



Village of Barons

ISSUED FOR USE

PHASE II AND PHASE III ENVIRONMENTAL SITE ASSESSMENT

202 MAIN STREET

LOT 1 AND LOT 2, BLOCK 7, PLAN 2605X

BARONS, ALBERTA

Site 9557

L22101182.001

October 2009

Available for Public Distribution

EXECUTIVE SUMMARY**Foreword**

Ms. Laurie Beck, Administrator for the Village of Barons, retained EBA Engineering Consultants Ltd. (EBA) to conduct Phase II and Phase III environmental site assessments (ESAs) of a property located at 202 Main Street (legally described as Lot 1 and Lot 2, Block 7, Plan 2605X), in Barons, Alberta.

The Phase II and Phase III ESA were initiated following a geotechnical evaluation for a roadway improvement and water line upgrade project along Main Street that extended from Railway Avenue to Prairie Avenue. The geotechnical investigation encountered petroleum hydrocarbons (PHCs) within soils and groundwater to the north of the site and was conducted by EBA in December 2007 (EBA File: L22101182). The detection of PHCs triggered a historical site assessment, which determined that prior to the current operations, the site operated as a gas service station (Tjostheim Transport Ltd.). According to the Petroleum Tank Management Association of Alberta (PTMAA), two underground storage tanks (USTs) were likely abandoned on site and that signs of leakage were noted during site closure. No remediation activities were reported following the closure of the service station.

The objectives of the Phase II and Phase III ESAs were to assess soil and groundwater conditions on and off site, to delineate PHC impacts, and determine applicable remedial guidelines for the site. The Phase II and Phase III ESAs were conducted in accordance with the Alberta Municipal Affairs (AMA) Tank Site Remediation program objectives and Alberta Environment's (AENV) Alberta Tier 1 and Tier 2 Soil and Groundwater Remediation Guidelines, June 2007. The Phase II ESA was prepared in general accordance Canadian Standards Association (CSA) document "Z769-00 Phase II Environmental Site Assessment", updated in March 2000.

Findings and Conclusions

Based upon site conditions identified during the course of these assessments, AENV's Tier 1/2 Soil and Groundwater Remediation Guidelines, fine-grained criteria for residential land use have been applied for the evaluation of soil and groundwater quality. Soil guidelines were refined to include Protection of Domestic Use Aquifer (DUA) and Ecological Direct Soil Contact.

Based on analytical results to date, the following conclusions have been made:

- PHC impacts extend beyond the site boundary;
- PHC impacts were encountered within soil samples collected at depths between 1.2 m below ground level (mbgl) and 4.8 mbgl;
- the bedrock appears to be restricting the vertical migration of the impacts as PHCs were not identified below 4.8 mbgl;
- PHC concentrations greater than the AENV Tier 1 Guidelines were encountered within the soils at 08MW01, 08MW02, 08BH03, 08BH04, 08BH05, 08MW06, 09BH12, 09MW13, 09BH17, and 09BH20; and

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- PHC concentrations greater than the AENV Tier 1 Guidelines were encountered within the groundwater at 08MW01, 08MW02, 08MW06, 08MW07, 09MW10, 09MW13, and 09MW19.

Prior to evaluating the best remedial options for the site, additional assessment is recommended to determine the lateral extents to the east and south of the former pump island area. Assessment of these areas is warranted as PHC impacts in these areas could pose a risk to human health.

Additional delineation is also warranted at 08MW02, 09BH12, 09MW13, and 09BH20 as the vertical extent of the PHC impacts have not been fully identified at these locations.

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1.0 INTRODUCTION

1.1 GENERAL

Ms. Laurie Beck, Administrator for the Village of Barons, retained EBA Engineering Consultants Ltd. (EBA) to conduct Phase II and Phase III environmental site assessments (ESAs) of a property located at 202 Main Street (legally described as Lot 1 and Lot 2, Block 7, Plan 2605X), in Barons, Alberta, hereinafter referred to as the site (Figure 1).

The Phase II and Phase III ESAs were initiated following a geotechnical evaluation for a roadway improvement and water line upgrade project along Main Street from Railway Avenue to Prairie Avenue. The geotechnical investigation identified petroleum hydrocarbons (PHCs) within soils and groundwater to the north of the site and was conducted by EBA in December 2007 (EBA File: L22101182). The detection of PHCs triggered a historical assessment of the site, which determined that prior to the current operations, the site operated as a gas service station (Tjostheim Transport Ltd.). According to the Petroleum Tank Management Association of Alberta (PTMAA), two underground storage tanks (USTs) were likely abandoned on site and that signs of leakage were noted during site closure. No remediation activities were reported following the closure of the service station.

The objectives of the Phase II and Phase III ESAs were to assess soil and groundwater conditions on and off site, delineate PHC impacts, and determine applicable remedial guidelines for the site. The Phase II and Phase III ESAs were conducted in accordance with the Alberta Municipal Affairs (AMA) Tank Site Remediation program objectives and Alberta Environment's (AENV) Alberta Tier 1 and Tier 2 Soil and Groundwater Remediation Guidelines, June 2007. The Phase II ESA was prepared in general accordance Canadian Standards Association (CSA) document "Z769-00 Phase II Environmental Site Assessment", updated in March 2000.

1.2 AUTHORIZATION

Ms. Beck provided authorization to proceed with the assessment to Mr. Deryck Masterman of EBA on August 25, 2008.

1.3 SCOPE OF WORK

In accordance with our Phase II ESA proposal dated August 13, 2008, EBA conducted the following tasks:

- coordinated Alberta One-Call, Shaw Cable, and a private utility locator (Alberta Line Find) to identify utilities on site within the proposed work areas prior to commencing the drilling program;
- advanced eight boreholes and completed five boreholes as groundwater monitoring wells;

- obtained disturbed soil samples at regular intervals (0.75 m) and/or at changes in soil stratigraphy;
- screened bulk soil samples for organic vapour emissions (OVEs);
- submitted selected soil samples to Maxxam Analytics Inc. (Maxxam) of Calgary, Alberta for the analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), PHC fractions F1 to F4, lead, and particle size analysis (PSA) parameters;
- monitored OVEs and groundwater levels/free-product thickness within each of the five monitoring wells on site;
- collected and submitted five groundwater samples to Maxxam for chemical analysis of BTEX, PHC fractions F1 to F2, and dissolved lead; and
- compared laboratory results with the selected risk management criteria and identified area(s) where soil and/or groundwater exceed their respective criteria.

After the Phase II ESA evaluation of soil and groundwater quality on site, EBA recommended that a Phase III ESA be undertaken to assess off-site conditions to the north and west along Main Street and Alberta Avenue. The objective of the Phase III ESA was to begin delineation of the vertical and horizontal extent of the impacts. A proposal to conduct additional assessment for the site was provided to Ms. Beck on January 29, 2009 and included the following additional tasks:

- coordinated Alberta One-Call, Shaw Cable, and a private utility locator (Alberta Line Find) to conduct utility locates off site along Main Street and Alberta Avenue prior to commencing the drilling program;
- advanced an additional 13 boreholes and completed 3 boreholes as groundwater monitoring wells;
- screened bulk soil samples for OVEs;
- submitted 12 additional soil samples to Maxxam for the analysis of BTEX, PHC fractions F1 to F4, lead, and PSA parameters;
- monitored OVEs and groundwater levels/free-product thickness within each of the eight monitoring wells on site;
- collected and submitted three additional groundwater samples to Maxxam for chemical analysis of BTEX, PHC fractions F1 to F2, and dissolved lead;
- compared laboratory results with the selected risk management criteria and identified area(s) where soil and/or groundwater exceed their respective criteria; and
- prepared a Phase III ESA report discussing field observations and analytical results, with recommendations for further investigations or monitoring.

1.4 QUALIFICATIONS OF ASSESSORS

Mr. Jamie LaMontagne, oversaw all fieldwork on site. Mr. LaMontagne is an environmental technologist with EBA's Lethbridge environment practice and has more than eight years of experience in the environmental industry.

Mr. Deryck Masterman, B.Sc., A.Ag., was the project manager, assisted with the interpretation of the results, and wrote the report. Mr. Masterman is an environmental scientist for EBA's Lethbridge environment practice and has more than five years of experience in the environmental industry.

Ms. Mandi Parker, P.Ag., conducted the preliminary review of the report and assisted in the interpretation of the results. Ms. Parker is an environmental scientist for EBA's Lethbridge environment practice and has more than 10 years of experience in the environmental industry.

Mr. Tom Dance, M.Sc., P.Geol., conducted the final review of the report. Mr. Dance is a principal consultant in EBA's environment practice in Calgary and has more than 28 years experience in the environmental industry.

2.0 BACKGROUND INFORMATION

2.1 SITE DESCRIPTION

The site is a rectangular-shaped property, approximately 12,700 m² in area, located on the Southeast Quarter of Section 16, Township 012, Range 23 West of the Forth Meridian at 202 Main Street, Barons, Alberta. The site consists of a rectangular-shaped building, approximately 6,300 m² in area, and is owned by the Village of Barons. The buildings foundation is slab-on-grade. Historically, the site operated as a gas service station (Tjostheim Transport Ltd.). The former tank-nest area is suspected to have been located north of the building. The site is currently utilized as the Village of Barons maintenance building and also serves as a car wash.

A site plan is provided on Figure 2.

2.2 LAND USE

According to the Village of Barons, the site is zoned Direct Control (DC). Surrounding land use within 30 m or less of the site is comprised of Residential (R1), Commercial (C1), and DC.

2.3 GEOLOGY

The surficial geology in the Barons area is characterized as glaciolacustrine material with clay, silt, and sand forming the dominant geologic deposits (Shetson 1981). Bedrock in the Barons area consists of strata from the St. Mary River Formation of the late Cretaceous age and is comprised of sandstone and shale.

2.4 SURFACE WATER

There are several ephemeral wetlands located near the Village of Barons municipal boundaries; however, all identified wetlands are greater than 300 m from the site. Two water reservoirs are also located approximately 420 m southwest of the site; however, the reservoirs are no longer being used and according to Ms. Beck, will be reclaimed in the near future. The nearest surface waterbody of significance is Keho Lake, located approximately 5.25 km southeast of the site.

2.5 GROUNDWATER

Based on hydrogeological maps for the area, it is anticipated that shallow and regional groundwater flow would generally be southeast towards Keho Lake (Tokarsky 1974).

According to provincial water well records (AENV 2008), there are three registered water wells located within approximately 300 m of the site. The information gathered for registered water wells within 300 m of the site has been tabulated below.

WATER WELLS WITHIN 300 M OF THE SITE					
Well ID No.	Location	Approximate Distance and Direction from Site	Approximate Depth	Year Installed	Owner
0194222	SE ¼ 16-012-23 W4M	75 m northeast.	29 m	1958	Unknown
0194216	SE ¼ 16-012-23 W4M	300 m south.	29 m	1971	AENV No. 0613E
2058577	SE ¼ 16-012-23 W4M	Not verified.	20 m	1971	AENV No. 0611E

According to Ms. Beck, the Village of Barons began importing its potable water from the Village of Nobleford in April 2008. Potable water is piped to the Village of Barons from Nobleford's water treatment plant.

Water well locations are illustrated on Figure 3 and a summary of reported water wells near the site is provided in Appendix C.

3.0 METHODOLOGY

3.1 UTILITY LOCATION INFORMATION

Prior to drilling, Alberta One-Call and Shaw Cable were notified to locate public utilities on the property. In addition, a private utility locator (Alberta Line Find) was contracted by EBA to locate private underground utilities and verify underground utilities marked by representatives contacted by the Alberta One-Call system.

3.2 BOREHOLE DRILLING AND SOIL SAMPLING

EBA contracted Chilako Drilling Services Ltd. of Coaldale, Alberta to conduct the drilling using a truck-mounted drill rig equipped with 150 mm diameter solid-stem augers.

Eight boreholes were advanced on site on November 17, 2008. Thirteen additional boreholes were advanced off site to the north and west along Main Street and Alberta Avenue on March 12, 2009. The maximum depth assessed was 15.2 m below ground level (mbgl) (08MW08). Eight of the twenty-one boreholes were equipped with groundwater monitoring wells (08MW01, 08MW02, 08MW06, 08MW07, 08MW08, 09MW10, 09MW13, and 09MW19). Soil stratigraphy was logged in the field using the Unified Soil Classification System (USCS) and observations of staining and/or odours were recorded.

Groundwater monitoring wells were completed using 50 mm diameter polyvinyl chloride (PVC) standpipes. Silica sand was placed from the base of the borehole to approximately 0.3 m above the slotted interval of the standpipe within the borehole annulus. To reduce the possibility of inflow of surface water into the standpipe, the annulus of the monitoring wells above the slotted section was sealed with bentonite chips to approximately 0.2 mbgl and secured with a flush-mounted road box founded in concrete.

Borehole logs, including field screening results and a key to the USCS are presented in Appendix A. A site plan showing the approximate borehole/monitoring well locations is provided on Figure 2.

Soil samples were taken at regular depth intervals (0.75 m) and where changes in soil types were observed. Bagged soil samples were screened for OVEs using a GasTech TankTechtor™ 1238 ME (GasTech™) set in methane elimination mode.

Field vapour readings are not intended to provide a quantitative measurement of the level of hydrocarbon contamination in soil samples. The readings assist in the selection of samples for chemical analysis.

Based on OVE results, observations made during drilling, and the observed groundwater interface, samples were selected for laboratory analysis. Soil samples were placed in laboratory supplied 250 mL glass jars with Teflon™-lined lids, kept cool in coolers, and transported to Maxxam under chain-of-custody (COC) for laboratory chemical analyses of BTEX, PHC fractions F1 to F4, lead, and PSA. Soil analytical results are summarized in Table 1 and are discussed in Section 5.1.

The analytical methodologies are referenced with Maxxam's laboratory reports in Appendix B. The reader is directed to these references for further details on specific analytical methods.

3.3 GROUNDWATER MONITORING, SAMPLING, AND ANALYTICAL TESTING

On November 28, 2008 and March 27, 2009, the groundwater monitoring wells were monitored for OVEs using a GasTech™ operated in methane elimination mode. Liquid levels in the monitoring wells were also measured at that time using a Heron™ interface probe.

Subsequently, the groundwater monitoring wells were purged of approximately three well volumes of standing water and allowed to recover to approximately 80% of the static level prior to sample collection. Groundwater samples were then collected using dedicated disposable bailers and were stored in laboratory-supplied bottles. Samples were preserved according to laboratory instructions and transported in coolers to Maxxam under COC for analysis of BTEX, PHC fractions F1 to F2, and dissolved lead. Groundwater monitoring and sampling was conducted in accordance with EBA work methods (WM4203) to ensure sample quality was maintained.

The analytical program was developed following a review of historical land use, which identified the potential presence of PHCs and lead as contaminants of potential concern. Analytical methodologies are referenced with Maxxam's laboratory reports in Appendix B. Monitoring well completions details and field monitoring results are summarized in Table 2. Groundwater analytical results are summarized in Table 3 and are discussed in Section 5.2.

3.4 HYDRAULIC CONDUCTIVITY ASSESSMENT

On November 28, 2008, EBA conducted hydraulic conductivity tests (K-test) at three monitoring locations (08MW1, 08MW2, and 08MW6). The K-tests were performed to estimate the hydraulic conductivity of the geologic material, across which the well is screened using the Hvorslev rising head bail test and Bouwer and Rice slug test analysis.

The test results are provided in Appendix C.

3.5 MATERIALS MANAGEMENT

Drill cuttings were placed within a soil bag identified as containing potentially hazardous materials and were stored on site. Water purged from the monitoring wells was stored within 205 L drums on site. Drill cuttings and purged groundwater are still on site.

4.0 FIELD ASSESSMENT RESULTS

Section 4.1 to Section 4.3 discuss the soil materials encountered, groundwater and soil conditions, and guideline criteria selected.

4.1 SOIL MATERIALS

During the drilling investigations, the soil materials generally consisted of:

- asphalt and/or clay fill from surface grade to approximately 0.7 mbgl;
- clay (lacustrine) with intermittent silt/sand lenses from 0.7 mbgl to 4.0 mbgl; and
- weathered sandstone (bedrock) from 4.0 mbgl to the maximum depth of investigation (15.2 mbgl).

With the exception of the sample collected from 08MW01 (4.8 mbgl), which was coarse grained, soil samples submitted for PSA were determined to be fine-grained material.

The stratigraphy observed during the drilling program was generally consistent with published reports for the regional geology in the Barons area, as described in Section 2.3.

4.2 GROUNDWATER AND SOIL CONDITIONS

On March 26, 2009, EBA measured OVE concentrations and groundwater levels within each monitoring locations. OVE concentrations ranged between 50 parts per million (ppm) (08MW08 and 09MW10) and 20% of the lower explosive limit (LEL) (08MW06). Groundwater was encountered at depths ranging from 2.5 mbgl (09MW13) to 3.0 mbgl (09MW19). Approximately 8.5 cm of free product was noted within 08MW06 at the time of monitoring. Groundwater monitoring results indicate that the groundwater table is relatively flat with a slight hydraulic gradient to the south.

Hydraulic conductivity tests conducted within 08MW01 (3×10^{-6} m/s), 08MW02 (3×10^{-7} m/s), and 08MW06 (1×10^{-6} m/s) provide an average calculated hydraulic conductivity of 5×10^{-6} m/s.

Hydraulic conductivity results are provided in Appendix C.

4.3 GUIDELINE CRITERIA SELECTION

To assist in assessing the quality of soil and groundwater analyzed during the environmental assessment at the site, AENV's Tier 1 and Tier 2 Remediation Guidelines were applied. To apply these guidelines, the background information summarized in Section 2.0 was used to assess the land use and sensitivity of the site.

The site is located within an area of commercial buildings and residential dwellings. Therefore, the most sensitive land use within 30 m of the site is residential.

Drilling at the site demonstrated that the underling soils are predominantly fined grained. The depth to groundwater at the time of the assessment ranged between 2.5 mbgl and 3.0 mbgl.

The chemicals of potential concern associated with gasoline include the monocyclic aromatic hydrocarbons (BTEX) and the aliphatic hydrocarbons F1 (C_6 to C_{10} hydrocarbon chain), F2 (C_{11} to C_{16} hydrocarbon chain), F3 (C_{17} to C_{24} hydrocarbon chain), and F4 (longer than C_{25} hydrocarbon chains).

Under the residential land use scenario for fine-grained soils, the Tier 1 Guidelines for aromatic hydrocarbons include the exposure pathway for the protection of drinking water. However, for the F1 to F4 hydrocarbons, the Tier 1 criteria is based on the protection of ecological receptors and that is the pathway for direct soil contact by ecological organisms.

Within the guidelines, allowance can be made for exclusion of some pathways if site conditions permit. Testing of groundwater beneath the site yielded a hydraulic conductivity value of 5×10^{-6} m/s, with a soil thickness greater than 2.5 m. These conditions suggest that the saturated soils might yield sufficient water for domestic use. Therefore, the pathway for protection of drinking water cannot be excluded.

Some evidence of hydrocarbon affects (i.e., staining and vapours) was discovered beneath the roadway. This sort of institutional barrier eliminates the opportunity for direct contact by soil organisms; therefore, the ecological pathway may not be a realistic measure for assessing soil quality. The next most stringent criteria for assessing soil quality would be by vapour inhalation (for the F1 and F2 hydrocarbons). However, in keeping with the conservation nature of the Tier 1 Guidelines, we have applied the ecological direct contact for this assessment.

5.0 SOIL AND GROUNDWATER QUALITY

The following sections discuss the soil and groundwater analytical results.

5.1 SOIL ANALYTICAL RESULTS

Indications of PHC staining and/or odours were noted during the drilling investigation at each borehole location; however, the vertical extent of the PHC indicators varied between borehole locations.

Thirty-three samples were submitted for chemical analysis. PHC staining and/or high OVE concentrations were identified at 08MW08, 08MW10, 08BH14, 09BH15, 09BH16, 09BH18, or 09BH21 during the drilling program. Because the intent of the Phase III ESA was to delineate the extent of the plume, soil samples were not submitted from these locations.

Soil analytical results are summarized in Table 1. Analytical results greater than the guidelines are tabulated below and are plotted on Figure 4.

SUMMARY OF SOIL ANALYTICAL RESULTS				
Parameter	Guideline	Concentration Greater than Guidelines		
		Borehole	Depth	Result
Benzene	0.046 mg/kg	08MW01	4.2 m	6.3 mg/kg
		08MW02	2.2 m	3.2 mg/kg
		08BH03	1.2 m and 1.8 m	0.15 mg/kg and 54 mg/kg
		08BH04	3.0 m	19 mg/kg
		08BH05	2.4 m	1.1 mg/kg
		08MW06	2.4 m	2.0 mg/kg
		09BH12	3.0 m	1.5 mg/kg
		09MW13	4.8 m	0.054 mg/kg
		09BH20	3.0 m and 3.6 m	9.7 mg/kg and 0.53 mg/kg
Toluene	0.52 mg/kg	08BH03	1.8 m	6.4 mg/kg

SUMMARY OF SOIL ANALYTICAL RESULTS (CONTINUED)				
Parameter	Guideline	Concentration Greater than Guidelines		
		Borehole	Depth	Result
Ethylbenzene	0.11 mg/kg	08MW01	4.2 m	13 mg/kg
		08MW02	2.2 m	41 mg/kg
		08BH03	1.2 m and 1.8 m	0.21 mg/kg and 310 mg/kg
		08BH04	3.0 m	36 mg/kg
		08BH05	2.4 m	6.3 mg/kg
		08BH06	2.4 m	21 mg/kg
		09BH12	3.0 m	12 mg/kg
		09BH17	3.0 m	19 mg/kg
		09BH20	3.0 m and 3.6 m	21 mg/kg and 0.2 mg/kg
Xylenes	15 mg/kg	08MW01	4.2 m	16 mg/kg
		08MW02	2.2 m	50 mg/kg
		08BH03	1.8 m	1,500 mg/kg
		08BH04	3.0 m	50 mg/kg
		08MW06	2.4 m	31 mg/kg
		09BH12	3.0 m	18 mg/kg
		09BH17	3.0 m	29 mg/kg
		09BH20	3.0 m	36 mg/kg
PHC Fraction F1	various	08MW02	2.2 m	1,000 mg/kg
		08BH03	1.8 m	5,300 mg/kg
		08BH04	3.0 m	1,300 mg/kg
		08MW06	2.4 m	280 mg/kg
PHC Fraction F2	various	08MW01	4.2 m	4,700 mg/kg
		08MW02	2.2 m and 4.2 m	310 mg/kg and 23 mg/kg
		08BH03	1.8 m	3,500 mg/kg
		08BH04	3.0 m	4,200 mg/kg
		08BH05	2.4 m	2,000 mg/kg
		08MW06	2.4 m	1,300 mg/kg
PHC Fraction F3	2,600 mg/kg	08BH03	1.8 m	9,400 mg/kg

The hydrocarbon impacts are present off site to the north and west. Utility conduits in the roadways (Main Street and Alberta Avenue) may be providing a preferential migration pathway. Some hydrocarbon impacts have been detected in the upper few centimetres of the fractured bedrock; however, the bedrock stratum appears to be restricting the downward migration of the hydrocarbons.

Within the areas assessed, toluene and PHC fraction F1 and F2 concentrations greater than the domestic use aquifer (DUA) guideline are within the clay stratum around the tank nest area.

PHC fraction F3 was detected on the north side of the site; however, only 08BH03 contained a concentration greater than the ecological direct soil contact guideline.

5.2 GROUNDWATER ANALYTICAL RESULTS

Eight groundwater samples, plus one duplicate from monitoring well 09MW10, were submitted for chemical analysis. Groundwater analytical results are summarized in Table 3. Groundwater analytical results greater than the guidelines are tabulated below and are plotted on Figure 5.

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS			
Parameter	Guideline	Concentrations Greater than Guidelines	
		Monitoring Well	Result
Benzene	0.005 mg/L	08MW01	5.5 mg/L
		08MW02	1.6 mg/L
		08MW06	1.2 mg/L
		08MW07	0.056 mg/L
		09MW10	0.13 mg/L
		09MW13	0.7 mg/L
		09MW19	0.23 mg/L
Ethylbenzene	0.0024 mg/L	08MW01	0.47 mg/L
		08MW02	0.4 mg/L
		08MW06	0.35 mg/L
		09MW13	0.28 mg/L
Xylenes	0.3 mg/L	08MW01	0.5 mg/L
		08MW02	0.5 mg/L
		08MW06	0.52 mg/L
		09MW13	0.37 mg/L
PHC Fraction F1	2.2 mg/L	09MW13	3.9 mg/L
PHC Fraction F2	1.1 mg/L	08MW01	6.4 mg/L
		08MW02	8.2 mg/L
		08MW06	31.9 mg/L
		09MW13	28.4 mg/L

The hydrocarbon impacts have migrated off site to the north and west; however, concentrations greater than the applied guidelines are limited to seven monitoring wells (08MW01, 08MW02, 08MW06, 08MW07, 09MW10, 09MW13, and 09MW19). The migration of these parameters appears to be restricted by the clay stratum; however, utility conduits in the roadways (Main Street and Alberta Avenue) are likely the cause for the intermittent off-site migration.

Generally, the hydrocarbon concentrations are strongest in the area of the tank nest; however, a strong concentration of PHC fraction F2 was also detected at 09MW13.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The objectives of the Phase II and Phase III ESAs were to assess soil and groundwater conditions on and off site, to delineate PHC impacts, and to determine applicable remedial guidelines for the site.

Based upon soil and groundwater conditions identified during the course of the Phase II and Phase III ESAs, the following conclusions have been made:

- PHC impacts extend beyond the site boundary to the north and west;
- PHC impacts were encountered within soil samples collected at depths between 1.2 mbgl and 4.8 mbgl;
- the bedrock appears to be restricting the vertical migration of the impacts as PHCs were not identified below 4.8 mbgl;
- PHC concentrations greater than the AENV Tier 1 Guidelines were encountered within the soils at 08MW01, 08MW02, 08BH03, 08BH04, 08BH05, 08MW06, 09BH12, 09MW13, 09BH17, and 09BH20; and
- PHC concentrations greater than the AENV Tier 1 Guidelines were encountered within the groundwater at 08MW01, 08MW02, 08MW06, 09BH12, 09MW07, 09MW10, 09MW13, and 09MW19.

Prior to evaluating the best remedial options for the site, additional assessment to determine the extent to the east and south of the former pump island area is recommended. Assessment of these areas is warranted as PHC impacts in these areas could pose a risk to human health.

Additional delineation is also warranted at 08MW02, 09BH12, 09MW13, and 09BH20 as the vertical extent of the PHC impacts have not been fully identified.

7.0 LIMITATIONS OF REPORT

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

8.0 CLOSURE

EBA trusts that this report satisfies your present requirements. Should you have any questions or comments, please contact Mr. Deryck Masterman at our Lethbridge office.

Respectfully submitted,
EBA Engineering Consultants Ltd.



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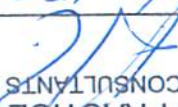


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Reviewed by:
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REFERENCES

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TABLES

TABLE 1: SOIL ANALYTICAL RESULTS - AMA SITE 9557

Parameters	Detection Limits	Units	Protection of Domestic Use Aquifer		Ecological Direct Soil Contact	08BH01				08MW02				08BH03				08BH05				08MW06				08MW07			
			<3.0 mbgl			>3.0 mbgl		1.5 m	4.2 m	4.8 m	15 m	2.2 m	4.2 m	1.2 m	1.8 m	4.8 m	1.9 m	3.0 m	5.4 m	1.8 m	2.4 m	4.8 m	1.6 m	2.4 m	5.4 m	3.0 m	4.2 m	6.0 m	
			Petroleum Hydrocarbons																										
Benzene	0.02	mg/kg	0.046	0.046	120	nd	6.3	nd	nd	3.2	nd	0.15	5.1	nd	nd	12	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Toluene	0.01	mg/kg	0.52	0.52	220	nd	13	nd	nd	41	nd	0.31	310	nd	nd	36	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Trichlorobenzene	0.04	mg/kg	0.11	0.11	240	nd	15	0.092	nd	50	nd	1	1,500	nd	0.21	50	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Nitrobenzene	0.04	mg/kg	15	15	150	nd	16	0.16	nd	50	nd	1	1,500	nd	0.21	50	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
1,1,1-trichloroethane	12	mg/kg	210	210	420	nd	150	nd	nd	1,000	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
1,2-dichloroethane	10	mg/kg	150	150	300	nd	4,700	250	nd	310	nd	nd	3,500	nd	nd	1,200	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
1,3-dichloroethane	10	mg/kg	nd	nd	2,600	nd	4,700	140	nd	310	nd	nd	3,500	nd	nd	1,200	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
1,4-dichloroethane	10	mg/kg	nd	nd	11,200	nd	23	nd	nd	nd	nd	nd	2,400	nd	nd	1,700	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Metals																													
Lead (Pb)	1	mg/kg	nd	nd	300	nd	8	6	8	13	5	46	6	nd	21	1	nd	6	16	9	9	14	8	9	9	9	8	8	
Physical Properties																													
Soil Moisture Content	0.3	%	nd	nd	nd	22	14	5.3	20	26	6.1	16	24	14	20	20	19	1	25	12	24	23	11	24	14	14	10	10	
75 um Sieve	0.2	%	nd	nd	nd	94	nd	49	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
25 um Sieve	0.2	%	nd	nd	nd	6	nd	51	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
6.3 MI Class	0.2	%	nd	nd	nd	FINI	nd	COARSE	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	

Parameters	Protection of Domestic Use Aquifer		Ecological Direct Soil Contact	12-Mar-09													
	Units	09BH09		09BH11		09BH12		09BH17		09BH19		09BH20					
		< 3.0 mbgl		> 3.0 mbgl	5.4 m	6.0 m	4.2 m	2.4 m	3.0 m	4.8 m	3.0 m	4.2 m	4.8 m	5.4 m	3.0 m	3.6 m	
Petroleum Hydrocarbons																	
Benzene	0.02	mg/kg	0.046	0.046	120	nd	nd	0.023	0.016	1.5	0.054	0.97	0.036	0.02	0.018	2.7	0.33
Toluene	0.01	mg/kg	0.52	0.52	220	nd	nd	nd	nd	10,000	nd	nd	nd	nd	nd	0.06	0.1
Trichloroethene	0.04	mg/kg	0.11	0.11	240	nd	nd	0.058	nd	12	0.05	19	0.051	nd	nd	21	0.2
Nitrobenzene	0.04	mg/kg	15	15	150	nd	nd	0.11	nd	18	0.069	29	0.066	nd	nd	36	0.7
1,1,1-trichloroethane	12	mg/kg	210	210	420	nd	nd	1.20	nd	410	nd	501	nd	nd	nd	430	nd
1,2-dichloroethane	10	mg/kg	150	150	300	13	11	nd	nd	180	69	1,400	nd	nd	nd	660	nd
1,3-dichloroethane	10	mg/kg	nd	nd	2,600	nd	nd	nd	nd	24	nd	520	nd	nd	nd	210	nd
1,4-dichloroethane	10	mg/kg	nd	nd	11,200	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Metals																	
Lead (Pb)	1	mg/kg	nd	nd	300	10	8	nd	9	13	4	13	8	8	8	12	nd
Physical Properties																	
Soil Moisture Content	0.3	%	nd	nd	nd	18	10	14	18	23	1	21	13	18	1	19	13
75 um Sieve	0.2	%	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
25 um Sieve	0.2	%	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
6.3 MI Class	0.2	%	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Notes:

- Alberta Environment: August 2008 Alberta Tier 1 Soil Remediation Guidelines Values for Soil and Groundwater for Residential Land Use for Fine-grained Soil.
- Detection limits increased for one significant figure due to dilution of sample.
- nd - Parameter not analyzed
- nd - Less than analytical detection limits.
- ng - No guidelines established
- nd and Underlined** - Greater than the referenced guideline.



TABLE 2: MONITORING WELL COMPLETION DETAILS AND FIELD MONITORING RESULTS - AMA SITE 9557

Monitoring Well Identifier	Date of Installation	TOC Elevation ¹ (m)	Monitoring Well Depth (mBTOC) ²	Screen Interval (mbg) ³	Screened In	Free Product (mBTOC)	Depth to Groundwater (mBTOC)	Groundwater Elevation (m)	Organic Vapour Emissions ⁴
						26-Mar-09			
08MW01	17-Nov-08	99.22	4.62	1.5 to 4.5	Clay and Bedrock	nd	2.83	96.39	2% LEL
08MW02	17-Nov-08	99.33	5.25	2.2 to 5.2	Clay and Bedrock	nd	2.90	96.43	390 ppm
08MW06	17-Nov-08	99.17	5.81	1.5 to 6.1	Clay and Bedrock	2.77	2.86	96.32	20% LEL
08MW07	17-Nov-08	99.13	4.90	1.5 to 6.1	Clay and Bedrock	nd	2.74	96.39	190 ppm
08MW08	19-Nov-08	99.15	14.30	10.5 to 15.2	Bedrock	nd	2.55	96.60	50 ppm
09MW10	12-Mar-09	99.29	6.10	3.1 to 6.1	Clay and Bedrock	nd	2.91	96.38	50 ppm
09MW13	12-Mar-09	98.86	6.10	3.1 to 6.1	Clay and Bedrock	nd	2.50	96.36	2% LEL
09MW19	12-Mar-09	99.38	6.10	3.1 to 6.1	Clay and Bedrock	nd	3.00	96.38	150 ppm

Notes:

Benchmark: Top bolt of fire hydrant located on the northwest corner of Main Street and Alberta Avenue.

¹ Elevation of top of plastic casing.

² Meters below top of plastic casing.

³ Meters below grade.

⁴ Organic vapour emissions recorded using a Gastech 1238 METM calibrated to hexane and operated in methane elimination mode.

nd - Not detected.

ppm - Parts per million.

%LEL - Percentage of the lower explosive limit.

TABLE 3: GROUNDWATER ANALYTICAL RESULTS - AMA SITE 9557

Parameter	Detection Limits	Units	AENV Tier ¹	28-Nov-08					26-Mar-09			
				08MW01	08MW02	08MW06	08MW07	08MW08	09MW10	09DUP02*	09MW13	09MW19
Petroleum Hydrocarbons												
Benzene	0.0009	mg/L	0.005	<u>5.5</u>	<u>1.6</u>	<u>1.2</u>	<u>0.056</u>	nd	<u>0.13</u>	<u>0.13</u>	<u>0.7</u>	<u>0.23</u>
Toluene	0.0009	mg/L	0.024	0.0005	0.0017	0.0022	nd	nd	0.0007	0.0007	0.0013	0.0007
Ethylbenzene	0.0009	mg/L	0.0024	<u>0.47</u>	<u>0.4</u>	<u>0.35</u>	nd	nd	0.0004	0.0006	<u>0.28</u>	nd
Xylenes	0.002	mg/L	0.3	<u>0.5</u>	<u>0.5</u>	<u>0.52</u>	0.014	nd	0.027	0.028	<u>0.37</u>	0.0017
F1 (C ₆ to C ₁₀)	0.2	mg/L	2.2	nd	1	2	0.5	nd	0.3	0.2	<u>3.2</u>	nd
F2 (C ₁₀ to C ₁₆)	0.1	mg/L	1.1	<u>6.4</u>	<u>8.2</u>	<u>31.9</u>	0.7	nd	0.2	0.2	<u>28.4</u>	nd
Metals												
Lead (Pb)	1	mg/L	0.01	0.0059	nd	nd	0.0002	nd	nd	nd	nd	nd

Notes:

¹ Alberta Environment. August 2008. Alberta Tier 1 Soil and Groundwater Remediation Guidelines for Fine-grained Soils on Residential Land Use.

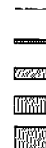
nt - Parameter not analyzed.

nd - Below analytical detection limits.

ng - No guidelines established.

Bold and Underlined - Greater than the referenced guideline.

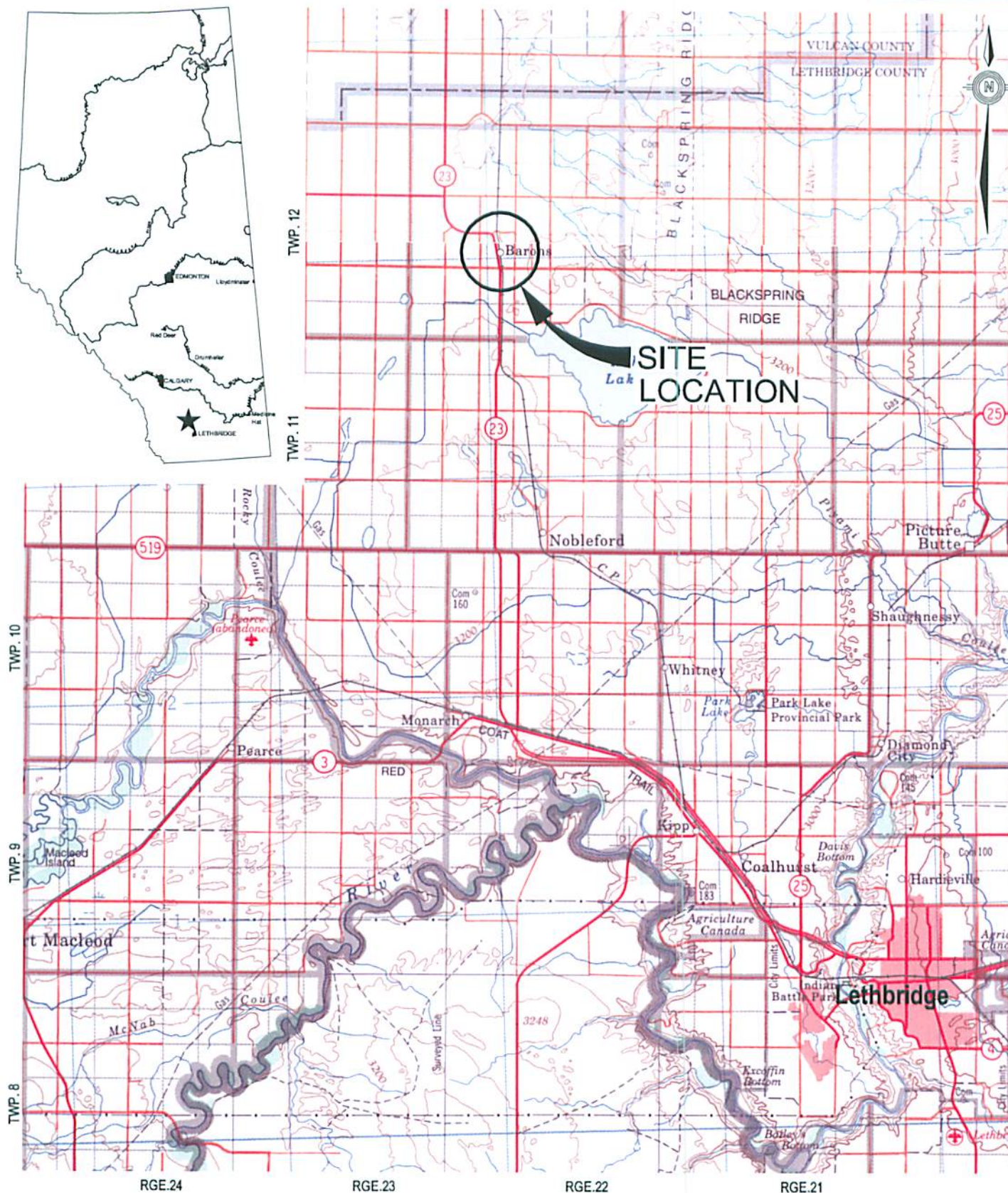
*09DUP02 - Duplicate sample of 09MW10.



FIGURES



\\lethbridge\geodatabase\l221 Projects\L22101182\001\L22101182-001_FIG1-5.dwg



CLIENT

Village of Barons

PHASE II/III ENVIRONMENTAL SITE ASSESSMENT
AMA SITE 9557

SITE LOCATION PLAN

NOTE
NOT TO SCALE

EBA Engineering
Consultants Ltd.

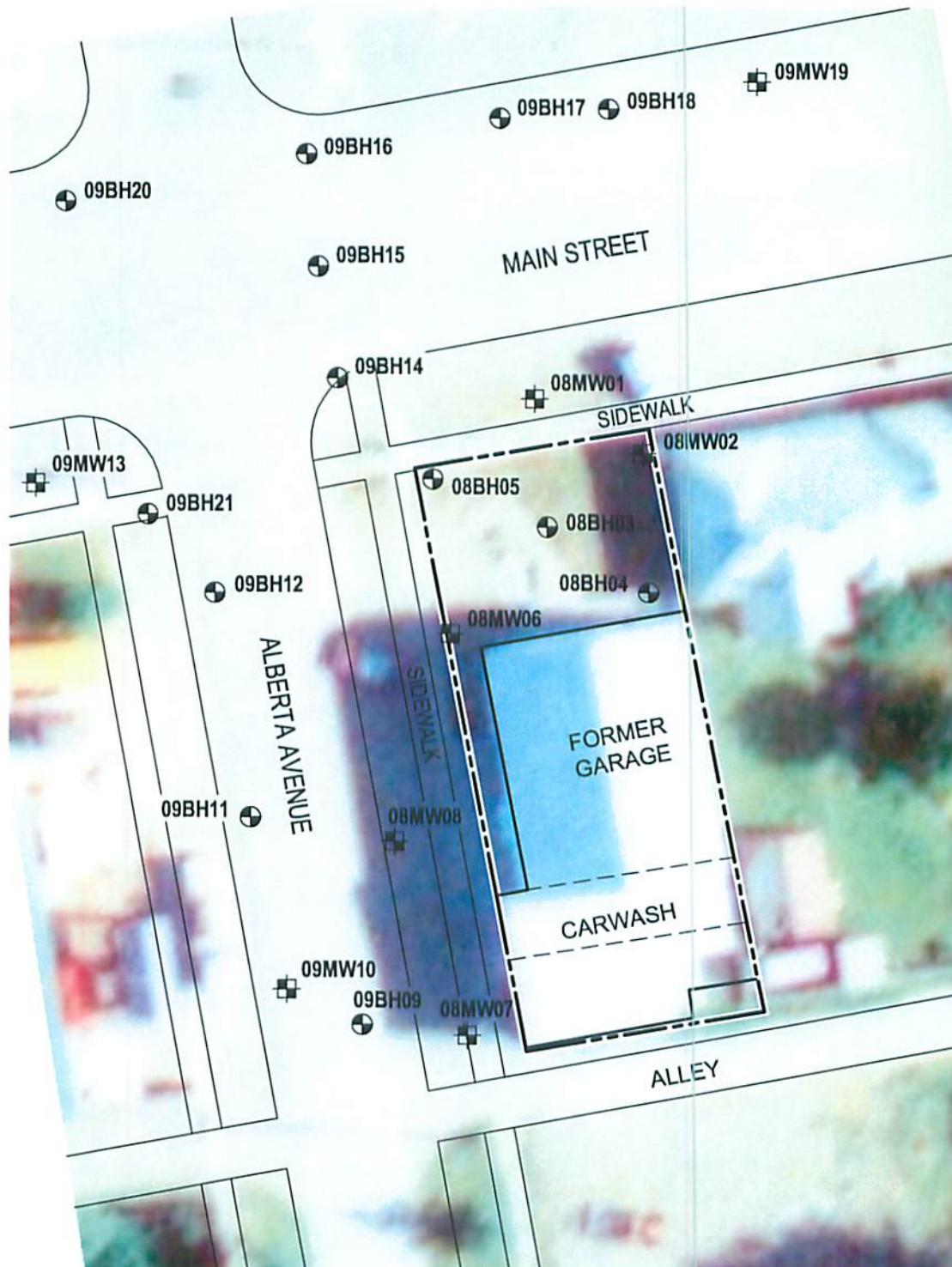


PROJECT NO.
L22101182.001
OFFICE
LETH

DWN	CHK	REV
LCH	DM	0

DATE
August 9, 2009

Figure 1



LEGEND

- SITE BOUNDARY
- 08BH# BOREHOLE LOCATION
- + 08MW# MONITORING WELL



CLIENT

Village of Barons

PHASE II/III ENVIRONMENTAL SITE ASSESSMENT AMA SITE 9557

SITE PLAN

**EBA Engineering
Consultants Ltd.**



PROJECT NO.
L22101182.001
OFFICE
LETH

DWN
LCH
DATE
August 10, 2009

CKD
DM
REV
0

Figure 2



LEGEND

● WELL LOCATION

0 100 250 m



APPROXIMATE SCALE 1: 7 500

Village of Barons

**EBA Engineering
Consultants Ltd.**

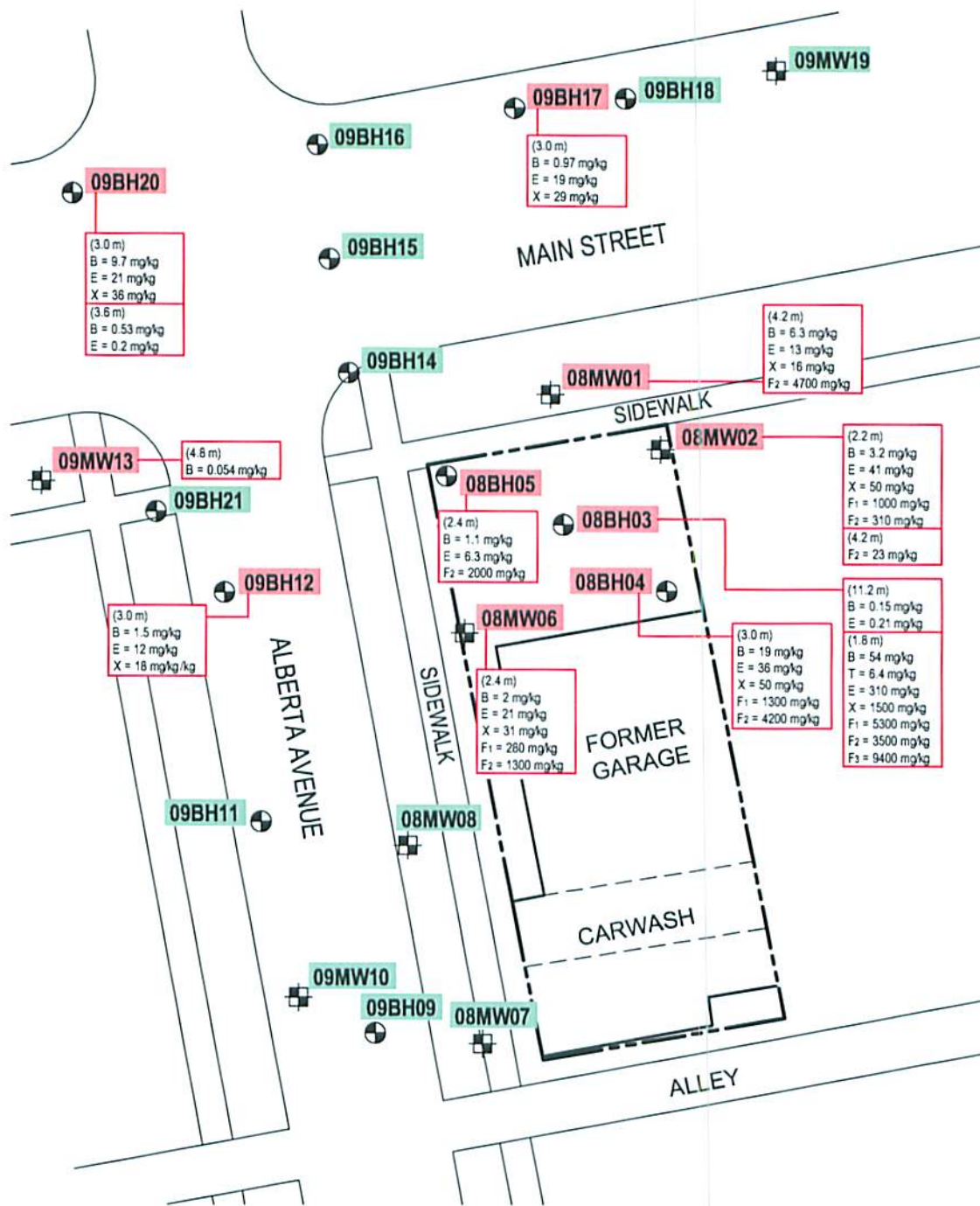


**PHASE II/III ENVIRONMENTAL SITE ASSESSMENT
AMA SITE 9557**

ESTIMATED LOCATION OF WELLS NEAR THE SITE

PROJECT NO L22101182.001	JWN LCH	CKD DM	REV 0
DATE LETH	DATE August 10, 2009		

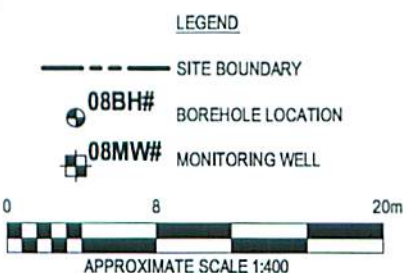
Figure 3



SOIL ANALYTICAL RESULTS LEGEND

- BH/MW#** BOREHOLE OR MONITORING WELL MEETS AENV TIER 1 GUIDELINES FOR SOIL AT RESIDENTIAL SITES, FOR FINE GRAINED SOILS
- BH/MW#** BOREHOLE OR MONITORING WELL EXCEEDS AENV TIER 1 GUIDELINES FOR SOIL AT RESIDENTIAL SITES, FOR FINE GRAINED SOILS

B = Benzene (mg/kg)
T = Toluene (mg/kg)
E = Ethylbenzene (mg/kg)
X = Xylene (mg/kg)
F₁ = Petroleum Hydrocarbon Fraction 1 (mg/kg)
F₂ = Petroleum Hydrocarbon Fraction 2 (mg/kg)
F₃ = Petroleum Hydrocarbon Fraction 3 (mg/kg)



CLIENT

Village of Barons

EBA Engineering
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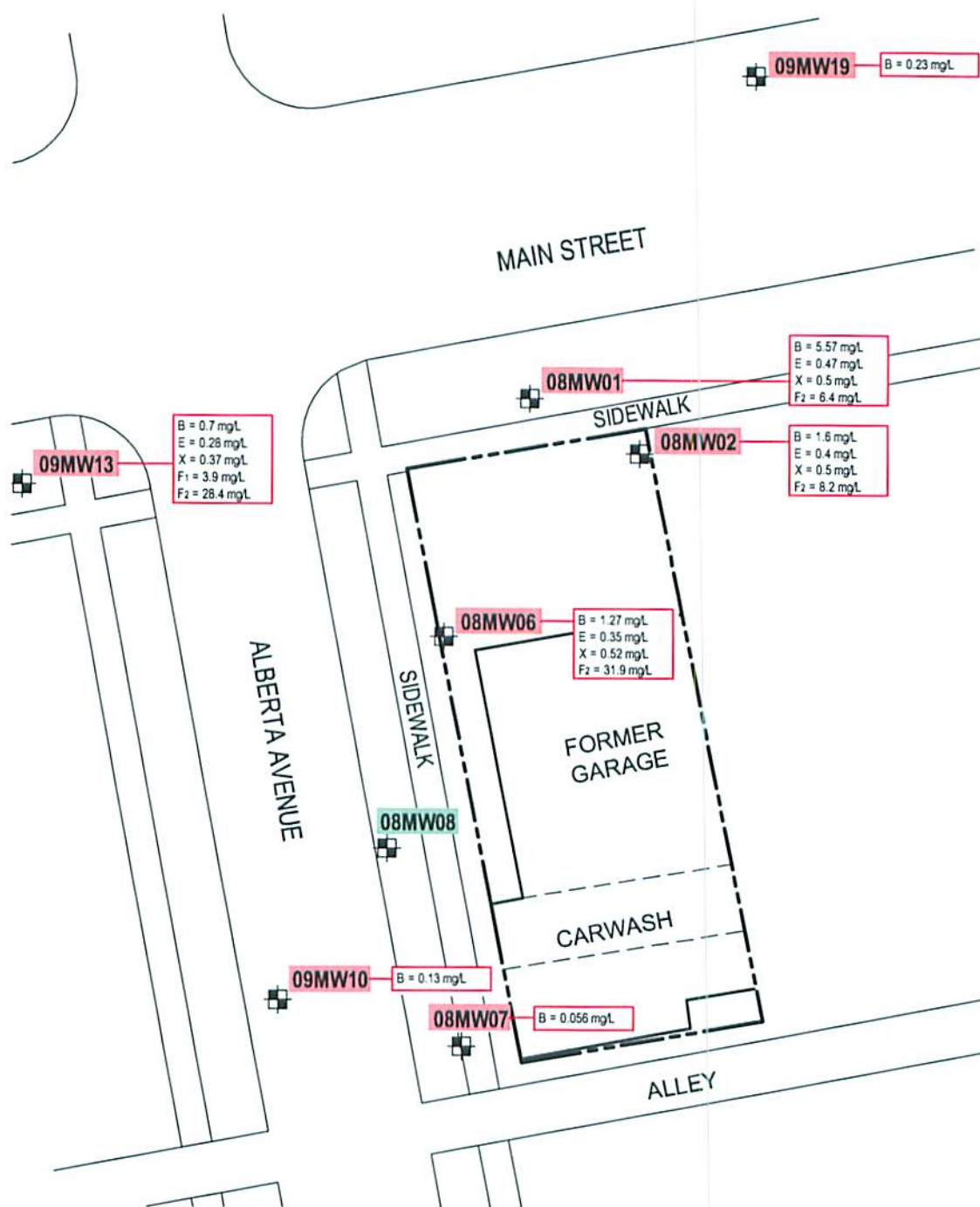


PHASE II/III ENVIRONMENTAL SITE ASSESSMENT AMA SITE 9557

SOIL ANALYTICAL RESULTS GREATER THAN AENV TIER 1 GUIDELINES

PROJECT NO. L22101182.001	DWN LCH	OKD DM	REV 0
OFFICE LETH	DATE August 31, 2009		

Figure 4



GROUNDWATER ANALYTICAL RESULTS LEGEND

- MW#** BOREHOLE OR MONITORING WELL MEETS AENV TIER 1 GUIDELINES FOR GROUNDWATER AT RESIDENTIAL SITES, FOR FINE GRAINED SOILS
- MW#** BOREHOLE OR MONITORING WELL EXCEEDS AENV TIER 1 GUIDELINES FOR GROUNDWATER AT RESIDENTIAL SITES, FOR FINE GRAINED SOILS

B = Benzene (mg/L)
T = Toluene (mg/L)
E = Ethylbenzene (mg/L)
X = Xylene (mg/L)
F1 = Petroleum Hydrocarbon Fraction 1 (mg/L)
F2 = Petroleum Hydrocarbon Fraction 2 (mg/L)
F3 = Petroleum Hydrocarbon Fraction 3 (mg/L)

LEGEND



CLIENT

Village of Barons

PHASE II/III ENVIRONMENTAL SITE ASSESSMENT
AMA SITE 9557

GROUNDWATER ANALYTICAL RESULTS GREATER
THAN AENV TIER 1 GUIDELINES

EBA Engineering
Consultants Ltd.



PROJECT NO.
L22101182.001
OFFICE
LETH

DWN
LCH
DATE
August 31, 2009

CND
DM
REV
0

Figure 5

APPENDIX A

APPENDIX A BOREHOLE LOGS

TERMS USED ON BOREHOLE LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

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

DESCRIPTIVE TERM RELATIVE DENSITY N (blows per 0.3m)

Very Loose	0 to 20%	0 to 4
Loose	20 to 40%	4 to 10
Compact	40 to 75%	10 to 30
Dense	75 to 90%	30 to 50
Very Dense	90 to 100%	greater than 50

The number of blows, N, on a 61mm O.D. split spoon sampler of a 63.5kg weight falling 0.76m, required to drive the sampler a distance of 0.3m from 0.15m to 0.45m.

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

DESCRIPTIVE TERM

UNCONFINED COMPRESSIVE STRENGTH (kPa)

Very Soft	Less than 25
Soft	25 to 50
Firm	50 to 100
Stiff	100 to 200
Very Stiff	200 to 400
Hard	Greater than 400

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

GENERAL DESCRIPTIVE TERMS

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

[illegible]

ICE NOT VISIBLE

GROUP SYMBOLS	SUBGROUP DESCRIPTION	N	Nb	Nc	Ice
		Partly-banded or flake			
		No areas ice, well-banded			
		Even ice, well-banded			

NOTE:
 1. Best symbols are used to indicate borderline or mixed ice characteristics.
 2. Visual estimates of ice contents indicated on bar/box.
 3. Ice 2 or 3.
 4. This system of ground ice description has been used and from NRC Technical Memo 79, Guide to the First Description of Permafrost for Engineering Purposes.

LEGEND

GROUP SYMBOLS	SUBGROUP DESCRIPTION	V	Vb	Vc	Vd	ICE
		Individual ice crystals or inclusions				
		Ice coatings on particles				
		Random or irregularly oriented ice formations				
		Sorted or distinctly oriented ice formations				

VISIBLE ICE LESS THAN BOX BY VOLUME

GROUP SYMBOLS	SUBGROUP DESCRIPTION	ICE + Soil Type	ICE
		Ice with soil inclusions	
		Ice without soil inclusions (greater than 25 mm (1 in.) thick)	

VISIBLE ICE GREATER THAN BOX BY VOLUME



PROJECT: PHASE II ESA			CLIENT: Village of Barons			PROJECT NO. - BOREHOLE NO.		
ADDRESS: 202 MAIN STREET			DRILL METHOD: 150mm SOLID STEM AUGER			L22101182.001 - 08MW01		
CITY: BARONS, AB			PROJECT ENGINEER: DERYCK MASTERMAN			ELEVATION: 99.22m		
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE	☒ CORE		
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS	☒ SAND		

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)				NOTES & COMMENTS	Monitoring well	Elevation (m)
				200	400	600	800			
0	CLAY (FILL) - silty, sandy, some gravel, moist, stiff, low to medium plastic, dark brown									99.0
1	CLAY - silty, trace to some sand, very moist, firm to stiff, medium plastic, grey brown		B1							98.0
			B2							
	... moist, stiff, dark brown mottling, high plastic clay inclusions		B3							
	... dark grey to black staining, strong hydrocarbon odor		B4					1875		97.0
2										
3	... grey		B5					3125		96.0
	... sandy, low to medium plastic, dark brown with grey mottling		B6							
4	BEDROCK - sandstone, silty, damp, low to moderate strength, weathered, yellow brown with dark grey mottling		B7					10000		95.0
	... no staining, slight odor		B8							
	... light grey		B9							94.0
5	End of Borehole @ 5.5m		B10							
6	Auger Refusal @ 5.5m No Seepage or Sloughing on Completion 50mm PVC Standpipe Installed to 5.5m, Bottom 3.0m Screened									93.0
7										92.0
8										91.0
9										90.0
10										

 EBA Engineering Consultants Ltd.	LOGGED BY: JL	COMPLETION DEPTH: 5.5m
	REVIEWED BY: DM	COMPLETE: 11/17/2008
	DRAWING NO: B1	Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 08MMW02	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN		ELEVATION: 99.33m	
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS
				☒ CORE	
				☒ SAND	

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)	NOTES & COMMENTS	Monitoring Well	Elevation (m)
0	CLAY (FILL) - silty, sandy, some gravel, damp, stiff, medium plastic, dark brown						99.0
1	CLAY - silty, trace to some sand, wet, soft to firm, medium plastic, grey brown		B1				98.0
2	... dark brown mottling, high plastic clay inclusions		B2				97.0
3	... grey staining, strong hydrocarbon odor		B3				96.0
4	... sandy, low to medium plastic		B4				95.0
5	BEDROCK - sandstone, silty, damp, low to moderate strength, weathered, yellow brown, trace hydrocarbon odor		B5				94.0
6	... light grey		B6				93.0
7	End of Borehole @ 5.2m		B7				92.0
8	Auger Refusal @ 5.2m No Seepage or Sloughing on Completion 50mm PVC Standpipe Installed to 5.5m, Bottom 3.0m Screened		B8				91.0
9			B9				90.0
10							



EBA Engineering Consultants Ltd.

LOGGED BY: JL
 REVIEWED BY: DM
 DRAWING NO: B2
 COMPLETION DEPTH: 5.2m
 COMPLETE: 11/17/2008
 Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.		
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 08BH03		
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN				
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE	☒ CORE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS	☒ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	NOTES & COMMENTS	Depth (ft)
0	CLAY (FILL) - silty, sandy, some gravel, stiff, damp, medium plastic, dark brown				0
1			B1		3
	... black staining, wood and debris		B2		5
2	CLAY - silty, trace to some sand, moist, stiff, medium plastic, dark grey to black, high plastic clay inclusions, hydrocarbon odor		B3		7
			B4		9
3	... sandy, low plastic, grey		B5		10
	... black mottling		B6		12
4	BEDROCK - sandstone, silty, damp, low to moderate strength, weathered, yellow brown with grey black mottling		B7		15
	... light grey mottling, slight odor		B8		17
5			B9		19
	... grey brown		B10		21
6	End of Borehole @ 6.1m				23
	No Seepage or Sloughing on Completion Backfilled with Bentonite and Cuttings				25
7					27
8					29
9					31
10					33

 EBA Engineering Consultants Ltd.	LOGGED BY: JL	COMPLETION DEPTH: 6.1m
	REVIEWED BY: DM	COMPLETE: 11/17/2008
	DRAWING NO: B3	Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.		
ADDRESS: 202 MAIN STREET		DRILL METHOD: 160mm SOLID STEM AUGER		L22101182.001 - 08BH04		
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN				
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE	☐ CORE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS	☒ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)				NOTES & COMMENTS	Depth (ft)
				200	400	600	800		
0	CLAY (FILL) - silty, sandy, some gravel, damp, stiff, medium plastic, brown								0
1	... dark brown ... wet, soft to firm, grey staining		B1						5
2	CLAY - silty, trace sand, moist, stiff, high plastic, grey brown with brown mottling		B2						5
	... grey staining		B3						
			B4						
3	... sandy, moist, low to medium plastic, dark black		B5					1000	10
			B6						
4	BEDROCK - sandstone, silty, damp, low to moderate strength, weathered, yellow brown with grey staining, trace hydrocarbon odor		B7					2250	15
			B8						
5	... moist ... yellow brown, no staining or odors		B9						
6	End of Borehole @ 6.1m		B10						20
7	No Seepage or Sloughing on Completion Backfilled with Bentonite and Cuttings								
8									25
9									30
10									33



EBA Engineering Consultants Ltd.

LOGGED BY: JL

REVIEWED BY: DM

DRAWING NO: B4

COMPLETION DEPTH: 6.1m

COMPLETE: 11/17/2008

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PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.		
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 08BH05		
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN				
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE	☒ CORE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS	☒ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)				NOTES & COMMENTS	Depth (ft)
				200	400	600	800		
0	CLAY (FILL) - silty, sandy, some gravel, damp, stiff, medium plastic, dark brown								0
1	CLAY - silty, trace to some sand, moist, stiff, medium plastic, grey brown with brown mottling ... very moist to wet, soft to firm ... dark brown mottling, high plastic clay inclusions ... grey blue staining		B1						5
2			B2						5
			B3						
			B4				1250		
3	... sandy, moist, low to medium plastic, trace grey staining, slight hydrocarbon odor		B5						10
			B6						
4	BEDROCK - sandstone, silty, damp, low to moderate strength, weathered, yellow brown with grey staining, no hydrocarbon odor ... thin grey seams		B7						15
			B8						
5	End of Borehole @ 5.2m		B9						
6	Auger Refusal @ 5.2m No Seepage or Sloughing on Completion Backfilled with Bentonite and Cuttings								20
7									25
8									
9									30
10									35

 EBA Engineering Consultants Ltd.	LOGGED BY: JL	COMPLETION DEPTH: 5.2m
	REVIEWED BY: DM	COMPLETE: 11/17/2008
	DRAWING NO: B5	Page 1 of 1

PROJECT: PHASE II ESA			CLIENT: Village of Barons			PROJECT NO. - BOREHOLE NO.		
ADDRESS: 202 MAIN STREET			DRILL METHOD: 150mm SOLID STEM AUGER			L22101182.001 - 08MW08		
CITY: BARONS, AB			PROJECT ENGINEER: DERYCK MASTERMAN			ELEVATION: 99.17m		
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE	☒ CORE		
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS	☒ SAND		

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)				NOTES & COMMENTS	Monitoring well	Elevation (m)
				200	400	600	800			
0	CLAY (Fill) - silty, sandy, some gravel, damp, stiff, medium plastic, dark brown									99.0
1	CLAY - silty, trace to some sand, very moist to wet, firm, medium plastic, grey brown with brown mottling		B1							98.0
	... dark brown mottling, high plastic clay inclusions		B2							97.0
	... grey blue staining		B3							96.0
2			B4							95.0
3	... sandy, moist, low to medium plastic, trace grey staining, slight hydrocarbon odor		B5							94.0
			B6							93.0
4	BEDROCK - sandstone, silty, damp, low to moderate strength, weathered, yellow brown, slight hydrocarbon odor		B7							92.0
	... grey white		B8							91.0
5			B9							90.0
6	... yellow brown		B10							89.0
7	End of Borehole @ 6.1m Auger Refusal @ 6.1m No Seepage or Sloughing on Completion 50mm PVC Standpipe Installed to 6.1m, Bottom 4.5m Screened									

 **EBA Engineering Consultants Ltd.**

LOGGED BY: JL

COMPLETION DEPTH: 6.1m

REVIEWED BY: DM

COMPLETE: 11/17/2008

DRAWING NO: B6

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PROJECT: PHASE II ESA			CLIENT: Village of Barons			PROJECT NO. - BOREHOLE NO.		
ADDRESS: 202 MAIN STREET			DRILL METHOD: 150mm SOLID STEM AUGER			L22101182.001 - 08MW07		
CITY: BARONS, AB			PROJECT ENGINEER: DERYCK MASTERMAN			ELEVATION: 99.13m		
SAMPLE TYPE		☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE	☒ CORE	
BACKFILL TYPE		☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS	☒ SAND	

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)				NOTES & COMMENTS	Monitoring well	Elevation (m)
				200	400	600	800			
0	CLAY (FILL) - silty, sandy, some gravel, damp, stiff, medium plastic, dark brown									99.0
1	CLAY - silty, trace to some sand, moist, stiff, medium plastic, grey brown		B1							98.0
2	... dark brown mottling, high plastic clay inclusions		B2							97.0
3			B3							96.0
4			B4							95.0
5			B5							94.0
6			B6							93.0
7	BEDROCK - sandstone, silty, damp, low to moderate strength, weathered, yellow brown, ... hydrocarbon odor		B7					312		92.0
8	... grey white, slight hydrocarbon odor		B8					125		91.0
9			B9							90.0
10	End of Borehole @ 6.1m Auger Refusal @ 6.1m No Seepage or Sloughing on Completion 50mm PVC Standpipe Installed to 6.1m, Bottom 4.5m Screened		B10							



EBA Engineering Consultants Ltd.

LOGGED BY: JL

REVIEWED BY: DM

DRAWING NO: B7

COMPLETION DEPTH: 6.1m

COMPLETE: 11/17/2008

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PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm CORE		L22101182.001 - 08MW08	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN		ELEVATION: 99.15m	
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS
☒ CORE ☒ SAND					

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)				NOTES & COMMENTS	Monitoring well	Elevation (m)
				200	400	600	800			
0	CLAY (FILL) - silty, sandy, some gravel, damp, stiff, medium plastic, dark brown									99.0
1	CLAY - silty, trace to some sand, moist, stiff, medium plastic, grey brown		B1							98.0
2	... dark brown mottling, high plastic clay inclusions		B2							97.0
3			B3							96.0
4	... hydrocarbon odor		B4							95.0
5	BEDROCK - sandstone, silty, damp, low to moderate strength, weathered, yellow brown									94.0
6	... hydrocarbon odor									93.0
7	... grey white, slight hydrocarbon odor		C1							92.0
8	... trace shells and coal									91.0
9	... grey brown		C3							90.0
10	... dark grey brown									89.0
11										88.0
12			C2							87.0
13	... dark brown,									86.0
14	... dark grey		C4							85.0
15	End of Borehole @ 15.2m									84.0
16	No Seepage or Sloughing on Completion 50mm PVC Standpipe Installed to 15.2m, Bottom 4.5m Screened									83.0
17										



EBA Engineering Consultants Ltd.

LOGGED BY: JL

REVIEWED BY: DM

DRAWING NO: B8

COMPLETION DEPTH: 15.2m

COMPLETE: 11/17/2008

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PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 09BH09	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN			
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS
					☒ CORE
					☒ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)				NOTES & COMMENTS	Depth (ft)
				200	400	600	800		
0	ASPHALT								0
	CLAY (FILL) - some silt, sandy, some gravel (sizes to 25 mm), frozen, low plastic, very dark brown, trace white precipitates.		B1						
1	CLAY (Lacustrine) - silty, trace sand, frozen, medium plastic, light greyish brown, trace white precipitates.		B2						
	... firm, damp, olive brown.		B3						5
2	... soft, moist, medium to high plastic.		B4						
	... dark brown high plastic mottled, olive brown.		B5						10
3	... sandy, soft, wet, low plastic, brown, trace coal and oxide inclusions.		B6						
4	... trace sandstone inclusions.		B7						15
	BEDROCK - sandstone, silty, moist, low to moderate strength, weathered, yellowish brown, trace odor.		B8						
5			B9						
6	End of Borehole @ 6.1m		B10						20
7									25
8									30
9									35
10									33

 EBA Engineering Consultants Ltd.	LOGGED BY: JL	COMPLETION DEPTH: 6.1m
	REVIEWED BY: DM	COMPLETE: 3/12/2009
	DRAWING NO: B9	Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 09MW10	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN		ELEVATION: 99.29m	
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS
☒ CORE					

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm) 200 400 600 800	NOTES & COMMENTS	Monitoring well	Elevation (m)
0	ASPHALT CLAY (FILL) - some silt, sandy, some gravel (sizes to 20 mm), frozen, low plastic, dark brown, trace white precipitates.		B1				99.0
1	CLAY (Lacustrine) - silty, trace sand, frozen, medium plastic, light greyish brown, trace white precipitates. ... firm, damp. ... soft, moist, dark brown high plastic mottle, olive brown.		B2				98.0
2			B3				97.0
3			B4				96.0
3.29/2009			B5				95.0
4	... sandy, soft, wet, low plastic, brown, trace coal and oxide inclusions, dark olive brown. ... trace sandstone inclusions.		B6				94.0
5	BEDROCK - sandstone, silty, moist, low to moderate strength, weathered, yellowish brown. ... trace odor. ... grey.		B7				93.0
6	... no distinct odor.		B8				92.0
7			B9				91.0
8			B10				90.0
9	End of Borehole @ 6.1m No Seepage or Sloughing on Completion 50mm PVC Standpipe Installed to 6.1m, Bottom 3.0 m Screened						



PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 09BH11	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN			
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS
					☒ CORE
					☒ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)				NOTES & COMMENTS	Depth (ft)
				200	400	600	800		
0	ASPHALT								0
	CLAY (FILL) - some silt, sandy, gravel (sizes to 25 mm), frozen, low plastic, dark brown, trace white precipitates.		B1						
1	CLAY (Lacustrine) - silty, trace sand, frozen, medium plastic, light greyish brown, trace white precipitates. ... firm, damp.		B2						5
	... soft, moist, medium to high plastic, dark grey to black staining, strong odor.		B3						
2			B4						
3			B5						10
	... sandy, dark brown, trace coal and oxide inclusions.		B6						
4	... no staining, olive brown, trace odor.		B7						15
	BEDROCK - sandstone, silty, moist, low to moderate strength, weathered, yellowish brown, trace odor.		B8						
5			B9						20
	... trace odor.		B10						
6	End of Borehole @ 6.1m								33
7									
8									25
9									30
10									



EBA Engineering Consultants Ltd.

LOGGED BY: JL

REVIEWED BY: DM

DRAWING NO: B11

COMPLETION DEPTH: 6.1m

COMPLETE: 3/12/2009

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PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 09BH12	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN			
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS
					☒ CORE
					☒ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)				NOTES & COMMENTS	Depth (ft)
				200	400	600	800		
0	TOPSOIL								0
	CLAY (Lacustrine) - silty, trace sand, frozen, medium plastic, light greyish brown, trace white precipitates.		B1						
1	... firm, damp.		B2						
	... soft, moist, dark brown high plastic mottle, olive brown.		B3						
2			B4						
3	... dark grey to black staining, strong odor.		B5						
	End of Borehole @ 3.0 m								
4									
5									
6									

 EBA Engineering Consultants Ltd.	LOGGED BY: JL	COMPLETION DEPTH: 3m
	REVIEWED BY: DM	COMPLETE: 3/12/2009
	DRAWING NO: B12	Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 09MW13	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN		ELEVATION: 98.86m	
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS
☒ CORE ☒ SAND					

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)				NOTES & COMMENTS	Monitoring well	Elevation (m)
				200	400	600	800			
0	ASPHALT									
	CLAY (FILL) - some silt, sandy, gravel (sizes to 20 mm), frozen, low plastic, dark brown, trace white precipitates.		B1							
1	CLAY (Lacustrine) - silty, trace sand, frozen, medium plastic, light grayish brown, trace white precipitates.		B2							98.0
	... firm, damp, olive brown.		B3							
	... soft, moist, dark brown high plastic mottle, olive brown.		B4							
2			B5							97.0
			B6							
	... sandy, soft, wet, low plastic, brown, dark olive brown, trace coal and oxide inclusions.		B7							
4	... trace sandstone inclusions.		B8							95.0
	BEDROCK - sandstone, silty, moist, low to moderate strength, weathered, yellowish brown.		B9							
5			B10							94.0
	... trace odor.									
6	... grey.									93.0
	End of Borehole @ 6.1m No Seepage or Sloughing on Completion 50mm PVC Standpipe Installed to 6.1m, Bottom 3.0 m Screened									
7										92.0
8										91.0
9										90.0
10										89.0

 EBA Engineering Consultants Ltd.	LOGGED BY: JL	COMPLETION DEPTH: 6.1m
	REVIEWED BY: DM	COMPLETE: 3/12/2009
	DRAWING NO: B13	Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 08BH14	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN			
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS
				☒ CORE	☒ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)		NOTES & COMMENTS
				200 - 400	400 - 600	
0	TOPSOIL					
0.5	CLAY (Fill) - silty, sandy, frozen low plastic, dark brown.		B1			
1.0	CLAY (Lacustrine) - silty, trace sand, frozen, low plastic, light grayish brown, trace white precipitates.		B2			
1.5	... dark grey to black staining, strong odor.					
2.0	... firm, damp.					
2.5	... soft, moist.					
3.0	End of Borehole @ 3.0 m		B5			
3.5						
4.0						
4.5						
5.0						
5.5						
6.0						
6.5						
7.0						
7.5						
8.0						
8.5						
9.0						
9.5						
10.0						
10.5						
11.0						
11.5						
12.0						
12.5						
13.0						
13.5						
14.0						
14.5						
15.0						
15.5						
16.0						
16.5						
17.0						
17.5						
18.0						
18.5						
19.0						
19.5						
20.0						

LOGGED BY: JL		COMPLETION DEPTH: 3m
REVIEWED BY: DM		COMPLETE: 3/12/2009
DRAWING NO: B14		Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 09BH15	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN			
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☐ A-CASING	☐ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
				☐ CORE	☐ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (con)	NOTES & COMMENTS	Depth (ft)
				200 400 600 800		
0	ASPHALT					0
	CLAY (Fill) - silty, sandy, frozen low plastic, dark brown.		B1			
1	CLAY (Lacustrine) - silty, trace sand, frozen, low plastic, light greyish brown, trace white precipitates. ... firm, damp, olive brown.		B2			
	... soft, moist, dark grey to black staining, strong odor.		B3			5
2			B4			
			B5			10
3	End of Borehole @ 3.0 m					
4						15
5						
6						20

EBA Engineering Consultants Ltd.	LOGGED BY: JL	COMPLETION DEPTH: 3m
	REVIEWED BY: DM	COMPLETE: 3/12/2009
	DRAWING NO: B15	Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.		
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 09BH16		
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN				
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE	☒ CORE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS	☒ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)				NOTES & COMMENTS	Depth (ft)
				200	400	600	800		
0	ASPHALT								0
	CLAY (Fill) - silty, sandy, gravel, frozen low plastic, dark brown.								
			B1						
1	CLAY (Lacustrine) - silty, trace sand, frozen, low plastic, light greyish brown, trace white precipitates. ... firm, damp, olive brown.								
	... soft, moist.		B2						
	...dark grey to black staining, strong odor.		B3						
2			B4						
3			B5						
	... sandy, soft, wet.		B6						
4	BEDROCK - sandstone, silty, moist, low to moderate strength, weathered, yellowish brown, no distinct odor.		B7						
	End of Borehole @ 4.5 m								
5									
6									20

 EBA Engineering Consultants Ltd.	LOGGED BY: JL	COMPLETION DEPTH: 4.5m
	REVIEWED BY: DM	COMPLETE: 3/12/2009
	DRAWING NO: B16	Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 09BH17	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN			
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS
					☒ CORE
					☒ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm) 200 400 600 800	NOTES & COMMENTS	Depth (m)
0	ASPHALT					0
	CLAY (Fill) - silty, sandy, gravel, frozen low plastic, dark brown.					
			B1			
1	CLAY (Lacustrine) - silty, trace sand, frozen, low plastic, light grayish brown, trace white precipitates. ... firm, damp.					
			B2			
	... soft, moist, dark brown high plastic mottled, olive brown.					5
			B3			
2	...dark grey to black staining, strong odor.					
			B4			
			B5			10
3	... sandy, soft, wet, trace coal and oxide inclusions.					
			B6			
4	BEDROCK - sandstone, silty, moist, low to moderate strength, weathered, yellowish brown, no distinct odor.					
			B7			
	End of Borehole @ 4.5 m					15
5						
6						20

EBA Engineering Consultants Ltd.	LOGGED BY: JL	COMPLETION DEPTH: 4.5m
	REVIEWED BY: DM	COMPLETE: 3/12/2009
	DRAWING NO: B17	Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 09BH18	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN			
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS
					☒ CORE
					☒ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)	NOTES & COMMENTS	Depth (m)
0	ASPHALT					0
	CLAY (Filt) - silty, sandy, gravel, frozen low plastic, dark brown.		B1			
1	CLAY (Lacustrine) - silty, trace sand, frozen, low plastic, light grayish brown, trace white precipitates. ... firm, damp, olive brown.		B2			
2	... soft, moist, dark brown high plastic mottle, olive brown.		B3			
	...dark grey to black staining, strong odor.		B4			
3	... sandy, soft, wet, trace coal and oxide inclusions.		B5			
	BEDROCK - sandstone, silty, moist, low to moderate strength, weathered, yellowish brown, no distinct odor.		B6			
4			B7			
5	End of Borehole @ 4.5 m					
6						20

LOGGED BY: JL		COMPLETION DEPTH: 4.5m
REVIEWED BY: DM		COMPLETE: 3/12/2009
DRAWING NO: B18		Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 09MW19	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN		ELEVATION: 99.38m	
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☐ A-CASING	☐ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☐ PEA GRAVEL	☐ SLOUGH	☐ GROUT	☐ DRILL CUTTINGS
					☐ CORE
					☐ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)				NOTES & COMMENTS	Monitoring well	Elevation (m)
				200	400	600	800			
0	ASPHALT									99.0
	CLAY (FILL) - some silt, sandy, gravel (sizes to 20 mm), frozen, low plastic, dark brown, trace white precipitates.		B1							
1	CLAY (Lacustrine) - silty, trace sand, frozen, medium plastic, light grayish brown, trace white precipitates.		B2							98.0
	... firm, damp, olive brown.		B3							
	... soft, moist, dark brown high plastic mottle, olive brown.		B4							97.0
2			B5							
	... sandy, soft, wet, low plastic, brown, dark olive brown, trace coal and oxide inclusions.		B6							96.0
3			B7							95.0
	BEDROCK - sandstone, silty, moist, low to moderate strength, weathered, yellowish brown, no distinct odor.		B8							
4			B9							94.0
	... greyish brown.		B10							
	... trace odor.									93.0
6	End of Borehole @ 6.1m No Seepage or Sloughing on Completion 50mm PVC Standpipe Installed to 6.1m, Bottom 3.0 m Screened									92.0
7										91.0
8										90.0
9										
10										



EBA Engineering Consultants Ltd.

LOGGED BY: JL

REVIEWED BY: DM

DRAWING NO: B19

COMPLETION DEPTH: 6.1m

COMPLETE: 3/12/2009

Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 09BH20	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN			

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

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm) 200 400 600 800	NOTES & COMMENTS	Depth (ft)
0	ASPHALT					0
	CLAY (Fill) - some silt, sandy, gravel, frozen low plastic, dark brown.		B1			
1	CLAY (Lacustrine) - silty, trace sand, frozen, low plastic, light greyish brown, trace white precipitates. ... firm, damp, olive brown.		B2			
	... soft, moist, dark brown high plastic mottle, olive brown. ...dark gray to black staining, strong odor.		B3			
2			B4			
			B5			
3	... no staining or odor.		B6			
	... sandy, soft, wet, trace coal and oxide inclusions, dark olive brown.		B7			
4	BEDROCK - sandstone, silty, moist, low to moderate strength, weathered, yellowish brown, no distinct odor.					
	End of Borehole @ 4.5 m					
5						
6						

	EBA Engineering Consultants Ltd.	LOGGED BY: JL	COMPLETION DEPTH: 6.1m
		REVIEWED BY: DM	COMPLETE: 3/12/2009
		DRAWING NO: B20	Page 1 of 1

PROJECT: PHASE II ESA		CLIENT: Village of Barons		PROJECT NO. - BOREHOLE NO.	
ADDRESS: 202 MAIN STREET		DRILL METHOD: 150mm SOLID STEM AUGER		L22101182.001 - 09BH21	
CITY: BARONS, AB		PROJECT ENGINEER: DERYCK MASTERMAN			
SAMPLE TYPE	☒ DISTURBED	☒ NO RECOVERY	☒ SPT	☒ A-CASING	☒ SHELBY TUBE
BACKFILL TYPE	☒ BENTONITE	☒ PEA GRAVEL	☒ SLOUGH	☒ GROUT	☒ DRILL CUTTINGS
					☒ CORE
					☒ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	HYDROCARBONS (ppm)	NOTES & COMMENTS	Depth (ft)
0	Topsol			200 400 600 800		0
	CLAY (Fill) - silty, sandy, frozen low plastic, dark brown.					
	CLAY (Lacustrine) - silty, trace sand, frozen, low plastic, light greyish brown, trace white precipitates.		B1			
1	... firm, damp, olive brown.		B2			
	... soft, moist, dark brown high plastic mottle, olive brown.		B3			5
2			B4			
	... dark grey to black staining, strong odor.		B5			10
3	End of Borehole @ 3.0 m					
4						15
5						
6						20



EBA Engineering Consultants Ltd.

LOGGED BY: JL

REVIEWED BY: DM

DRAWING NO: B20

COMPLETION DEPTH: 4.5m

COMPLETE: 3/12/2009

Page 1 of 1

ISSUED FOR USE

L22101182.001
October 2009



APPENDIX B

APPENDIX B LABORATORY CERTIFICATES



Your Project #: L22101182.001, AMA SITE 9557
Site: BARONS, AB
Your C.O.C. #: 117002, 117003

Attention: DERYCK MASTERMAN
EBA ENGINEERING CONSULTANTS LTD.
442-10n STREET NORTH
LETHBRIDGE, AB
CANADA T1H 2C7

Report Date: 2008/11/26

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A863927

Received: 2008/11/20, 9:50

Sample Matrix: Soil
Samples Received: 21

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 by HS GC/MS (MeOH extract)	15	2008/11/20	2008/11/21	CAL SOP-00104	EPA 8260 C
BTEX/F1 by HS GC/MS (MeOH extract)	1	2008/11/20	2008/11/22	CAL SOP-00104	EPA 8260 C
BTEX/F1 by HS GC/MS (MeOH extract)	5	2008/11/20	2008/11/25	CAL SOP-00104	EPA 8260 C
CCME Hydrocarbons (F2-F4 in soil)	4	2008/11/20	2008/11/21	CAL SOP-00086	CCME PHC-CWS
CCME Hydrocarbons (F2-F4 in soil)	17	2008/11/20	2008/11/22	CAL SOP-00086	CCME PHC-CWS
CCME Hydrocarbons (F4G in soil)	1	2008/11/20	2008/11/23	CAL SOP-00086	CWS PHCS Tier 1
Moisture	21	N/A	2008/11/21	CAL SOP-00023	McKeague MSSMA 2.411
Lead	21	2008/11/21	2008/11/23	CAL SOP-00191	EPA SW-846 6020B
Particle Size by Sieve (75 micron)	3	N/A	2008/11/22	CAL SOP-00025	SSMA 47.4

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

Encryption Key

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

NICOLE CHAN,
Email: Nicole.Chan@MaxxamAnalytics.com
Phone# (403) 291-3077

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

For Service Group specific validation please refer to the Validation Signature Page

Total cover pages: 1

EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, AMA SITE 9557
 Site Reference: BARONS, AB

 Maxxam Job #: A863927
 Report Date: 2008/11/26

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		M79628		M79630	M79631		
Sampling Date		2008/11/17		2008/11/17	2008/11/17		
COC Number		117002		117002	117002		
	Units	08MW01/1.5M	QC Batch	08MW01/4.2M	08MW01/4.8M	RDL	QC Batch

Physical Properties							
Moisture	%	22	2752896	14	5.3	0.3	2752768
Sieve - Pan	%	94	2753046	N/A	49	0.2	2753046
Sieve - #200 (>0.075mm)	%	6.0	2753046	N/A	51	0.2	2753046
Grain Size	%	FINE	2753046	N/A	COARSE	0.2	2753046
N/A = Not Applicable RDL = Reportable Detection Limit							

Maxxam ID		M79632	M79634	M79635	M79636		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117002	117002	117002	117002		
	Units	08MW02/1.6M	08MW02/2.2M	08MW02/4.2M	08BH03/1.2M	RDL	QC Batch

Physical Properties							
Moisture	%	20	26	6.1	16	0.3	2752768
RDL = Reportable Detection Limit							

Maxxam ID		M79636	M79637	M79638	M79639		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117002	117002	117002	117002		
	Units	08BH03/1.2M Lab-Dup	08BH03/1.8M	08BH03/4.8M	08BH04/1.9M	RDL	QC Batch

Physical Properties							
Moisture	%	15	24	14	20	0.3	2752768
RDL = Reportable Detection Limit							

Maxxam Job #: A863927
 Report Date: 2008/11/26

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, AMA SITE 9557
 Site Reference: BARONS, AB

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		M79674	M79675	M79676	M79691		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117002	117002	117003	117003		
	Units	08BH04/3.0M	08BH04/5.4M	08BH05/1.8M	08BH05/2.4M	RDL	QC Batch

Physical Properties							
Moisture	%	20	19	17	23	0.3	2752768
Sieve - Pan	%	73	N/A	N/A	N/A	0.2	2753046
Sieve - #200 (>0.075mm)	%	27	N/A	N/A	N/A	0.2	2753046
Grain Size	%	FINE	N/A	N/A	N/A	0.2	2753046
N/A = Not Applicable RDL = Reportable Detection Limit							

Maxxam ID		M79692	M79693	M79693	M79694		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117003	117003	117003	117003		
	Units	08BH05/4.8M	08MW06/1.6M	08MW06/1.6M Lab-Dup	08MW06/2.4M	RDL	QC Batch

Physical Properties							
Moisture	%	12	24	24	23	0.3	2752768
RDL = Reportable Detection Limit							

Maxxam ID		M79695	M79697		M79698		
Sampling Date		2008/11/17	2008/11/17		2008/11/17		
COC Number		117003	117003		117003		
	Units	08MW06/5.4M	08MW07/3.0M	QC Batch	08MW07/4.2M	RDL	QC Batch

Physical Properties							
Moisture	%	11	24	2752768	14	0.3	2752896
RDL = Reportable Detection Limit							

Maxxam ID		M79699		
Sampling Date		2008/11/17		
COC Number		117003		
	Units	08MW07/6.0M	RDL	QC Batch

Physical Properties				
Moisture	%	10	0.3	2752896
RDL = Reportable Detection Limit				

Maxxam Job #: A863927
 Report Date: 2008/11/26

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, AMA SITE 9557
 Site Reference: BARONS, AB

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		M79628	M79628	M79630	M79631		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117002	117002	117002	117002		
	Units	08MW01/1.5M	08MW01/1.5M Lab-Dup	08MW01/4.2M	08MW01/4.8M	RDL	QC Batch

Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	<10	4700	250	10	2752515
F3 (C16-C34 Hydrocarbons)	mg/kg	<10	<10	2100	140	10	2752515
F4 (C34-C50 Hydrocarbons)	mg/kg	<10	<10	23	<10	10	2752515
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	N/A	2752515
Surrogate Recovery (%)							
O-TERPHENYL (sur.)	%	103	98	114	91	N/A	2752515

 N/A = Not Applicable
 RDL = Reportable Detection Limit

Maxxam ID		M79632	M79634	M79635	M79636		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117002	117002	117002	117002		
	Units	08MW02/1.6M	08MW02/2.2M	08MW02/4.2M	08BH03/1.2M	RDL	QC Batch

Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	310	23	<10	10	2752515
F3 (C16-C34 Hydrocarbons)	mg/kg	<10	<10	21	360	10	2752515
F4 (C34-C50 Hydrocarbons)	mg/kg	<10	<10	<10	100	10	2752515
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	N/A	2752515
Surrogate Recovery (%)							
O-TERPHENYL (sur.)	%	96	101	109	97	N/A	2752515

 N/A = Not Applicable
 RDL = Reportable Detection Limit

Maxxam Job #: A863927
 Report Date: 2008/11/26

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, AMA SITE 9557
 Site Reference: BARONS, AB

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		M79637	M79638	M79639	M79674		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117002	117002	117002	117002		
	Units	08BH03/1.8M	08BH03/4.8M	08BH04/1.8M	08BH04/3.0M	RDL	QC Batch

Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/kg	3500	<10	<10	4200	10	2752515
F3 (C16-C34 Hydrocarbons)	mg/kg	9400	<10	<10	1700	10	2752515
F4 (C34-C50 Hydrocarbons)	mg/kg	1500	<10	<10	<10	10	2752515
Reached Baseline at C50	mg/kg	No	Yes	Yes	Yes	N/A	2752515
OIL & GREASE							
F4SG (Heavy Hydrocarbons-Grav.)	mg/kg	6800	N/A	N/A	N/A	500	2752517
Surrogate Recovery (%)							
O-TERPHENYL (sur.)	%	100	101	97	127	N/A	2752515

 N/A = Not Applicable
 RDL = Reportable Detection Limit

Maxxam ID		M79675	M79676	M79691	M79692		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117002	117003	117003	117003		
	Units	08BH04/5.4M	08BH05/1.8M	08BH05/2.4M	08BH05/4.8M	RDL	QC Batch

Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	<10	2000	<10	10	2752515
F3 (C16-C34 Hydrocarbons)	mg/kg	<10	<10	1000	<10	10	2752515
F4 (C34-C50 Hydrocarbons)	mg/kg	<10	<10	<10	<10	10	2752515
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	N/A	2752515
Surrogate Recovery (%)							
O-TERPHENYL (sur.)	%	102	97	106	97	N/A	2752515

 N/A = Not Applicable
 RDL = Reportable Detection Limit

Maxxam Job #: A863927
 Report Date: 2008/11/26

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, AMA SITE 9557
 Site Reference: BARONS, AB

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		M79693	M79694	M79695	M79697		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117003	117003	117003	117003		
	Units	08MW06/1.6M	08MW06/2.4M	08MW06/5.4M	08MW07/3.0M	RDL	QC Batch

Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	1300	<10	<10	10	2752515
F3 (C16-C34 Hydrocarbons)	mg/kg	<10	510	<10	<10	10	2752515
F4 (C34-C50 Hydrocarbons)	mg/kg	<10	<10	<10	<10	10	2752515
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	N/A	2752515
Surrogate Recovery (%)							
O-TERPHENYL (sur.)	%	101	102	100	94	N/A	2752515

 N/A = Not Applicable
 RDL = Reportable Detection Limit

Maxxam ID		M79698		M79699	M79699		
Sampling Date		2008/11/17		2008/11/17	2008/11/17		
COC Number		117003		117003	117003		
	Units	08MW07/4.2M	QC Batch	08MW07/6.0M	08MW07/6.0M	RDL	QC Batch
					Lab-Dup		

Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	2752515	<10	<10	10	2752502
F3 (C16-C34 Hydrocarbons)	mg/kg	<10	2752515	<10	<10	10	2752502
F4 (C34-C50 Hydrocarbons)	mg/kg	<10	2752515	<10	<10	10	2752502
Reached Baseline at C50	mg/kg	Yes	2752515	Yes	Yes	N/A	2752502
Surrogate Recovery (%)							
O-TERPHENYL (sur.)	%	97	2752515	110	99	N/A	2752502

 N/A = Not Applicable
 RDL = Reportable Detection Limit

Maxxam Job #: A863927
 Report Date: 2008/11/26

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, AMA SITE 9557
 Site Reference: BARONS, AB

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		M79628	M79628	M79630	M79631	M79632		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117002	117002	117002	117002	117002		
	Units	08MW01/1.5M	08MW01/1.5M Lab-Dup	08MW01/4.2M	08MW01/4.8M	08MW02/1.6M	RDL	QC Batch

Elements								
Total Lead (Pb)	mg/kg	9	9	8	6	8	1	2755722

RDL = Reportable Detection Limit

Maxxam ID		M79634	M79635	M79636	M79637	M79638		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117002	117002	117002	117002	117002		
	Units	08MW02/2.2M	08MW02/4.2M	08BH03/1.2M	08BH03/1.8M	08BH03/4.8M	RDL	QC Batch

Elements								
Total Lead (Pb)	mg/kg	13	5	46	67	7	1	2755722

RDL = Reportable Detection Limit

Maxxam ID		M79639	M79674	M79675	M79676	M79691		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117002	117002	117002	117003	117003		
	Units	08BH04/1.9M	08BH04/3.0M	08BH04/5.4M	08BH05/1.8M	08BH05/2.4M	RDL	QC Batch

Elements								
Total Lead (Pb)	mg/kg	21	17	7	6	16	1	2755722

RDL = Reportable Detection Limit

Maxxam ID		M79692	M79693	M79694	M79695	M79697		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117003	117003	117003	117003	117003		
	Units	08BH05/4.8M	08MW06/1.6M	08MW06/2.4M	08MW06/5.4M	08MW07/3.0M	RDL	QC Batch

Elements								
Total Lead (Pb)	mg/kg	9	9	14	8	9	1	2755722

RDL = Reportable Detection Limit

Maxxam Job #: A863927
Report Date: 2008/11/26

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA SITE 9557
Site Reference: BARONS, AB

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		M79898		M79899	M79899		
Sampling Date		2008/11/17		2008/11/17	2008/11/17		
COC Number		117003		117003	117003		
	Units	08MW07/4.2M	QC Batch	08MW07/6.0M	08MW07/6.0M Lab-Dup	RDL	QC Batch

Elements							
Total Lead (Pb)	mg/kg	9	2755722	8	8	1	2755672

RDL = Reportable Detection Limit

Maxxam Job #: A863927
 Report Date: 2008/11/26

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, AMA SITE 9557
 Site Reference: BARONS, AB

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		M79828	M79830	M79831		
Sampling Date		2008/11/17	2008/11/17	2008/11/17		
COC Number		117002	117002	117002		
	Units	08MW01/1.5M	08MW01/4.2M	08MW01/4.8M	RDL	QC Batch

Volatiles						
Benzene	mg/kg	<0.0050	6.3	<0.0050	0.0050	2752554
Toluene	mg/kg	<0.020	<0.020	<0.020	0.020	2752554
Ethylbenzene	mg/kg	<0.010	13	0.092	0.010	2752554
Xylenes (Total)	mg/kg	<0.040	16	0.16	0.040	2752554
m & p-Xylene	mg/kg	<0.040	16	0.16	0.040	2752554
o-Xylene	mg/kg	<0.020	<0.020	<0.020	0.020	2752554
F1 (C6-C10) - BTEX	mg/kg	<12	710	<12	12	2752554
(C6-C10)	mg/kg	<12	750	<12	12	2752554
Surrogate Recovery (%)						
4-BROMOFLUOROBENZENE (sur.)	%	92	115	117	N/A	2752554
D10-ETHYLBENZENE (sur.)	%	68	106	77	N/A	2752554
D4-1,2-DICHLOROETHANE (sur.)	%	86	86	85	N/A	2752554
D8-TOLUENE (sur.)	%	106	108	106	N/A	2752554

 N/A = Not Applicable
 RDL = Reportable Detection Limit

Maxxam Job #: A863927
Report Date: 2008/11/26

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA SITE 9557
Site Reference: BARONS, AB

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		M79631	M79632	M79634		
Sampling Date		2008/11/17	2008/11/17	2008/11/17		
COC Number		117002	117002	117002		
	Units	08MW01/4.6M Lab-Dup	08MW02/1.6M	08MW02/2.2M	RDL	QC Batch

Volatiles						
Benzene	mg/kg	<0.0050	<0.0050	3.2	0.0050	2752554
Toluene	mg/kg	<0.020	<0.020	<0.020	0.020	2752554
Ethylbenzene	mg/kg	0.085	<0.010	41	0.010	2752554
Xylenes (Total)	mg/kg	0.13	<0.040	50	0.040	2752554
m & p-Xylene	mg/kg	0.13	<0.040	50	0.040	2752554
o-Xylene	mg/kg	<0.020	<0.020	<0.020	0.020	2752554
F1 (C6-C10) - BTEX	mg/kg	<12	<12	1000	12	2752554
(C6-C10)	mg/kg	<12	<12	1100	12	2752554
Surrogate Recovery (%)						
4-BROMOFLUOROBENZENE (sur.)	%	96	92	96	N/A	2752554
D10-ETHYLBENZENE (sur.)	%	78	72	97	N/A	2752554
D4-1,2-DICHLOROETHANE (sur.)	%	82	85	86	N/A	2752554
D8-TOLUENE (sur.)	%	107	105	112	N/A	2752554

N/A = Not Applicable
RDL = Reportable Detection Limit

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxam ID	M79635	M79638	M79637
Sampling Date	2008/11/17	2008/11/17	2008/11/17
COC Number	117002	117002	117002
Units	08MW02/4.2M	08BH03/1.2M	08BH03/1.8M
RDL			
QC Batch			

Volatiles							
Benzene	mg/kg	<0.0050	0.16	0.0050	54	0.050	2752554
Toluene	mg/kg	<0.020	0.11	0.020	6.4	0.20	2752554
Ethylbenzene	mg/kg	<0.010	0.21	0.010	310	0.10	2752554
Xylenes (Total)	mg/kg	<0.040	1.0	0.040	1500	0.40	2752554
m & p-Xylene	mg/kg	<0.040	0.82	0.040	1200	0.40	2752554
o-Xylene	mg/kg	<0.020	0.21	0.020	240	0.20	2752554
F1 (C8-C10) - BTX	mg/kg	<12	<12	12	5300	120	2752554
(C8-C10)	mg/kg	<12	<12	12	7100	120	2752554
Surrogate Recovery (%)							
4-BROMOFLUOROBENZENE (sur.)	%	92	95	N/A	95	N/A	2752554
D10-ETHYLBENZENE (sur.)	%	75	72	N/A	85	N/A	2752554
D4-1,2-DICHLOROETHANE (sur.)	%	85	84	N/A	85	N/A	2752554
D8-TOLUENE (sur.)	%	106	106	N/A	106	N/A	2752554
N/A = Not Applicable RDL = Reportable Detection Limit							

Maxxam Job #: A863927
Report Date: 2008/1/26

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA SITE 9557
Site Reference: BARONS, AB

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID	M79838	M79839	M79874	M79875	
Sampling Date	2008/11/17	2008/11/17	2008/11/17	2008/11/17	
COC Number	117002	117002	117002	117002	
Units	08BH03/4.8M	08BH04/1.9M	08BH04/3.0M	08BH04/5.4M	RDL QC Batch

Volatiles					
Benzene	mg/kg	<0.0050	19	<0.0050	0.0050 2752554
Toluene	mg/kg	<0.020	<0.020	<0.020	0.020 2752554
Ethylbenzene	mg/kg	<0.010	36	<0.010	0.010 2752554
Xylenes (Total)	mg/kg	<0.040	50	<0.040	0.040 2752554
m & p-Xylene	mg/kg	<0.040	50	<0.040	0.040 2752554
o-Xylene	mg/kg	<0.020	0.10	<0.020	0.020 2752554
F1 (C8-C10) - BTEX	mg/kg	<12	1300	<12	12 2752554
(C6-C10)	mg/kg	<12	1400	<12	12 2752554
Surrogate Recovery (%)					
4-BROMOFLUOROBENZENE (sur.)	%	95	114	96	N/A 2752554
D10-ETHYLBENZENE (sur.)	%	79	126	78	N/A 2752554
D4-1,2-DICHLOROETHANE (sur.)	%	83	82	86	N/A 2752554
D8-TOLUENE (sur.)	%	102	110	101	N/A 2752554

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: A863927
Report Date: 2008/11/26

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA SITE 9557
Site Reference: BARONS, AB

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		M79676	M79691	M79692	M79693		
Sampling Date		2008/11/17	2008/11/17	2008/11/17	2008/11/17		
COC Number		117003	117003	117003	117003		
	Units	08BH05/1.8M	08BH05/2.4M	08BH05/4.8M	08MW06/1.6M	RDL	QC Batch
Volatiles							
Benzene	mg/kg	<0.0050	1.1	<0.0050	<0.0050	0.0050	2752554
Toluene	mg/kg	<0.020	<0.020	<0.020	<0.020	0.020	2752554
Ethylbenzene	mg/kg	<0.010	6.3	<0.010	<0.010	0.010	2752554
Xylenes (Total)	mg/kg	<0.040	8.0	<0.040	<0.040	0.040	2752554
m & p-Xylene	mg/kg	<0.040	8.0	<0.040	<0.040	0.040	2752554
o-Xylene	mg/kg	<0.020	<0.020	<0.020	<0.020	0.020	2752554
F1 (C6-C10) - BTEX	mg/kg	<12	140	<12	<12	12	2752554
(C6-C10)	mg/kg	<12	160	<12	<12	12	2752554
Surrogate Recovery (%)							
4-BROMOFLUOROBENZENE (sur.)	%	93	97	96	93	N/A	2752554
D10-ETHYLBENZENE (sur.)	%	74	76	79	72	N/A	2752554
D4-1,2-DICHLOROETHANE (sur.)	%	84	82	87	83	N/A	2752554
D8-TOLUENE (sur.)	%	108	106	104	106	N/A	2752554
N/A = Not Applicable RDL = Reportable Detection Limit							

Maxxam Job #: A863927
Report Date: 2008/11/26

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA SITE 9557
Site Reference: BARONS, AB

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		M79684	M79695	M79697		
Sampling Date		2008/11/17	2008/11/17	2008/11/17		
COC Number		117003	117003	117003		
	Units	08MW06/2.4M	08MW06/5.4M	08MW07/3.0M	RDL	QC Batch
Volatiles						
Benzene	mg/kg	2.0	<0.0050	<0.0050	0.0050	2752554
Toluene	mg/kg	<0.020	<0.020	<0.020	0.020	2752554
Ethylbenzene	mg/kg	21	<0.010	<0.010	0.010	2752554
Xylenes (Total)	mg/kg	31	<0.040	<0.040	0.040	2752554
m & p-Xylene	mg/kg	31	<0.040	<0.040	0.040	2752554
o-Xylene	mg/kg	<0.020	<0.020	<0.020	0.020	2752554
F1 (C6-C10) - BTEX	mg/kg	280	<12	<12	12	2752554
(C6-C10)	mg/kg	340	<12	<12	12	2752554
Surrogate Recovery (%)						
4-BROMOFLUOROBENZENE (sur.)	%	98	95	92	N/A	2752554
D10-ETHYLBENZENE (sur.)	%	81	77	71	N/A	2752554
D4-1,2-DICHLOROETHANE (sur.)	%	85	85	82	N/A	2752554
D8-TOLUENE (sur.)	%	106	102	106	N/A	2752554
N/A = Not Applicable RDL = Reportable Detection Limit						

Maxxam Job #: A863927
Report Date: 2008/11/26

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA SITE 9557
Site Reference: BARONS, AB

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		M79898		M79899		
Sampling Date		2008/11/17		2008/11/17		
COC Number		117003		117003		
	Units	08MW07/4.2M	QC Batch	08MW07/6.0M	RDL	QC Batch

Volatiles						
Benzene	mg/kg	<0.0050	2752554	<0.0050	0.0050	2752558
Toluene	mg/kg	<0.020	2752554	<0.020	0.020	2752558
Ethylbenzene	mg/kg	<0.010	2752554	<0.010	0.010	2752558
Xylenes (Total)	mg/kg	<0.040	2752554	<0.040	0.040	2752558
m & p-Xylene	mg/kg	<0.040	2752554	<0.040	0.040	2752558
o-Xylene	mg/kg	<0.020	2752554	<0.020	0.020	2752558
F1 (C6-C10) - BTEX	mg/kg	<12	2752554	<12	12	2752558
(C6-C10)	mg/kg	<12	2752554	<12	12	2752558
Surrogate Recovery (%)						
4-BROMOFLUOROBENZENE (sur.)	%	95	2752554	93	N/A	2752558
D10-ETHYLBENZENE (sur.)	%	76	2752554	76	N/A	2752558
D4-1,2-DICHLOROETHANE (sur.)	%	81	2752554	82	N/A	2752558
D8-TOLUENE (sur.)	%	106	2752554	105	N/A	2752558

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: A863927
Report Date: 2008/11/26

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA SITE 9557
Site Reference: BARONS, AB

Package 1	8.0°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

VOLATILE ORGANICS BY GC-MS (SOIL) Comments

Sample M79637-01 BTEX/F1 by HS GC/MS (MeOH extract): Detection limits raised due to dilution to bring analyte within the calibrated range.

Results relate only to the items tested.

EBA ENGINEERING CONSULTANTS LTD.
Attention: DERYCK MASTERMAN
Client Project #: L22101182.001, AMA SITE 9557
P.O. #:
Site Reference: BARONS, AB

Quality Assurance Report
Maxam Job Number: CA863927

QA/QC	Batch	Num Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
2752502 MR5	Calibration Check	F2 (C10-C16 Hydrocarbons)	2008/11/21	109	%	80 - 120			
		F3 (C16-C34 Hydrocarbons)	2008/11/21	117	%	80 - 120			
		F4 (C34-C50 Hydrocarbons)	2008/11/21	120	%	80 - 120			
MATRIX SPIKE									
O-TERPHENYL (sur.)									
50 - 130		F2 (C10-C16 Hydrocarbons)	2008/11/21	99	%				
50 - 130		F3 (C16-C34 Hydrocarbons)	2008/11/21	116	%				
50 - 130		F4 (C34-C50 Hydrocarbons)	2008/11/21	110	%				
50 - 130		O-TERPHENYL (sur.)	2008/11/21	114	%				
50 - 130		F2 (C10-C16 Hydrocarbons)	2008/11/21	87	%				
50 - 130		F3 (C16-C34 Hydrocarbons)	2008/11/21	106	%				
50 - 130		F4 (C34-C50 Hydrocarbons)	2008/11/21	107	%				
80 - 120		O-TERPHENYL (sur.)	2008/11/21	116	%				
80 - 120		F2 (C10-C16 Hydrocarbons)	2008/11/21	95	%				
BLANK									
50		F2 (C10-C16 Hydrocarbons)	2008/11/21	<10	mg/kg				
50		F3 (C16-C34 Hydrocarbons)	2008/11/21	<10	mg/kg				
50		F4 (C34-C50 Hydrocarbons)	2008/11/21	<10	mg/kg				
RPD [M79699-01]									
2752515 MR5	Calibration Check	F2 (C10-C16 Hydrocarbons)	2008/11/21	105	%				
		F3 (C16-C34 Hydrocarbons)	2008/11/21	100	%				
		F4 (C34-C50 Hydrocarbons)	2008/11/21	85	%				
MATRIX SPIKE									
O-TERPHENYL (sur.)									
50 - 130		F2 (C10-C16 Hydrocarbons)	2008/11/21	92	%				
50 - 130		F3 (C16-C34 Hydrocarbons)	2008/11/21	94	%				
50 - 130		F4 (C34-C50 Hydrocarbons)	2008/11/21	86	%				
50 - 130		O-TERPHENYL (sur.)	2008/11/21	90	%				
50 - 130		F2 (C10-C16 Hydrocarbons)	2008/11/21	89	%				
50 - 130		F3 (C16-C34 Hydrocarbons)	2008/11/21	98	%				
50 - 130		F4 (C34-C50 Hydrocarbons)	2008/11/21	89	%				
80 - 120		O-TERPHENYL (sur.)	2008/11/21	90	%				
80 - 120		F2 (C10-C16 Hydrocarbons)	2008/11/21	99	%				
BLANK									
50		F2 (C10-C16 Hydrocarbons)	2008/11/21	<10	mg/kg				
50		F3 (C16-C34 Hydrocarbons)	2008/11/21	<10	mg/kg				
50		F4 (C34-C50 Hydrocarbons)	2008/11/21	<10	mg/kg				
RPD [M79628-01]									
2752517 MP7	Calibration Check	F4S6 (Heavy Hydrocarbons-Grav.)	2008/11/23	93	mg/kg				
		4-BROMOFLUOROBENZENE (sur.)	2008/11/21	73	%				
		D10-ETHYLBENZENE (sur.)	2008/11/21	81	%				
		D4-1,2-DICHLOROETHANE (sur.)	2008/11/21	105	%				
		D8-TOLUENE (sur.)	2008/11/21	91	%				
		Benzene	2008/11/21	89	%				
		Toluene	2008/11/21	93	%				
		Ethylbenzene	2008/11/21	99	%				
		m & p-Xylene	2008/11/21	96	%				
		o-Xylene	2008/11/21	101	%				
		(C6-C10)	2008/11/21	94	%				
60 - 140		4-BROMOFLUOROBENZENE (sur.)	2008/11/21	71	%				
30 - 130		D10-ETHYLBENZENE (sur.)	2008/11/21	81	%				
60 - 140		D4-1,2-DICHLOROETHANE (sur.)	2008/11/21	101	%				
60 - 140		D8-TOLUENE (sur.)	2008/11/21	81	%				
60 - 140		Benzene	2008/11/21	101	%				
60 - 140		Matrix Spike	2008/11/21	80	%				

EBA ENGINEERING CONSULTANTS LTD.
Attention: DERYCK MASTERMAN
Client Project #: L22101182.001, AMA SITE 9557
P.O. #:
Site Reference: BARONS, AB

Quality Assurance Report (Continued)

Maxxam Job Number: CA863927

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2752554 KB7	MATRIX SPIKE [M79631-01]	Toluene	2008/11/21		82	%	60 - 140
		Ethylbenzene	2008/11/21		85	%	60 - 140
		m & p-Xylene	2008/11/21		89	%	60 - 140
		o-Xylene	2008/11/21		87	%	60 - 140
		(C6-C10)	2008/11/21		112	%	60 - 140
		4-BROMOFLUOROBENZENE (sur.)	2008/11/21		94	%	60 - 140
		D10-ETHYLBENZENE (sur.)	2008/11/21		73	%	30 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2008/11/21		83	%	60 - 140
		D8-TOLUENE (sur.)	2008/11/21		106	%	60 - 140
		Benzene	2008/11/21		89	%	75 - 125
		Toluene	2008/11/21		95	%	75 - 125
		Ethylbenzene	2008/11/21		94	%	75 - 125
		m & p-Xylene	2008/11/21		106	%	75 - 125
		o-Xylene	2008/11/21		111	%	75 - 125
		(C6-C10)	2008/11/21		95	%	70 - 130
	SPIKE	4-BROMOFLUOROBENZENE (sur.)	2008/11/21		92	%	60 - 140
		D10-ETHYLBENZENE (sur.)	2008/11/21		76	%	30 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2008/11/21		80	%	60 - 140
		D8-TOLUENE (sur.)	2008/11/21		106	%	60 - 140
		Benzene	2008/11/21	<0.0050		mg/kg	
		Toluene	2008/11/21	<0.020		mg/kg	
		Ethylbenzene	2008/11/21	<0.010		mg/kg	
		Xylenes (Total)	2008/11/21	<0.040		mg/kg	
		m & p-Xylene	2008/11/21	<0.040		mg/kg	
		o-Xylene	2008/11/21	<0.020		mg/kg	
		F1 (C6-C10) - BTEX	2008/11/21	<12		mg/kg	
		(C6-C10)	2008/11/21	<12		mg/kg	
	BLANK	Benzene	2008/11/21	NC		%	50
		Toluene	2008/11/21	NC		%	50
		Ethylbenzene	2008/11/21	8.3		%	50
		Xylenes (Total)	2008/11/21	NC		%	50
		m & p-Xylene	2008/11/21	NC		%	50
		o-Xylene	2008/11/21	NC		%	50
		F1 (C6-C10) - BTEX	2008/11/21	NC		%	50
		(C6-C10)	2008/11/21	NC		%	50
	RPD [M79631-01]	4-BROMOFLUOROBENZENE (sur.)	2008/11/21		93	%	60 - 140
		D10-ETHYLBENZENE (sur.)	2008/11/21		71	%	30 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2008/11/21		82	%	60 - 140
		D8-TOLUENE (sur.)	2008/11/21		105	%	60 - 140
		Benzene	2008/11/21		91	%	85 - 115
		Toluene	2008/11/21		92	%	85 - 115
		Ethylbenzene	2008/11/21		93	%	85 - 115
		m & p-Xylene	2008/11/21		100	%	85 - 115
		o-Xylene	2008/11/21		98	%	85 - 115
		(C6-C10)	2008/11/21		101	%	70 - 130
	MATRIX SPIKE	4-BROMOFLUOROBENZENE (sur.)	2008/11/22		89	%	60 - 140
		D10-ETHYLBENZENE (sur.)	2008/11/22		63	%	30 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2008/11/22		79	%	60 - 140
		D8-TOLUENE (sur.)	2008/11/22		95	%	60 - 140
		Benzene	2008/11/22		76	%	60 - 140
		Toluene	2008/11/22		77	%	60 - 140
		Ethylbenzene	2008/11/22		81	%	60 - 140
		m & p-Xylene	2008/11/22		86	%	60 - 140
		o-Xylene	2008/11/22		85	%	60 - 140
2752558 KB7	Calibration Check	4-BROMOFLUOROBENZENE (sur.)	2008/11/21		93	%	60 - 140
		D10-ETHYLBENZENE (sur.)	2008/11/21		71	%	30 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2008/11/21		82	%	60 - 140
		D8-TOLUENE (sur.)	2008/11/21		105	%	60 - 140
		Benzene	2008/11/21		91	%	85 - 115
		Toluene	2008/11/21		92	%	85 - 115
		Ethylbenzene	2008/11/21		93	%	85 - 115
		m & p-Xylene	2008/11/21		100	%	85 - 115
		o-Xylene	2008/11/21		98	%	85 - 115
		(C6-C10)	2008/11/21		101	%	70 - 130
	MATRIX SPIKE	4-BROMOFLUOROBENZENE (sur.)	2008/11/22		89	%	60 - 140
		D10-ETHYLBENZENE (sur.)	2008/11/22		63	%	30 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2008/11/22		79	%	60 - 140
		D8-TOLUENE (sur.)	2008/11/22		95	%	60 - 140
		Benzene	2008/11/22		76	%	60 - 140
		Toluene	2008/11/22		77	%	60 - 140
		Ethylbenzene	2008/11/22		81	%	60 - 140
		m & p-Xylene	2008/11/22		86	%	60 - 140
		o-Xylene	2008/11/22		85	%	60 - 140

EBA ENGINEERING CONSULTANTS LTD.

Attention: DERYCK MASTERMAN

Client Project #: L22101182.001, AMA SITE 9557

P.O. #:

Site Reference: BARONS, AB

Quality Assurance Report (Continued)

Maxxam Job Number: CA863927

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2752558 KB7	MATRIX SPIKE	(C6-C10)	2008/11/22		101	%	60 - 140
		4-BROMOFLUOROBENZENE (sur.)	2008/11/21		94	%	60 - 140
		D10-ETHYLBENZENE (sur.)	2008/11/21		73	%	30 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2008/11/21		83	%	60 - 140
		D8-TOLUENE (sur.)	2008/11/21		106	%	60 - 140
		Benzene	2008/11/21		89	%	75 - 125
		Toluene	2008/11/21		95	%	75 - 125
		Ethylbenzene	2008/11/21		94	%	75 - 125
		m & p-Xylene	2008/11/21		106	%	75 - 125
		o-Xylene	2008/11/21		111	%	75 - 125
		(C6-C10)	2008/11/21		95	%	70 - 130
	BLANK	4-BROMOFLUOROBENZENE (sur.)	2008/11/21		92	%	60 - 140
		D10-ETHYLBENZENE (sur.)	2008/11/21		73	%	30 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2008/11/21		85	%	60 - 140
		D8-TOLUENE (sur.)	2008/11/21		109	%	60 - 140
		Benzene	2008/11/21	<0.0050		mg/kg	
		Toluene	2008/11/21	<0.020		mg/kg	
		Ethylbenzene	2008/11/21	<0.010		mg/kg	
		Xylenes (Total)	2008/11/21	<0.040		mg/kg	
		m & p-Xylene	2008/11/21	<0.040		mg/kg	
		o-Xylene	2008/11/21	<0.020		mg/kg	
		F1 (C6-C10) - BTEX	2008/11/21	<12		mg/kg	
		(C6-C10)	2008/11/21	<12		mg/kg	
	RPD	Benzene	2008/11/22	NC		%	50
		Toluene	2008/11/22	NC		%	50
		Ethylbenzene	2008/11/22	NC		%	50
		Xylenes (Total)	2008/11/22	NC		%	50
		m & p-Xylene	2008/11/22	NC		%	50
		o-Xylene	2008/11/22	NC		%	50
		F1 (C6-C10) - BTEX	2008/11/22	NC		%	50
		(C6-C10)	2008/11/22	NC		%	50
2752768 RM2	RPD [M79636-01]	Moisture	2008/11/21	3.9		%	20
	RPD [M79693-01]	Moisture	2008/11/21	0.4		%	20
2752896 RM2	RPD	Moisture	2008/11/21	1.1		%	20
2753046 FV	QC STANDARD	Sieve - Pan	2008/11/22		100	%	90 - 110
		Sieve - #200 (>0.075mm)	2008/11/22		99	%	90 - 110
	RPD	Sieve - Pan	2008/11/22	2.6		%	35
		Sieve - #200 (>0.075mm)	2008/11/22	5.2		%	35
2755872 LW	Calibration Check	Total Lead (Pb)	2008/11/23		101	%	75 - 125
	MATRIX SPIKE						
	[M79699-01]	Total Lead (Pb)	2008/11/23		86	%	75 - 125
	QC STANDARD	Total Lead (Pb)	2008/11/23		88	%	54 - 146
	BLANK	Total Lead (Pb)	2008/11/23	<1		mg/kg	
	RPD [M79699-01]	Total Lead (Pb)	2008/11/23	0.4		%	35
2755722 LW	Calibration Check	Total Lead (Pb)	2008/11/23		101	%	75 - 125
	MATRIX SPIKE						
	[M79628-01]	Total Lead (Pb)	2008/11/23		84	%	75 - 125
	QC STANDARD	Total Lead (Pb)	2008/11/23		77	%	54 - 146
	BLANK	Total Lead (Pb)	2008/11/23	<1		mg/kg	
	RPD [M79628-01]	Total Lead (Pb)	2008/11/23	3.2		%	35

NC = Non-calculable

RPD = Relative Percent Difference

Sample Integrity Form

Invoice To:
EBA ENGINEERING CONSULTANTS LTD.
ATTN: DERYCK MASTERMAN
442-10n STREET NORTH
LETHBRIDGE, AB
CANADA T1H 2C7
Client Contact:
DERYCK MASTERMAN

Maxxam Job #: A863927
Date Received: 2008/11/20
Your C.O.C. #: 117002
Your Project #: L22101182.001, AMA SITE
Maxxam Project Manager: NICOLE CHAN
Quote #: A80250

No discrepancies noted.

Report Comments

Received Date: 2008/11/20 **Time:** 9:50 **By:** _____

Inspected Date: _____ **Time:** _____ **By:** _____

SIF Created Date: _____ **Time:** 00:00 **By:** _____

Validation Signature Page

Maxxam Job #: A863927

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



JANET GAO,



KAZI RAHMAN,



VERONICA FALK,

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Page: 1 of 2

Invoice To: Florida Airport Yes ☒ No ☐
 Company Name: ERA Engineering Consultants
 Contact Name: Donna Martinez
 Address: 442 - 10th St. N.
Levensville AR 71854 RD 500203
 Phone / Fax #: Ph: (404) 328-2009 Fax: (404) 328-8813

Report To: _____

POB / AFE #:	
Quota #:	
Police #:	2215181
Project Name:	ADA Srv 9553
Location:	48
Sample #:	

REGULATORY REQUIREMENTS:

- ☐ ATY - Soil Contamination ☐ RST --
☐ CCME ☐ CDHQG
☐ CCME FINAL ☐ 660
☐ See next page for notes on Final report

REPORT DISTRIBUTION:

- ☐ Mail ☐ Fax
☒ PDF ☒ Email ☐ Other: _____
☒ Email: director@nab.ca

SERVICE REQUESTED:

- ☐ **EMERGENCY** - Please advise you contact the lab

RESEARCH METHODS

- ☐ Total ☒ Extractable ☐ Dissolved

ANALYSIS REQUESTED

[illegible]

Relinquished By: AMIE CAROLINE BOWEN

Signature _____

COMMENTS/SPECIAL INSTRUCTIONS:

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

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MAY 1 1968

Cd/Cs 117002

Company Name: FINELINE LITERARY CONSULTANTS
 Contact Name: FINELINE LITERARY CONSULTANTS
 Address: 442-15th St. N.
LYNN, MN 55349 PO. FIN201
 Phone / Fax #: Ph: 612-291-0917 : Fax: 612-291-0917

Report To:

PO # / AFE #
Quotation #
Project # 423 / 010000 / 001
Project Name: BILAL SITE 9232
Location: BILAL SITE
Contract # 010000

REGULATORY REQUIREMENTS:

- ☐ ATY - Self Contamination
- ☐ CCME
- ☐ CCME FINAL
- ☐ This entry is to appear on Final Report
- EST
- CHNOG
- 100
- 06-11-89

REPORT DISTRIBUTION:

- ☒ Mail ☐ Fax
☒ PDF ☒ Email ☐ Other: _____
 Email: hmadhman@chase.com

SERVICE REQUESTED:

- ☐ **FLUSH** (Please enclose you confirm the lab)
Date Required: 07/20
☒ **REGULAR Turnaround**

METALS: TUNGSTEN:

- ☐
- Total
- ☐
- Extractable
- ☐
- Dissolved

ANALYSIS REQUESTED

[illegible]

Reinstated By: 4422-PT3 G-3

References

COMMENTS/SPECIAL INSTRUCTIONS:

References

ColC 117003

Your Project #: L22101182.001, BARONS SCC 9557
Site: BARONS, ALBERTA
Your C.O.C. #: 116996

Attention: DERYCK MASTERMAN
EBA ENGINEERING CONSULTANTS LTD.
442-10n STREET NORTH
LETHBRIDGE, AB
CANADA T1H 2C7

Report Date: 2008/12/05

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A865930
Received: 2008/11/29, 10:00

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Lead (Dissolved)	5	N/A	2008/12/05	CAL SOP-00003, CAL SOP-00008, CAL SOP-00009	ICP-MS

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 in Water by HS GC/MS	5	N/A	2008/12/03	CAL SOP-00104	EPA 8260 C
CCME Hydrocarbons in Water (F2; C10-C16)	1	2008/11/30	2008/12/03	CAL SOP-00087	CCME PHC-CWS
CCME Hydrocarbons in Water (F2; C10-C16)	4	2008/11/30	2008/12/04	CAL SOP-00087	CCME PHC-CWS

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

Encryption Key

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

NICOLE CHAN,
Email: Nicole.Chan@MaxxamAnalytics.com
Phone# (403) 291-3077

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

For Service Group specific validation please refer to the Validation Signature Page

Total cover pages: 1

Maxxam Job #: A865930
 Report Date: 2008/12/05

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, BARONS SCC 9557
 Site Reference: BARONS, ALBERTA
 Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		M95043	M95043	M95045	M95046		
Sampling Date		2008/11/28 AM	2008/11/28 AM	2008/11/28 AM	2008/11/28 AM		
COC Number		116996	116996	116996	116996		
	Units	08MW01	08MW01 Lab-Dup	08MW02	08MW06	RDL	QC Batch

Elements							
Dissolved Lead (Pb)	mg/L	0.0059	0.0059	<0.0002	<0.0002	0.0002	2785705
RDL = Reportable Detection Limit							

Maxxam ID		M95047		M95048		
Sampling Date		2008/11/28 AM		2008/11/28 AM		
COC Number		116996		116996		
	Units	08MW07	RDL	08MW08	RDL	QC Batch

Elements						
Dissolved Lead (Pb)	mg/L	0.0002	0.0002	<0.001	0.001	2785705
RDL = Reportable Detection Limit						

Maxxam Job #: A865930
 Report Date: 2008/12/05

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, BARONS SCC 9557
 Site Reference: BARONS, ALBERTA
 Sampler Initials: JL

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		M95043	M95045	M95046	M95047		
Sampling Date		2008/11/28 AM	2008/11/28 AM	2008/11/28 AM	2008/11/28 AM		
COC Number		116996	116996	116996	116996		
	Units	08MW01	08MW02	08MW06	08MW07	RDL	QC Batch

Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	mg/L	6.4	8.2	31.9	0.7	0.1	2772786
Surrogate Recovery (%)							
O-TERPHENYL (sur.)	%	99	102	79	104	N/A	2772786

 N/A = Not Applicable
 RDL = Reportable Detection Limit

Maxxam ID		M95048		
Sampling Date		2008/11/28 AM		
COC Number		116996		
	Units	08MW08	RDL	QC Batch

Hydrocarbons				
F2 (C10-C16 Hydrocarbons)	mg/L	<0.1	0.1	2772786
Surrogate Recovery (%)				
O-TERPHENYL (sur.)	%	108	N/A	2772786

 N/A = Not Applicable
 RDL = Reportable Detection Limit

Maxxam Job #: A865930
 Report Date: 2008/12/05

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, BARONS SCC 9557
 Site Reference: BARONS, ALBERTA
 Sampler Initials: JL

VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		M95043		M95045		
Sampling Date		2008/11/28 AM		2008/11/28 AM		
COC Number		116996		116996		
	Units	08MW01	RDL	08MW02	RDL	QC Batch

Volatiles						
Benzene	mg/L	5.5	0.02	1.6	0.004	2775641
Toluene	mg/L	0.0005	0.0004	0.0017	0.0004	2775641
Ethylbenzene	mg/L	0.47	0.02	0.40	0.004	2775641
o-Xylene	mg/L	0.0006	0.0004	0.0019	0.0004	2775641
m & p-Xylene	mg/L	0.50	0.04	0.50	0.008	2775641
Xylenes (Total)	mg/L	0.50	0.04	0.50	0.008	2775641
F1 (C8-C10) - BTEX	mg/L	<5	5	1	1	2775641
(C6-C10)	mg/L	6	5	4	1	2775641
Surrogate Recovery (%)						
4-BROMOFLUOROBENZENE (sur.)	%	101	N/A	100	N/A	2775641
D4-1,2-DICHLOROETHANE (sur.)	%	113	N/A	114	N/A	2775641
D8-TOLUENE (sur.)	%	102	N/A	103	N/A	2775641

 N/A = Not Applicable
 RDL = Reportable Detection Limit

Maxxam Job #: A865930
 Report Date: 2008/12/05

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, BARONS SCC 9557
 Site Reference: BARONS, ALBERTA
 Sampler Initials: JL

VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		M95046		M95047		
Sampling Date		2008/11/28 AM		2008/11/28 AM		
COC Number		116996		116996		
	Units	08MW06	RDL	08MW07	RDL	QC Batch

Volatiles						
Benzene	mg/L	1.2	0.004	0.056	0.0004	2775641
Toluene	mg/L	0.0022	0.0004	<0.0004	0.0004	2775641
Ethylbenzene	mg/L	0.35	0.004	<0.0004	0.0004	2775641
o-Xylene	mg/L	0.0011	0.0004	0.010	0.0004	2775641
m & p-Xylene	mg/L	0.51	0.008	0.0041	0.0008	2775641
Xylenes (Total)	mg/L	0.52	0.008	0.014	0.0008	2775641
F1 (C6-C10) - BTEX	mg/L	2	1	0.5	0.1	2775641
(C6-C10)	mg/L	4	1	0.6	0.1	2775641
Surrogate Recovery (%)						
4-BROMOFLUOROBENZENE (sur.)	%	100	N/A	102	N/A	2775641
D4-1,2-DICHLOROETHANE (sur.)	%	114	N/A	113	N/A	2775641
D8-TOLUENE (sur.)	%	104	N/A	106	N/A	2775641

 N/A = Not Applicable
 RDL = Reportable Detection Limit

Maxxam Job #: A865930
Report Date: 2008/12/05

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, BARONS SCC 9557
Site Reference: BARONS, ALBERTA
Sampler Initials: JL

VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		M95048		
Sampling Date		2008/11/28 AM		
COC Number		116996		
	Units	08MW08	RDL	QC Batch

Volatiles				
Benzene	mg/L	0.0005	0.0004	2775641
Toluene	mg/L	<0.0004	0.0004	2775641
Ethylbenzene	mg/L	<0.0004	0.0004	2775641
o-Xylene	mg/L	<0.0004	0.0004	2775641
m & p-Xylene	mg/L	<0.0008	0.0008	2775641
Xylenes (Total)	mg/L	<0.0008	0.0008	2775641
F1 (C8-C10) - BTEX	mg/L	<0.1	0.1	2775641
(C8-C10)	mg/L	<0.1	0.1	2775641
Surrogate Recovery (%)				
4-BROMOFLUOROBENZENE (sur.)	%	102	N/A	2775641
D4-1,2-DICHLOROETHANE (sur.)	%	120	N/A	2775641
D8-TOLUENE (sur.)	%	101	N/A	2775641

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: A865930
Report Date: 2008/12/05EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, BARONS SCC 9557
Site Reference: BARONS, ALBERTA
Sampler Initials: JL

Package 1	6.7°C
-----------	-------

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

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER) Comments

Sample M95043-01 Lead (Dissolved): Matrix Spike exceeds acceptance limits for Pb, due to matrix interference. Reanalysis yields similar results. (Recovery: 71%, limits 80-120%)

Sample M95048-01 Lead (Dissolved): Detection limits raised due to sample matrix.

VOLATILE ORGANICS BY GC-MS (WATER) Comments

Sample M95043-02 BTEX/F1 in Water by HS GC/MS: Detection limits raised due to dilution to bring analyte within the calibrated range.

Sample M95045-02 BTEX/F1 in Water by HS GC/MS: Detection limits raised due to dilution to bring analyte within the calibrated range.

Sample M95046-02 BTEX/F1 in Water by HS GC/MS: Detection limits raised due to dilution to bring analyte within the calibrated range.

Results relate only to the items tested.

EBA ENGINEERING CONSULTANTS LTD.
Attention: DERYCK MASTERMAN
Client Project #: L22101182.001, BARONS SCC 9557
P.O. #:
Site Reference: BARONS, ALBERTA

Quality Assurance Report
Maxxam Job Number: CA865930

QA/QC Batch			Date Analyzed				
Num Init	QC Type	Parameter	yyy/mm/dd	Value	Recovery	Units	QC Limits
2772786 AN4	MATRIX SPIKE	O-TERPHENYL (sur.)	2008/12/04		98	%	70 - 130
		F2 (C10-C16 Hydrocarbons)	2008/12/04		128	%	70 - 130
	SPIKE	O-TERPHENYL (sur.)	2008/12/04		97	%	70 - 130
		F2 (C10-C16 Hydrocarbons)	2008/12/04		118	%	70 - 130
	BLANK	O-TERPHENYL (sur.)	2008/12/04		110	%	70 - 130
		F2 (C10-C16 Hydrocarbons)	2008/12/04	<0.1		mg/L	
2775641 DV1	RPD	F2 (C10-C16 Hydrocarbons)	2008/12/03	NC		%	40
	MATRIX SPIKE	4-BROMOFLUOROBENZENE (sur.)	2008/12/02		104	%	70 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2008/12/02		119	%	70 - 130
		D8-TOLUENE (sur.)	2008/12/02		103	%	70 - 130
Benzene		2008/12/02		110	%	70 - 130	
Toluene		2008/12/02		107	%	70 - 130	
Ethylbenzene		2008/12/02		103	%	70 - 130	
o-Xylene		2008/12/02		101	%	70 - 130	
m & p-Xylene		2008/12/02		105	%	70 - 130	
SPIKE		4-BROMOFLUOROBENZENE (sur.)	2008/12/02		104	%	70 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2008/12/02		123	%	70 - 130
	D8-TOLUENE (sur.)	2008/12/02		101	%	70 - 130	
	Benzene	2008/12/02		106	%	70 - 130	
	Toluene	2008/12/02		100	%	70 - 130	
	Ethylbenzene	2008/12/02		92	%	70 - 130	
	o-Xylene	2008/12/02		93	%	70 - 130	
	m & p-Xylene	2008/12/02		94	%	70 - 130	
	(C6-C10)	2008/12/02		73	%	70 - 130	
	BLANK	4-BROMOFLUOROBENZENE (sur.)	2008/12/02		101	%	70 - 130
D4-1,2-DICHLOROETHANE (sur.)		2008/12/02		120	%	70 - 130	
D8-TOLUENE (sur.)		2008/12/02		103	%	70 - 130	
Benzene		2008/12/02	<0.0004		mg/L		
Toluene		2008/12/02	<0.0004		mg/L		
Ethylbenzene		2008/12/02	<0.0004		mg/L		
o-Xylene		2008/12/02	<0.0004		mg/L		
m & p-Xylene		2008/12/02	<0.0008		mg/L		
Xylenes (Total)		2008/12/02	<0.0008		mg/L		
RPD		F1 (C6-C10) - BTEX	2008/12/02	<0.1		mg/L	
	(C6-C10)	2008/12/02	<0.1		mg/L		
	Benzene	2008/12/02	NC		%	40	
	Toluene	2008/12/02	3.1		%	40	
	Ethylbenzene	2008/12/02	NC		%	40	
	o-Xylene	2008/12/02	NC		%	40	
	m & p-Xylene	2008/12/02	NC		%	40	
	Xylenes (Total)	2008/12/02	NC		%	40	
	F1 (C6-C10) - BTEX	2008/12/02	NC		%	40	
	(C6-C10)	2008/12/02	NC		%	40	
2785705 KC1	Calibration Check	Dissolved Lead (Pb)	2008/12/05		95	%	80 - 114
BLANK	Dissolved Lead (Pb)	2008/12/05	<0.0002		mg/L		
RPD [M95043-01]	Dissolved Lead (Pb)	2008/12/05	0		%	20	

NC = Non-calculable
RPD = Relative Percent Difference

Sample Integrity Form

Invoice To:
EBA ENGINEERING CONSULTANTS LTD.
ATTN: DERYCK MASTERMAN
442-10n STREET NORTH
LETHBRIDGE, AB
CANADA T1H 2C7
Client Contact:
DERYCK MASTERMAN

Maxxam Job #: A865930
Date Received: 2008/11/29
Your C.O.C. #: 116996
Your Project #: L22101182.001, BARONS S
Maxxam Project Manager: NICOLE CHAN
Quote #: A80250

No discrepancies noted.

Report Comments

Received Date: 2008/11/29 Time: 10:00 By: _____

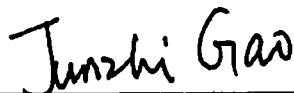
Inspected Date: _____ Time: _____ By: _____

SIF Created Date: _____ Time: 00:00 By: _____

Validation Signature Page

Maxxam Job #: A865930

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



JANET GAO, Senior Analyst, Organics Department



KAZI RAHMAN,

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Fax:

Sampler's Initials JS

☐ Total ☐ Extractable ☐ Dissolved[illegible]

Col C# **116996**

Your Project #: L22101182.001, AMA 9557
 Site: BARONS, AB
 Your C.O.C. #: 117009

Attention: DERYCK MASTERMAN
 EBA ENGINEERING CONSULTANTS LTD.
 442-10n STREET NORTH
 LETHBRIDGE, AB
 CANADA T1H 2C7

Report Date: 2009/03/23

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A911550

Received: 2009/03/14, 9:30

Sample Matrix: Soil
 # Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 by HS GC/MS (MeOH extract)	1	2009/03/16	2009/03/18	CAL SOP-00104	EPA 8260C/CCME
BTEX/F1 by HS GC/MS (MeOH extract)	1	2009/03/16	2009/03/19	CAL SOP-00104	EPA 8260C/CCME
BTEX/F1 by HS GC/MS (MeOH extract)	10	2009/03/16	2009/03/20	CAL SOP-00104	EPA 8260C/CCME
CCME Hydrocarbons (F2-F4 in soil)	12	2009/03/17	2009/03/20	CAL SOP-00086	CCME PHC-CWS
Moisture	12	N/A	2009/03/18	CAL SOP-00023	McKeague MSSMA 2.411
Lead	12	2009/03/19	2009/03/19	CAL SOP-00191	EPA SW846/6020B
Particle Size by Sieve (75 micron)	5	N/A	2009/03/20	CAL SOP-00025	SSMA 47.4

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

Encryption Key

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

NICOLE CHAN, Project Manager
 Email: Nicole.Chan@MaxxamAnalytics.com
 Phone# (403) 291-3077

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

For Service Group specific validation please refer to the Validation Signature Page

Total cover pages: 1

Maxxam Job #: A911550
 Report Date: 2009/03/23

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, AMA 9557
 Site Reference: BARONS, AB
 Sampler Initials: JL

AT1 BTEX, F1-F4, AND CHROMATOGRAM (SOIL)

Maxxam ID		O07641	O07643	O07645	O07645		
Sampling Date		2009/03/12	2009/03/12	2009/03/12	2009/03/12		
COC Number		117009	117009	117009	117009		
	Units	09BH09/5.4M	09BH11/4.2M	09BH12/3.0M	09BH12/3.0M Lab-Dup	RDL	QC Batch

Physical Properties							
Moisture	%	18	14	23	23	0.3	2995444
Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/kg	13	<10	180	N/A	10	2995382
F3 (C16-C34 Hydrocarbons)	mg/kg	<10	<10	24	N/A	10	2995382
F4 (C34-C50 Hydrocarbons)	mg/kg	<10	<10	<10	N/A	10	2995382
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	N/A	N/A	2995382
Volatiles							
Benzene	mg/kg	<0.0050	0.023	1.5	N/A	0.0050	2994378
Toluene	mg/kg	<0.020	<0.020	<0.020	N/A	0.020	2994378
Ethylbenzene	mg/kg	<0.010	0.028	12	N/A	0.010	2994378
Xylenes (Total)	mg/kg	<0.040	0.11	18	N/A	0.040	2994378
m & p-Xylene	mg/kg	<0.040	0.11	18	N/A	0.040	2994378
o-Xylene	mg/kg	<0.020	<0.020	<0.020	N/A	0.020	2994378
F1 (C6-C10) - BTEX	mg/kg	<12	<12	410	N/A	12	2994378
(C6-C10)	mg/kg	<12	<12	440	N/A	12	2994378
Surrogate Recovery (%)							
4-BROMOFLUOROBENZENE (sur.)	%	97	99	103	N/A	N/A	2994378
D10-ETHYLBENZENE (sur.)	%	65	85	93	N/A	N/A	2994378
D4-1,2-DICHLOROETHANE (sur.)	%	89	108	104	N/A	N/A	2994378
D8-TOLUENE (sur.)	%	108	94	103	N/A	N/A	2994378
O-TERPHENYL (sur.)	%	98	104	105	N/A	N/A	2995382

 N/A = Not Applicable
 RDL = Reportable Detection Limit

Maxxam Job #: A911550
 Report Date: 2009/03/23

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, AMA 9557
 Site Reference: BARONS, AB
 Sampler Initials: JL

AT1 BTEX, F1-F4, AND CHROMATOGRAM (SOIL)

Maxxam ID		O07648	O07649	O07652	O07653		
Sampling Date		2009/03/12	2009/03/12	2009/03/12	2009/03/12		
COC Number		117009	117009	117009	117009		
	Units	09BH17/4.2M	09BH19/4.8M	09BH20/3.0M	09BH20/3.6M	RDL	QC Batch

Physical Properties							
Moisture	%	15	18	19	13	0.3	2995444
Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	<10	660	<10	10	2995382
F3 (C16-C34 Hydrocarbons)	mg/kg	<10	<10	230	<10	10	2995382
F4 (C34-C50 Hydrocarbons)	mg/kg	<10	<10	<10	<10	10	2995382
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	N/A	2995382
Volatiles							
Benzene	mg/kg	0.036	0.020	9.7	0.53	0.0050	2994378
Toluene	mg/kg	<0.020	<0.020	0.056	0.10	0.020	2994378
Ethylbenzene	mg/kg	0.051	<0.010	21	0.20	0.010	2994378
Xylenes (Total)	mg/kg	0.066	<0.040	36	0.70	0.040	2994378
m & p-Xylene	mg/kg	0.066	<0.040	36	0.65	0.040	2994378
o-Xylene	mg/kg	<0.020	<0.020	0.040	0.044	0.020	2994378
F1 (C6-C10) - BTEX	mg/kg	<12	<12	430	<12	12	2994378
(C6-C10)	mg/kg	<12	<12	490	<12	12	2994378
Surrogate Recovery (%)							
4-BROMOFLUOROBENZENE (sur.)	%	102	100	101	101	N/A	2994378
D10-ETHYLBENZENE (sur.)	%	86	87	91	86	N/A	2994378
D4-1,2-DICHLOROETHANE (sur.)	%	104	101	110	105	N/A	2994378
D8-TOLUENE (sur.)	%	96	96	101	96	N/A	2994378
O-TERPHENYL (sur.)	%	97	103	106	99	N/A	2995382
N/A = Not Applicable RDL = Reportable Detection Limit							

Maxxam Job #: A911550
 Report Date: 2009/03/23

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, AMA 9557
 Site Reference: BARONS, AB
 Sampler Initials: JL

AT1 BTEX, F1-F4, SIEVE, & CHROMATOGRAM (SOIL)

Maxxam ID		O07642	O07644	O07646	O07647		
Sampling Date		2009/03/12	2009/03/12	2009/03/12	2009/03/12		
COC Number		117009	117009	117009	117009		
	Units	09BH09/6.0M	09BH12/2.4M	09BH13/4.8M	09BH17/3.0M	RDL	QC Batch
Physical Properties							
Moisture	%	19	18	17	21	0.3	2995444
Sieve - Pan	%	51	89	71	90	0.2	3000928
Sieve - #200 (>0.075mm)	%	49	11	29	10	0.2	3000928
Grain Size	%	FINE	FINE	FINE	FINE	0.2	3000928
Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/kg	11	<10	69	1400	10	2995382
F3 (C16-C34 Hydrocarbons)	mg/kg	<10	<10	<10	520	10	2995382
F4 (C34-C50 Hydrocarbons)	mg/kg	<10	<10	<10	<10	10	2995382
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	N/A	2995382
Volatiles							
Benzene	mg/kg	0.014	0.016	0.054	0.97	0.0050	2994378
Toluene	mg/kg	<0.020	<0.020	<0.020	<0.020	0.020	2994378
Ethylbenzene	mg/kg	<0.010	<0.010	0.057	19	0.010	2994378
Xylenes (Total)	mg/kg	<0.040	<0.040	0.069	29	0.040	2994378
m & p-Xylene	mg/kg	<0.040	<0.040	0.069	29	0.040	2994378
o-Xylene	mg/kg	<0.020	<0.020	<0.020	<0.020	0.020	2994378
F1 (C6-C10) - BTEX	mg/kg	<12	<12	<12	580	12	2994378
(C6-C10)	mg/kg	<12	<12	<12	630	12	2994378
Surrogate Recovery (%)							
4-BROMOFLUOROBENZENE (sur.)	%	101	99	100	90	N/A	2994378
D10-ETHYLBENZENE (sur.)	%	86	84	87	85	N/A	2994378
D4-1,2-DICHLOROETHANE (sur.)	%	101	106	106	92	N/A	2994378
D8-TOLUENE (sur.)	%	96	93	96	113	N/A	2994378
O-TERPHENYL (sur.)	%	109	104	104	104	N/A	2995382
N/A = Not Applicable RDL = Reportable Detection Limit							

Maxxam Job #: A911550
 Report Date: 2009/03/23

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, AMA 9557
 Site Reference: BARONS, AB
 Sampler Initials: JL

AT1 BTEX, F1-F4, SIEVE, & CHROMATOGRAM (SOIL)

Maxxam ID		O07851	O07851		
Sampling Date		2009/03/12	2009/03/12		
COC Number		117009	117009		
	Units	09BH19/5.4M	09BH19/5.4M Lab-Dup	RDL	QC Batch

Physical Properties					
Moisture	%	17	N/A	0.3	2995444
Sieve - Pan	%	52	N/A	0.2	3000928
Sieve - #200 (>0.075mm)	%	48	N/A	0.2	3000928
Grain Size	%	FINE	N/A	0.2	3000928
Ext. Pet. Hydrocarbon					
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	10	2995382
F3 (C16-C34 Hydrocarbons)	mg/kg	<10	N/A	10	2995382
F4 (C34-C50 Hydrocarbons)	mg/kg	<10	N/A	10	2995382
Reached Baseline at C50	mg/kg	Yes	N/A	N/A	2995382
Volatiles					
Benzene	mg/kg	0.018	0.024	0.0050	2994378
Toluene	mg/kg	<0.020	<0.020	0.020	2994378
Ethylbenzene	mg/kg	<0.010	0.026	0.010	2994378
Xylenes (Total)	mg/kg	<0.040	0.044	0.040	2994378
m & p-Xylene	mg/kg	<0.040	0.044	0.040	2994378
o-Xylene	mg/kg	<0.020	<0.020	0.020	2994378
F1 (C6-C10) - BTEX	mg/kg	<12	<12	12	2994378
(C6-C10)	mg/kg	<12	<12	12	2994378
Surrogate Recovery (%)					
4-BROMOFLUOROBENZENE (sur.)	%	100	104	N/A	2994378
D10-ETHYLBENZENE (sur.)	%	86	90	N/A	2994378
D4-1,2-DICHLOROETHANE (sur.)	%	103	108	N/A	2994378
D8-TOLUENE (sur.)	%	96	95	N/A	2994378
O-TERPHENYL (sur.)	%	95	N/A	N/A	2995382
N/A = Not Applicable RDL = Reportable Detection Limit					

Maxxam Job #: A911550
 Report Date: 2009/03/23

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001, AMA 9557
 Site Reference: BARONS, AB
 Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		O07641	O07641	O07642	O07643	O07644		
Sampling Date		2009/03/12	2009/03/12	2009/03/12	2009/03/12	2009/03/12		
COC Number		117009	117009	117009	117009	117009		
	Units	09BH09/5.4M	09BH09/5.4M Lab-Dup	09BH09/6.0M	09BH11/4.2M	09BH12/2.4M	RDL	QC Batch

Elements								
Total Lead (Pb)	mg/kg	10	11	8	7	9	1	3002221

RDL = Reportable Detection Limit

Maxxam ID		O07645	O07646	O07647	O07648	O07649		
Sampling Date		2009/03/12	2009/03/12	2009/03/12	2009/03/12	2009/03/12		
COC Number		117009	117009	117009	117009	117009		
	Units	09BH12/3.0M	09BH13/4.8M	09BH17/3.0M	09BH17/4.2M	09BH19/4.8M	RDL	QC Batch

Elements								
Total Lead (Pb)	mg/kg	13	4	13	7	8	1	3002221

RDL = Reportable Detection Limit

Maxxam ID		O07651	O07652	O07653		
Sampling Date		2009/03/12	2009/03/12	2009/03/12		
COC Number		117009	117009	117009		
	Units	09BH19/5.4M	09BH20/3.0M	09BH20/3.6M	RDL	QC Batch

Elements						
Total Lead (Pb)	mg/kg	8	12	7	1	3002221

RDL = Reportable Detection Limit

Maxxam Job #: A911550
Report Date: 2009/03/23

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Sampler Initials: JL

Package 1	10.0°C
-----------	--------

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

General Comments

Results relate only to the items tested.

EBA ENGINEERING CONSULTANTS LTD.
Attention: DERYCK MASTERMAN
Client Project #: L22101182.001, AMA 9557
P.O. #:
Site Reference: BARONS, AB

Quality Assurance Report
Maxxam Job Number: CA911550

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2994378 RSA	MATRIX SPIKE [O07651-01]	4-BROMOFLUOROBENZENE (sur.)	2009/03/20		103	%	60 - 140
		D10-ETHYLBENZENE (sur.)	2009/03/20		86	%	30 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2009/03/20		109	%	60 - 140
		D8-TOLUENE (sur.)	2009/03/20		96	%	60 - 140
		Benzene	2009/03/20		86	%	60 - 140
		Toluene	2009/03/20		90	%	60 - 140
		Ethylbenzene	2009/03/20		89	%	60 - 140
		m & p-Xylene	2009/03/20		92	%	60 - 140
		o-Xylene	2009/03/20		93	%	60 - 140
		(C6-C10)	2009/03/20		96	%	60 - 140
	SPIKE	4-BROMOFLUOROBENZENE (sur.)	2009/03/20		101	%	60 - 140
		D10-ETHYLBENZENE (sur.)	2009/03/20		88	%	30 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2009/03/20		105	%	60 - 140
		D8-TOLUENE (sur.)	2009/03/20		97	%	60 - 140
		Benzene	2009/03/20		81	%	60 - 140
		Toluene	2009/03/20		78	%	60 - 140
		Ethylbenzene	2009/03/20		76	%	60 - 140
		m & p-Xylene	2009/03/20		79	%	60 - 140
		o-Xylene	2009/03/20		80	%	60 - 140
		(C6-C10)	2009/03/20		96	%	60 - 140
	BLANK	4-BROMOFLUOROBENZENE (sur.)	2009/03/20		98	%	60 - 140
		D10-ETHYLBENZENE (sur.)	2009/03/20		86	%	30 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2009/03/20		101	%	60 - 140
		D8-TOLUENE (sur.)	2009/03/20		95	%	60 - 140
		Benzene	2009/03/20	<0.0050		mg/kg	
		Toluene	2009/03/20	<0.020		mg/kg	
		Ethylbenzene	2009/03/20	<0.010		mg/kg	
		Xylenes (Total)	2009/03/20	<0.040		mg/kg	
		m & p-Xylene	2009/03/20	<0.040		mg/kg	
		o-Xylene	2009/03/20	<0.020		mg/kg	
	RPD [O07651-01]	F1 (C6-C10) - BTEX	2009/03/20	<12		mg/kg	
		(C6-C10)	2009/03/20	<12		mg/kg	
		Benzene	2009/03/20	NC		%	50
		Toluene	2009/03/20	NC		%	50
		Ethylbenzene	2009/03/20	NC		%	50
		Xylenes (Total)	2009/03/20	NC		%	50
		m & p-Xylene	2009/03/20	NC		%	50
		o-Xylene	2009/03/20	NC		%	50
		F1 (C6-C10) - BTEX	2009/03/20	NC		%	50
		(C6-C10)	2009/03/20	NC		%	50
2995382 LSH	MATRIX SPIKE	O-TERPHENYL (sur.)	2009/03/20		110	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2009/03/20		95	%	50 - 130
		F3 (C16-C34 Hydrocarbons)	2009/03/20		85	%	50 - 130
		F4 (C34-C50 Hydrocarbons)	2009/03/20		92	%	50 - 130
	SPIKE	O-TERPHENYL (sur.)	2009/03/20		107	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2009/03/20		110	%	80 - 120
		F3 (C16-C34 Hydrocarbons)	2009/03/20		93	%	80 - 120
		F4 (C34-C50 Hydrocarbons)	2009/03/20		88	%	80 - 120
	BLANK	O-TERPHENYL (sur.)	2009/03/19		106	%	50 - 130
		F2 (C10-C16 Hydrocarbons)	2009/03/19	<10		mg/kg	
		F3 (C16-C34 Hydrocarbons)	2009/03/19	<10		mg/kg	
		F4 (C34-C50 Hydrocarbons)	2009/03/19	<10		mg/kg	
	RPD	F2 (C10-C16 Hydrocarbons)	2009/03/20	NC		%	50
		F3 (C16-C34 Hydrocarbons)	2009/03/20	NC		%	50

EBA ENGINEERING CONSULTANTS LTD.
Attention: DERYCK MASTERMAN
Client Project #: L22101182.001, AMA 9557
P.O. #:
Site Reference: BARONS, AB

Quality Assurance Report (Continued)
Maxxam Job Number: CA911550

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2995382 LSH	RPD	F4 (C34-C50 Hydrocarbons)	2009/03/20	NC		%	50
2995444 RM2	RPD [O07645-01]	Moisture	2009/03/18	2.6		%	20
3000928 FV	QC STANDARD	Sieve - Pan	2009/03/20		100	%	89 - 111
		Sieve - #200 (>0.075mm)	2009/03/20		100	%	75 - 125
	RPD	Sieve - Pan	2009/03/20	6.0		%	35
		Sieve - #200 (>0.075mm)	2009/03/20	9.3		%	35
3002221 ST4	MATRIX SPIKE [O07641-01]	Total Lead (Pb)	2009/03/19		102	%	75 - 125
	QC STANDARD	Total Lead (Pb)	2009/03/19		81	%	54 - 146
	SPIKE	Total Lead (Pb)	2009/03/19		98	%	75 - 125
	BLANK	Total Lead (Pb)	2009/03/19	<1		mg/kg	
	RPD [O07641-01]	Total Lead (Pb)	2009/03/19	2.1		%	35

NC = Non-calculable

RPD = Relative Percent Difference

Maxxam Analytics International Corporation o/a Maxxam Analytics Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone(403) 291-3077 FAX(403) 291-6468

Sample Integrity Form

Invoice To:
EBA ENGINEERING CONSULTANTS LTD.
ATTN: DERYCK MASTERMAN
442-10n STREET NORTH
LETHBRIDGE, AB
CANADA T1H 2C7
Client Contact:
DERYCK MASTERMAN

Maxxam Job #: A911550
Date Received: 2009/03/14
Your C.O.C. #: 117009
Your Project #: L22101182.001, AMA 9557
Maxxam Project Manager: NICOLE CHAN
Quote #: A80250

No discrepancies noted.

Report Comments

Received Date: 2009/03/14 Time: 9:30 By: _____

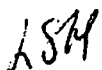
Inspected Date: _____ Time: _____ By: _____

SIF Created Date: _____ Time: 00:00 By: _____

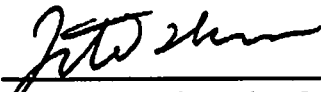
Validation Signature Page

Maxxam Job #: A911550

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



LUBA SHYMUSHOVSKA, Senior Analyst, Organic Department



LILI ZHOU, Senior analyst, Inorganic department.



ORLA JORGENSEN, Organics Supervisor

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

C of C # 117009

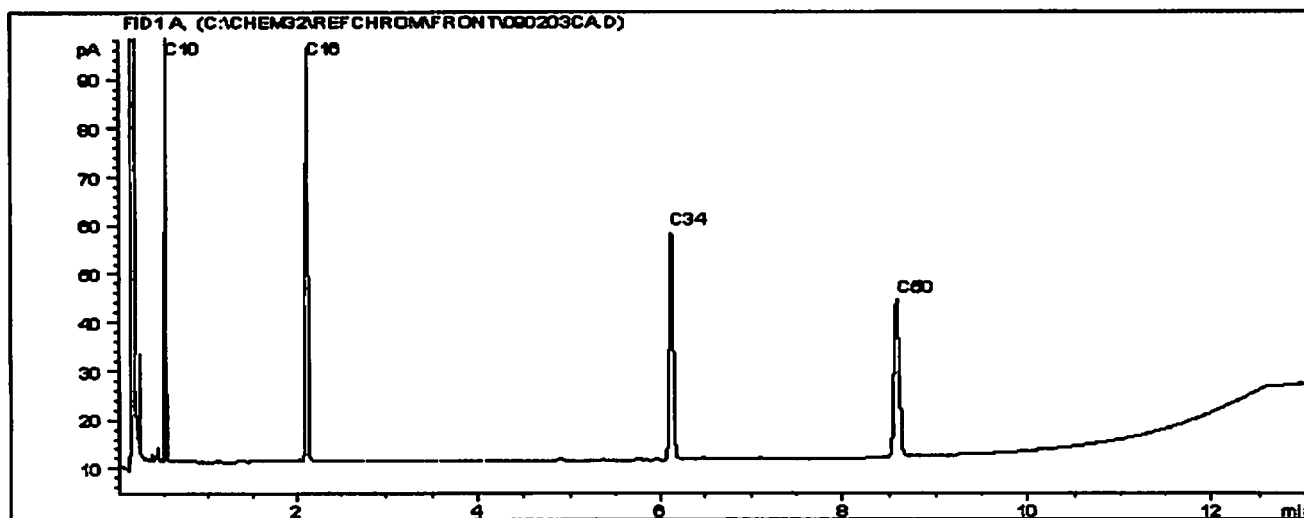
Report Date: 2009/03/23
Maxxam Job #: A911550
Maxxam Sample: 007641

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Client ID: 09BH09/5.4M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

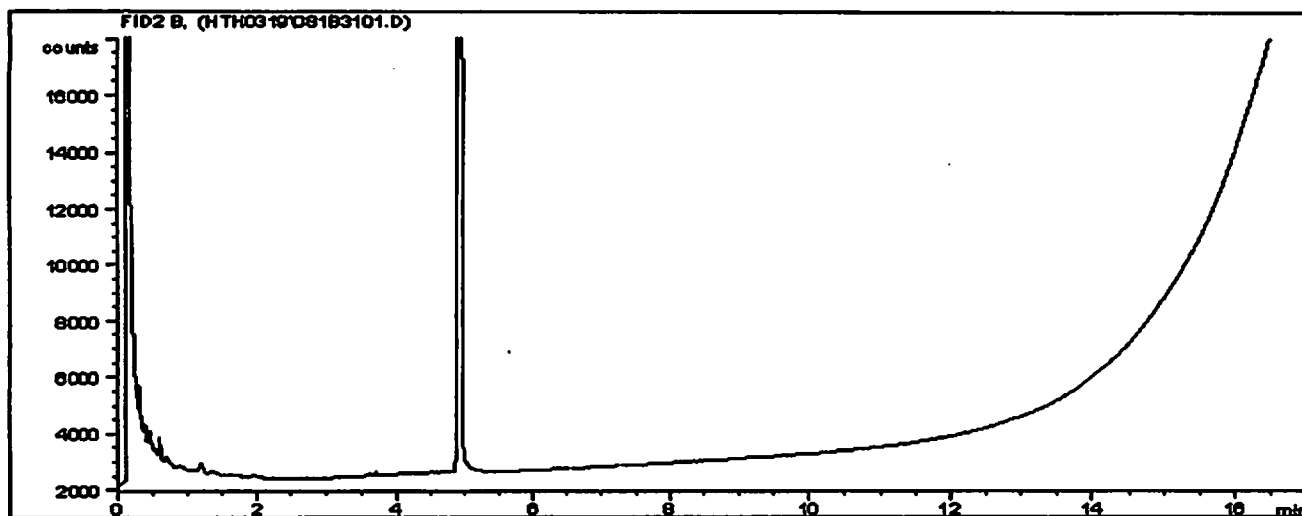
Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required to please contact the laboratory.

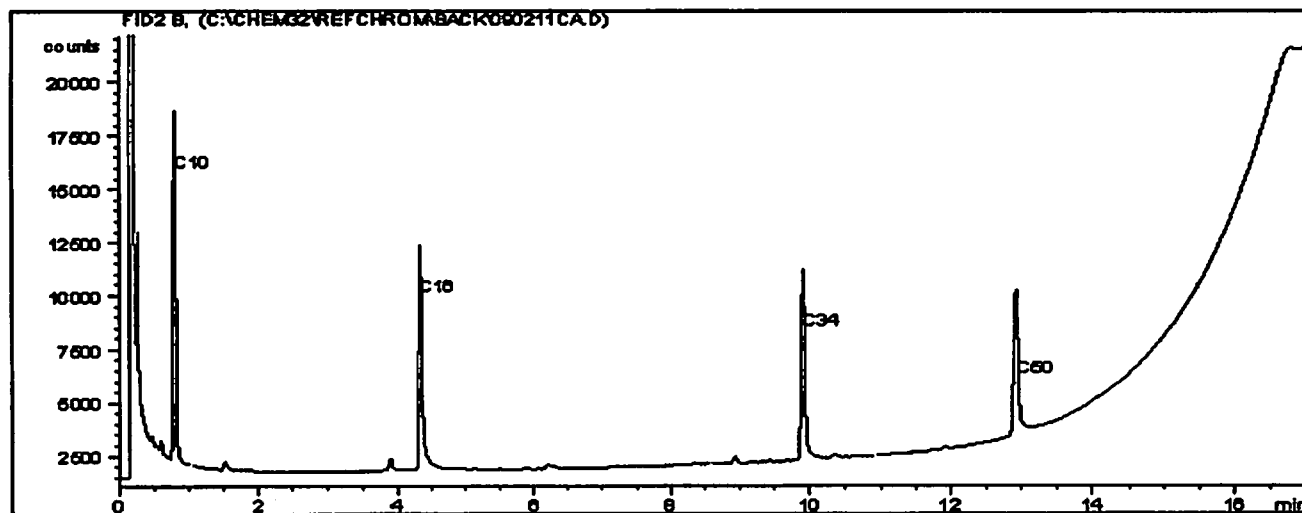
Report Date: 2009/03/23
Maxxam Job #: A911550
Maxxam Sample: 007642

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Client ID: 09BH09/6.0M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

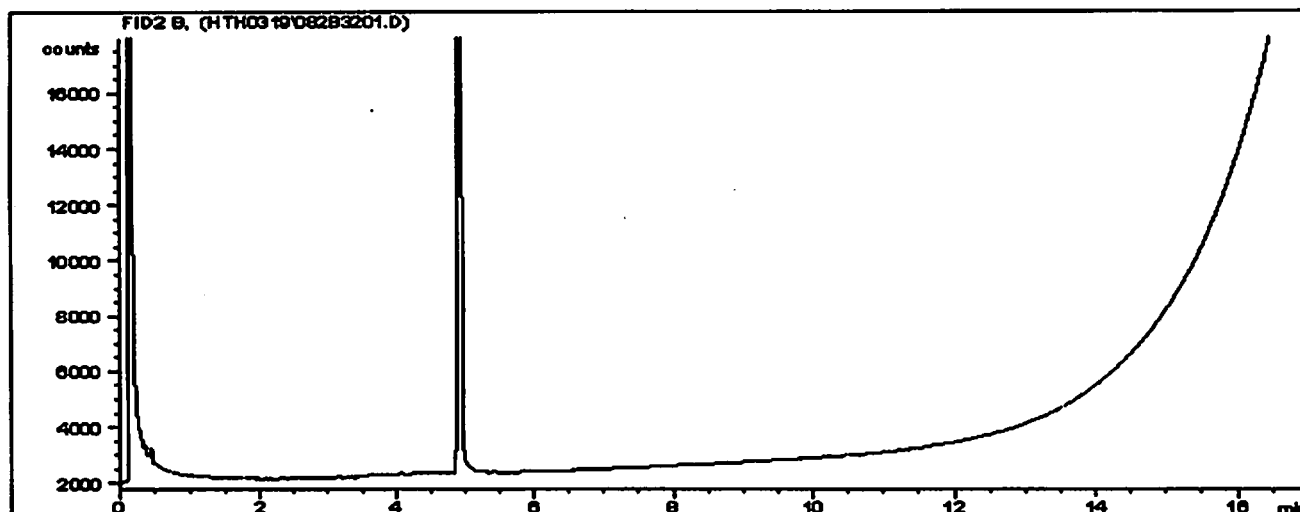
Page 1 of 1

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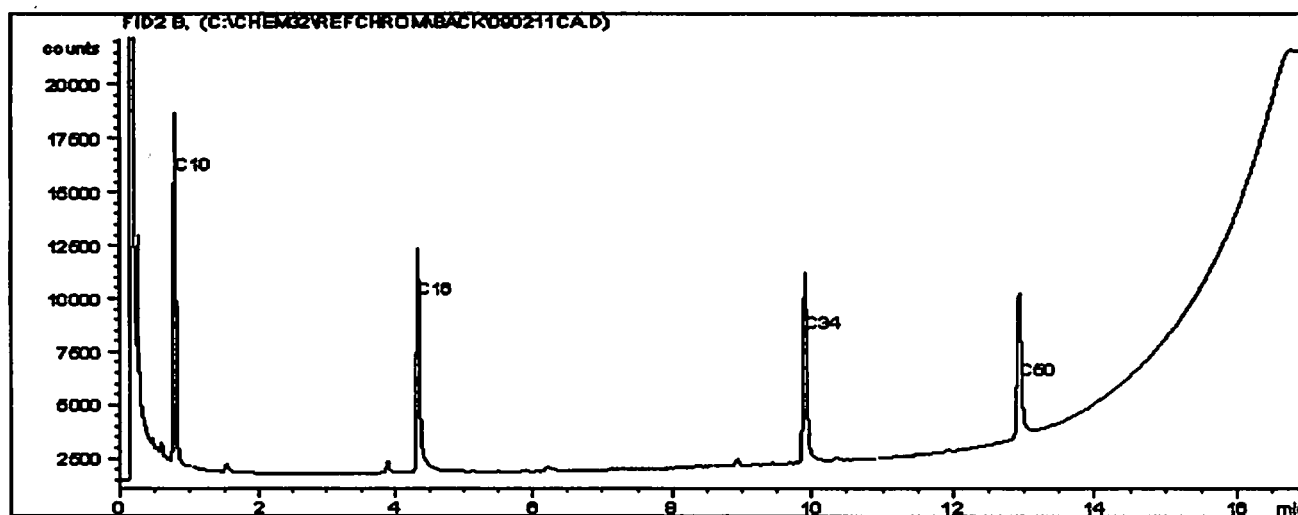
Report Date: 2009/03/23
Maxxam Job #: A911550
Maxxam Sample: O07643

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Client ID: 09BH11/4.2M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

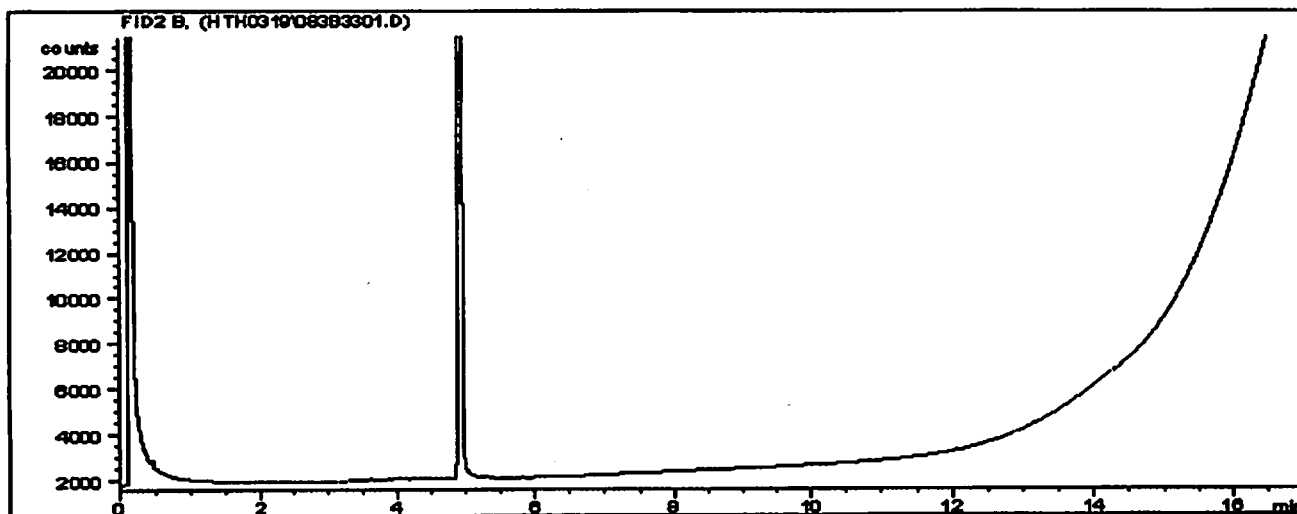
Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required to please contact the laboratory.

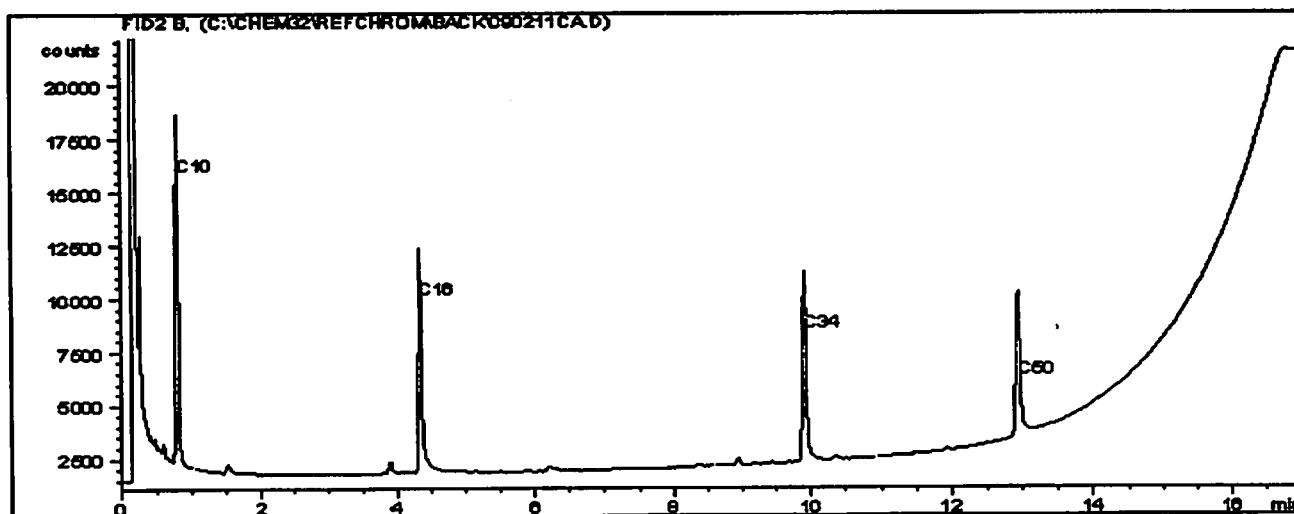
Report Date: 2009/03/23
Maxxam Job #: A911550
Maxxam Sample: 007644

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Client ID: 09BH12/2.4M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

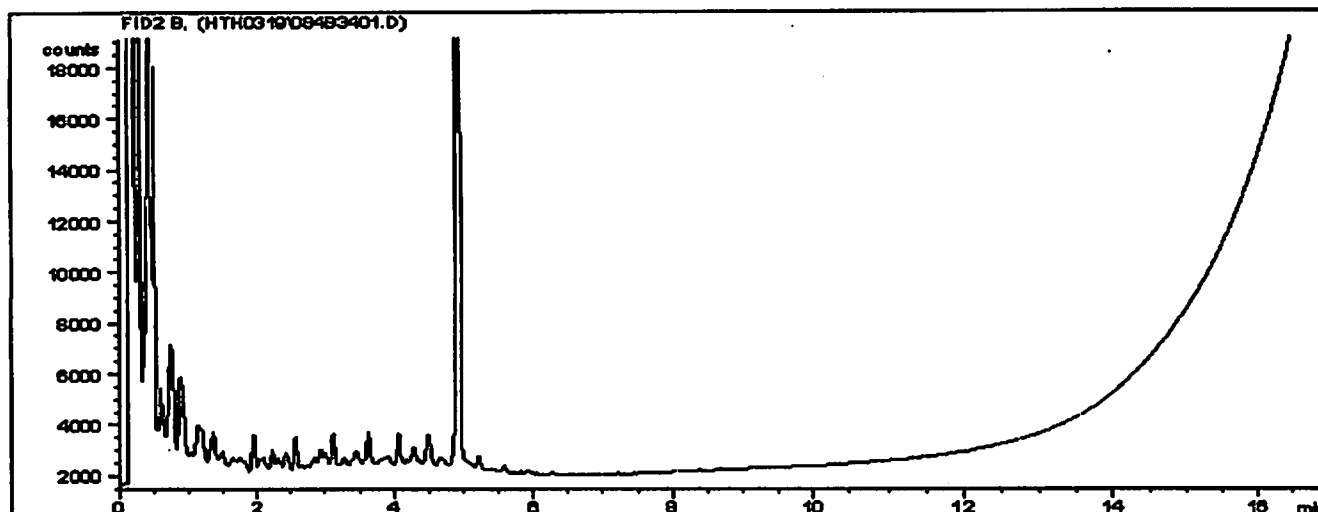
Page 1 of 1

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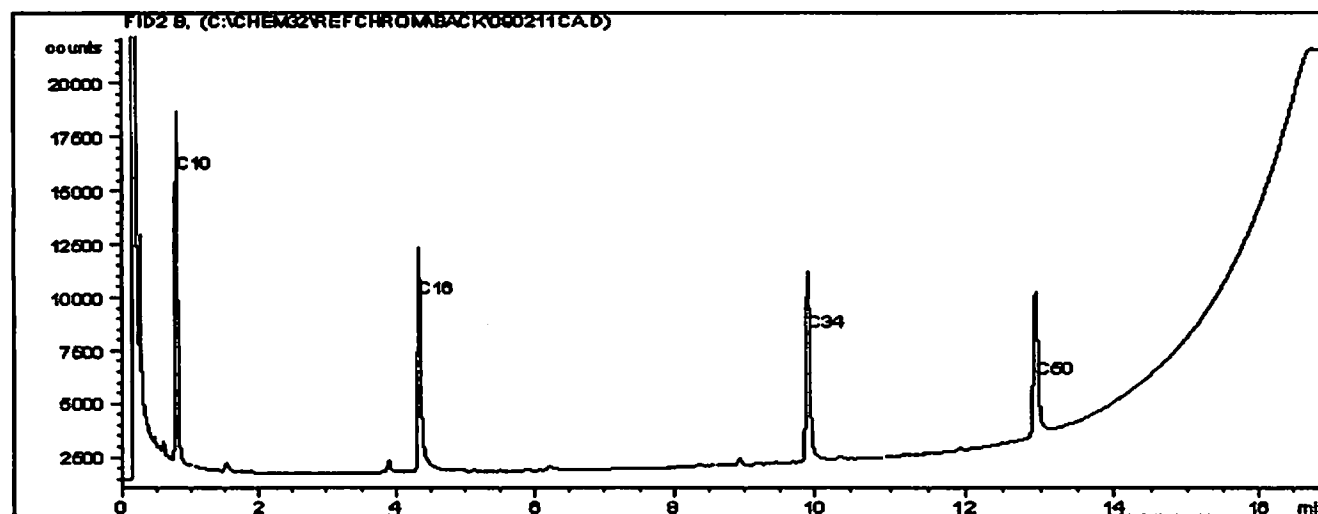
Report Date: 2009/03/23
Maxxam Job #: A911550
Maxxam Sample: O07645

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Client ID: 09BH12/3.0M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Versol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

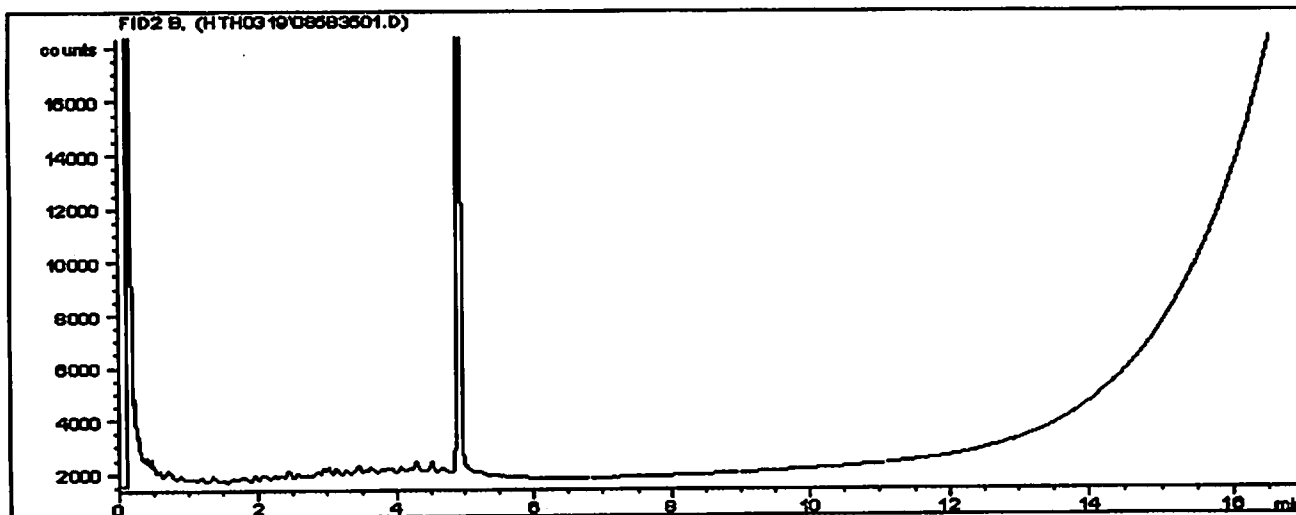
Page 1 of 1

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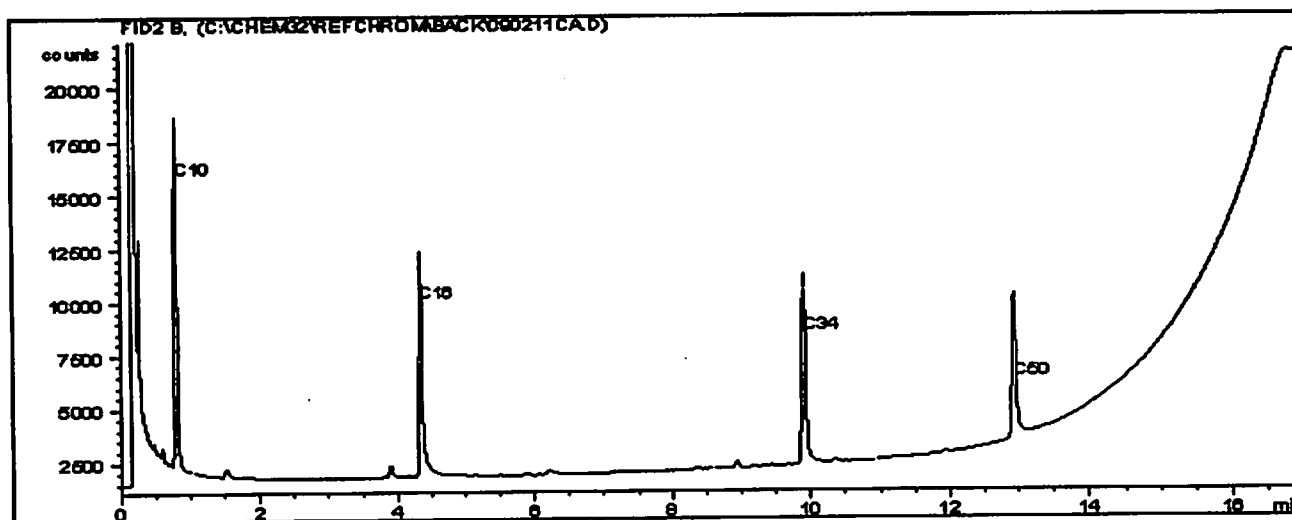
Report Date: 2009/03/23
Maxxam Job #: A911550
Maxxam Sample: O07646

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Client ID: 09BH13/4.8M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Versol: C8 - C12
Kerosene: C7 - C16

Diesel:
Lubricating Oils:
Crude Oils:

C8 - C22
C20 - C40
C3 - C60+

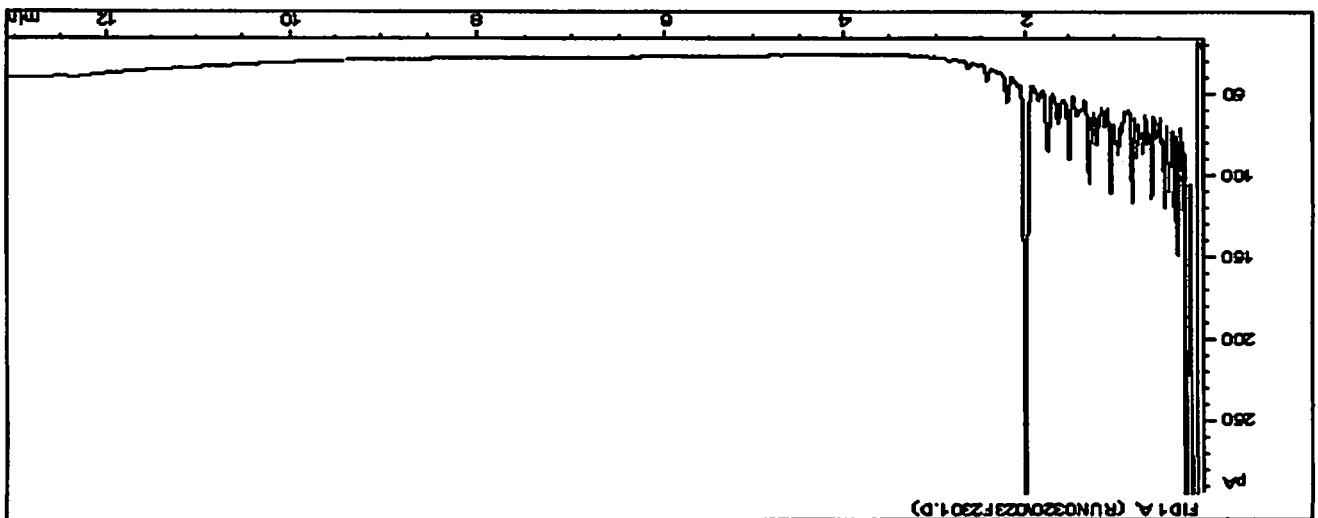
Page 1 of 1

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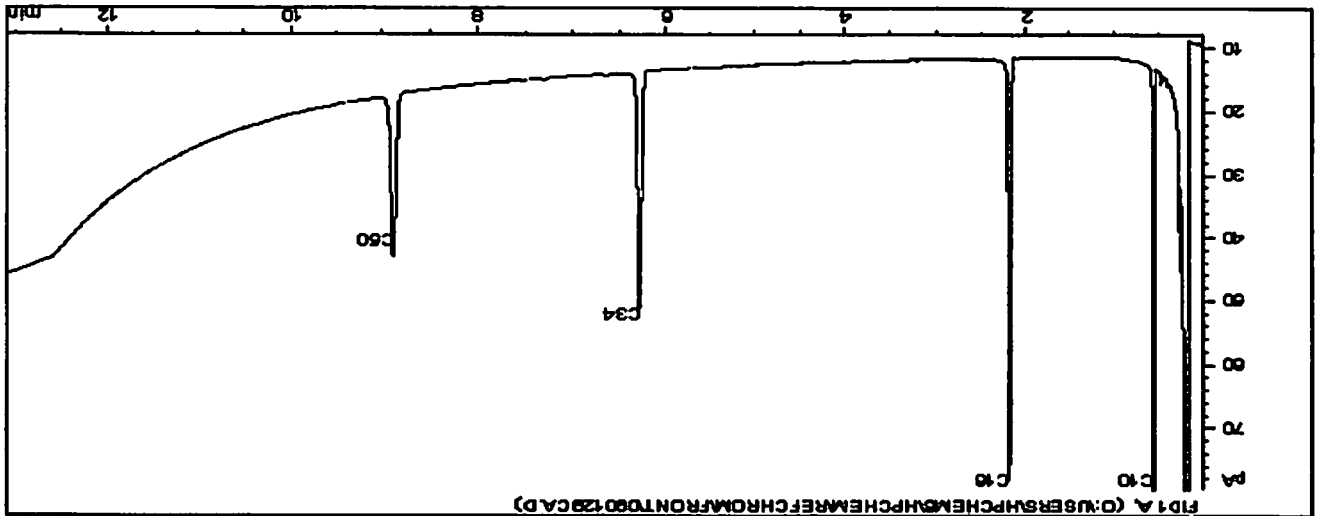
Report Date: 2009/03/23
Maxxam Job #: A911550
Maxxam Sample: 007647

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Client ID: 09BH17/3.0M



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

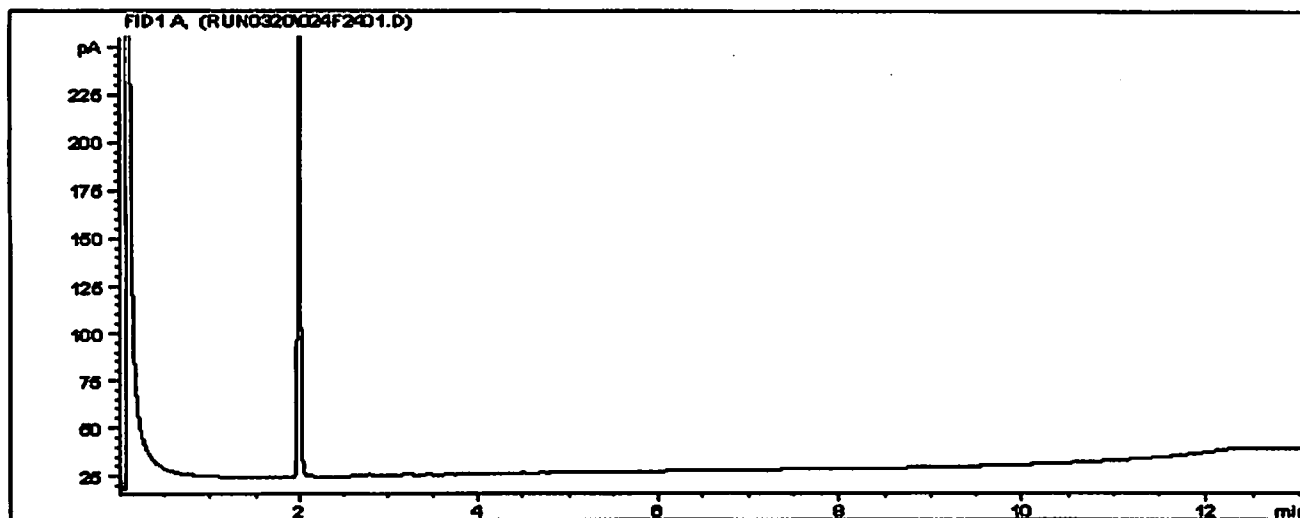
Gasoline:	C4 - C12	Diesel:	C8 - C22
Kerosene:	C8 - C16	Lubricating Oils:	C20 - C40
Varisol:	C7 - C16	Crude Oils:	C3 - C60+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required to please contact the laboratory.

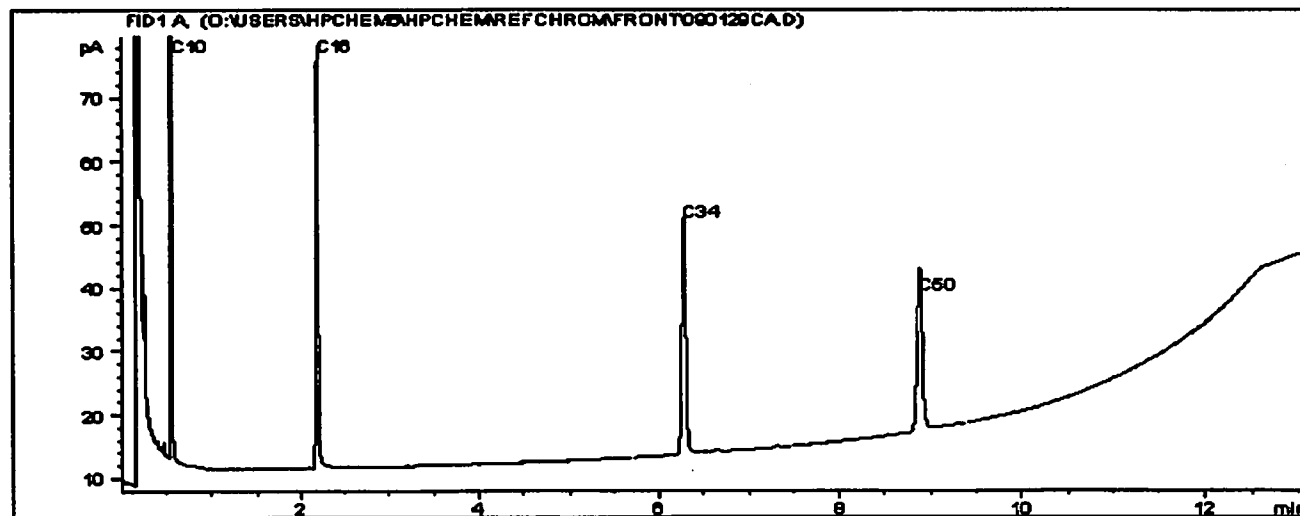
Report Date: 2009/03/23
Maxxam Job #: A911550
Maxxam Sample: O07648

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Client ID: 09BH17/4.2M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

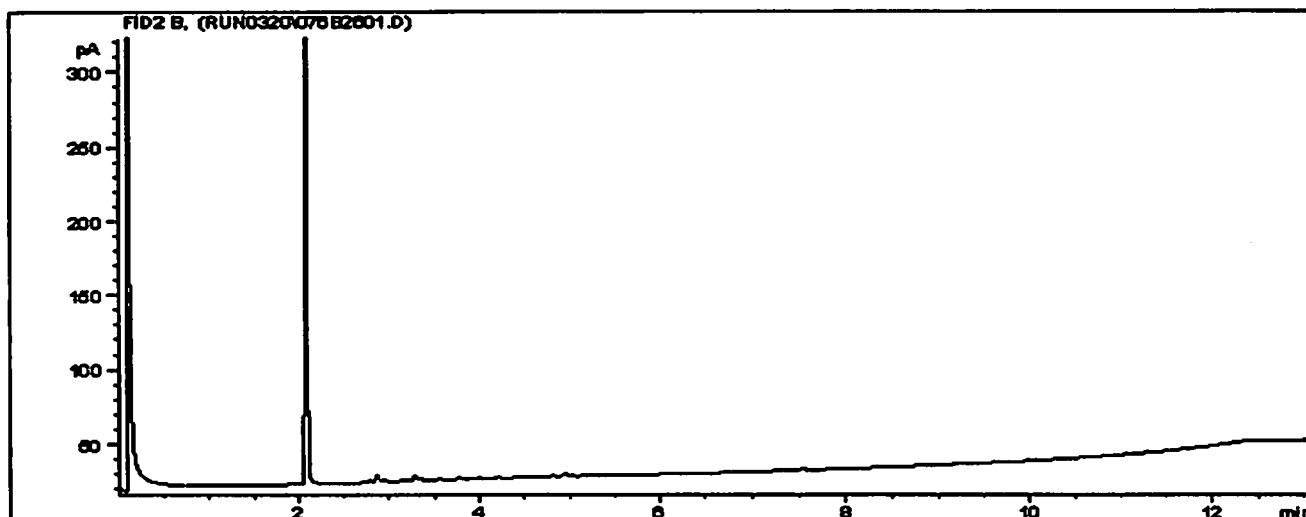
Page 1 of 1

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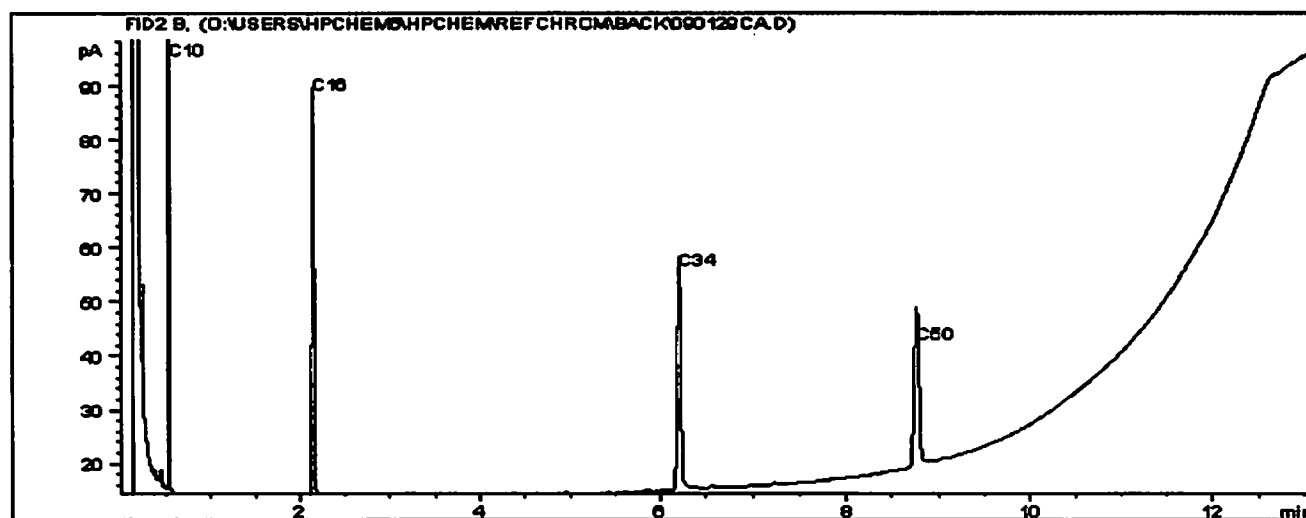
Report Date: 2009/03/23
Maxxam Job #: A911550
Maxxam Sample: O07649

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Client ID: 09BH19/4.8M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

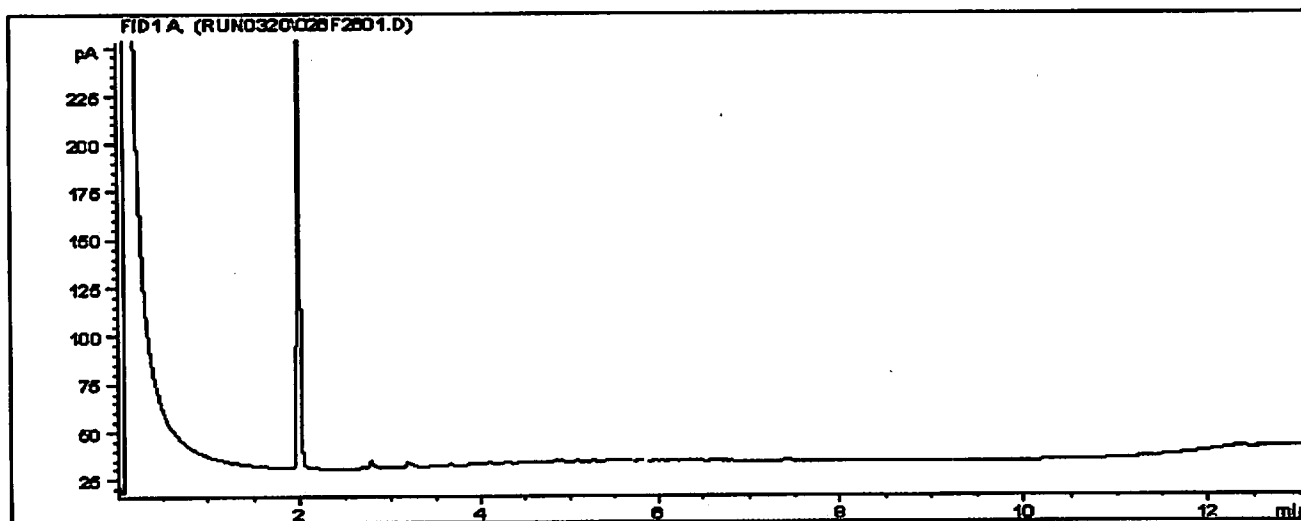
Page 1 of 1

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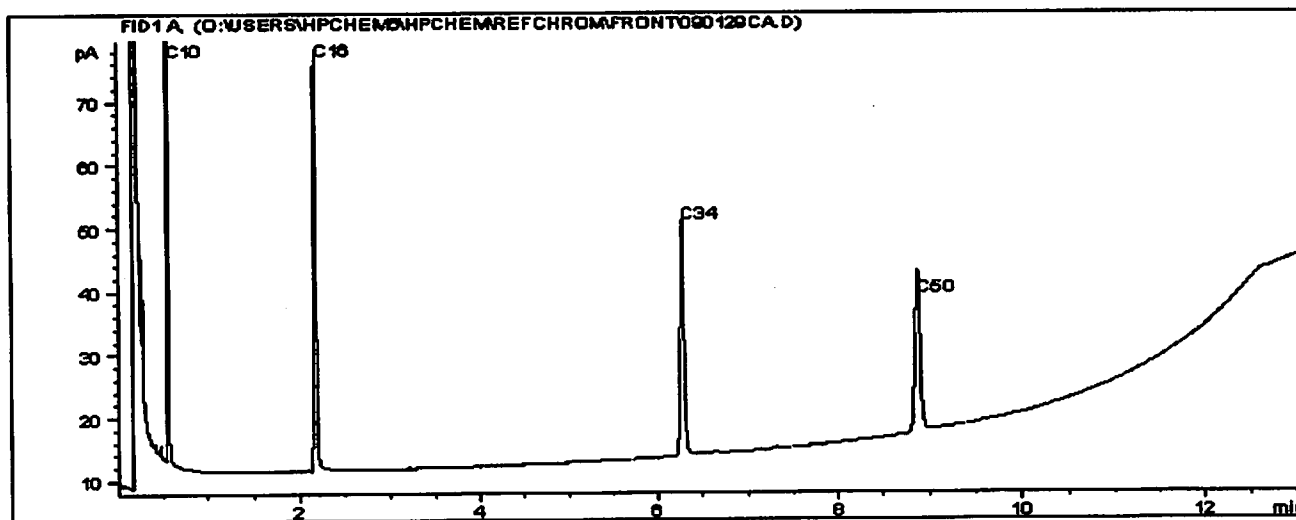
Report Date: 2009/03/23
Maxxam Job #: A911550
Maxxam Sample: O07651

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Client ID: 09BH19/5.4M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

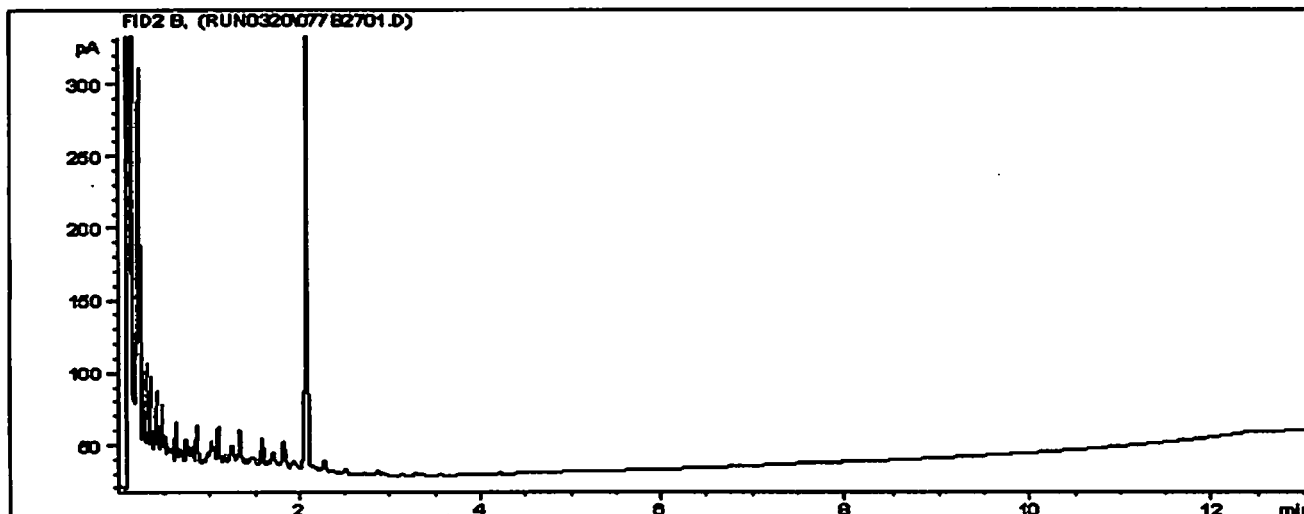
Page 1 of 1

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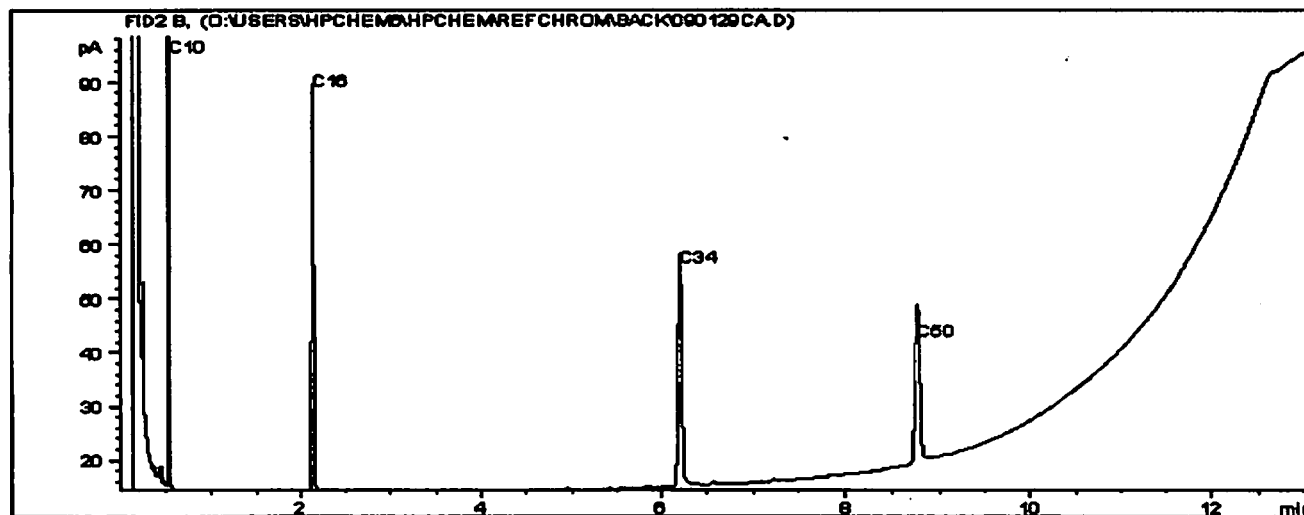
Report Date: 2009/03/23
Maxxam Job #: A911550
Maxxam Sample: O07652

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Client ID: 09BH20/3.0M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

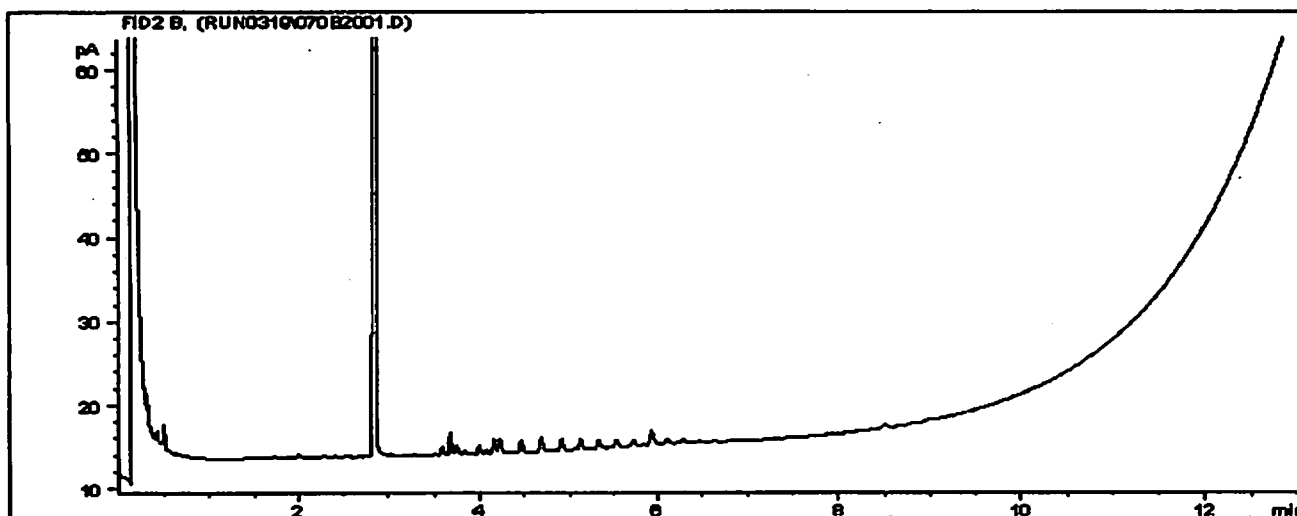
Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required to please contact the laboratory.

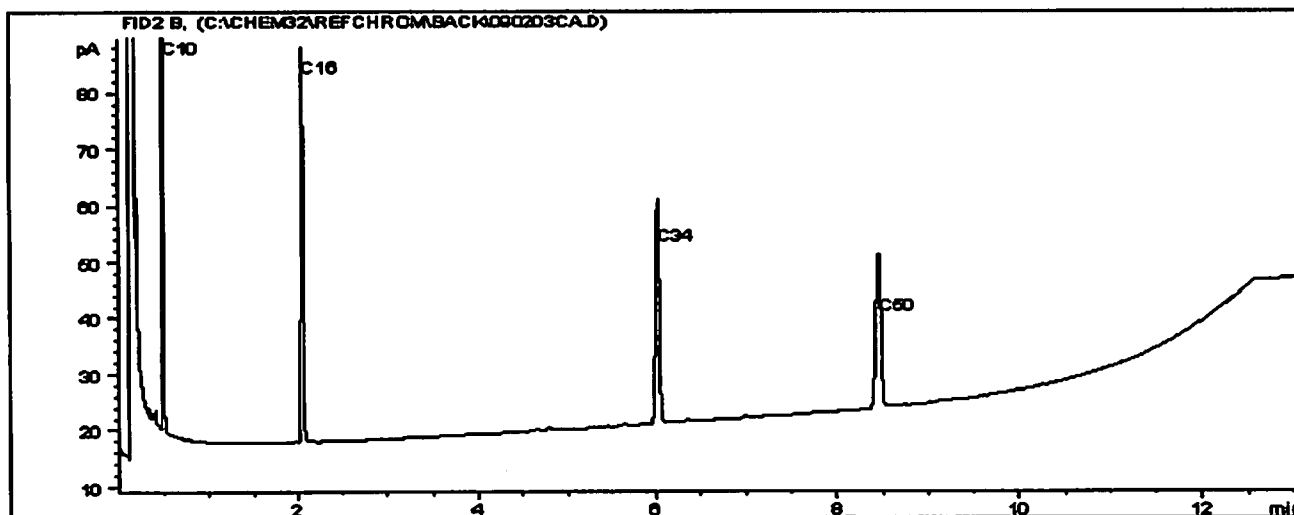
Report Date: 2009/03/23
Maxxam Job #: A911550
Maxxam Sample: O07653

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001, AMA 9557
Site Reference: BARONS, AB
Client ID: 09BH20/3.6M

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required to please contact the laboratory.

Your Project #: L22101182.001
Your C.O.C. #: 23606

Attention: DERYCK MASTERMAN
EBA ENGINEERING CONSULTANTS LTD.
442-10n STREET NORTH
LETHBRIDGE, AB
CANADA T1H 2C7

Report Date: 2009/03/31

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A913846

Received: 2009/03/27, 8:30

Sample Matrix: Water

Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 In Water by HS GC/MS	4	N/A	2009/03/31	CAL SOP-00104	EPA 8260 C / CCME
CCME Hydrocarbons in Water (F2: C10-C16)	4	2009/03/28	2009/03/28	CAL SOP-00087	CCME PHC-CWS
Lead (Dissolved)	4	N/A	2009/03/30	CAL SOP-00191	EPA SW-846 6020A

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

Encryption Key

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

NICOLE CHAN, Project Manager
Email: Nicole.Chan@MaxxamAnalytics.com
Phone# (403) 291-3077

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

For Service Group specific validation please refer to the Validation Signature Page

Total cover pages: 1

Maxxam Job #: A913846
 Report Date: 2009/03/31

 EBA ENGINEERING CONSULTANTS LTD.
 Client Project #: L22101182.001

Sampler Initials: JL

AT1 BTEX AND F1-F2 (WATER)

Maxxam ID		O23752	O23755	O23756	O23757		
Sampling Date		2009/03/26	2009/03/26	2009/03/26	2009/03/26		
COC Number		23806	23806	23806	23806		
	Units	09MW10	09MW13	09MW19	DUP02	RDL	QC Batch
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	mg/L	0.2	28.4	<0.1	0.2	0.1	3021723
Volatiles							
Benzene	mg/L	0.13	0.70	0.23	0.13	0.0004	3021832
Toluene	mg/L	0.0007	0.0013	0.0007	0.0007	0.0004	3021832
Ethylbenzene	mg/L	0.0004	0.28	<0.0004	0.0006	0.0004	3021832
o-Xylene	mg/L	0.015	0.0083	<0.0004	0.015	0.0004	3021832
m & p-Xylene	mg/L	0.013	0.36	0.0017	0.013	0.0008	3021832
Xylenes (Total)	mg/L	0.027	0.37	0.0017	0.028	0.0008	3021832
F1 (C6-C10) - BTEX	mg/L	0.3	3.9	<0.1	0.2	0.1	3021832
(C6-C10)	mg/L	0.4	5.3	0.2	0.4	0.1	3021832
Surrogate Recovery (%)							
4-BROMOFLUOROBENZENE (sur.)	%	100	100	98	99	N/A	3021832
D4-1,2-DICHLOROETHANE (sur.)	%	81	86	94	79	N/A	3021832
D8-TOLUENE (sur.)	%	100	110	98	99	N/A	3021832
O-TERPHENYL (sur.)	%	96	107	104	99	N/A	3021723
N/A = Not Applicable RDL = Reportable Detection Limit							

Maxxam Job #: A913846
Report Date: 2009/03/31

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001

Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		O23752	O23755	O23756	O23757		
Sampling Date		2009/03/26	2009/03/26	2009/03/26	2009/03/26		
COC Number		23606	23606	23606	23606		
	Units	09MW10	09MW13	09MW19	DUP02	RDL	QC Batch

Elements							
Dissolved Lead (Pb)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	3020370

RDL = Reportable Detection Limit

Maxxam Job #: A913846
Report Date: 2009/03/31

EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001

Sampler Initials: JL

Package 1	8.3°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Results relate only to the items tested.

EBA ENGINEERING CONSULTANTS LTD.

Attention: DERYCK MASTERMAN

Client Project #: L22101182.001

P.O. #:

Site Reference:

Quality Assurance Report

Maxxam Job Number: CA913846

QA/QC Batch			Date Analyzed				
Num Init	QC Type	Parameter	yyyy/mm/dd	Value	Recovery	Units	QC Limits
3020370 ST4	MATRIX SPIKE	Dissolved Lead (Pb)	2009/03/30		85	%	80 - 120
	SPIKE	Dissolved Lead (Pb)	2009/03/30		103	%	80 - 119
	BLANK	Dissolved Lead (Pb)	2009/03/30	<0.0002		mg/L	
	RPD	Dissolved Lead (Pb)	2009/03/30	NC		%	20
3021723 AM7	MATRIX SPIKE	O-TERPHENYL (sur.)	2009/03/28		93	%	70 - 130
		F2 (C10-C16 Hydrocarbons)	2009/03/28		92	%	70 - 130
	SPIKE	O-TERPHENYL (sur.)	2009/03/28		101	%	70 - 130
		F2 (C10-C16 Hydrocarbons)	2009/03/28		113	%	70 - 130
	BLANK	O-TERPHENYL (sur.)	2009/03/28		103	%	70 - 130
		F2 (C10-C16 Hydrocarbons)	2009/03/28	<0.1		mg/L	
	RPD	F2 (C10-C16 Hydrocarbons)	2009/03/28	NC		%	40
	MATRIX SPIKE	4-BROMOFLUOROBENZENE (sur.)	2009/03/31		97	%	70 - 130
3021832 DV1		D4-1,2-DICHLOROETHANE (sur.)	2009/03/31		103	%	70 - 130
		D8-TOLUENE (sur.)	2009/03/31		95	%	70 - 130
		Benzene	2009/03/31		97	%	70 - 130
		Toluene	2009/03/31		99	%	70 - 130
		Ethylbenzene	2009/03/31		97	%	70 - 130
		o-Xylene	2009/03/31		100	%	70 - 130
		m & p-Xylene	2009/03/31		97	%	70 - 130
	SPIKE	4-BROMOFLUOROBENZENE (sur.)	2009/03/30		99	%	70 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2009/03/30		98	%	70 - 130
		D8-TOLUENE (sur.)	2009/03/30		99	%	70 - 130
		Benzene	2009/03/30		79	%	70 - 130
		Toluene	2009/03/30		81	%	70 - 130
		Ethylbenzene	2009/03/30		80	%	70 - 130
		o-Xylene	2009/03/30		84	%	70 - 130
		m & p-Xylene	2009/03/30		81	%	70 - 130
		(C6-C10)	2009/03/30		72	%	70 - 130
	BLANK	4-BROMOFLUOROBENZENE (sur.)	2009/03/30		96	%	70 - 130
		D4-1,2-DICHLOROETHANE (sur.)	2009/03/30		92	%	70 - 130
		D8-TOLUENE (sur.)	2009/03/30		100	%	70 - 130
		Benzene	2009/03/30	<0.0004		mg/L	
		Toluene	2009/03/30	<0.0004		mg/L	
		Ethylbenzene	2009/03/30	<0.0004		mg/L	
		o-Xylene	2009/03/30	<0.0004		mg/L	
		m & p-Xylene	2009/03/30	<0.0008		mg/L	
		Xylenes (Total)	2009/03/30	<0.0008		mg/L	
		F1 (C6-C10) - BTEX	2009/03/30	<0.1		mg/L	
		(C6-C10)	2009/03/30	<0.1		mg/L	
	RPD	Benzene	2009/03/31	NC		%	40
		Toluene	2009/03/31	NC		%	40
		Ethylbenzene	2009/03/31	NC		%	40
		o-Xylene	2009/03/31	NC		%	40
		m & p-Xylene	2009/03/31	NC		%	40
		Xylenes (Total)	2009/03/31	NC		%	40
		F1 (C6-C10) - BTEX	2009/03/31	NC		%	40
		(C6-C10)	2009/03/31	NC		%	40

NC = Non-calculable

RPD = Relative Percent Difference

Sample Integrity Form

Invoice To:
EBA ENGINEERING CONSULTANTS LTD.
ATTN: DERYCK MASTERMAN
442-10n STREET NORTH
LETHBRIDGE, AB
CANADA T1H 2C7
Client Contact:
DERYCK MASTERMAN

Maxxam Job #: A913846
Date Received: 2009/03/27
Your C.O.C. #: 23606
Your Project #: L22101182.001
Maxxam Project Manager: NICOLE CHAN
Quote #: A80250

No discrepancies noted.

Report Comments

Received Date: 2009/03/27 **Time:** 8:30 **By:** _____

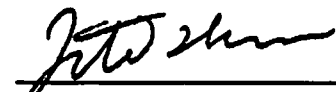
Inspected Date: _____ **Time:** _____ **By:** _____

SIF Created Date: _____ **Time:** 00:00 **By:** _____

Validation Signature Page

Maxxam Job #: A913846

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



LILI ZHOU, Senior analyst, Inorganic department.



ORLA JORGENSEN, Organics Supervisor

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Invoice To: **State of Texas** Yes ☒ No ☐
 Company Name: **State of Texas**
 Contact Name: **State of Texas**
 Address: **State of Texas**
 Phone / Fax: **State of Texas**

Report To: **State of Texas**
 Report ID: **State of Texas**
 Report Date: **State of Texas**

PO # / A/E #: **State of Texas**
 Quotation #: **State of Texas**
 Project Name: **State of Texas**
 Location: **State of Texas**
 Sample's name: **State of Texas**

REGULATORY REQUIREMENTS:

- ☐ AT - (1994)
- ☐ CDE
- ☐ CDE PAUL
- ☐ Regulatory Limits to appear on Final report

REPORT DISTRIBUTION:

- ☐ PRT
- ☐ CDHOG
- ☐ CDE

SERVICE REQUIREMENTS:

- ☐ Please email you contact the lab
- ☐ Date Required: **State of Texas**
- ☒ REGULAR Turnaround

Sample Identification	Matrix SW	Date & Time Sampled Year/Month/Day
1 0211010	State of Texas	State of Texas
2 0211013	State of Texas	State of Texas
3 0211015	State of Texas	State of Texas
4 0211012	State of Texas	State of Texas
5		
6		
7		
8		
9		
10		
11		
12		

Submitted By: **State of Texas**
 Date: **State of Texas**
 Comments/Special Instructions: **State of Texas**

RECEIVED
 10/27/02
 10:00 AM
 10/27/02

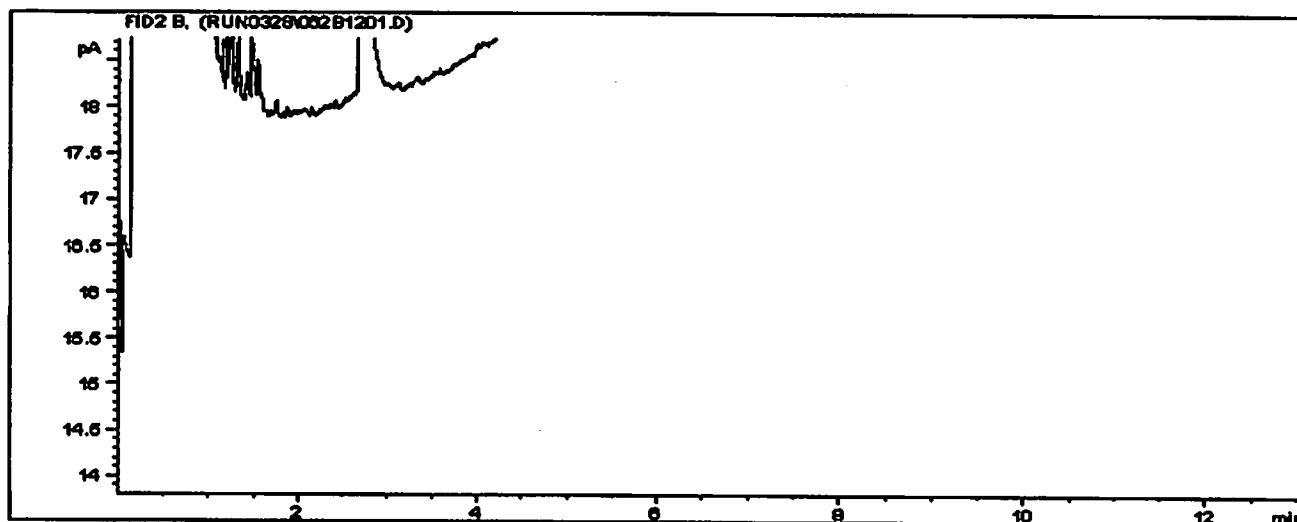
COC #

Report Date: 2009/03/31
Maxxam Job #: A913846
Maxxam Sample: O23752

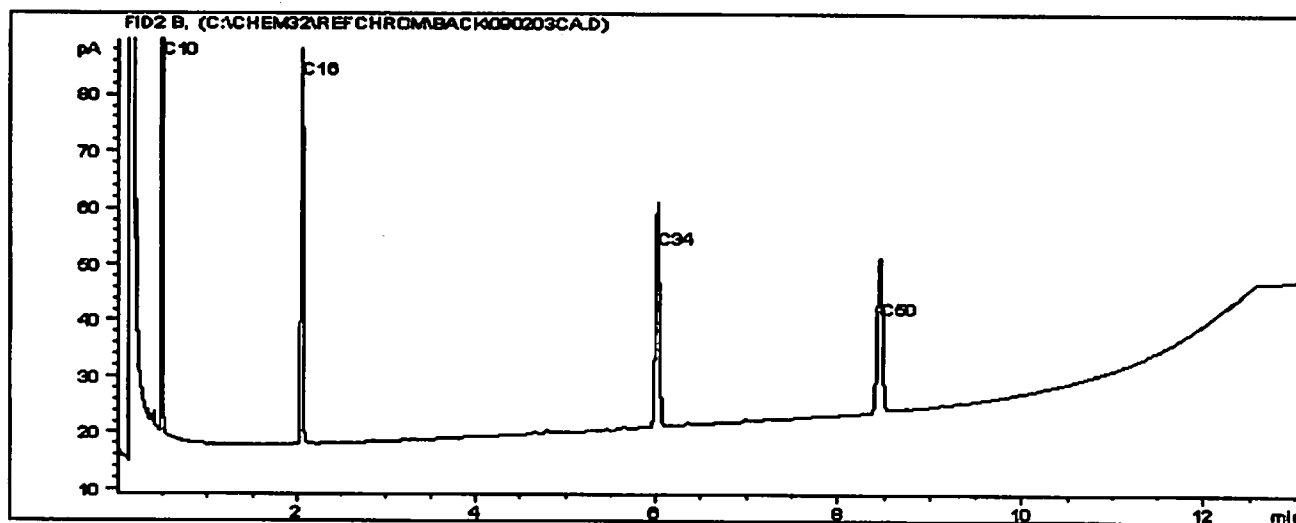
EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001

Client ID: 09MW10

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

Page 1 of 1

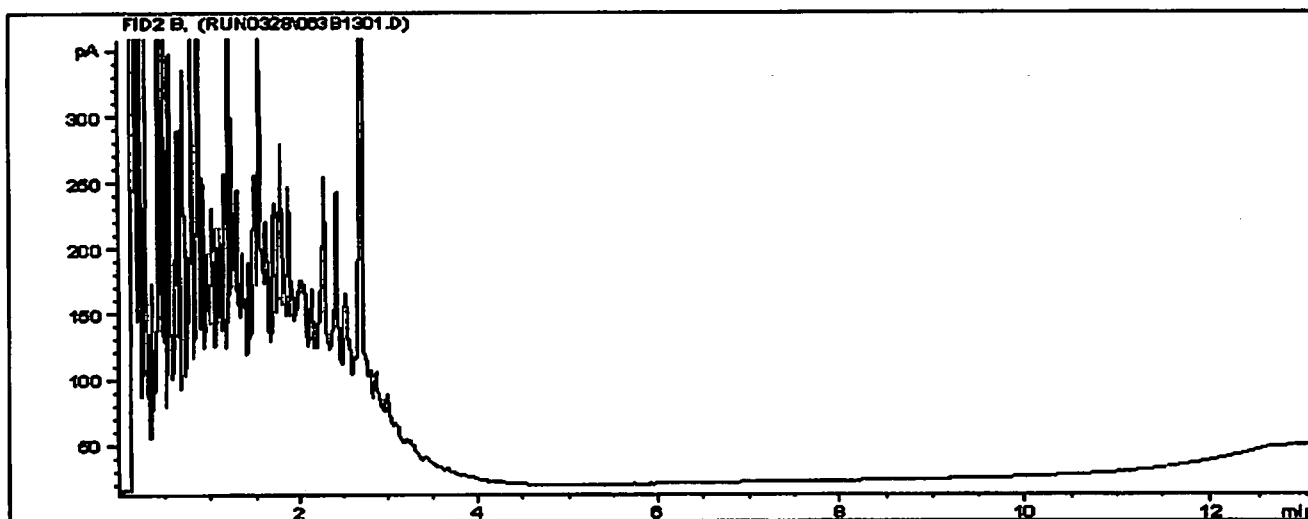
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required to please contact the laboratory.

Report Date: 2009/03/31
Maxxam Job #: A913846
Maxxam Sample: O23755

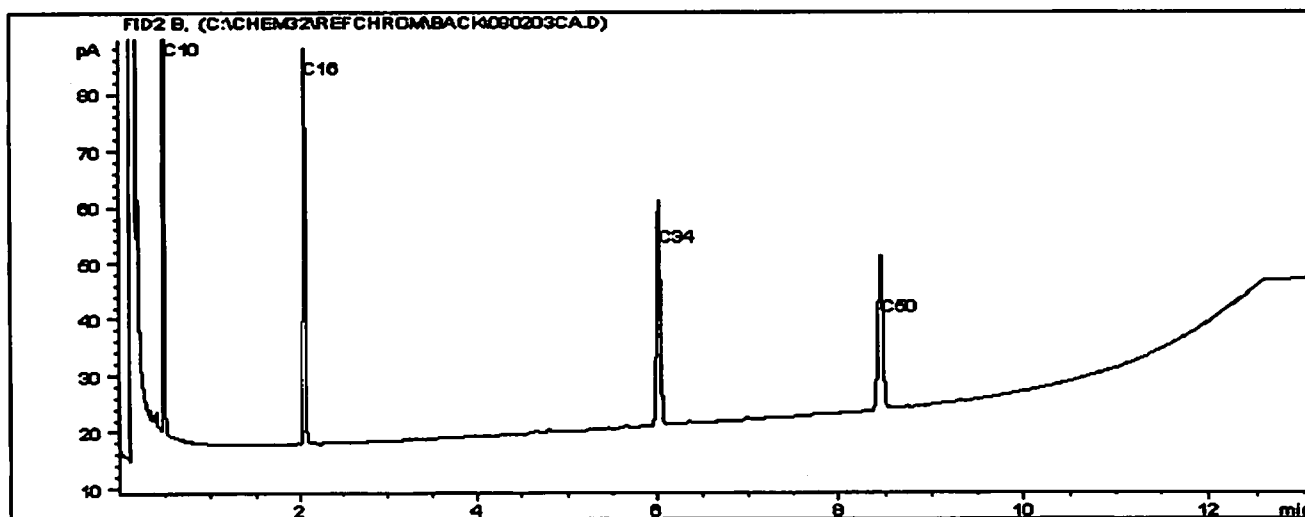
EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001

Client ID: 09MW13

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

Page 1 of 1

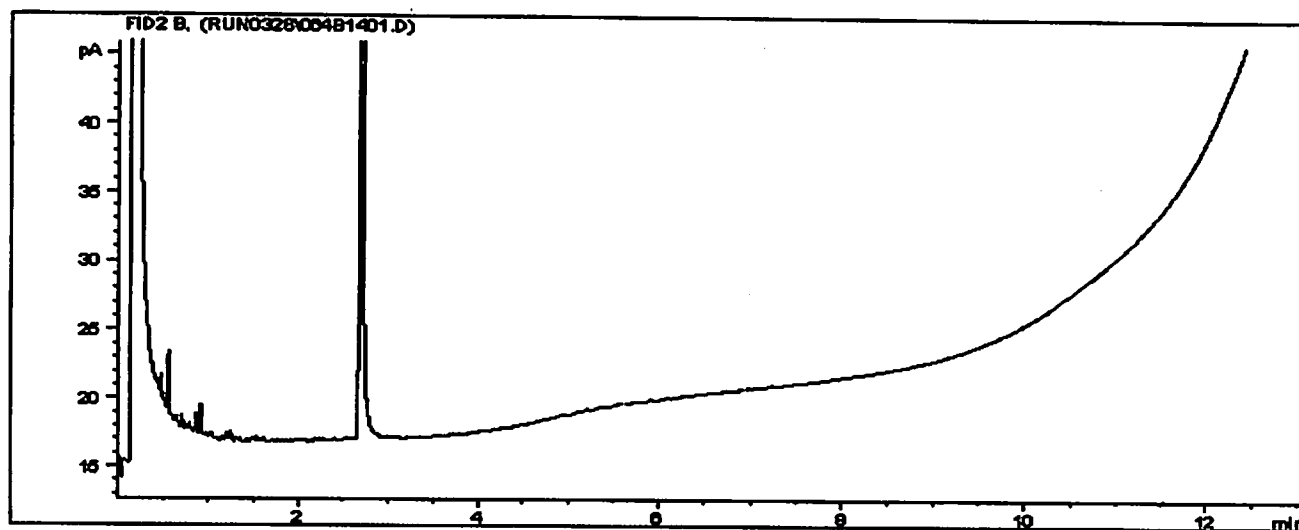
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required to please contact the laboratory.

Report Date: 2009/03/31
Maxxam Job #: A913846
Maxxam Sample: O23756

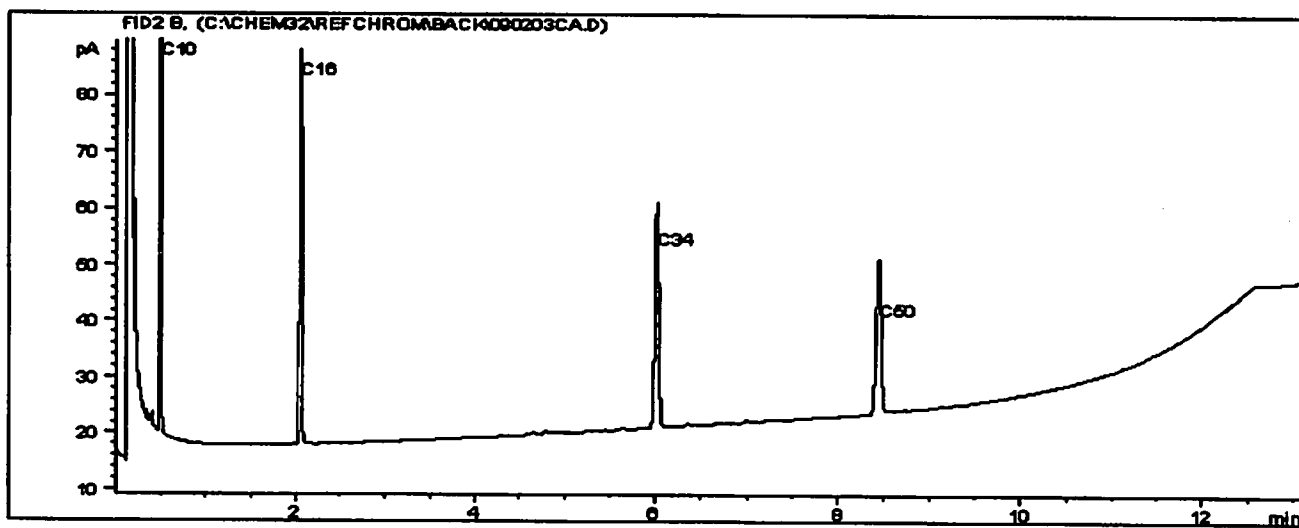
EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001

Client ID: 09MW19

CCME Hydrocarbons In Water (F2; C10-C16) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

Page 1 of 1

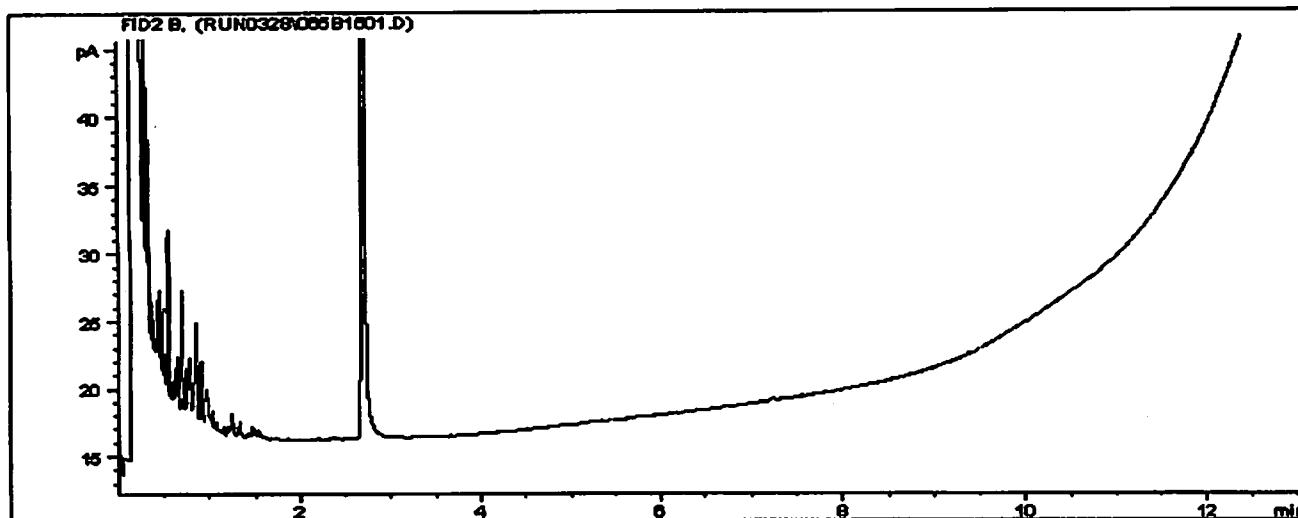
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required to please contact the laboratory.

Report Date: 2009/03/31
Maxxam Job #: A913846
Maxxam Sample: O23757

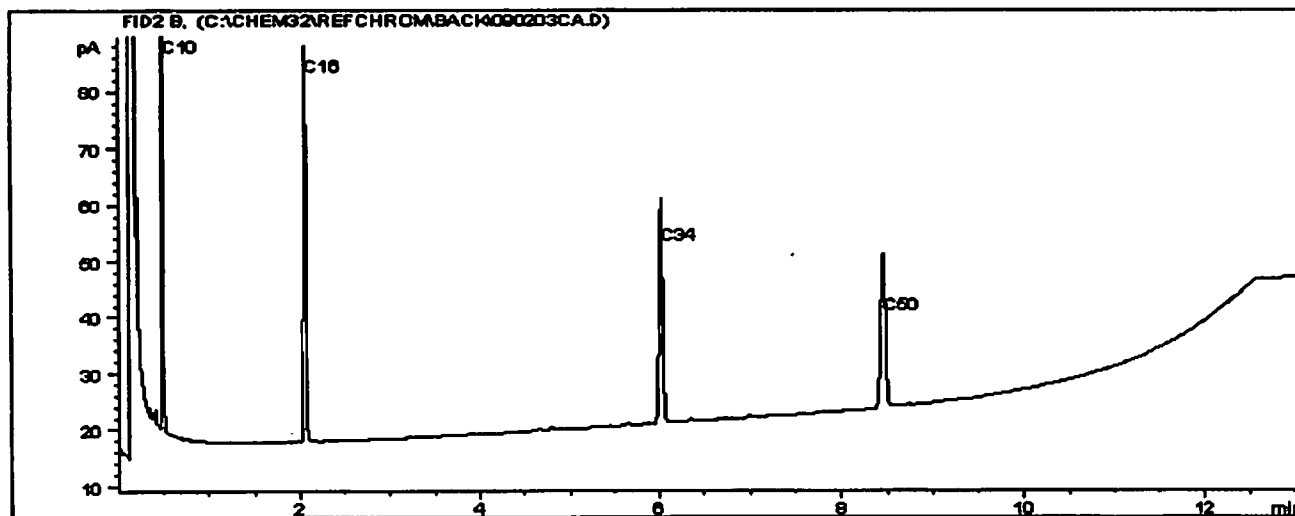
EBA ENGINEERING CONSULTANTS LTD.
Client Project #: L22101182.001

Client ID: DUP02

CCME Hydrocarbons In Water (F2; C10-C16) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline: C4 - C12
Varsol: C8 - C12
Kerosene: C7 - C16

Diesel: C8 - C22
Lubricating Oils: C20 - C40
Crude Oils: C3 - C60+

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required to please contact the laboratory.



APPENDIX C

APPENDIX C INFORMATION COLLECTED FOR GUIDELINE SELECTIONS





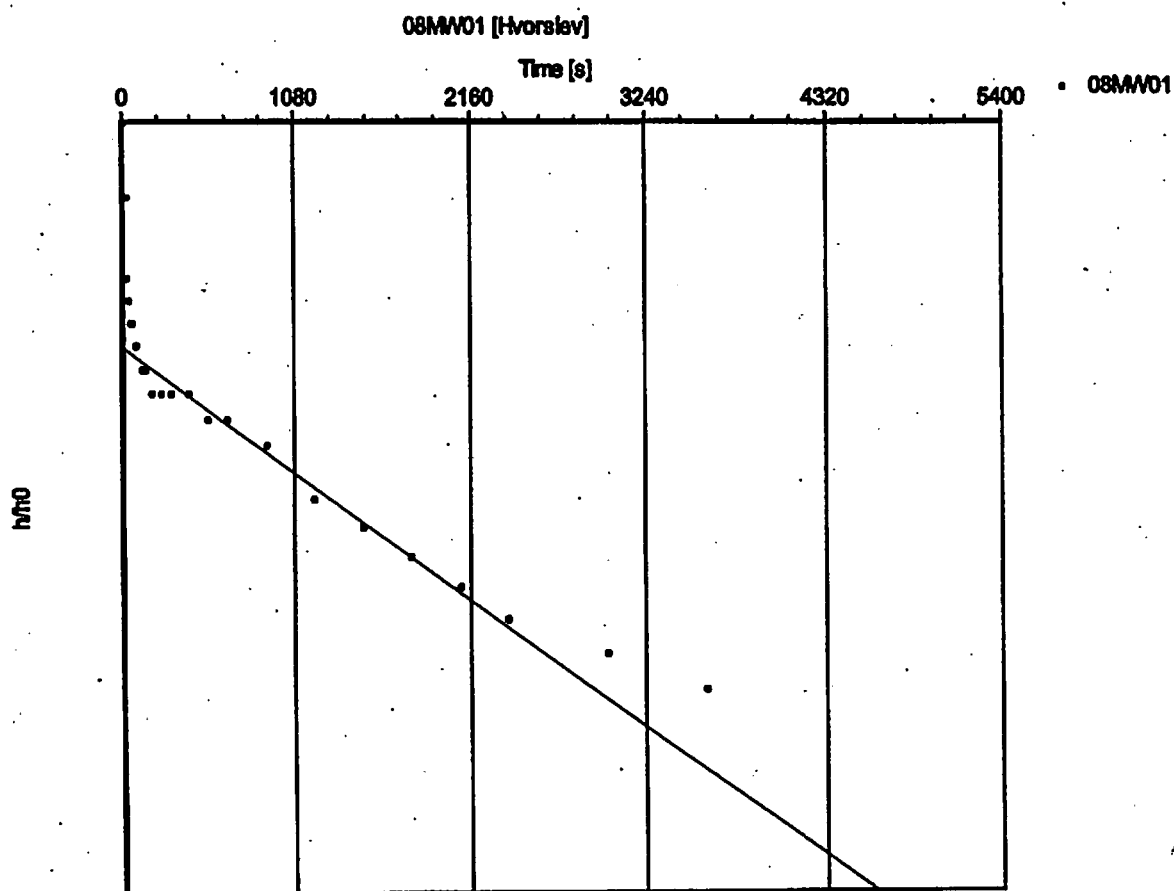
EBA Engineering Consultants Ltd
Riverbend Atrium One #115, 200 Rivercrest Drive SE
Calgary, AB T2C 2X5 CANADA

Slug Test Analysis Report

Project: The Village of Barons - Site Inspection

Number: L22101182.001

Client: The Village of Barons



Slug Test: 08MW01

Analysis Method: Hvorslev

Analysis Results:

Conductivity: 1.94E-7 [m/s]

Test parameters:

Test Well: 08MW01

Aquifer Thickness: 1.945 [m]

Casing radius: 0.051 [m]

Screen length: 3 [m]

Boring radius: 0.152 [m]

Comments:

Evaluated by: Jay X

Evaluation: 12/16/2008

Figure



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

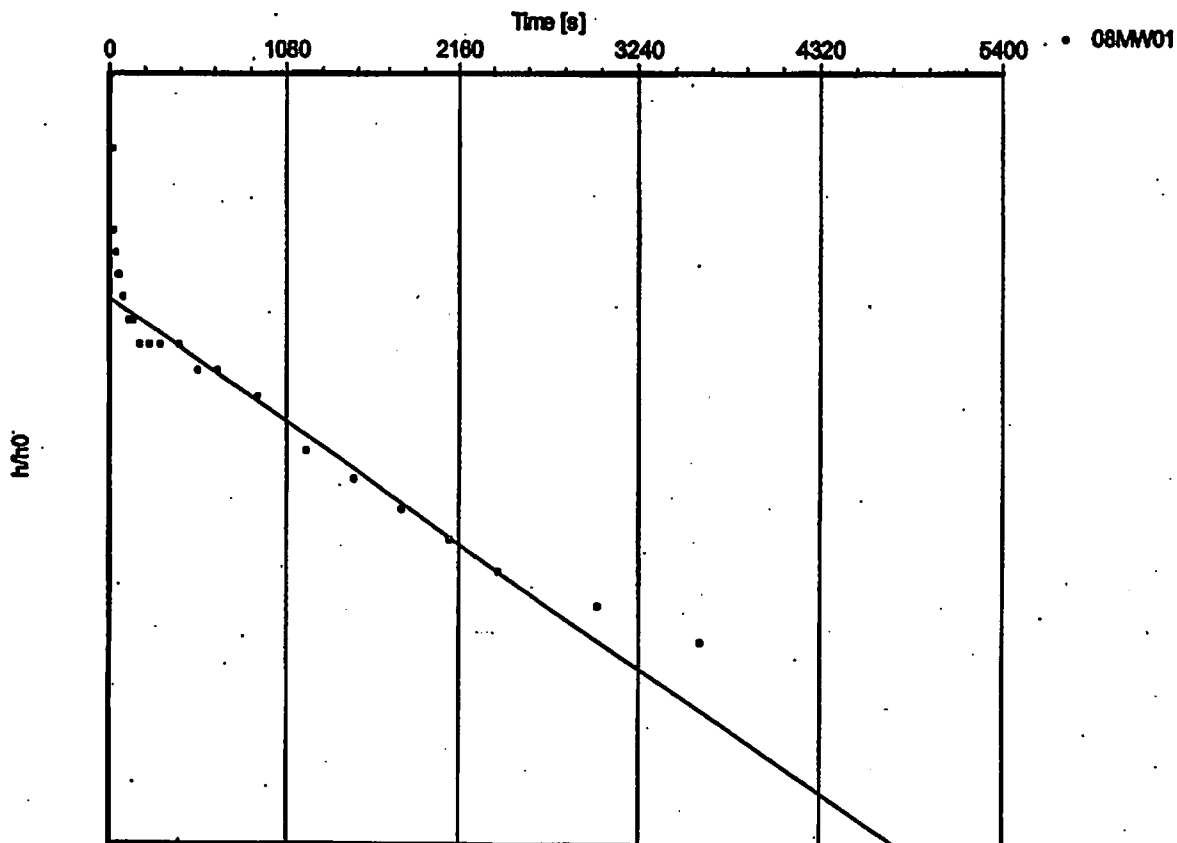
Slug Test Analysis Report

Project: The Village of Barons - Site Inspection

Number: L22101182.001

Client: The Village of Barons

08MW01 [Bouwer & Rice]



Slug Test: 08MW01

Analysis Method: Bouwer & Rice

Analysis Results:

Conductivity: 3.19E-7 [m/s]

Test parameters:

Test Well: 08MW01
Casing radius: 0.051 [m]
Screen length: 3 [m]
Boring radius: 0.152 [m]

r(eff): 0.082 [m]

Aquifer Thickness: 1.945 [m]
Gravel Pack Porosity (%) 20

Comments:

Evaluated by: Jay X
Evaluation: 12/18/2008



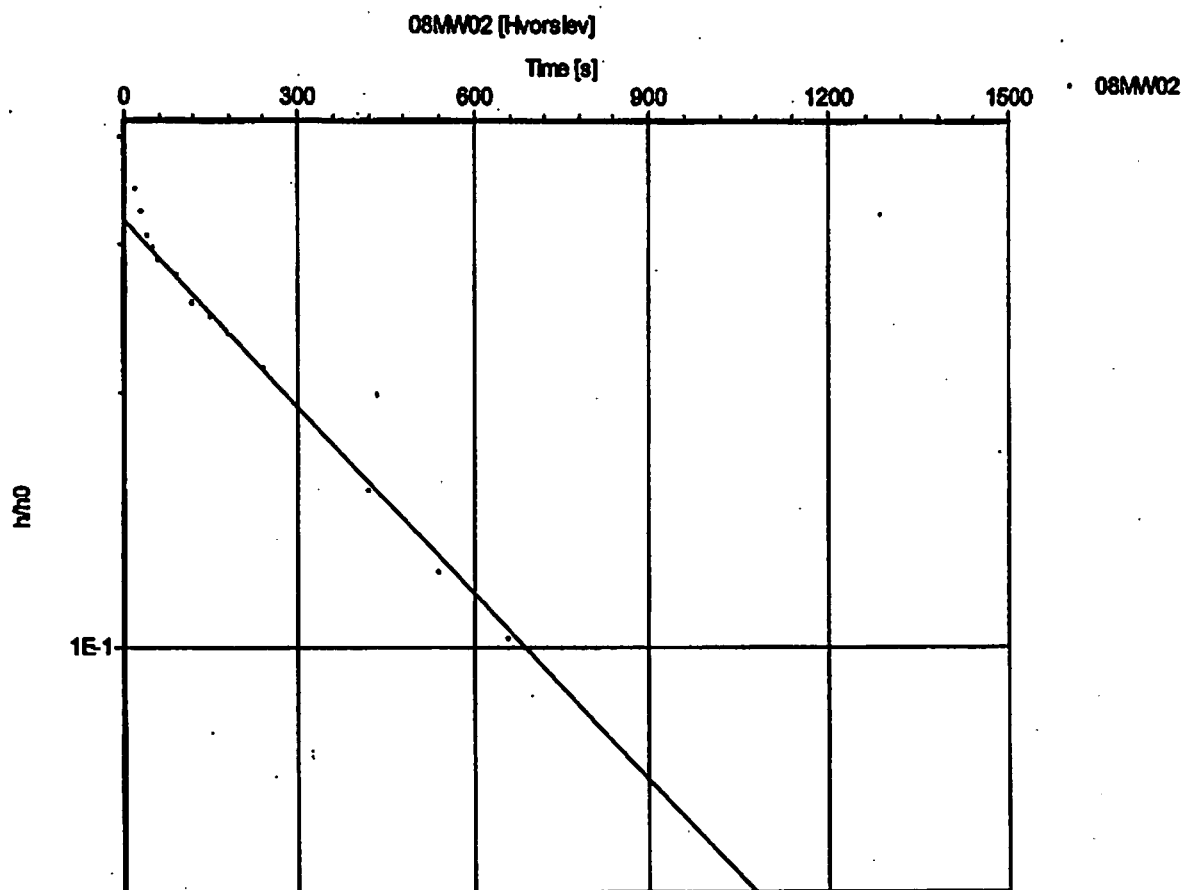
EBA Engineering Consultants Ltd
Riverbend Atrium One #115, 200 Rivercrest Drive SE
Calgary, AB T2C 2X5 CANADA

Slug Test Analysis Report

Project: The Village of Barons - Site Inspection

Number: L22101182.001

Client: The Village of Barons



Slug Test: 08MW02

Analysis Method: Hvorslev

Analysis Results:

Conductivity: 2.20E-6 [m/s]

Test parameters:	Test Well:	08MW02	Aquifer Thickness:	2.495 [m]
	Casing radius:	0.051 [m]		
	Screen length:	3 [m]		
	Boring radius:	0.152 [m]		

Comments:

Evaluated by: Jay X
Evaluation 12/18/2008

Figure



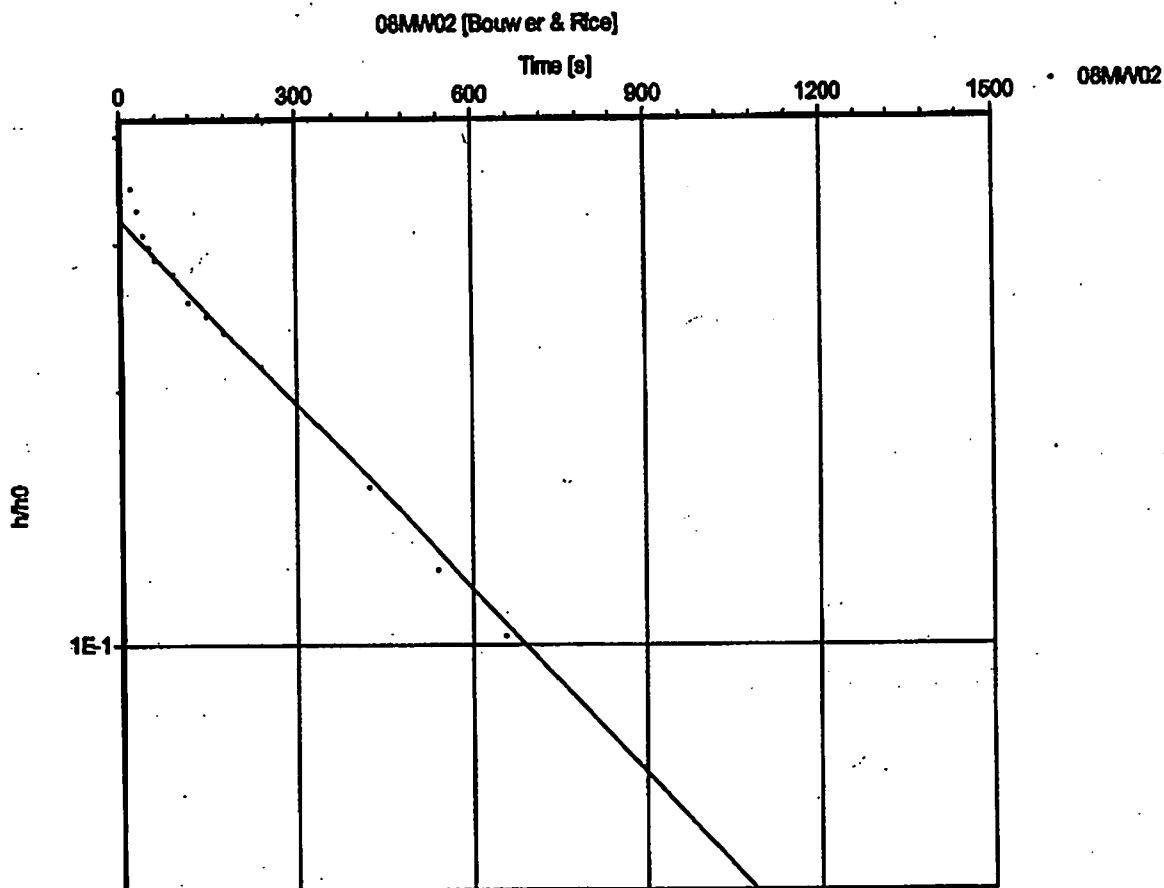
EBA Engineering Consultants Ltd
 Riverbend Atrium One #116, 200 Rivercrest Drive SE
 Calgary, AB T2C 2X5 CANADA

Slug Test Analysis Report

Project: The Village of Barons - Site Inspection

Number: L22101182.001

Client: The Village of Barons



Slug Test: 08MW02

Analysis Method: Bouwer & Rice

Analysis Results:

Conductivity: 4.01E-8 [m/s]

Test parameters:

Test Well: 08MW02
Casing radius: 0.051 [m]
Screen length: 3 [m]
Boring radius: 0.152 [m]
r_{eff}: 0.082 [m]

Aquifer Thickness: 2.495 [m]
Gravel Pack Porosity (%) 20

Comments:

Evaluated by: Jay X

Evaluation 12/16/2008

Figure



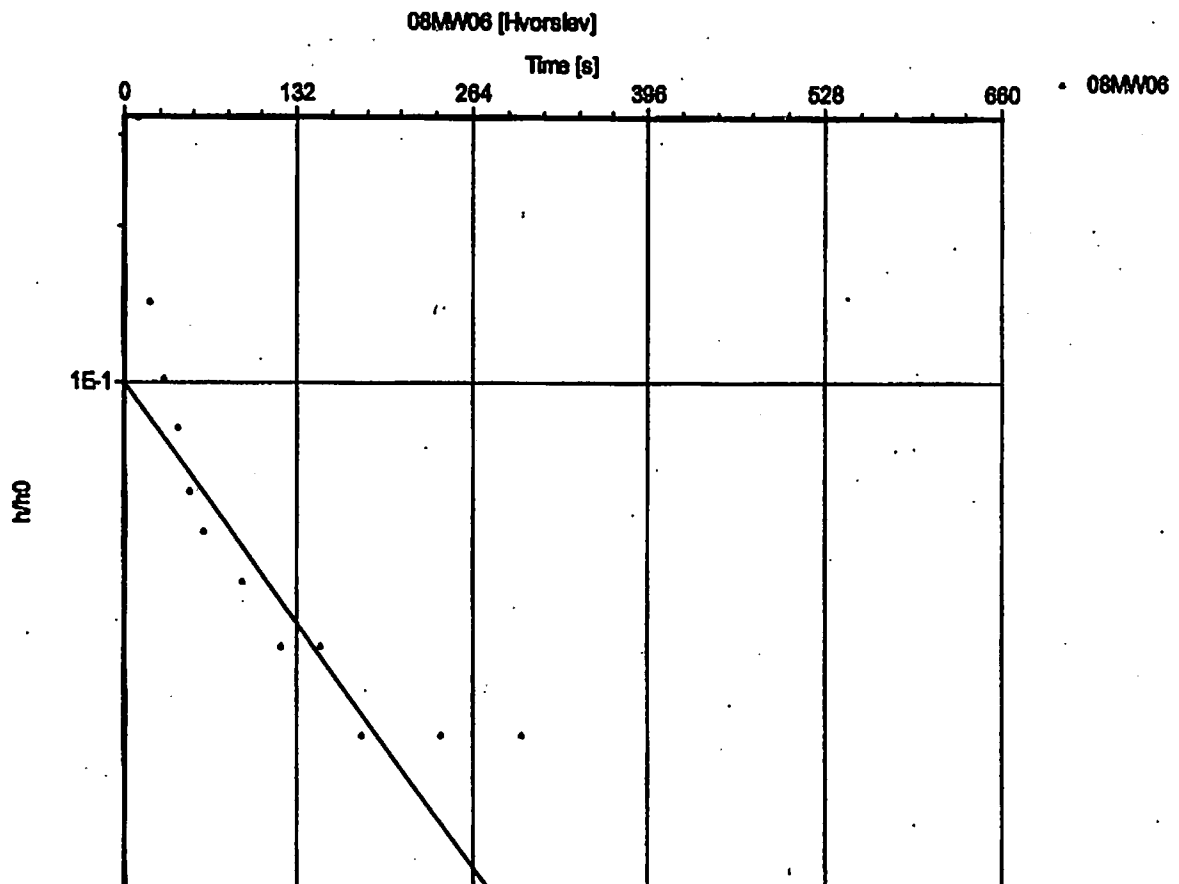
EBA Engineering Consultants Ltd
Riverbend Atrium One #115, 200 Rivercrest Drive SE
Calgary, AB T2C 2X5 CANADA

Slug Test Analysis Report

Project: The Village of Barons - Site Inspection

Number: L22101182.001

Client: The Village of Barons



Slug Test: 08MW06

Analysis Method: Hvorslev

Analysis Results:

Conductivity: 8.40E-6 [m/s]

Test parameters:

Test Well: 08MW06

Aquifer Thickness: 3.205 [m]

Casing radius: 0.051 [m]

Screen length: 4.3 [m]

Boring radius: 0.152 [m]

Comments:

Very scattered data

Evaluated by: Jay X

Evaluation 12/16/2008

Figure



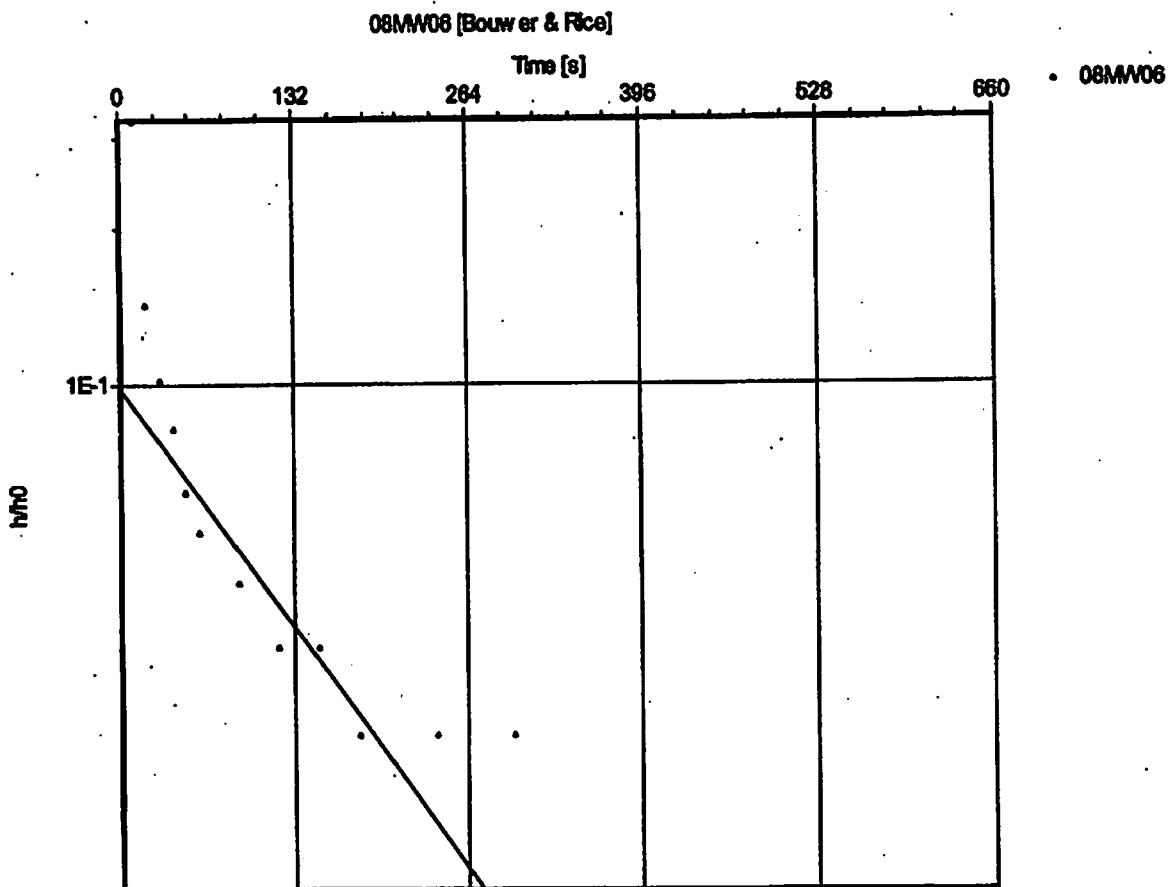
EBA Engineering Consultants Ltd
Riverbend Atrium One #115, 200 Rivercrest Drive SE
Calgary, AB T2C 2X5 CANADA

Slug Test Analysis Report

Project: The Village of Barons - Site Inspection

Number: L22101182.001

Client: The Village of Barons



Slug Test: 08MW06

Analysis Method: Bouwer & Rice

Analysis Results:

Conductivity: 1.51E-5 [m/s]

Test parameters:	Test Well:	08MW06	Aquifer Thickness:	3.205 [m]
	Casing radius:	0.051 [m]	Gravel Pack Porosity (%):	20
	Screen length:	4.3 [m]		
	Boring radius:	0.152 [m]		
	r(eff):	0.082 [m]		

Comments: Very scattered data

Figure

Evaluated by: Jay X
Evaluation 12/16/2008



Water Well Drilling Report

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.: 0194222
Map Verified: Not Verified
Date Report Received:
Measurements: Imperial

1. Contractor & Well Owner Information

Company Name: INTERPROVINCIAL DRLG
Drilling Company Approval No.:
Mailing Address: City or Town: Postal Code:
Well Owner's Name: Well Location Identifier:
P.O. Box Number: Mailing Address: Postal Code:
City: Province: Country:

2. Well Location

1/4 or Sec Twp Rge Wee
LSD EH 16 012 23 M
4

Location in Quarter
0 FT from Bound
0 FT from Bound

Lot Block Plan

Well Elev: 3165 FT
How Obtain: Estimated

3. Drilling Information

Type of Work: Well Inventory
Reclaimed Well
Data Reclaimed: Materials Used:
Method of Drilling: Drilled
Flowing Well: No
Gas Present: No
Rate: Gallons
Oil Present: No
Proposed well use:
Domestic
Anticipated Water
Requirements/day
0 Gallons

6. Well Yield

Test Date (yyyy/mm/dd): Start Time:
1958/02/10 11:00 AM

Test Method: Bailer

Non pumping static level: 32 FT

Rate of water removal: 15 Gallons/A

4. Formation Log

Depth from ground level (feet)	Lithology Description
1	Topsoil
10	Gravel & Boulders
21	Sand & Gravel
23	Silty Sand & Gravel
44	Blue Shale
59	Gray Shale
63	Sand & Shale
79	Gray Shale
83	Gray Sandy Shale
90	Gray Water Bearing Sandstone
96	Blue Shale

5. Well Completion

Date Started (yyyy/mm/dd): 1958/02/10
Date Completed (yyyy/mm/dd): 1958/02/10
Well Depth: 96 FT
Borehole Diameter: 0 Inches
Casing Type: Unknown
Liner Type:
Size OD: 6 Inches
Size OD: 0 Inches
Wall Thickness: 0 Inches
Wall Thickness: 0 Inches
Bottom at: 96 FT
Top: 0 FT Bottom: 0 FT
Perforations from: 0 FT to: 0 FT
Perforations Size: 0 Inches x 0 Inches
from: 0 FT to: 0 FT
0 Inches x 0 Inches
from: 0 FT to: 0 FT
0 Inches x 0 Inches
Perforated by:

Depth of pump intake: 0 FT

Water level at end of pumping: FT

Distance from top of casing to ground level: Inches

Depth To water level (feet)
Elapsed Time

Drawdown Minutes: Sec Recove

Total Drawdown: 0 FT

If water removal was less than 2 hr duration, reason why:

Recommended pumping rate: 0 Gallons/Min

Recommended pump intake: 0 FT

Type Pump Installed

Pump Type:

Pump Model:

H.P.:

Any further pump test information?

Seal: from: 0 FT to: 0 FT
Seal: from: 0 FT to: 0 FT
Seal: from: 0 FT to: 0 FT
Screen Type: Screen ID: 0 Inches
from: 0 FT to: 0 FT Slot Size: 0 Inches
Screen Type: Screen ID: 0 Inches
from: 0 FT to: 0 FT Slot Size: 0 Inches

Screen Installation Method:

Fittings

Top: Bottom:

Pack:

Grain Size: Amount:

Geophysical Log Taken:

Retained on Files:

Additional Test and/or Pump Data

Chemistries taken By Driller: No

Held: 0 Documents Held: 1

Pitless Adapter Type:

Drop Pipe Type:

Length: FT Diameter: Inches

Comments:

OWNER STATES CEALR, MEDIUM HARD WATER.

7. Contractor Certification

Driller's Name: UNKNOWN DRILLER

Certification No.:

This well was constructed in accordance with the Water Well regulation of the Alberta Environmental Protection & Enhancement Act. All information in this report is true.

Signature Yr Mo Day



Water Well Drilling Report

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.: 0194216
Map Verified: Field
Date Report Received:
Measurements: Imperial

1. Contractor & Well Owner Information

Company Name: ALBERTA ENVIRONMENT/EARTH SCIENCES DIVISION
Drilling Company Approval No.: 89998
Mailing Address: 8820-108 ST, OXBRIDGE PLACE City or Town: EDMONTON AB CA Postal Code: T5K 2J6
Well Owner's Name: ALTA ENV #0813E Well Location Identifier:
P.O. Box Number: Mailing Address: Postal Code:
City: Province: Country:

2. Well Location

1/4 or Sec Twp Rge Wgs
LSD SE 16 012 23 M
Location in Quarter
0 FT from Bounds
0 FT from Bounds
Lot Block Plan

3. Drilling Information

Type of Work: Test Hole
Reclaimed Well
Date Reclaimed: Materials Used: Proposed well use: Unknown
Method of Drilling: Drilled Anticipated Water Requirements/day 0 Gallons
Flowing Well: No Rate: Gallons Oil Present: No
Gas Present: No

6. Well Yield

Test Date (yyyy/mm/dd): Start Time:
Test Method:
Non pumping FT
static level:
Rate of water Gallons/Min
removal:
Depth of pump FT
Intake:
Water level at FT
end of
pumping:
Distance from inches
top of casing to
ground level:
Depth To water level (feet)
Elapsed Time
Drawdown Minutes:Sec Recover

4. Formation Log

Depth from ground level (feet)	Lithology Description
9	Clay
12	Hard Shale
28	Shale
38	Hard Shale & Sandstone
47	Siltstone
56	Hard Sandstone
58	Shale
63	Hard Sandstone
64	Shale
80	Water Bearing Sandstone
95	Shale & Sandstone

5. Well Completion

Date Started (yyyy/mm/dd): Date Completed (yyyy/mm/dd):
1971/03/01
Well Depth: 95 FT Borehole Diameter: 0 Inches
Casing Type: Liner Type:
Size OD: 0 Inches Size OD: 0 Inches
Wall Thickness: 0 Inches Wall Thickness: 0 Inches
Bottom at: 0 FT Top: 0 FT Bottom: 0 FT
Perforations Perforations Size:
from: 0 FT to: 0 FT 0 Inches x 0 Inches
from: 0 FT to: 0 FT 0 Inches x 0 Inches
from: 0 FT to: 0 FT 0 Inches x 0 Inches
Perforated by:

Seal:
from: 0 FT to: 0 FT
Seal:
from: 0 FT to: 0 FT
Seal:
from: 0 FT to: 0 FT
Screen Type:
from: 0 FT to: 0 FT Screen ID: 0 Inches
Slot Size: 0 Inches
Screen Type:
from: 0 FT to: 0 FT Screen ID: 0 Inches
Slot Size: 0 Inches
Screen Installation Method:
Fittings
Top: Bottom:
Pack:
Grain Size: Amount:
Geophysical Log Taken:
Retained on Files:
Additional Test and/or Pump Data
Chemistries taken By Driller: No
Held: 0 Documents Held: 1
Pitless Adapter Type:
Drop Pipe Type:
Length: Diameter:
Comments:
OWNER STATES AIR DRILLED 100FT W. & 25FT S. OF 612-E.

Total Drawdown: FT
If water removal was less than 2 hr duration, reason why:
Recommended pumping rate: Gallons/Min
Recommended pump intake: FT
Type pump installed
Pump type:
Pump model:
H.P.:
Any further pump test information?

7. Contractor Certification

Driller's Name: UNKNOWN DRILLER
Certification No.:
This well was constructed in accordance with the Water Well regulation of the Alberta Environmental Protection & Enhancement Act. All information in this report is true.
Signature Yr Mo Day



Water Well-Drilling Report

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.
The information contained in this "Water Well Drilling Report" is unverified by Alberta Environment

Well I.D.: 2058577
Map Verified: Not Verified
Date Report Received: 2007/03/09
Measurements: Imperial

1. Contractor & Well Owner Information

Company Name: UNKNOWN DRILLING COMP. 10
Drilling Company Approval No.: 10
Mailing Address: UNKNOWN
City or Town: Postal Code:
Well Owner's Name: ALTA ENV - 611E
Well Location Identifier:
P.O. Box Number: Mailing Address: Postal Code:
City: EDMONTON
Province: AB
Country: CA

2. Well Location

1/4 or Sec Twp Rge Wes
LSD SE 16 012 23 M
4
Location in Quarter
FT from N Bound
FT from E Bound
Lot Block Plan

3. Drilling Information

Type of Work: Test Hole
Reclaimed Well
Date Reclaimed:
Method of Drilling: Rotary
Flowing Well: No
Gas Present: No
Materials Used: Unknown
Proposed well use:
Observation
Anticipated Water
Requirements/day
Gallons
Rate: Gallons
Oil Present: No

6. Well Yield

Test Date (yyyy/mm/dd): Start Time:
Test Method:
Non pumping FT
static level:
Rate of water Gallons/Min
removal:
Depth of pump FT
intake:
Water level at FT
end of
pumping:
Distance from Inches
top of casing to
ground level:
Depth To water level (feet)
Elapsed Time
Drawdown Minutes:Sec Recover

4. Formation Log

Depth from
ground
level (feet)
Lithology Description

5. Well Completion

Date Started (yyyy/mm/dd): 1971/03/12
Date Completed (yyyy/mm/dd): 1971/03/12
Well Depth: 65 FT
Borehole Diameter: Inches
Casing Type: Unknown
Liner Type: Unknown
Size OD: Inches
Size OD: Inches
Wall Thickness: Inches
Wall Thickness: Inches
Bottom at: FT
Top: FT Bottom: FT
Perforations
from: FT to: FT
from: FT to: FT
from: FT to: FT
Perforations Size:
Inches x Inches
Inches x Inches
Inches x Inches

Perforated by: Unknown

Seal: Unknown
from: FT to: FT
Seal: Unknown
from: FT to: FT
Seal: Unknown
from: FT to: FT
Screen Type: Unknown
from: FT to: FT
Screen ID: Inches
Slot Size: Inches
Screen Type: Unknown
from: FT to: FT
Screen ID: Inches
Slot Size: Inches
Screen Installation Method: Unknown
Fittings
Top: Unknown Bottom: Unknown

Pack: Unknown
Grain Size: Amount: Unknown

Geophysical Log Taken:
Retained on File:

Additional Test and/or Pump Data
Chemistries taken By Driller: No
Held: Documents Held:

Pitless Adapter Type:
Drop Pipe Type:
Length: Diameter:
Comments:

7. Contractor Certification

Driller's Name: UNKNOWN DRILLER10
Certification No.: 10
This well was constructed in accordance with the Water Well
regulation of the Alberta Environmental Protection &
Enhancement Act. All information in this report is true.
Signature Yr Mo Day



Water Well Drilling Report

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.: 0184195
 Map Verified: Field
 Date Report Received: 1981/05/27
 Measurements: Imperial

1. Contractor & Well Owner Information

Company Name: ALBERTA ENVIRONMENT/EARTH SCIENCES DIVISION		Drilling Company Approval No.: 99998
Mailing Address: 9820-108 ST. OXBRIDGE PLACE	City or Town: EDMONTON AB CA	Postal Code: T5K 2J6
Well Owner's Name: ALTA ENV #1998E	Well Location Identifier:	
P.O. Box Number:	Mailing Address:	Postal Code:
City:	Province:	Country:

2. Well Location

1/4 or LSD SW	Sec 15	Twp 012	Rge 23	West M
Location in Quarter 0 FT from 0 FT from				
Lot	Block	Plan		
Well Elev: 3175 FT		How Obtain: Estimated		

3. Drilling Information

Type of Work: Test Hole	Proposed well use: Unknown Anticipated Water Requirements/day 0 Gallons
Reclaimed Well	
Date Reclaimed:	
Method of Drilling: Rotary	
Flowing Well: No	Rate: Gallons
Gas Present: No	Oil Present: No

6. Well Yield

Test Date(yyyy/mm/dd): Start Time:	
Test Method:	
Non pumping	FT
static level:	
Rate of water removal:	Gallons/Min
Depth of pump intake:	FT
Water level at end of pumping:	FT
Distance from top of casing to ground level:	Inches
Depth To water level (feet)	
Elapsed Time	
Drawdown	Minutes:Sec Recov

4. Formation Log

Depth from ground level (feet)	Lithology Description
10	Silt
25	Shale
71	Silty Shale
72	Sandstone
84	Shale
89	Sandstone
98	Shale
100	Sandstone
104	Shale
107	Sandstone
110	Shale
112	Sandstone
115	Shale
120	Sandstone
135	Shale
137	Sandstone
138	Shale
140	Sandstone
141	Shale
148	Sandstone
190	Shale
198	Sandstone
198	Shale
200	Sandstone

5. Well Completion

Date Started(yyyy/mm/dd): 1980/11/09	Date Completed(yyyy/mm/dd): 1980/11/20
Well Depth: 200 FT	Borehole Diameter: 0 Inches
Casing Type:	Liner Type:
Size OD: 0 Inches	Size OD: 0 Inches
Wall Thickness: 0 Inches	Wall Thickness: 0 Inches
Bottom at: 0 FT	Top: 0 FT Bottom: 0 FT
Perforations from: 0 FT to: 0 FT	Perforations Size: 0 Inches x 0 Inches
from: 0 FT to: 0 FT	0 Inches x 0 Inches
from: 0 FT to: 0 FT	0 Inches x 0 Inches
Perforated by:	
Seal: from: 0 FT to: 0 FT	
Seal: from: 0 FT to: 0 FT	
Seal: from: 0 FT to: 0 FT	
Screen Type: from: 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
Screen Type: from: 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
Screen Installation Method:	
Fittings	
Top:	Bottom:
Pack:	
Grain Size:	Amount:
Geophysical Log Taken:	
Retained on Files:	
Additional Test and/or Pump Data	
Chemistries taken By Driller: No	
Held: 0	Documents Held: 4
Pitless Adapter Type:	
Drop Pipe Type:	
Length:	Diameter:
Comments: OWNER STATES WELL CORED.	

Total Drawdown: FT

If water removal was less than 2 hr duration, reason why:

Recommended pumping rate: Gallons/Min

Recommended pump intake: FT

Type pump installed

Pump type:

Pump model:

H.P.:

Any further pump test information?

7. Contractor Certification

Driller's Name:	UNKNOWN DRILLER
Certification No.:	
This well was constructed in accordance with the Water Well regulation of the Alberta Environmental Protection & Enhancement Act. All information in this report is true.	
Signature	Yr Mo Day

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

70 7 1970 7

265	Brownish Gray Bentonitic Shale
275	Brownish Gray Bentonitic Shale & Sandstone
285	Gray Shale

Report



Water Well Drilling Report

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.: 0194198
 Map Verified: Not Verified
 Date Report Received: 1989/12/10
 Measurements: Imperial

1. Contractor & Well Owner Information

Company Name: HENNING DRILLING LTD. Drilling Company Approval No.:
 Mailing Address: City or Town: Postal Code:
 Well Owner's Name: BARONS OIL Well Location Identifier:
 P.O. Box Number: Mailing Address: BARONS Postal Code:
 City: Province: Country:

2. Well Location

1/4 or Sec Twp Rge West
 LSD 14 15 012 23 M
 4

Location in Quarter
 0 FT from Bounda
 0 FT from Bounda

Lot Block Plan

Well Elev: How Obtain:
 FT Not Obtain

3. Drilling Information

Type of Work: New Well
 Reclaimed Well
 Date Reclaimed: Materials Used:
 Method of Drilling: Rotary
 Flowing Well: No Rate: Gallons
 Gas Present: No Oil Present: No
 Proposed well use:
 Injection
 Anticipated Water
 Requirements/day
 0 Gallons

6. Well Yield

Test Date(yyyy/mm/dd): Start Time:

Test Method:

Non pumping FT

static level:

Rate of water Gallons/Min
 removal:

Depth of pump FT
 intake:

Water level at FT

end of

pumping:

Distance from inches
 top of casing to
 ground level:

Depth To water level (feet)

Elapsed Time

Drawdown Minutes:Sec Recover:

Total Drawdown: FT

If water removal was less than 2 hr
 duration, reason why:

Recommended pumping rate:
 Gallons/Min

Recommended pump intake: FT

Type pump installed

Pump type:

Pump model:

H.P.:

Any further pump test information?

4. Formation Log

Depth from ground level (feet)	Lithology Description
4	Brown Clay
20	Shale
48	Dark Shale
49	Sandstone
381	Sandstone
391	Hard Unknown
832	Hard Unknown
542	Hard Unknown
555	Shale

5. Well Completion

Date Started(yyyy/mm/dd): Date Completed(yyyy/mm/dd):
 1987/02/01
 Well Depth: 555 FT Borehole Diameter: 0 inches
 Casing Type: Liner Type: Unknown
 Size OD: 0 inches Size OD: 0 inches
 Wall Thickness: 0 inches Wall Thickness: 0 inches
 Bottom at: 0 FT Top: 0 FT Bottom: 547 FT
 Perforations Perforations Size:
 from: 316 FT to: 354 FT 0 inches x 0 inches
 from: 370 FT to: 407 FT 0 inches x 0 inches
 from: 510 FT to: 547 FT 0 inches x 0 inches

Perforated by:

Seal:

from: 0 FT to: 0 FT

Seal:

from: 0 FT to: 0 FT

Seal:

from: 0 FT to: 0 FT

Screen Type:

from: 0 FT to: 0 FT Screen ID: 0 inches

Slot Size: 0 inches

Screen Type:

from: 0 FT to: 0 FT Screen ID: 0 inches

Slot Size: 0 inches

Screen Installation Method:

Fittings

Top:

Bottom:

Pack:

Grain Size: Amount:

Geophysical Log Taken: ELECTRIC

Retained on Files: ELECTRIC yes

Additional Test and/or Pump Data

Chemistries taken By Driller: No

Held: 0 Documents Held: 7

Pitless Adapter Type:

Drop Pipe Type:

Length: Diameter:

Comments:

OWNER STATES INJECTION TEST INCLUDED IN FILE.

7. Contractor Certification

Driller's Name: UNKNOWN DRILLER

Certification No.:

This well was constructed in accordance with the Water Well
 regulation of the Alberta Environmental Protection &
 Enhancement Act. All information in this report is true.

Signature Yr Mo Day

APPENDIX D

APPENDIX D GEO-ENVIRONMENTAL REPORT – GENERAL CONDITIONS

GEO-ENVIRONMENTAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT AND OWNERSHIP

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

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