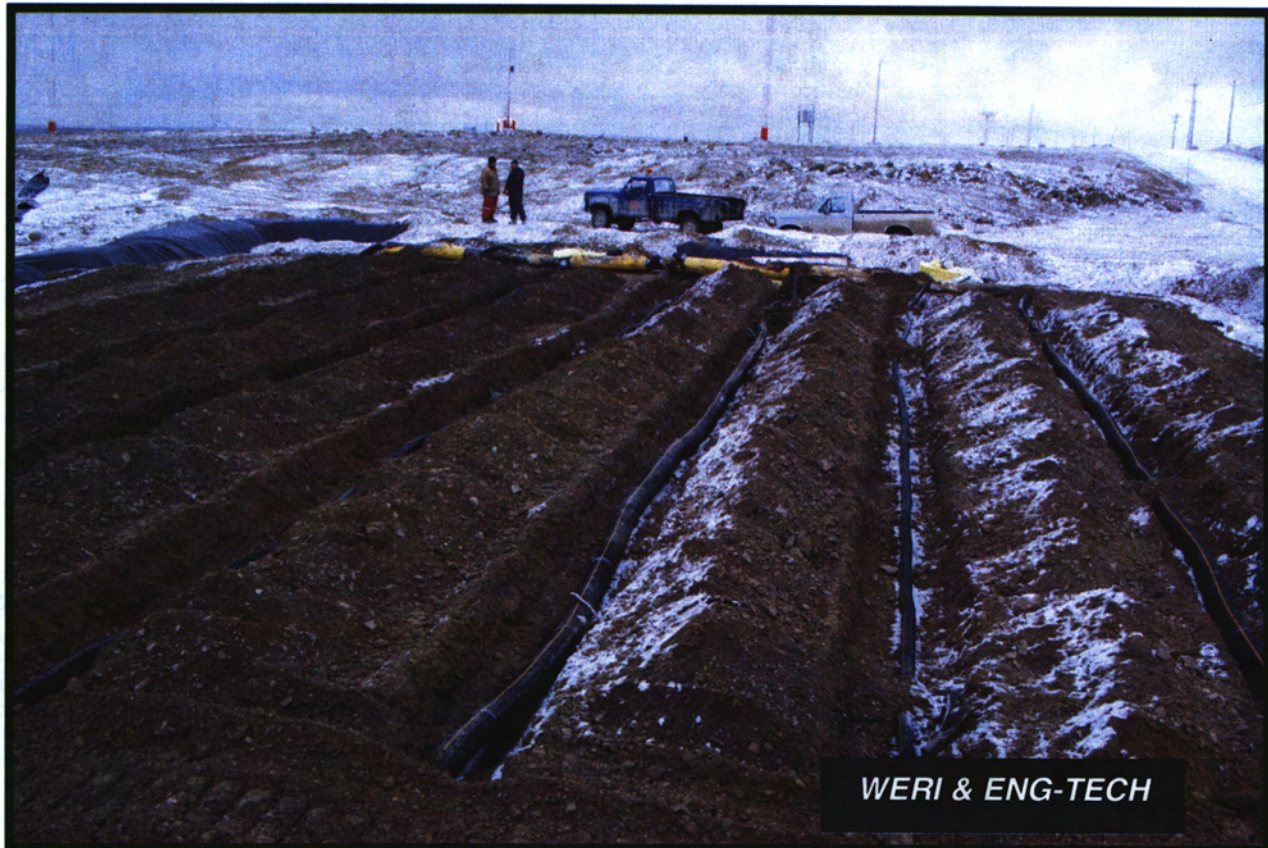


TRANSPORT CANADA 

FINAL REPORT
Resolute Bay FTA Remedial Work
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1.0 INTRODUCTION

1.1 Terms of Reference

Winnipeg Environmental Remediations Inc. (WERI) and ENG-TECH Consulting Limited (ENG-TECH) were retained by Transport Canada (TC) to conduct a soil sampling program that utilizes bioremediation as a means to degrade petroleum hydrocarbons from contaminated soils, placed in two (2) land treatment units (LTUs). A separate undertaking included installing ground heating system into one of the LTUs in order to enhance petroleum hydrocarbons degradation by providing an optimum temperature for microbial growth. This report details the activities conducted to date.

1.2 Background

In August of 2002, WERI conducted demolition and remedial activities at the former Fire Training Area (FTA) in an attempt to bring the Resolute Bay Airport in compliance with current Canadian environmental legislation. The work included 1) excavation of petroleum hydrocarbon contaminated soil from a fire training mock-up area; 2) excavation of contaminated soil from a former above ground storage tank (AST) site; and 3) the construction of two (2) LTUs. The LTUs were excavated to permafrost 1-1.5 m below grade, and lined with 20 mil Oil-Resistant Reinforced Polyethylene (OR RPE) liner supplied by TC. LTU 1 had outside dimensions of 70 m x 40 m and was divided into 3 zones separated by berms. Zone 1 and Zone 2 contained heavier hydrocarbons while Zone 3 contained lighter hydrocarbons. LTU 2 was not subdivided and contained lighter hydrocarbons.

Approximately 5500 m³ of petroleum impacted soil was excavated from the fire training mock-up area encompassing an area approximately 95 m x 65 m, with an average depth of 0.9 m below grade. Approximately 300 m³ of contaminated soil was excavated from the AST site, approximately 20 m x 20 m in area with an average depth of 0.75 m below grade. Field screening for organic vapours using a photo ionization detector (PID), in conjunction with confirmatory soil sampling, was conducted at both excavation locations to ascertain that all contaminated soil was excavated.

Bioremediation was employed in the LTUs in an effort to reduce the hydrocarbon concentrations. Bioremediation or biodegradation is a process of degradation by biological means, where organisms (most often bacteria, but also fungi and plants) oxidize organic compounds (substrate), during respiration processes, both aerobic (oxygen present) and anaerobic (oxygen absent), to produce carbon dioxide, water and biomass. Other bacteria are known to break down organic material via reductive processes (opposed to oxidative processes). Any form of organic substance may be susceptible to biodegradation, which includes hydrocarbons. A detailed review of remediation and remediation technologies is included in Appendix A.

1.3 Objectives

The following project consisted of two principle objectives. The first objective was to conduct confirmatory soil sampling programs in order to assess changes to petroleum hydrocarbon concentrations, from petroleum contaminated soils (PCS) using an LTU system.

The second objective was to install a ground heating system in one of the LTUs to determine its effectiveness towards enhancing bioremediation. The efficacy of this system could be beneficial for northern communities that want to eliminate hydrocarbon contaminated soils, cost effectively.

1.4 Scope of Work

The scope of work for the project consisted of:

- An initial soil sampling and testing program, for petroleum hydrocarbon and micro-organism concentrations, followed by the applying nutrients and surfactants to Zone 1 in LTU 1, nutrients alone to LTU 2, and no nutrients to zone 2 and 3. After applying nutrients, the surfaces were to be blended and graded using a D4 blade.
- Conducted a second soil sampling and testing program of the remediating soils in the LTUs the following year. Samples were taken from the same locations and depths as previously sampled during the first year. Nutrients were added to Zone 1 and 2 of LTU 1, to LTU 2, and no nutrients to zone 3. After applying nutrients, the surfaces were to be blended and graded using a D4 blade.
- Conducted a third soil sampling and testing program of the remediating soils in the LTUs after 2 years. Samples were taken from the same locations and depths as the previous two years.
- A soil heating system was installed in a section of LTU 2, in order to increase the remediation time available for soil treatment. The heating system was designed to include heaters with intake and exhaust chambers to cycle warm air through the impacted soil.
- Thermocouples were installed to assess the soil temperature at different locations and depths within the soil heated system (LTU 2).

1.5 Methodology

Soil sampling was conducted using guidelines and criteria outlined in publications from the American Society for Testing and Materials (ASTM), and the Canadian Council of Ministers of the Environment (CCME).

2.0 SITE CONDITIONS

2.1 Site Location and Description

Resolute Bay (74.7N, 94.83W) is located on the south shore of Cornwallis Island in the Arctic, as shown in Figure 1. The site of investigation is located approximately 6 km north of the community of Resolute Bay, just north of the airport, as shown in Figure 2.

The Former FTA

The former FTA, shown in Figure 3, was located approximately 2 km north of the Air Terminal Building at Resolute Bay Airport and south of the Nav Canada control tower. It consisted of a fire training mock-up area, four (4) ASTs, a fuel pump house and underground piping. Two gravel roads bounded the former FTA to the west and east; one leading to the metal dump and the other to the Nav Canada control tower, respectively.

LTU 1 and LTU 2

LTU 1 and LTU 2 are located within the boundaries of the former FTA. LTU 1 is located north of the fire training mock-up area and LTU 2 is located south of the AST site, as shown in Figure 3.

2.2 Site Geology and Groundwater

The Resolute Bay area is dominated by glacial features. Surficial material in the area consists of coarse, angular weathered grey shale. The Resolute Bay area is subject to continuous permafrost.

Groundwater is not used as a drinking water source as glacial water is readily available and used as the local potable water supply.

3.0 PROJECT DETAILS

3.1 August 2002 Work Program

In August 2002 the initial sampling program for attaining petroleum hydrocarbon concentrations was undertaken, along with the application of nutrients and/or surfactant to selected zones. Thirty-six (36) soil samples were collected and tested for hydrocarbon concentration as follows:

- Zone 1 and Zone 2 in LTU 1 – A total of twelve (12) samples, six (6) from each zone at two (2) sampling point locations. Three (3) samples were collected at each location; One (1) at the surface, one (1) 0.4 m below the surface, and one (1) 0.8 m below the surface, as shown in Figure 4.
- Zone 3 in LTU 1 and LTU 2 – A total of twenty-four (27) samples, twelve (12) from Zone 3 and twelve (15) from LTU 2, at specified sampling point locations. Three (3) samples were collected at each location; One (1) at the surface, one (1) 0.4 m below the surface,

and one (1) 0.8 m below the surface, as shown in Figure 5. In addition, three (3) samples were collected from LTU 2, as shown in Figure 5.

Each of the above noted soil samples were also tested for the presence of aerobic and anaerobic heterotrophic bacteria.

Upon completion of the soil sampling program, nutrients and a surfactant were applied to selected zones as follows:

- 145 kg (320 lbs) of 38-0-0 Nitrogen-Phosphorus-Potassium (N-P-K), and 40 kg (88 lbs) of "Cyclone White" surfactant were added to zone 1 in LTU 1.
- 2273 kg (5000 lbs) of 38-0-0 (N-P-K) was added to LTU 2.

Surfactants are substances that can be used to separate contaminants from the soil structure, allowing for greater microbial-induced hydrocarbon degradation. The zones were tilled and graded using a D4 blade after the application of the nutrients and surfactant to a maximum depth of 0.3 m below the surface.

3.2 September 2003 Work Program

On September 5th 2003, the second round of soil testing was conducted to assess soil remediation progress. Hydrocarbon odours were present at all sample locations. Soil samples were collected at the same locations and depths as previously done during the first year (August 2002), with a few exceptions. Sample location 10 from LTU 2, as well as all sample locations from LTU 1, were sampled at a depth of 0.6 m instead of 0.8 m as previously done in August 2002. LTU 2 was frozen at a depth of 0.5 m below grade, with only minor frost above. Three (3) additional confirmatory samples from locations not previously sampled in August 2002 were collected and submitted for testing. These can be seen in Figure 5. A total of thirty-nine (39) soil samples were collected and tested for petroleum hydrocarbons.

A total of six (6) samples were tested for the presence of aerobic and anaerobic heterotrophic bacteria for comparative analysis with samples collected in August 2002. In Addition, hydrocarbon reducing bacteria plate counts were determined from six (6) samples.

Upon completion of soil sampling, nutrients were applied to selected zones as follows:

- 91 kg (200 lbs) of 38-0-0 (N-P-K) was added to Zone 2 in LTU 1.
- 634 kg (1400 lbs) of 38-0-0 (N-P-K) was added to LTU 2.

Zone 2 in LTU 1 and LTU 2 was tilled and graded using a D4 blade after the application of the nutrients to a maximum depth of 0.3 m below the surface.

The ground heating system was installed at the north end of LTU 2 upon completion of tilling activities. The air exchange components of the system comprised of three (3) heat inflow lines and four (4) return air lines as illustrated in Figure 6. The inflow lines were 75 mm (3") diameter pipes with slit cuts. The return lines were 150 mm (6") diameter pipe and 24.4 m (80 ft.) long, with the exception of the most westerly return line, which was only 19.8 m (65 ft.) long, with the

southern 12.2 m (40 ft.) of pipe being 75 mm in diameter. All inflow lines and return lines were connected using tees to solid 200 mm (8") PVC manifolds. All pipe lines were installed at 0.4 m below grade. The air exchange housing was 2.4 x 1.2 x 1.2 m (L x W x H) and consisted of two (2) heaters and two (2) exhaust fans as shown in Figure 7.

Thermocouples were installed at various locations along the inflow and return lines at 0.4 m below grade, at the intake chamber, at the exhaust/heater chamber, and at grade within the heated area. Figure 8 illustrates the locations of the thermocouples. The approximate depth of the thermo lines were installed at 0.4 m below grade.

Following installation of the ground heat monitoring system, the pipes were covered with soil, and overlain with insulation. The area was covered with an Enviro Liner® supplied by Layfield Geosynthetics weighted down with rocks and steel pipes. The perimeters were secured by burying them in trenches backfilled with soil. Final electrical connections were completed at the exhaust house and the site was cleaned of excess supplies. Photographs of the installation process are shown in Appendix B.

3.3 August 2004 Work Program

Temperature readings of the thermocouples were taken on August 11th, 2004 prior to the heaters and blowers being turned on. The temperatures were taken again on August 12th, 2004 after the blowers and heaters had been running for 12 consecutive hours. Temperature data are shown in Table 4. The heaters were shut down for the winter in early October.

Nutrients and a surfactant were applied to selected zones as follows:

- 100 kg (220 lbs) of "Cyclone White" surfactant was added to Zone 1 in LTU 1.
- 400 kg (880 lbs) of 38-0-0 (N-P-K) was added to Zones 1 and 2 in LTU 1.
- 600 kg (1323 lbs) of 38-0-0 (N-P-K) was added to the non-covered Zone in LTU 2.

The zones were tilled and graded using a D4 blade after the application of the nutrients and surfactant to a maximum depth of 0.3 m below the surface.

3.4 August 2005 Work Program

On August 28th, 2005 a third round of soil testing was conducted to assess soil remediation progress. Soil samples were collected at the same locations and depths as previously sampled during first two rounds of testing in August 2002, and September 2003. A total of thirty-nine (39) soil samples were collected and tested for petroleum hydrocarbons. The locations of all soil samples collected from LTU 1 and LTU 2 are illustrated in Figures 4 and 5, respectively.

Temperature readings to assess the heating system were taken at 10:00 am on August 28th, 2005. Temperature data are shown in Table 4.

3.5 Analytical Analysis

A total of one-hundred-fourteen (114) soil samples from the three (3) sampling work programs were submitted to Enviro•Test Laboratories in Winnipeg, Manitoba for petroleum hydrocarbon analyses. Each sample was tested for benzene, ethyl-benzene, toluene, xylene (BTEX) and petroleum fractions F1 (C6-C10), F2 (C10-C16), F3 (C16-C34), and F4 (C34-C50). An outline of the results for samples from LTU1 and LTU2 are shown in Tables 1 and 2 respectively. Microbial plate counts were conducted on all samples collected during the August 2002 work program, as well as on six (6) samples collected during the September 2003 work program. Table 3 outlines the aerobic, anaerobic heterotrophic, and hydrocarbon reducing bacteria plate count results. A copy of the analytical test results from Enviro•Test is included in Appendix C. Weekly temperature readings were taken by site staff between August 2004 and August 2005. However, the data obtained collected was misplaced by site staff and therefore does not appear in this report, with the exception of the three days of readings shown in Table 4. The purpose of retrieving the weekly temperature data was to demonstrate that the heated soil remained above freezing longer than the unheated soil, thus increasing the time for bioremediation.

3.6 Remediation Criteria

The laboratory results of the BTEX analyses of the submitted soil samples were compared to the 1998 Government of the Northwest Territories (GNWT) Guideline for Contaminated Site Remediation of industrial sites and the 2003 CCME Canadian Environmental Quality Guidelines for soil at industrial sites. The laboratory results of CCME F1-F4 were compared to the 2001 Canada-Wide Standards for Petroleum Hydrocarbons in Soil Tier 1 levels for coarse-grained surface soils at industrial sites. Included in Appendix D is a sieve analysis illustrating that the soil in the LTUs is coarse-grained.

4.0 DISCUSSION and CONCLUSION

The purpose of this study was to determine if bioremediation is a feasible alternative to reducing (destroying) hazardous contaminants (in the form of petroleum hydrocarbon), for North Canadian communities, in an event that soils become contaminated, and that the treated soils meet the safety standard criteria.

The data obtained indicates that bioremediation process worked in reducing hydrocarbon concentrations from the contaminated soils. Since the primary organisms used in the bioremediation process were bacteria, it was important to establish their presence. The bacteria plate counts confirm viable populations of aerobic and anaerobic heterotrophic bacteria in the soil. Some lower counts of anaerobic bacteria were found in Zone 3 soils and soils exposed to heat, however, this did not have an over all influence on its ability to degrade the hydrocarbon concentrations from the soils, from both LTUs. In general, it there was a trend towards reducing the hydrocarbon concentrations, as time progressed. Of all hydrocarbons analyzed, the larger portions reduced were Benzene, Toluene, Ethyl Benzene, and F4 (34-C50) and to a lesser extent xylene, F1 (C6-C10), F2 (C10-C16), and F3 (C16-C34). Some treatments that show an increase in hydrocarbon concentration may be ignored; what appears as a increase in concentration is likely caused by a high hydrocarbon concentration plume migrating from one area of the zone to another, thereby confounding the results.

To enhance the rate of degradation, microorganisms will require the optimum conditions that provide optimum growth rates. These conditions include substrate (hydrocarbon), ecological niche (space), nutrients and temperature. The first two are found in abundance. The third condition is that organisms have adequate nutrients. LTU 1 tested for the effect nutrients and, in addition, a surfactant had on the effectiveness of hydrocarbon degradation. It is inconclusive whether the addition of the nutrients or surfactant improved the degradation of the contaminants. It is recommended to further investigate with different nutrient concentrations.

The remediation criteria for Benzene, Toulene, Ethyl Benzene, Xylene and F1 (C6-C10) were obtained from the 1998 GNWT Guileline, the remaining hydrocarbon fractions were obtained from 2001 CCME CWS for PHCs in Soil, respectively. Each contaminant was met for all hydrocarbon species tested, except for the hydrocarbon fraction F2 (C10-C16). Although an observable reduction in concentration for this fraction occurred, the total reduction was insufficient to meet the standard criterion. This implies that the bioremediation process is working, however, it requires more time to fully remediate the site to the specified standards, and longer still to reduce the F2 (C10-C16) fraction to a safe level. Since hydrocarbon concentrations will not increase at a site unless it is further contaminated, with sufficient time an adequate reduction may be achieved.

The greatest challenge facing bioremediation in the north is the cold temperatures occurring during winter months. A brief analysis of the historic temperature data for the area revealed that the mean monthly maximum temperatures that are above freezing occur during June, July and August. The short summer season gives only a short period of time where bacteria may grow in temperatures above freezing. As such, the effect of heat on microbial growth and in turn their effects on hydrocarbon degradation were investigated in LTU 2 treatment area. Employing a heating system would help prevent the ground from freezing, and thus prolonging the biodegradation process. A heating system during the months in which the mean temperature is just below freezing (ie. above -10°C) can effectively double the time the biodegradation process has to operate. As mentioned above, heat had an effect on bacterial growth; more specifically it impeded the growth of anaerobic heterotrophic bacteria. Despite the reduction in anaerobic heterotroph populations, there still was a reduction in concentration for some of the hydrocarbon species. This is an indication that aerobic bacteria are the dominant organisms conducting the degradation. As a result, a proper system of soil aeration is required to maintain an adequate air supply to microorganisms in the soil. Some hydrocarbons appear to be unaffected by the bacteria, whereas others hydrocarbon species were degraded up to 600 % more than the unheated treatments. As such faster rates of bioremediation could be obtained by having the system run for several more years, extend the heating temperature time over the entire winter period, and monitor the temperature more regularly.

5.0 CLOSURE

This report outlines the remedial work currently completed at Resolute Bay from August 2002 to September 2005. If you have any questions regarding the work presented herein, please contact the undersigned.

Sincerely,
ENG-TECH Consulting Limited

Winnipeg Environment Remediation Inc.



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CDH/kwj

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Table 1: Soil Sample Analyses From LT
(all concentrations are in mg/kg)

Sample Identification	Parameters and Sampling														
	Benzene			Toluene			Ethyl Benzene			Xylene			F1 (C6-C10)		
Sampling Date	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005
0-.2+mc1		0.92	2.9		0.06	0.54	0.42	0.17	1.3	16	3.5	7.3	260	110	11
0-.2+mc2	1.1	2.0	4.9	<0.01	0.08		0.33	0.20	1.8	2.6	8.9	17	100	160	31
0-.2+mc3	1.4	0.43	2.2	<0.01	<0.01	0.37	0.17	0.05	0.56	1.0	1.2	4.2	86	36	8
0-.2+mc4	1.4	0.084	0.44	<0.01	<0.01	0.14	0.13	0.03	0.46	0.91	0.41	1.3	57	14	4
0-.2+mc5	4.9	0.21	2.4	<0.01	0.02	0.53	0.35	0.10	1.2		1.4	3.9	200	46	12
0-.2+mc6	0.33	0.55	2.3	<0.01	0.05	0.56	0.07	0.48	1.4	0.43	4.0	9.6	25	180	16
0-.2+mn1	4.5	2.2	0.12		0.03	0.02	0.58	0.29	0.06		8.6	0.15	240	190	1
0-.2+mn2	13	4.9	4.9				6.0	4.2	2.1			18			2
0-.2+mn3		3.1					1.3	0.59	1.3			14		230	12
0-.2+mn4	0.15	0.90	0.29	<0.01	0.57	0.06	0.04	0.25	0.24	0.24	18	2.2	11	110	<
0-.2+mn5	2.5	1.5	3.7	0.29		1.1	0.22	0.26	0.78	9.0			110	150	2
0-.2+mn6	1.0	1.1	2.9	<0.01			0.03	0.45	1.1	2.4	14	15	49	99	15
.2+mc1		1.8	1.0	0.58	0.08	0.26	1.8	0.32	0.71		13	2.7		—	8
.2+mc2	4.7	3.7		0.55	0.10		0.51	0.50	3.1						
.2+mc3	3.7	3.6	1.1	0.23	0.09	0.23	0.51	0.51	0.39	17		8.0			7
.2+mc4	4.1	2.7	0.75	0.22	0.12	0.1	0.38	0.30	1.2	5.8	16	4.5	330	210	14
.2+mc5	0.96	4.3	3.3	<0.01	0.14	0.26	0.16	0.44	1.8	1.4		7.2	81		26
.2+mc6	0.39	2.2	0.48	<0.01	0.10	0.09	0.04	0.21	0.12	0.35	19	0.96	32	200	2
.2+mc7		2.4	0.79	0.75	0.17	0.17	0.73	0.22	0.74		15	2.4		180	7
.2+mc8		0.49		0.28	0.04		0.55	0.10	1.8		2.5			64	
.2+mc9		1.5		0.47	0.25		0.62	0.18	1.9	20	17			160	
.2+mc10		0.37	1.0		0.02	0.43	1.3	0.08	0.68		1.9	3.1		52	8
.2+mc11	5.0	1.7			0.06		0.62	0.17	1.6		12		250	140	
.2+mc12		1.8	3.9		0.09		0.62	0.14	1.3		11	19	210	140	23
1998 GNWT Guideline ¹	5			0.8			20			20			N/V		
2001 CWS for PHCs in Soil ²	N/V			N/V			N/V			N/V			330		
2002 CCME EQG ³	5			0.8			20			20			N/V		

NOTES:

- (1) 1998 GNWT Guideline for Contaminated Site Remediation of industrial sites
- (2) 2001 CCME CWS for PHCs in Soil Tier 1 levels for coarse-grained surface soils at industrial site
- (3) 2002 CCME Canadian EQG for soil at industrial sites
- Soil Samples in exc...
Soil samples in exc...

Table 1: Soil Sample Analyses From LTU1
(all concentrations are in mg/kg)

Parameters and Sampling Dates																
Xylene		F1 (C6-C10)			F2 (C10-C16)			F3 (C16-C34)			F4 (C34-C50)			F4G-SG (GHH Silica)		
Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005
3.5	7.3	260	110	180				810	1500	1200	290	310	550	2500	—	—
8.9	17	100	160	300					1700	1500	970	430	700	2000	7200	—
1.2	4.2	86	36	85		430	330	700	170	130	270	40	51	1300	—	—
0.41	1.3	57	14	46					1100	1100	1100	300	540	2600	2000	—
1.4	3.9	200	46	120					1400	690	980	360	330	2800	2400	—
4.0	9.6	25	180	160	330			160	540	410	77	150	190	—	—	—
8.6	0.15	240	190	11			340	350	860	270	100	180	120	—	—	—
	18			210				720	1200	870	240	260	370	890	4600	—
	14		230	170			740	900		260	360	910	100	1100	8600	—
18	2.2	11	110	<5			600	1000		360	450	610	120	1100	7700	—
		110	150	210				720	1400	1200	210	260	380	—	2000	—
14	15	49	99	150			<5	900	730	800	250	150	260	3200	—	—
13	2.7		—	83		—		630	—	960	230	—	410	900	—	—
								710	570	1300	210	120	530	—	—	—
	8.0			72			530	1300	430	190	430	92	89	1100	—	—
16	4.5	330	210	140			420	260	610	91	84	140	27	—	—	—
	7.2	81		260	210		540	31	600	120	6	130	33	—	—	—
19	0.96	32	200	27	230		13	32	1000	18	6	220	<5	—	1300	—
15	2.4		180	76				1400	1600	450	540	370	190	2100	1700	—
2.5			64					910		890	320	470	350	910	7900	—
17			160					700	1100	510	250	260	210	780	2000	—
1.9	3.1		52	89				970	1200	620	300	270	230	1000	2500	—
12		250	140					1100	1600	980	310	340	320	1100	2700	—
11	19	210	140	230				1300	760	580	390	170	190	990	—	—
20		N/V			N/V			N/V			N/V			N/V		
N/V		330			760			1700			3300			N/V		
20		N/V			N/V			N/V			N/V			N/V		

 Soil Samples in excess of GNWT and CCME EQG Criteria
 Soil samples in excess of CCME for PHCs in Soil Criteria

Table 1A: Soil Sample Analyses From LTU1 – Averaged
(all concentrations are in mg/kg)

Sample Identification	Parameters and Sampling Dates												
	Benzene			Toluene			Ethyl Benzene			Xylene			
Sampling Date	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002
All Depths													
Zone 1	2.6	0.7	2.5		0.1	0.5	0.2	0.2	1.1	7.5	3.2	7.2	12
Zone 2		2.3	2.8				1.4	1.0	0.9			12.6	23
Zone 3	4.6	2.2	3.4		0.1	0.7	0.7	0.3	1.3		15.8	14.0	
Zone 1 – Depths													
Surface	3.8	0.5	1.7		0.0	0.3	0.3	0.1	0.9	8.5	2.0	4.3	15
0.4 m	3.0	1.1	3.7	0.0	0.1	0.7	0.3	0.2	1.5	13.3	5.2	10.5	15
0.6 m	0.9	0.5	2.3	0.0	0.0	0.5	0.1	0.3	1.0	0.7	2.6	6.9	50
Zone 2 – Depths													
Surface	2.3	1.6	0.2		0.3	0.0	0.3	0.3	0.2	13.1	13.3	1.2	12
0.4 m		3.2	4.3				3.1	2.2	1.4				
0.6 m	4.8	2.1	4.0				0.7	0.5	1.2		18.5	14.5	19
Zone 3 – Depths													
Surface		1.8	0.9		0.1	0.2	1.1	0.2	0.8		11.5	3.2	
0.4 m	4.0	2.5		0.4	0.1		0.5	0.3	2.1		18.6		
0.6 m	3.6	2.3	3.4	0.6	0.1	0.7	0.4	0.3	0.9	16.1	17.3	13.5	
1998 GNWT Guideline ¹	5			0.8			20			20			
2001 CWS for PHCs in Soil ²	N/V			N/V			N/V			N/V			
2002 CCME EQG ³	5			0.8			20			20			

NOTES:

- (1) 1998 GNWT Guideline for Contaminated Site Remediation of industrial sites
 (2) 2001 CCME CWS for PHCs in Soil Tier 1 levels for coarse-grained surface soils at industrial site
 (3) 2002 CCME Canadian EQG for soil at industrial sites

Soil Samples in excess of guideline
 Soil samples in excess of guideline

Analyses From LTU1 – Averaged by Zone and Depth
 (all concentrations are in mg/kg)

Parameters and Sampling Dates

Xylene			F1 (C6-C10)			F2 (C10-C16)			F3 (C16-C34)			F4 (C34-C50)		
Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005
7.5	3.2	7.2	121	91	149	1500	2670	2130	1362	1068	838	615	265	394
		12.6	230	195	150	1500	2670	2130	765	1068	627	268	395	225
	15.8	14.0	230	228	267	1500	2670	2130	779	1052	559	256	235	234
8.5	2.0	4.3	159	62	113	1500	2670	2130	1405	1300	1150	695	305	545
13.3	5.2	10.5	150	103	210	1500	2670	2130	1550	1095	975	395	515	
0.7	2.6	6.9	56	108	123	1500	2670	2130	430	355	270	174	95	121
13.1	13.3	1.2	126	150	11	1500	2670	470	675	2000	315	275	395	120
			270	210		1500	2670	470	720	1300	1035	225	260	375
	18.5	14.5	195	165	160	1500	2670	740	900	2310	530	305	530	180
	11.5	3.2	147	97		1500	2670	1500	815	1137	530	289	260	214
	18.6		261			1500	2670	1500	688	1218	823	212	265	308
16.1	17.3	13.5	255	255		1500	2670	1500	833	823	325	269	186	163
20			N/V			N/V			N/V			N/V		
N/V			330			760			1700			3300		
20			N/V			N/V			N/V			N/V		

 Soil Samples in excess of GNWT and CCME EQG Criteria
 Soil samples in excess of CCME for PHCs in Soil Criteria

Table 2A: Soil Sample Analyses From LTU2 – Averaged
(all concentrations are in mg/kg)

Sample Identification	Parameters and Sampling Dates												
	Benzene			Toluene			Ethyl Benzene			Xylene			Other
Sampling Date	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002
Total Area													
Surface		1.8	0.8			0.5	1.5	0.5	0.6		13.3	9.0	
0.4 m below grade	4.2	2.3	3.6				0.8	1.3	2.9		17.9		326
0.6/0.8 m below grade	2.7	1.3		0.7	0.4		0.5	0.3	7.0		8.3		238
Heated Area													
Surface		1.6	0.7				2.6	0.5	0.6		14.1	10.1	
0.4 m below grade		0.9	0.5			0.3	2.6	0.3	0.3		9.2	4.2	
0.6/0.8 m below grade		1.8		0.8	0.8		0.4	0.4	7.7	9.1	11.0		125
Unheated Area													
Surface	2.5	2.1	0.9	0.2		0.3	0.4	0.5	0.6		12.1	7.5	272
0.4 m below grade	1.9	2.4	3.1	0.5			0.6	1.3	1.5			11.3	292
0.6/0.8 m below grade	2.3	0.8		0.5	0.1		0.6	0.2	6.3		5.5		
1998 GNWT Guideline ¹	5			0.8			20			20			
2001 CWS for PHCs in Soil ²	N/V			N/V			N/V			N/V			
2002 CCME EQG ³	5			0.8			20			20			

NOTES:

- (1) 1998 GNWT Guideline for Contaminated Site Remediation of industrial sites
- (2) 2001 CCME CWS for PHCs in Soil Tier 1 levels for coarse-grained surface soils at industrial site
- (3) 2002 CCME Canadian EQG for soil at industrial sites

Soil Samples in ex
Soil samples in e

Analyses From LTU2 – Averaged by Depth and Areas
all concentrations are in mg/kg)

Parameters and Sampling Dates

Xylene			F1 (C6-C10)			F2 (C10-C16)			F3 (C16-C34)			F4 (C34-C50)		
Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005
	13.3	9.0		174	86			937	637	420	446	235	89	173
	17.9		326	271	148				657	725	665	235	145	248
	8.3		238	133					580	413	953	195	75	380
	14.1	10.1		139	64				660	420	660	260	94	263
	9.2	4.2		83	41		615		660	260	810	260	53	305
9.1	11.0		125	165					460	360	1250	168	67	485
	12.1	7.5	272	222	116			507	613	420	160	210	82	53
		11.3	292		195				589	1010	460	190	190	155
	5.5			102					700	465	655	221	83	275
20			N/V			N/V			N/V			N/V		
N/V			330			760			1700			3300		
20			N/V			N/V			N/V			N/V		

 Soil Samples in excess of GNWT and CCME EQG Criteria
 Soil samples in excess of CCME for PHCs in Soil Criteria

site

Table 2: Soil Sample Analyses From
(all concentrations are in mg/kg)

Sample Identification	Parameters and Sampling Dates														
	Benzene			Toluene			Ethyl Benzene			Xylene			F1 (C6-C10)		
Sampling Date	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005
.2+mn1		0.16	0.63		<0.01	0.36	4.2	0.03	0.29		0.42	4.2		15	
.2+mn2		0.23			<0.01		1.3	0.05	6.7			0.35			15
.2+mn3	4.4	1.6		0.10	0.06		0.23	0.14	8.1	6.1	10		140	200	
.2+mn4	4.8	1.7	0.36			0.19	0.93	0.52	0.31		18	4.1	260	150	
.2+mn5	4.1	4.2	1.8	0.48			0.59	2.4	2.0				250	300	
.2+mn6	1.9	2.0					0.52	0.66	7.3	12	12		110	130	
.2+mn7	3.9	1.4	0.32	0.42 ^a		0.06	0.68	0.87	0.39			2.2		190	
.2+mn8	3.1	2.7	2.9	0.46			0.97	1.9	1.7			9.6		330	
.2+mn9	3.3	0.84		0.53	0.09		1.0	0.16	7.5		6.7			93	
.2+mn10	1.1	0.59	0.34	0.01	0.04	0.06	0.14	0.16	0.29	4.1	6.0	1.4	94	75	
.2+mn11	0.69	2.1	3.2	<0.01	0.20		0.15	0.75	1.2	3.0	7.3	13	63		
.2+mn12	1.3	0.77		<0.01	0.01		0.28	0.16	5.0	5.5	4.3		110	110	
.13 mn13	—	0.87	0.54	—	0.77		—	0.21	1.2	—	15	18	—	120	
.13 mn14	—	3.8	1.2	—		0.79	—	1.2	0.77	—		14	—	270	
.13 mn15	—	4.2	2.1	—	0.02	0.65	—	0.44	1.2	—	6.4	19	—		
1998 GNWT Guideline ¹	5			0.8			20			20			N/V		
2001 CWS for PHCs in Soil ²	N/V			N/V			N/V			N/V			330		
2002 CCME EQG ³	5			0.8			20			20			N/V		

NOTES:

- (1) 1998 GNWT Guideline for Contaminated Site Remediation of industrial sites
- (2) 2001 CCME CWS for PHCs in Soil Tier 1 levels for coarse-grained surface soils at industrial site
- (3) 2002 CCME Canadian EQG for soil at industrial sites

Soil Samples in e
Soil samples in

2: Soil Sample Analyses From LTU2
 all concentrations are in mg/kg)

Parameters and Sampling Dates																
ylene		F1 (C6-C10)			F2 (C10-C16)			F3 (C16-C34)			F4 (C34-C50)			F4G-SG (GHH Silica)		
Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005	Aug 2002	Sept 2003	Sept 2005
0.42	4.2		15	38		300		710	210	780	270	48	290	790	—	—
0.35			15	40		260		760	150	920	280	38	360	940	—	—
10		140	200					720	550	1100	260	100	440	850	—	—
18	4.1	260	150	44		930	<5	610	310	840	250	57	320	1300	—	—
		250	300	160				690	730	820	280	160	320	750	—	—
12		110	130		430	430		200	170	1400	76	34	530	—	—	—
	2.2		190	52			330	1200	560	130	410	100	42	1400	—	—
	9.6		330	240				1100	1100	530	360	200	170	1500	—	—
6.7			93					1300	320	1000	420	56	420	1500	—	—
6.0	1.4	94	75	37	130		220	26	440	150	10	83	56	—	—	—
7.3	13	63		150	500			78	920	390	20	180	140	—	—	—
4.3		110	110					99	610	310	22	110	130	—	—	—
15	18	—	120	80	—			—	480	360	—	110	180	—	—	—
	14	—	270	92	—			—	680	660	—	160	260	—	—	—
6.4	19	—		260	—	760		—	260	200	—	62	60	—	—	—
20		N/V			N/V			N/V			N/V			N/V		
N/V		330			760			1700			3300			N/V		
20		N/V			N/V			N/V			N/V			N/V		

 Soil Samples in excess of GNWT and CCME EQG Criteria
 Soil samples in excess of CCME for PHCs in Soil Criteria

Table 3: Soil Sample Analyses

Sample Identification	Parameters			
	Sample Date	Aerobic Plate Count (CFU/gram)	Anaerobic Heterotrophic Plate Count (CFU/gram)	Hydrocarbon Reducing Bacteria (MPNU/gram)
LTU 1: 0-.2+mc1	Aug 26, 2002	15,800,000	26,700,000	N/V
LTU 1: 0-.2+mc2	Aug 26, 2002	2,250,000	840,000	N/V
LTU 1: 0-.2+mc3	Aug 26, 2002	1,580,000	380,000	N/V
LTU 1: 0-.2+mc4	Aug 26, 2002	5,550,000	170,000	N/V
LTU 1: 0-.2+mc5	Aug 26, 2002	8,200,000	2,050,000	N/V
LTU 1: 0-.2+mc6	Aug 26, 2002	1,630,000	69,000	N/V
LTU 1: 0-.2+mn1	Aug 26, 2002	13,500,000	12,100,000	N/V
LTU 1: 0-.2+mn2	Aug 26, 2002	19,000,000	420,000	N/V
LTU 1: 0-.2+mn3	Aug 26, 2002	9,050,000	4,800,000	N/V
LTU 1: 0-.2+mn4	Aug 26, 2002	3,600,000	650,000	N/V
LTU 1: 0-.2+mn5	Aug 26, 2002	16,000,000	5,300,000	N/V
LTU 1: 0-.2+mn6	Aug 26, 2002	12,700,000	2,100,000	N/V
LTU 1: .2+mc1	Aug 26, 2002	2,000,000	200	N/V
LTU 1: .2+mc2	Aug 26, 2002	18,200,000	200	N/V
LTU 1: .2+mc3	Aug 26, 2002	8,400,000	150	N/V
LTU 1: .2+mc4	Aug 26, 2002	2,100,000	100	N/V
LTU 1: .2+mc5	Aug 26, 2002	960,000	50	N/V
LTU 1: .2+mc6	Aug 26, 2002	590,000	50	N/V
LTU 1: .2+mc7	Aug 26, 2002	19,100	900	N/V
LTU 1: .2+mc8	Aug 26, 2002	19,300,000	1,270,000	N/V
LTU 1: .2+mc9	Aug 26, 2002	7,000,000	100	N/V
LTU 1: .2+mc10	Aug 26, 2002	13,600,000	10,700,000	N/V
LTU 1: .2+mc11	Aug 26, 2002	27,000,000	<100	N/V
LTU 1: .2+mc12	Aug 26, 2002	16,500,000	300	N/V
LTU 2: .2+mn1	Aug 26, 2002	7,100,000	5000	N/V
LTU 2: .2+mn2	Aug 26, 2002	10,100,000	<100	N/V
LTU 2: .2+mn3	Aug 26, 2002	11,600,000	<100	N/V
LTU 2: .2+mn4	Aug 26, 2002	10,600,000	<100	N/V
LTU 2: .2+mn5	Aug 26, 2002	4,000,000	<100	N/V
LTU 2: .2+mn6	Aug 26, 2002	1,550,000	1,700,000	N/V
LTU 2: .2+mn7	Aug 26, 2002	12,200,000	1,100,000	N/V
LTU 2: .2+mn8	Aug 26, 2002	12,600,000	430,000	N/V
LTU 2: .2+mn9	Aug 26, 2002	19,600,000	60,000	N/V
LTU 2: .2+mn10	Aug 26, 2002	2,940,000	200,000	N/V
LTU 2: .2+mn11	Aug 26, 2002	1,400,000	76,500	N/V
LTU 2: .2+mn12	Aug 26, 2002	2,700,000	345,000	N/V
LTU1: SP1 (0-.2+mc1)	Sept 9, 2003	3,300,000	< 5	7500
LTU1: SP3 (0-.2+mn1)	Sept 9, 2003	2000	< 5	< 3
LTU1: SP5 (.2+mc1)	Sept 9, 2003	4,450,000	< 5	15000
LTU1: SP7 (.2+mc7)	Sept 9, 2003	2,350,000	500	3900
LTU2: SP10 (.2+mn4)	Sept 9, 2003	3,550,000	< 5	> 150000
LTU2: SP11(.2+mn10)	Sept 9, 2003	5,550,000	< 5	> 150000

NOTES:

CFU = Colony Forming Units

MPNU = Most Probable Number Units

N/V = No Value Reported in Test Results

Table 3A: Soil Sample Analyses for Bacteria Plate Counts - Comparison					
Sample Identification	Parameters				
	Zone or Area	Sample Date	Aerobic Plate Count (CFU/gram)	Anaerobic Heterotrophic Plate Count (CFU/gram)	Hydrocarbon Reducing Bacteria (MPNU/gram)
LTU 1: 0-.2+mc1	Zone 1	Aug 26, 2002	15,800,000	26,700,000	N/V
LTU 1: 0-.2+mn1	Zone 2	Aug 26, 2002	13,500,000	12,100,000	N/V
LTU 1: .2+mc1	Zone 3	Aug 26, 2002	2,000,000	200	N/V
LTU 1: .2+mc7	Zone 3	Aug 26, 2002	19,100	900	N/V
LTU 2: .2+mn4	Heated	Aug 26, 2002	10,600,000	<100	N/V
LTU 2: .2+mn10	Unheated	Aug 26, 2002	2,940,000	200,000	N/V
LTU1: SP1 (0-.2+mc1)	Zone 1	Sept 9, 2003	3,300,000	< 5	7500
LTU1: SP3 (0-.2+mn1)	Zone 2	Sept 9, 2003	2000	< 5	< 3
LTU1: SP5 (.2+mc1)	Zone 3	Sept 9, 2003	4,450,000	< 5	15000
LTU1: SP7 (.2+mc7)	Zone 3	Sept 9, 2003	2,350,000	500	3900
LTU2: SP10 (.2+mn4)	Heated	Sept 9, 2003	3,550,000	< 5	> 150000
LTU2: SP11(.2+mn10)	Unheated	Sept 9, 2003	5,550,000	< 5	> 150000

NOTES:

CFU = Colony Forming Units

MPNU = Most Probable Number Units

N/V = No Value Reported in Test Results

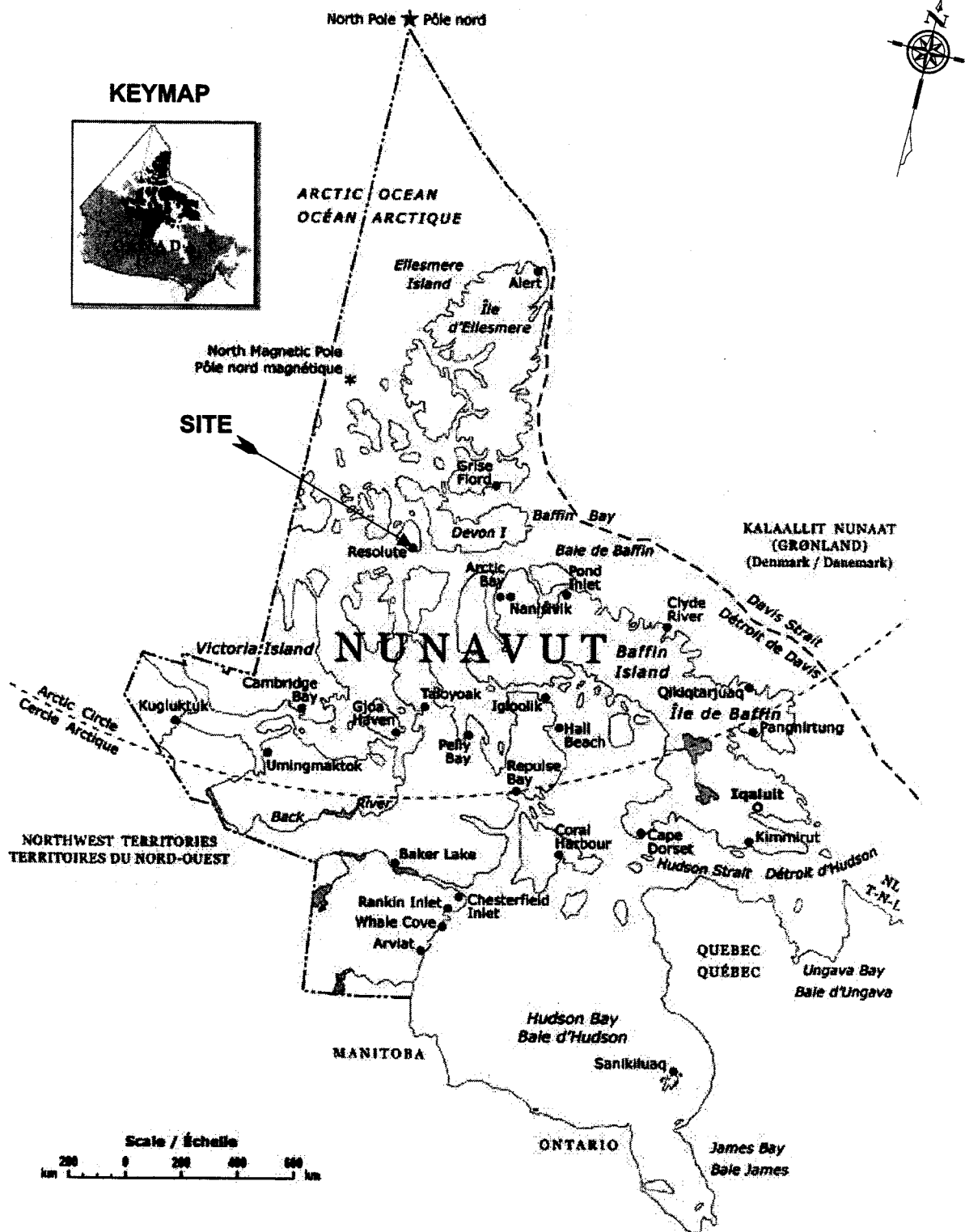
\\Server\projects\2002\Projects\117(W.E.I Inc.)\08(Resolute Bay)\FinalReport\Table3A.doc

Table 4: Temperature Data from Thermocouples
(all temperatures are in °C)

Wire Coding	Tape Coding	Temperature Readings		
		Aug 11/04	Aug 12/04	Aug 28/05
Ambient Air Temperature (Environment Canada Data)		2.6	2.6	4.7
A @ Grade	1 thin strip black	11	2	4
A @ 0.4	2 thin strips black	4	0	2
B @ Grade	3 thin strips black	10	2	3
B @ 0.4	4 thin strips black	—	—	—
C @ 0.4	1 thick grey	—	—	1
D @ Grade	1 thick grey; 1 thin black	11	2	3
D @ 0.4	1 thick grey; 2 thin black	4	1	2
E @ Grade	1 thick grey, 3 thin black	11	1	3
E @ 0.4	1 thick grey, 4 thin black	8	0	0
F @ 0.4	2 thick grey	9	0	2
G @ 0.4	2 thick grey, 1 thin black	6	1	2
H - Ambient	2 thick grey, 2 thin black	9	—	5
I - Intake	2 thick grey, 3 thin black	15	17	5
J - Leaf	2 thick grey, 4 thin black	8	57	5
K @ Grade	3 thick grey	8	2	3
K@ 0.4	3 thick grey, 1 thin black	6	2	3

LIST OF FIGURES

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- Figure 2: LTU Site Location
- Figure 3: LTU Locations
- Figure 4: LTU1 Sampling Locations
- Figure 5: LTU 2 Sampling Locations
- Figure 6: Layout Plan of Ground Heating System
- Figure 7: Air Exchange Housing
- Figure 8: Thermocouple Locations



CLIENT:

TRANSPORT CANADA

DRAWN BY:

KWJ

SCALE:

As shown

DATE:

FEB 2004

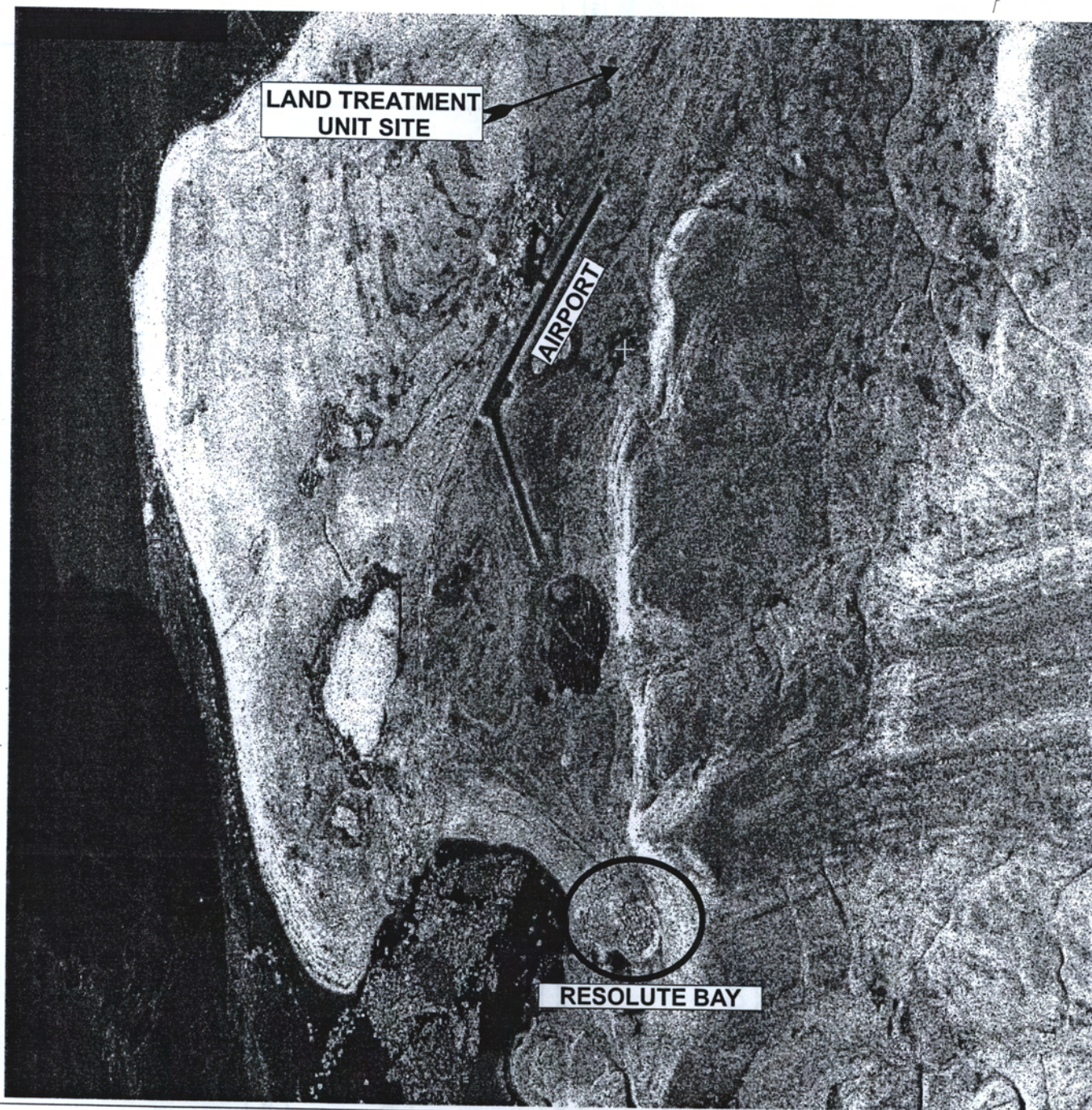
FILE No.

02-117-06

FIGURE No.

1

RESOLUTE BAY LOCATION
RESOLUTE BAY FTA
REMEDIAL WORK
RESOLUTE BAY, NUNAVUT



CLIENT:

TRANSPORT CANADA

DRAWN BY:

KWJ

SCALE:

N/A

DATE:

FEB 2004

FILE No.

02-117-06

FIGURE No.

2

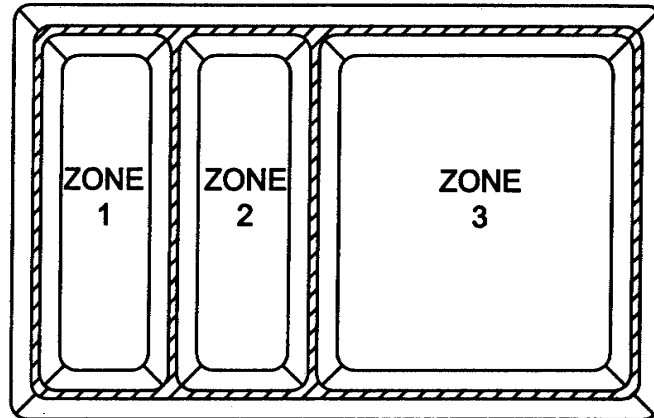
LTU SITE LOCATION
RESOLUTE BAY FTA
REMEDIAL WORK
RESOLUTE BAY, NUNAVUT



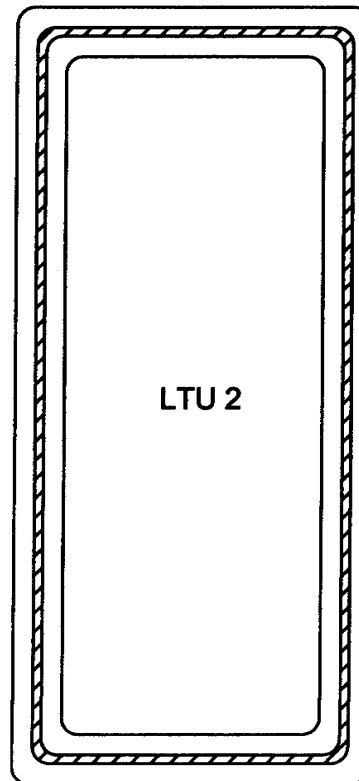
NAV CAN TOWER



LTU 1



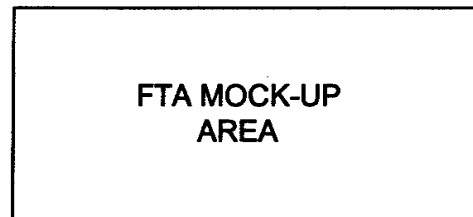
AST SITE



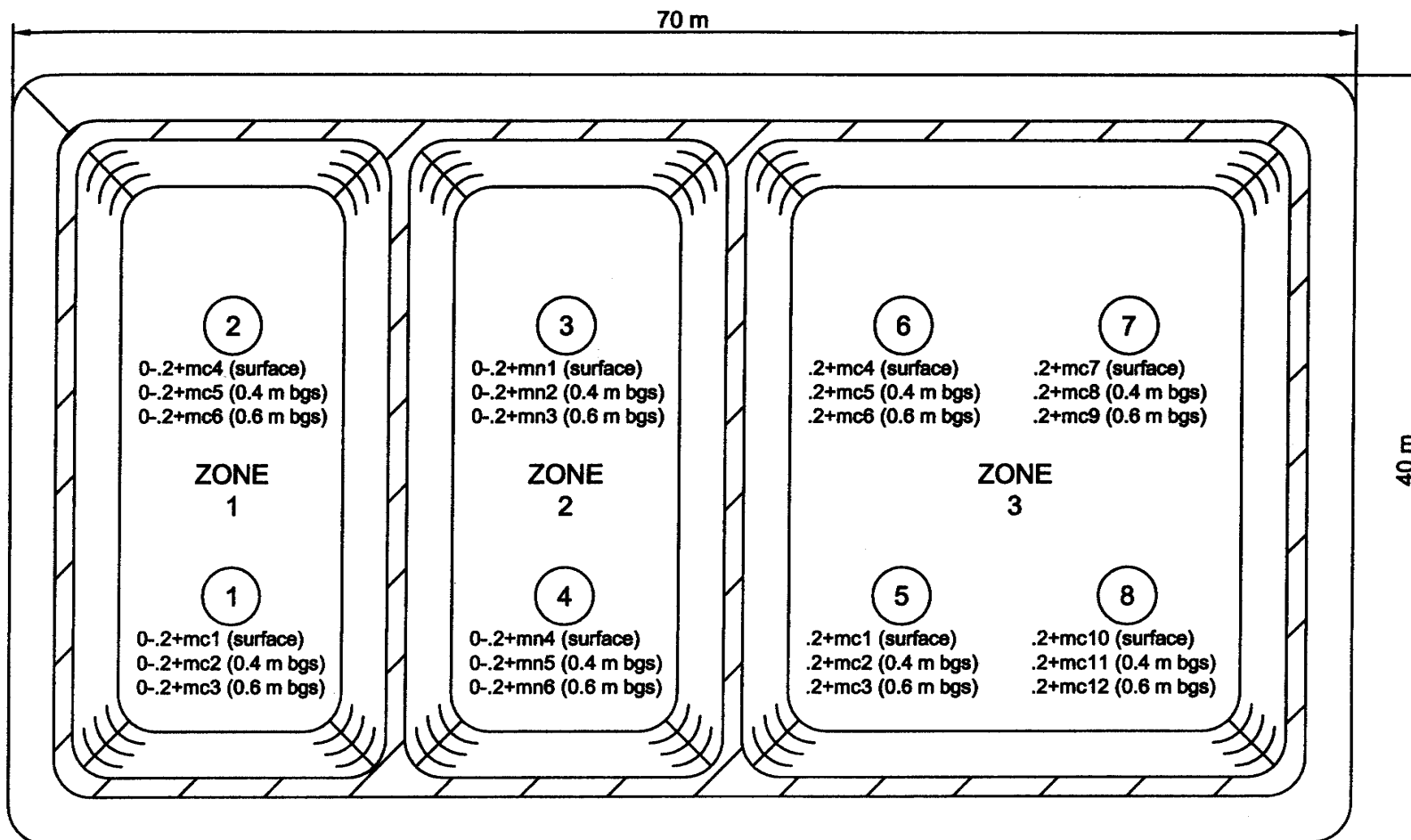
GRAVEL ROAD

GRAVEL ROAD LEADING TO METAL DUMP

FTA MOCK-UP
AREA



No.	DD / MM / YYYY	DESCRIPTION	BY
			#8 - 854 Marion Street Winnipeg, MB R2J 0K4 Phone: (204) 233-1894 Fax: (204) 235-1579
ENG. STAMP:		 Certificate of Authorisation ENG-TECH Consulting Limited No. 2476 Expiry: April 30, 2006	
CLIENT: TRANSPORT CANADA			
PROJECT: RESOLUTE BAY FTA REMEDIAL WORK RESOLUTE BAY, NUNAVUT			
DWG DESCRIPTION: LTU LOCATIONS			
SCALE: NTS			
DRAWN BY: KWJ		DATE: FEBRUARY 2004	
FILE No.: 02-117-06		CLIENT DWG/FIG. No.:	
ENG-TECH DWG/FIG. No.: 3			REV.: 1



NOTES:

① Sample Location

bgs = Below ground surface

0-.2+mc1 (surface) = Sample identification (depth of sample)



No.	DD / MM / YYYY	DESCRIPTION	BY

ENG-TECH
Consulting Limited

#8 - 854 Marion Street
Winnipeg, MB R2J 0K4
Phone: (204) 233-1894
Fax: (204) 235-1579

ENG. STAMP:



CLIENT:
TRANSPORT CANADA

PROJECT:
RESOLUTE BAY FTA
REMEDIAL WORK
RESOLUTE BAY, NUNAVUT

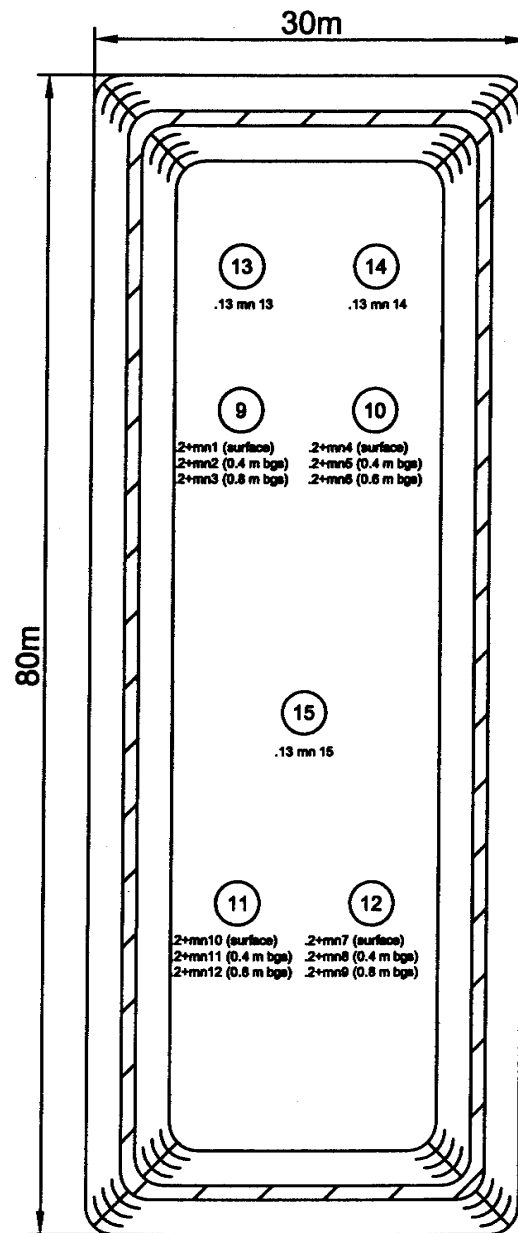
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LTU 1 SAMPLING LOCATIONS

SCALE:
NTS

DRAWN BY: KWJ DATE: FEBRUARY 2004

FILE No.: 02-117-06 CLIENT DWGFIG. No.:

ENG-TECH DWGFIG. No.: 4 REV.: 1



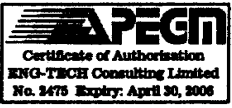
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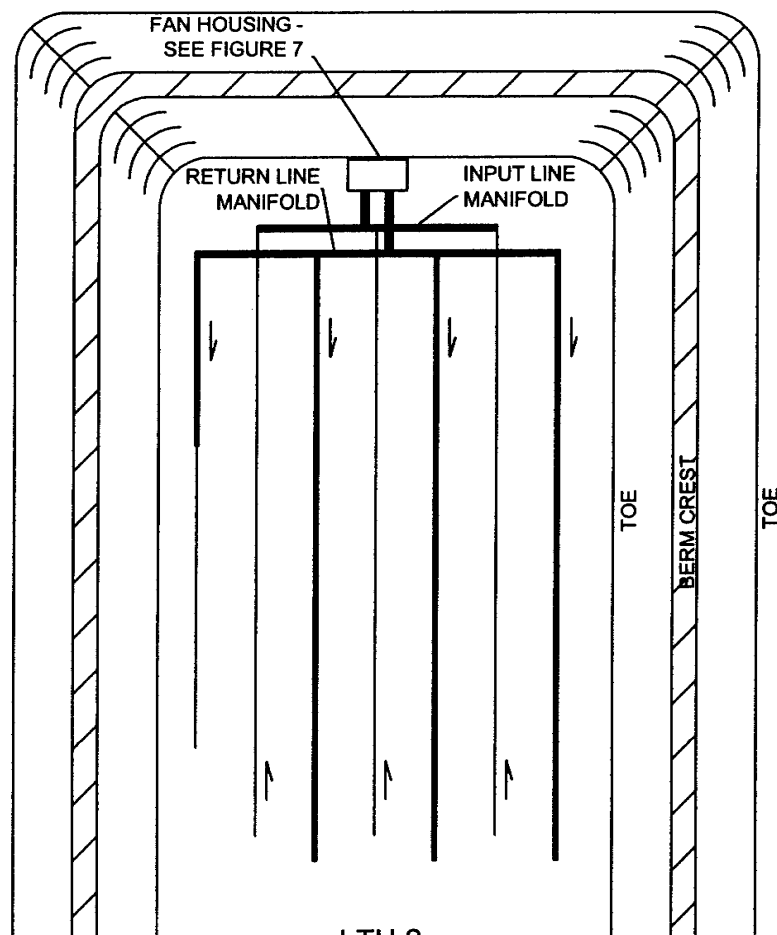
⑪ Sample Location

bgs = Below ground surface

0-2+mc1 (surface) = Sample identification (depth of sample)



No.	DD / MM / YYYY	DESCRIPTION	BY
		 #6 - 854 Marion Street Winnipeg, MB R2J 0K4 Phone: (204) 233-1894 Fax: (204) 235-1579	
ENG. STAMP:		 Certificate of Authorisation ENG-TECH Consulting Limited No. 2475 Expiry: April 30, 2006	
CLIENT: TRANSPORT CANADA			
PROJECT: RESOLUTE BAY FTA REMEDIAL WORK RESOLUTE BAY, NUNAVUT			
DWG DESCRIPTION: LTU 2 SAMPLING LOCATIONS			
SCALE: NTS			
DRAWN BY: KWJ		DATE: FEBRUARY 2004	
FILE No.: 02-117-06		CLIENT DWG/FIG. No.:	
ENG-TECH DWG/FIG. No.: 5			REV.: 1



LTU 2

NOTES:

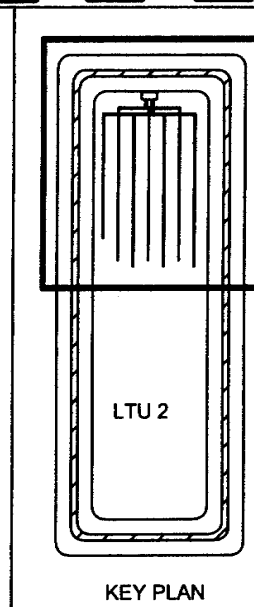
RETURN LINES (4):

USED 150 mm (6 in.) DIAMETER PIPE WITH SAW CUTS. (I)
 ALL RETURN LINES WERE 24.4 m (80 ft.) LONG, EXCEPT FOR THE MOST WESTERN LINE WAS 19.8 m (65 ft.) LONG; AND THE SOUTHERN 12.2 m (40 ft.) WAS 75 mm (3 in. PIPE) IN DIAMETER.

INPUT LINES (3):

USED 75 mm (3 in.) DIAMETER PIPE WITH MANUFACTURE CUTS. (I)
 ALL INPUT LINES WERE 24.4 m (80 ft.) LONG.

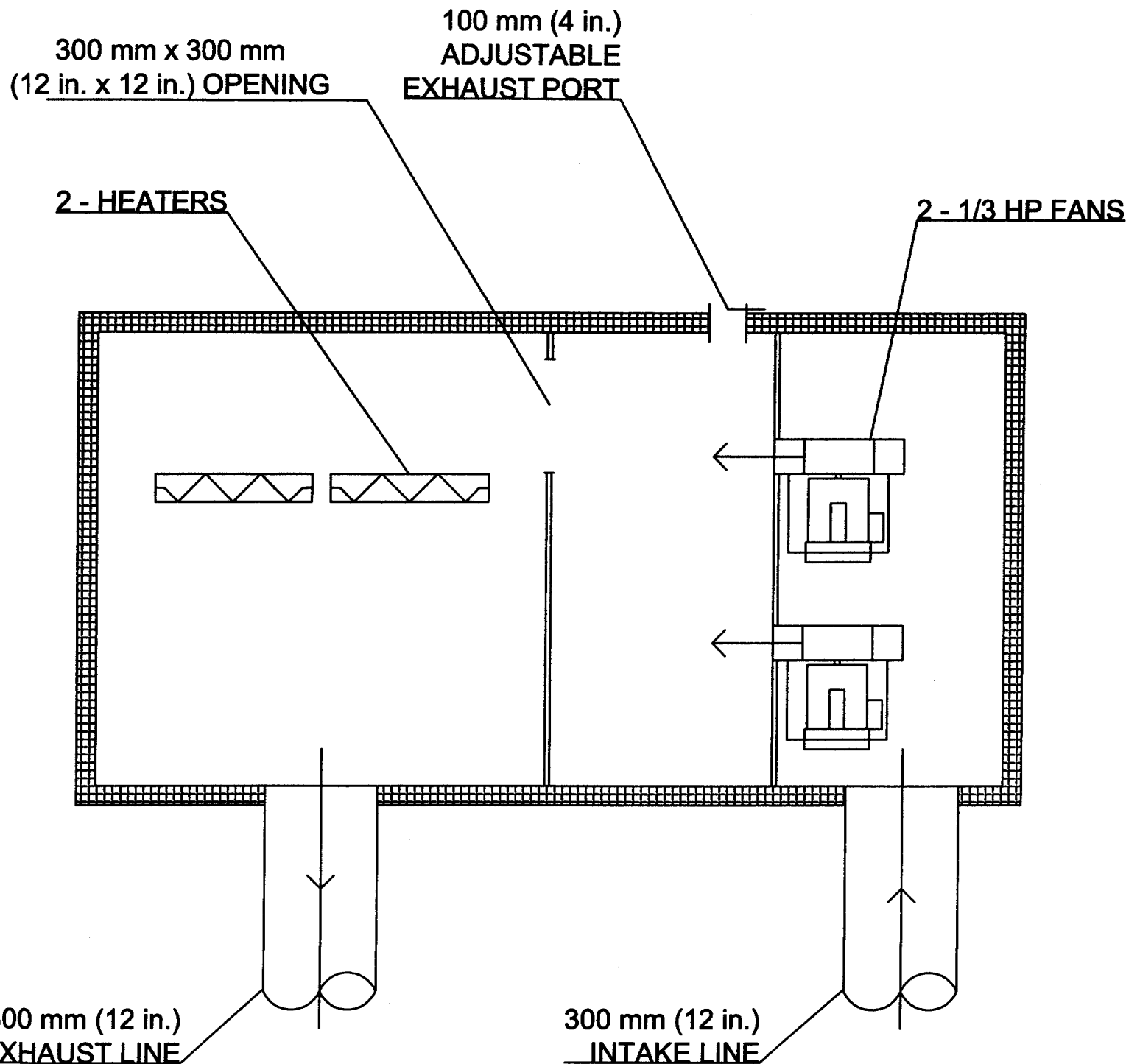
ALL PIPE, EXCEPT MANIFOLDS, WERE INSTALLED 0.4 m BELOW GRADE.
 MOST WESTERN PIPE WAS LOCATED 1.5 m (5 ft.) INSIDE TOE OF BERM.
 ALL PIPES WERE SPACED AT 2.4 m (8 ft.) APART.
 USED SOLID 200 mm (8 in.) DIAMETER PVC WITH TEES FOR INPUT/RETURN LINE MANIFOLD CONNECTIONS.
 USED 300 mm (12 in.) DIAMETER CLOTH FLEXIBLE MEMBRANES FOR FAN HOUSING MANIFOLDS



KEY PLAN

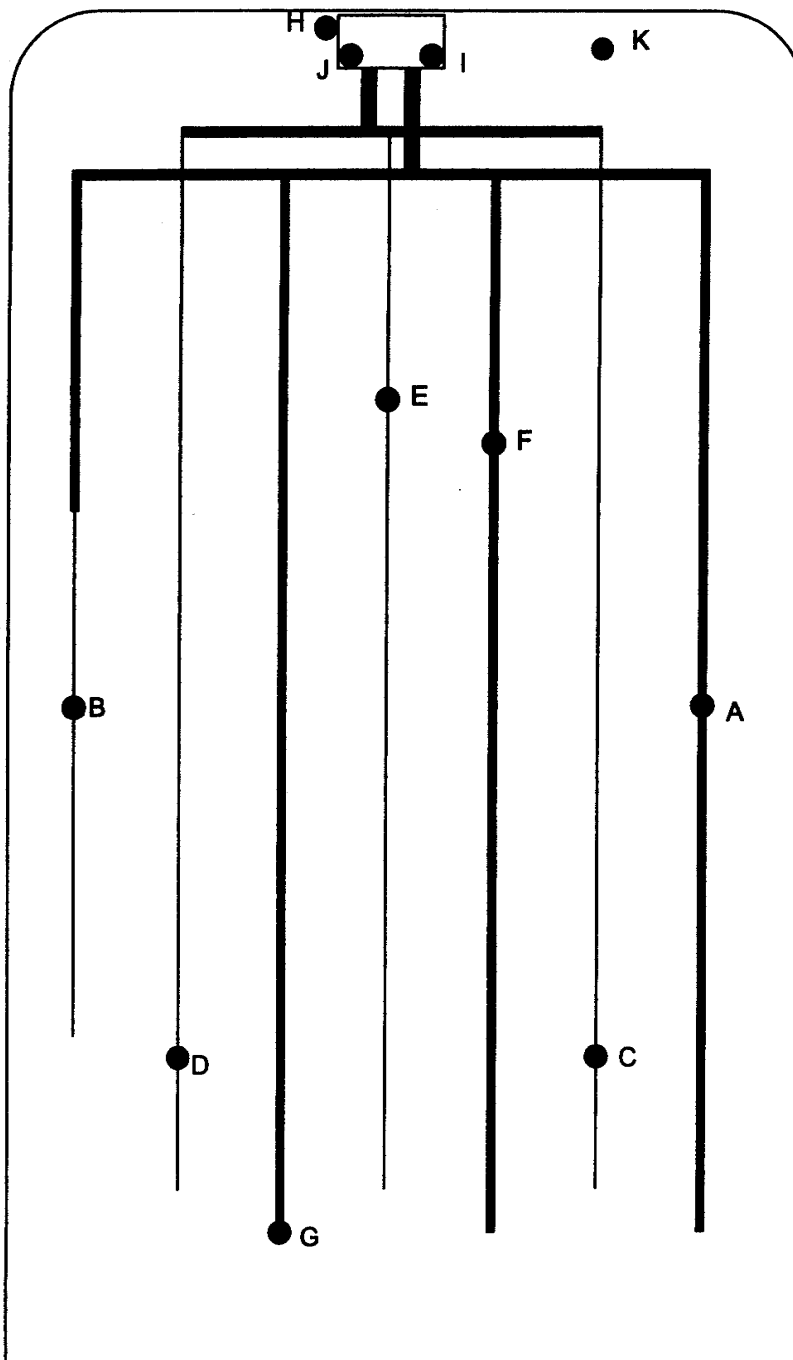


No.	DD / MM / YYYY	DESCRIPTION	BY
		 #6 - 854 Marion Street Winnipeg, MB R2J 0K4 Phone: (204) 233-1694 Fax: (204) 235-1579	
ENG. STAMP:		 Certificate of Authorization ENG-TECH Consulting Limited No. 2475 Expiry: April 30, 2006	
CLIENT: TRANSPORT CANADA			
PROJECT: RESOLUTE BAY FTA REMEDIAL WORK RESOLUTE BAY, NUNAVUT			
DWG DESCRIPTION: LAYOUT PLAN OF GROUND HEATING SYSTEM			
SCALE: NTS			
DRAWN BY: KWJ		DATE: FEBRUARY 2004	
FILE No.: 02-117-06		CLIENT DWG/FIG. No.:	
ENG-TECH DWG/FIG. No.: 6			REV.: 1



No.	DD / MM / YYYY	DESCRIPTION	BY
		 #8 - 854 Marion Street Winnipeg, MB R2J 0K4 Phone: (204) 233-1694 Fax: (204) 235-1579	
ENG. STAMP:		 Certificate of Authorisation ENG-TECH Consulting Limited No. 2475 Expiry: April 30, 2006	
CLIENT: TRANSPORT CANADA			
PROJECT: RESOLUTE BAY FTA REMEDIAL WORK RESOLUTE BAY, NUNAVUT			
DWG DESCRIPTION: AIR EXCHANGE HOUSING			
SCALE: NTS			
DRAWN BY: KWJ		DATE: FEBRUARY 2004	
FILE No.: 02-117-06		CLIENT DWG/FIG. No.:	
ENG-TECH DWG/FIG. No.: 7			REV.: 1

INSIDE TOE OF BERM



■ 150 mm (6 in.) DIAMETER PIPE WITH SAW CUTS

| 75 mm (3 in.) DIAMETER PIPE WITH MANUFACTURE CUTS

● THERMOCOUPLE LEGEND

ID - Depth (wire coding)

A - 0.0 m below grade (1 thin black strip)
0.4 m below grade (2 thin black strips)

B - 0.0 m below grade (3 thin black strips)
0.4 m below grade (4 thin black strips)

C - 0.4 m below grade (1 thick grey strip)

D - 0.0 m below grade (1 thick grey strip, 1 thin black strip)
0.4 m below grade (1 thick grey strip, 2 thin black strips)

E - 0.0 m below grade (1 thick grey strip, 3 thin black strips)
0.4 m below grade (1 thick grey strip, 4 thin black strips)

F - 0.4 m below grade (2 thick grey strips)

G - 0.4 m below grade (2 thick grey strips, 1 thin black)

H - Ambient Air Temperature (2 thick grey strips, 2 thin black)

I - Intake Chamber (2 thick grey strips, 3 thin black strips)

J - Exhaust Chamber (2 thick grey strips, 4 thin black)

K - 0.0 m below grade (3 thick grey strips)
0.4 m below grade (3 thick grey strips, 1 thin black strip)



No.	DD / MM / YYYY	DESCRIPTION	BY
		 #8 - 854 Marion Street Winnipeg, MB R2J 0K4 Phone: (204) 233-1894 Fax: (204) 235-1579	
ENG. STAMP:		 Certificate of Authorization ENG-TECH Consulting Limited No. 3475 Expiry: April 30, 2006	
CLIENT: TRANSPORT CANADA			
PROJECT: THERMOCOUPLE LOCATIONS			
DWG DESCRIPTION: AIR EXCHANGE HOUSING			
SCALE: NTS			
DRAWN BY: KWJ		DATE: FEBRUARY 2004	
FILE No.: 02-117-06		CLIENT DWG/FIG. No.:	
ENG-TECH DWG/FIG. No.: 8			REV.: 1

APPENDIX A

Soil Remediation Literature Review

Soil Remediation Literature Review

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1.0 Introduction

ENG-TECH Consulting Limited (ENG-TECH) and Winnipeg Environmental Remediations Inc. (WERI) were retained by Transport Canada to complete a literature review on remediation technologies for petroleum hydrocarbons. ENG-TECH and WERI are currently involved in a project in Resolute Bay, Nunavut where bio-degradation of petroleum hydrocarbons in land treatment units (LTUs) is currently ongoing. The purpose of the literature is to outline some of the technologies which could be used and some of the items which impact the use of each technology. Emphases on costs or availability were not assessed in the review.

2.0 Background

Remediation of contaminated sites, in particular hydrocarbon contaminated sites, is a rapidly expanding requirement in North America. This is due, in part, to knowledge of the hazards that hydrocarbon contaminated soil and groundwater represent. There are several different in-situ and ex-situ remediation technologies available. The four most commonly considered are biological, physical, chemical and thermal.

3.0 Bioremediation

Bioremediation or biodegradation means "the process of degradation or remediation is biological". Bioremediation is a process where microorganisms, both bacteria and fungi, biologically oxidize organic compounds (substrate) into carbon dioxide, water and biomass (Autry and Ellis, 1992; Zitrides, 1990; Torpy et al., 1989), (in simpler terms, the decomposition of leaves is a process of bioremediation). Any form of organic substance may be susceptible to biodegradation, including hydrocarbons.

3.1 Bioremediation Approaches

There are two different bioremediation approaches: (1) the microbiological approach and (2) the microbial ecology approach (Golueke and Diaz, 1990; Piotroski, 1991; Mayer and Horn, 1991).

3.1.1 Microbiological Approach

The microbiological approach involves inoculating contaminated soil with specific microorganisms. The microorganisms used are either contaminant-specific or site-specific.

The first form, contaminant-specific degraders, is purchased commercially and arrives pre-packaged. The microorganisms are isolated from a contaminated site because of their inherent ability to degrade a particular contaminant. The microorganisms are further acclimated to degrade the contaminant at elevated concentrations. The strains having the ability to degrade the contaminant at elevated concentrations are then isolated, cultured in large numbers, and stored for use at other sites having the same contaminant.

The second form is site-specific degraders. Soil samples from the contaminated site are brought to a laboratory and the process of acclimating the microbial population to degrade the site specific contaminants at elevated concentrations begins. Again, strains having the ability to degrade the contaminants at elevated concentrations are isolated, cultured in large numbers, and then re-applied to the site from which they were obtained.

These two forms have the same objective, to use specific microbial strains to increase the rate of contaminant degradation.

3.1.2 Microbial Ecology Approach

The microbial ecology approach involves identifying and adjusting various physical and chemical parameters which may impede the rate of degradation by indigenous (site specific) microorganisms. This approach involves neutralizing the effects of Leibig's law of minimum or Shelford's law of tolerance. According to these laws, the rate of a biological process, such as growth, is limited by the parameter that is furthest from the organisms requirements (e.g. nutrients) or tolerance (such as temperature, pH, etc.)(Atlas and Bartha, 1993). Once the rate limiting parameter is identified and adjusted, the indigenous microorganisms are left to degrade the contaminant. Little attention is given to isolating and identifying the degrading microorganisms. However, in most bioremediation systems, more than one parameter requires adjustment before the system is optimized.

3.1.3 Advantages and Disadvantages

Each approach (microbiological and microbial ecology) has advantages and disadvantages over the other. The greatest advantage the microbiological approach has is that the microorganisms are contaminant specific. Therefore, an immediate increase in the rate of contaminant degradation occurs when the microbes are applied to the site. There is no acclimation period or the acclimation period is very short as compared to the microbial ecology approach.

Major disadvantages in using pre-packaged microbes include: (1) acclimation is usually done at a higher temperature than the site temperature, this could result in the incorrect microbial temperature group being used in a cold climate (ie. microorganisms from the mesophile group are being used instead of microorganisms from the psychrophile group), (2) microbes may not fare well under the conditions in which they are being used compared to the indigenous microorganisms, (3) not just one or two species are responsible for completely degrading the contaminants, (4) once nutrients are applied to the site, indigenous microorganisms can fare better because they are used to site conditions, and (5) purchasing or laboratory costs.

3.2 Parameters Affecting Bioremediation

There are a variety of different parameters that can hinder any bioremediation process. Not all parameters will be discussed here. Only those parameters most often referred to in the literature dealing with in-situ bioremediation will be discussed under the following three headings: physical, chemical and microbiological.

3.2.1 Physical Factors

The physical parameters discussed most often in the literature include:

- temperature
- hydraulic conductivity and permeability
- contaminant type and concentration
- stratigraphy, lithology and hydrogeology

The affects of each of these parameters on bioremediation will be discussed.

3.2.1.1 Temperature

Temperature has the most profound affect on the rate of microbial growth though to a lesser extent it may also affect chemical reactions. Usually, an increase in temperature results in an increase in the rate of microbial growth (Henson, 1991), providing the temperature increase is not above the organism's optimum temperature for growth.

Based on temperature, microorganisms can broadly be distinguished into three groups. The three groups are: psychrophiles, mesophiles and thermophiles. Each group has both a general and optimum temperature range for growth. The general growth range of one group does overlap the general growth range of the adjacent group. The mesophile group is the most predominant degrader of petroleum contaminants and has an optimum growth temperature of 27°C (Song et al., 1990). Lower temperatures will cause lower biodegradation rates, but biodegradation will still occur. It is estimated that psychrophile microorganisms are about 60 - 70% as efficient as mesophiles.

3.2.1.2 Hydraulic Conductivity and Permeability

Darcy's law states that the flow rate of a liquid through porous media is proportional to the head loss, h , and inversely proportional to the length, l , of flow path in one dimensional flow (Todd, 1980). The hydraulic conductivity, K , is the proportionally constant in Darcy's law. The value of K is specific to the fluid. Physical factors such as particle size, distribution, shape, and porosity can affect the hydraulic conductivity of a soil or rock (LeGrand and Stringfield, 1971; Rasmussen, 1964).

The permeability (k) of a soil or rock defines its ability to transmit any fluid. Hence, permeability is a property of the medium only and is independent of the fluid properties (Freeze and Cherry, 1979). The hydraulic conductivity and permeability vary for different rocks and unconsolidated deposits. Hydraulic conductivity in the range of 10^{-4} cm/sec or greater is suitable for in situ bioremediation (Thomas and Ward, 1989). A high hydraulic conductivity will aid in delivering oxygen, moisture (in the vadose zone) and nutrients to the contaminated zone. However, during remediation, chemical reactions, microbial growth, and various hydrocarbons can alter the hydraulic conductivity (Brown and Thomas, 1984; Brown et al., 1984; Dragun, 1988; Frankenberger et al., 1979).

Dragun (1988) explains two mechanisms by which the presence of hydrocarbons can increase the hydraulic conductivity. The first mechanism involves the dielectric constant. The dielectric constant represents the ability of a liquid to transmit a charge, with most hydrocarbons have dielectric constants less than water. Hydrocarbons with dielectric constants less than water enter the inter-particle spaces in the soil matrix and force water and ions out. The hydrocarbons act as an insulator between adjacent particles and reduce electrostatic repulsion forces. A decrease in the repulsion forces decreased the distance between adjacent particles, which causes cracks and fissures to form. These cracks and fissures can permit preferential flow, which can increase the hydraulic conductivity. The second mechanism involves the removal of dipolar water molecules from the

inter-particle spacing, via mass action. This destroys the water structure that extends out from the particle surface. When a hydrocarbon has a very low dielectric constant, it will not exhibit any tendency to align itself with the surface oxygen of clay minerals. Therefore, no solvent structure extends out from the particle surface, and the inter-particle spacing becomes very small. This can also cause cracks and fissures, thus causing preferential flow.

Brown and Thomas (1984) reported diesel fuel caused a 40 times, 1400 times and 1800 times increase in the hydraulic conductivity of a 26% mica-sand mixture, a 16% bentonite-sand mixture, and a 10% bentonite-sand mixture, respectively.

Fernandex and Quigley (1985) reported higher hydraulic conductivities for aromatic hydrocarbons than for water, alcohols and acetone in Samia soils.

As entrapped gas, microbial population or phosphatase activity increases, the hydraulic conductivity decreases (Gupta and Swartzendruber, 1962; McCalla, 1950). Entrapped gases in the macro-voids can cause particle movement, swelling, or a reduction in the mean pore space, which can decrease the hydraulic conductivity. An increase in microbial quantity can cause pore clogging, which may restrict water flow and inevitably decrease the hydraulic conductivity.

3.2.1.3 Contaminant Type and Concentration

When considering petroleum products, the more complex the hydrocarbons and the more hydrophobic it is in nature, the more difficult it is for microorganisms to reduce it, and a longer time will be required for biodegradation (Kobayaski and Rittman, 1982). Microorganisms consume only soluble organic molecules and when they are placed in the presence of an insoluble molecule (such as a hydrocarbon), they synthesize and secrete a natural emulsifier to first pseudo-solubilize the hydrocarbon thus making it available for consumption (Goma et al., 1976).

Both high and low contaminant concentrations can inhibit microbial degradation (Bradford and Krishnamoorthy, 1991; Sulflita, 1989).

The in-situ biodegradation rates of diesel fuel were estimated to range from 0.2 to 20 mg/kg/day for different pilot and full scale sites (Hinchee and Ong, 1992).

3.2.1.4 Stratigraphy, Lithology and Hydrogeology

Stratigraphy, lithology and hydrogeology encompass such things as soil type and depth, grain size, moisture content, porosity or void ratio, and groundwater flow. These factors affect biodegradation and influence system design.

Moisture levels between 20% and 80% of saturation are suitable for in situ bioremediation (Bossert and Bartha, 1984). Hinchee (1989) found an increase in CO₂ produced when the moisture content was increased from 25% to 75% field capacity. Field capacity is defined as the amount of moisture in the soil after the water from the macropores has drained out.

The greater the surface area exposed to the microbes the faster the rate of bioremediation. Two major reasons are: (1) the rate of contaminant desorption increased, and (2) an increase in bioavailability occurs. In dense soils, grain size can reduce the rate of biodegradation when clogging reduces bioavailability. When landfarming, bulking the soil will increase the surface area of

the contaminant exposed to the microbes, which increase bioavailability. A laboratory land treatment study suggests biodegradation is inversely proportional to aggregate size (Mott et al., 1990). Soils high in organic carbon content can also hinder remediation by reducing bioavailability. Soils with high organic carbon content may increase the absorption of hydrocarbons, in particular polynuclear aromatic hydrocarbons (PAHs). Adsorbed hydrocarbons are non-bioavailable and thus non-biodegradable.

3.2.2 Chemical Factors

There are many chemical parameters that can affect biodegradation. However, the parameters most often requiring attention are:

- nutrient levels
- oxygen availability
- soil pH and water pH

Other considerations dealing with oxidation and reduction are too numerous, complex and not well documented. Therefore, a discussion of them will not be included here.

3.2.2.1 Nutrient Level

Macronutrients (such as nitrogen and phosphorus), micronutrients, (such as sulphur), and trace nutrients (such as Potassium, Magnesium, Calcium, Iron, Sodium, and Zinc) are typically required by microorganisms (Prince and Sambasivam, 1993). However, in most bioremediation treatment systems, nitrogen and phosphorus are the key factors.

The optimum carbon: nitrogen: phosphorus (C:N:P) ratio will vary from one location to another. Usually, a C:N:P ratio from 100:10:1 to 100:10:5 will suffice, but may also depend on the type of treatment used and the phase (liquid or solid) in which the containment is found. Depending on whether degradation is aerobic or anaerobic, the nitrogen source can be applied as ammonium-nitrogen, ammonia-nitrogen or nitrate-nitrogen. The phosphorus required for biodegradation is usually applied using salt forms of orthophosphate (PO_4).

3.2.2.2 Oxygen Availability

There are many different ways to provide the oxygen that is required to aerobic in situ biodegradation. Aerated water, hydrogen peroxide and air extraction or injection wells are three common ways of delivering oxygen to the subsurface. Depending on the type of hydrocarbons to degrade, 1.5 to 3.5 kg of oxygen may be required to aerobically biodegrade 1 kg of hydrocarbons (Dineen et al., 1989; Lund et al., 1991).

3.2.2.3 Soil pH and Water pH

Most microorganisms can survive within 1 pH from their optimum. Soil or aqueous pHs between 6 and 8 are suitable for biodegradation (Staps, 1989; Barnhart and Myers, 1989). When the pH is not in this range, adjustment can be accomplished using basic or acidic compounds as required.

3.2.3 Microbiological Factors

As early as 1895, biodegradation was known to exist, but the subject received little attention until

recently (Prince and Sambasivam, 1993). In the early part of the twentieth century researchers isolated many different species of microorganisms (e.g., *Thobacillus*, *Pseudeomonas*, *Methanomonas*, *Micrococcus*, *Arthrobacter*, and *Bacillus*) having the ability to degrade complex hydrocarbons (e.g., crude asphalt, kerosene, naphthalene, rubber, and crude oil (Beerstecher Jr., 1954)). Isolating soil microbes revealed that the genus *Pseudomonas* and the genus *Arthrobacter* are the most common petroleum degrading microorganisms.

Biodegradation of petroleum hydrocarbons can take place under aerobic or anaerobic conditions (Atlas, 1991). Aerobic biodegradation of petroleum hydrocarbons under ideal laboratory conditions has been reported in the order of 2500 to 100,000 g/m³/day. However, under in-situ conditions, biodegradation rates are lower, in the range of 0.001 to 60 g/m³/day (Bartha and Atlas, 1987). Under anaerobic conditions, biodegradation rates are lower than aerobic rates. The low anaerobic rates may not be sufficient to biodegrade sites within acceptable time limits.

3.3 Remediation

Other forms of bioremediation can be done on site using engineered pits or slurry reactors. Both of these technologies require the contaminated soil to be excavated. Therefore, two major advantages in using in-situ treatment over these technologies is the amount of money saved in civil works and on on-site management. But, the major advantages in using on site treatment in engineering pits or slurry reactors include: (1) an increase in control over parameters such as temperature, pH, moisture content, dissolved oxygen, bioavailability, and nutrients, (2) the leachate is collected and also treated; (3) the time required for remediation is usually less for on site treatment than for in-situ treatment.

APPENDIX B

Photographs of Ground Heating System Installation (6)



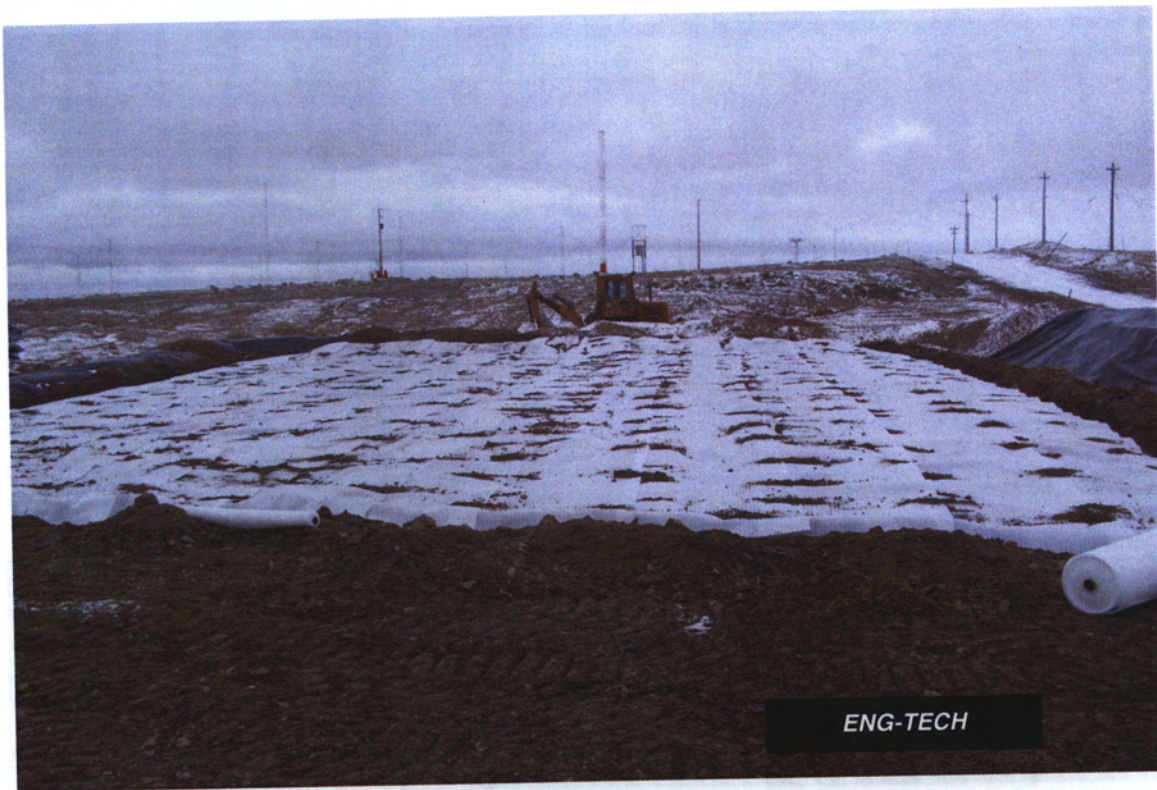
Photograph 1 – Excavation for pipe installation of ground heating system.



Photograph 2 – Pipes set in ground for heating system.



Photograph 3 – Area of ground heating system, without insulation cover.



Photograph 4 – Area of ground heating system, with insulation cover.



Photograph 5 – Final cover over ground heating system.



Photograph 6 – Ground heating system, in operation.

APPENDIX C

Enviro•Test Laboratories Test Results



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ANALYTICAL REPORT

ENVIRONMENTAL MANAGEMENT & TECH

DATE: 22-SEP-03

ATTN: DENNIS ANTONY

805 BLACKDALE ROAD

WEST ST PAUL MB R4A 9A4

Lab Work Order #: L130103

Sampled By: D ANTONY

Date Received: 12-SEP-03

Project P.O. #:

Project Reference: RESOLUTE BAY

Comments:

APPROVED BY: 

GERRY VERA

Project 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.

LABORATORY ACCREDITATIONS:

- STANDARDS COUNCIL OF CANADA IN COOPERATION WITH THE CANADIAN ASSOCIATION FOR ENVIRONMENTAL ANALYTICAL LABORATORIES (CAEAL)
- FOR SPECIFIC TESTS AS REGISTERED BY THE COUNCIL (EDMONTON, CALGARY, GRANDE PRAIRIE, SASKATOON, WINNIPEG, THUNDER BAY, WATERLOO)
- AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA) IN THE INDUSTRIAL HYGIENE PROGRAM (EDMONTON, WINNIPEG)
- STANDARDS COUNCIL OF CANADA IN COOPERATION WITH THE CANADIAN FOOD INSPECTION AGENCY (CFIA) FOR FERTILIZER AND FEED TESTING (SASKATOON) AND FOR MICROBIOLOGICAL TESTING IN FOOD (WINNIPEG)

RESOLUTE BAY

L130103 CONTD....

PAGE 1 of 7

ENVIRO-TEST ANALYTICAL REPORT

L130103-1 TP1									
Sample Date: 10-SEP-03									
Matrix: SOIL									
CCME TVHs and TEHs									
CCME Total Hydrocarbons									
F1 (C8-C10)	150		5	mg/kg		19-SEP-03			
F1-BTEX	140		5	mg/kg		19-SEP-03			
F2 (C10-C16)	8300		5	mg/kg		19-SEP-03			
F3 (C16-C34)	400		5	mg/kg		19-SEP-03			
F4 (C34-C50)	20		5	mg/kg		19-SEP-03			
Total Hydrocarbons (C8-C50)	6900		5	mg/kg		19-SEP-03			
Chromatogram to baseline at nC50	YES					19-SEP-03			
CCME Total Extractable Hydrocarbons									
Prep/Analysis Dates									
CCME BTEX									
Benzene	0.096		0.005	mg/kg	16-SEP-03	18-SEP-03	JPG	R143994	
Toluene	0.05		0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
Ethylbenzene	0.44		0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
o-Xylene	1.5		0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
Xylenes, m+p	4.3		0.02	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
Xylenes	5.8		0.03	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
% Moisture	6.5		0.1	%	17-SEP-03	17-SEP-03	JPG	R143358	
L130103-2 TP2									
Sample Date: 10-SEP-03									
Matrix: SOIL									
CCME TVHs and TEHs									
CCME Total Hydrocarbons									
F1 (C8-C10)	49		5	mg/kg		19-SEP-03			
F1-BTEX	47		5	mg/kg		19-SEP-03			
F2 (C10-C16)	3500		5	mg/kg		19-SEP-03			
F3 (C16-C34)	190		5	mg/kg		19-SEP-03			
F4 (C34-C50)	8		5	mg/kg		19-SEP-03			
Total Hydrocarbons (C8-C50)	3700		5	mg/kg		19-SEP-03			
Chromatogram to baseline at nC50	YES					19-SEP-03			
CCME Total Extractable Hydrocarbons									
Prep/Analysis Dates									
CCME BTEX									
Benzene	0.12		0.005	mg/kg	16-SEP-03	18-SEP-03	JPG	R143994	
Toluene	<0.01		0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
Ethylbenzene	0.08		0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
o-Xylene	0.47		0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
Xylenes, m+p	1.2		0.02	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
Xylenes	1.7		0.03	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
% Moisture	9.0		0.1	%	17-SEP-03	17-SEP-03	JPG	R143358	
L130103-3 TP3									
Sample Date: 10 SEP 03									
Matrix: SOIL									
CCME TVHs and TEHs									
CCME Total Hydrocarbons									
F1 (C8-C10)	15		5	mg/kg		19-SEP-03			
F1-BTEX	15		5	mg/kg		19-SEP-03			
F2 (C10-C16)	970		5	mg/kg		19-SEP-03			

RESOLUTE BAY

L130103 CONTD....

PAGE 2 of 7

ENVIRO-TEST ANALYTICAL REPORT

Sample Date: 10-SEP-03									
Matrix: SOIL									
CCME TVHs and TEHs									
CCME Total Hydrocarbons									
F3 (C16-C34)	64	5	mg/kg	19-SEP-03					
F4 (C34-C50)	13	5	mg/kg	19-SEP-03					
Total Hydrocarbons (C6-C50)	1100	5	mg/kg	19-SEP-03					
Chromatogram to baseline at nC50	YES			19-SEP-03					
CCME Total Extractable Hydrocarbons									
Prep/Analysis Dates									
CCME BTEX									
Benzene	0.036	0.005	mg/kg	16-SEP-03	18-SEP-03	JPG	R143994		
Toluene	<0.01	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083		
Ethylbenzene	0.02	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083		
o-Xylene	0.06	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083		
Xylenes, m+p	0.20	0.02	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083		
Xylenes	0.26	0.03	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083		
% Moisture	6.0	0.1	%	17-SEP-03	17-SEP-03	JPG	R143358		
L130103-4 TP4									
Sample Date: 10-SEP-03									
Matrix: SOIL									
CCME TVHs and TEHs									
CCME Total Hydrocarbons									
F1 (C6-C10)	<5	5	mg/kg	19-SEP-03					
F1-BTEX	<5	5	mg/kg	19-SEP-03					
F2 (C10-C16)	<5	5	mg/kg	19-SEP-03					
F3 (C16-C34)	11	5	mg/kg	19-SEP-03					
F4 (C34-C50)	<5	5	mg/kg	19-SEP-03					
Total Hydrocarbons (C6-C50)	11	5	mg/kg	19-SEP-03					
Chromatogram to baseline at nC50	YES			19-SEP-03					
CCME Total Extractable Hydrocarbons									
Prep/Analysis Dates									
CCME BTEX									
Benzene	<0.005	0.005	mg/kg	16-SEP-03	18-SEP-03	JPG	R143994		
Toluene	<0.01	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083		
Ethylbenzene	<0.01	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083		
o-Xylene	<0.01	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083		
Xylenes, m+p	<0.02	0.02	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083		
Xylenes	<0.03	0.03	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083		
% Moisture	16	0.1	%	17-SEP-03	17-SEP-03	JPG	R143358		
L130103-5 TP5									
Sample Date: 10-SEP-03									
Matrix: SOIL									
CCME TVHs and TEHs									
CCME Total Hydrocarbons									
F1 (C6-C10)	8	5	mg/kg	19-SEP-03					
F1-BTEX	8	5	mg/kg	19-SEP-03					
F2 (C10-C16)	2000	5	mg/kg	19-SEP-03					
F3 (C16-C34)	150	5	mg/kg	19-SEP-03					
F4 (C34-C50)	5	5	mg/kg	19-SEP-03					
Total Hydrocarbons (C6-C50)	2200	5	mg/kg	19-SEP-03					

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L130103-5 TP5 Sample Date: 10-SEP-03 Matrix: SOIL CCME TVHs and TEHs CCME Total Hydrocarbons Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture								
	YES					19-SEP-03		
						16-SEP-03	18-SEP-03	JPG R143994
	0.084	0.005	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	<0.01	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	<0.01	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	0.03	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	0.05	0.02	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	0.08	0.03	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	4.9	0.1	%	17-SEP-03	17-SEP-03	JPG	R143358	
L130103-6 TP6 Sample Date: 10-SEP-03 Matrix: SOIL CCME TVHs and TEHs CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture								
	110	5	mg/kg		19-SEP-03			
	98	5	mg/kg		19-SEP-03			
	3400	5	mg/kg		19-SEP-03			
	71	5	mg/kg		19-SEP-03			
	<5	5	mg/kg		19-SEP-03			
	3600	5	mg/kg		19-SEP-03			
	YES				19-SEP-03			
					16-SEP-03	18-SEP-03	JPG	R143994
	0.12	0.005	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	0.32	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	0.61	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	4.0	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	6.4	0.02	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	10	0.03	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	7.9	0.1	%	17-SEP-03	17-SEP-03	JPG	R143358	
L130103-7 TP7 Sample Date: 10-SEP-03 Matrix: SOIL CCME TVHs and TEHs CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates								
	160	5	mg/kg		19-SEP-03			
	150	5	mg/kg		19-SEP-03			
	5700	5	mg/kg		19-SEP-03			
	29	5	mg/kg		19-SEP-03			
	<5	5	mg/kg		19-SEP-03			
	5900	5	mg/kg		19-SEP-03			
	YES				19-SEP-03			
					16-SEP-03	18-SEP-03	JPG	R143994

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L130103-7 TP7 Sample Date: 10-SEP-03 Matrix: SOIL CCME TVHs and TEHs CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture								
	3.6	0.005	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	0.63	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	0.33	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	1.8	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	3.6	0.02	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	5.4	0.03	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	13	0.1	%	17-SEP-03	17-SEP-03	JPG	R143358	
L130103-8 TP8 Sample Date: 10-SEP-03 Matrix: SOIL CCME TVHs and TEHs CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C8-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture								
	92	5	mg/kg		19-SEP-03			
	85	5	mg/kg		19-SEP-03			
	84	5	mg/kg		19-SEP-03			
	14	5	mg/kg		19-SEP-03			
	<5	5	mg/kg		19-SEP-03			
	190	5	mg/kg		19-SEP-03			
	YES				19-SEP-03			
				16-SEP-03	18-SEP-03	JPG	R143994	
	2.0	0.005	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	1.0	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	0.23	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	1.0	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	3.1	0.02	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	4.1	0.03	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	9.4	0.1	%	17-SEP-03	17-SEP-03	JPG	R143358	
L130103-9 TP9 Sample Date: 10-SEP-03 Matrix: SOIL CCME TVHs and TEHs CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C8-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene								
	56	5	mg/kg		19-SEP-03			
	54	5	mg/kg		19-SEP-03			
	850	5	mg/kg		19-SEP-03			
	18	5	mg/kg		19-SEP-03			
	<5	5	mg/kg		19-SEP-03			
	920	5	mg/kg		19-SEP-03			
	YES				19-SEP-03			
				16-SEP-03	18-SEP-03	JPG	R143994	
	0.018	0.005	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	<0.01	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	0.07	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	

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L130103-9 TP9 Sample Date: 10-SEP-03 Matrix: SOIL CCME TVHs and TEHs CCME BTEX o-Xylene Xylenes, m+p Xylenes % Moisture								
	0.91	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	1.3	0.02	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	2.2	0.03	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	4.5	0.1	%	17-SEP-03	17-SEP-03	JPG	R143358	
L130103-10 TP11 Sample Date: 10-SEP-03 Matrix: SOIL CCME TVHs and TEHs CCME Total Hydrocarbons F1 (C8-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C8-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture								
	86	5	mg/kg		19-SEP-03			
	84	5	mg/kg		19-SEP-03			
	5300	5	mg/kg		19-SEP-03			
	160	5	mg/kg		19-SEP-03			
	<5	5	mg/kg		19-SEP-03			
	5500	5	mg/kg		19-SEP-03			
	YES				19-SEP-03			
				16-SEP-03	18-SEP-03	JPG	R143994	
	0.007	0.005	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	<0.01	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	0.25	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	0.55	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	1.5	0.02	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	2.0	0.03	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	6.4	0.1	%	17-SEP-03	17-SEP-03	JPG	R143358	
L130103-11 TP12 Sample Date: 10-SEP-03 Matrix: SOIL CCME TVHs and TEHs CCME Total Hydrocarbons F1 (C8-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C8-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes								
	<5	5	mg/kg		19-SEP-03			
	<5	5	mg/kg		19-SEP-03			
	320	5	mg/kg		19-SEP-03			
	30	5	mg/kg		19-SEP-03			
	<5	5	mg/kg		19-SEP-03			
	350	5	mg/kg		19-SEP-03			
	YES				19-SEP-03			
				16-SEP-03	18-SEP-03	JPG	R143994	
	0.009	0.005	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	<0.01	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	<0.01	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	<0.01	0.01	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	<0.02	0.02	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	
	<0.03	0.03	mg/kg	16-SEP-03	17-SEP-03	DVH	R144083	

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L130103-11 TP12

Sample Date: 10-SEP-03

Matrix: SOIL

% Moisture

11

0.1

%

17-SEP-03

17-SEP-03

JPG

R143358

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

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Reference Information

Methods Listed (if applicable):

ETL Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based
ETL-BTX,TVH-CCME-WP	Soil	CCME BTEX		CCME CWS-PHC Dec-2000 - Publ 1310
ETL-TEH-CCME-WP	Soil	CCME Total Extractable Hydrocarbons		CCME CWS-PHC Dec-2000 - Publ 1310

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

Chain of Custody numbers:

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
WP	Enviro-Test Laboratories - Winnipeg, Manitoba, 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 warning units 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.

Enviro-Test Laboratories 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, Enviro-Test Laboratories assumes no liability for the use or interpretation of the results.

ENVIRO-TEST ANALYTICAL REPORT

[illegible]

ENVIRO-TEST ANALYTICAL REPORT

L197746-3	#3								
Sample Date: 10-AUG-04									
Matrix: SOIL									
CCME BTEX + F1-F4									
CCME Total Hydrocarbons									
F3 (C16-C34)	600	5	mg/kg		23-AUG-04				
F4 (C34-C50)	19	5	mg/kg		23-AUG-04				
Total Hydrocarbons (C6-C50)	14000	5	mg/kg		23-AUG-04				
Chromatogram to baseline at nC50	YES				23-AUG-04				
CCME Total Extractable Hydrocarbons									
Prep/Analysis Dates					21-AUG-04	23-AUG-04	HDT	R211453	
CCME BTEX									
Benzene	<0.005	0.005	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044		
Toluene	0.02	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044		
Ethylbenzene	0.19	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044		
o-Xylene	0.36	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044		
Xylenes, m+p	0.91	0.02	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044		
Xylenes	1.3	0.03	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044		
% Moisture	9.1	0.1	%	17-AUG-04	18-AUG-04	CDD	R209999		
L197746-4	#4								
Sample Date: 10-AUG-04									
Matrix: SOIL									
CCME BTEX + F1-F4									
CCME Total Hydrocarbons									
F1 (C6-C10)	13	5	mg/kg		23-AUG-04				
F1-BTEX	13	5	mg/kg		23-AUG-04				
F2 (C10-C16)	10000	5	mg/kg		23-AUG-04				
F3 (C16-C34)	430	5	mg/kg		23-AUG-04				
F4 (C34-C50)	14	5	mg/kg		23-AUG-04				
Total Hydrocarbons (C6-C50)	10000	5	mg/kg		23-AUG-04				
Chromatogram to baseline at nC50	YES				23-AUG-04				
CCME Total Extractable Hydrocarbons									
Prep/Analysis Dates					21-AUG-04	23-AUG-04	HDT	R211453	
CCME BTEX									
Benzene	<0.005	0.005	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044		
Toluene	<0.01	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044		
Ethylbenzene	0.04	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044		
o-Xylene	0.04	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044		
Xylenes, m+p	0.15	0.02	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044		
Xylenes	0.19	0.03	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044		
% Moisture	18	0.1	%	17-AUG-04	18-AUG-04	CDD	R209999		
L197746-5	#5								
Sample Date: 10-AUG-04									
Matrix: SOIL									
CCME BTEX + F1-F4									
CCME Total Hydrocarbons									
F1 (C6-C10)	11	5	mg/kg		23-AUG-04				
F1-BTEX	11	5	mg/kg		23-AUG-04				
F2 (C10-C16)	21000	5	mg/kg		23-AUG-04				
F3 (C16-C34)	1800	5	mg/kg		23-AUG-04				
F4 (C34-C50)	45	5	mg/kg		23-AUG-04				
Total Hydrocarbons (C6-C50)	23000	5	mg/kg		23-AUG-04				

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L197746-5 #5 Sample Date: 10-AUG-04 Matrix: SOIL CCME BTEX + F1-F4 CCME Total Hydrocarbons Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture								
	YES					23-AUG-04		
						21-AUG-04	23-AUG-04	HDT R211453
	<0.005	0.005	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	<0.01	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.04	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.04	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.17	0.02	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.21	0.03	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	19	0.1	%	17-AUG-04	18-AUG-04	CDD	R209999	
L197746-6 #6 Sample Date: 10-AUG-04 Matrix: SOIL CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture								
	12	5	mg/kg		23-AUG-04			
	12	5	mg/kg		23-AUG-04			
	13000	5	mg/kg		23-AUG-04			
	1800	5	mg/kg		23-AUG-04			
	210	5	mg/kg		23-AUG-04			
	15000	5	mg/kg		23-AUG-04			
	YES				23-AUG-04			
					21-AUG-04	23-AUG-04	HDT	R211453
	<0.005	0.005	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	<0.01	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.06	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.06	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.23	0.02	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.29	0.03	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	18	0.1	%	17-AUG-04	18-AUG-04	CDD	R209999	
L197746-7 #7 Sample Date: 10-AUG-04 Matrix: SOIL CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates								
	10	5	mg/kg		23-AUG-04			
	10	5	mg/kg		23-AUG-04			
	7600	5	mg/kg		23-AUG-04			
	940	5	mg/kg		23-AUG-04			
	110	5	mg/kg		23-AUG-04			
	8700	5	mg/kg		23-AUG-04			
	YES				23-AUG-04			
					21-AUG-04	23-AUG-04	HDT	R211453

ENVIRO-TEST ANALYTICAL REPORT

L197746-7 #7 Sample Date: 10-AUG-04 Matrix: SOIL CCME BTEX + F1-F4 CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture								
	<0.005	0.005	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	<0.01	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.04	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.04	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.15	0.02	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.20	0.03	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	12	0.1	%	17-AUG-04	18-AUG-04	CDD	R209999	
L197746-8 #8 Sample Date: 10-AUG-04 Matrix: SOIL CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture								
	7	5	mg/kg		23-AUG-04			
	7	5	mg/kg		23-AUG-04			
	3200	5	mg/kg		23-AUG-04			
	260	5	mg/kg		23-AUG-04			
	18	5	mg/kg		23-AUG-04			
	3500	5	mg/kg		23-AUG-04			
	YES				23-AUG-04			
				21-AUG-04	23-AUG-04	HDT	R211453	
	<0.005	0.005	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	<0.01	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	<0.01	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.01	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.04	0.02	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.05	0.03	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	9.1	0.1	%	17-AUG-04	18-AUG-04	CDD	R209999	
L197746-9 #9 Sample Date: 10-AUG-04 Matrix: SOIL CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene								
	39	5	mg/kg		23-AUG-04			
	38	5	mg/kg		23-AUG-04			
	10000	5	mg/kg		23-AUG-04			
	670	5	mg/kg		23-AUG-04			
	42	5	mg/kg		23-AUG-04			
	11000	5	mg/kg		23-AUG-04			
	YES				23-AUG-04			
				21-AUG-04	23-AUG-04	HDT	R211453	
	<0.005	0.005	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	<0.01	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	
	0.17	0.01	mg/kg	17-AUG-04	18-AUG-04	DVH	R210044	

Reference Information

Methods Listed (if applicable):

ETL Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
ETL-BTX,TVH-CCME-WP	Soil	CCME BTEX		CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TEH-CCME-WP	Soil	CCME Total Extractable Hydrocarbons		CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TVH,TEH-CCME-WP	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.

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

Chain of Custody numbers:

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
WP	Enviro-Test Laboratories - Winnipeg, Manitoba, 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 warning units 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.

Enviro-Test Laboratories 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, Enviro-Test Laboratories assumes no liability for the use or interpretation of the results.

Enviro-Test Quality Control Report

Workorder: L197746

Client: ENG-TECH CONSULTING
#6-854 MARION STREET
WINNIPEG MB R2J 0K4

Contact: CLARK HRYHORUK

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ETL-BTX.TVH-CCME-WP <u>Soil</u>								
Batch	R210044							
WG215133-2	CCV							
Benzene			98		%		70-130	17-AUG-04
Ethylbenzene			100		%		70-130	17-AUG-04
Xylenes, m+p			101		%		70-130	17-AUG-04
o-Xylene			105		%		70-130	17-AUG-04
Toluene			100		%		70-130	17-AUG-04
TVH: (C6-C10 / No BTEX Correction)			91		%		70-130	17-AUG-04
WG215133-5	CCV							
Benzene			92		%		70-130	18-AUG-04
Ethylbenzene			94		%		70-130	18-AUG-04
Xylenes, m+p			95		%		70-130	18-AUG-04
o-Xylene			98		%		70-130	18-AUG-04
Toluene			93		%		70-130	18-AUG-04
TVH: (C6-C10 / No BTEX Correction)			93		%		70-130	18-AUG-04
WG215133-6	CCV							
Benzene			87		%		70-130	18-AUG-04
Ethylbenzene			93		%		70-130	18-AUG-04
Xylenes, m+p			95		%		70-130	18-AUG-04
o-Xylene			102		%		70-130	18-AUG-04
Toluene			93		%		70-130	18-AUG-04
TVH: (C6-C10 / No BTEX Correction)			104		%		70-130	18-AUG-04
WG215133-1	CVS							
Benzene			93		%		83-117	17-AUG-04
Ethylbenzene			90		%		83-117	17-AUG-04
Xylenes, m+p			106		%		83-117	17-AUG-04
o-Xylene			87		%		83-117	17-AUG-04
Toluene			85		%		83-117	17-AUG-04
TVH: (C6-C10 / No BTEX Correction)			92		%		83-117	17-AUG-04
WG214850-3	DUP	L197722-2						
Benzene		<0.005	<0.005	RPD-NA	mg/kg	N/A	38	17-AUG-04
Ethylbenzene		<0.01	<0.01	RPD-NA	mg/kg	N/A	38	17-AUG-04
Xylenes, m+p		<0.02	<0.02	RPD-NA	mg/kg	N/A	38	17-AUG-04
o-Xylene		<0.01	<0.01	RPD-NA	mg/kg	N/A	38	17-AUG-04
Toluene		<0.01	<0.01	RPD-NA	mg/kg	N/A	38	17-AUG-04

Enviro-Test Quality Control Report

Workorder: L197746

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ETL-BTX-TVH-CCME-WP <u>Soil</u>								
Batch	R210044							
WG214859-3	DUP	L197722-2						
TVH: (C6-C10 / No BTEX Correction)		<5	<5	RPD-NA	mg/kg	N/A	38	17-AUG-04
Xylenes		<0.03	<0.03	RPD-NA	mg/kg	N/A	30	17-AUG-04
WG214859-4	DUP	L197773-3						
Benzene		<0.005	<0.005	RPD-NA	mg/kg	N/A	38	18-AUG-04
Ethylbenzene		<0.01	<0.01	RPD-NA	mg/kg	N/A	38	18-AUG-04
Xylenes, m+p		0.06	<0.02	G	mg/kg	N/A	38	18-AUG-04
o-Xylene		0.03	0.01	J	mg/kg	0.02	0.031	18-AUG-04
Toluene		<0.01	<0.01	RPD-NA	mg/kg	N/A	38	18-AUG-04
TVH: (C6-C10 / No BTEX Correction)		<5	<5	RPD-NA	mg/kg	N/A	38	18-AUG-04
Xylenes		0.09	<0.03	G	mg/kg	N/A	30	18-AUG-04
WG214859-1	LCS							
Benzene			85		%		80-120	17-AUG-04
Ethylbenzene			87		%		80-120	17-AUG-04
Xylenes, m+p			88		%		80-120	17-AUG-04
o-Xylene			98		%		80-120	17-AUG-04
Toluene			90		%		80-120	17-AUG-04
TVH: (C6-C10 / No BTEX Correction)			92		%		80-120	17-AUG-04
WG214859-2	MB							
Benzene			<0.005		mg/kg		0.005	17-AUG-04
Ethylbenzene			<0.01		mg/kg		0.01	17-AUG-04
Xylenes, m+p			<0.02		mg/kg		0.02	17-AUG-04
o-Xylene			<0.01		mg/kg		0.01	17-AUG-04
Toluene			<0.01		mg/kg		0.01	17-AUG-04
TVH: (C6-C10 / No BTEX Correction)			<5		mg/kg		5	17-AUG-04
Xylenes			<0.03		mg/kg		0.03	17-AUG-04
ETL-TEH-CCME-WP <u>Soil</u>								
Batch	R211453							
WG216725-2	CCV							
F2 (C10-C16)			98		%		70-130	23-AUG-04
F3 (C16-C34)			98		%		70-130	23-AUG-04
F4 (C34-C50)			96		%		70-130	23-AUG-04
WG216725-1	CVS							
F2 (C10-C16)			113		%		83-117	23-AUG-04
F3 (C16-C34)			84		%		83-117	23-AUG-04
WG214713-5	DUP	L196174-31						
F2 (C10-C16)		29	29	J	mg/kg	0	15	23-AUG-04
F3 (C16-C34)		500	510		mg/kg	1.5	38	23-AUG-04
F4 (C34-C50)		530	660		mg/kg	23	38	23-AUG-04

Enviro-Test Quality Control Report

Workorder: L197746

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
Product - Batch and Sample Number Relations:								
ETL-BTX,TVH-CCME-WP	2							
	R210044	L197746-1	L197746-2	L197746-3	L197746-4	L197746-5		
		L197746-6	L197746-7	L197746-8	L197746-9	L197746-10		
ETL-TEH-CCME-WP	2							
	R211453	L197746-1	L197746-2	L197746-3	L197746-4	L197746-5		
		L197746-6	L197746-7	L197746-8	L197746-9	L197746-10		
MOISTURE-WP	2							
	R209999	L197746-1	L197746-2	L197746-3	L197746-4	L197746-5		
		L197746-6	L197746-7	L197746-8	L197746-9	L197746-10		

ENVIRO-TEST QC REPORT

Page 4 of 4

Workorder # L197746

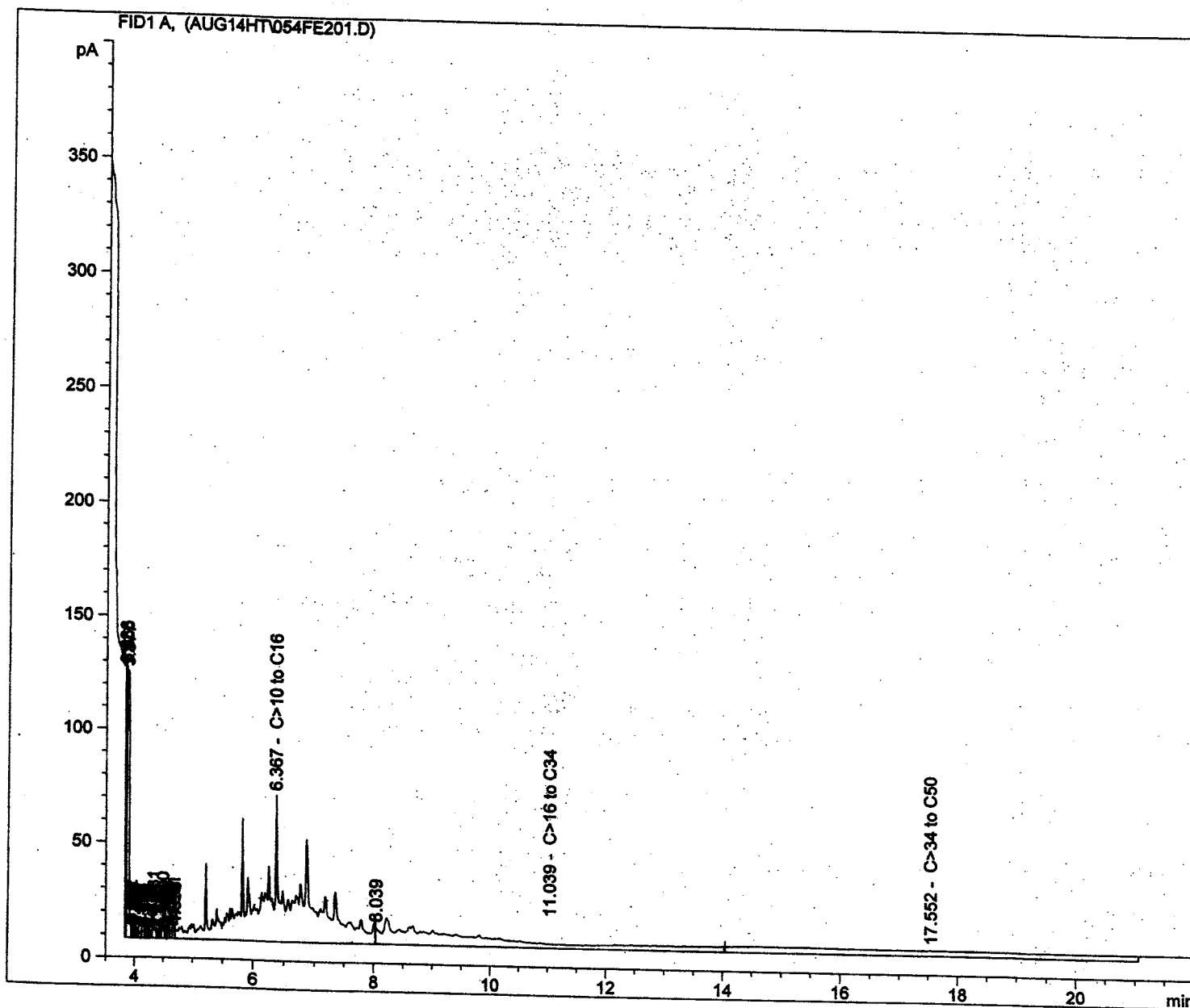
Legend:

Limit	95% Confidence Interval (Laboratory Warning Limits)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Materials
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

Qualifier:

RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
A	Method blank exceeds acceptance limit. Blank correction not applied, unless the qualifier "RAMB" (result adjusted for method blank) appears in the Analytical Report.
B	Method blank result exceeds acceptance limit, however, it is less than 5% of sample concentration. Blank correction not applied.
E	Matrix spike recovery may fall outside the acceptance limits due to high sample background.
F	Silver recovery low, likely due to elevated chloride levels in sample.
G	Outlier - No assignable cause for nonconformity has been determined.
H	Result falls within the 99% Confidence Interval (Laboratory Control Limits)
J	Duplicate results and limit(s) are expressed in terms of absolute difference.
K	The sample referenced above is of a non-standard matrix type; standard QC acceptance criteria may not be achievable.

Injection Date : 8/23/04 2:10:16 AM
Sample Name : L197746-1
Acq. Operator : H. TURNER
Seq. Line : 246
Location : Vial 54
Inj : 1
Inj Volume : 1 µl
Sequence File : C:\HPCHEM\1\SEQUENCE\AUG16HT.S
Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 7/23/04 3:27:22 PM by T. Truong
Extractable Hydrocarbons Method for acquiring data from FID.

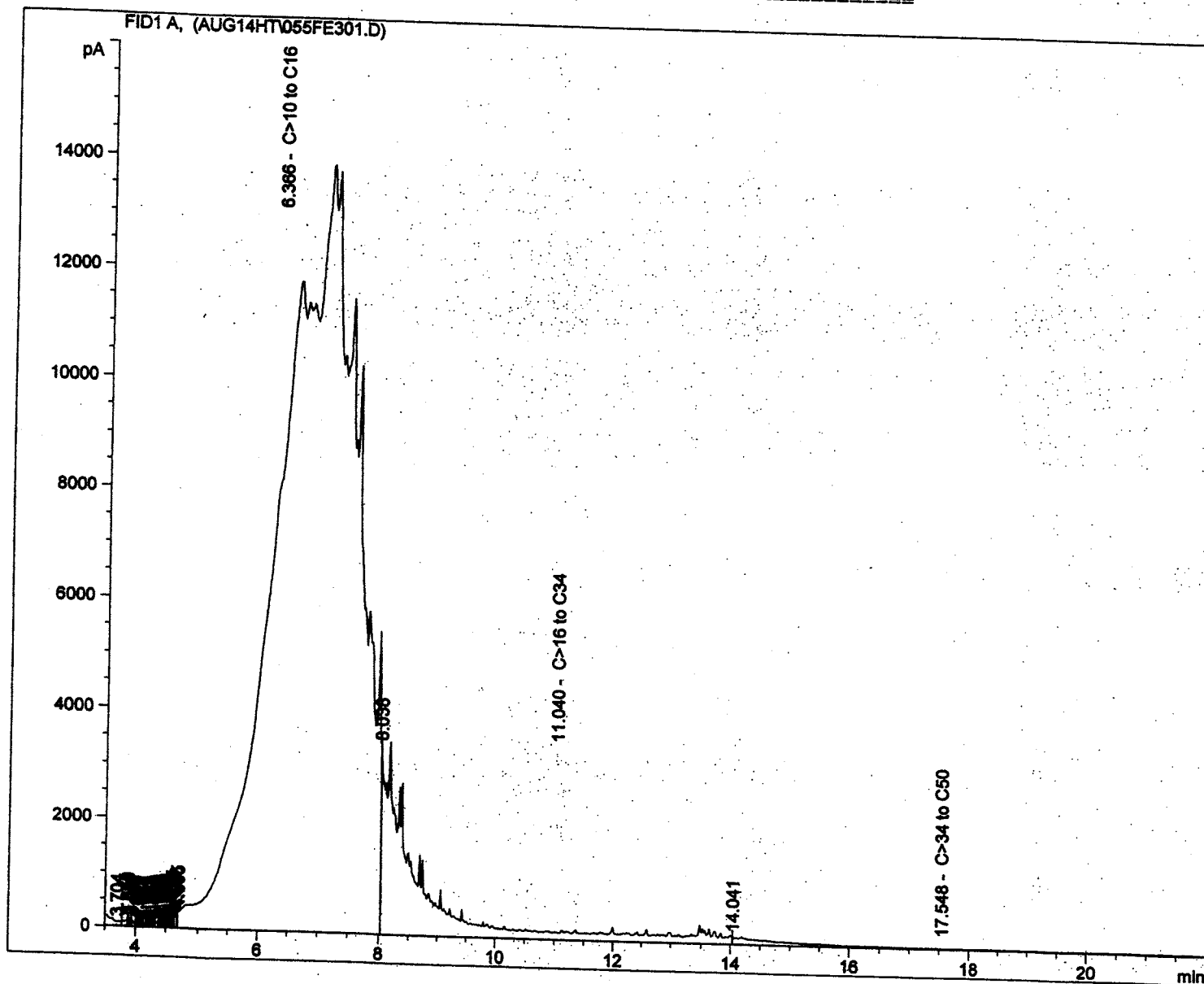


External Standard Report

Sorted By : Retention Time
Calib. Data Modified : 4/13/04 3:28:39 PM
Multiplier : 1.0000
Dilution : 1.0000

Signal 1: FID1 A,

Injection Date : 8/23/04 2:43:03 AM
Sample Name : L197746-2
Acq. Operator : H. TURNER
Seq. Line : 247
Location : Vial 55
Inj : 1
Inj Volume : 1 µl
Acq. Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 7/23/04 3:27:22 PM by T. Truong
Analysis Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 8/23/04 10:03:22 AM by H. TURNER
(modified after loading)
Extractable Hydrocarbons Method for acquiring data from FID.

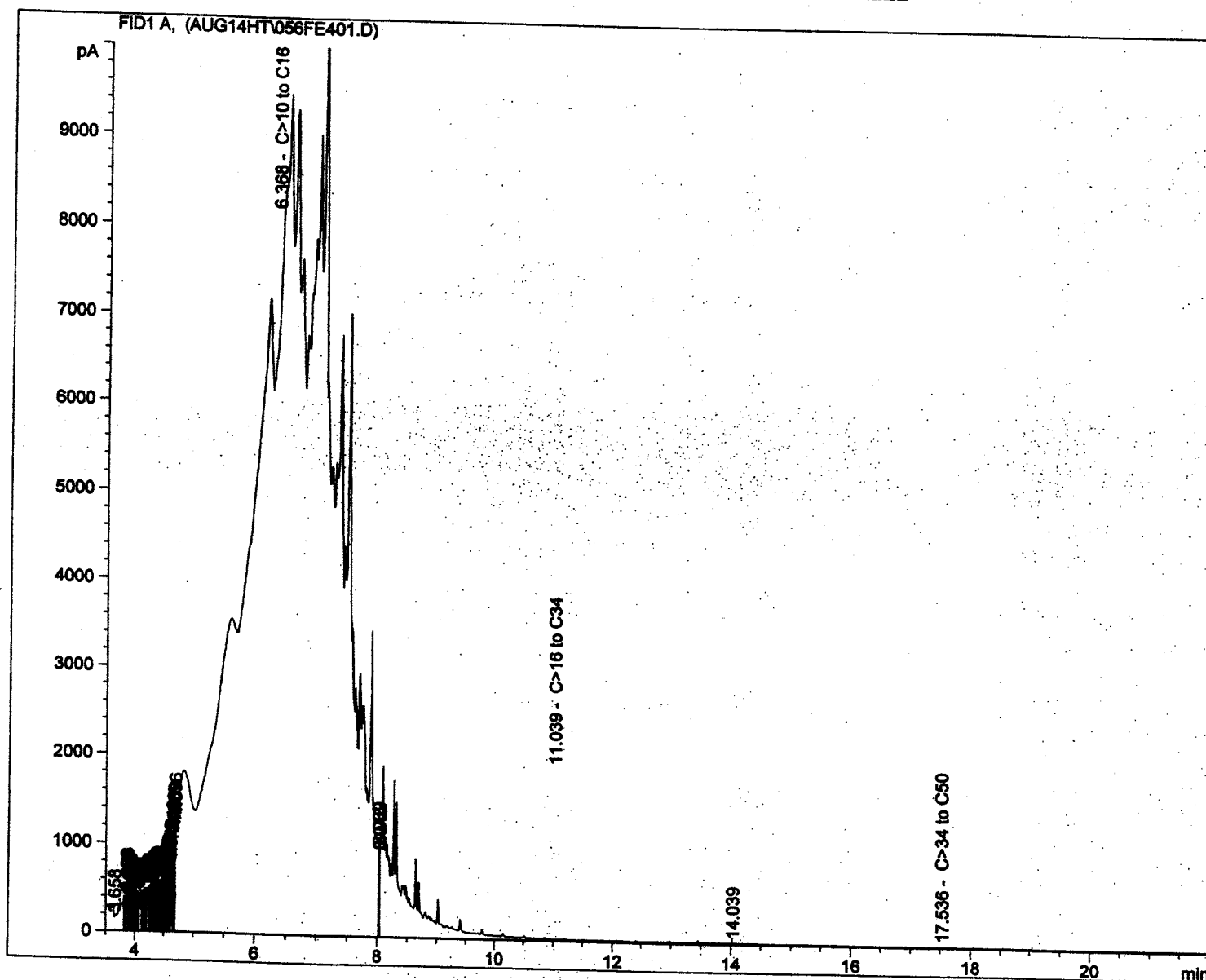


External Standard Report

Sorted By : Retention Time
Calib. Data Modified : 4/13/04 3:28:39 PM
Multiplier : 1.0000
Dilution : 1.0000

Signal 1: FID1 A,

Injection Date : 8/23/04 3:15:43 AM Seq. Line : 248
Sample Name : L197746-3 Location : Vial 56
Acq. Operator : H. TURNER Inj : 1
Inj Volume : 1 µl
Acq. Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 7/23/04 3:27:22 PM by T. Truong
Analysis Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 8/23/04 10:06:55 AM by H. TURNER
(modified after loading)
Extractable Hydrocarbons Method for acquiring data from FID.



External Standard Report

Sorted By : Retention Time
Calib. Data Modified : 4/13/04 3:28:39 PM
Multiplier : 1.0000
Dilution : 1.0000

Signal 1: FID1 A,

Injection Date : 8/23/04 3:48:30 AM

Seq. Line : 249

Sample Name : L197746-4

Location : Vial 57

Acq. Operator : H. TURNER

Inj : 1

Inj Volume : 1 µl

Acq. Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M

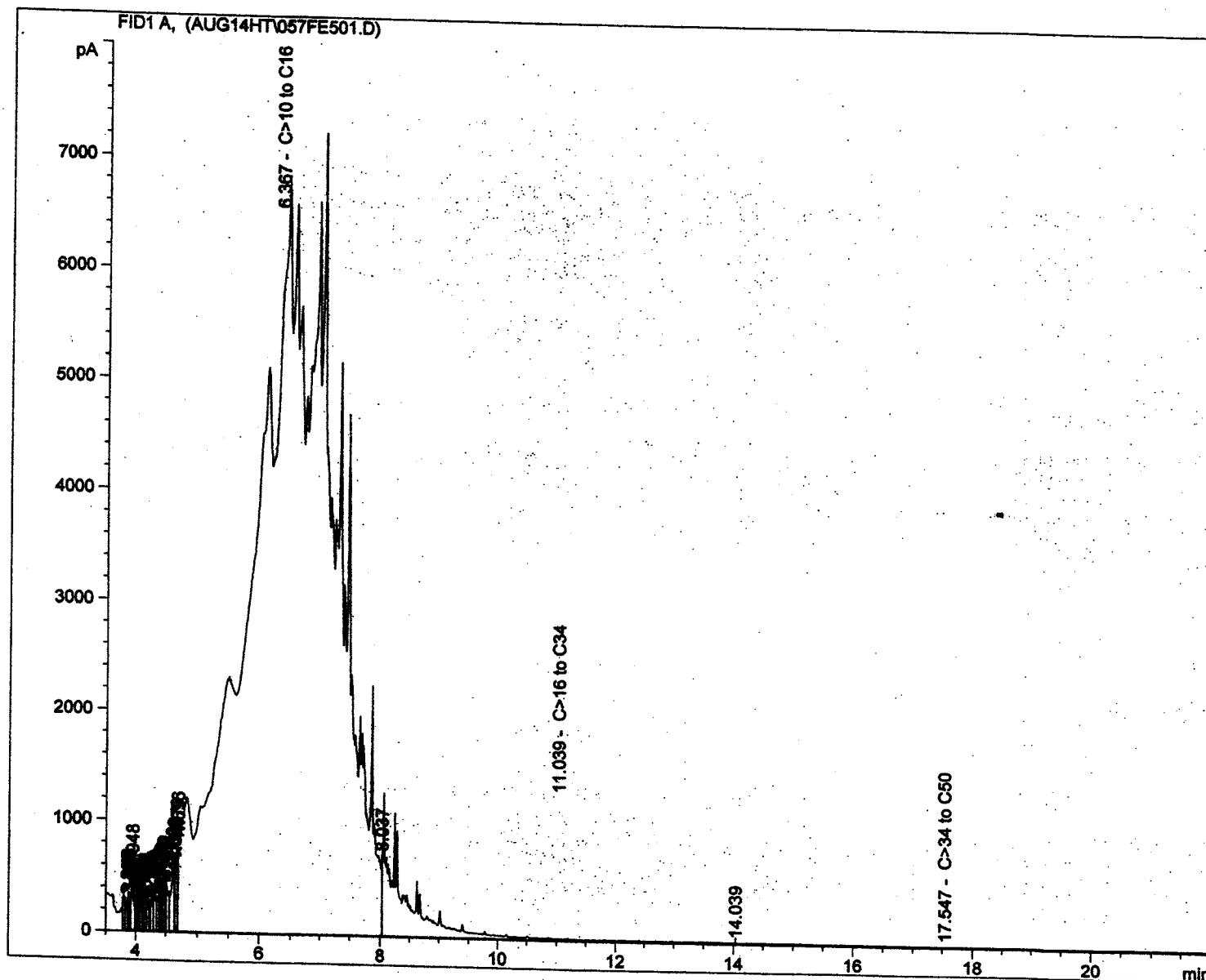
Last changed : 7/23/04 3:27:22 PM by T. Truong

Analysis Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M

Last changed : 8/23/04 10:04:21 AM by H. TURNER

(modified after loading)

Extractable Hydrocarbons Method for acquiring data from FID.

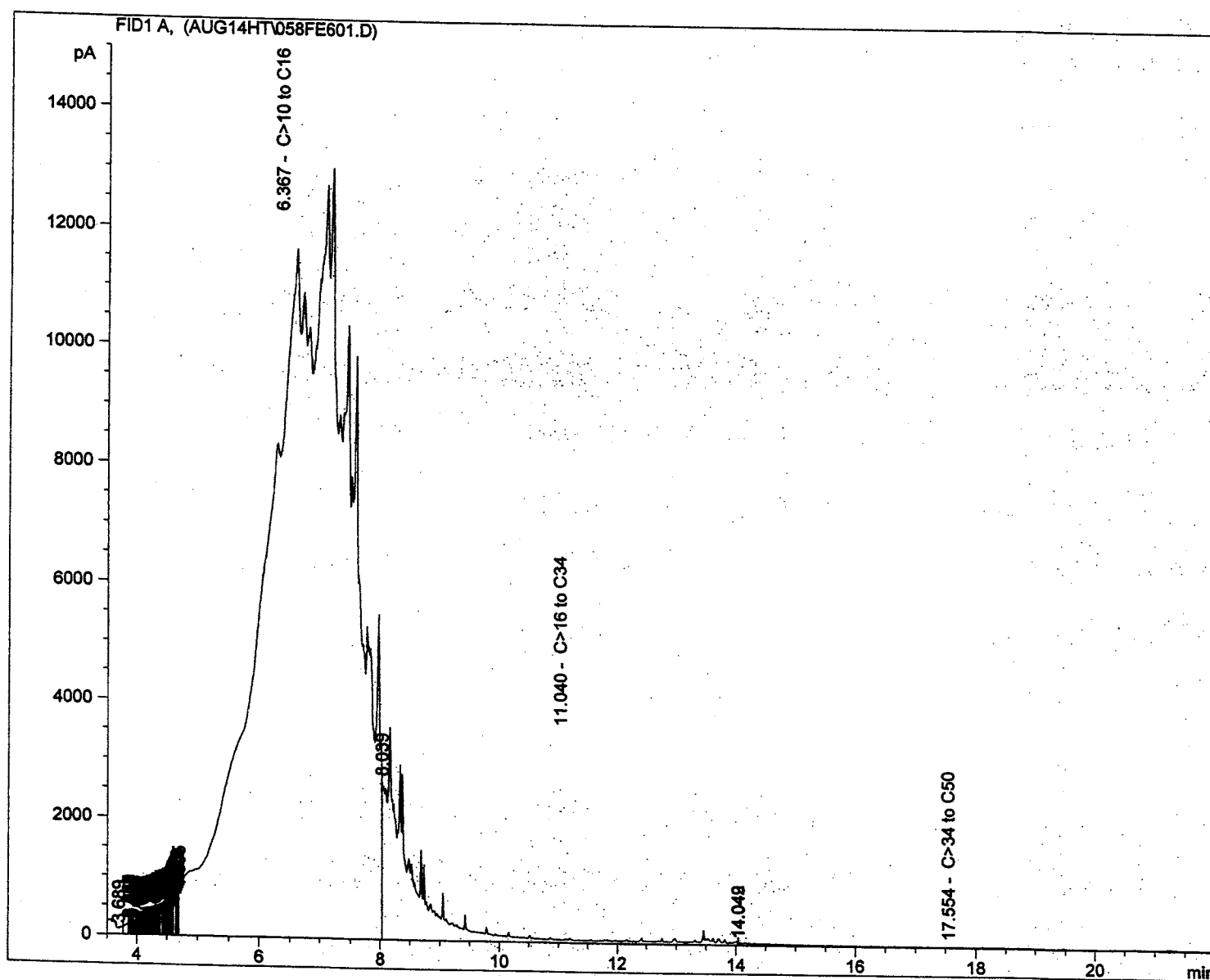


External Standard Report

Sorted By	:	Retention Time
Calib. Data Modified	:	4/13/04 3:28:39 PM
Multiplier	:	1.0000
Dilution	:	1.0000

Signal 1: FID1 A,

Injection Date : 8/23/04 4:21:21 AM Seq. Line : 250
Sample Name : L197746-5 Location : Vial 58
Acq. Operator : H. TURNER Inj : 1
Inj Volume : 1 µl
Acq. Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 7/23/04 3:27:22 PM by T. Truong
Analysis Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 8/23/04 10:04:54 AM by H. TURNER
(modified after loading)
Extractable Hydrocarbons Method for acquiring data from FID.



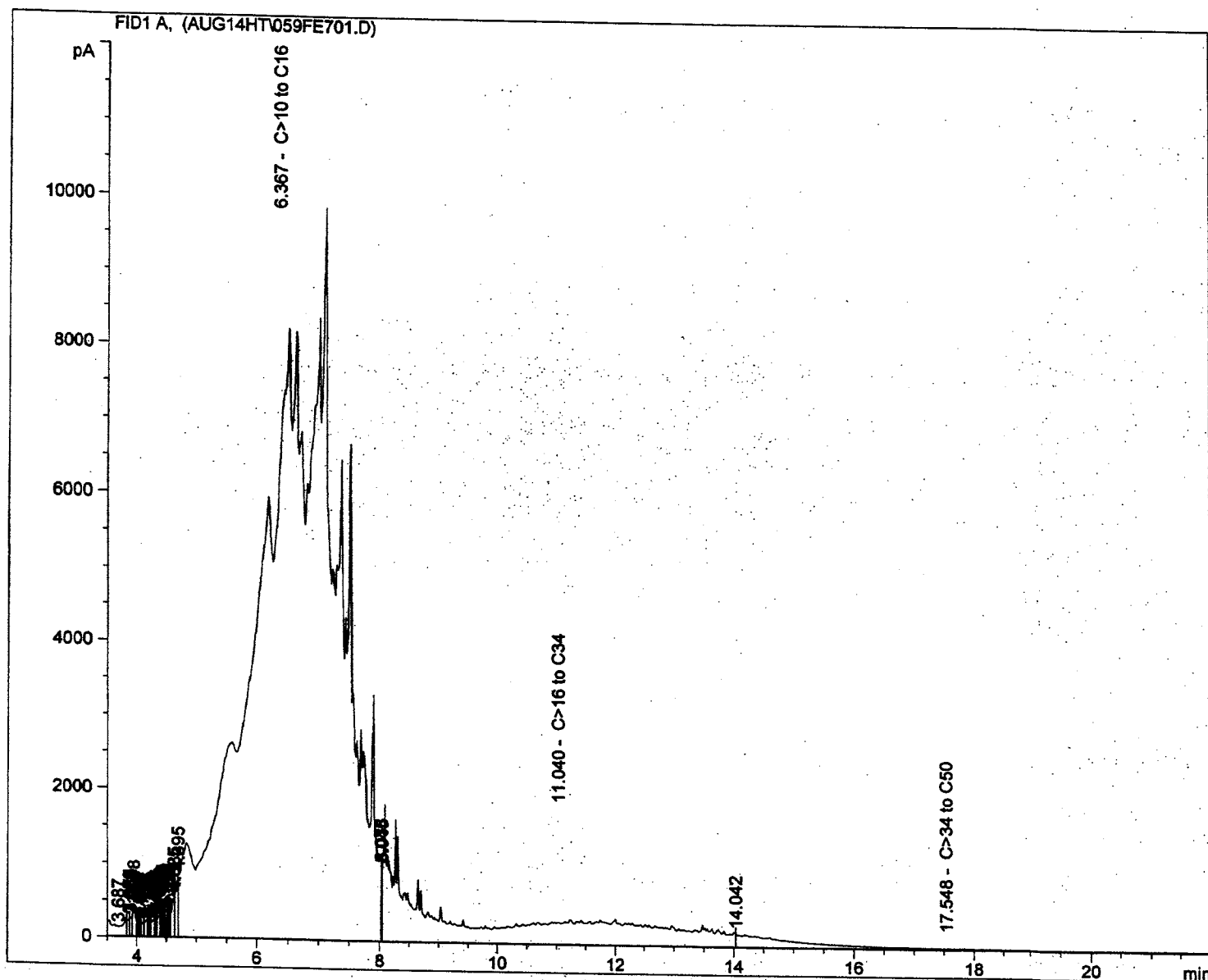
External Standard Report

Sorted By : Retention Time
Calib. Data Modified : 4/13/04 3:28:39 PM
Multiplier : 1.0000
Dilution : 1.0000

Signal 1: FID1 A,

Injection Date : 8/23/04 4:54:22 AM Seq. Line : 251
Sample Name : L197746-6 Location : Vial 59
Acq. Operator : H. TURNER Inj : 1
Inj Volume : 1 µl
Acq. Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 7/23/04 3:27:22 PM by T. Truong
Analysis Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 8/23/04 10:05:11 AM by H. TURNER
(modified after loading)

Extractable Hydrocarbons Method for acquiring data from FID.

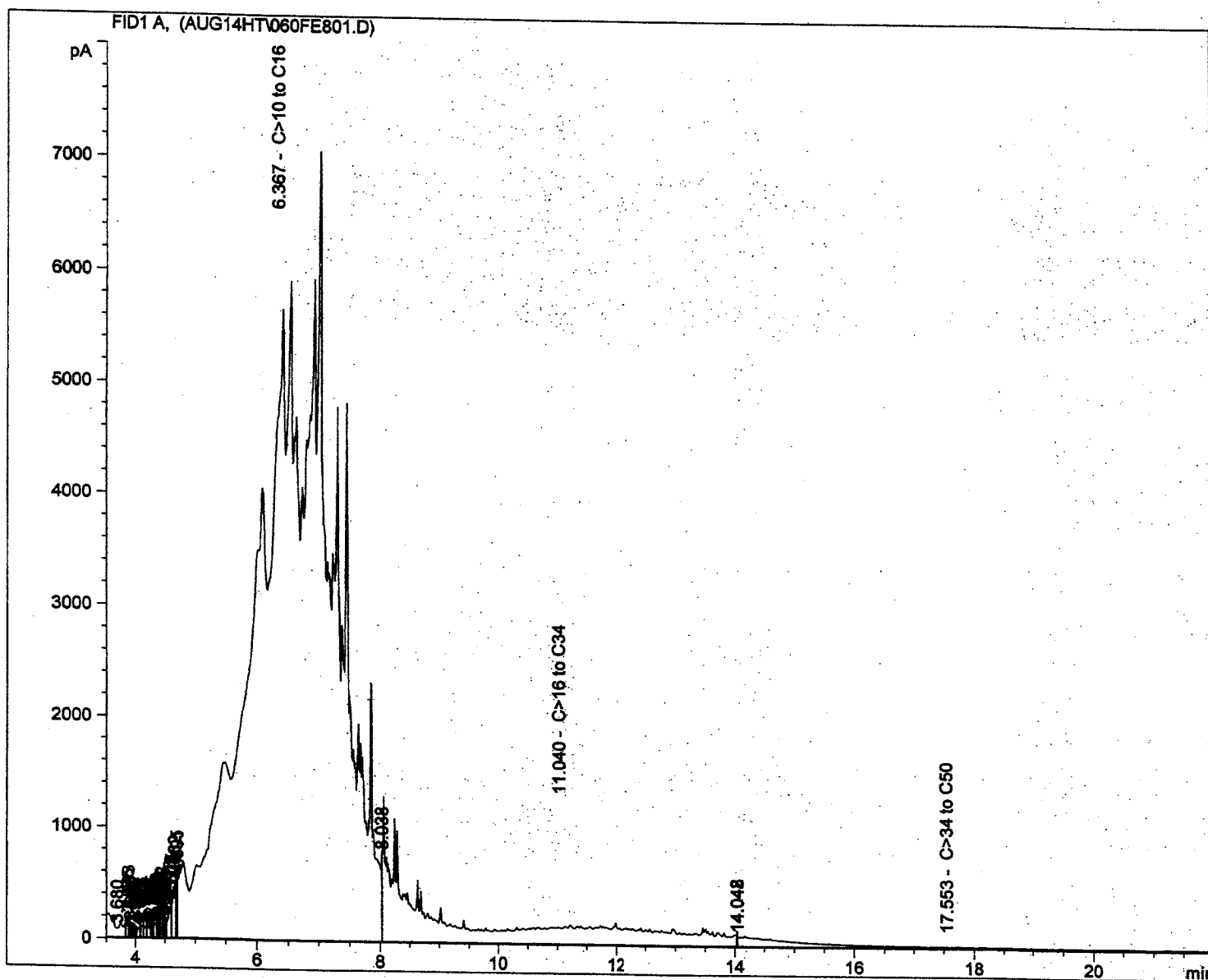


External Standard Report

Sorted By : Retention Time
Calib. Data Modified : 4/13/04 3:28:39 PM
Multiplier : 1.0000
Dilution : 1.0000

Signal 1: FID1 A,

Injection Date : 8/23/04 5:27:23 AM Seq. Line : 252
Sample Name : L197746-7 Location : Vial 60
Acq. Operator : H. TURNER Inj : 1
Inj Volume : 1 µl
Acq. Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 7/23/04 3:27:22 PM by T. Truong
Analysis Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 8/23/04 10:05:28 AM by H. TURNER
(modified after loading)
Extractable Hydrocarbons Method for acquiring data from FID.



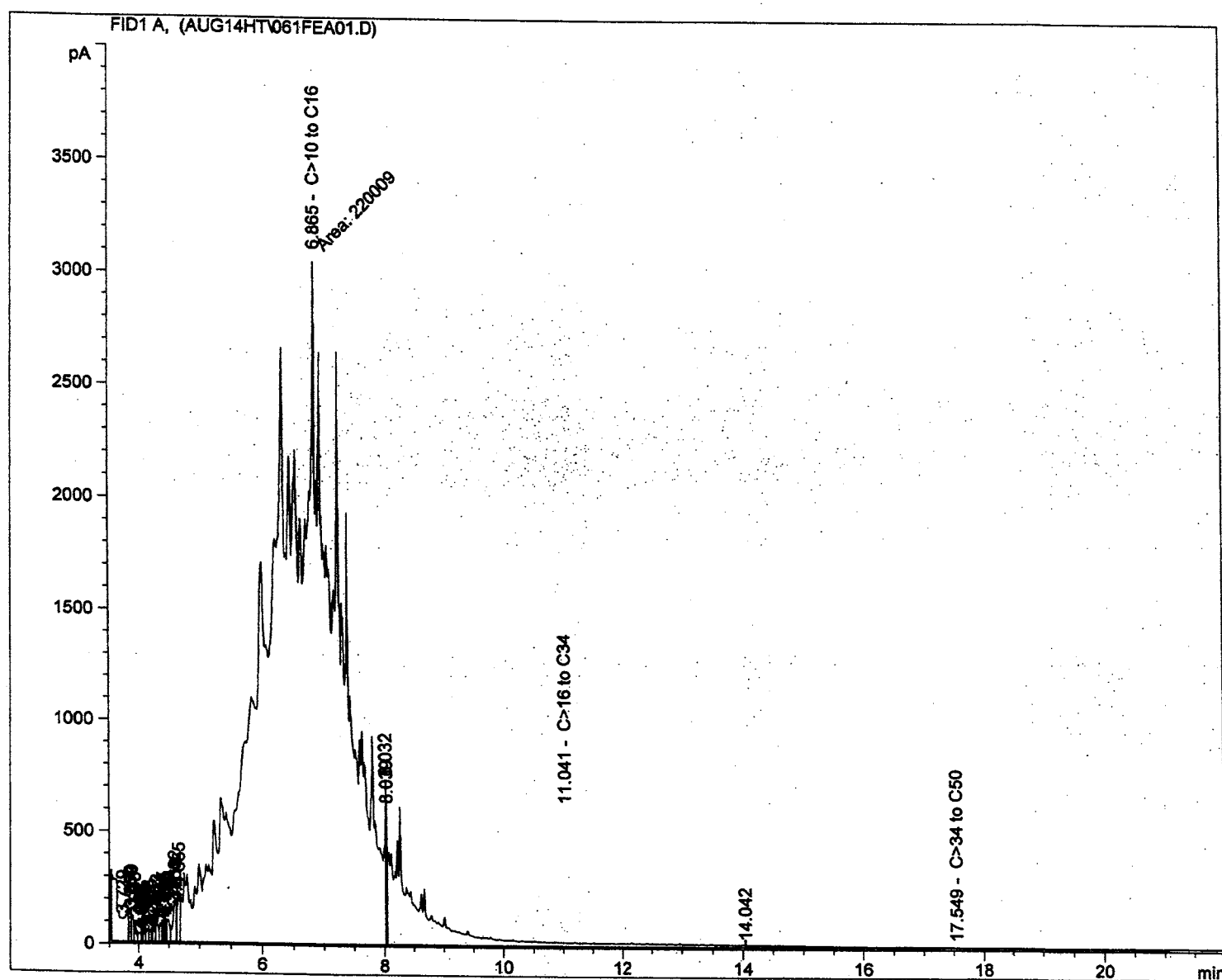
External Standard Report

Sorted By : Retention Time
Calib. Data Modified : 4/13/04 3:28:39 PM
Multiplier : 1.0000
Dilution : 1.0000

Signal 1: FID1 A,

Injection Date : 8/23/04 6:33:47 AM Seq. Line : 254
Sample Name : L197746-8 Location : Vial 61
Acq. Operator : H. TURNER Inj : 1
Inj Volume : 1 µl
Acq. Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 7/23/04 3:27:22 PM by T. Truong
Analysis Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 8/23/04 10:05:53 AM by H. TURNER
(modified after loading)

Extractable Hydrocarbons Method for acquiring data from FID.



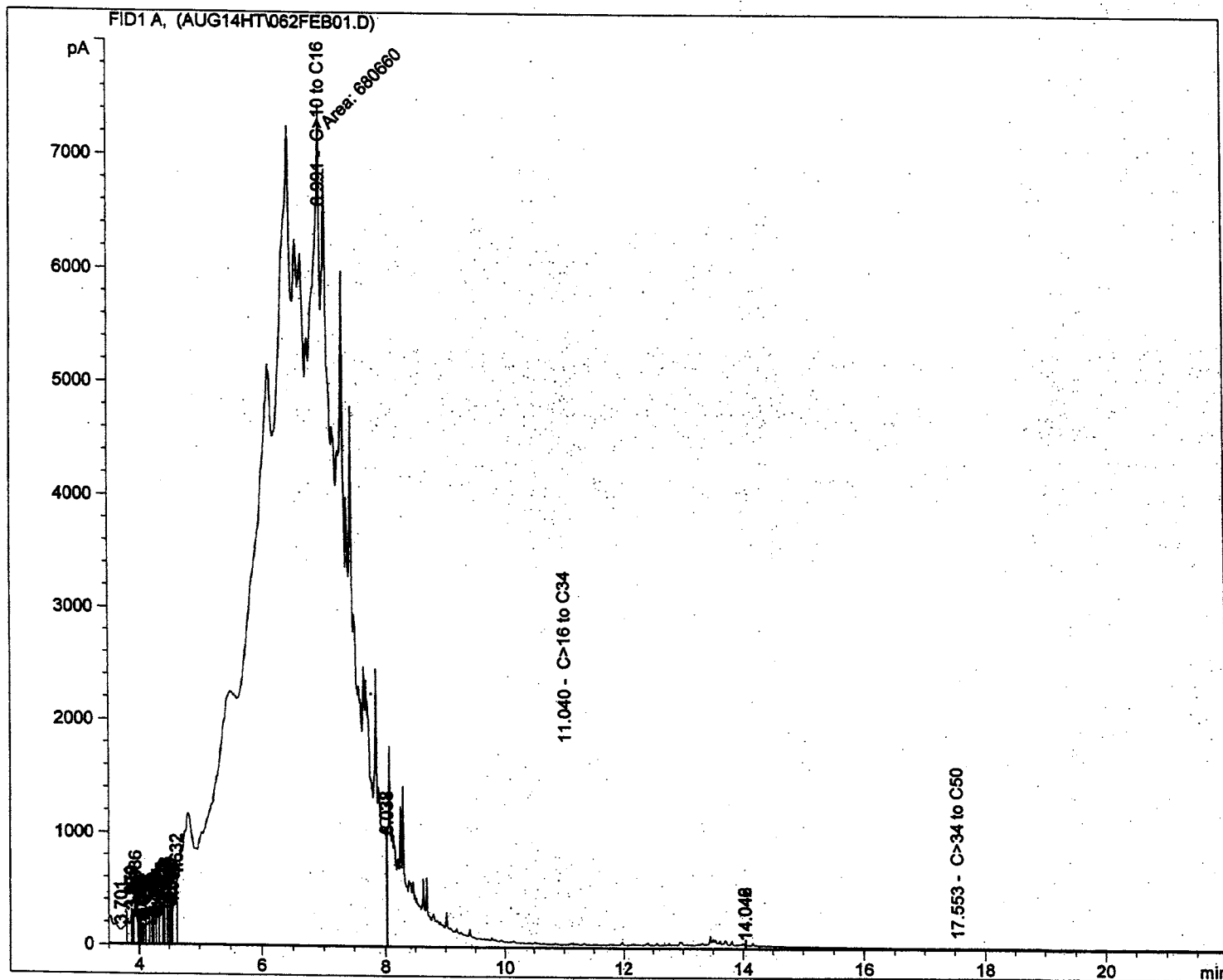
External Standard Report

Sorted By : Retention Time
Calib. Data Modified : 4/13/04 3:28:39 PM
Multiplier : 1.0000
Dilution : 1.0000

Signal 1: FID1 A,

Injection Date : 8/23/04 7:07:09 AM Seq. Line : 255
Sample Name : L197746-9 Location : Vial 62
Acq. Operator : H. TURNER Inj : 1
Inj Volume : 1 µl
Acq. Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 7/23/04 3:27:22 PM by T. Truong
Analysis Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 8/23/04 10:06:28 AM by H. TURNER
(modified after loading)

Extractable Hydrocarbons Method for acquiring data from FID.



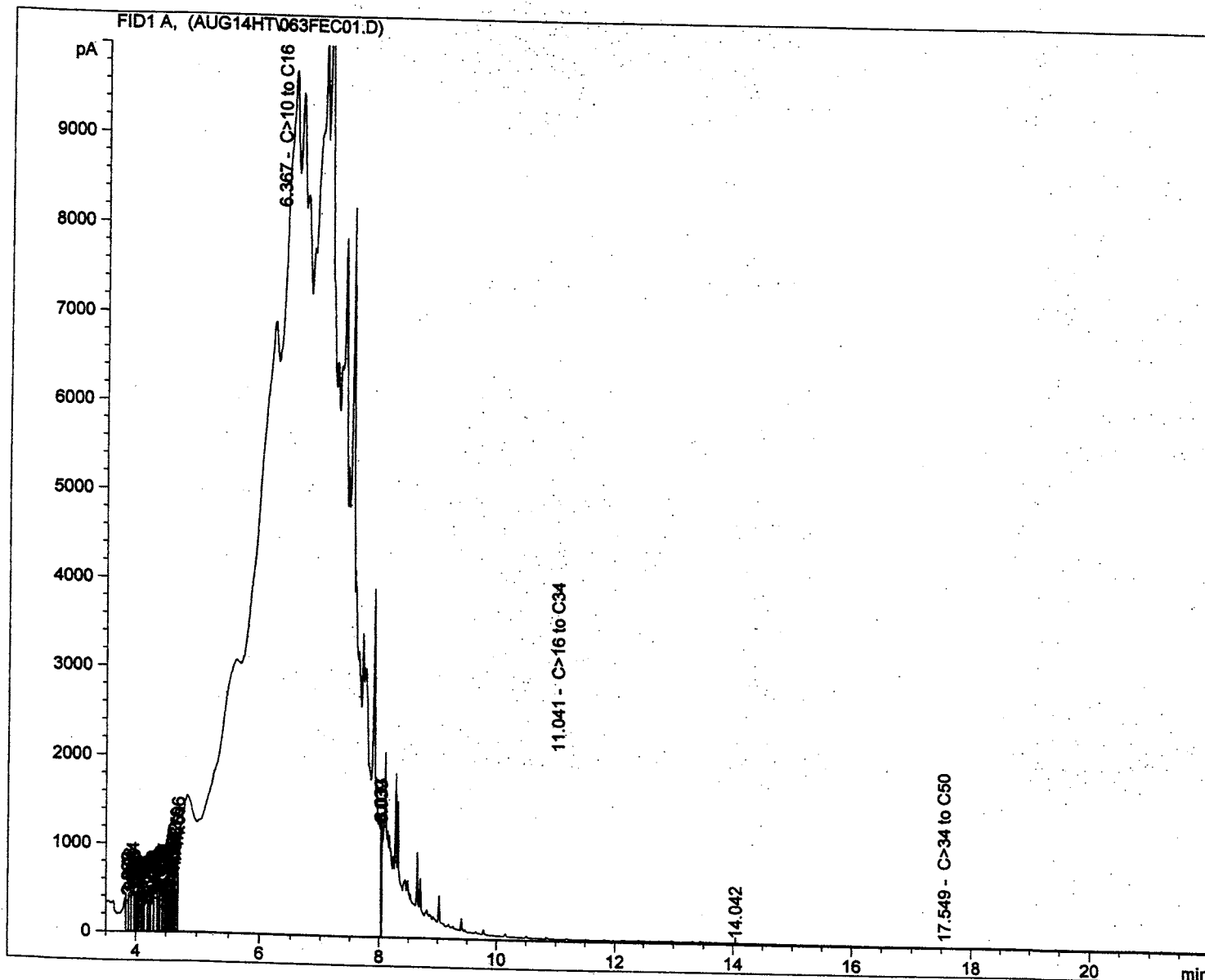
External Standard Report

Sorted By : Retention Time
Calib. Data Modified : 4/13/04 3:28:39 PM
Multiplier : 1.0000
Dilution : 1.0000

Signal 1: FID1 A,

Injection Date : 8/23/04 7:40:30 AM Seq. Line : 256
Sample Name : L197746-10 Location : Vial 63
Acq. Operator : H. TURNER Inj : 1
Inj Volume : 1 µl
Acq. Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 7/23/04 3:27:22 PM by T. Truong
Analysis Method : C:\HPCHEM\1\METHODS\CCMEFRAT.M
Last changed : 8/23/04 10:06:55 AM by H. TURNER
(modified after loading)

Extractable Hydrocarbons Method for acquiring data from FID.



External Standard Report

Sorted By : Retention Time
Calib. Data Modified : 4/13/04 3:28:39 PM
Multiplier : 1.0000
Dilution : 1.0000

Signal 1: FID1 A,



PRELIMINARY RESULTS

TRANSPORT CANADA
ATTN: BILL FERGUSON
3 344 EDMONTON STREET
WINNIPEG MB R3C 0P6

DATE: 12-SEP-05 03:48 PM

Lab Work Order #: L313607

Sampled By: AT

Date Received: 02-SEP-05

Project P.O. #: RESOLUTE-<TU1

Job Reference: 02-117-06

Comments:

APPROVED BY: _____

GERRY VERA

Project Manager

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

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313607-1 0-.2+MC1 Sample Date: 28-AUG-05 Matrix: Soil								
CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	180		5	mg/kg		12-SEP-05		
F1-BTEX	170		5	mg/kg		12-SEP-05		
F2 (C10-C16)	3000		5	mg/kg		12-SEP-05		
F3 (C16-C34)	1200		5	mg/kg		12-SEP-05		
F4 (C34-C50)	550		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	4900		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	2.9		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.54		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	1.3		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	4.4		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	2.9		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	7.3		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	8.5		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601
L313607-2 0-.2+MC2 Sample Date: 28-AUG-05 Matrix: Soil								
CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	300		5	mg/kg		12-SEP-05		
F1-BTEX	280		5	mg/kg		12-SEP-05		
F2 (C10-C16)	4500		5	mg/kg		12-SEP-05		
F3 (C16-C34)	1500		5	mg/kg		12-SEP-05		
F4 (C34-C50)	700		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	7000		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	4.9		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.91		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	1.8		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	11		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	6.0		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	17		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	9.8		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601
L313607-3 0-.2+MC3 Sample Date: 28-AUG-05 Matrix: Soil								
CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	85		5	mg/kg		12-SEP-05		
F1-BTEX	78		5	mg/kg		12-SEP-05		
F2 (C10-C16)	330		5	mg/kg		12-SEP-05		
F3 (C16-C34)	130		5	mg/kg		12-SEP-05		

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L	Units	Extracted	Analyzed	By	Batch
L313607-3 0-2+MC3 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture	 51 600 YES 2.2 0.37 0.56 2.2 2.1 4.2 8.2		 5 5 0.005 0.01 0.01 0.01 0.02 0.03 0.1	 mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg %	 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05	 12-SEP-05 12-SEP-05 12-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05	 HDT DVH DVH DVH DVH DVH DVH	 R322020 R322299 R322299 R322299 R322299 R322299 R322299
L313607-4 0-2+MC4 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture	 46 44 1600 1100 540 3300 YES 0.44 0.14 0.46 0.29 0.98 1.3 8.7		 5 5 5 5 5 5 0.005 0.01 0.01 0.01 0.02 0.03 0.1	 mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg %	 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05	 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05	 HDT DVH DVH DVH DVH DVH DVH	 R322020 R322299 R322299 R322299 R322299 R322299 R322299
L313607-5 0-2+MC5 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons	 120 110 2000 690 330 3100 YES		 5 5 5 5 5 5	 mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05			

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313607-5 0-2+MC5 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	2.4		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.53		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	1.2		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	1.3		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	2.6		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	3.9		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	8.4		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601
L313607-6 0-2+MC6 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons								
F1 (C6-C10)	160		5	mg/kg		12-SEP-05		
F1-BTEX	150		5	mg/kg		12-SEP-05		
F2 (C10-C16)	1400		5	mg/kg		12-SEP-05		
F3 (C16-C34)	410		5	mg/kg		12-SEP-05		
F4 (C34-C50)	190		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	2200		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	2.3		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.56		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	1.4		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	6.7		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	2.9		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	9.6		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	7.7		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601
L313607-7 0-2+MN1 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons								
F1 (C6-C10)	11		5	mg/kg		12-SEP-05		
F1-BTEX	11		5	mg/kg		12-SEP-05		
F2 (C10-C16)	340		5	mg/kg		12-SEP-05		
F3 (C16-C34)	270		5	mg/kg		12-SEP-05		
F4 (C34-C50)	120		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	740		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	0.12		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.02		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313607-7 0-.2+MN1 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME BTEX								
Ethylbenzene	0.06		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	0.05		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	0.10		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	0.15		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	8.4		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601
L313607-8 0-.2+MN2 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons								
F1 (C6-C10)	210		5	mg/kg		12-SEP-05		
F1-BTEX	180		5	mg/kg		12-SEP-05		
F2 (C10-C16)	2800		5	mg/kg		12-SEP-05		
F3 (C16-C34)	870		5	mg/kg		12-SEP-05		
F4 (C34-C50)	370		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	4300		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	4.9		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	7.6		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	2.1		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	6.7		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	11		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	18		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	8.5		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601
L313607-9 0-.2+MN3 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons								
F1 (C6-C10)	170		5	mg/kg		12-SEP-05		
F1-BTEX	140		5	mg/kg		12-SEP-05		
F2 (C10-C16)	740		5	mg/kg		12-SEP-05		
F3 (C16-C34)	260		5	mg/kg		12-SEP-05		
F4 (C34-C50)	100		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	1300		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	5.1		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	6.9		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	1.3		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	5.2		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	9.1		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	14		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313607-9 0-.2+MN3 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4								
% Moisture	6.8		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601
L313607-10 0-.2+MN4 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		12-SEP-05		
F1-BTEX	<5		5	mg/kg		12-SEP-05		
F2 (C10-C16)	600		5	mg/kg		12-SEP-05		
F3 (C16-C34)	360		5	mg/kg		12-SEP-05		
F4 (C34-C50)	120		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	1100		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	0.29		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.06		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	0.24		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	1.5		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	0.72		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	2.2		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	12		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601
L313607-11 0-.2+MN5 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons								
F1 (C6-C10)	210		5	mg/kg		12-SEP-05		
F1-BTEX	180		5	mg/kg		12-SEP-05		
F2 (C10-C16)	3100		5	mg/kg		12-SEP-05		
F3 (C16-C34)	1200		5	mg/kg		12-SEP-05		
F4 (C34-C50)	380		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	4900		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	3.7		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	1.1		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	0.78		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	12		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	13		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	26		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	8.8		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313607-12 0-2+MN6 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture	150 130 <5 800 260 1200 YES 2.9 2.2 1.1 6.8 7.9 15 9.4		5 5 5 5 5 5 0.005 0.01 0.01 0.01 0.02 0.03 0.1	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg %	 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05	12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05	HDT DVH DVH DVH DVH DVH DVH HDT	R322020 R322299 R322299 R322299 R322299 R322299 R322299 R321601
L313607-13 .2+MC1 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture	83 78 1900 960 410 3400 YES 1.0 0.26 0.71 0.55 2.2 2.7 8.5		5 5 5 5 5 5 0.005 0.01 0.01 0.01 0.02 0.03 0.1	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg %	 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05	12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05	HDT DVH DVH DVH DVH DVH DVH HDT	R322020 R322299 R322299 R322299 R322299 R322299 R322299 R321601
L313607-14 .2+MC2 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34)	680 640 3300 1300		5 5 5 5	mg/kg mg/kg mg/kg mg/kg	 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05			

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313607-16 .2+MC4 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	0.75		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.10		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	1.2		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	1.2		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	3.2		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	4.5		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	11		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601
L313607-17 .2+MC5 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons								
F1 (C6-C10)	260		5	mg/kg		12-SEP-05		
F1-BTEX	250		5	mg/kg		12-SEP-05		
F2 (C10-C16)	540		5	mg/kg		12-SEP-05		
F3 (C16-C34)	120		5	mg/kg		12-SEP-05		
F4 (C34-C50)	33		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	950		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	3.3		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.26		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	1.8		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	2.9		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	4.3		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	7.2		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	9.1		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601
L313607-18 .2+MC6 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons								
F1 (C6-C10)	27		5	mg/kg		12-SEP-05		
F1-BTEX	25		5	mg/kg		12-SEP-05		
F2 (C10-C16)	13		5	mg/kg		12-SEP-05		
F3 (C16-C34)	18		5	mg/kg		12-SEP-05		
F4 (C34-C50)	<5		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	58		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	0.48		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.09		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313607-18 .2+MC6 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME BTEX Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture	 0.12 0.22 0.73 0.96 7.7		 0.01 0.01 0.02 0.03 0.1	 mg/kg mg/kg mg/kg mg/kg %	 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05	 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 07-SEP-05	 DVH DVH DVH DVH HDT	 R322299 R322299 R322299 R322299 R321601
L313607-19 .2+MC7 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture	 76 72 1100 450 190 1800 YES 0.79 0.17 0.74 0.58 1.8 2.4 11		 5 5 5 5 5 5 0.005 0.01 0.01 0.01 0.02 0.03 0.1	 mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg %	 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05	 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 07-SEP-05	 HDT DVH DVH DVH DVH DVH HDT DVH DVH DVH DVH DVH HDT	 R322020 R322299 R322299 R322299 R322299 R322299 R322020 R322299 R322299 R322299 R322299 R322299 R321601
L313607-20 .2+MC8 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes	 490 450 3000 890 350 4700 YES 6.7 1.7 1.8 14 20 33		 5 5 5 5 5 5 0.005 0.01 0.01 0.01 0.02 0.03	 mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05	 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05	 HDT DVH DVH DVH DVH DVH HDT DVH DVH DVH DVH DVH	 R322020 R322299 R322299 R322299 R322299 R322299 R322020 R322299 R322299 R322299 R322299 R322299

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313607-20 .2+MC8 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4								
% Moisture	8.9		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601
L313607-21 .2+MC9 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	690		5	mg/kg		12-SEP-05		
F1-BTEX	650		5	mg/kg		12-SEP-05		
F2 (C10-C16)	1500		5	mg/kg		12-SEP-05		
F3 (C16-C34)	510		5	mg/kg		12-SEP-05		
F4 (C34-C50)	210		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	2900		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	8.3		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	1.3		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	1.9		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	12		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	14		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	26		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	7.4		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601
L313607-22 .2+MC10 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	89		5	mg/kg		12-SEP-05		
F1-BTEX	84		5	mg/kg		12-SEP-05		
F2 (C10-C16)	2000		5	mg/kg		12-SEP-05		
F3 (C16-C34)	620		5	mg/kg		12-SEP-05		
F4 (C34-C50)	230		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	2900		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	1.0		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.43		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	0.68		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	0.91		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	2.2		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	3.1		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	11		0.1	%	07-SEP-05	07-SEP-05	HDT	R321601

ENVIRO-TEST ANALYTICAL REPORT

[illegible]

Reference Information

Methods Listed (if applicable):

ETL Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
ETL-BTX,TVH-CCME-WP	Soil	CCME BTEX		CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TEH-CCME-WP	Soil	CCME Total Extractable Hydrocarbons		CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TVH,TEH-CCME-WP	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.

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

Chain of Custody numbers:

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
WP	Enviro-Test Laboratories - Winnipeg, Manitoba, 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 warning units 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.

Enviro-Test Laboratories 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, Enviro-Test Laboratories assumes no liability for the use or interpretation of the results.



PRELIMINARY RESULTS

TRANSPORT CANADA
ATTN: BILL FERGUSON
3 344 EDMONTON STREET
WINNIPEG MB R3C 0P6

DATE: 12-SEP-05 04:08 PM

Lab Work Order #: L313622

Sampled By: AT

Date Received: 02-SEP-05

Project P.O. #: RESOLUTE-<TU2

Job Reference: 02-117-06

Comments:

APPROVED BY: _____

GERRY VERA

Project Manager

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

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313622-1 .2+MN1								
Sample Date: 28-AUG-05								
Matrix: Soil								
CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	38		5	mg/kg		12-SEP-05		
F1-BTEX	33		5	mg/kg		12-SEP-05		
F2 (C10-C16)	1600		5	mg/kg		12-SEP-05		
F3 (C16-C34)	780		5	mg/kg		12-SEP-05		
F4 (C34-C50)	290		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	2700		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	0.63		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.36		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	0.29		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	1.5		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	2.7		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	4.2		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	6.3		0.1	%	09-SEP-05	09-SEP-05	HDT	R321711
L313622-2 .2+MN2								
Sample Date: 28-AUG-05								
Matrix: Soil								
CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	40		5	mg/kg		12-SEP-05		
F1-BTEX	<5		5	mg/kg		12-SEP-05		
F2 (C10-C16)	3100		5	mg/kg		12-SEP-05		
F3 (C16-C34)	920		5	mg/kg		12-SEP-05		
F4 (C34-C50)	360		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	4400		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	6.3		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	18		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	6.7		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	17		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	34		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	51		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	8.0		0.1	%	09-SEP-05	09-SEP-05	HDT	R321711
L313622-3 .2+MN3								
Sample Date: 28-AUG-05								
Matrix: Soil								
CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	760		5	mg/kg		12-SEP-05		
F1-BTEX	670		5	mg/kg		12-SEP-05		
F2 (C10-C16)	4200		5	mg/kg		12-SEP-05		
F3 (C16-C34)	1100		5	mg/kg		12-SEP-05		

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313622-5 .2+MN5 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	1.8		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	5.1		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	2.0		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	8.8		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	15		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	24		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	8.0		0.1	%	09-SEP-05	09-SEP-05	HDT	R321711
L313622-6 .2+MN6 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons								
F1 (C6-C10)	450		5	mg/kg		12-SEP-05		
F1-BTEX	360		5	mg/kg		12-SEP-05		
F2 (C10-C16)	3100		5	mg/kg		12-SEP-05		
F3 (C16-C34)	1400		5	mg/kg		12-SEP-05		
F4 (C34-C50)	530		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	5500		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	6.5		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	21		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	7.3		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	18		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	36		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	54		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	7.2		0.1	%	09-SEP-05	09-SEP-05	HDT	R321711
L313622-7 .2+MN10 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons								
F1 (C6-C10)	37		5	mg/kg		12-SEP-05		
F1-BTEX	35		5	mg/kg		12-SEP-05		
F2 (C10-C16)	220		5	mg/kg		12-SEP-05		
F3 (C16-C34)	150		5	mg/kg		12-SEP-05		
F4 (C34-C50)	56		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	460		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	0.34		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.06		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313622-7 .2+MN10 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME BTEX Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture	 0.29 0.37 1.0 1.4 9.1		 0.01 0.01 0.02 0.03 0.1	 mg/kg mg/kg mg/kg mg/kg %	 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 09-SEP-05	 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05 09-SEP-05	 DVH DVH DVH DVH HDT	 R322299 R322299 R322299 R322299 R321711
L313622-8 .2+MN11 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes % Moisture	 150 130 840 390 140 1500 YES 3.2 3.5 1.2 4.2 9.1 13 8.6		 5 5 5 5 5 5 0.005 0.01 0.01 0.01 0.02 0.03 0.1	 mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg %	 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 09-SEP-05	 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 09-SEP-05	 HDT DVH DVH DVH DVH DVH HDT	 R322020 R322299 R322299 R322299 R322299 R322299 R322020 R322299 R322299 R322299 R322299 R322299 R321711
L313622-9 .2+MN12 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4 CCME Total Hydrocarbons F1 (C6-C10) F1-BTEX F2 (C10-C16) F3 (C16-C34) F4 (C34-C50) Total Hydrocarbons (C6-C50) Chromatogram to baseline at nC50 CCME Total Extractable Hydrocarbons Prep/Analysis Dates CCME BTEX Benzene Toluene Ethylbenzene o-Xylene Xylenes, m+p Xylenes	 370 310 970 310 130 1800 YES 7.6 15 5.0 12 25 36		 5 5 5 5 5 5 0.005 0.01 0.01 0.01 0.02 0.03	 mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05 07-SEP-05	 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 12-SEP-05 09-SEP-05	 HDT DVH DVH DVH DVH DVH HDT	 R322020 R322299 R322299 R322299 R322299 R322299 R322020 R322299 R322299 R322299 R322299 R322299 R322299

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313622-9 .2+MN12 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4								
% Moisture	8.5		0.1	%	09-SEP-05	09-SEP-05	HDT	R321711
L313622-10 .2+MN7 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	52		5	mg/kg		12-SEP-05		
F1-BTEX	49		5	mg/kg		12-SEP-05		
F2 (C10-C16)	330		5	mg/kg		12-SEP-05		
F3 (C16-C34)	130		5	mg/kg		12-SEP-05		
F4 (C34-C50)	42		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	550		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	0.32		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	0.06		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	0.39		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	1.2		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	1.1		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	2.2		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	12		0.1	%	09-SEP-05	09-SEP-05	HDT	R321711
L313622-11 .2+MN8 Sample Date: 28-AUG-05 Matrix: Soil CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	240		5	mg/kg		12-SEP-05		
F1-BTEX	220		5	mg/kg		12-SEP-05		
F2 (C10-C16)	1500		5	mg/kg		12-SEP-05		
F3 (C16-C34)	530		5	mg/kg		12-SEP-05		
F4 (C34-C50)	170		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	2400		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	2.9		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	2.6		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	1.7		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	8.3		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	1.4		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	9.6		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	7.5		0.1	%	09-SEP-05	09-SEP-05	HDT	R321711

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L313622-12 .2+MN9								
Sample Date: 28-AUG-05								
Matrix: Soil								
CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	590		5	mg/kg		12-SEP-05		
F1-BTEX	520		5	mg/kg		12-SEP-05		
F2 (C10-C16)	3300		5	mg/kg		12-SEP-05		
F3 (C16-C34)	1000		5	mg/kg		12-SEP-05		
F4 (C34-C50)	420		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	5300		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	6.9		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	11		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	7.5		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	23		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	22		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	45		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	8.7		0.1	%	09-SEP-05	09-SEP-05	HDT	R321711
L313622-13 .13MN13								
Sample Date: 28-AUG-05								
Matrix: Soil								
CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	80		5	mg/kg		12-SEP-05		
F1-BTEX	59		5	mg/kg		12-SEP-05		
F2 (C10-C16)	1000		5	mg/kg		12-SEP-05		
F3 (C16-C34)	360		5	mg/kg		12-SEP-05		
F4 (C34-C50)	180		5	mg/kg		12-SEP-05		
Total Hydrocarbons (C6-C50)	1600		5	mg/kg		12-SEP-05		
Chromatogram to baseline at nC50	YES					12-SEP-05		
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					07-SEP-05	12-SEP-05	HDT	R322020
CCME BTEX								
Benzene	0.54		0.005	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Toluene	1.7		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Ethylbenzene	1.2		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
o-Xylene	6.8		0.01	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes, m+p	11		0.02	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
Xylenes	18		0.03	mg/kg	07-SEP-05	09-SEP-05	DVH	R322299
% Moisture	7.4		0.1	%	09-SEP-05	09-SEP-05	HDT	R321711
L313622-14 .13MN14								
Sample Date: 28-AUG-05								
Matrix: Soil								
CCME BTEX + F1-F4								
CCME Total Hydrocarbons								
F1 (C6-C10)	92		5	mg/kg		12-SEP-05		
F1-BTEX	75		5	mg/kg		12-SEP-05		
F2 (C10-C16)	1500		5	mg/kg		12-SEP-05		
F3 (C16-C34)	660		5	mg/kg		12-SEP-05		

ENVIRO-TEST ANALYTICAL REPORT

[illegible]

Reference Information

Methods Listed (If applicable):

ETL Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
ETL-BTX,TVH-CCME-WP	Soil	CCME BTEX		CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TEH-CCME-WP	Soil	CCME Total Extractable Hydrocarbons		CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TVH,TEH-CCME-WP	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.

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

Chain of Custody numbers:

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
WP	Enviro-Test Laboratories - Winnipeg, Manitoba, 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 warning units 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.

Enviro-Test Laboratories 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, Enviro-Test Laboratories assumes no liability for the use or interpretation of the results.

APPENDIX D

Contaminated Soil Sieve Analysis



#6 - 854 Marion Street Winnipeg,
Manitoba R2J 0K4 eng_tech@mts.net
www.eng-tech.ca

SIEVE ANALYSIS REPORT

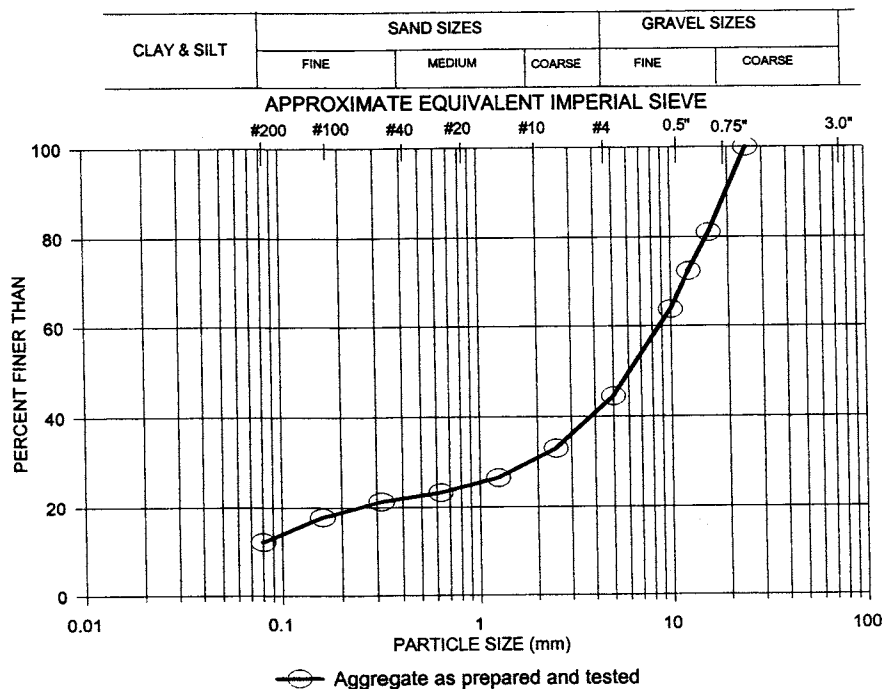
Transport Canada
3rd Floor 344 Edmonton Street
Winnipeg, Manitoba
R3C 0P4

File No.: 02-117-06
Reference No.: 2-117-6-1

ATTENTION:
PROJECT: RESOLUTE BAY FTA REMEDIAL WORK

DATE SAMPLED: - SAMPLED BY: ENG-TECH TYPE OF SAMPLE: GRAB
DATE RECEIVED: - DATE TESTED: Sept 22/03 SOURCE: LTU-2

SAMPLE DESCRIPTION:
SG - Sandy Gravel, fine to coarse
grained.



COMMENTS:
All gravel over 25 mm had been
removed prior to sampling.

PARTICLE SIZE (mm)	PERCENT PASSING	SPECIFICATION	
		LOW	HIGH
25.0	> 100.0		
16.0	> 81.1		
12.5	> 72.4		
10.0	> 63.9		
5.0	> 44.5		
2.5	> 33.0		
1.25	> 26.6		
0.630	> 23.3		
0.315	> 21.3		
0.160	> 17.8		
0.080	> 12.2		

cc:

ENG-TECH Consulting Limited

per: Clark Hryhoruk, M.Sc., P. Eng., Principal
Ph: (204) 233-1694, Fx: (204) 235-1579