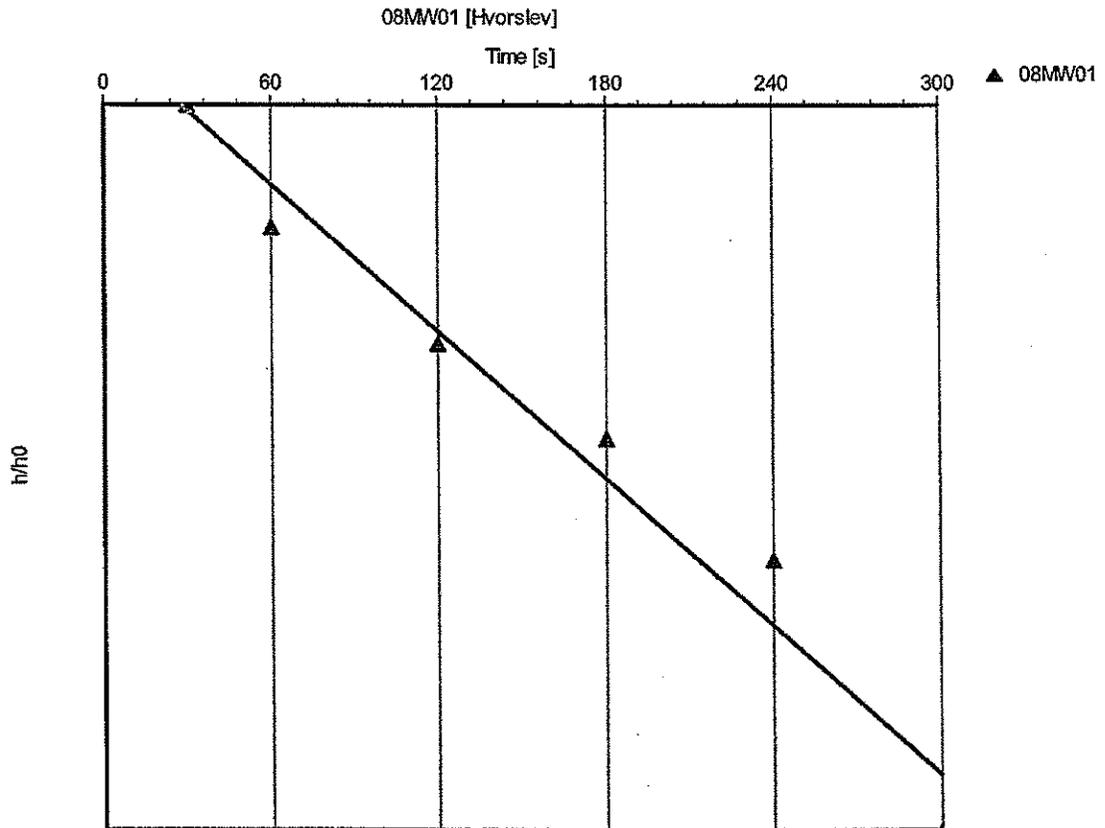
EBA Engineering Consultants Ltd. Slug Test Analysis Report

115, 200 Rivercrest Drive SE
Calgary, AB
(403) 203-3305

Project: Wood Buffalo Park

Number: C22101178

Client: Public Works and Government Services Canada



Slug Test: 08MW01

Analysis Method: Hvorslev

Analysis Results:

Conductivity: 1.98E-6 [m/s]

Test parameters:

Test Well:	08MW01	Aquifer Thickness:	1.295 [m]
Casing radius:	0.0254 [m]		
Screen length:	3.1 [m]		
Boring radius:	0.0762 [m]		

Comments:

Evaluated by: Jan Czarniecki

Evaluation Date: 4/3/2008



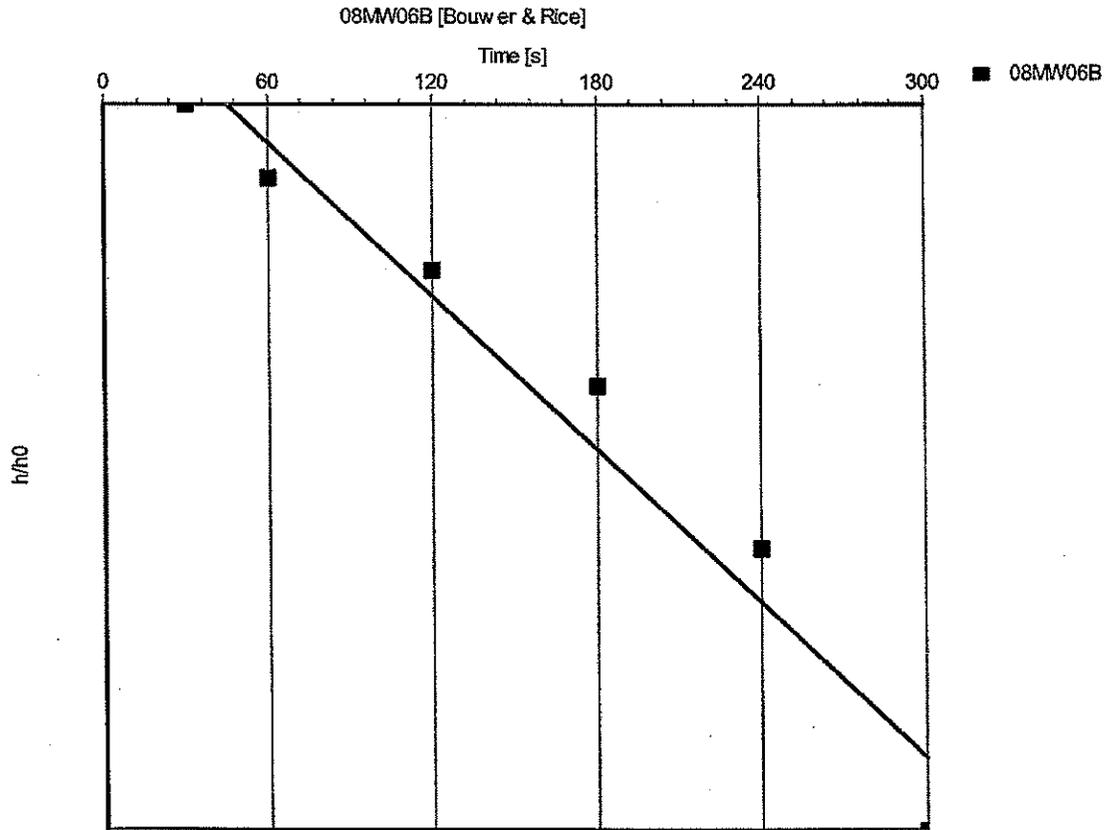
EBA Engineering Consultants Ltd. Slug Test Analysis Report

115, 200 Rivercrest Drive SE
 Calgary, AB
 (403) 203-3305

Project: Wood Buffalo Park

Number: C22101178

Client: Public Works and Government Services Canada



Slug Test: 08MW06B

Analysis Method: Bouwer & Rice

Analysis Results:

Conductivity: 1.58E-6 [m/s]

Test parameters:

Test Well:	08MW06B	Aquifer Thickness:	1.6 [m]
Casing radius:	0.0254 [m]	Gravel Pack Porosity (%):	25
Screen length:	3.1 [m]		
Boring radius:	0.0762 [m]		
r(eff):	0.044 [m]		

Comments:

Evaluated by: Jan Czamecki

Evaluation Date: 4/3/2008



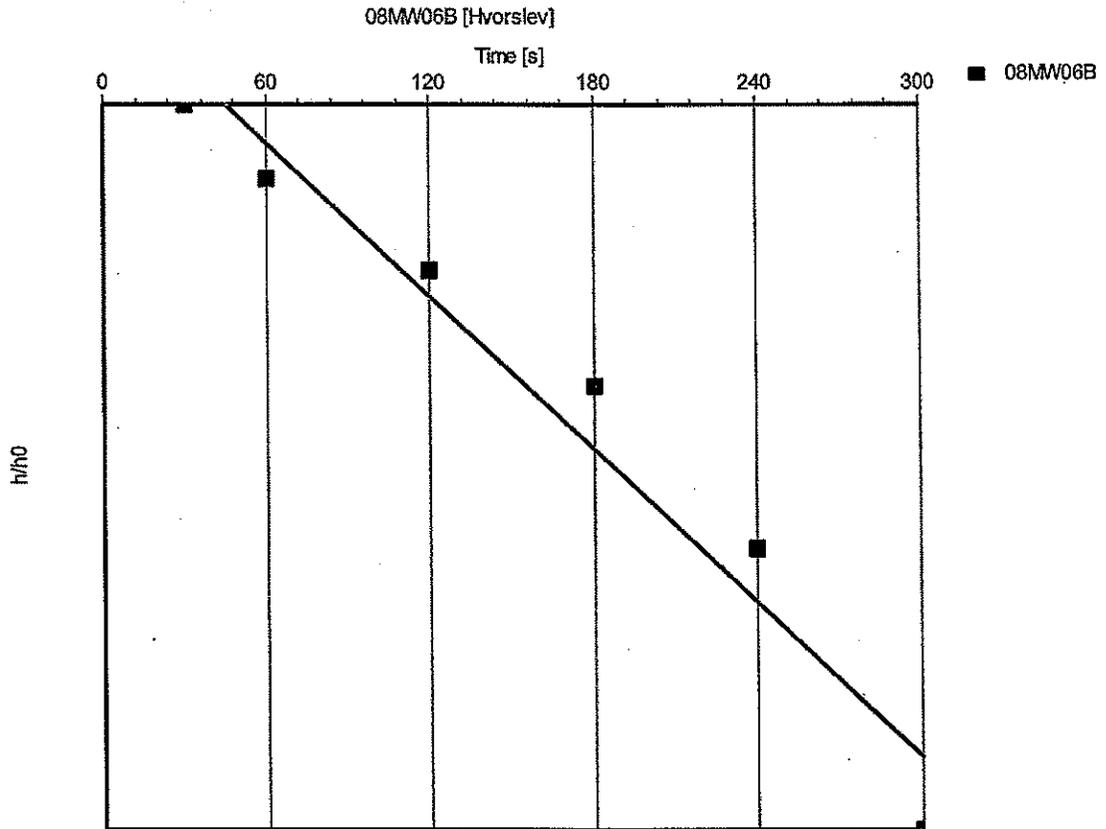
EBA Engineering Consultants Ltd. Slug Test Analysis Report

115, 200 Rivercrest Drive SE
Calgary, AB
(403) 203-3305

Project: Wood Buffalo Park

Number: C22101178

Client: Public Works and Government Services Canada



Slug Test: 08MW06B

Analysis Method: Hvorslev

Analysis Results:

Conductivity: 2.46E-6 [m/s]

Test parameters:

Test Well: 08MW06B
Casing radius: 0.0254 [m]
Screen length: 3.1 [m]
Boring radius: 0.0762 [m]

Aquifer Thickness: 1.6 [m]

Comments:

Evaluated by: Jan Czamecki

Evaluation Date: 4/3/2008



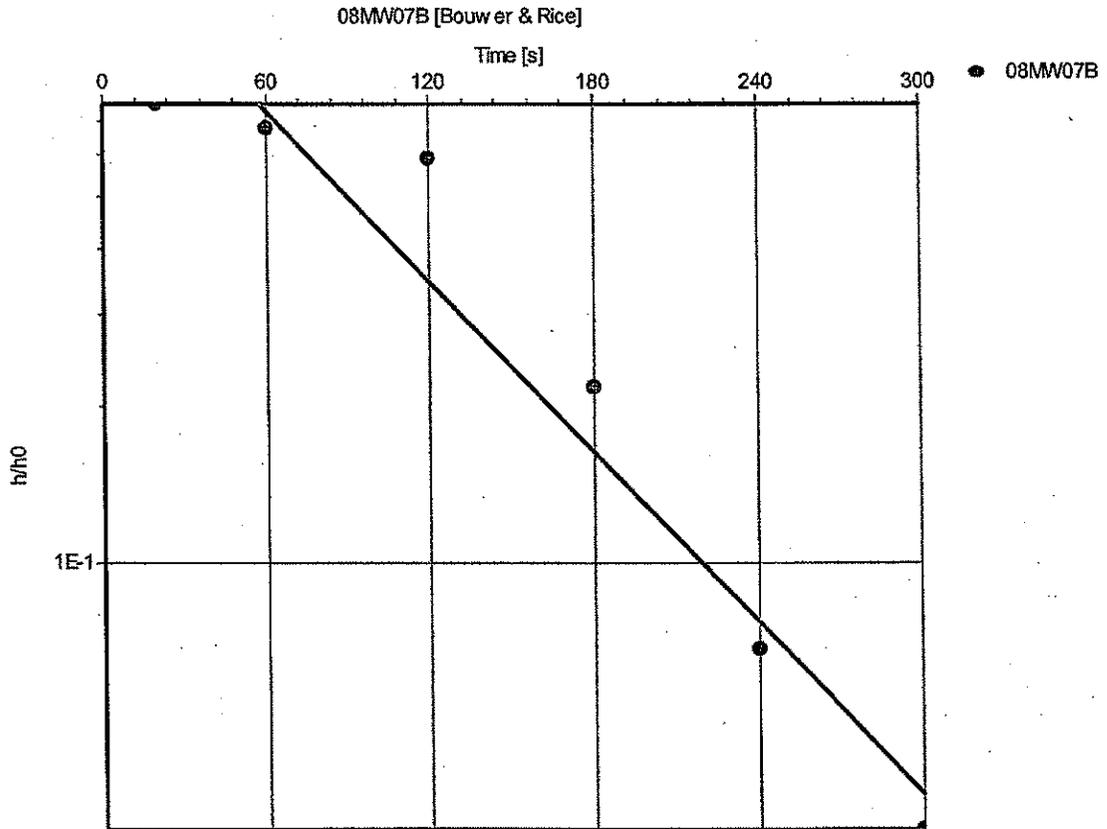
EBA Engineering Consultants Ltd. Slug Test Analysis Report

115, 200 Rivercrest Drive SE
Calgary, AB
(403) 203-3305

Project: Wood Buffalo Park

Number: C22101178

Client: Public Works and Government Services Canada



Slug Test: 08MW07B

Analysis Method: Bouwer & Rice

Analysis Results:

Conductivity: 2.71E-6 [m/s]

Test parameters:	Test Well: 08MW07B	Aquifer Thickness: 1.175 [m]
	Casing radius: 0.0254 [m]	Gravel Pack Porosity (%): 25
	Screen length: 3.1 [m]	
	Boring radius: 0.0762 [m]	
	r(eff): 0.044 [m]	

Comments:

Evaluated by: Jan Czamecki

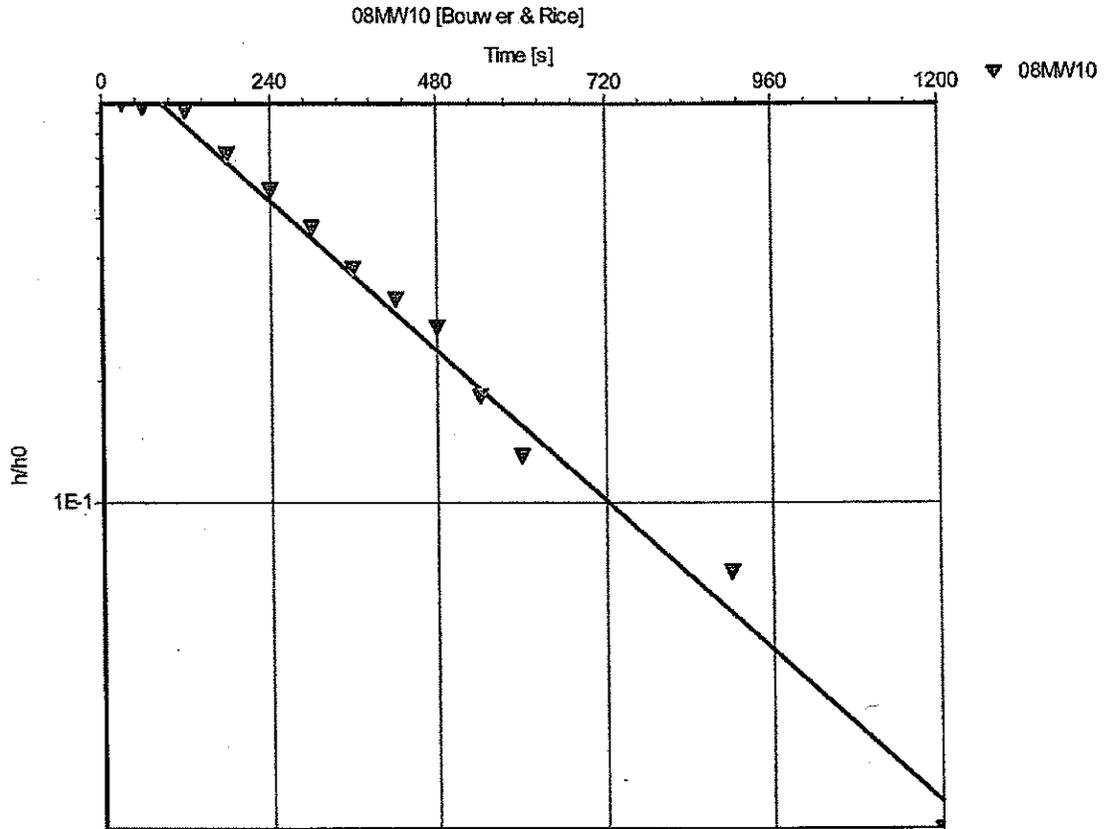
Evaluation Date: 4/3/2008



EBA Engineering Consultants Ltd. Slug Test Analysis Report

115, 200 Rivercrest Drive SE
 Calgary, AB
 (403) 203-3305

Project: Wood Buffalo Park
 Number: C22101178
 Client: Public Works and Government Services Canada



Slug Test: 08MW10
Analysis Method: Bouwer & Rice

Analysis Results: Conductivity: 5.83E-7 [m/s]

Test parameters:	Test Well:	08MW10	Aquifer Thickness:	0.762 [m]
	Casing radius:	0.0254 [m]	Gravel Pack Porosity (%):	25
	Screen length:	3.1 [m]		
	Boring radius:	0.0762 [m]		
	r(eff):	0.044 [m]		

Comments:

Evaluated by: Jan Czameckl
 Evaluation Date: 4/3/2008



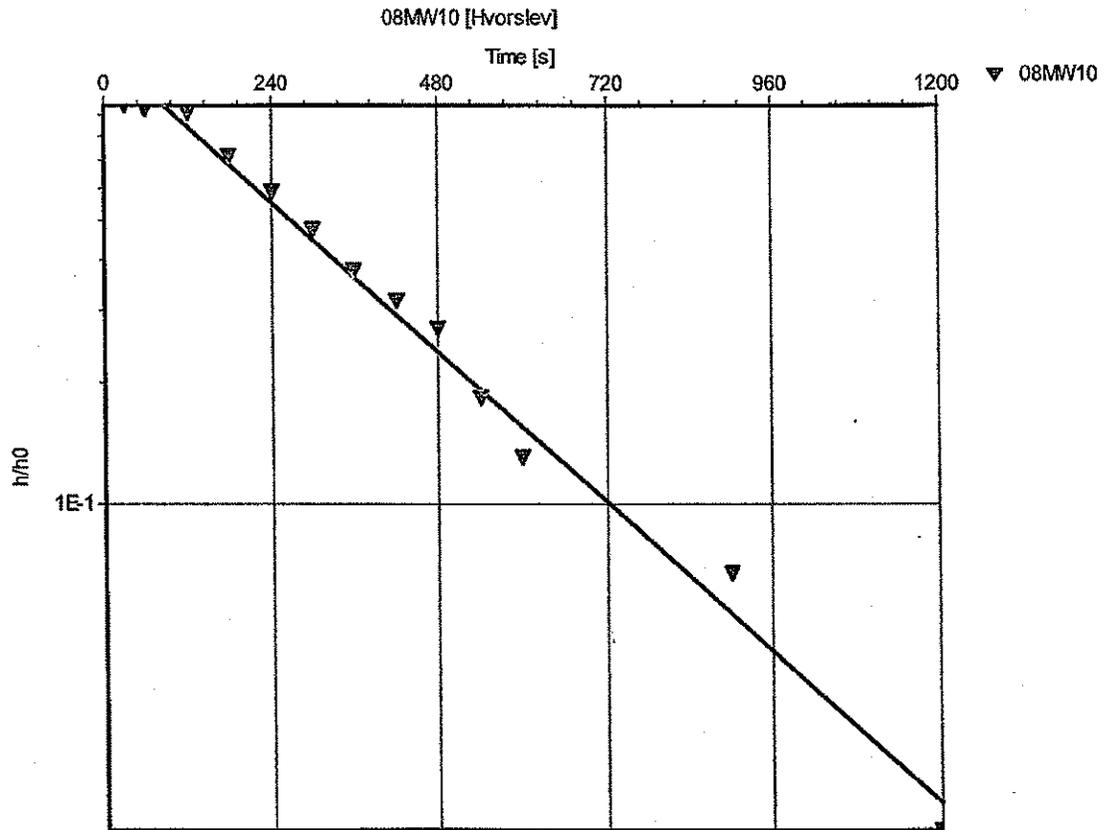
EBA Engineering Consultants Ltd. Slug Test Analysis Report

115, 200 Rivercrest Drive SE
 Calgary, AB
 (403) 203-3305

Project: Wood Buffalo Park

Number: C22101178

Client: Public Works and Government Services Canada



Slug Test: 08MW10

Analysis Method: Hvorslev

Analysis Results:

Conductivity: 1.37E-6 [m/s]

Test parameters:

Test Well: 08MW10
 Casing radius: 0.0254 [m]
 Screen length: 3.1 [m]
 Boring radius: 0.0762 [m]

Aquifer Thickness: 0.762 [m]

Comments:

Evaluated by: Jan Czarniecki

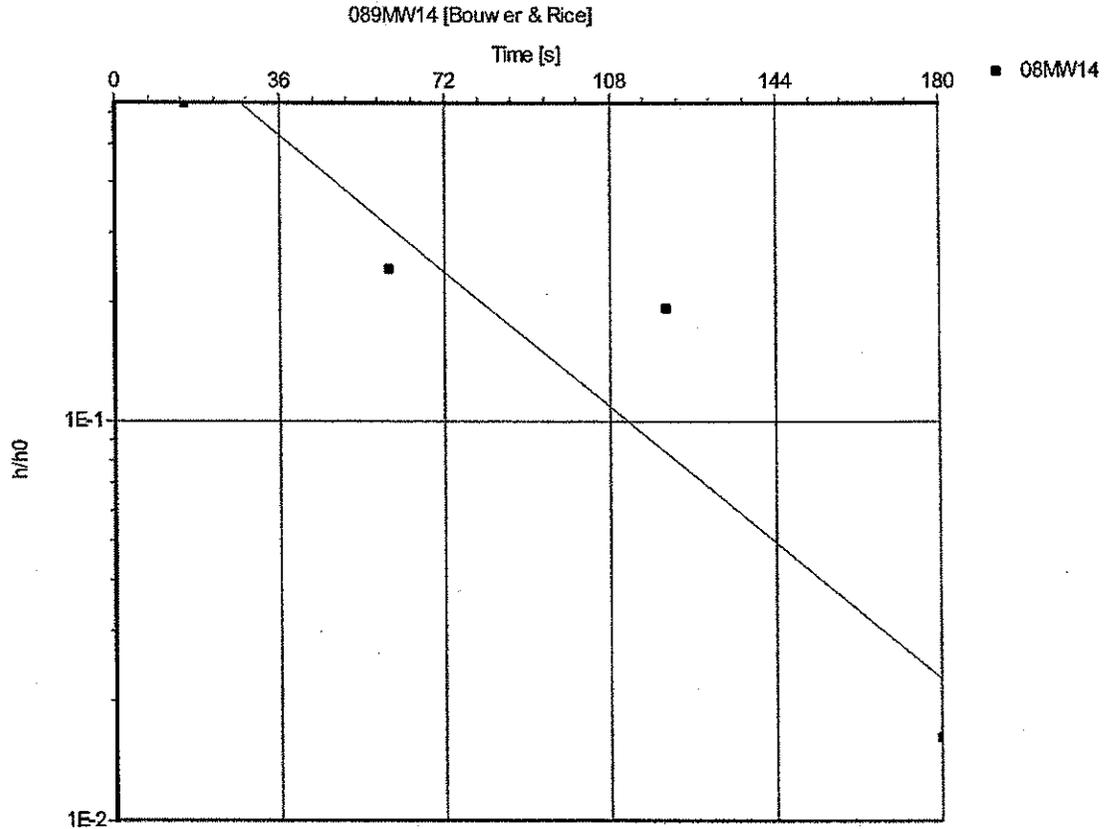
Evaluation Date: 4/3/2008



EBA Engineering Consultants Ltd
Riverbend Atrium One #115, 200 Rivercrest Drive SE
Calgary, AB T2C 2X5 CANADA

Slug Test Analysis Report

Project: Garden River Parks Canada
Number: C22101178
Client: Parks Canada



Slug Test: 089MW14
Analysis Method: Bouwer & Rice

Analysis Results: Conductivity: 1.11E-5 [m/s]

Test parameters:

Test Well:	08MW14	Aquifer Thickness:	0.712 [m]
Casing radius:	0.0254 [m]	Gravel Pack Porosity (%):	20
Screen length:	3 [m]		
Boring radius:	0.0762 [m]		
r(eff):	0.041 [m]		

Comments: Automatic fit

Evaluated by: Jay X
Evaluation: 10/6/2008



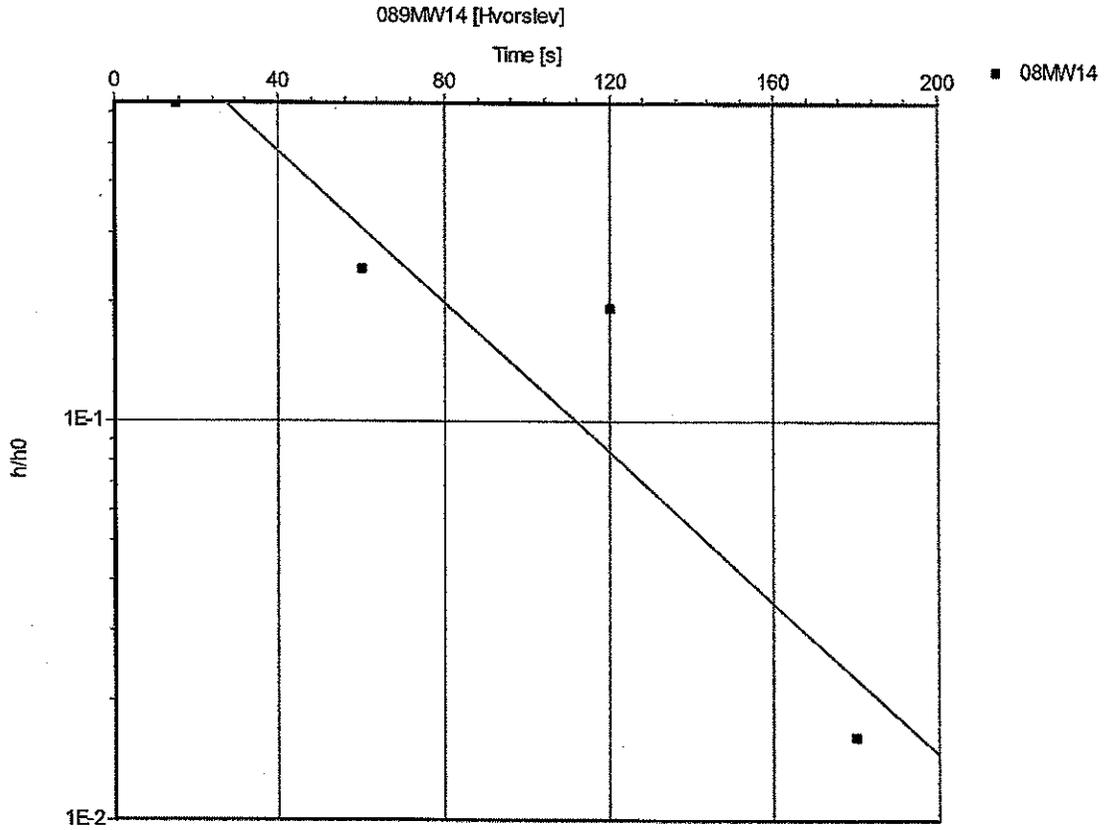
EBA Engineering Consultants Ltd
Riverbend Atrium One #115, 200 Rivercrest Drive SE
Calgary, AB T2C 2X5 CANADA

Slug Test Analysis Report

Project: Garden River Parks Canada

Number: C22101178

Client: Parks Canada



Slug Test: 089MW14

Analysis Method: Hvorslev

Analysis Results:

Conductivity: 8.63E-6 [m/s]

Test parameters:

Test Well:	08MW14	Aquifer Thickness:	0.712 [m]
Casing radius:	0.0254 [m]		
Screen length:	3 [m]		
Boring radius:	0.0762 [m]		

Comments: Automatic fit

Evaluated by: Jay X

Evaluation: 10/6/2008

Figure

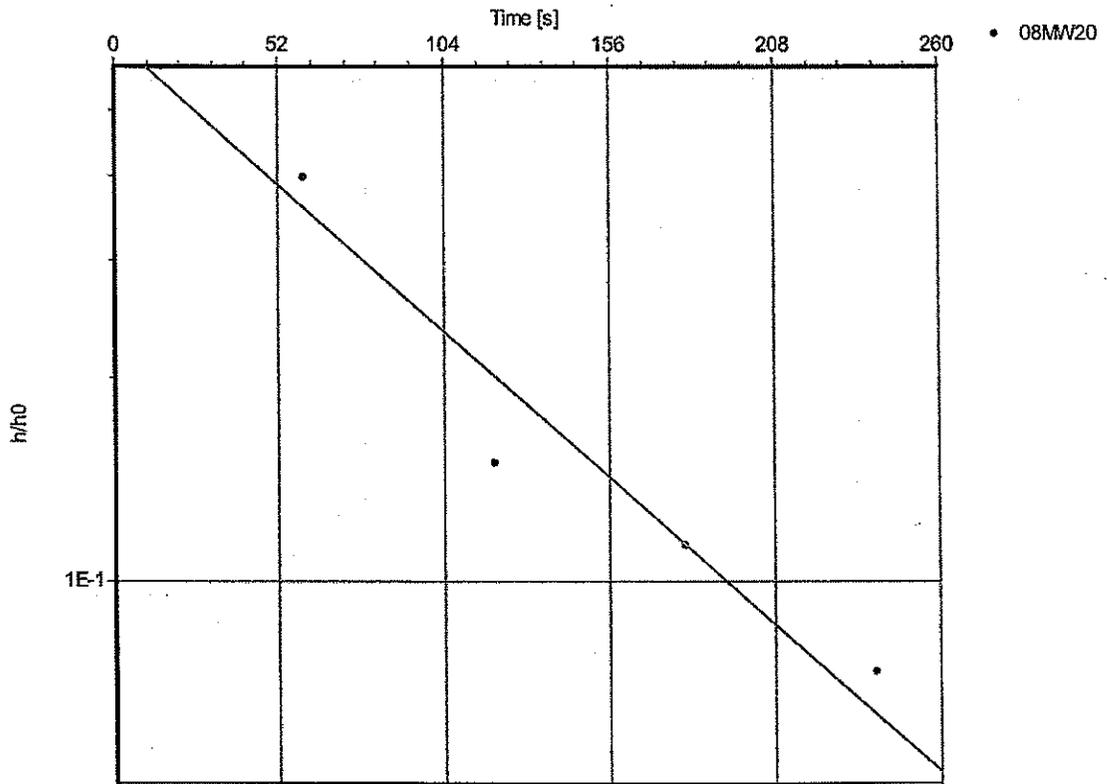


EBA Engineering Consultants Ltd
Riverbend Atrium One #115, 200 Rivercrest Drive SE
Calgary, AB T2C 2X5 CANADA

Slug Test Analysis Report

Project: Garden River Parks Canada
Number: C22101178
Client: Parks Canada

08MW20 [Bouwer & Rice]



Slug Test: 08MW20
Analysis Method: Bouwer & Rice

Analysis Results: Conductivity: 7.01E-6 [m/s]

Test parameters:	Test Well:	08MW20	Aquifer Thickness:	2.176 [m]
	Casing radius:	0.0254 [m]	Gravel Pack Porosity (%)	20
	Screen length:	3 [m]		
	Boring radius:	0.0762 [m]		
	r(eff):	0.041 [m]		

Comments: Automatic fit

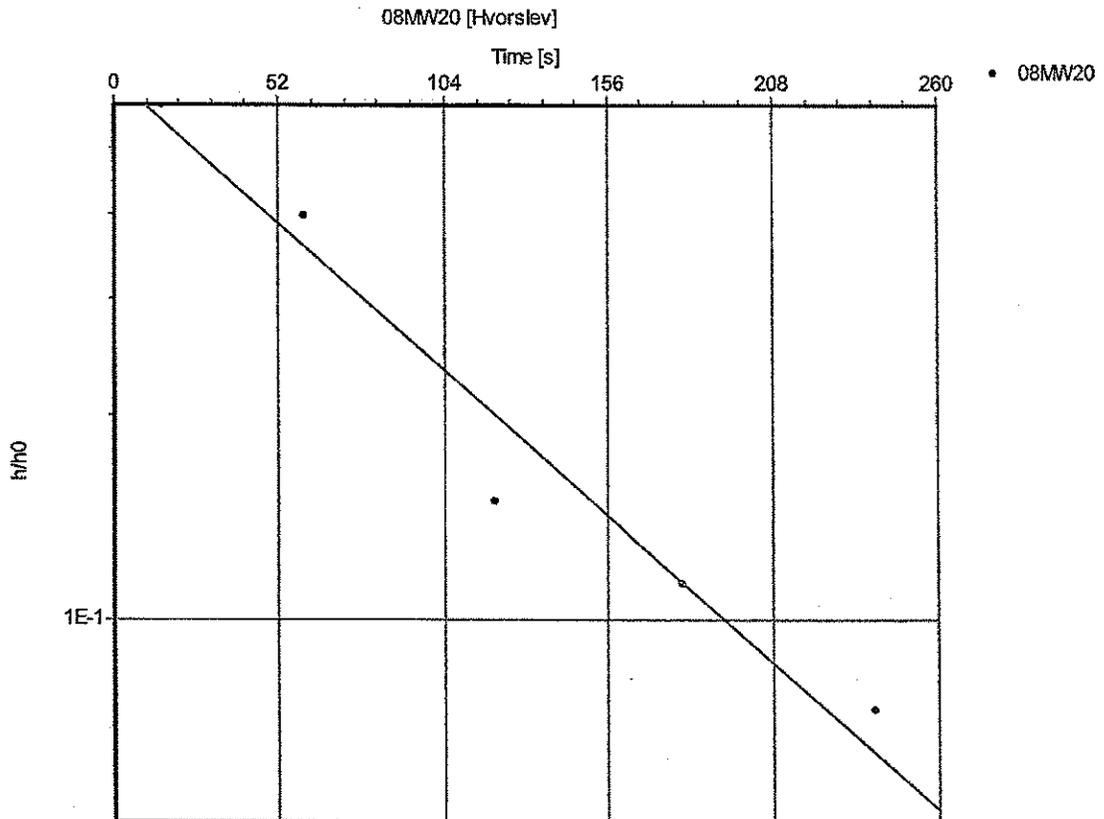
Evaluated by: Jay X
Evaluation: 10/6/2008



EBA Engineering Consultants Ltd
Riverbend Atrium One #115, 200 Rivercrest Drive SE
Calgary, AB T2C 2X5 CANADA

Slug Test Analysis Report

Project: Garden River Parks Canada
Number: C22101178
Client: Parks Canada



Slug Test: 08MW20
Analysis Method: Hvorslev

Analysis Results: Conductivity: 3.82E-6 [m/s]

Test parameters: Test Well: 08MW20 Aquifer Thickness: 2.176 [m]
Casing radius: 0.0254 [m]
Screen length: 3 [m]
Boring radius: 0.0762 [m]

Comments: Automatic fit

Evaluated by: Jay X
Evaluation: 10/8/2008

Figure



APPENDIX D

APPENDIX D QUALITY CONTROL/QUALITY ASSURANCE OF FIELD SAMPLING PROGRAM

Quality Control/Quality Assurance of Field Sampling Program
Contaminant Site Assessment
Community of Garden River, Wood Buffalo National Park, Alberta

1.0 INTRODUCTION

Quality assurance/quality control (QA/QC) programs for environmental sampling are implemented to assess and/or quantify field, laboratory and data reduction quality.

Field quality control includes procedures and documentation, as discussed in the methodology section of the report, and sometimes collection of quality assurance samples, discussed in the section below.

Laboratory QA/QC reports are required by environmental laboratories accredited by the Canadian Association of Environmental Analytical Laboratories (CAELA) and can be requested to be attached to the laboratory data or requested from the lab directly. Laboratory QA/QC data reviewed by the assessor is generally limited to percentage recovery of added surrogates. The detection limits of the analytical methods are presented on the analytical reports.

Data QA/QC can be evaluated by a variety of methods, some qualitative and some quantitative, using methods defined in Canadian Council of Ministers of the Environment (CCME) "Soil Data Quality Objectives (DQOs)" or United States Environmental Protection Agency (USEPA) "Attainment of Clean-up Objectives." For upstream oil and gas sites, analytical results are reviewed and compared to what would be expected for the material type and situation based upon the assessors experience. Discrepancies are investigated by either analyzing additional samples or re-analysis of the same sample. For a statistically designed program, the DQO would quantitatively define the overall level of uncertainty allowed for the entire project taking into account sampling variability, uncertainty allowed for the entire project taking into account sampling variability, uncertainty in laboratory procedures, and any statistical procedures used to evaluate the data.

2.0 FIELD QUALITY ASSURANCE SAMPLING METHODS

Field quality assurance sampling programs are used to measure the precision and accuracy of the field sampling using blanks, duplicates, spike, or replicate samples. The type of sample used depends upon the objective and budget of the sampling plan, the matrix (soil or water), and type of potential contaminant.

Soils

The goal of field quality samples should be to evaluate the precision and accuracy of sampling, but this is often difficult to do because of the variability of concentrations within

the soil. Some sampling programs collect sufficient samples to define the population distribution of various parameters in the soils, or take sufficient replicate samples that the data can be summarized statistically. However, this is costly and not warranted if a sample is much higher or lower than the soil quality objective (SQO).

Duplicate or split samples are used to evaluate precision for soils. Duplicate samples are collected at the same location and time but without being mixed in a common container. Split samples are those that have been placed in a common container, thoroughly mixed, and then placed in two laboratory containers. Duplicate samples are more commonly collected. The data is usually compared by relative percent difference (RPD). RPD is calculated as follows: $RPD = [(V1-V2)/(V1+V2)/2] * 100\%$.

In poor precision situations, the results cannot be distinguished whether it is due to the non-homogeneous nature of the samples or poor sampling method or laboratory technique. Therefore, the data is usually used for flagging data to double check rather than for taking corrective actions.

For contaminant assessments, approximately 1 duplicate sample for every ten soil samples are collected for duplicate analysis. The sample locations chosen vary between materials expected to have less variability (control subsoil) and more variability (suspected impacts visible in field). The data is provided in the attached table and RPDs calculated. The target RPD is also affected by expected soil variability and background concentrations. A preferred target RPD for hydrocarbons is less than 75% and any over 100% are flagged as possible data issues.

Cross-contamination, if caused, is usually by sampling error such as not trimming the samples if collected off a solid stem auger, and is evaluated by reviewing the drilling the records and notes on sample quality compared to the laboratory results. Higher potential exists for cross-contamination between layers if one is using an auger rather than a coring tube, or if one is below the water table.

Groundwater

For routine water quality or salinity, either no quality assurance samples are generally collected, or approximately 10% of the samples are collected for duplicate analysis. The duplicate analysis is compared by RPD, similar to the soils, but the target RPD is less than 20% difference.

For organic compounds, quality assurance samples are generally collected and analyzed per sampling event. For suspected hydrocarbon impacts, the main organic analyzed would be benzene, toluene, ethylbenzene, and xylenes (BTEX) compounds, and possibly alcohols or other volatile compounds if they were used on the site and that are also common in the laboratory or field environment.

Usually, clean disposable polyethylene bailers, dedicated to each monitoring well, are used for sampling groundwater. In this case, equipment blanks are not usually done. However,

if other equipment is used for sampling and equipment blank consisting of water running over the sampling equipment after it has been decontaminated, might be analyzed.

3.0 RESULTS

Duplicate soil samples were collected from boreholes 08SS52, 08SS33, 08SS59, 08MW16, 08BH17, 08BH19, and 08MW22. Duplicate soil samples were analyzed for petroleum hydrocarbons (PHCs), detailed salinity, and metals. Duplicated groundwater samples were collected from monitoring well 08MW21 and analyzed for PHCs. The lab results and the calculated RPDs are presented in Tables D1 (soil) and D2 (groundwater).

Most duplicate soil samples had RPDs below 75%. The duplicate soil samples collected from 08SS59 did not meet the target RPD of 75% for three of the PHC results. Since PHC results from other duplicate samples met the target RPD value, it is assumed that heterogeneous soil is the likely factor for the exceeding 75%. The RPD value of one metal result (chromium) from 08MW16 was 100%, but all other duplicate sample metal results had RPDs below 40%.

Analytical results for the duplicate groundwater samples were below laboratory detection limit and cannot be assessed using RPD.

4.0 CONCLUSION

The QA/QC of the field sampling methods is considered to be acceptable for the purpose of this assessment.

TABLE D1: QA/QC ANALYTICAL RESULTS FOR SOIL SAMPLES

Parameters	Units	Detection Limits	Former Septic Tile Field			Garden River Airstrip			Garden River Trading			Northlands School Historic AST						Church			Garden River Public Works		
			08SS52 0 - 0.6 m	08SS52D 0 - 0.6 m	RPD ¹	08SS33 0 - 0.6 m	08SS33D 0 - 0.6 m	RPD ¹	08SS59 0 - 0.6 m	08SS59D 0 - 0.6 m	RPD ¹	08MW16 6.1 m	08MW16D 6.1 m	RPD ¹	08BH17 4.3 m	08BH17D 4.3 m	RPD ¹	08BH19 4.3 m	08BH19D 4.3 m	RPD ¹	08MW22 0.6 m	08MW22D 0.6 m	RPD ¹
Hydrocarbons																							
Benzene	mg/kg	0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	-
Toluene	mg/kg	0.01	<0.01	<0.01	-	<0.01	<0.01	-	0.08	0.04	67	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Ethylbenzene	mg/kg	0.01	<0.01	<0.01	-	<0.01	<0.01	-	0.02	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Xylenes	mg/kg	0.02	<0.02	<0.02	-	<0.02	<0.02	-	0.12	0.05	82	0.04	0.04	0	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-
F1 (C ₆ to C ₁₀)	mg/kg	5	<5	<5	-	<5	<5	-	<5	<5	-	<5	<5	-	<5	<5	-	<5	<5	-	<5	<5	-
F2 (C ₁₀ to C ₁₄)	mg/kg	20	<20	<20	-	<20	<20	-	<20	<20	-	<20	<20	-29	<20	<20	-	<20	<20	-	540	450	18
F3 (C ₁₆ to C ₃₄)	mg/kg	20	<20	<20	-	<20	<20	-	90	300	-108	<20	<20	-	<20	<20	-	<20	<20	-	14,000	12,000	15
F4 (C ₃₄ to C ₅₀)	mg/kg	20	<20	30	-	<20	<20	-	50	110	-75	<20	<20	-	<20	<20	-	<20	<20	-	2,600	2,300	12
F4 (C ₃₄₊)HGT	mg/kg	500																			10,000	12,000	-18
Total Hydrocarbons (TEH)	mg/kg	20	<20	30	-	<20	<20	-	140	410	-98	30	40	-29	<20	<20	-	<20	<20	-	17,000	15,000	13
Soil Moisture Content	%	0.1	7.5	7.6	-1	9.3	11	-17	23	20	14	3.3	3.4	-3	3.9	7.6	-64	20	20	0	11	10	10
Routine																							
pH	pH-unit	0.1																7.3	7.6	-4			
Electrical Conductivity (EC)	dS/m	0.01																0.29	0.41	-34			
Sodium Adsorption Ratio (SAR)	Ratio	0.1																0.3	0.4	-29			
Saturation	%	0.1																36.2	43.7	-19			
Soluble Salts																							
Calcium (Ca)	mg/kg	2																21	26	-21			
Magnesium (Mg)	mg/kg	1																4	6	-40			
Sodium (Na)	mg/kg	0.9																3.3	5.4	-48			
Potassium (K)	mg/kg	0.9																<0.7	1.7	-			
Chloride (Cl)	mg/kg	9																<7	18	-			
Sulphate (SO ₄)	mg/kg	3																16	32	-67			
Metals																							
Antimony (Sb)	mg/kg	20	<0.2	<0.2	-	<0.2	<0.2	-				<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-
Arsenic (As)	mg/kg	0.2	6.7	6.3	6	8.7	6.6	27				5.0	4.7	6	5.9	5.2	13	8.7	14.4	-49	6.3	6.6	-5
Barium (Ba)	mg/kg	5	272	219	22	194	173	11				79	115	-37	109	88	21	227	285	-23	132	152	-14
Beryllium (Be)	mg/kg	1	<1	<1	-	<1	<1	-				<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-
Cadmium (Cd)	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-				<0.5	<0.5	-	<0.5	<0.5	-	<0.5	0.6	-	<0.5	<0.5	-
Chromium (Cr)	mg/kg	0.5	20.4	19.8	3	23.9	22.0	8				16.5	5.5	100	6.9	7.1	-3	14.4	20.3	-34	9.7	11.4	-16
Cobalt (Co)	mg/kg	1	9	7	25	9	9	0				4	4	0	4	4	0	6	7	-15	5	5	0
Copper (Cu)	mg/kg	2	12	11	9	14	9	43				7	6	15	8	8	0	16	25	-44	13	14	-7
Lead (Pb)	mg/kg	5	11	9	20	9	8	12	15	23	-42	<5	<5	-	<5	<5	-	8	11	-32	6	7	-15
Mercury (Hg)	mg/kg	0.05	<0.05	<0.05	-	<0.05	<0.05	-				<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
Molybdenum (Mo)	mg/kg	1	<1	<1	-	<1	<1	-				3	<1	-	<1	<1	-	1	2	-67	1	1	0
Nickel (Ni)	mg/kg	2	16	16	0	20	17	16				13	10	26	11	10	10	19	25	-27	15	16	-6
Selenium (Se)	mg/kg	0.2	0.4	0.4	0	0.4	0.3	29				0.3	0.3	0	<0.2	<0.2	-	0.4	0.6	-40	0.3	0.3	0
Silver (Ag)	mg/kg	1	<1	<1	-	<1	<1	-				<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-
Thallium (Tl)	mg/kg	1	<1	<1	-	<1	<1	-				<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-
Tin (Sn)	mg/kg	5	<5	<5	-	<5	<5	-				<5	<5	-	<5	<5	-	<5	<5	-	<5	<5	-
Uranium (U)	mg/kg	2	<2	<2	-	<2	<2	-				<2	<2	-	<2	<2	-	<2	<2	-	<2	<2	-
Vanadium (V)	mg/kg	1	40	37	8	42	38	10				15	15	0	17	17	0	30	38	-24	22	24	-9
Zinc (Zn)	mg/kg	10	70	70	0	70	60	15				30	30	0	40	40	0	80	110	-32	80	90	-12
Laboratory Identification No.			L676396-209	L676396-212		L676396-189	L676396-193		L676396-217	L676396-218		L676396-123	L676396-130		L676396-137	L676396-147		L676396-169	L676396-179		L676396-35	L676396-67	

Notes:
¹ RPD - Relative percent difference calculated by: RPD = |(V1-V2)/((V1+V2)/2)|*100%.
 "-" Denotes calculation of RPD not possible because values below method detection limit.
BOLD - RPD >75%.

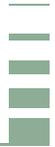
TABLE D2: QA/QC ANALYTICAL RESULTS FOR GROUNDWATER					
Parameters	Units	Detection Limits	08MW21	08MW21D	RPD ¹
			31-Aug-08	31-Aug-08	
<u>Volatile Hydrocarbons</u>					
Benzene	mg/L	0.0005	<0.00050	<0.00050	-
Toluene	mg/L	0.0005	<0.00050	<0.00050	-
Ethylbenzene	mg/L	0.0005	<0.00050	<0.00050	-
Xylenes	mg/L	0.0005	<0.00050	<0.00050	-
F1 (C ₆ to C ₁₀)	mg/L	0.1	<0.1	<0.1	-
F2 (C ₁₀ to C ₁₆)	mg/L	0.1	<0.2	<0.2	-
<u>Laboratory Identification No.</u>			L676397-16	L676397-19	

Notes:

¹ RPD - Relative percent difference calculated by: $RPD = [(V1-V2)/((V1+V2)/2)]*100\%$.

"-" Denotes calculation of RPD not possible because values below method detection limit.

BOLD - RPD >20%.



APPENDIX E

APPENDIX E REMEDIATION ACTION PLAN – PUBLIC WORKS YARD

REMEDIAL ACTION PLAN (RAP) FOR PUBLIC WORKS YARD

1.0 AREA AND CONTAMINANTS OF CONCERN

EBA Engineering Consultants Ltd. (EBA) conducted a contaminant site assessment in 2008 (see main report for details) at the Public Works Yard in the Community of Garden River, Alberta. Ten soil samples were collected from the Garden River Public Works Yard and all exceeded applicable guidelines for one or more petroleum hydrocarbon (PHC) fractions F1, F2, F3, and F4. The samples were collected from locations east and south of the Public Works building adjacent to the waste oil above-ground storage tank (AST) and the propane tanks, north of the public works trailer near the propane tank and barrel storage areas, and the equipment parking area. The groundwater samples collected from locations adjacent to the barrel storage area had iron concentrations greater than 2008 Health Canada Guidelines for Canadian Drinking Water Quality (CDWQ) and the 2008 Alberta Tier 1 Guideline.

EBA's drilling plan was limited by utilities and site conditions; therefore, only broad estimates of the area and volume of impacted soil can be made. The area of soil with PHC impacts was estimated to be 1,800 m². The volume of impacted soil estimated to be approximately 4,000 m³ based on an estimated 1.5 m³ of surficial stained soil with a 50% contingency for additional impacted soil to be present at a greater depth.

2.0 OBJECTIVES FOR REMEDIATION

The objectives for remediation are to remove and treat/dispose soil at the site to meet the 2007 Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health and/or 2008 Alberta Tier 1 Soil and Groundwater Remediation Guidelines (residential/parkland, coarse-textured surface soils).

3.0 POTENTIAL REMEDIAL OPTIONS

Potential remedial options include the following:

- Excavate and remove soil to an approved landfill, likely in High Level or Rainbow Lake. The work would involve specification, tendering and award, mobilization of equipment to site, excavation and confirmatory testing of excavation, hauling and disposal of soil to the landfill, and backfilling of the excavation with clean soil and compaction and surface reclamation. Advantages to this method are that it results in quick and immediate removal of impacted soil and reclamation of the site. The technology is easy to implement. The disadvantages are high cost due to distance to an appropriate landfill. The approximate Class D cost estimate is as follows:

Task	Estimate
Specification and Tendering	\$50,000
Trailer / Camp Costs for Contractor / Consultant	\$100,000
Contractor Mob / Demob	\$50,000
Confirmatory Sampling / Supervisor	\$100,000
Tipping Fees at \$30/tonne (\$60/m ³) for 4,000 m ³	\$240,000
Excavation Costs \$10/m ³ for 4,000/m ³	\$40,000
Hauling Costs \$1,000/10 m ³ load or \$100/m ³)	\$400,000
Backfilling (assume free local source of fill)	\$80,000
TOTAL (Class D estimate)	\$1,060,000

- Excavate and landfarm impacted soil within an engineered landfarm in the community. The work involves specification writing, tendering and award, mobilization of equipment to site, construction of landfarm, excavation of soil and placement in landfarm, backfilling and reclaiming excavation, tilling soil until remedial objectives are met, and decommissioning landfarm. The advantages of this method are it is economical. The disadvantages are that it is difficult to successfully treat soils with high F3 and F4 concentrations using this method and it may be a multi-year remedial program. The approximate Class D cost estimate is as follows:

Task	Estimate
Specification and Tendering	\$50,000
Trailer / Camp Costs for Contractor Consultant	\$100,000
Contractor Mob / Demob	\$50,000
Confirmatory Sampling / Supervisor	\$100,000
Landfarm Area Construction (not including liner)	\$100,000
Excavation Costs (\$10/m ³ for 4,000/m ³)	\$40,000
Hauling Costs to Landfarm (\$10/m ³)	\$40,000
Backfilling (assume free source of fill)	\$80,000
Tilling	\$100,000
Decommissioning of landfill	\$100,000
Subtotal (Class D estimate, not including liner)	\$760,000
Liner Cost 9 m ² installed at 12,000 m ²	\$108,000
TOTAL (Class D estimate with liner)	\$868,000

- Treat soil in situ using chemical oxidation. The work involves conducting an initial pilot trial to determine the viability of this approach, specification writing, tendering and award, mobilization of equipment to site, soil treatment, and verification testing.

A variation of this method would be to combine this method with landfarming as chemical oxidation makes hydrocarbons more amenable for biotreatment. Advantages to this method are that it could be quick to treat, if the method is determined to be viable and it may represent a cost savings over hauling to a landfill. Disadvantages include potential failure of the pilot trial and subsequent delay and a small increase of costs overall for treatment as well as increased sodium adsorption ratio (SAR) of treated soils. The approximate Class D cost estimate is as follows:

Task	Estimate
Pilot Trial	\$25,000
Specification and Tendering	\$50,000
Trailer / Camp Costs for Contractor Consultant	\$100,000
Contractor Mob / Demob Chemical Delivery	\$100,000
Confirmatory Sampling / Supervisor	\$100,000
Mixing Costs (assume two passes)	\$100,000
Chemical Costs (assume \$1,100 / m ³)	\$400,000
TOTAL	\$875,000

4.0 RECOMMENDED TREATMENT OPTION

EBA recommends conducting a pilot trial for chemical oxidation as an initial course of action for the following reasons:

- Landfarming alone is unlikely to work given the high F3 and F4 concentrations at the site.
- The large volume of impacted soil makes the cost of landfilling the soil at least 20% greater.
- The potential cost savings on remediation outweigh the small cost of an unsuccessful pilot trial.

It is likely a pilot trial will result in one of two outcomes:

- Not economical in comparison to landfilling. Recommend to landfill soil following the pilot trial.
- Economical to proceed on the basis of in-situ chemical oxidation alone.

5.0 STEPS IN A PILOT TRIAL

The following go-forward actions are recommended for a pilot trial:

- Step 1: Treatment design and determination of appropriate chemical oxidation products for use in trial.
- Step 2: Obtaining soil from the site for a trial.
- Step 3: Conduct trial.
- Step 4: Evaluation of trial and provide recommendation for further work.

If the pilot trial is found to be successful, the following steps are recommended:

- Step 1: As volumes are tentative, a performance-based specification will need to be written based on a volume estimate of between 2,000 m³ and 4,000 m³.
- Step 2: Provide camp and trailers.
- Step 3: Mob / demob consultant and contractor to site.
- Step 4: Mix chemical in soil with excavator and allu bucket.
- Step 5: Following a two to four week time period after mixing sample soil.
- Step 6: If results are not achieved, add more chemical, remix and sample.
- Step 7: Demob from site.
- Step 8: Prepare report.

If pilot trial is unsuccessful, the following steps are recommended for landfilling the soil:

- Step 1: As volumes are tentative, a performance-based specification will need to be written for a volume estimate.
- Step 2: Provide camp and trailer.
- Step 3: Mob / demob consultant and contractor.
- Step 4: Excavate soil and conduct confirmatory sampling. Haul soil to landfill.
- Step 5: When excavation boundaries are reached, haul fill to site, backfill and compact.
- Step 6: Demob from site.
- Step 7: Prepare report.

6.0 COST ESTIMATE

The approximate cost for undertaking a pilot trial is estimated to be \$25,000 and is broken down as follows

- Step 1: \$3,000 fees.
- Step 2: \$4,000 fees and \$6,000 disbursements to travel to site and transport soil back south.
- Step 3: \$5,000 fees and \$3,000 disbursements in chemical oxidation products and soil disposal costs.
- Step 4: \$4,000 report and recommendation.

Further work to successfully treat the soil, following the pilot trial will vary depending on the outcome. The worst outcome would be to haul soil off site to a landfill, likely to be in the \$1,000,000 range +/- 40%.

7.0 SCHEDULE

The proposed schedule for the pilot trial is as follows assuming that the trials could start by March 15, 2009 or sooner:

- Treatment design beginning in winter 2009 and complete by spring 2009.
- Obtain soil and conduct trial beginning and ending in spring 2009.
- Evaluation report and recommendation in spring 2009.

Work to remediate the site could proceed in 2009 and the schedule would be as follows:

- Prepare specifications in late spring 2009.
- Award contract early summer 2009.
- Camp set up by end of July 2009.
- Mob / Demob to site by beginning of August 2009.
- One to two month field program of either in situ treatment or excavation landfilling.
- Demob from site fall 2009.
- Report in late fall 2009.



APPENDIX F

APPENDIX F REMEDIATION ACTION PLAN - AIRSTRIP

REMEDIAL ACTION PLAN (RAP) FOR AIRSTRIP

1.0 AREA AND CONTAMINANTS OF CONCERN

EBA Engineering Consultants Ltd. (EBA) conducted a contaminated site assessment in 2008 (see main report for details) at the airstrip in the Community of Garden River, Alberta. One soil sample, which was collected from the Garden River Airstrip, at locations adjacent to fuel drums near the eastern end, exceeded the applicable guidelines for petroleum hydrocarbon (PHC) fractions F1 and F2. This sample had a high combustible vapour concentration (CVC) [5% lower explosive limit (LEL)].

Soil with PHC impacts at the Garden River Airstrip was associated with fuel storage at the eastern edge of the airstrip. The volume of impacted soil is estimated to be approximately 500 m³.

2.0 OBJECTIVES FOR REMEDIATION

The objectives for remediation are to remove and treat/dispose soil at the site to meet the 2007 Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health and/or 2008 Alberta Tier 1 Soil and Groundwater Remediation Guidelines (residential/parkland, coarse-textured surface soils).

3.0 POTENTIAL REMEDIAL OPTIONS

Potential remedial options include the following:

- Excavate and remove soil to an approved landfill, likely in High Level or Rainbow Lake. The work would involve specification, tendering and award, mobilization of equipment to site, excavation and confirmatory testing of excavation, hauling and disposal of soil to the landfill, and backfilling of the excavation with clean soil and compaction and reclamation. Advantages to this method are that it is quick to remove impacted soil and reclaim the site. The technology is easy to implement. The disadvantages are high cost due to distance to an appropriate landfill. The cost if conducted at the same time as the Public Works Yard would be approximately \$250/m³. If done separately, costs would be much higher as common costs, such as a camp for workers could not be shared over the two projects.
- Excavate and landfarm impacted soil within an engineered landfarm. The work involves specification writing, tendering and award, mobilization of equipment to site, construction of landfarm, excavation of soil and placement in landfarm, backfilling and reclaiming excavation, tilling soil until remedial objectives are met, and decommissioning the landfarm. The advantages of this method are it is economical and

bioremediation is a proven and easy to implement technology. The disadvantages are that it will be a multi-year remedial program. The cost of this option, if done at the same time as the remediation at the Public Works Yard would be approximately \$200/m³. If done separately, the costs would be higher.

- Treat soil on site using in-situ chemical oxidation. The work involves specification writing, tendering and award, mobilization of equipment to site, soil treatment, and verification testing. Advantages to this method are that it could be relatively quick to treat hydrocarbons. As equipment needs are minimal (large backhoe with allu mixing bucket), it is likely that local area equipment can be utilized. Disadvantages include potential failure to remediate the hydrocarbon economically, so therefore, a pilot trial is recommended. The cost for this option is estimated to be approximately \$200/m³ if done at the same time as the Public Works Yard but greater if done separately.

4.0 RECOMMENDED TREATMENT OPTION

EBA recommends treating the soil at the airstrip in situ through either chemical oxidation or landfarming for the following reasons:

- The large distance to transport impacted soil makes the cost of landfilling the soil more costly.
- The potential cost savings of remediation greatly outweigh the small cost of a unsuccessful pilot trial, if chemical oxidation is chosen as an option.
- While landfarming is similar in cost to chemical oxidation, it may not be effective to treat the soils at the Public Works yard and it would be preferable to treat the soils at both sites at the same time and in the same manner to save costs.

5.0 STEPS IN A PILOT TRIAL

Please see RAP for Public Works Yard

6.0 COST ESTIMATE

Please see RAP for Public Works Yard for details. The additional costs (above those estimate for the Public Works Yard) to treat the soils at the airport is estimated to be \$200,000, if done at the same time as the Public Works Yard.

7.0 SCHEDULE

Please see RAP for Public Works Yard



APPENDIX G

APPENDIX G CCME NATIONAL CLASSIFICATION SYSTEM FOR CONTAMINATED SITES

**CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions**

Subject Site:	Test Site	
Civic Address: <i>(or other description of location)</i>	On the north shore of the Peace River, approximately 220 km east of High Level, Alberta, in Wood Buffalo National Park	
Site Common Name : <i>(if applicable)</i>	Community of Garden River	
Site Owner or Custodian: <i>(Organization and Contact Person)</i>	Parks Canada Agency	
Legal description or metes and bounds:	N 58°42.5', W113°52.0'	
Approximate Site area:		
PID(s) : <i>(or Parcel Identification Numbers [PIN] if untitled Crown land)</i>	Garden River Public Works Yard (FCSI #00022200)	
Centre of site: <i>(provide latitude/longitude or UTM coordinates)</i>	Latitude:	_____ degrees _____ min _____ secs
	Longitude:	_____ degrees _____ min _____ secs
	UTM Coordinate:	Northing 6512253.105 Easting 681506.6544
Site Land Use:	Current:	Commercial/Industrial
	Proposed:	
Site Plan	To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.	
Provide a brief description of the Site:	<p style="text-align: center;">The Garden River Public Works Yard is located east of the community of Garden River (see attached Site Plan).</p>	

CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions

Affected media and Contaminants of Potential Concern (COPC):	The concentration of petroleum hydrocarbon fractions F2, F3, and F4 in soil samples exceeded Alberta Environment 2008 Soil and Groundwater Remediation Guidelines. The groundwater concentrations of Cadmium, Iron, and Selenium in four monitoring wells exceeded Canadian Council of Ministers of the Environment 2007 Canadian Water Quality Guidelines for the protection of aquatic life. The concentration of dissolved Manganese in one monitoring well exceeded Health Canada 2008 Guidelines for Canadian Drinking Water Quality.
--	--

Please fill in the "letter" that best describes the level of information available for the site being assessed:

Site Letter Grade

If letter grade is F, do not continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent.

Scoring Completed By:	Cathy Hamlen, Ph.D. A.Ag.
Date Scoring Completed:	6-Feb-09

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
1. Residency Media (replaces physical state)				
Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines? yes = has an exceedance or strongly suspected to have an exceedance no = does not have an exceedance or strongly suspected not to have an exceedance		Seventeen soil samples and four groundwater monitoring wells were assessed. Refer to <i>Contaminated Site Assessment, Initial and Detailed Testing Programs, Wood Buffalo National Park, Various Locations in the Community of Garden River, Alberta</i> (EBA Consulting Engineers Ltd., 2009).	The overall score is calculated by adding the individual scores from each residency media (having one or more exceedance of the most conservative media specific and land-use appropriate CCME guideline). Summary tables of the Canadian Environmental Quality Guidelines for soil, water (aquatic life, non-potable groundwater environments, and agricultural water uses) and sediment are available on the CCME website at http://www.ccmec.ca/publications/ceqg_rceq.html?category_id=124 . For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at http://www.hc-sc.gc.ca/ewh-semt/subs/water-eau/doc_sup-appui/sum_guides_recom/index_e.html .	An increasing number of residency media containing chemical exceedances often equates to a greater potential risk due to an increase in the number of potential exposure pathways.
A. Soil	No			
Yes No Do Not Know	0			
B. Groundwater	Yes			
Yes No Do Not Know	2			
C. Surface water	No			
Yes No Do Not Know	0			
D. Sediment	No			
Yes No Do Not Know	0			
"Known" -score "Potential" - score	2 --			
2. Chemical Hazard				
What is the relative degree of chemical hazard of the contaminant in the list of hazard rankings proposed by the Federal Contaminated Sites Action Plan (FCSAP)? High Medium Low Do Not Know	High	Petroleum hydrocarbon fractions F2 (soil) is Medium and F3 and F4 (soil) are Low; Cadmium and Lead (groundwater) are High, Selenium (groundwater) is Medium, and Manganese (groundwater) is Low.	The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site. The degree of hazard has been defined by the Federal Contaminated Sites Action Plan (FCSAP) and a list of substances with their associated hazard (Low, Medium and High) has been provided as a separate sheet in this file. <i>See Attached Reference Material for Contaminant Hazard Rankings.</i>	Hazard as defined in the revised NCS pertains to the physical properties of a chemical which can cause harm. Properties can include toxic potency, propensity to biomagnify, persistence in the environment, etc. Although there is some overlap between hazard and contaminant exceedance factor below, it will not be possible to derive contaminant exceedance factors for many substances which have a designated chemical hazard designation, but don't have a CCME guideline. The purpose of this category is to avoid missing a measure of toxic potential.
"Known" -score "Potential" - score	8 --			
3. Contaminant Exceedance Factor				
What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")? Mobile NAPL High (>100x) Medium (10x to 100x) Low (1x to 10x) Do Not Know	Medium (10x to 100x)	The maximum petroleum hydrocarbon fraction F2 concentration in soil was 69.2 times higher than Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines, the maximum F3 concentration in soil was 96.7 times higher, and the maximum F4 concentration was 8.2 times higher. The maximum groundwater Manganese concentration was 11.96 times higher than Health Canada 2008 Guideline for Canadian Drinking Water Quality, and the maximum groundwater Lead concentration was 8.8 times higher. The maximum groundwater Cadmium concentration was 1.03 times higher than the CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life, the maximum groundwater Selenium concentration was 5.1 times higher than the 2007 CCME guideline.	Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the <i>most conservative media-specific and land-use appropriate CCME environmental quality guidelines</i> . Ranking should be based on contaminant with greatest exceedance of CCME guidelines. Ranking of contaminant hazard as high, medium and low is as follows: High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines Mobile NAPL = Contaminant is a non-aqueous phase liquid (i.e., due to its low solubility, it does not dissolve in water, but remains as a separate liquid) and is present at a sufficiently high saturation (i.e., greater than residual NAPL saturation) such that there is significant potential for mobility either downwards or laterally. Other standards may include local background concentration or published toxicity benchmarks. Results of toxicity testing with site samples can be used as an alternative. This approach is only relevant for contaminants that do not biomagnify in the food web, since toxicity tests would not indicate potential effects at higher trophic levels. High = lethality observed. Medium = no lethality, but sub lethal effects observed. Low = neither lethal nor sub lethal effects observed.	In the event that elevated levels of a material with no associated CCME guidelines are present, check provincial and USEPA environmental criteria. Hazard Quotients (sometimes referred to as a screening quotient in risk assessments) refer to the ratio of measured concentration to the concentration believed to be the threshold for toxicity. A similar calculation is used here to determine the contaminant exceedance factor (CEF). Concentrations greater than one times the applicable CCME guideline (i.e., CEF=>1) indicate that risks are possible. Mobile NAPL has the highest associated score (8) because of its highly concentrated nature and potential for increase in the size of the impacted zone.
"Known" -score "Potential" - score	4 --			

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
4. Contaminant Quantity (known or strongly suspected)				
What is the known or strongly suspected quantity of all contaminants? >10 hectare (ha) or 5000 m ³ 2 to 10 ha or 1000 to 5000 m ³ <2 ha or 1000 m ³ Do Not Know	2 to 10 ha or 1000 to 5000 m ³	The soil concentrations of petroleum hydrocarbon fractions F2 to F4 that exceeded Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines and the groundwater monitoring wells with concentrations of COPC exceeding CCME 2007 Canadian Water Quality Guidelines for the protection of aquatic life covered an area of approximately 1,620 m ² .	Measure or estimate the area or quantity of total contamination (i.e. all contaminants known or strongly suspected to be present on the site). The "Area of Contamination" is defined as the area or volume of contaminated media (soil, sediment, groundwater, surface water) exceeding appropriate environmental criteria.	A larger quantity of a potentially toxic substance can result in a larger frequency of exposure as well as a greater probability of migration, therefore, larger quantities of these substances earn a higher score.
	"Known" - score			
	"Potential" - score	---		
5. Modifying Factors				
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment? Yes No Do Not Know	No	Chemicals do not persist.	Persistent chemicals, e.g., PCBs, chlorinated pesticides etc. either do not degrade or take longer to degrade, and therefore may be available to cause effects for a longer period of time. Canadian Environmental Protection Act (CEPA) classifies a chemical as persistent when it has at least one of the following characteristics: (a) in air, (i) its half-life is equal to or greater than 2 days, or (ii) it is subject to atmospheric transport from its source to a remote area; (b) in water, its half-life is equal to or greater than 182 days; (c) in sediments, its half-life is equal to or greater than 365 days; or (d) in soil, its half-life is equal to or greater than 182 days. This list does not include metals or metalloids, which in their elemental form do not degrade. However metals and metalloids form chemical species in the environment, many of which are not readily bioavailable.	Examples of Persistent Substances are provided in attached Reference Materials
	Yes			
Are there contaminants present that could cause damage to utilities and infrastructure, either now or in the future, given their location? Yes No Do Not Know	No			Some contaminants may react or absorb into underground utilities and infrastructure. For example, organic solvents may degrade some plastics, and salts could cause corrosion of metal.
	Yes	0		
How many different contaminant classes have representative CCME guideline exceedances? one two to four five or more Do Not Know	two to four	Cadmium, Iron, Manganese, and Selenium in groundwater.	For the purposes of the revised NCS ranking system, the following chemicals represent distinct chemical "classes": inorganic substances (including metals), volatile petroleum hydrocarbons, light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons, PAHs, phenolic substances, chlorinated hydrocarbons, halogenated methanes, phthalate esters, pesticides.	Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.
	one			
	"Known" - Score	2		
	"Potential" - Score	---		

Contaminant Characteristic Total

Raw Total Scores- "Known"	22
Raw Total Scores- "Potential"	0
Raw Combined Total Scores	22
Total Score (Raw Combined / 40 * 33)	18.2

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
1. Groundwater Movement				
A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary.				
<p>i) For potable groundwater environments 1) groundwater concentrations exceed background concentrations and 1X the Guideline for Canadian Drinking Water Quality (GCDWQ) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater contamination. For non-potable environments (typically urban environments with municipal services), 1) groundwater concentrations exceed 1X the applicable non-potable guidelines or modified generic guidelines (which exclude ingestion of drinking water pathway) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater impacts.</p> <p>ii) Same as (i) except the information is not known but strongly suspected based on indirect observations.</p> <p>iii) Meets GCDWQ for potable environments meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for non-potable environments or Absence of groundwater exposure pathway (i.e., there is no aquifer (see definition at right) at the site or there is an adequate isolating layer between the aquifer and the contamination, and within 5 km of the site there are no aquatic receiving environments and the groundwater does not daylight).</p>	<p>12</p> <p>0</p> <p>0</p> <p>0</p> <p>0</p> <p>Score 0</p>	<p>Manganese and Lead concentrations in groundwater exceeded aesthetic objectives for drinking water (Health Canada 2008 Guidelines for Canadian Drinking Water Quality). The Cadmium and Selenium concentrations in groundwater exceed guideline for protection of freshwater aquatic life (CCME 2007). The hydraulic conductivity of the site ranged between 7.01 x 10⁻⁶ m/s and 3.82 x 10⁻⁶ m/s.</p>	<p>Review chemical data and evaluate groundwater quality.</p> <p>The evaluation method concentrates on 1) a potable or non-potable groundwater environment, the groundwater flow system and its potential to be an exposure pathway to known or potential receptors.</p> <p>An aquifer is defined as a geologic unit that yields groundwater in usable quantities and drinking water quality. The aquifer can currently be used as a potable water supply or could have the potential for use in the future. Non-potable groundwater environments are defined as areas that are serviced with a reliable alternative water supply (most commonly provided in urban areas); evaluation of a non-potable environment will be based on a site specific basis.</p> <p>Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils.</p> <p>Seeps and springs are considered part of the groundwater pathway.</p> <p>In Arctic environments, the potability and evaluation of the seasonal active layer (above the permafrost) as a groundwater exposure pathway will be considered on a site-specific basis.</p>	<p>The 1992 NCS rationale evaluated the off-site migration as a regulatory issue. The exposure assessment and classification of hazards should be evaluated regardless of the property boundaries.</p> <p>Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a groundwater supply source in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links.</p> <p>Note that for potable groundwater that also daylight into a nearby surface water body the more stringent guidelines for both drinking water and protection of aquatic life should be considered.</p> <p>Selected References</p> <p>Potable Environments</p> <p>Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/owh/semt/pubs/water/gau/doc_swp-sppu/sum_guides-res_recom/index_e.html</p> <p>Non-Potable Environments</p> <p>Canadian Water Quality Guidelines for Protection of Aquatic Life. CCME. 1999 www.ccme.ca</p> <p>Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.</p>
NOTE: If a score is assigned here for Known COPC Exceedances, then you can skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)				
B. Potential for groundwater pathway.				
<p>a. Relative Mobility</p> <p>High</p> <p>Moderate</p> <p>Low</p> <p>Insignificant</p> <p>Do Not Know</p>	<p>Score 2</p>	<p>Organics</p> <p>Koc (L/kg)</p> <p>Koc < 500 (i.e., log Koc < 2.7)</p> <p>Koc = 500 to 5000 (i.e., log Koc = 2.7 to 3.7)</p> <p>Koc = 5,000 to 100,000 (i.e., log Koc = 3.7 to 5)</p> <p>Koc > 100,000 (i.e., log Koc > 5)</p> <p>Metals with higher mobility at acidic conditions</p> <p>pH < 5</p> <p>pH = 5 to 6</p> <p>pH > 6</p> <p>Metals with higher mobility at alkaline conditions</p> <p>pH > 8.5</p> <p>pH = 7.5 to 8.5</p> <p>pH < 7.5</p>	<p>Reference: US EPA Soil Screening Guidance (Part 5 - Table 39)</p> <p>If a score of zero is assigned for relative mobility, it is still recommended that the following sections on potential for groundwater pathway be evaluated and scored. Although the Koc of an individual contaminant may suggest that it will be relatively immobile, it is possible that, with complex mixtures, there could be enhanced mobility due to co-solvent effects. Therefore, the Koc cannot be relied on solely as a measure of mobility. An evaluation of other factors such as containment, thickness of confining layer, hydraulic conductivities and precipitation infiltration rate are still useful in predicting potential for groundwater migration, even if a contaminant is expected to have insignificant mobility based on its chemistry alone.</p>	
<p>b. Presence of engineered sub-surface containment?</p> <p>No containment</p> <p>Partial containment</p> <p>Full containment</p> <p>Do Not Know</p>	<p>Score 1.5</p>	<p>Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved.</p> <p>Full containment is defined as an engineered system or natural attenuation processes, monitored as being effective, which provide for full capture and/or treatment of contaminants. All chemicals of concern must be contained for Full Containment scoring. Natural attenuation must have sufficient data, and reports cited with monitoring data to support steady state conditions and the attenuation processes. If there is no containment or insufficient natural attenuation process, the category is evaluated as high. If there is less than full containment or if uncertain, then evaluate in medium. In Arctic environments, permafrost will be evaluated, as appropriate, based on detailed evaluations, effectiveness and reliability to contain/control contaminant migration.</p>	<p>Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links.</p> <p>Selected Resources:</p> <p>United States Environmental Protection Agency (USEPA) 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.</p> <p>Environment Canada - Ontario Region - Natural Attenuation Technical Assistance Bulletins (TABS) Number 18-21.</p>	
<p>c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway</p> <p>3 m or less including no confining layer or discontinuous confining layer</p> <p>3 to 10 m</p> <p>> 10 m</p> <p>Do Not Know</p>	<p>Score 0.5</p>	<p>The term "confining layer" refers to geologic material with little or no permeability or hydraulic conductivity (such as unfractured clay); water does not pass through this layer or the rate of movement is extremely slow.</p> <p>Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway.</p> <p>The evaluation of this category is based on:</p> <p>1) The presence and thickness of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as drinking water sources or</p> <p>2) The presence and thickness of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated zone (e.g., water table aquifer, first hydrostratigraphic unit or other groundwater pathway).</p>		
<p>d. Hydraulic conductivity of confining layer</p> <p>> 10⁻⁶ cm/s or no confining layer</p> <p>10⁻⁶ to 10⁻⁸ cm/s</p> <p>< 10⁻⁸ cm/s</p> <p>Do Not Know</p>	<p>Score 0.5</p>	<p>Determine the nature of geologic materials and estimate hydraulic conductivity from published material (or use "Range of Values of Hydraulic Conductivity and Permeability" figure in the Reference Material sheet). Unfractured clays should be scored low. Silts should be scored medium. Sand, gravel should be scored high. The evaluation of this category is based on:</p> <p>1) The presence and hydraulic conductivity (K) of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as a drinking water source, groundwater exposure pathway or</p> <p>2) The presence and permeability (K) of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated water table aquifer, first hydrostratigraphic unit or other groundwater pathway.</p>		

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for groundwater pathway.				
e. Precipitation infiltration rate (Annual precipitation factor x surface soil relative permeability factor) High Moderate Low Very Low None Do Not Know	Score	0.4	Precipitation Refer to Environment Canada precipitation records for relevant areas. Divide annual precipitation by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score). Permeability For surface soil relative permeability (i.e., infiltration) assume: gravel (1), sand (0.6), loam (0.3) and pavement or clay (0). Multiply the surface soil relative permeability factor with precipitation factor to obtain the score for precipitation infiltration rate.	
f. Hydraulic conductivity of aquifer >10 ⁻² cm/s 10 ⁻² to 10 ⁻⁴ cm/s <10 ⁻⁴ cm/s Do Not Know	Score	1	Determine the nature of geologic materials and estimate hydraulic conductivity of all aquifers of concern from published material (refer to "Range of Values of Hydraulic Conductivity and Permeability" in the Reference Material sheet).	
Potential groundwater pathway total	5.9	Note: if a "known" score is provided, the "potential" score is disallowed.		
Allowed Potential score	---			
Groundwater pathway total	9			
2. Surface Water Movement				
A. Demonstrated migration of COPC in surface water above background conditions				
Known concentrations of surface water: i) Concentrations exceed background concentrations and exceed CCME CWQG for protection of aquatic life, irrigation, livestock water, and/or recreation (whichever uses are applicable at the site) by >1 X; or There is known contact of contaminants with surface water based on site observations. or In the absence of CWQG, chemicals have been proven to be toxic based on site specific testing (e.g. toxicity testing; or other indicator testing of exposure). ii) Same as (i) except the information is not known but is <u>suspected</u> based on indirect observations. iii) Meets CWQG or absence of surface water exposure pathway (i.e., Distance to nearest surface water is > 5 km.)	Score	12	Collect all available information on quality of surface water near to site. Evaluate available data against Canadian Water Quality Guidelines (select appropriate guidelines based on local water use, e.g., recreation, irrigation, aquatic life, livestock watering, etc.). The evaluation method concentrates on the surface water flow system and its potential to be an exposure pathway. Contamination is present on the surface (above ground) and has the potential to impact surface water bodies. Surface water is defined as a water body that supports one of the following uses: recreation, irrigation, livestock watering, aquatic life.	General Notes: Someone experienced must provide a thorough description of the sources researched to classify the surface water body in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact name, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. Selected References: CCME, 1999, Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME, 1999, Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water) www.ccme.ca Health and Welfare Canada, 1992, Guidelines for Canadian Recreational Water Quality.
NOTE: If a score is assigned here for Demonstrated Migration in Surface Water, then you can skip Part B (Potential for migration of COPCs in surface water) and go to Section 3 (Surface Soils)				
B. Potential for migration of COPCs in surface water				
a. Presence of containment No containment Partial containment Full containment Do Not Know	Score	3	Review the existing engineered systems and relate these structures to site conditions and proximity to surface water and determine if full containment is achieved: score low if there is full containment such as capping, berms, dikes; score medium if there is partial containment such as natural barriers, trees, ditches, sedimentation ponds; score high if there are no intervening barriers between the site and nearby surface water. Full containment must include containment of all chemicals.	
b. Distance to Surface Water 0 to <100 m 100 - 300 m >300 m Do Not Know	Score	2	Review available mapping and survey data to determine distance to nearest surface water bodies.	

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<p>c. Topography</p> <p>Contaminants above ground level and slope is steep</p> <p>Contaminants at or below ground level and slope is steep</p> <p>Contaminants above ground level and slope is intermediate</p> <p>Contaminants at or below ground level and slope is intermediate</p> <p>Contaminants above ground level and slope is flat</p> <p>Contaminants at or below ground level and slope is flat</p> <p>Do Not Know</p>	1		<p>Review engineering documents on the topography of the site and the slope of surrounding terrain.</p> <p>Steep slope = >50%</p> <p>Intermediate slope = between 5 and 50%</p> <p>Flat slope = < 5%</p> <p>Note: Type of fill placement (e.g., trench, above ground, etc.).</p>	
<p>d. Run-off potential</p> <p>High (rainfall run-off score > 0.6)</p> <p>Moderate (0.4 < rainfall run-off score < 0.6)</p> <p>Low (0.2 < rainfall run-off score < 0.4)</p> <p>Very Low (0 < rainfall run-off score < 0.2)</p> <p>None (rainfall run-off score = 0)</p> <p>Do Not Know</p>	0.4		<p>Rainfall</p> <p>Refer to Environment Canada precipitation records for relevant areas. Divide rainfall by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score).</p> <p>The former definition of annual rainfall did not include the precipitation as snow. This minor adjustment has been made. The second modification was the inclusion of permeability of surface materials as an evaluation factor.</p> <p>Permeability</p> <p>For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1).</p> <p>Multiply the infiltration factor with precipitation factor to obtain rainfall run off score.</p>	<p>Selected Sources:</p> <p>Environment Canada web page link www.msc.ec.gc.ca</p> <p>Snow to rainfall conversion apply ratio of 15 (snow):1(water)</p>
<p>e. Flood potential</p> <p>1 in 2 years</p> <p>1 in 10 years</p> <p>1 in 50 years</p> <p>Do Not Know</p>	0.5		<p>Review published data such as flood plain mapping or flood potential (e.g., spring or mountain run-off) and Conservation Authority records to evaluate flood potential of nearby water courses both up and down gradient. Rate zero if site not in flood plain.</p>	
Potential surface water pathway total	0.9			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Surface water pathway total	8			
3. Surface Soils (potential for dust, dermal and ingestion exposure)				
A. Demonstrated concentrations of COPC in surface soils (top 1.5 m)				
<p>COPCs measured in surface soils exceed the CCME soil quality guideline.</p> <p>Strongly suspected that soils exceed guidelines</p> <p>COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock).</p>	<p>12</p> <p>9</p> <p>0</p> <p>12</p> <p>Score 12</p>	<p>Ten surface samples of soil (0 - 0.6 m depth) had concentrations of petroleum hydrocarbon fractions F2 thru F4 that exceeded Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines. The risk is high since the area included gravel parking areas without vegetative cover.</p>	<p>Collect all available information on quality of surface soils (i.e., top 1.5 metres) at the site. Evaluate data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (i.e. agricultural, residential/peri-land, commercial, or industrial), and soil texture if applicable (i.e., coarse or fine).</p>	<p>Selected References:</p> <p>CCME, 1999, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health</p> <p>www.ec.gc.ca</p>
NOTE: If a score is assigned here for Demonstrated Concentrations In Surface Soils, then you can skip Part B (Potential for a surface soils migration pathway) and go to Section 4 (Vapour)				
B. Potential for a surface soils (top 1.5 m) migration pathway				
<p>a. Are the soils in question covered?</p> <p>Exposed</p> <p>Vegetated</p> <p>Landscaped</p> <p>Paved</p> <p>Do Not Know</p>	4		<p>Consult engineering or risk assessment reports for the site. Alternatively, review photographs or perform a site visit.</p> <p>Landscaped surface soils must include a minimum of 0.5 m of topsoil.</p>	<p>If the possibility of contaminants in blowing snow have not been included in the revised NCS as it is difficult to assess what constitutes an unacceptable concentration and secondly, spills to snow or ice are most efficiently mitigated while freezing conditions remain.</p>
<p>b. For what proportion of the year does the site remain covered by snow?</p> <p>0 to 10% of the year</p> <p>10 to 30% of the year</p> <p>More than 30% of the year</p> <p>Do Not Know</p>	3		<p>Consult climatic information for the site. The increments represent the full span from soils which are always wet or covered with snow (and therefore less likely to generate dust) to those soils which are predominantly dry and not covered by snow (and therefore are more likely to generate dust).</p>	
Potential surface soil pathway total	7			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Soil pathway total	12			

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
4. Vapour				
A. Demonstrated COPCs in vapour.				
Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations.	12	The concentration of petroleum hydrocarbons (fraction F2) exceeded Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines in seven soil samples. The sample were collected as close as 20 m east of the Public Works Building.	Consult previous investigations, including human health risk assessments, for reports of vapours detected.	
Strongly suspected (based on observations and/or modelling)	9			
Vapour has not been measured and volatile hydrocarbons have not been found in site soils or groundwater.	0			
Score	9			
NOTE: If a score is assigned here for Demonstrated COPCs In Vapour, then you can skip Part B (Potential for COPCs In vapour) and go to Section 5 (Sediment)				
B. Potential for COPCs in vapour				
a. Relative Volatility based on Henry's Law Constant, H _f (dimensionless) High (H _f > 1.0E-1) Moderate (H _f = 1.0E-1 to 1.0E-3) Low (H _f < 1.0E-3) Not Volatile Do Not Know			Reference: US EPA Soil Screening Guidance (Part 5 - Table 36) Provided in Attached Reference Materials	If the Henry's Law Constant for a substance indicates that it is not volatile, and a score of zero is assigned here for relative volatility, then the other three questions in this section on Potential for COPCs will be automatically assigned scores of zero and you can skip to section 5.
Score	2.5			
b. What is the soil grain size? Fine Coarse Do Not Know			Review soil permeability data in engineering reports. The greater the permeability of soils, the greater the possible movement of vapours. Fine-grained soils are defined as those which contain greater than 50% by mass particles less than 75 µm mean diameter (D ₅₀ < 75 µm). Coarse-grained soils are defined as those which contain greater than 50% by mass particles greater than 75 µm mean diameter (D ₅₀ > 75 µm).	
Score	3			
c. Is the depth to the source less than 10m? Yes No Do Not Know			Review groundwater depths below grade for the site.	
Score	2			
d. Are there any preferential pathways? Yes No Do Not Know			Visit the site during dry summer conditions and/or review available photographs. Where bedrock is present, fractures would likely act as preferential pathways.	Preferential pathways refer to areas where vapour migration is more likely to occur because there is lower resistance to flow than in the surrounding materials. For example, underground conduits such as sewer and utility lines, drains, or septic systems may serve as preferential pathways. Features of the building itself that may also be preferential pathways include earthen floors, expansion joints, wall cracks, or foundation perforations for subsurface features such as utility pipes, sumps, and drains.
Score	2			
Potential vapour pathway total	9.5			
Allowed Potential score	9	Note: If a "known" score is provided, the "potential" score is disallowed.		
Vapour pathway total	9			
5. Sediment Movement				
A. Demonstrated migration of sediments containing COPCs				
There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated.	12	Public Works employees are expected to drive vehicles and walk over impacted ground. Sediment movement is considered to be likely.	Review sediment assessment reports. Evidence of migration of contaminants in sediments may usually not be considered a significant concern in lakes/marine environments, but could be very important in rivers where transport downstream could be significant.	
Strongly suspected (based on observations and/or modelling)	9			
Sediments have been contained and there is no indication that sediments will migrate in future, or Absence of sediment exposure pathway (i.e., within 5 km of the site there are no aquatic receiving environments, and therefore no sediments).	0			
Score	12			
NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you can skip Part B (Potential for Sediment Migration) and go to Section 5 (Modifying Factors)				

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for sediment migration				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")? Yes No Do Not Know	4	Note: If a "known" score is provided, the "potential" score is disallowed.	Review existing sediment assessments. If sediment coring has been completed, it may indicate that historically contaminated sediments have been covered over by newer "clean" sediments. This assessment will require that cores collected demonstrate a low concentration near the top and higher concentration with sediment depth. Review existing sediment assessments. If the sediments present at the site are in a river, select "no" for this question. Review existing sediment assessments. It is important that the assessment is made under worst case flows (high yearly flows). Under high yearly flows, areas which are commonly depositional	
b. For lakes and marine habitats, are the contaminated sediments in shallow water and therefore likely to be affected by tidal action, wave action or propeller wash? Yes No Do Not Know	4			
c. For rivers, are the contaminated sediments in an area prone to sediment scouring? Yes No Do Not Know	4			
Potential sediment pathway total	12			
Allowed Potential score	—			
Sediment pathway total	12			
6. Modifying Factors				
Are there subsurface utility conduits in the area affected by contamination? Yes No Do Not Know	0	No underground facilities were located in August 2008.	Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
Known Potential	0 0			

Migration Potential Total

Raw "known" total	50
Raw "potential" total	0.0
Raw combined total	50.0
Total (max 33)	25.8

Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore, the total "Potential" Score may not reflect the sum of the individual "Potential" scores.

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Human				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to humans as a result of the contaminated site. (Class 1 Site)	22		*Where adverse effects on humans are documented, the site should be automatically designated Class 1 site (i.e., action required). There is no need to proceed through the NCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired (e.g. for comparison with other Class 1 sites).	Known adverse impact includes domestic and traditional food sources. Adverse effects based on food chain transfer to humans and/or animals can be scored in this category. However, the weight of evidence must show a direct link of a contaminated food source/supply and subsequent ingestion/transfer to humans. Any associated adverse effects to the environment are scored separately later in this worksheet. Someone experienced must provide a thorough description of the sources researched to evaluate and determine the quantified exposure/impact (adverse effect) in the vicinity of the contaminated site.
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	10	The maximum petroleum hydrocarbon fraction F2 concentration in soil was 69.2 times higher than Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines, the maximum F3 concentration in soil was 96.7 times higher, and the maximum F4 concentration was 8.2 times higher. The samples were collected from the surface of the site.	This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1 for noncarcinogenic chemicals and incremental cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this is typically either >10 ⁻⁶ or >10 ⁻⁵). Known impacts can also be evaluated based on blood testing (e.g. blood lead >10 ug/dL) or other health based testing.	Selected References: Health Canada - Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Health Screening Level Risk Assessment (http://www.hc-sc.gc.ca/ehp/contaminated/index_e.html) United States Environmental Protection Agency, Integrated Risk Information System (IRIS) (http://www.epa.gov/iris/)
No quantified or suspected exposures/impacts in humans.	0		This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 0.2 for non-carcinogenic chemicals and incremental lifetime cancer risks for carcinogenic chemicals that are within acceptable levels as defined by the jurisdiction (for most jurisdictions this is less than either 10 ⁻⁶ or 10 ⁻⁵).	
Score	22			
NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Human Exposure) and go to Section 2 (Human Exposure Modifying Factors)				
B. Potential for human exposure				
a) Land use (provides an indication of potential human exposure scenarios)			Review zoning and land use maps over the distances indicated. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place. Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	This is the main "receptor" factor used in site scoring. A higher score implies a greater exposure and/or exposure of more sensitive human receptors (e.g., children).
Agricultural Residential / Parkland Commercial Industrial Do Not Know				
Score	1.5			
b. Indicate the level of accessibility to the contaminated portion of the site (e.g., the potential for coming in contact with contamination)			Review location and structures and contaminants at the site and determine if there are intervening barriers between the site and humans. A low rating should be assigned to a (covered) site surrounded by a fence or in a remote location, whereas a high score should be assigned to a site that has no cover, fence, natural barriers or buffer.	
Limited barriers to prevent site access; contamination not covered Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered. Controlled access or remote location and contaminants are covered Do Not Know				
Score	1			
B. Potential for human exposure				
c) Potential for intake of contaminated soil, water, sediment or foods for operable or potentially operable pathways, as identified in Worksheet II (Migration Potential).			If soils or potable groundwater are present exceeding their respective CCME guidelines, dermal contact is assumed. Exposure to surface water, non-potable groundwater or sediments exceeding their respective CCME guidelines will depend on the site. Select "Yes" if dermal exposure to surface water, non-potable groundwater or sediments is expected. For instance, dermal contact with sediments would not be expected in an active port. Only soils in the top 1.5 m are defined by CCME (2003) as surface soils. If contaminated soils are only located deeper than 1.5 m, direct contact with soils is not anticipated to be an operable contaminant exposure pathway.	Exposure via the skin is generally believed to be a minor exposure route. However for some organic contaminants, skin exposure can play a very important component of overall exposure. Dermal exposure can occur while swimming in contaminated waters, bathing with contaminated surface water/groundwater and digging in contaminated dirt, etc.
i) direct contact Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated? Yes No Do Not Know				
Score	3			
ii) Inhalation (i.e., inhalation of dust, vapour)			If inhabitable buildings are on the site within 30 m of soils or groundwater exceeding their respective guidelines for volatile chemicals, there is a potential of risk to human health (Health Canada, 2004). Review site investigations for location of soil samples (having exceedances of volatile substances relative to buildings. Refer to (ii) Migration Potential worksheet, 4B) Potential for COPCs in Vapour for a definition of volatility.	Exposure via the lungs (inhalation) can be a very important exposure pathway. Inhalation can be via both particulates (dust) and gas (vapours). Vapours can be a problem where buildings have been built on former industrial sites or where volatile contaminants have migrated below buildings resulting in the potential for vapour intrusion. Assesses the potential for humans to be exposed to vapours originating from site soils. The closer the receptor is to a source of volatile chemicals in soil, the greater the potential of exposure. Also, coarser-grained soil will convey vapour much more efficiently in the soil than finer grained material such as clays and silts.
Vapour - Are there inhabitable buildings on the site within 30 m of soils or groundwater with volatile contamination as determined in Worksheet II (Migration Potential)? Yes No Do Not Know				
Score	3			
Dust - If there is contaminated surface soil (e.g. top 1.5 m), indicate whether the soil is fine or coarse textured. If it is known that surface soil is not contaminated, enter a score of zero. Fine Coarse Surface soil is not contaminated or absent Do Not Know Texture			Consult grain size data for the site. If soils (containing exceedances of the CCME soil quality guidelines) predominantly consist of fine material (having a median grain size of 75 microns); as defined by CCME (2006) then these soils are more likely to generate dusts.	General Notes: Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a vapour migration and/or dust generation in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. Selected References: Canadian Council of Ministers of the Environment (CCME), 2006. Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. PN 1332 (http://www.ccme.ca) Golder, 2004. Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC
Score	0			
Inhalation total	3			

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site	Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for human exposure					
	<p>ii) Ingestion (i.e., ingestion of food items, water and soils (for children), including traditional foods.</p> <p>Drinking Water: Choose a score based on the proximity to a drinking water supply, to indicate the potential for contamination (present or future).</p> <p>0 to 100 m 100 to 300 m 300 m to 1 km 1 to 5 km No drinking water present Do Not Know</p> <p>Score</p> <p>Is an alternative water supply readily available?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Is human ingestion of contaminated soils possible?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Ingestion total</p>	<p>2</p> <p>1</p> <p>3</p> <p>1</p> <p>7</p>	<p>Note if a "Known" Human Health score is provided, the "Potential" score is disabled.</p>	<p>Review available site data to determine if drinking water (groundwater, surface water, private, commercial or municipal supply) is known or suspected to be contaminated above Guidelines for Canadian Drinking Water Quality. If drinking water supply is known to be contaminated, some immediate action (e.g., provision of alternate drinking water supply) should be initiated to reduce or eliminate exposure.</p> <p>The evaluation of significant potential for exceedances of the water supply in the future may be based on the capture zones of the drinking water wells; contaminant travel times; computer modelling of wind and contaminant transport.</p> <p>If contaminated soils are located within the top 1.5 m, it is assumed that ingestion of soils is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely, and the duration is shorter. Refer to human health risk assessment reports for the site in question.</p> <p>Use human health risk assessment reports (or others) to determine if there is significant reliance on traditional food sources associated with the site. Is the food item in question going to spend a large proportion of its time at the site (e.g., large mammals may spend a very small amount of time at a small contaminated site)? Human health risk assessment reports for the site in question will also provide information on potential bioaccumulation of the CDPC in question.</p>	<p>Selected References: Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/hccr-rscce/water/publication/drinking_water_quality_guidelines/hcc.html</p> <p>Drinking water can be an extremely important exposure pathway to humans. If site groundwater or surface water is not used for drinking, then this pathway is considered to be inoperable.</p> <p>Consider both wild foods such as salmon, venison, caribou, as well as agricultural sources of food items if the contaminated site is on or adjacent to agricultural land uses.</p>
	<p>Human Health Total "Potential" Score</p> <p>Allowed "Potential" Score</p>	<p>15.5</p> <p>---</p>			
2. Human Exposure Modifying Factors					
	<p>a) Strong reliance of local people on natural resources for survival (i.e., food, water, shelter, etc.)</p> <p>Yes No Do Not Know</p> <p>Known Potential</p> <p>Raw Human "known" total</p> <p>Raw Human "potential" total</p> <p>Raw Human Exposure Total Score</p> <p>Human Health Total (max 22)</p>	<p>Yes</p> <p>6</p> <p>28</p> <p>0</p> <p>28</p> <p>22.0</p>	<p>Potable water supply is local: Strong reliance of community on local foods which include fish from Peace River.</p>		
3. Ecological					
A. Known exposure					
	<p>Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to terrestrial or aquatic organisms as a result of the contaminated site.</p> <p>Score</p> <p>Same as above, but "Strongly Suspected" based on observations or indirect evidence.</p> <p>Score</p> <p>No quantified or suspected exposures/impacts in terrestrial or aquatic organisms</p> <p>Score</p>	<p>18</p> <p>12</p> <p>0</p> <p>18</p> <p>18</p>	<p>The concentrations of petroleum hydrocarbon fractions F2 thru F4 exceeded Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines in surface soil samples (0 to 0.8 m depth). Groundwater concentrations of Cadmium, Lead, and Selenium were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life and the site is approximately 0.5 km north of the Peace River.</p>	<p>Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are deemed to be severe, the site may be categorized as class one (i.e., a priority for remediation or risk management), regardless of the numerical total NCS score. For the purpose of application of the NCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. If ecological effects are determined to be severe and an automatic Class 1 is assigned, there is no need to proceed through the NCS. However, a scoring guideline (18) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites).</p> <p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1. Alternatively, known impacts can also be evaluated based on a weight of evidence assessment involving a combination of site observations, tissue testing, toxicity testing and quantitative community assessments. Scoring of adverse effects on individual rare or endangered species will be completed on a case-by-case basis with full scientific justification.</p> <p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 1 and no other observable or measurable sign of impacts. Alternatively, it can be based on a combination of other lines of evidence showing no adverse effects, such as site observations, tissue testing, toxicity testing and quantitative community assessments.</p>	<p>CCME, 1999: Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Use www.ccme.ca Sensitive receptors- review, Canadian Council on Ecological Areas www.ccea.org</p> <p>Ecological effects should be evaluated at a population or community level, as opposed to at the level of individuals. For example, population-level effects could include reduced reproduction, growth or survival in a species. Community-level effects could include reduced species diversity or relative abundance. Further discussion of ecological assessment endpoints is provided in <i>Framework for Ecological Risk Assessment: General Guidance</i> (CCME 1999).</p> <p>Notes: Someone experienced must provide a thorough description of the sources researched to classify the environmental receptors in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.</p>
<p>NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)</p>					

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for ecological exposure (for the contaminated portion of the site)				
a) Terrestrial				
i) Land use				
Agricultural (or Wild lands) Residential/Parkland Commercial Industrial Do Not Know	Score 1.5		Review zoning and land use maps. If the proposed future land use is <i>more intensive</i> than the current land use, evaluate this factor assuming the proposed future use is in place (indicate in the worksheet that future land use is the consideration). Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Wild lands are grouped with agricultural land due to the similarities in receptors that would be expected to occur there (e.g., herbivorous mammals and birds) and the similar need for a high level of protection to ensure ecological functioning. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	
ii) Uptake potential				
Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site? Yes No Do Not Know	Score 1		If contaminated soils are located within the top 1.5 m, it is assumed that direct contact of soils with plants and soil invertebrates is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely.	
iii) Ingestion (i.e., wildlife or domestic animals ingesting contaminated food items, soils or water)				
Are terrestrial animals likely to be ingesting contaminated water at the site? Yes No Do Not Know	Score 1		Refer to an Ecological Risk Assessment for the site. If there is contaminated surface water at the site, assume that terrestrial organisms will ingest it.	
Are terrestrial animals likely to be ingesting contaminated soils at the site? Yes No Do Not Know	Score 1		Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.	
Can the contamination identified bioaccumulate? Yes No Do Not Know	Score 1		Bioaccumulation of contaminants within food items is considered possible if: 1) The Log(K _{ow}) of the contaminant is greater than 4 (as per the chemical characteristics worksheet) and concentrations in soils exceed the most conservative CCME soil quality guideline for the intended land use, or 2) The contaminant in collected tissue samples exceeds the Canadian Tissue Residue Guidelines.	
Distance to sensitive terrestrial ecological area 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score 1.5		It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor located within this area of the site will be subject to further evaluations. It is also considered that any environmental receptor located greater than 5 km will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance; arctic environments (on a site specific basis); nature preserves, habitats for species at risk, sensitive forests, natural parks or forests.
Raw Terrestrial Total Potential Allowed Terrestrial Total Potential	7 —	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
B. Potential for ecological exposure (for the contaminated portion of the site)				
b) Aquatic				
i) Classification of aquatic environment				
Sensitive Typical Not Applicable (no aquatic environment present) Do Not Know	Score 2		"Sensitive aquatic environments" include those in or adjacent to shellfish or fish harvesting areas, marine parks, ecological reserves and fish migration paths. Also includes those areas deemed to have ecological significance such as for fish food resources, spawning areas or having rare or endangered species. "Typical aquatic environments" include those in areas other than those listed above.	
ii) Uptake potential				
Does groundwater daylighting to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact? Yes No (or Not Applicable) Do Not Know	Score 1		Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways: 1) by comparing collected nearshore groundwater concentrations to the CCME water quality guidelines (this will be a conservative comparison, as contaminant concentrations in groundwater often decrease between nearshore wells and the point of discharge). 2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge. 3) by installing water samplers, "peepers", in the sediments in the area of daylighting groundwater	
Distance from the contaminated site to an important surface water resource 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score 1.5		It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor or important water resource located within this area of the site will be subject to further evaluation. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and lens and other aquatic environments.
		Bioaccumulation of food items is possible if:		

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site	Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
	Are aquatic species (i.e., forage fish, invertebrates or plants) that are consumed by predatory fish or wildlife consumers, such as mammals and birds, likely to accumulate contaminants in their tissues? Yes No Do Not Know	1		1) The Log(flow) of the contaminant is greater than 4 (as per the chemical characteristics work sheet and concentrations in sediments exceed the CCME ISQG). 2) The contaminant in collected tissue samples exceeds the CCME tissue quality guidelines.	
	Raw Aquatic Total Potential Allowed Aquatic Total Potential	5.5 —	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
4. Ecological Exposure Modifying Factors					
a) Known occurrence of a species at risk.	Is there a potential for a species at risk to be present at the site? Yes No Do Not Know	Do Not Know 1	Not known if a species at risk is present at the site.	Consult any ecological risk assessment reports. If information is not present, utilize on-line database such as Eco Explorer, Regional, Provincial (Environment Ministries), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance.	Species at risk include those that are extirpated, endangered, threatened, or of special concern. For a list of species at risk, consult Schedule 1 of the federal Species at Risk Act (http://www.sar.govt.ca/species/schedule1_sarfm.html). Many provincial governments may also provide regionally applicable lists of species at risk. For example, in British Columbia, consult: BCNWRAP, 2005. Endangered Species and Ecosystems in British Columbia. Provincial red and blue lists. Ministry of Sustainable Resource Management and Water, Land and Air Protection (http://srmwww.gov.bc.ca/str/ps/red-blue.htm)
b) Potential Impact of aesthetics (e.g., enrichment of a lake or tainting of food flavor).	Is there evidence of aesthetic impact to receiving water bodies? Yes No Do Not Know Is there evidence of olfactory impact (i.e., unpleasant smell)? Yes No Do Not Know Is there evidence of increase in plant growth in the lake or water body? Yes No Do Not Know Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different? Yes No Do Not Know	Do Not Know 1 No 0 No 0 Do Not Know 1	Peace River has high flow. Do not know if the aesthetics will be impacted.	Documentation may consist of environmental investigation reports, press articles, petitions or other records. Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat. A distinct increase of plant growth in an aquatic environment may suggest enrichment. Nutrients e.g., nitrogen or phosphorus releases to an aquatic body can act as a fertilizer. Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.	This item will require some level of documentation by user, including contact names, addresses, phone numbers, e-mail addresses. Evidence of changes must be documented, please attach copy of report containing relevant information.
	Ecological Modifying Factors Total - Known Ecological Modifying Factors Total - Potential Raw Ecological Total - Known Raw Ecological Total - Potential Raw Ecological Total Ecological Total (Max 18)	0 3 18 3 21 18.0			
5. Other Potential Contaminant Receptors					
a) Exposure of permafrost (leading to erosion and structural concerns)	Are there improvements (roads, buildings) at the site dependent upon the permafrost for structural integrity? Yes No Do Not Know Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment? Yes No Do Not Know	No 0 Do Not Know 1	Do not know.	Consult engineering reports, site plans or air photos of the site. When permafrost melts, the stability of the soil decreases, leading to erosion. Human structures, such as roads and/or buildings are often dependent on the stability that the permafrost provides. Melting permafrost leads to a decreased stability of underlying soils. Wind or surface run-off erosion can carry soils into nearby aquatic habitats. The increased soil loadings into a river can cause an increase in total dissolved solids and a resulting decrease in aquatic habitat quality. In addition, the erosion can bring contaminants from soils to aquatic environments.	Plants and lichens provide a natural insulating layer which will help prevent thawing of the permafrost during the summer. Plants and lichens may also absorb less solar radiation. Solar radiation is turned into heat which can also cause underlying permafrost to melt.
	Other Potential Receptors Total - Known Other Potential Receptors Total - Potential	0 1			
Exposure Total					
	Raw Human Health + Ecological Total - Known Raw Human Health + Ecological Total - Potential Raw Total Exposure Total (max 34)	48 4 50 37.0	Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.		

**CCME National Classification System (2008)
Score Summary**

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCS completely.

I. Contaminant Characteristics	Known	Potential
1. Residency Media	2	—
2. Chemical Hazard	8	—
3. Contaminant Exceedance Factor	4	—
4. Contaminant Quantity	6	—
5. Modifying Factors	2	—
Raw Total Score	22	0
Raw Total Score (Known + Potential)	22	
Adjusted Total Score (Raw Total / 40 * 33)	18.2 (max 33)	

II. Migration Potential	Known	Potential
1. Groundwater Movement	9	—
2. Surface Water Movement	8	—
3. Soil	12	—
4. Vapour	9	—
5. Sediment Movement	12	—
6. Modifying Factors	0	0
Raw Total Score	50	0
Raw Total Score (Known + Potential)	50	
Adjusted Total Score (Raw Total / 64 * 33)	25.8 (max 33)	

III. Exposure	Known	Potential
1. Human Receptors		
A. Known Impact	22	—
B. Potential		—
a. Land Use		—
b. Accessibility		—
c. Exposure Route		—
i. Direct Contact		—
ii. Inhalation		—
iii. Ingestion		—
2. Human Receptors Modifying Factors	6	—
Raw Total Human Score	28	0
Raw Total Human Score (Known + Potential)	28	
Adjusted Total Human Score	22.0 (maximum 22)	
3. Ecological Receptors		
A. Known Impact	18	—
B. Potential		—
a. Terrestrial		—
b. Aquatic		—
4. Ecological Receptors Modifying Factors	0	3
Raw Total Ecological Score	18	3
Raw Total Ecological Score (Known + Potential)	21	
Adjusted Total Ecological Score	18.0 (maximum 18)	
5. Other Receptors	0	1
Total Other Receptors Score (Known + Potential)	1	
Total Exposure Score (Human + Ecological + Other)	41.0	
Adjusted Total Exposure Score (Total Exposure / 46 * 34)	30.3 (max 34)	

Site Score	
Test Site	
Site Letter Grade	A
Certainty Percentage	100%
% Responses that are "Do Not Know"	-59%
Total NCSCS Score for site	74.2
Site Classification Category	1

Site Classification Categories*:

- Class 1 - High Priority for Action (Total NCS Score >70)
- Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
- Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
- Class N - Not a Priority for Action (Total NCS Score <37)
- Class INS - Insufficient Information (>15% of responses are "Do Not Know")

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

**CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions**

Subject Site:	Test Site	
Civic Address: <i>(or other description of location)</i>	On the north shore of the Peace River, approximately 220 km east of High Level, Alberta, in Wood Buffalo National Park	
Site Common Name : <i>(if applicable)</i>	Community of Garden River	
Site Owner or Custodian: <i>(Organization and Contact Person)</i>	Parks Canada Agency	
Legal description or metes and bounds:	N 58°42.5', W113°52.0'	
Approximate Site area:		
PID(s) : <i>(or Parcel Identification Numbers [PIN] if untitled Crown land)</i>	Garden River Airstrip (FCSI #00022199)	
Centre of site: <i>(provide latitude/longitude or UTM coordinates)</i>	Latitude:	_____ degrees _____ min _____ secs
	Longitude:	_____ degrees _____ min _____ secs
	UTM Coordinate:	Northing Easting
Site Land Use:	Current:	Commercial/Industrial
	Proposed:	Commercial/Industrial
Site Plan	To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.	
Provide a brief description of the Site:	<p style="text-align: center;">The Garden River Airstrip is located north of the community of Garden River (see attached Site Plan).</p>	

CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions

Affected media and Contaminants of Potential Concern (COPC):	The concentration of petroleum hydrocarbon fractions F1 and F2 in one sample exceeded Alberta Environment 2008 Soil and Groundwater Remediation Guidelines. The concentrations of dissolved Cadmium, Selenium, and Zinc in three monitoring wells exceeded Canadian Council of Ministers of the Environment 2007 Canadian water quality guidelines for the protection of aquatic life. The concentrations of dissolved Manganese in three monitoring wells exceeded Health Canada 2008 Guidelines for Canadian drinking water quality.
--	--

Please fill in the "letter" that best describes the level of information available for the site being assessed:

Site Letter Grade

If letter grade is F, do not continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent.

Scoring Completed By:	Cathy Hamlen, Ph.D. A.Ag.
Date Scoring Completed:	6-Feb-09

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes	
1. Residency Media (replaces physical state)					
Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines? yes = has an exceedance or strongly suspected to have an exceedance no = does not have an exceedance or strongly suspected not to have an exceedance			The overall score is calculated by adding the individual scores from each residency media (having one or more exceedance of the most conservative media specific and land-use appropriate CCME guideline). Summary tables of the Canadian Environmental Quality Guidelines for soil, water (aquatic life, non-potable groundwater environments, and agricultural water uses) and sediment are available on the CCME website at http://www.ccme.ca/publications/ceqg_rcoe.html?category_id=124 . For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guides_recom/index_e.html .	An increasing number of residency media containing chemical exceedances often equates to a greater potential risk due to an increase in the number of potential exposure pathways.	
A. Soil	No	Twelve soil samples and three groundwater monitoring wells were assessed. Refer to <i>Contaminated Site Assessment, Initial and Detailed Testing Programs, Wood Buffalo National Park, Various Locations in the Community of Garden River, Alberta</i> (EBA Consulting Engineers Ltd., 2009).			
Yes	0				
No					
Do Not Know					
B. Groundwater	Yes				
Yes	2				
No					
Do Not Know					
C. Surface water	No				
Yes	0				
No					
Do Not Know					
D. Sediment	No				
Yes	0				
No					
Do Not Know					
"Known" -score	2				
"Potential" - score	--				
2. Chemical Hazard					
What is the relative degree of chemical hazard of the contaminant in the list of hazard rankings proposed by the Federal Contaminated Sites Action Plan (FCSAP)? High Medium Low Do Not Know	High	Petroleum hydrocarbon fraction F1 (soil) is High and fraction F2 (soil) is Medium; Cadmium (groundwater) is High, Selenium (groundwater) is Medium, and Manganese and Zinc (groundwater) are Low.	The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site. The degree of hazard has been defined by the Federal Contaminated Sites Action Plan (FCSAP) and a list of substances with their associated hazard (Low, Medium and High) has been provided as a separate sheet in this file. <i>See Attached Reference Material for Contaminant Hazard Rankings.</i>	Hazard as defined in the revised NCS pertains to the physical properties of a chemical which can cause harm. Properties can include toxic potency, propensity to biomagnify, persistence in the environment, etc. Although there is some overlap between hazard and contaminant exceedance factor below, it will not be possible to derive contaminant exceedance factors for many substances which have a designated chemical hazard designation, but don't have a CCME guideline. The purpose of this category is to avoid missing a measure of toxic potential.	
"Known" -score	8				
"Potential" - score	--				
3. Contaminant Exceedance Factor					
What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")? Mobile NAPL High (>100x) Medium (10x to 100x) Low (1x to 10x) Do Not Know	Medium (10x to 100x)	The petroleum hydrocarbon fraction F1 concentration in soil was 22.5 times higher than Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines and the F2 concentration in soil was 24.6 times higher than Alberta Environment 2008 Tier 1 guideline; The maximum groundwater Manganese concentration was 2.48 times higher than Health Canada 2008 Guideline for Canadian Drinking Water Quality; The maximum groundwater Cadmium concentration was 1.03 times higher than the CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life, the maximum groundwater Selenium concentration was 21.4 times higher than the 2007 CCME guideline, and the maximum groundwater Zinc concentration was 3.2 times higher than the 2007 CCME guideline.	Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the <i>most conservative media-specific and land-use appropriate CCME environmental quality guidelines</i> . Ranking should be based on contaminant with greatest exceedance of CCME guidelines. Ranking of contaminant hazard as high, medium and low is as follows: High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines Mobile NAPL = Contaminant is a non-aqueous phase liquid (i.e., due to its low solubility, it does not dissolve in water, but remains as a separate liquid) and is present at a sufficiently high saturation (i.e., greater than residual NAPL saturation) such that there is significant potential for mobility either downwards or laterally. Other standards may include local background concentration or published toxicity benchmarks. Results of toxicity testing with site samples can be used as an alternative. This approach is only relevant for contaminants that do not biomagnify in the food web, since toxicity tests would not indicate potential effects at higher trophic levels. High = lethality observed. Medium = no lethality, but sub lethal effects observed. Low = neither lethal nor sub lethal effects observed.	In the event that elevated levels of a material with no associated CCME guidelines are present, check provincial and USEPA environmental criteria. Hazard Quotients (sometimes referred to as a screening quotient in risk assessments) refer to the ratio of measured concentration to the concentration believed to be the threshold for toxicity. A similar calculation is used here to determine the contaminant exceedance factor (CEF). Concentrations greater than one times the applicable CCME guideline (i.e., CEF=>1) indicate that risks are possible. Mobile NAPL has the highest associated score (8) because of its highly concentrated nature and potential for increase in the size of the impacted zone.	
"Known" -score	4				
"Potential" - score	--				

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
4. Contaminant Quantity (known or strongly suspected)				
What is the known or strongly suspected quantity of all contaminants? >10 hectare (ha) or 5000 m ³ 2 to 10 ha or 1000 to 5000 m ³ <2 ha or 1000 m ³ Do Not Know	>10 hectare (ha) or 5000 m ³ ---	The soil concentrations of petroleum hydrocarbon fractions F1 and F2 that exceeded Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines were detected in an area of approximately 1,600 m ² . The groundwater monitoring wells with concentrations of COPC exceeding CCME 2007 Canadian Water Quality Guidelines for the protection of aquatic life covered an area of approximately 10,000 m ² .	Measure or estimate the area or quantity of total contamination (i.e. all contaminants known or strongly suspected to be present on the site). The "Area of Contamination" is defined as the area or volume of contaminated media (soil, sediment, groundwater, surface water) exceeding appropriate environmental criteria.	A larger quantity of a potentially toxic substance can result in a larger frequency of exposure as well as a greater probability of migration, therefore, larger quantities of these substances earn a higher score.
"Known" - score	9			
"Potential" - score	---			
5. Modifying Factors				
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment? Yes No Do Not Know	No 0	Chemicals do not persist.	Persistent chemicals, e.g., PCBs, chlorinated pesticides etc. either do not degrade or take longer to degrade, and therefore may be available to cause effects for a longer period of time. Canadian Environmental Protection Act (CEPA) classifies a chemical as persistent when it has at least one of the following characteristics: (a) in air, (i) its half-life is equal to or greater than 2 days, or (ii) it is subject to atmospheric transport from its source to a remote area; (b) in water, its half-life is equal to or greater than 182 days; (c) in sediments, its half-life is equal to or greater than 365 days; or (d) in soil, its half-life is equal to or greater than 182 days. This list does not include metals or metalloids, which in their elemental form do not degrade. However metals and metalloids form chemical species in the environment, many of which are not readily bioavailable.	<i>Examples of Persistent Substances are provided in attached Reference Materials</i>
Are there contaminants present that could cause damage to utilities and infrastructure, either now or in the future, given their location? Yes No Do Not Know	No 0			Some contaminants may react or absorb into underground utilities and infrastructure. For example, organic solvents may degrade some plastics, and salts could cause corrosion of metal.
How many different contaminant classes have representative CCME guideline exceedances? one two to four five or more Do Not Know	two to four 2	Cadmium, Selenium, and Zinc in groundwater.	For the purposes of the revised NCS ranking system, the following chemicals represent distinct chemical "classes": Inorganic substances (including metals), volatile petroleum hydrocarbons, light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons, PAHs, phenolic substances, chlorinated hydrocarbons, halogenated methanes, phthalate esters, pesticides.	<i>Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.</i>
"Known" - Score	2			
"Potential" - Score	---			

Contaminant Characteristic Total

Raw Total Scores- "Known"	25
Raw Total Scores- "Potential"	0
Raw Combined Total Scores	25
Total Score (Raw Combined / 40 * 33)	20.6

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Groundwater Movement				
A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary.				
<p>i) For potable groundwater environments 1) groundwater concentrations exceed background concentrations and 1X the Guideline for Canadian Drinking Water Quality (GCDWQ) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater contamination. For non-potable environments (typically urban environments with municipal services): 1) groundwater concentrations exceed 1X the applicable non-potable guidelines or modified generic guidelines (which exclude ingestion of drinking water pathway) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater impacts.</p> <p>ii) Same as (i) except the information is not known but is <u>strongly suspected</u> based on indirect observations.</p> <p>iii) Meets GCDWQ for potable environments meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for non-potable environments or Absence of groundwater exposure pathway (i.e., there is no aquifer (see definition at right) at the site or there is an adequate isolating layer between the aquifer and the contamination, and within 5 km of the site there are no aquatic receiving environments and the groundwater does not daylight).</p>	12	<p>Selenium concentration in one monitoring well exceeded maximum acceptable concentration for drinking water (Health Canada 2008 Guidelines for Canadian Drinking Water Quality). Manganese in groundwater exceeded drinking water aesthetic objective (Health Canada 2008). Cadmium, Selenium, and Zinc concentrations exceeded guideline for protection of fresh water aquatic life (CCME, 2007). Hydraulic conductivity is in the order of 10 m/s at the site.</p>	<p>Review chemical data and evaluate groundwater quality.</p> <p>The evaluation method concentrates on 1) a potable or non-potable groundwater environment; the groundwater flow system and its potential to be an exposure pathway to known or potential receptors</p> <p>An aquifer is defined as a geologic unit that yields groundwater in usable quantities and drinking water quality. The aquifer can currently be used as a potable water supply or could have the potential for use in the future. Non-potable groundwater environments are defined as areas that are serviced with a reliable alternative water supply (most commonly provided in urban areas). The evaluation of a non-potable environment will be based on a site specific basis.</p> <p>Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils.</p> <p>Seeps and springs are considered part of the groundwater pathway.</p> <p>In Arctic environments, the potability and evaluation of the seasonal active layer (above the permafrost) as a groundwater exposure pathway will be considered on a site-specific basis.</p>	<p>The 1992 NCS rationale evaluated the off-site migration as a regulatory issue. The exposure assessment and classification of hazards should be evaluated regardless of the property boundaries.</p> <p>Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a groundwater supply source in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links.</p> <p>Note that for potable groundwater that also daylights into a nearby surface water body, the more stringent guidelines for both drinking water and protection of aquatic life should be considered.</p> <p>Selected References</p> <p>Potable Environments</p> <p>Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/ewh-spm/wubs/water/gau/gac_suo-soultium_guide-res_recom/index_e.html</p> <p>Non-Potable Environments</p> <p>Canadian Water Quality Guidelines for Protection of Aquatic Life. CCME, 1999 www.ccme.ca</p> <p>Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations, Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.</p>
<p>NOTE: If a score is assigned here for Known COPC Exceedances, then you can skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)</p>				
B. Potential for groundwater pathway.				
<p>a. Relative Mobility</p> <p>High Moderate Low Insignificant Do Not Know</p>			<p>Organics Koc (L/kg)</p> <p>Metals with higher mobility at acidic conditions pH < 5</p> <p>Metals with higher mobility at alkaline conditions pH > 8.5</p> <p>Koc < 500 (i.e., log Koc < 2.7) pH < 5 pH > 8.5 Koc = 500 to 5000 (i.e., log Koc = 2.7 to 3.7) pH = 5 to 6 pH = 7.5 to 8.5 Koc = 5,000 to 100,000 (i.e., log Koc = 3.7 to 5) pH > 6 pH > 7.5 Koc > 100,000 (i.e., log Koc > 5)</p>	<p>Reference: US EPA Soil Screening Guidance (Part 5 - Table 3b)</p> <p>If a score of zero is assigned for relative mobility, it is still recommended that the following sections on potential for groundwater pathway be evaluated and scored. Although the Koc of an individual contaminant may suggest that it will be relatively immobile, it is possible that, with complex mixtures, there could be enhanced mobility due to co-solvent effects. Therefore, the Koc cannot be relied on solely as a measure of mobility. An evaluation of other factors such as containment, thickness of confining layer, hydraulic conductivities and precipitation infiltration rate are still useful in predicting potential for groundwater migration, even if a contaminant is expected to have insignificant mobility based on its chemistry alone.</p>
<p>b. Presence of engineered sub-surface containment?</p> <p>No containment Partial containment Full containment Do Not Know</p>			<p>Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved.</p> <p>Full containment is defined as an engineered system or natural attenuation processes, monitored as being effective, which provides for full capture and/or treatment of contaminants. All chemicals of concern must be contained for "Full Containment" scoring. Natural attenuation must have sufficient data, and reports cited with monitoring data to support steady state conditions and the attenuation processes. If there is no containment or insufficient natural attenuation process, this category is evaluated as high. If there is less than full containment or if uncertain, then evaluate medium. In Arctic environments, permafrost will be evaluated, as appropriate, based on detailed evaluations, effectiveness and reliability to contain/control contaminant migration.</p>	<p>Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links.</p> <p>Selected Resources:</p> <p>United States Environmental Protection Agency (USEPA) 1988, Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.</p> <p>Environment Canada - Ontario Region - Natural Attenuation Technical Assistance Bulletin (TABs) Number 10-21.</p>
<p>c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway</p> <p>3 m or less including no confining layer or discontinuous confining layer 3 to 10 m > 10 m Do Not Know</p>			<p>The term "confining layer" refers to geologic material with little or no permeability or hydraulic conductivity (such as unfractured clay); water does not pass through this layer or the rate of movement is extremely slow.</p> <p>Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway.</p> <p>The evaluation of this category is based on:</p> <p>1) The presence and thickness of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as drinking water sources or</p> <p>2) The presence and thickness of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated zone (e.g., water table aquifer, first hydrostratigraphic unit or other groundwater pathway).</p>	
<p>d. Hydraulic conductivity of confining layer</p> <p>>10⁻⁶ cm/s or no confining layer 10⁻⁶ to 10⁻⁸ cm/s <10⁻⁸ cm/s Do Not Know</p>			<p>Determine the nature of geologic materials and estimate hydraulic conductivity from published material (or use "Range of Values of Hydraulic Conductivity and Permeability" figure in the Reference Material sheet). Unfractured clays should be scored low. Silt should be scored medium. Sand, gravel should be scored high. The evaluation of this category is based on:</p> <p>1) The presence and hydraulic conductivity (K) of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as a drinking water source, groundwater exposure pathway or</p> <p>2) The presence and permeability (K) of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated water table aquifer, first hydrostratigraphic unit or other groundwater pathway.</p>	

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
<p>c. Topography</p> <p>Contaminants above ground level and slope is steep Contaminants at or below ground level and slope is steep Contaminants above ground level and slope is intermediate Contaminants at or below ground level and slope is intermediate Contaminants above ground level and slope is flat Contaminants at or below ground level and slope is flat Do Not Know</p>	1		<p>Review engineering documents on the topography of the site and the slope of surrounding terrain.</p> <p>Steep slope = >50% Intermediate slope = between 5 and 50% Flat slope = < 5% Note: Type of fill placement (e.g., trench, above ground, etc.).</p>	
<p>d. Run-off potential</p> <p>High (rainfall run-off score > 0.6) Moderate (0.4 < rainfall run-off score < 0.8) Low (0.2 < rainfall run-off score < 0.4) Very Low (0 < rainfall run-off score < 0.2) None (rainfall run-off score = 0) Do Not Know</p>	0.4		<p>Rainfall Refer to Environment Canada precipitation records for relevant areas. Divide rainfall by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score). The former definition of annual rainfall did not include the precipitation as snow. This minor adjustment has been made. The second modification was the inclusion of permeability of surface materials as an evaluation factor.</p> <p>Permeability For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1). Multiply the infiltration factor with precipitation factor to obtain rainfall run off score.</p>	<p>Selected Sources: Environment Canada web page link www.msc.ec.gc.ca Snow to rainfall conversion apply ratio of 15 (snow):1(water)</p>
<p>e. Flood potential</p> <p>1 in 2 years 1 in 10 years 1 in 50 years Do Not Know</p>	0.5		<p>Review published data such as flood plain mapping or flood potential (e.g., spring or mountain run off) and Conservation Authority records to evaluate flood potential of nearby water courses both up and down gradient. Rate zero if site not in flood plain.</p>	
Potential surface water pathway total	0.9			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Surface water pathway total	8			
3. Surface Soils (potential for dust, dermal and ingestion exposure)				
A. Demonstrated concentrations of COPC in surface soils (top 1.5 m)				
<p>COPCs measured in surface soils exceed the CCME soil quality guideline.</p> <p>Strongly suspected that soils exceed guidelines</p> <p>COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock).</p>	12 9 0	<p>The concentrations of petroleum hydrocarbon fractions F1 and F2 exceeded Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines in one surface soil sample (0 - 0.6 m depth). The risk is minimized since the area has full vegetative cover.</p>	<p>Collect all available information on quality of surface soils (i.e., top 1.5 metres) at the site. Evaluate available data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (i.e., agricultural, residential/peri-domestic, commercial, or industrial), and soil texture if applicable (i.e., coarse or fine).</p>	<p>Selected References: CCME, 1999, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health www.ccme.ca</p>
	12			
NOTE: If a score is assigned here for Demonstrated Concentrations in Surface Soils, then you can skip Part B (Potential for a surface soils migration pathway) and go to Section 4 (Vapour)				
B. Potential for a surface soils (top 1.5 m) migration pathway				
<p>a. Are the soils in question covered?</p> <p>Exposed Vegetated Landscaped Paved Do Not Know</p>	4		<p>Consult engineering or risk assessment reports for the site. Alternatively, review photographs or perform a site visit. Landscaped surface soils must include a minimum of 0.5 m of topsoil.</p>	<p>The possibility of contaminants in blowing snow have not been included in the revised NCS as it is difficult to assess what constitutes an unacceptable concentration and secondly, spills to snow or ice are most efficiently mitigated while freezing conditions remain.</p>
<p>b. For what proportion of the year does the site remain covered by snow?</p> <p>0 to 10% of the year 10 to 30% of the year More than 30% of the year Do Not Know</p>	3		<p>Consult climatic information for the site. The increments represent the full span from soils which are always wet or covered with snow (and therefore less likely to generate dust) to those soils which are predominantly dry and not covered by snow (and therefore are more likely to generate dust).</p>	
Potential surface soil pathway total	7			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Soil pathway total	12			

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
4. Vapour				
A. Demonstrated COPCs in vapour.				
Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations.	12	The concentration of petroleum hydrocarbons (fractions F1 and F2) exceeded Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines in one surface sample. The soil sample was collected approximately 150 m east of a Parks Canada Cabin.	Consult previous investigations, including human health risk assessments, for reports of vapours detected.	
Strongly suspected (based on observations and/or modelling)	9			
Vapour has not been measured and volatile hydrocarbons have not been found in site soils or groundwater.	0			
Score	9			
NOTE: If a score is assigned here for Demonstrated COPCs in Vapour, then you can skip Part B (Potential for COPCs in vapour) and go to Section 5 (Sediment)				
B. Potential for COPCs in vapour				
a. Relative Volatility based on Henry's Law Constant, H [†] (dimensionless) High (H [†] > 1.0E-1) Moderate (H [†] = 1.0E-1 to 1.0E-3) Low (H [†] < 1.0E-3) Not Volatile Do Not Know			Reference: US EPA Soil Screening Guidance (Part 5 - Table 36) Provided in Attached Reference Materials	If the Henry's Law Constant for a substance indicates that it is not volatile, and a score of zero is assigned here for relative volatility, then the other three questions in this section on Potential for COPCs will be automatically assigned scores of zero and you can skip to section 5.
Score	2.5			
b. What is the soil grain size? Fine Coarse Do Not Know			Review soil permeability data in engineering reports. The greater the permeability of soils, the greater the possible movement of vapours. Fine-grained soils are defined as those which contain greater than 50% by mass particles less than 75 µm mean diameter (D50 < 75 µm). Coarse-grained soils are defined as those which contain greater than 50% by mass particles greater than 75 µm mean diameter (D50 > 75 µm).	
Score	3			
c. Is the depth to the source less than 10m? Yes No Do Not Know			Review groundwater depths below grade for the site.	
Score	2			
d. Are there any preferential pathways? Yes No Do Not Know			Visit the site during dry summer conditions and/or review available photographs. Where bedrock is present, fractures would likely act as preferential pathways.	Preferential pathways refer to areas where vapour migration is more likely to occur because there is lower resistance to flow than in the surrounding materials. For example, underground conduits such as sewer and utility lines, drains, or septic systems may serve as preferential pathways. Features of the building itself that may also be preferential pathways include earthen floors, expansion joints, wall cracks, or foundation perforations for subsurface features such as utility pipes, sumps, and drains.
Score	2			
Potential vapour pathway total	9.5			
Allowed Potential score	—			
Vapour pathway total	9	Note: If a "known" score is provided, the "potential" score is disallowed.		
5. Sediment Movement				
A. Demonstrated migration of sediments containing COPCs				
There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated.	12	The site has full vegetative cover and sediment movement is considered to be unlikely.	Review sediment assessment reports. Evidence of migration of contaminants in sediments must be reported by someone experienced in this area.	Usually not considered a significant concern in lakes/marine environments, but could be very important in rivers where transport downstream could be significant.
Strongly suspected (based on observations and/or modelling)	9			
Sediments have been contained and there is no indication that sediments will migrate in future, or Absence of sediment exposure pathway (i.e., within 5 km of the site there are no aquatic receiving environments, and therefore no sediments).	0			
Score	9			
NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you can skip Part B (Potential for Sediment Migration) and go to Section 6 (Modifying Factors)				

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for sediment migration				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")? Yes No Do Not Know	4		Review existing sediment assessments. If sediment coring has been completed, it may indicate that historically contaminated sediments have been covered over by newer "clean" sediments. This assessment will require that cores collected demonstrate a low concentration near the top and higher concentration with sediment depth.	
b. For lakes and marine habitats, are the contaminated sediments in shallow water and therefore likely to be affected by tidal action, wave action or propeller wash? Yes No Do Not Know	4		Review existing sediment assessments. If the sediments present at the site are in a river, select "no" for this question.	
c. For rivers, are the contaminated sediments in an area prone to sediment scouring? Yes No Do Not Know	4		Review existing sediment assessments. It is important that the assessment is made under worst case flows (high yearly flows). Under high yearly flows, areas which are commonly depositional	
Potential sediment pathway total	12			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Sediment pathway total	9			
6. Modifying Factors				
Are there subsurface utility conduits in the area affected by contamination? Yes No Do Not Know	No	No underground facilities were located in March 2008.	Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
	Known Potential	0 0		

Migration Potential Total

Raw "known" total	47
Raw "potential" total	0.0
Raw combined total	47.0
Total [max 33]	24.2

Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore, the total "Potential" Score may not reflect the sum of the individual "Potential" scores.

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Human				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to humans as a result of the contaminated site. (Class 1 Site)	22	The soil concentration of petroleum hydrocarbon fraction F1 was 22.5 times higher than Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines and the soil concentration of F2 was 24.6 times higher than Alberta Environment 2008 Tier 1 guideline. The sample was collected from the eastern edge of the site. The groundwater concentration of Selenium in one monitoring well exceeded maximum acceptable concentration for drinking water (Health Canada 2008). The monitoring well is located near the Parks Canada shed.	Where adverse effects on humans are documented, the site should be automatically designated Class 1 site (i.e., action required). There is no need to proceed through the NCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites). This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1 for noncarcinogenic chemicals and incremental cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this is typically either >10 ⁻⁶ or >10 ⁻⁵). Known impacts can also be evaluated based on blood testing (e.g. blood lead >10 ug/dL) or other health based testing. This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 0.2 for non-carcinogenic chemicals and incremental lifetime cancer risks for carcinogenic chemicals that are within acceptable levels as defined by the jurisdiction (for most jurisdictions this is less than either 10 ⁻⁶ or 10 ⁻⁵).	Known adverse impact includes domestic and traditional food sources. Adverse effects based on food chain transfer to humans and/or animals can be scored in this category. However, the weight of evidence must show a direct link of a contaminated food source/supply and subsequent ingestion/transfer to humans. Any associated adverse effects to the environment are scored separately later in this worksheet. Someone experienced must provide a thorough description of the sources researched to evaluate and determine the quantified exposure/impact (adverse effect) in the vicinity of the contaminated site. Selected References: Health Canada- Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Health Screening Level Risk Assessments www.hc-sc.gc.ca/wch-sant/contam/index_e.html United States Environmental Protection Agency, Integrated Risk Information System (IRIS) http://www.epa.gov/iris/
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	10			
No quantified or suspected exposures/impacts in humans.	0			
Score	22			
NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Human Exposure) and go to Section 2 (Human Exposure Modifying Factors)				
B. Potential for human exposure				
a) Land use (provides an indication of potential human exposure scenarios) Agricultural Residential / Parkland Commercial Industrial Do Not Know	Score	1.5	Review zoning and land use maps over the distances indicated. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place. Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Residential/parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (recreational), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	This is the main "receptor" factor used in site scoring. A higher score implies a greater exposure and/or exposure of more sensitive human receptors (e.g., children).
b. Indicate the level of accessibility to the contaminated portion of the site (e.g., the potential for coming in contact with contamination) Limited barriers to prevent site access; contamination not covered Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered. Controlled access or remote location and contaminants are covered Do Not Know	Score	1	Review location and structures and contaminants at the site and determine if there are intervening barriers between the site and humans. A low rating should be assigned to a (covered) site surrounded by a fence or in a remote location, whereas a high score should be assigned to a site that has no cover, fence, natural barriers or buffer.	
B. Potential for human exposure				
c) Potential for intake of contaminated soil, water, sediment or foods for operable or potentially operable pathways, as identified in Worksheet II (Migration Potential). i) direct contact Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated? Yes No Do Not Know	Score	3	If soils or potable groundwater are present exceeding their respective CCME guidelines, dermal contact is assumed. Exposure to surface water, non-potable groundwater or sediments exceeding their respective CCME guidelines will depend on the site. Select "Yes" if dermal exposure to surface water, non-potable groundwater or sediments is expected. For instance, dermal contact with sediments would not be expected in an active port. Only soils in the top 1.5 m are defined by CCME (2003) as surface soils. If contaminated soils are only located deeper than 1.5 m, direct contact with soils is not anticipated to be an operable contaminant exposure pathway.	Exposure via the skin is generally believed to be a minor exposure route. However for some organic contaminants, skin exposure can play a very important component of overall exposure. Dermal exposure can occur while swimming in contaminated waters, bathing with contaminated surface water/groundwater and digging in contaminated dirt, etc.
ii) inhalation (i.e., inhalation of dust, vapour) Vapour - Are there inhabitable buildings on the site within 30 m of soils or groundwater with volatile contamination as determined in Worksheet II (Migration Potential)? Yes No Do Not Know Dust - If there is contaminated surface soil (e.g. top 1.5 m), indicate whether the soil is fine or coarse textured. If it is known that surface soil is not contaminated, enter a score of zero. Fine Coarse Surface soil is not contaminated or absent Do Not Know Texture	Score	3	If inhabitable buildings are on the site within 30 m of soils or groundwater exceeding their respective guidelines for volatile chemicals, there is a potential of risk to human health (Health Canada, 2004). Review site investigations for location of soil samples (having exceedances of volatile substances) relative to buildings. Refer to (II) Migration Potential worksheet, 4B (Ontario) for COPCS in Vapour for a definition of volatility. Consult grain size data for the site. If soils (containing exceedances of the CCME soil quality guidelines) predominantly consist of fine material (having a median grain size of 75 microns; as defined by CCME (2008)) then these soils are more likely to generate dusts.	Exposure via the lungs (inhalation) can be a very important exposure pathway. Inhalation can be via both particulates (dust) and gas (vapour). Vapours can be a problem where buildings have been built on former industrial sites or where volatile contaminants have migrated below buildings resulting in the potential for vapour intrusion. Assesses the potential for humans to be exposed to vapours originating from site soils. The closer the receptor is to a source of volatile chemicals in soil, the greater the potential of exposure. Also, coarser-grained soil will convey vapour much more efficiently in the soil than finer grained material such as clays and silts. General Notes: Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a vapour migration and/or dust generation in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as Internet links. Selected References: Canadian Council of Ministers of the Environment (CCME), 2006. Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. PN 133 www.ccme.ca Golder, 2004. Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC
Score	0			
Inhalation total	3			

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site	Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for human exposure					
	<p>iii) Ingestion (i.e., ingestion of food items, water and soils [for children]), including traditional foods.</p> <p>Drinking Water: Choose a score based on the proximity to a drinking water supply, to indicate the potential for contamination (present or future).</p> <p>0 to 100 m 100 to 300 m 300 m to 1 km 1 to 5 km No drinking water present Do Not Know</p> <p>Score</p> <p>Is an alternative water supply readily available?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Is human ingestion of contaminated soils possible?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Ingestion total</p>	<p>2</p> <p>1</p> <p>3</p> <p>1</p> <p>7</p>	<p>Note if a "Known" Human Health score is provided, the "Potential" score is disallowed.</p>	<p>Review available site data to determine if drinking water (groundwater, surface water, private, commercial or municipal supply) is known or suspected to be contaminated above Guidelines for Canadian Drinking Water Quality. If drinking water supply is known to be contaminated, some immediate action (e.g., provision of alternate drinking water supply) should be initiated to reduce or eliminate exposure.</p> <p>The evaluation of significant potential for exceedances of the water supply in the future may be based on the capture zones of the drinking water wells; contaminant travel times; computer modeling of flow and contaminant transport.</p> <p>If contaminated soils are located within the top 1.5 m, it is assumed that ingestion of soils is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely, and the duration is shorter. Refer to human health risk assessment reports for the site in question.</p> <p>Use human health risk assessment reports (or others) to determine if there is significant reliance on traditional food sources associated with the site. Is the food item in question going to spend a large proportion of its time at the site (e.g., large mammals may spend a very small amount of time at a small contaminated site)? Human health risk assessment reports for the site in question will also provide information on potential bioaccumulation of the COPC in question.</p>	<p>Selected References: Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/hccs/scse/water/substances/drinking_water_quality_guidelines_toc.html</p> <p>Drinking water can be an extremely important exposure pathway to humans. If site groundwater or surface water is not used for drinking, then this pathway is considered to be inoperable.</p> <p>Consider both wild foods such as salmon, venison, caribou, as well as agricultural sources of food items if the contaminated site is on or adjacent to agricultural land uses.</p>
	<p>Human Health Total "Potential" Score</p> <p>Allowed "Potential" Score</p>	<p>15.5</p> <p>—</p>			
2. Human Exposure Modifying Factors					
	<p>a) Strong reliance of local people on natural resources for survival (i.e., food, water, shelter, etc.)</p> <p>Yes No Do Not Know</p> <p>Known</p> <p>Potential</p> <p>Raw Human "known" total</p> <p>Raw Human "potential" total</p> <p>Raw Human Exposure Total Score</p> <p>Human Health Total (max 22)</p>	<p>Yes</p> <p>8</p> <p>—</p> <p>28</p> <p>0</p> <p>28</p> <p>22.0</p>	<p>Potable water supply is local; Strong reliance of community on local foods which include fish from Peace River.</p>		
3. Ecological					
A. Known exposure					
	<p>Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to terrestrial or aquatic organisms as a result of the contaminated site.</p> <p>Score</p> <p>Same as above, but "Strongly Suspected" based on observations or indirect evidence.</p> <p>Score</p> <p>No quantified or suspected exposures/impacts in terrestrial or aquatic organisms</p> <p>Score</p> <p>Score</p>	<p>18</p> <p>12</p> <p>0</p> <p>18</p> <p>18</p>	<p>The concentrations of petroleum hydrocarbon fractions F1 and F2 exceeded Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines in one surface soil sample (0 - 0.6 m depth). Groundwater concentrations of Cadmium, Selenium, and Zinc were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life and the site is approximately 1 km north of the Peace River.</p>	<p>Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are deemed to be severe, the site may be categorized as class one (i.e., a priority for remediation or risk management), regardless of the numerical total NCS score. For the purpose of application of the NCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. If ecological effects are determined to be severe and an automatic Class 1 is assigned, there is no need to proceed through the NCS. However, a scoring guideline (18) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites).</p> <p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1. Alternatively, known impacts can also be evaluated based on a weight of evidence assessment involving a combination of site observations, tissue testing, toxicity testing and quantitative community assessments. Scoring of adverse effects on individual rams or endangered species will be completed on a case-by-case basis with full scientific justification.</p> <p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 1 and no other observable or measurable sign of impacts. Alternatively, it can be based on a combination of other lines of evidence showing no adverse effects such as site observations, tissue testing, toxicity testing and quantitative community assessments.</p>	<p>CCME, 1990: Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses www.ccme.ca Sensitive receptors- review: Canadian Council on Ecological Areas www.ccea.org</p> <p>Ecological effects should be evaluated at a population or community level, as opposed to at the level of individuals. For example, population-level effects could include reduced reproduction, growth or survival in a species. Community-level effects could include reduced species diversity or relative abundances. Further discussion of ecological assessment endpoints is provided in <i>A Framework for Ecological Risk Assessment: General Guidance</i> (CCME 1998).</p> <p>Notes: Someone experienced must provide a thorough description of the sources researched to classify the environmental receptors in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.</p>
<p>NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)</p>					

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for ecological exposure (for the contaminated portion of the site)				
a) Terrestrial				
i) Land use				
Agricultural (or Wild lands) Residential/Parkland Commercial Industrial Do Not Know	Score	1.5	Review zoning and land use maps. If the proposed future land use is more sensitive than the current land use, evaluate this factor assuming the proposed future use is in place (indicate in the worksheet that future land use is the consideration). Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Wild lands are grouped with agricultural land due to the similarities in receptors that would be expected to occur there (e.g., herbivorous mammals and birds) and the similar need for a high level of protection to ensure ecological functioning. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	
ii) Uptake potential				
Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site? Yes No Do Not Know	Score	1	If contaminated soils are located within the top 1.5 m, it is assumed that direct contact of soils with plants and soil invertebrates is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely.	
ii) Ingestion (i.e., wildlife or domestic animals ingesting contaminated food items, soils or water)				
Are terrestrial animals likely to be ingesting contaminated water at the site? Yes No Do Not Know	Score	1	Refer to an Ecological Risk Assessment for the site. If there is contaminated surface water at the site, assume that terrestrial organisms will ingest it.	
Are terrestrial animals likely to be ingesting contaminated soils at the site? Yes No Do Not Know	Score	1	Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.	
Can the contamination identified bioaccumulate? Yes No Do Not Know	Score	1	Bioaccumulation of contaminants within food items is considered possible if: 1) The Log(Kow) of the contaminant is greater than 4 (as per the chemical characteristics worksheet) and concentrations in soils exceed the most conservative CCME soil quality guideline for the intended land use, or 2) The contaminant in collected tissue samples exceeds the Canadian Tissue Residue Guidelines.	
Distance to sensitive terrestrial ecological area 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score	1.5	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor located within this area of the site will be subject to further evaluations. It is also considered that any environmental receptor located greater than 5 km will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance; arctic environments (on a site specific basis); nature preserves, habitats for species at risk, sensitive forests, natural parks or forests.
Raw Terrestrial Total Potential	7	Note If a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
Allowed Terrestrial Total Potential	—			
B. Potential for ecological exposure (for the contaminated portion of the site)				
b) Aquatic				
i) Classification of aquatic environment				
Sensitive Typical Not Applicable (no aquatic environment present) Do Not Know	Score	2	"Sensitive aquatic environments" include those in or adjacent to shellfish or fish harvesting areas, marine parks, ecological reserves and fish migration paths. Also includes those areas deemed to have ecological significance such as for fish food resources, spawning areas or having rare or endangered species. "Typical aquatic environments" include those in areas other than those listed above.	
ii) Uptake potential				
Does groundwater daylighting to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact? Yes No (or Not Applicable) Do Not Know	Score	1	Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways: 1) by comparing collected nearshore groundwater concentrations to the CCME water quality guidelines (this will be a conservative comparison, as contaminant concentrations in groundwater often decrease between nearshore wells and the point of discharge). 2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge. 3) by installing water samplers, "peepers", in the sediments in the area of daylighting groundwater	
Distance from the contaminated site to an important surface water resource 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score	1.5	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor or important water resource located within this area of the site will be subject to further evaluation. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and rivers and other aquatic environments.
Bioaccumulation of food items is possible if:				

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site	Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
	Are aquatic species (i.e., forage fish, invertebrates or plants) that are consumed by predatory fish or wildlife consumers, such as mammals and birds, likely to accumulate contaminants in their tissues? Yes No Do Not Know	1		1) The Log(K _{ow}) of the contaminant is greater than 4 (as per the chemical characteristics work sheet and concentrations in sediments exceed the CCME ISQG _s . 2) The contaminant in collected tissue samples exceeds the CCME tissue quality guidelines.	
	Raw Aquatic Total Potential Allowed Aquatic Total Potential	5.5 ---	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
4. Ecological Exposure Modifying Factors					
a) Known occurrence of a species at risk.	Is there a potential for a species at risk to be present at the site? Yes No Do Not Know	Do Not Know 1	Not known if a species at risk is present at the site.	Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as Eco Explorer, Regional, Provincial (Environment Ministries), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance.	Species at risk include those that are extirpated, endangered, threatened, or of special concern. For a list of species at risk, consult Schedule 1 of the federal Species at Risk Act (http://www.sar.gov.gc.ca/species/schedules_e.cfm?de=1). Many provincial governments may also provide regional applicable lists of species at risk. For example, in British Columbia, consult BCNWRAP, 2005. Endangered Species and Ecosystems in British Columbia. Provincial red and blue lists, Ministry of Sustainable Resource Management and Water, Land and Air Protection http://srmwww.gov.bc.ca/atrisk/red-blue.htm
b) Potential impact of aesthetics (e.g., enrichment of a lake or tainting of food flavor).	Is there evidence of aesthetic impact in receiving water bodies? Yes No Do Not Know Is there evidence of olfactory impact (i.e., unpleasant smell)? Yes No Do Not Know Is there evidence of increase in plant growth in the lake or water body? Yes No Do Not Know Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different? Yes No Do Not Know	Do Not Know 1 0 0 Do Not Know 1	Peace River has high flow. Do not know if the aesthetics will be impacted.	Documentation may consist of environmental investigation reports, press articles, petitions or other records. Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat. A distinct increase of plant growth in an aquatic environment may suggest enrichment. Nutrients e.g., nitrogen or phosphorous releases to an aquatic body can act as a fertilizer. Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.	This item will require some level of documentation by user, including contact names, addresses, phone numbers, e-mail addresses. Evidence of changes must be documented, please attach copy of report containing relevant information.
	Ecological Modifying Factors Total - Known Ecological Modifying Factors Total - Potential Raw Ecological Total - Known Raw Ecological Total - Potential Raw Ecological Total Ecological Total (Max 18)	0 3 18 3 21 18.0			
5. Other Potential Contaminant Receptors					
a) Exposure of permafrost (leading to erosion and structural concerns)	Are there improvements (roads, buildings) at the site dependent upon the permafrost for structural integrity? Yes No Do Not Know Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment? Yes No Do Not Know	No 0 --- Do Not Know --- 1	Do not know.	Consult engineering reports, site plans or air photos of the site. When permafrost melts, the stability of the soil decreases, leading to erosion. Human structures, such as roads and/or buildings are often dependent on the stability that the permafrost provides. Melting permafrost leads to a decreased stability of underlying soils. Wind or surface run-off erosion can carry soils into nearby aquatic habitats. The increased soil loadings into a river can cause an increase in total dissolved solids and a resulting decrease in aquatic habitat quality. In addition, the erosion can bring contaminants from soils to aquatic environments.	Plants and lichens provide a natural insulating layer which will help prevent thawing of the permafrost during the summer. Plants and lichens may also absorb less solar radiation. Solar radiation is turned into heat which can also cause underlying permafrost to melt.
	Other Potential Receptors Total - Known Other Potential Receptors Total - Potential	0 1			
Exposure Total					
	Raw Human Health + Ecological Total - Known Raw Human Health + Ecological Total - Potential Raw Total Exposure Total (max 34)	48 4 50 37.0	Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.		

**CCME National Classification System (2008)
Score Summary**

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCS completely.

I. Contaminant Characteristics

	Known	Potential
1. Residency Media	2	---
2. Chemical Hazard	8	---
3. Contaminant Exceedance Factor	4	---
4. Contaminant Quantity	9	---
5. Modifying Factors	2	---

Raw Total Score	25	0
Raw Total Score (Known + Potential)	25	
Adjusted Total Score (Raw Total / 40 * 33)	20.6	(max 33)

II. Migration Potential

	Known	Potential
1. Groundwater Movement	9	---
2. Surface Water Movement	8	---
3. Soil	12	---
4. Vapour	9	---
5. Sediment Movement	9	---
6. Modifying Factors	0	0

Raw Total Score	47	0
Raw Total Score (Known + Potential)	47	
Adjusted Total Score (Raw Total / 64 * 33)	24.2	(max 33)

III. Exposure

	Known	Potential
1. Human Receptors		
A. Known Impact	22	
B. Potential		
a. Land Use		---
b. Accessibility		---
c. Exposure Route		
i. Direct Contact		---
ii. Inhalation		---
iii. Ingestion		---
2. Human Receptors Modifying Factors	6	---
Raw Total Human Score	28	0

Raw Total Human Score (Known + Potential)	28
Adjusted Total Human Score	22.0 (maximum 22)

3. Ecological Receptors		
A. Known Impact	18	
B. Potential		
a. Terrestrial		---
b. Aquatic		---
4. Ecological Receptors Modifying Factors	0	3
Raw Total Ecological Score	18	3

Raw Total Ecological Score (Known + Potential)	21
Adjusted Total Ecological Score	18.0 (maximum 18)

5. Other Receptors	0	1
Total Other Receptors Score (Known + Potential)	1	

Total Exposure Score (Human + Ecological + Other)	41.0
Adjusted Total Exposure Score (Total Exposure / 46 * 34)	30.3 (max 34)

Site Score

Test Site	
Site Letter Grade	A
Certainty Percentage	100%
% Responses that are "Do Not Know"	-59%
Total NCSCS Score for site	75.2
Site Classification Category	1

Site Classification Categories*:

- Class 1 - High Priority for Action (Total NCS Score >70)
- Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
- Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
- Class N - Not a Priority for Action (Total NCS Score <37)
- Class INS - Insufficient Information (>15% of responses are "Do Not Know")

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

**CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions**

Subject Site:	Test Site	
Civic Address: <i>(or other description of location)</i>	On the north shore of the Peace River, approximately 220 km east of High Level, Alberta, in Wood Buffalo National Park	
Site Common Name : <i>(if applicable)</i>	Community of Garden River	
Site Owner or Custodian: <i>(Organization and Contact Person)</i>	Parks Canada Agency	
Legal description or metes and bounds:	N 58°42.5', W113°52.0'	
Approximate Site area:		
PID(s): <i>(or Parcel Identification Numbers [PIN] if untitled Crown land)</i>	Garden River Landfill (FCSI #00022827)	
Centre of site: <i>(provide latitude/longitude or UTM coordinates)</i>	Latitude:	_____ degrees _____ min _____ secs
	Longitude:	_____ degrees _____ min _____ secs
Site Land Use:	Current:	Commercial/Industrial
	Proposed:	
Site Plan	To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.	
Provide a brief description of the Site:	<p style="text-align: center;">Landfill is located approximately 1 km northwest of the community of Garden River (see attached Site Plan).</p>	

**CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions**

Affected media and Contaminants of Potential Concern (COPC):	The concentration of petroleum hydrocarbon fraction F3 in one soil sample exceeded Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines. The concentration of Copper in one soil sample exceeded Canadian Council of Ministers of the Environment 2007 Canadian soil quality guidelines for the protection of environmental and human health. The concentrations of dissolved Pyrene, Benzo(a)anthracene, Cadmium, Selenium, and Zinc exceeded Canadian Council of Ministers of the Environment 2007 Canadian water quality guidelines for the protection of aquatic life. The dissolved concentrations of Manganese exceeded Health Canada 2008 Guidelines for Canadian drinking water quality.
--	---

Please fill in the "letter" that best describes the level of information available for the site being assessed:

Site Letter Grade

If letter grade is F, do not continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent.

Scoring Completed By:	Cathy Hamlen, Ph.D. A.Ag.
Date Scoring Completed:	5-Feb-09

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes			
1. Residency Media (replaces physical state)							
Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines? yes = has an exceedance or strongly suspected to have an exceedance no = does not have an exceedance or strongly suspected not to have an exceedance		Eleven soil samples and three groundwater monitoring wells were assessed. Refer to <i>Contaminated Site Assessment, Initial and Detailed Testing Programs, Wood Buffalo National Park, Various Locations in the Community of Garden River, Alberta</i> (EBA Consulting Engineers Ltd., 2009).	The overall score is calculated by adding the individual scores from each residency media (having one or more exceedance of the most conservative media specific and land-use appropriate CCME guideline). Summary tables of the Canadian Environmental Quality Guidelines for soil, water (aquatic life, non-potable groundwater environments, and agricultural water uses) and sediment are available on the CCME website at http://www.ccme.ca/publications/ceqg_rcqe.html?category_id=124 . For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guides_recom/index_e.html .	An increasing number of residency media containing chemical exceedances often equates to a greater potential risk due to an increase in the number of potential exposure pathways.			
A. Soil	Yes No Do Not Know				2		
B. Groundwater	Yes No Do Not Know				2		
C. Surface water	Yes No Do Not Know				0		
D. Sediment	Yes No Do Not Know				0		
"Known" -score					4		
"Potential" - score					—		
2. Chemical Hazard							
What is the relative degree of chemical hazard of the contaminant in the list of hazard rankings proposed by the Federal Contaminated Sites Action Plan (FCSAP)? High Medium Low Do Not Know	High				F3 and copper in soil are Low, Manganese and Zinc in groundwater are Low, Pyrene and Selenium in groundwater are Medium, and Benzo(a)anthracene and Cadmium in groundwater are High.	The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site. The degree of hazard has been defined by the Federal Contaminated Sites Action Plan (FCSAP) and a list of substances with their associated hazard (Low, Medium and High) has been provided as a separate sheet in this file. See Attached Reference Material for Contaminant Hazard Rankings.	Hazard as defined in the revised NCS pertains to the physical properties of a chemical which can cause harm. Properties can include toxic potency, propensity to biomagnify, persistence in the environment, etc. Although there is some overlap between hazard and contaminant exceedance factor below, it will not be possible to derive contaminant exceedance factors for many substances which have a designated chemical hazard designation, but don't have a CCME guideline. The purpose of this category is to avoid missing a measure of toxic potential.
"Known" -score							
"Potential" - score		—					
3. Contaminant Exceedance Factor							
What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")? Mobile NAPL High (>100x) Medium (10x to 100x) Low (1x to 10x) Do Not Know	Medium (10x to 100x)	The concentration of F3 (soil) was 2.7 times higher than AENV Tier 1 soil guideline, and the concentration of copper (soil) was 3.2 times higher than CCME 2007 Canadian soil quality guideline; The maximum dissolved Manganese concentration was 2.9 times higher than Health Canada 2008 Guideline for drinking water, the maximum dissolved Zinc concentration was 3.9 times higher than CCME 2007 Canadian water quality guidelines for the protection of fresh water aquatic life, the maximum dissolved Pyrene concentration was 2.0 times higher than the CCME 2007 guideline for protection of aquatic life, the maximum dissolved Selenium concentration was 4.7 times higher than the 2007 CCME guideline, the dissolved Benzo(a)anthracene concentration was 1.1 times higher than the 2007 CCME guideline, and the maximum dissolved Cadmium concentration was 15.5 times higher than the 2007 CCME guideline.	Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the <i>most conservative media-specific and land-use appropriate CCME environmental quality guidelines</i> . Ranking should be based on contaminant with greatest exceedance of CCME guidelines. Ranking of contaminant hazard as high, medium and low is as follows: High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines Mobile NAPL = Contaminant is a non-aqueous phase liquid (i.e., due to its low solubility, it does not dissolve in water, but remains as a separate liquid) and is present at a sufficiently high saturation (i.e., greater than residual NAPL saturation) such that there is significant potential for mobility either downwards or laterally. Other standards may include local background concentration or published toxicity benchmarks. Results of toxicity testing with site samples can be used as an alternative. This approach is only relevant for contaminants that do not biomagnify in the food web, since toxicity tests would not indicate potential effects at higher trophic levels. High = lethally observed. Medium = no lethality, but sub lethal effects observed. Low = neither lethal nor sub lethal effects observed.	In the event that elevated levels of a material with no associated CCME guidelines are present, check provincial and USEPA environmental criteria. Hazard Quotients (sometimes referred to as a screening quotient in risk assessments) refer to the ratio of measured concentration to the concentration believed to be the threshold for toxicity. A similar calculation is used here to determine the contaminant exceedance factor (CEF). Concentrations greater than one times the applicable CCME guideline (i.e., CEF>1) indicate that risks are possible. Mobile NAPL has the highest associated score (8) because of its highly concentrated nature and potential for increase in the size of the impacted zone.			
"Known" -score					4		
"Potential" - score					—		

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
4. Contaminant Quantity (known or strongly suspected)				
What is the known or strongly suspected quantity of all contaminants? >10 hectare (ha) or 5000 m ³ 2 to 10 ha or 1000 to 5000 m ³ <2 ha or 1000 m ³ Do Not Know	2 to 10 ha or 1000 to 5000 m ³	Area of site is approximately 3,000 m ² .	Measure or estimate the area or quantity of total contamination (i.e. all contaminants known or strongly suspected to be present on the site). The "Area of Contamination" is defined as the area or volume of contaminated media (soil, sediment, groundwater, surface water) exceeding appropriate environmental criteria.	A larger quantity of a potentially toxic substance can result in a larger frequency of exposure as well as a greater probability of migration, therefore, larger quantities of these substances earn a higher score.
"Known" - score	6			
"Potential" - score	—			
5. Modifying Factors				
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment? Yes No Do Not Know	No 0	Chemicals do not persist.	Persistent chemicals, e.g., PCBs, chlorinated pesticides etc. either do not degrade or take longer to degrade, and therefore may be available to cause effects for a longer period of time. Canadian Environmental Protection Act (CEPA) classifies a chemical as persistent when it has at least one of the following characteristics: (a) in air, (i) its half-life is equal to or greater than 2 days, or (ii) it is subject to atmospheric transport from its source to a remote area; (b) in water, its half-life is equal to or greater than 182 days; (c) in sediments, its half-life is equal to or greater than 365 days; or (d) in soil, its half-life is equal to or greater than 182 days. This list does not include metals or metalloids, which in their elemental form do not degrade. However metals and metalloids form chemical species in the environment, many of which are not readily bioavailable.	<i>Examples of Persistent Substances are provided in attached Reference Materials</i>
Are there contaminants present that could cause damage to utilities and infrastructure, either now or in the future, given their location? Yes No Do Not Know	No 0			Some contaminants may react or absorb into underground utilities and infrastructure. For example, organic solvents may degrade some plastics, and salts could cause corrosion of metal.
How many different contaminant classes have representative CCME guideline exceedances? one two to four five or more Do Not Know	five or more 3	Pyrene, Benzo(a)anthracene, Cadmium, Selenium, and Zinc in groundwater; Copper in Soil.	For the purposes of the revised NCS ranking system, the following chemicals represent distinct chemical "classes": inorganic substances (including metals), volatile petroleum hydrocarbons, light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons, PAHs, phenolic substances, chlorinated hydrocarbons, halogenated methanes, phthalate esters, pesticides.	<i>Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.</i>
"Known" - Score	3			
"Potential" - Score	—			

Contaminant Characteristic Total

Raw Total Scores- "Known"	25
Raw Total Scores- "Potential"	0
Raw Combined Total Scores	25
Total Score (Raw Combined / 40 * 33)	20.6

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Groundwater Movement				
A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary.				
<p>i) For potable groundwater environments 1) groundwater concentrations exceed background concentrations and 1X the Guideline for Canadian Drinking Water Quality (GCDWO) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater contamination. For non-potable environments (typically urban environments with municipal services), 1) groundwater concentrations exceed 1X the applicable non-potable guidelines or modified generic guidelines (which exclude ingestion of drinking water pathway) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater impacts.</p> <p>ii) Same as (i) except the information is not known but strongly suspected based on indirect observations.</p> <p>iii) Meets GCDWO for potable environments meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for non-potable environments or Absence of groundwater exposure pathway (i.e., there is no aquifer (see definition at right) at the site or there is an adequate isolating layer between the aquifer and the contamination, and within 5 km of the site there are no aquatic receiving environments and the groundwater does not daylight).</p>	<p>12</p> <p>9</p> <p>0</p>	<p>The groundwater Manganese concentration exceeded the drinking water aesthetic objective (Health Canada 2008 Guidelines for Canadian Drinking Water Quality). Cadmium, Selenium, Zinc concentrations exceeded guideline for protection of fresh water aquatic life (CCME, 2007). Hydraulic conductivity is in the order of 10m/s at the site.</p>	<p>Review chemical data and evaluate groundwater quality. The evaluation method concentrates on 1) a potable or non-potable groundwater environment, the groundwater flow system and its potential to be an exposure pathway to known or potential receptors.</p> <p>An aquifer is defined as a geologic unit that yields groundwater in usable quantities and drinking water quality. The aquifer can currently be used as a potable water supply or could have the potential for use in the future. Non-potable groundwater environments are defined as areas that are serviced with a reliable alternative water supply (most commonly provided in urban areas); evaluation of a non-potable environment will be based on a site specific basis.</p> <p>Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils.</p> <p>Seeps and springs are considered part of the groundwater pathway.</p> <p>In Arctic environments, the potability and evaluation of the seasonal active layer (above the permafrost) as a groundwater exposure pathway will be considered on a site-specific basis.</p>	<p>The 1992 NCS rationale evaluated the off-site migration as a regulatory issue. The exposure assessment and classification of hazards should be evaluated regardless of the property boundaries.</p> <p>Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a groundwater supply source in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links.</p> <p>Note that for potable groundwater that also daylights into a nearby surface water body, the more stringent guidelines for both drinking water and protection of aquatic life should be considered.</p> <p>Selected References</p> <p>Potable Environments,</p> <p>Guidelines for Canadian Drinking Water Quality www.bc-sc.gc.ca/lwh-som/cubs/water-sau/toc_sau-epau/sum_guide-res_recom/index_e.html</p> <p>Non-Potable Environments,</p> <p>Canadian Water Quality Guidelines for Protection of Aquatic Life. CCME. 1999 www.ccme.ca</p> <p>Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.</p>
<p>NOTE: If a score is assigned here for Known COPC Exceedances, then you can skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)</p>				
B. Potential for groundwater pathway.				
<p>a. Relative Mobility</p> <p>High</p> <p>Moderate</p> <p>Low</p> <p>Insignificant</p> <p>Do Not Know</p>	<p>2</p>	<p>Organics</p> <p>Metals with higher mobility at acidic conditions</p> <p>Metals with higher mobility at alkaline conditions</p> <p>Koc < 500 (i.e., log Koc < 2.7) pH < 5</p> <p>Koc = 500 to 5000 (i.e., log Koc = 2.7 to 3.7) pH = 5 to 6</p> <p>Koc = 5,000 to 100,000 (i.e., log Koc = 3.7 to 5) pH > 6</p> <p>Koc > 100,000 (i.e., log Koc > 5) pH > 6</p>	<p>Reference: US EPA Soil Screening Guidance (Part 5 - Table 39)</p> <p>If a score of zero is assigned for relative mobility, it is still recommended that the following sections on potential for groundwater pathway be evaluated and scored. Although the Koc of an individual contaminant may suggest that it will be relatively immobile, it is possible that, with complex mixtures, there could be enhanced mobility due to co-solvent effects. Therefore, the Koc cannot be relied on solely as a measure of mobility. An evaluation of other factors such as containment, thickness of confining layer, hydraulic conductivities and precipitation infiltration rate are still useful in predicting potential for groundwater migration, even if a contaminant is expected to have insignificant mobility based on its chemistry alone.</p>	
<p>b. Presence of engineered sub-surface containment?</p> <p>No containment</p> <p>Partial containment</p> <p>Full containment</p> <p>Do Not Know</p>	<p>1.5</p>	<p>Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved.</p> <p>Full containment is defined as an engineered system or natural attenuation processes, monitored as being effective, which provide for full capture and/or treatment of contaminants. All chemicals of concern must be contained for Full Containment scoring. Natural attenuation must have sufficient data, and reports cited with monitoring data to support steady state conditions and the attenuation processes. If there is no containment or insufficient natural attenuation process, the category is evaluated as high. If there is less than full containment or if uncertain, then evaluate medium. In Arctic environments, permafrost will be evaluated, as appropriate, based on detailed evaluations, effectiveness and reliability to contain/control contaminant migration.</p>	<p>Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links.</p> <p>Selected Resources:</p> <p>United States Environmental Protection Agency (USEPA) 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.</p> <p>Environment Canada - Ontario Region - Natural Attenuation Technical Assistance Bulletin (TAB) Number 19-21.</p>	
<p>c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway</p> <p>3 m or less including no confining layer or discontinuous confining layer</p> <p>3 to 10 m</p> <p>> 10 m</p> <p>Do Not Know</p>	<p>0.5</p>	<p>The term "confining layer" refers to geologic material with little or no permeability or hydraulic conductivity (such as unfractured clay); water does not pass through this layer or the rate of movement is extremely slow.</p> <p>Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway.</p> <p>The evaluation of this category is based on:</p> <p>1) The presence and thickness of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as drinking water sources or</p> <p>2) The presence and thickness of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated zone (e.g. water table aquifer, fral hydrostratigraphic unit or other groundwater pathway).</p>		
<p>d. Hydraulic conductivity of confining layer</p> <p>>10⁻⁴ cm/s or no confining layer</p> <p>10⁻⁴ to 10⁻⁶ cm/s</p> <p><10⁻⁶ cm/s</p> <p>Do Not Know</p>	<p>0.5</p>	<p>Determine the nature of geologic materials and estimate hydraulic conductivity from published material (or use "Range of Values of Hydraulic Conductivity and Permeability" figure in the Reference Material sheet). Unfractured clays should be scored low. Silts should be scored medium. Sand, gravel should be scored high. The evaluation of this category is based on:</p> <p>1) The presence and hydraulic conductivity (K) of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as a drinking water source, groundwater exposure pathway or</p> <p>2) The presence and permeability (K) of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated water table aquifer, fral hydrostratigraphic unit or other groundwater pathway.</p>		

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for groundwater pathway.				
<p>e. Precipitation infiltration rate (Annual precipitation factor x surface soil relative permeability factor)</p> <p>High Moderate Low Very Low None Do Not Know</p>	0.4		<p>Precipitation Refer to Environment Canada precipitation records for relevant areas. Divide annual precipitation by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score).</p> <p>Permeability For surface soil relative permeability (i.e., infiltration) assume: gravel (1), sand (0.6), loam (0.3) and pavement or clay (0).</p> <p>Multiply the surface soil relative permeability factor with precipitation factor to obtain the score for precipitation infiltration rate.</p>	
<p>f. Hydraulic conductivity of aquifer</p> <p>>10⁻² cm/s 10⁻² to 10⁻⁴ cm/s <10⁻⁴ cm/s Do Not Know</p>	1		Determine the nature of geologic materials and estimate hydraulic conductivity of all aquifers of concern from published material (refer to "Range of Values of Hydraulic Conductivity and Permeability" in the Reference Material sheet).	
Potential groundwater pathway total	5.0			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Groundwater pathway total	0			
2. Surface Water Movement				
A. Demonstrated migration of COPC in surface water above background conditions				
<p>Known concentrations of surface water:</p> <p>i) Concentrations exceed background concentrations and exceed CCME CWQG for protection of aquatic life, irrigation, livestock water, and/or recreation (whichever uses are applicable at the site) by >1 X; or There is known contact of contaminants with surface water based on site observations. or In the absence of CWQG, chemicals have been proven to be toxic based on site specific testing (e.g. toxicity testing; or other indicator testing of exposure).</p> <p>ii) Same as (i) except the information is not known but is <u>highly suspected</u> based on indirect observations.</p> <p>iii) Meets CWQG or absence of surface water exposure pathway (i.e., Distance to nearest surface water is > 5 km.)</p>	12	<p>Dissolved Pyrene, Benzo(a)anthracene, Zinc, Selenium, and Cadmium concentrations were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life. The site is approximately 2 km west of Peace River and approximately 1 km north of Garden Creek, a tributary that runs through the community.</p>	<p>Collect all available information on quality of surface water near to site. Evaluate available data against Canadian Water Quality Guidelines (select appropriate guidelines based on local water use, e.g., recreation, irrigation, aquatic life, livestock watering, etc.). The evaluation method concentrates on the surface water flow system and its potential to be an exposure pathway. Contamination is present on the surface (above ground) and has the potential to impact surface water bodies. Surface water is defined as a water body that supports one of the following uses: recreation, irrigation, livestock watering, aquatic life.</p>	<p>General Notes: Someone experienced must provide a thorough description of the sources researched to classify the surface water body in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact name, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.</p> <p>Selected References: CCME. 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME. 1999. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water) www.ccme.ca Health and Welfare Canada. 1992. Guidelines for Canadian Recreational Water Quality.</p>
<p>NOTE: If a score is assigned here for Demonstrated Migration in Surface Water, then you can skip Part B (Potential for migration of COPCs in surface water) and go to Section 3 (Surface Soils)</p>				
B. Potential for migration of COPCs in surface water				
<p>a. Presence of containment</p> <p>No containment Partial containment Full containment Do Not Know</p>	3		<p>Review the existing engineered systems and relate these structures to site conditions and proximity to surface water and determine if full containment is achieved: score low if there is full containment such as capping, berms, dikes; score medium if there is partial containment such as natural barriers, trees, ditches, sedimentation ponds; score high if there are no intervening barriers between the site and nearby surface water. Full containment must include containment of all chemicals.</p>	
<p>b. Distance to Surface Water</p> <p>0 to <100 m 100 - 300 m >300 m Do Not Know</p>	2		<p>Review available mapping and survey data to determine distance to nearest surface water bodies.</p>	

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<p>c. Topography</p> <p>Contaminants above ground level and slope is steep</p> <p>Contaminants at or below ground level and slope is steep</p> <p>Contaminants above ground level and slope is intermediate</p> <p>Contaminants at or below ground level and slope is intermediate</p> <p>Contaminants above ground level and slope is flat</p> <p>Contaminants at or below ground level and slope is flat</p> <p>Do Not Know</p>	1		<p>Review engineering documents on the topography of the site and the slope of surrounding terrain.</p> <p>Steep slope = >50%</p> <p>Intermediate slope = between 5 and 50%</p> <p>Flat slope = < 5%</p> <p>Note: Type of fill placement (e.g., trench, above ground, etc.).</p>	
<p>d. Run-off potential</p> <p>High (rainfall run-off score > 0.6)</p> <p>Moderate (0.4 < rainfall run-off score < 0.6)</p> <p>Low (0.2 < rainfall run-off score < 0.4)</p> <p>Very Low (0 < rainfall run-off score < 0.2)</p> <p>None (rainfall run-off score = 0)</p> <p>Do Not Know</p>	0.4		<p>Rainfall</p> <p>Refer to Environment Canada precipitation records for relevant areas. Divide rainfall by 1000 and round to nearest tenth (e.g., 607 mm = 0.7 score).</p> <p>The former definition of annual rainfall did not include the precipitation as snow. This minor adjustment has been made. The second modification was the inclusion of permeability of surface materials as an evaluation factor.</p> <p>Permeability</p> <p>For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1).</p> <p>Multiply the infiltration factor with precipitation factor to obtain rainfall run off score.</p>	<p>Selected Sources:</p> <p>Environment Canada web page link www.msc.ec.gc.ca</p> <p>Snow to rainfall conversion apply ratio of 15 (snow):1(water)</p>
<p>e. Flood potential</p> <p>1 in 2 years</p> <p>1 in 10 years</p> <p>1 in 50 years</p> <p>Do Not Know</p>	0.5		<p>Review published data such as flood plain mapping or flood potential (e.g., spring or mountain run-off) and Conservation Authority records to evaluate flood potential of nearby water courses both up and down gradient. Rate zero if site not in flood plain.</p>	
Potential surface water pathway total	6.9			
Allowed Potential score	—			
Surface water pathway total	8	Note: If a "known" score is provided, the "potential" score is disallowed.		
3. Surface Soils (potential for dust, dermal and ingestion exposure)				
A. Demonstrated concentrations of COPC in surface soils (top 1.5 m)				
<p>COPCs measured in surface soils exceed the CCME soil quality guideline.</p> <p>Strongly suspected that soils exceed guidelines</p> <p>COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock).</p>	12 9 0	<p>In one surface (0 - 50 m depth) soil sample, the concentration of Copper exceeded the CCME 2007 Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health and the concentration of petroleum hydrocarbon fraction F3 exceeded Alberta Environment 2008 Tier 1 Soil and Groundwater Remediation Guidelines. The site is an active landfill and management activities are expected to involve soil handling.</p>	<p>Collect all available information on quality of surface soils (i.e., top 1.5 metres) at the site. Evaluate available data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (i.e., agricultural, residential/peri-land, commercial, or industrial), and soil texture if applicable (i.e., coarse or fine).</p>	<p>Selected References:</p> <p>CCME: 1999. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health</p> <p>www.ccme.gc.ca</p>
Score	12			
NOTE: If a score is assigned here for Demonstrated Concentrations in Surface Soils, then you can skip Part B (Potential for a surface soils migration pathway) and go to Section 4 (Vapour)				
B. Potential for a surface soils (top 1.5 m) migration pathway				
<p>a. Are the soils in question covered?</p> <p>Exposed</p> <p>Vegetated</p> <p>Landscaped</p> <p>Paved</p> <p>Do Not Know</p>	4		<p>Consult engineering or risk assessment reports for the site. Alternatively, review photographs or perform a site visit.</p> <p>Landscaped surface soils must include a minimum of 0.5 m of topsoil.</p>	<p>The possibility of contaminants in blowing snow have not been included in the revised NCS as it is difficult to assess what constitutes an unacceptable concentration and secondly, spills to snow or ice are most efficiently mitigated while freezing conditions remain.</p>
<p>b. For what proportion of the year does the site remain covered by snow?</p> <p>0 to 10% of the year</p> <p>10 to 30% of the year</p> <p>More than 30% of the year</p> <p>Do Not Know</p>	3		<p>Consult climatic information for the site. The increments represent the full span from soils which are always wet or covered with snow (and therefore less likely to generate dust) to those soils which are predominantly dry and not covered by snow (and therefore are more likely to generate dust).</p>	
Potential surface soil pathway total	7			
Allowed Potential score	—			
Soil pathway total	12	Note: If a "known" score is provided, the "potential" score is disallowed.		

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
4. Vapour				
A. Demonstrated COPCs in vapour.				
Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations.	12	The groundwater concentrations of volatile hydrocarbons (Pyrene and Benzo(a)anthracene) were above CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life. Site is more than 1 km from community buildings.	Consult previous investigations, including human health risk assessments, for reports of vapours detected.	
Strongly suspected (based on observations and/or modelling)	9			
Vapour has not been measured and volatile hydrocarbons have not been found in site soils or groundwater.	0			
Score	9			
NOTE: If a score is assigned here for Demonstrated COPCs in Vapour, then you can skip Part B (Potential for COPCs in vapour) and go to Section 5 (Sediment)				
B. Potential for COPCs in vapour.				
a. Relative Volatility based on Henry's Law Constant, H ^f (dimensionless) High (H ^f > 1.0E-1) Moderate (H ^f = 1.0E-1 to 1.0E-3) Low (H ^f < 1.0E-3) Not Volatile Do Not Know			Reference: US EPA Soil Screening Guidance (Part 5 - Table 36) Provided in Attached Reference Materials	If the Henry's Law Constant for a substance indicates that it is not volatile, and a score of zero is assigned here for relative volatility, then the other three questions in this section on Potential for COPCs will be automatically assigned scores of zero and you can skip to section 5.
Score	2.5			
b. What is the soil grain size? Fine Coarse Do Not Know			Review soil permeability data in engineering reports. The greater the permeability of soils, the greater the possible movement of vapours. Fine-grained soils are defined as those which contain greater than 50% by mass particles less than 75 µm mean diameter (D50 < 75 µm). Coarse-grained soils are defined as those which contain greater than 50% by mass particles greater than 75 µm mean diameter (D50 > 75 µm).	
Score	3			
c. Is the depth to the source less than 10m? Yes No Do Not Know			Review groundwater depths below grade for the site.	
Score	2			
d. Are there any preferential pathways? Yes No Do Not Know			Visit the site during dry summer conditions and/or review available photographs. Where bedrock is present, fractures would likely act as preferential pathways.	Preferential pathways refer to areas where vapour migration is more likely to occur because there is lower resistance to flow than in the surrounding materials. For example, underground conduits such as sewer and utility lines, drains, or septic systems may serve as preferential pathways. Features of the building itself that may also be preferential pathways include earthen floors, expansion joints, wall cracks, or foundation perforations for subsurface features such as utility pipes, sumps, and drains.
Score	2			
Potential vapour pathway total	9.5			
Allowed Potential score	9	Note: If a "known" score is provided, the "potential" score is disallowed.		
Vapour pathway total	9			
5. Sediment Movement				
A. Demonstrated migration of sediments containing COPCs				
There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated.	12	The site is vegetated, but landfill management activities might disturb the surface and expose sediments.	Review sediment assessment reports. Evidence of migration of contaminants in sediments must be reported by someone experienced in this area.	Usually not considered a significant concern in lakes/marine environments, but could be very important in rivers where transport downstream could be significant.
Strongly suspected (based on observations and/or modelling)	9			
Sediments have been contained and there is no indication that sediments will migrate in future, or Absence of sediment exposure pathway (i.e., within 5 km of the site there are no aquatic receiving environments, and therefore no sediments).	0			
Score	9			
NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you can skip Part B (Potential for Sediment Migration) and go to Section 6 (Modifying Factors)				

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for sediment migration				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")? Yes No Do Not Know	4		Review existing sediment assessments. If sediment coring has been completed, it may indicate that historically contaminated sediments have been covered over by newer "clean" sediments. This assessment will require that cores collected demonstrate a low concentration near the top and higher concentration with sediment depth. Review existing sediment assessments. If the sediments present at the site are in a river, select "no" for this question. Review existing sediment assessments. It is important that the assessment is made under worst case flows (high yearly flows). Under high yearly flows, areas which are commonly depositional	
b. For lakes and marine habitats, are the contaminated sediments in shallow water and therefore likely to be affected by tidal action, wave action or propeller wash? Yes No Do Not Know	4			
c. For rivers, are the contaminated sediments in an area prone to sediment scouring? Yes No Do Not Know	4			
Potential sediment pathway total	12	Note: if a "known" score is provided, the "potential" score is disallowed.		
Allowed Potential score	—			
Sediment pathway total	9			
6. Modifying Factors				
Are there subsurface utility conduits in the area affected by contamination? Yes No Do Not Know	No	No underground utilities were located in March 2008.	Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
	Known: 0 Potential: 0			

Migration Potential Total	
Raw "known" total	47
Raw "potential" total	0.0
Raw combined total	47.0
Total (max 33)	24.2

Note: if "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore, the total "Potential" Score may not reflect the sum of the individual "Potential" scores.

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Human				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to humans as a result of the contaminated site. (Class 1 Site*)	22		*Where adverse effects on humans are documented, the site should be automatically designated Class 1 site (i.e., action required). There is no need to proceed through the NCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites).	Known adverse impact includes domestic and traditional food sources. Adverse effects based on food chain transfer to humans and/or animals can be scored in this category. However, the weight of evidence must show a direct link of a contaminated food source/supply and subsequent ingestion/transfer to humans. Any associated adverse effects to the environment are scored separately later in this worksheet. Someone experienced must provide a thorough description of the sources researched to evaluate and determine the quantified exposure/impact (adverse effect) in the vicinity of the contaminated site.
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	10	The site is located at least 1 km northwest of the community. A single surface soil sample (0 - 0.8 m depth) had Copper concentration greater than the Canadian Council of Ministers of the Environment 2007 Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health.	This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients > 1 for noncarcinogenic chemicals and incremental cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this typically either > 10 ⁻⁶ or > 10 ⁻⁵). Known impacts can also be evaluated based on blood testing (e.g. blood lead > 10 µg/dL) or other health based testing.	Selected References: Health Canada- Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Health Screening Level Risk Assessments http://www.hc-sc.gc.ca/ehp/contaminated/index_e.html United States Environmental Protection Agency, Integrated Risk Information System (IRIS) http://toxnet.nlm.nih.gov
No quantified or suspected exposures/impacts in humans.	0		This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 0.2 for non-carcinogenic chemicals and incremental lifetime cancer risks for carcinogenic chemicals that are within acceptable levels as defined by the jurisdiction (for most jurisdictions this is less than either 10 ⁻⁶ or 10 ⁻⁵).	
Score	10			
NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Human Exposure) and go to Section 2 (Human Exposure Modifying Factors)				
B. Potential for human exposure				
a) Land use (provides an indication of potential human exposure scenarios) Agricultural Residential / Parkland Commercial Industrial Do Not Know	Score		Review zoning and land use maps over the distances indicated. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place. Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	This is the main "receptor" factor used in site scoring. A higher score implies a greater exposure and/or exposure of more sensitive human receptors (e.g., children).
Score	1.5			
b. Indicate the level of accessibility to the contaminated portion of the site (e.g., the potential for coming in contact with contamination) Limited barriers to prevent site access; contamination not covered Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered. Controlled access or remote location and contaminants are covered Do Not Know	Score		Review location and structures and contaminants at the site and determine if there are intervening barriers between the site and humans. A low rating should be assigned to a (covered) site surrounded by a fence or in a remote location, whereas a high score should be assigned to a site that has no cover, fence, natural barriers or buffer.	
Score	1			
B. Potential for human exposure				
c) Potential for intake of contaminated soil, water, sediment or foods for operable or potentially operable pathways, as identified in Worksheet II (Migration Potential). i) direct contact Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated? Yes No Do Not Know	Score		If soils or potable groundwater are present exceeding their respective CCME guidelines, dermal contact is assumed. Exposure to surface water, non-potable groundwater or sediments exceeding their respective CCME guidelines will depend on the site. Select "Yes" if dermal exposure to surface water, non-potable groundwater or sediments is expected. For instance, dermal contact with sediments would not be expected in an active port. Only soils in the top 1.5 m are defined by CCME (2003) as surface soils. If contaminated soils are only located deeper than 1.5 m, direct contact with soils is not anticipated to be an operable contaminant exposure pathway.	Exposure via the skin is generally believed to be a minor exposure route. However for some organic contaminants, skin exposure can play a very important component of overall exposure. Dermal exposure can occur while swimming in contaminated waters, bathing with contaminated surface water/groundwater and digging in contaminated dirt, etc.
Score	3			
ii) Inhalation (i.e., inhalation of dust, vapour) Vapour - Are there inhabitable buildings on the site within 30 m of soils or groundwater with volatile contamination as determined in Worksheet II (Migration Potential)? Yes No Do Not Know	Score		If inhabitable buildings are on the site within 30 m of soils or groundwater exceeding their respective guidelines for volatile chemicals, there is a potential of risk to human health (Health Canada, 2004). Review site investigations for location of soil samples (having exceedances of volatile substances) relative to buildings. Refer to (II) Migration Potential worksheet, 4B (Potential for COPCs in Vapour) for a definition of volatility.	Exposure via the lungs (inhalation) can be a very important exposure pathway. Inhalation can be via both particulates (dust) and gas (vapours). Vapours can be a problem where buildings have been built on former industrial sites or where volatile contaminants have migrated below buildings resulting in the potential for vapour intrusion.
Score	3			
Dust - If there is contaminated surface soil (e.g. top 1.5 m), indicate whether the soil is fine or coarse textured. If it is known that surface soil is not contaminated, enter a score of zero. Fine Coarse Surface soil is not contaminated or absent Do Not Know Texture	Score		Consult grain size data for the site. If soils (containing exceedances of the CCME soil quality guidelines) predominantly consist of fine material (having a median grain size of 75 microns; as defined by CCME (2006)) then these soils are more likely to generate dust.	Assesses the potential for humans to be exposed to vapours originating from site soils. The closer the receptor is to a source of volatile chemicals in soil, the greater the potential of exposure. Also, coarser-grained soil will convey vapour much more efficiently in the soil than finer grained material such as clays and silts.
Score	0			
Inhalation total	3			

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for human exposure				
<p>ii) Ingestion (i.e., ingestion of food items, water and soils (for children)), including traditional foods.</p> <p>Drinking Water: Choose a score based on the proximity to drinking water supply, to indicate the potential for contamination (present or future).</p> <p>0 to 100 m 100 to 300 m 300 m to 1 km 1 to 5 km No drinking water present Do Not Know</p>			<p>Review available site data to determine if drinking water (groundwater, surface water, private, commercial or municipal supply) is known or suspected to be contaminated above Guidelines for Canadian Drinking Water Quality. If drinking water supply is known to be contaminated, some immediate action (e.g., provision of alternate drinking water supply) should be initiated to reduce or eliminate exposure.</p> <p>The evaluation of significant potential for exceedances of the water supply in the future may be based on the capture zones of the drinking water wells; contaminant travel times; computer modelling of and contaminant transport.</p>	<p>Selected References: Guidelines for Canadian Drinking Water Quality http://www.hc-sc.gc.ca/hccp-accp/water/publications/drinking_water_quality_guidelines/0cc.htm</p> <p>Drinking water can be an extremely important exposure pathway to humans. If site groundwater or surface water is not available for drinking, then this pathway is considered to be inoperable.</p>
<p>Is an alternative water supply readily available?</p> <p>Yes No Do Not Know</p>	2			
<p>Is human ingestion of contaminated soils possible?</p> <p>Yes No Do Not Know</p>	1			
<p>Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings?</p> <p>Yes No Do Not Know</p>	3		<p>If contaminated soils are located within the top 1.5 m, it is assumed that ingestion of soils is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely, and the duration is shorter. Refer to human health risk assessment reports for the site in question.</p>	<p>Consider both wild foods such as salmon, venison, caribou, as well as agricultural sources of food items if the contaminated site is on or adjacent to agricultural land uses.</p>
<p>Human Health Total "Potential" Score</p> <p>Allowed "Potential" Score</p>	15.5	Note if a "Known" Human Health score is provided, the "Potential" score is disallowed.		
2. Human Exposure Modifying Factors				
<p>a) Strong reliance of local people on natural resources for survival (i.e., food, water, shelter, etc.)</p> <p>Yes No Do Not Know</p>	Yes			
<p>Known Potential</p> <p>Raw Human "known" total</p> <p>Raw Human "potential" total</p> <p>Raw Human Exposure Total Score</p> <p>Human Health Total (max 22)</p>	0 0 0 16 16.0	Potable water supply is local; Strong reliance of community on local foods which include fish from Peace River.		
3. Ecological				
A. Known exposure				
<p>Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to terrestrial or aquatic organisms as a result of the contaminated site.</p>	18		<p>Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are deemed to be severe, the site may be categorized as class one (i.e., a priority for remediation or risk management), regardless of the numerical total NCS score. For the purpose of application of the NCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. If ecological effects are determined to be severe and an automatic Class 1 is assigned, there is no need to proceed through the NCS. However, a scoring guideline (18) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites).</p>	<p>CCME, 1999: Canadian Water Quality Guidelines for the Protection of Aquatic Life http://www.ccme.ca CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Use http://www.ccme.ca Sensitive receptors - review: Canadian Council on Ecological Areas http://www.ccea.org</p> <p>Ecological effects should be evaluated at a population or community level, as opposed to at the level of individuals. For example, population-level effects could include reduced reproduction, growth or survival in a species. Community-level effects could include reduced species diversity or relative abundances. Further discussion of ecological assessment endpoints is provided in <i>Framework for Ecological Risk Assessment: General Guidance</i> (CCME 1998).</p> <p>Notes: Someone experienced must provide a thorough description of the sources researched to classify the environmental receptors in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.</p>
<p>Same as above, but "Strongly Suspected" based on observations or indirect evidence.</p>	12	<p>Groundwater concentrations of Pyrene, Benzoflanthracene, Cadmium, Selenium, and Zinc were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life. The site is within 2 of the Peace River.</p>	<p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1. Alternatively, known impacts can also be evaluated based on a weight of evidence assessment involving a combination of site observations, tissue testing, toxicity testing and quantitative community assessments. Scoring of adverse effects on individual rare or endangered species will be completed on a case-by-case basis with full scientific justification.</p>	
<p>No quantified or suspected exposures/impacts in terrestrial or aquatic organisms</p>	0		<p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 1 and no other observable or measurable sign of impacts. Alternatively, it can be based on a combination of other lines of evidence showing no adverse effects, such as site observations, tissue testing, toxicity testing and quantitative community assessments.</p>	
<p>Score</p>	12			
<p>NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)</p>				

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for ecological exposure (for the contaminated portion of the site)				
a) Terrestrial				
i) Land use				
Agricultural (or Wild lands) Residential/Parkland Commercial Industrial Do Not Know	Score	1.5	Review zoning and land use maps. If the proposed future land use is <i>less sensitive</i> than the current land use, evaluate this factor assuming the proposed future use is in place (indicate in the worksheet that future land use is the consideration). Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Wild lands are grouped with agricultural land due to the similarities in receptors that would be expected to occur there (e.g., herbivorous mammals and birds) and the similar need for a high level of protection to ensure ecological functioning. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	
ii) Uptake potential				
Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site? Yes No Do Not Know	Score	1	If contaminated soils are located within the top 1.5 m, it is assumed that direct contact of soils with plants and soil invertebrates is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely.	
iii) Ingestion (i.e., wildlife or domestic animals ingesting contaminated food items, soils or water)				
Are terrestrial animals likely to be ingesting contaminated water at the site? Yes No Do Not Know	Score	1	Refer to an Ecological Risk Assessment for the site. If there is contaminated surface water at the site, assume that terrestrial organisms will ingest it.	
Are terrestrial animals likely to be ingesting contaminated soils at the site? Yes No Do Not Know	Score	1	Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.	
Can the contamination identified bioaccumulate? Yes No Do Not Know	Score	1	Bioaccumulation of contaminants within food items is considered possible if: 1) The Log(K _{ow}) of the contaminant is greater than 4 (as per the chemical characteristics work sheet) and concentrations in soils exceed the most conservative CCME soil quality guideline for the intended land use, or 2) The contaminant in collected tissue samples exceeds the Canadian Tissue Residue Guidelines.	
Distance to sensitive terrestrial ecological area 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score	1.5	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor located within this area of the site will be subject to further evaluations. It is also considered that any environmental receptor located greater than 5 km will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link www.cceaa.org	Environmental receptors include: local, regional or provincial species of interest or significance; arctic environments (on a site specific basis); nature preserves, habitats for species at risk, sensitive forests, natural parks or forests.
Raw Terrestrial Total Potential		7		
Allowed Terrestrial Total Potential		---	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.	
B. Potential for ecological exposure (for the contaminated portion of the site)				
b) Aquatic				
i) Classification of aquatic environment				
Sensitive Typical Not Applicable (no aquatic environment present) Do Not Know	Score	2	"Sensitive aquatic environments" include those in or adjacent to shellfish or fish harvesting areas, marine parks, ecological reserves and fish migration paths. Also includes those areas deemed to have ecological significance such as for fish food resources, spawning areas or having rare or endangered species. "Typical aquatic environments" include those in areas other than those listed above.	
ii) Uptake potential				
Does groundwater daylighting to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact? Yes No (or Not Applicable) Do Not Know	Score	1	Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways: 1) by comparing collected nearshore groundwater concentrations to the CCME water quality guidelines (this will be a conservative comparison, as contaminant concentrations in groundwater often decrease between nearshore wells and the point of discharge). 2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge. 3) by installing water samplers, "peepers", in the sediments in the area of daylighting groundwater.	
Distance from the contaminated site to an important surface water resource 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score	1.5	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor or important water resource located within this area of the site will be subject to further evaluation. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.cceaa.org .	Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and fens and other aquatic environments.
			Bioaccumulation of food items is possible if:	

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
Are aquatic species (i.e., forage fish, invertebrates or plants) that are consumed by predatory fish or wildlife consumers, such as mammals and birds, likely to accumulate contaminants in their tissues? Yes No Do Not Know	1		1) The Log(K _{ow}) of the contaminant is greater than 4 (as per the chemical characteristics work sheet) and concentrations in sediments exceed the CCME ISQGs. 2) The contaminant in collected tissue samples exceeds the CCME tissue quality guidelines.	
Raw Aquatic Total Potential	5.5	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
Allowed Aquatic Total Potential	---			
4. Ecological Exposure Modifying Factors				
a) Known occurrence of a species at risk. Is there a potential for a species at risk to be present at the site? Yes No Do Not Know	Do Not Know 1	Not known if a species at risk is present at the site.	Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as Eco Explorer, Regional, Provincial (Environment Minister), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance.	Species at risk include those that are extirpated, endangered, threatened, or of special concern. For a list of species at risk, consult Schedule 1 of the federal Species at Risk Act (http://www.sar.gov.ca/species/schedule1.htm). Many provincial governments may also provide regional applicable lists of species at risk. For example, in British Columbia, consult: BCNRM/ELAP, 2005. Endangered Species and Ecosystems in British Columbia. Provincial red and blue lists. Ministry of Sustainable Resource Management and Water, Land and Air Protection (http://srmmwww.gov.bc.ca/erisk/red-blue.htm)
Score	1			
b) Potential impact of aesthetics (e.g., enrichment of a lake or tainting of food flavor). Is there evidence of aesthetic impact to receiving water bodies? Yes No Do Not Know	Do Not Know 1	Peace River has high flow. Do not know if the aesthetics will be impacted.	Documentation may consist of environmental investigation reports, press articles, petitions or other records.	This item will require some level of documentation by user, including contact names, addresses, phone numbers, e-mail addresses. Evidence of changes must be documented, please attach copy of report containing relevant information.
Is there evidence of olfactory impact (i.e., unpleasant smell)? Yes No Do Not Know	No 0		Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat.	
Is there evidence of increase in plant growth in the lake or water body? Yes No Do Not Know	No 0		A distinct increase of plant growth in an aquatic environment may suggest enrichment. Nutrients e.g., nitrogen or phosphorous releases to an aquatic body can act as a fertilizer.	
Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different? Yes No Do Not Know	Do Not Know 1		Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.	
Ecological Modifying Factors Total - Known	0			
Ecological Modifying Factors Total - Potential	3			
Raw Ecological Total - Known	12			
Raw Ecological Total - Potential	3			
Raw Ecological Total	15			
Ecological Total (Max 18)	15.0			
5. Other Potential Contaminant Receptors				
a) Exposure of permafrost (leading to erosion and structural concerns) Are there improvements (roads, buildings) at the site dependent upon the permafrost for structural integrity? Yes No Do Not Know	No 0		Consult engineering reports, site plans or air photos of the site. When permafrost melts, the stability of the soil decreases, leading to erosion. Human structures, such as roads and/or buildings are often dependent on the stability that the permafrost provides.	Plants and lichens provide a natural insulating layer which will help prevent thawing of the permafrost during the summer. Plants and lichens may also absorb less solar radiation. Solar radiation is turned into heat which can also cause underlying permafrost to melt.
Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment? Yes No Do Not Know	Do Not Know 1	Do not know.	Melting permafrost leads to a decreased stability of underlying soils. Wind or surface run-off erosion can carry soils into nearby aquatic habitats. The increased soil loadings into a river can cause an increase in total dissolved solids and a resulting decrease in aquatic habitat quality. In addition, the erosion can bring contaminants from soils to aquatic environments.	
Other Potential Receptors Total - Known	0			
Other Potential Receptors Total - Potential	1			
Exposure Total				
Raw Human Health + Ecological Total - Known	28			
Raw Human Health + Ecological Total - Potential	4	Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.		
Raw Total	32			
Exposure Total (max 34)	23.7			

**CCME National Classification System (2008)
Score Summary**

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCS completely.

I. Contaminant Characteristics

	Known	Potential
1. Residency Media	4	---
2. Chemical Hazard	8	---
3. Contaminant Exceedance Factor	4	---
4. Contaminant Quantity	6	---
5. Modifying Factors	3	---

Raw Total Score 25 0

Raw Total Score (Known + Potential) 25

Adjusted Total Score (Raw Total / 40 * 33) 20.6 (max 33)

II. Migration Potential

	Known	Potential
1. Groundwater Movement	9	---
2. Surface Water Movement	8	---
3. Soil	12	---
4. Vapour	9	---
5. Sediment Movement	9	---
6. Modifying Factors	0	0

Raw Total Score 47 0

Raw Total Score (Known + Potential) 47

Adjusted Total Score (Raw Total / 64 * 33) 24.2 (max 33)

III. Exposure

	Known	Potential
1. Human Receptors		
A. Known Impact	10	
B. Potential		
a. Land Use		---
b. Accessibility		---
c. Exposure Route		
i. Direct Contact		---
ii. Inhalation		---
iii. Ingestion		---
2. Human Receptors Modifying Factors	6	---
Raw Total Human Score	16	0

Raw Total Human Score (Known + Potential) 16

Adjusted Total Human Score 16.0 (maximum 22)

3. Ecological Receptors

A. Known Impact	12	
B. Potential		
a. Terrestrial		---
b. Aquatic		---
4. Ecological Receptors Modifying Factors	0	3
Raw Total Ecological Score	12	3

Raw Total Ecological Score (Known + Potential) 15

Adjusted Total Ecological Score 15.0 (maximum 18)

5. Other Receptors

	0	1
--	---	---

Total Other Receptors Score (Known + Potential) 1

Total Exposure Score (Human + Ecological + Other) 32.0

Adjusted Total Exposure Score (Total Exposure / 46 * 34) 23.7 (max 34)

Site Score

Test Site

Site Letter Grade A

Certainty Percentage 100%

% Responses that are "Do Not Know" -59%

Total NCSCS Score for site 68.5

Site Classification Category 2

Site Classification Categories*:

Class 1 - High Priority for Action (Total NCS Score >70)

Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)

Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)

Class N - Not a Priority for Action (Total NCS Score <37)

Class INS - Insufficient Information (>15% of responses are "Do Not Know")

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions

Subject Site:	Test Site	
Civic Address: <i>(or other description of location)</i>	On the north shore of the Peace River, approximately 220 km east of High Level, Alberta, in Wood Buffalo National Park	
Site Common Name : <i>(if applicable)</i>	Community of Garden River	
Site Owner or Custodian: <i>(Organization and Contact Person)</i>	Parks Canada Agency	
Legal description or metes and bounds:	N 58°42.5', W113°52.0'	
Approximate Site area:		
PID(s) : <i>(or Parcel Identification Numbers [PIN] if untitled Crown land)</i>	Garden River Old Dump (FCSI #15841002)	
Centre of site: <i>(provide latitude/longitude or UTM coordinates)</i>	Latitude:	_____ degrees _____ min _____ secs
	Longitude:	_____ degrees _____ min _____ secs
Site Land Use:	UTM Coordinate:	Northing Easting
	Current:	Commercial/Industrial
	Proposed:	
Site Plan	To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.	
Provide a brief description of the Site:	<p style="text-align: center;">The Garden River Old Dump is located on the east side of the community of Garden River, approximately 300 m north of the Peace River (see attached Site Plan).</p>	

CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions

Affected media and Contaminants of Potential Concern (COPC):	The concentration of Selenium in one sample exceeded Canadian Council of Ministers of the Environment 2007 Canadian soil quality guidelines for the protection of environmental and human health. The concentrations of dissolved Cadmium, Lead, Selenium, and Zinc in three monitoring wells exceeded Canadian Council of Ministers of the Environment 2007 Canadian water quality guidelines for the protection of aquatic life. The concentrations of dissolved Manganese in three monitoring wells exceeded Health Canada 2008 Guidelines for Canadian drinking water quality.
--	--

Please fill in the "letter" that best describes the level of information available for the site being assessed:

Site Letter Grade

If letter grade is F, do not continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent.

Scoring Completed By:	Cathy Hamlen, Ph.D. A.Ag.
Date Scoring Completed:	5-Feb-09

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
1. Residency Media (replaces physical state)				
Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines? yes = has an exceedance or strongly suspected to have an exceedance no = does not have an exceedance or strongly suspected not to have an exceedance			The overall score is calculated by adding the individual scores from each residency media (having one or more exceedance of the most conservative media specific and land-use appropriate CCME guideline). Summary tables of the Canadian Environmental Quality Guidelines for soil, water (aquatic life, non-potable groundwater environments, and agricultural water uses) and sediment are available on the CCME website at http://www.ccme.ca/publications/ceqg_rceq.html?category_id=124 . For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at http://www.hc-sc.gc.ca/ewh-seml/pubs/water-eau/doc_sup-appu/sum_guides_recom/index_e.html .	An increasing number of residency media containing chemical exceedances often equates to a greater potential risk due to an increase in the number of potential exposure pathways.
A. Soil	Yes No Do Not Know	Eleven soil samples and three groundwater monitoring wells were assessed. Refer to <i>Contaminated Site Assessment, Initial and Detailed Testing Programs, Wood Buffalo National Park, Various Locations in the Community of Garden River, Alberta</i> (EBA Consulting Engineers Ltd., 2009).		
	Yes No Do Not Know			
B. Groundwater	Yes No Do Not Know			
	Yes No Do Not Know			
C. Surface water	Yes No Do Not Know			
	Yes No Do Not Know			
D. Sediment	Yes No Do Not Know			
	Yes No Do Not Know			
	"Known" -score "Potential" - score			
	4 —			
2. Chemical Hazard				
What is the relative degree of chemical hazard of the contaminant in the list of hazard rankings proposed by the Federal Contaminated Sites Action Plan (FCSAP)? High Medium Low Do Not Know	High	Cadmium (groundwater) is High, Selenium (groundwater, soil) is Medium, and Iron, Manganese, and Zinc (groundwater) are Low.	The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site. The degree of hazard has been defined by the Federal Contaminated Sites Action Plan (FCSAP) and a list of substances with their associated hazard (Low, Medium and High) has been provided as a separate sheet in this file. See Attached Reference Material for Contaminant Hazard Rankings.	Hazard as defined in the revised NCS pertains to the physical properties of a chemical which can cause harm. Properties can include toxic potency, propensity to biomagnify, persistence in the environment, etc. Although there is some overlap between hazard and contaminant exceedance factor below, it will not be possible to derive contaminant exceedance factors for many substances which have a designated chemical hazard designation, but don't have a CCME guideline. The purpose of this category is to avoid missing a measure of toxic potential.
	High			
"Known" -score "Potential" - score	8 —			
3. Contaminant Exceedance Factor				
What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")? Mobile NAPL High (>100x) Medium (10x to 100x) Low (1x to 10x) Do Not Know	Medium (10x to 100x)	The maximum Selenium concentration in soil was 1.58 times higher than CCME 2007 Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health; The maximum groundwater Manganese concentration was 12.7 times higher than Health Canada 2008 Guideline for Canadian Drinking Water Quality, and the maximum groundwater Iron concentration was 6.7 times higher than the 2008 Health Canada guideline and the CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life; The maximum groundwater Zinc concentration was 3.1 times higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life, the maximum Selenium concentration was 10.8 times higher than the 2007 CCME guideline, and the maximum dissolved Cadmium concentration was 21.6 times higher than the 2007 CCME guideline.	Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the <i>most conservative media-specific and land-use appropriate CCME environmental quality guidelines</i> . Ranking should be based on contaminant with greatest exceedance of CCME guidelines. Ranking of contaminant hazard as high, medium and low is as follows: High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines Mobile NAPL = Contaminant is a non-aqueous phase liquid (i.e., due to its low solubility, it does not dissolve in water, but remains as a separate liquid) and is present at a sufficiently high saturation (i.e., greater than residual NAPL saturation) such that there is significant potential for mobility either downwards or laterally. Other standards may include local background concentration or published toxicity benchmarks. Results of toxicity testing with site samples can be used as an alternative. This approach is only relevant for contaminants that do not biomagnify in the food web, since toxicity tests would not indicate potential effects at higher trophic levels. High = lethality observed. Medium = no lethality, but sub lethal effects observed. Low = neither lethal nor sub lethal effects observed.	In the event that elevated levels of a material with no associated CCME guidelines are present, check provincial and USEPA environmental criteria. Hazard Quotients (sometimes referred to as a screening quotient in risk assessments) refer to the ratio of measured concentration to the concentration believed to be the threshold for toxicity. A similar calculation is used here to determine the contaminant exceedance factor (CEF). Concentrations greater than one times the applicable CCME guideline (i.e., CEF=>1) indicate that risks are possible. Mobile NAPL has the highest associated score (8) because of its highly concentrated nature and potential for increase in the size of the impacted zone.
	Medium (10x to 100x)			
"Known" -score "Potential" - score	4 —			

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
4. Contaminant Quantity (known or strongly suspected)				
What is the known or strongly suspected quantity of all contaminants? >10 hectare (ha) or 5000 m ³ 2 to 10 ha or 1000 to 5000 m ³ <2 ha or 1000 m ³ Do Not Know	>10 hectare (ha) or 5000 m ³ ---	Area of site is approximately 8,000 m ² .	Measure or estimate the area or quantity of total contamination (i.e. all contaminants known or strongly suspected to be present on the site). The "Area of Contamination" is defined as the area or volume of contaminated media (soil, sediment, groundwater, surface water) exceeding appropriate environmental criteria.	A larger quantity of a potentially toxic substance can result in a larger frequency of exposure as well as a greater probability of migration, therefore, larger quantities of these substances earn a higher score.
"Known" - score	9			
"Potential" - score	---			
5. Modifying Factors				
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment? Yes No Do Not Know	No 0 ---	Chemicals do not persist.	Persistent chemicals, e.g., PCBs, chlorinated pesticides etc. either do not degrade or take longer to degrade, and therefore may be available to cause effects for a longer period of time. Canadian Environmental Protection Act (CEPA) classifies a chemical as persistent when it has at least one of the following characteristics: (a) In air, (i) its half-life is equal to or greater than 2 days, or (ii) it is subject to atmospheric transport from its source to a remote area; (b) In water, its half-life is equal to or greater than 182 days; (c) In sediments, its half-life is equal to or greater than 365 days; or (d) In soil, its half-life is equal to or greater than 182 days. This list does not include metals or metalloids, which in their elemental form do not degrade. However metals and metalloids form chemical species in the environment, many of which are not readily bioavailable.	Examples of Persistent Substances are provided in attached Reference Materials
Are there contaminants present that could cause damage to utilities and infrastructure, either now or in the future, given their location? Yes No Do Not Know	No 0 ---			Some contaminants may react or absorb into underground utilities and infrastructure. For example, organic solvents may degrade some plastics, and salts could cause corrosion of metal.
How many different contaminant classes have representative CCME guideline exceedances? one two to four five or more Do Not Know	five or more 3 ---	Cadmium, Iron, Selenium, and Zinc in groundwater; Selenium in soil.	For the purposes of the revised NCS ranking system, the following chemicals represent distinct chemical "classes": inorganic substances (including metals), volatile petroleum hydrocarbons, light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons, PAHs, phenolic substances, chlorinated hydrocarbons, halogenated methanes, phthalate esters, pesticides.	Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.
"Known" - Score	3			
"Potential" - Score	---			

Contaminant Characteristic Total

Raw Total Scores- "Known"	28
Raw Total Scores- "Potential"	0
Raw Combined Total Scores	28
Total Score (Raw Combined / 40 * 33)	23.1

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Groundwater Movement				
A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary.				
<p>i) For potable groundwater environments 1) groundwater concentrations exceed background concentrations and 1X the Guideline for Canadian Drinking Water Quality (GCDWQ) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater contamination. For non-potable environments (typically urban environments with municipal services), 1) groundwater concentrations exceed 1X the applicable non-potable guidelines or modified generic guidelines (which exclude ingestion of drinking water pathway) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater impacts.</p> <p>ii) Same as (i) except the information is not known but is only suspected based on indirect observations.</p> <p>iii) Meets GCDWQ for potable environments meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for non-potable environments or Absence of groundwater exposure pathway (i.e., there is no aquifer (see definition at right) at the site or there is an adequate isolating layer between the aquifer and the contamination, and within 5 km of the site there are no aquatic receiving environments and the groundwater does not daylight).</p>	12	<p>Selenium concentration in one monitoring well exceeded maximum acceptable concentration for drinking water (Health Canada 2008). Manganese in groundwater exceeded drinking water aesthetic objective (Health Canada 2008 Guidelines for Canadian Drinking Water Quality). Cadmium, Iron, Manganese, and Zinc concentrations exceeded guideline for protection of fresh water aquatic life (CCME, 2007). The hydraulic conductivity of the site is in the range of 10m/s and groundwater flow is interpreted to be towards the Peace River (based on March 2008 groundwater elevation contours).</p>	<p>Review chemical data and evaluate groundwater quality.</p> <p>The evaluation method concentrates on 1) a potable or non-potable groundwater environment, the groundwater flow system and its potential to be an exposure pathway to known or potential receptors</p> <p>An aquifer is defined as a geologic unit that yields groundwater in usable quantities and drinking water quality. The aquifer can currently be used as a potable water supply or could have the potential for use in the future. Non-potable groundwater environments are defined as areas that are serviced with a reliable alternative water supply (most commonly provided in urban areas). The evaluation of a non-potable environment will be based on a site specific basis.</p> <p>Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils.</p> <p>Seeps and springs are considered part of the groundwater pathway.</p> <p>In Arctic environments, the potability and evaluation of the seasonal active layer (above the permafrost) as a groundwater exposure pathway will be considered on a site-specific basis.</p>	<p>The 1992 NCS rationale evaluated the off-site migration as a regulatory issue. The exposure assessment and classification of hazards should be evaluated regardless of the property boundaries.</p> <p>Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a groundwater supply source in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links.</p> <p>Note that for potable groundwater that also daylights into a nearby surface water body, the more stringent guidelines for both drinking water and protection of aquatic life should be considered.</p> <p>Selected References</p> <p><u>Potable Environments</u></p> <p>Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/rwh-som/pubs/water_sau/for_sus-appeil/sum_guidelines_recommandes.html</p> <p><u>Non-Potable Environments</u></p> <p>Canadian Water Quality Guidelines for Protection of Aquatic Life. CCME, 1999 www.ccme.ca</p> <p>Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.</p>
NOTE: If a score is assigned here for Known COPC Exceedances, then you can skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)				
B. Potential for groundwater pathway.				
<p>a. Relative Mobility</p> <p>High Moderate Low Insignificant Do Not Know</p>			<p>Organics Koc (L/kg)</p> <p>Metals with higher mobility at acidic conditions</p> <p>Metals with higher mobility at alkaline conditions</p> <p>Koc < 500 (i.e., log Koc < 2.7) pH < 5</p> <p>Koc = 500 to 5000 (i.e., log Koc = 2.7 to 3.7) pH = 5 to 8</p> <p>Koc = 5,000 to 100,000 (i.e., log Koc = 3.7 to 5) pH > 8</p> <p>Koc > 100,000 (i.e., log Koc > 5) pH < 7.5</p>	<p>Reference: US EPA Soil Screening Guidance (Part 5 - Table 39)</p> <p>If a score of zero is assigned for relative mobility, it is still recommended that the following sections on potential for groundwater pathway be evaluated and scored. Although the Koc of an individual contaminant may suggest that it will be relatively immobile, it is possible that, with complex mixtures, there could be enhanced mobility due to co-solvent effects. Therefore, the Koc cannot be relied on solely as a measure of mobility. An evaluation of other factors such as containment, thickness of confining layer, hydraulic conductivities and precipitation infiltration rate are still useful in predicting potential for groundwater migration, even if a contaminant is expected to have insignificant mobility based on its chemistry alone.</p>
	Score	2		
<p>b. Presence of engineered sub-surface containment?</p> <p>No containment Partial containment Full containment Do Not Know</p>			<p>Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved.</p> <p>Full containment is defined as an engineered system or natural attenuation processes, monitored as being effective, which provide for full capture and/or treatment of contaminants. All chemicals of concern must be contained for Full Containment scoring. Natural attenuation must have sufficient data, and reports cited with monitoring data to support steady state conditions and the attenuation processes. If there is no containment or insufficient natural attenuation process, this category is evaluated as high. If there is less than full containment or if uncertain, then evaluate as medium. In Arctic environments, permafrost will be evaluated, as appropriate, based on detailed evaluations, effectiveness and reliability to contain/control contaminant migration.</p>	<p>Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links.</p> <p>Selected Resources:</p> <p>United States Environmental Protection Agency (USEPA) 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.</p> <p>Environment Canada - Ontario Region - Natural Attenuation Technical Assistance Bulletins (TABs) Number 19-21.</p>
	Score	1.5		
<p>c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway</p> <p>3 m or less including no confining layer or discontinuous confining layer 3 to 10 m > 10 m Do Not Know</p>			<p>The term "confining layer" refers to geologic material with little or no permeability or hydraulic conductivity (such as unfractured clay); water does not pass through this layer or the rate of movement is extremely slow.</p> <p>Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway.</p> <p>The evaluation of this category is based on:</p> <p>1) The presence and thickness of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as drinking water sources or</p> <p>2) The presence and thickness of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated zone (e.g., water table aquifer, first hydrostratigraphic unit or other groundwater pathway).</p>	
	Score	0.5		
<p>d. Hydraulic conductivity of confining layer</p> <p>>10⁻⁴ cm/s or no confining layer 10⁻⁴ to 10⁻⁶ cm/s <10⁻⁶ cm/s Do Not Know</p>			<p>Determine the nature of geologic materials and estimate hydraulic conductivity from published material (or use Range of Values of Hydraulic Conductivity and Permeability figure in the Reference Material sheet). Unfractured clays should be scored low. Silts should be scored medium. Sand, gravel should be scored high. The evaluation of this category is based on:</p> <p>1) The presence and hydraulic conductivity (K) of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as a drinking water source, groundwater exposure pathway or</p> <p>2) The presence and permeability (K) of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated water table aquifer, first hydrostratigraphic unit or other groundwater pathway.</p>	
	Score	0.5		

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for groundwater pathway.				
<p>e. Precipitation infiltration rate (Annual precipitation factor x surface soil relative permeability factor)</p> <p>High Moderate Low Very Low None Do Not Know</p>	Score	0.4	<p>Precipitation Refer to Environment Canada precipitation records for relevant areas. Divide annual precipitation by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score).</p> <p>Permeability For surface soil relative permeability (i.e., infiltration) assume: gravel (1), sand (0.6), loam (0.3) and pavement or clay (0).</p> <p>Multiply the surface soil relative permeability factor with precipitation factor to obtain the score for precipitation infiltration rate.</p>	
<p>f. Hydraulic conductivity of aquifer</p> <p>>10⁻² cm/s 10⁻² to 10⁻⁴ cm/s <10⁻⁴ cm/s Do Not Know</p>	Score	1	Determine the nature of geologic materials and estimate hydraulic conductivity of all aquifers of concern from published material (refer to "Range of Values of Hydraulic Conductivity and Permeability" in the Reference Material sheet).	
Potential groundwater pathway total	Score	5.9		
Allowed Potential score	Score	---	Note: If a "known" score is provided, the "potential" score is disallowed.	
Groundwater pathway total	Score	9		
2. Surface Water Movement				
A. Demonstrated migration of COPC in surface water above background conditions				
<p>Known concentrations of surface water:</p> <p>i) Concentrations exceed background concentrations and exceed CCME CWQG for protection of aquatic life, irrigation, livestock water, and/or recreation (whichever uses are applicable at the site) by >1 X; or There is known contact of contaminants with surface water based on site observations. or In the absence of CWQG, chemicals have been proven to be toxic based on site specific testing (e.g. toxicity testing; or other indicator testing of exposure).</p> <p>ii) Same as (i) except the information is not known but <u>strongly suspected</u> based on indirect observations.</p> <p>iii) Meets CWQG or absence of surface water exposure pathway (i.e., Distance to nearest surface water is > 5 km.)</p>	Score	12 8 0 8	<p>Collect all available information on quality of surface water near to site. Evaluate available data against Canadian Water Quality Guidelines (select appropriate guidelines based on local water use, e.g., recreation, irrigation, aquatic life, livestock watering, etc.). The evaluation method concentrates on the surface water flow system and its potential to be an exposure pathway. Contamination is present on the surface (above ground) and has the potential to impact surface water bodies.</p> <p>Surface water is defined as a water body that supports one of the following uses: recreation, irrigation, livestock watering, aquatic life.</p> <p>Groundwater concentrations of Cadmium, Iron, Selenium, and Zinc were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life. The site is approximately 300 m north of the Peace River.</p>	<p>General Notes: Someone experienced must provide a thorough description of the sources researched to classify the surface water body in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact name, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.</p> <p>Selected References: CCME. 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME. 1999. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water) www.ccme.ca Health and Welfare Canada. 1992. Guidelines for Canadian Recreational Water Quality.</p>
<p>NOTE: If a score is assigned here for Demonstrated Migration in Surface Water, then you can skip Part B (Potential for migration of COPCs in surface water) and go to Section 3 (Surface Soils)</p>				
B. Potential for migration of COPCs in surface water				
<p>a. Presence of containment</p> <p>No containment Partial containment Full containment Do Not Know</p>	Score	3	Review the existing engineered systems and relate these structures to site conditions and proximity to surface water and determine if full containment is achieved: score low if there is full containment such as capping, berms, dikes; score medium if there is partial containment such as natural barriers, trees, ditches, sedimentation ponds; score high if there are no intervening barriers between the site and nearby surface water. Full containment must include containment of all chemicals.	
<p>b. Distance to Surface Water</p> <p>0 to <100 m 100 - 300 m >300 m Do Not Know</p>	Score	2	Review available mapping and survey data to determine distance to nearest surface water bodies.	

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<p>c. Topography</p> <p>Contaminants above ground level and slope is steep</p> <p>Contaminants at or below ground level and slope is steep</p> <p>Contaminants above ground level and slope is intermediate</p> <p>Contaminants at or below ground level and slope is intermediate</p> <p>Contaminants above ground level and slope is flat</p> <p>Contaminants at or below ground level and slope is flat</p> <p>Do Not Know</p>	1		<p>Review engineering documents on the topography of the site and the slope of surrounding terrain.</p> <p>Steep slope = >50%</p> <p>Intermediate slope = between 5 and 50%</p> <p>Flat slope = < 5%</p> <p>Note: Type of fill placement (e.g., trench, above ground, etc.).</p>	
<p>d. Run-off potential</p> <p>High (rainfall run-off score > 0.8)</p> <p>Moderate (0.4 < rainfall run-off score < 0.8)</p> <p>Low (0.2 < rainfall run-off score < 0.4)</p> <p>Very Low (0 < rainfall run-off score < 0.2)</p> <p>None (rainfall run-off score = 0)</p> <p>Do Not Know</p>	0.4		<p>Rainfall</p> <p>Refer to Environment Canada precipitation records for relevant areas. Divide rainfall by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score).</p> <p>The former definition of annual rainfall did not include the precipitation as snow. This minor adjustment has been made. The second modification was the inclusion of permeability of surface materials as an evaluation factor.</p> <p>Permeability</p> <p>For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1).</p> <p>Multiply the infiltration factor with precipitation factor to obtain rainfall run off score.</p>	<p>Selected Sources:</p> <p>Environment Canada web page link www.msc.ec.gc.ca</p> <p>Snow to rainfall conversion apply ratio of 15 (snow):1 (water)</p>
<p>e. Flood potential</p> <p>1 in 2 years</p> <p>1 in 10 years</p> <p>1 in 50 years</p> <p>Do Not Know</p>	0.5		<p>Review published data such as flood plain mapping or flood potential (e.g., spring or mountain run-off) and Conservation Authority records to evaluate flood potential of nearby water courses both up and down gradient. Rate zero if site not in flood plain.</p>	
Potential surface water pathway total	0.9			
Allowed Potential score	—			
Surface water pathway total	8	Note: If a "known" score is provided, the "potential" score is disallowed.		
3. Surface Soils (potential for dust, dermal and ingestion exposure)				
A. Demonstrated concentrations of COPC in surface soils (top 1.5 m)				
<p>COPCs measured in surface soils exceed the CCME soil quality guideline.</p> <p>Strongly suspected that soils exceed guidelines</p> <p>COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock).</p>	<p>12</p> <p>9</p> <p>0</p> <p>12</p> <p>12</p>	<p>The concentration of Selenium in one surface soil sample (0 - 0.6 m depth) exceeded the CCME 2007 Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. Risk is minimized since the site is not an active landfill and has full vegetative cover.</p>	<p>Collect all available information on quality of surface soils (i.e., top 1.5 metres) at the site. Evaluate available data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (i.e., agricultural, residential/parkland, commercial, or industrial), and soil texture if applicable (i.e., coarse or fine).</p>	<p>Selected References:</p> <p>CCME, 1999, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health</p> <p>www.ccme.ca</p>
NOTE: If a score is assigned here for Demonstrated Concentrations in Surface Soils, then you can skip Part B (Potential for a surface soils migration pathway) and go to Section 4 (Appur).				
B. Potential for a surface soils (top 1.5 m) migration pathway				
<p>a. Are the soils in question covered?</p> <p>Exposed</p> <p>Vegetated</p> <p>Landscaped</p> <p>Paved</p> <p>Do Not Know</p>	4		<p>Consult engineering or risk assessment reports for the site. Alternatively, review photographs or perform a site visit.</p> <p>Landscaped surface soils must include a minimum of 0.5 m of topsoil.</p>	<p>The possibility of contaminants in blowing snow have not been included in the revised NCS as it is difficult to assess what constitutes an unacceptable concentration and secondly, spills to snow or ice are most efficiently mitigated while freezing conditions remain.</p>
<p>b. For what proportion of the year does the site remain covered by snow?</p> <p>0 to 10% of the year</p> <p>10 to 30% of the year</p> <p>More than 30% of the year</p> <p>Do Not Know</p>	3		<p>Consult climatic information for the site. The increments represent the full span from soils which are always wet or covered with snow (and therefore less likely to generate dust) to those soils which are predominantly dry and not covered by snow (and therefore are more likely to generate dust).</p>	
Potential surface soil pathway total	7			
Allowed Potential score	—			
Soil pathway total	12	Note: If a "known" score is provided, the "potential" score is disallowed.		

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site	Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
4. Vapour					
A. Demonstrated COPCs in vapour.					
	Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations.	12	No Volatile COPCs were detected in soil or groundwater.	Consult previous investigations, including human health risk assessments, for reports of vapours detected.	
	Strongly suspected (based on observations and/or modelling)	9			
	Vapour has not been measured and volatile hydrocarbons have not been found in site soils or groundwater.	0			
	Score	0			
NOTE: If a score is assigned here for Demonstrated COPCs in Vapour, then you can skip Part B (Potential for COPCs in vapour) and go to Section 5 (Sediment)					
B. Potential for COPCs in vapour					
	a. Relative Volatility based on Henry's Law Constant, H [*] (dimensionless) High (H [*] > 1.0E-1) Moderate (H [*] = 1.0E-1 to 1.0E-3) Low (H [*] < 1.0E-3) Not Volatile Do Not Know			Reference: US EPA Soil Screening Guidance (Part 5 - Table 36) Provided in Attached Reference Materials	If the Henry's Law Constant for a substance indicates that it is not volatile, and a score of zero is assigned here for relative volatility, then the other three questions in this section on Potential for COPCs will be automatically assigned scores of zero and you can skip to section 5.
	Score	2.5			
	b. What is the soil grain size? Fine Coarse Do Not Know			Review soil permeability data in engineering reports. The greater the permeability of soils, the greater the possible movement of vapours. Fine-grained soils are defined as those which contain greater than 50% by mass particles less than 75 µm mean diameter (D50 < 75 µm). Coarse-grained soils are defined as those which contain greater than 50% by mass particles greater than 75 µm mean diameter (D50 > 75 µm).	
	Score	3			
	c. Is the depth to the source less than 10m? Yes No Do Not Know			Review groundwater depths below grade for the site.	
	Score	2			
	d. Are there any preferential pathways? Yes No Do Not Know			Visit the site during dry summer conditions and/or review available photographs. Where bedrock is present, fractures would likely act as preferential pathways.	Preferential pathways refer to areas where vapour migration is more likely to occur because there is lower resistance to flow than in the surrounding materials. For example, underground conduits such as sewer and utility lines, drains, or septic systems may serve as preferential pathways. Features of the building itself that may also be preferential pathways include earthen floors, expansion joints, wall cracks, or foundation perforations for subsurface features such as utility pipes, sumps, and drains.
	Score	2			
	Potential vapour pathway total	9.5			
	Allowed Potential score	—			
	Vapour pathway total	0	Note: If a "known" score is provided, the "potential" score is disallowed.		
5. Sediment Movement					
A. Demonstrated migration of sediments containing COPCs					
	There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated.	12	The site has full vegetative cover and is no longer an active landfill.	Review sediment assessment reports. Evidence of migration of contaminants in sediments must be reported by someone experienced in this area.	Usually not considered a significant concern in lakes/marine environments, but could be very important in rivers where transport downstream could be significant.
	Strongly suspected (based on observations and/or modelling)	9			
	Sediments have been contained and there is no indication that sediments will migrate in future. or Absence of sediment exposure pathway (i.e., within 5 km of the site there are no aquatic receiving environments, and therefore no sediments).	0			
	Score	0			
NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you can skip Part B (Potential for Sediment Migration) and go to Section 6 (Modifying Factors)					

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for sediment migration				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")? Yes No Do Not Know	4		Review existing sediment assessments. If sediment coring has been completed, it may indicate that historically contaminated sediments have been covered over by newer "clean" sediments. This assessment will require that cores collected demonstrate a low concentration near the top and higher concentration with sediment depth.	
b. For lakes and marine habitats, are the contaminated sediments in shallow water and therefore likely to be affected by tidal action, wave action or propeller wash? Yes No Do Not Know	4		Review existing sediment assessments. If the sediments present at the site are in a river, select "no" for this question.	
c. For rivers, are the contaminated sediments in an area prone to sediment scouring? Yes No Do Not Know	4		Review existing sediment assessments. It is important that the assessment is made under worst case flows (high yearly flows). Under high yearly flows, areas which are commonly depositional	
Potential sediment pathway total	12			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Sediment pathway total	0			
6. Modifying Factors				
Are there subsurface utility conduits in the area affected by contamination? Yes No Do Not Know	No	No underground utilities were located in March 2008.	Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
	Known: 0 Potential: 0			

Migration Potential Total	
Raw "known" total	29
Raw "potential" total	0.0
Raw combined total	29.0
Total (max 33)	15.0

Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore, the total "Potential" Score may not reflect the sum of the individual "Potential" scores.

CCME National Classification System (2008)

(II) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Human				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to humans as a result of the contaminated site. (Class 1 Site*)	22	The site is located approximately 300 m east of the community. The soil sample with the Selenium concentration greater than the CCME 2007 Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health was collected 7.6 m below ground, and groundwater concentration of Selenium at this location exceeded maximum acceptable concentration for drinking water (Health Canada 2008). Groundwater flow is interpreted to be towards the Peace River and away from the community (based on March 2008 groundwater elevation contours).	*Where adverse effects on humans are documented, the site should be automatically designated Class 1 site (i.e., action required). There is no need to proceed through the NCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites). This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1 for non-carcinogenic chemicals and incremental cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this typically either >10 ⁻⁶ or >10 ⁻⁵). Known impacts can also be evaluated based on blood testing (e.g. blood lead >10 ug/dL) or other health based testing. This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 0.2 for non-carcinogenic chemicals and incremental lifetime cancer risks for carcinogenic chemicals that are within acceptable levels as defined by the jurisdiction (for most jurisdictions this is less than either 10 ⁻⁶ or 10 ⁻⁵).	Known adverse impact includes domestic and traditional food sources. Adverse effects based on food chain transfer to humans and/or animals can be scored in this category. However, the weight of evidence must show a direct link of a contaminated food source/supply and subsequent ingestion/transfer to humans. Any associated adverse effects to the environment are scored separately later in this worksheet. Someone experienced must provide a thorough description of the sources researched to evaluate and determine the quantified exposure/impact (adverse effect) in the vicinity of the contaminated site. Selected References: Health Canada- Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Health Screening Level Risk Assessment www.hc-sc.gc.ca/ehp/contaminated/ia/index_e.html United States Environmental Protection Agency, Integrated Risk Information System (IRIS) http://www.epa.gov/iris/
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	10			
No quantified or suspected exposures/impacts in humans.	0			
Score	10			
NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Human Exposure) and go to Section 2 (Human Exposure Modifying Factors)				
B. Potential for human exposure				
a) Land use (provides an indication of potential human exposure scenarios) Agricultural Residential / Parkland Commercial Industrial Do Not Know	1.5	Review zoning and land use maps over the distances indicated. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place. Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	This is the main "receptor" factor used in site scoring. A higher score implies a greater exposure and/or exposure of more sensitive human receptors (e.g., children).	
Score	1.5			
b. Indicate the level of accessibility to the contaminated portion of the site (e.g., the potential for coming in contact with contamination) Limited barriers to prevent site access; contamination not covered Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered. Controlled access or remote location and contaminants are covered Do Not Know	1	Review location and structures and contaminants at the site and determine if there are intervening barriers between the site and humans. A low rating should be assigned to a (covered) site surrounded by a fence or in a remote location, whereas a high score should be assigned to a site that has no cover, fence, natural barriers or buffer.		
B. Potential for human exposure				
c) Potential for intake of contaminated soil, water, sediment or food for operable or potentially operable pathways, as identified in Worksheet II (Migration Potential). i) direct contact Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated? Yes No Do Not Know	3	If soils or potable groundwater are present exceeding their respective CCME guidelines, dermal contact is assumed. Exposure to surface water, non-potable groundwater or sediments exceeding their respective CCME guidelines will depend on the site. Select "Yes" if dermal exposure to surface water, non-potable groundwater or sediments is expected. For instance, dermal contact with sediments would not be expected in an active port. Only soils in the top 1.5 m are defined by CCME (2003) as surface soils. If contaminated soils are only located deeper than 1.5 m, direct contact with soils is not anticipated to be an operable contaminant exposure pathway.	Exposure via the skin is generally believed to be a minor exposure route. However for some organic contaminants, skin exposure can play a very important component of overall exposure. Dermal exposure can occur while swimming in contaminated water, bathing with contaminated surface water/groundwater and digging in contaminated dirt, etc.	
Score	3			
ii) Inhalation (i.e., inhalation of dust, vapour) Vapour - Are there inhabitable buildings on the site within 30 m of soils or groundwater with volatile contamination as determined in Worksheet II (Migration Potential)? Yes No Do Not Know Dust - If there is contaminated surface soil (e.g. top 1.5 m), indicate whether the soil is fine or coarse textured. If it is known that surface soil is not contaminated, enter a score of zero. Fine Coarse Surface soil is not contaminated or absent Do Not Know Texture	3	If inhabitable buildings are on the site within 30 m of soils or groundwater exceeding their respective guidelines for volatile chemicals, there is a potential of risk to human health (Health Canada, 2004). Review site investigations for location of soil samples (having exceedances of volatile substances relative to buildings. Refer to (II) Migration Potential worksheet, 4B Potential for COPCs in Vapour for a definition of volatility. Consult grain size data for the site. If soils (containing exceedances of the CCME soil quality guidelines) predominantly consist of fine material (having a median grain size of 75 microns; as defined by CCME (2006)) then these soils are more likely to generate dusts.	Exposure via the lungs (inhalation) can be a very important exposure pathway. Inhalation can be via both particulates (dust) and gas (vapour). Vapours can be a problem where buildings have been built on former industrial sites or where volatile contaminants have migrated below buildings resulting in the potential for vapour intrusion. Assesses the potential for humans to be exposed to vapours originating from site soils. The closer the receptor is to a source of volatile chemicals in soil, the greater the potential of exposure. Also, coarser-grained soil will convey vapour much more efficiently in the soil than finer grained material such as clays and silts. General Notes: Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a vapour migration and/or dust generation in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as Internet links. Selected References: Canadian Council of Ministers of the Environment (CCME), 2006. Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. PN 133 www.ccme.ca Golder, 2004. Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC	
Score	3			
Score	0			
Inhalation total	3			

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for human exposure				
ii) Ingestion (i.e., ingestion of food items, water and soils [for children]), including traditional foods. Drinking Water: Choose a score based on the proximity to a drinking water supply. To indicate the potential for contamination (present or future). 0 to 100 m 100 to 300 m 300 m to 1 km 1 to 5 km No drinking water present Do Not Know Score 2 Is an alternative water supply readily available? Yes No Do Not Know Score 1 Is human ingestion of contaminated soils possible? Yes No Do Not Know Score 3 Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings? Yes No Do Not Know Score 1 Ingestion total 7			Review available site data to determine if drinking water (groundwater, surface water, private, commercial or municipal supply) is known or suspected to be contaminated above Guidelines for Canadian Drinking Water Quality. If drinking water supply is known to be contaminated, some immediate action (e.g., provision of alternate drinking water supply) should be initiated to reduce or eliminate exposure. The evaluation of significant potential for exceedances of the water supply in the future may be based on the capture zones of the drinking water wells; contaminant travel times; computer modeling of flow and contaminant transport. If contaminated soils are located within the top 1.5 m, it is assumed that ingestion of soils is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely, and the duration is shorter. Refer to human health risk assessment reports for the site in question. Use human health risk assessment reports (or others) to determine if there is significant reliance on traditional food sources associated with the site. Is the food item in question going to spend a large proportion of its time at the site (e.g., large mammals may spend a very small amount of time at a small contaminated site)? Human health risk assessment reports for the site in question will also provide information on potential bioaccumulation of the COPC in question.	Selected References: Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/hccs-pssc/water/publications/drinking_water_quality_guidelines/02c.html Drinking water can be an extremely important exposure pathway to humans. If site groundwater or surface water is not used for drinking, then this pathway is considered to be inoperable. Consider both wild foods such as salmon, venison, caribou, as well as agricultural sources of food items if the contaminated site is on or adjacent to agricultural land uses.
Human Health Total "Potential" Score Allowed "Potential" Score 15.5 ---		Note if a "Known" Human Health score is provided, the "Potential" score is disallowed.		
2. Human Exposure Modifying Factors				
a) Strong reliance of local people on natural resources for survival (i.e., food, water, shelter, etc.) Yes No Do Not Know Known Potential 6 Raw Human "unknown" total 16 Raw Human "potential" total 0 Raw Human Exposure Total Score 16 Human Health Total (max 22) 18.0	Yes	Potable water supply is local; Strong reliance of community on local foods which include fish from Peace River.		
3. Ecological				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to terrestrial or aquatic organisms as a result of the contaminated site. 18 Same as above, but "Strongly Suspected" based on observations or indirect evidence. 12 No quantified or suspected exposures/impacts in terrestrial or aquatic organisms 0 18 Score 18		Dissolved concentrations of Cadmium, Iron, Selenium, and Zinc were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life. The site is within 0.5 km of the Peace River.	Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are deemed to be severe, the site may be categorized as class one (i.e., a priority for remediation or risk management), regardless of the numerical total NCS score. For the purpose of application of the NCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. If ecological effects are determined to be severe and an automatic Class 1 is assigned, there is no need to proceed through the NCS. However, a scoring guideline (18) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites). This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1. Alternatively, known impacts can also be evaluated based on a weight of evidence assessment involving a combination of site observations, tissue testing, toxicity testing and quantitative community assessments. Scoring of adverse effects on individual rare or endangered species will be completed on a case-by-case basis with full scientific justification. This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 1 and no other observable or measurable sign of impacts. Alternatively, it can be based on a combination of other lines of evidence showing no adverse effects such as site observations, tissue testing, toxicity testing and quantitative community assessments.	CCME, 1999: Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses www.ccme.ca Sensitive receptors- review: Canadian Council on Ecological Areas www.ccea.org Ecological effects should be evaluated at a population or community level, as opposed to at the level of individuals. For example, population-level effects could include reduced reproduction, growth or survival in a species. Community-level effects could include reduced species diversity or relative abundances. Further discussion of ecological assessment endpoints is provided in a Framework for Ecological Risk Assessment: General Guidance (CCME 1998). Notes: Someone experienced must provide a thorough description of the sources researched to classify the environmental receptors in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.
NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)				

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for ecological exposure (for the contaminated portion of the site)				
a) Terrestrial				
i) Land use				
Agricultural (or Wild lands) Residential/Parkland Commercial Industrial Do Not Know	Score	1.5	Review zoning and land use maps. If the proposed future land use is less sensitive than the current land use, evaluate this factor assuming the proposed future use is in place (indicate in the worksheet that future land use is the consideration). Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Wild lands are grouped with agricultural land due to the similarities in receptors that would be expected to occur there (e.g., herbivorous mammals and birds) and the similar need for a high level of protection to ensure ecological functioning. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	
ii) Uptake potential				
Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site? Yes No Do Not Know	Score	1	If contaminated soils are located within the top 1.5 m, it is assumed that direct contact of soils with plants and soil invertebrates is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely.	
iii) Ingestion (i.e., wildlife or domestic animals ingesting contaminated food items, soils or water)				
Are terrestrial animals likely to be ingesting contaminated water at the site? Yes No Do Not Know	Score	1	Refer to an Ecological Risk Assessment for the site. If there is contaminated surface water at the site, assume that terrestrial organisms will ingest it.	
Are terrestrial animals likely to be ingesting contaminated soils at the site? Yes No Do Not Know	Score	1	Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.	
Can the contamination identified bioaccumulate? Yes No Do Not Know	Score	1	Bioaccumulation of contaminants within food items is considered possible if: 1) The Log(Kow) of the contaminant is greater than 4 (as per the chemical characteristics worksheet) and concentrations in soils exceed the most conservative CCME soil quality guideline for the intended land use, or 2) The contaminant in collected tissue samples exceeds the Canadian Tissue Residue Guidelines.	
Distance to sensitive terrestrial ecological area 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score	1.5	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor located within this area of the site will be subject to further evaluations. It is also considered that any environmental receptor located greater than 5 km will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance; arctic environments (on a site specific basis); nature preserves, habitats for species at risk, sensitive forests, natural parks or forests.
Raw Terrestrial Total Potential		7		
Allowed Terrestrial Total Potential		—		Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.
B. Potential for ecological exposure (for the contaminated portion of the site)				
b) Aquatic				
i) Classification of aquatic environment				
Sensitive Typical Not Applicable (no aquatic environment present) Do Not Know	Score	2	"Sensitive aquatic environments" include those in or adjacent to shellfish or fish harvesting areas, marine parks, ecological reserves and fish migration paths. Also includes those areas deemed to have ecological significance such as for fish food resources, spawning areas or having rare or endangered species. "Typical aquatic environments" include those in areas other than those listed above.	
ii) Uptake potential				
Does groundwater daylighting to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact? Yes No (or Not Applicable) Do Not Know	Score	1	Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways: 1) by comparing collected nearshore groundwater concentrations to the CCME water quality guidelines (this will be a conservative comparison, as contaminant concentrations in groundwater often decrease between nearshore wells and the point of discharge). 2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge. 3) by installing water samplers, "peepers", in the sediments in the area of daylighting groundwater.	
Distance from the contaminated site to an important surface water resource 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score	1.5	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor or important water resource located within this area of the site will be subject to further evaluation. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and ferns and other aquatic environments.
			Bioaccumulation of food items is possible if:	

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
<p>Are aquatic species (i.e., forage fish, invertebrates or plants) that are consumed by predatory fish or wildlife consumers, such as mammals and birds, likely to accumulate contaminants in their tissues?</p> <p>Yes No Do Not Know</p>	<p>Score: 1</p> <p>Raw Aquatic Total Potential: 5.5</p> <p>Allowed Aquatic Total Potential: ---</p>	<p>Note: If a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.</p>	<p>1) The Log(K_{ow}) of the contaminant is greater than 4 (as per the chemical characteristics work sheet and concentrations in sediments exceed the CCME ISOGS.</p> <p>2) The contaminant in collected tissue samples exceeds the CCME tissue quality guidelines.</p>	
4. Ecological Exposure Modifying Factors				
<p>a) Known occurrence of a species at risk.</p> <p>Is there a potential for a species at risk to be present at the site?</p> <p>Yes No Do Not Know</p>	<p>Score: 1</p>	<p>Not known if a species at risk is present at the site.</p>	<p>Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as Eco Explorer, Regional, Provincial (Environment Ministries), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance.</p>	<p>Species at risk include those that are extirpated, endangered, threatened, or of special concern. For a list of species at risk, consult Schedule 1 of the federal Species at Risk Act (http://www.sararegistry.gc.ca/species/schedule_1_s1m1r01). Many provincial governments may also provide regionally applicable lists of species at risk. For example, in British Columbia, consult: BCNWLAP, 2005, Endangered Species and Ecosystems in British Columbia, Provincial red and blue lists, Ministry of Sustainable Resource Management and Water, Land and Air Protection (http://www.gov.bc.ca/air/risk/red-blue.htm)</p>
<p>b) Potential impact of aesthetics (e.g., enrichment of a lake or tainting of food flavor).</p> <p>Is there evidence of aesthetic impact to receiving water bodies?</p> <p>Yes No Do Not Know</p> <p>Is there evidence of olfactory impact (i.e., unpleasant smell)?</p> <p>Yes No Do Not Know</p> <p>Is there evidence of increase in plant growth in the lake or water body?</p> <p>Yes No Do Not Know</p> <p>Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different?</p> <p>Yes No Do Not Know</p>	<p>Score: 1</p> <p>Ecological Modifying Factors Total - Known: 0</p> <p>Ecological Modifying Factors Total - Potential: 3</p> <p>Raw Ecological Total - Known: 18</p> <p>Raw Ecological Total - Potential: 3</p> <p>Raw Ecological Total: 21</p> <p>Ecological Total (Max 18): 18.0</p>	<p>Peace River has high flow. Do not know if the aesthetics will be impacted.</p>	<p>Documentation may consist of environmental investigation reports, press articles, petitions or other records.</p> <p>Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat.</p> <p>A distinct increase of plant growth in an aquatic environment may suggest enrichment. Nutrients e.g., nitrogen or phosphorous releases to an aquatic body can act as a fertilizer.</p> <p>Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.</p>	<p>This item will require some level of documentation by user, including contact names, addresses, phone numbers, e-mail addresses. Evidence of changes must be documented, please attach copy of report containing relevant information.</p>
5. Other Potential Contaminant Receptors				
<p>a) Exposure of permafrost (leading to erosion and structural concerns)</p> <p>Are there improvements (roads, buildings) at the site dependent upon the permafrost for structural integrity?</p> <p>Yes No Do Not Know</p> <p>Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment?</p> <p>Yes No Do Not Know</p>	<p>Score: 1</p> <p>Other Potential Receptors Total - Known: 0</p> <p>Other Potential Receptors Total - Potential: 1</p>	<p>Do not know.</p>	<p>Consult engineering reports, site plans or air photos of the site. When permafrost melts, the stability of the soil decreases, leading to erosion. Human structures, such as roads and/or buildings are often dependent on the stability that the permafrost provides.</p> <p>Melting permafrost leads to a decreased stability of underlying soils. Wind or surface run-off erosion can carry soils into nearby aquatic habitats. The increased soil loadings into a river can cause an increase in total dissolved solids and a resulting decrease in aquatic habitat quality. In addition, the erosion can bring contaminants from soils to aquatic environments.</p>	<p>Plants and lichens provide a natural insulating layer which will help prevent thawing of the permafrost during the summer. Plants and lichens may also absorb less solar radiation. Solar radiation is turned into heat which can also cause underlying permafrost to melt.</p>
<p>Exposure Total</p> <p>Raw Human Health + Ecological Total - Known: 34</p> <p>Raw Human Health + Ecological Total - Potential: 4</p> <p>Raw Total: 38</p> <p>Exposure Total (max 34): 28.1</p>				
		<p>Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.</p>		

**CCME National Classification System (2008)
Score Summary**

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCS completely.

I. Contaminant Characteristics

	Known	Potential
1. Residency Media	4	---
2. Chemical Hazard	8	---
3. Contaminant Exceedance Factor	4	---
4. Contaminant Quantity	9	---
5. Modifying Factors	3	---

Raw Total Score **28** **0**

Raw Total Score (Known + Potential) **28**

Adjusted Total Score (Raw Total / 40 * 33) **23.1** (max 33)

II. Migration Potential

	Known	Potential
1. Groundwater Movement	9	---
2. Surface Water Movement	8	---
3. Soil	12	---
4. Vapour	0	---
5. Sediment Movement	0	---
6. Modifying Factors	0	0

Raw Total Score **29** **0**

Raw Total Score (Known + Potential) **29**

Adjusted Total Score (Raw Total / 64 * 33) **15.0** (max 33)

III. Exposure

	Known	Potential
1. Human Receptors		
A. Known Impact	10	
B. Potential		
a. Land Use		---
b. Accessibility		---
c. Exposure Route		
i. Direct Contact		---
ii. Inhalation		---
iii. Ingestion		---
2. Human Receptors Modifying Factors	6	---
Raw Total Human Score	16	0

Raw Total Human Score (Known + Potential) **16**
Adjusted Total Human Score **16.0** (maximum 22)

3. Ecological Receptors		
A. Known Impact	18	
B. Potential		
a. Terrestrial		---
b. Aquatic		---
4. Ecological Receptors Modifying Factors	0	3
Raw Total Ecological Score	18	3

Raw Total Ecological Score (Known + Potential) **21**
Adjusted Total Ecological Score **18.0** (maximum 18)

5. Other Receptors	0	1
Total Other Receptors Score (Known + Potential)	1	

Total Exposure Score (Human + Ecological + Other) **35.0**
Adjusted Total Exposure Score (Total Exposure / 46 * 34) **25.9** (max 34)

Site Score

Test Site	
Site Letter Grade	A
Certainty Percentage	100%
% Responses that are "Do Not Know"	-59%
Total NCSCS Score for site	63.9
Site Classification Category	2

Site Classification Categories*:

- Class 1 - High Priority for Action (Total NCS Score >70)
- Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
- Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
- Class N - Not a Priority for Action (Total NCS Score <37)
- Class INS - Insufficient Information (>15% of responses are "Do Not Know")

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

**CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions**

Subject Site:	Test Site	
Civic Address: <i>(or other description of location)</i>	On the north shore of the Peace River, approximately 220 km east of High Level, Alberta, in Wood Buffalo National Park	
Site Common Name : <i>(if applicable)</i>	Community of Garden River	
Site Owner or Custodian: <i>(Organization and Contact Person)</i>	Parks Canada Agency	
Legal description or metes and bounds:	N 58°42.5', W113°52.0'	
Approximate Site area:		
PID(s): <i>(or Parcel Identification Numbers [PIN] if untitled Crown land)</i>	Northlands School Historic AST (FCSI #00022828)	
Centre of site: <i>(provide latitude/longitude or UTM coordinates)</i>	Latitude:	_____ degrees _____ min _____ secs
	Longitude:	_____ degrees _____ min _____ secs
	UTM Coordinate:	Northing 6511191.299 Easting 680525.8838
Site Land Use:	Current:	Residential
	Proposed:	
Site Plan	To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.	
Provide a brief description of the Site:	<p style="text-align: center;">The Northlands School Historic AST is located within the community of Garden River (see attached Site Plan).</p>	

CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions

Affected media and Contaminants of Potential Concern (COPC):	The groundwater concentrations of Cadmium and Selenium in one monitoring well exceeded Canadian Council of Ministers of the Environment 2007 Canadian Water Quality Guidelines for the protection of aquatic life and the groundwater concentration of Manganese exceeded Health Canada 2008 Guidelines for Canadian Drinking Water Quality.
--	--

Please fill in the "letter" that best describes the level of information available for the site being assessed:

Site Letter Grade

If letter grade is F, do not continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent.

Scoring Completed By:	Cathy Hamlen, Ph.D. A.Ag.
Date Scoring Completed:	6-Feb-09

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes	
1. Residency Media (replaces physical state)					
Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines? yes = has an exceedance or strongly suspected to have an exceedance no = does not have an exceedance or strongly suspected not to have an exceedance			The overall score is calculated by adding the individual scores from each residency media (having one or more exceedance of the most conservative media specific and land-use appropriate CCME guideline). Summary tables of the Canadian Environmental Quality Guidelines for soil, water (aquatic life, non-potable groundwater environments, and agricultural water uses) and sediment are available on the CCME website at http://www.ccme.ca/publications/ceqg_rceq.html?category_id=124 . For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup/appu/sum_guides_recom/index_e.html .	An increasing number of residency media containing chemical exceedances often equates to a greater potential risk due to an increase in the number of potential exposure pathways.	
A. Soil	No	Five soil samples and one groundwater monitoring well were assessed. Refer to <i>Contaminated Site Assessment, Initial and Detailed Testing Programs, Wood Buffalo National Park, Various Locations in the Community of Garden River, Alberta</i> (EBA Consulting Engineers Ltd., 2009).			
Yes	0				
No					
Do Not Know					
B. Groundwater	Yes				
Yes	2				
No					
Do Not Know					
C. Surface water	No				
Yes	0				
No					
Do Not Know					
D. Sediment	No				
Yes	0				
No					
Do Not Know					
"Known" - score	2				
"Potential" - score	--				
2. Chemical Hazard					
What is the relative degree of chemical hazard of the contaminant in the list of hazard rankings proposed by the Federal Contaminated Sites Action Plan (FCSAP)?	High	Cadmium (groundwater) is High, and Selenium (groundwater) is Medium, and Manganese (groundwater) is Low.	The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site. The degree of hazard has been defined by the Federal Contaminated Sites Action Plan (FCSAP) and a list of substances with their associated hazard (Low, Medium and High) has been provided as a separate sheet in this file. <i>See Attached Reference Material for Contaminant Hazard Rankings.</i>	Hazard as defined in the revised NCS pertains to the physical properties of a chemical which can cause harm. Properties can include toxic potency, propensity to biomagnify, persistence in the environment, etc. Although there is some overlap between hazard and contaminant exceedance factor below, it will not be possible to derive contaminant exceedance factors for many substances which have a designated chemical hazard designation, but don't have a CCME guideline. The purpose of this category is to avoid missing a measure of toxic potential.	
High					
Medium					
Low					
Do Not Know					
"Known" - score	8				
"Potential" - score	--				
3. Contaminant Exceedance Factor					
What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")?	High (10x to 100x)	The groundwater Cadmium concentration was 1.03 times higher than the CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life. The groundwater Selenium concentration was 1.79 times higher and the groundwater Manganese concentration was 31.6 times higher than the Health Canada 2008 Guideline for Canadian Drinking Water Quality.	Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the <i>most conservative media-specific and land-use appropriate CCME environmental quality guidelines</i> . Ranking should be based on contaminant with greatest exceedance of CCME guidelines. Ranking of contaminant hazard as high, medium and low is as follows: High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines Mobile NAPL = Contaminant is a non-aqueous phase liquid (i.e., due to its low solubility, it does not dissolve in water, but remains as a separate liquid) and is present at a sufficiently high saturation (i.e., greater than residual NAPL saturation) such that there is significant potential for mobility either downwards or laterally. Other standards may include local background concentration or published toxicity benchmarks. Results of toxicity testing with site samples can be used as an alternative. This approach is only relevant for contaminants that do not biomagnify in the food web, since toxicity tests would not indicate potential effects at higher trophic levels. High = lethality observed. Medium = no lethality, but sub lethal effects observed. Low = neither lethal nor sub lethal effects observed.	In the event that elevated levels of a material with no associated CCME guidelines are present, check provincial and USEPA environmental criteria. Hazard Quotients (sometimes referred to as a screening quotient in risk assessments) refer to the ratio of measured concentration to the concentration believed to be the threshold for toxicity. A similar calculation is used here to determine the contaminant exceedance factor (CEF). Concentrations greater than one times the applicable CCME guideline (i.e., CEF > 1) indicate that risks are possible. Mobile NAPL has the highest associated score (8) because of its highly concentrated nature and potential for increase in the size of the impacted zone.	
Mobile NAPL					
High (>100x)					
Medium (10x to 100x)					
Low (1x to 10x)					
Do Not Know					
"Known" - score	4				
"Potential" - score	--				

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
4. Contaminant Quantity (known or strongly suspected)				
What is the known or strongly suspected quantity of all contaminants? >10 hectare (ha) or 5000 m ³ 2 to 10 ha or 1000 to 5000 m ³ <2 ha or 1000 m ³ Do Not Know	2 to 10 ha or 1000 to 5000 m ³	The groundwater monitoring wells with COPCs exceeding Health Canada 2008 Guidelines for Canadian Drinking Water Quality and CCME 2007 Canadian Water Quality Guidelines for the protection of aquatic life represented an area of approximately 1,250 m ² .	Measure or estimate the area or quantity of total contamination (i.e., all contaminants known or strongly suspected to be present on the site). The "Area of Contamination" is defined as the area or volume of contaminated media (soil, sediment, groundwater, surface water) exceeding appropriate environmental criteria.	A larger quantity of a potentially toxic substance can result in a larger frequency of exposure as well as a greater probability of migration, therefore, larger quantities of these substances earn a higher score.
	"Known" - score			
	"Potential" - score	---		
5. Modifying Factors				
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment? Yes No Do Not Know	No	Chemicals do not persist.	Persistent chemicals, e.g., PCBs, chlorinated pesticides etc. either do not degrade or take longer to degrade, and therefore may be available to cause effects for a longer period of time. Canadian Environmental Protection Act (CEPA) classifies a chemical as persistent when it has at least one of the following characteristics: (a) In air, (i) its half-life is equal to or greater than 2 days, or (ii) it is subject to atmospheric transport from its source to a remote area; (b) In water, its half-life is equal to or greater than 182 days; (c) In sediments, its half-life is equal to or greater than 365 days; or (d) In soil, its half-life is equal to or greater than 182 days. This list does not include metals or metalloids, which in their elemental form do not degrade. However metals and metalloids form chemical species in the environment, many of which are not readily bioavailable.	Examples of Persistent Substances are provided in attached Reference Materials
	Yes			
Are there contaminants present that could cause damage to utilities and infrastructure, either now or in the future, given their location? Yes No Do Not Know	No			Some contaminants may react or absorb into underground utilities and infrastructure. For example, organic solvents may degrade some plastics, and salts could cause corrosion of metal.
	Yes	0		
How many different contaminant classes have representative CCME guideline exceedances? one two to four five or more Do Not Know	two to four	Cadmium, Manganese, and Selenium in groundwater.	For the purposes of the revised NCS ranking system, the following chemicals represent distinct chemical "classes": inorganic substances (including metals), volatile petroleum hydrocarbons, light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons, PAHs, phenolic substances, chlorinated hydrocarbons, halogenated methanes, phthalate esters, pesticides.	Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.
	one			
	"Known" - Score	2		
	"Potential" - Score	---		

Contaminant Characteristic Total

Raw Total Scores- "Known"	22
Raw Total Scores- "Potential"	0
Raw Combined Total Scores	22
Total Score (Raw Combined / 40 * 33)	18.2

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Groundwater Movement				
A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary.				
<p>i) For potable groundwater environments 1) groundwater concentrations exceed background concentrations and 1X the Guideline for Canadian Drinking Water Quality (GCDWQ) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater contamination. For non-potable environments (typically urban environments with municipal services), 1) groundwater concentrations exceed 1X the applicable non-potable guidelines or modified generic guidelines (which exclude ingestion of drinking water pathway) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater impacts.</p> <p>ii) Same as (i) except the information is not known but <u>strongly suspected</u> based on indirect observations.</p> <p>iii) Meets GCDWQ for potable environments meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for non-potable environments or Absence of groundwater exposure pathway (i.e., there is no aquifer (see definition at right) at the site or there is an adequate isolating layer between the aquifer and the contamination, and within 5 km of the site there are no aquatic receiving environments and the groundwater does not daylight).</p>	<p>12</p> <p>0</p> <p>0</p>	<p>Selenium concentration in groundwater was 2.87 times higher than maximum acceptable concentration for drinking water (Health Canada 2008 Guidelines for Canadian Drinking Water Quality) and the Manganese concentration was 31.8 times higher than the drinking water aesthetic objective (Health Canada 2008). The monitoring well is located within the community.</p>	<p>Review chemical data and evaluate groundwater quality.</p> <p>The evaluation method concentrates on 1) a potable or non-potable groundwater environment, the groundwater flow system and its potential to be an exposure pathway to known or potential receptors</p> <p>An aquifer is defined as a geologic unit that yields groundwater in usable quantities and drinking water quality. The aquifer can currently be used as a potable water supply or could have the potential for use in the future. Non-potable groundwater environments are defined as areas that are serviced with a reliable alternative water supply (most commonly provided in urban areas). The evaluation of a non-potable environment will be based on a site specific basis.</p> <p>Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils.</p> <p>Seeps and springs are considered part of the groundwater pathway.</p> <p>In Arctic environments, the potability and evaluation of the seasonal active layer (above the permafrost) as a groundwater exposure pathway will be considered on a site-specific basis.</p>	<p>The 1992 NCS rationale evaluated the off-site migration as a regulatory issue. The exposure assessment and classification of hazards should be evaluated regardless of the property boundaries.</p> <p>Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a groundwater supply source in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links.</p> <p>Note that for potable groundwater that also daylights into a nearby surface water body, the more stringent guidelines for both drinking water and protection of aquatic life should be considered.</p> <p>Selected References</p> <p><u>Potable Environments</u></p> <p>Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/owh/stom/abus/water/gau/goc_suv-appui/suv_guide-res_recom/index_e.html</p> <p><u>Non-Potable Environments</u></p> <p>Canadian Water Quality Guidelines for Protection of Aquatic Life. CCME, 1999 www.ccme.ca</p> <p>Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.</p>
<p>NOTE: If a score is assigned here for Known COPC Exceedances, then you can skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)</p>				
B. Potential for groundwater pathway.				
<p>a. Relative Mobility</p> <p>High</p> <p>Moderate</p> <p>Low</p> <p>Insignificant</p> <p>Do Not Know</p>	<p>2</p>	<p>Organics</p> <p>Koc (L/Kg)</p> <p>Koc < 500 (i.e., log Koc < 2.7) pH < 5</p> <p>Koc = 500 to 5000 (i.e., log Koc = 2.7 to 3.7) pH = 5 to 8</p> <p>Koc = 5,000 to 100,000 (i.e., log Koc = 3.7 to 5) pH > 8</p> <p>Koc > 100,000 (i.e., log Koc > 5)</p> <p>Metals with higher mobility at acidic conditions</p> <p>Metals with higher mobility at alkaline conditions</p>	<p>Reference: US EPA Soil Screening Guidance (Part 5 - Table 39)</p> <p>If a score of zero is assigned for relative mobility, it is still recommended that the following sections on potential for groundwater pathway be evaluated and scored. Although the Koc of an individual contaminant may suggest that it will be relatively immobile, it is possible that, with complex mixtures, there could be enhanced mobility due to co-solvent effects. Therefore, the Koc cannot be relied on solely as a measure of mobility. An evaluation of other factors such as containment, thickness of confining layer, hydraulic conductivities and precipitation infiltration rate are still useful in predicting potential for groundwater migration, even if a contaminant is expected to have insignificant mobility based on its chemistry alone.</p>	
<p>b. Presence of engineered sub-surface containment?</p> <p>No containment</p> <p>Partial containment</p> <p>Full containment</p> <p>Do Not Know</p>	<p>1.5</p>	<p>Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved.</p> <p>Full containment is defined as an engineered system or natural attenuation processes, monitored as being effective, which provides for full capture and/or treatment of contaminants. All chemicals of concern must be contained for 'Full Containment' scoring. Natural attenuation must have sufficient data, and reports cited with monitoring data to support steady state conditions and the attenuation processes. If there is no containment or insufficient natural attenuation process, this category is evaluated as high. If there is less than full containment or if uncertain, then evaluate as medium. In Arctic environments, permafrost will be evaluated, as appropriate, based on detailed evaluations, effectiveness and reliability to contain/control contaminant migration.</p>	<p>Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links.</p> <p>Selected Resources:</p> <p>United States Environmental Protection Agency (USEPA) 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.</p> <p>Environment Canada - Ontario Region - Natural Attenuation Technical Assistance Bulletins (TABs) Number 19-21.</p>	
<p>c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway</p> <p>3 m or less including no confining layer or discontinuous confining layer</p> <p>3 to 10 m</p> <p>> 10 m</p> <p>Do Not Know</p>	<p>0.5</p>	<p>The term "confining layer" refers to geologic material with little or no permeability or hydraulic conductivity (such as unfractured clay); water does not pass through this layer or the rate of movement is extremely slow.</p> <p>Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway.</p> <p>The evaluation of this category is based on:</p> <p>1) The presence and thickness of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as drinking water sources or</p> <p>2) The presence and thickness of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated zone (e.g., water table aquifer, first hydrostratigraphic unit or other groundwater pathway).</p>		
<p>d. Hydraulic conductivity of confining layer</p> <p>>10⁻⁶ cm/s or no confining layer</p> <p>10⁻⁶ to 10⁻⁸ cm/s</p> <p><10⁻⁶ cm/s</p> <p>Do Not Know</p>	<p>0.5</p>	<p>Determine the nature of geologic materials and estimate hydraulic conductivity from published material (or use 'Range of Values of Hydraulic Conductivity and Permeability' figure in the Reference Material sheet). Unfractured clays should be scored low. Silts should be scored medium. Sand, gravel should be scored high. The evaluation of this category is based on:</p> <p>1) The presence and hydraulic conductivity (K') of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as a drinking water source, groundwater exposure pathway or</p> <p>2) The presence and permeability (K') of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated water table aquifer, first hydrostratigraphic unit or other groundwater pathway.</p>		

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for groundwater pathway.				
<p>e. Precipitation infiltration rate (Annual precipitation factor x surface soil relative permeability factor)</p> <p>High Moderate Low Very Low None Do Not Know</p>	0.4		<p>Precipitation Refer to Environment Canada precipitation records for relevant areas. Divide annual precipitation by 1000 and round to nearest tenth (e.g., 687 mm = 0.7 score).</p> <p>Permeability For surface soil relative permeability (i.e., infiltration) assume: gravel (1), sand (0.6), loam (0.3) and pavement or clay (0).</p> <p>Multiply the surface soil relative permeability factor with precipitation factor to obtain the score or precipitation infiltration rate.</p>	
<p>f. Hydraulic conductivity of aquifer</p> <p>>10⁻² cm/s 10⁻² to 10⁻⁴ cm/s <10⁻⁴ cm/s Do Not Know</p>	1		Determine the nature of geologic materials and estimate hydraulic conductivity of all aquifers of concern from published material (refer to "Range of Values of Hydraulic Conductivity and Permeability" in the Reference Material sheet).	
Potential groundwater pathway total	5.9			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Groundwater pathway total	12			
2. Surface Water Movement				
A. Demonstrated migration of COPC in surface water above background conditions				
<p>Known concentrations of surface water:</p> <p>i) Concentrations exceed background concentrations and exceed CCME CWQG for protection of aquatic life, irrigation, livestock water, and/or recreation (whichever uses are applicable at the site) by >1 X. or There is known contact of contaminants with surface water based on site observations. or In the absence of CWQG, chemicals have been proven to be toxic based on site specific testing (e.g. toxicity testing; or other indicator testing of exposure).</p> <p>ii) Same as (i) except the information is not known but <u>strongly suspected</u> based on indirect observations.</p> <p>iii) Meets CWQG or absence of surface water exposure pathway (i.e., Distance to nearest surface water is > 5 km.)</p>	12	Groundwater concentrations of Cadmium and Selenium were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life. The site is approximately 200 m from the edge of a bluff beside the Peace River.	<p>Collect all available information on quality of surface water near to site. Evaluate available data against Canadian Water Quality Guidelines (select appropriate guidelines based on local water use, e.g., recreation, irrigation, aquatic life, livestock watering, etc.). The evaluation method concentrates on the surface water flow system and its potential to be an exposure pathway. Contamination is present on the surface (above ground) and has the potential to impact surface water bodies. Surface water is defined as a water body that supports one of the following uses: recreation, irrigation, livestock watering, aquatic life.</p>	<p>General Notes: Someone experienced must provide a thorough description of the sources researched to classify the surface water body in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.</p> <p>Selected References: CCME, 1999, Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME, 1999, Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water) www.ccme.ca Health and Welfare Canada, 1992, Guidelines for Canadian Recreational Water Quality.</p>
NOTE: If a score is assigned here for Demonstrated Migration in Surface Water, then you can skip Part B (Potential for migration of COPCs in surface water) and go to Section 3 (Surface Soils)				
B. Potential for migration of COPCs in surface water				
<p>a. Presence of containment</p> <p>No containment Partial containment Full containment Do Not Know</p>	3		Review the existing engineered systems and relate those structures to site conditions and proximity to surface water and determine if full containment is achieved: score low if there is full containment such as capping, berms, dikes; score medium if there is partial containment such as natural barriers, trees, ditches, sedimentation ponds; score high if there are no intervening barriers between the site and nearby surface water. Full containment must include containment of all chemicals.	
<p>b. Distance to Surface Water</p> <p>0 to <100 m 100 - 300 m >300 m Do Not Know</p>	2		Review available mapping and survey data to determine distance to nearest surface water bodies.	

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<p>c. Topography</p> <p>Contaminants above ground level and slope is steep</p> <p>Contaminants at or below ground level and slope is steep</p> <p>Contaminants above ground level and slope is intermediate</p> <p>Contaminants at or below ground level and slope is intermediate</p> <p>Contaminants above ground level and slope is flat</p> <p>Contaminants at or below ground level and slope is flat</p> <p>Do Not Know</p>	1		<p>Review engineering documents on the topography of the site and the slope of surrounding terrain.</p> <p>Steep slope = >50%</p> <p>Intermediate slope = between 5 and 50%</p> <p>Flat slope = < 5%</p> <p>Note: Type of fill placement (e.g., trench, above ground, etc.).</p>	
<p>d. Run-off potential</p> <p>High (rainfall run-off score > 0.6)</p> <p>Moderate (0.4 < rainfall run-off score < 0.6)</p> <p>Low (0.2 < rainfall run-off score < 0.4)</p> <p>Very Low (0 < rainfall run-off score < 0.2)</p> <p>None (rainfall run-off score = 0)</p> <p>Do Not Know</p>	0.4		<p>Rainfall</p> <p>Refer to Environment Canada precipitation records for relevant areas. Divide rainfall by 1000 and round to nearest tenth (e.g., 687 mm = 0.7 score).</p> <p>The former definition of annual rainfall did not include the precipitation as snow. This minor adjustment has been made. The second modification was the inclusion of permeability of surface materials as an evaluation factor.</p> <p>Permeability</p> <p>For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1).</p> <p>Multiply the infiltration factor with precipitation factor to obtain rainfall run off score.</p>	<p>Selected Sources:</p> <p>Environment Canada web page link http://www.msc.ec.gc.ca</p> <p>Snow to rainfall conversion apply ratio of 15 (snow):1(water)</p>
<p>e. Flood potential</p> <p>1 in 2 years</p> <p>1 in 10 years</p> <p>1 in 50 years</p> <p>Do Not Know</p>	0.6		<p>Review published data such as flood plain mapping or flood potential (e.g., spring or mountain run off) and Conservation Authority records to evaluate flood potential of nearby water courses both up and down gradient. Rate zero if site not in flood plain.</p>	
Potential surface water pathway total	6.9			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
Surface water pathway total	8			
3. Surface Soils (potential for dust, dermal and ingestion exposure)				
A. Demonstrated concentrations of COPC in surface soils (top 1.5 m)				
<p>COPCs measured in surface soils exceed the CCME soil quality guideline.</p> <p>Strongly suspected that soils exceed guidelines</p> <p>COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock).</p>	<p>12</p> <p>9</p> <p>0</p> <p>0</p> <p>0</p>	<p>Soil concentrations met federal and provincial guidelines.</p>	<p>Collect all available information on quality of surface soils (i.e., top 1.5 metres) at the site. Evaluate available data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (i.e., agricultural, residential/parlans, commercial, or industrial), and soil texture if applicable (i.e., coarse or fine).</p>	<p>Selected References:</p> <p>CCME: 1999, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health</p> <p>www.ccme.ca</p>
<p>NOTE: If a score is assigned here for Demonstrated Concentrations in Surface Soils, then you can skip Part B (Potential for a surface soils migration pathway) and go to Section 4 (vapour)</p>				
B. Potential for a surface soils (top 1.5 m) migration pathway				
<p>a. Are the soils in question covered?</p> <p>Exposed</p> <p>Vegetated</p> <p>Landscaped</p> <p>Paved</p> <p>Do Not Know</p>	4		<p>Consult engineering or risk assessment reports for the site. Alternatively, review photographs or perform a site visit.</p> <p>Landscaped surface soils must include a minimum of 0.5 m of topsoil.</p>	<p>The possibility of contaminants in blowing snow have not been included in the revised NCS as it is difficult to assess what constitutes an unacceptable concentration and secondly, spills to snow or ice are most efficiently mitigated while freezing conditions remain.</p>
<p>b. For what proportion of the year does the site remain covered by snow?</p> <p>0 to 10% of the year</p> <p>10 to 30% of the year</p> <p>More than 30% of the year</p> <p>Do Not Know</p>	3		<p>Consult climatic information for the site. The increments represent the full span from soils which are always wet or covered with snow (and therefore less likely to generate dust) to those soils which are predominantly dry and not covered by snow (and therefore are more likely to generate dust).</p>	
Potential surface soil pathway total	7			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
Soil pathway total	0			

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site	Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
4. Vapour					
A. Demonstrated COPCs in vapour.					
	Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations.	12	Concentrations of volatile COPCs in the soil and groundwater were below provincial and federal guidelines.	Consult previous investigations, including human health risk assessments, for reports of vapours detected.	
	Strongly suspected (based on observations and/or modeling)	9			
	Vapour has not been measured and volatile hydrocarbons have not been found in site soils or groundwater.	0			
	Score	0			
NOTE: If a score is assigned here for Demonstrated COPCs In Vapour, then you can skip Part B (Potential for COPCs in vapour) and go to Section 5 (Sediment)					
B. Potential for COPCs in vapour					
	a. Relative Volatility based on Henry's Law Constant, H ^f (dimensionless) High (H ^f > 1.0E-1) Moderate (H ^f = 1.0E-1 to 1.0E-3) Low (H ^f < 1.0E-3) Not Volatile Do Not Know			Reference: US EPA Soil Screening Guidance (Part 5 - Table 38) Provided in Attached Reference Materials	If the Henry's Law Constant for a substance indicates that it is not volatile, and a score of zero is assigned here for relative volatility, then the other three questions in this section on Potential for COPCs will be automatically assigned scores of zero and you can skip to section 6.
	Score	2.5			
	b. What is the soil grain size? Fine Coarse Do Not Know			Review soil permeability data in engineering reports. The greater the permeability of soils, the greater the possible movement of vapours. Fine-grained soils are defined as those which contain greater than 50% by mass particles less than 75 µm mean diameter (D50 < 75 µm). Coarse-grained soils are defined as those which contain greater than 50% by mass particles greater than 75 µm mean diameter (D50 > 75 µm).	
	Score	3			
	c. Is the depth to the source less than 10m? Yes No Do Not Know			Review groundwater depths below grade for the site.	
	Score	2			
	d. Are there any preferential pathways? Yes No Do Not Know			Visit the site during dry summer conditions and/or review available photographs. Where bedrock is present, fractures would likely act as preferential pathways.	Preferential pathways refer to areas where vapour migration is more likely to occur because there is lower resistance to flow than in the surrounding materials. For example, underground conduits such as sewer and utility lines, drains, or septic systems may serve as preferential pathways. Features of the building itself that may also be preferential pathways include earthen floors, expansion joints, wall cracks, or foundation perforations for subsurface features such as utility pipes, sumps, and drains.
	Score	2			
	Potential vapour pathway total	9.5			
	Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
	Vapour pathway total	0			
5. Sediment Movement					
A. Demonstrated migration of sediments containing COPCs					
	There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated.	12	No COPC in soil exceeded provincial or federal guidelines.	Review sediment assessment reports. Evidence of migration of contaminants in sediments must be reported by someone experienced in this area.	Usually not considered a significant concern in lakes/marine environments, but could be very important in rivers where transport downstream could be significant.
	Strongly suspected (based on observations and/or modeling)	9			
	Sediments have been contained and there is no indication that sediments will migrate in future, or Absence of sediment exposure pathway (i.e., within 5 km of the site there are no aquatic receiving environments, and therefore no sediments).	0			
	Score	0			
NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you can skip Part B (Potential for Sediment Migration) and go to Section 6 (Modifying Factors)					

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for sediment migration				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")? Yes No Do Not Know	4		Review existing sediment assessments. If sediment coring has been completed, it may indicate that historically contaminated sediments have been covered over by newer "clean" sediments. This assessment will require that cores collected demonstrate a low concentration near the top and higher concentration with sediment depth. Review existing sediment assessments. If the sediments present at the site are in a river, select "no" for this question. Review existing sediment assessments. It is important that the assessment is made under worst case flows (high yearly flows). Under high yearly flows, areas which are commonly depositional	
b. For lakes and marine habitats, are the contaminated sediments in shallow water and therefore likely to be affected by tidal action, wave action or propeller wash? Yes No Do Not Know	4			
c. For rivers, are the contaminated sediments in an area prone to sediment scouring? Yes No Do Not Know	4			
Potential sediment pathway total	12	Note: If a "known" score is provided, the "potential" score is disallowed.		
Allowed Potential score	---			
Sediment pathway total	0			
6. Modifying Factors				
Are there subsurface utility conduits in the area affected by contamination? Yes No Do Not Know	No	No COPC in soil exceeded provincial or federal guidelines.	Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
Known	0			
Potential	0			

Migration Potential Total

Raw "known" total	20
Raw "potential" total	0.0
Raw combined total	20.0
Total (max 33)	10.3

Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore, the total "Potential" Score may not reflect the sum of the individual "Potential" scores.

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Human				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to humans as a result of the contaminated site. (Class 1 Site*)	22	Selenium concentration in groundwater was 2.87 times higher than maximum acceptable concentration for drinking water (Health Canada 2008 Guidelines for Canadian Drinking Water Quality). The potable water source for the community is not known.	*If there adverse effects on humans are documented, the site should be automatically designated Class 1 site (i.e., action required). There is no need to proceed through the NCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites). This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1 for noncarcinogenic chemicals and incremental cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this typically either >10 ⁻⁶ or >10 ⁻⁵). Known impacts can also be evaluated based on blood testing (e.g. blood lead >10 ug/dL) or other health based testing. This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 0.2 for non-carcinogenic chemicals and incremental lifetime cancer risks for carcinogenic chemicals that are within acceptable levels as defined by the jurisdiction (for most jurisdictions this is less than either 10 ⁻⁶ or 10 ⁻⁵).	Known adverse impact includes domestic and traditional food sources. Adverse effects based on food chain transfer to humans and/or animals can be scored in this category. However, the weight of evidence must show a direct link of a contaminated food source/supply and subsequent ingestion/transfer to humans. Any associated adverse effects to the environment are scored separately later in this worksheet. Someone experienced must provide a thorough description of the sources researched to evaluate and determine the quantified exposure/impact (adverse effect) in the vicinity of the contaminated site. Selected References: Health Canada- Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Health Screening Level Risk Assessment (http://www.hc-sc.gc.ca/wha-sa/m/wha/contam/assess/index_e.html) United States Environmental Protection Agency, Integrated Risk Information System (IRIS) (http://www.epa.gov/iris/)
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	10			
No quantified or suspected exposures/impacts in humans.	0			
Score	10			
NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Human Exposure) and go to Section 2 (Human Exposure Modifying Factors)				
B. Potential for human exposure				
a) Land use (provides an indication of potential human exposure scenarios) Agricultural Residential / Parkland Commercial Industrial Do Not Know	1.5		Review zoning and land use maps over the distances indicated. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place. Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	This is the main "receptor" factor used in site scoring. A higher score implies a greater exposure and/or exposure of more sensitive human receptors (e.g., children).
b. Indicate the level of accessibility to the contaminated portion of the site (e.g., the potential for coming in contact with contamination) Limited barriers to prevent site access; contamination not covered Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered. Controlled access or remote location and contaminants are covered Do Not Know	1		Review location and structures and contaminants at the site and determine if there are intervening barriers between the site and humans. A low rating should be assigned to a (covered) site surrounded by a fence or in a remote location, whereas a high score should be assigned to a site that has no cover, fence, natural barriers or buffer.	
B. Potential for human exposure				
c) Potential for intake of contaminated soil, water, sediment or foods for operable or potentially operable pathways, as identified in Worksheet II (Migration Potential). i) direct contact Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated? Yes No Do Not Know	3		If soils or potable groundwater are present exceeding their respective CCME guidelines, dermal contact is assumed. Exposure to surface water, non-potable groundwater or sediments exceeding their respective CCME guidelines will depend on the site. Select "Yes" if dermal exposure to surface water, non-potable groundwater or sediments is expected. For instance, dermal contact with sediments would not be expected in an active port. Only soils in the top 1.5 m are defined by CCME (2003) as surface soils. If contaminated soils are only located deeper than 1.5 m, direct contact with soils is not anticipated to be an operable contaminant exposure pathway.	Exposure via the skin is generally believed to be a minor exposure route. However for some organic contaminants, skin exposure can play a very important component of overall exposure. Dermal exposure can occur while swimming in contaminated waters, bathing with contaminated surface water/groundwater and digging in contaminated dirt, etc.
ii) inhalation (i.e., inhalation of dust, vapour) Vapour - Are there inhabitable buildings on the site within 30 m of soils or groundwater with volatile contamination as determined in Worksheet II (Migration Potential)? Yes No Do Not Know	3		If inhabitable buildings are on the site within 30 m of soils or groundwater exceeding their respective guidelines for volatile chemicals, there is a potential of risk to human health (Health Canada, 2004). Review site investigations for location of soil samples (having exceedances of volatile substances relative to buildings. Refer to (II) Migration Potential worksheet, 4B/Potential for COPCs in Vapour for a definition of volatility.	Exposure via the lungs (inhalation) can be a very important exposure pathway. Inhalation can be via both particulates (dust) and gas (vapours). Vapours can be a problem where buildings have been built on former industrial sites or where volatile contaminants have migrated below buildings resulting in the potential for vapour intrusion.
Dust - If there is contaminated surface soil (e.g. top 1.5 m), indicate whether the soil is fine or coarse textured. If it is known that surface soil is not contaminated, enter a score of zero. Fine Coarse Surface soil is not contaminated or absent Do Not Know Texture	0		Consult grain size data for the site. If soils (containing exceedances of the CCME soil quality guidelines) predominantly consist of fine material (having a median grain size of 75 microns; as defined by CCME (2008)) then these soils are more likely to generate dusts.	Assesses the potential for humans to be exposed to vapours originating from site soils. The closer the receptor is to a source of volatile chemicals in soil, the greater the potential of exposure. Also, coarser-grained soil will convey vapour much more efficiently in the soil than finer grained material such as clays and silts.
Score	0			General Notes: Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a vapour migration and/or dust generation in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. Selected References: Canadian Council of Ministers of the Environment (CCME). 2006. Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. PN 133@www.ccmec.ca Golder, 2004. Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC
inhalation total	3			

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site	Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for human exposure					
	<p>iii) Ingestion (i.e., ingestion of food items, water and soils [for children]). Including traditional foods.</p> <p>Drinking Water: Choose a score based on the proximity to drinking water supply, to indicate the potential for contamination (present or future).</p> <p>0 to 100 m 100 to 300 m 300 m to 1 km 1 to 5 km No drinking water present Do Not Know</p> <p>Score</p> <p>Is an alternative water supply readily available?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Is human ingestion of contaminated soils possible?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Ingestion total</p>	<p>2</p> <p>1</p> <p>3</p> <p>1</p> <p>7</p>	<p>Note if a "Known" Human Health score is provided, the "Potential" score is disallowed.</p>	<p>Review available site data to determine if drinking water (groundwater, surface water, private, commercial or municipal supply) is known or suspected to be contaminated above Guidelines for Canadian Drinking Water Quality. If drinking water supply is known to be contaminated, some immediate action (e.g., provision of alternate drinking water supply) should be initiated to reduce or eliminate exposure.</p> <p>The evaluation of significant potential for exceedances of the water supply in the future may be based on the capture zones of the drinking water wells; contaminant travel times; computer modeling of flow and contaminant transport.</p> <p>If contaminated soils are located within the top 1.5 m, it is assumed that ingestion of soils is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely, and the duration is shorter. Refer to human health risk assessment reports for the site in question.</p> <p>Use human health risk assessment reports (or others) to determine if there is significant reliance on traditional food sources associated with the site. Is the food item in question going to spend a large proportion of its time at the site (e.g., large mammals may spend a very small amount of time at a small contaminated site)? Human health risk assessment reports for the site in question will also provide information on potential bioaccumulation of the COPC in question.</p>	<p>Selected References: Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/hpsc/seac/water/publications/drinking_water_quality_guidelines2006.html</p> <p>Drinking water can be an extremely important exposure pathway to humans. If site groundwater or surface water is not used for drinking, then this pathway is considered to be inoperable.</p> <p>Consider both wild foods such as salmon, venison, caribou, as well as agricultural sources of food items if the contaminated site is on or adjacent to agricultural land uses.</p>
	<p>Human Health Total "Potential" Score</p> <p>Allowed "Potential" Score</p>	<p>15.5</p> <p>---</p>			
2. Human Exposure Modifying Factors					
	<p>a) Strong reliance of local people on natural resources for survival (i.e., food, water, shelter, etc.)</p> <p>Yes No Do Not Know</p> <p>Known Potential</p> <p>Raw Human "known" total Raw Human "potential" total Raw Human Exposure Total Score Human Health Total (max 22)</p>	<p>Yes</p> <p>0 ---</p> <p>15 0 15 16.0</p>	<p>Potable water supply is local; Strong reliance of community on local foods which include fish from Peace River.</p>		
3. Ecological					
A. Known exposure					
	<p>Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to terrestrial or aquatic organisms as a result of the contaminated site.</p> <p>Score</p> <p>Same as above, but "Strongly Suspected" based on observations or indirect evidence.</p> <p>Score</p> <p>No quantified or suspected exposures/impacts in terrestrial or aquatic organisms</p> <p>Score</p>	<p>18</p> <p>12</p> <p>0</p> <p>12</p> <p>12</p>	<p>Monitoring well concentrations of Cadmium and Selenium were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life and the site is located on a bluff adjacent to the Peace River</p>	<p>Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are deemed to be severe, the site may be categorized as class one (i.e., a priority for remediation or risk management), regardless of the numerical total NCS score. For the purpose of application of the NCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. If ecological effects are determined to be severe and an automatic Class 1 is assigned, there is no need to proceed through the NCS. However, a scoring guideline (18) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites).</p> <p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1. Alternatively, known impacts can also be evaluated based on a weight of evidence assessment involving a combination of site observations, tissue testing, toxicity testing and quantitative community assessments. Scoring of adverse effects on individual rare or endangered species will be completed on a case-by-case basis with full scientific justification.</p> <p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 1 and no other observable or measurable sign of impacts. Alternatively, it can be based on a combination of other lines of evidence showing no adverse effects such as site observations, tissue testing, toxicity testing and quantitative community assessments.</p>	<p>CCME, 1999: Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses www.ccme.ca Sensitive receptors- review: Canadian Council on Ecological Areas www.ccea.org</p> <p>Ecological effects should be evaluated at a population or community level, as opposed to at the level of individuals. For example, population-level effects could include reduced reproduction, growth or survival in a species. Community-level effects could include reduced species diversity or relative abundances. Further discussion of ecological assessment endpoints is provided in <i>A Framework for Ecological Risk Assessment: General Guidance</i> (CCME 1996).</p> <p>Notes: Someone experienced must provide a thorough description of the sources researched to classify the environmental receptors in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.</p>
<p>NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)</p>					

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for ecological exposure (for the contaminated portion of the site)				
a) Terrestrial				
i) Land use				
Agricultural (or Wild lands) Residential/Parkland Commercial Industrial Do Not Know	Score	1.5	Review zoning and land use maps. If the proposed future land use is less sensitive than the current land use, evaluate this factor assuming the proposed future use is in place (indicate in the worksheet that future land use is the consideration). Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Wild lands are grouped with agricultural land due to the similarities in receptors that would be expected to occur there (e.g., herbivorous mammals and birds) and the similar need for a high level of protection to ensure ecological functioning. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (Industrial).	
ii) Uptake potential				
Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site? Yes No Do Not Know	Score	1	If contaminated soils are located within the top 1.5 m, it is assumed that direct contact of soils with plants and soil invertebrates is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely.	
iii) Ingestion (i.e., wildlife or domestic animals ingesting contaminated food items, soils or water)				
Are terrestrial animals likely to be ingesting contaminated water at the site? Yes No Do Not Know	Score	1	Refer to an Ecological Risk Assessment for the site. If there is contaminated surface water at the site, assume that terrestrial organisms will ingest it.	
Are terrestrial animals likely to be ingesting contaminated soils at the site? Yes No Do Not Know	Score	1	Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.	
Can the contamination identified bioaccumulate? Yes No Do Not Know	Score	1	Bioaccumulation of contaminants within food items is considered possible if: 1) The Log(Kow) of the contaminant is greater than 4 (as per the chemical characteristics work sheet) and concentrations in soils exceed the most conservative CCME soil quality guideline for the intended land use, or 2) The contaminant in collected tissue samples exceeds the Canadian Tissue Residue Guidelines.	
Distance to sensitive terrestrial ecological area 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score	1.5	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor located within this area of the site will be subject to further evaluations. It is also considered that any environmental receptor located greater than 5 km will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance; arctic environments (on a site specific basis); nature preserves, habitats for species at risk, sensitive forests, natural parks or forests.
Raw Terrestrial Total Potential		7		
Allowed Terrestrial Total Potential		—	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.	
B. Potential for ecological exposure (for the contaminated portion of the site)				
b) Aquatic				
i) Classification of aquatic environment				
Sensitive Typical Not Applicable (no aquatic environment present) Do Not Know	Score	2	"Sensitive aquatic environments" include those in or adjacent to shellfish or fish harvesting areas, marine parks, ecological reserves and fish migration paths. Also includes those areas deemed to have ecological significance such as for fish food resources, spawning areas or having rare or endangered species. "Typical aquatic environments" include those in areas other than those listed above.	
ii) Uptake potential				
Does groundwater daylighting to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact? Yes No (or Not Applicable) Do Not Know	Score	1	Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways: 1) by comparing collected nearshore groundwater concentrations to the CCME water quality guidelines (this will be a conservative comparison, as contaminant concentrations in groundwater often decrease between nearshore wells and the point of discharge). 2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge. 3) by installing water samplers, "peepers", in the sediments in the area of daylighting groundwater	
Distance from the contaminated site to an important surface water resource 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score	1.5	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor or important water resource located within this area of the site will be subject to further evaluation. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and rivers and other aquatic environments.
			Bioaccumulation of food items is possible if:	

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site		Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
Are aquatic species (i.e., forage fish, invertebrates or plants) that are consumed by predatory fish or wildlife consumers, such as mammals and birds, likely to accumulate contaminants in their tissues? Yes No Do Not Know		1		1) The Log(K _{ow}) of the contaminant is greater than 4 (as per the chemical characteristics work sheet and concentrations in sediments exceed the CCME ISQGS. 2) The contaminant in collected tissue samples exceeds the CCME tissue quality guidelines.	
Score		1			
Raw Aquatic Total Potential		5.5	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
Allowed Aquatic Total Potential		---			
4. Ecological Exposure Modifying Factors					
a) Known occurrence of a species at risk. Is there a potential for a species at risk to be present at the site? Yes No Do Not Know		Do Not Know	Not known if a species at risk is present at the site.	Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as Eco Explorer, Regional, Provincial (Environment Ministries), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance.	Species at risk include those that are extirpated, endangered, threatened, or of special concern. For a list of species at risk, consult Schedule 1 of the federal Species at Risk Act (http://www.sarregistry.gc.ca/species/schedule1_s.cfm?d=1). Many provincial governments may also provide regional applicable lists of species at risk. For example, in British Columbia, consult: BCNWRAP, 2005, Endangered Species and Ecosystems in British Columbia. Provincial red and blue lists. Ministry of Sustainable Resource Management and Water, Land and Air Protection (http://srmmwww.gov.bc.ca/erisk/red-blue.htm)
Score		1			
b) Potential impact of aesthetics (e.g., enrichment of a lake or laining of food flavor). Is there evidence of aesthetic impact to receiving water bodies? Yes No Do Not Know		Do Not Know	Peace River has high flow. Do not know if the aesthetics will be impacted.	Documentation may consist of environmental investigation reports, press articles, petitions or other records. Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat. A distinct increase of plant growth in an aquatic environment may suggest enrichment. Nutrients (e.g., nitrogen or phosphorous releases to an aquatic body can act as a fertilizer. Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.	This item will require some level of documentation by user, including contact names, addresses, phone numbers, e-mail addresses. Evidence of changes must be documented, please attach copy of report containing relevant information.
Yes No Do Not Know		1			
Is there evidence of olfactory impact (i.e., unpleasant smell)? Yes No Do Not Know		No			
Yes No Do Not Know		0			
Is there evidence of increase in plant growth in the lake or water body? Yes No Do Not Know		No			
Yes No Do Not Know		0			
Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different? Yes No Do Not Know		Do Not Know			
Yes No Do Not Know		1			
Ecological Modifying Factors Total - Known		0			
Ecological Modifying Factors Total - Potential		3			
Raw Ecological Total - Known		12			
Raw Ecological Total - Potential		3			
Raw Ecological Total		15			
Ecological Total (Max 18)		15.0			
5. Other Potential Contaminant Receptors					
a) Exposure of permafrost (leading to erosion and structural concerns) Are there improvements (roads, buildings) at the site dependent upon the permafrost for structural integrity? Yes No Do Not Know		No		Consult engineering reports, site plans or air photos of the site. When permafrost melts, the stability of the soil decreases, leading to erosion. Human structures, such as roads and/or buildings are often dependent on the stability that the permafrost provides.	Plants and lichens provide a natural insulating layer which will help prevent thawing of the permafrost during the summer. Plants and lichens may also absorb less solar radiation. Solar radiation is turned into heat which can also cause underlying permafrost to melt.
Yes No Do Not Know		0			
Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment? Yes No Do Not Know		Do Not Know	Do not know.	Melting permafrost leads to a decreased stability of underlying soils. Wind or surface run-off erosion can carry soils into nearby aquatic habitats. The increased soil loadings into a river can cause an increase in total dissolved solids and a resulting decrease in aquatic habitat quality. In addition, the erosion can bring contaminants from soils to aquatic environments.	
Yes No Do Not Know		1			
Other Potential Receptors Total - Known		0			
Other Potential Receptors Total - Potential		1			
Exposure Total					
Raw Human Health + Ecological Total - Known		28			
Raw Human Health + Ecological Total - Potential		4	Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.		
Raw Total		32			
Exposure Total (max 34)		23.7			

**CCME National Classification System (2008)
Score Summary**

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCS completely.

I. Contaminant Characteristics	Known	Potential
1. Residency Media	2	—
2. Chemical Hazard	8	—
3. Contaminant Exceedance Factor	4	—
4. Contaminant Quantity	6	—
5. Modifying Factors	2	—
Raw Total Score	22	0
Raw Total Score (Known + Potential)	22	
Adjusted Total Score (Raw Total / 40 * 33)	18.2	(max 33)

II. Migration Potential	Known	Potential
1. Groundwater Movement	12	—
2. Surface Water Movement	8	—
3. Soil	0	—
4. Vapour	0	—
5. Sediment Movement	0	—
6. Modifying Factors	0	0
Raw Total Score	20	0
Raw Total Score (Known + Potential)	20	
Adjusted Total Score (Raw Total / 64 * 33)	10.3	(max 33)

III. Exposure	Known	Potential
1. Human Receptors		
A. Known Impact	10	
B. Potential		
a. Land Use		—
b. Accessibility		—
c. Exposure Route		
i. Direct Contact		—
ii. Inhalation		—
iii. Ingestion		—
2. Human Receptors Modifying Factors	6	—
Raw Total Human Score	16	0
Raw Total Human Score (Known + Potential)	16	
Adjusted Total Human Score	16.0	(maximum 22)
3. Ecological Receptors		
A. Known Impact	12	
B. Potential		
a. Terrestrial		—
b. Aquatic		—
4. Ecological Receptors Modifying Factors	0	3
Raw Total Ecological Score	12	3
Raw Total Ecological Score (Known + Potential)	15	
Adjusted Total Ecological Score	15.0	(maximum 18)
5. Other Receptors	0	1
Total Other Receptors Score (Known + Potential)	1	
Total Exposure Score (Human + Ecological + Other)	32.0	
Adjusted Total Exposure Score (Total Exposure / 46 * 34)	23.7	(max 34)

Site Score	
Test Site	
Site Letter Grade	A
Certainty Percentage	100%
% Responses that are "Do Not Know"	-59%
Total NCSCS Score for site	52.1
Site Classification Category	2

Site Classification Categories*:

- Class 1 - High Priority for Action (Total NCS Score >70)
- Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
- Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
- Class N - Not a Priority for Action (Total NCS Score <37)
- Class INS - Insufficient Information (>15% of responses are "Do Not Know")

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

**CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions**

Subject Site:	Test Site	
Civic Address: <i>(or other description of location)</i>	On the north shore of the Peace River, approximately 220 km east of High Level, Alberta, in Wood Buffalo National Park	
Site Common Name : <i>(if applicable)</i>	Community of Garden River	
Site Owner or Custodian: <i>(Organization and Contact Person)</i>	Parks Canada Agency	
Legal description or metes and bounds:	N 58°42.5', W113°52.0'	
Approximate Site area:		
PID(s) : <i>(or Parcel Identification Numbers [PIN] if untitled Crown land)</i>	Former Septic Tile Field (FCSI #00022830)	
Centre of site: <i>(provide latitude/longitude or UTM coordinates)</i>	Latitude:	_____ degrees _____ min _____ secs
	Longitude:	_____ degrees _____ min _____ secs
Site Land Use:	UTM Coordinate:	Northing Easting
	Current:	Residential
	Proposed:	
Site Plan	To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.	
Provide a brief description of the Site:	<p style="text-align: center;">The Former Septic Tile Field is located at the east side of the community of Garden River (see attached Site Plan).</p>	

CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions

Affected media and Contaminants of Potential Concern (COPC):	The concentrations of dissolved Cadmium, Selenium, and Zinc in three monitoring wells exceeded Canadian Council of Ministers of the Environment 2007 Canadian water quality guidelines for the protection of aquatic life. The concentrations of dissolved Manganese in three monitoring wells exceeded Health Canada 2008 Guidelines for Canadian drinking water quality.
--	--

Please fill in the "letter" that best describes the level of information available for the site being assessed:

Site Letter Grade

If letter grade is F, do not continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent.

Scoring Completed By:	Cathy Hamlen, Ph.D. A.Ag.
Date Scoring Completed:	6-Feb-09

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
1. Residency Media (replaces physical state)				
Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines? yes = has an exceedance or strongly suspected to have an exceedance no = does not have an exceedance or strongly suspected not to have an exceedance			The overall score is calculated by adding the individual scores from each residency media (having one or more exceedance of the most conservative media specific and land-use appropriate CCME guideline). Summary tables of the Canadian Environmental Quality Guidelines for soil, water (aquatic life, non-potable groundwater environments, and agricultural water uses) and sediment are available on the CCME website at http://www.ccme.ca/publications/ceqs_rcqe.html?category_id=124 . For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guides_recom/index_e.html .	An increasing number of residency media containing chemical exceedances often equates to a greater potential risk due to an increase in the number of potential exposure pathways.
A. Soil	No 0	Twelve soil samples and three groundwater monitoring wells were assessed. Refer to <i>Contaminated Site Assessment, Initial and Detailed Testing Programs, Wood Buffalo National Park, Various Locations in the Community of Garden River, Alberta</i> (EBA Consulting Engineers Ltd., 2009).		
Yes No Do Not Know	0			
B. Groundwater	Yes 2			
Yes No Do Not Know	2			
C. Surface water	No 0			
Yes No Do Not Know	0			
D. Sediment	No 0			
Yes No Do Not Know	0			
"Known" -score	2			
"Potential" - score	---			
2. Chemical Hazard				
What is the relative degree of chemical hazard of the contaminant in the list of hazard rankings proposed by the Federal Contaminated Sites Action Plan (FCSAP)? High Medium Low Do Not Know	High	Cadmium (groundwater) is High, Selenium (groundwater) is Medium, and Manganese and Zinc (groundwater) are Low.	The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site. The degree of hazard has been defined by the Federal Contaminated Sites Action Plan (FCSAP) and a list of substances with their associated hazard (Low, Medium and High) has been provided as a separate sheet in this file. <i>See Attached Reference Material for Contaminant Hazard Rankings.</i>	Hazard as defined in the revised NCS pertains to the physical properties of a chemical which can cause harm. Properties can include toxic potency, propensity to biomagnify, persistence in the environment, etc. Although there is some overlap between hazard and contaminant exceedance factor below, it will not be possible to derive contaminant exceedance factors for many substances which have a designated chemical hazard designation, but don't have a CCME guideline. The purpose of this category is to avoid missing a measure of toxic potential.
"Known" -score	8			
"Potential" - score	---			
3. Contaminant Exceedance Factor				
What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")? Mobile NAPL High (>100x) Medium (10x to 100x) Low (1x to 10x) Do Not Know	Low (1x to 10x)	The maximum groundwater Manganese concentration was 3.4 times higher than Health Canada 2008 Guidelines for Canadian Drinking Water Quality; The maximum groundwater Cadmium concentration was 1.03 times higher than the CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life, the maximum groundwater Selenium concentration was 5 times higher than the 2007 CCME guideline, and the maximum groundwater Zinc concentration was 1.8 times higher than the 2007 CCME guideline.	Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the <i>most conservative media-specific and land-use appropriate CCME environmental quality guidelines</i> . Ranking should be based on contaminant with greatest exceedance of CCME guidelines. Ranking of contaminant hazard as high, medium and low is as follows: High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines Mobile NAPL = Contaminant is a non-aqueous phase liquid (i.e., due to its low solubility, it does not dissolve in water, but remains as a separate liquid) and is present at a sufficiently high saturation (i.e., greater than residual NAPL saturation) such that there is significant potential for mobility either downwards or laterally. Other standards may include local background concentration or published toxicity benchmarks. Results of toxicity testing with site samples can be used as an alternative. This approach is only relevant for contaminants that do not biomagnify in the food web, since toxicity tests would not indicate potential effects at higher trophic levels. High = lethality observed. Medium = no lethality, but sub lethal effects observed. Low = neither lethal nor sub lethal effects observed.	In the event that elevated levels of a material with no associated CCME guidelines are present, check provincial and USEPA environmental criteria. Hazard Quotients (sometimes referred to as a screening quotient in risk assessments) refer to the ratio of measured concentration to the concentration believed to be the threshold for toxicity. A similar calculation is used here to determine the contaminant exceedance factor (CEF). Concentrations greater than one times the applicable CCME guideline (i.e., CEF=>1) indicate that risks are possible. Mobile NAPL has the highest associated score (8) because of its highly concentrated nature and potential for increase in the size of the impacted zone.
"Known" -score	2			
"Potential" - score	---			

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
4. Contaminant Quantity (known or strongly suspected)				
What is the known or strongly suspected quantity of all contaminants? >10 hectare (ha) or 5000 m ³ 2 to 10 ha or 1000 to 5000 m ³ <2 ha or 1000 m ³ Do Not Know	2 to 10 ha or 1000 to 5000 m ³	The assessment area is approximately 4,000 m ² .	Measure or estimate the area or quantity of total contamination (i.e. all contaminants known or strongly suspected to be present on the site). The "Area of Contamination" is defined as the area or volume of contaminated media (soil, sediment, groundwater, surface water) exceeding appropriate environmental criteria.	A larger quantity of a potentially toxic substance can result in a larger frequency of exposure as well as a greater probability of migration, therefore, larger quantities of these substances earn a higher score.
"Known" - score	6			
"Potential" - score	---			
5. Modifying Factors				
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment? Yes No Do Not Know	No 0	Chemicals do not persist.	Persistent chemicals, e.g., PCBs, chlorinated pesticides etc. either do not degrade or take longer to degrade, and therefore may be available to cause effects for a longer period of time. Canadian Environmental Protection Act (CEPA) classifies a chemical as persistent when it has at least one of the following characteristics: (a) In air, (i) its half-life is equal to or greater than 2 days, or (ii) it is subject to atmospheric transport from its source to a remote area; (b) in water, its half-life is equal to or greater than 182 days; (c) in sediments, its half-life is equal to or greater than 365 days; or (d) in soil, its half-life is equal to or greater than 182 days. This list does not include metals or metalloids, which in their elemental form do not degrade. However metals and metalloids form chemical species in the environment, many of which are not readily bioavailable.	<i>Examples of Persistent Substances are provided in attached Reference Materials</i>
Are there contaminants present that could cause damage to utilities and infrastructure, either now or in the future, given their location? Yes No Do Not Know	No 0			Some contaminants may react or absorb into underground utilities and infrastructure. For example, organic solvents may degrade some plastics, and salts could cause corrosion of metal.
How many different contaminant classes have representative CCME guideline exceedances? one two to four five or more Do Not Know	two to four 2	Cadmium, Selenium, and Zinc in groundwater.	For the purposes of the revised NCS ranking system, the following chemicals represent distinct chemical "classes": inorganic substances (including metals), volatile petroleum hydrocarbons, light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons, PAHs, phenolic substances, chlorinated hydrocarbons, halogenated methanes, phthalate esters, pesticides.	<i>Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.</i>
"Known" - Score	2			
"Potential" - Score	---			

Contaminant Characteristic Total

Raw Total Scores- "Known"	20
Raw Total Scores- "Potential"	0
Raw Combined Total Scores	20
Total Score (Raw Combined / 40 * 33)	16.5

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Groundwater Movement				
A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary.				
<p>i) For potable groundwater environments 1) groundwater concentrations exceed background concentrations and 1X the Guideline for Canadian Drinking Water Quality (GCDWQ) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater contamination. For non-potable environments (typically urban environments with municipal services), 1) groundwater concentrations exceed 1X the applicable non-potable guidelines or modified generic guidelines (which exclude ingestion of drinking water pathway) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater impacts.</p> <p>ii) Same as (i) except the information is not known but is <u>strongly suspected</u> based on indirect observations.</p> <p>iii) Meets GCDWQ for potable environments meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for non-potable environments or Absence of groundwater exposure pathway (i.e., there is no aquifer (see definition at right) at the site or there is an adequate isolating layer between the aquifer and the contamination, and within 5 km of the site there are no aquatic receiving environments and the groundwater does not daylight).</p>	<p>12</p> <p>0</p> <p>0</p> <p>12</p> <p>Score 12</p>	<p>Manganese in groundwater exceeded drinking water aesthetic objective (Health Canada 2008 Guidelines for Canadian Drinking Water Quality). The Zinc concentration exceeded guideline for protection of fresh water aquatic life (CCME, 2007). Hydraulic conductivity is in the order of 10 m/s at the site and the apparent direction of groundwater flow is towards community (based on March 2008 groundwater elevation contours).</p>	<p>Review chemical data and evaluate groundwater quality.</p> <p>The evaluation method concentrates on 1) a potable or non-potable groundwater environment; the groundwater flow system and its potential to be an exposure pathway to known or potential receptors</p> <p>An aquifer is defined as a geologic unit that yields groundwater in usable quantities and drinking water quality. The aquifer can currently be used as a potable water supply or could have the potential for use in the future. Non-potable groundwater environments are defined as areas that are serviced with a reliable alternative water supply (most commonly provided in urban areas). Evaluation of a non-potable environment will be based on a site specific basis.</p> <p>Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils.</p> <p>Seeps and springs are considered part of the groundwater pathway.</p> <p>In Arctic environments, the potability and evaluation of the seasonal active layer (above the permafrost) as a groundwater exposure pathway will be considered on a site-specific basis.</p>	<p>The 1992 NCS rationale evaluated the off-site migration as a regulatory issue. The exposure assessment and classification of hazards should be evaluated regardless of the property boundaries.</p> <p>Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a groundwater supply source in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links.</p> <p>Note that for potable groundwater that also daylights into a nearby surface water body, the more stringent guidelines for both drinking water and protection of aquatic life should be considered.</p> <p>Selected References</p> <p>Potable Environments</p> <p>Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/ewh-scmt/cvst/water/eau/doc_ssp/sum_guide-res_recom/index_e.html</p> <p>Non-Potable Environments</p> <p>Canadian Water Quality Guidelines for Protection of Aquatic Life. CCME. 1999 www.ccm.ca</p> <p>Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.</p>
NOTE: If a score is assigned here for Known COPC Exceedances, then you can skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)				
B. Potential for groundwater pathway.				
<p>a. Relative Mobility</p> <p>High</p> <p>Moderate</p> <p>Low</p> <p>Insignificant</p> <p>Do Not Know</p>	<p>2</p> <p>Score 2</p>	<p>Organics</p> <p>Koc (L/kg)</p> <p>Koc < 500 (i.e., log Koc < 2.7)</p> <p>Koc = 500 to 5000 (i.e., log Koc = 2.7 to 3.7)</p> <p>Koc = 5,000 to 100,000 (i.e., log Koc = 3.7 to 5)</p> <p>Koc > 100,000 (i.e., log Koc > 5)</p> <p>Metals with higher mobility at acidic conditions</p> <p>pH < 5</p> <p>pH = 5 to 6</p> <p>pH > 6</p> <p>Metals with higher mobility at alkaline conditions</p> <p>pH > 8.5</p> <p>pH = 7.5 to 8.5</p> <p>pH < 7.5</p>	<p>Reference: US EPA Soil Screening Guidance (Part 5 - Table 39)</p> <p>If a score of zero is assigned for relative mobility, it is still recommended that the following sections on potential for groundwater pathway be evaluated and scored. Although the Koc of an individual contaminant may suggest that it will be relatively immobile, it is possible that, with complex mixtures, there could be enhanced mobility due to co-solvent effects. Therefore, the Koc cannot be relied on solely as a measure of mobility. An evaluation of other factors such as containment, thickness of confining layer, hydraulic conductivity and precipitation infiltration rate are still useful in predicting potential for groundwater migration, even if a contaminant is expected to have insignificant mobility based on its chemistry alone.</p>	
<p>b. Presence of engineered sub-surface containment?</p> <p>No containment</p> <p>Partial containment</p> <p>Full containment</p> <p>Do Not Know</p>	<p>1.5</p> <p>Score 1.5</p>	<p>Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved.</p> <p>Full containment is defined as an engineered system or natural attenuation processes, monitored as being effective, which provide for full capture and/or treatment of contaminants. All chemicals of concern must be contained for Full Containment scoring. Natural attenuation must have sufficient data, and reports cited with monitoring data to support steady state conditions and the attenuation processes. If there is no containment or insufficient natural attenuation process, the category is evaluated as high. If there is less than full containment or if uncertain, then evaluation is evaluated as medium. In Arctic environments, permafrost will be evaluated, as appropriate, based on detailed evaluations, effectiveness and reliability to contain/control contaminant migration.</p>	<p>Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links.</p> <p>Selected Resources:</p> <p>United States Environmental Protection Agency (USEPA) 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.</p> <p>Environment Canada - Ontario Region - Natural Attenuation Technical Assistance Bulletins (TABs) Number 19-21.</p>	
<p>c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway</p> <p>3 m or less including no confining layer or discontinuous confining layer</p> <p>3 to 10 m</p> <p>> 10 m</p> <p>Do Not Know</p>	<p>0.5</p> <p>Score 0.5</p>	<p>The term "confining layer" refers to geologic material with little or no permeability or hydraulic conductivity (such as unfractured clay); water does not pass through this layer or the rate of movement is extremely slow.</p> <p>Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway.</p> <p>The evaluation of this category is based on:</p> <p>1) The presence and thickness of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as drinking water sources or</p> <p>2) The presence and thickness of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated zone (e.g., water table aquifer, first hydrostratigraphic unit or other groundwater pathway).</p>	<p>Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links.</p>	
<p>d. Hydraulic conductivity of confining layer</p> <p>>10⁻⁴ cm/s or no confining layer</p> <p>10⁻⁴ to 10⁻⁶ cm/s</p> <p><10⁻⁶ cm/s</p> <p>Do Not Know</p>	<p>0.5</p> <p>Score 0.5</p>	<p>Determine the nature of geologic materials and estimate hydraulic conductivity from published material (or use "Range of Values of Hydraulic Conductivity and Permeability" figure in the Reference Material sheet). Unfractured clays should be scored low. Silts should be scored medium. Sand, gravel should be scored high. The evaluation of this category is based on:</p> <p>1) The presence and hydraulic conductivity (K) of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as a drinking water source, groundwater exposure pathway or</p> <p>2) The presence and permeability (K) of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated water table aquifer, first hydrostratigraphic unit or other groundwater pathway.</p>	<p>Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links.</p>	

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for groundwater pathway.				
e. Precipitation infiltration rate (Annual precipitation factor x surface soil relative permeability factor) High Moderate Low Very Low None Do Not Know	Score	0.4	Precipitation Refer to Environment Canada precipitation records for relevant areas. Divide annual precipitation by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score). Permeability For surface soil relative permeability (i.e., infiltration) assume: gravel (1), sand (0.6), loam (0.3) and pavement or clay (0). Multiply the surface soil relative permeability factor with precipitation factor to obtain the score or precipitation infiltration rate.	
f. Hydraulic conductivity of aquifer >10 ⁻² cm/s 10 ⁻² to 10 ⁻⁴ cm/s <10 ⁻⁴ cm/s Do Not Know	Score	1	Determine the nature of geologic materials and estimate hydraulic conductivity of all aquifers of concern from published material (refer to "Range of Values of Hydraulic Conductivity and Permeability" in the Reference Material sheet).	
Potential groundwater pathway total	Score	5.0		
Allowed Potential score	Score	—		Note: If a "known" score is provided, the "potential" score is disallowed.
Groundwater pathway total	Score	12		
2. Surface Water Movement				
A. Demonstrated migration of COPC in surface water above background conditions				
Known concentrations of surface water: i) Concentrations exceed background concentrations and exceed CCME CWQG for protection of aquatic life, irrigation, livestock water, and/or recreation (whichever uses are applicable at the site) by >1 X; or There is known contact of contaminants with surface water based on site observations. or In the absence of CWQG, chemicals have been proven to be toxic based on site specific testing (e.g. toxicity testing; or other indicator testing of exposure). ii) Same as (i) except the information is not known but is <u>only suspected</u> based on indirect observations. iii) Meets CWQG or absence of surface water exposure pathway (i.e., distance to nearest surface water is > 5 km.)	Score	12	Collect all available information on quality of surface water near to site. Evaluate available data against Canadian Water Quality Guidelines (select appropriate guidelines based on local water use, e.g., recreation, irrigation, aquatic life, livestock watering, etc.). The evaluation method concentrates on the surface water flow system and its potential to be an exposure pathway. Contamination is present on the surface (above ground) and has the potential to impact surface water bodies. Surface water is defined as a water body that supports one of the following uses: recreation, irrigation, livestock watering, aquatic life.	General Notes: Someone experienced must provide a thorough description of the sources researched to classify the surface water body in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact name, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. Selected References: CCME, 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME, 1999. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water) www.ccme.ca Health and Welfare Canada, 1992. Guidelines for Canadian Recreational Water Quality.
	Score	6		
	Score	0		
	Score	8		
NOTE: If a score is assigned here for Demonstrated Migration in Surface Water, then you can skip Part B (Potential for migration of COPCs in surface water) and go to Section 3 (Surface Soils)				
B. Potential for migration of COPCs in surface water				
a. Presence of containment No containment Partial containment Full containment Do Not Know	Score	3	Review the existing engineered systems and relate these structures to site conditions and proximity to surface water and determine if full containment is achieved: score low if there is full containment such as capping, berms, dikes; score medium if there is partial containment such as natural barriers, trees, ditches, sedimentation ponds; score high if there are no intervening barriers between the site and nearby surface water. Full containment must include containment of all chemicals.	
b. Distance to Surface Water 0 to <100 m 100 - 300 m >300 m Do Not Know	Score	2	Review available mapping and survey data to determine distance to nearest surface water bodies.	

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<p>c. Topography Contaminants above ground level and slope is steep Contaminants at or below ground level and slope is steep Contaminants above ground level and slope is intermediate Contaminants at or below ground level and slope is intermediate Contaminants above ground level and slope is flat Contaminants at or below ground level and slope is flat Do Not Know</p>	1		<p>Review engineering documents on the topography of the site and the slope of surrounding terrain. Steep slope = >50% Intermediate slope = between 5 and 50% Flat slope = < 5% Note: Type of fill placement (e.g., trench, above ground, etc.).</p>	
<p>d. Run-off potential High (rainfall run-off score > 0.6) Moderate (0.4 < rainfall run-off score < 0.6) Low (0.2 < rainfall run-off score < 0.4) Very Low (0 < rainfall run-off score < 0.2) None (rainfall run-off score = 0) Do Not Know</p>	0.4		<p>Rainfall: Refer to Environment Canada precipitation records for relevant areas. Divide rainfall by 1000 and round to nearest tenth (e.g., 587 mm = 0.7 score). The former definition of annual rainfall did not include the precipitation as snow. This minor adjustment has been made. The second modification was the inclusion of permeability of surface materials as an evaluation factor. Permeability For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1). Multiply the infiltration factor with precipitation factor to obtain rainfall run off score.</p>	<p>Selected Sources: Environment Canada web page link www.msc.ec.gc.ca Snow to rainfall conversion apply ratio of 15 (snow):1 (water)</p>
<p>e. Flood potential 1 in 2 years 1 in 10 years 1 in 50 years Do Not Know</p>	0.5		<p>Review published data such as flood plain mapping or flood potential (e.g., spring or mountain run off) and Conservation Authority records to evaluate flood potential of nearby water courses both up and down gradient. Rate zero if site not in flood plain.</p>	
Potential surface water pathway total	6.9			
Allowed Potential score	—			
Surface water pathway total	8	Note: If a "known" score is provided, the "potential" score is disallowed.		
3. Surface Soils (potential for dust, dermal and ingestion exposure)				
A. Demonstrated concentrations of COPC in surface soils (top 1.5 m)				
<p>COPCs measured in surface soils exceed the CCME soil quality guideline.</p>	12	No soil concentrations of COPC exceeded provincial or federal guidelines.	<p>Collect all available information on quality of surface soils (i.e., top 1.5 metres) at the site. Evaluate available data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (i.e. agricultural, residential/parkland, commercial, or industrial), and soil texture if applicable (i.e., coarse or fine).</p>	<p>Selected References: CCME, 1999, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health www.ec.gc.ca</p>
Strongly suspected that soils exceed guidelines	9			
COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock)	0			
	0			
Score	0			
<p>NOTE: If a score is assigned here for Demonstrated Concentrations in Surface Soils, then you can skip Part B (Potential for a surface soils migration pathway) and go to Section 4 (Vapour)</p>				
B. Potential for a surface soils (top 1.5 m) migration pathway				
<p>a. Are the soils in question covered? Exposed Vegetated Landscaped Paved Do Not Know</p>	4		<p>Consult engineering or risk assessment reports for the site. Alternatively, review photographs or perform a site visit. Landscaped surface soils must include a minimum of 0.5 m of topsoil.</p>	<p>The possibility of contaminants in blowing snow have not been included in the revised NCS as it is difficult to assess what constitutes an unacceptable concentration and secondly, spills to snow or ice are most efficiently mitigated when freezing conditions remain.</p>
<p>b. For what proportion of the year does the site remain covered by snow? 0 to 10% of the year 10 to 30% of the year More than 30% of the year Do Not Know</p>	3		<p>Consult climatic information for the site. The increments represent the full span from soils which are always wet or covered with snow (and therefore less likely to generate dust) to those soils which are predominantly dry and not covered by snow (and therefore are more likely to generate dust).</p>	
Potential surface soil pathway total	7			
Allowed Potential score	—			
Soil pathway total	0	Note: If a "known" score is provided, the "potential" score is disallowed.		

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
4. Vapour				
A. Demonstrated COPCs in vapour.				
Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations.	12	Measured volatile hydrocarbons in the soil were below laboratory detection limits.	Consult previous investigations, including human health risk assessments, for reports of vapour detected.	
Strongly suspected (based on observations and/or modelling)	9			
Vapour has not been measured and volatile hydrocarbons have not been found in site soils or groundwater.	0			
Score	0			
NOTE: If a score is assigned here for Demonstrated COPCs in Vapour, then you can skip Part B (Potential for COPCs in vapour) and go to Section 5 (Sediment)				
B. Potential for COPCs in vapour				
a. Relative Volatility based on Henry's Law Constant, H[*] (dimensionless) High (H [*] > 1.0E-1) Moderate (H [*] = 1.0E-1 to 1.0E-3) Low (H [*] < 1.0E-3) Not Volatile Do Not Know			Reference: US EPA Soil Screening Guidance (Part 5 - Table 36) Provided in Attached Reference Materials	If the Henry's Law Constant for a substance indicates that it is not volatile, and a score of zero is assigned here for relative volatility, then the other three questions in this section on Potential for COPCs will be automatically assigned scores of zero and you can skip to section 5.
Score	2.5			
b. What is the soil grain size? Fine Coarse Do Not Know			Review soil permeability data in engineering reports. The greater the permeability of soils, the greater the possible movement of vapours. Fine-grained soils are defined as those which contain greater than 50% by mass particles less than 75 µm mean diameter (D50 < 75 µm). Coarse-grained soils are defined as those which contain greater than 50% by mass particles greater than 75 µm mean diameter (D50 > 75 µm)	
Score	3			
c. Is the depth to the source less than 10m? Yes No Do Not Know			Review groundwater depths below grade for the site.	
Score	2			
d. Are there any preferential pathways? Yes No Do Not Know			Visit the site during dry summer conditions and/or review available photographs. Where bedrock is present, fractures would likely act as preferential pathways.	Preferential pathways refer to areas where vapour migration is more likely to occur because there is lower resistance to flow than in the surrounding materials. For example, underground conduits such as sewer and utility lines, drains, or septic systems may serve as preferential pathways. Features of the building itself that may also be preferential pathways include earthen floors, expansion joints, wall cracks, or foundation perforations for subsurface features such as utility pipes, sumps, and drains.
Score	2			
Potential vapour pathway total	9.5			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Vapour pathway total	0			
5. Sediment Movement				
A. Demonstrated migration of sediments containing COPCs				
There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated.	12	No soil concentrations of COPC exceeded provincial or federal guidelines.	Review sediment assessment reports. Evidence of migration of contaminants in sediments must be reported by someone experienced in this area.	Usually not considered a significant concern in lakes/marine environments, but could be very important in rivers where transport downstream could be significant.
Strongly suspected (based on observations and/or modelling)	9			
Sediments have been contained and there is no indication that sediments will migrate in future, or Absence of sediment exposure pathway (i.e., within 5 km of the site there are no aquatic receiving environments, and therefore no sediments).	0			
Score	0			
NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you can skip Part B (Potential for Sediment Migration) and go to Section 6 (Modifying Factors)				

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for sediment migration				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")? Yes No Do Not Know	4		Review existing sediment assessments. If sediment coring has been completed, it may indicate that historically contaminated sediments have been covered over by newer "clean" sediments. This assessment will require that cores collected demonstrate a low concentration near the top and higher concentration with sediment depth. Review existing sediment assessments. If the sediments present at the site are in a river, select "no" for this question.	
b. For lakes and marine habitats, are the contaminated sediments in shallow water and therefore likely to be affected by tidal action, wave action or propeller wash? Yes No Do Not Know	4			
c. For rivers, are the contaminated sediments in an area prone to sediment scouring? Yes No Do Not Know	4			
Potential sediment pathway total	12	Note: If a "Known" score is provided, the "Potential" score is disallowed.		
Allowed Potential score	—			
Sediment pathway total	0			
6. Modifying Factors				
Are there subsurface utility conduits in the area affected by contamination? Yes No Do Not Know	No	No underground facilities were located in March 2008.	Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
Known	0			
Potential	0			

Migration Potential Total		
Raw "known" total	20	Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore, the total "Potential" Score may not reflect the sum of the individual "Potential" scores.
Raw "potential" total	0.0	
Raw combined total	20.0	
Total (max 33)	10.3	

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Human				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to humans as a result of the contaminated site. (Class 1 Site*)	22		*Where adverse effects on humans are documented, the site should be automatically designated Class 1 site (i.e., action required). There is no need to proceed through the NCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites).	Known adverse impact includes domestic and traditional food sources. Adverse effects based on food chain transfer to humans and/or animals can be scored in this category. However, the weight of evidence must show a direct link of a contaminated food source/supply and subsequent ingestion/transfer to humans. Any associated adverse effects to the environment are scored separately later in this worksheet. Someone experienced must provide a thorough description of the sources researched to evaluate and determine the quantified exposure/impact (adverse effect) in the vicinity of the contaminated site.
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	10		This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1 for noncarcinogenic chemicals and incremental cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this typically either >10 ⁻⁶ or >10 ⁻⁷). Known impacts can also be evaluated based on blood testing (e.g. blood lead >10 ug/dL) or other health based testing.	Selected References: Health Canada- Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Health Screening Level Risk Assessment http://www.hc-sc.gc.ca/rwh-ssm/vivus/contam/la/index_e.html United States Environmental Protection Agency, Integrated Risk Information System (IRIS) http://www.epa.gov/iris/
No quantified or suspected exposures/impacts in humans.	0		This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 0.2 for non-carcinogenic chemicals and incremental lifetime cancer risks for carcinogenic chemicals that are within acceptable levels as defined by the jurisdiction (for most jurisdictions this is less than either 10 ⁻⁶ or 10 ⁻⁵).	
Score	0			
NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Human Exposure) and go to Section 2 (Human Exposure Modifying Factors)				
B. Potential for human exposure				
a) Land use (provides an indication of potential human exposure scenarios) Agricultural Residential / Parkland Commercial Industrial Do Not Know	Score	1.5	Review zoning and land use maps over the distances indicated. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place. Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	This is the main "receptor" factor used in site scoring. A higher score implies a greater exposure and/or exposure of more sensitive human receptors (e.g., children).
b. Indicate the level of accessibility to the contaminated portion of the site (e.g., the potential for coming in contact with contamination) Limited barriers to prevent site access; contamination not covered Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered. Controlled access or remote location and contaminants are covered Do Not Know	Score	1	Review location and structures and contaminants at the site and determine if there are intervening barriers between the site and humans. A low rating should be assigned to a (covered) site surrounded by a fence or in a remote location, whereas a high score should be assigned to a site that has no cover, fence, natural barriers or buffer.	
B. Potential for human exposure				
c) Potential for intake of contaminated soil, water, sediment or foods for operable or potentially operable pathways, as identified in Worksheet II (Migration Potential). i) direct contact Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated? Yes No Do Not Know	Score	3	If soils or potable groundwater are present exceeding their respective CCME guidelines, dermal contact is assumed. Exposure to surface water, non-potable groundwater or sediments exceeding their respective CCME guidelines will depend on the site. Select "Yes" if dermal exposure to surface water, non-potable groundwater or sediments is expected. For instance, dermal contact with sediments would not be expected in an active port. Only soils in the top 1.5 m are defined by CCME (2003) as surface soils. If contaminated soils are only located deeper than 1.5 m, direct contact with soils is not anticipated to be an operable contaminant exposure pathway.	Exposure via the skin is generally believed to be a minor exposure route. However for some organic contaminants, skin exposure can play a very important component of overall exposure. Dermal exposure can occur while swimming in contaminated waters, bathing with contaminated surface water/groundwater and digging in contaminated dirt, etc.
ii) Inhalation (i.e., inhalation of dust, vapour) Vapour - Are there inhabitable buildings on the site within 30 m of soils or groundwater with volatile contamination as determined in Worksheet II (Migration Potential)? Yes No Do Not Know	Score	3	If inhabitable buildings are on the site within 30 m of soils or groundwater exceeding their respective guidelines for volatile chemicals, there is a potential of risk to human health (Health Canada, 2004). Review site investigations for location of soil samples (having exceedances of volatile substances relative to buildings. Refer to (II) Migration Potential worksheet, 4B) and/or for COPCs in Vapour for a definition of volatility.	Exposure via the lungs (inhalation) can be a very important exposure pathway. Inhalation can be via both particulates (dust) and gas (vapours). Vapours can be a problem where buildings have been built on former industrial sites or where volatile contaminants have migrated below buildings resulting in the potential for vapour intrusion.
Dust - If there is contaminated surface soil (e.g. top 1.5 m), indicate whether the soil is fine or coarse textured. If it is known that surface soil is not contaminated, enter a score of zero. Fine Coarse Surface soil is not contaminated or absent Do Not Know Texture	Score	0	Consult grain size data for the site. If soils (containing exceedances of the CCME soil quality guidelines) predominantly consist of fine material (having a median grain size of 75 microns; as defined by CCME (2006)) then these soils are more likely to generate dusts.	Assesses the potential for humans to be exposed to vapours originating from site soils. The closer the receptor is to a source of volatile chemicals in soil, the greater the potential of exposure. Also, coarser-grained soil will convey vapour much more efficiently in the soil than finer grained material such as clays and silts.
Score	0			General Notes: Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a vapour migration and/or dust generation in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. Selected References: Canadian Council of Ministers of the Environment (CCME). 2006. Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. PN 1332 www.ccm.ca Golder, 2004. Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC
Inhalation total	Score	3		

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site	Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for human exposure					
	<p>ii) Ingestion (i.e., ingestion of food items, water and soils (for children), including traditional foods.</p> <p>Drinking Water: Choose a score based on the proximity to a drinking water supply, to indicate the potential for contamination (present or future).</p> <p>0 to 100 m 100 to 300 m 300 m to 1 km 1 to 5 km No drinking water present Do Not Know</p> <p>Score</p> <p>2</p> <p>Is an alternative water supply readily available?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>1</p> <p>Is human ingestion of contaminated soils possible?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>3</p> <p>Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>1</p> <p>Ingestion total</p> <p>7</p>			<p>Review available site data to determine if drinking water (groundwater, surface water, private, commercial or municipal supply) is known or suspected to be contaminated above Guidelines for Canadian Drinking Water Quality. If drinking water supply is known to be contaminated, some immediate action (e.g., provision of alternate drinking water supply) should be initiated to reduce or eliminate exposure.</p> <p>The evaluation of significant potential for exceedances of the water supply in the future may be based on the capture zones of the drinking water wells; contaminant travel times; computer modeling of and contaminant transport.</p> <p>If contaminated soils are located within the top 1.5 m, it is assumed that ingestion of soils is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely, and the duration is shorter. Refer to human health risk assessment reports for the site in question.</p> <p>Use human health risk assessment reports (or others) to determine if there is significant reliance on traditional food sources associated with the site. Is the food item in question going to spend a large proportion of its time at the site (e.g., large mammals may spend a very small amount of time at a small contaminated site)? Human health risk assessment reports for the site in question will also provide information on potential bioaccumulation of the COPC in question.</p>	<p>Selected References: Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/hpsc/pccs/water/publications/drinking_water_quality_guidelines/08c.htm</p> <p>Drinking water can be an extremely important exposure pathway to humans. If site groundwater or surface water is not used for drinking, then this pathway is considered to be inoperable.</p> <p>Consider both wild foods such as salmon, venison, caribou, as well as agricultural sources of food items if the contaminated site is on or adjacent to agricultural land uses.</p>
	Human Health Total "Potential" Score	15.5	Note if a "Known" Human Health score is provided, the "Potential" score is disallowed.		
	Allowed "Potential" Score	—			
2. Human Exposure Modifying Factors					
	<p>a) Strong reliance of local people on natural resources for survival (i.e., food, water, shelter, etc.)</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>8</p> <p>Known Potential</p> <p>—</p> <p>Raw Human "known" total</p> <p>0</p> <p>Raw Human "potential" total</p> <p>0</p> <p>Raw Human Exposure Total Score</p> <p>8</p> <p>Human Health Total (max 22)</p> <p>8.0</p>		<p>Potable water supply is local; Strong reliance of community on local foods which include fish from Peace River.</p>		
3. Ecological					
A. Known exposure					
	<p>Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to terrestrial or aquatic organisms as a result of the contaminated site.</p> <p>Score</p> <p>18</p> <p>Same as above, but "Strongly Suspected" based on observations or indirect evidence.</p> <p>Score</p> <p>12</p> <p>No quantified or suspected exposures/impacts in terrestrial or aquatic organisms</p> <p>Score</p> <p>0</p> <p>Score</p> <p>12</p>		<p>Groundwater concentrations of Cadmium, Selenium, and Zinc were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life and the site is approximately 0.5 km from the Peace River and Garden Creek.</p>	<p>Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are deemed to be severe, the site may be categorized as class one (i.e., a priority for remediation or risk management), regardless of the numerical total NCS score. For the purpose of application of the NCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. If ecological effects are determined to be severe and an automatic Class 1 is assigned, there is no need to proceed through the NCS. However, a scoring guideline (18) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites).</p> <p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1. Alternatively, known impacts can also be evaluated based on a weight of evidence assessment involving a combination of site observations, tissue testing, toxicity testing and quantitative community assessments. Scoring of adverse effects on individual rare or endangered species will be completed on a case-by-case basis with full scientific justification.</p> <p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 1 and no other observable or measurable sign of impacts. Alternatively, it can be based on a combination of other lines of evidence showing no adverse effects, such as site observations, tissue testing, toxicity testing and quantitative community assessments.</p>	<p>CCME, 1999: Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca</p> <p>CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Use www.ccme.ca</p> <p>Genalitive receptors-review: Canadian Council on Ecological Areas www.ccea.org</p> <p>Ecological effects should be evaluated at a population or community level, as opposed to at the level of individuals. For example, population-level effects could include reduced reproduction, growth or survival in a species. Community-level effects could include reduced species diversity or relative abundances. Further discussion of ecological assessment endpoints is provided in <i>Framework for Ecological Risk Assessment: General Guidance</i> (CCME 1996).</p> <p>Notes: Someone experienced must provide a thorough description of the sources researched to classify the environmental receptors in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as Internet links.</p>
<p>NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)</p>					

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for ecological exposure (for the contaminated portion of the site)				
a) Terrestrial				
i) Land use				
Agricultural (or Wild lands) Residential/Parkland Commercial Industrial Do Not Know	Score	1.5	Review zoning and land use maps. If the proposed future land use is more intensive than the current land use, evaluate this factor assuming the proposed future use is in place (indicate in the worksheet that future land use is the consideration). Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Wild lands are grouped with agricultural land due to the similarities in receptors that would be expected to occur there (e.g., herbivorous mammals and birds) and the similar need for a high level of protection to ensure ecological functioning. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	
ii) Uptake potential				
Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site? Yes No Do Not Know	Score	1	If contaminated soils are located within the top 1.5 m, it is assumed that direct contact of soils with plants and soil invertebrates is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely.	
iii) Ingestion (i.e., wildlife or domestic animals ingesting contaminated food items, soils or water)				
Are terrestrial animals likely to be ingesting contaminated water at the site? Yes No Do Not Know	Score	1	Refer to an Ecological Risk Assessment for the site. If there is contaminated surface water at the site, assume that terrestrial organisms will ingest it.	
Are terrestrial animals likely to be ingesting contaminated soils at the site? Yes No Do Not Know	Score	1	Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.	
Can the contamination identified bioaccumulate? Yes No Do Not Know	Score	1	Bioaccumulation of contaminants within food items is considered possible if: 1) The Log(Kow) of the contaminant is greater than 4 (as per the chemical characteristics work sheet) and concentrations in soils exceed the most conservative CCME soil quality guideline for the intended land use, or 2) The contaminant in collected tissue samples exceeds the Canadian Tissue Residue Guidelines.	
Distance to sensitive terrestrial ecological area 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score	1.5	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor located within this area of the site will be subject to further evaluations. It is also considered that any environmental receptor located greater than 5 km will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance; arctic environments (on a site specific basis); nature preserves, habitats for species at risk, sensitive forests, natural parks or forests.
Raw Terrestrial Total Potential		7		
Allowed Terrestrial Total Potential		---		Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.
B. Potential for ecological exposure (for the contaminated portion of the site)				
b) Aquatic				
i) Classification of aquatic environment				
Sensitive Typical Not Applicable (no aquatic environment present) Do Not Know	Score	2	"Sensitive aquatic environments" include those in or adjacent to shellfish or fish harvesting areas, marine parks, ecological reserves and fish migration paths. Also includes those areas deemed to have ecological significance such as for fish food resources, spawning areas or having rare or endangered species. "Typical aquatic environments" include those in areas other than those listed above.	
ii) Uptake potential				
Does groundwater daylighting to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact? Yes No (or Not Applicable) Do Not Know	Score	1	Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways: 1) by comparing collected nearshore groundwater concentrations to the CCME water quality guidelines (this will be a conservative comparison, as contaminant concentrations in groundwater often decrease between nearshore wells and the point of discharge). 2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge. 3) by installing water samplers, "peepers", in the sediments in the area of daylighting groundwater.	
Distance from the contaminated site to an important surface water resource 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score	1.5	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor or important water resource located within this area of the site will be subject to further evaluation. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org .	Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and ferns and other aquatic environments.
			Bioaccumulation of food items is possible if:	

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<p>Are aquatic species (i.e., forage fish, invertebrates or plants) that are consumed by predatory fish or wildlife consumers, such as mammals and birds, likely to accumulate contaminants in their tissues?</p> <p>Yes No Do Not Know</p>	<p>Score 1</p>		<p>1) The Log(K_{ow}) of the contaminant is greater than 4 (as per the chemical characteristics work sheet and concentrations in sediments exceed the CCME ISQG). 2) The contaminant in collected tissue samples exceeds the CCME tissue quality guidelines.</p>	
<p>Raw Aquatic Total Potential Allowed Aquatic Total Potential</p>	<p>5.5 ---</p>	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
4. Ecological Exposure Modifying Factors				
<p>a) Known occurrence of a species at risk.</p> <p>Is there a potential for a species at risk to be present at the site?</p> <p>Yes No Do Not Know</p>	<p>Do Not Know ---</p>	Not known if a species at risk is present at the site.	<p>Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as Eco Explorer, Regional, Provincial (Environment Ministries), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance.</p>	<p>Species at risk include those that are extirpated, endangered, threatened, or of special concern. For a list of species at risk, consult Schedule 1 of the federal Species at Risk Act (http://www.sararegistry.gc.ca/species/schedule1_a.cfm?rid=1). Many provincial governments may also provide regionally applicable lists of species at risk. For example, in British Columbia, consult: BCMFLAP, 2005, Endangered Species and Ecosystems in British Columbia, Provincial red and blue lists, Ministry of Sustainable Resource Management and Water, Land and Air Protection (http://www.gov.bc.ca/strick/red-blue.htm)</p>
<p>Score 1</p>				
<p>b) Potential impact of aesthetics (e.g., enrichment of a lake or tinting of food flavor).</p> <p>Is there evidence of aesthetic impact to receiving water bodies?</p> <p>Yes No Do Not Know</p> <p>Is there evidence of olfactory impact (i.e., unpleasant smells)?</p> <p>Yes No Do Not Know</p> <p>Is there evidence of increase in plant growth in the lake or water body?</p> <p>Yes No Do Not Know</p> <p>Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different?</p> <p>Yes No Do Not Know</p>	<p>Do Not Know --- 1 No 0 --- No 0 --- Do Not Know --- 1 0 3 12 3 15 15.0</p>	<p>Peace River has high flow. Do not know if the aesthetics will be impacted.</p>	<p>Documentation may consist of environmental investigation reports, press articles, petitions or other records.</p> <p>Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat.</p> <p>A distinct increase of plant growth in an aquatic environment may suggest enrichment. Nutrients (e.g., nitrogen or phosphorus) releases to an aquatic body can act as a fertilizer.</p> <p>Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.</p>	<p>This item will require some level of documentation by user, including contact names, addresses, phone numbers, e-mail addresses. Evidence of changes must be documented, please attach copy of report containing relevant information.</p>
<p>Ecological Modifying Factors Total - Known Ecological Modifying Factors Total - Potential Raw Ecological Total - Known Raw Ecological Total - Potential Raw Ecological Total Ecological Total (Max 18)</p>				
5. Other Potential Contaminant Receptors				
<p>a) Exposure of permafrost (leading to erosion and structural concerns)</p> <p>Are there improvements (roads, buildings) at the site dependent upon the permafrost for structural integrity?</p> <p>Yes No Do Not Know</p> <p>Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment?</p> <p>Yes No Do Not Know</p>	<p>No 0 --- Do Not Know --- 1 0 1</p>	Do not know.	<p>Consult engineering reports, site plans or air photos of the site. When permafrost melts, the stability of the soil decreases, leading to erosion. Human structures, such as roads and/or buildings are often dependent on the stability that the permafrost provides.</p> <p>Melting permafrost leads to a decreased stability of underlying soils. Wind or surface run-off erosion can carry soils into nearby aquatic habitats. The increased soil loadings into a river can cause an increase in total dissolved solids and a resulting decrease in aquatic habitat quality. In addition, the erosion can bring contaminants from soils to aquatic environments.</p>	<p>Plants and lichens provide a natural insulating layer which will help prevent thawing of the permafrost during the summer. Plants and lichens may also absorb less solar radiation. Solar radiation is turned into heat which can also cause underlying permafrost to melt.</p>
<p>Other Potential Receptors Total - Known Other Potential Receptors Total - Potential</p>	<p>0 1</p>			
Exposure Total				
<p>Raw Human Health + Ecological Total - Known Raw Human Health + Ecological Total - Potential Raw Total Exposure Total (max 34)</p>	<p>18 4 22 18.3</p>	Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.		

CCME National Classification System (2008)
Score Summary

Scores from individual worksheets are tallied in this worksheet.
 Refer to this sheet after filling out the revised NCS completely.

I. Contaminant Characteristics

	Known	Potential
1. Residency Media	2	---
2. Chemical Hazard	8	---
3. Contaminant Exceedance Factor	2	---
4. Contaminant Quantity	6	---
5. Modifying Factors	2	---

Raw Total Score	20	0
Raw Total Score (Known + Potential)	20	
Adjusted Total Score (Raw Total / 40 * 33)	16.5	(max 33)

II. Migration Potential

	Known	Potential
1. Groundwater Movement	12	---
2. Surface Water Movement	8	---
3. Soil	0	---
4. Vapour	0	---
5. Sediment Movement	0	---
6. Modifying Factors	0	0

Raw Total Score	20	0
Raw Total Score (Known + Potential)	20	
Adjusted Total Score (Raw Total / 64 * 33)	10.3	(max 33)

III. Exposure

	Known	Potential
1. Human Receptors		
A. Known Impact	0	
B. Potential		
a. Land Use		---
b. Accessibility		---
c. Exposure Route		
i. Direct Contact		---
ii. Inhalation		---
iii. Ingestion		---
2. Human Receptors Modifying Factors	6	---
Raw Total Human Score	6	0

Raw Total Human Score (Known + Potential)	6
Adjusted Total Human Score	6.0 (maximum 22)

3. Ecological Receptors		
A. Known Impact	12	
B. Potential		
a. Terrestrial		---
b. Aquatic		---
4. Ecological Receptors Modifying Factors	0	3
Raw Total Ecological Score	12	3

Raw Total Ecological Score (Known + Potential)	15
Adjusted Total Ecological Score	15.0 (maximum 18)

5. Other Receptors	0	1
Total Other Receptors Score (Known + Potential)	1	

Total Exposure Score (Human + Ecological + Other)	22.0
Adjusted Total Exposure Score (Total Exposure / 46 * 34)	16.3 (max 34)

Site Score

Test Site	
Site Letter Grade	A
Certainty Percentage	100%
% Responses that are "Do Not Know"	-59%
Total NCSCS Score for site	43.1
Site Classification Category	3

Site Classification Categories*:

- Class 1 - High Priority for Action (Total NCS Score >70)
- Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
- Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
- Class N - Not a Priority for Action (Total NCS Score <37)
- Class INS - Insufficient Information (>15% of responses are "Do Not Know")

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

**CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions**

Subject Site:	Test Site	
Civic Address: <i>(or other description of location)</i>	On the north shore of the Peace River, approximately 220 km east of High Level, Alberta, in Wood Buffalo National Park	
Site Common Name : <i>(if applicable)</i>	Community of Garden River	
Site Owner or Custodian: <i>(Organization and Contact Person)</i>	Parks Canada Agency	
Legal description or metes and bounds:	N 58°42.5', W113°52.0'	
Approximate Site area:		
PID(s) : <i>(or Parcel Identification Numbers [PIN] if untitled Crown land)</i>	Garden River Trading (Charlie Rose) AST (FCSI #00022202)	
Centre of site: <i>(provide latitude/longitude or UTM coordinates)</i>	Latitude:	_____ degrees _____ min _____ secs
	Longitude:	_____ degrees _____ min _____ secs
Site Land Use:	UTM Coordinate:	Northing 6511083.579 Easting 680620.3577
	Current:	Residential
	Proposed:	
Site Plan	To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.	
Provide a brief description of the Site:	<p style="text-align: center;">The Garden River Trading (Charlie Rose) AST is located north of the community of Garden River (see attached Site Plan).</p>	

CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions

Affected media and Contaminants of Potential Concern (COPC):	The groundwater concentrations of Cadmium, Selenium, and Zinc in one monitoring well exceeded Canadian Council of Ministers of the Environment 2007 Canadian Water Quality Guidelines for the protection of aquatic life.
--	---

Please fill in the "letter" that best describes the level of information available for the site being assessed:

Site Letter Grade

If letter grade is F, do not continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent.

Scoring Completed By:	Cathy Hamlen, Ph.D. A.Ag.
Date Scoring Completed:	6-Feb-09

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
1. Residency Media (replaces physical state)				
Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines? yes = has an exceedance or strongly suspected to have an exceedance no = does not have an exceedance or strongly suspected not to have an exceedance			The overall score is calculated by adding the individual scores from each residency media (having one or more exceedance of the most conservative media specific and land-use appropriate CCME guideline). Summary tables of the Canadian Environmental Quality Guidelines for soil, water (aquatic life, non-potable groundwater environments, and agricultural water uses) and sediment are available on the CCME website at http://www.ccmec.ca/publications/ceqg_rqce.html?category_id=124 . For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guides_recom/index_e.html .	An increasing number of residency media containing chemical exceedances often equates to a greater potential risk due to an increase in the number of potential exposure pathways.
A. Soil	No 0	Five soil samples and one groundwater monitoring well were assessed. Refer to <i>Contaminated Site Assessment, Initial and Detailed Testing Programs, Wood Buffalo National Park, Various Locations in the Community of Garden River, Alberta</i> (EBA Consulting Engineers Ltd., 2009).		
Yes No Do Not Know	0			
B. Groundwater	Yes 2			
Yes No Do Not Know	2			
C. Surface water	No 0			
Yes No Do Not Know	0			
D. Sediment	No 0			
Yes No Do Not Know	0			
"Known" -score	2			
"Potential" - score	--			
2. Chemical Hazard				
What is the relative degree of chemical hazard of the contaminant in the list of hazard rankings proposed by the Federal Contaminated Sites Action Plan (FCSAP)? High Medium Low Do Not Know	High	Cadmium (groundwater) is High, Selenium (groundwater) is Medium, and Zinc (groundwater) is Low.	The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site. The degree of hazard has been defined by the Federal Contaminated Sites Action Plan (FCSAP) and a list of substances with their associated hazard (Low, Medium and High) has been provided as a separate sheet in this file. <i>See Attached Reference Material for Contaminant Hazard Rankings.</i>	Hazard as defined in the revised NCS pertains to the physical properties of a chemical which can cause harm. Properties can include toxic potency, propensity to biomagnify, persistence in the environment, etc. Although there is some overlap between hazard and contaminant exceedance factor below, it will not be possible to derive contaminant exceedance factors for many substances which have a designated chemical hazard designation, but don't have a CCME guideline. The purpose of this category is to avoid missing a measure of toxic potential.
"Known" -score	8			
"Potential" - score	--			
3. Contaminant Exceedance Factor				
What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")? Mobile NAPL High (>100x) Medium (10x to 100x) Low (1x to 10x) Do Not Know	Low (1x to 10x)	The groundwater Cadmium concentration was 1.03 times higher than the CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life, and the groundwater Zinc concentration was 1.1 times higher than the 2007 CCME guideline. The groundwater Selenium concentration was 1.6 times higher than the Health Canada 2008 Guidelines for Canadian Drinking Water Quality.	Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the <i>most conservative media-specific and land-use appropriate CCME environmental quality guidelines</i> . Ranking should be based on contaminant with greatest exceedance of CCME guidelines. Ranking of contaminant hazard as high, medium and low is as follows: High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines Mobile NAPL = Contaminant is a non-aqueous phase liquid (i.e., due to its low solubility, it does not dissolve in water, but remains as a separate liquid) and is present at a sufficiently high saturation (i.e., greater than residual NAPL saturation) such that there is significant potential for mobility either downwards or laterally. Other standards may include local background concentration or published toxicity benchmarks. Results of toxicity testing with site samples can be used as an alternative. This approach is only relevant for contaminants that do not biomagnify in the food web, since toxicity tests would not indicate potential effects at higher trophic levels. High = lethality observed. Medium = no lethality, but sub lethal effects observed. Low = neither lethal nor sub lethal effects observed.	In the event that elevated levels of a material with no associated CCME guidelines are present, check provincial and USEPA environmental criteria. Hazard Quotients (sometimes referred to as a screening quotient in risk assessments) refer to the ratio of measured concentration to the concentration believed to be the threshold for toxicity. A similar calculation is used here to determine the contaminant exceedance factor (CEF). Concentrations greater than one times the applicable CCME guideline (i.e., CEF=>1) indicate that risks are possible. Mobile NAPL has the highest associated score (8) because of its highly concentrated nature and potential for increase in the size of the impacted zone.
"Known" -score	2			
"Potential" - score	--			

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes	
4. Contaminant Quantity (known or strongly suspected)					
What is the known or strongly suspected quantity of all contaminants? >10 hectare (ha) or 5000 m ³ 2 to 10 ha or 1000 to 5000 m ³ <2 ha or 1000 m ³ Do Not Know	<2 ha or 1000 m ³	The groundwater monitoring well with concentrations of COPC exceeding Canadian Council of Ministers of the Environment 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life and Health Canada 2008 Guidelines for Canadian Drinking Water Quality covered an area of approximately 50 m ² .	Measure or estimate the area or quantity of total contamination (i.e. all contaminants known or strongly suspected to be present on the site). The "Area of Contamination" is defined as the area or volume of contaminated media (soil, sediment, groundwater, surface water) exceeding appropriate environmental criteria.	A larger quantity of a potentially toxic substance can result in a larger frequency of exposure as well as a greater probability of migration, therefore, larger quantities of these substances earn a higher score.	
	"Known" - score				2
	"Potential" - score				--
5. Modifying Factors					
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment? Yes No Do Not Know	No	Chemicals do not persist.	Persistent chemicals, e.g., PCBs, chlorinated pesticides etc. either do not degrade or take longer to degrade, and therefore may be available to cause effects for a longer period of time. Canadian Environmental Protection Act (CEPA) classifies a chemical as persistent when it has at least one of the following characteristics: (a) in air, (i) its half-life is equal to or greater than 2 days, or (ii) it is subject to atmospheric transport from its source to a remote area; (b) in water, its half-life is equal to or greater than 182 days; (c) in sediments, its half-life is equal to or greater than 365 days; or (d) in soil, its half-life is equal to or greater than 182 days. This list does not include metals or metalloids, which in their elemental form do not degrade. However metals and metalloids form chemical species in the environment, many of which are not readily bioavailable.	Examples of Persistent Substances are provided in attached Reference Materials	
	0				
Are there contaminants present that could cause damage to utilities and infrastructure, either now or in the future, given their location? Yes No Do Not Know	No			Some contaminants may react or absorb into underground utilities and infrastructure. For example, organic solvents may degrade some plastics, and salts could cause corrosion of metal.	
	0				
How many different contaminant classes have representative CCME guideline exceedances? one two to four five or more Do Not Know	two to four	Cadmium, Selenium, and Zinc in groundwater.	For the purposes of the revised NCS ranking system, the following chemicals represent distinct chemical "classes": inorganic substances (including metals), volatile petroleum hydrocarbons, light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons, PAHs, phenolic substances, chlorinated hydrocarbons, halogenated methanes, phthalate esters, pesticides.	Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.	
	2				
	"Known" - Score	2			
	"Potential" - Score	--			

Contaminant Characteristic Total

Raw Total Scores- "Known"	16
Raw Total Scores- "Potential"	0
Raw Combined Total Scores	16
Total Score (Raw Combined / 40 * 33)	13.2

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
1. Groundwater Movement				
A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary.				
<p>i) For potable groundwater environments 1) groundwater concentrations exceed background concentrations and 1X the Guideline for Canadian Drinking Water Quality (GCDWQ) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater contamination. For non-potable environments (typically urban environments with municipal services), 1) groundwater concentrations exceed 1X the applicable non-potable guidelines or modified generic guidelines (which exclude ingestion of drinking water pathway) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater impacts.</p> <p>ii) Same as (i) except the information is not known but <u>strongly suspected</u> based on indirect observations.</p> <p>iii) Meets GCDWQ for potable environments meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for non-potable environments or Absence of groundwater exposure pathway (i.e., there is no aquifer (see definition at right) at the site or there is an adequate isolating layer between the aquifer and the contamination, and within 5 km of the site there are no aquatic receiving environments and the groundwater does not daylight).</p>	<p>12</p> <p>0</p> <p>0</p> <p>12</p> <p>Score 12</p>	<p>Selenium in groundwater was 1.6 times higher than Health Canada 2008 Guidelines for Canadian Drinking Water Quality, but source for potable water is unknown. Cadmium and Zinc concentrations exceeded guideline for protection of fresh water aquatic life (CCME, 2007). Hydraulic conductivity is in the order of 10⁻⁶ m/s at the site.</p>	<p>Review chemical data and evaluate groundwater quality.</p> <p>The evaluation method concentrates on 1) a potable or non-potable groundwater environment; 2) the groundwater flow system and its potential to be an exposure pathway to known or potential receptors</p> <p>An aquifer is defined as a geologic unit that yields groundwater in usable quantities and drinking water quality. The aquifer can currently be used as a potable water supply or could have the potential for use in the future. Non-potable groundwater environments are defined as areas that are serviced with a reliable alternative water supply (most commonly provided in urban areas). The evaluation of a non-potable environment will be based on a site specific basis.</p> <p>Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils.</p> <p>Seeps and springs are considered part of the groundwater pathway.</p> <p>In Arctic environments, the potability and evaluation of the seasonal active layer (above the permafrost) as a groundwater exposure pathway will be considered on a site-specific basis.</p>	<p>The 1992 NCS rationale evaluated the off-site migration as a regulatory issue. The exposure assessment and classification of hazards should be evaluated regardless of the property boundaries.</p> <p>Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a groundwater supply source in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links.</p> <p>Note that for potable groundwater that also daylights into a nearby surface water body, the more stringent guidelines for both drinking water and protection of aquatic life should be considered.</p> <p>Selected References</p> <p>Potable Environments.</p> <p>Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/awt-spm/ouba/water-eau/dqs-sqp-spm/svm/guide-res/recom/index_e.html</p> <p>Non-Potable Environments.</p> <p>Canadian Water Quality Guidelines for Protection of Aquatic Life. CCME, 1999 www.ccme.ca</p> <p>Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.</p>
NOTE: If a score is assigned here for Known COPC Exceedances, then you can skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)				
B. Potential for groundwater pathway.				
<p>a. Relative Mobility</p> <p>High</p> <p>Moderate</p> <p>Low</p> <p>Insignificant</p> <p>Do Not Know</p>	<p>2</p> <p>Score 2</p>	<p>Organics</p> <p>Koc (L/kg)</p> <p>Koc < 500 (i.e., log Koc < 2.7)</p> <p>Koc = 500 to 5000 (i.e., log Koc = 2.7 to 3.7)</p> <p>Koc = 5,000 to 100,000 (i.e., log Koc = 3.7 to 5)</p> <p>Koc > 100,000 (i.e., log Koc > 5)</p> <p>Metals with higher mobility at acidic conditions</p> <p>pH < 5</p> <p>pH = 5 to 6</p> <p>pH > 6</p> <p>Metals with higher mobility at alkaline conditions</p> <p>pH > 8.5</p> <p>pH = 7.5 to 8.5</p> <p>pH < 7.5</p>	<p>Reference: US EPA Soil Screening Guidance (Part 5 - Table 39)</p> <p>If a score of zero is assigned for relative mobility, it is still recommended that the following sections on potential for groundwater pathway be evaluated and scored. Although the Koc of an individual contaminant may suggest that it will be relatively immobile, it is possible that, with complex mixtures, there could be enhanced mobility due to co-solvent effects. Therefore, the Koc cannot be relied on solely as a measure of mobility. An evaluation of other factors such as containment, thickness of confining layer, hydraulic conductivities and precipitation infiltration rate are still useful in predicting potential for groundwater migration, even if a contaminant is expected to have insignificant mobility based on its chemistry alone.</p>	
<p>b. Presence of engineered sub-surface containment?</p> <p>No containment</p> <p>Partial containment</p> <p>Full containment</p> <p>Do Not Know</p>	<p>1.5</p> <p>Score 1.5</p>	<p>Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved.</p> <p>Full containment is defined as an engineered system or natural attenuation processes, monitored as being effective, which provide for full capture and/or treatment of contaminants. All chemicals of concern must be contained for Full Containment scoring. Natural attenuation must have sufficient data, and reports cited with monitoring data to support steady state conditions and the attenuation processes. If there is no containment or insufficient natural attenuation process, this category is evaluated as high. If there is less than full containment or if uncertain, then evaluate as medium. In Arctic environments, permafrost will be evaluated, as appropriate, based on detailed evaluations, effectiveness and reliability to contain/control contaminant migration.</p>	<p>Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links.</p> <p>Selected Resources:</p> <p>United States Environmental Protection Agency (USEPA) 1998, Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.</p> <p>Environment Canada— Ontario Region— Natural Attenuation Technical Assistance Bulletin (TABS) Number 19-21.</p>	
<p>c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway</p> <p>3 m or less including no confining layer or discontinuous confining layer</p> <p>3 to 10 m</p> <p>> 10 m</p> <p>Do Not Know</p>	<p>0.5</p> <p>Score 0.5</p>	<p>The term "confining layer" refers to geologic material with little or no permeability or hydraulic conductivity (such as unfractured clay); water does not pass through this layer or the rate of movement is extremely slow.</p> <p>Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway.</p> <p>The evaluation of this category is based on:</p> <p>1) The presence and thickness of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as drinking water sources or</p> <p>2) The presence and thickness of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated zone (e.g., water table aquifer, first hydrostratigraphic unit or other groundwater pathway).</p>		
<p>d. Hydraulic conductivity of confining layer</p> <p>>10⁻⁸ cm/s or no confining layer</p> <p>10⁻⁸ to 10⁻⁹ cm/s</p> <p><10⁻⁹ cm/s</p> <p>Do Not Know</p>	<p>0.5</p> <p>Score 0.5</p>	<p>Determine the nature of geologic materials and estimate hydraulic conductivity from published material (or use "Range of Values of Hydraulic Conductivity and Permeability" figure in the Reference Material sheet). Unfractured clays should be scored low. Silts should be scored medium. Sand, gravel should be scored high. The evaluation of this category is based on:</p> <p>1) The presence and hydraulic conductivity (K) of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as a drinking water source, groundwater exposure pathway or</p> <p>2) The presence and permeability (K) of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated water table aquifer, first hydrostratigraphic unit or other groundwater pathway.</p>		

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for groundwater pathway.				
e. Precipitation infiltration rate (Annual precipitation factor x surface soil relative permeability factor) High Moderate Low Vary Low None Do Not Know	Score	0.4	Precipitation Refer to Environment Canada precipitation records for relevant areas. Divide annual precipitation by 1000 and round to nearest tenth (e.g., 687 mm = 0.7 score). Permeability For surface soil relative permeability (i.e., infiltration) assume: gravel (1), sand (0.6), loam (0.3) and pavement or clay (0). Multiply the surface soil relative permeability factor with precipitation factor to obtain the score for precipitation infiltration rate.	
f. Hydraulic conductivity of aquifer $>10^{-3}$ cm/s 10^{-3} to 10^{-4} cm/s $<10^{-4}$ cm/s Do Not Know	Score	1	Determine the nature of geologic materials and estimate hydraulic conductivity of all aquifers of concern from published material (refer to "Range of Values of Hydraulic Conductivity and Permeability" in the Reference Material sheet).	
Potential groundwater pathway total	5.9			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Groundwater pathway total	12			
2. Surface Water Movement				
A. Demonstrated migration of COPC in surface water above background conditions				
Known concentrations of surface water: i) Concentrations exceed background concentrations and exceed CCME CWQG for protection of aquatic life, irrigation, livestock water, and/or recreation (whichever uses are applicable at the site) by >1 X; or There is known contact of contaminants with surface water based on site observations. or In the absence of CWQG, chemicals have been proven to be toxic based on site specific testing (e.g. toxicity testing; or other indicator testing of exposure). ii) Same as (i) except the information is not known but is <u>strongly suspected</u> based on indirect observations. iii) Meets CWQG or absence of surface water exposure pathway (i.e., Distance to nearest surface water is > 5 km.)	Score	12	Groundwater concentrations of Cadmium, Selenium, and Zinc were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life. The site is on a bluff above the Peace River.	Collect all available information on quality of surface water near to site. Evaluate available data against Canadian Water Quality Guidelines (select appropriate guidelines based on local water use, e.g., recreation, irrigation, aquatic life, livestock watering, etc.). The evaluation method concentrates on the surface water flow system and its potential to be an exposure pathway. Contamination is present on the surface (above ground) and has the potential to impact surface water bodies. Surface water is defined as a water body that supports one of the following uses: recreation, irrigation, livestock watering, aquatic life. General Notes: Someone experienced must provide a thorough description of the sources researched to classify the surface water body in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as Internet links. Selected References: CCME. 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME. 1999. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water) www.ccme.ca Health and Welfare Canada. 1992. Guidelines for Canadian Recreational Water Quality.
NOTE: If a score is assigned here for Demonstrated Migration in Surface Water, then you can skip Part B (Potential for migration of COPCs in surface water) and go to Section 3 (Surface Soils)				
B. Potential for migration of COPCs in surface water				
a. Presence of containment No containment Partial containment Full containment Do Not Know	Score	3	Review the existing engineered systems and relate these structures to site conditions and proximity to surface water and determine if full containment is achieved; score low if there is full containment such as capping, berms, dikes; score medium if there is partial containment such as natural barriers, trees, ditches, sedimentation ponds; score high if there are no intervening barriers between the site and nearby surface water. Full containment must include containment of all chemicals.	
b. Distance to Surface Water 0 to <100 m 100 - 300 m >300 m Do Not Know	Score	2	Review available mapping and survey data to determine distance to nearest surface water bodies.	

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<p>c. Topography</p> <p>Contaminants above ground level and slope is steep Contaminants at or below ground level and slope is steep Contaminants above ground level and slope is intermediate Contaminants at or below ground level and slope is Contaminants above ground level and slope is flat Contaminants at or below ground level and slope is flat Do Not Know</p>	<p>Score</p> <p>1</p>		<p>Review engineering documents on the topography of the site and the slope of surrounding terrain.</p> <p>Steep slope = >50% Intermediate slope = between 5 and 50% Flat slope = < 5% Note: Type of fill placement (e.g., trench, above ground, etc.).</p>	
<p>d. Run-off potential</p> <p>High (rainfall run-off score > 0.8) Moderate (0.4 < rainfall run-off score < 0.8) Low (0.2 < rainfall run-off score < 0.4) Very Low (0 < rainfall run-off score < 0.2) None (rainfall run-off score = 0) Do Not Know</p>	<p>Score</p> <p>0.4</p>		<p>Rainfall Refer to Environment Canada precipitation records for relevant areas. Divide rainfall by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score). The former definition of annual rainfall did not include the precipitation as snow. This minor adjustment has been made. The second modification was the inclusion of permeability of surface materials as an evaluation factor.</p> <p>Permeability For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1). Multiply the infiltration factor with precipitation factor to obtain rainfall run off score.</p>	<p>Selected Sources: Environment Canada web page link www.msc.ec.gc.ca Snow to rainfall conversion apply ratio of 15 (snow):1(water)</p>
<p>e. Flood potential</p> <p>1 in 2 years 1 in 10 years 1 in 50 years Do Not Know</p>	<p>Score</p> <p>0.5</p>		<p>Review published data such as flood plain mapping or flood potential (e.g., spring or mountain run off) and Conservation Authority records to evaluate flood potential of nearby water courses both up and down gradient. Rate zero if site not in flood plain.</p>	
Potential surface water pathway total	6.9			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Surface water pathway total	8			
3. Surface Soils (potential for dust, dermal and ingestion exposure)				
A. Demonstrated concentrations of COPC in surface soils (top 1.5 m)				
<p>COPCs measured in surface soils exceed the CCME soil quality guideline.</p> <p>Strongly suspected that soils exceed guidelines</p> <p>COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock).</p>	<p>12</p> <p>9</p> <p>0</p> <p>0</p> <p>Score</p> <p>0</p>	<p>Soil concentrations met federal and provincial guidelines.</p>	<p>Collect all available information on quality of surface soils (i.e., top 1.5 metres) at the site. Evaluate available data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (i.e. agricultural, residential/parkland, commercial, or industrial), and soil texture if applicable (i.e., coarse or fine).</p>	<p>Selected References: CCME, 1999, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health www.ccme.ca</p>
<p>NOTE: If a score is assigned here for Demonstrated Concentrations In Surface Soils, then you can skip Part B (Potential for a surface soils migration pathway) and go to Section 4 (Vapour)</p>				
B. Potential for a surface soils (top 1.5 m) migration pathway				
<p>a. Are the soils in question covered?</p> <p>Exposed Vegetated Landscaped Paved Do Not Know</p>	<p>Score</p> <p>4</p>		<p>Consult engineering or risk assessment reports for the site. Alternatively, review photographs and perform a site visit. Landscaped surface soils must include a minimum of 0.5 m of topsoil.</p>	<p>The possibility of contaminants in blowing snow have not been included in the revised NCS as it is difficult to assess what constitutes an unacceptable concentration and secondly, spills to snow or ice are most efficiently mitigated while freezing conditions remain.</p>
<p>b. For what proportion of the year does the site remain covered by snow?</p> <p>0 to 10% of the year 10 to 30% of the year More than 30% of the year Do Not Know</p>	<p>Score</p> <p>3</p>		<p>Consult climatic information for the site. The increments represent the full span from soils which are always wet or covered with snow (and therefore less likely to generate dust) to those soils which are predominantly dry and not covered by snow (and therefore are more likely to generate dust).</p>	
Potential surface soil pathway total	7			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Soil pathway total	0			

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
4. Vapour				
A. Demonstrated COPCs in vapour.				
Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations.	12	Concentrations of volatile COPCs in the soil and groundwater were below provincial and federal guidelines.	Consult previous investigations, including human health risk assessments, for reports of vapours detected.	
Strongly suspected (based on observations and/or modelling)	9			
Vapour has not been measured and volatile hydrocarbons have not been found in site soils or groundwater.	0			
Score	0			
NOTE: If a score is assigned here for Demonstrated COPCs in Vapour, then you can skip Part B (Potential for COPCs in vapour) and go to Section 5 (Sediment)				
B. Potential for COPCs in vapour				
a. Relative Volatility based on Henry's Law Constant, H[*] (dimensionless) High (H [*] > 1.0E-1) Moderate (H [*] = 1.0E-1 to 1.0E-3) Low (H [*] < 1.0E-3) Not Volatile Do Not Know			Reference: US EPA Soil Screening Guidance (Part 5 - Table 36) Provided in Attached Reference Materials	If the Henry's Law Constant for a substance indicates that it is not volatile, and a score of zero is assigned here for relative volatility, then the other three questions in this section on Potential for COPCs will be automatically assigned scores of zero and you can skip to section 5.
Score	2.5			
b. What is the soil grain size? Fine Coarse Do Not Know			Review soil permeability data in engineering reports. The greater the permeability of soils, the greater the possible movement of vapours. Fine-grained soils are defined as those which contain greater than 50% by mass particles less than 75 µm mean diameter (D50 < 75 µm). Coarse-grained soils are defined as those which contain greater than 50% by mass particles greater than 75 µm mean diameter (D50 > 75 µm).	
Score	3			
c. Is the depth to the source less than 10m? Yes No Do Not Know			Review groundwater depths below grade for the site.	
Score	2			
d. Are there any preferential pathways? Yes No Do Not Know			Visit the site during dry summer conditions and/or review available photographs. Where bedrock is present, fractures would likely act as preferential pathways.	Preferential pathways refer to areas where vapour migration is more likely to occur because there is lower resistance to flow than in the surrounding materials. For example, underground conduits such as sewer and utility lines, drains, or septic systems may serve as preferential pathways. Features of the building itself that may also be preferential pathways include earthen floors, expansion joints, wall cracks, or foundation perforations for subsurface features such as utility pipes, sumps, and drains.
Score	2			
Potential vapour pathway total	9.5			
Allowed Potential score	—	Note: if a "known" score is provided, the "potential" score is disallowed.		
Vapour pathway total	0			
5. Sediment Movement				
A. Demonstrated migration of sediments containing COPCs				
There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated.	12	No COPC in soil exceeded provincial or federal guidelines.	Review sediment assessment reports. Evidence of migration of contaminants in sediments must be reported by someone experienced in this area.	Usually not considered a significant concern in lakes/marine environments, but could be very important in rivers where transport downstream could be significant.
Strongly suspected (based on observations and/or modelling)	9			
Sediments have been contained and there is no indication that sediments will migrate in future. or Absence of sediment exposure pathway (i.e., within 5 km of the site there are no aquatic receiving environments, and therefore no sediments).	0			
Score	0			
NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you can skip Part B (Potential for Sediment Migration) and go to Section 6 (Modifying Factors)				

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for sediment migration				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")? Yes No Do Not Know	4	Review existing sediment assessments. If sediment capping has been completed, it may indicate that historically contaminated sediments have been covered over by newer "clean" sediments. This assessment will require that cores collected demonstrate a low concentration near the top and higher concentration with sediment depth.	Review existing sediment assessments. If the sediments present at the site are in a river, select "no" for this question.	
b. For lakes and marine habitats, are the contaminated sediments in shallow water and therefore likely to be affected by tidal action, wave action or propeller wash? Yes No Do Not Know	4			
c. For rivers, are the contaminated sediments in an area prone to sediment scouring? Yes No Do Not Know	4			
Potential sediment pathway total	12	Note: If a "known" score is provided, the "potential" score is disallowed.		
Allowed Potential score	—			
Sediment pathway total	0			
6. Modifying Factors				
Are there subsurface utility conduits in the area affected by contamination? Yes No Do Not Know	No	No COPC in soil exceeded provincial or federal guidelines.	Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
Known	0			
Potential	0			

Migration Potential Total	
Raw "known" total	20
Raw "potential" total	0.0
Raw combined total	20.0
Total (max 33)	10.3

Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore, the total "Potential" Score may not reflect the sum of the individual "Potential" scores.

CCME National Classification System (2008)

(II) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Human				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to humans as a result of the contaminated site. (Class 1 Site)	22	The groundwater concentration of Selenium was 1.6 times higher than the Health Canada 2008 Guidelines for Canadian Drinking Water Quality, and the monitoring well is located within the community. However, source of potable water not known.	*Where adverse effects on humans are documented, the site should be automatically designated Class 1 site (i.e., action required). There is no need to proceed through the NCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired (e.g. for comparison with other Class 1 sites). This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1 for noncarcinogenic chemicals and incremental cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this typically either >10 ⁻⁶ or >10 ⁻⁵). Known impacts can also be evaluated based on blood testing (e.g. blood lead >10 µg/dL) or other health based testing. This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 0.2 for non-carcinogenic chemicals and incremental lifetime cancer risks for carcinogenic chemicals that are within acceptable levels as defined by the jurisdiction (for most jurisdictions this is less than either 10 ⁻⁶ or 10 ⁻⁵).	Known adverse impact includes domestic and traditional food sources. Adverse effects based on food chain transfer to humans and/or animals can be scored in this category. However, the weight of evidence must show a direct link of a contaminated food source/supply and subsequent ingestion/transfer to humans. Any associated adverse effects to the environment are scored separately later in this worksheet. Someone experienced must provide a thorough description of the sources researched to evaluate and determine the quantified exposure/impact (adverse effect) in the vicinity of the contaminated site. Selected References: Health Canada - Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Health Screening Level Risk Assessments (http://www.hc-sc.gc.ca/ehp/contaminated_sites/index_a.php) United States Environmental Protection Agency, Integrated Risk Information System (http://www.epa.gov/iris/)
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	10			
No quantified or suspected exposures/impacts in humans.	0			
Score	10			
NOTE: If a score is assigned here for Known Exposure, then you can skip Part B. (Potential for Human Exposure) and go to Section 2 (Human Exposure Modifying Factors)				
B. Potential for human exposure				
a) Land use (provides an indication of potential human exposure scenarios) Agricultural Residential / Parkland Commercial Industrial Do Not Know	Score		Review zoning and land use maps over the distances indicated. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place. Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (Industrial).	This is the main "receptor" factor used in site scoring. A higher score implies a greater exposure and/or exposure of more sensitive human receptors (e.g., children).
b. Indicate the level of accessibility to the contaminated portion of the site (e.g., the potential for coming in contact with contamination) Limited barriers to prevent site access; contamination not covered Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered. Controlled access or remote location and contaminants are covered Do Not Know	Score		Review location and structures and contaminants at the site and determine if there are intervening barriers between the site and humans. A low rating should be assigned to a (covered) site surrounded by a fence or in a remote location, whereas a high score should be assigned to a site that has no cover, fence, natural barriers or buffer.	
B. Potential for human exposure				
c) Potential for intake of contaminated soil, water, sediment or food for operable or potentially operable pathways, as identified in Worksheet II (Migration Potential). i) direct contact Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated? Yes No Do Not Know	Score		If soils or potable groundwater are present exceeding their respective CCME guidelines, dermal contact is assumed. Exposure to surface water, non-potable groundwater or sediments exceeding their respective CCME guidelines will depend on the site. Select "Yes" if dermal exposure to surface water, non-potable groundwater or sediments is expected. For instance, dermal contact with sediments would not be expected in an active port. Only soils in the top 1.5 m are defined by CCME (2003) as surface soils. If contaminated soils are only located deeper than 1.5 m, direct contact with soils is not anticipated to be an operable contaminant exposure pathway.	Exposure via the skin is generally believed to be a minor exposure route. However for some organic contaminants, skin exposure can play a very important component of overall exposure. Dermal exposure can occur while swimming in contaminated waters, bathing with contaminated surface water/groundwater and digging in contaminated dirt, etc.
ii) Inhalation (i.e., inhalation of dust, vapour) Vapour - Are there inhabitable buildings on the site within 30 m of soils or groundwater with volatile contamination as determined in Worksheet II (Migration Potential)? Yes No Do Not Know	Score		If inhabitable buildings are on the site within 30 m of soils or groundwater exceeding their respective guidelines for volatile chemicals, there is a potential of risk to human health (Health Canada, 2004). Review site investigations for location of soil samples (having exceedances of volatile substances) near buildings. Refer to (II) Migration Potential worksheet, 4B) Potential for COPCs in Vapour for a definition of volatility.	Exposure via the lungs (inhalation) can be a very important exposure pathway. Inhalation can be via both particulates (dust) and gas (vapours). Vapours can be a problem where buildings have been built on former industrial sites or where volatile contaminants have migrated below buildings resulting in the potential for vapour intrusion.
Dust - If there is contaminated surface soil (e.g. top 1.5 m), indicate whether the soil is fine or coarse textured. If it is known that surface soil is not contaminated, enter a score of zero. Fine Coarse Surface soil is not contaminated or absent Do Not Know Texture	Score		Consult grain size data for the site. If soils (containing exceedances of the CCME soil quality guidelines) predominantly consist of fine material (having a median grain size of 75 microns; as defined by CCME (2006)) then these soils are more likely to generate dusts.	Assesses the potential for humans to be exposed to vapours originating from site soils. The closer the receptor is to a source of volatile chemicals in soil, the greater the potential of exposure. Also, coarser-grained soil will convey vapour much more efficiently in the soil than finer grained material such as clays and silts.
General Notes: Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a vapour migration and/or dust generation in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. Selected References: Canadian Council of Ministers of the Environment (CCME), 2006, Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines, PN 133, www.ccme.ca Golder, 2004, Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC				
Inhalation total				
Score				
0				
3				

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site	Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for human exposure					
	<p>ii) Ingestion (i.e., ingestion of food items, water and soils (for children)), including traditional foods.</p> <p>Drinking Water: Choose a score based on the proximity to a drinking water supply, to indicate the potential for contamination (present or future).</p> <p>0 to 100 m 100 to 300 m 300 m to 1 km 1 to 5 km No drinking water present Do Not Know</p> <p>Score</p> <p>Is an alternative water supply readily available?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Is human ingestion of contaminated soils possible?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Ingestion total</p>	<p>2</p> <p>1</p> <p>3</p> <p>1</p> <p>7</p>	<p>Note if a "Known" Human Health score is provided, the "Potential" score is disallowed.</p>	<p>Review available site data to determine if drinking water (groundwater, surface water, private, commercial or municipal supply) is known or suspected to be contaminated above Guidelines for Canadian Drinking Water Quality. If drinking water supply is known to be contaminated, some immediate action (e.g., provision of alternate drinking water supply) should be initiated to reduce or eliminate exposure.</p> <p>The evaluation of significant potential for exceedances of the water supply in the future may be based on the capture zones of the drinking water wells; contaminant travel times; computer modelling of flow and contaminant transport.</p> <p>If contaminated soils are located within the top 1.5 m, it is assumed that ingestion of soils is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely, and the duration is shorter. Refer to human health risk assessment reports for the site in question.</p> <p>Use human health risk assessment reports (or others) to determine if there is significant reliance on traditional food sources associated with the site. Is the food item in question going to spend a large proportion of its time at the site (e.g., large mammals may spend a very small amount of time at a small contaminated site)? Human health risk assessment reports for the site in question will also provide information on potential bioaccumulation of the COPC in question.</p>	<p>Selected References: Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/hcc-sc/scsc/water/publications/drinking_water_quality_guidelines/0cc.html</p> <p>Drinking water can be an extremely important exposure pathway to humans. If site groundwater or surface water is not used for drinking, then this pathway is considered to be inoperable.</p> <p>Consider both wild foods such as salmon, venison, caribou, as well as agricultural sources of food items if the contaminated site is on or adjacent to agricultural land uses.</p>
	<p>Human Health Total "Potential" Score</p> <p>Allowed "Potential" Score</p>	<p>15.5</p> <p>---</p>			
2. Human Exposure Modifying Factors					
	<p>a) Strong reliance of local people on natural resources for survival (i.e., food, water, shelter, etc.)</p> <p>Yes No Do Not Know</p> <p>Known Potential</p> <p>Raw Human "Known" total</p> <p>Raw Human "potential" total</p> <p>Raw Human Exposure Total Score</p> <p>Human Health Total (max 22)</p>	<p>Yes</p> <p>0</p> <p>---</p> <p>18</p> <p>0</p> <p>18</p> <p>10.0</p>	<p>Potable water supply is local; Strong reliance of community on local foods which include fish from Peace River.</p>		
3. Ecological					
A. Known exposure					
	<p>Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to terrestrial or aquatic organisms as a result of the contaminated site.</p> <p>Score</p> <p>Same as above, but "Strongly Suspected" based on observations or indirect evidence.</p> <p>Score</p> <p>No quantified or suspected exposures/impacts in terrestrial or aquatic organisms</p> <p>Score</p>	<p>18</p> <p>12</p> <p>0</p> <p>12</p> <p>12</p>	<p>Groundwater concentrations of Cadmium, Selenium, and Zinc were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life and the site is on a bluff above the Peace River.</p>	<p>Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are deemed to be severe, the site may be categorized as class one (i.e., a priority for remediation or risk management), regardless of the numerical total NCS score. For the purpose of application of the NCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. If ecological effects are determined to be severe and an automatic Class 1 is assigned, there is no need to proceed through the NCS. However, a scoring guideline (18) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites).</p> <p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1. Alternatively, known impacts can also be evaluated based on a weight of evidence assessment involving a combination of site observations, tissue testing, toxicity testing and quantitative community assessments. Scoring of adverse effects on individual rare or endangered species will be completed on a case-by-case basis with full scientific justification.</p> <p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 1 and no other observable or measurable sign of impacts. Alternatively, it can be based on a combination of other lines of evidence showing no adverse effects such as site observations, tissue testing, toxicity testing and quantitative community assessments.</p>	<p>CCME, 1999: Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca</p> <p>CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses www.ccme.ca</p> <p>Sensitive receptors- review: Canadian Council on Ecological Areas www.ccea.ca</p> <p>Ecological effects should be evaluated at a population or community level, as opposed to at the level of individuals. For example, population-level effects could include reduced reproduction, growth or survival in a species. Community-level effects could include reduced species diversity or relative abundances. Further discussion of ecological assessment endpoints is provided in A Framework for Ecological Risk Assessment: General Guidance (CCME 1996).</p> <p>Notes: Someone experienced must provide a thorough description of the sources researched to classify the environmental receptors in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.</p>
<p>NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)</p>					

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for ecological exposure (for the contaminated portion of the site)				
a) Terrestrial				
i) Land use				
Agricultural (or Wild lands)			Review zoning and land use maps. If the proposed future land use is more intensive than the current land use, evaluate this factor assuming the proposed future use is in place (indicate in the worksheet that future land use is the consideration). Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Wild lands are grouped with agricultural land due to the similarities in receptors that would be expected to occur there (e.g., herbivorous mammals and birds) and the similar need for a high level of protection to ensure ecological functioning. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	
Residential/Parkland				
Commercial				
Industrial				
Do Not Know				
Score	1.5			
ii) Uptake potential				
Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site?				
Yes			If contaminated soils are located within the top 1.5 m, it is assumed that direct contact of soils with plants and soil invertebrates is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely.	
No				
Do Not Know				
Score	1			
iii) Ingestion (i.e., wildlife or domestic animals ingesting contaminated food items, soils or water)				
Are terrestrial animals likely to be ingesting contaminated water at the site?				
Yes			Refer to an Ecological Risk Assessment for the site. If there is contaminated surface water at the site, assume that terrestrial organisms will ingest it.	
No				
Do Not Know				
Score	1			
Are terrestrial animals likely to be ingesting contaminated soils at the site?				
Yes			Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.	
No				
Do Not Know				
Score	1			
Can the contamination identified bioaccumulate?				
Yes			Bioaccumulation of contaminants within food items is considered possible if: 1) The Log(Kow) of the contaminant is greater than 4 (as per the chemical characteristics worksheet) and concentrations in soils exceed the most conservative CCME soil quality guideline for the intended land use, or 2) The contaminant in collected tissue samples exceeds the Canadian Tissue Residue Guidelines. It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor located within this area of the site will be subject to further evaluations. It is also considered that any environmental receptor located greater than 5 km will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance; arctic environments (on a site specific basis); nature preserves, habitats for species at risk, sensitive forests, natural parks or forests.
No				
Do Not Know				
Score	1			
Distance to sensitive terrestrial ecological area				
0 to 300 m			It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor located within this area of the site will be subject to further evaluations. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	
300 m to 1 km				
1 to 5 km				
> 5 km				
Do Not Know				
Score	1.5			
Raw Terrestrial Total Potential		7		
Allowed Terrestrial Total Potential		—		Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.
B. Potential for ecological exposure (for the contaminated portion of the site)				
b) Aquatic				
i) Classification of aquatic environment				
Sensitive			"Sensitive aquatic environments" include those in or adjacent to shellfish or fish harvesting areas, marine parks, ecological reserves and fish migration paths. Also includes those areas deemed to have ecological significance such as for fish food resources, spawning areas or having rare or endangered species. "Typical aquatic environments" include those in areas other than those listed above.	
Typical				
Not Applicable (no aquatic environment present)				
Do Not Know				
Score	2			
ii) Uptake potential				
Does groundwater dayflying to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact?				
Yes			Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways: 1) by comparing collected nearshore groundwater concentrations to the CCME water quality guidelines (this will be a conservative comparison, as contaminant concentrations in groundwater often decrease between nearshore wells and the point of discharge); 2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge; 3) by installing water samplers, "peepers", in the sediments in the area of dayflying groundwater	
No (or Not Applicable)				
Do Not Know				
Score	1			
Distance from the contaminated site to an important surface water resource				
0 to 300 m			It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor or important water resource located within this area of the site will be subject to further evaluation. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and lens and other aquatic environments.
300 m to 1 km				
1 to 5 km				
> 5 km				
Do Not Know				
Score	1.5			
Bioaccumulation of food items is possible if:				

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site		Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
		Are aquatic species (i.e., forage fish, invertebrates or plants) that are consumed by predatory fish or wildlife consumers, such as mammals and birds, likely to accumulate contaminants in their tissues? Yes No Do Not Know	1		1) The Log(K _{ow}) of the contaminant is greater than 4 (as per the chemical characteristics work sheet and concentrations in sediments exceed the CCME ISQGS. 2) The contaminant in collected tissue samples exceeds the CCME tissue quality guidelines.	
		Raw Aquatic Total Potential	5.5	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
		Allowed Aquatic Total Potential	—			
4. Ecological Exposure Modifying Factors						
a) Known occurrence of a species at risk.		Is there a potential for a species at risk to be present at the site? Yes No Do Not Know	Do Not Know	Not known if a species at risk is present at the site.	Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as Eco Explorer, Regional, Provincial (Environment Ministries), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance.	Species at risk include those that are extirpated, endangered, threatened, or of special concern. For a list of species at risk, consult Schedule 1 of the federal Species at Risk Act (http://www.sar.gov.ca/sar/sar/schedule1_e.shtml). Many provincial governments may also provide regional applicable lists of species at risk. For example, in British Columbia, consult: BCHWLP, 2005. Endangered Species and Ecosystems in British Columbia. Provincial red and blue lists. Ministry of Sustainable Resource Management and Water, Land and Air Protection (http://srmmwww.gov.bc.ca/brick/red-blue.htm)
		Score	1			
b) Potential impact of aesthetics (e.g., enrichment of a lake or tainting of food flavor).		Is there evidence of aesthetic impact to receiving water bodies? Yes No Do Not Know	1	Peace River has high flow. Do not know if the aesthetics will be impacted.	Documentation may consist of environmental investigation reports, press articles, petitions or other records. Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat. A distinct increase of plant growth in an aquatic environment may suggest enrichment. Nutrients (e.g., nitrogen or phosphorous) releases to an aquatic body can act as a fertilizer. Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.	This item will require some level of documentation by user, including contact names, addresses, phone numbers, e-mail addresses. Evidence of changes must be documented, please attach copy of report containing relevant information.
		Is there evidence of olfactory impact (i.e., unpleasant smell)? Yes No Do Not Know	0			
		Is there evidence of increase in plant growth in the lake or water body? Yes No Do Not Know	0			
		Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different? Yes No Do Not Know	1			
		Ecological Modifying Factors Total - Known	0			
		Ecological Modifying Factors Total - Potential	3			
		Raw Ecological Total - Known	12			
		Raw Ecological Total - Potential	3			
		Raw Ecological Total	15			
		Ecological Total (Max 18)	15.0			
5. Other Potential Contaminant Receptors						
a) Exposure of permafrost (leading to erosion and structural concerns)		Are there improvements (roads, buildings) at the site dependent upon the permafrost for structural integrity? Yes No Do Not Know	No	Do not know.	Consult engineering reports, site plans or air photos of the site. When permafrost melts, the stability of the soil decreases, leading to erosion. Human structures, such as roads and/or buildings are often dependent on the stability that the permafrost provides. Melting permafrost leads to a decreased stability of underlying soils. Wind or surface run-off erosion can carry soils into nearby aquatic habitats. The increased soil loadings into a river can cause an increase in total dissolved solids and a resulting decrease in aquatic habitat quality. In addition, the erosion can bring contaminants from soils to aquatic environments.	Plants and lichens provide a natural insulating layer which will help prevent thawing of the permafrost during the summer. Plants and lichens may also absorb less solar radiation. Solar radiation is turned into heat which can also cause underlying permafrost to melt.
		Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment? Yes No Do Not Know	Do Not Know			
		Other Potential Receptors Total - Known	0			
		Other Potential Receptors Total - Potential	1			
		Exposure Total				
		Raw Human Health + Ecological Total - Known	28	Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.		
		Raw Human Health + Ecological Total - Potential	4			
		Raw Total	32			
		Exposure Total (max 34)	23.7			

**CCME National Classification System (2008)
Score Summary**

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCS completely.

I. Contaminant Characteristics	Known	Potential
1. Residency Media	2	---
2. Chemical Hazard	8	---
3. Contaminant Exceedance Factor	2	---
4. Contaminant Quantity	2	---
5. Modifying Factors	2	---
Raw Total Score	16	0
Raw Total Score (Known + Potential)	16	
Adjusted Total Score (Raw Total / 40 * 33)	13.2	(max 33)

II. Migration Potential	Known	Potential
1. Groundwater Movement	12	---
2. Surface Water Movement	8	---
3. Soil	0	---
4. Vapour	0	---
5. Sediment Movement	0	---
6. Modifying Factors	0	0
Raw Total Score	20	0
Raw Total Score (Known + Potential)	20	
Adjusted Total Score (Raw Total / 64 * 33)	10.3	(max 33)

III. Exposure	Known	Potential
1. Human Receptors		
A. Known Impact	10	
B. Potential		
a. Land Use		---
b. Accessibility		---
c. Exposure Route		
i. Direct Contact		---
ii. Inhalation		---
iii. Ingestion		---
2. Human Receptors Modifying Factors	6	---
Raw Total Human Score	16	0
Raw Total Human Score (Known + Potential)	16	
Adjusted Total Human Score	16.0	(maximum 22)
3. Ecological Receptors		
A. Known Impact	12	
B. Potential		
a. Terrestrial		---
b. Aquatic		---
4. Ecological Receptors Modifying Factors	0	3
Raw Total Ecological Score	12	3
Raw Total Ecological Score (Known + Potential)	15	
Adjusted Total Ecological Score	15.0	(maximum 18)
5. Other Receptors	0	1
Total Other Receptors Score (Known + Potential)	1	
Total Exposure Score (Human + Ecological + Other)	32.0	
Adjusted Total Exposure Score (Total Exposure / 46 * 34)	23.7	(max 34)

Site Score	
Test Site	
Site Letter Grade	A
Certainty Percentage	100%
% Responses that are "Do Not Know"	-59%
Total NCSCS Score for site	47.2
Site Classification Category	3

Site Classification Categories*:

- Class 1 - High Priority for Action (Total NCS Score >70)
- Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
- Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
- Class N - Not a Priority for Action (Total NCS Score <37)
- Class INS - Insufficient Information (>15% of responses are "Do Not Know")

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

**CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions**

Subject Site:	Test Site	
Civic Address: <i>(or other description of location)</i>	On the north shore of the Peace River, approximately 220 km east of High Level, Alberta, in Wood Buffalo National Park	
Site Common Name : <i>(if applicable)</i>	Community of Garden River	
Site Owner or Custodian: <i>(Organization and Contact Person)</i>	Parks Canada Agency	
Legal description or metes and bounds:	N 58°42.5', W113°52.0'	
Approximate Site area:		
PID(s) : <i>(or Parcel Identification Numbers [PIN] if untitled Crown land)</i>	Fifth Meridian Market AST (FCSI #00022201)	
Centre of site: <i>(provide latitude/longitude or UTM coordinates)</i>	Latitude:	_____ degrees _____ min _____ secs
	Longitude:	_____ degrees _____ min _____ secs
	UTM Coordinate:	Northing 6511163.683 Easting 680598.0815
Site Land Use:	Current:	Residential
	Proposed:	
Site Plan	To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.	
Provide a brief description of the Site:	<p style="text-align: center;">The Fifth Meridian Market AST is located within the community of Garden River (see attached Site Plan).</p>	

CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions

Affected media and Contaminants of Potential Concern (COPC):	The groundwater concentrations of Cadmium, Selenium, and Zinc in one monitoring well exceeded Canadian Council of Ministers of the Environment 2007 Canadian Water Quality Guidelines for the protection of aquatic life.
--	---

Please fill in the "letter" that best describes the level of information available for the site being assessed:

Site Letter Grade

If letter grade is F, do not continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent.

Scoring Completed By:	Cathy Hamlen, Ph.D. A.Ag.
Date Scoring Completed:	6-Feb-09

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
1. Residency Media (replaces physical state)				
Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines? yes = has an exceedance or strongly suspected to have an exceedance no = does not have an exceedance or strongly suspected not to have an exceedance		Six soil samples and one groundwater monitoring well were assessed. Refer to <i>Contaminated Site Assessment, Initial and Detailed Testing Programs, Wood Buffalo National Park, Various Locations in the Community of Garden River, Alberta</i> (EBA Consulting Engineers Ltd., 2009).	The overall score is calculated by adding the individual scores from each residency media (having one or more exceedance of the most conservative media specific and land-use appropriate CCME guideline). Summary tables of the Canadian Environmental Quality Guidelines for soil, water (aquatic life, non-potable groundwater environments, and agricultural water uses) and sediment are available on the CCME website at http://www.ccme.ca/publications/ceqg_rceq.html?category_id=124 . For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appu/sum_guides_recom/index_e.html .	An increasing number of residency media containing chemical exceedances often equates to a greater potential risk due to an increase in the number of potential exposure pathways.
A. Soil	No			
Yes No Do Not Know	0			
B. Groundwater	Yes			
Yes No Do Not Know	2			
C. Surface water	No			
Yes No Do Not Know	0			
D. Sediment	No			
Yes No Do Not Know	0			
"Known" - score "Potential" - score	2 --			
2. Chemical Hazard				
What is the relative degree of chemical hazard of the contaminant in the list of hazard rankings proposed by the Federal Contaminated Sites Action Plan (FCSAP)? High Medium Low Do Not Know	High	Cadmium (groundwater) is High, and Selenium (groundwater) is Medium.	The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site. The degree of hazard has been defined by the Federal Contaminated Sites Action Plan (FCSAP) and a list of substances with their associated hazard (Low, Medium and High) has been provided as a separate sheet in this file. <i>See Attached Reference Material for Contaminant Hazard Rankings.</i>	Hazard as defined in the revised NCS pertains to the physical properties of a chemical which can cause harm. Properties can include toxic potency, propensity to biomagnify, persistence in the environment, etc. Although there is some overlap between hazard and contaminant exceedance factor below, it will not be possible to derive contaminant exceedance factors for many substances which have a designated chemical hazard designation, but don't have a CCME guideline. The purpose of this category is to avoid missing a measure of toxic potential.
"Known" - score "Potential" - score	8 --			
3. Contaminant Exceedance Factor				
What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")? Mobile NAPL High (>100x) Medium (10x to 100x) Low (1x to 10x) Do Not Know	Low (1x to 10x)	The groundwater Cadmium concentration was 1.03 times higher than the CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life. The groundwater Selenium concentration was 2.87 times higher than the Health Canada 2008 Guideline for Canadian Drinking Water Quality.	Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the <i>most conservative media-specific and land-use appropriate CCME environmental quality guidelines</i> . Ranking should be based on contaminant with greatest exceedance of CCME guidelines. Ranking of contaminant hazard as high, medium and low is as follows: High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines Mobile NAPL = Contaminant is a non-aqueous phase liquid (i.e., due to its low solubility, it does not dissolve in water, but remains as a separate liquid) and is present at a sufficiently high saturation (i.e., greater than residual NAPL saturation) such that there is significant potential for mobility either downwards or laterally. Other standards may include local background concentration or published toxicity benchmarks. Results of toxicity testing with site samples can be used as an alternative. This approach is only relevant for contaminants that do not biomagnify in the food web, since toxicity tests would not indicate potential effects at higher trophic levels. High = lethality observed. Medium = no lethality, but sub lethal effects observed. Low = neither lethal nor sub lethal effects observed.	In the event that elevated levels of a material with no associated CCME guidelines are present, check provincial and USEPA environmental criteria. Hazard Quotients (sometimes referred to as a screening quotient in risk assessments) refer to the ratio of measured concentration to the concentration believed to be the threshold for toxicity. A similar calculation is used here to determine the contaminant exceedance factor (CEF). Concentrations greater than one times the applicable CCME guideline (i.e., CEF=>1) indicate that risks are possible. Mobile NAPL has the highest associated score (8) because of its highly concentrated nature and potential for increase in the size of the impacted zone.
"Known" - score "Potential" - score	2 --			

CCME National Classification System (2008)

(I) Contaminant Characteristics

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes	
4. Contaminant Quantity (known or strongly suspected)					
What is the known or strongly suspected quantity of all contaminants? >10 hectare (ha) or 5000 m ³ 2 to 10 ha or 1000 to 5000 m ³ <2 ha or 1000 m ³ Do Not Know	<2 ha or 1000 m ³	The groundwater monitoring wells with COPCs exceeding Health Canada 2008 Guidelines for Canadian Drinking Water Quality and CCME 2007 Canadian Water Quality Guidelines for the protection of aquatic life represented an area of approximately 500 m ² .	Measure or estimate the area or quantity of total contamination (i.e. all contaminants known or strongly suspected to be present on the site). The "Area of Contamination" is defined as the area or volume of contaminated media (soil, sediment, groundwater, surface water) exceeding appropriate environmental criteria.	A larger quantity of a potentially toxic substance can result in a larger frequency of exposure as well as a greater probability of migration, therefore, larger quantities of these substances earn a higher score.	
	"Known" - score				2
	"Potential" - score				—
5. Modifying Factors					
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment? Yes No Do Not Know	No	Chemicals do not persist.	Persistent chemicals, e.g., PCBs, chlorinated pesticides etc. either do not degrade or take longer to degrade, and therefore may be available to cause effects for a longer period of time. Canadian Environmental Protection Act (CEPA) classifies a chemical as persistent when it has at least one of the following characteristics: (a) in air, (i) its half-life is equal to or greater than 2 days, or (ii) it is subject to atmospheric transport from its source to a remote area; (b) in water, its half-life is equal to or greater than 182 days; (c) in sediments, its half-life is equal to or greater than 365 days; or (d) in soil, its half-life is equal to or greater than 182 days. This list does not include metals or metalloids, which in their elemental form do not degrade. However metals and metalloids form chemical species in the environment, many of which are not readily bioavailable.	Examples of Persistent Substances are provided in attached Reference Materials	
	0				
Are there contaminants present that could cause damage to utilities and infrastructure, either now or in the future, given their location? Yes No Do Not Know	No			Some contaminants may react or absorb into underground utilities and infrastructure. For example, organic solvents may degrade some plastics, and salts could cause corrosion of metal.	
	0				
How many different contaminant classes have representative CCME guideline exceedances? one two to four five or more Do Not Know	two to four	Cadmium, and Selenium in groundwater.	For the purposes of the revised NCS ranking system, the following chemicals represent distinct chemical "classes": inorganic substances (including metals), volatile petroleum hydrocarbons, light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons, PAHs, phenolic substances, chlorinated hydrocarbons, halogenated methanes, phthalate esters, pesticides.	Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.	
	2				
"Known" - Score	2				
"Potential" - Score	—				

Contaminant Characteristic Total

Raw Total Scores- "Known"	16
Raw Total Scores- "Potential"	0
Raw Combined Total Scores	16
Total Score (Raw Combined / 40 * 33)	13.2

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
1. Groundwater Movement				
A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary				
<p>i) For potable groundwater environments 1) groundwater concentrations exceed background concentrations and 1X the Guideline for Canadian Drinking Water Quality (GCDWQ) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater contamination. For non-potable environments (typically urban environments with municipal services), 1) groundwater concentrations exceed 1X the applicable non-potable guidelines or modified generic guidelines (which exclude ingestion of drinking water pathway) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater impacts.</p> <p>ii) Same as (i) except the information is not known but strongly suspected based on indirect observations.</p> <p>iii) Meets GCDWQ for potable environments meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for non-potable environments or Absence of groundwater exposure pathway (i.e., there is no aquifer (see definition at right) at the site or there is an adequate isolating layer between the aquifer and the contamination, and within 5 km of the site there are no aquatic receiving environments and the groundwater does not daylight).</p>	<p>12</p> <p>9</p> <p>0</p> <p>12</p> <p>Score 12</p>	<p>Selenium concentrations were up to 2.87 times higher than maximum acceptable concentration for drinking water (Health Canada 2008 Guidelines for Canadian Drinking Water Quality). Manganese concentration in one groundwater well exceeded drinking water aesthetic objective (Health Canada 2008). Cadmium concentrations exceeded the guideline for protection of freshwater aquatic life (CCME, 2007). Hydraulic conductivity is in the order of 10-6 m/s at the site.</p>	<p>Review chemical data and evaluate groundwater quality.</p> <p>The evaluation method concentrates on 1) a potable or non-potable groundwater environment, the groundwater flow system and its potential to be an exposure pathway to known or potential receptors</p> <p>An aquifer is defined as a geologic unit that yields groundwater in usable quantities and drinking water quality. The aquifer can currently be used as a potable water supply or could have the potential for use in the future. Non-potable groundwater environments are defined as areas that are serviced with a reliable alternative water supply (most commonly provided in urban areas), evaluation of a non-potable environment will be based on a site specific basis.</p> <p>Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils.</p> <p>Seeps and springs are considered part of the groundwater pathway.</p> <p>In Arctic environments, the potability and evaluation of the seasonal active layer (above the permafrost) as a groundwater exposure pathway will be considered on a site-specific basis.</p>	<p>The 1992 NCS rationale evaluated the off-site migration as a regulatory issue. The exposure assessment and classification of hazards should be evaluated regardless of the property boundaries.</p> <p>Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a groundwater supply source in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links.</p> <p>Note that for potable groundwater that also daylights into a nearby surface water body, the more stringent guidelines for both drinking water and protection of aquatic life should be considered.</p> <p>Selected References</p> <p>Potable Environments</p> <p>Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/ewh-scmt/water/ewh/gdc/gdc_ssp/ajsum/guide-res_recom/index_e.html</p> <p>Non-Potable Environments</p> <p>Canadian Water Quality Guidelines for Protection of Aquatic Life. CCME. 1999 www.ccme.ca</p> <p>Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.</p>
NOTE: If a score is assigned here for Known COPC Exceedances, then you can skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)				
B. Potential for groundwater pathway.				
<p>a. Relative Mobility</p> <p>High</p> <p>Moderate</p> <p>Low</p> <p>Insignificant</p> <p>Do Not Know</p>	<p>Score 2</p>	<p>Organics</p> <p>Koc < 500 (i.e., log Koc < 2.7)</p> <p>Koc = 500 to 5000 (i.e., log Koc = 2.7 to 3.7)</p> <p>Koc = 5,000 to 100,000 (i.e., log Koc = 3.7 to 5)</p> <p>Koc > 100,000 (i.e., log Koc > 5)</p> <p>Metals with higher mobility at acidic conditions</p> <p>pH < 5</p> <p>pH = 5 to 6</p> <p>pH > 6</p> <p>Metals with higher mobility at alkaline conditions</p> <p>pH > 8.5</p> <p>pH = 7.5 to 8.5</p> <p>pH < 7.5</p>	<p>Reference: US EPA Soil Screening Guidance (Part 5 - Table 3B)</p> <p>If a score of zero is assigned for relative mobility, it is still recommended that the following sections on potential for groundwater pathway be evaluated and scored. Although the Koc of an individual contaminant may suggest that it will be relatively immobile, it is possible that, with complex mixtures, there could be enhanced mobility due to co-solvent effects. Therefore, the Koc cannot be relied on solely as a measure of mobility. An evaluation of other factors such as containment, thickness of confining layer, hydraulic conductivities and precipitation infiltration rate are still useful in predicting potential for groundwater migration, even if a contaminant is expected to have insignificant mobility based on its chemistry alone.</p>	
<p>b. Presence of engineered sub-surface containment?</p> <p>No containment</p> <p>Partial containment</p> <p>Full containment</p> <p>Do Not Know</p>	<p>Score 1.5</p>	<p>Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved.</p> <p>Full containment is defined as an engineered system or natural attenuation processes, monitored as being effective, which provide for full capture and/or treatment of contaminants. All chemicals of concern must be contained for full containment scoring. Natural attenuation must have sufficient data, and reports cited with monitoring data to support steady state conditions and the attenuation processes. If there is no containment or insufficient natural attenuation process, this category is evaluated as high. If there is less than full containment or if uncertain, then evaluate medium. In Arctic environments, permafrost will be evaluated, as appropriate, based on detailed evaluations, effectiveness and reliability to contain/control contaminant migration.</p>	<p>Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links.</p> <p>Selected Resources:</p> <p>United States Environmental Protection Agency (USEPA) 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.</p> <p>Environment Canada - Ontario Region - Natural Attenuation Technical Assistance Bulletin (TAB) Number 10-21.</p>	
<p>c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway</p> <p>3 m or less including no confining layer or discontinuous confining layer</p> <p>3 to 10 m</p> <p>> 10 m</p> <p>Do Not Know</p>	<p>Score 0.5</p>	<p>The term "confining layer" refers to geologic material with little or no permeability or hydraulic conductivity (such as unfractured clay); water does not pass through this layer or the rate of movement is extremely slow.</p> <p>Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway.</p> <p>The evaluation of this category is based on:</p> <p>1) The presence and thickness of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as drinking water sources or</p> <p>2) The presence and thickness of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated zone (e.g., water table aquifer, first hydrostratigraphic unit or other groundwater pathway).</p>		
<p>d. Hydraulic conductivity of confining layer</p> <p>>10⁻⁴ cm/s or no confining layer</p> <p>10⁻⁴ to 10⁻⁶ cm/s</p> <p><10⁻⁶ cm/s</p> <p>Do Not Know</p>	<p>Score 0.5</p>	<p>Determine the nature of geologic materials and estimate hydraulic conductivity from published material (or use "Range of Values of Hydraulic Conductivity and Permeability" figure in the Reference Material sheet). Unfractured clays should be scored low. Silts should be scored medium. Sand, gravel should be scored high. The evaluation of this category is based on:</p> <p>1) The presence and hydraulic conductivity [K] of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as a drinking water source, groundwater exposure pathway or</p> <p>2) The presence and permeability [K] of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated water table aquifer, first hydrostratigraphic unit or other groundwater pathway.</p>		

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site	Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for groundwater pathway.					
	e. Precipitation infiltration rate (Annual precipitation factor x surface soil relative permeability factor) High Moderate Low Very Low None Do Not Know			Precipitation Refer to Environment Canada precipitation records for relevant areas. Divide annual precipitation by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score). Permeability For surface soil relative permeability (i.e., infiltration) assume: gravel (1), sand (0.6), loam (0.3) and pavement or clay (0). Multiply the surface soil relative permeability factor with precipitation factor to obtain the score for precipitation infiltration rate.	
		Score	0.4		
	f. Hydraulic conductivity of aquifer >10 ⁻² cm/s 10 ⁻² to 10 ⁻⁴ cm/s <10 ⁻⁴ cm/s Do Not Know			Determine the nature of geologic materials and estimate hydraulic conductivity of all aquifers of concern from published material (refer to "Range of Values of Hydraulic Conductivity and Permeability" in the Reference Material sheet).	
		Score	1		
	Potential groundwater pathway total		5.9		
	Allowed Potential score		---	Note: If a "known" score is provided, the "potential" score is disallowed.	
	Groundwater pathway total		12		
2. Surface Water Movement					
A. Demonstrated migration of COPC in surface water above background conditions					
	Known concentrations of surface water: i) Concentrations exceed background concentrations and exceed CCME CWQG for protection of aquatic life, irrigation, livestock water, and/or recreation (whichever uses are applicable at the site) by >1 X; or There is known contact of contaminants with surface water based on site observations. or In the absence of CWQG, chemicals have been proven to be toxic based on site specific testing (e.g. toxicity testing; or other indicator testing of exposure). ii) Same as (i) except the information is not known but is <u>strongly suspected</u> based on indirect observations. iii) Meets CWQG or absence of surface water exposure pathway (i.e., Distance to nearest surface water is > 5 km.)			Collect all available information on quality of surface water near to site. Evaluate available data against Canadian Water Quality Guidelines (select appropriate guidelines based on local water use, e.g., recreation, irrigation, aquatic life, livestock watering, etc.). The evaluation method concentrates on the surface water flow system and its potential to be an exposure pathway. Contamination is present on the surface (above ground) and has the potential to impact surface water bodies. Surface water is defined as a water body that supports one of the following uses: recreation, irrigation, livestock watering, aquatic life.	General Notes: Someone experienced must provide a thorough description of the sources researched to classify the surface water body in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. Selected References: CCME. 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME. 1999. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water) www.ccme.ca Health and Welfare Canada. 1992. Guidelines for Canadian Recreational Water Quality.
		12	Groundwater concentrations of Cadmium and Selenium were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life. The site is approximately 200 m from the edge of a bluff beside the Peace River.		
		8			
		0			
		Score	8		
NOTE: If a score is assigned here for Demonstrated Migration in Surface Water, then you can skip Part B (Potential for migration of COPCs in surface water) and go to Section 3 (Surface Soils)					
B. Potential for migration of COPCs in surface water					
	a. Presence of containment No containment Partial containment Full containment Do Not Know			Review the existing engineered systems and relate these structures to site conditions and proximity to surface water and determine if full containment is achieved: score low if there is full containment such as capping, berms, dikes; score medium if there is partial containment such as natural barriers, trees, ditches, sedimentation ponds; score high if there are no intervening barriers between the site and nearby surface water. Full containment must include containment of all chemicals.	
		Score	3		
	b. Distance to Surface Water 0 to <100 m 100 - 300 m >300 m Do Not Know			Review available mapping and survey data to determine distance to nearest surface water bodies.	
		Score	2		

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<p>c. Topography</p> <p>Contaminants above ground level and slope is steep</p> <p>Contaminants at or below ground level and slope is steep</p> <p>Contaminants above ground level and slope is intermediate</p> <p>Contaminants at or below ground level and slope is intermediate</p> <p>Contaminants above ground level and slope is flat</p> <p>Contaminants at or below ground level and slope is flat</p> <p>Do Not Know</p>	1		<p>Review engineering documents on the topography of the site and the slope of surrounding terrain.</p> <p>Sleep slope = >50%</p> <p>Intermediate slope = between 5 and 50%</p> <p>Flat slope = < 5%</p> <p>Note: Type of fill placement (e.g., trench, above ground, etc.).</p>	
<p>d. Run-off potential</p> <p>High (rainfall run-off score > 0.8)</p> <p>Moderate (0.4 < rainfall run-off score < 0.8)</p> <p>Low (0.2 < rainfall run-off score < 0.4)</p> <p>Very Low (0 < rainfall run-off score < 0.2)</p> <p>None (rainfall run-off score = 0)</p> <p>Do Not Know</p>	0.4		<p>Rainfall</p> <p>Refer to Environment Canada precipitation records for relevant areas. Divide rainfall by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score).</p> <p>The former definition of annual rainfall did not include the precipitation as snow. This minor adjustment has been made. The second modification was the inclusion of permeability of surface materials as an evaluation factor.</p> <p>Permeability</p> <p>For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1).</p> <p>Multiply the infiltration factor with precipitation factor to obtain rainfall run off score.</p>	<p>Selected Sources:</p> <p>Environment Canada web page link www.msc.ec.gc.ca</p> <p>Snow to rainfall conversion apply ratio of 15 (snow):1 (water)</p>
<p>e. Flood potential</p> <p>1 in 2 years</p> <p>1 in 10 years</p> <p>1 in 50 years</p> <p>Do Not Know</p>	0.5		<p>Review published data such as flood plain mapping or flood potential (e.g., spring or mountain run-off) and Conservation Authority records to evaluate flood potential of nearby water courses both up and down gradient. Rate zero if site not in flood plain.</p>	
Potential surface water pathway total	6.9			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Surface water pathway total	8			
3. Surface Soils (potential for dust, dermal and ingestion exposure)				
A. Demonstrated concentrations of COPC in surface soils (top 1.5 m)				
<p>COPCs measured in surface soils exceed the CCME soil quality guideline.</p> <p>Strongly suspected that soils exceed guidelines</p> <p>COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock).</p>	12	Soil concentrations met federal and provincial guidelines.	<p>Collect all available information on quality of surface soils (i.e., top 1.5 metres) at the site. Evaluate available data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (i.e. agricultural, residential/parkland, commercial, or industrial), and soil texture if applicable (i.e., coarse or fine).</p>	<p>Selected References:</p> <p>CCME, 1999. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health</p> <p>www.ccme.ca</p>
	9			
	0			
	0			
	0			
<p>NOTE: If a score is assigned here for Demonstrated Concentrations In Surface Soils, then you can skip Part B (Potential for a surface soils migration pathway) and go to Section 4 (Vapour)</p>				
B. Potential for a surface soils (top 1.5 m) migration pathway				
<p>a. Are the soils in question covered?</p> <p>Exposed</p> <p>Vegetated</p> <p>Landscaped</p> <p>Paved</p> <p>Do Not Know</p>	4		<p>Consult engineering or risk assessment reports for the site. Alternatively, review photographs and perform a site visit.</p> <p>Landscaped surface soils must include a minimum of 0.5 m of topsoil.</p>	<p>The possibility of contaminants in blowing snow have not been included in the revised NCS as it is difficult to assess what constitutes an unacceptable concentration and secondly, spills to snow or ice are most efficiently mitigated while freezing conditions remain.</p>
<p>b. For what proportion of the year does the site remain covered by snow?</p> <p>0 to 10% of the year</p> <p>10 to 30% of the year</p> <p>More than 30% of the year</p> <p>Do Not Know</p>	3		<p>Consult climatic information for the site. The increments represent the full span from soils which are always wet or covered with snow (and therefore less likely to generate dust) to those soils which are predominantly dry and not covered by snow (and therefore are more likely to generate dust).</p>	
Potential surface soil pathway total	7			
Allowed Potential score	—	Note: If a "known" score is provided, the "potential" score is disallowed.		
Soil pathway total	0			

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
4. Vapour				
A. Demonstrated COPCs in vapour.				
Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations.	12	Concentrations of volatile COPCs in the soil and groundwater were below provincial and federal guidelines.	Consult previous investigations, including human health risk assessments, for reports of vapours detected.	
Strongly suspected (based on observations and/or modelling)	9			
Vapour has not been measured and volatile hydrocarbons have not been found in site soils or groundwater.	0			
Score	0			
NOTE: If a score is assigned here for Demonstrated COPCs in Vapour, then you can skip Part B (Potential for COPCs in vapour) and go to Section 5 (Sediment)				
B. Potential for COPCs in vapour				
a. Relative Volatility based on Henry's Law Constant, H ^o (dimensionless) High (H ^o > 1.0E-1) Moderate (H ^o = 1.0E-1 to 1.0E-3) Low (H ^o < 1.0E-3) Not Volatile Do Not Know			Reference: US EPA Soil Screening Guidance (Part 5 - Table 38) Provided in Attached Reference Materials	If the Henry's Law Constant for a substance indicates that it is not volatile, and a score of zero is assigned here for relative volatility, then the other three questions in this section on Potential for COPCs will be automatically assigned scores of zero and you can skip to section 5.
Score	2.5			
b. What is the soil grain size? Fine Coarse Do Not Know			Review soil permeability data in engineering reports. The greater the permeability of soils, the greater the possible movement of vapours. Fine-grained soils are defined as those which contain greater than 50% by mass particles less than 75 µm mean diameter (D50 < 75 µm). Coarse-grained soils are defined as those which contain greater than 50% by mass particles greater than 75 µm mean diameter (D50 > 75 µm)	
Score	3			
c. Is the depth to the source less than 10m? Yes No Do Not Know			Review groundwater depths below grade for the site.	
Score	2			
d. Are there any preferential pathways? Yes No Do Not Know			Visit the site during dry summer conditions and/or review available photographs. Where bedrock is present, fractures would likely act as preferential pathways.	Preferential pathways refer to areas where vapour migration is more likely to occur because there is lower resistance to flow than in the surrounding materials. For example, underground conduits such as sewer and utility lines, drains, or septic systems may serve as preferential pathways. Features of the building itself that may also be preferential pathways include earthen floors, expansion joints, wall cracks, or foundation perforations for subsurface features such as utility pipes, sumps, and drains.
Score	2			
Potential vapour pathway total	9.5			
Allowed Potential score		Note: If a "known" score is provided, the "potential" score is disallowed.		
Vapour pathway total	0			
5. Sediment Movement				
A. Demonstrated migration of sediments containing COPCs				
There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated.	12	No COPC in soil exceeded provincial or federal guidelines.	Review sediment assessment reports. Evidence of migration of contaminants in sediments must be reported by someone experienced in this area.	Usually not considered a significant concern in lakes/marine environments, but could be very important in rivers where transport downstream could be significant.
Strongly suspected (based on observations and/or modelling)	9			
Sediments have been contained and there is no indication that sediments will migrate in future. or Absence of sediment exposure pathway (i.e., within 5 km of the site there are no aquatic receiving environments, and therefore no sediments).	0			
Score	0			
NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you can skip Part B (Potential for Sediment Migration) and go to Section 6 (Modifying Factors)				

CCME National Classification System (2008)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for sediment migration				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")? Yes No Do Not Know	4	Note: If a "Known" score is provided, the "potential" score is disallowed.	Review existing sediment assessments. If sediment coring has been completed, it may indicate that historically contaminated sediments have been covered over by newer "clean" sediments. This assessment will require that cores collected demonstrate a low concentration near the top and higher concentration with sediment depth.	
b. For lakes and marine habitats, are the contaminated sediments in shallow water and therefore likely to be affected by tidal action, wave action or propeller wash? Yes No Do Not Know	4			
c. For rivers, are the contaminated sediments in an area prone to sediment scouring? Yes No Do Not Know	4			
Potential sediment pathway total	12			
Allowed Potential score	—			
Sediment pathway total	0			
6. Modifying Factors				
Are there subsurface utility conduits in the area affected by contamination? Yes No Do Not Know	0	No COPC in soil exceeded provincial or federal guidelines.	Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
Known	0			
Potential	0			

Migration Potential Total

Raw "Known" total	20
Raw "Potential" total	0.0
Raw combined total	20.0
Total (max 33)	10.3

Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore, the total "Potential" Score may not reflect the sum of the individual "Potential" scores.

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Human				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to humans as a result of the contaminated site. (Class 1 Site)	22	The groundwater concentration of Selenium exceeded maximum acceptable concentration for drinking water (Health Canada 2008). The monitoring wells are located within the community, but potable water supply may come from Peace River.	Where adverse effects on humans are documented, the site should be automatically designated Class 1 site (i.e., action required). There is no need to proceed through the NCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites). This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1 for noncarcinogenic chemicals and incremental cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this typically either >10 ⁻⁶ or >10 ⁻⁵). Known impacts can also be evaluated based on blood testing (e.g. blood lead >10 µg/dL) or other health based testing. This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 0.2 for non-carcinogenic chemicals and incremental lifetime cancer risks for carcinogenic chemicals that are within acceptable levels as defined by the jurisdiction (for most jurisdictions this is less than either 10 ⁻⁶ or 10 ⁻⁵).	Known adverse impact includes domestic and traditional food sources. Adverse effects based on food chain transfer to humans and/or animals can be scored in this category. However, the weight of evidence must show a direct link of a contaminated food source/supply and subsequent ingestion/transfer to humans. Any associated adverse effects to the environment are scored separately later in this worksheet. Someone experienced must provide a thorough description of the sources researched to evaluate and determine the quantified exposure/impact (adverse effect) in the vicinity of the contaminated site. Selected References: Health Canada- Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Health Screening Level Risk Assessments www.hc-sc.gc.ca/envh-pem/ubs/contam/2/index_e.html United States Environmental Protection Agency, Integrated Risk Information System (IRIS) http://www.epa.gov/iris/
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	10			
No quantified or suspected exposures/impacts in humans.	0			
Score	10			
NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Human Exposure) and go to Section 2 (Human Exposure Modifying Factors)				
B. Potential for human exposure				
a) Land use (provides an indication of potential human exposure scenarios) Agricultural Residential / Parkland Commercial Industrial Do Not Know	Score		Review zoning and land use maps over the distances indicated. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place. Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	This is the main "receptor" factor used in site scoring. A higher score implies a greater exposure and/or exposure of more sensitive human receptors (e.g., children).
Score	1.5			
b. Indicate the level of accessibility to the contaminated portion of the site (e.g., the potential for coming in contact with contamination) Limited barriers to prevent site access; contamination not covered Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered. Controlled access or remote location and contaminants are covered Do Not Know	Score		Review location and structures and contaminants at the site and determine if there are intervening barriers between the site and humans. A low rating should be assigned to a (covered) site surrounded by a fence or in a remote location, whereas a high score should be assigned to a site that has no cover, fence, natural barriers or buffer.	
Score	1			
B. Potential for human exposure				
c) Potential for intake of contaminated soil, water, sediment or foods for operable or potentially operable pathways, as identified in Worksheet II (Migration Potential). i) direct contact Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated? Yes No Do Not Know	Score		If soils or potable groundwater are present exceeding their respective CCME guidelines, dermal contact is assumed. Exposure to surface water, non-potable groundwater or sediments exceeding their respective CCME guidelines will depend on the site. Select "Yes" if dermal exposure to surface water, non-potable groundwater or sediments is expected. For instance, dermal contact with sediments would not be expected in an active port. Only soils in the top 1.5 m are defined by CCME (2003) as surface soils. If contaminated soils are only located deeper than 1.5 m, direct contact with soils is not anticipated to be an operable contaminant exposure pathway.	Exposure via the skin is generally believed to be a minor exposure route. However for some organic contaminants, skin exposure can play a very important component of overall exposure. Dermal exposure can occur while swimming in contaminated waters, bathing with contaminated surface water/groundwater and digging in contaminated dirt, etc.
Score	3			
ii) inhalation (i.e., Inhalation of dust, vapour) Vapour - Are there inhabitable buildings on the site within 30 m of soils or groundwater with volatile contamination as determined in Worksheet II (Migration Potential)? Yes No Do Not Know	Score		If inhabitable buildings are on the site within 30 m of soils or groundwater exceeding their respective guidelines for volatile chemicals, there is a potential of risk to human health (Health Canada, 2004). Review site investigations for location of soil samples (having exceedances of volatile substances relative to buildings. Refer to (II) Migration Potential worksheet 4B) Potential for COPCs in Vapour for a definition of volatility.	Exposure via the lungs (inhalation) can be a very important exposure pathway. Inhalation can be via both particulates (dust) and gas (vapours). Vapours can be a problem where buildings have been built on former industrial sites or where volatile contaminants have migrated below buildings resulting in the potential for vapour intrusion. Assesses the potential for humans to be exposed to vapours originating from site soils. The closer the receptor is to a source of volatile chemicals in soil, the greater the potential of exposure. Also, coarser-grained soil will convey vapour much more efficiently in the soil than finer grained material such as clays and silts.
Score	3			
Dust - If there is contaminated surface soil (e.g. top 1.5 m), indicate whether the soil is fine or coarse textured. If it is known that surface soil is not contaminated, enter a score of zero. Fine Coarse Surface soil is not contaminated or absent Do Not Know Texture	Score		Consult grain size data for the site. If soils (containing exceedances of the CCME soil quality guidelines) predominantly consist of fine material (having a median grain size of 75 microns; as defined by CCME (2008)) then these soils are more likely to generate dusts.	General Notes: Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a vapour migration and/or dust generation in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. Selected References: Canadian Council of Ministers of the Environment (CCME), 2006, Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. PN 1332 www.ccme.ca Golder, 2004, Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC
Score	0			
Inhalation total	3			

CCME National Classification System (2008)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for human exposure				
<p>iii) Ingestion (i.e., ingestion of food items, water and soils (for children)), including traditional foods.</p> <p>Drinking Water: Choose a score based on the proximity to drinking water supply, to indicate the potential for contamination (present or future).</p> <p>0 to 100 m 100 to 300 m 300 m to 1 km 1 to 5 km No drinking water present Do Not Know</p> <p>Score</p> <p>Is an alternative water supply readily available?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Is human ingestion of contaminated soils possible?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Ingestion total</p>	<p>2</p> <p>1</p> <p>3</p> <p>1</p> <p>7</p>	<p>Note if a "Known" Human Health score is provided, the "Potential" score is disallowed.</p>	<p>Review available site data to determine if drinking water (groundwater, surface water, private, commercial or municipal supply) is known or suspected to be contaminated above Guidelines for Canadian Drinking Water Quality. If drinking water supply is known to be contaminated, some immediate action (e.g., provision of alternate drinking water supply) should be initiated to reduce or eliminate exposure.</p> <p>The evaluation of significant potential for exceedances of the water supply in the future may be based on the capture zones of the drinking water wells; contaminant travel time; computer modeling of end contaminant transport.</p> <p>If contaminated soils are located within the top 1.5 m, it is assumed that ingestion of soils is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely, and the duration is shorter. Refer to human health risk assessment reports for the site in question.</p> <p>Use human health risk assessment reports (or others) to determine if there is significant reliance on traditional food sources associated with the site. Is the food item in question going to spend a large proportion of its time at the site (e.g., large mammals may spend a very small amount of time at a small contaminated site)? Human health risk assessment reports for the site in question will also provide information on potential bioaccumulation of the COPC in question.</p>	<p>Selected References: Guidelines for Canadian Drinking Water Quality www.hc-sc.gc.ca/hccc-accpar/publications/drinking_water_quality_guidelines/hoc.htm</p> <p>Drinking water can be an extremely important exposure pathway to humans. If site groundwater or surface water is not used for drinking, then this pathway is considered to be inoperable.</p> <p>Consider both wild foods such as salmon, venison, caribou, as well as agricultural sources of food items if the contaminated site is on or adjacent to agricultural land uses.</p>
<p>Human Health Total "Potential" Score</p> <p>Allowed "Potential" Score</p>	<p>15.5</p> <p>---</p>			
2. Human Exposure Modifying Factors				
<p>a) Strong reliance of local people on natural resources for survival (i.e., food, water, shelter, etc.)</p> <p>Yes No Do Not Know</p> <p>Known Potential</p> <p>Raw Human "known" total Raw Human "potential" total Raw Human Exposure Total Score Human Health Total (max 22)</p>	<p>Yes</p> <p>6 ---</p> <p>18 0 18 18.0</p>	<p>Potable water supply is local, but either from river or wells; Strong reliance of community on local foods which include fish from Peace River.</p>		
3. Ecological				
A. Known exposure				
<p>Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to terrestrial or aquatic organisms as a result of the contaminated site.</p> <p>Score</p> <p>Same as above, but "Strongly Suspected" based on observations or indirect evidence.</p> <p>Score</p> <p>No quantified or suspected exposures/impacts in terrestrial or aquatic organisms</p> <p>Score</p>	<p>18</p> <p>12</p> <p>0</p> <p>12</p> <p>12</p>	<p>Monitoring well concentrations of Cadmium and Selenium were higher than CCME 2007 Canadian Water Quality Guidelines for the protection of fresh water aquatic life and the site is located on a bluff adjacent to the Peace River.</p>	<p>Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are deemed to be severe, the site may be categorized as class one (i.e., a priority for remediation or risk management), regardless of the numerical total NCS score. For the purpose of application of the NCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. If ecological effects are determined to be severe and an automatic Class 1 is assigned, there is no need to proceed through the NCS. However, a scoring guideline (18) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites).</p> <p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1. Alternatively, known impacts can also be evaluated based on a weight of evidence assessment involving a combination of site observations, tissue testing, toxicity testing and quantitative community assessments. Scoring of adverse effects on individual rare or endangered species will be completed on a case-by-case basis with full scientific justification.</p> <p>This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 1 and no other observable or measurable sign of impacts. Alternatively, it can be based on a combination of other lines of evidence showing no adverse effects, such as site observations, tissue testing, toxicity testing and quantitative community assessments.</p>	<p>CCME, 1999: Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Use www.ccme.ca Genative receptors- review: Canadian Council on Ecological Areas www.ccea.org</p> <p>Ecological effects should be evaluated at a population or community level, as opposed to at the level of individuals. For example, population-level effects could include reduced reproduction, growth or survival in a species. Community-level effects could include reduced species diversity or relative abundances. Further discussion of ecological assessment endpoints is provided in <i>Framework for Ecological Risk Assessment: General Guidance</i> (CCME 1998).</p> <p>Notes: Someone experienced must provide a thorough description of the sources researched to classify the environmental receptors in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.</p>
<p>NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)</p>				

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for ecological exposure (for the contaminated portion of the site)				
a) Terrestrial				
i) Land use				
Agricultural (or Wild lands) Residential/Parkland Commercial Industrial Do Not Know	Score	1.5	Review zoning and land use maps. If the proposed future land use is more intensive than the current land use, evaluate this factor assuming the proposed future use is in place (indicate in the worksheet that future land use is the consideration). Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Wild lands are grouped with agricultural land due to the similarities in receptors that would be expected to occur there (e.g., herbivorous mammals and birds) and the similar need for a high level of protection to ensure ecological functioning. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	
ii) Uptake potential				
Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site? Yes No Do Not Know	Score	1	If contaminated soils are located within the top 1.5 m, it is assumed that direct contact of soils with plants and soil invertebrates is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely.	
iii) Ingestion (i.e., wildlife or domestic animals ingesting contaminated food items, soils or water)				
Are terrestrial animals likely to be ingesting contaminated water at the site? Yes No Do Not Know	Score	1	Refer to an Ecological Risk Assessment for the site. If there is contaminated surface water at the site, assume that terrestrial organisms will ingest it.	
Are terrestrial animals likely to be ingesting contaminated soils at the site? Yes No Do Not Know	Score	1	Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.	
Can the contamination identified bioaccumulate? Yes No Do Not Know	Score	1	Bioaccumulation of contaminants within food items is considered possible if: 1) The Log(Kow) of the contaminant is greater than 4 (as per the chemical characteristics worksheet) and concentrations in soils exceed the most conservative CCME soil quality guideline for the intended land use, or 2) The contaminant in collected tissue samples exceeds the Canadian Tissue Residue Guidelines.	
Distance to sensitive terrestrial ecological area 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score	1.5	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor located within this area of the site will be subject to further evaluations. It is also considered that any environmental receptor located greater than 5 km will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance; exotic environments (on a site specific basis); nature preserves, habitats for species at risk, sensitive forests, natural parks or forests.
Raw Terrestrial Total Potential		7	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.	
Allowed Terrestrial Total Potential		—		
B. Potential for ecological exposure (for the contaminated portion of the site)				
b) Aquatic				
i) Classification of aquatic environment				
Sensitive Typical Not Applicable (no aquatic environment present) Do Not Know	Score	2	"Sensitive aquatic environments" include those in or adjacent to shellfish or fish harvesting areas, marine parks, ecological reserves and fish migration paths. Also includes those areas deemed to have ecological significance such as for fish food resources, spawning areas or having rare or endangered species. "Typical aquatic environments" include those in areas other than those listed above.	
ii) Uptake potential				
Does groundwater daylighting to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact? Yes No (or Not Applicable) Do Not Know	Score	1	Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways: 1) by comparing collected nearshore groundwater concentrations to the CCME water quality guidelines (this will be a conservative comparison, as contaminant concentrations in groundwater often decrease between nearshore wells and the point of discharge). 2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge. 3) by installing water samplers, "peepers", in the sediments in the area of daylighting groundwater.	
Distance from the contaminated site to an important surface water resource 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	Score	1.5	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor or important water resource located within this area of the site will be subject to further evaluation. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org	Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and ferns and other aquatic environments.
Bioaccumulation of food items is possible if:				

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Test Site	Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
	Are aquatic species (i.e., forage fish, invertebrates or plants) that are consumed by predatory fish or wildlife consumers, such as mammals and birds, likely to accumulate contaminants in their tissues? Yes No Do Not Know	1		1) The Log(K _{ow}) of the contaminant is greater than 4 (as per the chemical characteristics work sheet) and concentrations in sediments exceed the CCME ISQGs. 2) The contaminant in collected tissue samples exceeds the CCME tissue quality guidelines.	
	Raw Aquatic Total Potential Allowed Aquatic Total Potential	5.5 ---	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
4. Ecological Exposure Modifying Factors					
a) Known occurrence of a species at risk.	Is there a potential for a species at risk to be present at the site? Yes No Do Not Know	Do Not Know ---	Not known if a species at risk is present at the site.	Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as Eco Explorer, Regional, Provincial (Environment Ministries), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance.	Species at risk include those that are extirpated, endangered, threatened, or of special concern. For a list of species at risk, consult Schedule 1 of the federal Species at Risk Act (http://www.sar.gov.ca/species/schedule_1_e.cfm). Many provincial governments may also provide regionally applicable lists of species at risk. For example, in British Columbia, consult: BCWMLAP, 2005. Endangered Species and Ecosystems in British Columbia. Provincial red and blue lists. Ministry of Sustainable Resource Management and Water, Land and Air Protection http://rmmwww.gov.bc.ca/atrisk/red-blue.htm
	Score	1			
b) Potential impact of aesthetics (e.g., enrichment of a lake or tainting of food flavor).	Is there evidence of aesthetic impact to receiving water bodies? Yes No Do Not Know	Do Not Know ---	Peace River has high flow. Do not know if the aesthetics will be impacted.	Documentation may consist of environmental investigation reports, press articles, petitions or other records. Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat. A distinct increase of plant growth in an aquatic environment may suggest enrichment. Nutrients e.g., nitrogen or phosphorus releases to an aquatic body can act as a fertilizer. Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.	This item will require some level of documentation by user, including contact names, addresses, phone numbers, e-mail addresses. Evidence of changes must be documented, please attach copy of report containing relevant information.
	Is there evidence of olfactory impact (i.e., unpleasant smell)? Yes No Do Not Know	No 0 ---			
	Is there evidence of increase in plant growth in the lake or water body? Yes No Do Not Know	No 0 ---			
	Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different? Yes No Do Not Know	Do Not Know ---			
	Ecological Modifying Factors Total - Known Ecological Modifying Factors Total - Potential Raw Ecological Total - Known Raw Ecological Total - Potential Raw Ecological Total Ecological Total (Max 18)	0 3 12 3 15 15.0			
5. Other Potential Contaminant Receptors					
a) Exposure of permafrost (leading to erosion and structural concerns)	Are there improvements (roads, buildings) at the site dependent upon the permafrost for structural integrity? Yes No Do Not Know	No 0 ---	Do not know.	Consult engineering reports, site plans or air photos of the site. When permafrost melts, the stability of the soil decreases, leading to erosion. Human structures, such as roads and/or buildings are often dependent on the stability that the permafrost provides. Melting permafrost leads to a decreased stability of underlying soils. Wind or surface run-off erosion can carry soils into nearby aquatic habitats. The increased soil loadings into a river can cause an increase in total dissolved solids and a resulting decrease in aquatic habitat quality. In addition, the erosion can bring contaminants from soils to aquatic environments.	Plants and lichens provide a natural insulating layer which will help prevent thawing of the permafrost during the summer. Plants and lichens may also absorb less solar radiation. Solar radiation is turned into heat which can also cause underlying permafrost to melt.
	Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment? Yes No Do Not Know	Do Not Know ---			
	Other Potential Receptors Total - Known Other Potential Receptors Total - Potential	0 1			
Exposure Total					
	Raw Human Health + Ecological Total - Known Raw Human Health + Ecological Total - Potential Raw Total Exposure Total (max 34)	28 4 32 23.7	Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.		

**CCME National Classification System (2008)
Score Summary**

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCS completely.

I. Contaminant Characteristics	Known	Potential
1. Residency Media	2	---
2. Chemical Hazard	8	---
3. Contaminant Exceedance Factor	2	---
4. Contaminant Quantity	2	---
5. Modifying Factors	2	---
Raw Total Score	16	0
Raw Total Score (Known + Potential)	16	
Adjusted Total Score (Raw Total / 40 * 33)	13.2	(max 33)

II. Migration Potential	Known	Potential
1. Groundwater Movement	12	---
2. Surface Water Movement	8	---
3. Soil	0	---
4. Vapour	0	---
5. Sediment Movement	0	---
6. Modifying Factors	0	0
Raw Total Score	20	0
Raw Total Score (Known + Potential)	20	
Adjusted Total Score (Raw Total / 64 * 33)	10.3	(max 33)

III. Exposure	Known	Potential
1. Human Receptors		
A. Known Impact	10	
B. Potential		
a. Land Use		---
b. Accessibility		---
c. Exposure Route		
i. Direct Contact		---
ii. Inhalation		---
iii. Ingestion		---
2. Human Receptors Modifying Factors	6	---
Raw Total Human Score	16	0
Raw Total Human Score (Known + Potential)	16	
Adjusted Total Human Score	16.0	(maximum 22)
3. Ecological Receptors		
A. Known Impact	12	
B. Potential		
a. Terrestrial		---
b. Aquatic		---
4. Ecological Receptors Modifying Factors	0	3
Raw Total Ecological Score	12	3
Raw Total Ecological Score (Known + Potential)	15	
Adjusted Total Ecological Score	15.0	(maximum 18)
5. Other Receptors	0	1
Total Other Receptors Score (Known + Potential)	1	
Total Exposure Score (Human + Ecological + Other)	32.0	
Adjusted Total Exposure Score (Total Exposure / 46 * 34)	23.7	(max 34)

Site Score	
Test Site	
Site Letter Grade	A
Certainty Percentage	100%
% Responses that are "Do Not Know"	-59%
Total NCSCS Score for site	47.2
Site Classification Category	3

Site Classification Categories*:

- Class 1 - High Priority for Action (Total NCS Score >70)
- Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
- Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
- Class N - Not a Priority for Action (Total NCS Score <37)
- Class INS - Insufficient Information (>15% of responses are "Do Not Know")

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions

Subject Site:	Test Site	
Civic Address: <i>(or other description of location)</i>	On the north shore of the Peace River, approximately 220 km east of High Level, Alberta, in Wood Buffalo National Park	
Site Common Name : <i>(if applicable)</i>	Community of Garden River	
Site Owner or Custodian: <i>(Organization and Contact Person)</i>	Parks Canada Agency	
Legal description or metes and bounds:	N 58°42.5', W113°52.0'	
Approximate Site area:		
PID(s) : <i>(or Parcel Identification Numbers [PIN] if untitled Crown land)</i>	Church Historic AST	
Centre of site: <i>(provide latitude/longitude or UTM coordinates)</i>	Latitude:	_____ degrees _____ min _____ secs
	Longitude:	_____ degrees _____ min _____ secs
Site Land Use:	UTM Coordinate:	Northing Easting
	Current:	Residential
	Proposed:	
Site Plan	<p>To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.</p>	
Provide a brief description of the Site:	<p>The Church Historic AST are is located north of the community of Garden River (see attached Site Plan).</p>	

CCME National Classification System for Contaminated Sites (2008)
Summary of Site Conditions

Affected media and Contaminants of Potential Concern (COPC):	All measured soil concentrations of COPC met federal and provincial guidelines.
--	---

Please fill in the "letter" that best describes the level of information available for the site being assessed:

Site Letter Grade

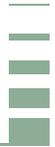
If letter grade is F, do not continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent.

Scoring Completed By:	Cathy Hamlen, Ph.D. A.Ag.
Date Scoring Completed:	6-Feb-09

**CCME National Classification System for Contaminated Sites (2008)
Pre-Screening Checklist**

Question	Response (yes / no)	Comment
1. Are Radioactive material, Bacterial contamination or Biological hazards likely to be present at the site?	<input type="checkbox"/> No	If yes, do not proceed through the NCSCS. Contact applicable regulatory agency immediately.
2. Are there no contamination exceedances (known or suspected)? Determination of exceedances may be based on: 1) CCME environmental quality guidelines; 2) equivalent provincial guidelines/standards if no CCME guideline exists for a specific chemical in a relevant medium; or 3) toxicity benchmarks derived from the literature for chemicals not covered by CCME or provincial guidelines/standards.	<input type="checkbox"/> Yes	If yes (i.e., there are no exceedances), do not proceed through the NCSCS.
3. Have partial/incompleted or no environmental site investigations been conducted for the Site?	<input type="checkbox"/> No	If yes, do not proceed through the NCSCS.
4. Is there direct and significant evidence of impacts to humans at the site, or off-site due to migration of contaminants from the site?	<input type="checkbox"/> No	If yes, automatically rate the site as Class 1, a priority for remediation or risk management, regardless of the total score obtained should one be calculated (e.g., for comparison with other Class 1 sites).
5. Is there direct and significant evidence of impacts to ecological receptors at the site, or off-site due to migration of contaminants from the site?	<input type="checkbox"/> Yes	Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are considered to be severe, the site may be categorized as Class 1, regardless of the numerical total NCSCS score. For the purpose of application of the NCSCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction.
6. Are there indicators of significant adverse effects in the exposure zone (i.e., the zone in which receptors may come into contact with contaminants)? Some examples are as follows: -Hydrocarbon sheen or NAPL in the exposure zone -Severely stressed biota or devoid of biota; -Presence of material at ground surface or sediment with suspected high concentration of contaminants such as ore tailings, sandblasting grit, slag, and coal tar.	<input type="checkbox"/> No	If yes, automatically rate the site as Class 1, a priority for remediation or risk management, regardless of the total score obtained should one be calculated (e.g., for comparison with other Class 1 sites).
7. Do measured concentrations of volatiles or unexploded ordnances represent an explosion hazard ?	<input type="checkbox"/> No	If yes, automatically rate the site as Class 1, a priority for remediation or risk management, and do not continue until the safety risks have been addressed. Consult your jurisdiction's occupational health and safety guidance or legislation on explosive hazards and measurement of lower explosive limits.

If none of the above applies, proceed with the NCSCS scoring.



APPENDIX H

APPENDIX H GEO-ENVIRONMENTAL REPORT – GENERAL CONDITIONS

GEO-ENVIRONMENTAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of EBA’s client. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA’s client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 LIMITATIONS OF REPORT

This report is based solely on the conditions which existed on site at the time of EBA’s investigation. The client, and any other parties using this report with the express written consent of the client and EBA, acknowledge that conditions affecting the environmental assessment of the site can vary with time and that the conclusions and recommendations set out in this report are time sensitive.

The client, and any other party using this report with the express written consent of the client and EBA, also acknowledge that the conclusions and recommendations set out in this report are based on limited observations and testing on the subject site and that conditions may vary across the site which, in turn, could affect the conclusions and recommendations made.

The client acknowledges that EBA is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the client.

2.1 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of this report, EBA may have relied on information provided by persons other than the client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

3.0 LIMITATION OF LIABILITY

The client recognizes that property containing contaminants and hazardous wastes creates a high risk of claims brought by third parties arising out of the presence of those materials. In consideration of these risks, and in consideration of EBA providing the services requested, the client agrees that EBA’s liability to the client, with respect to any issues relating to contaminants or other hazardous wastes located on the subject site shall be limited as follows:

1. With respect to any claims brought against EBA by the client arising out of the provision or failure to provide services hereunder shall be limited to the amount of fees paid by the client to EBA under this Agreement, whether the action is based on breach of contract or tort;
2. With respect to claims brought by third parties arising out of the presence of contaminants or hazardous wastes on the subject site, the client agrees to indemnify, defend and hold harmless EBA from and against any and all claim or claims, action or actions, demands, damages, penalties, fines, losses, costs and expenses of every nature and kind whatsoever, including solicitor-client costs, arising or alleged to arise either in whole or part out of services provided by EBA, whether the claim be brought against EBA for breach of contract or tort.

4.0 JOB SITE SAFETY

EBA is only responsible for the activities of its employees on the job site and is not responsible for the supervision of any other persons whatsoever. The presence of EBA personnel on site shall not be construed in any way to relieve the client or any other persons on site from their responsibility for job site safety.

5.0 DISCLOSURE OF INFORMATION BY CLIENT

The client agrees to fully cooperate with EBA with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The client acknowledges that in order for EBA to properly provide the service, EBA is relying upon the full disclosure and accuracy of any such information.

6.0 STANDARD OF CARE

Services performed by EBA for this report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Engineering judgement has been applied in developing the conclusions and/or recommendations provided in this report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this report.

7.0 EMERGENCY PROCEDURES

The client undertakes to inform EBA of all hazardous conditions, or possible hazardous conditions which are known to it. The client recognizes that the activities of EBA may uncover previously unknown hazardous materials or conditions and that such discovery may result in the necessity to undertake emergency procedures to protect EBA employees, other persons and the environment. These procedures may involve additional costs outside of any budgets previously agreed upon. The client agrees to pay EBA for any expenses incurred as a result of such discoveries and to compensate EBA through payment of additional fees and expenses for time spent by EBA to deal with the consequences of such discoveries.

8.0 NOTIFICATION OF AUTHORITIES

The client acknowledges that in certain instances the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by EBA in its reasonably exercised discretion.

9.0 OWNERSHIP OF INSTRUMENTS OF SERVICE

The client acknowledges that all reports, plans, and data generated by EBA during the performance of the work and other documents prepared by EBA are considered its professional work product and shall remain the copyright property of EBA.

10.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by EBA shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancies, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by EBA shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA's instruments of professional service will be used only and exactly as submitted by EBA.

The Client recognizes and agrees that electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.