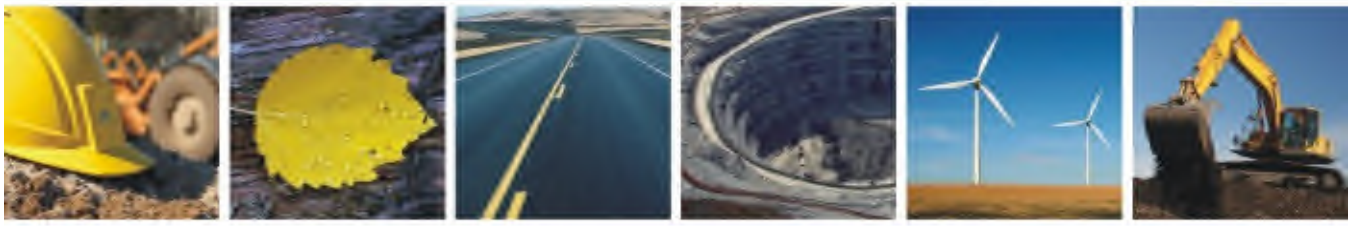
WHITE RIVER FIRST NATION

AQUIFER AND WELLHEAD PROTECTION PLAN
WHITE RIVER FIRST NATION COMMUNITY WELLS
BEAVER CREEK, YT



REPORT

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EXECUTIVE SUMMARY

EBA Engineering Consultants Ltd., operating as EBA, A Tetra Tech Company (EBA), was retained by White River First Nation (WRFN) to update the Aquifer and Wellhead Protection Plan (AWHPP) developed by EBA in 2007 for the four WRFN Community Wells serving two community water systems.

The objective of the AWHPP is to provide practical protective measures to identify and pragmatically manage activities within the well capture zones and recharge areas for the WRFN water community supply wells with the intention of reducing risks to the water supply source. This plan is important to protect the valuable resource, the health and safety of the community, and to protect the investment in water supply infrastructure. The AWHPP is a living document which should be updated based on activities around the community wells that might result in additional risks, or when risks have been addressed.

Groundwater from the Beaver Creek aquifer is of good quality, and some protection is provided by discontinuous permafrost and intermittent finer-grained soil layers, as well as an unsaturated zone thickness of approximately 15 m. However, the majority of the soil in the area is comprised of coarse sands and gravels. This increases the potential for contamination from surface sources to infiltrate through these soils to the aquifer and impact water supply wells.

Based on the results of this study and the updated AWHPP, EBA emphasizes the following conclusions:

- To date there has been no identified contamination in groundwater sampled from the Community Wells; however, any release of contaminants within the identified capture zones would represent a potential risk to the aquifer and water quality of the Community Wells;
- A total of 11 wells have been decommissioned in accordance with the Canadian Groundwater Association - Guidelines for Water Well Construction;
- Water quality results from the Community Wells do not suggest that upgradient septic fields and manure pile storage are currently impacting the water quality of the wells; however, septic fields and manure pile storage have the potential to impact the Beaver Creek Aquifer and community wells;
- The highest risks to the Community Wells are from livestock manure storage; leachate from septic fields; potential releases and spills from Aboveground Storage Tanks (ASTs); and potential spills;
- ASTs located outside of the well capture zones have been identified as potential sources of contamination, for which environmental concerns should be addressed; and
- Risk evaluation based on exposure likelihood and hazard consequences of the potential hazards identified through this process are summarized in Table 5 and Figures 2 and 3.

A list of risk reduction and elimination strategies is provided in Table 6 for identified areas of potential environmental concern (APECs) within the well capture zones. Recommendations for further risk reduction and management strategies are summarized in Section 6.2 of this report

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ACRONYMS & ABBREVIATIONS

APEC	Areas of Potential Environmental Concern
AANDC	Aboriginal Affairs and Northern Development Canada
AST	Aboveground Storage Tank
AWHPP	Aquifer and Wellhead Protection Plan
EBA	EBA Engineering Consultants Ltd. operating as EBA, A Tetra Tech Company
INAC	Indian and Northern Affairs Canada
PCOC	Potential Contaminants of Concern
UST	Underground Storage Tank
WRFN	White River First Nation
YCSR	Yukon Contaminated Sites Regulations
YG	Government of Yukon

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1.0 INTRODUCTION

1.1 General

EBA Engineering Consultants Ltd., operating as EBA, A Tetra Tech Company (EBA), was retained by White River First Nation (WRFN) to update the Aquifer and Wellhead Protection Plan (AWHPP) developed by EBA in 2007 for the four WRFN Community Wells serving two public drinking water systems identified as System 1 (Wells 1A and 1B) and System 2 (Wells 2A and 2B).

The objective of the AWHPP is to provide practical protective measures to identify and pragmatically manage activities within the well capture zones and recharge areas for the WRFN water community supply wells with the intention of reducing risks to the water supply source. This AWHPP is important to protect the valuable groundwater resource, the health and safety of the community, and the investment in water supply infrastructure. The AWHPP is a living document which should be updated based on activities around the community wells that might result in additional risks, or when risks have been addressed.

This report presents all of the findings, discussion, conclusions and recommendations for the updated AWHPP.

1.2 Purpose and Scope

The purpose of this work was to provide a risk-based AWHPP for the WRFN Community Wells. Risk-based AWHPPs are established to identify, forestall, manage, mitigate, monitor, and communicate risks to quality and quantity of water supplying wells used by humans, animals (e.g., livestock), plants (e.g., irrigation) or for industrial process water. Groundwater entering a well comes from an area that is defined as a capture zone or recharge area for that well. The basic objective of risk-based AWHPP is to provide realistic protective measures to prudently manage activities in the capture zone or recharge area of a well or well field to reduce risks to a water supply.

The AWHPP for the WRFN Community Wells has been developed to include the following three stages:

- Stage One – Risk Framework (Section 3.0);
- Stage Two – Risk Assessment (Section 4.0); and
- Stage Three – Risk Management (Section 5.0).

2.0 SITE DESCRIPTION

2.1 Location of Study Area

The WRFN Community Wells are located in the WRFN Community at the south end of Beaver Creek, Yukon. Beaver Creek is located approximately 450 km northwest of Whitehorse, Yukon on the west side of the Alaska Highway, near the Yukon/Alaska border (Figure 1). Topographical data from the Beaver Creek area is provided in Figure 2, while a detailed layout of the WRFN community is provided in Figure 3.

2.2 Existing Water Systems

Residents in the Community of Beaver Creek obtain their drinking water from two operational water systems - Water System 1 and Water System 2 (Figure 3). The WRFN water systems included in this AWHPP are comprised of the following:

- Water System 1 is served by Community Well 1A and Well 1B. Well 1A was drilled in the fall of 2006, while Well 1B was drilled in August 2007; both wells were drilled under the direction of EBA. The two wells are connected to the System 1 pump house and the associated shallow bury looped piped distribution system that serves the Administration Building, Youth Drop-in Centre, Land Claims office, and 17 residences. Wells 1A and 1B are both defined as Community Wells. Well logs for Well 1A and 1B are included in Appendix B.
- Water System 2 is served by of Community Well 2A and Well 2B. Well 2A was originally drilled in 1983 as a supply well for the WRFN community, while Well 2B was drilled in August 2007 under the direction of EBA. These two wells are connected to the System 2 pump house and the associated shallow bury looped piped distribution system that serves eight domestic residences. Wells 2A and 2B are both defined as Community Wells. Well logs for Well 2A and 2B are included in Appendix B.

To EBA's knowledge, there are five additional active wells remaining in proximity to the WRFN community (Figure 3) which include Wells #3 and 4 on Lot 1017 West serving four WRFN Community residences, and three additional wells (not directly serving WRFN) which supply the Government of Yukon (YG) Grader Station, Beaver Creek Visitor Reception Center, and Beaver Creek Curling Club to the east and north of System 2.

One additional well (Well#15), located north of House 13 is abandoned but remains in place.

There are numerous wells other in Beaver Creek located downgradient of the WRFN community wells.

2.3 Hydrogeology of the Beaver Creek Area

The hydrogeological regime of the Beaver Creek area is interpreted from data collected from a variety of sources including lithological information presented on well logs; groundwater level measurements taken during field investigations; pumping tests results; water quality data; and available topographical, geological and surficial mapping records. Table 1, attached, summarizes well information for all active wells within the WRFN community, and also includes the wells decommissioned in 2008 and 2011. Appendix B provides well logs for Well 1A, 1B, 2A, and 2B.

2.3.1 Topography and Hydrology

The ground surface within the region of Beaver Creek is relatively planar, with a gentle slope toward the north-northeast. The ground surface within the WRFN village area is consistent with the regional topography. Marshlands are prominent more than 1 km to the west and southwest of Beaver Creek (Figure 2).

The Beaver Creek drainage crosses the Alaska Highway about 2 km south of the WRFN community and flows towards the north-northeast. At its closest point, the Beaver Creek drainage is about 800 m east of the WRFN community area, and has a gradient of about 1 to 2% based on regional topographic information.

2.3.2 Surficial and Bedrock Geology

Surficial geology mapping data indicates that the Beaver Creek community is located on a broad glaciofluvial plain (Gordey and Makepeace, 2003). Surficial soils are described as consisting of sand and gravel units with veneers of organic soils. Regional geology mapping (Gordey and Makepeace, 2003) indicates the subsurface soils consist of quaternary aged unconsolidated glacial, glaciofluvial and glaciolacustrine deposits.

Bedrock outcrops located approximately 4 km to the northeast and northwest consist of greenstone metamorphic rocks described as ultramafic heavily foliated and sheared volcanic rock containing cherty tuff (Gordey and Makepeace, 2003).

2.3.3 Hydraulic Gradient and Groundwater Flow Direction

The regional groundwater flow regime is interpreted to consist of groundwater recharge occurring via infiltration in the upland areas to the west and southwest of the community of Beaver Creek with discharge occurring to the Beaver Creek drainage. The regional groundwater flow direction was found to be to be in a north to north-easterly direction, generally corresponding to topography (EBA, 2004).

The depth to groundwater in the study area is typically about 15 m below ground (EBA, 2004). The general hydraulic conductivity values from pumping tests completed on WRFN Community and Domestic Wells ranged from 7.9×10^{-3} m/s to 5.2×10^{-2} m/s (EBA, 2007). Groundwater flow direction within the Study area was identified to be towards the north-northeast with a hydraulic gradient of about 0.0008 m/m (EBA, 2004). Based on these hydrogeological parameters the groundwater velocity can be estimated using the Darcy Equation as shown below:

$$v = (K \times i) / n$$

Where: v = Groundwater Flow Velocity based on Darcy's Equation

K = Hydraulic conductivity of aquifer (6×10^{-2} m/s)

i = Hydraulic gradient (0.0008 m/m)

n = Porosity of aquifer (typically about 0.3)

The lateral groundwater flow velocity was estimated to range from 1.5 to 11.5 m/day, with an average value on the order of 6.5 m per day.

2.3.4 Aquifer Recharge Areas

Aquifer recharge areas in the Beaver Creek watershed are thought to be primarily located in the upland areas to the west and southwest of Beaver Creek (Figure 2) with discharge occurring to the Beaver Creek drainage, with a direction of flow roughly parallel to Beaver Creek (north-easterly direction), generally mimicking topography.

2.3.5 Aquifer Vulnerability

The level of vulnerability of an aquifer is a measure of to the potential for any contaminant introduced at or near ground surface (i.e. spills, leaks, at surface or from underground piping, tanks or septic fields) to reach

the groundwater table. The vulnerability of the aquifer is taken into account when defining the risk to the aquifer.

Groundwater from the Beaver Creek aquifer is of good quality, and some protection is provided by discontinuous permafrost and intermittent finer-grained soil layers (semi-confined), as well as an unsaturated zone thickness of approximately 15 m. However, the majority of the soils in the area are largely comprised of coarse sands and gravels increasing the potential for surface sources of contamination to infiltrate through these soils to the aquifer and impact water supply wells.

EBA estimated the vulnerability of the Beaver Creek Aquifer using the semi-quantitative Intrinsic Susceptibility Index (ISI) method. ISI scores from 0 to 30 indicate high vulnerability; 30 to 80 indicate medium vulnerability, and greater than 80 suggest low vulnerability. The ISI evaluation for the Beaver Creek Aquifer resulted in a score of 35, which indicates moderate vulnerability (See Appendix C).

3.0 STAGE ONE – RISK FRAMEWORK

3.1 Risk Approach

The initial step towards a risk-based AWHPP is to determine the appropriate risk approach for the project. Risk identification can be qualitative (a descriptive assessment of the risk elements; hazards, exposure likelihood and receptor) or quantitative, (i.e., based on probabilistic mathematical analysis of the risk elements). Due to the limited site information and resources available for this project, a qualitative risk approach was deemed appropriate.

3.2 Responsible Parties

The responsible parties in the context of this risk-based AWHPP are the Community Well owners: the WRFN. Chief and Council represent the WRFN citizens. As AANDC has fiduciary responsibility, and by providing funding for this project, they are included as a responsible party.

3.3 Risk Management Team

One of the initial steps to successful development and implementation of an AWHPP is to form a risk management team comprising representatives from the owner, technical advisors, and any key stakeholder groups such as domestic and community well users in the area. The risk management team for this AWHPP currently consists of a selection of the WRFN Chief and Council (the Owner), WRFN water system operators, and EBA (the technical advisor). For the remainder of this report, “WRFN Chief and Council” is referred to as WRFN.

3.4 Risk Tolerance

For this project risk tolerance is a measure of the acceptable level of risk by the risk management team or water supplier. A risk-tolerant owner would be able to accept or transfer some level of risk, while a risk adverse owner would seek to eliminate even the lowest level of risk to the water supply.

Based on discussions with the WRFN (Owner), EBA considers the Owner to be risk adverse.

4.0 STAGE TWO – RISK ASSESSMENT

4.1 Well Capture Zone Assessment

The first technical step in developing this AWHPP was to identify the capture zone (the geographic area that contributes groundwater to a well) for the Community Wells (Well 1A, 1B, 2A and 2B). The capture zone is a key element in an AWHPP, since only groundwater within this zone reaches the well. The size and shape of the capture zone depends upon the hydrogeologic setting, and the design and operational characteristics of the water supply well.

As part of the 2007 AWHPP development, the capture zones for the WRFN Community Wells were identified using both analytical methods and groundwater modelling software (Visual MODFLOW). The analytical method used to define the capture zones is based on the Theim Equation (See Appendix C).

The groundwater flow model used for the capture zone analysis was developed by Waterloo Hydrogeologic Inc using the Visual MODFLOW modelling code (Version 3.1.0.86). Visual MODFLOW is based on the USGS MODFLOW code, which simulates groundwater flow in three-dimensions using the finite-difference method, either in steady-state or transient mode. MODFLOW uses a block centred grid system in which nodes are positioned at the centre of the finite-difference cells. The vertical dimension is simulated by defining layers within the finite-difference mesh. The following sections describe the methodology used to build and calibrate the groundwater flow model.

4.1.1 Capture Zone Model Development and Calibration

The model grid used to assess the well capture zones for Wells 1A and 1B, and Wells 2A and 2B (2007 WRFN AWHPP report) was comprised of 79 columns and 75 rows to represent the 4,700 m by 10,000 m model area (see Appendix C). The model was oriented such that the y-axis was parallel to the observed groundwater flow direction (EBA, 2004). Cell dimensions within the grid range from 20 m in the vicinity of the pumping wells to 200 m near the model extents. Varying the cell dimensions allows for increased resolution and greater accuracy in the vicinity of the WRFN Community wells. The model was developed with three vertical layers that were interpreted from the well logs for the area:

- Layer 1 (upper) - represents the overlying sand and gravel layer;
- Layer 2 (middle) - represents the semi confining unit ($K = 1 \times 10^{-5}$ m/s); and
- Layer 3 (lower) - represents the Beaver Creek gravel aquifer ($K = 1 \times 10^{-2}$ m/s).

Constant head boundary conditions were positioned at the north (top) and south (bottom) of the model domain to represent groundwater discharge and recharge areas.

Depending upon location, slope, and type of near-surface ground material, approximately 10% of total precipitation in the Beaver Creek area is expected to recharge groundwater. The model was calibrated using a recharge rate of 42 mm/yr, which is equivalent to about 10% of the historic average annual precipitation from 1961 to 1990 (420 mm/yr) recorded at the Environment Beaver Creek Airport monitoring station.

Pumping wells (Well 1A and Well 2A) were assigned pumping rates equivalent to forecasted Average Day Demand (ADD) for each well. The ADD was estimated to be 13 m^3/day for Well 1A and 10 m^3/day for Well 2A (EBA, 2007), which is supported by the maximum average daily demand values observed in the water system monitoring records in 2012.

In order to compare actual and simulated groundwater flow, the model was verified by comparing predicted model head values with actual head values observed in the field. Model parameters (hydraulic conductivity, and recharge) were adjusted within appropriate ranges until acceptable matches between predicted and observed head values were achieved.

4.1.2 Capture Zone Model Results

Once the model was "run" and "calibrated", a "backward tracking particle method" was used to simulate the 90 day, 1, 5, and 10-year capture zones for each well. In a backward particle simulation, as the name implies, particles are "released" at the well, then tracked backward through time assuming they are transported by the flow field generated by the computer model. The results of this simulation indicated that the capture zones for each well were very long and narrow. The reason for this result is that the aquifer is not confined, and is highly permeable and productive. Pumping of these wells results in negligible drawdown. The Thiem analytical method also confirmed the long and narrow capture zones (See Appendix C).

When modelling indicates long and narrow capture zones, the positioning of the capture zones is very sensitive to the exact location of the groundwater contours. A relatively small error or seasonal change in groundwater contours could result in a major shift in the capture zone. Therefore, it is standard practice in the case of such long and narrow capture zones to provide a factor of safety or "buffer zone" around the AWHP area delineated by analytical equations and numerical models. To account for potential error and/or seasonal changes in the Beaver Creek aquifer, for every 100 m upgradient of each well, the capture zone boundary was extended 25 metres away from the centreline of the capture zone that the numerical model predicted. This procedure for including a factor of safety buffer where capture zone analysis methods predict long and narrow capture zones was recommended in the State of Wyoming's Wellhead Protection Plan (State of Wyoming, 1997). The modeled capture zones (with factor of safety) for the WRFN Community Wells are indicated on Figures 2 and 3.

The capture zones are similar for each of the Community Wells, and, as the buffer zones extend outward at a 25/100 slope, they overlap. As indicated on Figure 2, the 1, 5 and 10 year capture zones, overlap so much, that they are essentially the same for both the System 1 and System 2 Community Wells. The capture zones just upgradient of each well, however are distinct (i.e. the sanitary zones and 90 day travel time zone). The ultimate capture zones encompass an area of approximately 3 km^2 extending to the uplands paralleling the Beaver Creek drainage.

Groundwater models inherently contain a degree of uncertainty as there are many simplifying assumptions that must be made in order to model a natural system. The conservative assumptions built into the groundwater flow model result in the definition of both reasonable and realistic AWHPPs.

4.2 Potential Receptors

Potential receptors are the users of the water from the Community Wells, namely the WRFN residents who are connected to the System 1 and System 2 water distribution systems. These Community Wells serve the majority of the community as indicated in the summary of buildings served below:

System 1

- Serves the Administration Building (#19), Land Claims office (#1A), and Youth Drop-In Center (#1B), and Wellness Center (#13); and
- Serves residential buildings # 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14/15, 16/17, staff cabin (18), and 32.

System 2

- Serves residential buildings # 20, 21, 22, 23, 24, 25, 26, and 27.

4.3 Identification of Risk Scenarios

Risk can be defined as the potential for exposure of a receptor to a hazard. Risk assessment is the process of evaluating the consequences of hazard severity and likelihood of exposure, then evaluating, ranking and mapping the identified risk scenarios. There are three key elements of risk: exposure, hazard, and receptor which, when combined, generate the definition of risk. Risk can be effectively removed or reduced to acceptable levels if any of the three elements are eliminated or blocked. Potential for exposure can be expressed in terms of the likelihood of a receptor (eg. humans, animals and plants) coming into contact with a hazard. Hazards can be categorized in terms of severity (contaminant toxicity). To be practical and conservative, the evaluation of a hazard in this analysis assigns the highest potential concern that may be presented at the well head for that hazard (i.e. no retardation or reduction in hazard severity along its travel path to the well).

In order to evaluate potential risks to the Community Wells, potential sources of contamination were assessed. These sources, or Areas of Potential Environmental Concern (APECs), were investigated and plotted on a map with respect to the well capture zones (Figure 3).

EBA used several different methods to identify APECs near and within the AWHPPs, including:

- Meeting with WRFN representatives for collection of anecdotal information and visual site reconnaissance (completed on March 20, 2007 and November 14, 2012);
- Reviewing current and historical maps for the area for surrounding land use;
- Completing a large area search (10 km radius of the Site) for spills records within Environment Canada, Environmental Protection Branch Spills Records that search for spills up to 2001;
- Completing a large area search (10 km radius of the Site) for contaminated sites and spills within the Government of Yukon, Department of Environment, Environmental Programs Branch that contains reports from 2001 to present;
- Reviewing previous reports pertaining to the Site and the immediate vicinity;

- Reviewing upgrades conducted since the 2007 AWHPP; and
- Reviewing water quality sampling results.

A list of all APECs located within, or in proximity to the capture zones for Wells 1A, 1B, 2A and 2B, and their corresponding potential contaminants of concern (PCOC's) are summarized in Table 2. Both potential chemical and biological pathogens have been considered in this inventory. Figure 3 shows the spatial distribution of the identified APECs in Table 2, in relation to the defined well capture zones.

The inventory presented in Table 2 and in Figure 3 should not be considered as a static "one-time" item; rather, it is a framework for on-going management and should be reviewed and revised over time as APECs or the associated risks change.

Note that only the APECs located directly within the capture zones have been presented in this document. For a full list of historical APECs from around the WRFN community and the Village of Beaver Creek, refer to the 2007 AWHPP study (EBA, 2007).

Above Ground Storage Tanks during the site investigation conducted by EBA in 2012, and during source water protection upgrades in 2011, EBA assessed the conditions of the ASTs within the area of the well capture zones. Noticeable hydrocarbon staining and odour was observed at ASTs at House 4 (SP6) and House 10 (SP7) indicating the potential for hydrocarbon contamination in these areas (see Table 2 and Figure 3). A technical memo of the observations in 2011 was provided to WRFN on June 3, 2011 (Appendix D). These areas of potential environmental concern are identified in Table 2 and Figure 3.

In addition, during the source water protection upgrades conducted in 2011, EBA assessed the conditions of the above ground storage tanks within the WRFN community connected to System 1, but outside of the well capture zones. EBA identified a number of ASTs around the site where potential hydrocarbon contamination existed (as evidenced by hydrocarbon staining). These sources of potential contamination should be addressed, but are not included in Table 2 as they are not located within the well capture zones. These locations include ASTs at House 12, House 13, Duplex 16/17 and the Youth Drop In-Centre. Observations of the ASTs made during this assessment were summarized in a technical memo provided to WRFN on June 3, 2011 (Appendix D).

As part of the AHWPP recommendations in 2007, the above ground storage tanks (AST) at House 5, located directly within the 90 day capture zone for Wells 1A and 1B, House 9 located directly within the 90 day capture zone for Wells 2A and 2B, and the Administration building located within the 1 year capture zone for Wells 2A and 2B have been upgraded to double walled tanks in 2012. These upgrades help to reduce the risk associated with a fuel spill resulting from a leak in the tank; however, the risk of a fuel spill due to overfilling of the tanks still remains. As double walled tanks are considered to be a preventative measure, the associated exposure risk for these tanks have been reduced in this assessment, compared to standard ASTs installed on site.

4.3.1 Contaminated Sites and Spills Search, Environment Canada

Environment Canada maintained the spill records within the Yukon between 1972 and 2001. From 2001 on, the responsibility was transferred to YG. Ms. Nathalie Lowry of Environment Canada indicated that there were no records of reported spills in the Beaver Creek, Yukon area, however this does not exclude the

possibility that an unreported spill may have occurred (N. Lowry, pers. comm., 2007). A summary of these spills and contaminated sites, and remediation reports are provided in Appendix E.

4.3.2 Contaminated Sites and Spills Search, Government of Yukon

Government of Yukon, Department of Environment, Environmental Programs Branch has maintained the Yukon Spills Report Centre since 2001. A large area search (10 km radius of the Site) was conducted for contaminated sites and spills. The search conducted by YG Environment in 2013 identified records of two fuel spills located within the captures zone of Wells 2A and 2B. One spill located near House 10 (originally identified in the 2007 AWHPP) was remediated by EBA in 2010 (SR3 in Table 2), while the leak identified at fuel line for the Administration Building has never been addressed to EBA's knowledge (SP5 in Table 2). This report does not exclude the possibility of unreported contamination within the capture zones, but rather; indicates only the ones that YG has a record of in their database. A summary of these spills and contaminated sites and remediation reports are provided in Appendix E.

4.3.3 Surrounding Land Uses

The WRFN community is bounded by:

- Undeveloped lands to the south of System 1 and System 2;
- Four additional WRFN residents to the west of System 1;
- The Yukon Government Grader Station, Health Center and Visitor Reception Center to the east of System 2; and
- The Curling Rink and Recreational Pool to the north of System 2.

4.3.4 Ongoing Management Activities

EBA reviewed on-going management activities within the WRFN community since the WRFN AWHPP was first developed in 2007.

4.3.4.1 Wells

A total of 10 wells, which were identified as being improperly constructed or abandoned wells resulting in potential contamination risk to the groundwater source, have been decommissioned in the area of the System 1 and System 2 since the development of the AWHPP in 2007.

These wells have decommissioned in accordance with the Canadian Groundwater Association - Guidelines for Water Well Construction document and the risk associated with these wells as potential contamination sources to the Beaver Creek Aquifer has been eliminated. A summary of the decommissioned wells and year they were decommissioned are provided below:

- Old Well 1 (2011)
- Well 5 (2008)
- Well 6 (2011)
- Well 7 (2011)
- Well 8 (2008)
- Well 9 (2008)
- Well 10 (2008)
- Well 11 (2008)
- Well 12 (2011)
- Well 13 (2011)

In addition, a sanitary seal was installed around Well 2A during construction of the System 2 pump house in 2007 in accordance with the Canadian Groundwater Association - Guidelines for Water Well Construction document, and the risk of this well as a potential contamination source to the Beaver Creek Aquifer has been eliminated.

4.3.5 Water Quality Sampling Results

EBA reviewed water quality sampling results collected in 2012 for System 1 and System 2.

Water samples from System 1 (Well 1A and Treated) were collected on January 30, 2012 by WRFN operators for general chemical and physical, and trihalomethane (THM) water quality analysis as required for yearly reporting under the Yukon Public Health and Safety Act.

General chemical and physical water quality samples for System 2 (Well 2A, Well 2B, and Treated) were collected on November 14, 2012 by EBA as part of the water system operation assessment. Samples were also analyzed for hydrocarbons as a screening measure to assess potential impacts from hydrocarbon sources such above ground storage tanks located within the capture zone for Wells 2A and 2B, and a historical fuel spill which occurred in 2007.

Analytical results from System 1 and System 2 water quality sampling events are summarized in Tables 3a, 3b and 3c, attached. Laboratory analytical reports are provided in Appendix F. A summary of the laboratory analytical results is provided below:

- Laboratory analytical results indicate that all samples collected for System 1 and System 2 are below the health (maximum acceptable concentrations – MAC) and aesthetic objective (AO) related parameters in the Guidelines for Canadian Drinking Water Quality (GCDWQ, 2012), suggesting good drinking water quality from the Beaver Creek aquifer;
- Nutrient concentrations including nitrate, nitrite, and phosphates were below detection limits indicating that there are no observable impacts from upstream septic and manure piles on water quality at the time of the assessment;
- Analytical results for Extractable Petroleum Hydrocarbons (EPH) and Polycyclic Aromatic Hydrocarbons (PAHs) were below the laboratory detection limit, indicating that there are no

observable impacts from upstream above ground storage tanks and recorded fuel spills at the time of the assessment;

- Trihalomethanes (THMs) were detected at very low concentrations (0.007 mg/L) in treated water from System 1 in the sample collected on January 30, 2012; however, the total THM concentration was well below the GCDWQ maximum acceptable concentration of 0.1 mg/L. Furthermore, WRFN uses point of entry granular activated carbon treatment systems which should reduce THM concentrations; and
- Trans-1,2-dichloroethylene was detected at a concentration of 0.0042 mg/L in the treated water sample from System 1. There is no GCDWQ value for this parameter; however the US Environmental Protection Agency (EPA) guidelines indicate that 1,2-dichloroethylene should not exceed 0.1 mg/L. The US EPA also indicates that the major source of trans-1,2-dichloroethylene in drinking water is discharge from industrial chemical factories. As there are no industrial chemical factories in Beaver Creek, no other VOCs (other than trihalomethanes, which are a chlorination by-product) were detected in the water sample, and re-test results from a treated drinking water sample collected on April 29, 2013 show trans-1,2-dichloroethylene below detection limit (<0.0010 mg/L), it is EBA's opinion that this positive result was a "false positive" result from sampling and/or testing error.

4.4 Identification of Risks in Well Capture Zones

The AWHPP defines areas within the well capture zones, which are determined by the level of control required (and thus groundwater resource management strategies) to safeguard a water supply, including:

- Zone 1 – between 0 and 90 days to reach the wells;
- Zone 2 – between 90 days and 1 year to reach the wells;
- Zone 3 – between 1 year and 5 years to reach the wells; and
- Zone 4 – between 5 year and 10 years to reach the wells.

The sanitary protection zone area consists of the area immediately surrounding the wellhead and the areas within the capture zone where groundwater will take 90 days or less to reach the wellhead. The 90 day travel time zone (sanitary protection zone) requires the highest level of control and is considered to be at risk of microbial pathogens as well as chemical contaminants. Zone 2 is considered to be at risk for microbial pathogens as well as chemical contaminants. Zone 3 and Zone 4 delineate zones at risk from of chemical contamination. The following sections discuss the risk evaluation in terms of the defined AWPP zones.

4.4.1 Zone 1 – 90 Day Travel Time (Sanitary Protection Zone)

A contaminant release in Zone 1 presents a high likelihood of exposure to the users of the WRFN water systems. EBA identified the following potential hazards to the sanitary protection zones (wellheads) for each of the production wells:

- Improperly renovated septic waste due to improperly constructed system or system failure;
- Discharge of hazardous chemicals and/or pharmaceuticals in septic systems;

- Spills/leaks from ASTs, vehicles, etc., within the well field;
- Infiltration of leachate from manure piles; and
- Migration of contaminants into the aquifer through improperly abandoned, sealed or constructed wells.

In the event that any of the above scenarios did occur, they would represent the highest health risk to WRFN Community.

4.4.2 Zone 2 – One Year Travel Time

A contaminant release within Zone 2 represents medium to high (depending on natural attenuation) exposure likelihood to the users of the production wells. Potential hazards in this Zone are summarized below:

- Improper renovation of sewage from septic tank or field due to improper construction or failure;
- Spills/leaks from ASTs, vehicles; etc.
- Releases from industrial activity and pesticide use on the Firebreak line;
- Migration of contaminants into the aquifer through improperly abandoned, sealed or constructed wells; and
- Potential releases from industrial activity and pesticide use on the Firebreak line (all Community Wells).

4.4.3 Zone 3 – Five Year Travel Time

A contaminant release within Zone 3 represents medium to low (depending on natural attenuation) exposure likelihood to the community wells. Potential sources of environmental concern within Zone 3 are typically ranked as medium hazards. There were no potential hazards identified in this zone. However, future potential hazards would be any form of commercial or industrial activity such mining and logging.

4.4.4 Zone 4 – 10 Year Travel Time

A contaminant release within Zone 4 represents low to very low (depending on the type of pathogen released and probability of natural attenuation) exposure likelihood to the community wells due to renovation capacity and dilution. Potential sources of environmental concern within Zone 4 are typically ranked as low potential risks. There was no current potential risk identified in this zone. However future potential risk could include any form of industrial activity such as mining and logging.

4.5 Risk Evaluation and Mapping

Estimates of the risk to well users from each hazard have been developed using the Risk Matrix shown in Figure 4 on the following page. The risk estimates are based on several factors including:

- Size and magnitude of the hazard (point source or non-point source);
- Location (i.e., distance from well(s));

- Groundwater travel time to the well(s);
- The likelihood of the contaminant directly affecting water at the well; and
- The severity of the hazard to water entering the well.

The above mentioned factors were used to define the categories of exposure likelihood and hazard consequence.

The risk matrix (Figure 4) provides the potential risk posed by each hazard location with the well capture zones for the WRNF Community Wells. The overall Risk of "Very Low", "Low", "Medium", or "High" is assigned to each potential hazard identified within the capture zones and is passed on the combined exposure likelihood and hazard consequence for each potential contaminant source.

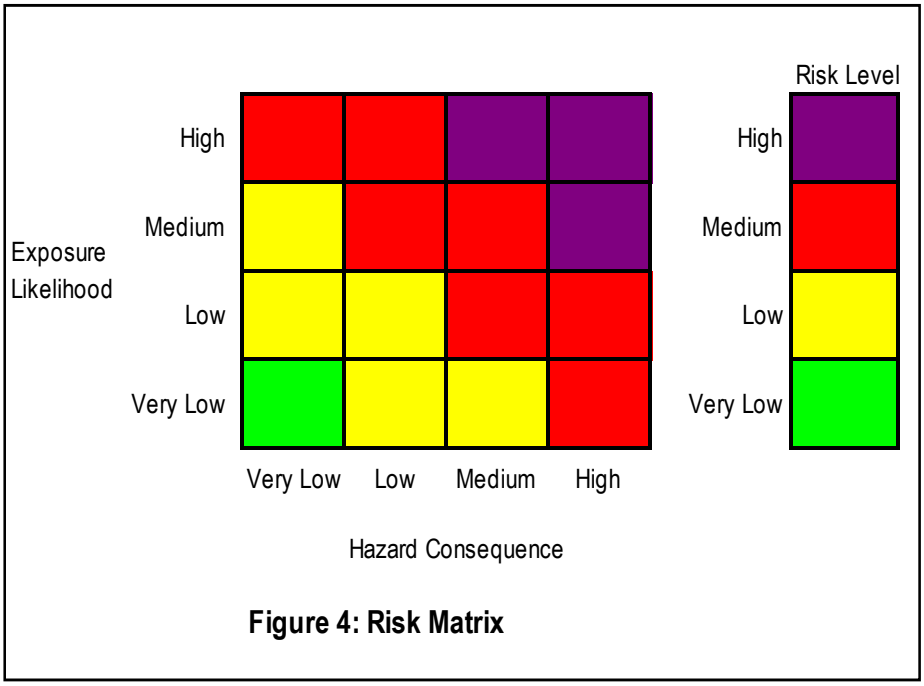

Figure 4: Risk Matrix

Table 4 identifies the rational used for assigning "Very Low", "Low", "Medium", or "High" potential values to exposure likelihood and hazard consequence for each APEC in, or within proximity to the well capture zones, as identified in Table 2.

Table 4: Exposure and Hazard Categories

Exposure Likelihood		Criteria
Bacteriological Pathogen	**Chemical Pathogen**	
Very Low	Low	Groundwater travel time over 5 years (Zone 4)
Low	Medium	Groundwater travel time 1 to 5 years (Zone 3)
Medium	High	Groundwater travel time 1 year or less (Zone 2)
High	High	Groundwater travel time less than 90 days (Zone 1)

Table 4: Exposure and Hazard Categories

Exposure Likelihood		Criteria
Bacteriological Pathogen	Chemical Pathogen	
Hazard Consequence (Bacteriological and Chemical Pathogens)		Human Criteria
Very Low		Exceeds aesthetic objectives in drinking water guidelines
Low		Short-term health conditions (Lost time: days)
Medium		Chronic health hazard (Lost time: weeks to months)
High		Acute health hazard (permanent disabilities or fatalities)

The resulting risk ranks "high", "medium", "low,", and "very low" are then plotted on the Risk Map (Figure 2 and 3) by using colours to represent the different risk categories (Magenta=High, Red=Medium, Yellow=Low and Green- Very Low) and identified in the Risk Matrix for each set of community wells as shown in Figures 5a and 5b.

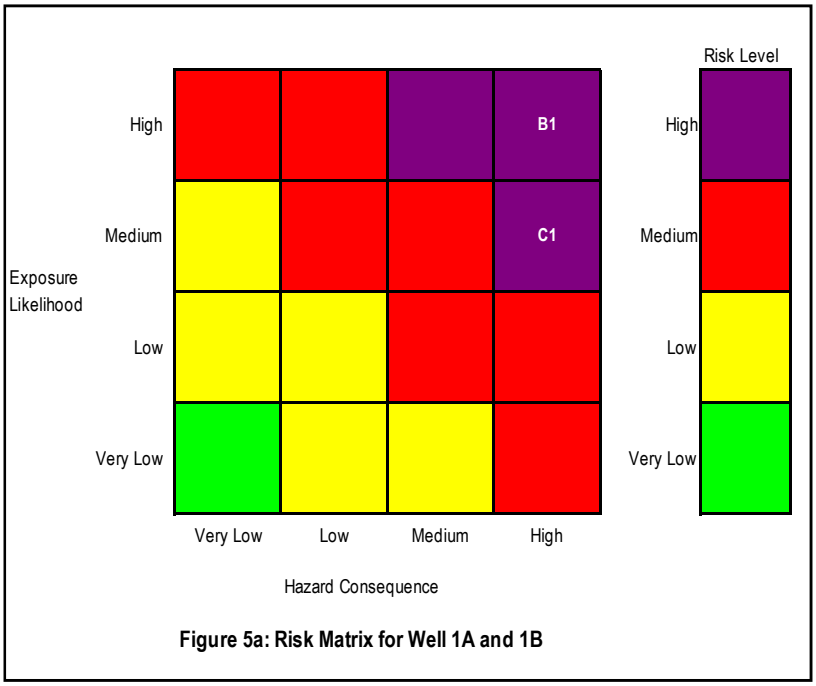

Figure 5a: Risk Matrix for Well 1A and 1B

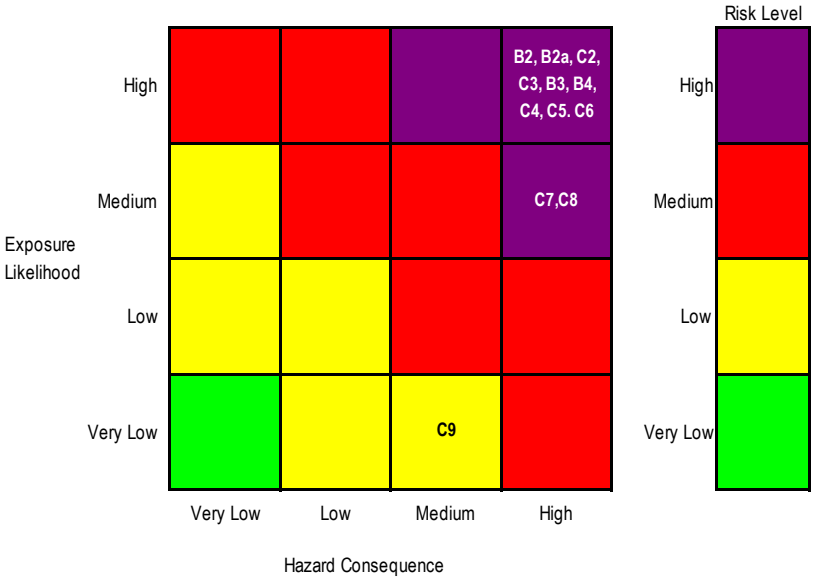

Figure 5b: Risk Matrix for Well 2A and 2B

Note: Figure 4, 5a and 5b are produced in colour; reproduction may not be representative of the original.

Understanding, tracking and managing identified risks becomes straight forward and intuitive through the use of the colour-coded Risk Map presented in Figure 3 which shows the specific risk rank for each potential hazard. The symbols associate with the potential hazards; shown in Figure 3, correspond to the interpreted level of risk based on the likelihood and consequence of exposure as shown in the Risk Matrix (Figure 4).

The Risk Map is the key deliverable and forms the basis for the risk-based AWHPP.

Table 5 represents a summary of risk scenarios within the capture zones as identified in Table 2 and evaluated using the Risk Matrix (Figure 4) based on exposure and hazard categories identified in Table 4. The risk rank results (as shown in Figures 5a and 5b) are a function of applying the hazard scenario to the risk matrix framework, and provide an overall risk ranking for individual contaminant sources.

Table 5: Risk Database and Risk Evaluation

MAP ID	Time (Capture Zone)	HAZARD DESCRIPTION	EXPOSURE LIKELIHOOD	HAZARD CONSEQUENCE	RISK RANK
Well 1A and 1B					
B1	Zone 1	Effluent from septic field. There is one septic system in this zone (House # 5)	High	High	**High**
C1	Zone 1	Release or Spill from AST. There is one AST in this zone (House # 5) with a double walled fuel tank.[1]	Low	High	**Medium**
Well 2A and 2B					
B2	Zone 1	Horse manure in pen[2]	High	High	High
B2a	Zone 1	Runoff from manure pile north of horse pen[2,3]	High	High	High
C2	Zone 1	Release or Spill from AST. There are ASTs in this area (House 9, 10, 11) with standard fuel tanks.	High	High	High
C3	Zone 2	Release or Spill from AST. There are 5ASTs within this area (Houses 4,5,6,7,and 8) with standard tanks.	High	High	High
B3	Zone 1	Effluent from septic field. There are 3 septic fields (House # 9, 10 and 11) within or directly adjacent to this zone.	High	High	High
B4	Zone 2	Effluent from septic field. There are five septic fields (House # 4, 5, 6, 7, 8) within this zone	Medium	High	High
C4	Zone 2	Former fuel line leak at Administration Building	High	High	High
C5	Zone 2	Observed hydrocarbon staining and odour around the AST at House 4 and 6	High	High	High
C6	Zone 1	Observed hydrocarbon staining and odour around the AST at House 10	High	High	High
C7	Zone 2	Release or Spill from AST. There are two fuel tanks at Administration Building with double walls.[1]	Low	High	Medium
C8	Zone 1	Release or Spill from AST. There is one ASTs in this area (House 9) with a double walled fuel tank.[1]	Low	High	Medium
C9	Zone 1	Remediated fuel spill near House 10[4]	Very Low	Medium	Low

Notes:

1. Double walled fuel tanks are considered to present a low likelihood of expose due to the added level of protection from tank leakage.

2. Pathogens found in horse manure include viruses, parasites and bacteria such as *C. Parvum*, *Giardia,* and *E.Coli.* (Bidyut et al. 2007; Hancock et al 1998; Health Canada, Jan 2012; Health Canada, April 2012; Krogman et al. 2006 and Olson, 2001)

3. Drainage from the manure pile may be connected to the capture zone via ditching and surface drainage.

4. Assumed to be low exposure likelihood as site has been considered by EBA as remediated to below the YCSR Residential Land Use standards and very low concentrations of hydrocarbons would remain.

5. APECs are numbered based on field observations with C indicating a chemical pathogen and B indicating a bacteriological pathogen

Several locations of environmental concern were noted outside the capture zones and/or were not observed to be a problem at the time of the field review. These include:

- Hydrocarbon stained areas at Houses 12 and 13, Duplex 16/17 and the Youth Drop-In Centre;
- Abandoned Well 15 which has not been decommissioned; and
- Indications of concern from WRFN citizens regarding possible future pesticide and heavy equipment use in the firebreak line.

The Risk Database and Risk Maps represent the current conditions of the well and aquifer and should not be considered as a static item "one-time". The Risk Database and Risk Maps should be updated as new risks are identified and as known risks are managed to low levels and taken off the database.

5.0 STAGE THREE – RISK MANAGEMENT

5.1 Risk Management Strategy

The risk management strategy integrates information collected during the capture zone delineation and hazard identification steps and provides workable strategies for preventing, detecting, and responding to wellhead protection risks. The following includes examples of such strategies:

- Endorsing and promoting Best Management Practices (BMPs);
- Providing public and landowner information sessions and training; and,
- Implementing Action and Management Strategies provided in Table 6.

Most hazard scenarios identified are *potential* rather than existing threats to the WRFN Community Wells. Therefore, based on the AWHPP assessment, the most appropriate risk management for this site will be preventative action and contingency planning in the event that one of the potential hazard scenarios occurs.

Water quality results from the Community Wells do not suggest upgradient septic fields and manure piles are impacting the water quality of the wells at this time. However, it is recommended that livestock and manure piles be located outside of Zone 1 and to implement the education and monitoring programs for septic fields and tanks within the sanitary and 90 day travel time zone (Zone 1). No new septic systems or livestock areas should be allowed within Zone 1.

In terms of risk communication, the Risk Maps and Risk Information Poster can form a concise and convenient basis for communicating information regarding the status of potential threats to all stakeholders including the risk management team, water system operators, community organizations, or municipal councils. Frequent reporting is important to document progress, improve public perception, reduce potential legal issues and possibly reduce insurance costs.

5.2 Risk Reduction Plan

A Risk Reduction Plan involves pre-planning actions to respond to acute risks situated within the capture zone. For example, this would include emergency response actions and communication should a contaminant release occur within a well capture zone. A list of risk reduction and elimination strategies is provided in Table 6.

Table 6. Risk Reduction/Elimination Strategies to be Considered

Map ID	Hazard Description	Current Risk	Risk Reduction Options to Consider	Risk Elimination Options to Consider
C1, C7 and C8	Release or spill from double walled ASTs within Zones 1 and 2	Medium	Tertiary containment (i.e. concrete enclosure protected from rainwater) to capture any spills resulting from damage to fuel lines or overflows during refilling of ASTs.	Replace with propane
C2 C3,	Release or spill from ASTs within Zones 1 and 2	High	Secondary containment (i.e. double walled tanks) and flex hose. Implement spill contingency plan. Ensure that fuel delivery personnel exercise extreme caution when refilling ASTs. A WRFN representative should act as a spotter during filling of all ASTs.	Replace with propane
B1, B3, B4	Effluent from septic fields within Zones 1 and 2	High	Educate and train home owners how to properly maintain these systems and what can be disposed of (i.e. no disposal of household hazardous wastes or pharmaceuticals). Implement a monitoring system to ensure proper operation and timely pump-out.	Ensure all septic tanks and fields are registered with environmental health and implement a yearly monitoring program to ensure proper operation.
B2, B2a	Manure pile within or adjacent Zone 1	High/ Medium	-	Relocate livestock and manure pile storage away from capture zones.
C4, C5, C6	Fuel line leak at Administration Building, House 4 and 6 ASTs, and House 10 AST	Medium	-	Conduct site investigation and conduct remedial excavation of contaminated material.

5.3 Risk Monitoring

A Risk Monitoring Plan involves periodic reviewing, auditing and updating of the Risk Maps and Risk Database. Once an AWHPP is in place, continued implementation of the program is essential for it to be worthwhile. The Risk Monitoring Plan entails periodically inspecting the Community Wells and well sites; periodically inspecting the capture zones for new AWHPP hazards; working together with the Town of Beaver Creek to identify and create zoning by-laws for the Beaver Creek area; and updating the status for each identified risk as risk management actions are implemented. The outcome of this would be revised Risk Maps for display or reporting purposes.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

EBA has updated this AWHPP from the original version developed in 2007 for the Community Wells within the WRFN community, located within the village of Beaver Creek, based on current risks assessed in 2012.

Based on the findings of this study, EBA emphasizes the following conclusions:

- To date there has been no identified contamination in groundwater sampled from the Community Wells; however, trans-1,2-dichloroethylene was detected in the treated water in System 1. Resampling results showed this chemical to be below detection limits and the result is considered to be a "false positive". Any release of contaminants within the identified capture zones would represent a potential risk to the aquifer and water quality of the Community Wells;
- Water quality results from the Community Wells do not suggest that upgradient septic fields and manure pile storage are impacting the water quality of the wells, however, septic fields and manure pile storage have the potential to impact the System 2 wells;
- The highest risks to the Community Wells are from livestock manure storage, leachate from septic fields or tanks, potential releases and spills from Aboveground Storage Tanks (ASTs); and
- There are additional potential areas of hydrocarbon contamination from leaking ASTs at buildings connected to System 1 but located outside of the well capture zones for System 2. These areas could potentially lead to contamination of the Beaver Creek aquifer (but not directly impact the community wells).

6.2 Recommendations

In addition to those recommended risk reduction/ elimination strategies provided in Table 6, EBA also recommends that WRFN complete the following:

- Replace all above ground storage tanks within the capture zones with double walled tanks and flex line hosing for secondary containment;
- Though Well 15 is not within the WRFN well capture zones, this well presents a contamination risk to the Beaver Creek Aquifer, and EBA recommends that WRFN properly decommission Well 15 based on the Canadian Groundwater Association Guidelines for Water Well Construction;

- Though EBA did not observed evidence of hydrocarbon contamination or use of chemicals in the firebreak line at the time of the site visit, this is an easily accessed area within the well capture zones and special attention to protecting this area is recommended;
- Conduct a site inspection and remedial excavation of potentially contaminated material from the noted fuel line leak at the Administration Building, as well as observed hydrocarbon stained areas at Houses 4, 6, 10 12 and 13, Duplex 16/17 and the Youth Drop-In Centre;
- Endorse and promote hazardous waste minimization and collection programs;
- Implement contingency planning including emergency response actions and communication. WRFN should update the emergency and spill response plan identifying key personnel responsible to respond in the event of an occurrence or spill when changes in Chief and Council occur;
- Complete regular tracking and monitoring of all well risks around the WRFN community (either with internal staff resources or outsourced to EBA) ;
- Provide protection to the well capture zones by installing signs identifying entrances to the AWHPP area;
- Educate the WRFN community members regarding the importance of maintaining ASTs and septic field maintenance and operation in order to protect the community wells;
- Review and update the AWHPP on a regular basis. An annual review may be sufficient; however, thought should be given to an "as required" approach; and
- Incorporate this AWPP into the WRFN community development plan, and work with the Yukon Government to develop a Groundwater Protection Program for the Village of Beaver Creek (as areas within the WRFN Community Well capture zones are not Land Set Aside for WRFN). This Groundwater Protection Program should consist of the following:

    1. Formal recognition and protection status for identified well protection zones such as those identified in this report;
    2. Enforcement of well protection measures;
    3. Restrictions on some land use activities within sensitive areas, well protection zones, designated recharge areas and areas of high vulnerability to contamination of the aquifer from surface sources (such as where the overlaying impervious layer is thinner);
    4. Hydrogeological assessment as a requirement of development for land use activities considered as higher risk, and including groundwater monitoring on and adjacent to specified sites as a condition of development; and
    5. A response action plan and remedial action plans as a condition of development for some specified higher risk land uses.

7.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Sincerely,
EBA Engineering Consultants Ltd.

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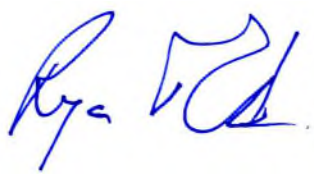

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TABLES

TABLE 1: SUMMARY OF WELL INFORMATION FOR WHITE RIVER FIRST NATION AT BEAVER CREEK

Well #	Well Status	Buildings Serviced		UTM Well Location		Well Log (Y/N)	Drilling Contractor	Date Drilled	Casing Diameter		Well Depth				Water Depth				Approx. Yield (USGPM)	Screen Information	Surface Completion Details	Potential Sources of Contamination				
											Well Log		Measured		Well Log		Measured					Septic Tank	Septic Field	Fuel Tank	Surface Water	Other / Comments
		Description	Address	Easting	Northing				(mm)	(inches)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)								
1 (Old)	Decomissioned	Administration Staff Cabin Duplex	19 18 16/17	506,098	6,916,256	Y	Midnight Sun	18-Oct-95	150	5.9	27.4	90.0	24.35	79.9	-	-	-	-	-	20-slot	760mm below grade	20 m	30 m	26 m	N	Decomissioned in 2008 Well pit backfilled
1A	Community	Lot 1017	System 1 Pump House	506,043	6,916,251	Y	Double D	15-Sep-06	155	6.1	35	114.8	-	-	15.0	49.2	-	-	72	20-slot	600 mm above grade	58 m	>60m	55 m	N	Pitless unit, sanitary seal to 6 m bgs, fenced enclosure
1B	Community	Lot 1017	System 1 Pump House	506,037	6,916,263	Y	Double D	28-Aug-07	155	6.1	35	114.8	-	-	14.6	47.9	-	-	132	100-slot	600 mm above grade	>60 m	>60 m	>60 m	N	Pitless unit, sanitary seal to 6 m bgs, fenced enclosure
2A	Community	Block 15	System 2 Pump House	506,107	6,916,580	Y	Midnight Sun	3-Nov-83	178	7.0	34.1	112.0	-	-	14.3	47.0	-	-	66*	20-slot	200mm below grade	>100 m	>100 m	40 m	N	Upgraded to pitless unit, sanitary seal to 6 m bgs, fenced enclosure
2B	Community	Block 15	System 2 Pump house	506,120	6,916,580	Y	Double D	31-Aug-07	155	6.1	34.4	112.9	-	-	13.7	44.9	-	-	132	100-slot	600 mm above grade	>100 m	>100 m	30 m	N	Pitless unit, sanitary seal to 6 m bgs, fenced enclosure
3	Domestic	Lot 1017W	1W, 2W	505,869	6,916,425	Y	Whitewater	16-Oct-00	150	5.9	28.3	93.0	-	-	14.6	48.0	-	-	60	no screen	560mm below grade	26 m	33 m	34 m	Y	well pit, fibreglass insulation
4	Domestic	Lot 1017W	3W, 4W	505,849	6,916,307	Y	Whitewater	11-Oct-00	150	5.9	22.6	74.0	22.22	72.9	15.2	50.0	16.235	53.3	60	no screen	600mm below grade	23 m	31 m	24 m	Y	well pit, fibreglass insulation
5	Decomissioned	Youth Centre Land Claims Office Lot 1017	1B 1A 2A	506,218	6,916,311	Y	Fredelana	24-Sep-97	150	5.9	31.1	102.0	26.20	86.0	-	-	-	-	-	15-slot	940mm below grade	~ 40 m	~ 40 m	25 m	Y	Decomissioned in 2008 Well pit backfilled
6	Decomissioned	Lot 1017	13, 14 / 15	506,172	6,916,392	Y	Fredelana	19-Sep-97	150	5.9	29.6	97.0	25.92	85.0	-	-	-	-	-	15-slot	400mm above grade	25 m	30 m	30 m	N	Decomissioned in 2011
7	Decomissioned	Lot 1017	7, 8	506,020	6,916,318	N	-	-	150	5.9	-	-	28.91	94.8	-	-	-	-	-	-	500mm below grade	31 m	35 m	30 m	Y	Decomissioned in 2011 Well pit backfilled
8	Decomissioned	Block 15	25, 26	506,238	6,916,753	Y	Territorial	3-Feb-97	178	7.0	19.8	65.0	17.02	55.8	-	-	-	-	-	15-slot	450mm above grade	33 m	~ 35 m	28 m	N	Decomissioned in 2008
9	Decomissioned	Lot 1017	9, 12	506,097	6,916,380	Y	Fredelana	16-Sep-97	150	5.9	28.7	94.0	-	-	-	-	-	-	-	15-slot	1450mm below grade	26 m	32 m	22 m	Y	Decomissioned in 2011 Well pit backfilled
10	Decomissioned	Lot 1017	2	506,153	6,916,214	N	Fredelana	28-Sep-97	178	7.0	29.9	98.0	26.00	85.3	-	-	-	-	-	15-slot	915mm below grade	23 m	27 m	19 m	Y	Decomissioned in 2011 Well pit backfilled
11	Decomissioned	Lot 1017	3, 4	506,106	6,916,187	Y	Midnight Sun	11-Aug-90	150	5.9	31.4	103.0	-	-	-	-	-	-	-	20-slot	400mm above grade	21 m	25 m	26 m	N	Decomissioned in 2008
12	Decomissioned	Lot 1017	5, 6	506,002	6,916,215	Y	-	-	150	5.9	-	-	21.26	69.7	-	-	-	-	-	-	480mm above grade	30 m	33 m	23 m	N	Decomissioned in 2011
13	Decomissioned	Lot 1017	9, 10	506,022	6,916,393	Y	Midnight Sun	12-Aug-90	150	5.9	25.0	82.0	35.66	117.0	-	-	-	-	-	20-slot	300mm above grade	42 m	45 m	30 m	N	Decomissioned in 2011
14	Abandoned	Block 15	YTG HWYS	506,205	6,916,543	Y	Midnight Sun	2-Nov-90	150	5.9	32.8	107.5	15.32	50.3	-	-	14.730	48.3	30	20-slot	100mm above grade	-	-	-	-	Well could not be found
15	Abandoned	Lot 1017	13	506,149	6,916,398	N	-	-	150	5.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Existing well. Not properly decomissioned
16	Decommissioned	Lot 1017	2A	-	-	N	-	-	150	5.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 2: AREAS OF POTENTIAL ENVIRONMENTAL CONCERN WITHIN CAPTURE ZONES FOR WRFN COMMUNITY WELLS 1A, 1B, 2A and 2B

					Approximate Distance from			
ID	**APECs**	**Easting**	**Northing**	**Time Period**	**Well # 1A & 1B**	**Well 2A & 2B**	**Notes**	**PCOC**
	Livestock							
B2, B2a	Horse Pen Manure (2 locations)	506009 / 506010	6916442 / 6916917	60s - current	190	169	Recommeded Relocation of Horse Pens in 2007 AWHPP	Biological (bacteria, viruses, protozoa), Chemicals (nitrites, phosphates)
	ASTs							
C1	ASTs within Capture Zones for Wells 1A & 1B	506061	6916243	current	55	395	House 5	Hydrocarbons (fuel, oils)
C2, C3	ASTs within Capture Zones for Wells 2A & 2B	506039 (Closest AST to Wells)	6916415 (Closest AST to Wells)	current	66 (House 6)	190 (House 10)	House 4, 6, 7, 8, 9, 10 and 11	Hydrocarbons (fuel, oils)
	Septic Pits							
B1	Septic Systems within Capture Zones for Wells 1A & 1B	506024	6916184	current	70	410	House 5	Biological (bacteria, viruses, protozoa), Chemicals (household cleaning products,nitrites, phosphates)
B3, B4	Septic Systems within Capture Zones for Wells 2A & 2B	506094 (Closest House to Wells)	6916421 (Closest House to Wells)	current	180	164	House 4, 6, 7, 8, 9, 10 and 11	Biological (bacteria, viruses, protozoa), Chemicals (household cleaning products,nitrites, phosphates)
	Spills/ Soil Relocation Permits							
C8	Soil Relocation Permit (4202-23-384), Remediated by EBA	506055	6916446	2007 - 2010	180	150	Remediated by EBA in 2010	Hydrocarbons (fuel, oils)
C4	Leaking UST line under Admin Building	506085	6916270	2007 - current	38	310	Leaking UST fuel line. No follow up to date.	Hydrocarbons (fuel, oils)
C5	Observed hydrocarbon staining and odour around the AST at House 4 and 6	506093	6916182	current	70	385	House 4 and ASTs	Hydrocarbons (fuel, oils)
C6	Observed hydrocarbon staining and odour around the AST at House 10	506043	6916421	current	185	180	House 10 AST	Hydrocarbons (fuel, oils)
Additional areas of concern noted (No potential hazard noted/not within capture zone)								
	Industrial Activity							
N/A	Cutline for the Firebreak line within Capture Zones for Wells 1A and 1B and Wells 2A and 2B	-	-	40s - summer 2006	200	500	Construction Equipment and reportedly used Agent Orange and DDT	Hydrocarbons (fuel, oils, lubricants), Chemicals (herbicides, pesticides) and metals
	Wells							
N/A	Well 15 (Abandoned)	506168	6916400	current	175	190	Potential conduits for contaminants	Any contaminated surface water that can migrate into the sub-surface via the improperly abandonded well
	Spills/ Soil Relocation Permits							
N/A	Observed hydrocarbon staining and odour around the AST at Houses 12 and 13, Duplex 16/17 and the Youth Drop in Centre	-	-	current	-	-	ASTs located adjacent to buildings	Hydrocarbons (fuel, oils)

Table 3a. System 1 and System 2 Water Quality Results for 2012

Well System	System 1		System 2			Guidelines for CDWQ[1]	
Well ID	Raw (Well 1A)	Treated	Raw (Well 2A)	Raw (Well 2B)	Treated		
Date Sampled	30-Jan-12	30-Jan-12	14-Nov-12	14-Nov-12	14-Nov-12	MAC[2]	AO[3]
Physical Tests							
Colour, True (CU)	<5.0	<5.0	<5.0	<5.0	<5.0	NS	15
Conductivity (uS/cm)	308	309	353	353	362	NS	NS
Hardness (as CaCO3)	175	175	197	193	187	NS	NS
pH	8.13	8.16	7.5	7.52	7.7	NS	6.5 - 8.5*
Total Dissolved Solids	189	193	231	229	229	NS	500
Turbidity (NTU)	0.11	0.15	0.2	0.1	<0.1	<0.3	NS
Anions and Nutrients							
Total Alkalinity (as CaCO3)	126	124	170	169	170	NS	NS
Chloride	0.73	1.45	1.57	1.57	2.35	NS	250
Fluoride	0.055	0.056	0.05	0.05	0.05	1.5	NS
Nitrate and Nitrite (as N)	0.248	0.245	-	-	-	NS	NS
Nitrate (as N)	0.248	0.245	0.77	0.77	0.77	10	NS
Nitrite (as N)	<0.001	<0.001	<0.01	<0.01	<0.01	NS	1.0*
Sulfate	38.5	39	29.1	29.1	29.1	NS	500
Bicarbonate	-	-	207	206	208	NS	NS
Carbonate	-	-	<6	<6	<6	NS	NS
Hydroxide	-	-	<5	<5	<5	NS	NS
Total Metals							
Aluminum	<0.01	<0.01	<0.005	<0.005	<0.005	NS	0.1*
Antimony	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	0.006	NS
Arsenic	0.00061	0.00063	0.0005	0.0005	0.0004	0.01	NS
Barium	0.027	0.026	0.04	0.037	0.037	1.0	NS
Boron	<0.1	<0.1	0.03	0.027	0.024	5	NS
Cadmium	<0.0002	<0.0002	<0.00007	<0.00007	<0.00007	0.005	NS
Calcium	56.9	56.3	64.3	63.2	61	NS	NS
Chromium	<0.002	<0.002	0.0018	0.0017	0.0016	0.05	NS
Copper	0.0015	0.0628	0.002	0.001	0.03	NS	1
Iron	<0.03	<0.03	<0.005	<0.005	<0.005	NS	0.3
Lead	<0.0005	<0.0005	<0.0001	<0.0001	0.0001	0.01	NS
Magnesium	8.06	7.99	8.78	8.58	8.5	NS	NS
Manganese	<0.002	<0.002	<0.001	<0.001	<0.001	NS	0.05
Mercury	<0.0002	<0.0002	<0.00001	<0.00001	<0.00001	0.001	NS
Potassium	1.24	1.21	1.2	1.2	1.2	NS	NS
Selenium	<0.001	<0.001	<0.0006	<0.0006	<0.0006	0.01	NS
Silicon	-	-	6.16	6.18	6.21	NS	NS
Sodium	3.5	4	3.6	3.4	4.2	NS	200
Uranium	0.00034	0.00033	<0.0005	<0.0005	<0.0005	0.02	NS
Vanadium	-	-	0.0008	0.0008	0.0008	NS	NS
Zinc	<0.05	<0.05	0.004	0.002	0.016	NS	5

Notes
NS - No Standard Currently Established
BOLD - Indicates an exceedance of Standard
All units are in mg/L unless otherwise stated
[1]Guidelines for Canadian Drinking Water Quality - Health Canada (2012)
[2]Maximum Acceptable Concentrations
[3]Aesthetic Objectives
[4]Yukon Contaminated Sites Regulations (YCSR) Drinking Water Standards (DW) - Schedule 3 of the Yukon Environment Act (2002)
*Based on other guidelines (OG) in the Guidelines for Canadian Drinking Water Quality - Health Canada (2012)

Table 3b. System 1 and System 2 Water Quality Results for 2012

Well System	System 1		System 2			Guidelines for CDWQ[1]	
Well ID	Raw (Well 1A)	Treated	Raw (Well 2A)	Raw (Well 2B)	Treated		
Date Sampled	30-Jan-12	30-Jan-12	14-Nov-12	14-Nov-12	14-Nov-12	MAC[2]	AO[3]
Volatile Organic Compounds							
Benzene	-	<0.0005	-	-	-	0.005	NS
Bromodichloromethane	-	0.0012	-	-	-	NS	NS
Bromoform	-	<0.001	-	-	-	NS	NS
Carbon Tetrachloride	-	<0.0005	-	-	-	0.002	NS
Chlorobenzene	-	<0.001	-	-	-	NS	NS
Dibromochloromethane	-	<0.001	-	-	-	NS	NS
Chloroethane	-	<0.001	-	-	-	NS	NS
Chloroform	-	0.0058	-	-	-	NS	NS
Chloromethane	-	<0.005	-	-	-	NS	NS
1,2-Dichlorobenzene	-	<0.0007	-	-	-	0.2	0.003
1,3-Dichlorobenzene	-	<0.001	-	-	-	NS	NS
1,4-Dichlorobenzene	-	<0.001	-	-	-	0.005	0.001
1,1-Dichloroethane	-	<0.001	-	-	-	NS	NS
1,2-Dichloroethane	-	<0.001	-	-	-	0.005	NS
1,1-Dichloroethylene	-	<0.001	-	-	-	0.014	NS
cis-1,2-Dichloroethylene	-	<0.001	-	-	-	NS	NS
trans-1,2-Dichloroethylene	-	0.0042	-	-	-	NS	NS
1,3-Dichloropropene (cis & trans)	-	<0.0014	-	-	-	NS	NS
Dichloromethane	-	<0.005	-	-	-	0.05	NS
1,2-Dichloropropane	-	<0.001	-	-	-	NS	NS
cis-1,3-Dichloropropylene	-	<0.001	-	-	-	NS	NS
trans-1,3-Dichloropropylene	-	<0.001	-	-	-	NS	NS
Ethylbenzene	-	<0.0005	-	-	-	NS	0.0024
Methyl t-butyl ether (MTBE)	-	<0.0005	-	-	-	NS	0.015
Styrene	-	<0.0005	-	-	-	NS	NS
1,1,1,2-Tetrachloroethane	-	<0.001	-	-	-	NS	NS
1,1,2,2-Tetrachloroethane	-	<0.001	-	-	-	NS	NS
Tetrachloroethylene	-	<0.001	-	-	-	0.03	NS
Toluene	-	<0.0007	-	-	-	NS	NS
1,1,1-Trichloroethane	-	<0.001	-	-	-	NS	NS
1,1,2-Trichloroethane	-	<0.001	-	-	-	NS	NS
Trichloroethylene	-	<0.001	-	-	-	0.005	NS
Trichlorofluoromethane	-	<0.001	-	-	-	NS	NS
Vinyl Chloride	-	<0.001	-	-	-	0.002	NS
ortho-Xylene	-	<0.0005	-	-	-	NS	NS
meta- & para-Xylene	-	<0.0005	-	-	-	NS	NS
Xylenes	-	<0.00075	-	-	-	NS	0.3
Trihalomethanes							
Total THMs	-	0.007	-	-	-	0.1	NS
Haloacetic Acids							
Bromochloroacetic Acid	-	0.001	-	-	-	NS	NS
Dibromoacetic Acid	-	<0.001	-	-	-	NS	NS
Dichloroacetic Acid	-	0.003	-	-	-	NS	NS
Total Haloacetic Acids	-	<0.0054	-	-	-	0.08	NS
Monobromoacetic Acid	-	<0.001	-	-	-	NS	NS
Monochloroacetic Acid	-	<0.005	-	-	-	NS	NS
Trichloroacetic Acid	-	0.0012	-	-	-	NS	NS

Notes
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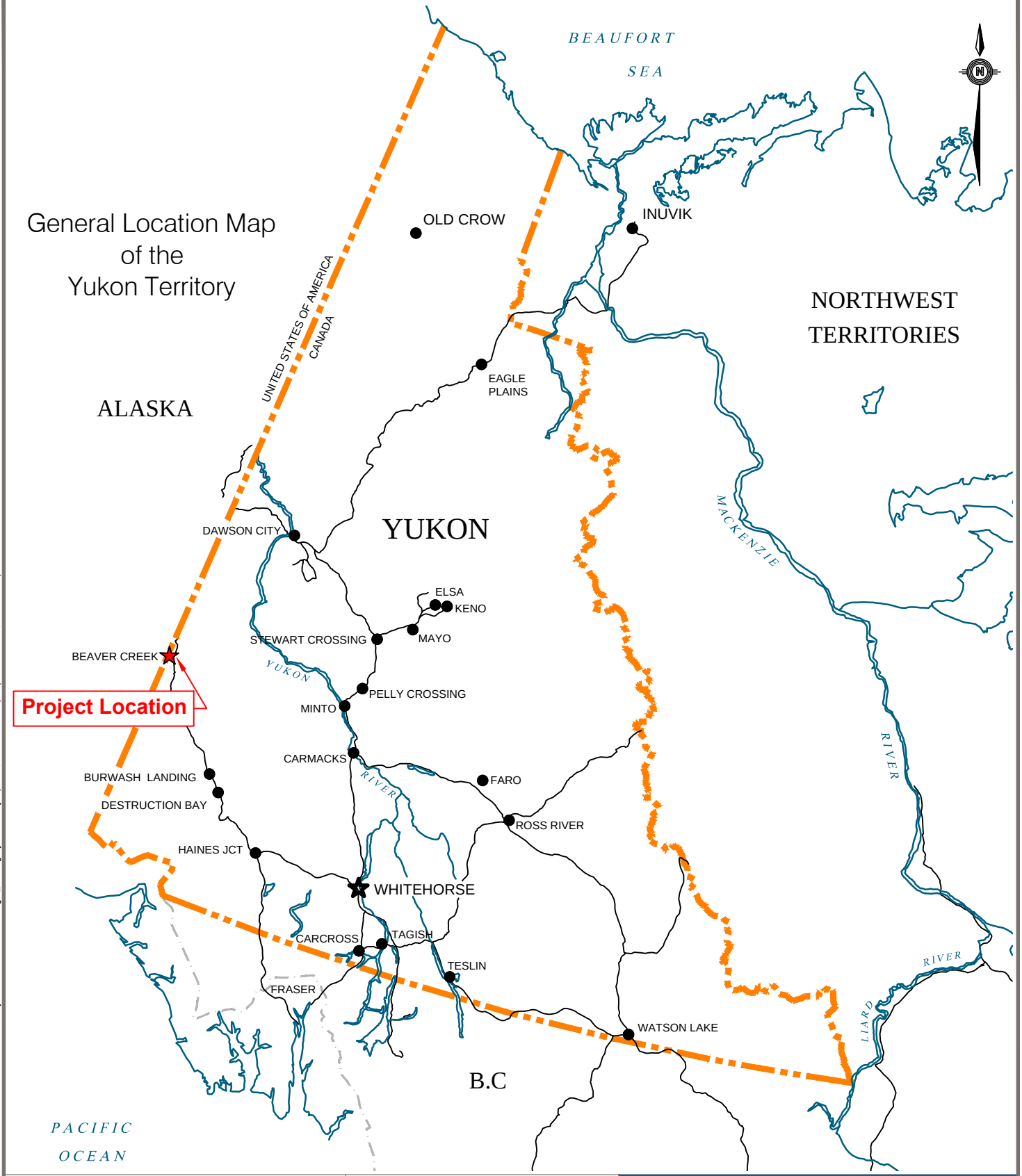
All units are in mg/L unless otherwise stated
[1]Guidelines for Canadian Drinking Water Quality - Health Canada (2012)
[2]Maximum Acceptable Concentrations
[3]Aesthetic Objectives
[4]Yukon Contaminated Sites Regulations (YCSR) Drinking Water Standards (DW) - Schedule 3 of the Yukon Environment Act (2002)
*Based on other guidelines (OG) in the Guidelines for Canadian Drinking Water Quality - Health Canada (2012)

Table 3c. System 1 and System 2 Water Quality Results for 2012

Well System	System 1		System 2			Guidelines for CDWQ[1]	
Well ID	Raw (Well 1A)	Treated	Raw (Well 2A)	Raw (Well 2B)	Treated		
Date Sampled	30-Jan-12	30-Jan-12	14-Nov-12	14-Nov-12	14-Nov-12	MAC[2]	AO[3]
Extractable Petroleum Hydrocarbons							
EPHw 10-19	-	-	<0.1	<0.1	-	NS	NS
EPHw 19-32	-	-	<0.1	<0.1	-	NS	NS
LEPHw	-	-	<0.1	<0.1	-	NS	NS
HEPHw	-	-	<0.1	<0.1	-	NS	NS
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	-	-	<0.0001	<0.0001	-	NS	NS
Acenaphthylene	-	-	<0.0001	<0.0001	-	NS	NS
Acridine	-	-	<0.00005	<0.00005	-	NS	NS
Anthracene	-	-	<0.0001	<0.0001	-	NS	NS
Benzo(a)anthracene	-	-	<0.00001	<0.00001	-	NS	NS
Benzo(a)pyrene	-	-	<0.00001	<0.00001	-	0.00001	NS
Benzo(b)fluoranthene	-	-	<0.00001	<0.00001	-	NS	NS
Benzo(g,h,i)perylene	-	-	<0.0001	<0.0001	-	NS	NS
Benzo(k)fluoranthene	-	-	<0.00002	<0.00002	-	NS	NS
Chrysene	-	-	<0.0001	<0.0001	-	NS	NS
Dibenzo(a,h)anthracene	-	-	<0.00001	<0.00001	-	NS	NS
Fluoranthene	-	-	<0.0001	<0.0001	-	NS	NS
Fluorene	-	-	<0.0001	<0.0001	-	NS	NS
Indeno(1,2,3-c,d)pyrene	-	-	<0.0001	<0.0001	-	NS	NS
Naphthalene	-	-	<0.0001	<0.0001	-	NS	NS
Phenanthrene	-	-	<0.0001	<0.0001	-	NS	NS
Pyrene	-	-	<0.00002	<0.00002	-	NS	NS
Quinoline	-	-	<0.00034	<0.00034	-	NS	NS

Notes
NS - No Standard Currently Established
BOLD - Indicates an exceedance of Standard
All units are in mg/L unless otherwise stated
[1]Guidelines for Canadian Drinking Water Quality - Health Canada (2012)
[2]Maximum Acceptable Concentrations
[3]Aesthetic Objectives
[4]Yukon Contaminated Sites Regulations (YCSR) Drinking Water Standards (DW) - Schedule 3 of the Yukon Environment Act (2002)
*Based on other guidelines (OG) in the Guidelines for Canadian Drinking Water Quality - Health Canada (2012)

FIGURES



Q:\Whitehorse\Data\0201drawings\Beaver Creek\W23103022-01 WRFN Water Distribution Systems\W23103022-01 Fig.1_R0.dwg [FIGURE 1] April 29, 2013 - 2:02:23 pm (BY: BUCHAN, CAMERON)

CLIENT

WHITE RIVER FIRST NATION

A TETRA TECH COMPANY

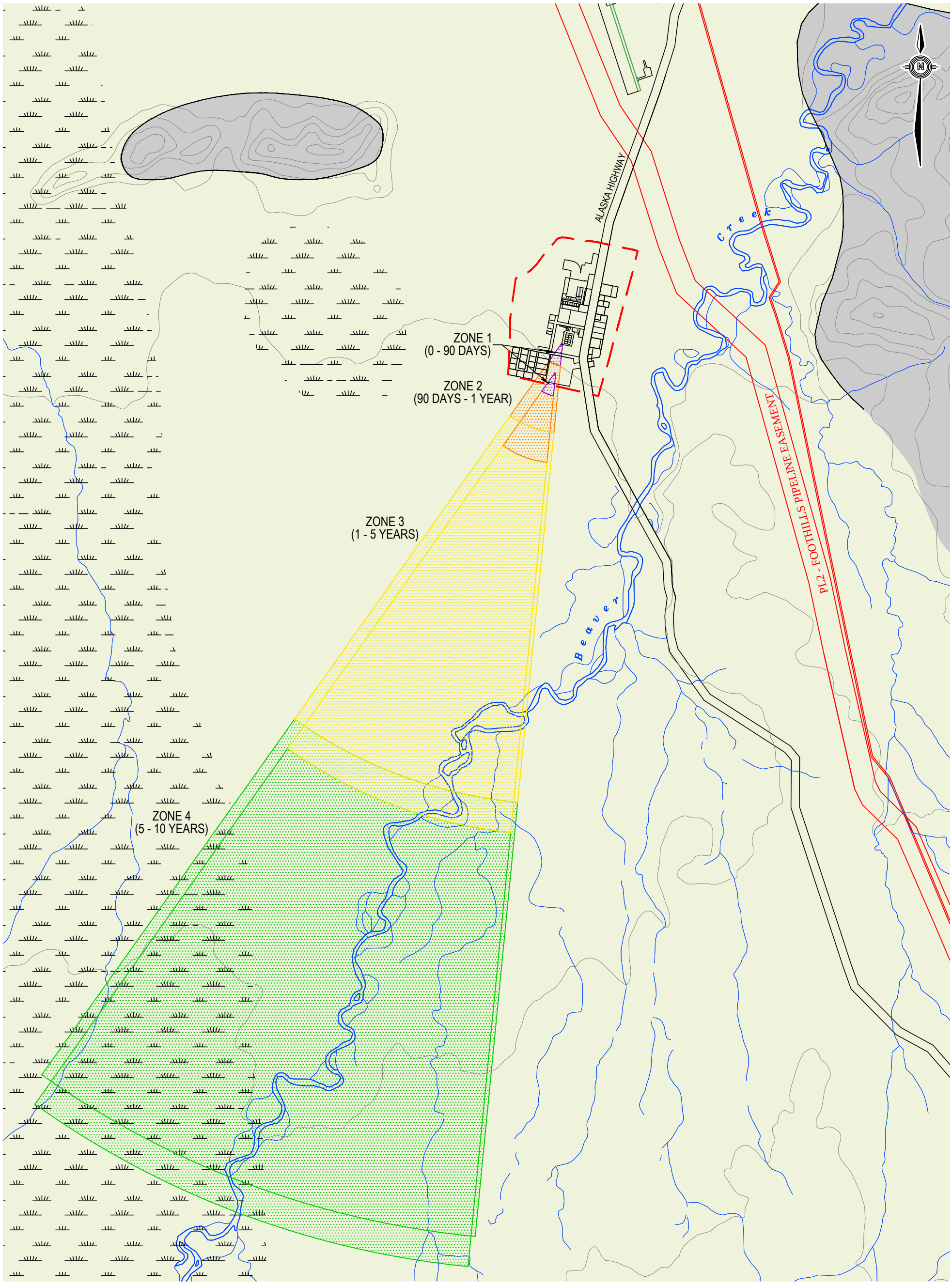
UPDATED AQUIFER AND WELLHEAD PROTECTION PLAN
WHITE RIVER FIRST NATION COMMUNITY WELLS
BEAVER CREEK, YUKON

SITE LOCATION MAP

PROJECT NO.	DWN	CKD	REV
W23103022-01	CB	DPC	0

OFFICE	DATE
EBA-WHSE	April 29, 2013

Figure 1



NOTES :

- THIS DRAWING WAS PRODUCED IN COLOR, REPRODUCTIONS MAY NOT BE REPRESENTATIVE OF THE ORIGINAL.
- THIS DRAWING HAS BEEN COMPILED FROM A SERIES OF AERIAL PHOTOGRAPHS OVERLAIN BY A LEGAL CADASTRAL SURVEY PLAN. THE BUILDINGS, STRUCTURES AND OVERALL ROAD LOCATIONS ARE CONSIDERED APPROXIMATE ONLY. THE WATER WELLS AND SEPTIC FIELDS HAVE BEEN LOCATED BY SITE INSPECTIONS.

0 2 000

Scale: 1: 40 000 (metres)

LEGEND :

- INDICATES AREAS OF POTENTIAL ENVIRONMENTAL CONCERN
- INDICATES MARSHLAND
- WINDY ASSEMBLAGE - DEVONIAN TO CRETACEOUS AGE SHEARED AND FOLIATED GREENSTONE AND VOLCANIC ASH AND TUFF.
- QUATERNARY ASSEMBLAGE - UNCONSOLIDATED GLACIAL, GLACIALFLUVIAL AND GLACIOLACUSTRINE DEPOSITS OF SILT, SAND AND GRAVEL AND LOCAL VOLCANIC ASH.

CLIENT

WHITE RIVER FIRST NATION

A TETRA TECH COMPANY

UPDATED AQUIFER AND WELLHEAD PROTECTION PLAN
WHITE RIVER FIRST NATION COMMUNITY WELLS
BEAVER CREEK, YUKON

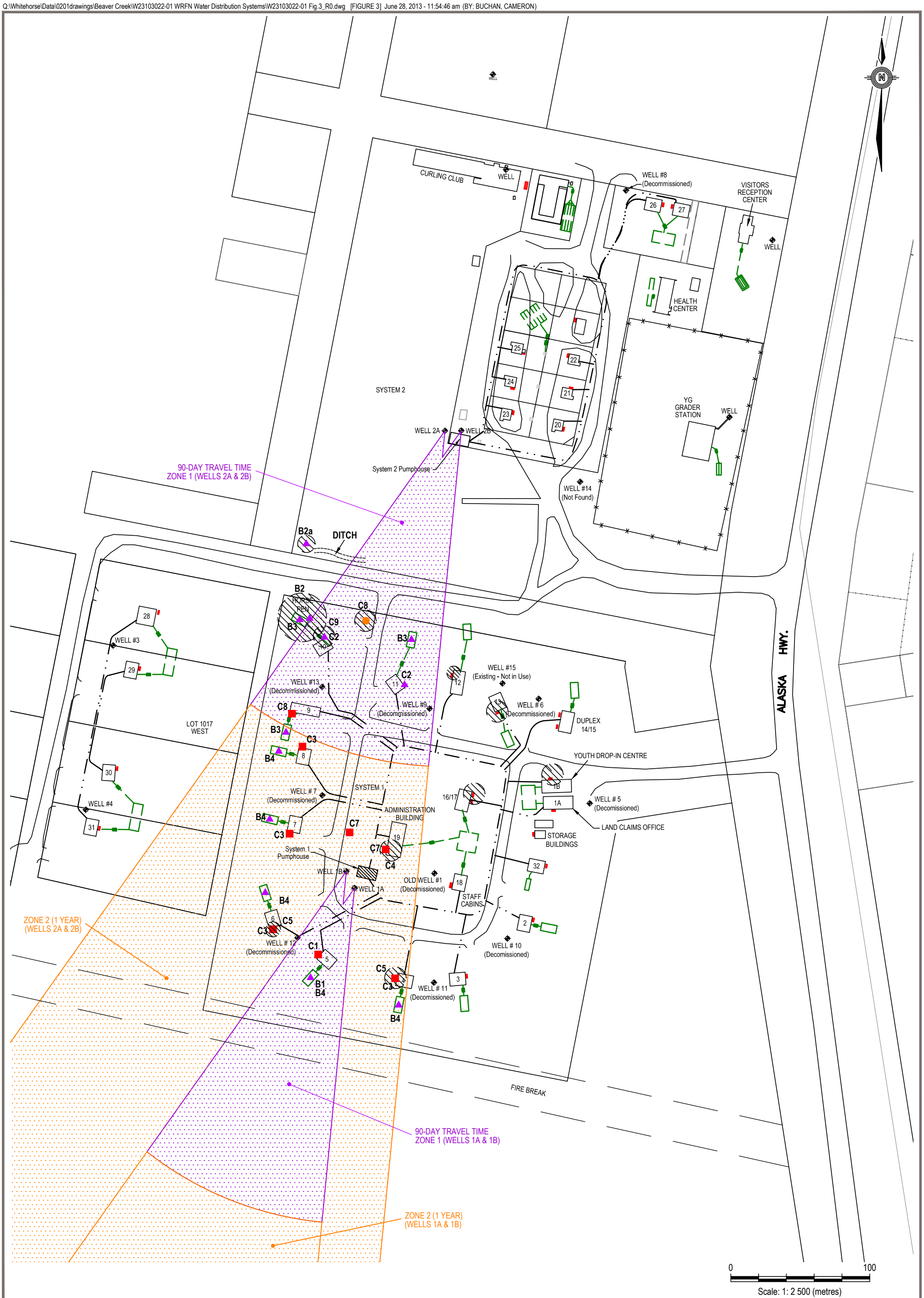
SITE PLAN SHOWING SURFICIAL GEOLOGY AND AQUIFER CAPTURE ZONES

PROJECT NO.	DWN	CKD	REV
W23103022-01	CB	DPC	0

OFFICE	DATE
EBA-WHSE	April 29, 2013

Figure 2

Q:\Whitehorse\Data\0201drawings\Beaver Creek\W23103022-01 WRFN Water Distribution Systems\W23103022-01 Fig.3_R0.dwg [FIGURE 3] June 28, 2013 - 11:54:46 am (BY: BUCHAN, CAMERON)



LEGEND:

WELL #2 - WELL NUMBER
- WATER WELL
- SEPTIC FIELD
- ABOVE GROUND FUEL TANKS (AST)
- AREA OF POTENTIAL CONTAMINATION
- HIGH RISK
- MEDIUM RISK
- LOW RISK
- VERY LOW RISK (NONE IDENTIFIED)

CLIENT

WHITE RIVER FIRST NATION

A TETRA TECH COMPANY

UPDATED AQUIFER AND WELLHEAD PROTECTION PLAN
WHITE RIVER FIRST NATION COMMUNITY WELLS
BEAVER CREEK, YUKON

RISK MAP SHOWING WRFN COMMUNITY WELLS AND CAPTURE ZONES

PROJECT NO.	DWN	CKD	REV
W23103022-01	CB	DPC	0

OFFICE	DATE
EBA-WHSE	April 29, 2013

Figure 3

PHOTOGRAPHS

Photo 1: Double Walled Above Ground Storage Tank at House 5

Photo 2: Typical Above Ground Storage Tank

Photo 1: Horse Pen at House 10

Photo 2: Septic Field Behind House 5

APPENDIX A
EBA'S GENERAL CONDITIONS

GENERAL CONDITIONS

GEO-ENVIRONMENTAL REPORT

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.

This report and the assessments and recommendations contained in it are intended for the sole use of EBA’s client. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA’s Client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA’s instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of EBA’s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA’s instruments of professional service will be used only and exactly as submitted by EBA.

Electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

3.0 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by EBA in its reasonably exercised discretion.

4.0 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of the report, EBA may rely on information provided by persons other than the Client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

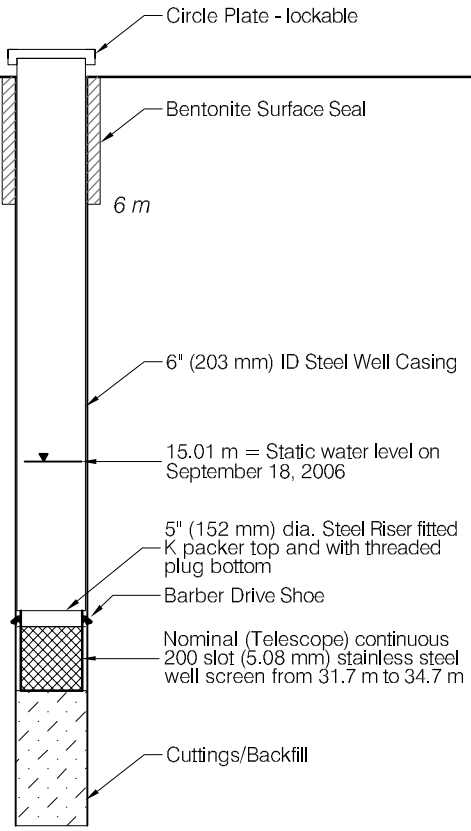
APPENDIX B

WHITE RIVER FIRST NATION COMMUNITY WELL LOGS (WELL 1A, 1B, 2A AND 2B)

HYDROGEOLOGIC LOG

BOREHOLE NO. **WELL # 1 a**

PURPOSE OF HOLE:	Water Supply Well	GROUND ELEV. (m-geod):	
DRILLING METHOD:	Dual Air Rotary	TOP OF CASING (m-geod):	
START DRILLING:	September 15, 2006	CASING STICK UP (m):	1.0 m above grd.
SCREEN INSTALLED:	September 17, 2006	DEPTH TO STATIC (m):	15.01 m below grd.
CONTRACTOR:	Double 'D' Drilling Ltd.	DEPTH TO SCREEN TOP (m):	31.7 m

Lithology (Depth (m))	Comments	Well Installation Summary
0m GRAVEL with sand, trace silt, well graded, damp 5m 10m 10.7 m SAND with silt, trace clay, brown, damp 13.7 m 15m GRAVEL with medium to coarse grained sand, dry, brown to gray 20m 21.3 m CLAY with silt, wet, brown 25m 25.9 m GRAVEL with coarse sand, wet, multicoloured 30m 35m 35.1 m 40m 45m 50m		

EBA Engineering Consultants Ltd.

PROJECT: WELL COMPLETION AND ASSESSMENT REPORT
WHITE RIVER FIRST NATION, BEAVER CREEK, YT.

CLIENT: WHITE RIVER FIRST NATION

TITLE: WATER WELL RECORD

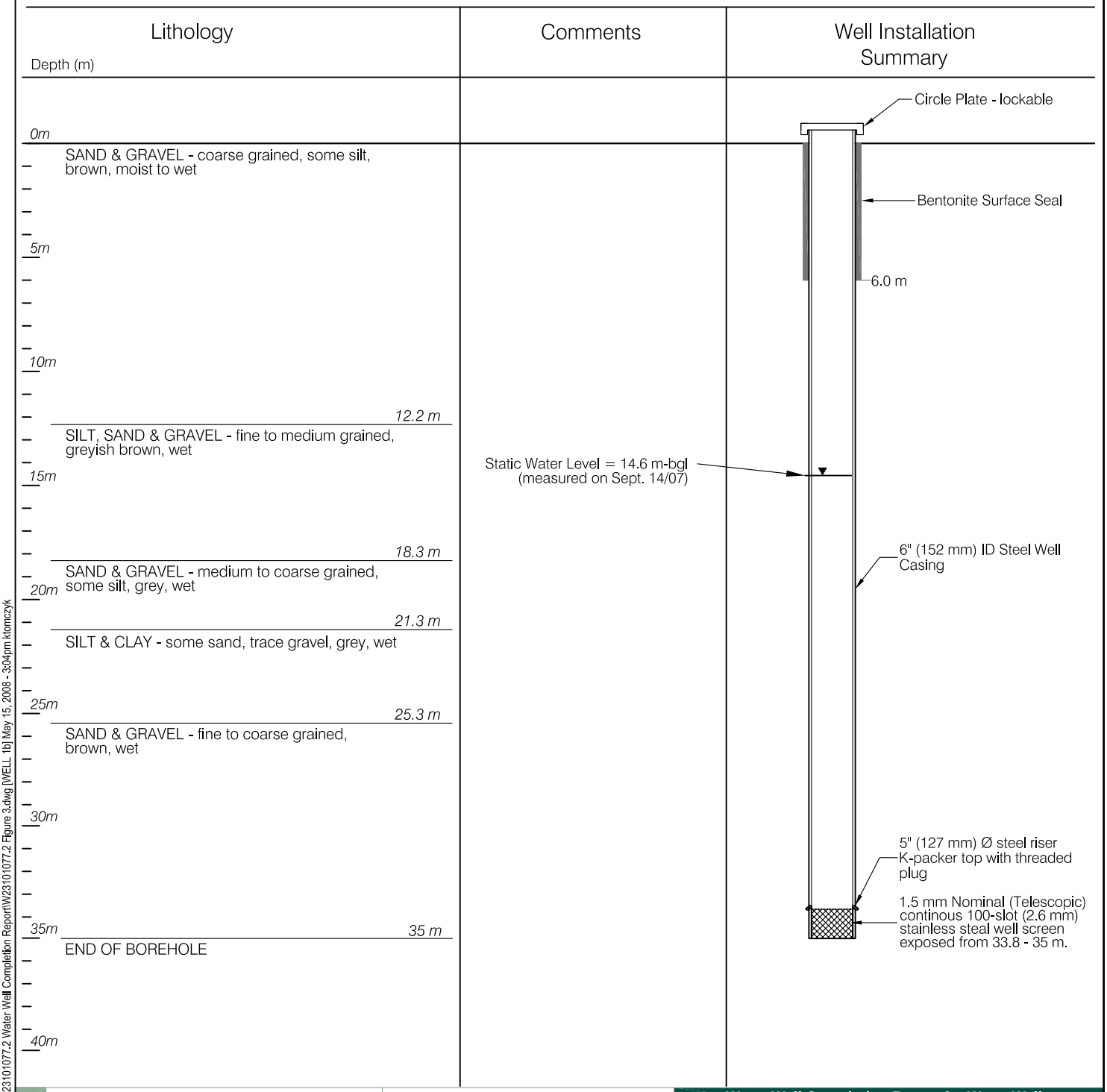
DATE	DWN.	CHKD.	FILE NO.	DRWG.
OCTOBER 2006	TK	JK	1260021.002	FIGURE 2

HYDROGEOLOGIC LOG

BOREHOLE NO. WELL 1b

PURPOSE OF HOLE: Water Supply Well
DRILLING METHOD: Air Rotary
DRILLING DATE: 2007/08/24
SCREEN INSTALLED: 33.8 - 35 m
CONTRACTOR: Double D Drilling Ltd.

CASING STICK UP: 1.0 m above grd.
DEPTH TO STATIC: 14.6 m below grd.
DEPTH TO SCREEN (m): 33.8 m



CLIENT

WHITE RIVER FIRST NATION

Water Well Completion Report for Water Wells 1b and 2b for WRFN Water Supply System Beaver Creek, YT.

WELL LOG FOR WELL 1b

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
W23101077.2	JSB	TAK/RMM	0

OFFICE: EBA-WHSE
DATE: December 10, 2007

Figure 3

Q:\Whitehorse\Data\0201drawings\Beaver Creek\W23101077.2 Water Well Completion Report\W23101077.2 Figure 3.dwg [WELL 1b] May 15, 2008 - 3:04pm ktomczyk

MIDNIGHT SUN DRILLING CO. LTD.
WHITEHORSE Y.T.
PH. 633-3070
P.O. BOX 4391
WHITEHORSE, YUKON

Field Report

Type [illegible]

Well # 2a

Started Nov. 3 19 8:

Completed Nov. 3 19 8:

NAME AND ADDRESS OF CLIENT	DESCRIPTION OF WORK	LOCATION OF WORK
Yukon Housing	W/W	
Badger Creek		

FORMATION LOG

FROM	TO	FORMATION
0'	30'	Gr. Cobbs.
30'	36'	Clay Gr.
36'	44'	Gr. Cobbs.
44'	65'	Gr. silt cobbs.
65'	90'	Gr. clay cobbs.
90'	112'	Gr. sand.

DESCRIPTION OF WORK	TIME DATE	FROM	TO	HOURS
MOVE				
move set up.	Nov. 3	2:00	2:30	0.5
"	"	2:30	6:00	3.5
set screen	"	6:00	7:00	1
Develop.	"	7:00	10:30	3.5
move off	"	10:30	11:00	0.5
	Nov. 4			
Travel to x/[illegible]				8

Rcrd. of Casing & Pipe

Size	Type	Size	Type
6 5/8"			
Feet	Inch	Feet	Inch
102'			

Remarks:
1- Drive shoe.
2- 20 slot.
1- 5 7/8" bit pin
2' riser lead packer
40 GPM.

Static Level		Total Rig Time	hrs.
Ground Level	47'	Total Standby	hrs.
Top Of Casing		Drilling Mud	sacks

SIGNATURES

MIDNIGHT SUN..... CLIENT.....

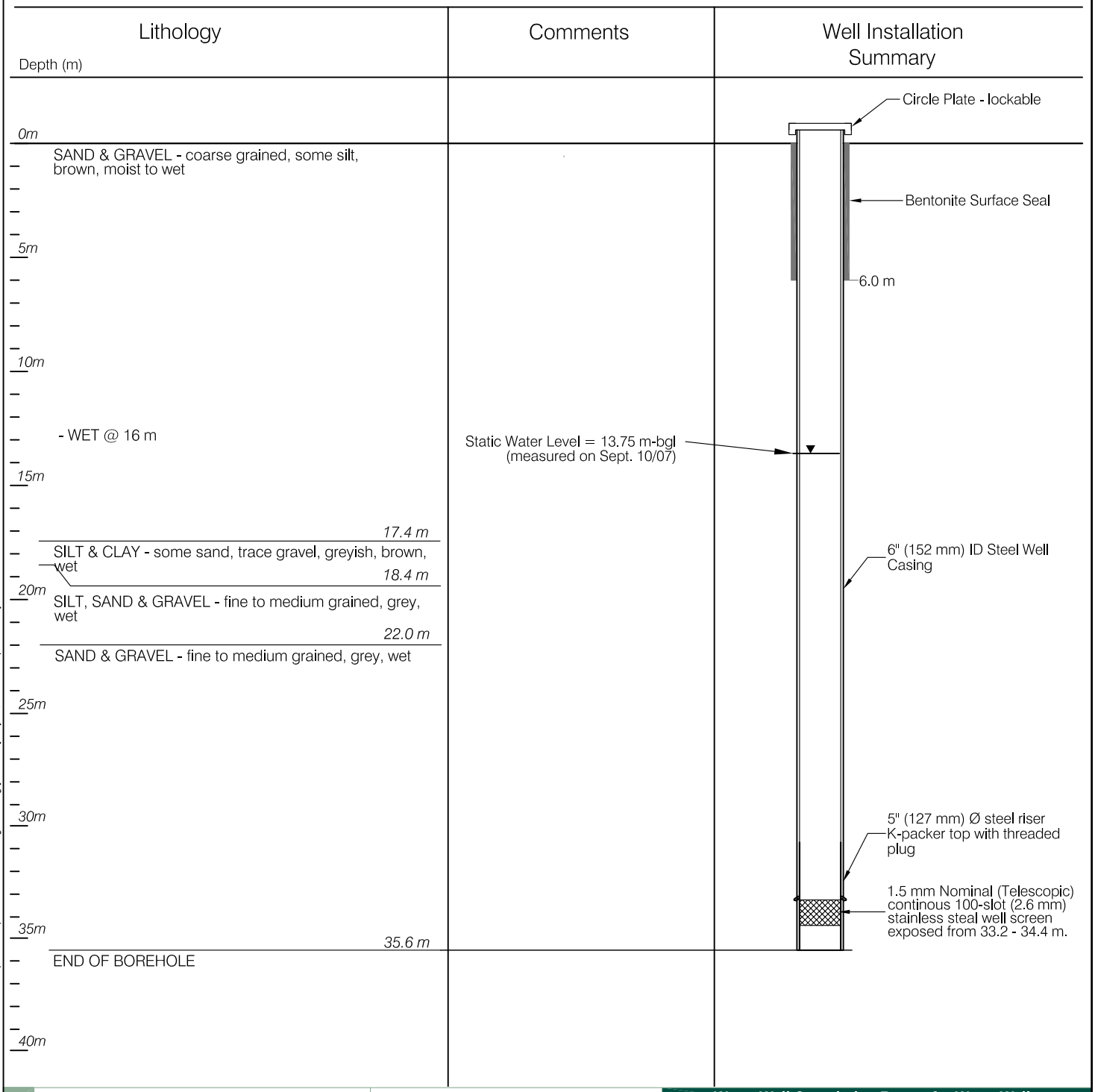
TLE..... TITLE.....

HYDROGEOLOGIC LOG

BOREHOLE NO. WELL 2b

PURPOSE OF HOLE: Water Supply Well
DRILLING METHOD: Air Rotary
DRILLING DATE: 2007/08/28
SCREEN INTERVAL: 33.2 - 34.4 m
CONTRACTOR: Double D Drilling Ltd.

CASING STICK UP: 1.0 m above grd.
DEPTH TO STATIC: 13.75 m below grd.
DEPTH TO SCREEN (m): 33.2 m



CLIENT

WHITE RIVER FIRST NATION

Water Well Completion Report for Water Wells 1b and 2b for WRFN Water Supply System Beaver Creek, YT.

WELL LOG FOR WELL 2b

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
W23101077.2	JSB	TAK/RMM	0

OFFICE: EBA-WHSE
DATE: November 30, 2007

Figure 4

Q:\Whitehorse\Data\0201drawings\Beaver Creek\W23101077.2 Water Well Completion Report\W23101077.2 Figure 4.dwg [WELL 1b] May 15, 2008 - 2:41pm ktomczyk

APPENDIX C

GROUNDWATER MODEL CONFIGURATION AND CALIBRATION

Table B1 - Beaver Creek Aquifer Vulnerabilty - Instrinsic Susceptibility Index

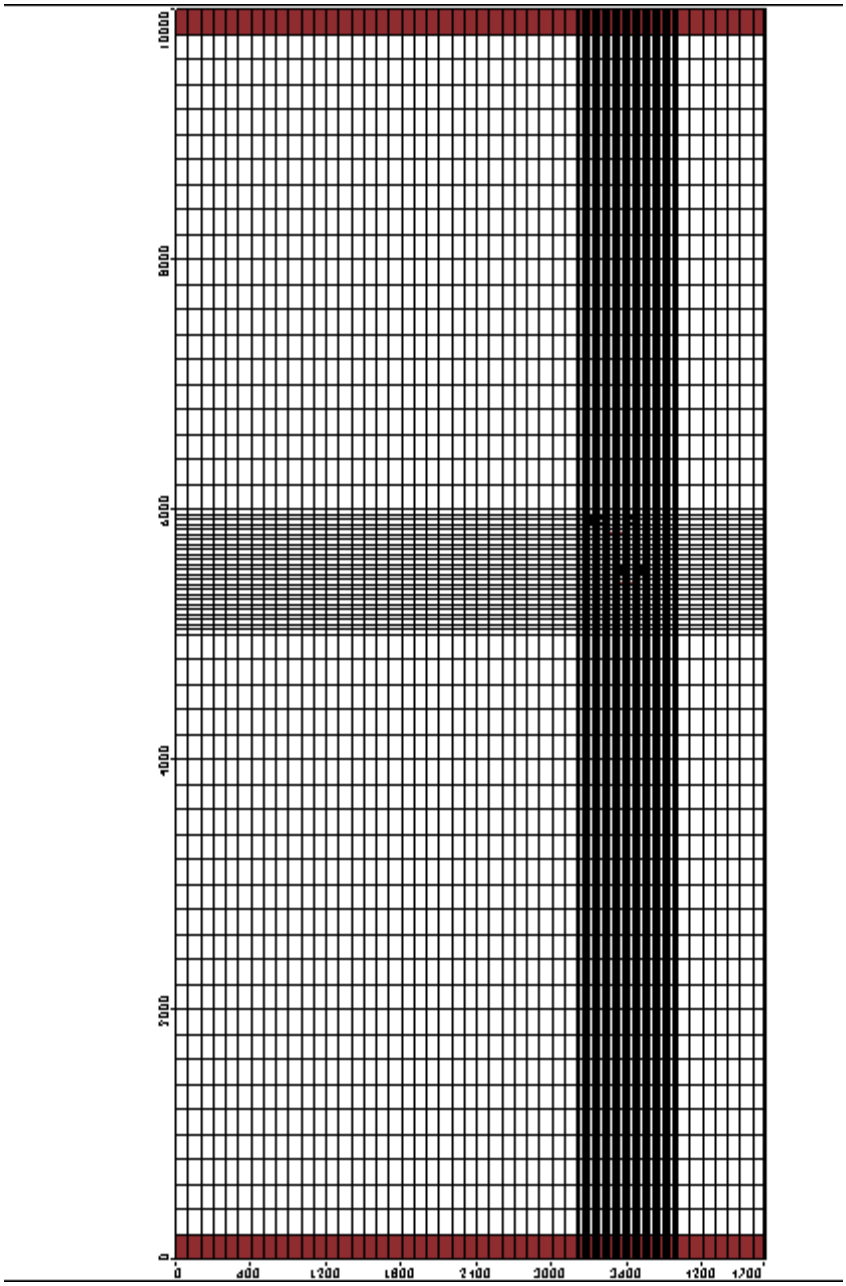
Thickness		Saturated Thickness		Saturated Thickness (a)	Description	K factor (b)	(a*b)
from	to	from	to				
					Gravel - trace sand, silt		
0	10.7	0	0	0	Sand, trace silt, clay	1	0
13.7	21.3	15.1	21.3	6.2	Gravel and sand	1	6.2
21.3	25.9	21.3	25.9	4.6	Clay with silt	5	23
25.9	35.1	25.9	31.7	5.8	Gravel with course sand	1	5.8
							35

Notes:

Low (> 80), Medium(30 to 80), high (0 to 30)

WRFN Aquifer Intrinsic Susceptibility = Medium

ISI Method from Ontario Minisrtry of Environment (November, 2001)



CLIENT

White River First Nation

Aquifer and Wellhead Protection Plan
White River First Nation, Beaver Creek, YT

Plan View of Layer B showing
Model domain and boundary conditions

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
W23101007	RMM	RMM	1
OFFICE: EBA-Whitehorse	DATE: May 2007		

Figure B1

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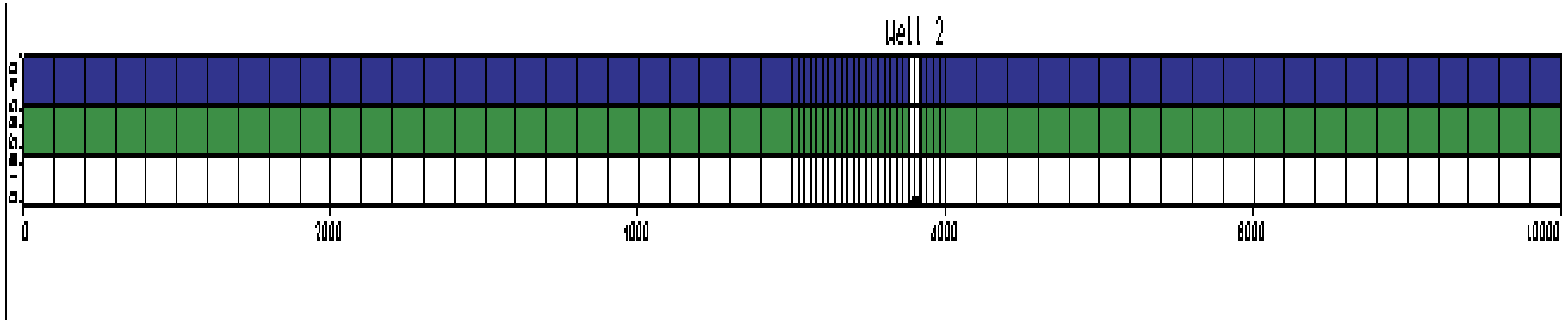

CLIENT

White River First Nation

Aquifer and Wellhead Protection Plan
White River First Nation, Beaver Creek, YT

Profile view of column 48

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
W23101007	RMM	RMM	1

OFFICE	DATE
EBA-Whitehorse	May, 2007

Figure B2

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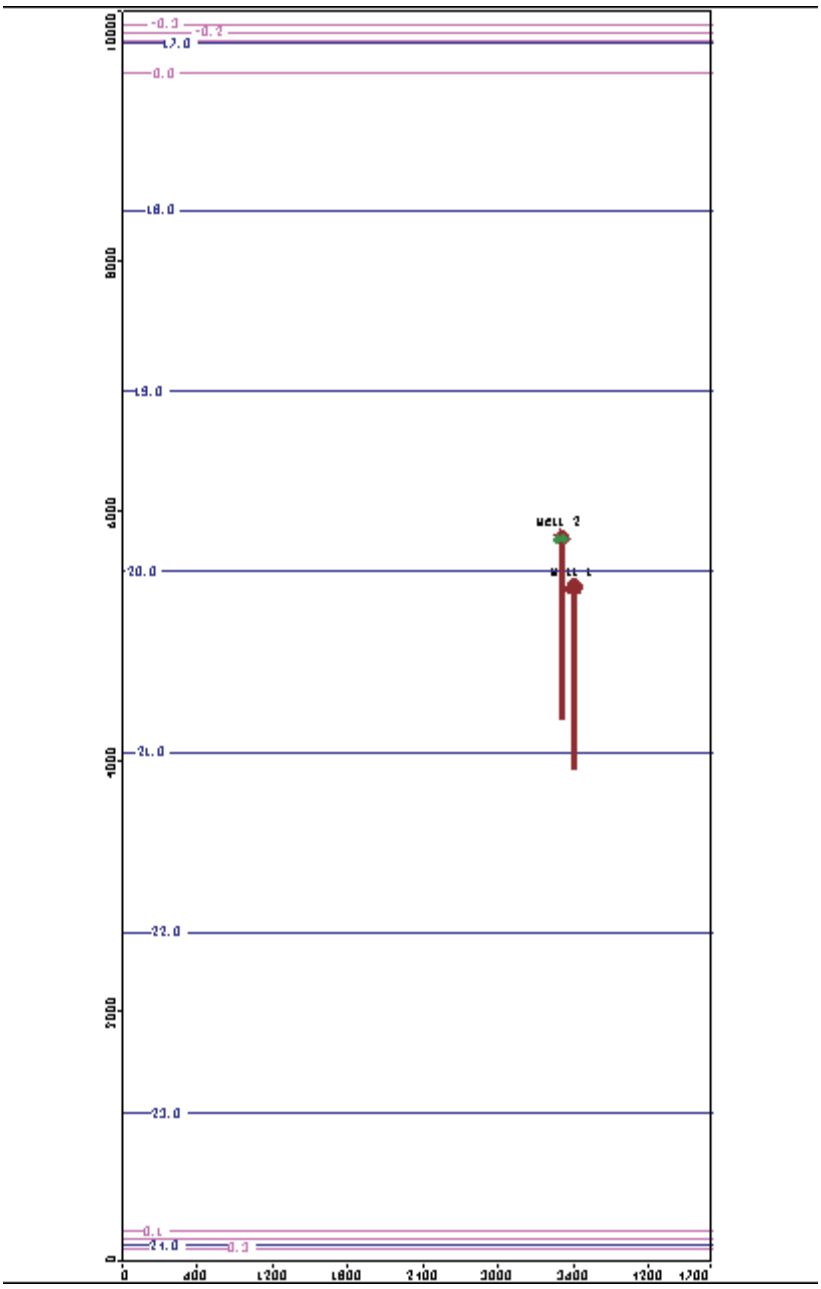

CLIENT

White River First Nation

Aquifer and Wellhead Protection Plan
White River First Nation, Beaver Creek, YT

Model Output
1 Year

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
W23101007	RMM	RMM	1
OFFICE: EBA-Whitehorse	DATE: May 2007		

Figure B3

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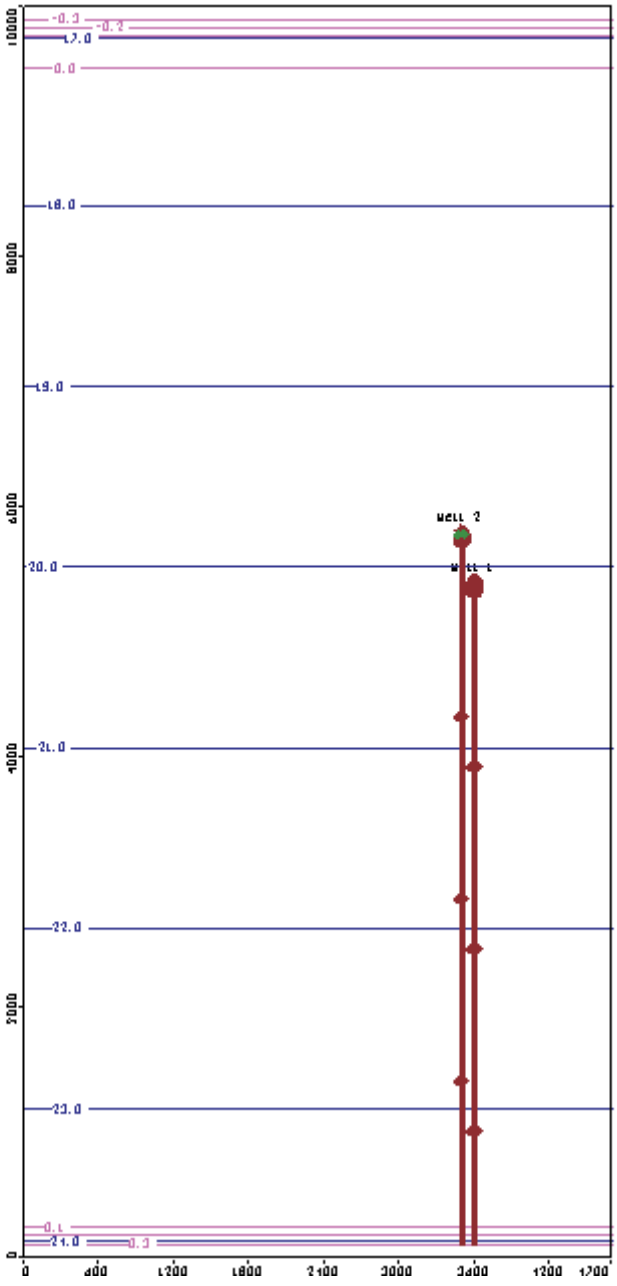

CLIENT

White River First Nation

Aquifer and Wellhead Protection Plan
White River First Nation, Beaver Creek, YT

Model Output
5 Year

EBA Engineering Consultants Ltd.

PROJECT NO.	DWN	CKD	REV
W23101007	RMM	RMM	1
OFFICE: EBA-Whitehorse	DATE: May 2007		

Figure B4

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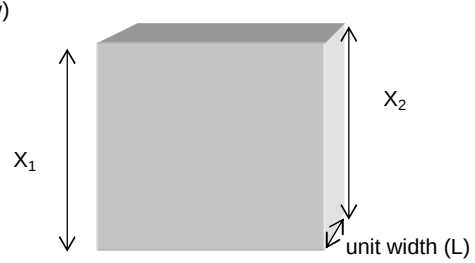
Analytical Equations for Capture Zone and Travel Time Analysis (Thiem Method)

Qo = background flow component per unit width (regional flow)

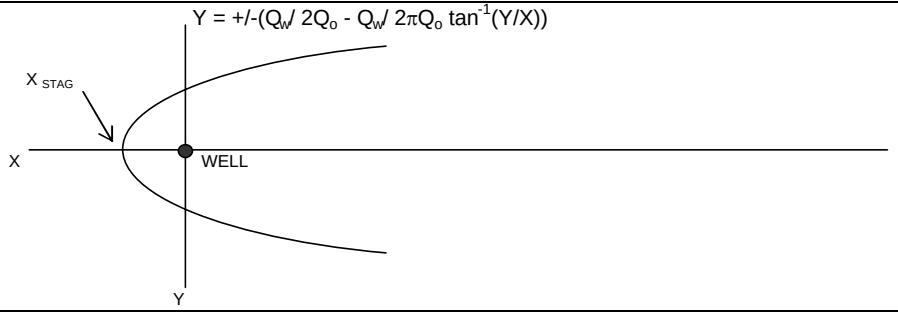
$Qo = K(X_1^2 - X_2^2)/ 2L$



Hydraulic Conductivity (K) =	1.00E-02	m/ sec
X1 =	647.5	m
X2 =	647.1	m
L =	520	m
Qo =	0.004979231	m^3/sec per unit width of aquifer

$Y = +/-(Q_w/ 2Q_o - Q_w/ 2\pi Q_o \tan^{-1}(Y/X))$

$X_{STAG} = Q_w / 2\pi Q_o$



		Q_w (Well Pumping Rate) =	0.000115741	m^3/ sec	10 m3/day
		X_{STAG} =	0.003699509	m	
	X = 0	Y =	0.005811176	m	
	X = infinity	Y =	0.011622352	m	2y= 0.023245
X= 2.41 Y	Y/X = 0.41	Y =	0.010182883	m	X = 0.024541
		CHECK	0.010169558	m	
X= Y	Y/X = 1	Y =	0.008716764		

RECHARGE AREA

INFILTRATION RATE	42	mm/yr
	1.332E-09	m/sec
PUMPING RATE (Q)	1.16E-04	m^3/ sec
INFILTRATION AREA	8.69E+04	m^2
	0.0869048	km^2
	8.6904762	ha

x (m) 5608036.5 distance away from well where recharge area is met

TRAVEL TIMES	years	distance (x)	TRAVEL TIMES	years	distance (x)
1-year	1	970.33846	10-day	0.02739726	26.58461538
5-year	5	4851.6923	50-day	0.136986301	132.9230769
10-year	10	9703.3846	100-day	0.273972603	265.8461538

APPENDIX D

EBA TECHNIAL MEMO – POTENTIAL HYDROCARBON CONTAMINATION, JUNE 3, 2011

TECHNICAL MEMO

EBA, A Tetra Tech Company
Calcite Business Centre, Unit 6, 151 Industrial Road
Whitehorse, YT Y1A 2V3 CANADA
p. 867.668.3068 f. 867.668.4349

ISSUED FOR USE

TO:	Doug Broeren – WRFN Capital Projects Director	**DATE:**	June 3, 2011
C:	Ryan Martin, EBA, A Tetra Tech Company	**MEMO NO.:**	
FROM:	Darryl Cann, EBA, A Tetra Tech Company	**EBA FILE:**	W23101077.13

SUBJECT: May 30 – June 1, 2011 Site Visit

1.0 INTRODUCTION

The following memo provides a summary of the activities conducted during the EBA site visit to White River First Nation community from May 30 – June 1, 2011, and also a discussion regarding observations about above ground storage tanks at the houses around System 1.

The purpose for the site visit was to conduct a mid-tender walk around meeting with bidding contractors to review the proposed upgrades for 2011, and also to collect water samples as part of the Permitting and GUDI assessment phases. During the site visit, EBA staff also assessed the condition of above ground storage tanks (ASTs) located in System 1 as one leaking tank was observed during the onsite meeting.

2.0 MID-TENDER SITE VISIT

EBA met with representatives from Skookum and TSL Contractors Ltd. on site to answer questions and review the proposed upgrades for 2011. This site visit was open to all bidding contractors however only two showed up for the meeting. The visit included the viewing of the System 1 pumphouse and all buildings associated with the proposed upgrades. The location for the installation of recirculation panels were reviewed for each house, including the Youth Drop-in Center. In addition, the location of service line connections to the main and to the individual houses were identified, including the location of road crossings. Well, well house and utilitidette locations were identified for decommissioning. The System 2 pumphouse was not reviewed however the pumphouse is representative of the System 1 pumphouse.

3.0 WATER QUALITY / QUANTITY

EBA collected water samples from Well 1, Well 2, and Supply line in the System 1 and System 2 pumphouses for water quality testing: drinking water package (physical parameters, nutrients, total metals), mercury, radionuclides and trihalomethane in support of the permitting requirements and GUDI study.

In order to assess actual water demands on System 1 and System 2, water level loggers were installed in the operating storage tanks. These units will record water level data in the tanks for a period of three weeks. As part of this study, the system bleeding had to be turned off in each pumphouse for the duration of data collection.

As part of the GUDI study requirements, Patrick Johnny was trained in sampling additional water quality parameter at the Well 1 and Well 2 raw water sampling ports in System 1 and also at Beaver Creek. This information was also discussed with Henryk Peterschein, however Henryk was not present for the training exercise. It is our understanding that Patrick will be doing the GUDI sampling during the summer as Henryk will be away from the site. In addition, EBA conducted an MPA sampling test on the raw water from Well 1 in System 1 for a period of 9 hours, as part of the GUDI requirements.

4.0 ABOVE GROUND STORAGE TANK OBSERVATIONS

During the tender site visit with bidding contractors, EBA observed a leak in the AST serving the Youth Drop-In Center. Due to this discovery, EBA further investigated ASTs located within proximity of the System 1 and System 2 well capture zones, as identified in the Aquifer Well Head and Protection Plan issued by EBA in 2007. This was done in support of the permitting process. Mr. Todd Pinkess from Environmental Health had inquired about the condition of AST's within the well capture zone during a previous meeting with EBA on April 18, 2011. Several leaking fuel tanks at the houses around System 1 were observed during this investigation. The following list is a summary of the observations:

House 4 – noticeable hydrocarbon staining and odour was observed on the ground near the valve of the tank and under the supports closest to the tank valve (Photo 1). This is an indication of a leak in the valve, fuel line leading into the house, or the tank around the area of the valve.

House 10 – noticeable hydrocarbon staining and odour was observed on the ground near the fuel line connection to the tank. A 4 L container had previously been placed under the fuel line fitting, presumably to collect leaking fuel (Photo 2). At the time of inspection, this container was filled largely with water with some hydrocarbon residue in the container as well. This house is located directly in the well capture zone for System 2.

House 12 – significant hydrocarbon staining and odour was observed on the ground under the tank valve and fuel filter. It appears the resident had previously put down insulation material and newspaper to soak up the leaking fuel (Photo 3). Material used to soak up the leak was saturated with fuel. No staining was observed under the tank, which suggests the problem is associated with the tank outlet, valve or filter.

House 13 – noticeable staining and hydrocarbon odour was observed on the ground in the area of the tank valve and fuel filter. A bucket had been placed under the fuel filter, however no fuel was observed in the bucket at the time. No staining was observed under the tank, which suggests the problem is associated with the tank outlet, valve or filter (Photo 4).

Duplex 16/17 – noticeable staining and hydrocarbon odours was observed at the southern most tank located adjacent to the duplex, in the area of the tank valve and piping (Photo 5). It was not possible to see under the bottom of the tank due to vegetation and location of the tank in proximity to the ground.

Youth Drop-In Center – significant visible staining and hydrocarbon odour were observed around the area of the tank valve, both on the ground and on the tank itself (Photo 6). The ground directly below the tank valve was heavily stained. An oily residue could be observed on the ground below the valve, as well as the tank. This suggests a leak in the tank itself, near the tank valve.

The visible staining and hydrocarbon odours observed indicate contamination of the surrounding soil in the area of the above ground storage tanks. The extent of soil contamination is unknown and would require further assessment. It is recommended that these tanks be replaced to prevent further contamination. Contaminated soil should be removed prior to installing new tanks. New tanks should be provided with secondary containment measures, and flex hosing between the ASTs and houses to reduce the risk of contaminating of the aquifer upstream of the supply wells.

In addition, although no visible signs of staining or hydrocarbon odours were observed around ASTs located at House 5, 6, 7, 8, 9, and Administration Building, these tanks are located within the well capture zones for the wells serving the System 1 and System 2 pumphouses. The fuel tank on the Greenhouse (not inspected) is also within proximity of the well capture zone for System # 2. These tanks should also be replaced, as part of the recommendations provided in the Aquifer and Well Head Protection Plan provided by EBA in 2007. As these buildings are located within the well capture zone, new tanks should be provided with secondary containment measures and flex hosing between the ASTs and houses to reduce the risk of contaminating of the aquifer upstream of the supply wells.

EBA is able to assist with the removal of contaminated soil from Houses 4, 12, 13, Duplex 16/17 and the Youth Drop-In Center during the proposed 2011 water system upgrades as excavation equipment will be readily available. This can be addressed under separate scope and budget.

Photo 1: Hydrocarbon staining around AST located at House 4

Photo 2: Hydrocarbon staining and leak collection at AST located at House 10

Photo 3: Hydrocarbon staining around AST located at House 12

Photo 4: Hydrocarbon staining around AST located at House 13

Photo 5: Hydrocarbon staining around southern most AST located at Duplex 16/17

Photo 6: Hydrocarbon staining around AST located at the Youth Drop-In Center

APPENDIX E

CONTAMINATED SITE AND SPILL SEARCH RESULTS

Cann, Darryl

From: Lust, Jolene
Sent: Friday, April 05, 2013 10:09 AM
To: Cann, Darryl
Subject: FW: EBA Spill Records Request: Beaver Creek

Hey Darryl – Below is the YG spill request response. I've uploaded this email to the SP site. Let me know if you need me contact Bethany for any further info.

Jolene Lust, B.Sc. | **Environmental Scientist**
p. 867.668.2071 x267 | **f.** 867.668.4349
jlust@eba.ca

EBA, A Tetra Tech Company | **Engineering Practice**
Calcite Business Centre, Unit 6, 151 Industrial Road | Whitehorse, YT Y1A 2V3 | **www.eba.ca**

From: Bethany.Peters@gov.yk.ca [mailto:Bethany.Peters@gov.yk.ca]
Sent: Friday, April 05, 2013 9:37 AM
To: Lust, Jolene
Subject: RE: EBA Spill Records Request: Beaver Creek

Hi Jolene,

Environmental Programs Branch does have information on a number of sites within and near Beaver Creek, Yukon. I have summarized the sites below:

- CBSA Beaver Creek Customs Office (Lot 1018 Quad 115K/07): January 2006 spill reported of 700 L diesel fuel; 40 cubic meters of soil was relocated to LTF in 2009 under a Relocation Permit. The accompanying report notes that some contaminated material remains on site above Contaminated Sites Regulation commercial land use standards. It is unknown whether additional work has been completed on site since the 2009 report was submitted.
- CCRA Beaver Creek Staff Residence (Lot 15 Group 951, Blue House #1793): Contamination is attributed to a spill during the filling of furnace oil. One characterization sample showed soil contamination above applicable standards for petroleum hydrocarbons; approximately 30 cubic meters of material was to be relocated to Whitehorse LTF, but no confirmation that relocation was completed, or confirmatory sampling submitted.
- Northwestel Central Office, Beaver Creek (Lot 12-1 Group 0951): In 2006, a relocation permit was issued for approximately 60 cubic meters of soil from NWTel office in Beaver Creek to Arctic Backhoe's LTF. Confirmatory sampling showed soil remained on site above CSR standards.
- Snag Airstrip (km 26 Snag Road): A 1995/1996 site assessment of the airstrip site revealed soil contaminated with PCBs, pesticides, metals and PAHs. This material was removed from the site, except for soil containing metals, which was placed in an engineered containment cell (facility) on site in1996/1997, then finally relocated to facility in Fort Nelson in 2006. No decommissioning sampling has been provided to the Branch to confirm that the containment cell was not breached during its use.

Sites without analytical data:

- Beaver Creek Highway Camp (Disposition 910011): An Environmental Site Investigation report dated January 2007 notes numerous areas of surficial staining, and that special waste was being improperly stored. A UST was removed in 2006, and no contaminated soil was identified within the area of UST excavation. No analytical data is on file to characterize status of contamination on full site, although based on surficial staining observations contamination is considered possible.
- White River First Nation Administration Building (Lot 1017 Quad 115K/07) :

    - An ongoing leaking UST diesel spill was reported to the Spills Line in 2008; fuel staining was discovered in the crawl space of the building. It is unknown the extent of contamination on site, or if any remedial work was completed. No analytical data is on file to confirm state of contamination on site, although it is suspected.
    - WRFN House #10 (within Lot 1017, Beaver Creek): in 2007 a chronic leak from a fuel truck was reported. In 2010 a relocation permit was obtained and excavation and relocation of the contaminated material was completed. All confirmatory sampling was below applicable CSR standards within area of excavation.
- Wellgreen Mine Site (Alaska Hwy Km 1788.6 and Km 1787.5): A 2009 site assessment noted three main areas of concern: tailings area, mill, and car battery storage area. A plan of remediation was submitted to Branch in 2009, but it is unknown if restoration of site has commenced.
- YECL station (Lot 27 Group 951): 0.5 cubic meters of contaminated soil was relocated from YECL site in Beaver Creek; no confirmatory samples on file.
- Burwash Landing Resort (Lot 2-3 Group 852): site assessment was conducted on site in 2010. No soil or water samples were submitted for laboratory analysis, but a number of areas are likely contaminated, based on PID readings as visual sheen of PHC on groundwater. Unknown if further assessment or restoration has been conducted on site.
- Bear Flats Lodge (Mile 1167 Alaska Hwy): Email correspondence in file from lodge operator dated July 21, 1998 notes that a construction camp was in operation on the lodge property over the past 4 years; several large oil stains were noted, and anecdotal information was provided regarding the burial of waste metal and garbage on site. It is unknown if a formal site assessment was conducted, or any remediation completed.

Remediated Sites:

- Beaver Creek Airport (Lot 45 REM Group 951): A leak from a fuel tanker occurred in 2006, contaminated soil was excavated and removed; confirmatory sampling indicated soil concentrations were below applicable standards.
- RCMP station (Block 10 Lot 8): Spill occurred January 2012; relocation of contaminated material was completed and confirmatory samples are below applicable standards.

Please note that while the above two sites are considered remediated in the area of the spill, it does not mean that contamination does not exist in other areas of the property, or that contamination has not occurred since remediation activities noted in our records were concluded.

Please contact me at the below coordinates if you have further questions, would like to view any of our files or need other information in the future.

Best,

Bethany Peters
Environmental Protection Analyst
Environment Yukon
P: 867.667.8848 F: 867.393.6205
e: Bethany.Peters@gov.yk.ca

From: Lust, Jolene [mailto:jlust@eba.ca]
Sent: Tuesday, April 02, 2013 10:54 AM
To: Bethany.Peters
Subject: EBA Spill Records Request

Hi Bethany,

EBA is completing an aquifer and wellhead protection plan for the water wells in the community of Beaver Creek, Yukon. I would appreciate a review of the YG spill records to determine if there have been any documents spills within the vicinity of the wells. Please conduct a review within a 10 km radius of the center of Beaver Creek. As a reference, the administration building is approximately the center of the community water wells.

If you have any questions or need any further information, please feel free to contact me at the number below.

Thanks,

Jolene

Jolene Lust, B.Sc. | **Environmental Scientist**
p. 867.668.2071 x267 | **f.** 867.668.4349
jlust@eba.ca

EBA, A Tetra Tech Company | **Engineering Practice**
Calcite Business Centre, Unit 6, 151 Industrial Road | Whitehorse, YT Y1A 2V3 | **www.eba.ca**

EBA, A Tetra Tech Company
Calcite Business Centre, Unit 6, 151 Industrial Road
Whitehorse, YT Y1A 2V3 CANADA
p. 867.668.3068 f. 867.668.4349

SUMMARY REPORT

ISSUED FOR USE

DATE: January 12, 2010 **EBA FILE:** W23101315.002

LOCATION OF PROJECT: House #10, Beaver Creek, Yukon

LOCATION OF EXCAVATION: 3.6 m northeast of the cabin and 6.5 m southeast of the power pole on site

FIELD PERSONNEL: Christopher Harwood

PROJECT MANAGER: Christopher Harwood

Site Observations:

General:

- Fine, silty material exists from approximately the surface to a depth of 0.5 m. A coarse sand layer exists between 1.5 and 2.0 m below the surface.
- Excavated material consisted mostly of coarse grained gravel with some sand and trace silt.
- Excavated haul material thought to be below Yukon Contaminated Site Residential standards (YCSR-RL) but above federal drinking water standards were placed on a 5 mil polypropylene-lined pad at White River First Nation's gravel pit (1 km north of Canadian Customs.) Approximately 70 cubic metres of material was stockpiled at this site. The samples taken from this material were referred to as Low Level Stockpile samples (LLS). LLS samples were analyzed as a composite to determine contaminant concentrations.
- Excavated haul material thought to be above Territorial CSR standards was transported to Arctic Backhoe's Land Treatment Facility in Whitehorse. Samples were taken for every 50 cubic metres of material removed to classify concentration and character of contaminants.
- EBA sampled and analyzed confirmatory material from all four walls and base of the excavation. These samples were compared to the Canadian Soil Quality Guidelines for Residential/Park land (coarse grain soils) due to their being taken from material to be left on federal land and the proximity to a drinking water catch basin. One sample was taken for every 10 running meters, and every 3 meters in depth. Samples were also taken for every 30 square metres of base.
- EBA personnel supervised the excavation backfill and collected three samples from the backfill material.
- Arctic Backhoe services obtained a relocation permit (4202-23-384). Arctic Backhoe relocated approximately 160 m^3 of contaminated soil to their Land Treatment Facility.

October 23rd, 2010:

- EBA was on site from the start of excavation activities. Excavation of potentially contaminated soils was based on previous analytical results.
- Excavation began at visible surface staining in area identified by land owner. The excavation was progressed to the north up to and including an area previously identified as being contaminated.

- Confirmatory samples N01, N02, N03, E01, E02 and B01 were taken. Samples LLS 1-5 were taken.

October 24th, 2010:

- Field monitoring equipment indicated that the north extent of the excavation was below federal soil standards for the protection of potable water and so excavation proceeded to the south, east, west and base of the area immediately surrounding visible staining.
- Haul 1-4 samples were taken. LLS 6 sample was taken. Confirmatory samples E03, E04, E05, E06, W01, W02, W03, W04, W05, S01, S02, B02 and B03 were taken.

October 25th, 2010:

- EBA supervised backfill and sampled backfill.
- Backfill samples BF 01-03 were taken. The client declined to have these samples analyzed.

Analytical Results:

Attached Figure 1 identifies subject site location and Figure 2 identifies soil sample locations. Table 1A (attached) shows confirmatory soil sample analytical results compared to the applicable Canadian Soil Quality Guidelines for Residential/Park land (coarse grain soils) for material left in situ. Table 1B shows analytical results compared to the Yukon Contaminated Sites Regulation Residential Land Use standards. These standards were applied to material left in the low level stockpile and those transported to the Land Treatment Facility. The Exova Analytical Laboratory Report is also attached.

- The analytical results indicated that soil removed to the LTF in excess of YCSR contained Light Extractable Petroleum Hydrocarbons (LEPHs) in excess of YCSR .
- The analytical results of soil samples collected from the base and side walls indicates all results are below Canadian Soil Quality Guidelines for residential and park land (coarse grained soil)
- Soil removed to the Low Level Stockpile area at the White River First Nation's gravel pit is of low enough concentration to be used on a commercial site situated on territorial land.

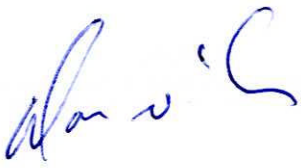
Conclusions and Recommendations:

- Analytical results from confirmatory soil samples indicate that soil remaining at the site contains concentrations of petroleum hydrocarbons below Canadian Soil Quality Guidelines for Residential/Park land (coarse grain soils) standards.
- Analytical results for soil located at the LLS indicate that the concentrations are below YCSR for all land use categories. EBA recommends the soil be used on commercial or industrial properties on territorial land as fill or surface material.

On Site Technician:

Christopher Harwood
Environmental Scientist
Whitehorse Environment Group
Direct line: 867 668-2071 x235
charwood@eba.ca

Senior Reviewer:



Don Wilson, B.Sc.
Team Leader, Contaminants
Whitehorse Environment Group
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dwilson@eba.ca

TABLES

Table 1A : Analytical Results for Soil Samples Collected During Contamination Remediation at House #10, Beaver Creek, Yukon

	Units	Sample Identification														CSQG[1]
		B01	B02	E01	E02	E03	E04	N01	N02	N03	S01	S02	W01	W02	W03	
Sampled Date	n/a	23-Oct-10	24-Oct-10	23-Oct-10	23-Oct-10	24-Oct-10	24-Oct-10	23-Oct-10	23-Oct-10	23-Oct-10	24-Oct-10	24-Oct-10	24-Oct-10	24-Oct-10	24-Oct-10	NC
Depth	m	2.6	4.2	0.5	1.83	1.1	3.6	0.61	1.83	2.6	0.6	3.5	1.2	3.6	1.4	NC
Moisture	% by weight	6.17	3.64	16.8	4.77	4.64	4.12	17.8	6.55	4.12	4.88	5.21	4.3	3.99	4.13	NC
Mono-Aromatic Hydrocarbons (MAH)																
Benzene	µg/g	<0.004	0.004	<0.004	<0.004	<0.004	<0.004	0.004	<0.004	<0.004	<0.004	<0.004	0.004	<0.004	<0.004	0.03
Ethylbenzene	µg/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.082
Toluene	µg/g	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.37
Total Xylenes (m,p,o)	µg/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	11
PHC F1 (C6-C10)	µg/g	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	6	5	NC
PHC F1(C6-C10) - BTEX	µg/g	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	6	5	30
Total Extractable Hydocarbons (THE)																
PHC F2 (>C10-C16)	µg/g	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	150
PHC F3 (>C16-C34)	µg/g	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	300
PHC F4 (>C34-C50)	µg/g	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	2800

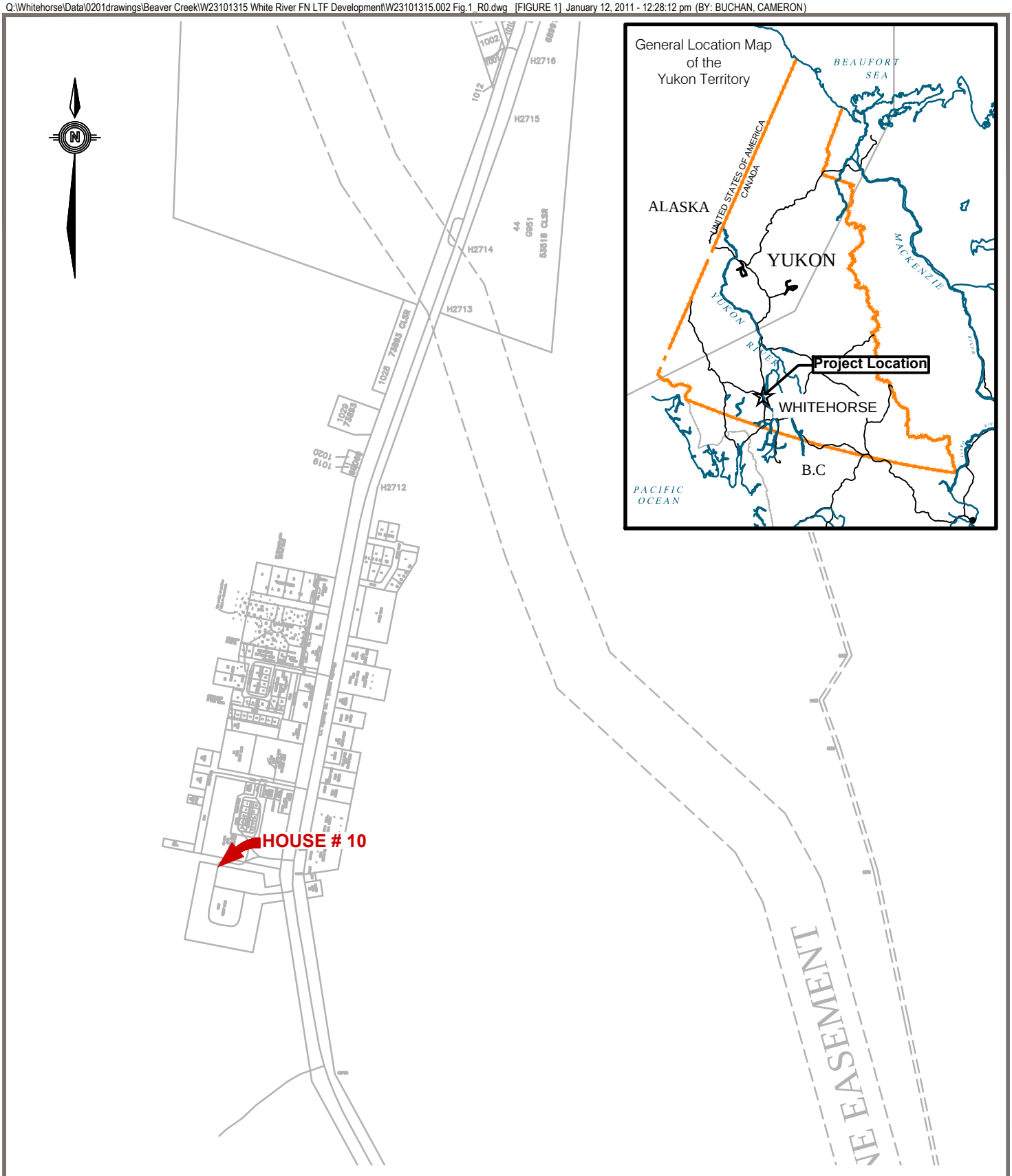
Notes:
1 - CSQG is Canadian Soil Quality Guidelines for Residential/Park land use; Coarse grained soil values apply
NC - No criteria established
Bold - Result in excess of CSQG for coarse grained soil
< - Denotes result is below the laboratory detection limit

Table 1B : Analytical Results for Soil Samples Collected During Contamination Remediation at House #10, Beaver Creek, Yukon

	Units	Sample Identification					CSR-RL[1]
		Comp (LLS01- 06)	Haul #1	Haul #2	Haul #3	Haul #4	
Sampled Date	n/a	n/a	23-Oct-10	24-Oct-10	24-Oct-10	24-Oct-10	
Moisture	% by weight	5.53	20.3	24.7	5.22	33.1	NC
Polycyclic Aromatic Hydrocarbons (PAHs)							
Acenaphthene	µg/g	<0.05	<0.5	<0.05	<0.05	<0.05	NC
Acenaphthylene	µg/g	<0.05	<0.5	<0.05	<0.05	<0.05	NC
Anthracene	µg/g	<0.05	<0.5	<0.05	<0.05	<0.05	NC
Benz(a)anthracene	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	1
Benzo(a) pyrene	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	1
Benzo(b)fluoranthene	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	1
Benzo(g,h,i)perylene	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	NC
Benzo(k)fluoranthene	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	1
Chrysene	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	NC
Dibenz(a,h)anthracene	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	1
Fluoranthene	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	NC
Fluorene	µg/g	<0.05	0.87	<0.05	0.05	0.06	NC
Indeno(1,2,3-c,d)pyrene	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	1
Naphthalene	µg/g	<0.05	2.72	0.62	<0.05	0.28	5
Phenanthrene	µg/g	<0.05	1.18	<0.05	0.09	<0.05	5
Pyrene	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	10
Mono-Aromatic Hydrocarbons (MAH)							
Benzene	µg/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.04
Ethylbenzene	µg/g	<0.05	<0.05	0.09	<0.05	<0.05	1
Toluene	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	1.5
Total Xylenes (m,p,o)	µg/g	<0.05	0.19	0.32	<0.05	<0.05	5
Methyl t-Butyl Ether	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	NC
Styrene	µg/g	<0.05	<0.05	<0.05	<0.05	<0.05	5
Volatile Petroleum Hydrocarbons (VPH)							
VHs6-10	µg/g	<50	250	<50	<50	<50	NC
VPHs (VHs6-10 minus BTEX)	µg/g	<50	**250**	<50	<50	<50	200
Extractable Petroleum Hydrocarbons (EPH)							
HEPHs	µg/g	<20	129	42	<20	140	1000
LEPHs	µg/g	38	**5860**	146	**1110**	**2980**	1000

Notes:
1 - Yukon Government, Environment Act, Contaminated Sites Regulations - Residential Land Use Standards
NC - No criteria established
Bold - Result in excess of CSR-RL standard
< - Denotes result is below the laboratory detection limit

FIGURES



LEGEND

0 1 000

Scale: 1: 20 000 (metres)

CLIENT

WHITE RIVER FIRST NATION

SOIL REMEDIATION EXCAVATION
HOUSE # 10 - BEAVER CREEK, YUKON

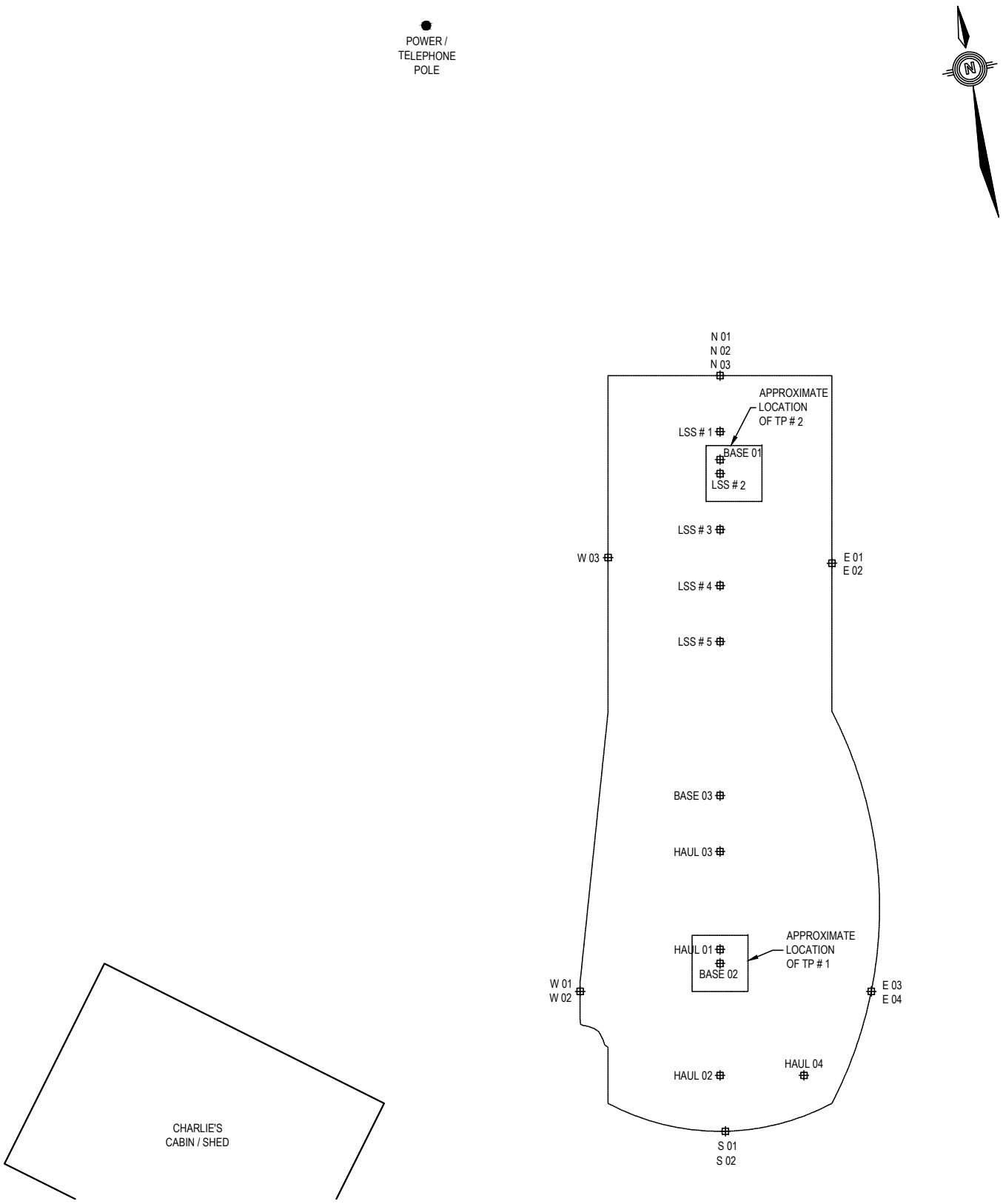
LOCATION PLAN

eba A TETRA TECH COMPANY

PROJECT NO.	DWN	CKD	REV
W23101315.002	CB	CDH	0

OFFICE	DATE
EBA-WHSE	January 12, 2011

Figure 1



LEGEND

- BOREHOLE LOCATION
- MONITORING WELL LOCATION
- SAMPLE LOCATION

0 5

Scale: 1: 100 (metres)

CLIENT

WHITE RIVER FIRST NATION

SOIL REMEDIATION EXCAVATION
HOUSE # 10 - WHITEHORSE, YUKON

SITE PLAN SHOWING SAMPLE LOCATIONS

eba A TETRA TECH COMPANY

PROJECT NO.	DWN	CKD	REV
W23101315.002	CB	CDH	0

OFFICE	DATE
EBA-WHSE	January 12, 2011

Figure 2

APPENDIX A

APPENDIX A ANALYTICAL RESULTS

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Report Transmission Cover Page

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**770855**
Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

Contact & Affiliation	Address	Delivery Commitments
Kim Greenman EBA Engineering Consultants Ltd -	Unit 6, 151 Industrial Road, Calcite Business Whitehorse, Yukon Territory Y1A 2V3 Phone: (867) 668-2071 Fax: (867) 668-4349 Email: kgreenman@eba.ca	On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report
Chris Harwood EBA Engineering Consultants Ltd -	Unit 6, 151 Industrial Road Whitehorse, Yukon Territory Y1A 2V3 Phone: (867) 668-2071 Fax: (867) 668-4349 Email: charwood@eba.ca	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report, COC) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report

Notes To Clients:

- Surrogate recoveries are not available for PAH samples 21, 22 and 23 because the analysis was requested after sample extraction.
- Surrogate recovery of Nitrobenzene-d5 for PAH sample 20 is not available due to interference from hydrocarbons. All other surrogate recoveries and quality control meet acceptance criteria.
- Reduction of analytical volume was necessary due to matrix effects in PAH sample 20. Detection limits are adjusted accordingly.
- Sample 33 was prepared as lab mixtures. Loss of volatile compounds may have occurred during this preparation.

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Sample Custody

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**770855**
Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

Sample Disposal Date: February 02, 2011

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	$ 2.50 per sample
Storage for an additional 60 days	$ 5.00 per sample
Storage for an additional 90 days	$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ DHL
- ☐ Purolator
- ☐ Other (specify) _____

Name _____
Company _____
Address _____
_____
Phone _____
Fax _____

Signature _____

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Analytical Report

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Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

		Reference Number	770855-1	770855-2	770855-3	
		Sample Date	Oct 23, 2010	Oct 23, 2010	Oct 23, 2010	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	N01 / 0.61m	N02 / 1.83m	N03 / 2.6m	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			28-Oct-10	28-Oct-10	28-Oct-10	
Benzene	Dry Weight	mg/kg	0.004	<0.004	<0.004	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			28-Oct-10	28-Oct-10	28-Oct-10	
F1 C6-C10	Dry Weight	mg/kg	<4	<4	<4	4
F1 -BTEX	Dry Weight	mg/kg	<4	<4	<4	4
Extractable Petroleum Hydrocarbons - Soxhlet						
Extraction Date			29-Oct-10	29-Oct-10	29-Oct-10	
F2 C10-C16	Dry Weight	mg/kg	<20	<20	<20	20
F3 C16-C34	Dry Weight	mg/kg	<20	<20	<20	20
F4 C34-C50	Dry Weight	mg/kg	<30	<30	<30	30
F4HTGC C34-C50+	Dry Weight	mg/kg	<30	<30	<30	30
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	17.80	6.55	4.12	

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Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

		Reference Number	770855-4	770855-5	770855-6	
		Sample Date	Oct 24, 2010	Oct 24, 2010	Oct 23, 2010	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	S01 / 0.6m	S02 / 3.5m	E01 / 0.5m	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			28-Oct-10	28-Oct-10	28-Oct-10	
Benzene	Dry Weight	mg/kg	<0.004	<0.004	<0.004	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			28-Oct-10	28-Oct-10	28-Oct-10	
F1 C6-C10	Dry Weight	mg/kg	<4	<4	<4	4
F1 -BTEX	Dry Weight	mg/kg	<4	<4	<4	4
Extractable Petroleum Hydrocarbons - Soxhlet						
Extraction Date			29-Oct-10	29-Oct-10	29-Oct-10	
F2 C10-C16	Dry Weight	mg/kg	<20	<20	<20	20
F3 C16-C34	Dry Weight	mg/kg	<20	<20	<20	20
F4 C34-C50	Dry Weight	mg/kg	<30	<30	<30	30
F4HTGC C34-C50+	Dry Weight	mg/kg	<30	<30	<30	30
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	4.88	5.21	16.80	

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Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

		Reference Number	770855-7	770855-8	770855-9	
		Sample Date	Oct 23, 2010	Oct 24, 2010	Oct 24, 2010	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	E02 / 1.83m	E03 / 1.1m	E04 / 3.6m	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			28-Oct-10	28-Oct-10	28-Oct-10	
Benzene	Dry Weight	mg/kg	<0.004	<0.004	<0.004	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			28-Oct-10	28-Oct-10	28-Oct-10	
F1 C6-C10	Dry Weight	mg/kg	<4	<4	<4	4
F1 -BTEX	Dry Weight	mg/kg	<4	<4	<4	4
Extractable Petroleum Hydrocarbons - Soxhlet						
Extraction Date			29-Oct-10	29-Oct-10	29-Oct-10	
F2 C10-C16	Dry Weight	mg/kg	<20	<20	<20	20
F3 C16-C34	Dry Weight	mg/kg	<20	<20	<20	20
F4 C34-C50	Dry Weight	mg/kg	<30	<30	<30	30
F4HTGC C34-C50+	Dry Weight	mg/kg	<30	<30	<30	30
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	4.77	4.64	4.12	

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Analytical Report

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Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

		Reference Number	770855-12	770855-13	770855-14	
		Sample Date	Oct 24, 2010	Oct 24, 2010	Oct 24, 2010	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	W01 / 1.2m	W02 / 3.6m	W03 / 1.4m	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			28-Oct-10	28-Oct-10	28-Oct-10	
Benzene	Dry Weight	mg/kg	0.004	<0.004	<0.004	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			28-Oct-10	28-Oct-10	28-Oct-10	
F1 C6-C10	Dry Weight	mg/kg	<4	6	5	4
F1 -BTEX	Dry Weight	mg/kg	<4	6	5	4
Extractable Petroleum Hydrocarbons - Soxhlet						
Extraction Date			29-Oct-10	29-Oct-10	29-Oct-10	
F2 C10-C16	Dry Weight	mg/kg	<20	<20	<20	20
F3 C16-C34	Dry Weight	mg/kg	<20	<20	<20	20
F4 C34-C50	Dry Weight	mg/kg	<30	<30	<30	30
F4HTGC C34-C50+	Dry Weight	mg/kg	<30	<30	<30	30
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	4.30	3.99	4.13	

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Analytical Report

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Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

			Reference Number	770855-17	770855-18		
			Sample Date	Oct 23, 2010	Oct 24, 2010		
			Sample Time	NA	NA		
			Sample Location				
			Sample Description	B01 / 2.6m	B02 / 4.2m		
			Matrix	Soil	Soil		
Analyte			**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Extractable Petroleum Hydrocarbons - Soxhlet							
Extraction Date				29-Oct-10	29-Oct-10		
F2 C10-C16	Dry Weight		mg/kg	<20	<20		20
F3 C16-C34	Dry Weight		mg/kg	<20	<20		20
F4 C34-C50	Dry Weight		mg/kg	<30	<30		30
F4HTGC C34-C50+	Dry Weight		mg/kg	<30	<30		30
% C50+			%	<5	<5		
Silica Gel Cleanup							
Silica Gel Cleanup				Done	Done		
Soil % Moisture							
Moisture	Soil % Moisture		% by weight	6.17	3.64		

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Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

			Reference Number	770855-17	770855-18	770855-20	
			Sample Date	Oct 23, 2010	Oct 24, 2010	Oct 23, 2010	
			Sample Time	NA	NA	NA	
			Sample Location				
			Sample Description	B01 / 2.6m	B02 / 4.2m	Haul #1	
			Matrix	Soil	Soil	Soil	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil							
Benzene	Dry Weight	ug/g				<0.02	0.02
Toluene	Dry Weight	ug/g				<0.05	0.05
Ethylbenzene	Dry Weight	ug/g				<0.05	0.05
Total Xylenes (m,p,o)	Dry Weight	ug/g				0.19	0.05
Styrene	Dry Weight	ug/g				<0.05	0.05
Methyl t-Butyl Ether	Dry Weight	ug/g				<0.05	0.05
Extraction Date				28-Oct-10	28-Oct-10		
Benzene	Dry Weight	mg/kg		<0.004	0.004		0.004
Toluene	Dry Weight	mg/kg		<0.005	<0.005		0.005
Ethylbenzene	Dry Weight	mg/kg		<0.010	<0.010		0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg		<0.010	<0.010		0.010
Volatile Petroleum Hydrocarbons - Soil							
VHs6-10	Dry Weight	ug/g				250	50
VPHs (VHs6-10 minus BTEX)	Dry Weight	ug/g				250	50
Extraction Date				28-Oct-10	28-Oct-10		
F1 C6-C10	Dry Weight	mg/kg		<4	<4		4
F1 -BTEX	Dry Weight	mg/kg		<4	<4		4

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Analytical Report

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**770855**
Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

		Reference Number	770855-20	770855-21	770855-22	
		Sample Date	Oct 23, 2010	Oct 24, 2010	Oct 24, 2010	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Haul #1	Haul #2	Haul #3	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Extractable Petroleum Hydrocarbons - Soil						
LEPHs	Dry Weight	ug/g	5860	146	1110	20
HEPHs	Dry Weight	ug/g	129	42	<20	20
Polycyclic Aromatic Hydrocarbons - Soil						
Acenaphthene	Dry Weight	ug/g	<0.5	<0.05	<0.05	0.05
Acenaphthylene	Dry Weight	ug/g	<0.5	<0.05	<0.05	0.05
Anthracene	Dry Weight	ug/g	<0.5	<0.05	<0.05	0.05
Benzo(a)anthracene	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
Benzo(a)pyrene	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
Benzo(b)fluoranthene	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
Benzo(g,h,i)perylene	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
Benzo(k)fluoranthene	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
Chrysene	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
Dibenzo(a,h)anthracene	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
Fluoranthene	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
Fluorene	Dry Weight	ug/g	0.87	<0.05	0.05	0.05
Indeno(1,2,3-c,d)pyrene	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
Naphthalene	Dry Weight	ug/g	2.72	0.62	<0.05	0.05
Phenanthrene	Dry Weight	ug/g	1.18	<0.05	0.09	0.05
Pyrene	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
PAH - Soil - Surrogate Recovery						
2-Fluorobiphenyl	PAH - Surrogate	%	113	NA	NA	40-130
Nitrobenzene-d5	PAH - Surrogate	%	NA	NA	NA	40-130
p-Terphenyl-d14	PAH - Surrogate	%	104	NA	NA	40-130
Moisture						
Moisture	Soil % Moisture	%	20.30	24.70	5.22	

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Analytical Report

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Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

		Reference Number	770855-21	770855-22	770855-23	
		Sample Date	Oct 24, 2010	Oct 24, 2010	Oct 24, 2010	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Haul #2	Haul #3	Haul #4	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Benzene	Dry Weight	ug/g	<0.02	<0.02	<0.02	0.02
Toluene	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
Ethylbenzene	Dry Weight	ug/g	0.09	<0.05	<0.05	0.05
Total Xylenes (m,p,o)	Dry Weight	ug/g	0.32	<0.05	<0.05	0.05
Styrene	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
Methyl t-Butyl Ether	Dry Weight	ug/g	<0.05	<0.05	<0.05	0.05
Volatile Petroleum Hydrocarbons - Soil						
VHs6-10	Dry Weight	ug/g	<50	<50	<50	50
VPHs (VHs6-10 minus BTEX)	Dry Weight	ug/g	<50	<50	<50	50

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Analytical Report

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**770855**
Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

		Reference Number	770855-23	770855-33		
		Sample Date	Oct 24, 2010			
		Sample Time	NA			
		Sample Location				
		Sample Description	Haul #4	Comp(LLS #01 + LLS #02 + LLS #03 + LLS #04 + LLS #05 + LLS #06)		
		Matrix	Soil	Soil		
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Extractable Petroleum Hydrocarbons - Soil						
LEPHs	Dry Weight	ug/g	2980	38		20
HEPHs	Dry Weight	ug/g	140	<20		20
Polycyclic Aromatic Hydrocarbons - Soil						
Acenaphthene	Dry Weight	ug/g	<0.05	<0.05		0.05
Acenaphthylene	Dry Weight	ug/g	<0.05	<0.05		0.05
Anthracene	Dry Weight	ug/g	<0.05	<0.05		0.05
Benzo(a)anthracene	Dry Weight	ug/g	<0.05	<0.05		0.05
Benzo(a)pyrene	Dry Weight	ug/g	<0.05	<0.05		0.05
Benzo(b)fluoranthene	Dry Weight	ug/g	<0.05	<0.05		0.05
Benzo(g,h,i)perylene	Dry Weight	ug/g	<0.05	<0.05		0.05
Benzo(k)fluoranthene	Dry Weight	ug/g	<0.05	<0.05		0.05
Chrysene	Dry Weight	ug/g	<0.05	<0.05		0.05
Dibenzo(a,h)anthracene	Dry Weight	ug/g	<0.05	<0.05		0.05
Fluoranthene	Dry Weight	ug/g	<0.05	<0.05		0.05
Fluorene	Dry Weight	ug/g	0.06	<0.05		0.05
Indeno(1,2,3-c,d)pyrene	Dry Weight	ug/g	<0.05	<0.05		0.05
Naphthalene	Dry Weight	ug/g	0.28	<0.05		0.05
Phenanthrene	Dry Weight	ug/g	<0.05	<0.05		0.05
Pyrene	Dry Weight	ug/g	<0.05	<0.05		0.05
PAH - Soil - Surrogate Recovery						
2-Fluorobiphenyl	PAH - Surrogate	%	NA	92		40-130
Nitrobenzene-d5	PAH - Surrogate	%	NA	70		40-130
p-Terphenyl-d14	PAH - Surrogate	%	NA	88		40-130
Moisture						
Moisture	Soil % Moisture	%	33.10	5.53		

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Analytical Report

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Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

Reference Number	770855-33
Sample Date	
Sample Time	
Sample Location	
Sample Description	Comp(LLS #01 + LLS #02 + LLS #03 + LLS #04 + LLS #05 + LLS #06)
Matrix	Soil

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Benzene	Dry Weight	ug/g	<0.02			0.02
Toluene	Dry Weight	ug/g	<0.05			0.05
Ethylbenzene	Dry Weight	ug/g	<0.05			0.05
Total Xylenes (m,p,o)	Dry Weight	ug/g	<0.05			0.05
Styrene	Dry Weight	ug/g	<0.05			0.05
Methyl t-Butyl Ether	Dry Weight	ug/g	<0.05			0.05
Volatile Petroleum Hydrocarbons - Soil						
VHs6-10	Dry Weight	ug/g	<50			50
VPHs (VHs6-10 minus BTEX)	Dry Weight	ug/g	<50			50

Approved by:

Andrew Garrard, BSc
General Manager

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Methodology and Notes

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**770855**
Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
BTEX-CCME - Soil	CCME	*	Reference Method for Canada-Wide Standard for PHC in Soil, CWS PHCS TIER 1	29-Oct-10	Exova Calgary
BTEX-CCME - Soil	US EPA	*	US EPA method, 8260B/5035	29-Oct-10	Exova Calgary
BTEX-VPH - Soil	BCELM	*	Volatile Hydrocarbons in Solids by GC/FID, VH Solids	28-Oct-10	Exova Surrey
BTEX-VPH - Soil	BCELM	*	Volatile Hydrocarbons in Solids by GC/FID, VH Solids	08-Nov-10	Exova Surrey
EPH - Soil	BCELM	*	Extractable Petroleum Hydrocarbons (EPH) in Solids by GC/FID, EPH Solids	28-Oct-10	Exova Surrey
EPH - Soil	BCELM	*	Extractable Petroleum Hydrocarbons (EPH) in Solids by GC/FID, EPH Solids	08-Nov-10	Exova Surrey
PAH - Soil (Surrey)	BCELM	*	Polycyclic Aromatic Hydrocarbons (PAHs) In Solids by GC/MS/SIM, PAH Solids	28-Oct-10	Exova Surrey
PAH - Soil (Surrey)	BCELM	*	Polycyclic Aromatic Hydrocarbons (PAHs) In Solids by GC/MS/SIM, PAH Solids	29-Oct-10	Exova Surrey
PAH - Soil (Surrey)	BCELM	*	Polycyclic Aromatic Hydrocarbons (PAHs) In Solids by GC/MS/SIM, PAH Solids	08-Nov-10	Exova Surrey
PAH - Soil (Surrey)	US EPA	*	Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry, 8270	28-Oct-10	Exova Surrey
PAH - Soil (Surrey)	US EPA	*	Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry, 8270	29-Oct-10	Exova Surrey
PAH - Soil (Surrey)	US EPA	*	Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry, 8270	08-Nov-10	Exova Surrey
TEH-CCME-Soil (Soxhlet)	CCME	*	Reference Method for Canada-Wide Standard for PHC in Soil, CWS PHCS TIER 1	29-Oct-10	Exova Calgary

** Reference Method Modified*

References

B.C.M.O.E	B.C. Ministry of Environment
BCELM	B.C. Environmental Laboratory Manual
CCME	Canadian Council of Ministers of the Environment
US EPA	US Environmental Protection Agency Test Methods

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Methodology and Notes

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Report To:	EBA Engineering Consultants	ID:	W23101315.002	Control Number:	A171880/78
	Unit 6, 151 Industrial Road	Name:	WRFN Beaver Creek House #10	Date Received:	Oct 27, 2010
	Whitehorse, YT, Canada	Location:	Remedial Earthworks	Date Reported:	Nov 12, 2010
	Y1A 2V3	LSD:		Report Number:	1382379
Attn:	Chris Harwood	P.O.:			
Sampled By:		Acct code:			
Company:	EBA				

Comments:

- Surrogate recoveries are not available for PAH samples 21, 22 and 23 because the analysis was requested after sample extraction.
- Surrogate recovery of Nitrobenzene-d5 for PAH sample 20 is not available due to interference from hydrocarbons. All other surrogate recoveries and quality control meet acceptance criteria.
- Reduction of analytical volume was necessary due to matrix effects in PAH sample 20. Detection limits are adjusted accordingly.
- Sample 33 was prepared as lab mixtures. Loss of volatile compounds may have occurred during this preparation.

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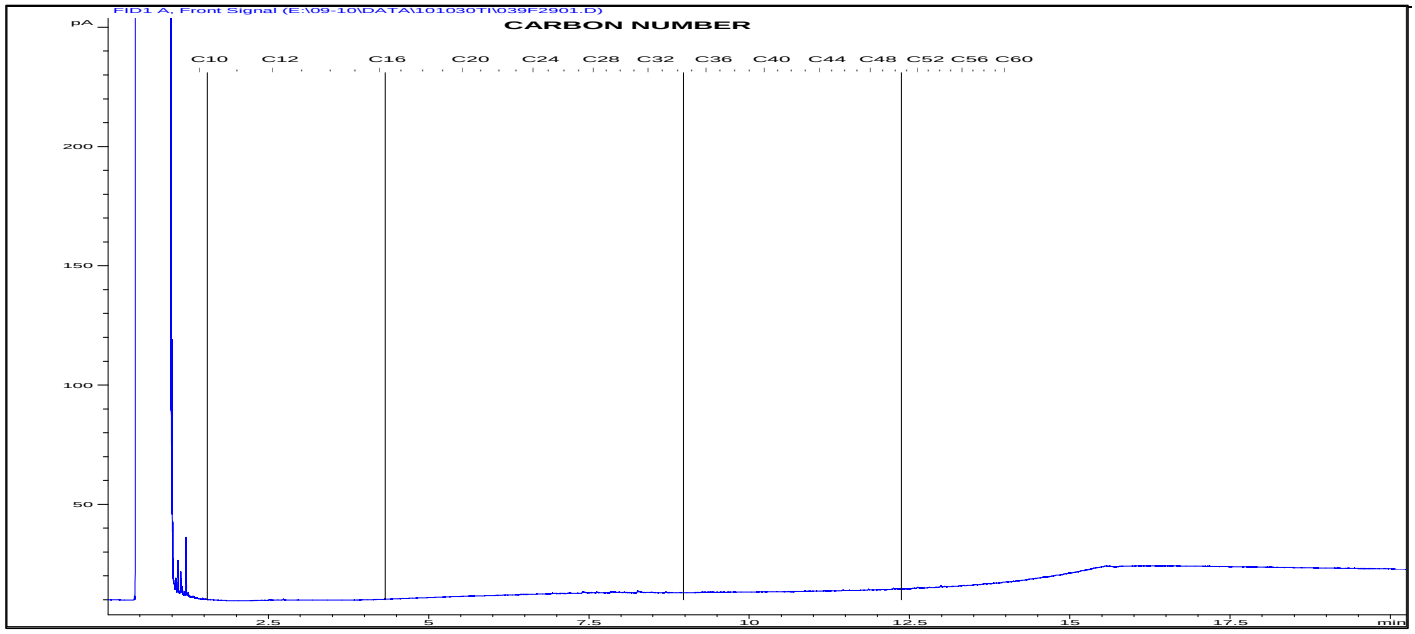
Hydrocarbon Chromatogram

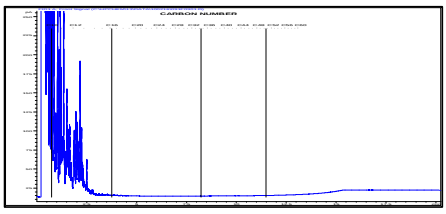
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-1 Sample Description: 0.61m N01
Sample Date: Oct 23, 2010

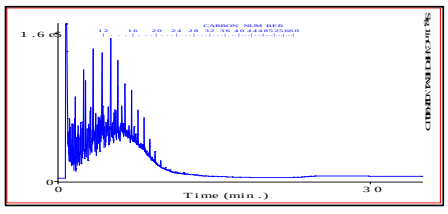


TYPICAL PRODUCT CHROMATOGRAMS

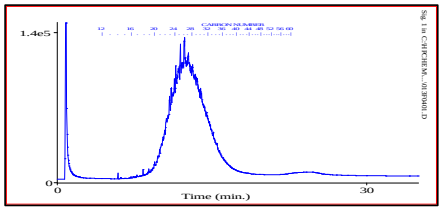
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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Hydrocarbon Chromatogram

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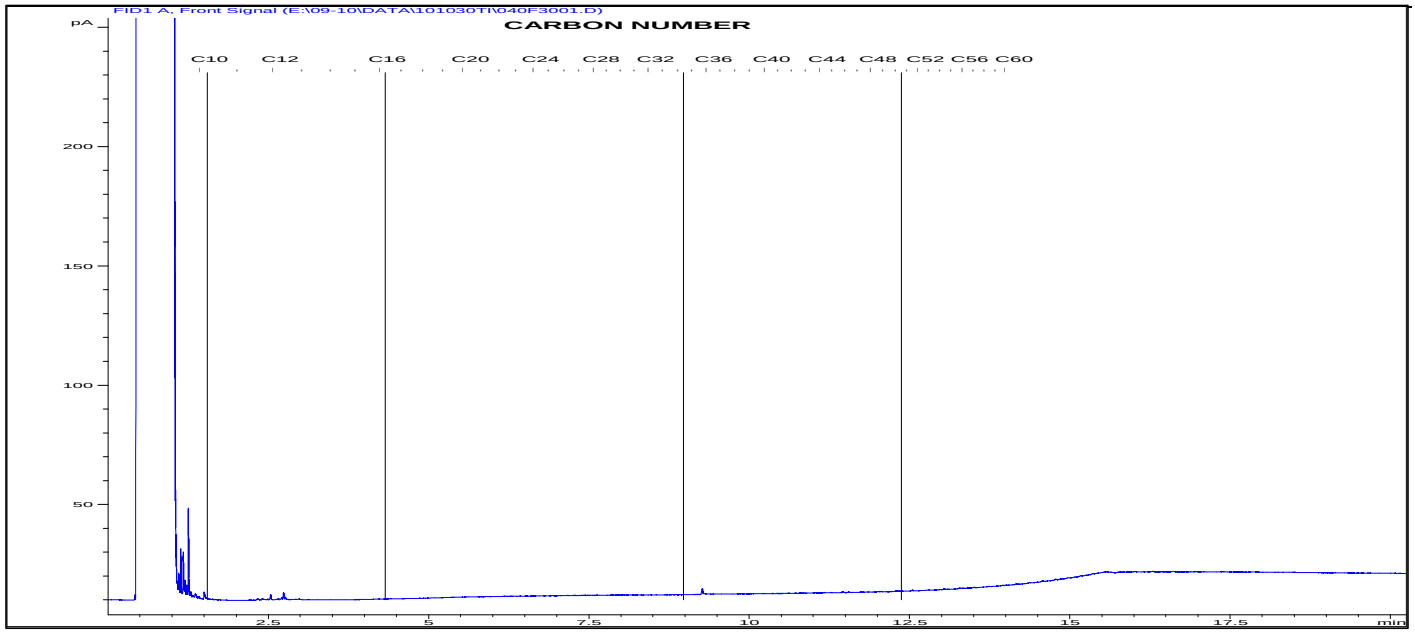
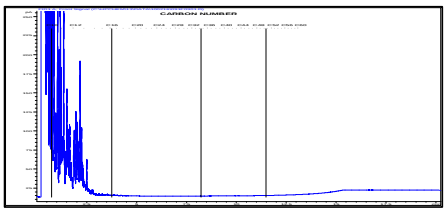
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-2 Sample Description: 1.83m N02
Sample Date: Oct 23, 2010

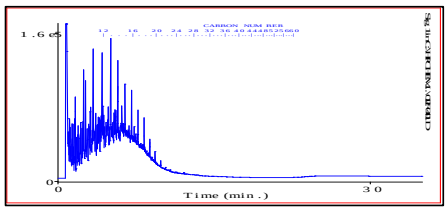


TYPICAL PRODUCT CHROMATOGRAMS

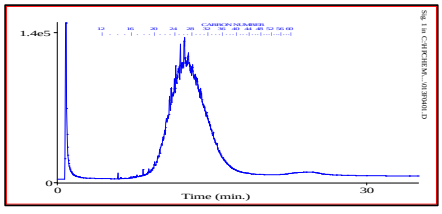
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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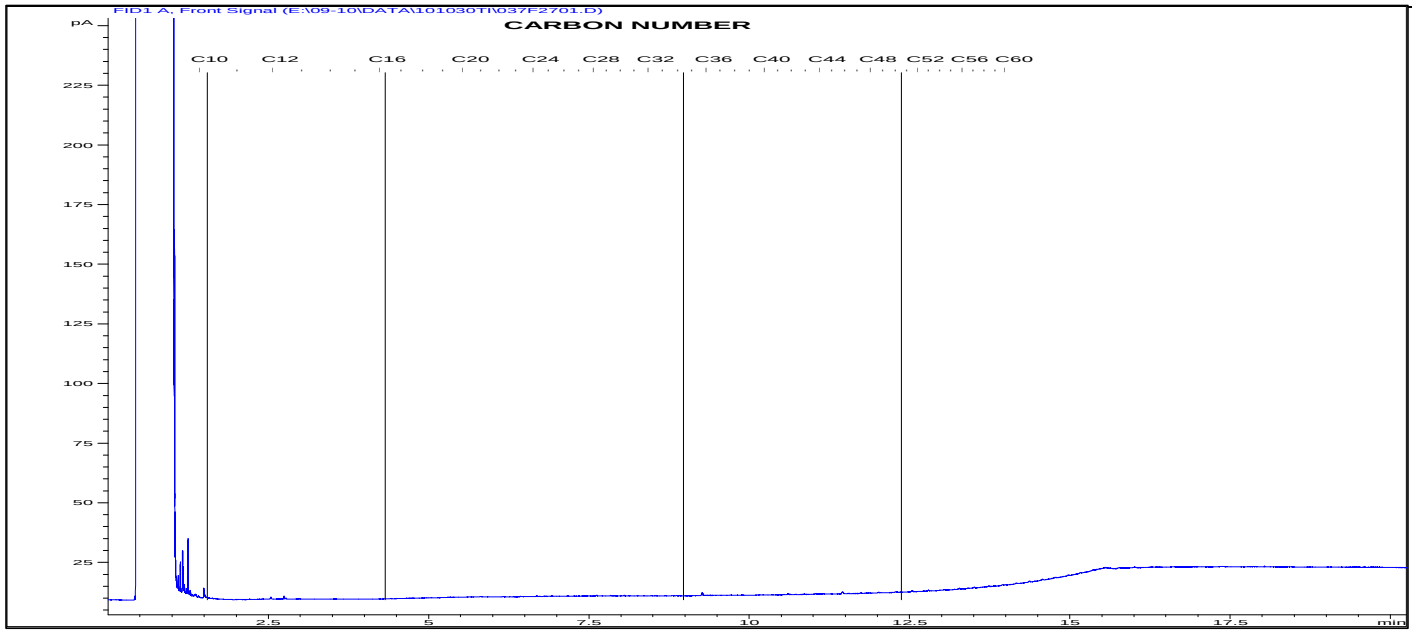
Hydrocarbon Chromatogram

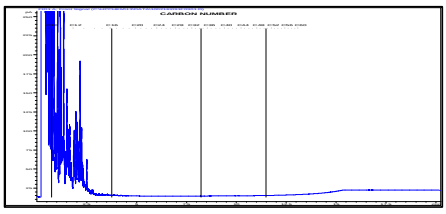
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-3 Sample Description: 2.6m N03
Sample Date: Oct 23, 2010

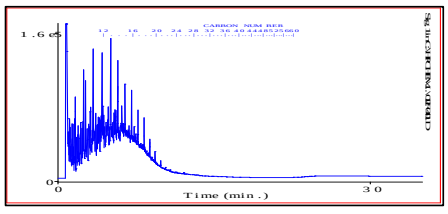


TYPICAL PRODUCT CHROMATOGRAMS

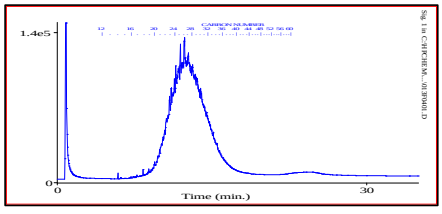
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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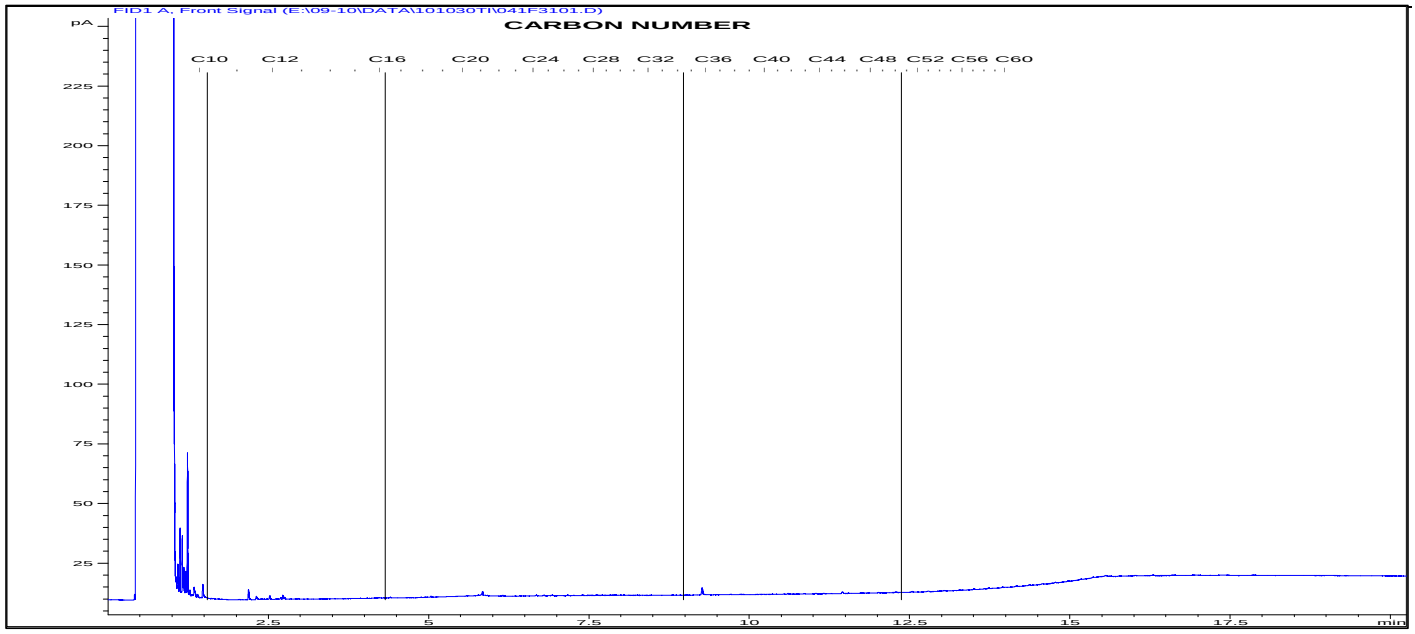
Hydrocarbon Chromatogram

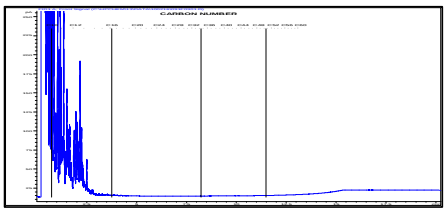
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-4 Sample Description: 0.6m S01
Sample Date: Oct 24, 2010

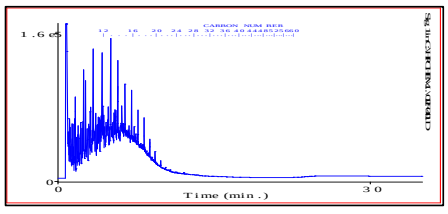


TYPICAL PRODUCT CHROMATOGRAMS

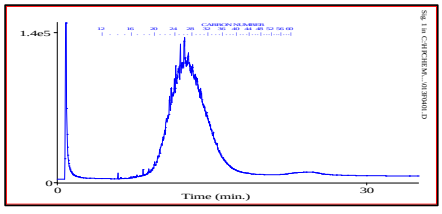
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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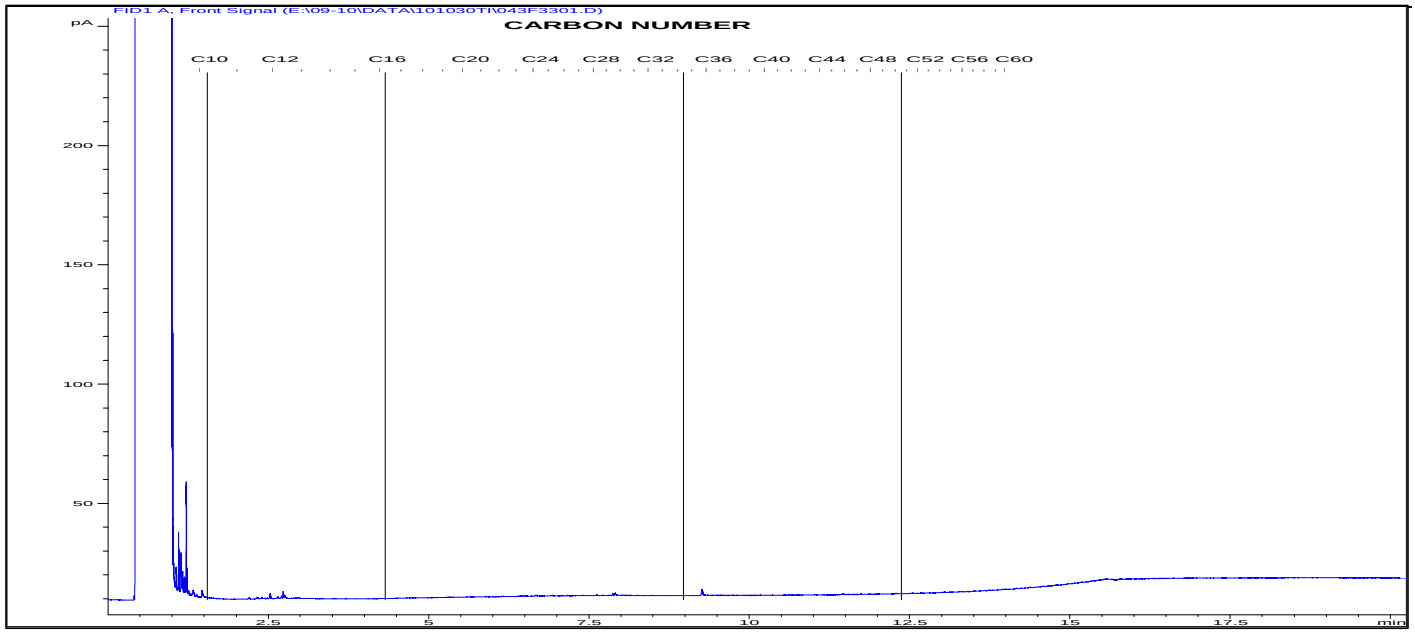
Hydrocarbon Chromatogram

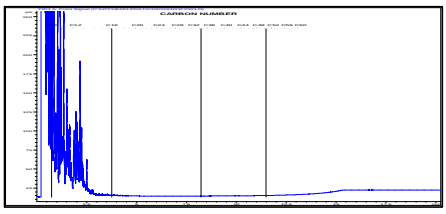
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-5 Sample Description: 3.5m S02
Sample Date: Oct 24, 2010

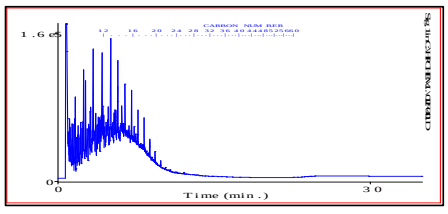


TYPICAL PRODUCT CHROMATOGRAMS

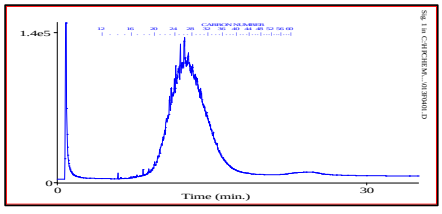
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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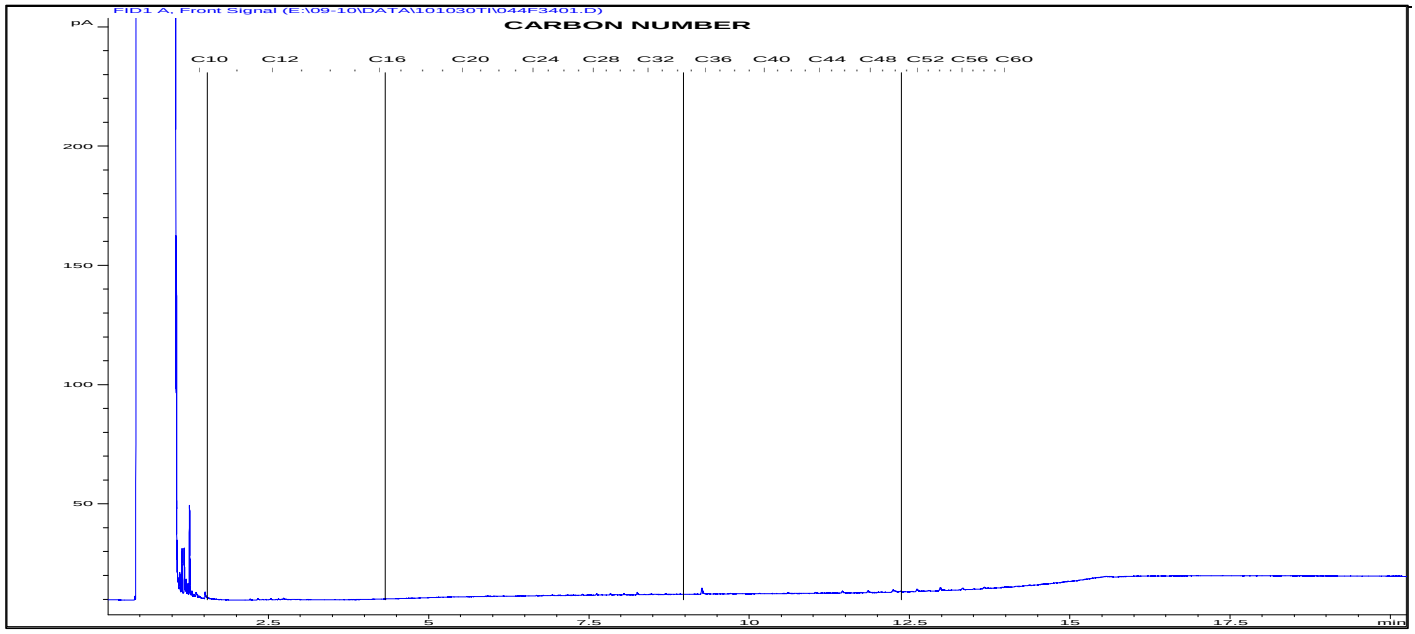
Hydrocarbon Chromatogram

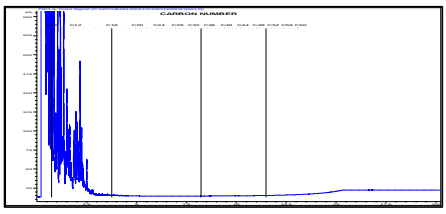
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-6 Sample Description: 0.5m E01
Sample Date: Oct 23, 2010

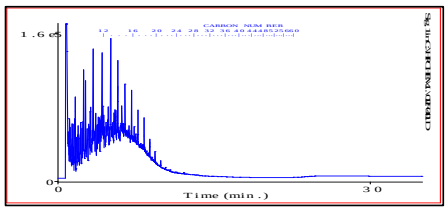


TYPICAL PRODUCT CHROMATOGRAMS

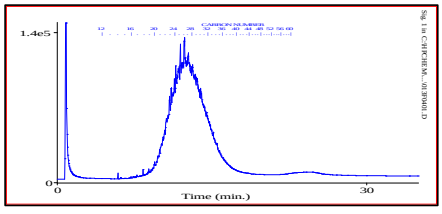
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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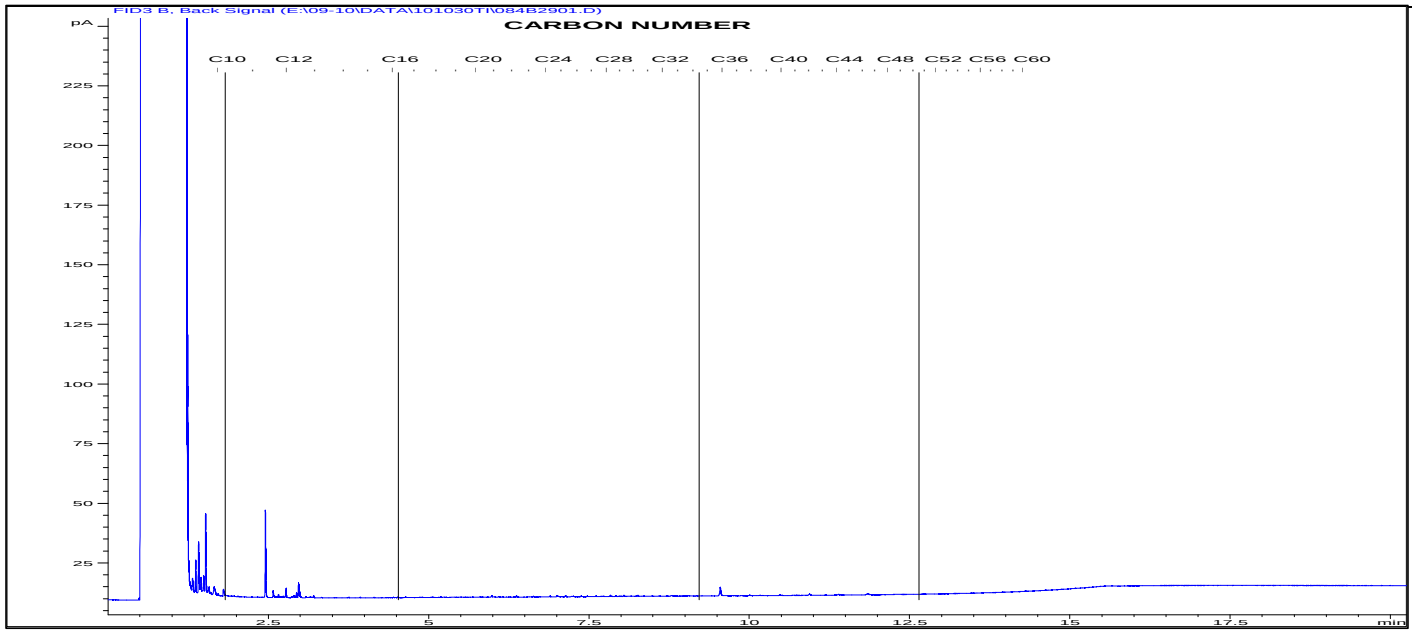
Hydrocarbon Chromatogram

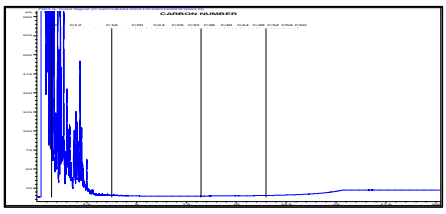
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-7 Sample Description: 1.83m E02
Sample Date: Oct 23, 2010

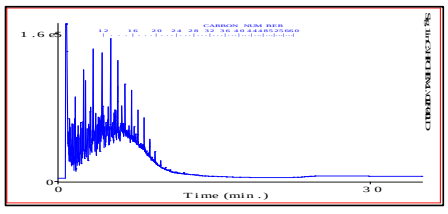


TYPICAL PRODUCT CHROMATOGRAMS

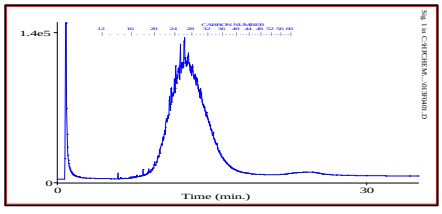
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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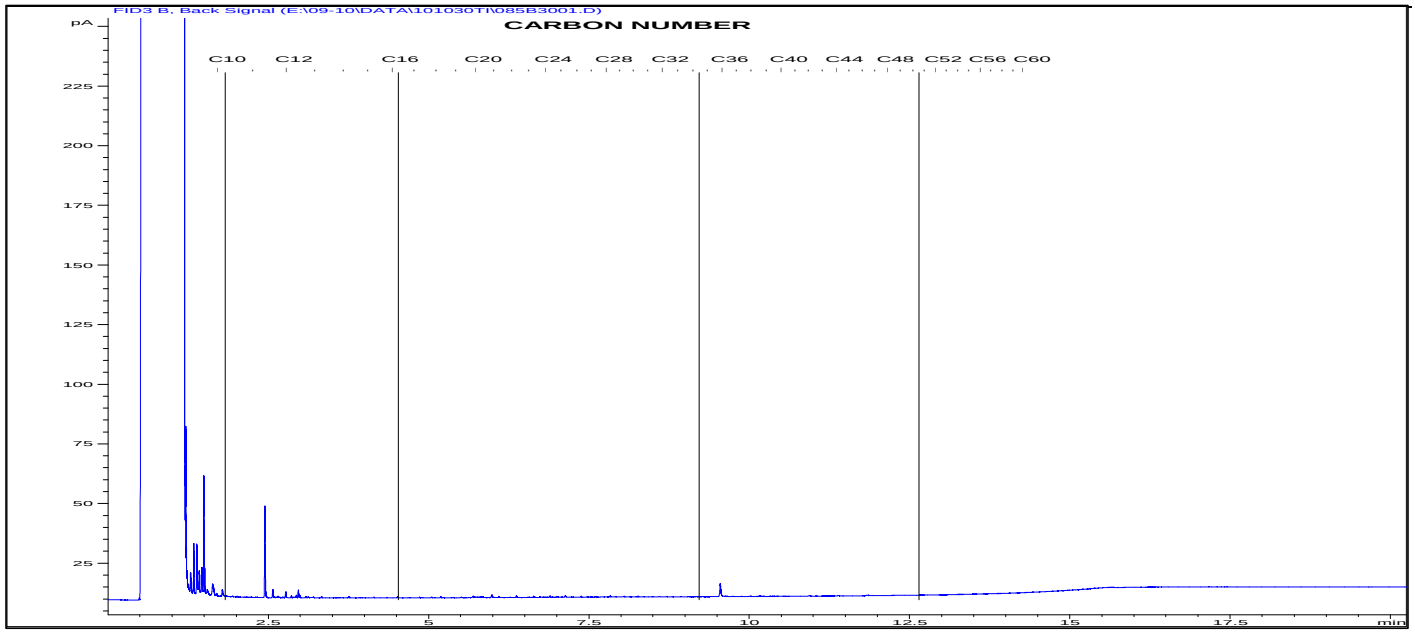
Hydrocarbon Chromatogram

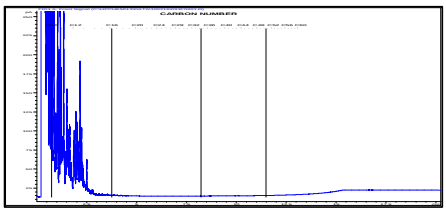
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-8 Sample Description: 1.1m E03
Sample Date: Oct 24, 2010

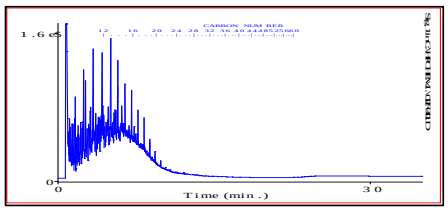


TYPICAL PRODUCT CHROMATOGRAMS

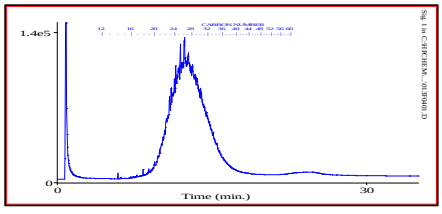
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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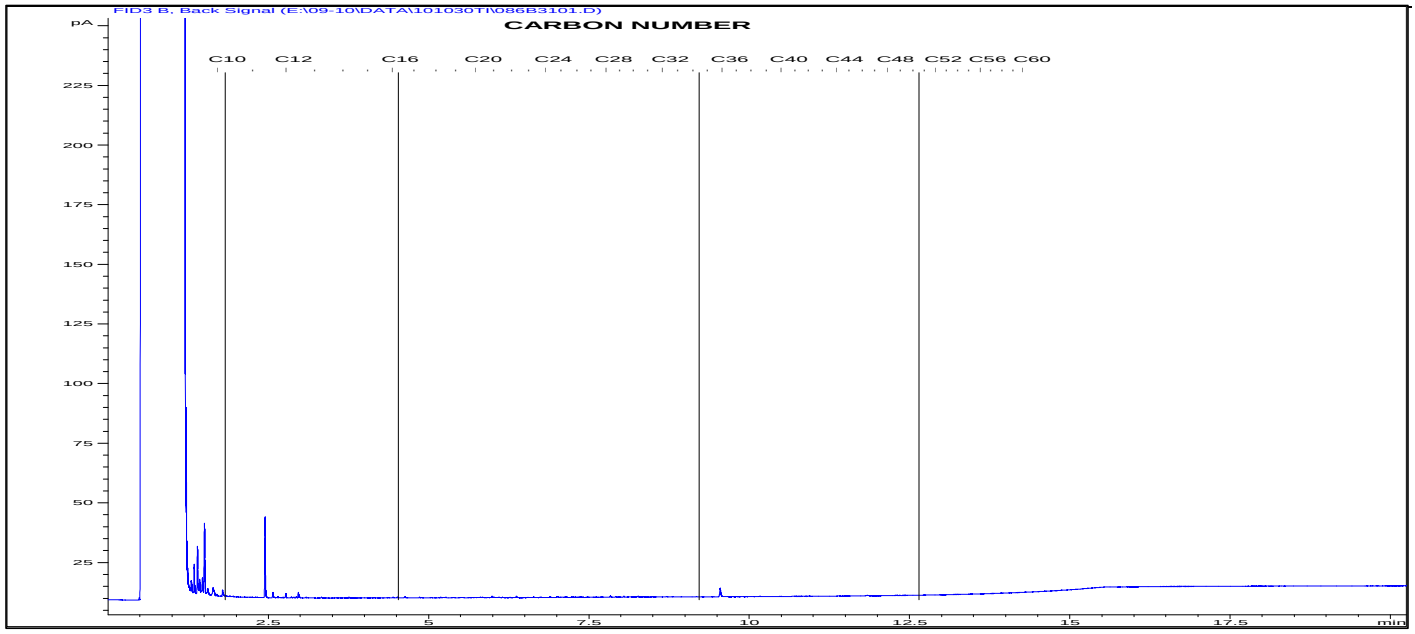
Hydrocarbon Chromatogram

Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

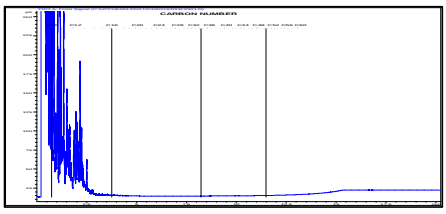
Exova Number: 770855-9
Sample Date: Oct 24, 2010

Sample Description: 3.6m E04

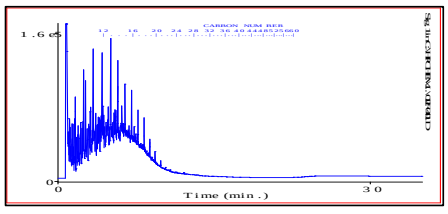


TYPICAL PRODUCT CHROMATOGRAMS

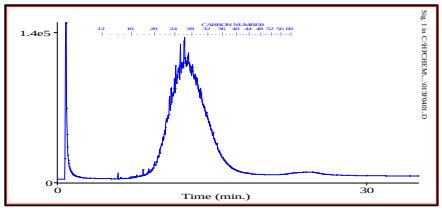
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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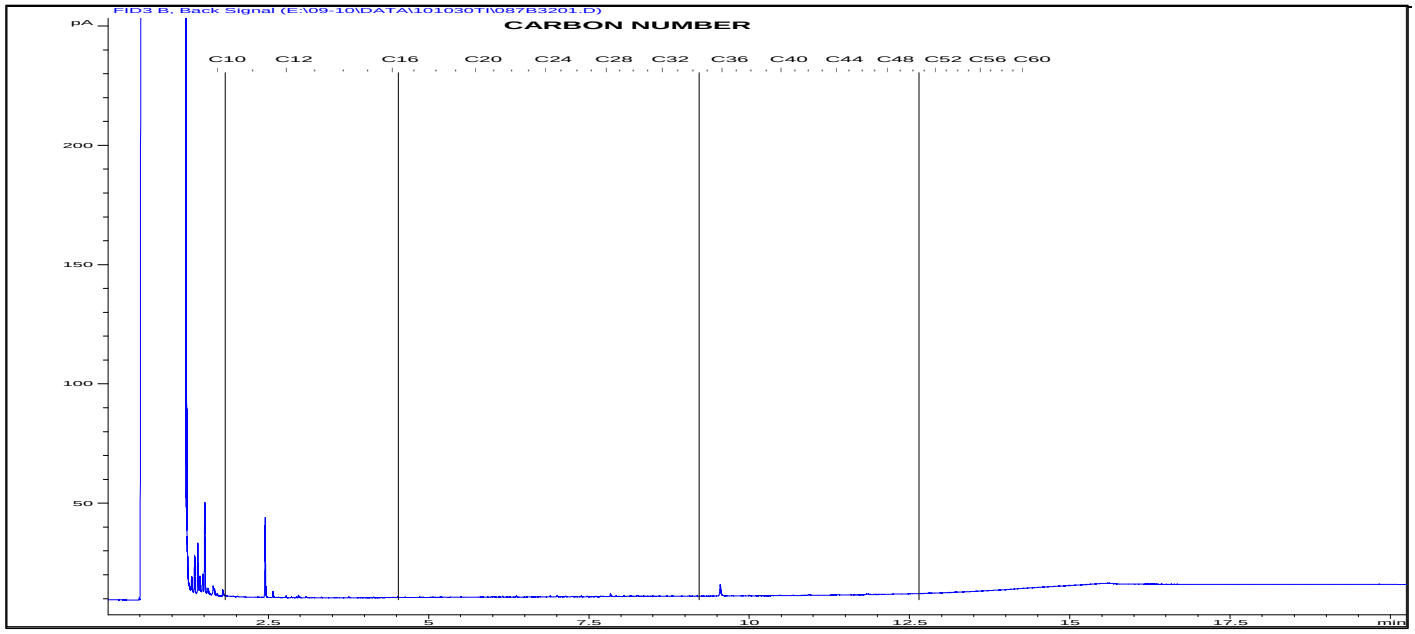
Hydrocarbon Chromatogram

Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

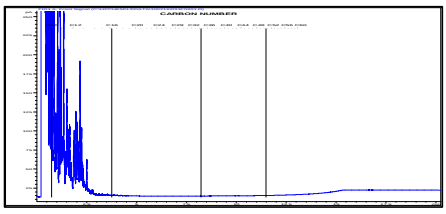
Exova Number: 770855-12
Sample Date: Oct 24, 2010

Sample Description: 1.2m W01

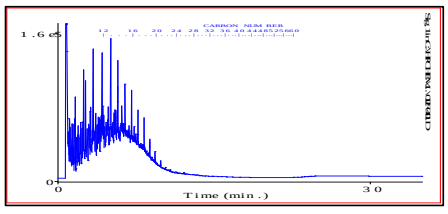


TYPICAL PRODUCT CHROMATOGRAMS

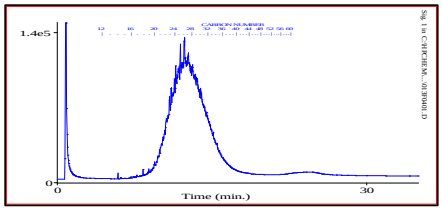
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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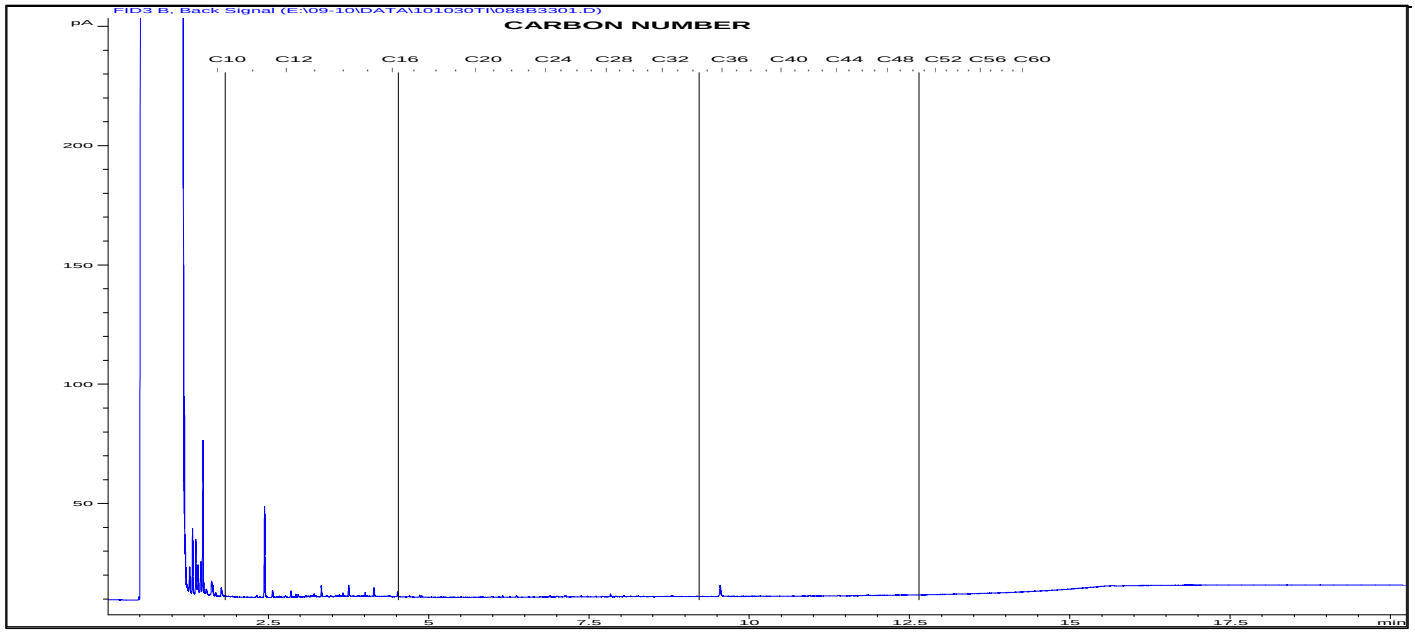
Hydrocarbon Chromatogram

Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

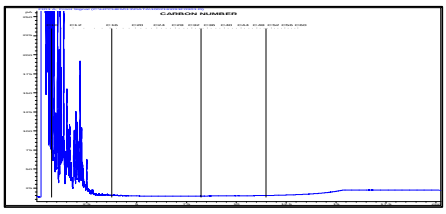
Exova Number: 770855-13
Sample Date: Oct 24, 2010

Sample Description: 3.6m W02

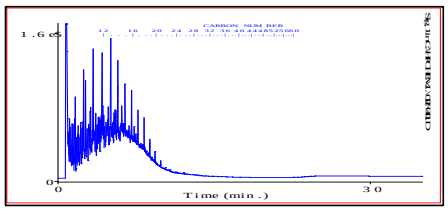


TYPICAL PRODUCT CHROMATOGRAMS

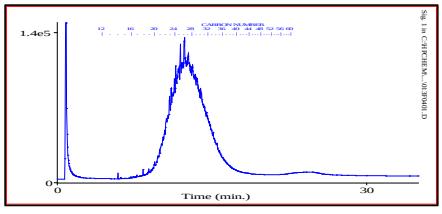
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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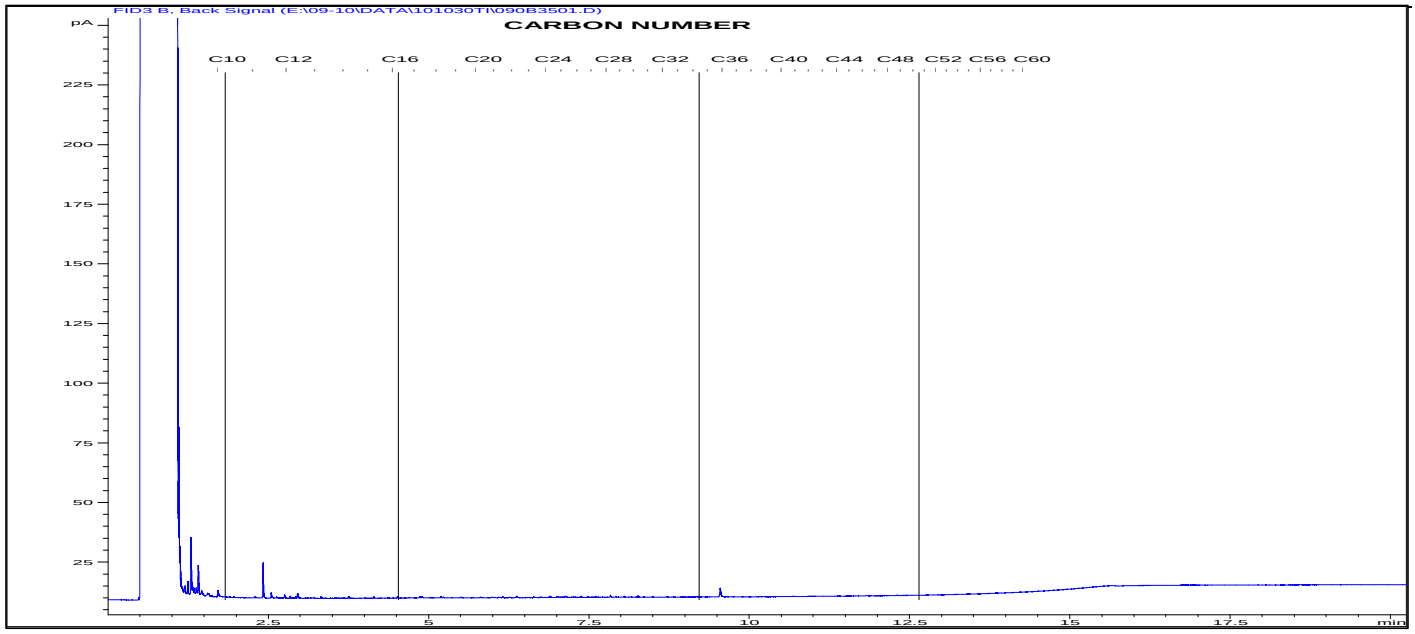
Hydrocarbon Chromatogram

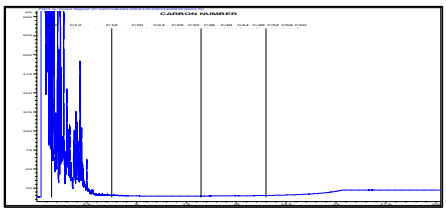
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-14 Sample Description: 1.4m W03
Sample Date: Oct 24, 2010

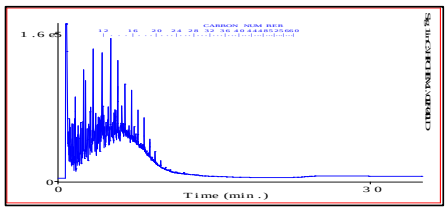


TYPICAL PRODUCT CHROMATOGRAMS

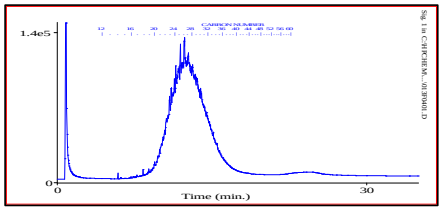
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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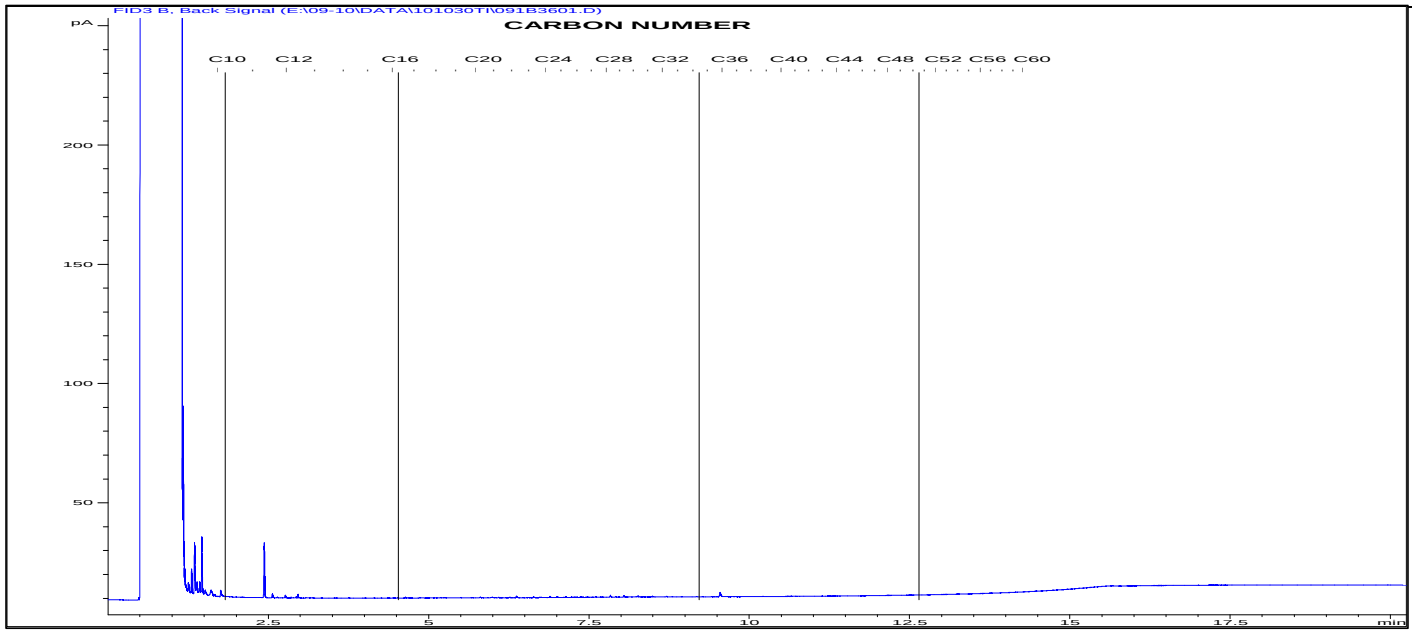
E: NWL-Calgary@exova.com
W: www.exova.com

Hydrocarbon Chromatogram

Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

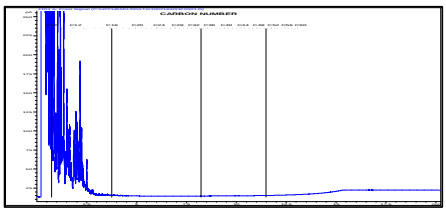
Exova Number: 770855-17
Sample Date: Oct 23, 2010

Sample Description: 2.6m B01

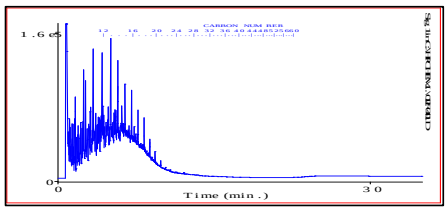


TYPICAL PRODUCT CHROMATOGRAMS

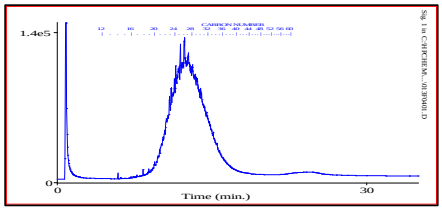
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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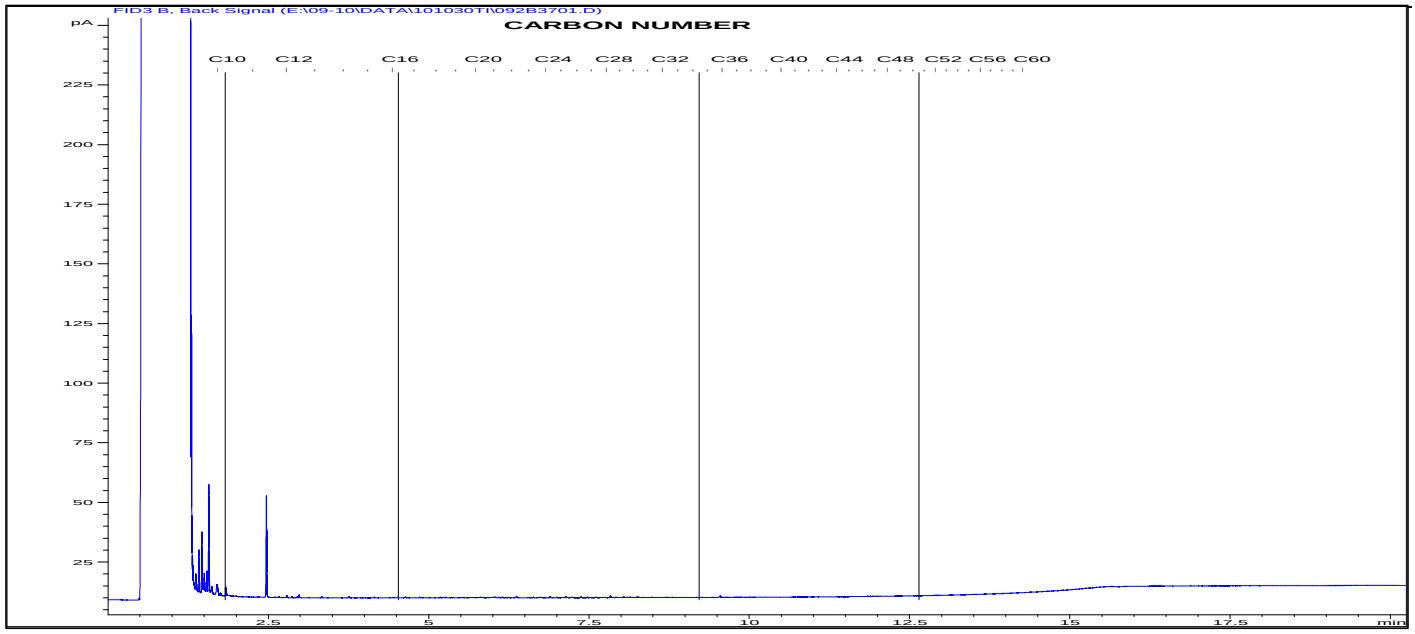
Hydrocarbon Chromatogram

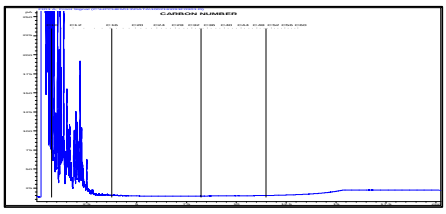
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 2, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3			Silica Gel Treated	
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-18 Sample Description: 4.2m B02
Sample Date: Oct 24, 2010

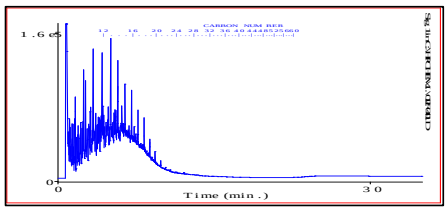


TYPICAL PRODUCT CHROMATOGRAMS

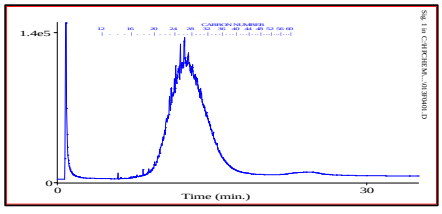
Unleaded Gasoline



Winter Diesel



Motor Oil 10W30



Product Carbon Number Ranges

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

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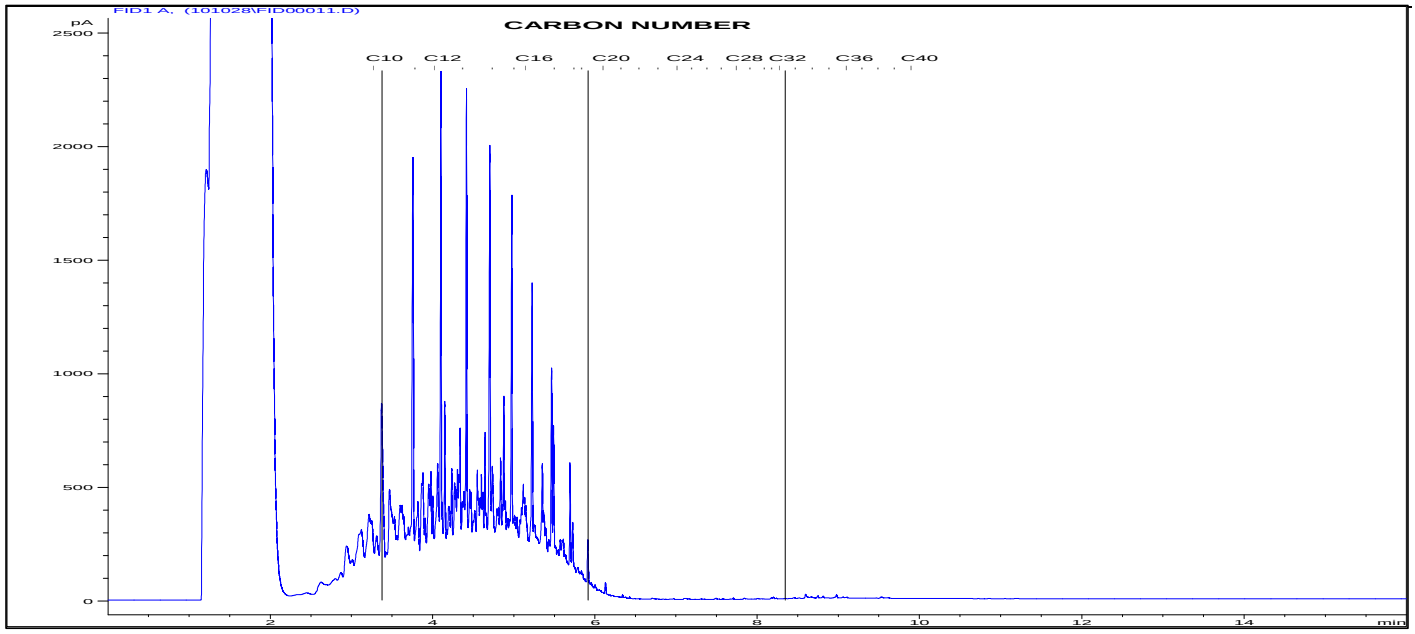
W: www.exova.com

Hydrocarbon Chromatogram

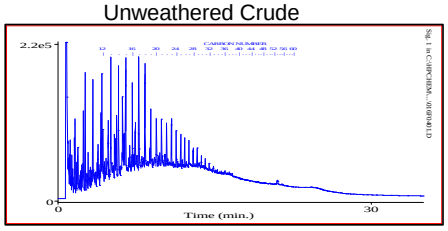
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 3, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3				
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-20 Sample Description: Haul #1
Sample Date: Oct 23, 2010

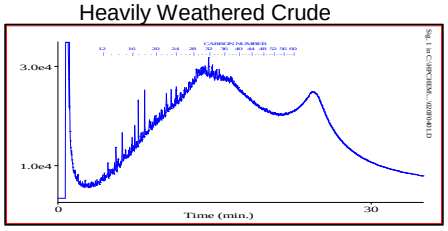


TYPICAL PRODUCT CHROMATOGRAMS

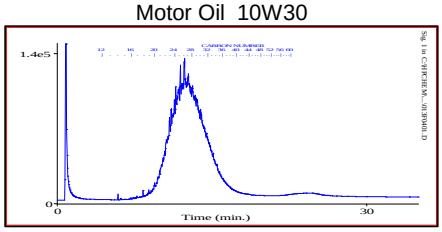
Unweathered Crude



Heavily Weathered Crude



Motor Oil 10W30



Product Carbon Number Ranges

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

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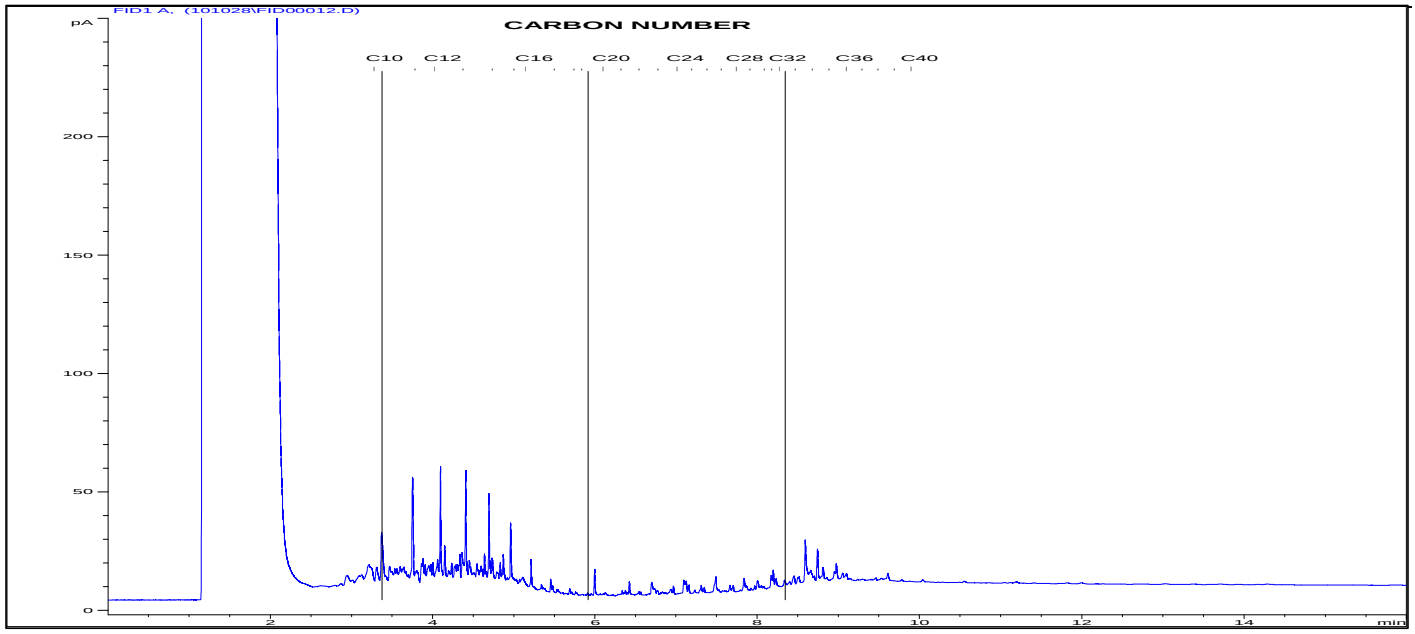
Hydrocarbon Chromatogram

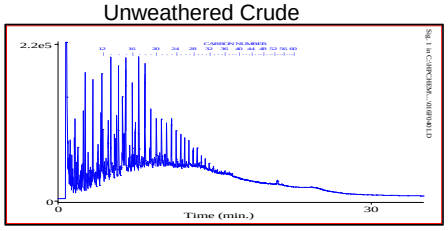
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 3, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3				
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-21 Sample Description: Haul #2
Sample Date: Oct 24, 2010

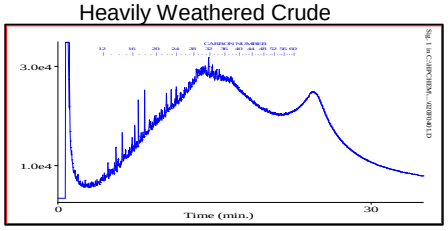


TYPICAL PRODUCT CHROMATOGRAMS

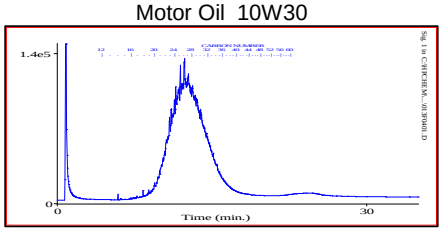
Unweathered Crude



Heavily Weathered Crude



Motor Oil 10W30



Product Carbon Number Ranges

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

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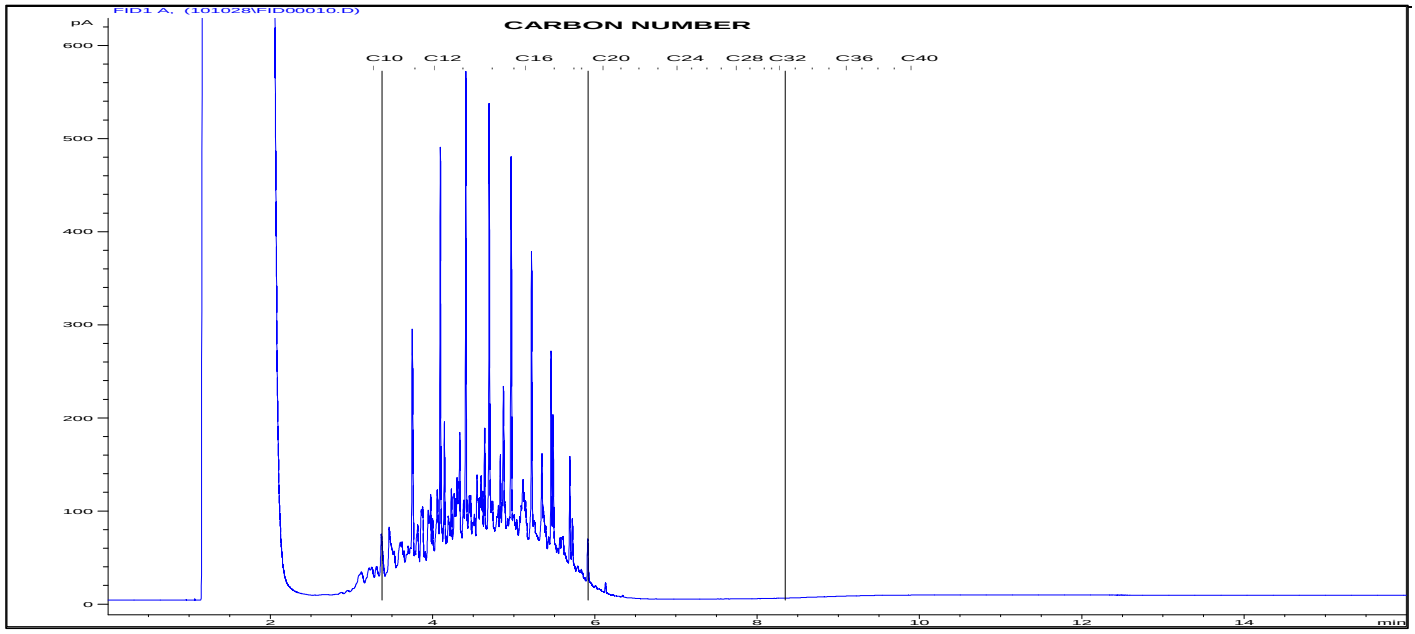
Hydrocarbon Chromatogram

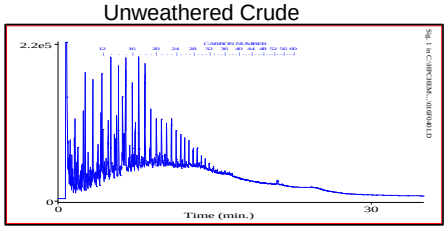
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 3, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3				
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-22 Sample Description: Haul #3
Sample Date: Oct 24, 2010

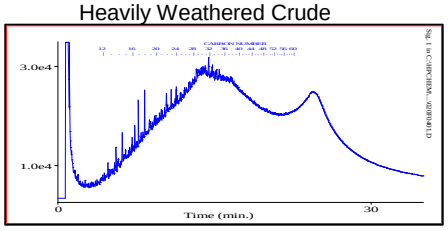


TYPICAL PRODUCT CHROMATOGRAMS

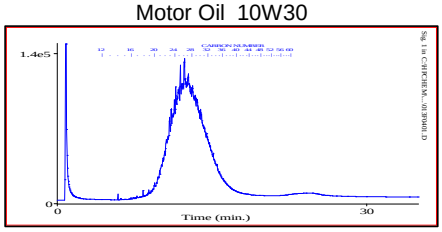
Unweathered Crude



Heavily Weathered Crude



Motor Oil 10W30



Product Carbon Number Ranges

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

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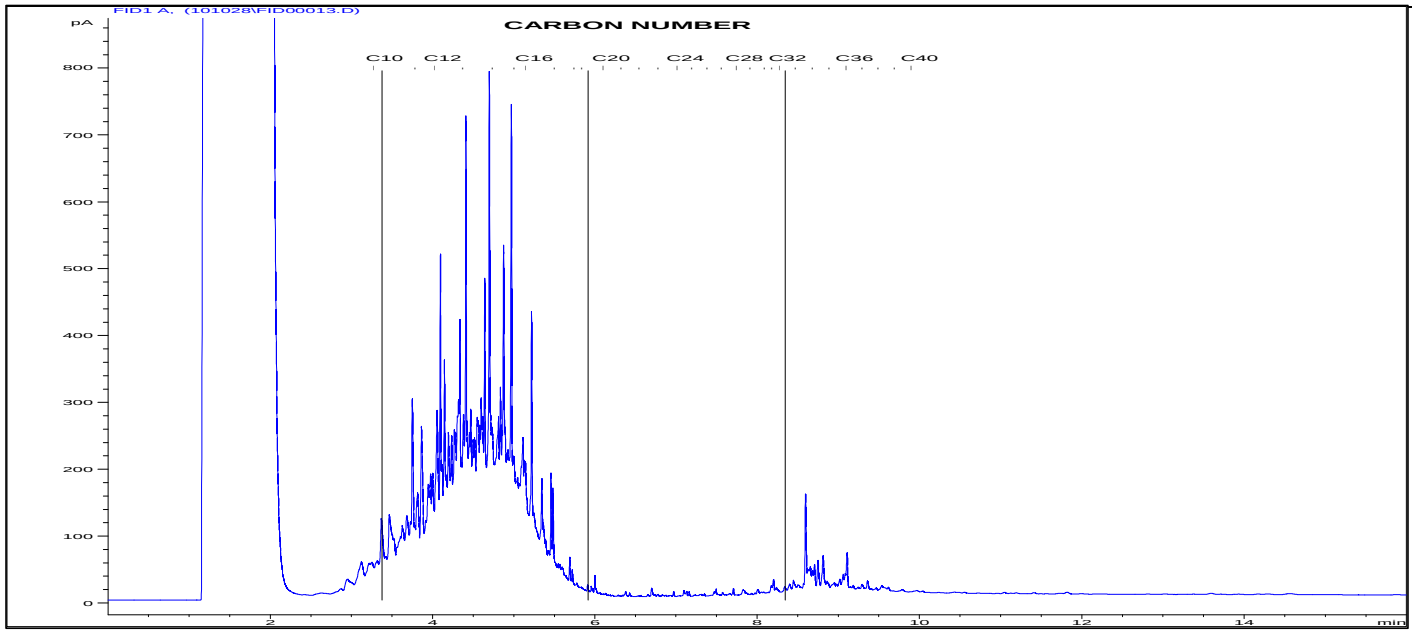
Hydrocarbon Chromatogram

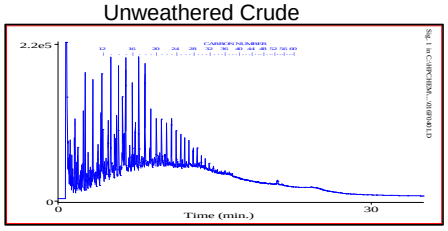
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 3, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1375519
	Y1A 2V3				
Attn:	Chris Harwood				
Sampled by:					
Company:	EBA				

Exova Number: 770855-23 Sample Description: Haul #4
Sample Date: Oct 24, 2010

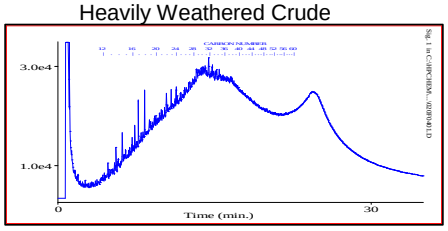


TYPICAL PRODUCT CHROMATOGRAMS

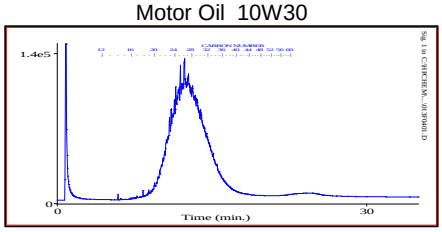
Unweathered Crude



Heavily Weathered Crude



Motor Oil 10W30



Product Carbon Number Ranges

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

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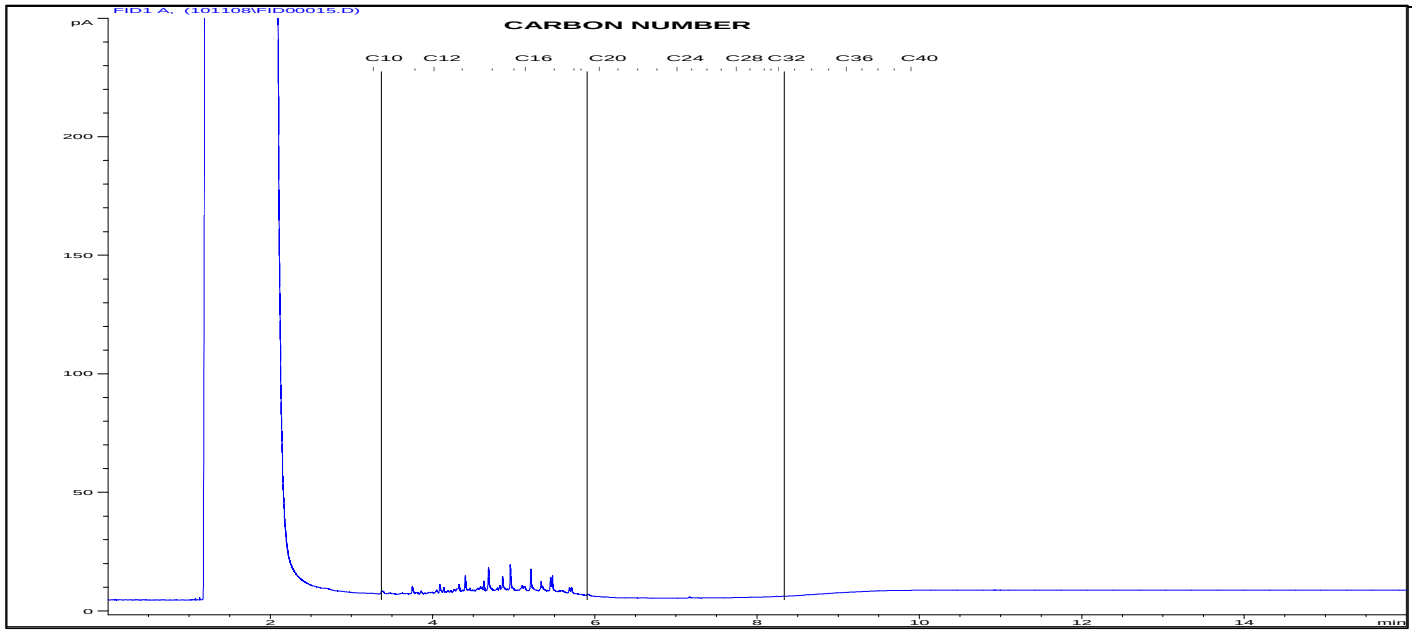
Hydrocarbon Chromatogram

Bill To:	EBA Engineering Consultants Lt	Project ID:	W23101315.002	Lot ID:	**770855**
Report To:	EBA Engineering Consultants Lt	Name:	WRFN Beaver Creek House #10	Control Number:	A171880/78
		Location:	Remedial Earthworks	Date Received:	Oct 27, 2010
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 12, 2010
	Whitehorse, YT, Canada	P.O.:		Report Number:	1382379
	Y1A 2V3				
Attn:	Chris Harwood				
Sampled by:					
Company:					

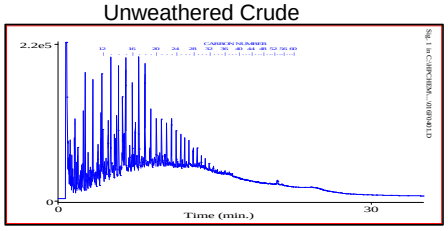
Exova Number: 770855-33
Sample Date:

Sample Description: Comp(LLS #01 + LLS #02 + LLS #03 + LLS #04 + LLS #05 + LLS #

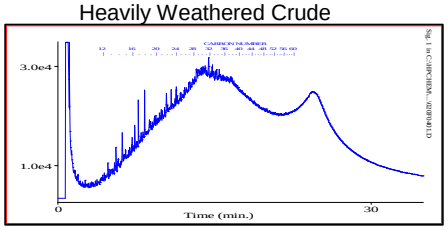


TYPICAL PRODUCT CHROMATOGRAMS

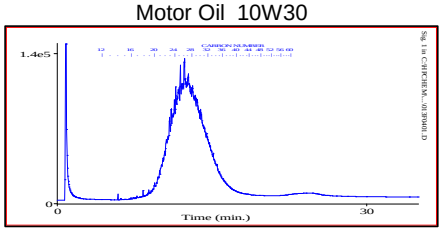
Unweathered Crude



Heavily Weathered Crude



Motor Oil 10W30



Product Carbon Number Ranges

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

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770855

Control Number A171880

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

See reverse for your nearest Exova location and proper sampling protocol

Billing Address:		Copy of Report:	**Copy of Report To:**		Copy of invoice:
Company:			Company:		Send invoice to this address for approval ☐
Address:	EBA Engineering Consulting Ltd. Unit 6 151 Industrial Road Whitehorse, Yukon YT Y1A 2V3	QA/QC Report ☐	Address:		
Attention:	Chris Harwood	Report Result:	Attention:		Report Result:
Phone:	(867) 668-2071 ext. 235	e-mail ☐	Phone:		e-mail ☐
Fax:	(867) 668-4349	Results Online ☐	Fax:		Results Online ☐
Cell:	chardwood@eba.ca	Fax ☐	Cell:		Fax ☐
e-mail:		Mail ☐	e-mail:		Mail ☐

Information to be included on Report and Invoice

Project ID: W2301315-002
Project Name: WRFN Beaver Creek House #10
Project Location: Remedial Earthworks.
Legal Location:
PO#:
Proj. Acct. Code:
Agreement ID:

PRIORITY

Please contact laboratory prior to submitting any RUSH samples.

Upon filling out this section, client accepts that surcharges will be applied to this analysis.

If not all samples require RUSH, please indicate in special instructions.

Date Required: _____
Signature: _____

Sample Custody (Please Print)
Sampled by:
Company EBA Signature
I authorize Exova to proceed with the work indicated on this form.
Date: Oct 26 Initial:
Received by: Sample Temp
Waybill #: Date
Company Time

RECEIVED
OCT 27 2010

Special Instructions / Comments

Please indicate which regulations you are required to meet:
☐ Health Canada Drinking Water Quality
☐ Alberta Tier 1
☐ Other: _____

	Sample Identification	Location	Depth IN	Depth CM	Depth M	Date/Time Sampled	Matrix	Sampling Method	Number of Containers	Enter tests above (✓ relevant samples below)	
	N01		0.6			Oct.23	Soil	Grab	1	CTEH-10 ✓	1
	N02		1.83			↓	↓	↓	1		2
	N03		2.6			↓			1	CVPH 4 + CTEH-S ✓	3
	S01		0.6			Oct.24			1		4
	S02		3.5			↓			1		5
	E01		0.5			Oct.23			1		6
	E02		1.83			↓			1		7
	E03		1.1			Oct.24			1		8
	E04		3.6						1		9
	E05		1.0						1	Hold ✓	10
	E06		3.0						1		11
	W01		1.2						1		12
	W02		3.6						1		13
	W03		1.4						1		14
	W04		1.0			↓	↓	↓	1		15

NOTE: All hazardous samples must be labeled according to WHMIS guidelines.

Page 1 of 3

ED 077-00

Exova

www.exova.com

Control Number A171878

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

See reverse for your nearest Exova location and proper sampling protocol

Billing Address:		Copy of Report:	**Copy of Report To:**		Copy of invoice:
Company:	EBA Engineering Consulting Ltd.		Company:		Send invoice to this address for approval
Address:	Unit 6 151 Industrial Road Whitehorse, Yukon YT Y1A 2V3	QA/QC Report	Address:		
Attention:	Chris Harwood	Report Result:	Attention:		Report Result:
Phone:	(867) 668-2071 ext. 235	e-mail	Phone:		e-mail
Fax:	(867) 668-4349	Results Online	Fax:		Results Online
Cell:	chardwood@eba.ca	Fax	Cell:		Fax
e-mail:		Mail	e-mail:		Mail

Information to be included on Report and Invoice

Project ID:
Project Name:
Project Location:
Legal Location:
PO#:
Proj. Acct. Code:
Agreement ID:

PRIORITY

Please contact laboratory prior to submitting any RUSH samples.

Upon filling out this section, client accepts that surcharges will be applied to this analysis.

If not all samples require RUSH, please indicate in special instructions.

Date Required: _____

Signature: _____

Sample Custody (Please Print)

Sampled by:

Company Signature

I authorize Exova to proceed with the work indicated on this form:

Date: Initial:

Received by: Sample Temp.

Waybill #: Date

Company Time

Special Instructions / Comments

Please indicate which regulations you are required to meet:

- ☐ Health Canada Drinking Water Quality
- ☐ Alberta Tier 1
- ☐ Other: _____

	Sample Identification	Location	Depth IN	Depth CM	(M)	Date/Time Sampled	Matrix	Sampling Method	Number of Containers ↓	Enter tests above (✓ relevant samples below)									
										CTE+10	CUPHH + CTE+5	HOLD							
	WQ5			3.0		Oct.24	Soil	Grab	1			✓							
	BO1			2.6		Oct.23			1										
	BO2			4.2		Oct.24			1			✓							
	BO3			3.4		↓			1			✓							
	Hand #1					Oct.23			1	✓									
	" #2					Oct.24			1		✓								
	" #3					↓			1		✓								
	" #4					↓		↓	1		✓								
	LLS #01					Oct.23		Comp	1			✓							
	LLS #02					↓		↓	1			✓							
	LLS #03								1			✓							
	LLS #04								1			✓							
	LLS #05					↓			1			✓							
	LLS #06					Oct.24			1			✓							
	BF #01						✓	↓	1			✓							

NOTE: All hazardous samples must be labeled according to WHMIS guidelines.

ED 077-00

Exova

www.exova.com

Control Number A171879

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

See reverse for your nearest Exova location and proper sampling protocol

Billing Address:		Copy of Report:	**Copy of Report To:**		Copy of invoice:
Company:			Company:		Send invoice to this address for approval ☐
Address:	EBA Engineering Consulting Ltd. Unit 6 151 Industrial Road Whitehorse, Yukon YT Y1A 2V3	QA/QC Report ☐	Address:		
Attention:	Chris Harwood	Report Result:	Attention:		Report Result:
Phone:	(867) 668-2071 ext. 235	e-mail ☐	Phone:		e-mail ☐
Fax:	(867) 668-4349	Results Online ☐	Fax:		Results Online ☐
Cell:	chardwood@eba.ca	Fax ☐	Cell:		Fax ☐
e-mail:		Mail ☐	e-mail:		Mail ☐

Information to be included on Report and Invoice	PRIORITY	Sample Custody (Please Print)
Project ID:	**Please contact laboratory prior to submitting any RUSH samples.**	Sampled by:
Project Name:	Upon filling out this section, client accepts that surcharges will be applied to this analysis.	Company / Signature
Project Location:	If not all samples require RUSH, please indicate in special instructions.	I authorize Exova to proceed with the work indicated on this form:
Legal Location:		Date: / Initial:
PO#:		Received by: / Sample Temp.
Proj. Acct. Code:	Date Required:	Waybill #: / Date
Agreement ID:	Signature:	Company / Time

Special Instructions / Comments

Please indicate which regulations you are required to meet:
☐ Health Canada Drinking Water Quality
☐ Alberta Tier 1
☐ Other:

	Sample Identification	Location	Depth IN	Depth CM	Depth M	Date/Time Sampled	Matrix	Sampling Method	↓	Number of Containers	Enter tests above (✓ relevant samples below)
	BF02					Oct 22	Soil	Grab	1	✓	
	BF03					↓	↓	↓	1	✓	

HOLD

NOTE: All hazardous samples must be labeled according to WHMIS guidelines.

ED 077-00

Tammera Kostya

From: Lowry,Nathalie [PYR] [Nathalie.Lowry@ec.gc.ca]
Sent: Wednesday, February 07, 2007 9:42 AM
To: Tammera Kostya
Subject: RE: Spill search_Beaver Creek, YT

HI Tammera,

I have no records of spill reports for Beaver Creek. My records search covered up to 2001. For records after 2001 please contact Matthew Nefstead at Yukon Government Environmental Programs (667.5076).

Nathalie Lowry, B.Sc., M.G.I.S.
Environmental Emergencies Program - Yukon
Environment Canada - Environmental Protection Operations
91782 Alaska Hwy, Whitehorse, YT Y1A 5B7
Phone: 867.667.3405 Cell: 867.333.9917 Fax: 867.667.7962
Email: Nathalie.Lowry@ec.gc.ca

From: Tammera Kostya [mailto:tkostya@eba.ca]
Sent: Wednesday, January 31, 2007 2:18 PM
To: Lowry,Nathalie [PYR]
Subject: Spill search_Beaver Creek, YT

Hi Nathalie,
I am conducting a Wellhead Protection Plan for the White River First Nation Community Wells in Beaver Creek,Yukon which requires an Environmental Assessment of the area surrounding the wellheads. I unfortunately do not have civic addresses however I have the legal of all lots I would like searched. You will find the excel file of the lots attached. Location of the wellheads are:

Well 1: E 506051 N 6916260
Well 2: E 506175 N 6916598
The lots listed are the surrounding areas around each well system which basically consists of the southern area of Beaver Creek Town. I am not sure if you search by individual lots or by area search based on geographical location? So I've supplied both.

I would appreciate a review of the spill records to determine if there have been any documented spills on any of the listed properties or the adjacent sites. Thank you for your assistance. If you need any further information, please feel free to contact me at the number below. Please note that your response will be included with the final report, for record keeping.

<<Lot and CLSR for Beaver Creek.xls>>

Tammera Kostya, BSc
Junior Hydrogeologist
p. 867.668.2071 x63 • f. 867.668.4349 • c. 867.334.4595
e. tkostya@eba.ca

EBA Engineering Consultants Ltd.
Calcite Business Centre, Unit 6, 151 Industrial Road
Whitehorse, Yukon Y1A 2V3 • CANADA

Tammera Kostya

From: Marlene.Sparks [Marlene.Sparks@gov.yk.ca]
Sent: Wednesday, February 07, 2007 8:40 AM
To: Tammera Kostya
Subject: RE: AST/UST search_Beaver Creek YT

Hello Tammera

I do not have any permits listed under the White River First Nation.

Marlene

-----Original Message-----
From: Tammera Kostya [mailto:tkostya@eba.ca]
Sent: Wednesday, January 31, 2007 2:17 PM
To: Marlene.Sparks
Subject: AST/UST search_Beaver Creek YT

Hi Marlene,

I am conducting a Wellhead Protection Plan for the White River First Nation Community Wells in Beaver Creek which requires an Environmental Assessment of the area surrounding the wellheads. I unfortunately do not have civic addresses however I have the legal of all lots I would like searched. You will find the excel file of the lots attached. I would appreciate a list of Above Ground Storage Tanks and Underground Storage Tanks on all the listed properties. If you need any further information please feel free to contact me at the below number.

Please note that your response will be included with the final report, for record keeping.

Thanks,

<<Lot and CLSR for Beaver Creek.xls>>

Tammera Kostya, BSc
Junior Hydrogeologist
p. 867.668.2071 x63 • f. 867.668.4349 • c. 867.334.4595
e. tkostya@eba.ca

EBA Engineering Consultants Ltd.
Calcite Business Centre, Unit 6, 151 Industrial Road
Whitehorse, Yukon Y1A 2V3 • CANADA

Tammera Kostya

From: Matthew.Nefstead [Matthew.Nefstead@gov.yk.ca]
Sent: Wednesday, January 31, 2007 5:01 PM
To: Tammera Kostya
Subject: RE: CSR and Devolution Search_Beaver Creek, YT

Tammera,

I have information on the following sites that appear to be within the area in question. Please note that a lack of information on any of the sites in question does not necessarily indicate that the sites are free of contamination. You may wish to also contact Nathalie Lowry at Environment Canada, as they maintain a separate spills database and may have information we do not.

Coordinates for the sites below are approximate.
BC059: "Enger Creek", E 507762 N 6915037. Former fuel cache and staging area. Debris has been removed, but it is unknown if any soil assessment or remediation occurred.
BC102: "Beaver Creek, MP 1200.7", E506613 N 6914571. Former military highway maintenance camp and dump. 1997 Preliminary Investigation shows no evidence of contamination. Report on file.

Spill 04-06: E 508784, N 6911150, reported to be 3 miles south of Beaver Creek on the Alaska Highway. A pup trailer carrying 24,000 L of diesel fuel detached from its transport vehicle and went into the ditch. It appeared that only a small amount of fuel was spilled, but the exact quantity is unknown. Extent of clean-up is unknown.

We have files on the following sites; you may view the files for more information:
4202-20-144: Beaver Creek Airport
4202-20-148: Beaver Creek Highway Maintenance Camp

Relocation permits have been issued for the removal of hydrocarbon-contaminated soil from the following locations:
4202-23-057: Canada Customs & Revenue Agency Beaver Creek Border Crossing Facility (adjacent to blue house #1793)
4202-23-094: Yukon Electrical Corporation Ltd. Beaver Creek Generator Site (Lot 37 – G951)
4202-23-167: Northwestel Inc. Beaver Creek Central Office (CLSR 78129, LTO-96-01, Plan 35947, Group 0951, Lot 12-1)

Please contact me if you have any questions, would like to view any of our files, or need further information in the future.

Matthew Nefstead
Contaminated Sites Analyst
Yukon Department of Environment (V-8)
(867) 667-5076

-----Original Message-----
From: Tammera Kostya [mailto:tkostya@eba.ca]
Sent: Wednesday, January 31, 2007 2:17 PM
To: Matthew.Nefstead
Subject: CSR and Devolution Search_Beaver Creek, YT

Hi Matthew
I am conducting a Wellhead Protection Plan for the White River First Nation Community Wells in Beaver

Creek,Yukon which requires an Environmental Assessment of the area surrounding the wellheads, as discussed yesterday by phone. I unfortunately do not have civic addresses however I have the legal of all lots I would like searched. You will find the excel file of the lots attached. Location of the wellheads are:

Well 1: E 506051 N 6916260
Well 2: E 506175 N 6916598
The lots listed are the surrounding areas around each well system which basically consists of the southern area of Beaver Creek Town. I am not sure if you search by individual lots or by area search based on geographical location? So I've supplied both.

I would like to confirm that these sites (listed in the excel file attached) are not designated as contaminated sites and to note if there have been any spills on or adjacent to any of these sites.

I would also appreciate a search of any devolution sites within the Beaver Creek area. My concern is more for any sites that are located within Beaver Creek and south of the Town along the Alaska Highway. Could you please conduct a search area encompassing the Beaver Creek Town and a 10 km sweep south of the Town along the Alaska Highway with a 1 km buffer (both east and west) from the Alaska Highway (making a 2 km girth).

Thank you for your assistance. If you need any further information, please feel free to contact me at the number below. Please note that your response will be included with the final report, for record keeping.

<<Lot and CLSR for Beaver Creek.xls>>

Tammera Kostya, BSc
Junior Hydrogeologist
p. 867.668.2071 x63 • f. 867.668.4349 • c. 867.334.4595
e. tkostya@eba.ca

EBA Engineering Consultants Ltd.
Calcite Business Centre, Unit 6, 151 Industrial Road
Whitehorse, Yukon Y1A 2V3 • CANADA

Yukon Contaminated Site

Report printed on 01 Feb 2007
Information last modified on 14 Feb 2005, 10:26:15

CSR File Number:
Site ID Number: BC059
Site Name: Enger Creek
Public Registry:

Location and Access

Latitude: 62° 22' 0" N
Longitude: 140° 51' 0" W
UTM Zone 7V
Easting: 507762.0053
Northing: 6915037.2725
NTS sheet: 115 K/07
District: Beaver Creek

Legal Description:
Civic Description:

Traditional Territory
Kluane
White River

Site Access: Helicopter
Name of access route:
GENERAL ACCESS: ENGER CREEK; HELICOPTER, VEHICLE

Contaminated Site Regulation (CSR) Status

Land Uses	Water Uses	CSR Status		Orders issued
		18 Oct 2004	Sources of potential contamination	☐

Federal Status

Devolution Site Status: Remediated Sites

Date	Follow-up action plan details

Description

General Description
STAGING AREA. NO PERMANENT IMPROVEMENT. VEGETATION: BRUSH. ASPECT AFFECTED: AESTHETICS. Update: Site has been remediated.

Distance to Residence: N/A
actual distance (m):
Visual Impact: N/A

Distance to Surface Water: N/A
Depth to Ground Water (m):
Area of site (m²): 00,100

Land Tenure

Owner	End date
Federal	

Site Occupants

Occupant	From date	To date	Activity 1	Activity 2	Activity 3
Unknown			STAGING AREA	Fuel Cache	

Potential Concerns

Solid waste landfill? N

Contaminants	Hazards	Structures	Waste Material
	Hydrocarbon/Fuel		Drums Scrap Metal

Yukon Contaminated Site

Report printed on 01 Feb 2007

Information last modified on 14 Feb 2005, 10:26:15

CSR File Number:
Site ID Number: BC059
Site Name: Enger Creek
Public Registry:

Documentation

Reports

Year	Author	Title	Location	Reference num

Maps and Photos

Type	Year	Description	File name
Photo	1993	drums	BC059a01

Monitoring and Inspections

Date	Inspected by	Observations	Next visit
24 Aug 1993	NEALE WORTLEY		

Comments and Recommendations

No further action.
Oct. 18/04: Reviewed for CSR status; "info available" due to presence of drums.

Tammera Kostya

From: Rick Seaman [seamanr@inac-ainc.gc.ca]
Sent: Monday, February 05, 2007 8:34 AM
To: Tammera Kostya
Subject: BC059

WHITEHRS-#32527
-v1-JUNK1.DOC

Hi Tammera

From the info that I have on my database, the site has been remediated.
It looks as though the site was used as an old staging area. There is no info as to indicate that there was any product in these abandoned drums.
The coordinates that I have are 62 22 00 140 51 00.BC059

If you have any questions

Please call

Rick

Rick Seaman
DIAND Waste Mgt
(867) 667-3273
seamanr@inac.gc.ca

Site Summary

Indian and Northern Affairs Canada

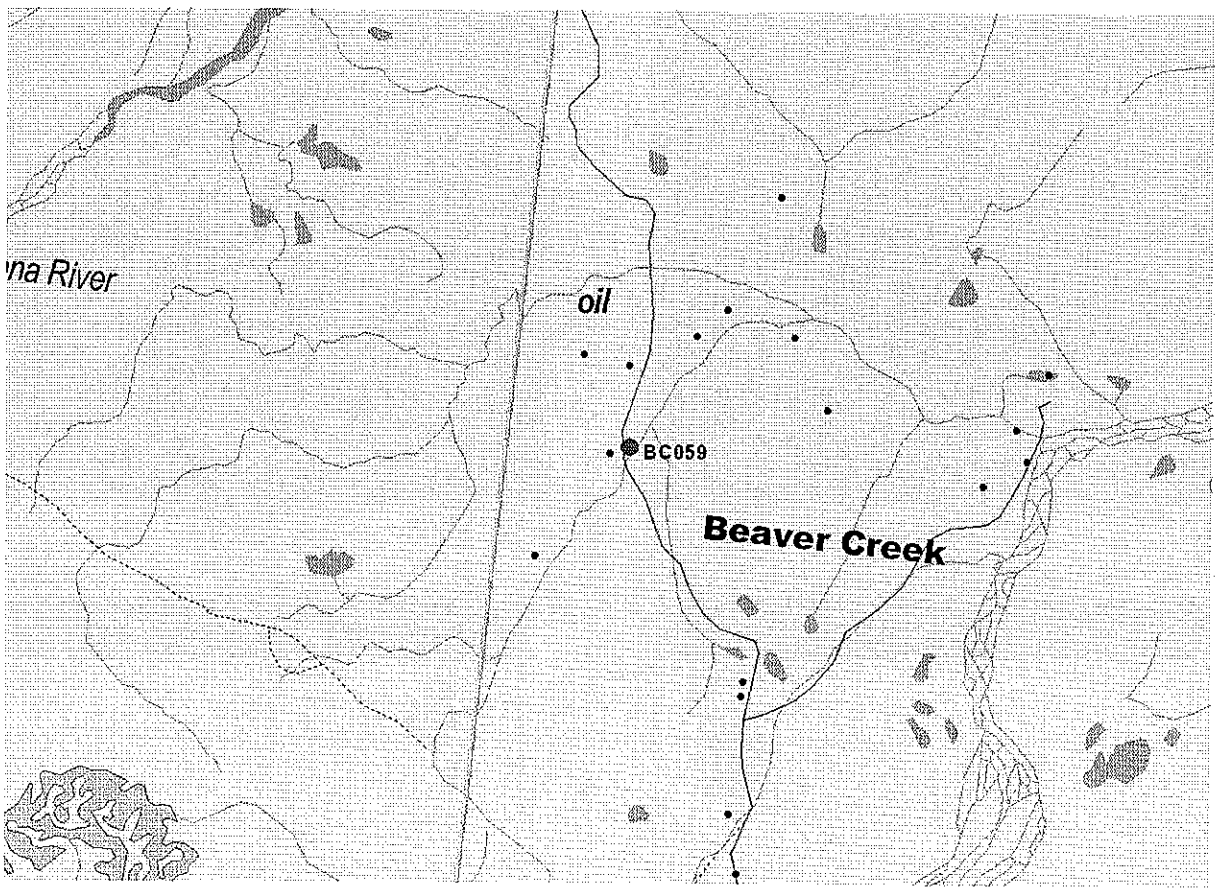
Site Information

Site Number: BC059
Site Name: ENGER CREEK
District: Beaver Creek
Traditional Area: Kluane/White River
NTS Sheet: 115 K/07

Latitude: 62.3666666666667
Longitude: -140.85
Easting: 507762.005294894
Northing: 6915037.27253846
UTM Zone: 7V

Devolution Status: Remediated Sites

Site Map



Data Sources : Department of Indian and Northern Affairs Canada (Site Information), Digital Chart of the World (Land Base).
Disclaimer: The representation of boundaries and locations must not be taken as authoritative.

Site Description: STAGING AREA. NO PERMANENT IMPROVEMENT. VEGETATION: BRUSH. ASPECT AFFECTED: AESTHETICS. Update: Site has been remediated.

Site Access: GENERAL ACCESS: ENGER CREEK; HELICOPTER, VEHICLE

Site Recommendation: No further action.

Yukon Contaminated Site

Report printed on 01 Feb 2007

Information last modified on 19 Oct 2004, 09:51:38

CSR File Number:
Site ID Number: BC102
Site Name: Beaver Creek, MP 1200.7
Public Registry:

Location and Access

Latitude: 62° 21' 45" N
Longitude: 140° 52' 20" W
UTM Zone 7V
Easting: 506612.9969
Northing: 6914570.6082
NTS sheet: 115 K/07
District: Beaver Creek

Legal Description:

Civic Description:

Traditional Territory
Kluane
White River

Site Access: Road
Name of access route: Alaska Highway

GENERAL ACCESS: SOUTH OF BEAVER CREEK, MILE POST 1200.7ON WEST SIDE OF ALASKA HIGHWAY, GRAVEL ROAD.

Contaminated Site Regulation (CSR) Status

Land Uses	Water Uses	CSR Status	Orders issued
		19 Oct 2004 Information available	☐

Federal Status

Devolution Site Status: Sites Not Requiring Remediation

Date	Follow-up action plan details
11 Jun 1999	The Gartner Lee report states that all refuse has been removed and there is no indication of residual contamination. Other waste materials affect aesthetics only and no further action is required.

Description

General Description

FORMER US ARMY HIGHWAY CONSTRUCTION CAMP FROM THE 1940'S, CURRENTLY A FEDRAL LAND LEASE. ORIGINALLY THE CAMP CONSISTED OF 22 WOODEN BUILDINGS LOCATED ON THE NORTH SIDE OF THE CREEK AND A DUMP AND BORROW PITS ON THE SOUTH SIDE. ENVIRONMENT CANADA INVENTORY IN 1976 FOUND SEVERAL WOODEN BUILDINGS, TWO WATER FILLED BOROW PITS AND AN AREA OF REFUSE CONTAINING FOUR TRUCK HULKS AND GENERAL DEBRIS. WOODEN DEBRIS WAS BURNED AND REFUSE WAS REMOVED TO BEAVER CREEK LANDFILL. GARTNER LEE SEPTEMBER 1996 FIELD INVESTIGATION INDICATES REFUSE HAS BEEN REMOVED AND THERE IS NO INDICATION OF RESIDUAL CONTAMINATION. VEGETATION HEAVILY OVERGROWN WITH ASPEN, WILLOW AND ALDER, WITH 2 CLEARED AREAS REMAINING AS EVIDENCE OF POST SITE ACTIVITIES.

Distance to Residence: >10 km
actual distance (m):
Visual Impact: Low

Distance to Surface Water: high water mark - 5
Depth to Ground Water (m):
Area of site (m²): 110,000

Land Tenure

Owner	End date
Federal DIAND	

Site Occupants

Occupant	From date	To date	Activity 1	Activity 2	Activity 3
Military	23 Apr 1905	03 May 1905	Highway Maintenance	Camp	Inactive Dump

Yukon Contaminated Site

Report printed on 01 Feb 2007

Information last modified on 19 Oct 2004, 09:51:38

CSR File Number:
Site ID Number: BC102
Site Name: Beaver Creek, MP 1200.7
Public Registry:

Potential Concerns

Solid waste landfill? N

Contaminants	Hazards	Structures	Waste Material
		Building	Debris/Refuse
		Excavations - Basement	Scrap Metal

Documentation

Reports

Year	Author	Title	Location	Reference num
1997	Gartner Lee Ltd.	PEI At Four Sites in Yukon (Sites BC102, HJ044, MA026, CA070)	DIAND	c1997_03

Maps and Photos

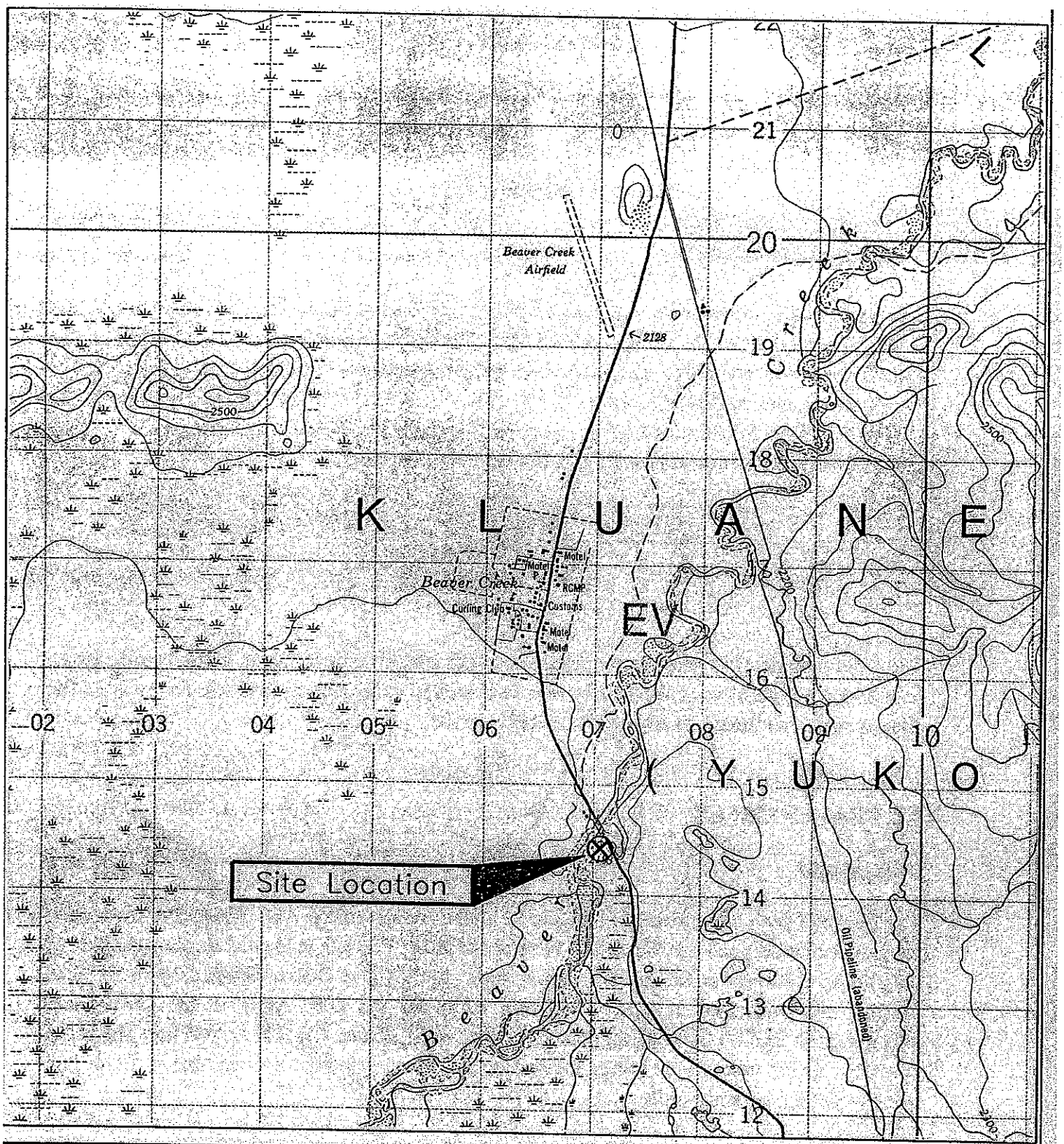
Type	Year	Description	File name
Map	1997	Scetch map	BC102b02
Map	1997	Site Location	BC102b01
Photo	1997	borrow pit	BC102a01

Monitoring and Inspections

Date	Inspected by	Observations	Next visit
01 Sep 1996	GARTNER LEE LTD.		

Comments and Recommendations

HYCAL 1997 RECOMMENDS NO FURTHER INVESTIGATION IS WARRENTED.
Oct. 19/04: Reviewed for CSR status; GLL's 1997 report shows no indication of contamination.



LEGEND

⊗ SITE LOCATION

Source:
NTS 115K/7 EDITION 3

SCALE 1:50,000

0 500 1000 1500 Metres

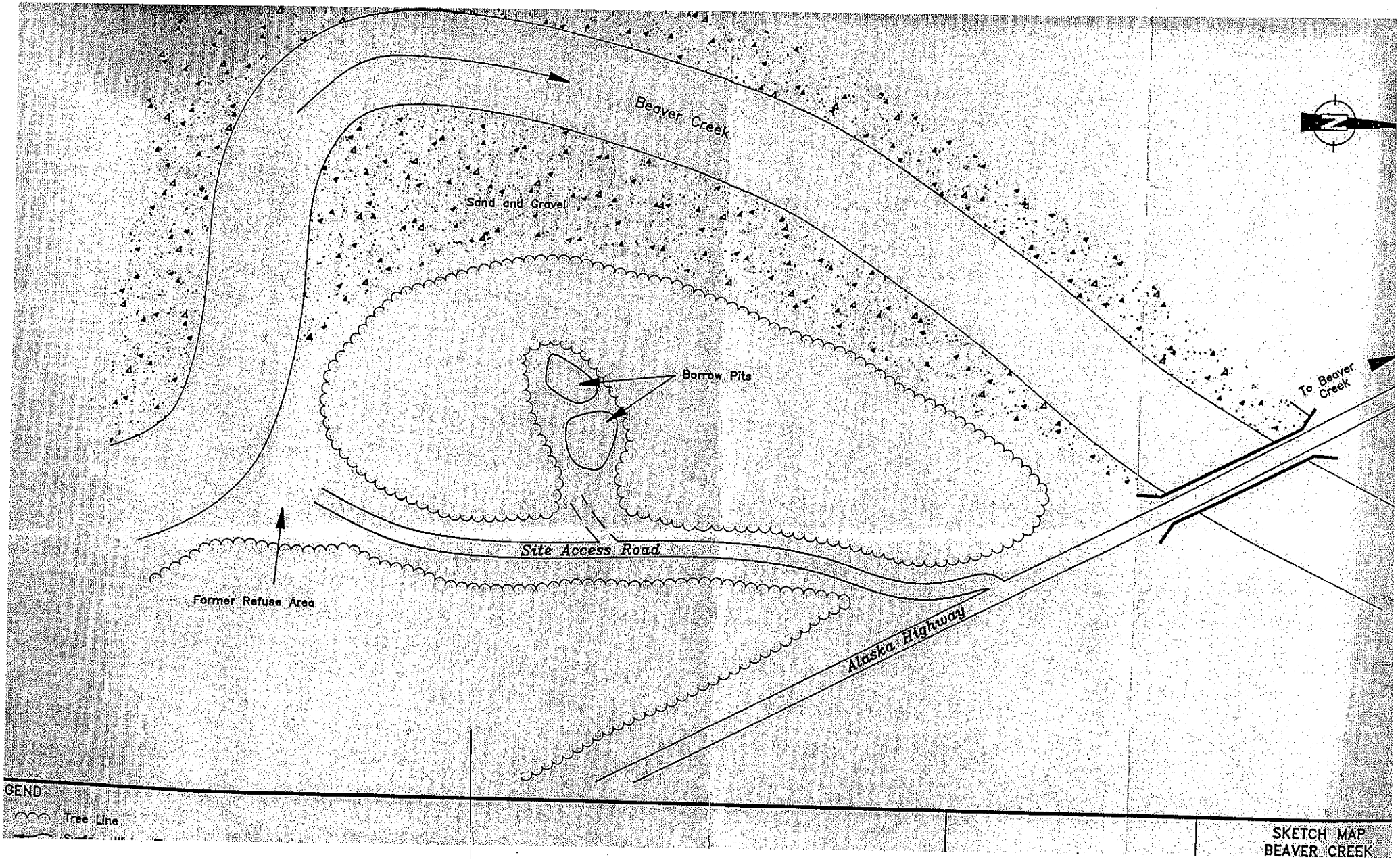
BEAVER CREEK LOCATION MAP

AES Standing Offer
Site Assessments

Drawn By: B. Belzac	Project No. 96776
Site Name: AES Standing Offer	File Name: D:\96776\776-BEAV

Gartner Lee

Figure No. 2


Beaver Creek
Sand and Gravel
Borrow Pits
To Beaver Creek
Site Access Road
Former Refuse Area
Alaska Highway
GEND
Tree Line
SKETCH MAP
BEAVER CREEK

Gartner
Lee

PRELIMINARY INVESTIGATIONS AT THREE SITES IN YUKON (SITES BC102, HJ044, MA026)

Prepared for:
DEPARTMENT OF INDIAN AFFAIRS
AND NORTHERN DEVELOPMENT

Prepared by:
GARTNER LEE LIMITED

GLL 96-776

January 1997

Distribution:
10cc Client
1cc Unbound
4cc File

Gartner Lee Limited

Unit 212
212 Main Street
Whitehorse, Y.T.
Y1A 2A9

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E-mail: Smorison@hyperfech.yk.ca

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- *Geology / Hydrogeology*
- *Mediation / Negotiation*

January 17th, 1997

Department of Indian Affairs and Northern Development
AES - Action on Waste Program
#345 - 300 Main Street
Whitehorse, Yukon Territory
Y1A 2A8

Attention: Mr. Brett Hartshorne, Manager
Action on Waste Program

Dear Mr. Hartshorne,

Re: Final Report - Preliminary Investigations at Three Sites in Yukon

In compliance with the requirements of the Statement of Work associated with Contract No. 96-6135, we are forwarding ten bound copies of our final report summarizing our investigations at the Beaver Creek, Haines Road and Fairchild Lake. As well, we are enclosing one unbound reproducible copy and a diskette (WordPerfect 6.1).

Added to this final version of the report are field methodologies, original analytical results for samples we collected, an Executive Summary, a list of references as well as response to points raised as a result of your review. We appreciate how quickly you were able to provide your comments on our draft report.

We have enjoyed working with you on this Standing Offer and look forward to future opportunities to provide our environmental consulting services.

Yours very truly,
GARTNER LEE LIMITED

Stephen R. Morison, M.Sc.
Senior Geoscientist
Manager, Whitehorse Office

EXECUTIVE SUMMARY

Gartner Lee Limited (GLL) was retained by the Department of Indian Affairs and Northern Development's (DIAND) Arctic Environmental Strategy (AES) Action on Waste Program to conduct preliminary environmental investigations at three separate sites located in the Yukon. The three sites investigated were part of an overall program in the Yukon to evaluate conditions at some 100 sites which may have been impacted from historical activities.

These assessments are considered important components of such initiatives as Land Claims negotiations, self government agreements for Yukon First Nations, devolution of federal responsibilities to the Yukon Government, overall public health and safety and natural resource management.

The three sites investigated by GLL were:

Site Name	Assessment Number	Waste Site Number
Beaver Creek	37	BC102
Haines Road	48	HJ044
Fairchild Lake	45	MA026

The three sites were visited by GLL staff during September of 1996. The site investigation methodologies varied from site to site as conditions dictated and varied from mapping and identifying key features at each site to collecting and analyzing soil samples where potential contamination was suspected.

The **Beaver Creek** site is a former U.S. Army road building camp from the 1940's located south of the town of Beaver Creek. The site was inventoried by Environment Canada in 1976 and was found to consist of several wooden buildings, two borrow pits and an area of refuse. The GLL investigation was limited to the borrow pit and refuse areas as the buildings were on land which is currently leased from the Crown.The site investigation revealed that the refuse identified in the 1976 report had been removed from the site and that there were no indications of any residual contamination.

The **Haines Road** site consists of an abandoned service station located at km 148.8, on the west side of the highway. The site investigation found the remnants of the building foundation as well as several small piles of debris. Also, anecdotal information from local residents indicate that a former owner of the property may be buried somewhere on the property. The site investigation revealed that there appears to be no physical impacts on the site from previous activities; however, the remaining debris results in minor aesthetic impacts. Based on the findings, no further investigation is recommended although the remaining debris should be removed or buried on-site.

The **Fairchild Lake** site was the location of a fuel cache used by mining exploration companies and local outfitters in the 1960s. In 1990 an Environment Canada inventory of the site recorded 185 drums on the site, with some of the drums leaking. The drums were subsequently removed in 1994 although boxes of drill core were left at the north end of the site.

The GLL investigation focused on the area formerly occupied by the fuel drums and samples of the shallow soils were collected from a visually impacted area. The samples were field screened for organic vapours and then submitted to an analytical laboratory for analyses. The laboratory analyses indicated that only one of the ten samples submitted showed concentrations of petroleum hydrocarbons above the appropriate criteria. The laboratory results also showed that the shallow soil contamination was limited to a small area and that migration towards the lake had not occurred.

Based on the findings, it is concluded that a small area at the south end of the site had been impacted by petroleum hydrocarbons and that attempts to remove these soils would likely have a greater impact on the site than contaminant impacts on the surrounding area. However, depending upon the clean-up objectives of AES and the local First Nations, the isolated area of contamination could be removed by hand or left in place to bioremediate naturally over time.

TABLE OF CONTENTS

List of Figures

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Appendices

1.0 INTRODUCTION

Gartner Lee Limited (GLL) was retained by the Department of Indian Affairs and Northern Development's (DIAND) Arctic Environmental Strategy (AES) Action on Waste Program on August 13, 1996 to conduct preliminary environmental investigations at three separate sites located throughout the Yukon Territory. The site locations are shown on Figure 1. The work was issued under government contract number 96-6135.

At that time GLL was requested to submit work plans for preliminary environmental assessments at each of the three sites. These work plans were submitted to AES on August 28, 1996, and were subsequently approved.

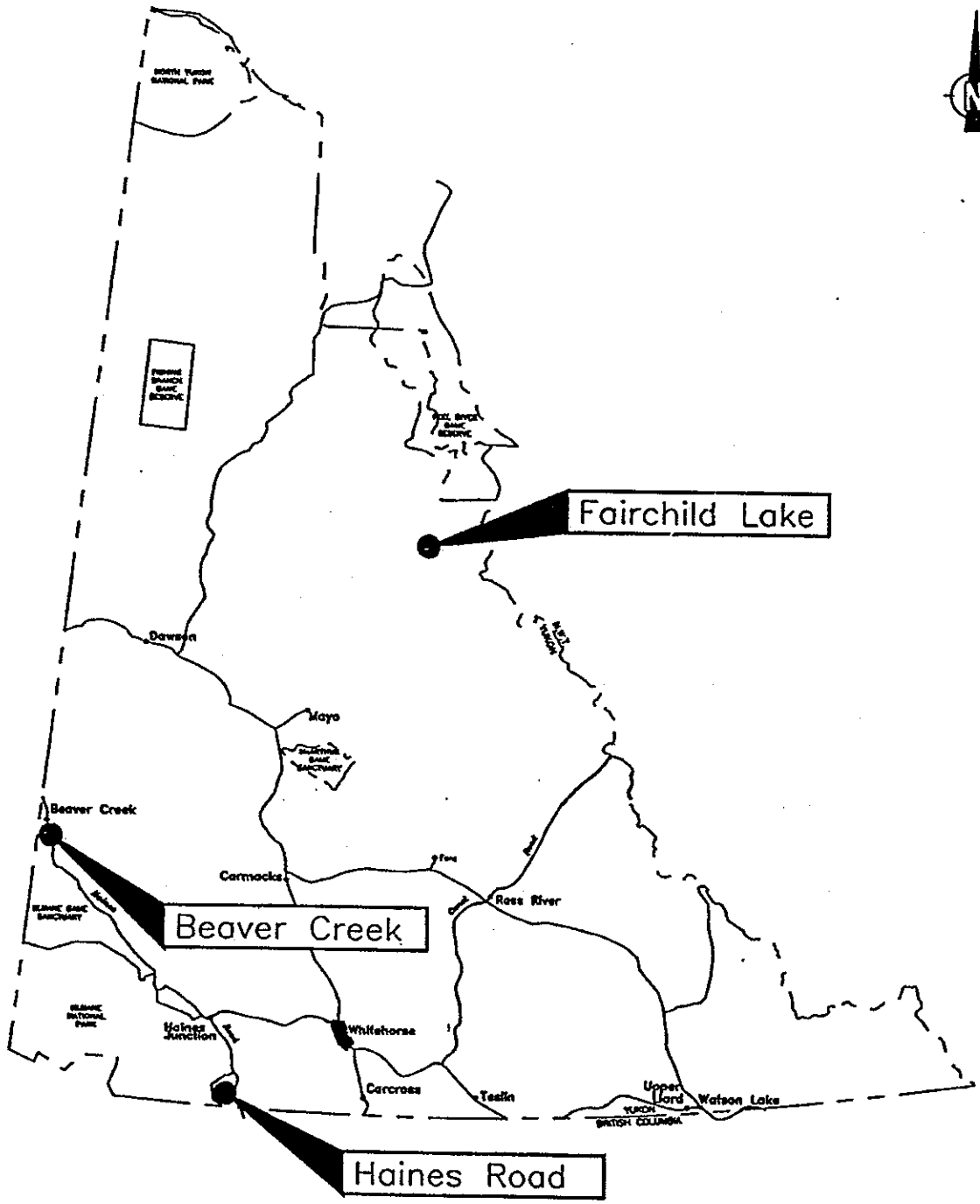
These assessments were conducted as part of an overall program for Yukon Territory to evaluate some 100 sites which are either known to contain or have the potential to contain a variety of contaminants and/or abandoned solid waste products from previous activities. These assessments are important aspects of initiatives such as Land Claims negotiations, self government agreements for Yukon First Nations, devolution of federal responsibilities to the Government of Yukon, overall public health and safety and natural resources management.

2.0 SCOPE OF WORK AND TECHNICAL APPROACH

The scope of the work completed by Gartner Lee Limited is summarized below on a task-by-task basis. It should be noted that not all of the tasks identified were completed at each site, as site conditions dictated the level of effort required at each individual site.

The tasks completed include:

- consultation with local First Nations in terms of the program and the field studies to be conducted;
- a thorough review of previous reports for the sites to be evaluated and contact with the district Resource Management Officers;
- a review of aerial photographs for each site and a terrain analysis to identify potential receptor areas;
- field investigations for each of the three sites by either truck or helicopter;
- identification, mapping and documentation of key features on each site;



LEGEND ● SITE LOCATION	SCALE 1:6,250,000 0 50 100 200 KM	SITE LOCATIONS AES Standing Offer Site Assessments
	Drawn By: C. Syrold / Project No. 96776 Site Name: AES Standing Offer / File Name: D:\96776\776-1	Gartner Lee Figure No. 1

- detection of buried metal debris with a metal detector, the collection of soil samples, water samples, and field screening with a photoionization detector were some of the field techniques applied;
- interpretation of field data and production of a detailed map for each site;
- the production of a report documenting site conditions and provided recommendations for any remedial measures.

The site investigations were conducted by Terry Duffy, B.Sc., a GLL hydrogeologist and Bruce Thomson from the community of Ross River, from September 7 to 13, 1996. The coordination for access to the sites and communications with the local First Nations communities was carried out by Mr. Gerald Issac, Principle of First Nations Consulting and Public Relations Services. Mr. S.R. Morison, Manager and Senior Geoscientist for Gartner Lee's Whitehorse office was the Project Manager for this work.

3.0 FINDINGS

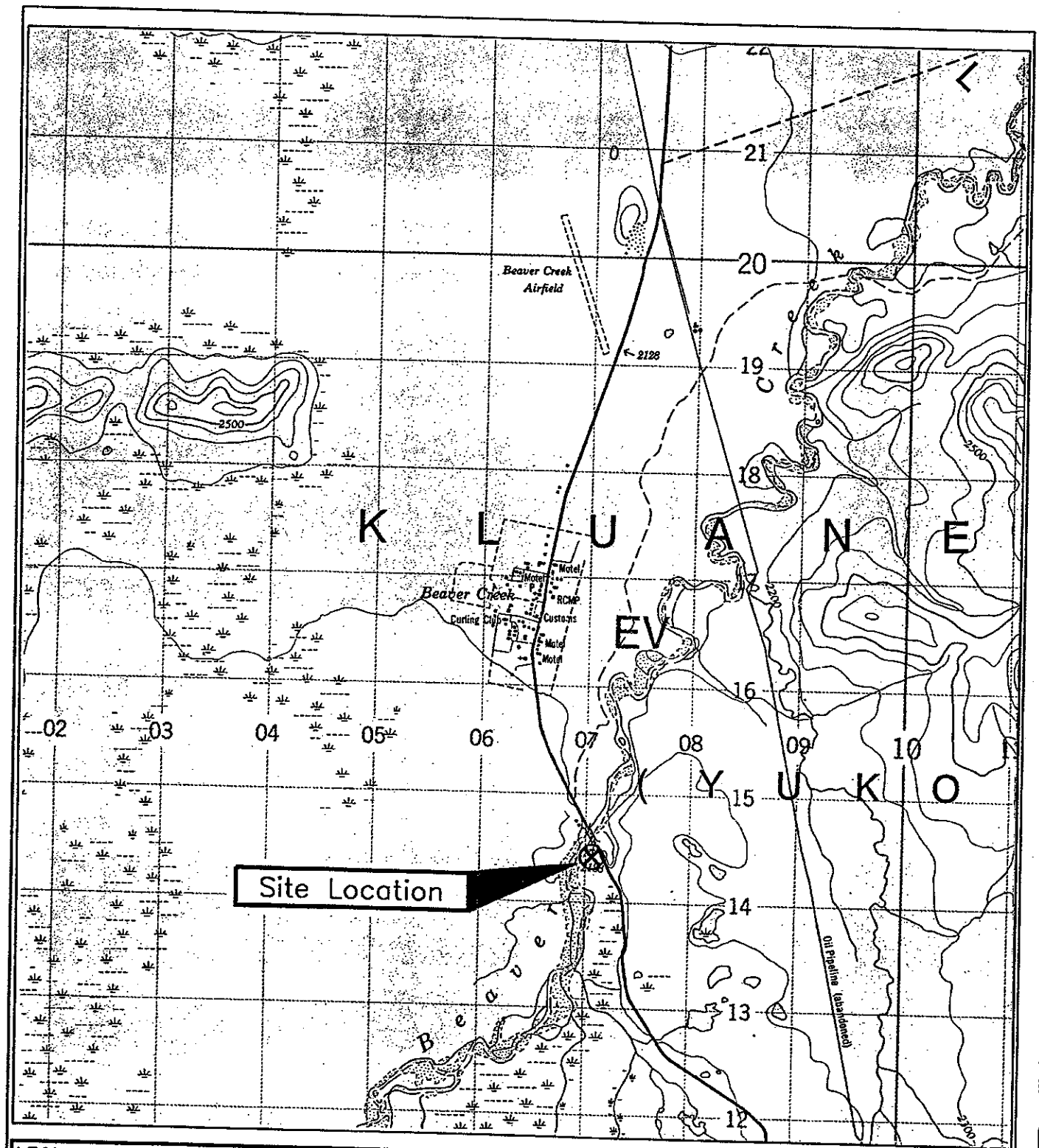
The following section presents the findings of the site investigations on a site-by-site basis. It includes a summary of the history and background information available for each of the sites as well a summary of any previous AES reports.

3.1 BEAVER CREEK

Background

The Beaver Creek site, referenced as Site 37 in the initial Yukon AES Waste Site Inventory, has now been assigned the Waste Site Number BC102. The site is located on the west side of the Alaska Highway at MP 1200.7, just south of the town of Beaver Creek (Figure 2). The original site was used as a road building camp by the U.S. Army in the 1940's and encompassed land on both the north and south sides of Beaver Creek. At that time the camp consisted of 22 wooden buildings located on the north side of the creek and a dump and borrow pits on the south side.

An inventory of the site in 1976 by Environment Canada's Environmental Protection Service identified four truck hulks, a refuse dump, two borrow pits and wooden debris all located on the south side of the creek. Recommendations made at that time were to burn the wooden debris and remove the truck hulks and refuse to the Beaver Creek landfill.



LEGEND

⊗ SITE LOCATION

Source:
NTS 115K/7 EDITION 3

SCALE 1:50,000

0 500 1000 1500 Metres

BEAVER CREEK LOCATION MAP

AES Standing Offer
Site Assessments

Drawn By: B. Belzac	Project No. 96776
Site Name: AES Standing Offer	File Name: D:\96776\776-BEAV

Gartner Lee

Figure No. 2

Site Description and Field Observations

The area investigated was limited to the portion of the site south of Beaver Creek. The land to the north is either privately owned or leased from the Crown. A site plan is provided in Figure 3.

The site is located in a flat area adjacent to Beaver Creek. To the south the topography rises slightly and the area is tree covered. Beaver Creek forms the north and west boundaries of the site and the site is bounded to the east by the Alaska Highway. Access is from a gravel road that heads west from the highway (Photographs 1 and 2).

The site is heavily overgrown with vegetation consisting of aspen, willow and alder, with only two cleared areas remaining as evidence of past site activities. Two, water-filled borrow pits are located in one of the cleared areas (Photographs 3 and 4). The second clearing is located at the terminus of the access road near the creek (Photograph 5).

The borrow pits are located to the north of the access road, near the centre of the site. They were excavated by road construction crews and the material was used on the Alaska Highway (N. Wortley, pers. comm.).

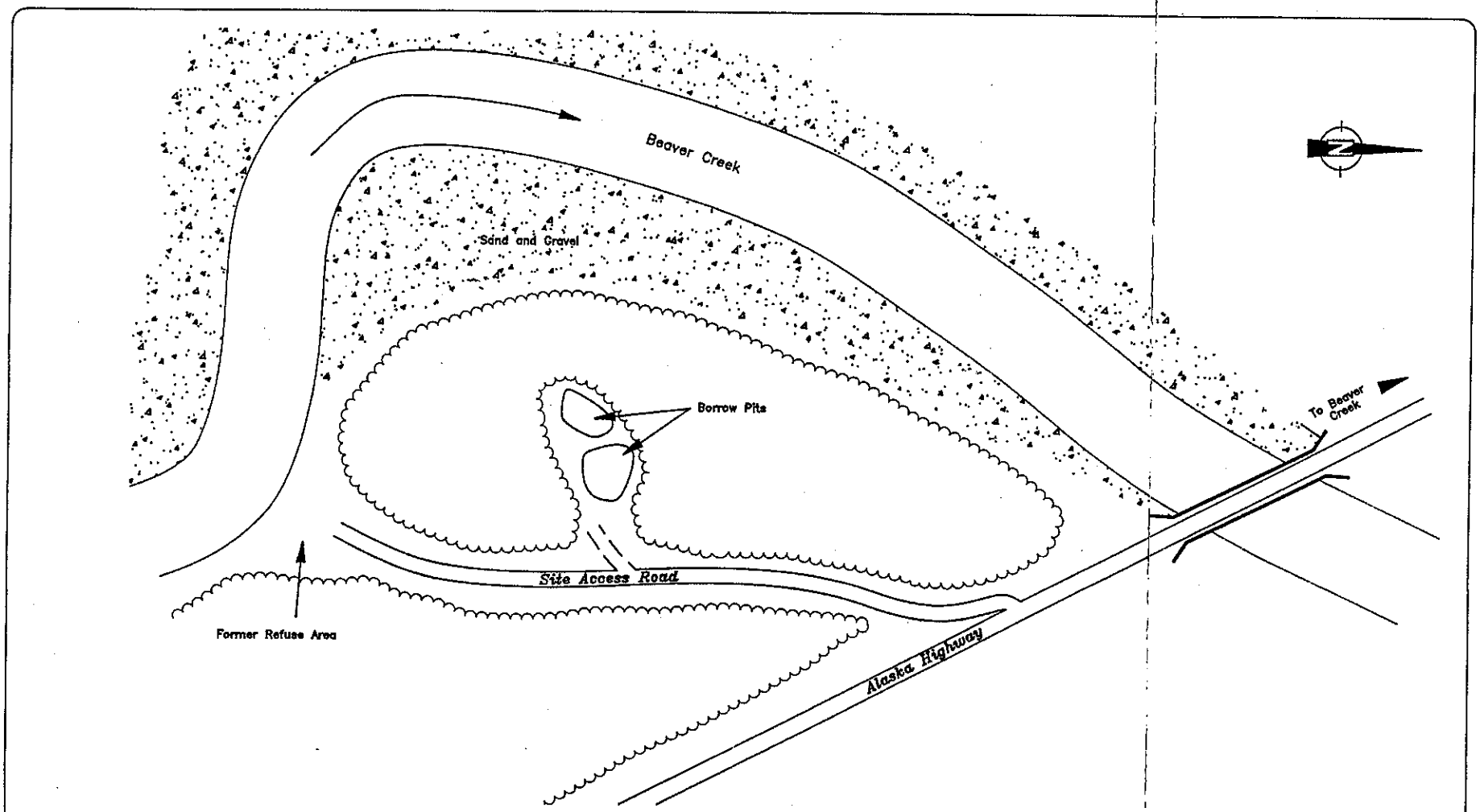
The second clearing is believed to be the area identified on the site map provided by AES as that which contained the refuse. There were no signs of any garbage as previous recommendations in the 1976 site report suggested that the refuse be removed to the Beaver Creek landfill. This appears to have been carried out and was confirmed with the local Resource Management Officer (RMO), Mr. Neale Wortley. Further discussions with Mr. Wortley resulted in the identification of two other potential sites near Long's Creek and behind the White River Inn. The site at Long's Creek apparently has several buried drums whose contents are unknown, and the site behind the White River Inn reportedly was the location of a large oil pipeline spill.

Conclusions

Based on the findings of the site investigation, the following conclusions can be made:

a) Little evidence remains from past activities on the site. Two cleared areas and two borrow pits were the only evidence remaining.

b) The refuse identified in the earlier report appears to have been removed from the site to the Beaver Creek landfill.



LEGEND

Tree Line

Surface Water Flow

Scale 1:2000 (approximate)

0 10 20 40 60 metres

SKETCH MAP
BEAVER CREEK

AES Standing Offer
Site Assessments

Figure No. 3

PHOTOGRAPHS - BEAVER CREEK
96-776

PHOTOGRAPH 1

Access to site from Alaska Highway.

PHOTOGRAPH 2

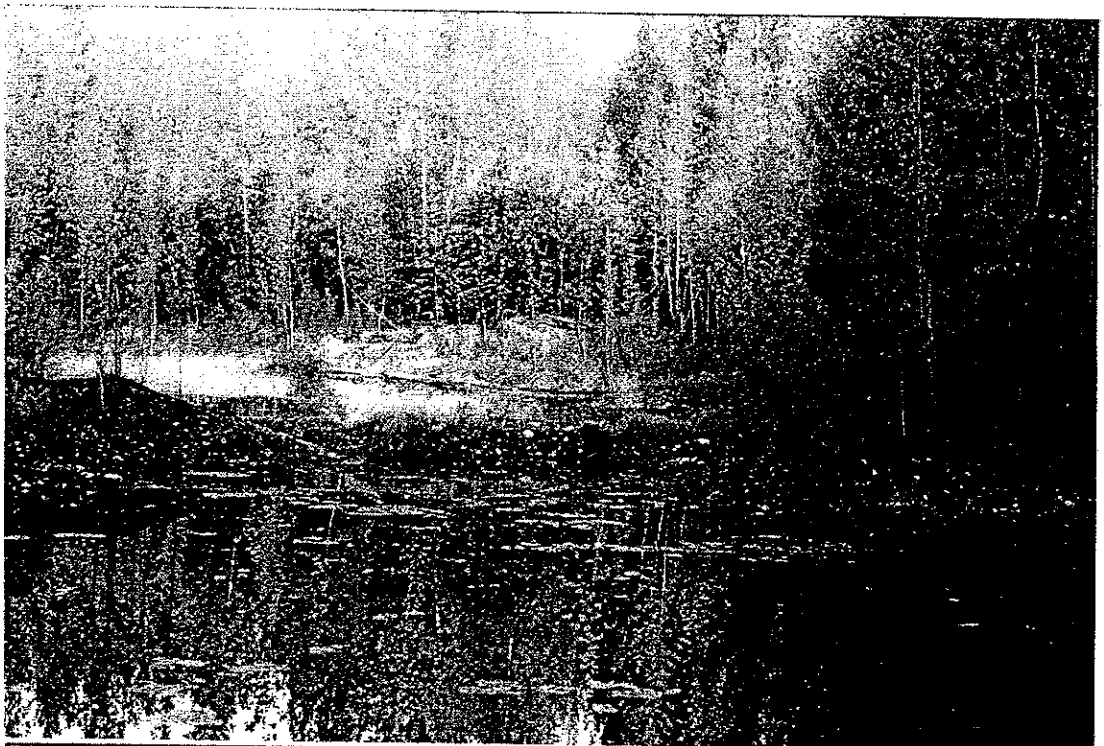
Gravel access road through site.

PHOTOGRAPHS - BEAVER CREEK
96-776

PHOTOGRAPH 3

West side of borrow pit area.

PHOTOGRAPH 4

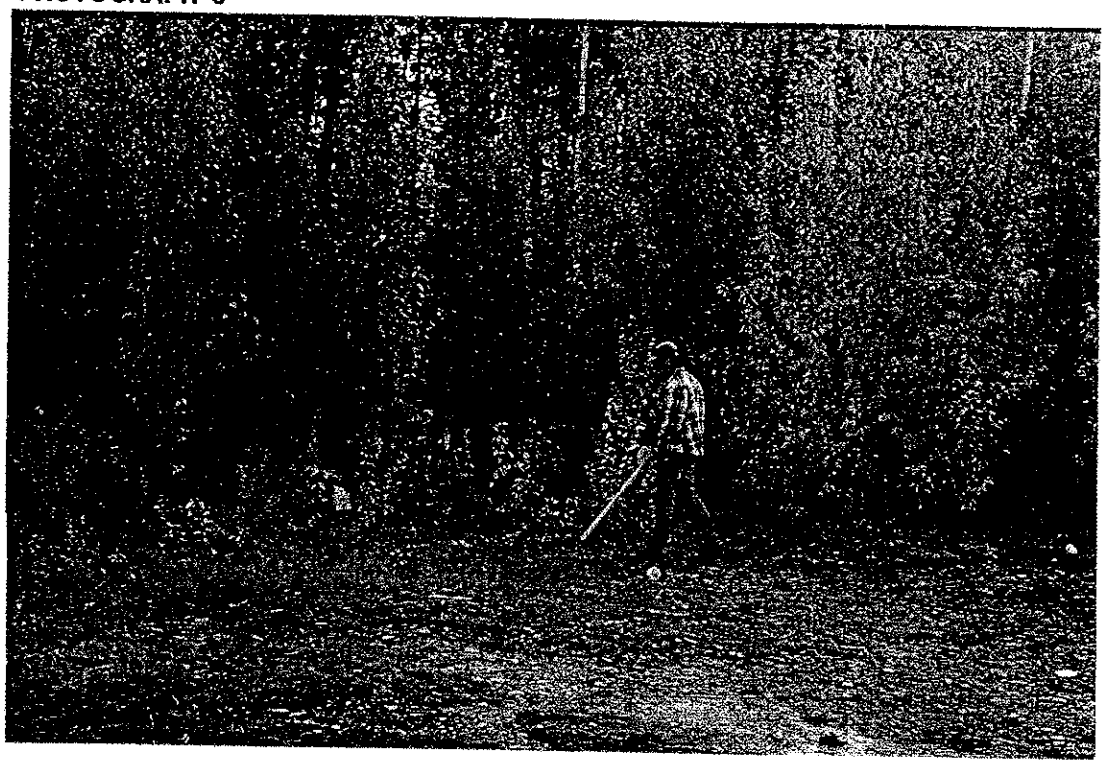


East side of borrow pit area.

PHOTOGRAPHS - BEAVER CREEK

96-776

PHOTOGRAPH 5



Investigating former refuse area with metal detector.

PHOTOGRAPH 6

Beaver Creek looking southwest.

c) There were no indications of any residual contamination resulting from previous site activities.

d) Two other local sites were mentioned by the local RMO as requiring further investigation.

Recommendations

The following recommendations can be made based on the conclusions outlined above:

a) Based upon the site observations, no further investigation of this site is warranted.

b) Based on input provided by the local RMO, follow-up work on two other local sites should be considered owing to the unknown nature of contents and / or volumes of the materials involved.

3.2 HAINES ROAD

Background

This site identified as Site 48 in the initial Yukon AES Waste Site Inventory, has now been assigned the Waste Site Number HJ044. The site is located at km 148.8 of the Haines Highway, just north of the British Columbia-Yukon border. The site location is shown in Figure 4. This site was assigned as a priority site for investigation because an automobile service station once occupied the site.

Little is known of the history of this site except that it operated from 1968 to approximately 1976. The site has been abandoned for several years and several attempts were made to contact individuals familiar with the site with limited success. According to unverified anecdotal information, human remains are buried somewhere on site.

Site Description and Field Observations

The site is located adjacent to an abandoned section of the old Haines Road, approximately 75 m west of the new Haines Highway (see Figure 5 - Site Sketch Map and Photograph 7). The property slopes gently to the west and is bordered by steep tree covered slopes to the north and west. To the south, a small gully separates the site from a cleared area.

Date:	December 13, 2006	Project #	1240246

Location of Project: Soil testing for UST removal, Beaver Creek
Tank Nest: Underground storage tank (UST) at YTG Grader Station, Beaver Creek.

EBA Personnel:
Field Technician: Justin Pigage
Project Manager: Don Wilson

Site Observations:

- EBA personnel arrived on site on the morning of August 8, 2006.
- The underground heating fuel storage tank was located and excavation commenced. The tank had been used to provide heating fuel to the workshop.
- The 9100 litre (2000 gallon) heating fuel tank was located close to the septic tank (approximately 3.7 m) and septic field, and power supply to the shop (see Figure 1).
- The UST was excavated by noon. The manufacturer's plate on the UST was dated 1987, indicating the year the tank was installed.
- The tank was inspected. There were a number of rust spots on the tank but no perforations, holes or leaks were identified.
- The fill material surrounding the tank was sandy-gravel. The surrounding surface soil was comprised of gravel, sandy with some cobbles, and a trace of silt. Groundwater was not encountered during the excavation.
- A small pocket of contamination was evident to the east of the UST at a depth of approximately 1.2 m to 1.6 m. The contamination was not considered to be related to the UST due its location (not contiguous to the tank).
- The contaminated soil totalled approximately 3 m^3 and was stockpiled on top of plastic sheeting adjacent to the excavated area.

Restoration Activities:

- Field screening was completed using a Photo-Ionization Detector (PID). PID readings were taken continuously during the excavation with readings recorded for each soil sampling location (See Table 1).
- Soil was removed where field screening suggested hydrocarbon concentrations might exceed the commercial and industrial land-use standards in the Contaminated Sites Regulation.
- Soil samples were collected from key locations in the excavated site, e.g. the base of the tank location and side walls of the excavation, where the highest PID readings were noted.
- The final dimensions of the excavation were approximately 7 m by 5 m by 2.6 m deep.
- Approximately 91 m^3 of soil were excavated from the site.
- Five confirmation soil samples from the excavation were submitted for laboratory analysis.
- One confirmation soil sample from the stockpiled soil was submitted for laboratory analysis.
- Arctic Backhoe Services Ltd disposed of the UST piping and delivered the tank to Whitehorse Grader Station for storage and future disposal.

Results

Laboratory analytical results indicated that all of the soil samples collected from the base and walls of the excavation and the stockpiled soil contained concentrations of hydrocarbons below the commercial and industrial land-use standards stated in the Contaminated Sites Regulation (CSR). Furthermore, soil samples collected from the base and walls of the excavation and the stockpiled soil contained concentrations of hydrocarbons below the urban park land-use standards stated in the Contaminated Sites Regulation. This indicates that the soil use is not restricted by the CSR.

Figure 1 shows the UST soil sample locations.

Table 1 shows the soil sample analytical results that were compared to the applicable YTG Contaminated Sites Regulation standard for industrial land use.

Photos 1 and 2 show the UST, the UST location and the stockpiled soil.

The analytical results and test methodologies are provided in the attached ALS Chemical Analysis Report. ALS accreditations are available from their web site at http://www.alsenviro.com/Quality_Canada/qual.html#accr.

Conclusions and recommendations

The laboratory analytical results indicate that concentrations of hydrocarbons are below the applicable land-use standards in all samples. The analytical gas chromatograms suggest that the pocket of contamination found on site was a combination of diesel-type fuel and lubricating oil. The contaminated soil is not considered to have come from the UST as it was not contiguous with the UST and included lubricating oil. There are no recommendations for further remedial action on the site.

Following a review of the laboratory analytical results, EBA had previously suggested to YTG that the stockpiled soil may be disposed on-site. YTG has reported that the stockpiled soil was used as fill within the Beaver Creek Grader Station site to address low areas.

This report has been prepared in accordance with generally accepted geo–environmental practices. Additional information regarding the use of this report is presented in the Environmental Report - General Conditions, which form a part of this report.

On Site Technician:

for Justin Pigage
Field Technician
December 13, 2006

Project Manager:

Don Wilson
Senior Environmental Scientist
December 13, 2006

eba

TABLE 1: Soil Sample Analytical Results
YTG Grader Station, Beaver Creek.
Underground Storage Tank Removal

Parameter	Results						
Sample Number	BC YTG 001	BC YTG 002	BC YTG 003	BC YTG 004	BC YTG 005	BC YTG 006	CSR*
Depth (m)	0.9	1.2	1.4	1.1	2.6	1.2	-
Moisture (%)	9.0	3.4	6.1	4.9	18	4.2	-
PID (ppm)	8.0	3.1	0.0	0.0	0.0	102	-
Extractable petroleum hydrocarbons (C_{10}-C_{19})	33	980	45	<5	72	620	2000
Extractable petroleum hydrocarbons (C_{19}-C_{32})	470	770	180	7	270	590	5000
Acenaphthene	-	-	-	-	-	<0.01	-
Acenaphthylene	-	-	-	-	-	<0.01	-
Anthracene	-	-	-	-	-	<0.01	-
Benzo(a)anthracene	-	-	-	-	-	<0.01	10
Benzo(a)pyrene	-	-	-	-	-	<0.01	-
Benzo(b)fluoranthene	-	-	-	-	-	<0.01	10
Benzo(g,h,i)perylene	-	-	-	-	-	<0.01	
Benzo(k)fluoranthene	-	-	-	-	-	<0.01	10
Chrysene	-	-	-	-	-	<0.01	-
Dibenza(a,h)anthracene	-	-	-	-	-	<0.01	10
Fluoranthene	-	-	-	-	-	<0.01	-
Fluorene	-	-	-	-	-	<0.01	-
Indeno(1,2,3-c,d)pyrene	-	-	-	-	-	<0.01	10
2-Methylnapthalene	-	-	-	-	-	<0.01	-
Naphthalene	-	-	-	-	-	<0.01	50
Phenanthrene	-	-	-	-	-	<0.01	50
Pyrene	-	-	-	-	-	<0.01	100

Notes: All values are in µg/g unless otherwise stated.
*Contaminated Sites Regulation (CSR), generic and matrix numerical standards for commercial land use.
Bold and Underline indicates an exceedance of the CSR applicable standard.

Sample Location Notes:
BC-YTG-006 sample taken from stockpiled soil

ENVIRONMENTAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT

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

This report and the assessments and recommendations contained in it are intended for the sole use of EBA's client. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 LIMITATIONS OF REPORT

This report is based solely on the conditions which existed on site at the time of EBA's investigation. The client, and any other parties using this report with the express written consent of the client and EBA, acknowledge that conditions affecting the environmental assessment of the site can vary with time and that the conclusions and recommendations set out in this report are time sensitive.

The client, and any other party using this report with the express written consent of the client and EBA, also acknowledge that the conclusions and recommendations set out in this report are based on limited observations and testing on the subject site and that conditions may vary across the site which, in turn, could affect the conclusions and recommendations made.

The client acknowledges that EBA is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the client.

2.1 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of this report, EBA may have relied on information provided by persons other than the client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

3.0 LIMITATION OF LIABILITY

The client recognizes that property containing contaminants and hazardous wastes creates a high risk of claims brought by third parties arising out of the presence of those materials. In consideration of these risks, and in consideration of EBA providing the services requested, the client agrees that EBA's liability to the client, with respect to any issues relating to contaminants or other hazardous wastes located on the subject site shall be limited as follows:

1. With respect to any claims brought against EBA by the client arising out of the provision or failure to provide services hereunder shall be limited to the amount of fees paid by the client to EBA under this Agreement, whether the action is based on breach of contract or tort;
2. With respect to claims brought by third parties arising out of the presence of contaminants or hazardous wastes on the subject site, the client agrees to indemnify, defend and hold harmless EBA from and against any and all claim or claims, action or actions, demands, damages, penalties, fines, losses, costs and expenses of every nature and kind whatsoever, including solicitor-client costs, arising or alleged to arise either in whole or part out of services provided by EBA, whether the claim be brought against EBA for breach of contract or tort.

4.0 JOB SITE SAFETY

EBA is only responsible for the activities of its employees on the job site and is not responsible for the supervision of any other persons whatsoever. The presence of EBA personnel on site shall not be construed in any way to relieve the client or any other persons on site from their responsibility for job site safety.

5.0 DISCLOSURE OF INFORMATION BY CLIENT

The client agrees to fully cooperate with EBA with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The client acknowledges that in order for EBA to properly provide the service, EBA is relying upon the full disclosure and accuracy of any such information.

6.0 STANDARD OF CARE

Services performed by EBA for this report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Engineering judgement has been applied in developing the conclusions and/or recommendations provided in this report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this report.

7.0 EMERGENCY PROCEDURES

The client undertakes to inform EBA of all hazardous conditions, or possible hazardous conditions which are known to it. The client recognizes that the activities of EBA may uncover previously unknown hazardous materials or conditions and that such discovery may result in the necessity to undertake emergency procedures to protect EBA employees, other persons and the environment. These procedures may involve additional costs outside of any budgets previously agreed upon. The client agrees to pay EBA for any expenses incurred as a result of such discoveries and to compensate EBA through payment of additional fees and expenses for time spent by EBA to deal with the consequences of such discoveries.

8.0 NOTIFICATION OF AUTHORITIES

The client acknowledges that in certain instances the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by EBA in its reasonably exercised discretion.

9.0 OWNERSHIP OF INSTRUMENTS OF SERVICE

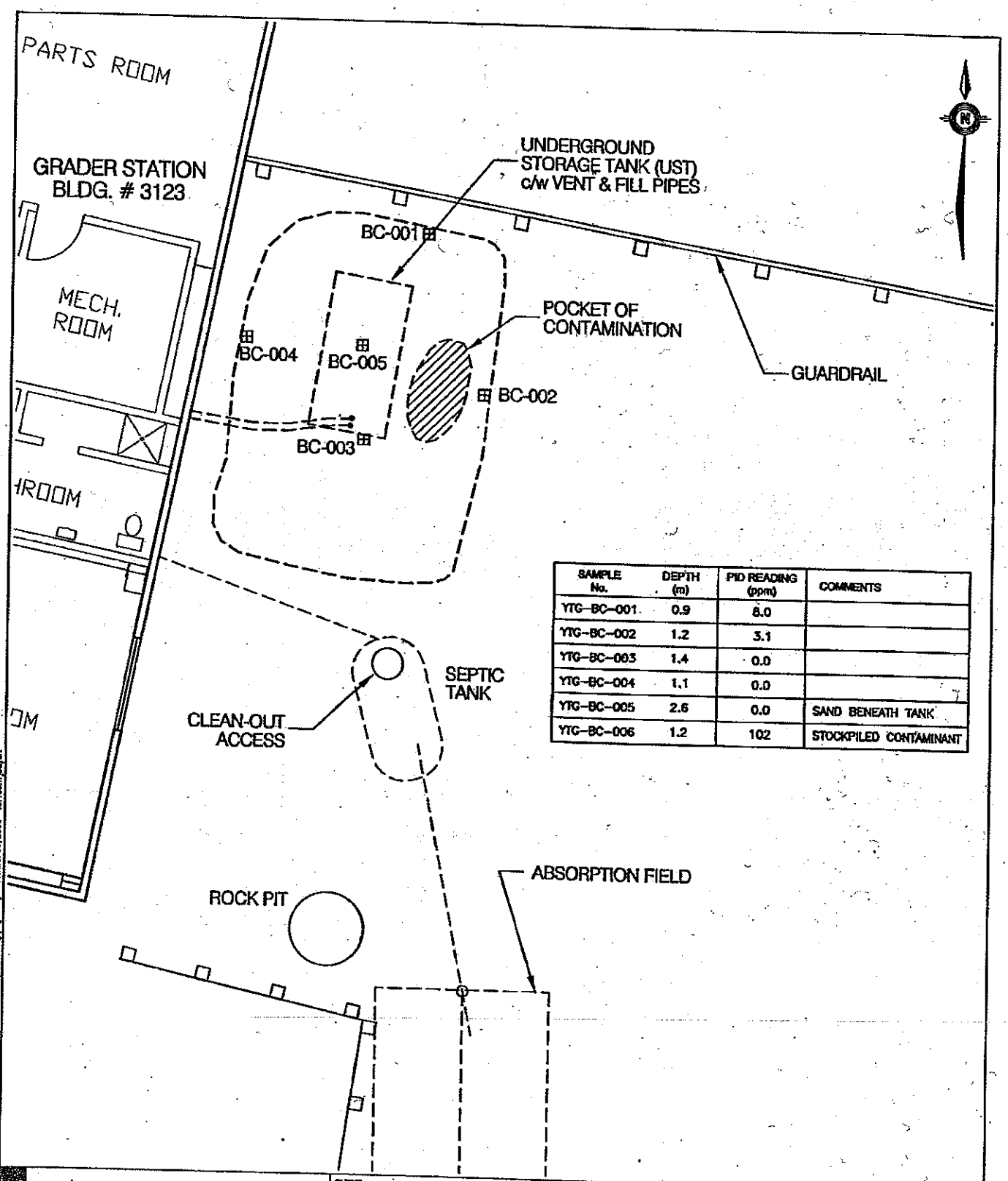
The client acknowledges that all reports, plans, and data generated by EBA during the performance of the work and other documents prepared by EBA are considered its professional work product and shall remain the copyright property of EBA.

10.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by EBA shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancies, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by EBA shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA's instruments of professional service will be used only and exactly as submitted by EBA.

The Client recognizes and agrees that electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.



SAMPLE No.	DEPTH (m)	PID READING (ppm)	COMMENTS
YTG-BC-001	0.9	8.0	
YTG-BC-002	1.2	3.1	
YTG-BC-003	1.4	0.0	
YTG-BC-004	1.1	0.0	
YTG-BC-005	2.6	0.0	SAND BENEATH TANK
YTG-BC-006	1.2	102	STOCKPILED CONTAMINANT

LEGEND

⊞ SOIL SAMPLING LOCATIONS

0 1 2 3 4 5 metres

SCALE 1:100

CLIENT

Yukon Transportation Maintenance Branch

EBA Engineering Consultants Ltd.

UNDERGROUND FUEL STORAGE TANK REMOVAL
YTG GRADER STATION - BEAVER CREEK, YUKON

SITE PLAN SHOWING
UST TANK LOCATION

PROJECT NO.	DWN	CKD	REV
1240246	JSB	GR/BEP	0
OFFICE: EBA-WHSE	DATE: October 26, 2006		

Figure 1

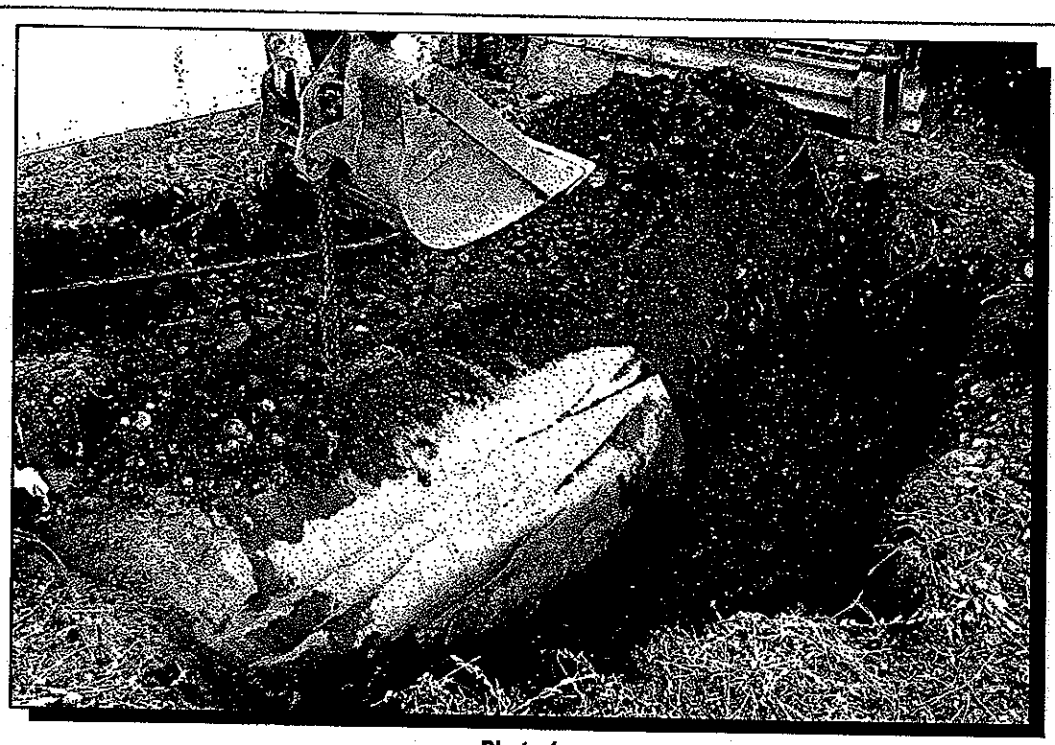


Photo 1
UST in situ. The east side of the shop is visible

Photo 2
Stockpiled soil from UST excavation

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

EBA Engineering
Consultants Ltd.
WHITEHORSE

SEP - 6 2006

RECEIVED

Environmental Division

ANALYTICAL REPORT

Reported On: 20-AUG-06 11:38 AM

EBA ENG CONSULTANTS LTD
ATTN: DON WILSON
UNIT 6 151 INDUSTRIAL RD
WHITEHORSE YK Y1A 2V3

Lab Work Order #: L421344 Date Received: 14-AUG-06

Project P.O. #:
Job Reference: 1240246
Legal Site Desc:
CofC Numbers: 246613

Other Information:

Comments:

ROY JONES
General Manager

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

KAREN HUEBNER

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L421344-6 1240246-BC-YTG-006 BEAVER CREEK								
Sampled By: JTP on 08-AUG-06								
Matrix: SOIL								
EPH and PAHs - BC CSR Regs								
LEPHs and HEPHs								
LEPHs	620		5	ug/g		20-AUG-06		
EHs10-19	620		5	ug/g		20-AUG-06		
HEPHs	590		5	ug/g		20-AUG-06		
EHs19-32	590		5	ug/g		20-AUG-06		
LEPHs and HEPHs								
Surr: 2-Bromobenzotrifluoride	93		34-164	%	18-AUG-06	18-AUG-06	MKE	R432209
Surr: Hexatriacontane	227	SOL:MI	37-183	%	18-AUG-06	18-AUG-06	MKE	R432209
Prep/Analysis Dates					18-AUG-06	18-AUG-06	MKE	R432209
PAHs - BC CSR Regs								
Acenaphthene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Acenaphthylene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Anthracene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Benz(a)anthracene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Benzo(a)pyrene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Benzo(b)fluoranthene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Benzo(g,h,i)perylene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Benzo(k)fluoranthene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Chrysene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Dibenz(a,h)anthracene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Fluoranthene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Fluorene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Indeno(1,2,3-c,d)pyrene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
2-Methylnaphthalene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Naphthalene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Phenanthrene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Pyrene	<0.01		0.01	ug/g	16-AUG-06	18-AUG-06	JME	R431845
Surr: Nitrobenzene d5	72		18-135	%	16-AUG-06	18-AUG-06	JME	R431845
Surr: 2-Fluorobiphenyl	90		30-134	%	16-AUG-06	18-AUG-06	JME	R431845
Surr: p-Terphenyl d14	81		47-146	%	16-AUG-06	18-AUG-06	JME	R431845
% Moisture	4.2		0.1	%		15-AUG-06	REK	R430586

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

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
ETL-L/HEPH-CALC-ED	Soil	LEPHs and HEPHs		BC MELP; CSR-Analytical Method 3
ETL-LEPH/HEPH-ED	Soil	LEPHs and HEPHs		BC MELP; CSR-Analytical Method 3
PAH-BCCSR-ED	Soil	PAHs - BC CSR Regs	EPA 3540C	EPA 3540/8270-GC/MS
PREP-MOISTURE-ED	Soil	% Moisture		Oven dry 105C-Gravimetric
TEH-BC-ED	Soil	EPH (C10-C19) & EPH (C19-C32)		BC MELP; CSR-Analytical Method 3

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

Chain of Custody numbers:

246613

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

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

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

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

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

ALS Laboratory Group Quality Control Report

Workorder: L421344 Report Date: 20-AUG-06

Client: EBA ENG CONSULTANTS LTD
UNIT 6 151 INDUSTRIAL RD
WHITEHORSE YK Y1A 2V3

Contact: DON WILSON

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ETL-LEPH/HEPH-ED	**Soil**							
Batch R432209								
WG484271-2 LCS								
HEPHs			127		%		57-138	18-AUG-06
LEPHs			127		%		57-138	18-AUG-06
WG484271-3 LCS								
HEPHs			116		%		57-138	18-AUG-06
LEPHs			109		%		57-138	18-AUG-06
WG484271-1 MB								
HEPHs			<5		ug/g		5	18-AUG-06
LEPHs			<5		ug/g		5	18-AUG-06
PAH-BCCSR-ED	**Soil**							
Batch R431845								
WG482124-3 MB								
Acenaphthene			<0.01		ug/g		0.01	17-AUG-06
Acenaphthylene			<0.01		ug/g		0.01	17-AUG-06
Anthracene			<0.01		ug/g		0.01	17-AUG-06
Benz(a)anthracene			<0.01		ug/g		0.01	17-AUG-06
Benzo(a)pyrene			<0.01		ug/g		0.01	17-AUG-06
Benzo(b)fluoranthene			<0.01		ug/g		0.01	17-AUG-06
Benzo(g,h,i)perylene			<0.01		ug/g		0.01	17-AUG-06
Benzo(k)fluoranthene			<0.01		ug/g		0.01	17-AUG-06
Chrysene			<0.01		ug/g		0.01	17-AUG-06
Dibenz(a,h)anthracene			<0.01		ug/g		0.01	17-AUG-06
Fluoranthene			<0.01		ug/g		0.01	17-AUG-06
Fluorene			<0.01		ug/g		0.01	17-AUG-06
Indeno(1,2,3-c,d)pyrene			<0.01		ug/g		0.01	17-AUG-06
Naphthalene			<0.01		ug/g		0.01	17-AUG-06
Phenanthrene			<0.01		ug/g		0.01	17-AUG-06
Pyrene			<0.01		ug/g		0.01	17-AUG-06
2-Methylnaphthalene			<0.01		ug/g		0.01	17-AUG-06
TEH-BC-ED	**Soil**							
Batch R432209								
WG484271-4 DUP		**L421342-10**						
EHs10-19		6	8	J	ug/g	2	20	18-AUG-06
EHs19-32		11	15	J	ug/g	4	20	18-AUG-06
WG484271-2 LCS								

ALS Laboratory Group Quality Control Report

Workorder: L421344 Report Date: 20-AUG-06

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TEH-BC-ED	Soil							
Batch R432209								
WG484271-2 LCS								
EHs10-19			127		%		56-139	18-AUG-06
EHs19-32			127		%		56-139	18-AUG-06
WG484271-3 LCS								
EHs10-19			109		%		56-139	18-AUG-06
EHs19-32			116		%		56-139	18-AUG-06
WG484271-1 MB								
EHs10-19			<5		ug/g		5	18-AUG-06
EHs19-32			<5		ug/g		5	18-AUG-06

ALS Laboratory Group Quality Control Report

Legend:

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

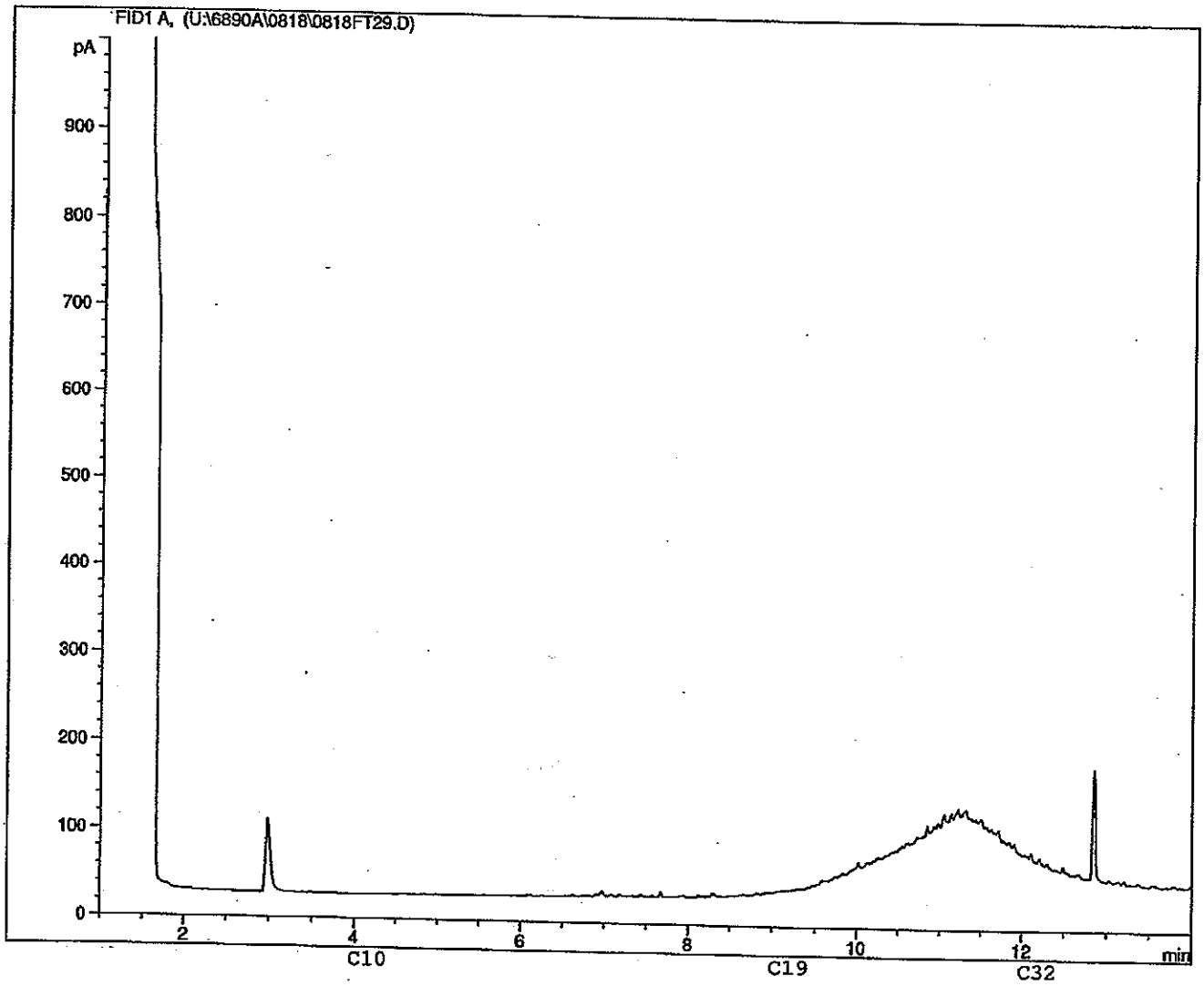
Qualifier:

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

Client ID: 1240246-BC-YTG-001 BEAVER CREEK

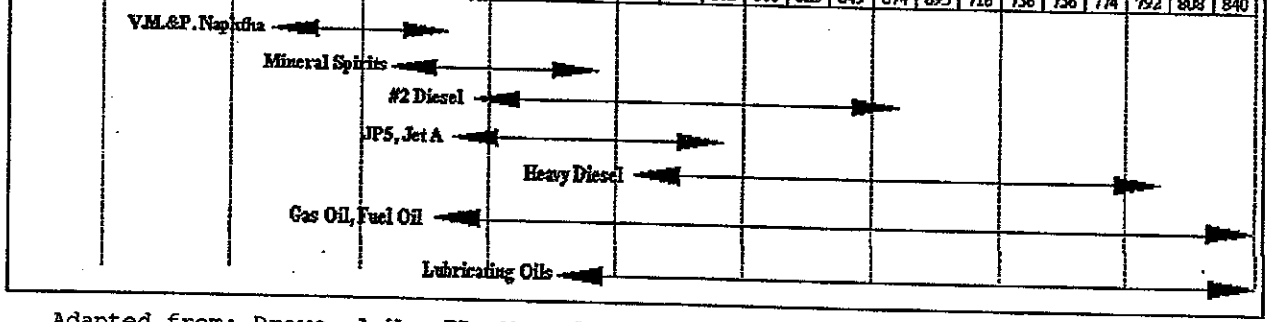
Sample ID: L421344-1 10
Injection Date: 8/19/2006 4:05:00 AM
Instrument: 6890

Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

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

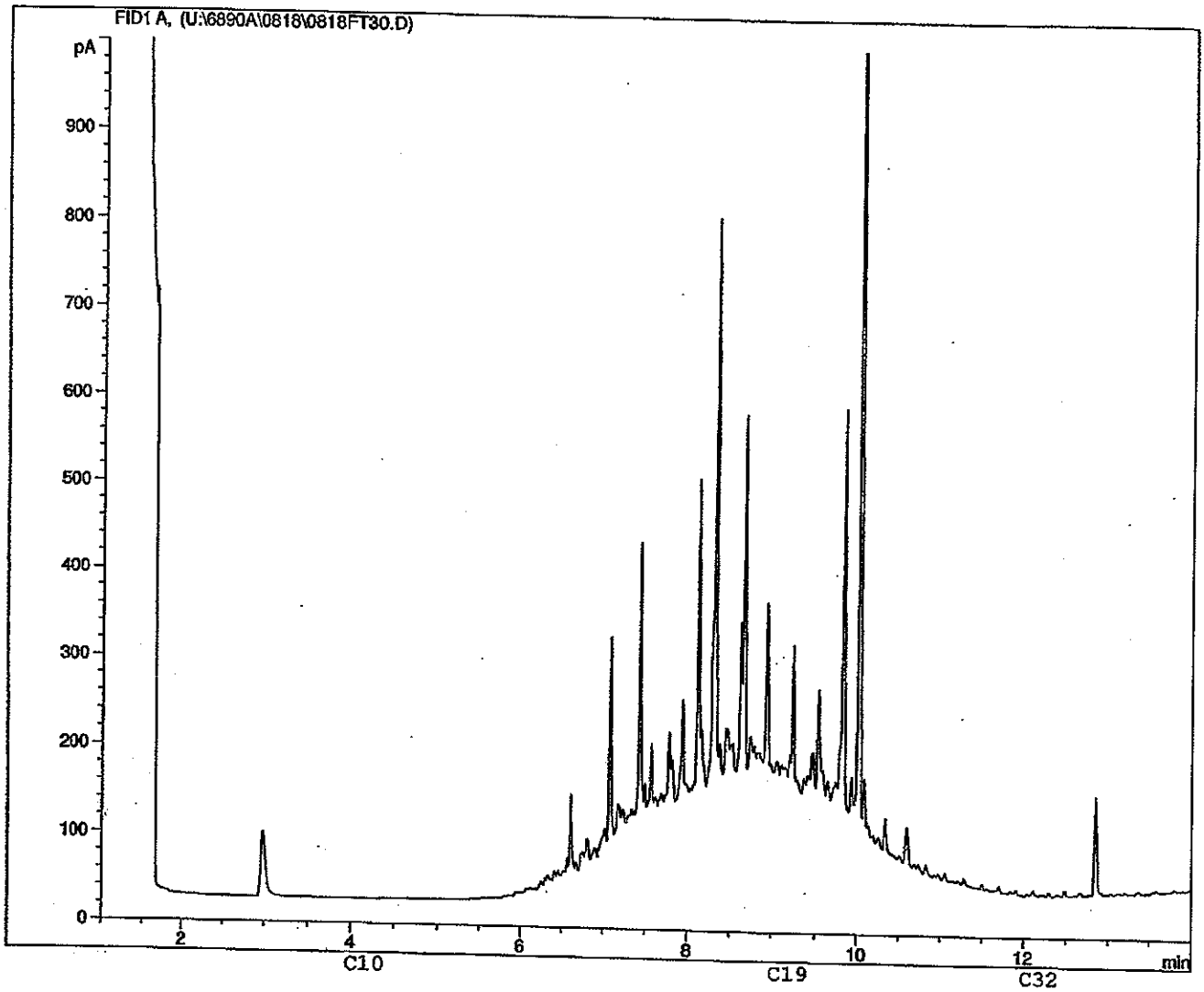


Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 1240246-BC-YTG-002 BEAVER CREEK

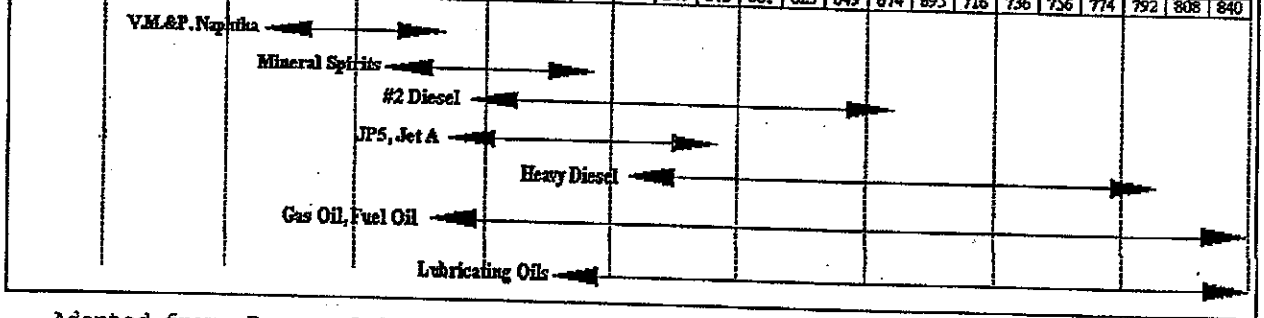
Sample ID: L421344-2 10
Injection Date: 8/19/2006 4:30:01 AM
Instrument: 6890

Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

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

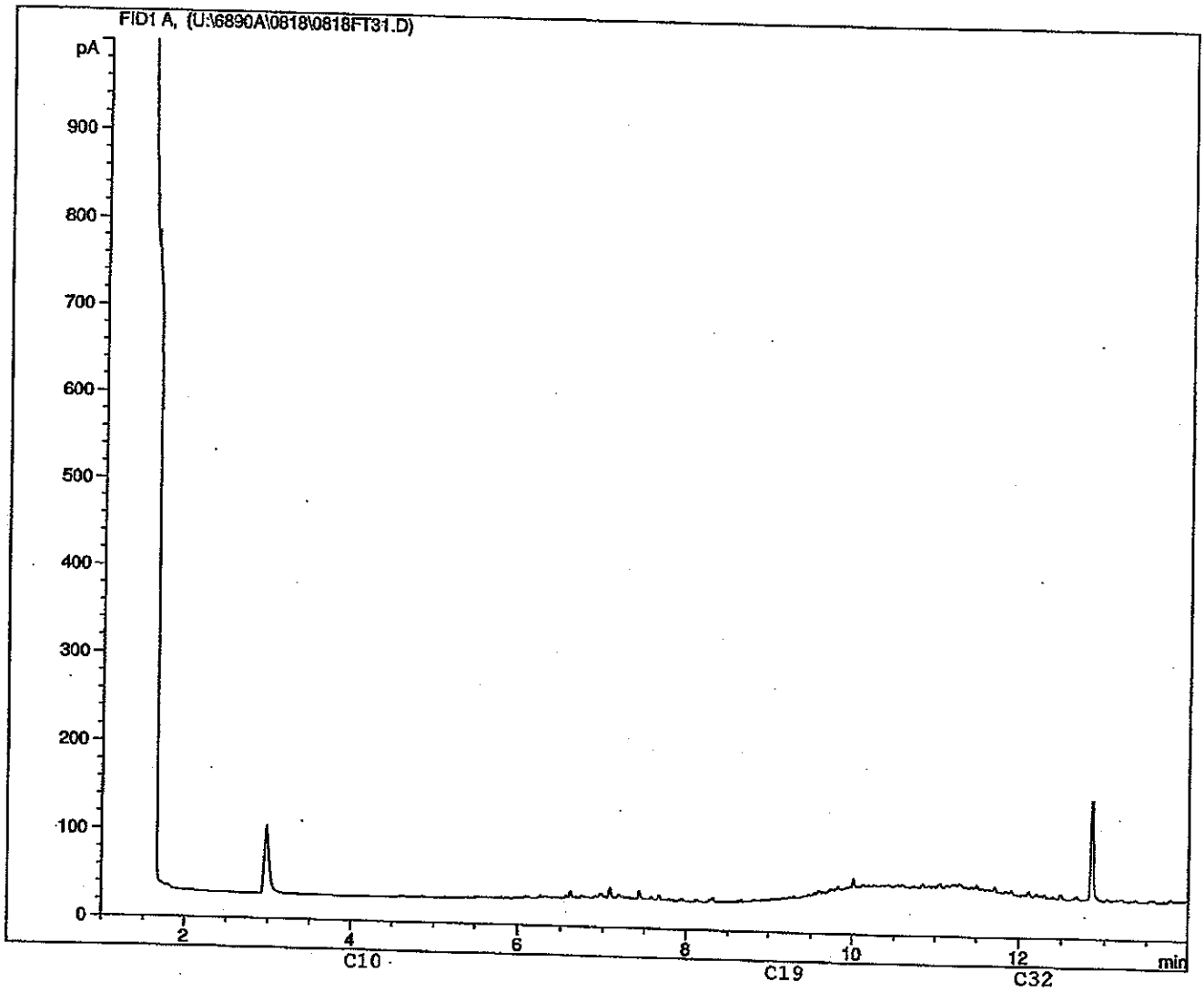


Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: 1240246-BC-YTG-003 BEAVER CREEK

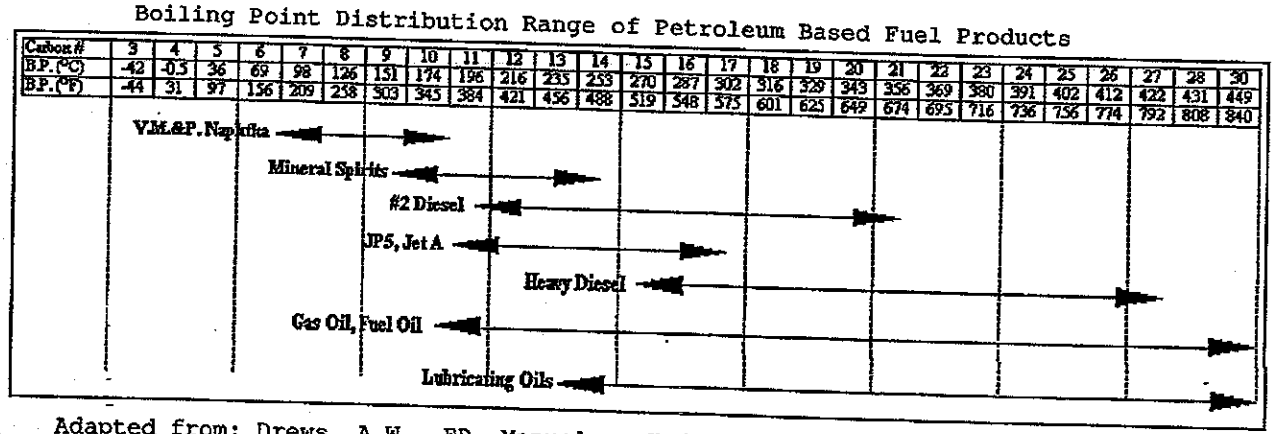
Sample ID: L421344-3 10
Injection Date: 8/19/2006 4:55:11 AM
Instrument: 6890

Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

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

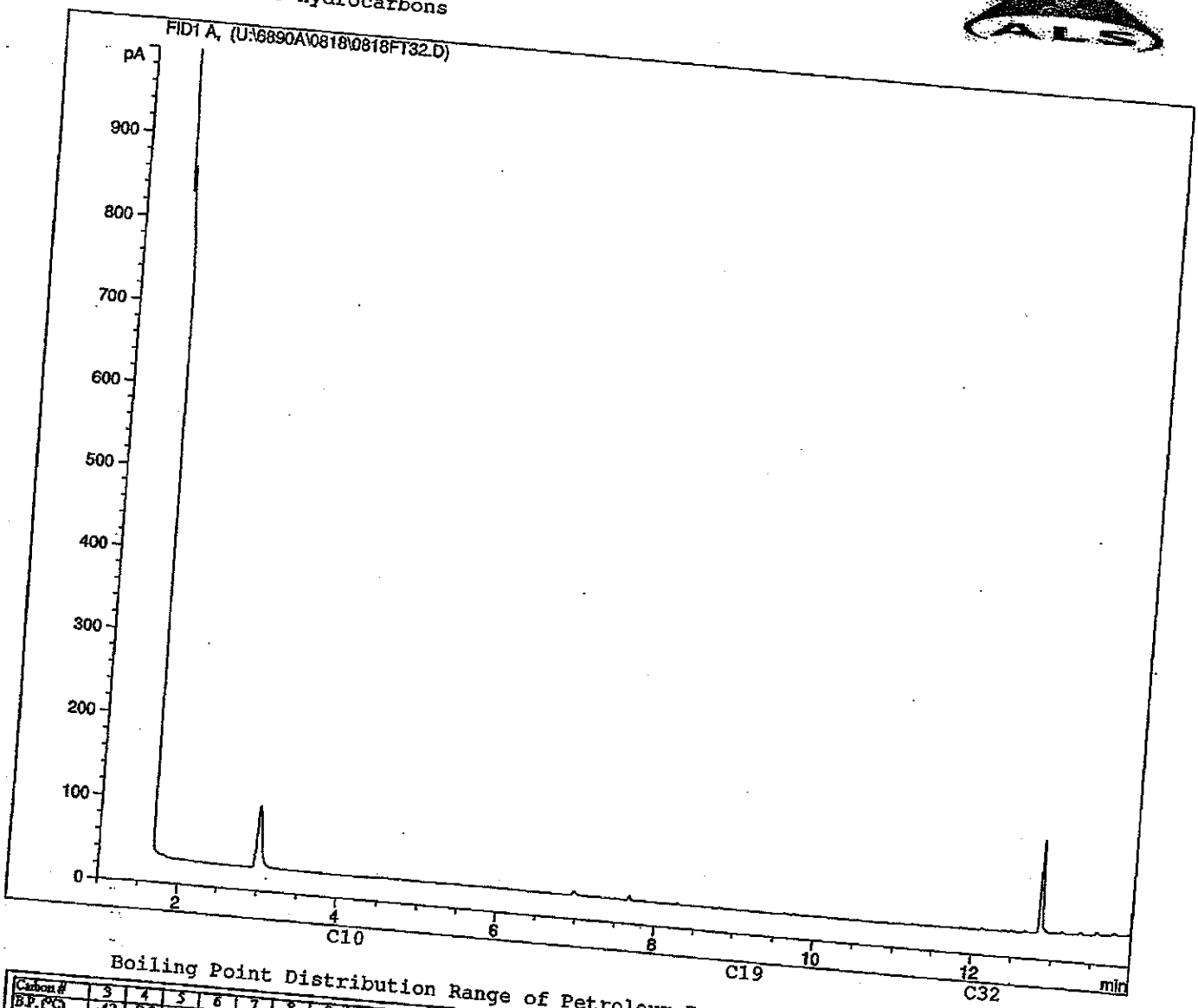


Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

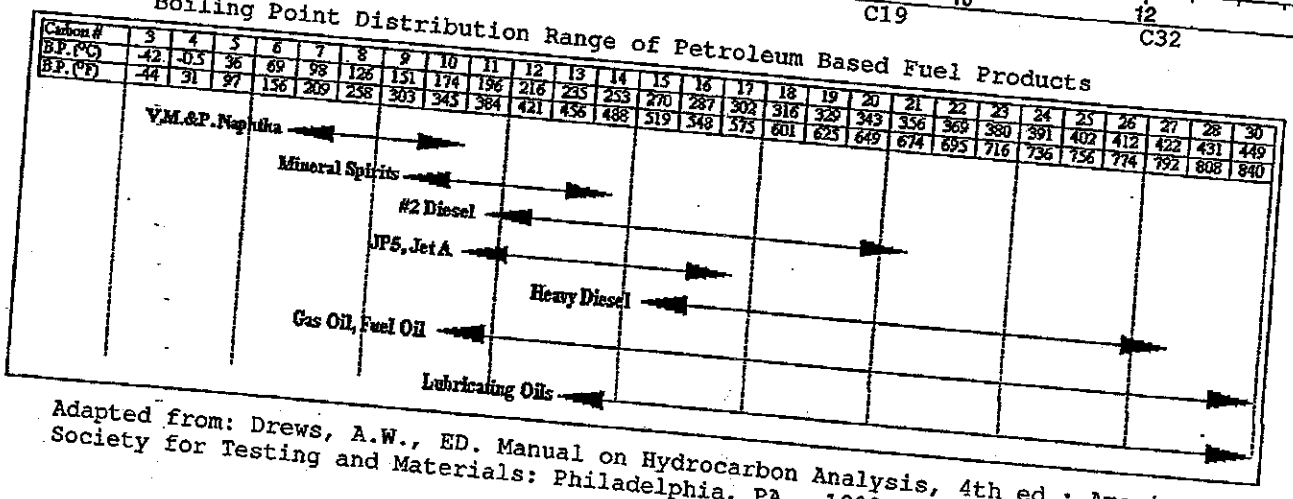
Client ID:

Sample ID: 1240246-BC-YTG-004 BEAVER CREEK
Injection Date: L421344-4 10
Instrument: 8/19/2006 5:20:11 AM
6890

Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products



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

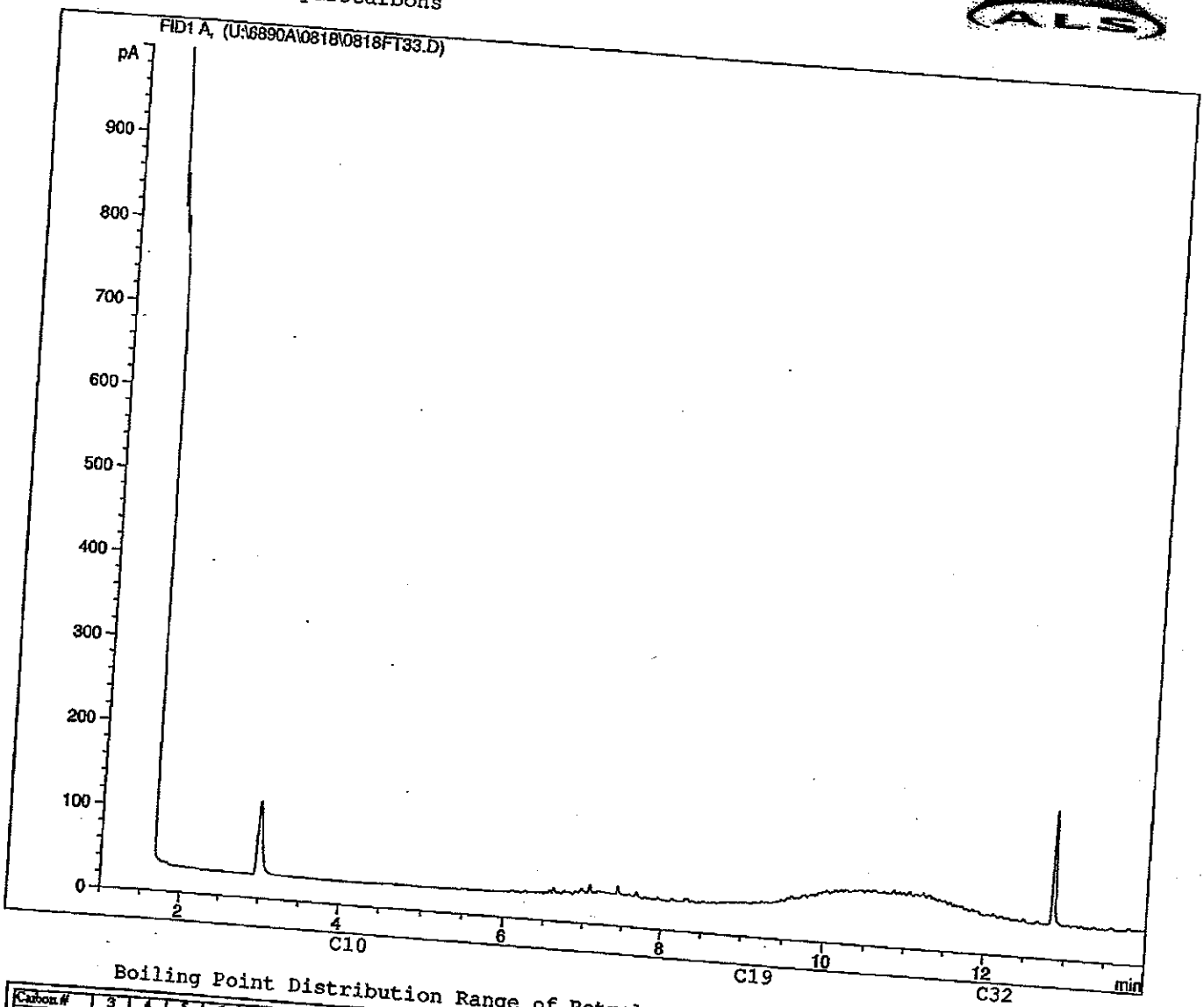
Client ID: 1240246-BC-YTG-005 BEAVER CREEK

Sample ID: L421344-5 10

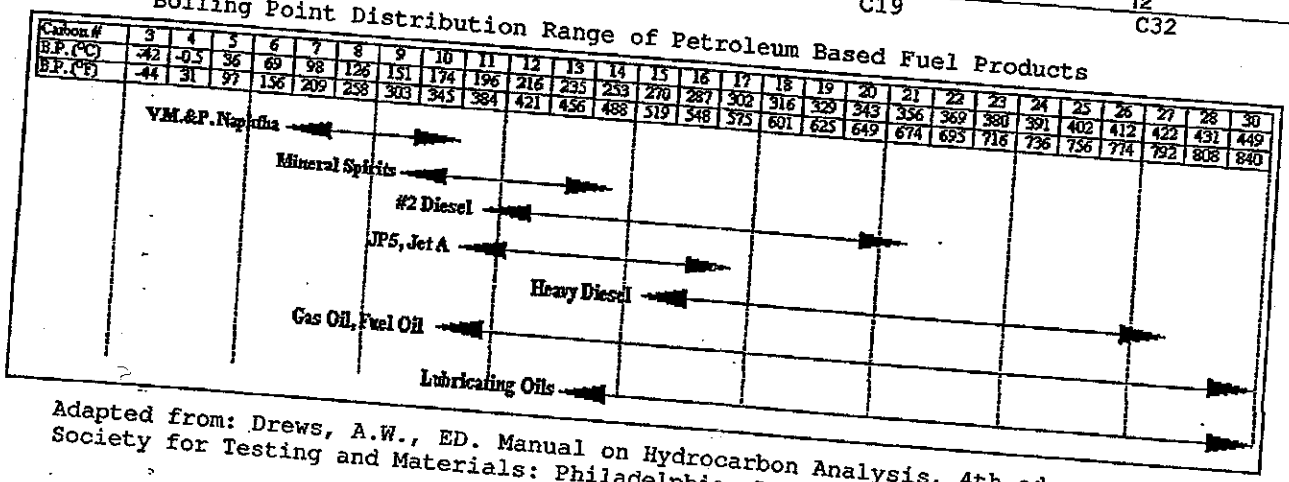
Injection Date: 8/19/2006 5:45:08 AM

Instrument: 6890

Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

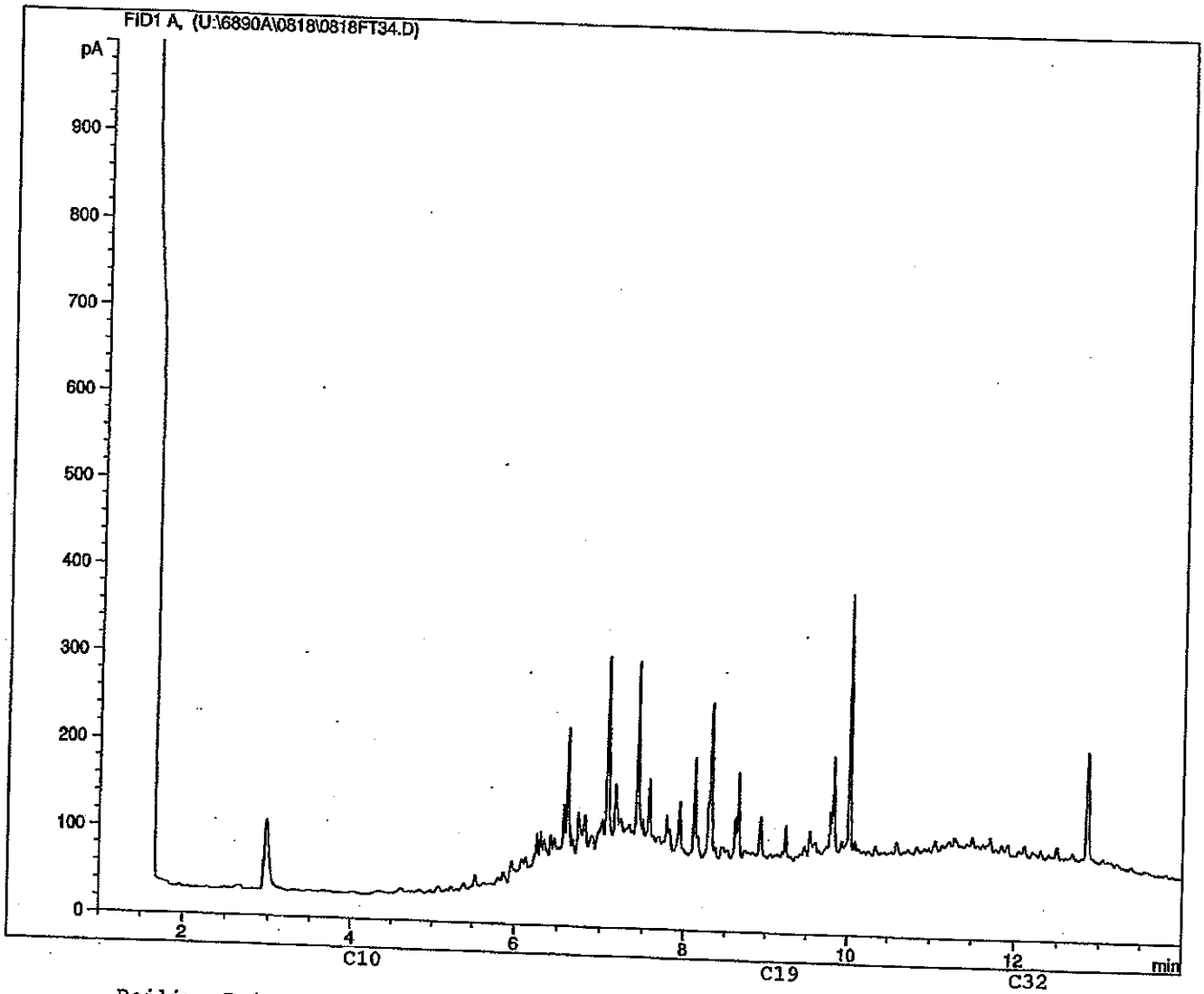


Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

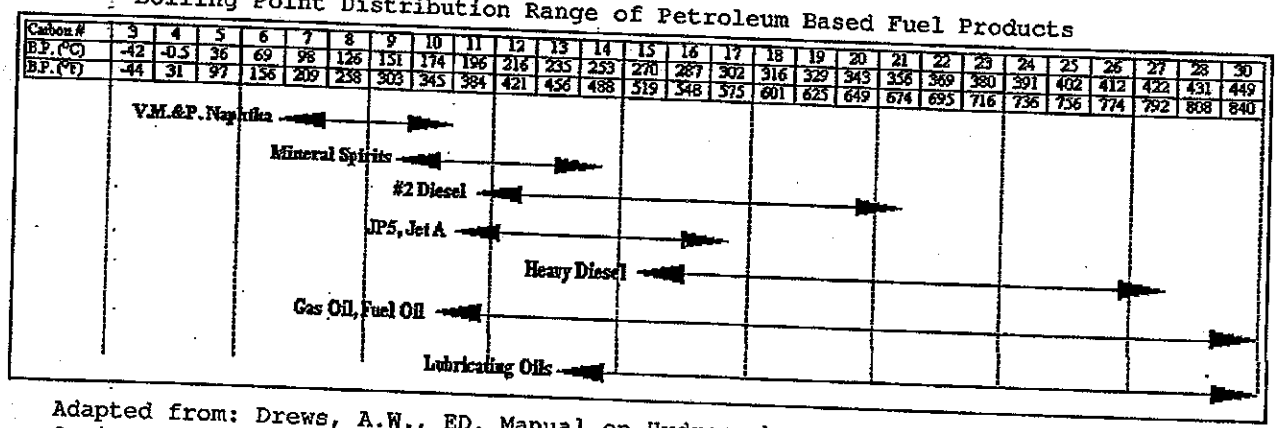
Client ID: 1240246-BC-YTG-006 BEAVER CREEK

Sample ID: L421344-6 10
Injection Date: 8/19/2006 6:10:24 AM
Instrument: 6890

Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products



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

October 5, 2006

EBA File: 1240240

Xstrata Plc.
3296 Francis Hughes Ave
Laval, Quebec

Attention: Mr. Richard Nieminen, P.Geo.

Subject: Addendum to Spill Restoration Summary Report
Beaver Creek Aerodrome, Beaver Creek, Yukon

1.0 INTRODUCTION

EBA Engineering Consultants Ltd. (EBA) is pleased to submit this letter report detailing additional sampling with regards to restoration activities at the Beaver Creek Aerodrome in Yukon (the subject property or Site). EBA was retained by Mr. Richard Nieminen of the Falconbridge Ltd. to provide environmental consulting services with regards to the fuel spill at the Site. Mr. Kirn Dhillon, P.Eng, conducted the initial spill response. Sample results indicated that hydrocarbon concentrations in soil removed as part of a remedial excavation were actually below the applicable Yukon Contaminated Sites Regulation (CSR) Commercial Land Use numerical standards. The stockpile of suspected contaminated soil was subsequently re-sampled and analyzed. This letter report documents the results of re-sampling and makes appropriate recommendations. It is an addendum to the September 21, 2006 report, and is not meant to be a stand-alone report

2.0 SUMMARY OF ADDITIONAL FIELDWORK

On September 17, EBA collected two additional samples from the stockpile of suspected contaminated soil in a manner exceeding Protocol 3 of the CSR. The estimated volume of the stockpile was in the order of 50 m^3. One representative samples for each half of the pile was collected. One sample represented 25 m^3 of soil. Each sample was formed by combining five different sub-samples from a given half. The sub-samples represented 5m^3. In addition to the two additional samples collected, EBA has the result from an *in situ* sample that was collected as part of the initial soil remediation.

EBA Engineering Consultants Ltd.
p. 867.668.3068 • f. 867.668.4349
Calcite Business Centre • Unit 6, 151 Industrial Road • Whitehorse, Yukon Y1A 2V3 • CANADA

3.0 RESULTS

Laboratory results are attached in Appendix A. The results of the two additional samples, and the initial *in situ* sample are summarized as follows:

TABLE 1: ANALYTICAL SOIL TESTING RESULTS

Parameter	1240240-H (22/07/2006)	1240240-Stockpile 1 (17/09/2006)	1240240-Stockpile 2 (17/09/2006)	Y-CSR Commercial Standards
% Moisture	8.9	13	11	-
LEPHs	1300	-	-	2000
EHs10-19	1300	590	78	2000
HEPHs	<5	-	-	5000
EHs19-32	<5	7	<5	5000
Acenaphthene	<0.01	-	-	NS
Acenaphthylene	<0.01	-	-	NS
Anthracene	<0.01	-	-	NS
Benz(a)anthracene	<0.01	-	-	10
Benzo(a)pyrene*	<0.01	-	-	10
Benzo(b)fluoranthene	<0.01	-	-	10
Benzo(g,h,i)perylene	<0.01	-	-	NS
Benzo(k)fluoranthene	<0.01	-	-	10
Chrysene	<0.01	-	-	NS
Dibenz(a,h)anthracene	<0.01	-	-	10
Fluoranthene	<0.01	-	-	NS
Fluorene	<0.01	-	-	NS
Indeno(1,2,3-c,d)pyrene	<0.01	-	-	10
2-Methylnaphthalene	0.21	-	-	NS
Naphthalene	0.05	-	-	50
Phenanthrene	<0.01	-	-	50
Pyrene	<0.01	-	-	100
Benzene*	<0.02	-	-	150
Toluene*	<0.02	-	-	25
Ethylbenzene*	<0.02	-	-	20
Xylenes (total)*	0.15	-	-	50
Styrene	<0.01	-	-	50
VHs6-10	36	-	-	200
VPHs	35	-	-	200

Notes: * - The most stringent of "Intake of contaminated soil" and "Toxicity to soil invertebrate and plants" site specific factors from Schedule 2 of the CSR was chosen
All units are in ug/g unless otherwise stated
NS – no standard for this parameter is currently available in the CSR

4.0 CONCLUSIONS & RECOMMENDATIONS

The results indicate that hydrocarbon concentrations are below CSR Commercial Land Use numerical standards and the soil is not considered contaminated under the CSR. These concentrations would decline further if the soil was thinly spread over the ground surface. It is recommended that the stockpile be disposed of by spreading on a property with commercial or industrial land use designation.

5.0 LIMITATIONS OF LIABILITY

This report has been prepared for the exclusive use of Xstrata Plc. for the specific application described in Section 1.0 of this report. It has been prepared in accordance with generally accepted geo-environmental engineering practices. No other warranty is made, either expressed or implied. Engineering judgement has been applied in developing the recommendations of this report.

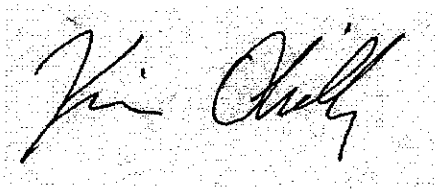
For further limitations, reference should be made to the attached Environmental Report-General Conditions, which form a part of this report.

With respect to regulatory compliance issues, please note that regulatory statutes and the interpretation of regulatory statutes are subject to change over time. Moreover, this report is not meant to represent a legal opinion regarding compliance with applicable laws.

6.0 CLOSURE

We trust this report meets your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

Sincerely,
EBA Engineering Consultants Ltd.



Kirn S. Dhillon, B.A.Sc., P.Eng.
Project Environmental Engineer
Direct Line: (867) 668-2071, ext. 25
e-mail: kdhillon@eba.ca

reviewed by:
Bengt Pettersson, B.Sc., M.A.
Team Leader, Environmental Services
Direct Line: (867) 668-2071 ext. 35
e-mail: bpetterson@eba.ca

KSD/djw/bep

APPENDIX F

WATER QUALITY SAMPLING ANALYTICAL RESULTS

WIRELESS WATER INC.
ATTN: Ron Green
202 - 1551 West 11th Avenue
Vancouver BC V6J 2B5

Date Received: 01-FEB-12
Report Date: 16-FEB-12 13:02 (MT)
Version: FINAL REV. 2

Client Phone: 604-785-5804

Certificate of Analysis

Lab Work Order #: L1109972

Project P.O. #: NOT SUBMITTED
Job Reference: AANDC YUKON DW
C of C Numbers:
Legal Site Desc:

Comments:

16-FEB-12: Nitrate + nitrite and total THM calculations have been added.

Dean Watt
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1109972-1 WRFN WATER SYSTEM #1 TREATED							
Sampled By: CLIENT on 30-JAN-12 @ 11:30							
Matrix: WATER							
Drinking Water Full Package							
Alkalinity by Colourimetric (Automated)							
Alkalinity, Total (as CaCO3)	124		2.0	mg/L		06-FEB-12	R2321699
Chloride by Ion Chromatography							
Chloride (Cl)	1.45		0.50	mg/L		05-FEB-12	R2322543
Colour (True) by Spectrometer							
Colour, True	<5.0		5.0	CU		06-FEB-12	R2321704
Conductivity (Automated)							
Conductivity	309		2.0	uS/cm		06-FEB-12	R2321920
Fluoride by Ion Chromatography							
Fluoride (F)	0.056		0.020	mg/L		05-FEB-12	R2322543
Hardness							
Hardness (as CaCO3)	175		0.50	mg/L		08-FEB-12	
Nitrate in Water by Ion Chromatography							
Nitrate (as N)	0.245		0.0050	mg/L		05-FEB-12	R2322543
Nitrite in Water by Ion Chromatography							
Nitrite (as N)	<0.0010		0.0010	mg/L		05-FEB-12	R2322543
Sulfate by Ion Chromatography							
Sulfate (SO4)	39.0		0.50	mg/L		05-FEB-12	R2322543
Total Dissolved Solids by Gravimetric							
Total Dissolved Solids	193		10	mg/L		07-FEB-12	R2323289
Total Mercury in Water by CVAFS							
Mercury (Hg)-Total	<0.00020		0.00020	mg/L		03-FEB-12	R2320897
Total Metals in Water by ICPMS(Low)							
Aluminum (Al)-Total	<0.010		0.010	mg/L		06-FEB-12	R2322842
Antimony (Sb)-Total	<0.00050		0.00050	mg/L		06-FEB-12	R2322842
Arsenic (As)-Total	0.00063		0.00010	mg/L		06-FEB-12	R2322842
Cadmium (Cd)-Total	<0.00020		0.00020	mg/L		06-FEB-12	R2322842
Chromium (Cr)-Total	<0.0020		0.0020	mg/L		06-FEB-12	R2322842
Copper (Cu)-Total	0.0628		0.0010	mg/L		06-FEB-12	R2322842
Lead (Pb)-Total	<0.00050		0.00050	mg/L		06-FEB-12	R2322842
Manganese (Mn)-Total	<0.0020		0.0020	mg/L		06-FEB-12	R2322842
Potassium (K)-Total	1.21		0.10	mg/L		06-FEB-12	R2322842
Selenium (Se)-Total	<0.0010		0.0010	mg/L		06-FEB-12	R2322842
Uranium (U)-Total	0.00033		0.00010	mg/L		06-FEB-12	R2322842
Total Metals in Water by ICPOES							
Barium (Ba)-Total	0.026		0.020	mg/L		05-FEB-12	R2321686
Boron (B)-Total	<0.10		0.10	mg/L		05-FEB-12	R2321686
Calcium (Ca)-Total	56.3		0.10	mg/L		05-FEB-12	R2321686
Iron (Fe)-Total	<0.030		0.030	mg/L		05-FEB-12	R2321686
Magnesium (Mg)-Total	7.99		0.10	mg/L		05-FEB-12	R2321686
Sodium (Na)-Total	4.0		2.0	mg/L		05-FEB-12	R2321686
Zinc (Zn)-Total	<0.050		0.050	mg/L		05-FEB-12	R2321686
Turbidity by Meter							
Turbidity	0.15		0.10	NTU		06-FEB-12	R2321703
pH by Meter (Automated)							
pH	8.16		0.10	pH		06-FEB-12	R2321920
Dissolved Metals in Water (DW)							
Dissolved Mercury in Water by CVAFS							
Mercury (Hg)-Dissolved	<0.00020		0.00020	mg/L		03-FEB-12	R2320897
Dissolved Metals in Water by ICPMS(Low)							
Aluminum (Al)-Dissolved	<0.010		0.010	mg/L		06-FEB-12	R2322842
Antimony (Sb)-Dissolved	<0.00050		0.00050	mg/L		06-FEB-12	R2322842

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1109972-1 WRFN WATER SYSTEM #1 TREATED							
Sampled By: CLIENT on 30-JAN-12 @ 11:30							
Matrix: WATER							
Dissolved Metals in Water by ICPMS(Low)							
Arsenic (As)-Dissolved	0.00064		0.00010	mg/L		06-FEB-12	R2322842
Cadmium (Cd)-Dissolved	<0.00020		0.00020	mg/L		06-FEB-12	R2322842
Chromium (Cr)-Dissolved	<0.0020		0.0020	mg/L		06-FEB-12	R2322842
Copper (Cu)-Dissolved	0.0625		0.0010	mg/L		06-FEB-12	R2322842
Lead (Pb)-Dissolved	<0.00050		0.00050	mg/L		06-FEB-12	R2322842
Manganese (Mn)-Dissolved	<0.0020		0.0020	mg/L		06-FEB-12	R2322842
Potassium (K)-Dissolved	1.21		0.10	mg/L		06-FEB-12	R2322842
Selenium (Se)-Dissolved	<0.0010		0.0010	mg/L		06-FEB-12	R2322842
Uranium (U)-Dissolved	0.00031		0.00010	mg/L		06-FEB-12	R2322842
Dissolved Metals in Water by ICPOES							
Barium (Ba)-Dissolved	0.025		0.020	mg/L		05-FEB-12	R2321686
Boron (B)-Dissolved	<0.10		0.10	mg/L		05-FEB-12	R2321686
Calcium (Ca)-Dissolved	57.3		0.10	mg/L		05-FEB-12	R2321686
Iron (Fe)-Dissolved	<0.030		0.030	mg/L		05-FEB-12	R2321686
Magnesium (Mg)-Dissolved	7.80		0.10	mg/L		05-FEB-12	R2321686
Sodium (Na)-Dissolved	3.7		2.0	mg/L		05-FEB-12	R2321686
Zinc (Zn)-Dissolved	<0.050		0.050	mg/L		05-FEB-12	R2321686
Miscellaneous Parameters							
Nitrate and Nitrite (as N)	0.245		0.0051	mg/L		14-FEB-12	
Total Haloacetic Acids 5	<0.0054		0.0054	mg/L		10-FEB-12	
Total THMs	0.0070		0.0020	mg/L		15-FEB-12	
Haloacetic Acids							
Monobromoacetic Acid	<0.0010		0.0010	mg/L		09-FEB-12	R2323516
Monochloroacetic Acid	<0.0050		0.0050	mg/L		09-FEB-12	R2323516
Bromochloroacetic Acid	0.0010		0.0010	mg/L		09-FEB-12	R2323516
Dibromoacetic Acid	<0.0010		0.0010	mg/L		09-FEB-12	R2323516
Dichloroacetic Acid	0.0030		0.0010	mg/L		09-FEB-12	R2323516
Trichloroacetic Acid	0.0012		0.0010	mg/L		09-FEB-12	R2323516
VOCs+MTBE in Water by HS GCMS							
BTEX/MTBE/Styrene by Headspace GCMS							
Benzene	<0.00050		0.00050	mg/L	10-FEB-12	10-FEB-12	R2323725
Ethylbenzene	<0.00050		0.00050	mg/L	10-FEB-12	10-FEB-12	R2323725
Methyl t-butyl ether (MTBE)	<0.00050		0.00050	mg/L	10-FEB-12	10-FEB-12	R2323725
Styrene	<0.00050		0.00050	mg/L	10-FEB-12	10-FEB-12	R2323725
Toluene	<0.00070	DLB	0.00070	mg/L	10-FEB-12	10-FEB-12	R2323725
meta- & para-Xylene	<0.00050		0.00050	mg/L	10-FEB-12	10-FEB-12	R2323725
ortho-Xylene	<0.00050		0.00050	mg/L	10-FEB-12	10-FEB-12	R2323725
Sum of Xylene Isomer Concentrations							
Xylenes	<0.00075		0.00075	mg/L		13-FEB-12	
VOC7 and/or VOC Surrogates for Waters							
Surrogate: 1,4-Difluorobenzene (SS)	100.3		70-130	%		10-FEB-12	R2323725
Surrogate: 4-Bromofluorobenzene (SS)	94.7		70-130	%		10-FEB-12	R2323725
VOCs in water by Headspace GCMS							
Bromodichloromethane	0.0012		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
Bromoform	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
Carbon Tetrachloride	<0.00050		0.00050	mg/L	10-FEB-12	10-FEB-12	R2323725
Chlorobenzene	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
Dibromochloromethane	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
Chloroethane	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
Chloroform	0.0058		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
Chloromethane	<0.0050		0.0050	mg/L	10-FEB-12	10-FEB-12	R2323725

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1109972-1 WRFN WATER SYSTEM #1 TREATED							
Sampled By: CLIENT on 30-JAN-12 @ 11:30							
Matrix: WATER							
VOCs in water by Headspace GCMS							
1,2-Dichlorobenzene	<0.00070		0.00070	mg/L	10-FEB-12	10-FEB-12	R2323725
1,3-Dichlorobenzene	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
1,4-Dichlorobenzene	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
1,1-Dichloroethane	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
1,2-Dichloroethane	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
1,1-Dichloroethylene	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
cis-1,2-Dichloroethylene	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
trans-1,2-Dichloroethylene	0.0042		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
Dichloromethane	<0.0050		0.0050	mg/L	10-FEB-12	10-FEB-12	R2323725
1,2-Dichloropropane	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
cis-1,3-Dichloropropylene	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
trans-1,3-Dichloropropylene	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
1,3-Dichloropropene (cis & trans)	<0.0014		0.0014	mg/L	10-FEB-12	10-FEB-12	R2323725
1,1,1,2-Tetrachloroethane	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
1,1,2,2-Tetrachloroethane	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
Tetrachloroethylene	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
1,1,1-Trichloroethane	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
1,1,2-Trichloroethane	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
Trichloroethylene	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
Trichlorofluoromethane	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
Vinyl Chloride	<0.0010		0.0010	mg/L	10-FEB-12	10-FEB-12	R2323725
L1109972-2 WRFN WATER SYSTEM #1 WELL #1 RAW							
Sampled By: CLIENT on 30-JAN-12 @ 10:45							
Matrix: WATER							
Drinking Water Full Package							
Alkalinity by Colourimetric (Automated)							
Alkalinity, Total (as CaCO3)	126		2.0	mg/L		06-FEB-12	R2321699
Chloride by Ion Chromatography							
Chloride (Cl)	0.73		0.50	mg/L		05-FEB-12	R2322543
Colour (True) by Spectrometer							
Colour, True	<5.0		5.0	CU		06-FEB-12	R2321704
Conductivity (Automated)							
Conductivity	308		2.0	uS/cm		06-FEB-12	R2321920
Fluoride by Ion Chromatography							
Fluoride (F)	0.055		0.020	mg/L		05-FEB-12	R2322543
Hardness							
Hardness (as CaCO3)	175		0.50	mg/L		08-FEB-12	
Nitrate in Water by Ion Chromatography							
Nitrate (as N)	0.248		0.0050	mg/L		05-FEB-12	R2322543
Nitrite in Water by Ion Chromatography							
Nitrite (as N)	<0.0010		0.0010	mg/L		05-FEB-12	R2322543
Sulfate by Ion Chromatography							
Sulfate (SO4)	38.5		0.50	mg/L		05-FEB-12	R2322543
Total Dissolved Solids by Gravimetric							
Total Dissolved Solids	189		10	mg/L		07-FEB-12	R2323289
Total Mercury in Water by CVAFS							
Mercury (Hg)-Total	<0.00020		0.00020	mg/L		03-FEB-12	R2320897
Total Metals in Water by ICPMS(Low)							
Aluminum (Al)-Total	<0.010		0.010	mg/L		06-FEB-12	R2322842
Antimony (Sb)-Total	<0.00050		0.00050	mg/L		06-FEB-12	R2322842
Arsenic (As)-Total	0.00061		0.00010	mg/L		06-FEB-12	R2322842

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1109972-2 WRFN WATER SYSTEM #1 WELL #1 RAW							
Sampled By: CLIENT on 30-JAN-12 @ 10:45							
Matrix: WATER							
Total Metals in Water by ICPMS(Low)							
Cadmium (Cd)-Total	<0.00020		0.00020	mg/L		06-FEB-12	R2322842
Chromium (Cr)-Total	<0.0020		0.0020	mg/L		06-FEB-12	R2322842
Copper (Cu)-Total	0.0015		0.0010	mg/L		06-FEB-12	R2322842
Lead (Pb)-Total	<0.00050		0.00050	mg/L		06-FEB-12	R2322842
Manganese (Mn)-Total	<0.0020		0.0020	mg/L		06-FEB-12	R2322842
Potassium (K)-Total	1.24		0.10	mg/L		06-FEB-12	R2322842
Selenium (Se)-Total	<0.0010		0.0010	mg/L		06-FEB-12	R2322842
Uranium (U)-Total	0.00034		0.00010	mg/L		06-FEB-12	R2322842
Total Metals in Water by ICPOES							
Barium (Ba)-Total	0.027		0.020	mg/L		05-FEB-12	R2321686
Boron (B)-Total	<0.10		0.10	mg/L		05-FEB-12	R2321686
Calcium (Ca)-Total	56.9		0.10	mg/L		05-FEB-12	R2321686
Iron (Fe)-Total	<0.030		0.030	mg/L		05-FEB-12	R2321686
Magnesium (Mg)-Total	8.06		0.10	mg/L		05-FEB-12	R2321686
Sodium (Na)-Total	3.5		2.0	mg/L		05-FEB-12	R2321686
Zinc (Zn)-Total	<0.050		0.050	mg/L		05-FEB-12	R2321686
Turbidity by Meter							
Turbidity	0.11		0.10	NTU		06-FEB-12	R2321703
pH by Meter (Automated)							
pH	8.13		0.10	pH		06-FEB-12	R2321920
Dissolved Metals in Water (DW)							
Dissolved Mercury in Water by CVAFS							
Mercury (Hg)-Dissolved	<0.00020		0.00020	mg/L		03-FEB-12	R2320897
Dissolved Metals in Water by ICPMS(Low)							
Aluminum (Al)-Dissolved	<0.010		0.010	mg/L		06-FEB-12	R2322842
Antimony (Sb)-Dissolved	<0.00050		0.00050	mg/L		06-FEB-12	R2322842
Arsenic (As)-Dissolved	0.00063		0.00010	mg/L		06-FEB-12	R2322842
Cadmium (Cd)-Dissolved	<0.00020		0.00020	mg/L		06-FEB-12	R2322842
Chromium (Cr)-Dissolved	<0.0020		0.0020	mg/L		06-FEB-12	R2322842
Copper (Cu)-Dissolved	0.0013		0.0010	mg/L		06-FEB-12	R2322842
Lead (Pb)-Dissolved	<0.00050		0.00050	mg/L		06-FEB-12	R2322842
Manganese (Mn)-Dissolved	<0.0020		0.0020	mg/L		06-FEB-12	R2322842
Potassium (K)-Dissolved	1.20		0.10	mg/L		06-FEB-12	R2322842
Selenium (Se)-Dissolved	<0.0010		0.0010	mg/L		06-FEB-12	R2322842
Uranium (U)-Dissolved	0.00031		0.00010	mg/L		06-FEB-12	R2322842
Dissolved Metals in Water by ICPOES							
Barium (Ba)-Dissolved	0.026		0.020	mg/L		05-FEB-12	R2321686
Boron (B)-Dissolved	<0.10		0.10	mg/L		05-FEB-12	R2321686
Calcium (Ca)-Dissolved	56.9		0.10	mg/L		05-FEB-12	R2321686
Iron (Fe)-Dissolved	<0.030		0.030	mg/L		05-FEB-12	R2321686
Magnesium (Mg)-Dissolved	7.89		0.10	mg/L		05-FEB-12	R2321686
Sodium (Na)-Dissolved	3.3		2.0	mg/L		05-FEB-12	R2321686
Zinc (Zn)-Dissolved	<0.050		0.050	mg/L		05-FEB-12	R2321686
Miscellaneous Parameters							
Nitrate and Nitrite (as N)	0.248		0.0051	mg/L		14-FEB-12	

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

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLA	Detection Limit Adjusted For required dilution
DLB	Detection limit was raised due to detection of analyte at comparable level in Method Blank.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
ANIONS-N+N-CALC-VA	Water	Nitrite & Nitrate in Water (Calculation)	EPA 300.0
Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).			
ANIONS-NO2-IC-VA	Water	Nitrite in Water by Ion Chromatography	EPA 300.0
This analysis is carried out using procedures adapted from EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Nitrite is detected by UV absorbance.			
ANIONS-NO3-IC-VA	Water	Nitrate in Water by Ion Chromatography	EPA 300.0
This analysis is carried out using procedures adapted from EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Nitrate is detected by UV absorbance.			
ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 B.
This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".			
COLOUR-TRUE-VA	Water	Colour (True) by Spectrometer	BCMOE Colour Single Wavelength
This analysis is carried out using procedures adapted from British Columbia Environmental Manual "Colour- Single Wavelength." Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Aparent Colour is determined without prior sample filtration. Colour is pH dependent. Unless otherwise indicated, reported colour results pertain to the pH of the sample as received, to within +/- 1 pH unit.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HAA-WP	Water	Haloacetic Acids	EPA 552.2
HAA concentration is determined using liquid-liquid extraction, capillary column, GC/electron capture techniques.			
HAA5-SUM-CALC-WP	Water	Total Haloacetic Acids 5 (HAA5)	CALCULATION
Total Haloacetic Acids 5 (HAA5) represents the sum of monobromoacetic acid, monochloroacetic acid, dibromoacetic acid, dichloroacetic acid and trichloroacetic acid. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-DIS-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS	EPA SW-846 3005A & EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
HG-TOT-CVAFS-VA	Water	Total Mercury in Water by CVAFS	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United			

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

MET-DIS-ICP-VA Water Dissolved Metals in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-DIS-LOW-MS-VA Water Dissolved Metals in Water by ICPMS(Low) EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures involves preliminary sample treatment by filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

MET-TOT-ICP-VA Water Total Metals in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-TOT-LOW-MS-VA Water Total Metals in Water by ICPMS(Low) EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

TDS-VA Water Total Dissolved Solids by Gravimetric APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

THM-SUM-CALC-VA Water Total Trihalomethane-THM CALCULATION

Total Trihalomethanes (where not conducted as part of a formation potential analysis) is equal to the sum of the individual parameter concentrations with non-detect results treated as zero.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

VOC-HSMS-VA Water VOCs in water by Headspace GCMS EPA8260B, 5021

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transfered into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.

VOC7-HSMS-VA Water BTEX/MTBE/Styrene by Headspace GCMS EPA8260B, 5021

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transfered into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.

VOC7/VOC-SURR-MS-VA Water VOC7 and/or VOC Surrogates for Waters EPA8260B, 5021

XYLENES-CALC-VA Water Sum of Xylene Isomer Concentrations CALCULATION

Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

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

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BC, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: WIRELESS WATER INC.
202 - 1551 West 11th Avenue
Vancouver BC V6J 2B5
Contact: Ron Green

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-COL-VA	**Water**							
Batch R2321699								
WG1425931-2 CRM		**VA-ALKL-CONTROL**						
Alkalinity, Total (as CaCO3)			99.1		%		85-115	06-FEB-12
WG1425931-5 CRM		**VA-ALKM-CONTROL**						
Alkalinity, Total (as CaCO3)			95.6		%		85-115	06-FEB-12
WG1425931-8 CRM		**VA-ALKH-CONTROL**						
Alkalinity, Total (as CaCO3)			99.2		%		85-115	06-FEB-12
WG1425931-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	06-FEB-12
WG1425931-4 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	06-FEB-12
WG1425931-7 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	06-FEB-12
ANIONS-CL-IC-VA	**Water**							
Batch R2322543								
WG1425516-12 LCS								
Chloride (Cl)			99.7		%		85-115	05-FEB-12
WG1425516-2 LCS								
Chloride (Cl)			100.1		%		85-115	05-FEB-12
WG1425516-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	05-FEB-12
WG1425516-10 MB								
Chloride (Cl)			<0.50		mg/L		0.5	05-FEB-12
WG1425516-4 MB								
Chloride (Cl)			<0.50		mg/L		0.5	05-FEB-12
WG1425516-7 MB								
Chloride (Cl)			<0.50		mg/L		0.5	05-FEB-12
WG1425516-11 MS		**L1110636-1**						
Chloride (Cl)			101.2		%		75-125	05-FEB-12
WG1425516-5 MS		**L1109972-1**						
Chloride (Cl)			100.8		%		75-125	05-FEB-12
WG1425516-8 MS		**L1110916-1**						
Chloride (Cl)			102.0		%		75-125	05-FEB-12
ANIONS-F-IC-VA	**Water**							
Batch R2322543								
WG1425516-12 LCS								
Fluoride (F)			107.8		%		85-115	05-FEB-12
WG1425516-2 LCS								
Fluoride (F)			108.8		%		85-115	05-FEB-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-F-IC-VA	**Water**							
Batch R2322543								
WG1425516-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	05-FEB-12
WG1425516-10 MB								
Fluoride (F)			<0.020		mg/L		0.02	05-FEB-12
WG1425516-4 MB								
Fluoride (F)			<0.020		mg/L		0.02	05-FEB-12
WG1425516-7 MB								
Fluoride (F)			<0.020		mg/L		0.02	05-FEB-12
WG1425516-11 MS		**L1110636-1**						
Fluoride (F)			109.6		%		75-125	05-FEB-12
WG1425516-5 MS		**L1109972-1**						
Fluoride (F)			110.4		%		75-125	05-FEB-12
WG1425516-8 MS		**L1110916-1**						
Fluoride (F)			111.2		%		75-125	05-FEB-12
ANIONS-NO2-IC-VA	**Water**							
Batch R2322543								
WG1425516-12 LCS								
Nitrite (as N)			102.3		%		85-115	05-FEB-12
WG1425516-2 LCS								
Nitrite (as N)			102.7		%		85-115	05-FEB-12
WG1425516-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	05-FEB-12
WG1425516-10 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	05-FEB-12
WG1425516-4 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	05-FEB-12
WG1425516-7 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	05-FEB-12
WG1425516-11 MS		**L1110636-1**						
Nitrite (as N)			103.5		%		75-125	05-FEB-12
WG1425516-5 MS		**L1109972-1**						
Nitrite (as N)			99.4		%		75-125	05-FEB-12
WG1425516-8 MS		**L1110916-1**						
Nitrite (as N)			104.0		%		75-125	05-FEB-12
ANIONS-NO3-IC-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-NO3-IC-VA	**Water**							
Batch R2322543								
WG1425516-12 LCS								
Nitrate (as N)			100.8		%		85-115	05-FEB-12
WG1425516-2 LCS								
Nitrate (as N)			101.0		%		85-115	05-FEB-12
WG1425516-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	05-FEB-12
WG1425516-10 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	05-FEB-12
WG1425516-4 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	05-FEB-12
WG1425516-7 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	05-FEB-12
WG1425516-11 MS		**L1110636-1**						
Nitrate (as N)			102.2		%		75-125	05-FEB-12
WG1425516-5 MS		**L1109972-1**						
Nitrate (as N)			101.3		%		75-125	05-FEB-12
WG1425516-8 MS		**L1110916-1**						
Nitrate (as N)			102.9		%		75-125	05-FEB-12
ANIONS-SO4-IC-VA	**Water**							
Batch R2322543								
WG1425516-12 LCS								
Sulfate (SO4)			101.9		%		85-115	05-FEB-12
WG1425516-2 LCS								
Sulfate (SO4)			102.7		%		85-115	05-FEB-12
WG1425516-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	05-FEB-12
WG1425516-10 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	05-FEB-12
WG1425516-4 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	05-FEB-12
WG1425516-7 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	05-FEB-12
WG1425516-11 MS		**L1110636-1**						
Sulfate (SO4)			N/A	MS-B	%		-	05-FEB-12
WG1425516-5 MS		**L1109972-1**						
Sulfate (SO4)			98.1		%		75-125	05-FEB-12
WG1425516-8 MS		**L1110916-1**						
Sulfate (SO4)			104.8		%		75-125	05-FEB-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
COLOUR-TRUE-VA	**Water**							
Batch R2321704								
WG1425800-2 CRM		**VA-COL-C-25**						
Colour, True			101.5		%		85-115	06-FEB-12
WG1425800-5 CRM		**VA-COL-C-25**						
Colour, True			102.2		%		85-115	06-FEB-12
WG1425800-1 MB								
Colour, True			<5.0		CU		5	06-FEB-12
WG1425800-4 MB								
Colour, True			<5.0		CU		5	06-FEB-12
EC-PCT-VA	**Water**							
Batch R2321920								
WG1425701-9 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			98.0		%		90-110	06-FEB-12
WG1425701-1 MB								
Conductivity			<2.0		uS/cm		2	06-FEB-12
WG1425701-2 MB								
Conductivity			<2.0		uS/cm		2	06-FEB-12
WG1425701-4 MB								
Conductivity			<2.0		uS/cm		2	06-FEB-12
HAA-WP	**Water**							
Batch R2323516								
WG1427930-2 CVS								
Monobromoacetic Acid			86.2		%		50-130	09-FEB-12
Monochloroacetic Acid			85.8		%		50-130	09-FEB-12
Bromochloroacetic Acid			99.9		%		50-130	09-FEB-12
Dibromoacetic Acid			90.1		%		50-130	09-FEB-12
Dichloroacetic Acid			85.1		%		50-130	09-FEB-12
Trichloroacetic Acid			85.5		%		50-130	09-FEB-12
WG1427930-3 CVS								
Monobromoacetic Acid			87.8		%		50-130	09-FEB-12
Monochloroacetic Acid			86.6		%		50-130	09-FEB-12
Bromochloroacetic Acid			103.8		%		50-130	09-FEB-12
Dibromoacetic Acid			91.5		%		50-130	09-FEB-12
Dichloroacetic Acid			87.6		%		50-130	09-FEB-12
Trichloroacetic Acid			85.5		%		50-130	09-FEB-12
WG1427930-1 MB								
Monobromoacetic Acid			<0.0010		mg/L		0.001	09-FEB-12
Monochloroacetic Acid			<0.0050		mg/L		0.005	09-FEB-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HAA-WP	**Water**							
Batch R2323516								
WG1427930-1 MB								
Bromochloroacetic Acid			<0.0010		mg/L		0.001	09-FEB-12
Dibromoacetic Acid			<0.0010		mg/L		0.001	09-FEB-12
Dichloroacetic Acid			<0.0010		mg/L		0.001	09-FEB-12
Trichloroacetic Acid			<0.0010		mg/L		0.001	09-FEB-12
HG-DIS-CVAFS-VA	**Water**							
Batch R2320897								
WG1425127-2 LCS								
Mercury (Hg)-Dissolved			103.4		%		80-120	03-FEB-12
WG1425127-1 MB								
Mercury (Hg)-Dissolved			<0.000050		mg/L		0.00005	03-FEB-12
Batch R2321651								
WG1424626-1 MB								
Mercury (Hg)-Dissolved			<0.000050		mg/L		0.00005	06-FEB-12
HG-TOT-CVAFS-VA	**Water**							
Batch R2320897								
WG1425127-2 LCS								
Mercury (Hg)-Total			103.4		%		80-120	03-FEB-12
WG1425127-1 MB								
Mercury (Hg)-Total			<0.000050		mg/L		0.00005	03-FEB-12
MET-DIS-ICP-VA	**Water**							
Batch R2321120								
WG1424626-2 CRM		**VA-HIGH-WATRM**						
Barium (Ba)-Dissolved			99.2		%		80-120	03-FEB-12
Boron (B)-Dissolved			99.4		%		80-120	03-FEB-12
Calcium (Ca)-Dissolved			103.3		%		80-120	03-FEB-12
Iron (Fe)-Dissolved			99.1		%		80-120	03-FEB-12
Magnesium (Mg)-Dissolved			102.8		%		80-120	03-FEB-12
Sodium (Na)-Dissolved			103.2		%		80-120	03-FEB-12
Zinc (Zn)-Dissolved			96.2		%		80-120	03-FEB-12
WG1424626-1 MB								
Barium (Ba)-Dissolved			<0.010		mg/L		0.01	03-FEB-12
Boron (B)-Dissolved			<0.10		mg/L		0.1	03-FEB-12
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	03-FEB-12
Iron (Fe)-Dissolved			<0.030		mg/L		0.03	03-FEB-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-DIS-ICP-VA	**Water**							
Batch R2321120								
WG1424626-1 MB								
Magnesium (Mg)-Dissolved			<0.10		mg/L		0.1	03-FEB-12
Sodium (Na)-Dissolved			<2.0		mg/L		2	03-FEB-12
Zinc (Zn)-Dissolved			<0.0050		mg/L		0.005	03-FEB-12
MET-DIS-LOW-MS-VA	**Water**							
Batch R2321438								
WG1424626-1 MB								
Aluminum (Al)-Dissolved			<0.0030		mg/L		0.003	03-FEB-12
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	03-FEB-12
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	03-FEB-12
Cadmium (Cd)-Dissolved			<0.000050		mg/L		0.00005	03-FEB-12
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	03-FEB-12
Copper (Cu)-Dissolved			<0.00050		mg/L		0.0005	03-FEB-12
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	03-FEB-12
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	03-FEB-12
Potassium (K)-Dissolved			<0.050		mg/L		0.05	03-FEB-12
Selenium (Se)-Dissolved			<0.0010		mg/L		0.001	03-FEB-12
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	03-FEB-12
MET-TOT-ICP-VA	**Water**							
Batch R2321172								
WG1425230-4 CRM		**VA-HIGH-WATRM**						
Barium (Ba)-Total			99.4		%		80-120	04-FEB-12
Boron (B)-Total			99.5		%		80-120	04-FEB-12
Calcium (Ca)-Total			100.5		%		80-120	04-FEB-12
Iron (Fe)-Total			98.7		%		80-120	04-FEB-12
Magnesium (Mg)-Total			101.2		%		80-120	04-FEB-12
Sodium (Na)-Total			105.7		%		80-120	04-FEB-12
Zinc (Zn)-Total			93.8		%		80-120	04-FEB-12
WG1425230-1 MB								
Barium (Ba)-Total			<0.010		mg/L		0.01	04-FEB-12
Boron (B)-Total			<0.10		mg/L		0.1	04-FEB-12
Calcium (Ca)-Total			<0.050		mg/L		0.05	04-FEB-12
Iron (Fe)-Total			<0.030		mg/L		0.03	04-FEB-12
Magnesium (Mg)-Total			<0.10		mg/L		0.1	04-FEB-12
Sodium (Na)-Total			<2.0		mg/L		2	04-FEB-12
Zinc (Zn)-Total			<0.0050		mg/L		0.005	04-FEB-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TOT-LOW-MS-VA	**Water**							
Batch R2321687								
WG1425230-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	06-FEB-12
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	06-FEB-12
Arsenic (As)-Total			<0.00010		mg/L		0.0001	06-FEB-12
Cadmium (Cd)-Total			<0.000050		mg/L		0.00005	06-FEB-12
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	06-FEB-12
Copper (Cu)-Total			<0.00050		mg/L		0.0005	06-FEB-12
Lead (Pb)-Total			<0.000050		mg/L		0.00005	06-FEB-12
Manganese (Mn)-Total			<0.000050		mg/L		0.00005	06-FEB-12
Potassium (K)-Total			<0.050		mg/L		0.05	06-FEB-12
Selenium (Se)-Total			<0.0010		mg/L		0.001	06-FEB-12
Uranium (U)-Total			<0.000010		mg/L		0.00001	06-FEB-12
PH-PCT-VA	**Water**							
Batch R2321920								
WG1425701-10 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	06-FEB-12
TDS-VA	**Water**							
Batch R2323289								
WG1426629-3 DUP		**L1109972-1**						
Total Dissolved Solids		193	193		mg/L	0.0	20	07-FEB-12
WG1426629-11 LCS								
Total Dissolved Solids			97.6		%		85-115	07-FEB-12
WG1426629-2 LCS								
Total Dissolved Solids			104.5		%		85-115	07-FEB-12
WG1426629-5 LCS								
Total Dissolved Solids			105.6		%		85-115	07-FEB-12
WG1426629-8 LCS								
Total Dissolved Solids			106.6		%		85-115	07-FEB-12
WG1426629-1 MB								
Total Dissolved Solids			<10		mg/L		10	07-FEB-12
WG1426629-10 MB								
Total Dissolved Solids			<10		mg/L		10	07-FEB-12
WG1426629-4 MB								
Total Dissolved Solids			<10		mg/L		10	07-FEB-12
WG1426629-7 MB								
Total Dissolved Solids			<10		mg/L		10	07-FEB-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-VA	**Water**							
Batch R2321703								
WG1425799-2 CRM		**VA-TURB-SPK-8**						
Turbidity			109.5		%		85-115	06-FEB-12
WG1425799-5 CRM		**VA-TURB-SPK-8**						
Turbidity			108.9		%		85-115	06-FEB-12
WG1425799-1 MB								
Turbidity			<0.10		NTU		0.1	06-FEB-12
WG1425799-4 MB								
Turbidity			<0.10		NTU		0.1	06-FEB-12
VOC-HSMS-VA	**Water**							
Batch R2323725								
WG1428379-2 LCS								
Bromodichloromethane			99.4		%		70-130	10-FEB-12
Bromoform			87.3		%		70-130	10-FEB-12
Carbon Tetrachloride			117.5		%		70-130	10-FEB-12
Chlorobenzene			103.9		%		70-130	10-FEB-12
Dibromochloromethane			96.9		%		70-130	10-FEB-12
Chloroethane			100.0		%		60-140	10-FEB-12
Chloroform			107.1		%		70-130	10-FEB-12
Chloromethane			105.4		%		60-140	10-FEB-12
1,2-Dichlorobenzene			103.0		%		70-130	10-FEB-12
1,3-Dichlorobenzene			113.5		%		70-130	10-FEB-12
1,4-Dichlorobenzene			109.9		%		70-130	10-FEB-12
1,1-Dichloroethane			104.3		%		70-130	10-FEB-12
1,2-Dichloroethane			91.4		%		70-130	10-FEB-12
1,1-Dichloroethylene			109.5		%		70-130	10-FEB-12
cis-1,2-Dichloroethylene			104.4		%		70-130	10-FEB-12
trans-1,2-Dichloroethylene			107.7		%		70-130	10-FEB-12
Dichloromethane			95.5		%		60-140	10-FEB-12
1,2-Dichloropropane			99.1		%		70-130	10-FEB-12
cis-1,3-Dichloropropylene			88.6		%		70-130	10-FEB-12
trans-1,3-Dichloropropylene			87.6		%		70-130	10-FEB-12
1,1,1,2-Tetrachloroethane			109.6		%		70-130	10-FEB-12
1,1,2,2-Tetrachloroethane			78.6		%		70-130	10-FEB-12
Tetrachloroethylene			113.0		%		70-130	10-FEB-12
1,1,1-Trichloroethane			118.3		%		70-130	10-FEB-12
1,1,2-Trichloroethane			90.9		%		70-130	10-FEB-12

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HSMS-VA	**Water**							
Batch R2323725								
WG1428379-2 LCS								
Trichloroethylene			109.2		%		70-130	10-FEB-12
Trichlorofluoromethane			123.2		%		60-140	10-FEB-12
Vinyl Chloride			105.3		%		60-140	10-FEB-12
WG1428379-1 MB								
Bromodichloromethane			<0.0010		mg/L		0.001	10-FEB-12
Bromoform			<0.0010		mg/L		0.001	10-FEB-12
Carbon Tetrachloride			<0.00050		mg/L		0.0005	10-FEB-12
Chlorobenzene			<0.0010		mg/L		0.001	10-FEB-12
Dibromochloromethane			<0.0010		mg/L		0.001	10-FEB-12
Chloroethane			<0.0010		mg/L		0.001	10-FEB-12
Chloroform			<0.0010		mg/L		0.001	10-FEB-12
Chloromethane			<0.0050		mg/L		0.005	10-FEB-12
1,2-Dichlorobenzene			<0.00070		mg/L		0.0007	10-FEB-12
1,3-Dichlorobenzene			<0.0010		mg/L		0.001	10-FEB-12
1,4-Dichlorobenzene			<0.0010		mg/L		0.001	10-FEB-12
1,1-Dichloroethane			<0.0010		mg/L		0.001	10-FEB-12
1,2-Dichloroethane			<0.0010		mg/L		0.001	10-FEB-12
1,1-Dichloroethylene			<0.0010		mg/L		0.001	10-FEB-12
cis-1,2-Dichloroethylene			<0.0010		mg/L		0.001	10-FEB-12
trans-1,2-Dichloroethylene			<0.0010		mg/L		0.001	10-FEB-12
Dichloromethane			<0.0050		mg/L		0.005	10-FEB-12
1,2-Dichloropropane			<0.0010		mg/L		0.001	10-FEB-12
cis-1,3-Dichloropropylene			<0.0010		mg/L		0.001	10-FEB-12
trans-1,3-Dichloropropylene			<0.0010		mg/L		0.001	10-FEB-12
1,1,1,2-Tetrachloroethane			<0.0010		mg/L		0.001	10-FEB-12
1,1,2,2-Tetrachloroethane			<0.0010		mg/L		0.001	10-FEB-12
Tetrachloroethylene			<0.0010		mg/L		0.001	10-FEB-12
1,1,1-Trichloroethane			<0.0010		mg/L		0.001	10-FEB-12
1,1,2-Trichloroethane			<0.0010		mg/L		0.001	10-FEB-12
Trichloroethylene			<0.0010		mg/L		0.001	10-FEB-12
Trichlorofluoromethane			<0.0010		mg/L		0.001	10-FEB-12
Vinyl Chloride			<0.0010		mg/L		0.001	10-FEB-12
VOC7-HSMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC7-HSMS-VA	**Water**							
Batch R2323725								
WG1428379-2 LCS								
Benzene			102.9		%		70-130	10-FEB-12
Ethylbenzene			111.8		%		70-130	10-FEB-12
Methyl t-butyl ether (MTBE)			102.3		%		70-130	10-FEB-12
Styrene			106.1		%		70-130	10-FEB-12
Toluene			106.5		%		70-130	10-FEB-12
meta- & para-Xylene			113.1		%		70-130	10-FEB-12
ortho-Xylene			110.2		%		70-130	10-FEB-12
WG1428379-1 MB								
Benzene			<0.00050		mg/L		0.0005	10-FEB-12
Ethylbenzene			<0.00050		mg/L		0.0005	10-FEB-12
Methyl t-butyl ether (MTBE)			<0.00050		mg/L		0.0005	10-FEB-12
Styrene			<0.00050		mg/L		0.0005	10-FEB-12
Toluene			<0.00050		mg/L		0.0005	10-FEB-12
meta- & para-Xylene			<0.00050		mg/L		0.0005	10-FEB-12
ortho-Xylene			<0.00050		mg/L		0.0005	10-FEB-12

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Colour (True) by Spectrometer							
	1	30-JAN-12 11:30	06-FEB-12 08:45	3	7	days	EHTL
	2	30-JAN-12 10:45	06-FEB-12 08:45	3	7	days	EHTL
Total Dissolved Solids by Gravimetric							
	1	30-JAN-12 11:30	07-FEB-12 23:40	7	9	days	EHT
	2	30-JAN-12 10:45	07-FEB-12 23:40	7	9	days	EHT
Turbidity by Meter							
	1	30-JAN-12 11:30	06-FEB-12 08:45	3	7	days	EHTL
	2	30-JAN-12 10:45	06-FEB-12 08:45	3	7	days	EHTL
pH by Meter (Automated)							
	1	30-JAN-12 11:30	06-FEB-12 13:24	0.25	170	hours	EHTR-FM
	2	30-JAN-12 10:45	06-FEB-12 13:24	0.25	171	hours	EHTR-FM
Anions and Nutrients							
Nitrate in Water by Ion Chromatography							
	1	30-JAN-12 11:30	05-FEB-12 08:52	3	6	days	EHTL
	2	30-JAN-12 10:45	05-FEB-12 08:52	3	6	days	EHTL
Nitrite in Water by Ion Chromatography							
	1	30-JAN-12 11:30	05-FEB-12 08:52	3	6	days	EHTL
	2	30-JAN-12 10:45	05-FEB-12 08:52	3	6	days	EHTL

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1109972 were received on 01-FEB-12 15:00.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

CANADA TOLL FREE 1-800-668-9878

www.alsenviro.com

L110 9972-COFC

REPORT TO:		REPORT FORMAT / DISTRIBUTION	
COMPANY:	Wireless Water Inc.	HARDCOPY:	NO YES
CONTACT:	Ron Green	ELECTRONIC	STD PDF, Excel, WW
ADDRESS:	# 202 - 1551 West 11th Avenue	EMAIL 1:	ron.green@wirelesswater.com
CITY/ PROV	Vancouver, BC V6J 2B5	EMAIL 2:	support@wirelesswater.com
PHONE: 640-785-5804			
INVOICE TO: SAME AS REPORT ? YES / NO			
COMPANY:	Wireless Water Inc.	**CLIENT / PROJECT INFORMATION:**	
CONTACT:	Accounts Payable	JOB #:	AANDC Yukon DW
ADDRESS:	# 202 - 1551 West 11th Avenue	PO /AFE:	
CITY/ PROV	Vancouver, BC V6J 2B5	Legal Site Description:	
PHONE: 640-785-5804	FAX	QUOTE #:	Q31474
Lab Work Order # (lab use only)	L110 9972	ALS CONTACT	Dean Watt

S
R
P
E
OTHER (ST DAT / WEEKEND) - CONTACT ALS

X

ANALYSIS REQUEST

Please indicate below Filtered. Preserved or both (F, P, F/P)

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE (dd-mmm-yy)	TIME (hh:mm)	SAMPLE TYPE	FULL-TOT-DW-VA	MET-DIS-DW-VA (F/P)	VOC+MTBE-WATER-VA (P)	HAA-WP (P)	NUMBER OF CONTAINERS
	~~WRFN Administration Building~~								
	WRFN Water System #1 Treated	30-Jan-12	11:30	Water	✓	✓	✓	✓	7
	WRFN Water System #1 ~~Well 1 Raw~~ Well 1 raw	30-Jan-12	10:45	Water	✓	✓			
	~~WRFN Water System #2 Treated~~								
	~~WRFN Water System #2 Well 2 Raw~~								

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

Total metals were preserved.

Failure to complete all portions of this form may delay analysis. Please fill in this form *LEGIBLY*. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified below.

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
Eileen Feb1/12	1500	A. JAN IN	15:00
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION (lab use only)

TEMPERATURE	SAMPLES RECEIVED IN GOOD CONDITION ?
4.1	If NO, Explain

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Report Transmission Cover Page

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

Contact & Affiliation	Address	Delivery Commitments
Ryan Martin EBA Engineering Consultants Ltd -	Unit 6, 151 Industrial Road Whitehorse, Yukon Territory Y1A 2V3 Phone: (867) 668-3068 Fax: (867) 668-4349 Email: rmartin@eba.ca	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (Test Report, COC) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report
Sarah Sternbergh EBA Engineering Consultants Ltd -	Unit 6, 151 Industrial Road, Calcite Business Centre Whitehorse, Yukon Territory Y1A 2V3 Phone: (867) 668-3068 Fax: (867) 668-4349 Email: ssternbergh@eba.ca	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report
Ingrid Fuller EBA Engineering Consultants Ltd -	Unit 6, 151 Industrial Road, Calcite Business Centre Whitehorse, Yukon Territory Y1A 2V3 Phone: (867) 668-2071 Fax: (867) 668-4349 Email: ifuller@eba.ca	On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report

Notes To Clients:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

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Sample Custody

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

Sample Disposal Date: February 21, 2013

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	$ 2.50 per sample
Storage for an additional 60 days	$ 5.00 per sample
Storage for an additional 90 days	$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ DHL
- ☐ Purolator
- ☐ Other (specify) _____

Name _____
Company _____
Address _____
_____
Phone _____
Fax _____

Signature _____

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Analytical Report

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

Reference Number	906246-1	906246-2	
Sample Date	Nov 14, 2012	Nov 14, 2012	
Sample Time	NA	NA	
Sample Location	WRFN	WRFN	
Sample Description	System 2 Well 1	System 2 Well 2	
Matrix	Water	Water	

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Extractable Petroleum Hydrocarbons - Water						
EPHw10-19		ug/L	<100	<100		100
EPHw19-32		ug/L	<100	<100		100
LEPHw		ug/L	<100	<100		100
HEPHw		ug/L	<100	<100		100
Polycyclic Aromatic Hydrocarbons - Water						
Acenaphthene		ug/L	<0.1	<0.1		0.1
Acenaphthylene		ug/L	<0.1	<0.1		0.1
Acridine		ug/L	<0.05	<0.05		0.05
Anthracene		ug/L	<0.1	<0.1		0.1
Benzo(a)anthracene		ug/L	<0.01	<0.01		0.01
Benzo(a)pyrene		ug/L	<0.01	<0.01		0.01
Benzo(b)fluoranthene		ug/L	<0.01	<0.01		0.01
Benzo(g,h,i)perylene		ug/L	<0.1	<0.1		0.1
Benzo(k)fluoranthene		ug/L	<0.02	<0.02		0.02
Chrysene		ug/L	<0.1	<0.1		0.1
Dibenzo(a,h)anthracene		ug/L	<0.01	<0.01		0.01
Fluoranthene		ug/L	<0.1	<0.1		0.1
Fluorene		ug/L	<0.1	<0.1		0.1
Indeno(1,2,3-c,d)pyrene		ug/L	<0.1	<0.1		0.1
Naphthalene		ug/L	<0.1	<0.1		0.1
Phenanthrene		ug/L	<0.1	<0.1		0.1
Pyrene		ug/L	<0.02	<0.02		0.02
Quinoline		ug/L	<0.34	<0.34		0.34
PAH - Water - Surrogate Recovery						
2-Fluorobiphenyl	PAH - Surrogate	%	99	104		50-130
p-Terphenyl-d14	PAH - Surrogate	%	102	105		60-130
Naphthalene-d8	PAH - Surrogate	%	89	93		50-130

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Analytical Report

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

		Reference Number	906246-1	906246-2	906246-3	
		Sample Date	Nov 14, 2012	Nov 14, 2012	Nov 14, 2012	
		Sample Time	NA	NA	NA	
		Sample Location	WRFN	WRFN	WRFN	
		Sample Description	System 2 Well 1	System 2 Well 2	2-Treated	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Extractable						
Aluminum	Extractable	mg/L	<0.005	<0.005	<0.005	0.005
Antimony	Extractable	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	Extractable	mg/L	0.0005	0.0005	0.0004	0.0002
Barium	Extractable	mg/L	0.040	0.037	0.037	0.001
Boron	Extractable	mg/L	0.030	0.027	0.024	0.005
Cadmium	Extractable	mg/L	<0.00007	<0.00007	<0.00007	0.00007
Chromium	Extractable	mg/L	0.0018	0.0017	0.0016	0.0005
Copper	Extractable	mg/L	0.002	0.001	0.030	0.001
Lead	Extractable	mg/L	<0.0001	<0.0001	0.0001	0.0001
Selenium	Extractable	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Uranium	Extractable	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Vanadium	Extractable	mg/L	0.0008	0.0008	0.0008	0.0001
Zinc	Extractable	mg/L	0.004	0.002	0.016	0.001
Metals Total						
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Physical and Aggregate Properties						
Turbidity		NTU	0.2	0.1	<0.1	0.1
Colour	Apparent	Colour units	<5	<5	<5	5
Routine Water						
pH	at 25 °C		7.50	7.52	7.70	
Electrical Conductivity		µS/cm at 25 C	353	353	362	1
Calcium	Extractable	mg/L	64.3	63.2	61.0	0.1
Iron	Extractable	mg/L	<0.005	<0.005	<0.005	0.005
Magnesium	Extractable	mg/L	8.78	8.58	8.50	0.1
Manganese	Extractable	mg/L	<0.001	<0.001	<0.001	0.001
Potassium	Extractable	mg/L	1.2	1.2	1.2	0.1
Silicon	Extractable	mg/L	6.16	6.18	6.21	0.05
Sodium	Extractable	mg/L	3.6	3.4	4.2	0.1
Bicarbonate		mg/L	207	206	208	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	170	169	170	5
Chloride	Dissolved	mg/L	1.57	1.57	2.35	0.05
Fluoride	Dissolved	mg/L	0.05	0.05	0.05	0.01
Nitrate - N	Dissolved	mg/L	0.77	0.77	0.77	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01

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Analytical Report

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

		Reference Number	906246-1	906246-2	906246-3	
		Sample Date	Nov 14, 2012	Nov 14, 2012	Nov 14, 2012	
		Sample Time	NA	NA	NA	
		Sample Location	WRFN	WRFN	WRFN	
		Sample Description	System 2 Well 1	System 2 Well 2	2-Treated	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water - Continued						
Sulfate (SO4)	Dissolved	mg/L	29.1	29.1	29.1	0.5
Hardness	as CaCO3	mg/L	197	193	187	1
Total Dissolved Solids	Extractable	mg/L	231	229	229	1

Approved by:

Mathieu Simoneau
Operations Manager

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Quality Control

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

Metals Extractable

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	ug/L	0.187	-9.990	9.990	yes
Antimony	ug/L	-0.009	-0.4020	0.4020	yes
Arsenic	ug/L	-0.072	-0.5010	0.5010	yes
Barium	ug/L	-0.083	-0.990	0.990	yes
Boron	ug/L	23.43	-4.001	6.001	yes
Cadmium	ug/L	-0.011	-0.06000	0.06000	yes
Chromium	ug/L	-0.01	-0.4980	0.4980	yes
Copper	ug/L	-0.001	-0.990	0.990	yes
Lead	ug/L	-0.056	-0.0990	0.0990	yes
Selenium	ug/L	-0.237	-2.0010	2.0010	yes
Uranium	ug/L	0.003	-0.5010	0.5010	yes
Vanadium	ug/L	-0.182	-0.30000	0.30000	yes
Zinc	ug/L	0.011	-5.370	5.370	yes
Date Acquired:	November 19, 2012				
Aluminum	ug/L	0	-5.010	5.010	yes
Antimony	ug/L	0	-0.2010	0.2010	yes
Arsenic	ug/L	0	-0.2010	0.2010	yes
Barium	ug/L	0	-0.990	0.990	yes
Boron	ug/L	0	-5.010	5.010	yes
Cadmium	ug/L	0	-0.06990	0.06990	yes
Chromium	ug/L	0	-0.5010	0.5010	yes
Copper	ug/L	0	-0.990	0.990	yes
Lead	ug/L	0	-0.0900	0.0900	yes
Selenium	ug/L	0	-0.6000	0.6000	yes
Uranium	ug/L	0	-0.5010	0.5010	yes
Vanadium	ug/L	0	-0.09000	0.09000	yes
Zinc	ug/L	0	-0.990	0.990	yes
Date Acquired:	November 19, 2012				

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Aluminum	ug/L	107.56	70	130	yes
Antimony	ug/L	93.36	85	115	yes
Arsenic	ug/L	104.12	90	110	yes
Barium	ug/L	94.86	90	110	yes
Boron	ug/L	97.80	70	130	yes
Cadmium	ug/L	102.96	90	110	yes
Chromium	ug/L	105.26	90	110	yes
Copper	ug/L	100.24	90	110	yes
Lead	ug/L	103.12	90	110	yes
Selenium	ug/L	105.56	90	110	yes
Uranium	ug/L	103.38	85	115	yes
Vanadium	ug/L	103.36	90	110	yes
Zinc	ug/L	95.14	90	110	yes

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Quality Control

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

Metals Extractable - Continued

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Date Acquired:	November 19, 2012				

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Aluminum	mg/L	0.302	0.300	0.256	0.344	yes
Antimony	mg/L	0.0730	0.0750	0.0558	0.0942	yes
Arsenic	mg/L	0.0642	0.0649	0.0529	0.0769	yes
Barium	mg/L	0.188	0.200	0.182	0.218	yes
Boron	mg/L	0.074	0.087	0.070	0.104	yes
Cadmium	mg/L	0.0554	0.05803	0.04963	0.06643	yes
Chromium	mg/L	0.0652	0.0675	0.0558	0.0792	yes
Copper	mg/L	0.054	0.057	0.052	0.061	yes
Lead	mg/L	0.156	0.1527	0.1305	0.1749	yes
Selenium	mg/L	0.112	0.1099	0.0856	0.1342	yes
Vanadium	mg/L	0.748	0.75000	0.66390	0.83610	yes
Zinc	mg/L	0.118	0.130	0.115	0.145	yes
Date Acquired:	November 19, 2012					

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Aluminum	mg/L	<0.005	<0.005	15	200.000	yes
Antimony	mg/L	<0.0002	<0.0002	15	0.5000	yes
Arsenic	mg/L	<0.0002	0.0002	15	0.5000	yes
Barium	mg/L	0.519	0.517	15	0.500	yes
Boron	mg/L	0.112	0.114	20	2.000	yes
Cadmium	mg/L	<0.00007	<0.00007	10	0.10000	yes
Chromium	mg/L	0.0023	0.0027	15	0.5000	yes
Copper	mg/L	0.007	0.007	15	0.500	yes
Lead	mg/L	0.0017	0.0016	10	0.1000	yes
Selenium	mg/L	<0.0006	<0.0006	10	0.5000	yes
Uranium	mg/L	<0.0005	<0.0005	10	0.0500	yes
Vanadium	mg/L	0.0005	0.0006	15	0.50000	yes
Zinc	mg/L	0.013	0.012	15	0.100	yes
Date Acquired:	November 19, 2012					

Metals Total

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Mercury	ng/L	-1.7	-9.990	9.990	yes
Date Acquired:	November 21, 2012				

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Mercury	ng/L	100.80	85	115	yes
Date Acquired:	November 21, 2012				

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Quality Control

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

Metals Total - Continued

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Mercury	ug/L	0.197	0.241	0.211	0.271	yes
Date Acquired:	November 21, 2012					

Physical and Aggregate Properties

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	0.2	0.2	24	0.2	yes
Colour	Colour units	38	36	20	10	yes
Date Acquired:	November 20, 2012					

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Turbidity	NTU	4.6	4.1	5.5	yes
Date Acquired:	November 19, 2012				
Colour	Colour units	25	20	30	yes
Date Acquired:	November 20, 2012				

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	-0.0013	-0.08	0.10	yes
Iron	mg/L	0.001	-0.005	0.005	yes
Magnesium	mg/L	0.0045	-0.06	0.06	yes
Manganese	mg/L	-0.0012	-0.010	0.002	yes
Phosphorus	mg/L	0.0059	-0.03	0.03	yes
Potassium	mg/L	0.007	-0.6	0.6	yes
Silicon	mg/L	-0.0196	-2.55	3.15	yes
Sodium	mg/L	-0.0003	-0.2	0.2	yes
Date Acquired:	November 19, 2012				
Calcium	mg/L	-0.0121	-0.10	0.10	yes
Iron	mg/L	-0.007	-0.005	0.005	yes
Magnesium	mg/L	-0.0115	-0.10	0.10	yes
Manganese	mg/L	-0.0004	-0.001	0.001	yes
Phosphorus	mg/L	-0.0047	-0.01	0.01	yes
Potassium	mg/L	0.0005	-0.1	0.1	yes
Silicon	mg/L	-0.0041	-0.05	0.05	yes
Sodium	mg/L	0.0004	-0.1	0.1	yes
Date Acquired:	November 19, 2012				
Chloride	mg/L	0.00628266	-0.20	0.20	yes
Fluoride	mg/L	0.0132147	-0.10	0.10	yes
Nitrate - N	mg/L	0	-0.03	0.03	yes
Nitrite - N	mg/L	0	-0.10	0.10	yes
Sulfate (SO4)	mg/L	0	-1.0	1.0	yes

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Quality Control

Bill To: EBA Engineering Consultants
Report To: EBA Engineering Consultants
Unit 6, 151 Industrial Road
Whitehorse, YT, Canada
Y1A 2V3
Attn: Ryan Martin
Sampled By: Ryan Martin
Company: EBA

Project:
ID: W23103022-01
Name: White River First Nation
Location: White River First Nation System
LSD:
P.O.:
Acct code:

Lot ID: **906246**
Control Number:
Date Received: Nov 16, 2012
Date Reported: Nov 23, 2012
Report Number: 1786173

Routine Water - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Date Acquired:	November 17, 2012				

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	94.17	85	115	yes
Fluoride	mg/L	104.38	85	115	yes
Nitrate - N	mg/L	94.99	85	115	yes
Nitrite - N	mg/L	95.36	90	110	yes
Sulfate (SO4)	mg/L	97.34	85	115	yes
Date Acquired:	November 17, 2012				
Calcium	mg/L		91	109	yes
Iron	mg/L	98.90	90	110	yes
Magnesium	mg/L	102.33	91	109	yes
Manganese	mg/L	107.60	90	110	yes
Phosphorus	mg/L	98.98	90	110	yes
Potassium	mg/L	106.08	90	110	yes
Silicon	mg/L	101.22	80	120	yes
Sodium	mg/L	95.82	90	110	yes
Date Acquired:	November 19, 2012				
Chloride	mg/L	99.39	85	105	yes
Fluoride	mg/L	98.56	89	109	yes
Nitrate - N	mg/L	97.42	88	108	yes
Nitrite - N	mg/L	101.85	99	119	yes
Sulfate (SO4)	mg/L	100.35	90	110	yes
Date Acquired:	November 17, 2012				

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
T-Alkalinity	mg/L	9	10	8	12	yes
Date Acquired:	November 19, 2012					
Calcium	mg/L	1.54	1.51	1.31	1.72	yes
Iron	mg/L	0.323	0.319	0.279	0.359	yes
Magnesium	mg/L	1.01	1.00	0.86	1.14	yes
Manganese	mg/L	0.382	0.374	0.340	0.408	yes
Potassium	mg/L	0.6	0.6	0.5	0.7	yes
Sodium	mg/L	0.9	0.9	0.8	1.0	yes
Date Acquired:	November 19, 2012					
Nitrite - N	mg/L	0.25	0.25	0.21	0.29	yes
Date Acquired:	November 17, 2012					

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Calcium	mg/L	36.7	36.2	30	1.00	yes
Iron	mg/L	0.257	0.254	30	0.100	yes
Magnesium	mg/L	11.5	11.3	30	1.00	yes

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Quality Control

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

Routine Water - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Manganese	mg/L	0.088	0.086	30	0.015	yes
Phosphorus	mg/L	0.02	<0.01	30	0.15	yes
Potassium	mg/L	1.6	1.5	30	5.0	yes
Silicon	mg/L	8.53	8.49	30	0.15	yes
Sodium	mg/L	83.9	81.3	30	1.5	yes
Date Acquired:	November 19, 2012					
pH		7.15	7.03	2		yes
Electrical Conductivity	dS/m at 25 C	0.200	0.202	10	0.005	yes
Bicarbonate	mg/L	110	109	10	10	yes
Carbonate	mg/L	<6	<6	10	10	yes
Hydroxide	mg/L	<5	<5	10	10	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	90	89	10	5	yes
Chloride	mg/L	1.57	1.59	15	0.25	yes
Fluoride	mg/L	0.05	0.05	15	0.50	yes
Nitrate - N	mg/L	0.77	0.76	15	0.05	yes
Nitrite - N	mg/L	<0.01	<0.01	15	0.50	yes
Sulfate (SO4)	mg/L	29.1	29.0	15	0.5	yes
Date Acquired:	November 17, 2012					

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Chloride	mg/L	1.24	1.28	6	0.01	yes
Fluoride	mg/L	0.21	0.20	6	0.01	yes
Nitrate - N	mg/L	0.28	0.29	12	0.05	yes
Nitrite - N	mg/L	0.29	0.30	6	0.01	yes
Sulfate (SO4)	mg/L	4.4	4.4	6	0.0	yes
Date Acquired:	November 17, 2012					

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
pH		9.87	9.17	10.81	yes
Electrical Conductivity	µS/cm at 25 C	180	165	243	yes
P-Alkalinity	mg/L	33	7	55	yes
T-Alkalinity	mg/L	89	90	101	yes
Date Acquired:	November 19, 2012				
pH		4.04	3.88	4.12	yes
Date Acquired:	November 19, 2012				
pH		8.01	7.88	8.12	yes
Date Acquired:	November 19, 2012				
Electrical Conductivity	µS/cm at 25 C	8	0	2	yes
Date Acquired:	November 19, 2012				
Electrical Conductivity	µS/cm at 25 C	1390	1323	1503	yes

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Quality Control

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Date Acquired:	November 19, 2012				
Electrical Conductivity	µS/cm at 25 C	<1	-2	2	yes
Date Acquired:	November 19, 2012				

Extractable Petroleum Hydrocarbons - Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
EPHw10-19	ug/mL	0	-100	100	yes
EPHw19-32	ug/mL	0	-100	100	yes
Date Acquired:	November 21, 2012				

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
EPHw10-19	ug/mL	101.82	85	115	yes
EPHw19-32	ug/mL	100.61	85	115	yes
Date Acquired:	November 21, 2012				

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
EPHw10-19	ug/L	2550	2430	40	500	yes
EPHw19-32	ug/L	2460	2350	40	500	yes
Date Acquired:	November 21, 2012					

Matrix Spike	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
EPHw10-19	ug/L	100	79	128	yes
EPHw19-32	ug/L	99	70	122	yes
Date Acquired:	November 21, 2012				

Polycyclic Aromatic Hydrocarbons - Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Acenaphthene	ng/mL	0	-0.1	0.1	yes
Acenaphthylene	ng/mL	0	-0.1	0.1	yes
Acridine	ng/mL	0	-0.05	0.05	yes
Anthracene	ng/mL	0	-0.1	0.1	yes
Benzo(a)anthracene	ng/mL	0	-0.01	0.01	yes
Benzo(a)pyrene	ng/mL	0	-0.01	0.01	yes
Benzo(b)fluoranthene	ng/mL	0	-0.01	0.01	yes
Benzo(g,h,i)perylene	ng/mL	0	-0.1	0.1	yes
Benzo(k)fluoranthene	ng/mL	0	-0.01	0.01	yes
Chrysene	ng/mL	0.00423	-0.1	0.1	yes
Dibenzo(a,h)anthracene	ng/mL	0	-0.01	0.01	yes
Fluoranthene	ng/mL	0	-0.1	0.1	yes

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Quality Control

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

Polycyclic Aromatic Hydrocarbons - Water - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Fluorene	ng/mL	0	-0.1	0.1	yes
Indeno(1,2,3-c,d)pyrene	ng/mL	0	-0.1	0.1	yes
Naphthalene	ng/mL	0	-0.1	0.1	yes
Phenanthrene	ng/mL	0.00344	-0.1	0.1	yes
Pyrene	ng/mL	0	-0.02	0.02	yes
Quinoline	ng/mL	0.0028	-0.34	0.34	yes

Date Acquired: November 21, 2012

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Acenaphthene	ng/mL	100.67	80	120	yes
Acenaphthylene	ng/mL	101.22	80	120	yes
Acridine	ng/mL	98.70	80	120	yes
Anthracene	ng/mL	101.84	80	120	yes
Benzo(a)anthracene	ng/mL	100.26	80	120	yes
Benzo(a)pyrene	ng/mL	102.50	80	120	yes
Benzo(b)fluoranthene	ng/mL	101.54	80	120	yes
Benzo(g,h,i)perylene	ng/mL	111.54	80	120	yes
Benzo(k)fluoranthene	ng/mL	99.71	80	120	yes
Chrysene	ng/mL	101.85	80	120	yes
Dibenzo(a,h)anthracene	ng/mL	105.35	80	120	yes
Fluoranthene	ng/mL	100.54	80	120	yes
Fluorene	ng/mL	101.41	80	120	yes
Indeno(1,2,3-c,d)pyrene	ng/mL	109.74	80	120	yes
Naphthalene	ng/mL	102.42	80	120	yes
Phenanthrene	ng/mL	100.48	80	120	yes
Pyrene	ng/mL	99.64	80	120	yes
Quinoline	ng/mL	101.60	80	120	yes

Date Acquired: November 21, 2012

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Acenaphthene	ug/L	<0.1	<0.1	60	0.5	yes
Acenaphthylene	ug/L	<0.1	<0.1	60	0.5	yes
Acridine	ug/L	0.07	0.08	60	0.25	yes
Anthracene	ug/L	<0.1	<0.1	60	0.5	yes
Benzo(a)anthracene	ug/L	0.08	0.09	60	0.05	yes
Benzo(a)pyrene	ug/L	0.07	0.08	60	0.05	yes
Benzo(b)fluoranthene	ug/L	0.08	0.09	60	0.05	yes
Benzo(g,h,i)perylene	ug/L	<0.1	<0.1	60	0.5	yes
Benzo(k)fluoranthene	ug/L	0.08	0.10	60	0.05	yes
Chrysene	ug/L	<0.1	<0.1	60	0.5	yes
Dibenzo(a,h)anthracene	ug/L	0.09	0.08	60	0.05	yes
Fluoranthene	ug/L	<0.1	<0.1	60	0.5	yes

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Quality Control

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Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

Polycyclic Aromatic Hydrocarbons - Water - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Fluorene	ug/L	<0.1	0.1	60	0.5	yes
Indeno(1,2,3-c,d)pyrene	ug/L	<0.1	<0.1	60	0.5	yes
Naphthalene	ug/L	<0.1	<0.1	60	0.5	yes
Phenanthrene	ug/L	<0.1	<0.1	60	0.5	yes
Pyrene	ug/L	0.08	0.08	60	0.10	yes
Quinoline	ug/L	<0.34	<0.34	60	1.70	yes

Date Acquired: November 21, 2012

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Acenaphthene	ug/L	79.5	50.0	130.0	yes
Acenaphthylene	ug/L	77.6	50.0	130.0	yes
Acridine	ug/L	73.3	50.01	129.99	yes
Anthracene	ug/L	77.3	50.0	130.0	yes
Benzo(a)anthracene	ug/L	81.2	50.01	129.99	yes
Benzo(a)pyrene	ug/L	72.6	50.01	129.99	yes
Benzo(b)fluoranthene	ug/L	79.0	50.01	129.99	yes
Benzo(g,h,i)perylene	ug/L	90.9	50.0	130.0	yes
Benzo(k)fluoranthene	ug/L	84.0	50.01	129.99	yes
Chrysene	ug/L	90.8	50.0	130.0	yes
Dibenzo(a,h)anthracene	ug/L	90.4	50.01	129.99	yes
Fluoranthene	ug/L	84.2	50.0	130.0	yes
Fluorene	ug/L	94.4	50.0	130.0	yes
Indeno(1,2,3-c,d)pyrene	ug/L	90.2	50.0	130.0	yes
Naphthalene	ug/L	93.1	50.0	130.0	yes
Phenanthrene	ug/L	86.7	50.0	130.0	yes
Pyrene	ug/L	80.9	50.01	129.99	yes
Quinoline	ug/L	88.0	50.01	129.99	yes

Date Acquired: November 21, 2012

PAH - Water - Surrogate Recovery

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
2-Fluorobiphenyl	%	99.35	80	120	yes
p-Terphenyl-d14	%	81.09	80	120	yes
Naphthalene-d8	%	100.49	80	120	yes

Date Acquired: November 21, 2012

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
2-Fluorobiphenyl	%	98	104	60	0	yes
p-Terphenyl-d14	%	87	92	60	0	yes

Date Acquired: November 21, 2012

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Quality Control

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
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Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

PAH - Water - Surrogate Recovery - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
2-Fluorobiphenyl	%	98	40	130	yes
p-Terphenyl-d14	%	87	40	130	yes
Naphthalene-d8	%	92	40	130	yes
Date Acquired:	November 21, 2012				

Trace Metals Total

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Mercury	ng/L	-0.4	-9.990	9.990	yes
Date Acquired:	November 21, 2012				

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Mercury	ug/L	<0.01	<0.010	20	0.050	yes
Date Acquired:	November 21, 2012					

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Methodology and Notes

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
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Attn:	Ryan Martin	P.O.:			
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Company:	EBA				

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Alkalinity - Titration Method, 2320 B	19-Nov-12	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Conductivity, 2510 B	19-Nov-12	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	pH - Electrometric Method, 4500-H+ B	19-Nov-12	Exova Surrey
Alk, pH, EC, Turb in water (Surrey)	APHA	*	Turbidity - Nephelometric Method, 2130 B	19-Nov-12	Exova Surrey
Anions by IEC in water (Surrey)	APHA	*	Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	17-Nov-12	Exova Surrey
Apparent Color (Surrey)	APHA	*	Spectrophotometric - Single Wavelength Method, 2120 C	20-Nov-12	Exova Surrey
EPH - Water	BCELM	*	Extractable Petroleum Hydrocarbons (EPH) in Water by GC/FID, EPH Water	21-Nov-12	Exova Surrey
Mercury Low Level (Total) in water (Surrey)	EPA	*	Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	21-Nov-12	Exova Surrey
Metals SemiTrace (Extractable) in water (Surrey)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	19-Nov-12	Exova Surrey
PAH - Water (Surrey)	BCELM	*	Polycyclic Aromatic Hydrocarbons in Water by GC/MS - PBM, PAH Water	21-Nov-12	Exova Surrey
Trace Metals (extractable) in Water (Surrey)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	19-Nov-12	Exova Surrey

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
B.C.M.O.E	B.C. Ministry of Environment
BCELM	B.C. Environmental Laboratory Manual
US EPA	US Environmental Protection Agency Test Methods

Comments:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.

Exova
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V3S 8P8, Canada

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F: +1 (604) 514-3323
E: Surrey@exova.com
W: www.exova.com

Methodology and Notes

Bill To:	EBA Engineering Consultants	Project:		Lot ID:	**906246**
Report To:	EBA Engineering Consultants	ID:	W23103022-01	Control Number:	
	Unit 6, 151 Industrial Road	Name:	White River First Nation	Date Received:	Nov 16, 2012
	Whitehorse, YT, Canada	Location:	White River First Nation System	Date Reported:	Nov 23, 2012
	Y1A 2V3	LSD:		Report Number:	1786173
Attn:	Ryan Martin	P.O.:			
Sampled By:	Ryan Martin	Acct code:			
Company:	EBA				

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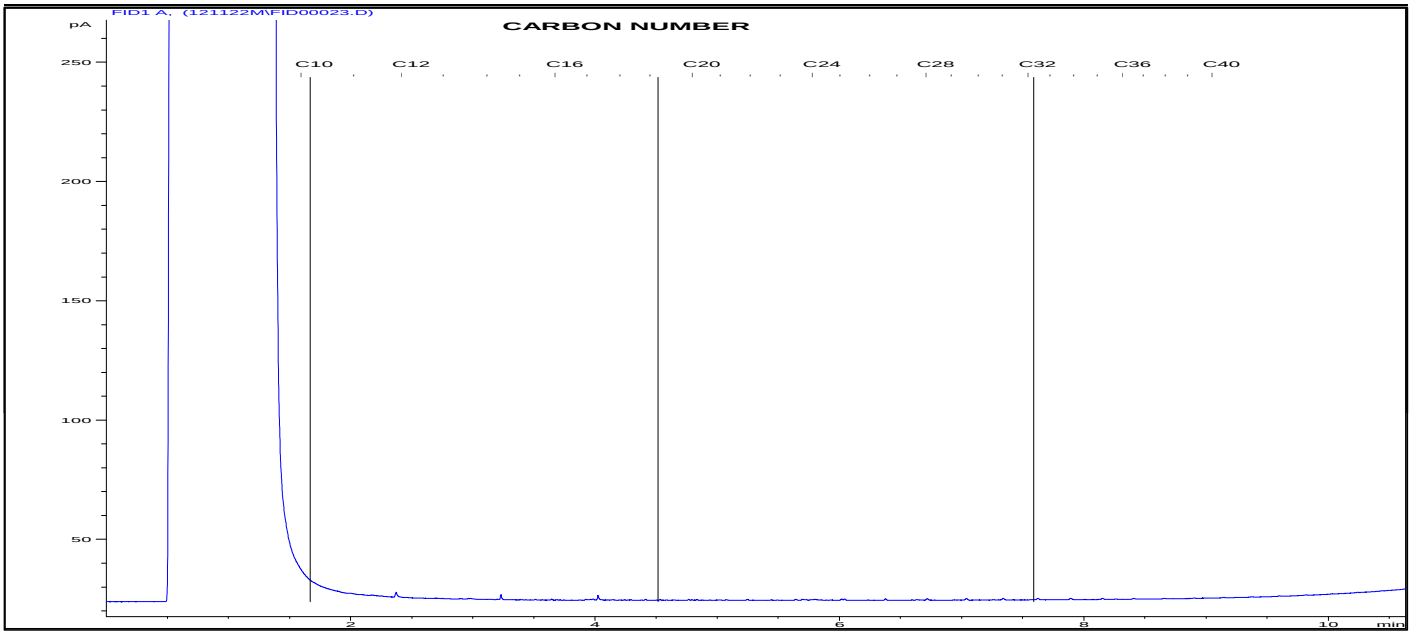
W: www.exova.com

Hydrocarbon Chromatogram

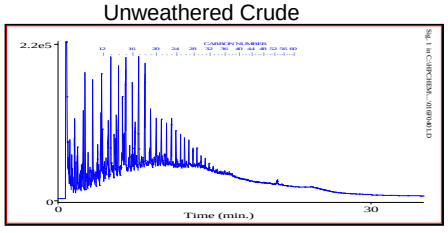
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23103022-01	Lot ID:	**906246**
Report To:	EBA Engineering Consultants Lt	Name:	White River First Nation	Control Number:	
		Location:	White River First Nation System 2	Date Received:	Nov 16, 2012
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 23, 2012
	Whitehorse, YT, Canada	P.O.:		Report Number:	1786173
	Y1A 2V3				
Attn:	Ryan Martin				
Sampled by:	Ryan Martin				
Company:	EBA				

Exova Number: 906246-1 Sample Description: System 2 Well 1
Sample Date: Nov 14, 2012

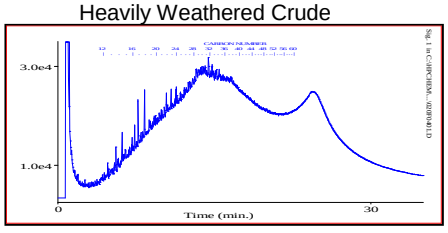


TYPICAL PRODUCT CHROMATOGRAMS

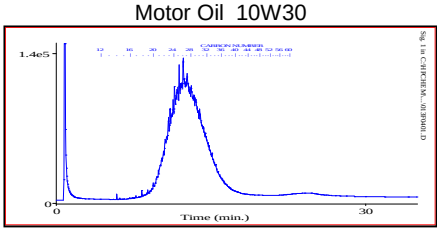
Unweathered Crude



Heavily Weathered Crude



Motor Oil 10W30



Product Carbon Number Ranges

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

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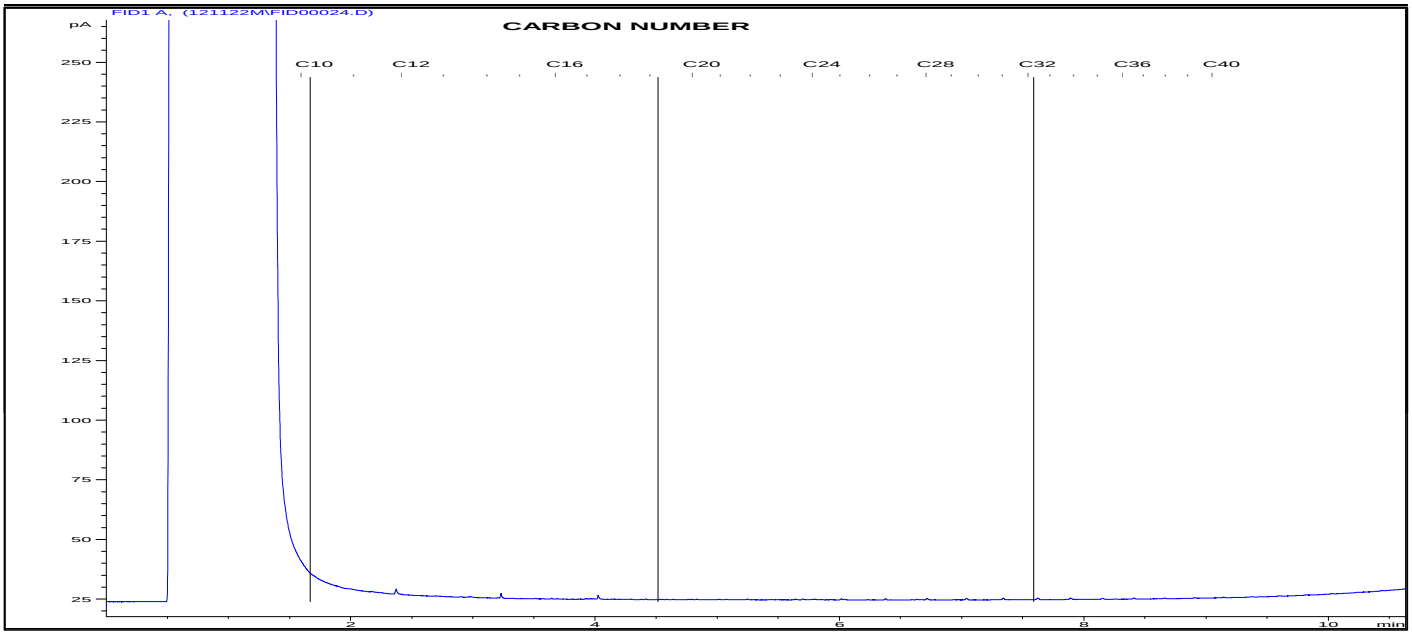
Hydrocarbon Chromatogram

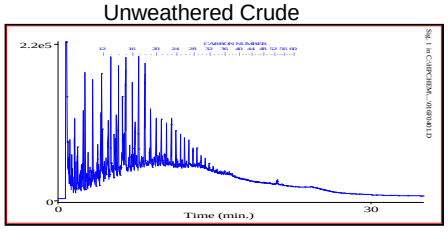
Bill To:	EBA Engineering Consultants Lt	Project ID:	W23103022-01	Lot ID:	**906246**
Report To:	EBA Engineering Consultants Lt	Name:	White River First Nation	Control Number:	
		Location:	White River First Nation System 2	Date Received:	Nov 16, 2012
	Unit 6, 151 Industrial Road	LSD:		Date Reported:	Nov 23, 2012
	Whitehorse, YT, Canada	P.O.:		Report Number:	1786173
	Y1A 2V3				
Attn:	Ryan Martin				
Sampled by:	Ryan Martin				
Company:	EBA				

Exova Number: 906246-2 Sample Description: System 2 Well 2
Sample Date: Nov 14, 2012

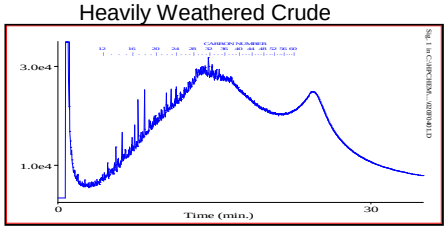


TYPICAL PRODUCT CHROMATOGRAMS

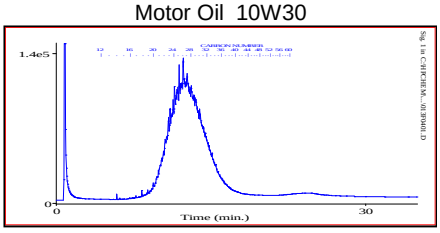
Unweathered Crude



Heavily Weathered Crude



Motor Oil 10W30



Product Carbon Number Ranges

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

LOT: 906246 COC

Exova Testing Advising Assuring

Control Number

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Billing Address:			**Copy of Report To:**		Copy of invoice:
Company:	EBA Engineering Consulting Ltd.		Company:	EBA Engineering Consulting Ltd.	Mail invoice to this address for approval ☐
Address:	Unit 6, 151 Industrial Road Whitehorse, YT Y1A 2V3	QA/QC Report [x]	Address:	Unit 6, 151 Industrial Road Whitehorse, YT Y1A 2V3	
		Report Result:			Report Result:
Attention:	Sarh Sternbergh	Fax ☐	Attention:	Ryan Martin	Fax ☐
Phone:	867-668-2071 ext. 253	Mail ☐	Phone:	867-668-3068	Mail ☐
Fax:	867-668-4349	Courier ☐	Fax:	867-668-4349	Courier ☐
Cell:		e-mail [x]	Cell:		e-mail [x]
e-mail:	ssternbergh@eba.ca	Results Online ☐	e-mail:	rmartin@eba.ca	Results Online ☐

Information to be included on Report and Invoice

Project ID: W2310**3022-01**
Project Name: White River First Nation
Project Location: White River First Nation System 2
Legal Location:
PO#:
Proj. Acct. Code:
Agreement ID: **87038**

RUSH **Please contact the laboratory to confirm rush dates and times before submitting samples.**

Upon filling out this section, client accepts that surcharges will be attached to this analysis

RUSH required on: All Analysis ☐ or As indicated ☐
Date Required:
Signature:
Exova Authorization:

RECEIVED NOV 16 2012

Sample Custody (Please Print)
Sampled by: Ryan Martin
Company EBA Signature
I authorize Exova to proceed with the work outlined in this form.
Date: 15-Nov-12 Initial: SES
Received by: Sample Temp.
Waybill #: Date
Company Time

Special Instructions / Comments
Please ensure results sent to BOTH Sarah and Ryan

FOR LAB USE ONLY
Condiftion of containers/coolers upon arrival at lab

☐ Check here if Exova is required to report results directly to a regulatory body (Please include contact information)

[x] Check here if you are testing POTABLE WATER for **HUMAN CONSUMPTION**

Please indicate which regulations you are required to meet:

	Sample Identification	Location	Depth IN CM M	Date/Time Sampled	Matrix	Sampling Method	Number of Containers	Enter tests above (✓ relevant samples below) CTEH6	W99YT									
1	System 2 Well 1	WRFN	N/A	14-Nov-12	Water	Grab	4	[x]	[x]									
2	Sample 2 Well 2	WRFN	N/A	14-Nov-12	Water	Grab	4	[x]	[x]									
3	2-Treated	WRFN	N/A	14-Nov-12	Water	Grab	2		[x]									
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		

NOTE: All hazardous samples must be labelled according to WHIMIS guidelines.

FAX TRANSMITTAL FORM

To: Ryan Martin
From: Doug
Company: EBA
Department: Capital.
Phone:
Date sent: May 8 2013
Fax: 668-4349
Time sent:
Number of pages: 1 of 5
Including cover sheet

Message:

Hi Ryan

Here are the test results from the recommendation from EBA

thank you

Doug

White River First Nation

PO Box 2
Beaver Creek, YT Y0B 1A0

Administration:
(867) 862-7802
Fax: (867) 862-7806

WRFN Office:
(867) 862-7044

Education & Training Office:
(867) 862-7014

Wellness center:
(867) 862-7623

WHITE RIVER FIRST NATION
ATTN: Doug Broeren
PO Box 2
Beaver Creek YT Y0B 1A0

Date Received: 29-APR-13
Report Date: 08-MAY-13 10:58 (MT)
Version: FINAL

Client Phone: 867-862-7802

Certificate of Analysis

Lab Work Order #: L1295282
Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 10-218513
Legal Site Desc:

Amber Springer
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1295282-1				
Description	Main Tank 0.0 Ch				
Sampled Date	29-APR-13				
Sampled Time	10:00				
Client ID	142- TANK SUPPLY- FILTERED + CHLORIN				
WATER					
Volatile Organic Compounds: trans-1,2-Dichloroethylene (mg/L)	<0.0010				

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
VOC-HSMS-VA	Water	VOCs in water by Headspace GCMS	EPA8260B, 5021
		The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. Target compound concentrations are measured using mass spectrometry detection.	
VOC7/VOC-SURR-MS-VA	Water	VOC7 and/or VOC Surrogates for Waters	EPA8260B, 5021

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

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

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

10-218513

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ronmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878
www.alsglobal.com

10- 21851

Page ___ of ___

Report To: ...UG BROEREN / ...E RIVER FIRST NATION / ...UC BROEREN / B... 2 BEAVER CREEK YUKON Y0B 1A0 / 86...802 Fax: 862-7806

Report Format / Distribution: Standard: Other (specify): Select: PDF Excel Digital Fax
Email 1:
Email 2:

Service Request (Rush subject to availability - Contact ALS to confirm TAT)
✓ Regular (Standard Turnaround Times - Business Days)
Priority (2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
Same Day or Weekend Emergency - Contact ALS to confirm TAT

Invoice To: Same as Report ? (circle) Yes or No (if No, provide details)
Copy of Invoice with Report? (circle) Yes or No
Company: WHITE RIVER FIRST NATION
Contact:
Address: BOX 1 BEAVER CREEK YUKON Y0B 1A0
Phone: 862-7802 Fax: 862-7806

Client / Project Information
Job #:
PO / AFE:
LSD:
Quote #:

Lab Work Order # (lab use only)

ALS Contact:
Sampler: H.P

Analysis Request (Indicate Filtered or Preserved, F/P)
TRIM - 1+2 Dichloroethylene

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Number of Containers
1	12 - TANK SUPPLY - FILTERED + CHLORIN	29/04/13	10:00 AM	MAIN TANK 0.10 CHLORIN	

L1295282-COFC

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date:	Time:	Received by: [signature]	Date: 29-Apr-13	Time: 15:10	Temperature: 9.4 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

GENF 18.01 Front