YUKON ENERGY CORPORATION

ISSUED FOR USE

GROUND-BASED GEOTHERMAL RECONNAISSANCE LARSEN CREEK / BEAVER RIVER AREA SOUTHEAST YUKON

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EXECUTIVE SUMMARY

The Larsen Creek / Beaver River area in the southeast Yukon has numerous thermal springs in relatively close proximity, characteristic of a geological environment with rock units and structures that create sub-surface pathways to allow rapid transmittal of heated fluids from depth to the surface. Six thermal springs were located and assessed and all occur within limestone associated with steeply dipping thrust faults. The two springs with the highest temperatures, elevated flows and extensive exposure (Pool Creek and Larsen Creek) are located on the same regional fault at a distance of about 22 km (Figure 1).

Larsen and Pool Creek Hot Springs are characterized as a calcium-magnesium-bicarbonate-sulphate water type. Springs at Thorpe Creek, Crow River, Coal River and Canyon Creek are the same less the sulphate component. All sites indicate a local meteoric origin of the spring water. Geothermometer results using the sodium-potassium-calcium formula are high at all sites (range: 167-232°C) but with the silica-based formula are more moderate (range: 48-99°C). Tritium concentrations indicate that residence time for Larsen Creek, Pool Creek and Crow River springs is > 50 years; and for Thorpe Creek, Coal River and Canyon Creek: < 50 years or mixed with young, shallow groundwater.

Summary of thermal parameters		T (°C)	EC (mS/cm)	pH
Pool Creek	high flow	53.2	611	6.4
Larsen Creek	high flow	51.0	547	7.01
Canyon Creek	high flow	15.0	358	7.7
Crow River	moderate flows	29.2	367	6.8
Thorpe Creek	moderate flows	25.3	380	6.9
Coal River	high flow	13.2	432	7.26

Based on the findings of this program, there is evidence for medium-temperature geothermal resources in the Larsen Creek / Beaver River area. Surface temperature, flow and structural geology are encouraging and it is probable that hot springs in the area could have suitable temperatures at depth to support a moderate geothermal development.

The geological setting in this area indicates that the geothermal resource is controlled by regional geological features (rock groups and major structures). Subsurface sources and actual temperatures at depth are not currently known. Estimates of regional geothermal gradient may be available from research of data from deep boreholes advanced for oil and gas exploration in the Liard Basin to the east.

The remoteness and distance from a power transmission grid likely preclude advancement of exploration in this area in the short term unless the economics change. However, more advanced assessment of the geothermal resources in this area should be considered if future power transmission infrastructure is developed along the Alaska Highway transportation corridor.

The presence of hot springs is a positive indication of geothermal activity. The exploration and potential for moderate to large scale geothermal development is more likely to focus on geothermal gradient and deep, sub-surface geology to assess reservoir potential. The southeast Yukon region has been the target of exploration for petroleum resources and temperature data from deep boreholes could provide direct evidence of the geothermal gradient in the area. Geothermal gradient, the ratio of temperature with depth, should be a logical next step in this region, particularly if borehole temperature data is available further west, closer to the community of Watson Lake where there is a small market demand.

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1.0 INTRODUCTION

EBA Engineering Consultants Ltd. (EBA) is presently conducting a Yukon geothermal exploration program for Yukon Energy Corporation (YEC). The Larsen Creek / Beaver River Area hosts a number of documented thermal springs and was identified as a favourable target for further evaluation. The study area is located within the sedimentary thrust fault belt of the northern Cordillera. Steep thrust faults can be conduits of hot water from deep thermal sources and form the model for most hot springs throughout the Cordillera.

The Larsen Creek / Beaver River study area covers an area of about 1500 km^2 in the southeast corner of the Yukon (Figure 1). The area is remote and mountainous with steep glaciated valleys and the only practical access is by helicopter. Float plane access to a number of lakes in the region is possible but none are close to thermal springs. The area is within the Liard River watershed and is drained by four main rivers: Beaver River, Crow River, Larsen Creek and Tropical Creek.

EBA conducted an open-water survey in April 2009 as part of Phase 029 that resulted in about 50 targets. A number of these targets were interpreted as having a high likelihood of thermal springs as the source of the open water.

1.0 PURPOSE

The key objective of this study was to conduct a geological and hydrogeochemical investigation of thermal springs in the Larsen Creek / Beaver River area of southeast Yukon to characterize the potential for geothermal resources. The purpose was also to follow-up on moderate and high priority open water survey anomalies identified in the winter open water survey completed in April 2009. The open water survey is reported under separate cover (Project Phase 029).

The scope of this work involved a range of preparatory office activities (geological and geothermal background review), followed by reconnaissance-level fieldwork (including direct measurement of physical parameters, water sampling and geology mapping), laboratory analysis of water chemistry, and environmental isotopes (oxygen-18, deuterium, and tritium), estimates of deep ground temperature (using hydrochemical geothermometer formulas), and a discussion of the results and next steps. Six days supported by helicopter were used to complete the fieldwork. During mobilization and demobilization to the project camp at Toobally Lakes Lodge, a stop-over at the Coal River Warm Springs was scheduled to investigate the thermal springs at this site.

No intrusive fieldwork (e.g., drilling) or geophysics was conducted for this program. This report contains all of the findings, results, analysis, discussion, conclusions, and recommendations from this assignment.

2.0 METHODS

Regional geology mapping was reviewed and integrated with other sources of geological information listed in the References Section. Fieldwork to carry out a preliminary assessment of the various thermal springs was completed in conjunction with follow-up on the open-water targets identified in an aerial survey completed April 2 and 3, 2009. The fieldwork was completed by J. Dennett, P.Geo., S. Klump, Ph.D., and L. Menzies, B.Sc., of EBA from September 14 to 22, 2009. Helicopter support was provided by Trans North Turbo Air of Watson Lake, Yukon, using a Bell Jet Ranger III helicopter. Accommodation was secured at the Toobally Lakes Lodge west of the study area. Fuel and supplies were flown to the lodge by radial-engine Beaver floatplane service provided by Northern Rockies Air Charter of Watson Lake, Yukon.

2.1 GROUND RECONNAISSANCE FOLLOW-UP ON WINTER OPEN-WATER TARGETS AND THERMAL SPRING ASSESSMENT

The scope of the ground-based reconnaissance included the following:

- Initial helicopter fly-over for site overview and safety reasons (spotting active wildlife);
- Identify water feature at winter open-water target site from air and assess on ground;
- Identify and map any active hydrothermal features found in the target areas (warm/hot springs or seeps);
- Identify and map rock staining or mineral precipitation potentially related to past hydrothermal activity. This included documenting surface encrustation (e.g., opal or travertine);
- Map main rock types, key geological structures and other geological features where exposed to help define the geological setting in each search area; and,
- Photograph and obtain GPS coordinates for all field stations (using hand held GPS unit).
- Record observations and structural data from bedrock outcrops at thermal spring sites.
- Measure and record field parameters with photos and GPS locations at the thermal springs.

Given the remote location and the need for speed and efficiency with a tight weather window, field programs were carried out with helicopter support. Prior to fieldwork every day, the EBA team held a tailgate-style safety meeting to discuss safety, weather and field logistics issues, including a helicopter safety check with the helicopter pilot.

2.2 WATER SAMPLING AND FIELD MEASUREMENTS

Field parameters measured during the site visit included: temperature, pH, electrical conductivity, total dissolved solids, and dissolved oxygen (in the case of a spring). The field instruments were calibrated on the day of sampling. Table 1 summarizes the field instruments used along with their resolution and accuracy.

TABLE 1: SUMMARY OF FIELD WATER CHEMISTRY INSTRUMENTS			
Parameter	Instrument	Resolution	Accuracy
UTM Coordinates	Magellan Meridian Platinum handheld GPS	1 m	~7 m
pH	Hanna HI 991300	0.01 pH units	0.1
EC	Hanna HI 991300	0.01 µS/cm	2% full scale
TDS	Hanna HI 991300	1 ppm	2% full scale
Temperature	Hanna HI 991300	0.1°C	0.5°C
Dissolved O_2	YSI 550A	0.01 mg/L	0.1 mg/L

Water samples were analyzed for hardness, alkalinity, cations and anions and dissolved metals. Samples were also analyzed for stable isotopes (oxygen-18 and deuterium) and tritium.

The major ion chemistry was included in order to classify the waters and determine their general chemical character. The metals analyses were used to support geothermometer calculations, specifically using sodium (Na), potassium (K), calcium (Ca), magnesium (Mg) and silicon (Si). Silicon was used to calculate the equivalent silica (SiO_2) concentration for use in the silica-based geothermometer formulas. The stable isotopes of water were included in order to plot them against a meteoric water line to determine if the sample waters were of meteoric origin, or were fractionated to enriched oxygen-18 values which can be an isotopic characteristic of geothermal waters. The radioactive hydrogen isotope tritium (^3H) was included to obtain information on the subsurface residence time of the water.

Water samples were collected in new, laboratory-supplied sample containers in accordance with laboratory recommended sampling procedures. Dissolved metals samples were field-filtered through a 0.45 µm filter and preserved with nitric acid (HNO_3).

Water samples were shipped on ice by air cargo to the laboratories. Inorganic water chemistry was analyzed by Exova in Surrey, British Columbia. Isotope analyses were conducted by the University of Waterloo, Environmental Isotope Laboratory in Waterloo, Ontario.

2.3 GEOTHERMOMETER

There are a wide range of empirical chemical geothermometer formulas. One group is based on the equilibrium reached among alkali elements (sodium (Na), potassium (K) and calcium (Ca); Fournier and Truesdell 1973). Another group is based on the solubility of various mineralogical forms of silica (SiO_2) in hot geothermal waters. Silica solubility is rate- dependent, so waters that gain silica at elevated temperatures only slowly release that silica as the waters cool (i.e., as they move upwards and discharge at the surface). For this reason, the silica content of discharging geothermal waters can be used to calculate the approximate maximum subsurface temperature at which the water acquired the silica content.

Some of the prominent formulas are presented in Table 2.

Because calcium is the dominant cation in all water samples collected, we have chosen to use the classic alkali formula no. 1 (Fournier and Truesdell 1973) with the constant term B = 4/3 (assuming subsurface temperatures are less than 100°C).

TABLE 2: COMMON GEOTHERMOMETER FORMULAS

#	Formula	Source	Comment
	Alkali-based formulas		
1	T°C = {1647/ [(log(Na/K) + B(log (sqrt(Ca)/Na) + 2.06)+2.47)]} – 273.15	Fournier and Truesdell, 1973	B = 4/3 below 100°C and 1/3 above 100°C; useable for T > 70°C, best 180–300°C
2	T°C = [1217/ (log(Na/K) + 1.483)] – 273.15	Fournier 1981	Alkali formula using Na and K only
3	T°C = [876.3/ (log(Na/K) + 0.8775)] – 273.15	Diaz-Gonzalez and Santoyo, 2008	Updated using world database of geothermal fluids
4	T°C = [1289/ (log(Na/K) + 1.635)] – 273.15	Verma and Santoyo 1995	Updated using an error propagation method, with Fournier's original data
	Silica-based formulas		
5	T°C = [1309/ (5.19 – logSiO_2)] – 273.15	Fournier 1981	Silica form is quartz with no steam loss; best for T > 180°C
6	T°C = [1522/ (5.75 – logSiO_2)] – 273.15	Fournier 1981	Silica form is quartz with steam loss from reservoir; best for T > 180°C
7	T°C = [1032/ (4.69 – logSiO_2)] – 273.15	Garcher and Arehart 2008	Silica form is chalcedony; best for T = 180-140°C
8	T°C = [731/ (4.52 – logSiO_2)] – 273.15	Garcher and Arehart 2008	Form is amorphous silica; best for T < 140°C
9	T°C = -44.119 +0.24469(SiO_2) – 1.7414 E-4(SiO_2)^2 + 79.305log(SiO_2)	Verma and Santoyo 1995	Updated using an error propagation method, with Fournier's original data; useful for T = 20-210°C

Note: All concentrations in molality (mg/kg). For water with density ~1 kg/L, concentrations of mg/L can be used.

For a silica geothermometer, we chose to use formula No. 9 (Verma and Santoyo 1995) since this is an update of Fournier's original formula and is applicable for temperatures ranging from 20 to 210°C. These formulae fit the hydrochemical setting and temperature ranges expected for the samples collected, and provide a reasonable estimate of subsurface temperatures for purposes of this reconnaissance study.

In applying the silica geothermometer, we assumed that for the waters sampled in this program, silicon (Si) is always bound as silica (SiO_2). For comparison and QA/QC reasons, dilute water samples for silicon analysis were collected at most sampling locations. The dilute sample silicon (Si) concentrations reported by the laboratory were first multiplied by 10 to determine the undiluted silicon concentration at the sampling point. The corrected silicon concentrations were then multiplied by 2.14 which is the ratio of atomic weights of Si and SiO_2. This calculated SiO_2 value was then used in the silica geothermometer formula.

3.0 RESULTS AND DISCUSSION

3.1 FIELD OBSERVATIONS AND DATA

A summary of field observations and data is compiled and presented as Table 3 in the Tables section. A total of 208 field stations were documented during this program (Figures 1 to 7). Representative photos are also attached at the end of this report.

Detailed sampling and assessment of thermal springs was completed in the region that included three known thermal springs and two springs discovered by the winter open water survey within the Larsen Creek / Beaver River study area and the Coal River Springs (Figure 1, Table 4). All winter open-water targets with moderate to high probability of being the result of a thermal anomaly were checked by air and most were checked on the ground. All but one (Canyon Creek) of the winter open-water survey sites, except for those of the previously known thermal springs, were determined to be the result of cold springs or winter flow in stream channels. Canyon Creek, located about 13 km south-southwest of Pool Creek Hot Springs (Figure 1), is a warm spring with strong flow and a temperature of 15°C (L09S-99, Table 4).

TABLE 4 LOCATION OF THERMAL SPRINGS

NAME	UTM Zone	EASTING	NORTHING
Pool Creek (Beaver River)	10	358399	6696650
Canyon Creek	10	353566	6685068
Crow River	10	345112	6676987
Larsen Creek South	10	360758	6675638
Larsen Creek North	10	360702	6676195
Thorpe Creek East	10	347787	6656059
Thorpe Creek West	10	346993	6655665
Coal River	9	586506	6670323

3.2 GEOLOGICAL SETTING OF THE LARSEN CREEK / BEAVER RIVER STUDY AREA

The study area occupies an area of about 1500 km^2 of the Liard Plateau in the southeast Yukon. It is bounded to the south by the Liard Plain, to the east by the La Biche and Kotaneelee Ranges and to the west by the low relief of the Hyland Plateau. The northern part of the study area is rugged and mountainous with local elevations above 1500 m. The Plateau is deeply dissected by resistant, north-trending anticlinal ridges and separated by wide synclinal valleys. The southern part of the study area is more gently rolling and heavily timbered. The major drainages are the Beaver River, Larsen Creek and Crow River. Lakes in the area are few and relatively small, perhaps in part due to increased pathways for groundwater in the highly faulted nature of the regional geology.

The southeast Yukon is within the Cordilleran orogen, characterized as an imbricated succession of folded eastward thrust sheets and includes the Rocky Mountains and other ranges. Structure in the Larsen Creek / Beaver River area is mostly steeply-dipping repetitive thrust faults trending north-south (Figure 1). The age of rock units in the Beaver River / Larsen Creek study area range from about 35 to 570 Ma. (Table 5). Folded and faulted sedimentary sequences are greater than four kilometres thick (BC-EMR).

Almost all the known thermal springs in the northern Cordillera are associated with deep flow systems in layered carbonate rock and steep thrust faults. The geological setting of the Laird Basin presents a favourable environment for geothermal resources. Steep thrust faults in the uplifted sediments –mostly limestone – of the Cordillera host numerous hot springs throughout the Rocky Mountains. Situated between the Rockies in the south and the Mackenzie Mountains to the north, the Liard Plateau shares the orogenic process that creates a model environment for thermal springs: upward transport of heated water along steep faults in sedimentary rocks. Studies of the Sulphur Mountain Hot Springs, located in a similar geological environment at Banff, Alberta, suggest that it is the result of meteoric water flowing down a fracture to a depth of 6 km to intersect another fault that takes the heated water back to the surface (Figure 8).

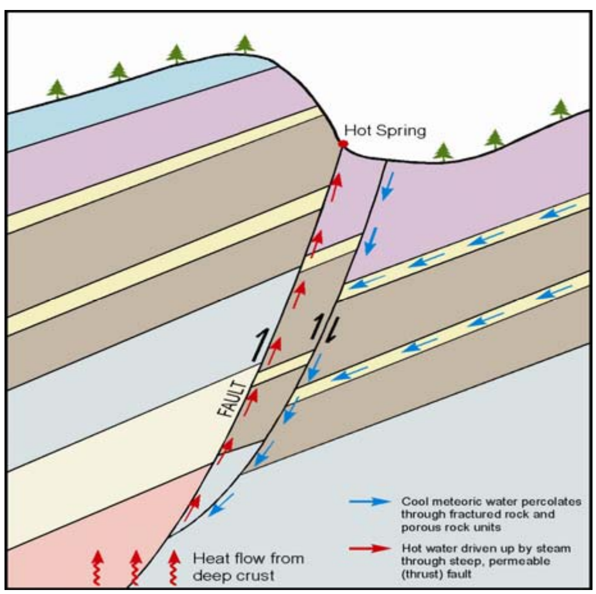

Figure 8: Conceptual model for Cordilleran hot springs with upward transport of heated water along steep faults in sedimentary rocks.

3.1 THERMAL SPRINGS

The approximate locations of thermal springs documented in historic reports were noted on regional maps; however, some of these locations were approximate or inaccurate. Each of these known thermal springs was identified during the open water survey conducted in April 2009 and the exact location was recorded. The 2009 field program included ground surveys of geology, measurement of water parameters and water sampling. Detailed assessments were completed at the thermal springs shown in Table 4.

The approximate location of Crow River Springs was noted on a map in a previous publication (Crandall and Sadlier-Brown, 1976) but no data at the site was previously recorded. The Thorpe Creek and Canyon Creek springs were located by the open water survey.

An anecdotal description of the location of two hot springs were provided to YEC by a former trapper in the area (Alex White), but the open water survey and subsequent follow-up work determined that there were no thermal springs in the locations provided.

3.1.1 Pool Creek Hot Springs

The Pool Creek Hot Springs were assessed on September 17 and 18, 2009. Potential thermal spring targets in the areas that were located from the winter open-water survey were also assessed on these dates. Access to the site was by helicopter with good landing sites in open meadows.

Pool Creek Hot Springs is characterized as a large area of prominent thermal meadows along both banks of the Beaver River downstream of Pool Creek, a tributary of the Beaver River. Open (unforested) fields of dense grasses, ferns and other rich ground vegetation along an extensive area on both banks of the Beaver River form a distinct geographical feature signifying the presence of these unique hot springs. Four thermal meadows occur over a channel distance of about 2 km (Figure 2). A prominent limestone bluff on the south river bank separates an upstream meadow (A; see Figure 2) from the large downstream area that is bisected by the Beaver River to form three additional meadows (B, C, and D). Numerous vents occur along the base of the slope in the upstream meadow (A - Photos 1, 2, 5 and 6) and the largest, south-bank downstream meadow (C, Photo 4). Meadow B was devoid of surface springs. Meadow D, furthest downstream, has numerous vents located along small stream channels on this elevated floodplain (Photos 1 and 3, Figure 2).

Elongate warm pools occur in each of the two fields located on the south bank of the river. Fields on the north bank do not have signature pools, but the absence of trees indicates the effect of elevated sub-surface temperatures on the ecology. Water flowing from thermal vents is clear and odourless.

Pool Creek Hot Springs from a natural thermal spring complex with over 30 thermal springs of varying temperature in close proximity mapped over a linear distance of 1150 m (Figure 2). Many of the vents occur along the base of the slope, but the extensive areas of thermal meadow that are devoid of forest cover indicate elevated ground temperatures well beyond the surface vent occurrences. Multiple vents and the large area of elevated ground temperatures suggests that the source has considerable flow volume, most of which probably enters the Beaver River shallow groundwater regime before reaching the surface.

The maximum observed spring water temperature was 53.2°C measured at one of the main spring vents in area C (Figure 2). The electrical conductivity was 611 µS/cm and pH was 6.4.

The geomorphology in this area is characterized by deep, sinuous limestone canyons that control the Beaver River channel and its tributaries. The Pool Creek springs are located on a pervasive regional fault at the contact of Upper Ordovician and Silurian Kindle Formation light grey limestone with Devonian and Mississippian Besa River Formation sandstone and shale. The same regional fault also hosts the Larsen Creek Hot Springs located about 22 km to the south (Figure 1). The Liard Basin is characterized with a series of deep, almost vertical thrust faults (BC EMR), and the Pool-Larsen fault is likely one of these.

3.1.2 Canyon Creek Warm Spring

Canyon Creek Warm Spring is a previously undocumented discovery in a remote side canyon in the upland headwaters of Canyon Creek. The Canyon Creek Warm Spring was discovered on September 18, 2009 during a follow-up of sites identified as potential thermal springs in the winter open-water survey. The warm spring is located in the headwaters of Canyon Creek, a previously un-named, large tributary of the Beaver River (Figure 3). The terrain at the site is mostly limestone bedrock with some talus. The site is marked by a striking 10 m-diameter mat of bright green moss where a high volume spring daylights within a shallow limestone canyon (Photos 8, 9, and 10) . Upstream flows in the tributary are low and the springs form the bulk of the flow in a hanging tributary on the east slopes of the narrow Canyon Creek valley (Photo 8).

Two thermal vents occur at the site (Figure 3, Photo 9). Temperature recorded at the upstream vent was 15°C (L09S-98). The electrical conductivity was 358 µS/cm and pH was 7.7.

The Canyon Creek Warm Spring is located next to a deep, linear erosional feature forming a north-south oriented canyon, parallel with the regional characterization of steeply-dipping repetitive thrust faults. Bedrock in the area is mapped as Upper Ordovician and Silurian Kindle Formation: mostly dark grey dolomite with well-bedded siltstone, sandstone, shale and light grey limestone, two kilometres west of three parallel regional north-south faults at the contact with Besa River Formation. Upstream of the springs, the stream bends to a north-south alignment to its source about 300 m upstream.

3.1.3 Crow River Warm Springs

The Crow River Springs were recorded in a previous report (Crandell and Sadlier - Brown, 1976) but no data was available and their location was vague. The Crow River

Springs were located during the winter open-water survey. Open pools, open meadows and running streams indicated a high probability of thermal springs and the site was marked for follow-up during the summer program.

The site was examined on September 18, 2009. The area is remote; however, an active trap line trail was observed through the area. The site is characterized by openings in the forest with small meadow areas where forest growth is inhibited, likely by elevated ground temperature. A linear array of springs parallels the north bank of the Crow River between the channel and a low ridge of forested limestone. Spring water is clear and odourless and flows were low to moderate.

Crow River Warm Springs form a thermal spring complex with at least 25 vents of varying temperature in close proximity mapped over a linear distance of about 650 m (Figure 4). Most vents day-lighted in overburden (glacial till or talus); however, limestone outcrops on the adjacent low relief ridge suggests bedrock is shallow. The linear array of vents suggests all are sourced from a common northwest striking fault that appears to control the channel of the Crow River in this area.

The main springs are dominated by two large pools, but numerous small vents are found along the line of gently sloped terrain beside the river. The narrow (6 m) channel of the Crow River is shallow, which allowed access to vents located on a mid-channel bar. A shallow lake located less than 500 m upstream drains into the river (Figure 4, Photos 11 to 14).

The maximum observed spring water temperature was 29.2°C, the electrical conductivity was 367 µS/cm and pH was 6.8.

The Crow River thermal springs are located on a regional northerly fault contact of Upper Ordovician and Silurian Kindle Formation (mostly dark grey dolomite with well-bedded siltstone, sandstone, shale and light grey limestone) with Besa River Formation (Figure 1).

3.1.4 Larsen Creek Hot Springs

The Larsen Creek site was investigated on September 16, 2009. Although the location was noted during the winter open-water survey, the location of Larsen Creek Hot Springs is well known and the helicopter pilot was familiar with the site. Two separate springs about 600 m apart occur in the area, which is heavily forested (Figure 5). Additional vents between the two hot spring sites were not found.

Larsen Creek South is characterized by a stunning 7 m diameter circular pool at the peak of a 6 m high rounded dome of tufa next to Larsen Creek (Photos 15 and 16). Four additional vents were found in this area. The water is clear and odourless. Gas bubbles into the pool from the floor about 3 m below the surface. Any bedrock at the site has long been covered by thick tufa deposits. Some additional small vents occur across the creek (Figure 5).

Larsen Creek North includes a series of small vents on a gravel bar and along the base of slope of a short escarpment, but the site is dominated by a high flow, 51°C spring flowing from limestone outcrop on the bank of a tributary to Larsen Creek (Photos 17 and 18). The electrical conductivity was 547 μS/cm and pH was 7.01. The water is clear with gas bubbles and has no discernable odour. A linear array of at least seven vents over a distance of about 400 m is aligned in a west-northwest direction parallel with the tributary stream.

The Larsen Creek Hot Springs are located on a strong regional fault at the contact of Upper Ordovician and Silurian Kindle Formation light grey limestone and Devonian and Mississippian Besa River Formation sandstone and shale. The same regional fault also hosts the Pool Creek Hot Springs located 22 km to the north. The Liard Basin is characterized with a series of deep, almost vertical thrust faults (BC EMR Geology Compilation), and the Pool-Larsen fault is likely of similar orientation with access to heat from deep in the earths crust.

3.1.5 Thorpe Creek Warm Springs

Although relatively unknown, there was some anecdotal evidence of thermal springs in this area; however, their exact location was determined from the results of the winter open-water survey completed in April 2009. The site was investigated on September 15, 2009. Two separate warm springs were located about one kilometre apart (Figure 6). Each area has multiple vents. The east springs were characterized by four strong springs in a 2.5 m diameter pool with a moderate combined flow cascading through boulders to drop 3 m into the stream about 25 m away (Photo 21). The springs emerge at the base of a low relief forested ridge of limestone. Weathered boulders were placed to partially dam the flow and form a shallow pool indicating historic anthropogenic influence; however, no signs of recent human activities were observed.

The west Thorpe Creek Warm Springs emerge in a forest opening with bright green in-stream vegetation (Photo 19 and 22). Flow from at least five vents within a 100 m diameter area next to a wetland feed a small tributary to Thorpe Creek.

The maximum spring water temperature of 25.3°C was observed at one of the west spring vents. The electrical conductivity was 380 μS/cm and pH was 6.9.

The Thorpe Creek thermal springs are located at the junction of the Beaver River Thrust Fault with a sub-parallel fault at the contact of the Kindle and Besa River Formations (Figure 1). The Beaver River thrust fault is a strong regional feature mapped from BC across the southeast Yukon and into the Northwest Territories. This fault also passes about 2.5 km east of the Crow River Warm Springs, which are located along a parallel fault 22 kilometres north of the Thorpe Creek site.

3.1.6 Coal River Warm Springs

The Coal River Warm Springs are protected by a Territorial Park. An evaluation of this site was rationalized to provide a greater understanding of the thermal environment in the region and it was useful to include with the inventory of Yukon thermal sites. The site was easily accessible as it is on the mobilization route from Watson Lake to the Larsen

Creek / Beaver River area. The southern spring was investigated during mobilization on September 14, 2009 and the northern spring was visited upon demobilization on September 20, 2009.

A spectacular wall of benched tufa about 15 m high, 65 m long and 15 m wide supporting turquoise, elongate pools mark the outflow of the South Coal River Warm Springs near the east bank of the Coal River (Photo 23to 25). The source spring is located about 90 m east upslope in dense spruce forest at the base of moderately steep slopes with discontinuous limestone bluffs (Figure 7). The water temperature in the pool was 13.2°C, the electrical conductivity was 432 µS/cm and pH was 7.26. Gas bubbles were observed in the centre of the source pool, which is about 75 m in length, 20 m wide and up to 5 m in depth (Photo 26). The water is clear and odourless. A high flow spills through a dilapidated weir and over a tufa wall on the pools western margin forming a stream that flows over a porous tufa fan bordered by robust ground vegetation.

The north spring, although not quite as spectacular as the multi-terraced pools of the south spring, has an augen-shaped pool of clear water atop an elongate shallow ridge of unforested tufa (Photo 27). The source spring is located in a forested area about 25 m west of the north end of the pool. Water quality is similar to that of the north spring.

The source of the south spring is located on a bench of talus and glacial drift at the base of limestone slopes on a northerly-trending fault line. The Coal River in this area follows a strong regional fault, a southern extension of the steeply dipping Rock River Fault, at the contact of Upper Ordovician and Silurian Kindle Formation (mostly dark grey dolomite and light grey limestone) with Upper Cambrian and Ordovician Rabbitkettle Formation limestone. The north-south structure through the Coal River Warm Springs is coincident with a strong magnetic anomaly identified on regional aeromagnetic maps.

3.2 HYDROGEOCHEMISTRY

3.2.1 Inorganic Chemistry

A summary of the chemistry and isotope analytical results are summarized in Table 6. Figure 9 shows a Piper Plot containing all water samples collected in the study area. The laboratory reports are included as Appendix B. To evaluate the quality of the analysis, EBA calculated the ion balance for each sample, i.e., the balance between sum of anion and cation equivalent charges. Usually, an ion balance of within 90 to 110% is considered satisfactory. The ion balances vary from 112 to 122% suggesting that analytical errors slightly exceeded typical limits. Possible reasons for the consistently high ion balances include slight overestimation of the major cation concentrations, slight underestimation of the anion concentrations or omitting of a positively charged ion or compound. The exact reason is difficult to determine; however, the observed ion balances are deemed acceptable for the purpose of hydrochemical characterization of the samples.

The water samples can be classified based on their major ion chemical composition, taking into account all major anions and cations exceeding 10 meq-%1. The water or hydrochemical facies is determined by listing the ions with concentrations greater than 10 meq-% in decreasing order (cations are listed first).

The water samples collected from the Larsen Creek Hot Springs and Pool Creek Hot Springs can be characterized as a calcium-magnesium- bicarbonate-sulphate water type (Ca-Mg- HCO_3-SO_4). The samples from all other springs sampled in the study area (Thorpe Creek, Crow River, Coal River, and Canyon Creek) can be characterized as calcium-magnesium-bicarbonate water (Ca-Mg-HCO_3).

The pH of all springs sampled was near neutral and the spring water mineralization was low to moderate. The highest mineralization was observed at Pool Creek and Larsen Creek Hot Springs with about 400 mg/L total dissolved solids. All other springs had total dissolved solids concentrations between about 200 and 300 mg/L.

3.2.2 Stable Isotopes

Figure 10 presents the results of the oxygen-18 and deuterium stable isotope analyses along with the Global (GMWL) and Local (LMWL) Meteoric Water Lines. The results are expressed in per mil units (parts per thousand) relative to Standard Mean Ocean Water (SMOW). All samples plot close to both the GMWL and the LMWL for Whitehorse, except for the sample collected from the Thorpe Creek Warm Springs which showed slightly enriched isotope values; however, the Thorpe Creek Warm Springs samples still plot within the range of the Whitehorse LMWL.

3.2.3 Radioactive Isotopes

The tritium concentration was measured in all water samples collected in the study area in order to provide an indication of potential residence time. The samples from the Larsen Creek Hot Springs, Pool Creek Hot Springs, and Crow River Warm Springs did not contain any measureable tritium. The tritium concentrations in the samples taken from the Thorpe Creek Warm Springs, the Coal River Warm Springs, and the Canyon Creek Warm Springs ranged from 1.2 to 6.3 TU[2]. The samples from a cold spring in the Crow River area contained 10.2 TU. The significance of these results is discussed in Section 4.2.

4.0 ANALYSIS AND DISCUSSION

4.1 CONCEPTUAL GEOLOGICAL MODEL

Reports and mapping of bedrock and structural geology were studied and compared to thermal system models that have been developed for hot springs in other regions. A

[1] The unit meq-% represents the percentage of cations and anions calculated from their milliequivalents per litre (meq/L). The unit meq/L is the molar concentration multiplied by the charge of the ions.

[2] TU – Tritium Unit: 1 TU corresponds to 3H/2H = 10-18 or 1 TU = 0.1181 Bq/kg (3.193 pCi/kg)

number of these models were reviewed and compared to the geological setting of thermal springs in the Larsen Creek / Beaver River area. A conceptual model was selected that could represent a hypothetical thermal system with a geological setting that would correlate with known site geology. The conceptual geological model presented as Figure 8 could represent the geological system in place at all the thermal springs investigated in the Larsen Creek / Beaver River area. Since sub-surface bedrock information and clear structural controls are unknown, the conceptual geological model presented here is necessarily simplistic and uncertain. With additional field and sub-surface information, this conceptual model could be refined and improved.

Geological models of hot springs have two main components: the sub-surface heat source and the transport mechanism. The heat sources are typically considered to be epithermal (shallow volcanism) or magmatic. Some hot springs may result from concentrated heat of radiation from the radioactive components of intrusive deposits or a regionally increased geothermal gradient. If water percolates deeply enough into the crust, it will be heated as it comes into contact with hot rocks. Heated water, or steam that is cooled with meteoric water, follows a fault to the surface to emerge as hot springs.

Most thermal springs are the result of meteoric (surface) water penetrating the ground to a sufficient depth to heat it, then following rock fractures to the surface. Other hot springs are derived from magmatic water (water that is dissolved in magma or that is derived from such water) or from water heated as rocks are metamorphosed. In most cases, meteoric water is carried deep into the earths crust following fractures in bedrock that intersect deep, high angle faults. Super-heated water is forced upward and, where a sealed route up a fault reaches the surface, emerges as a thermal spring. Transport of hot water to the surface is assumed to be along a geological structure (fault). In some cases, the transport structure may coincide with a conformable fault (i.e., where structural movement has occurred on a bedrock contact) or at a contact where alteration or deformation created a void (e.g., at an intrusive contact with country rock).

Critical in the creation of a hot spring is an express route to the surface. If the water moves slowly from depth to the surface, it will cool back down before it daylights as a spring. Since many of these springs occur in limestone formations, the openings allowing the water to the surface may be enlarged by dissolving of the limestone to create a virtual pipeline to the surface. This assures rapid upward flow and higher water temperature of thermal springs at the surface.

Fault attitude and location plays a crucial role in the function of geothermal systems. They act as effective conduits for fluid flow along the fault but they may also be effective barriers to fluid flow across the fault. The circulation depth of geothermal systems may be a function of the depth to the fault plane below the recharge area. The dip of the fault appears to play a significant role in the depth to which water circulates (Grasby and Hutcheon, 2001). Structure in the Larsen Creek / Beaver River area is mostly steeply-dipping repetitive thrust faults.

There may also be convective water circulation within a fault zone, where water recharges at one location, percolates downward and finds its way to hot springs within the same fault. In addition (and applicable to any hot springs), the full discharge of geothermal water may not occur at the hot springs; there may be some lateral leakage at depth along permeable zones or geological contact zones.

Significant to the understanding of the geothermal environment in the study area is that the Pool Creek Hot Springs and the Larsen Creek Hot Springs, which are the hottest springs in the area, are both located on the same fault at a distance of about 22 kilometres (Figure 1). This could indicate that this is a deep, permeable fault that allows access of meteoric fluids to higher temperatures in the earth's crust. It may also indicate that fault movement or orientation of the fault planes has created gaps or deterioration of the limestone that are more conducive to fluid transport. The Crow River and Thorpe Creek Warm Springs are also located at a similar longitude at a distance of 22 kilometres on adjacent fault systems that are only a few kilometres apart.

4.2 INORGANIC CHEMISTRY

All samples collected in the study area showed a similar chemical composition (cf. Figure 9) and can be characterized as Ca-Mg-HCO_3 type water. Only the samples taken from the Larsen Creek Hot Springs and Pool Creek Hot Springs are slightly different with sulphate being a second dominating anion (Ca-Mg-HCO_3-SO_4). The Ca-Mg-HCO_3 water type is typical for shallow groundwater and does not necessarily indicate deep fluid circulation and long groundwater residence times.

The similar chemical composition of all samples collected may suggest that all water samples originated from local shallow groundwater that has not undergone significant chemical alteration in the subsurface. The addition of sulphate as a second dominating anion in the samples from the Larsen Creek Hot Springs and Pool Creek Hot Springs may be explained by the dissolution of sulphate containing minerals such as gypsum or anhydrite.

None of the springs sampled show a high chloride or total dissolved solids concentrations which would be typical for far-traveled waters with long residence times and deep flow paths.

4.3 STABLE ISOTOPES

All samples plot close to both the Global Meteoric Water Line (GMWL) and the Local Meteoric Water Line (LMWL) of Whitehorse which indicates that the water is of local meteoric origin (Figure 10).

Stable isotopic fractionation which can be typical for high-temperature geothermal waters with high residence times was not observed.

4.4 TRITIUM CONCENTRATIONS AND GROUNDWATER RESIDENCE TIME

The tritium concentration of 10.2 TU in the sample collected from a cold spring in the Crow River area is similar to modern tritium concentrations in precipitation (IAEA/WMO, 2006) and indicates that this water represents recent recharge.

The samples from Larsen Creek Hot Springs, Pool Creek Hot Springs, and Crow River Warm Springs did not contain any measurable tritium which suggests that the residence time of these waters is greater than about 50 years, i.e., that the water infiltrated prior to the release of tritium by atmospheric nuclear bomb tests and does probably not contain a significant mixing component of young, shallow groundwater.

The remaining samples taken from the Thorpe Creek, Coal River, and Canyon Creek Warm Springs contained tritium concentrations ranging from 1.2 to 6.3 TU that are lower than the modern concentration in precipitation. This may either indicate:

- A residence time in the order of a minimum of a few years but less than about 50 years; or,
- Mixing of a deep, old water component with a residence time of more than 50 years (i.e., without any detectable tritium) and a younger, shallow groundwater component with a residence time of less than 50 years.

4.5 GEOTHERMOMETRY

EBA used geothermometer methods to estimate subsurface geothermal reservoir temperatures as described in Section 2.3. Table 7 summarizes the geothermometer temperatures estimated for the samples collected.

The silica-based geothermometer temperature was calculated for both the silicon concentrations measured in the undiluted and diluted water samples. The silicon concentrations in the diluted water samples were consistently higher than in the undiluted water samples when the concentrations in the diluted water samples are multiplied by the dilution factor of 10. The corresponding geothermometer temperatures for the diluted samples were about 10°C to 15°C higher than those for the undiluted samples (cf. Table 7). This can likely be explained by precipitation of the some of the dissolved silicon from the undiluted samples during field-filtering. Partial precipitation of the silica seems to have occurred despite the fact that great caution was exercised to avoid silica precipitation during field filtering.

It is important to note that the geothermometers do not provide any information on the depth and location of these temperature conditions. Furthermore, the silica geothermometer calculations do not take into account any mixing between the geothermal water and cold, shallow groundwater, and therefore usually present a lower estimate of the reservoir temperature.

The temperatures derived using the Na-K-Ca geothermometer are significantly higher than those from the silica-based geothermometer and appear to be unrealistically high. The temperatures calculated using the silica-based method seems to provide a more reliable lower estimate of the maximum subsurface temperature that the water samples had been exposed to. However; this remains speculative because of the lack of any direct subsurface temperature information.

TABLE 7: GEOTHERMOMETER RESULTS

SAMPLE	LOCATION	TEMPERATURE (°C)		
		Na-K-Ca	SiO2	d-SiO2*
L09S-4	Coal River WS	172	15	-
L09S-111	Coal River WS	167	15	-
L09S-05	Thorpe Creek WS	180	46	60
L09S-13	Thorpe Creek WS	183	35	48
L09S-44	Larsen Creek HS south	219	81	99
L09S-49	Larsen Creek HS south	216	77	89
L09S-51	Larsen Creek HS north	220	83	92
L09S-57	Pool Creek HS	203	81	99
L09S-76	Pool Creek HS	203	74	91
L09S-23	Crow River WS	232	53	65
L09S-98	Canyon Creek WS	178	43	58

* d-SiO_2 - diluted Si

5.0 CONCLUSIONS AND RECOMMENDATIONS

The Larsen Creek / Beaver River area has numerous thermal springs in relatively close proximity, characteristic of a geological environment with rock units and structures that create sub-surface pathways to allow rapid transmittal of heated fluids from depth to the surface. Six thermal springs were located and assessed and all occur within limestone associated with steeply dipping thrust faults. The two springs with the highest temperatures, elevated flows and extensive exposure (Pool Creek and Larsen Creek) are located on the same regional fault at a distance of about 22 km (Figure 1).

Based on the findings of this program, there is evidence for medium-temperature geothermal resources in the Larsen Creek / Beaver River area. Surface temperature, flow and structural geology are encouraging and it is probable that hot springs in the area could have suitable temperatures at depth to support a moderate geothermal development.

The geological setting in this area indicates that the geothermal resource is controlled by regional geological features (rock groups and major structures). Subsurface sources and actual temperatures at depth are not currently known. The geothermometer estimates have an inherent low level of confidence and in the absence of direct sub-surface data, definition of actual sub-surface temperatures would have to be confirmed by drilling at specific sites. Estimates of regional geothermal gradient may be available from research of data from deep boreholes advanced for oil and gas exploration in the Liard Basin to the east.

The remoteness and distance from a power transmission grid likely preclude advancement of exploration in this area in the short term unless the economics change. However, more advanced assessment of the geothermal resources in this area should be considered if future power transmission infrastructure is developed along the Alaska Highway transportation corridor.

The presence of hot springs is a positive indication of geothermal activity. The exploration and potential for moderate to large scale geothermal development is more likely to focus on geothermal gradient and deep, sub-surface geology to assess reservoir potential. The southeast Yukon region has been the target of exploration for petroleum resources and temperature data from deep boreholes could provide direct evidence of the geothermal gradient in the area. Geothermal gradient, the ratio of temperature with depth, should be a logical next step in this region, particularly if borehole temperature data is available further west, closer to the community of Watson Lake where there is a small market demand.

6.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of YEC and their agents. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than YEC, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. EBA's General Conditions are provided in Appendix A of this report.

7.0 CLOSURE

We trust that the foregoing information meets your present requirements. If you have any questions or require further information, please contact the undersigned.

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TABLES

TABLE 3: FIELD STATIONS IN LARSON CREEK / BEAVER RIVER STUDY AREA

Location	OWS WP#	Station	Date	UTM (Nad83)			Temp C	pH	EC	TDS	Comments
				Zone	Easting	Northing	[°C]	[-]	[µS/cm]	[ppm]	
Coal River Springs	WP150	L09L-01	14-Sep-09	9V	586841	6669407	13.0	6.88	378	218	Coal River Springs; a lot of pools on the left side of the Coal River springs have dried up; most warm seems to be draining underneath or down the mid-front face of the falls
Coal River Springs	WP150	L09L-02	14-Sep-09	9V	586847	6669414	13.3	6.62	378	212	Coal River Springs
Coal River Springs	WP150	L09L-03	14-Sep-09	9	586848	6669394	12.9	6.43	414	212	Coal River Springs
Coal River Springs	WP150	L09L-04	14-Sep-09	9	586848	6669394	13.1	7.40	405	204	-
Coal River Springs	WP150	L09L-05	15-Sep-09	9	586848	6669394	13.2	6.98	406	202	-
Coal River Springs	WP150	L09L-06	15-Sep-09	9	586848	6669394	12.9	6.26	393	201	
Coal River Springs	WP150	L09L-07	15-Sep-09	9	586848	6669394	14.6	6.43	389	199	Coal River Springs; pool may be warmer because it is shallow with little drainage and it is a warm day
Coal River Springs	WP150	L09L-08	15-Sep-09	9	586848	6669394	13.0	7.38	407	208	-
Coal River Springs	WP150	L09S-01	15-Sep-09	9	586809	6669409	13.1	7.86	450	225	Creek flowing into ponds
Coal River Springs	WP150	L09S-02	15-Sep-09	9	586824	6669425	12.8	7.13	433	217	Upper pool; small
Coal River Springs	WP150	L09S-03	15-Sep-09	9	586829	6669411	12.7	8.07	433	217	-
Coal River Springs	WP150	L09S-04	15-Sep-09	9	586989	6669498	13.2	7.26	432	216	Pool at head of creek; actual spring
Thorpe Creek	WP146/147	L09S-05	15-Sep-09	10	346830	6655705	25.3	6.86	380	192	Warm spring; moderate to high flow (>5L/s); feeding creek; several outlets in same spring; (~3-4m wide); lots of vegetation; fossiliferous limestone boulders at spring outlet; no obvious outcrops; some gas bubbling; very bright green vegetation at springs and continues down to the main channel but vegetation is not as abundant as at the springs; same plant species as at L09S-10 which is a cold spring
Thorpe Creek	WP248	L09S-06	15-Sep-09	10	346800	6655668	9.6	5.94		92	Small creek flowing into WS creek
Thorpe Creek	-	L09S-07	15-Sep-09	10	346831	6655630	11.2/7.7	6.88	138/56	70/28	2 small creeks flowing into WS creek; wetland drainage
Thorpe Creek	-	L09S-08	15-Sep-09	10	346861	6655647	16.8	7.46	302	155	WS creek (downstream of 1st confluence)
Thorpe Creek	-	L09S-09	15-Sep-09	10	346901	6655668	8.5	6.65	244	124	Spring downstream of WS creek; flows into WS creek
Thorpe Creek	-	L09S-10	15-Sep-09	10	346993	6655665	14.2	6.88	260	132	WS creek upstream of confluence with other creek (~ same size as WS creek) at helipad.
Thorpe Creek	-	L09S-11	15-Sep-09	10	347105	6655696	7.7	6.87	204	104	Creek flowing WS creek at helipad
Thorpe Creek	-	L09S-12	15-Sep-09	10	347065	6655782	5.0	6.67	194	97	Small creek
Thorpe Creek	-	L09S-13	15-Sep-09	10	347787	6656059	21.7	6.69	295	150	WS; huge flow; upwelling
Thorpe Creek	WP154	L09S-14	15-Sep-09	10	348520	6666363	8.6	6.61	226	117	-
Thorpe Creek	WP154	L09S-15	15-Sep-09	-	-	-	8.6	-	325	163	-
Thorpe Creek	WP154	L09S-16	15-Sep-09	10	348511	6666328	8.2	5.90	403	204	-
Thorpe Creek	WP154	L09S-17	15-Sep-09	10	348529	6666297	7.6	6.30	144	73	On main channel of stream; rock out crop looks like limestone
Thorpe Creek	WP154	L09S-18	15-Sep-09	10	348529	6666297	6.8	5.40	305	154	Small spring beside outcrop; slow to moderate flow from pond to creek (<10L/s); located across creek from L09S-17 at edge of spring
Crow River Springs	WP136	L09S-19	15-Sep-09	10	345357	6676895	20.3	6.77	353	179	Crow River Springs
Crow River Springs	WP136	L09S-20	15-Sep-09	10	345351	6676910	21.5	6.70	353	179	Fish in pond (see photos)
Crow River Springs	WP136	L09S-21	15-Sep-09	10	345303	6676957	19.2	6.50	340	179	-
Crow River Springs	WP136	L09S-22	15-Sep-09	10	345277	6676958	17.9	6.50	340	172	-
Crow River Springs	WP136	L09S-23	15-Sep-09	10	345233	66766994	28.0	6.80	367	188	Temp was 29.2 ~2 m upstream; open grassy meadow at toe of slope; tear shape pond with widest end at toe of slope; spring bubbling up in centre on SE side; lots of vegetation (mainly moss) within stream; white precipitate on rocks that are partially out of the water
Crow River Springs	WP136	L09S-24	15-Sep-09	10	345046	6677063	18.2	7.40	357	182	Open channel that flows into Crow River
Crow River Springs	WP136	L09S-25	15-Sep-09	10	344979	66677109	15.7	6.90	320	162	Spring out of slope
Crow River Springs	WP136	L09S-26	15-Sep-09	10	344965	6677115	18.6	6.50	361	184	Spring out of slope; bubbling but very little flow
Crow River Springs	WP136	L09S-27	15-Sep-09	10	344971	6677126	19.0	6.30	360	183	Small spring out of slope; little flow; same "spring" vegetation

TABLE 3: FIELD STATIONS IN LARSON CREEK / BEAVER RIVER STUDY AREA

Location	OWS WP#	Station	Date	UTM (Nad83)			Temp C	pH	EC	TDS	Comments
Crow River Springs	WP136	L09S-28	15-Sep-09	10	344946	6677123	18.0	6.60	362	183	White precipitate on rocks
Crow River Springs	WP136	L09S-29	15-Sep-09	10	344937	6677126	13.7	6.40	340	172	Very small spring that enters stream; strange noise - maybe gas.
Crow River Springs	WP136	L09S-30	15-Sep-09	10	344902	6677121	15.3	7.00	356	181	-
Crow River Springs	WP136	L09S-31	15-Sep-09	10	344902	6677121	12.9	6.80	344	175	-
Crow River Springs	WP136	L09S-32	15-Sep-09	10	344866	6677190	18.0	6.70	356	180	-
Crow River Springs	WP136	L09S-33	15-Sep-09	10	344880	6677180	14.3	6.60	351	179	Start of main tributary
Crow River Springs	WP136	L09S-34	15-Sep-09	10	344851	6677175	13.6	6.60	350	177	Small spring
Crow River Springs	WP136	L09S-35	15-Sep-09	10	344834	6677174	11.3	6.40	365	186	-
Crow River Springs	WP136	L09S-36	15-Sep-09	10	344987	6677102	17.9	6.70	350	179	Seep/spring coming out of left bank on channel
Crow River Springs	WP136	L09S-37	15-Sep-09	10	345129	6677022	22.6	6.90	375	190	-
OWS	-	L09S-38	16-Sep-09	9	665555	6669486	5.4	7.02	322	162	Open pond that flows into creek; bubbling; bright green algae
OWS	-	L09S-39	16-Sep-09	9	665463	6669702	5.3	7.64	301	150	Cold spring; seepage from slope (multiple spring outlets); moderate to high flow (>5L/s); lots of bright green bright moss and the plant with the green leaves and yellow flowers
OWS	-	L09S-40	16-Sep-09	9	665511	6669673	5.3	7.61	303	151	Small spring; bright green moss and bright green algae; also leafy plant with yellow flowers
Larson Creek South	WP137	L09S-41	16-Sep-09	10	360758	6675638	43.4	6.84	538	269	Larson Creek HS; big pool (diameter ~10m; depth ~4m), outlet of pool cascades down into Larson Creek; bubbling in centre of pool; turquoise colour; site is at the west edge of the pond; rusty green crusty algae
Larson Creek South	WP137	L09S-42	16-Sep-09	10	360758	6675638	42.9	6.87	540	269	-
Larson Creek South	WP137	L09S-43	16-Sep-09	10	360758	6675638	42.3	7.00	543	269	-
Larson Creek South	WP137	L09S-44	16-Sep-09	10	360758	6675638	43.1	7.00	538	269	Took 2 water sample sets and gas sample
Larson Creek South	WP137	L09S-45	16-Sep-09	10	360746	6675587	6.7	6.78	286	143	Small spring in trees upstream of pool at S-41
Larson Creek South	WP137	L09S-46	16-Sep-09	10	360673	6675509	13.0	7.24	399	199	Seepage at top of marshy opening on slope upstream of S-45; mostly sedges
Larson Creek South	WP137	L09S-47	16-Sep-09	10	360673	6675509	12.7	7.42	397	198	Small pool in forest; no flow upslope of marshy opening; 30-40cm deep and diameter = 2m.
Larson Creek South	WP137	L09S-48	16-Sep-09	10	360692	6675618	37.4	7.00	504	252	HS across Larson Creek from main HS; on gravel bar of Larson Creek; cold water pond just above HS; seeping out of flat gravel bar; low flow (~10L/min); some gas bubbles; white coating on rocks; same vegetation and algae as main pool
Larson Creek South	WP137	L09S-49	16-Sep-09	10	360696	6675624	39.4	7.00	508	255	Same description as S-48 but less flow (5L/min)
Larson Creek South	WP137	L09S-50	16-Sep-09	10	360687	6675606	14.7	7.01	318	158	Cold water pool upstream of S-48; no "hot spring" algae
Larson Creek North	WP137	L09S-51	16-Sep-09	-	-	-	50.9	7.01	547	273	HS in bank of creek (tributary that flows into Larsen Creek on left bank)
Pool Creek Hotsprings	WP120	L09S-52	17-Sep-09	10	350953	6700305	5.1	7.35	398	197	Small spring flows into side channel of Beaver River
Pool Creek Hotsprings	WP120	L09S-53	17-Sep-09	10	350930	6700336	5.2	7.00	395	196	Small spring flows into side channel of Beaver River; upstream of S-52.
Pool Creek Hotsprings	WP120	L09S-54	17-Sep-09	10	350830	6700397	4.3	7.25	399	199	Spring flows into side channel of Beaver River; upstream of S-53; fairly deep pool (1 m in diameter; 0.5 m deep); the main spring.
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-55	17-Sep-09	10	358399	6696650	49.1	6.60	621	313	Pool is fairly large (~30m in length, varies between 2m and 15m in width); spring comes out of ground ~15m away from toe of slope; dark green algae mainly in pool; large open meadow; trees around perimeter, mostly spruce mixed with balsam and paper birch; lots of patches of very tall ferns (up to 1.5m tall) and equisetum; lots of grey reindeer lichen; eurhynchium oreganum
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-56	17-Sep-09	10	358399	6696650	46.5	6.60	605	301	Other spring in the same pool as L09S-55 but there is less flow

TABLE 3: FIELD STATIONS IN LARSON CREEK / BEAVER RIVER STUDY AREA											
Location	OWS WP#	Station	Date	UTM (Nad83)			Temp C	pH	EC	TDS	Comments
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-57	17-Sep-09	10	358413	6696663	53.2	6.40	611	305	Took water sample; $CaCO_3$ precipitate on rocks around the spring and floating as a mat with dried out algae on the surface; no outflow
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-58	17-Sep-09	10	358517	6696663	33.6	7.01	569	285	Small pool at toe of slope; two main pools are connected; no obvious main spring; no outflow or inflow
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-59	17-Sep-09	10	358584	6696621	17.5	7.02	523	261	Small pool at toe of slope; no inflow/outflow; no obvious spring; appears to be standing water; pool is about 4m wide and 30 m long
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-60	17-Sep-09	10	358649	6696606	11.3	7.68	396	198	Small seepage area at toe of slope; same description as L09S-59 but with less water; only 2x4m; likely to be just standing surface water
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-61	17-Sep-09	10	358802	6696600	15.9	7.02	476	239	Elongated pond that goes along the toe of slope then continues out into centre of the meadow; some bubbling at station; small fish
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-62	17-Sep-09	10	358774	6696656	13.7	8.10	402	201	Same pond as L09S-61
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-63	17-Sep-09	10	358962	6696727	13.1	7.03	456	227	Stagnant water in ditch
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-64	17-Sep-09	10	358985	6696707	9.9	7.50	469	233	Looks like the start of the pool; standing water at the toe of slope that flows into the field
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-65	17-Sep-09	10	357960	6696313	30.9	6.98	449	225	At top end of channel/spring on the west side; lots of bubbling; bright green duckweed and algae on surface; dark green algae on rocks in water
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-66	17-Sep-09	10	357962	6696317	32.0	6.99	455	227	-
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-67	17-Sep-09	10	357986	6696343	31.1	7.06	458	228	20m downstream of L09S-66
Pool Creek Hotsprings	Pool Creek Hotsprings	L09S-68	17-Sep-09	10	357998	6696363	37.4	6.88	485	242	20m downstream of L09S-67
Pool Creek Hotsprings	-	L09S-69	17-Sep-09	10	358018	6696401	37.7	6.84	488	244	Small spring flows into channel; ~0.5L/s flow; ~30cm wide; no algae in stream
Pool Creek Hotsprings	-	L09S-70	17-Sep-09	10	358026	6696414	37.4	6.80	491	244	Small spring at tow of slope; connects with main channel; dark green algae on rocks in stream; some black algae
Pool Creek Hotsprings	-	L09S-71	17-Sep-09	10	358029	6696457	38.1	6.81	493	245	Spring at toe of slope which flows into channel; dark green algae
Pool Creek Hotsprings	-	L09S-72	17-Sep-09	10	358029	6696457	39.5	6.73	502	250	Spring at toe of slope which flows into channel
Pool Creek Hotsprings	-	L09S-73	17-Sep-09	10	358029	6696457	40.5	6.73	516	257	10 m downstream of L09S-71
Pool Creek Hotsprings	-	L09S-74	17-Sep-09	10	358032	6696475	37.9	6.72	470	235	15 m downstream of L09S-71
Pool Creek Hotsprings	-	L09S-75	17-Sep-09	10	358032	6696475	40.5	6.68	545	271	5m downstream of L09S-74; spring at toe of slope, flows into channel
Pool Creek Hotsprings	-	L09S-76	17-Sep-09	10	358030	6696524	40.6	6.68	565	282	Spring at toe of slope which flows into channel
Pool Creek Hotsprings	-	L09S-77	17-Sep-09	10	358029	6696541	40.0	7.01	593	296	-
Pool Creek Hotsprings	-	L09S-78	17-Sep-09	10	357999	6696569	28.7	6.93	437	290	The start of the spring; upstream of channel B
Pool Creek Hotsprings	-	L09S-79	17-Sep-09	10	358016	6696575	33.4	7.18	491	245	At confluence of Channel A and B; flow for channel B ~0.5m/s; 1m width, 12cm depth.

TABLE 3: FIELD STATIONS IN LARSON CREEK / BEAVER RIVER STUDY AREA											
Location	OWS WP#	Station	Date	UTM (Nad83)			Temp C	pH	EC	TDS	Comments
Pool Creek Hotsprings	-	L09S-80	18-Sep-09	10	358988	6696824	33.9	6.60	634	320	Top of small channel off side of Beaver River; not connected to River at top end; springs with some bubbling; dark green algae
Pool Creek Hotsprings	-	L09S-81	18-Sep-09	10	359000	6696933	28.4	6.69	552	278	Downstream from S-80 ~ 20m, same channel; green algae
Pool Creek Hotsprings	-	L09S-82	18-Sep-09	10	359028	6696948	22.5	6.92	562	290	Downstream from S-80 and S-81; same channel; no dark green algae this far down the channel
Pool Creek Hotsprings	-	L09S-83	18-Sep-09	10	358988	6697046	18.8	6.92	606	304	Narrow, channel-like pond; no flow; does not appear to be connected to the river; lots of duckweed; no dark green algae
Pool Creek Hotsprings	-	L09S-84	18-Sep-09	10	359005	6697057	23.7	6.92	608	304	Downstream of S-83; same channel; lots of aquatic plants (mostly duckweed); small amount of dark green algae; spruce; very large balsam; tall ferns
Pool Creek Hotsprings	-	L09S-85	18-Sep-09	10	359042	6697100	19.1	6.92	603	300	Some dark green algae but not as dark as hot springs
Pool Creek Hotsprings	-	L09S-86	18-Sep-09	10	359060	6697146	16.4	6.92	599	299	Slight downstream flow; beige and brown algae
Pool Creek Hotsprings	-	L09S-87	18-Sep-09	10	359065	6697218	12.5	7.63	573	286	Downstream of S-86; same channel
Pool Creek Hotsprings	-	L09S-88	18-Sep-09	10	359098	6697002	20.3	6.92	607	301	Small stream beside the Beaver River
Pool Creek Hotsprings	-	L09S-89	18-Sep-09	10	360138	6697910	8.8	7.15	340	170	Side channel on the Beaver River; river right down stream of Pool Creek Hot Springs; no green algae
Pool Creek Hotsprings	-	L09S-90	18-Sep-09	10	359934	6697738	8.1	7.29	678	339	Pool along toe of slope; located within the floodplain of the Beaver River
Pool Creek Hotsprings	WP125	L09S-91	18-Sep-09	10	366351	6696294	8.0	7.10	312	160	Old side channel off the Beaver River; standing water; no inlet or outlet; lots of duckweed
Pool Creek Hotsprings	WP152	L09S-92	18-Sep-09	10	366548	6696095	6.1	7.33	345	173	Side channel on the Beaver River
Crow River Springs	Crow River Springs	L09S-93	18-Sep-09	10	345112	6676987	20.6	7.22	297	148	Very small spring in the middle of the Crow River on a small island; green leafy plants with yellow flowers
Crow River Springs	Crow River Springs	L09S-94	18-Sep-09	10	345112	6676987	10.0	8.24	245	121	At Crow River site; beside S-93 but within the River
Crow River Springs	Crow River Springs	L09S-95	18-Sep-09	10	345048	6677014	15.1	7.48	353	177	Small spring on Crow River (right bank); upstream of S-93 and 94.
OWS	-	L09S-96	18-Sep-09	10	349588	6681693	3.9	7.47	313	157	Small spring flowing into stream on bend; bright green algae and moss
OWS	WP159	L09S-97	18-Sep-09	10	353521	6684721	5.1	8.25	283	141	Start of canyon.
Canyon	WP159	L09S-98	18-Sep-09	10	353566	6685068	15.1	7.27	358	179	Downstream of S-97; two big springs with significant flow; these springs more than double the volume of water upstream; a lot of bright green moss right around spring area
Canyon	WP159	L09S-99	18-Sep-09	10	353566	6685068	14.9	7.28	360	179	Spring at toe of slope ~ 1.5m above creek; less flow than L09S-98 (~5L/s)
OWS	WP159	L09S-100a	18-Sep-09	10	353284	6693264	7.9	8.43	243	121	Outlet of the trib of sites S-98 to 100 where it drains into Beaver River
OWS	WP159	L09S-100b	18-Sep-09	10	353284	6693264	7.8	8.60	286	144	Beaver River upstream of L09S-100a
OWS	WP162	L09S-101	19-Sep-09	10	343708	6678995	4.2	7.65	305	152	Small spring that flows down into main creek; lots of bright green moss and some very green plants
OWS	WP162	L09S-102	19-Sep-09	10	343733	6679026	4.0	7.65	318	159	Small spring at slope ~5m above valley bottom; moss cover
OWS	WP162	L09S-103	19-Sep-09	10	343740	6679079	4.1	7.65	320	160	-
OWS	WP162	L09S-104	19-Sep-09	10	343699	6679118	4.5	7.65	314	158	Small spring at base of slope; very little flow; some gas bubbles; moss cover
OWS	WP162	L09S-105	19-Sep-09	10	343677	6679166	4.6	7.65	326	163	Same description as L09S-104

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Location	OWS WP#	Station	Date	UTM (Nad83)			Temp C	pH	EC	TDS	Comments
OWS	WP162	L09S-106	19-Sep-09	10	343604	6677761	4.6	7.75	312	156	Small springs; some gas bubbles in small pool that springs flows into; leafy green plant with yellow flowers, some green and brown algae
OWS	WP135	L09S-107	19-Sep-09	10	340047	6676160	4.8	7.73	310	153	Small spring; lots of green moss
OWS	WP135	L09S-108	19-Sep-09	10	340091	6676138	4.8	7.64	314	157	Small spring flows into creek; lots of green moss and other bright green plants; some equisetum but a different species
OWS	WP155	L09S-109	19-Sep-09	10	340542	6671918	5.3	7.72	327	162	Stream flowing out of a pond within a wetland
OWS	-	L09S-110	19-Sep-09	9	652508	6667201	5.0	7.52	187	374	Site is on tropical creek; seepage from toe of limestone bluff.
OWS	-	L09S-111	19-Sep-09	9	586506	6670323	7.3	11.70	552	275	Coal River; northern spring; uppermost spring outlet; moderate flow (5 10L/s); moss cover and heavily vegetated around spring and creek
OWS	WP150	L09S-112	19-Sep-09	9	586671	6670021	11.7	-	548	274	Main northern pool of Coal River warm springs
OWS	WP150	L09J-01	14-Sep-09	9	586824	6669457	14.0	4.87	414	210	Coal River springs; north end of top pool at main site
Coal River Springs	-	L09J-02	14-Sep-09	9	586987	6669487	-	-	-	-	~300m upstream of main coal river springs; source pool behind old beaver dam
Coal River Springs	-	L09J-03	14-Sep-09	9	587027	6669429	-	-	-	-	-
Coal River Springs	-	L09J-04	14-Sep-09	9	586814	6669400	14.1	7.13	389	193	Centre, middle terrace of main coal river springs
Coal River Springs	-	L09J-05	14-Sep-09	9	586848	6669394	13.3	8.11	434	217	Small pool ~20m south of main creek; fed by small stream
Thorpe Creek	-	L09J-06	15-Sep-09	10	347835	6955956	14.9	7.71	268	134	2m wide stream; 15-30m deep; low ground vegetation only in this zone; distinctive; broad-leafed water plants in stream and some dark green algae; no trees
Thorpe Creek	-	L09J-07	15-Sep-09	10	347791	6956075	21.7	7.17	325	162	Strong flow; very strong flow from 4 main sources, 2 at north and east side of pond and 2 boiling up within pond; berm has been formed at the west side of form pond - obviously placed by man long ago; rocks covered with moss; broad-leafed water plants; high flow
Thorpe Creek	-	L09J-08	15-Sep-09	10	347744	6956106	6.5	7.14	182	92	In stream ~75m up stream of warm springs; stream water is moderately cloudy; stream is 1.2m wide, 0.15m deep; strong flow; up slope is dark gray, sugary texture
Thorpe Creek	-	L09J-09	15-Sep-09	10	347673	6956102	10.4	7.13	292	146	2.5m diameter pond within small forest opening; low flow; 15 m wide opening in the forest from spring down to stream with low ground vegetation; located at toe of 10m high slope/knob which is forested; med coloured green to dark algae; low ground vegetation; minor willows; no trees or large bushes where ground is influenced by warm water
Thorpe Creek	-	L09J-10	15-Sep-09	10	347582	6956168	6.4	7.59	180	90	Strong flow fed by 3 springs emerging from base of short (6m high), steep (73%) forested slop; water is cloudy; stream from spring flows 5m to main stream; main stream up stream of spring is clear
Thorpe Creek	-	L09J-11	15-Sep-09	10	347851	6955817	15.0	7.13	271	135	-
Thorpe Creek	WP154 (d/s)	L09J-12	15-Sep-09	10	349160	6666696	6.9	6.37	232	116	Stagnant small ponds at base of fissile limestone scarp; 30m high
Thorpe Creek	-	L09J-13	15-Sep-09	10	349072	6666636	6.9	7.14	297	149	-
Crow River Springs	WP136	L09J-14	15-Sep-09	10	345143	6677064	23.1	7.13	395	197	Trickle spring emerges 1/4 way up short (8m) moderate slope; flow down 0.20m wide channel to small (15-20m diameter) triangle fan shaped wetland
Crow River Springs	-	L09J-15	15-Sep-09	10	345159	6677057	21.3	7.13	384	191	Trickle flow down 0.4m wide low flow channel
Crow River Springs	-	L09J-16	15-Sep-09	10	345123	6677075	13.5	7.82	349	175	Tiny grassy, shallow pool; warm water plants; negligible flow; dry draw cut into slope
Crow River Springs	-	L09J-17	15-Sep-09	10	345056	6677089	25.5	7.13	377	188	Small seep on gentle slope; 4 m down stream splits to a "y"; west channel widens to 1.5m of warm vegetation and boulders with trickle flow increasing from additional small springs

TABLE 3: FIELD STATIONS IN LARSON CREEK / BEAVER RIVER STUDY AREA

Location	OWS WP#	Station	Date	UTM (Nad83)			Temp C	pH	EC	TDS	Comments
Crow River Springs	-	L09J-18	15-Sep-09	10	345028	6677097	22.3	7.13	388	194	Tiny spring with negligible flow from base of open grassy slope with thick vegetation horizon; 30m downstream of L09J-17; flows 3m into channel coming from eastern small springs; audible burping/off gassing within talus
Crow River Springs	-	L09J-19	15-Sep-09	10	345028	6677097	15.1	7.13	306	153	10m west of J-18; similar description
Crow River Springs	-	L09J-20	15-Sep-09	10	345028	6677097	23.8	7.12	380	190	In channel below J-19
Crow River Springs	-	L09J-21	15-Sep-09	10	344911	6677144	14.9	7.13	368	184	150m west of J-20; small seep/spring from short, grassy, partly forested bench; flows SW 5m into small, S-facing stream
Crow River Springs	-	L09J-22	15-Sep-09	10	344823	6677217	10.3	6.63	-	182	Large, 50m diameter open wetland-meadow; standing water in tall grasses and rushes
OWS	WP163	-	15-Sep-09	-	-	-	-	-	-	-	Wetland; one meandering channel; some wetland grasses; no areas of algae or green, warm water vegetation or springs
OWS	-	L09J-23	16-Sep-09	9	665707	6668954	5.0	7.75	314	156	0.75m wide; low flow channel (0.05 -0.15m deep); source is two low-low springs ~15m u/s; location is in the middle of a ~100m wide valley of prominent stream flowing south; open meadow of grass and tall willow with some mature spruce (~25m tall); dark green algae; warm-warm water, broad leafed flowering vegetation
OWS	-	L09J-24	16-Sep-09	9	665707	6668954	4.9	8.00	314	157	~3m south of J-23; moderate flow; 1m wide; 0.10-0.15m deep channel; flows from base of old beaver dam; J23 and J24 flow into another channel 10 m downstream, no algae or broad-leafed water plants; same vegetation as J-23
OWS	WP153	L09J-25	16-Sep-09	9	665805	6668821	5.6	8.05	307	157	Stagnant backwater in forested meadow/floodplain within 20 m of creek; numerous small sites with anomalous vegetation; bright green algae
OWS	WP143	-	16-Sep-09	-	-	-	-	-	-	-	Short LS canyon up stream of lake; open wetland u/a of canyon; some beaver dams; no sign of spring or anomalous vegetation
OWS	WP148	-	16-Sep-09	-	-	-	-	-	-	-	Meandering stream channel in wide valley of mixed open wetland and spruce forest; possible cold spring
Larson Creek North	-	L09J-26	16-Sep-09	10	361017	6676107	17.5	7.76	294	148	Creek is large; 3m wide, average 25cm deep; high flow
Larson Creek North	-	L09J-27	16-Sep-09	10	360881	6676216	26.1	7.30	484	246	Small seep in standing water in mostly dry backwater channel; at toe of 4m high escarpment of travertine; flat terrace above; rich, dark green algae and water plants
Larson Creek North	WP139	-	16-Sep-09	-	-	-	-	-	-	-	No sign of any spring; waterfall in trib
Larson Creek North	WP132	-	16-Sep-09	-	-	-	-	-	-	-	No sign of vegetation anomalies; open wetlands and beaver ponds; visibility good; flat; wetland; mid-valley terrain
Larson Creek North	WP138	-	16-Sep-09	-	-	-	-	-	-	-	On Larsen Creek; marks bottom end of open water channel; no anomalies
Larson Creek North	-	L09J-28	-	10	360837	6676224	29.0	7.21	462	234	Small spring/seep in mud bank next to channel of warm springs; low flow; dark green algae and water plants
Larson Creek North	-	L09J-29	16-Sep-09	10	360815	6676242	27.4	7.53	417	212	In stream located at toe of travertine scarp (4m high)
Larson Creek North	-	L09J-30	16-Sep-09	10	360704	6676221	23.0	7.41	339	172	Pack, stream and slope of orange groundcover; in small stream at toe of slope; head water of this stream that flows east down toe of north scarp; 0.5m wide; 0.10m deep channel; typical plants and algae
Larson Creek North	-	L09J-31	16-Sep-09	10	360702	6676195	51.0	6.91	506	258	Very high flow (10's of L/s) from 0.5 m wide; 1.5 m long area of orange stained boulders with white (calcite) precipitate; constant small gas bubbles along upper edge; located along NE bank of Trib A; ~ 25m D/stream of corner of LS slope where Trib A heads up into area where it is confirmed along steep NE Bank; dark green algae

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Location	OWS WP#	Station	Date	UTM (Nad83)			Temp C	pH	EC	TDS	Comments
Larson Creek North	-	L09J-32	16-Sep-09	10	360617	6676243	15.9	7.63	304	154	Small stream in back water; high water channel of Trib A; located at toe of NE slope
Larson Creek North	-	L09J-33	16-Sep-09	10	360497	6676282	13.8	7.69	418	213	Located at toe of 30m high limestone bluff on east side of Trib A floodplain; small seep in fluvial gravels; dark green algae
Larson Creek North	-	L09J-34	16-Sep-09	10	-	-	7.7	8.46	206	104	In main channel of Trib A in boulder fluvial; 4m wide wet channel; 20m high banks
OWS	WP140	-	16-Sep-09	10	360409	6656100	6.4	8.60	261	132	limestone (ls) canyon flows into Mooney River; steep ls walls around; sample at edge of Mooney River, in water flowing from canyon;
OWS	WP141	-	16-Sep-09	-	-	-	-	-	-	-	Channels all appear typical; some beaver ponds in openings; no anomalous vegetation; no springs observed
OWS	WP142	-	16-Sep-09	-	-	-	-	-	-	-	Thick, mature spruce forest; small stream with no openings, springs or vegetation anomalies
OWS	WP145	-	16-Sep-09	-	-	-	-	-	-	-	Stream channel is general winding through mature spruce forests; no openings; in vicinity of the lake with open wetlands and channel; no anomalous vegetation, openings or springs observed
OWS	WP157	-	17-Sep-09	-	-	-	-	-	-	-	Large stream channel in dense, mature spruce forest; no openings; no vegetation anomalies; large drainage basin
OWS	WP158	-	17-Sep-09	-	-	-	-	-	-	-	Large drainages; large streams with good flows and rapids; dense, mature spruce forest; no openings, no vegetation anomalies; numerous landslide from high on upper slopes in this area
OWS	-	L09J-35	17-Sep-09	10	351002	6700206	7.4	8.31	300	150	In side channel at bank of Beaver River; north side; next to marble bluff; 30m high
OWS	-	L09J-36	17-Sep-09	10	350853	6700380	4.5	7.59	357	184	Small flow stream on open area of mud (30x30m) in mature mixed forest
OWS	-	L09J-37	17-Sep-09	10	350748	6700306	6.3	8.86	440	219	~150m u/s from heli-pad where side channel flows into Beaver River; in stream with good flow from NW; flows into side channel; 0.5m wide; 0.08m deep
OWS	WP119	-	17-Sep-09	-	-	-	-	-	-	-	Beaver River channel has a few islands; wide channel; valley bottom closed mixed forest; some landslide opening; no openings, anomalous vegetation or springs observed
OWS	WP130	-	17-Sep-09	-	-	-	-	-	-	-	Fast-flowing stream with large drainage in narrow; v-shaped valley of mixed forest; some landslide openings; no other openings or anomalous vegetation; assume open from high flow
Pool Creek Hotsprings	-	L09J-38	17-Sep-09	10	358245	6696730	-	-	-	-	on south bank of Beaver River at extreme west point of hot springs; meadowland in forest at toe of slope and at east edge of vertical LS o/c that presents barrier to walking upstream.
Pool Creek Hotsprings	-	L09J-39	17-Sep-09	10	358997	6696797	13.9	8.21	430	214	At E edge of 4m wide; 0.45m deep channel in meadow; no presentable flow; fed by stream on south slope ~ 200m east
Pool Creek Hotsprings	Pool Creek Hotsprings	L09J-40	17-Sep-09	5 m S of WP019	358075	6696650	-	-	-	-	Vertical limestone (ls) bluff; dark grey, muggy ls; somewhat friable on W (fault) surface (vertical plane)
Pool Creek Hotsprings	Pool Creek Hotsprings	L09J-41	17-Sep-09	10	358017	6696582	33.2	7.01	545	273	Mouth of small channel from west (Channel A-2) into Channel A-1 (main channel of Area A; downstream of L09S-78.
Pool Creek Hotsprings	Pool Creek Hotsprings	L09J-42	18-Sep-09	10	358894	6696984	-	-	-	-	-
Pool Creek Hotsprings	Pool Creek Hotsprings	L09J-43	18-Sep-09	10	359094	6697002	35.7	6.87	358	329	Small spring emerging from floodplain silt; 5m north of Beaver River bank; joins another channel flowing from North(outflow of a main, wide channel/pond exposed as a forest opening); then into river

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Location	OWS WP#	Station	Date	UTM (Nad83)			Temp C	pH	EC	TDS	Comments
Pool Creek Hotsprings	Pool Creek Hotsprings	L09J-44	18-Sep-09	10	358198	6696999	-	-	-	-	At outcrop of very fissile, thinly bedded, dk gy limestone ~60m elev; above meadow of Area C
Pool Creek Hotsprings	Pool Creek Hotsprings	L09J-45	18-Sep-09	10	360417	6697859	8.1	7.55	395	195	1-2km down stream on Beaver River; side channel area with murky, bluish water
Pool Creek Hotsprings	Pool Creek Hotsprings	L09J-46	18-Sep-09	10	360528	6697956	5.5	7.80	338	179	Wide, flooded back channel against slope; fresh beaver activity
OWS	WP124	-	18-Sep-09	-	-	-	-	-	-	-	Standing water in old flood channel against slope; possibly elevated water by beaver activity; no anomalous vegetation; small opening in forest at up stream end of channel; likely cold water
OWS	WP131	L09J-47	18-Sep-09	10	370140	6692363	8.0	7.77	381	190	Annually active side channel of Beaver River; 15m wide silt flats; flowing water with some brown rust algae; no anomalous vegetation, green algae or forest openings; open channel area due to active seasonal high water flows
OWS	-	L09J-48	18-Sep-09	10	345432	6676406	3.4	8.24	302	151	Small stream in open meadow - grassy in middle of conifer forest
OWS	-	L09J-49	18-Sep-09	10	345383	6676377	3.9	8.19	364	183	Small stream in open grassy wetland meadow; from a cold spring; dark green algae
OWS	WP161	L09J-50	18-Sep-09	10	349398	6681300	13.9	7.84	176	86	Standing water in depression in open grassy wetland - probably solar heated
OWS	WP160	L09J-51	18-Sep-09	10	353514	6685095	10.9	7.92	338	168	In stream at top of waterfall ~45m down stream of main springs
OWS	WP159	L09J-52	18-Sep-09	10	353566	6685068	-	-	-	-	Located at limestone outcrop 10m above springs; above east side of stream bank; spring has high flow; located 50m u/s of OW152 warm springs; limestone canyon - light gray, massive
OWS	WP122	-	18-Sep-09	-	-	-	-	-	-	-	At confluence of major tributary from the south into Beaver River; high flow in narrow canyon; flew over lower canyon of trib; no vegetation anomalies or springs were observed
OWS	WP162	L09J-53	18-Sep-09	10	343651	6678512	7.9	8.30	258	124	At large pond 35m diameter; irregular shape, with med-green algae into low from east; pond is shallow average 30-40cm deep; limestone outcrop on both sides of E end of pond where it narrows at inflow; abundant green algae in a wide channel
OWS	-	L09J-54	19-Sep-09	10	343740	6678551	5.0	8.34	266	134	Good flow in 0.4m wide inflow to pond
OWS	-	L09J-55	19-Sep-09	10	343647	6678607	6.2	8.00	305	152	Very small spring with low flow; 6m long, 0.5m wide channel flowing (trickle) to pond from N; mass of water plants
OWS	-	L09J-56	19-Sep-09	10	343542	6678656	5.1	7.94	304	153	Small spring ~5m north on edge of 15m wide channel that flows into upper crow river; 1m wide x 4m long "spring area" of moss, and boulders; broad leaf water plants and moss; no algae
OWS	-	L09J-57	19-Sep-09	10	343549	6678747	5.3	8.05	305	152	Moderate flow spring with 0.5-2.0m wide channel; water channel is 0.4m wide, 0.05m deep; small spring flows west to upper Crow River Trib; second spring small from N; green moss and water plants
OWS	-	L09J-58	19-Sep-09	10	343562	6678829	3.8	7.98	290	145	Small spring with 3 apparent vents within 1.5m; parameters are from the middle vent; vegetated 3m high limestone outcrop; bright green moss and algae on 5m wide "bay" on east side of stream channel
OWS	-	L09J-58b	19-Sep-09	10	343663	6678943	6.1	8.01	287	144	Tiny "bay" (1.5x2.0m) in wetland channel/pond with no visible flow; small broad-leaf water plants suggest it may be spring fed; no algae; minor moss on site 135
OWS	-	L09J-59	19-Sep-09	10	343574	6677708	4.0	7.88	280	140	Small cold spring; bright green moss and broad-leaf water plants; minor algae

TABLE 3: FIELD STATIONS IN LARSON CREEK / BEAVER RIVER STUDY AREA

Location	OWS WP#	Station	Date	UTM (Nad83)			Temp C	pH	EC	TDS	Comments
OWS	WP135	L09J-60	19-Sep-09	10	340106	6676132	6.7	7.68	280	140	Small spring flows (trickle) NE into SE flowing, 5m wide stream; Many small cold springs in this area; observed from air all appear to have characteristics of cold springs: no dark green/blue algae; no precipitates; no ponds; green moss; broad-leaf water plants; minor algae
OWS	WP155	L09J-61	19-Sep-09	10	340306	6671946	7.2	7.63	289	144	Small spring 25 square meter area of multiple springs; in large open wetland meadow; spring 10m north; green moss; broad-leaf vegetation; yellow flowering plants
OWS	WP164	L09J-62	19-Sep-09	10	651180	6679873	5.1	7.69	329	162	Small spring on very small lake
OWS	WP134	-	19-Sep-09	-	-	-	-	-	-	-	Did not observe any signs of springs, vegetation anomalies; no anomalous openings
OWS	-	L09J-63	19-Sep-09	9	652443	6667238	7.0	8.02	346	173	Green pond with outflow into 40x60m opening = dry meadow in thick spruce forest; elongate pond is against the limestone bluff; flows ~40m into tropical creek; at 0.75m wide, 0.07m deep channel with high flow; washed limestone boulders, some with calcite coating; ancient breached beaver dam at outflow of meadow
OWS	WP164	-	19-Sep-09	-	-	-	-	-	-	-	Large lake and small lake in wetland, east of Tobally Lake at this point; no anomalous vegetation, openings or springs observed
Coal River Springs	Coal River Springs (upstream springs)	L09J-65	20-Sep-09	9	586696	6669952	11.2	8.05	469	234	Spring in forested area 20m west at south end of tufa deposit of this northernly spring; flows from under mound of forested moss; 0.6m wide and 0.10m deep channel; clear; no algae; minor moss; no tufa deposits on vegetation; tufa gravel on channel floor
Coal River Springs	Coal River Springs (upstream springs)	L09J-66	20-Sep-09	9	586775	6670091	12.0	7.33	491	246	Spring with 15m diameter opening of source spring area for down stream 75m pool and tufa wall; 10m W of L09S-111; high flow; moss and broad-lead water plants; no algae
Coal River Springs	Coal River Springs (upstream springs)	L09J-67	20-Sep-09	9	586761	6670107	11.6	7.37	483	242	One of multiple (>3) springs tucked up in forest ~10m due N of open source area; moss and vegetated LS boulders
Coal River Springs	Coal River Springs (upstream springs)	L09J-67b	20-Sep-09	9	586761	6670107	11.9	8.18	486	243	Centre of main braided stream; flowing into main pool 15m d/s.

Table 5 Geological Units in the Larsen Creek / Beaver River Region				
MAP UNIT	AGE	Ma	FORMATION	DESCRIPTION
Q	Quaternary	Recent	-	unconsolidated sand, gravel, silt and clay
ITR	Eocene	57.8-36.6	-	volcanics: rhyolite/flows/tuff/breccia
mKT	Mid-Cretaceous	120-80	Tombstone Suite	plutonic suite dominated by felsic to syenitic compositions
Ks	Lower Cretaceous	144-97.5	Sharp Mountain	Fine and coarse clastic assemblage, mostly marine, deposited in foredeep of Cordilleran orogen
CPM	Carboniferous and Permian	360-245	Mattson	thinly bedded grey sandstone, shale and coal overlain by massive bedded grey to brown sandstone, in turn overlain by grey sandstone, limestone and shale
DMBR	Devonian and Mississippian	408-320	Besa River	fine grained clastic assemblage sandstone and shale
OSK	Upper Ordovician and Silurian	458-405	Kindle	mostly dark grey dolomite with well-bedded siltstone, sandstone, shale and light grey limestone
OS	Middle Ordovician	478-458	Sunblood	mainly bluff, rouge and light grey weathering platy dolomite and limestone
PCB	Upper Proterozoic to Lower Cambrian	> 505	Backbone	massive quartzite with regionally extensive carbonate member and local mafic volcanics
TrJ	Triassic	570-505	Jones Lake	brown to buff weathering, calcareous fine grained sandstone, argillite and shale" massive, light grey weathering, fine crystalline, dark grey limestone" minor orange weathering platy limestone
ICS	Lower Cambrian	570-540	Sekwi	limestone, limestone conglomerate breccia, massive grey dolostone, sandstone, purple siltstone, bright orange weathering dolostone

TABLE 6: LARSEN CREEK WATER CHEMISTRY AND ISOTOPE ANALYTICAL RESULTS

Analyte		Units	Sample Name	L09S-5	L09S-5D	L09S-09	L09S-13	L09S-13D	L09S-23	L09S-23D	L09S-44	L09S-44D	L09S-441	L09-441D	L09S-49
			Lab	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova
			Lab ID	704058-1	704058-2	704058-3	70458-4	704058-5	704058-6	704058-7	704058-8	704058-9	704058-20	704058-21	704058-10
			Sample Date	15-Sep-09	15-Sep-09	15-Sep-09	15-Sep-09	15-Sep-09	15-Sep-09	15-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09
			Sample Location	Thorpe Creek WS	Thorpe Creek WS	Thorpe Creek CS	Thorpe Creek WS	Thorpe Creek WS	Crow River WS	Crow River WS	Larsen Creek HS	Larsen Creek HS	Larsen Creek HS	Larsen Creek HS	Larsen Creek HS
			Easting (UTM, Nad83)	347968	347968	346901	347787	347787	345233	345233	360758	360758	360758	360758	360696
			Northing (UTM, Nad83)	6656469	6656469	6655668	6656059	6656059	6676694	6676694	6675638	6675638	6675638	6675638	6675624
			Detection Limit	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
Ion Balance		%		116		122	118		117		118		112		115
Field Parameters															
Temperature	T	°C		25.3		8.5	21.7		28.0		43.1		43.1		39.4
pH		pH units		6.86		6.65	6.69		6.80		7.00		7.00		7.00
Dissolved O_2	DO	mg/L		-		-	1.62		-		-		-		0.41
Electrical Conductivity	EC	µS/cm at 25°C		380		244	295		367		538.0		538.0		508.0
Total Dissolved Solids	TDS	ppm		192		124	150		188		269		269		255
Physical Parameters															
pH		pH units	-	7.67		7.77	7.55		7.63		7.60		7.69		7.44
Electrical Conductivity	EC	µS/cm at 25°C	1	488		311	386		463		560		566		539
Total Dissolved Solids	TDS	ppm	1.0	287		170	226		272		372		369		349
Hardness		mg/L	5	256		173	205		254		287		282		278
Dissolved Major Ions															
Calcium	Ca	mg/L	0.001	67.9		44.2	55.7		56.8		84.1		82.9		80.5
Magnesium	Mg	mg/L	0.10	21.0		15.3	16.0		27.2		18.6		18.3		18.7
Sodium	Na	mg/L	0.10	4.1		0.9	2.7		0.8		5.6		5.6		4.8
Potassium	K	mg/L	0.1	1.7		0.5	1.3		1.3		4.2		4.1		3.6
Silicon	Si	mg/L	0.05	5.89	0.84	2.49	4.34	0.62	7.08	0.96	14.30	2.17	14.10	1.78	12.90
Chloride	Cl	mg/L	0.02	4.56		0.65	2.51		0.39		<0.02		5.15		4.60
Fuoride	F	mg/L	0.01	1.34		0.32	0.68		0.64		0.47		0.62		0.48
Nitrate - N	NO_3	mg/L	0.01	0.03		0.04	0.02		0.07		<0.01		<0.01		<0.01
Nitrite - N	NO2	mg/L	0.01	<0.01		<0.01	0.06		0.13		3.35		0.04		<0.01
Sulfate (SO4)	SO_4	mg/L	0.6	39.5		10.0	30.2		30.9		94.4		98.3		83.8
Hydroxide Alkalinity	OH	mg/L	5.0	<5		<5	<5		<5		<5		<5		<5
Carbonate Alkalinity	CO_3	mg/L	6.0	<6		<6	<6		<6		<6		<6		<6
Bicarbonate Alkalinity	HCO_3	mg/L	5.0	270		190	210		270		230		230		240
T-Alkalinity	$CaCO_3$	mg/L	5.0	219		159	174		224		191		192		195
PAlkalinity	$CaCO_3$	mg/L	5.0	<5		<5	<5		<5		<5		<5		<5
Metals - Dissolved															
Aluminum	Al	mg/L	0.005	<0.005		0.007	<0.005		<0.005		<0.005		<0.005		<0.005
Antimony	Sb	mg/L	0.0002	0.0006		0.0005	0.0005		0.0004		0.0005		0.0005		0.0003
Arsenic	As	mg/L	0.0002	0.0019		0.0006	0.0014		0.0009		0.0042		0.0056		0.0077
Barium	Ba	mg/L	0.001	0.118		0.163	0.091		0.140		0.076		0.078		0.088
Beryllium	Be	mg/L	0.00004	<0.00004		<0.00004	<0.00004		<0.00004		<0.00004		<0.00004		<0.00004
Bismuth	Bi	mg/L	0.001	<0.001		<0.001	<0.001		<0.001		<0.001		<0.001		<0.001
Boron	B	mg/L	0.004	0.043		0.011	0.026		0.019		0.077		0.073		0.064
Cadmium	Cd	mg/L	0.00001	0.00007		0.00012	0.00005		0.00004		0.00041		0.00069		0.00004
Chromium	Cr	mg/L	0.0004	0.0011		0.0010	0.0008		0.0013		0.0008		0.0009		0.0009
Cobalt	Co	mg/L	0.00002	0.00007		0.00005	0.00036		0.00006		0.00256		0.00367		0.00474
Copper	Cu	mg/L	0.001	<0.001		<0.001	<0.001		<0.001		<0.001		<0.001		<0.001
Iron	Fe	mg/L	0.01	<0.01		<0.01	0.09		<0.01		0.01		0.27		0.30
Lead	Pb	mg/L	0.0001	0.0001		<0.0001	0.0003		0.0005		0.0007		0.0019		0.0002
Lithium	Li	mg/L	0.001	0.016		0.003	0.010		0.005		0.028		0.030		0.025
Manganese	Mn	mg/L	0.0002	0.0008		<0.0002	0.0144		<0.0002		0.1540		0.2000		0.2900
Mercury	Hg	mg/L	0.010	<0.01		<0.01	0.007		<0.01		0.030		0.200		0.020

TABLE 6: LARSEN CREEK WATER CHEMISTRY AND ISOTOPE ANALYTICAL RESULTS

Analyte		Units	Sample Name	L09S-5	L09S-5D	L09S-09	L09S-13	L09S-13D	L09S-23	L09S-23D	L09S-44	L09S-44D	L09S-441	L09-441D	L09S-49
			Lab	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova
			Lab ID	704058-1	704058-2	704058-3	70458-4	704058-5	704058-6	704058-7	704058-8	704058-9	704058-20	704058-21	704058-10
			Sample Date	15-Sep-09	15-Sep-09	15-Sep-09	15-Sep-09	15-Sep-09	15-Sep-09	15-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09
			Sample Location	Thorpe Creek WS	Thorpe Creek WS	Thorpe Creek CS	Thorpe Creek WS	Thorpe Creek WS	Crow River WS	Crow River WS	Larsen Creek HS	Larsen Creek HS	Larsen Creek HS	Larsen Creek HS	Larsen Creek HS
			Easting (UTM, Nad83)	347968	347968	346901	347787	347787	345233	345233	360758	360758	360758	360758	360696
			Northing (UTM, Nad83)	6656469	6656469	6655668	6656059	6656059	6676694	6676694	6675638	6675638	6675638	6675638	6675624
			Detection Limit	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
Molybdenum	Mo	mg/L	0.0001	0.0031		0.0011	0.0018		0.0058		0.0034		0.0032		0.0019
Nickel	Ni	mg/L	0.001	0.001		0.002	0.003		0.004		0.005		0.007		0.009
Phosphorus	P	mg/L	0.003	0.015		0.009	0.007		0.006		0.010		0.019		0.020
Selenium	Se	mg/L	0.0006	<0.0006		<0.0006	<0.0006		<0.0006		<0.0006		<0.0006		<0.0006
Silver	Ag	mg/L	0.00001	<0.00001		<0.00001	<0.00001		<0.00001		<0.00001		<0.00001		<0.00001
Strontium	Sr	mg/L	0.001	0.848		0.178	0.525		0.058		1.380		1.420		1.200
Sulfur	S	mg/L	0.2	13.2		3.4	10.1		10.3		31.5		32.8		27.9
Thallium	Tl	mg/L	0.00001	0.00025		0.00004	0.00018		0.00027		0.00090		0.00078		0.00077
Thorium	Th	mg/L	0.0004	<0.0004		<0.0004	<0.0004		<0.0004		<0.0004		<0.0004		<0.0004
Tin	Sn	mg/L	0.0001	0.0002		<0.0001	<0.0001		<0.0001		0.0004		<0.0001		0.0002
Titanium	Ti	mg/L	0.0004	0.0004		0.0006	<0.0004		<0.0004		0.0007		0.0011		0.0010
Uranium	U	mg/L	0.0004	0.0017		0.0008	0.0010		0.0028		0.0006		0.0006		<0.0004
Vanadium	V	mg/L	0.0001	0.0007		0.0008	0.0004		0.0016		0.0003		0.0003		0.0003
Zinc	Zn	mg/L	0.001	0.013		0.005	0.013		0.034		0.050		0.073		0.056
Zirconium	Zr	mg/L	0.0001	<0.0001		0.0002	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Environmental Isotopes															
Oxygen-18[1]	$\delta^{18}O$	‰		-21.5		-21.9	-21.04		-22.65		-22.8		-		-22.87
Deuterium[1]	$\delta^{2}H$	‰		-172.6		-168.2	-166.7		-174.38		-175.19		-		-175.32
Tritium	^{3}H	TU[2]		1.2		6.2	3.8		<0.8		<0.8		-		<0.8

Notes:

"<" indicates less than the laboratory detection limit

"-" indicates not analyzed / no guidline established

HS - Hot Spring; WS - Warm Spring; CS - Cold Spring

[2] TU - Tritium Units (1TU = 0.1181 Becquerels/L; 1TU equals 1 ^{3}H atom in 10^{18} ^{1}H atoms)

TABLE 6: LARSEN CREEK WATER CHEMISTRY AND ISOTOPE ANALYTICAL RESULTS

Analyte		Units	Sample Name	L09S-49D	L09S-51	L09S-51D	L09S-57	L09S-57D	L09S-76	L09S-76D	L09S-98	L09S-98D	L09-103	L09S-111	L09S-04
			Lab	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova
			Lab ID	704058-10	704058-12	704058-12	704058-14	704058-14	704058-16	704058-16	704058-18	704058-19	704058-22	704058-23	704058-24
			Sample Date	16-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09	18-Sep-09	18-Sep-09	19-Sep-09	20-Sep-09	14-Sep-09
			Sample Location	Larsen Creek HS	Larsen Creek HS	Larsen Creek HS	Pool Creek HS	Pool Creek HS	Pool Creek HS	Pool Creek HS	Canyon Creek WS	Crow River Springs	Crow River CS	Coal River WS	Coal River WS
			Easting (UTM, Nad83)	360696	360687	360687	358413	358413	358030	358030	353566	353566	343740	586506	586989
			Northing (UTM, Nad83)	6675624	6675606	6675606	6696663	6696663	6696524	6696524	6685068	6685068	6679079	6670323	6669498
			Detection Limit	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
Ion Balance		%			113		114		115		116			117	116
Field Parameters															
Temperature	T	°C			50.9		53.2		40.6		15.1		4.1	11.7	13.2
pH		pH units			7.01		6.40		6.68		7.27		7.65	7.33	7.26
Dissolved O_2	DO	mg/L			0.15		-		-		-		8.7	-	-
Electrical Conductivity	EC	µS/cm at 25°C			547.0		611.0		565.0		358.0		320.0	552.0	432.0
Total Dissolved Solids	TDS	ppm			273		305		282		179		160	275	216
Physical Parameters															
pH		pH units	-		7.38		7.18		7.34		7.72		7.94	7.70	7.68
Electrical Conductivity	EC	µS/cm at 25°C	1		554		667		637		423		346	502	531
Total Dissolved Solids	TDS	ppm	1.0		367		428		399		240		184	284	298
Hardness		mg/L	5		284		345		334		225		185	273	285
Dissolved Major Ions															
Calcium	Ca		0.001		81.0		86.5		82.0		53.9		38.5	82.4	86.3
Magnesium	Mg		0.10		19.8		31.4		31.4		22.0		21.6	16.3	17.0
Sodium	Na		0.10		5.6		9.0		7.4		2.1		0.4	1.2	1.3
Potassium	K		0.1		4.2		4.5		3.9		1.0		0.4	0.6	0.7
Silicon	Si		0.05	1.71	14.90	1.85	14.20	2.18	12.10	1.81	5.44	0.81	1.99	2.47	2.52
Chloride	Cl		0.02		5.18		5.62		4.61		0.96		0.13	0.24	0.25
Fuoride	F		0.01		0.55		0.57		0.61		0.30		0.19	0.21	0.20
Nitrate - N	NO_3	mg/L	0.01		0.01		<0.01		0.01		0.13		0.12	0.28	0.25
Nitrite - N	NO2		0.01		<0.01		<0.01		0.04		<0.01		<0.01	0.21	0.22
Sulfate (SO4)	SO_4		0.6		96.2		94.1		69.9		24.0		5.0	17.0	19.0
Hydroxide Alkalinity	OH		5.0		<5		<5		<5		<5		<5	<5	<5
Carbonate Alkalinity	CO_3		6.0		<6		<6		<6		<6		<6	<6	<6
Bicarbonate Alkalinity	HCO_3		5.0		230		320		340		250		230	320	340
T-Alkalinity	$CaCO_3$		5.0		190		263		276		208		187	262	275
PAlkalinity	$CaCO_3$		5.0		<5		<5		<5		<5		<5	<5	<5
Metals - Dissolved															
Aluminum	Al		0.005		<0.005		<0.005		<0.005		<0.005		<0.005	<0.005	<0.005
Antimony	Sb		0.0002		0.0003		0.0003		0.0005		0.0005		0.0006	0.0006	0.0004
Arsenic	As		0.0002		0.0017		0.0026		0.0007		0.0005		0.0006	0.0004	0.0006
Barium	Ba		0.001		0.082		0.091		0.104		0.209		0.126	0.069	0.068
Beryllium	Be		0.00004		0.00006		0.00008		<0.00004		<0.00004		<0.00004	<0.00004	<0.00004
Bismuth	Bi		0.001		<0.001		<0.001		<0.001		<0.001		<0.001	<0.001	<0.001
Boron	B		0.004		0.074		0.099		0.082		0.024		0.005	0.010	0.010
Cadmium	Cd	mg/L	0.00001		0.00005		<0.00001		0.00015		0.00021		0.00004	0.00008	0.00007
Chromium	Cr		0.0004		0.0009		0.0013		0.0013		0.0010		0.0011	0.0014	0.0017
Cobalt	Co		0.00002		0.00018		0.00010		0.00010		0.00006		0.00006	0.00006	0.00005
Copper	Cu		0.001		<0.001		<0.001		<0.001		<0.001		<0.001	<0.001	<0.001
Iron	Fe		0.01		<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01
Lead	Pb		0.0001		0.0002		0.0015		0.0005		0.0002		0.0002	<0.0001	<0.0001
Lithium	Li		0.001		0.030		0.050		0.041		0.007		<0.0001	0.005	0.006
Manganese	Mn		0.0002		0.0090		0.0059		0.0106		0.0005		0.0016	0.0002	<0.0002
Mercury	Hg		0.010		<0.01		<0.01		<0.01		<0.01		<0.01	<0.01	<0.01

TABLE 6: LARSEN CREEK WATER CHEMISTRY AND ISOTOPE ANALYTICAL RESULTS

Analyte		Units	Sample Name	L09S-49D	L09S-51	L09S-51D	L09S-57	L09S-57D	L09S-76	L09S-76D	L09S-98	L09S-98D	L09-103	L09S-111	L09S-04
			Lab	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova	Exova
			Lab ID	704058-10	704058-12	704058-12	704058-14	704058-14	704058-16	704058-16	704058-18	704058-19	704058-22	704058-23	704058-24
			Sample Date	16-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09	16-Sep-09	18-Sep-09	18-Sep-09	19-Sep-09	20-Sep-09	14-Sep-09
			Sample Location	Larsen Creek HS	Larsen Creek HS	Larsen Creek HS	Pool Creek HS	Pool Creek HS	Pool Creek HS	Pool Creek HS	Canyon Creek WS	Crow River Springs	Crow River CS	Coal River WS	Coal River WS
			Easting (UTM, Nad83)	360696	360687	360687	358413	358413	358030	358030	353566	353566	343740	586506	586989
			Northing (UTM, Nad83)	6675624	6675606	6675606	6696663	6696663	6696524	6696524	6685068	6685068	6679079	6670323	6669498
			Detection Limit	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
Molybdenum	Mo	mg/L	0.0001		0.0009		0.0019		0.0017		0.0066		0.0037	0.0013	0.0015
Nickel	Ni	mg/L	0.001		0.002		0.002		0.002		0.003		<0.001	0.002	0.002
Phosphorus	P	mg/L	0.003		0.011		0.012		0.021		0.010		0.028	0.016	0.013
Selenium	Se	mg/L	0.0006		<0.0006		<0.0006		<0.0006		<0.0006		<0.0006	0.0006	0.0007
Silver	Ag	mg/L	0.00001		<0.00001		<0.00001		<0.00001		<0.00001		<0.00001	<0.00001	<0.00001
Strontium	Sr	mg/L	0.001		1.460		0.626		0.601		0.181		0.019	0.082	0.092
Sulfur	S	mg/L	0.2		32.1		31.4		23.3		8.0		1.7	5.8	6.3
Thallium	Tl	mg/L	0.00001		0.00013		0.00036		0.00024		0.00015		0.00002	0.00005	0.00005
Thorium	Th	mg/L	0.0004		<0.0004		<0.0004		<0.0004		<0.0004		<0.0004	<0.00004	<0.0004
Tin	Sn	mg/L	0.0001		0.0003		0.0002		0.0008		0.0007		0.0018	0.0011	<0.0001
Titanium	Ti	mg/L	0.0004		0.0005		0.0008		0.0007		<0.0004		<0.0004	<0.0004	<0.0004
Uranium	U	mg/L	0.0004		<0.0004		0.0012		0.0009		0.0019		0.0015	0.0013	0.0014
Vanadium	V	mg/L	0.0001		0.0005		0.0011		0.0016		0.0019		0.0006	0.0011	0.0013
Zinc	Zn	mg/L	0.001		0.014		0.009		0.009		0.037		0.006	0.028	0.033
Zirconium	Zr	mg/L	0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	<0.0001	<0.0001
Environmental Isotopes															
Oxygen-18[1]	$\delta^{18}O$	‰			-23		-22.97		-23.26		-22.85		-22.77	-22.94	-22.59
Deuterium[1]	$\delta^{2}H$	‰			-176		-177.9		-176.67		-175.01		-171.08	-173.91	-172.2
Tritium	^{3}H	TU[2]			<0.8		<0.8		<0.8		6.3		10.2	5.9	4.7

Notes:

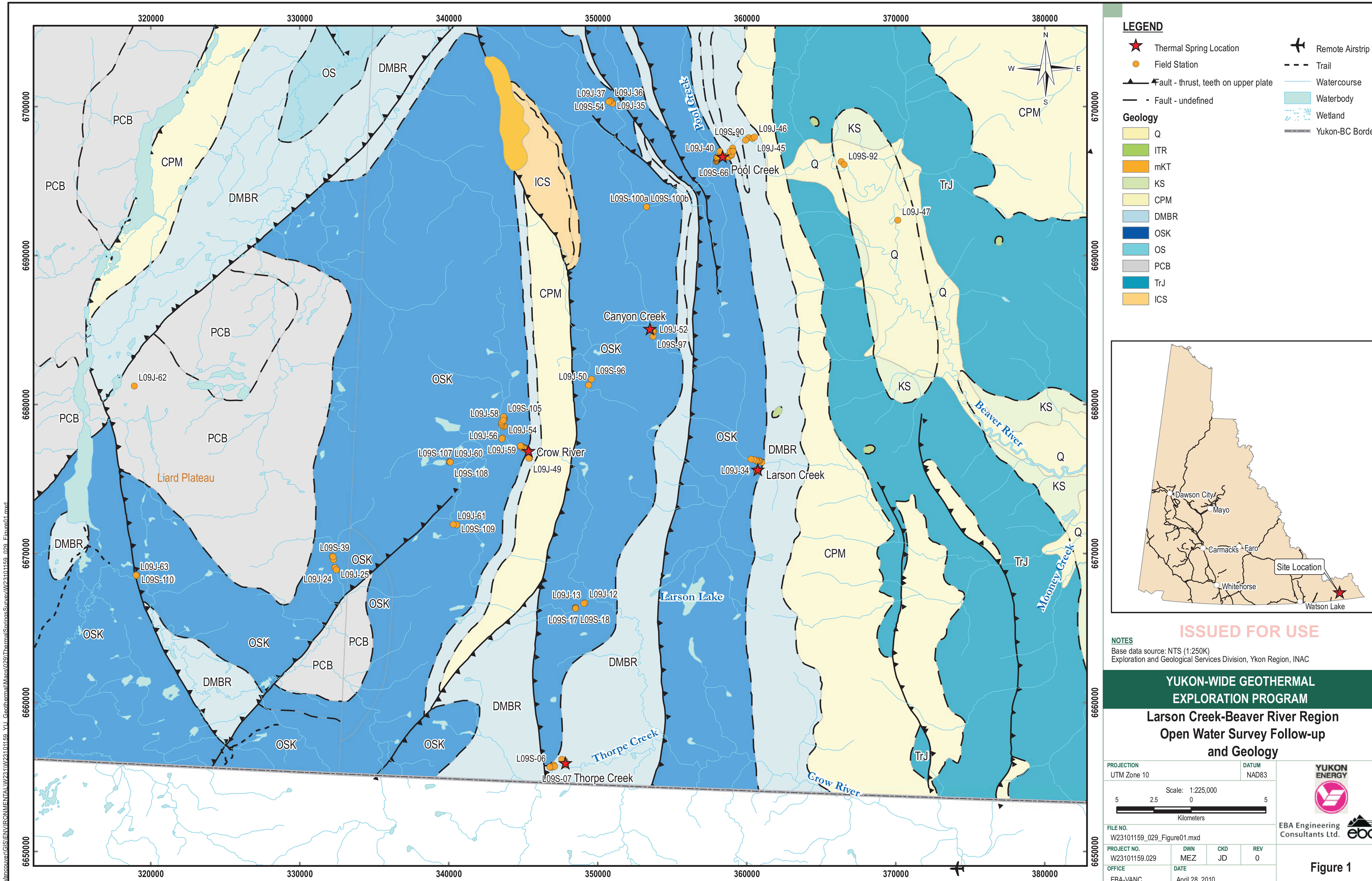
"<" indicates less than the laboratory detection limit

"-" indicates not analyzed / no guidline established

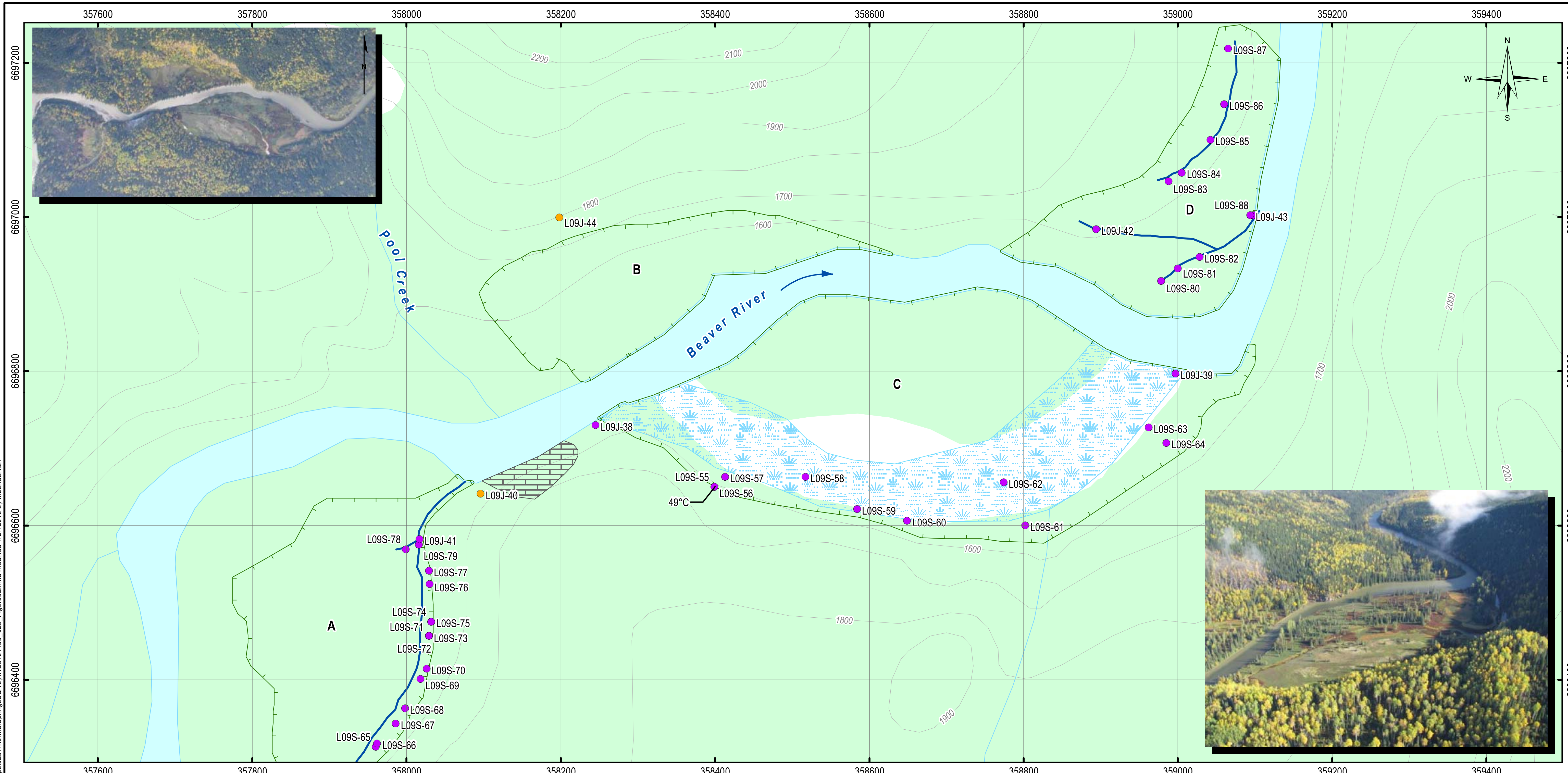
HS - Hot Spring; WS - Warm Spring; CS - Cold Spring

[2] TU - Tritium Units (1TU = 0.1181 Becquerels/L; 1TU equals 1 ^{3}H atom in 10^{18} ^{1}H atoms)

FIGURES



LEGEND
Thermal Spring Location
Field Station
Fault - thrust, teeth on upper plate
Fault - undefined
Remote Airstrip
Trail
Watercourse
Waterbody
Wetland
Yukon-BC Border
Geology
Q
ITR
mKT
KS
CPM
DMBR
OSK
OS
PCB
TrJ
ICS
Pool Creek
Canyon Creek
Crow River
Larson Creek
Thorpe Creek
Larson Lake
Beaver River
Mooney Creek
Liard Plateau
L09J-37
L09J-36
L09S-54
L09J-35
L09S-90
L09J-46
L09J-40
L09J-45
L09S-66
L09S-92
L09S-100a
L09S-100b
L09J-47
L09J-52
L09S-97
L09J-50
L09S-96
L09J-62
L09S-105
L09J-58
L09J-54
L09J-56
L09J-59
L09S-107
L09J-60
L09J-49
L09S-108
L09J-34
L09J-61
L09S-109
L09S-39
L09J-24
L09J-25
L09J-63
L09S-110
L09J-13
L09J-12
L09S-17
L09S-18
L09S-06
L09S-07
320000
330000
340000
350000
360000
370000
380000
6650000
6660000
6670000
6680000
6690000
6700000
N
E
S
W
Dawson City
Mayo
Carmacks
Faro
Site Location
Whitehorse
Watson Lake
ISSUED FOR USE
NOTES
Base data source: NTS (1:250K)
Exploration and Geological Services Division, Ykon Region, INAC
YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM
Larson Creek-Beaver River Region
Open Water Survey Follow-up
and Geology
PROJECTION
UTM Zone 10
DATUM
NAD83
Scale: 1:225,000
5 2.5 0 5
Kilometers
FILE NO.
W23101159_029_Figure01.mxd
PROJECT NO.
W23101159.029
DWN
MEZ
CKD
JD
REV
0
OFFICE
EBA-VANC
DATE
April 28, 2010
YUKON ENERGY
EBA Engineering Consultants Ltd.
eba
Figure 1



LEGEND

- Field Station
- Field Station with Thermal Anomaly
- Open Meadow
- Limestone Cliff
- Stream Channel
- Contour (100 ft)
- Watercourse
- Wetland
- Vegetation

NOTES

Base data source:
NTS 1:50,000 (Sheet 95C05)

Q:\Vancouver\GIS\ENVIRONMENTAL\W231\W23101159_YU_Geothermal\Maps\029\ThermalSpringsSurvey\W23101159_029_Figure02.mxd modified 4/27/2010 by mzondervan

ISSUED FOR USE

YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM

Pool Creek Hot Springs

PROJECTION	DATUM
UTM Zone 10	NAD83

Scale: 1:5,000
100 50 0 100
Meters

FILE NO.
W23101159_029_Figure02.mxd

PROJECT NO.	DWN	CKD	REV
W23101159.029	MEZ	JD	0

OFFICE	DATE
EBA-VANC	April 27, 2010

YUKON ENERGY

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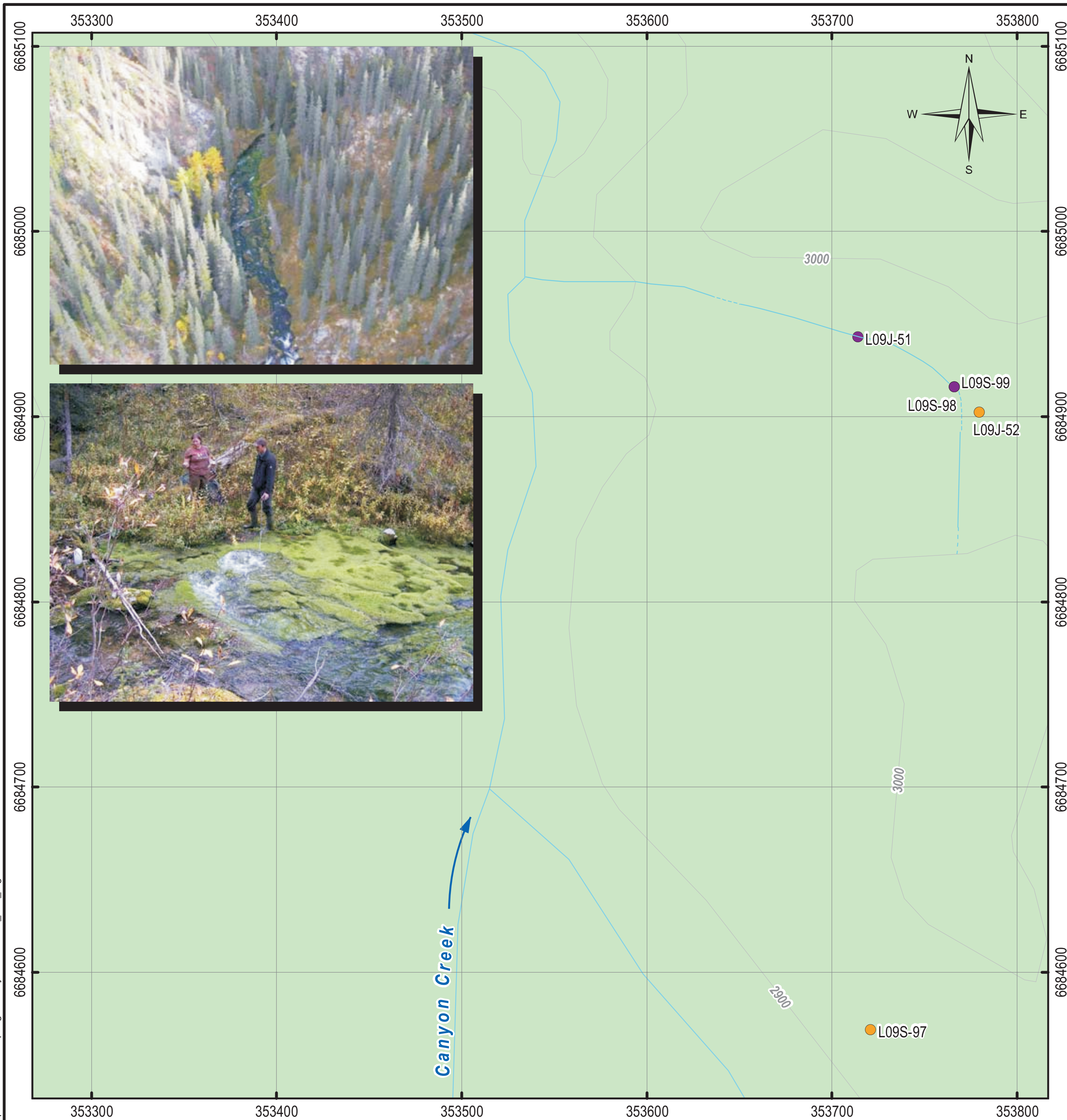
Figure 2



LEGEND

- Field Station
- Field Station with Thermal Anomaly
- Contour (100 ft)
- Watercourse
- Vegetation

NOTES

Base data source:
NTS 1:50,000 (Sheet 95C05)

ISSUED FOR USE

YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM

Canyon Creek Warm Spring

PROJECTION	DATUM
UTM Zone 10	NAD83

Scale: 1:3,000

50 25 0 50

Meters

FILE NO.
W23101159_029_Figure03.mxd

PROJECT NO.	DWN	CKD	REV
W23101159.029	MEZ	JD	0

OFFICE	DATE
EBA-VANC	April 27, 2010

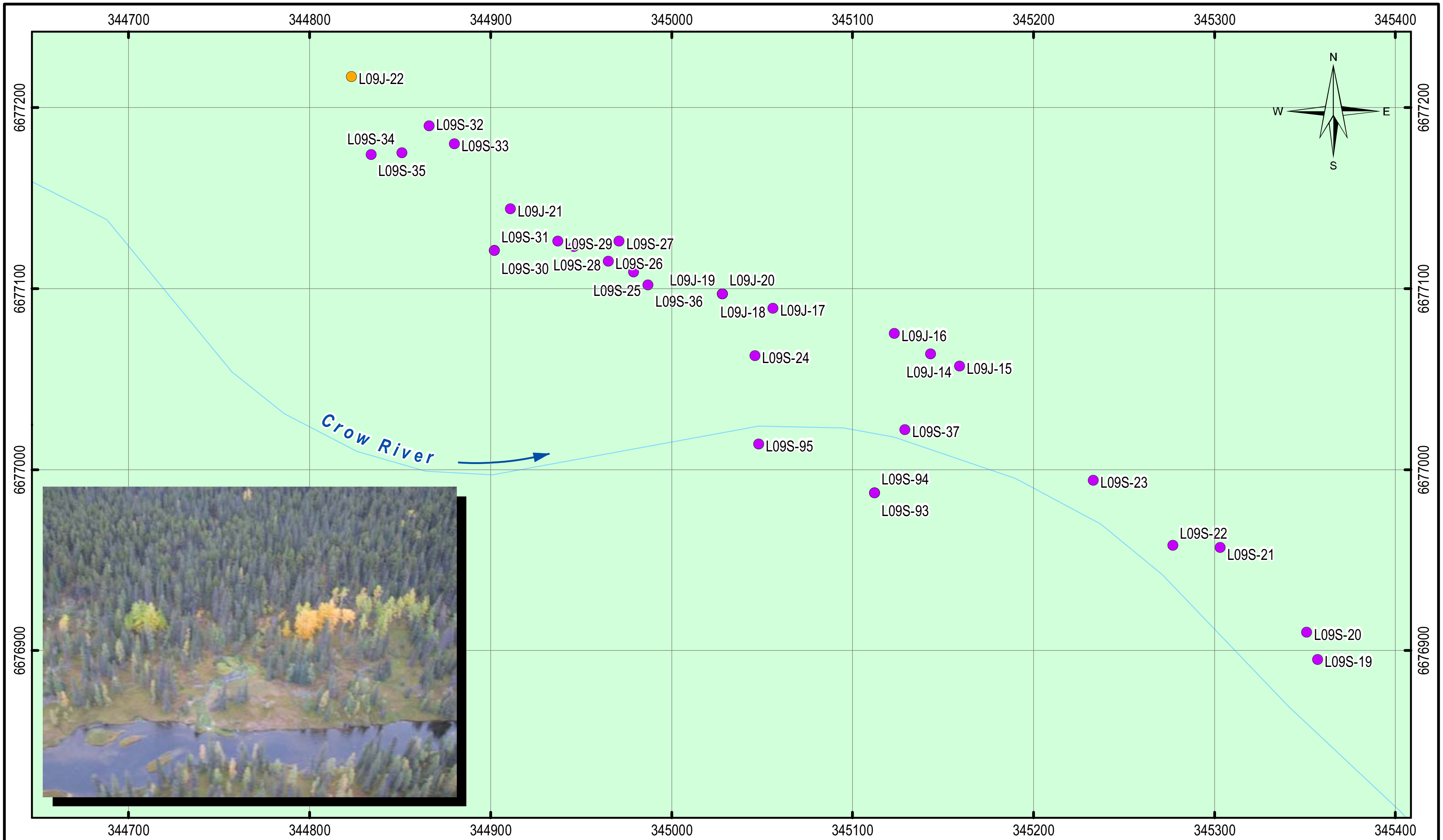
YUKON ENERGY

EBA Engineering Consultants Ltd.

Figure 3

Q:\Vancouver\GIS\ENVIRONMENTAL\W231\W23101159_YU_Geothermal\Maps\029\ThermalSpringsSurvey\W23101159_029_Figure03.mxd

Q:\Vancouver\GIS\ENVIRONMENTAL\W231\W23101159_YU_Geothermal\Maps\029\ThermalSpringsSurvey\W23101159_029_Figure04.mxd



LEGEND

- Field Station
- Field Station with Thermal Anomaly
- Contour (100 ft)
- Watercourse
- Vegetation

NOTES

Base data source:
NTS 1:50,000 (Sheet 95C04)

ISSUED FOR USE

Scale: 1:3,000

50 25 0 50

Meters

PROJECTION	DATUM
UTM Zone 10	NAD83

FILE NO.
W23101159_029_Figure04.mxd

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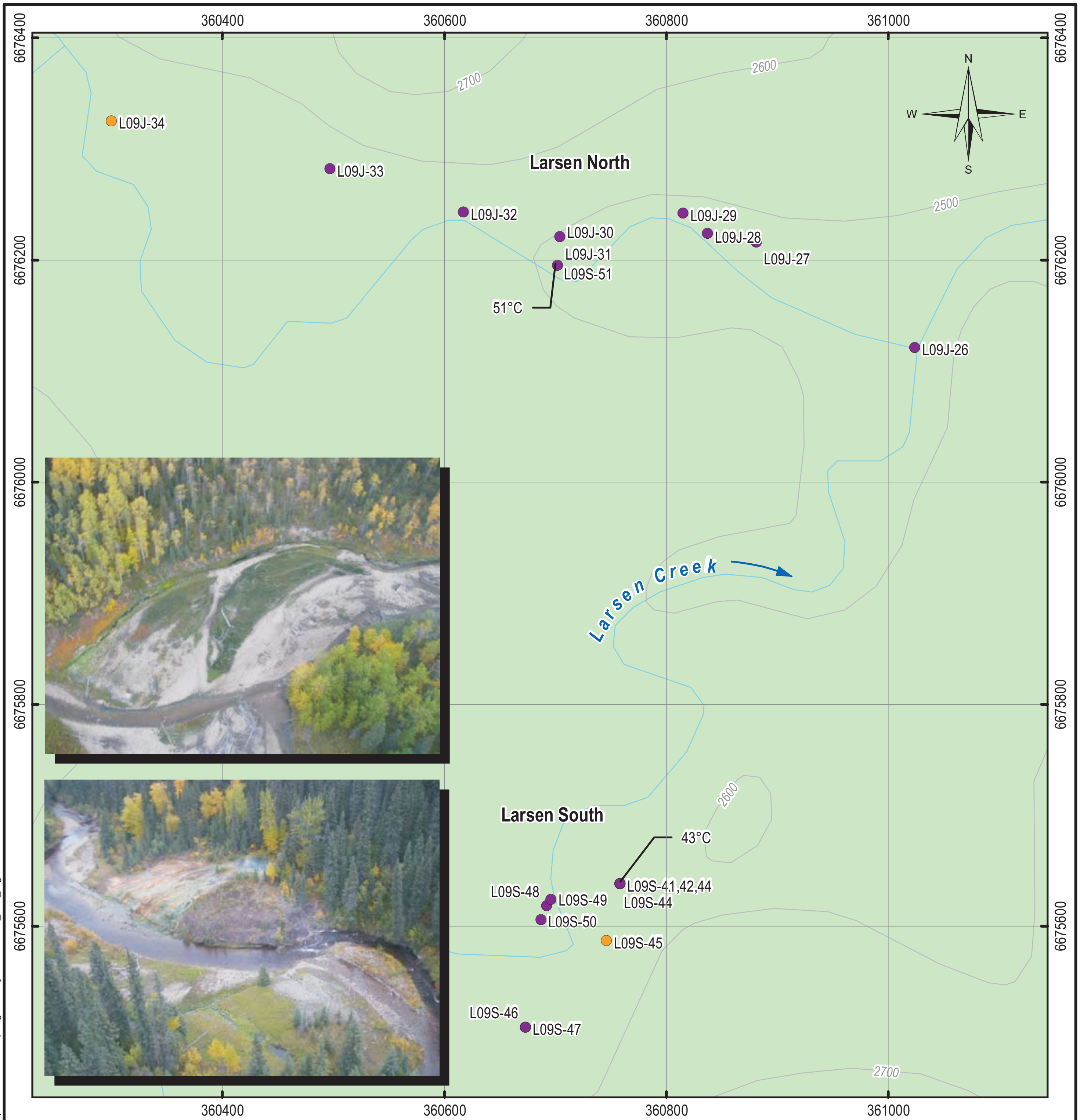
YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM

Crow River Warm Springs

PROJECT NO.	DWN	CKD	REV
W23101159.029	MEZ	JD	0

OFFICE	DATE
EBA-VANC	April 27, 2010

Figure 4



LEGEND

- Field Station
- Field Station with Thermal Anomaly
- Contour (100 ft)
- Watercourse
- Vegetation

NOTES

Base data source:
NTS 1:50,000 (Sheet 95C05)

ISSUED FOR USE

YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM

Larsen Creek Hot Springs

PROJECTION	DATUM
UTM Zone 10	NAD83

Scale: 1:5,000
100 50 0 100
Meters

FILE NO.
W23101159_029_Figure05.mxd

PROJECT NO.	DWN	CKD	REV
W23101159.029	MEZ	JD	0

OFFICE	DATE
EBA-VANC	April 27, 2010

YUKON ENERGY

EBA Engineering Consultants Ltd.

Figure 5

Q:\Vancouver\GIS\ENVIRONMENTAL\W231\W23101159_YU_Geothermal\Maps\029\ThermalSpringsSurvey\W23101159_029_Figure05.mxd

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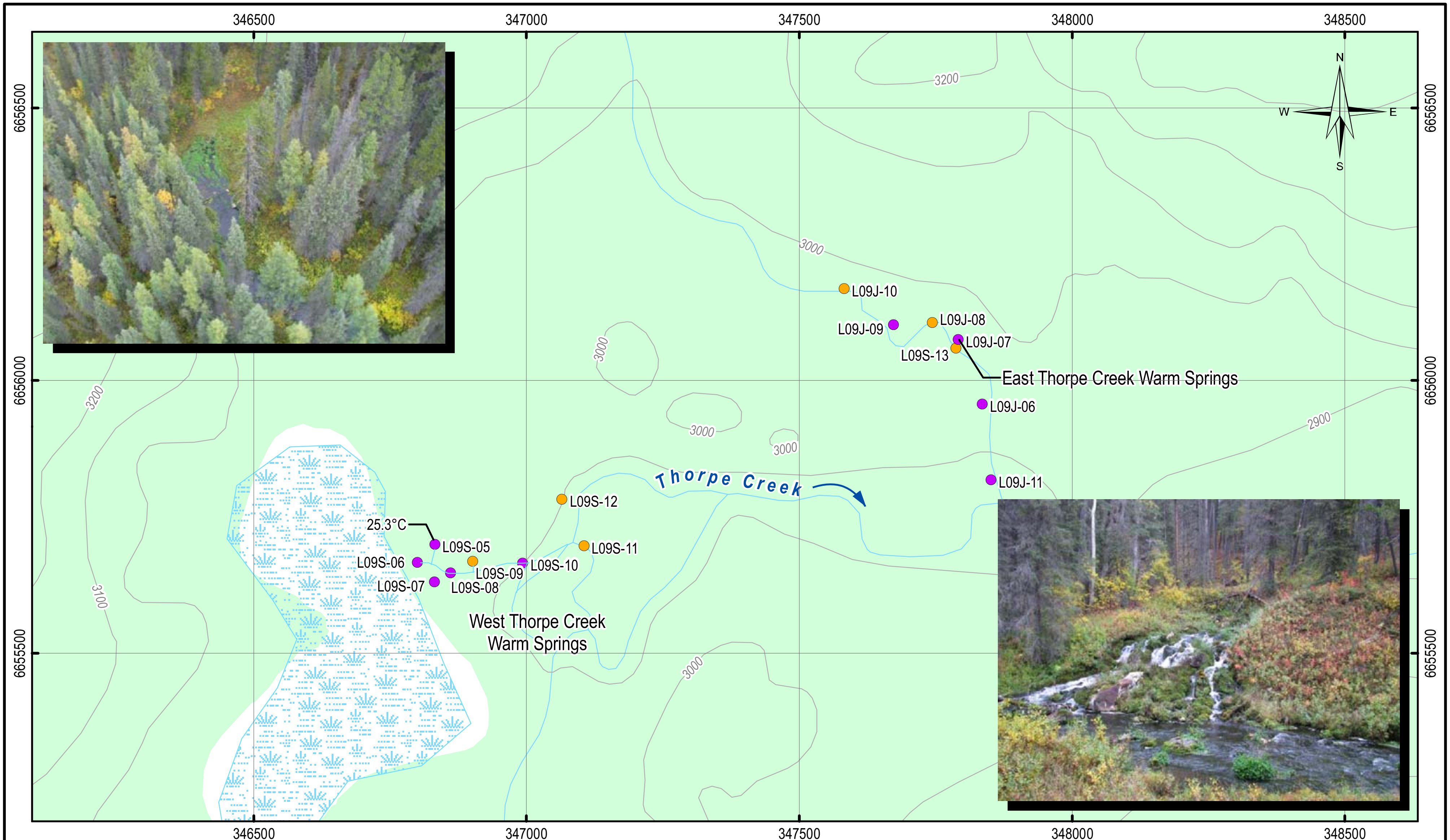

LEGEND

- Field Station
- Field Station with Thermal Anomaly
- Contour (100 ft)
- Watercourse
- Wetland
- Vegetation

NOTES

Base data source:
NTS 1:50,000 (Sheet 95C04)

ISSUED FOR USE

Scale: 1:10,000

200 100 0 200

Meters

PROJECTION	DATUM
UTM Zone 10	NAD83

FILE NO.
W23101159_029_Figure06.mxd

YUKON ENERGY

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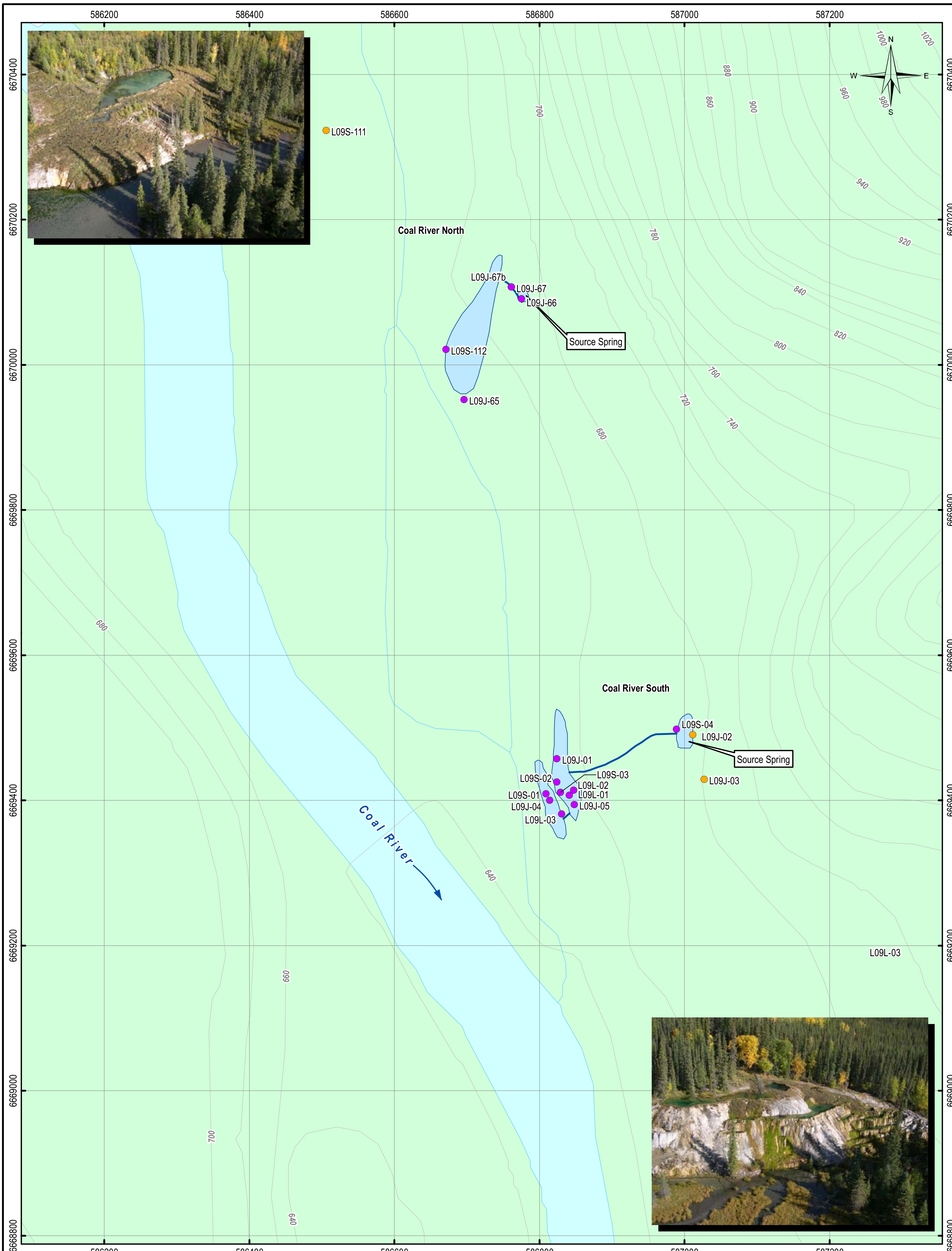
YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM

Thorpe Creek Warm Springs

PROJECT NO.	DWN	CKD	REV
W23101159.029	MEZ	JD	0

OFFICE	DATE
EBA-VANC	April 27, 2010

Figure 6

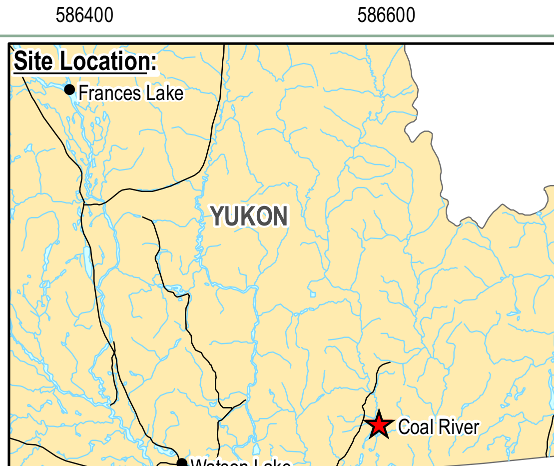


LEGEND

- Field Station
- Field Station with Thermal Anomaly
- Stream Channel
- Source Spring
- Contour (20 m)
- Watercourse
- Waterbody
- Vegetation

NOTES

Base data source:
NTS 1:50,000 (Sheet 95D03)



ISSUED FOR USE

YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM

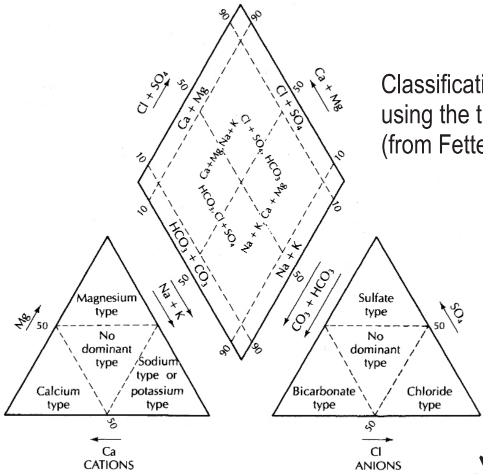
Coal River Warm Springs

PROJECTION: UTM Zone 9		DATUM: NAD83	
Scale: 1:5,000 (100 50 0 100 Meters)			
FILE NO.: W23101159_029_Figure07.mxd			
PROJECT NO.: W23101159.029	DWN: MEZ	CKD: JD	REV: 0
OFFICE: EBA-VANC	DATE: April 27, 2010		

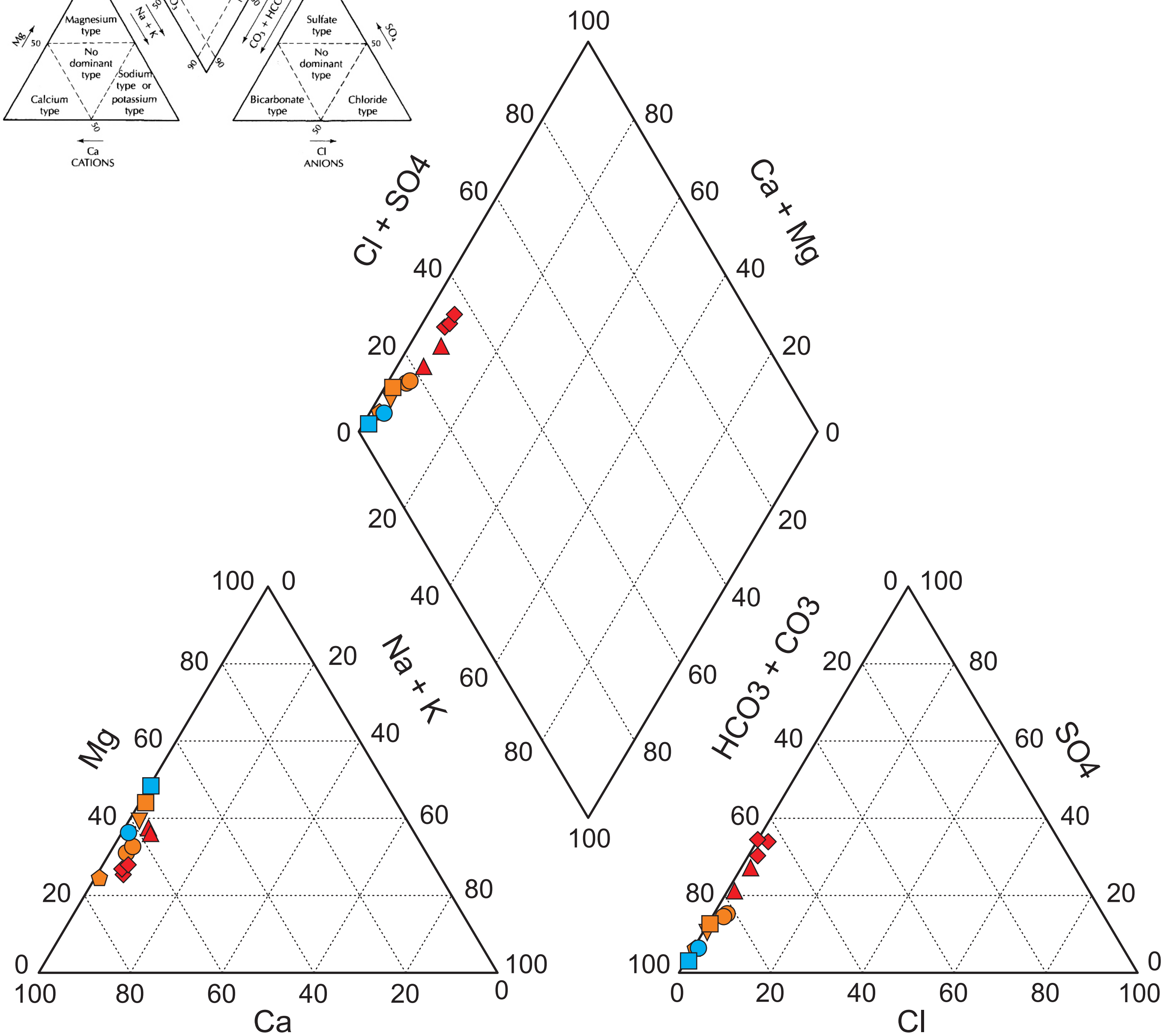
YUKON ENERGY

EBA Engineering Consultants Ltd.

Figure 7



Classification of hydrogeochemical water types using the trilinear Piper diagram (from Fetter, 2001)



ISSUED FOR USE

LEGEND

- Larsen Creek Hot Springs
- Pool Creek Hot Springs
- / Crow River Warm Springs / Cold Spring
- / Thorpe Creek Warm Springs / Cold Spring
- Canyon Creek Warm Springs
- Coal River Warm Springs

CLIENT

YUKON ENERGY

EBA Engineering Consultants Ltd.

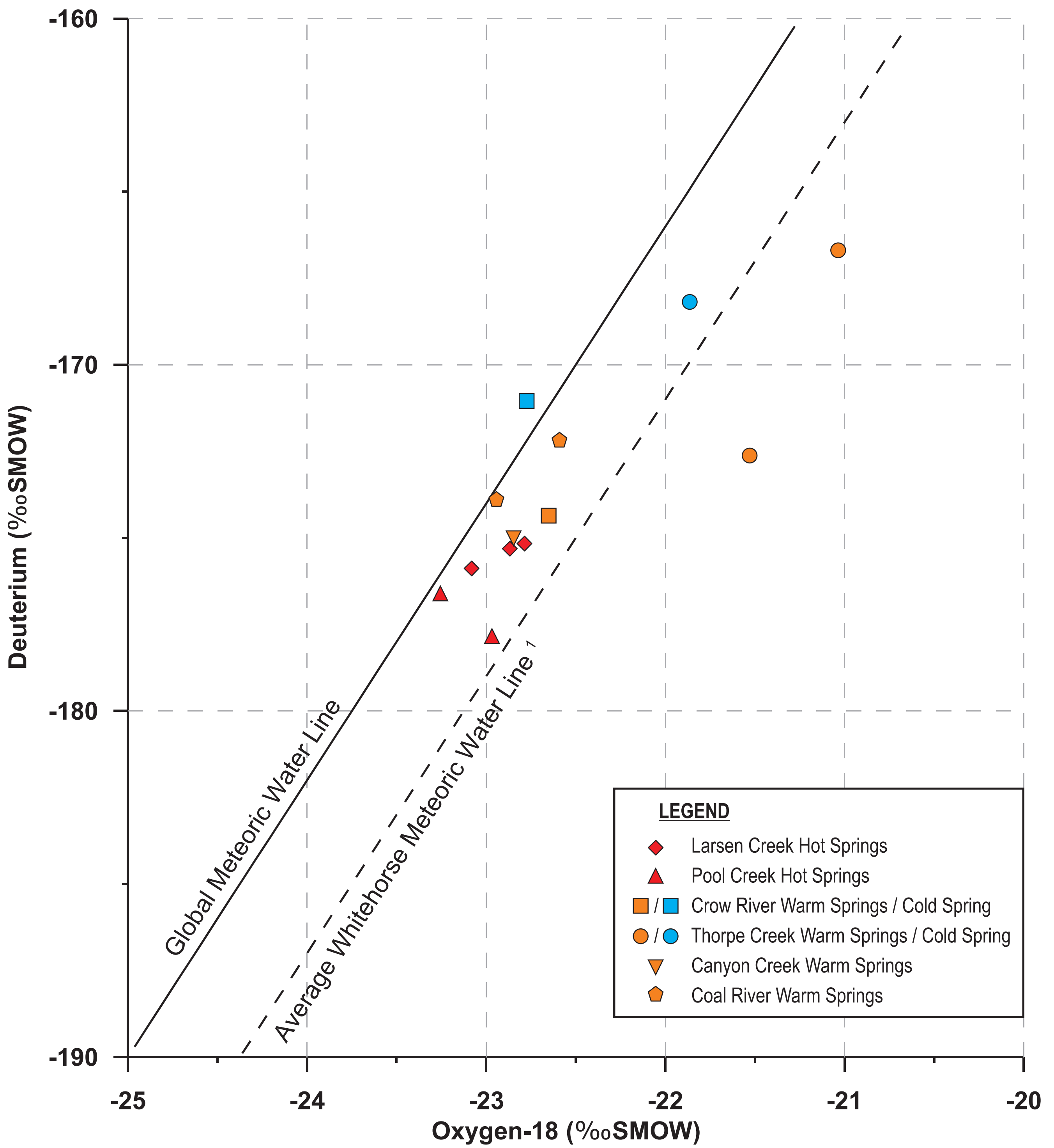
2009 GEOTHERMAL EXPLORATION
LARSEN CREEK/BEAVER RIVER AREA, YUKON

Piper Diagram

PROJECT NO.	DWN	CKD	REV
W23101159.029	SK	JTD	0

OFFICE	DATE
EBA-WHSE	April 2010

Figure 9



NOTES

1) LMWL - Local (Whitehorse) Meteoric Water Line from Birks, Edwards, Gibson, Michel, Drimmie, and MacTavish, Canadian Network for Isotopes in Precipitation, Univeristy of Waterloo/ Meteorological Service of Canada 2003.
2) GMWL - Global Meteoric Water Line from Fetter (1994) citing Craig (1961).
3) SMOW = Standard Mean Ocean Water

CLIENT

YUKON ENERGY

EBA Engineering Consultants Ltd.

2009 GEOTHERMAL EXPLORATION PROGRAM
LARSEN CREEK/BEAVER RIVER AREA, YUKON

Plot of Stable Isotope Data with Meteoric Water Line

PROJECT NO.	DWN	CKD	REV
W23101159.016	SK	RMM	0

OFFICE	DATE
EBA-WHSE	March 2010

Figure 10

PHOTOGRAPHS

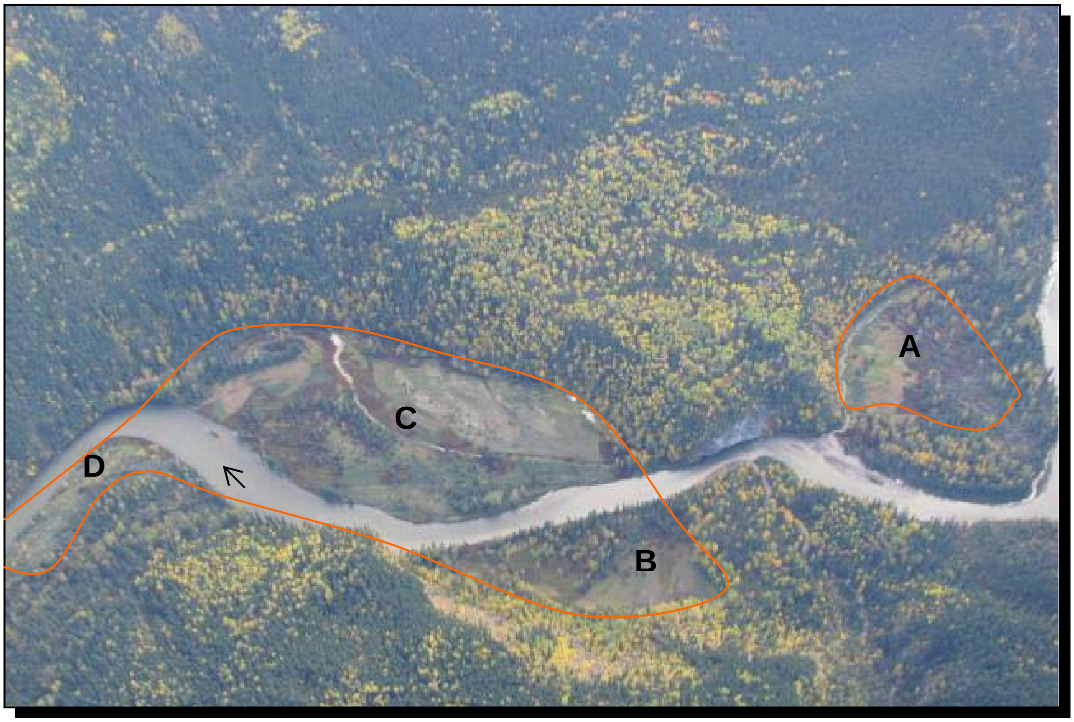


Photo 1
September 17, 2009. Thermal meadows of Pool Creek Hot Springs

Photo 2
September 17, 2009. View downstream, Beaver River of Pool Creek Hot Spring thermal meadow complex

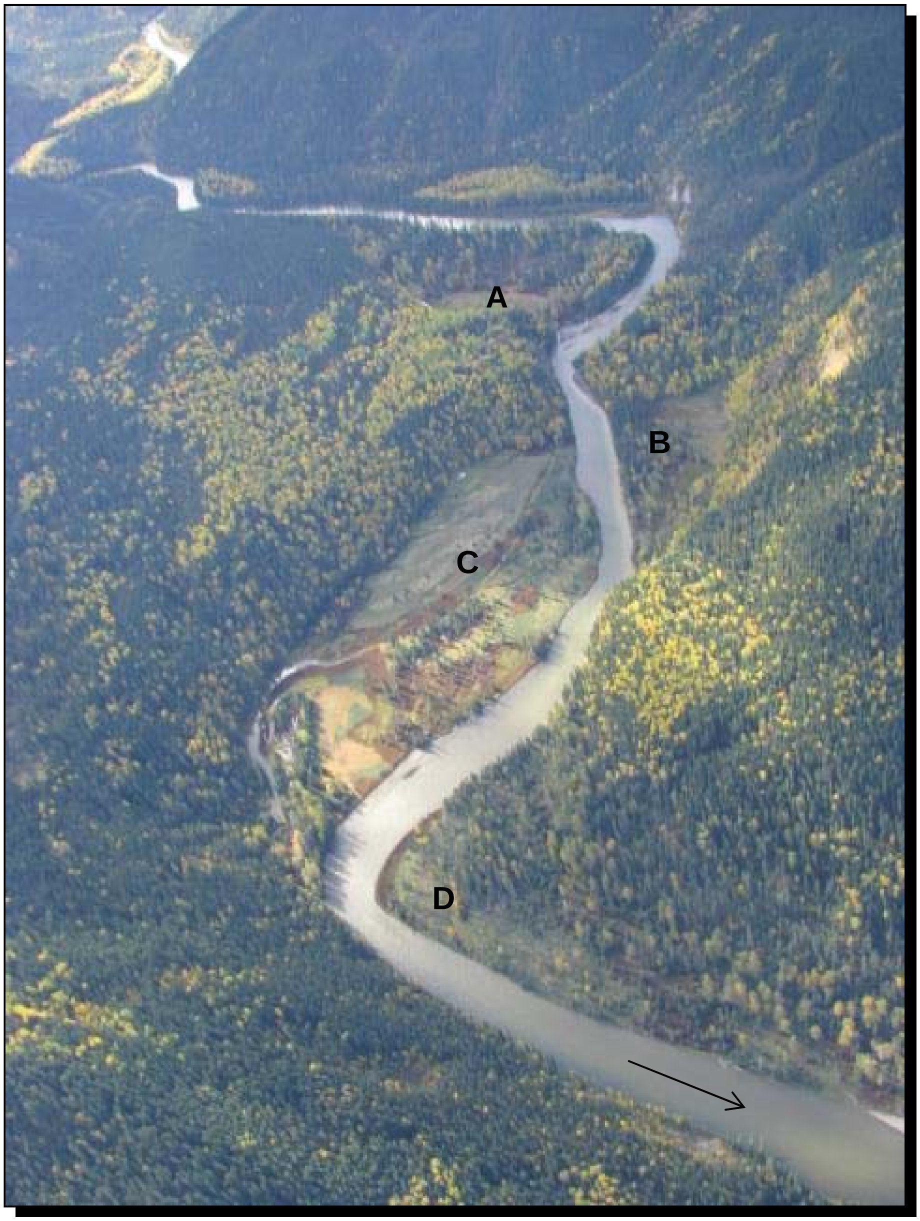


Photo 3
September 17, 2009. View upstream, Beaver River of Pool Creek Hot Spring thermal meadow complex.

Photo 4
September 17, 2009. Main thermal meadow (C) of Pool Creek Hot Springs

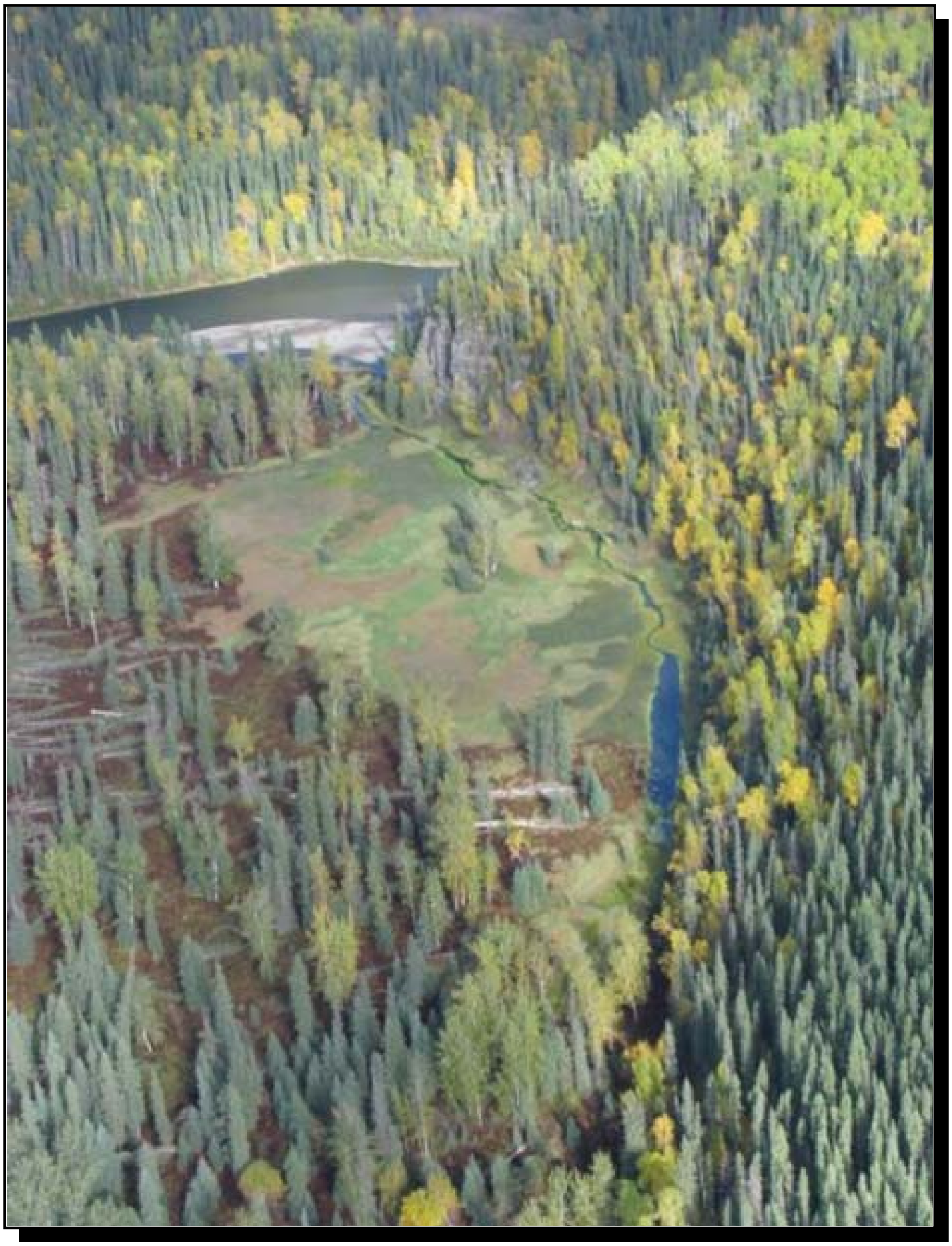


Photo 5
September 17, 2009. Pool and channel flowing to Beaver River from thermal pool in west thermal meadow (A) of Pool Creek Hot Springs

Photo 6
September 17, 2009. Pool Creek Hot Springs. Numerous thermal vents along stream channel of west thermal meadow (A)

Photo 7
September 17, 2009. Pool Creek Hot Springs. Example of vent along stream channel at base of slope of main thermal meadow (L09S-61)

Photo 8
September 18, 2009. Canyon Creek Warm Springs

Photo 9
September 18, 2009. Canyon Creek Warm Springs

Photo 10
September 18, 2009. Measuring water parameters at Canyon Creek Warm Springs

Photo 11
September 18, 2009. Crow River Warm Springs. Distinct line of yellow-leaved Aspen follows probable fault line

Photo 12
September 18, 2009. Crow River Warm Springs

Photo 13
September 18, 2009. One of numerous springs at Crow River Warm Springs

Photo 14
Thermal spring pool at Crow River Warm Springs

Photo 15
September 16, 2009. South Larsen Creek Hot Springs

Photo 16
September 16, 2009. South Larsen Creek Hot Springs

Photo 17

September 16, 2009. North Larsen Creek Hot Springs. Numerous vents occur along far bank and on gravel bar

Photo 18

September 16, 2009. North Larsen Creek Hot Springs. Highest temperature recorded in this area was at this vent in bedrock on the north bank of a tributary to Larsen Creek (51°C)

Photo 19
September 15, 2009. Thorpe Creek Warm Springs - west area

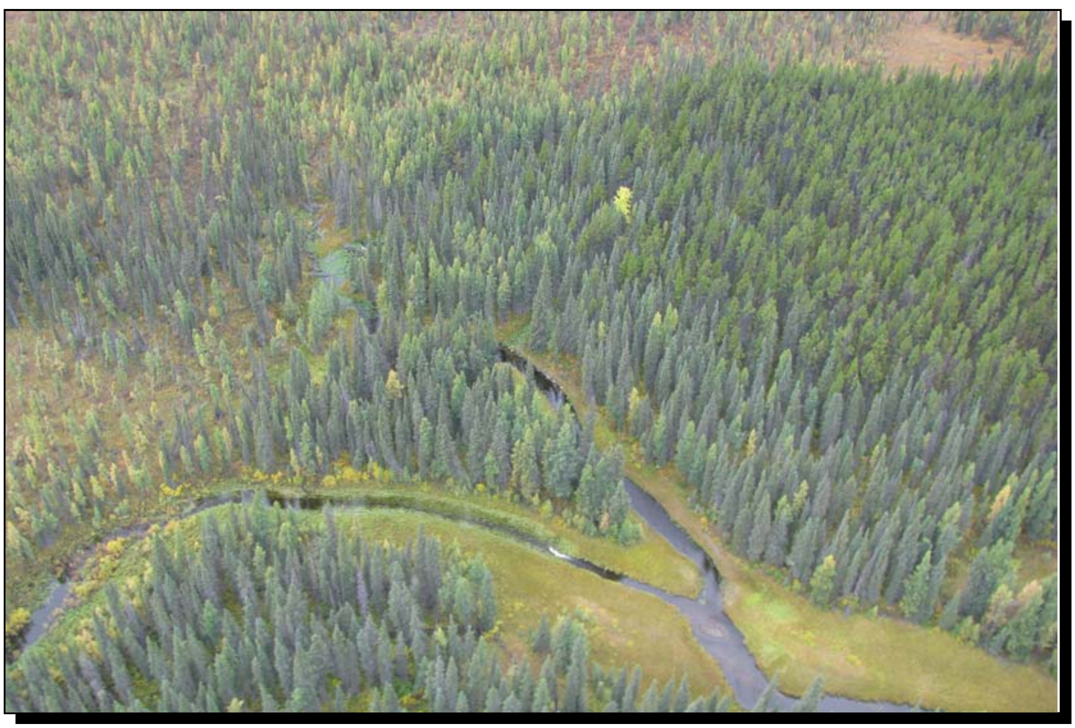


Photo 20
Thorpe Creek West Warm Springs

Photo 21
September 15, 2009. Thorpe Creek Warm Springs - northeast area

Photo 22
September 15, 2009. Thorpe Creek Warm Springs - northeast area, downstream of main springs

Photo 23
September 14, 2009. South Coal River Warm Springs (southeast view)

Photo 24
September 14, 2009. South Coal River Warm Springs

Photo 25
September 14, 2009. Travertine benches of South Coal River Warm Springs

Photo 26
September 14, 2009. Measuring water parameters at source spring of South Coal River Warm Springs

Photo 27
September 20, 2009. North Coal River Warm Springs (northwest view)

APPENDIX A

APPENDIX A EBA'S GENERAL CONDITIONS

GEO-ENVIRONMENTAL REPORT – GENERAL CONDITIONS

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

1.0 USE OF REPORT AND OWNERSHIP

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

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.

APPENDIX B

APPENDIX B LABORATORY ANALYTICAL REPORTS

Exova
#104, 19575-55 A Ave.
Surrey, British Columbia
V3S 8P8, Canada

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: NWL-Surrey@exova.com
W: www.exova.com

Report Transmission Cover Page

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Approval Status:	Approved
	Calcite Business Centre	Name:	Geothermal	Invoice Frequency:	by Lot
	Unit 6, 151 Industrial Road	Location:	Yukon	COD Status:	
	Whitehorse, YT, Canada	LSD:		Control Number:	
	Y1A 2V3	P.O.:		Date Received:	Sep 22, 2009
Attn:	Stephan Klump	Acct code:		Date Reported:	Sep 29, 2009
Sampled By:	SK			Report Number:	1252244
Company:	EBA				

Contact & Affiliation	Address	Delivery Commitments	
Stephan Klump EBA Engineering - Edmonton	Unit 6, 151 Industrial Road, Calcite Business Whitehorse, Yukon Territory Y1A 2V3 Phone: (867) 668-2071 Fax: (867) 668-4349 Email: sklump@eba.ca	On [Lot Verification] send (COA) 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 [Lot Approval and Final Test Report Approval] send (COC, Test Report, Invoice) by Post	M
Shelbree Schneider EBA Engineering - Edmonton	Unit 6, 151 Industrial Road, Calcite Business Whitehorse, Yukon Territory Y1A 2V3 Phone: (867) 668-2071 Fax: (867) 668-4349 Email: smschneider@eba.ca	On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report	

Notes To Clients:

- The ion balance was outside the range 90 - 110% for lot 704058. Field filtered samples were used for cations analysis, lab filtered samples were used for anions and dissolved phophorus.

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Sample Custody

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

Sample Disposal Date: December 28, 2009

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 Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

		Reference Number	704058-1	704058-2	704058-3	
		Sample Date	Sep 15, 2009	Sep 15, 2009	Sep 15, 2009	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	LC / L09S-5	LC / L09S-5D	LC / L09S-09	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	@ 25 °C		7.67		7.77	
Electrical Conductivity		µS/cm at 25 C	488		311	1
Electrical Conductivity		dS/m at 25 C	0.488		0.311	0.001
Calcium	Dissolved	mg/L	67.9		44.2	0.1
Magnesium	Dissolved	mg/L	21.0		15.3	0.1
Potassium	Dissolved	mg/L	1.7		0.5	0.1
Silicon	Dissolved	mg/L	5.89	0.84	2.49	0.05
Sodium	Dissolved	mg/L	4.1		0.9	0.1
Bicarbonate		mg/L	270		190	5
Carbonate		mg/L	<6		<6	6
Hydroxide		mg/L	<5		<5	5
P-Alkalinity	as CaCO3	mg/L	<5		<5	5
T-Alkalinity	as CaCO3	mg/L	219		159	5
Chloride	Dissolved	mg/L	4.56		0.65	0.02
Fluoride	Dissolved	mg/L	1.34		0.32	0.01
Nitrate - N	Dissolved	mg/L	0.03		0.04	0.01
Nitrite - N	Dissolved	mg/L	<0.01		<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	39.5		10	0.6
Hardness	as CaCO3	mg/L	256		173	5
Total Dissolved Solids	Dissolved	mg/L	287		170	1
Ionic Balance	Dissolved	%	116		122	

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

		Reference Number	704058-1	704058-3	704058-4	
		Sample Date	Sep 15, 2009	Sep 15, 2009	Sep 15, 2009	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	LC / L09S-5	LC / L09S-09	LC / LO9S-13	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Phosphorus	Total Dissolved	mg/L	0.015	0.009	0.007	0.003
Metals Dissolved						
Mercury	Total Dissolved	ug/L	<0.01	<0.01	<0.01	0.01
Aluminum	Dissolved	mg/L	<0.005	0.007	<0.005	0.005
Antimony	Dissolved	mg/L	0.0006	0.0005	0.0005	0.0002
Arsenic	Dissolved	mg/L	0.0019	0.0006	0.0014	0.0002
Barium	Dissolved	mg/L	0.118	0.163	0.091	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	0.043	0.011	0.026	0.004
Cadmium	Dissolved	mg/L	0.00007	0.00012	0.00005	0.00001
Chromium	Dissolved	mg/L	0.0011	0.001	0.0008	0.0004
Cobalt	Dissolved	mg/L	0.00007	0.00005	0.00036	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Iron	Dissolved	mg/L	<0.01	<0.01	0.09	0.01
Lead	Dissolved	mg/L	0.0001	<0.0001	0.0003	0.0001
Lithium	Dissolved	mg/L	0.016	0.003	0.010	0.001
Manganese	Dissolved	mg/L	0.0008	<0.0002	0.0144	0.0002
Molybdenum	Dissolved	mg/L	0.0031	0.0011	0.0018	0.0001
Nickel	Dissolved	mg/L	0.001	0.002	0.003	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium	Dissolved	mg/L	0.848	0.178	0.525	0.001
Sulfur	Dissolved	mg/L	13.2	3.4	10.1	0.2
Thallium	Dissolved	mg/L	0.00025	0.00004	0.00018	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	0.0002	<0.0001	<0.0001	0.0001
Titanium	Dissolved	mg/L	0.0004	0.0006	<0.0004	0.0004
Uranium	Dissolved	mg/L	0.0017	0.0008	0.0010	0.0004
Vanadium	Dissolved	mg/L	0.0007	0.0008	0.0004	0.0001
Zinc	Dissolved	mg/L	0.013	0.005	0.013	0.001
Zirconium	Dissolved	mg/L	<0.0001	0.0002	<0.0001	0.0001

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

		Reference Number	704058-4	704058-5	704058-6	
		Sample Date	Sep 15, 2009	Sep 15, 2009	Sep 15, 2009	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	LC / LO9S-13	LC / L09S-13D	LC / L09S-23	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	@ 25 °C		7.55		7.63	
Electrical Conductivity		µS/cm at 25 C	386		463	1
Electrical Conductivity		dS/m at 25 C	0.386		0.463	0.001
Calcium	Dissolved	mg/L	55.7		56.8	0.1
Magnesium	Dissolved	mg/L	16.0		27.2	0.1
Potassium	Dissolved	mg/L	1.3		1.3	0.1
Silicon	Dissolved	mg/L	4.34	0.62	7.08	0.05
Sodium	Dissolved	mg/L	2.7		0.8	0.1
Bicarbonate		mg/L	210		270	5
Carbonate		mg/L	<6		<6	6
Hydroxide		mg/L	<5		<5	5
P-Alkalinity	as CaCO3	mg/L	<5		<5	5
T-Alkalinity	as CaCO3	mg/L	174		224	5
Chloride	Dissolved	mg/L	2.51		0.39	0.02
Fluoride	Dissolved	mg/L	0.68		0.64	0.01
Nitrate - N	Dissolved	mg/L	0.02		0.07	0.01
Nitrite - N	Dissolved	mg/L	0.06		0.13	0.01
Sulfate (SO4)	Dissolved	mg/L	30.2		30.9	0.6
Hardness	as CaCO3	mg/L	205		254	5
Total Dissolved Solids	Dissolved	mg/L	226		272	1
Ionic Balance	Dissolved	%	118		117	

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

		Reference Number	704058-6	704058-8	704058-10	
		Sample Date	Sep 15, 2009	Sep 16, 2009	Sep 16, 2009	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	LC / L09S-23	LC / L09S-44	LC / L09S-49	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Phosphorus	Total Dissolved	mg/L	0.006	0.01	0.020	0.003
Metals Dissolved						
Mercury	Total Dissolved	ug/L	<0.01	0.03	0.02	0.01
Aluminum	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L	0.0004	0.0005	0.0003	0.0002
Arsenic	Dissolved	mg/L	0.0009	0.0042	0.0077	0.0002
Barium	Dissolved	mg/L	0.140	0.076	0.088	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	0.019	0.077	0.064	0.004
Cadmium	Dissolved	mg/L	0.00004	0.00041	0.00004	0.00001
Chromium	Dissolved	mg/L	0.0013	0.0008	0.0009	0.0004
Cobalt	Dissolved	mg/L	0.00006	0.00256	0.00474	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Iron	Dissolved	mg/L	<0.01	0.09	0.30	0.01
Lead	Dissolved	mg/L	0.0005	0.0007	0.0002	0.0001
Lithium	Dissolved	mg/L	0.005	0.028	0.025	0.001
Manganese	Dissolved	mg/L	<0.0002	0.1540	0.2900	0.0002
Molybdenum	Dissolved	mg/L	0.0058	0.0034	0.0019	0.0001
Nickel	Dissolved	mg/L	0.004	0.005	0.009	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium	Dissolved	mg/L	0.058	1.380	1.200	0.001
Sulfur	Dissolved	mg/L	10.3	31.5	27.9	0.2
Thallium	Dissolved	mg/L	0.00027	0.00090	0.00077	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	<0.0001	0.0004	0.0002	0.0001
Titanium	Dissolved	mg/L	<0.0004	0.0007	0.0010	0.0004
Uranium	Dissolved	mg/L	0.0028	0.0006	<0.0004	0.0004
Vanadium	Dissolved	mg/L	0.0016	0.0003	0.0003	0.0001
Zinc	Dissolved	mg/L	0.034	0.050	0.056	0.001
Zirconium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:	
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029
	Calcite Business Centre	Name:	Geothermal
	Unit 6, 151 Industrial Road	Location:	Yukon
	Whitehorse, YT, Canada	LSD:	
	Y1A 2V3	P.O.:	
Attn:	Stephan Klump	Acct code:	
Sampled By:	SK		
Company:	EBA		

Lot ID:	**704058**
Control Number:	
Date Received:	Sep 22, 2009
Date Reported:	Sep 29, 2009
Report Number:	1252244

		Reference Number	704058-7	704058-8	704058-9	
		Sample Date	Sep 15, 2009	Sep 16, 2009	Sep 16, 2009	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	LC / L09S-23D	LC / L09S-44	LC / L09S-44D	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	@ 25 °C			7.60		
Electrical Conductivity		µS/cm at 25 C		560		1
Electrical Conductivity		dS/m at 25 C		0.560		0.001
Calcium	Dissolved	mg/L		84.1		0.1
Magnesium	Dissolved	mg/L		18.6		0.1
Potassium	Dissolved	mg/L		4.2		0.1
Silicon	Dissolved	mg/L	0.96	14.3	2.17	0.05
Sodium	Dissolved	mg/L		5.6		0.1
Bicarbonate		mg/L		230		5
Carbonate		mg/L		<6		6
Hydroxide		mg/L		<5		5
P-Alkalinity	as CaCO3	mg/L		<5		5
T-Alkalinity	as CaCO3	mg/L		191		5
Chloride	Dissolved	mg/L		<0.02		0.02
Fluoride	Dissolved	mg/L		0.47		0.01
Nitrate - N	Dissolved	mg/L		<0.01		0.01
Nitrite - N	Dissolved	mg/L		3.35		0.01
Sulfate (SO4)	Dissolved	mg/L		94.4		0.6
Hardness	as CaCO3	mg/L		287		5
Total Dissolved Solids	Dissolved	mg/L		372		1
Ionic Balance	Dissolved	%		118		

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

		Reference Number	704058-10	704058-11	704058-12	
		Sample Date	Sep 16, 2009	Sep 16, 2009	Sep 16, 2009	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	LC / L09S-49	LC / L09S-49D	LC / L09S-51	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	@ 25 °C		7.44		7.38	
Electrical Conductivity		µS/cm at 25 C	539		554	1
Electrical Conductivity		dS/m at 25 C	0.539		0.554	0.001
Calcium	Dissolved	mg/L	80.5		81.0	0.1
Magnesium	Dissolved	mg/L	18.7		19.8	0.1
Potassium	Dissolved	mg/L	3.6		4.2	0.1
Silicon	Dissolved	mg/L	12.9	1.71	14.9	0.05
Sodium	Dissolved	mg/L	4.8		5.6	0.1
Bicarbonate		mg/L	240		230	5
Carbonate		mg/L	<6		<6	6
Hydroxide		mg/L	<5		<5	5
P-Alkalinity	as CaCO3	mg/L	<5		<5	5
T-Alkalinity	as CaCO3	mg/L	195		190	5
Chloride	Dissolved	mg/L	4.60		5.18	0.02
Fluoride	Dissolved	mg/L	0.48		0.55	0.01
Nitrate - N	Dissolved	mg/L	<0.01		0.01	0.01
Nitrite - N	Dissolved	mg/L	<0.01		<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	83.8		96.2	0.6
Hardness	as CaCO3	mg/L	278		284	5
Total Dissolved Solids	Dissolved	mg/L	349		367	1
Ionic Balance	Dissolved	%	115		113	

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

		Reference Number	704058-12	704058-14	704058-16	
		Sample Date	Sep 16, 2009	Sep 17, 2009	Sep 18, 2009	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	LC / L09S-51	LC / L09S-57	LC / L09S-76	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Phosphorus	Total Dissolved	mg/L	0.011	0.012	0.021	0.003
Metals Dissolved						
Mercury	Total Dissolved	ug/L	<0.01	<0.01	<0.01	0.01
Aluminum	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L	0.0003	0.0003	0.0005	0.0002
Arsenic	Dissolved	mg/L	0.0017	0.0026	0.0007	0.0002
Barium	Dissolved	mg/L	0.082	0.091	0.104	0.001
Beryllium	Dissolved	mg/L	0.00006	0.00008	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	0.074	0.099	0.082	0.004
Cadmium	Dissolved	mg/L	0.00005	<0.00001	0.00015	0.00001
Chromium	Dissolved	mg/L	0.0009	0.0013	0.0013	0.0004
Cobalt	Dissolved	mg/L	0.00018	0.00010	0.00010	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Iron	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Lead	Dissolved	mg/L	0.0002	0.0015	0.0005	0.0001
Lithium	Dissolved	mg/L	0.030	0.050	0.041	0.001
Manganese	Dissolved	mg/L	0.0090	0.0059	0.0106	0.0002
Molybdenum	Dissolved	mg/L	0.0009	0.0019	0.0017	0.0001
Nickel	Dissolved	mg/L	0.002	0.002	0.002	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium	Dissolved	mg/L	1.460	0.626	0.601	0.001
Sulfur	Dissolved	mg/L	32.1	31.4	23.3	0.2
Thallium	Dissolved	mg/L	0.00013	0.00036	0.00024	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	0.0003	0.0002	0.0008	0.0001
Titanium	Dissolved	mg/L	0.0005	0.0008	0.0007	0.0004
Uranium	Dissolved	mg/L	<0.0004	0.0012	0.0009	0.0004
Vanadium	Dissolved	mg/L	0.0005	0.0011	0.0016	0.0001
Zinc	Dissolved	mg/L	0.014	0.009	0.009	0.001
Zirconium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

		Reference Number	704058-13	704058-14	704058-15	
		Sample Date	Sep 16, 2009	Sep 17, 2009	Sep 17, 2009	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	LC / L09S-51D	LC / L09S-57	LC / L09S-57D	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	@ 25 °C			7.18		
Electrical Conductivity		µS/cm at 25 C		667		1
Electrical Conductivity		dS/m at 25 C		0.667		0.001
Calcium	Dissolved	mg/L		86.5		0.1
Magnesium	Dissolved	mg/L		31.4		0.1
Potassium	Dissolved	mg/L		4.5		0.1
Silicon	Dissolved	mg/L	1.85	14.2	2.18	0.05
Sodium	Dissolved	mg/L		9.0		0.1
Bicarbonate		mg/L		320		5
Carbonate		mg/L		<6		6
Hydroxide		mg/L		<5		5
P-Alkalinity	as CaCO3	mg/L		<5		5
T-Alkalinity	as CaCO3	mg/L		263		5
Chloride	Dissolved	mg/L		5.62		0.02
Fluoride	Dissolved	mg/L		0.57		0.01
Nitrate - N	Dissolved	mg/L		<0.01		0.01
Nitrite - N	Dissolved	mg/L		<0.01		0.01
Sulfate (SO4)	Dissolved	mg/L		94.1		0.6
Hardness	as CaCO3	mg/L		345		5
Total Dissolved Solids	Dissolved	mg/L		428		1
Ionic Balance	Dissolved	%		114		

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

		Reference Number	704058-16	704058-17	704058-18	
		Sample Date	Sep 18, 2009	Sep 18, 2009	Sep 18, 2009	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	LC / L09S-76	LC / L09S-76D	LC / L09S-98	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	@ 25 °C		7.34		7.72	
Electrical Conductivity		µS/cm at 25 C	637		423	1
Electrical Conductivity		dS/m at 25 C	0.637		0.423	0.001
Calcium	Dissolved	mg/L	82.0		53.9	0.1
Magnesium	Dissolved	mg/L	31.4		22.0	0.1
Potassium	Dissolved	mg/L	3.9		1.0	0.1
Silicon	Dissolved	mg/L	12.1	1.81	5.44	0.05
Sodium	Dissolved	mg/L	7.4		2.1	0.1
Bicarbonate		mg/L	340		250	5
Carbonate		mg/L	<6		<6	6
Hydroxide		mg/L	<5		<5	5
P-Alkalinity	as CaCO3	mg/L	<5		<5	5
T-Alkalinity	as CaCO3	mg/L	276		208	5
Chloride	Dissolved	mg/L	4.61		0.96	0.02
Fluoride	Dissolved	mg/L	0.61		0.30	0.01
Nitrate - N	Dissolved	mg/L	0.01		0.13	0.01
Nitrite - N	Dissolved	mg/L	0.04		<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	69.9		24	0.6
Hardness	as CaCO3	mg/L	334		225	5
Total Dissolved Solids	Dissolved	mg/L	399		240	1
Ionic Balance	Dissolved	%	115		116	

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

		Reference Number	704058-18	704058-20	704058-22	
		Sample Date	Sep 18, 2009	Sep 16, 2009	Sep 19, 2009	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	LC / L09S-98	LC / L09S-441	LC / L09S-103	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Phosphorus	Total Dissolved	mg/L	0.01	0.019	0.028	0.003
Metals Dissolved						
Mercury	Total Dissolved	ug/L	<0.01	0.2	<0.01	0.01
Aluminum	Dissolved	mg/L	<0.005	<0.005	<0.005	0.005
Antimony	Dissolved	mg/L	0.0005	0.0005	0.0006	0.0002
Arsenic	Dissolved	mg/L	0.0005	0.0056	0.0006	0.0002
Barium	Dissolved	mg/L	0.209	0.078	0.126	0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004	<0.00004	0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Boron	Dissolved	mg/L	0.024	0.073	0.005	0.004
Cadmium	Dissolved	mg/L	0.00021	0.00069	0.00004	0.00001
Chromium	Dissolved	mg/L	0.001	0.0009	0.0011	0.0004
Cobalt	Dissolved	mg/L	0.00006	0.00367	0.00006	0.00002
Copper	Dissolved	mg/L	<0.001	<0.001	<0.001	0.001
Iron	Dissolved	mg/L	<0.01	0.27	<0.01	0.01
Lead	Dissolved	mg/L	0.0002	0.0019	0.0002	0.0001
Lithium	Dissolved	mg/L	0.007	0.030	<0.001	0.001
Manganese	Dissolved	mg/L	0.0005	0.2000	0.0016	0.0002
Molybdenum	Dissolved	mg/L	0.0066	0.0032	0.0037	0.0001
Nickel	Dissolved	mg/L	0.003	0.007	<0.001	0.001
Selenium	Dissolved	mg/L	<0.0006	<0.0006	<0.0006	0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium	Dissolved	mg/L	0.181	1.420	0.019	0.001
Sulfur	Dissolved	mg/L	8.0	32.8	1.7	0.2
Thallium	Dissolved	mg/L	0.00015	0.00078	0.00002	0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004	<0.0004	0.0004
Tin	Dissolved	mg/L	0.0007	<0.0001	0.0018	0.0001
Titanium	Dissolved	mg/L	<0.0004	0.0011	<0.0004	0.0004
Uranium	Dissolved	mg/L	0.0019	0.0006	0.0015	0.0004
Vanadium	Dissolved	mg/L	0.0019	0.0003	0.0006	0.0001
Zinc	Dissolved	mg/L	0.037	0.073	0.006	0.001
Zirconium	Dissolved	mg/L	<0.0001	<0.0001	<0.0001	0.0001

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

		Reference Number	704058-19	704058-20	704058-21	
		Sample Date	Sep 18, 2009	Sep 16, 2009	Sep 16, 2009	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	LC / L09S-98D	LC / L09S-441	LC / L09S-441D	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Routine Water						
pH	@ 25 °C			7.69		
Electrical Conductivity		µS/cm at 25 C		566		1
Electrical Conductivity		dS/m at 25 C		0.566		0.001
Calcium	Dissolved	mg/L		82.9		0.1
Magnesium	Dissolved	mg/L		18.3		0.1
Potassium	Dissolved	mg/L		4.1		0.1
Silicon	Dissolved	mg/L	0.81	14.1	1.78	0.05
Sodium	Dissolved	mg/L		5.6		0.1
Bicarbonate		mg/L		230		5
Carbonate		mg/L		<6		6
Hydroxide		mg/L		<5		5
P-Alkalinity	as CaCO3	mg/L		<5		5
T-Alkalinity	as CaCO3	mg/L		192		5
Chloride	Dissolved	mg/L		5.15		0.02
Fluoride	Dissolved	mg/L		0.62		0.01
Nitrate - N	Dissolved	mg/L		<0.01		0.01
Nitrite - N	Dissolved	mg/L		0.04		0.01
Sulfate (SO4)	Dissolved	mg/L		98.3		0.6
Hardness	as CaCO3	mg/L		282		5
Total Dissolved Solids	Dissolved	mg/L		369		1
Ionic Balance	Dissolved	%		112		

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:	
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029
	Calcite Business Centre	Name:	Geothermal
	Unit 6, 151 Industrial Road	Location:	Yukon
	Whitehorse, YT, Canada	LSD:	
	Y1A 2V3	P.O.:	
Attn:	Stephan Klump	Acct code:	
Sampled By:	SK		
Company:	EBA		

Lot ID:	**704058**
Control Number:	
Date Received:	Sep 22, 2009
Date Reported:	Sep 29, 2009
Report Number:	1252244

Analyte		Units	Results	Results	Results	Nominal Detection Limit
		Reference Number	704058-22	704058-23	704058-24	
		Sample Date	Sep 19, 2009	Sep 20, 2009	Sep 14, 2009	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	LC / L09S-103	LC / L09S-111	LC / L09S-04	
		Matrix	Water	Water	Water	
Routine Water						
pH	@ 25 °C		7.94	7.70	7.68	
Electrical Conductivity		µS/cm at 25 C	346	502	531	1
Electrical Conductivity		dS/m at 25 C	0.346	0.502	0.531	0.001
Calcium	Dissolved	mg/L	38.5	82.4	86.3	0.1
Magnesium	Dissolved	mg/L	21.6	16.3	17.0	0.1
Potassium	Dissolved	mg/L	0.4	0.6	0.7	0.1
Silicon	Dissolved	mg/L	1.99	2.47	2.52	0.05
Sodium	Dissolved	mg/L	0.4	1.2	1.3	0.1
Bicarbonate		mg/L	230	320	340	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
P-Alkalinity	as CaCO3	mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	187	262	275	5
Chloride	Dissolved	mg/L	0.13	0.24	0.25	0.02
Fluoride	Dissolved	mg/L	0.19	0.21	0.20	0.01
Nitrate - N	Dissolved	mg/L	0.12	0.28	0.25	0.01
Nitrite - N	Dissolved	mg/L	<0.01	0.21	0.22	0.01
Sulfate (SO4)	Dissolved	mg/L	5.0	17	19	0.6
Hardness	as CaCO3	mg/L	185	273	285	5
Total Dissolved Solids	Dissolved	mg/L	184	284	298	1
Ionic Balance	Dissolved	%	116	117	116	

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:	
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029
	Calcite Business Centre	Name:	Geothermal
	Unit 6, 151 Industrial Road	Location:	Yukon
	Whitehorse, YT, Canada	LSD:	
	Y1A 2V3	P.O.:	
Attn:	Stephan Klump	Acct code:	
Sampled By:	SK		
Company:	EBA		

Lot ID:	**704058**
Control Number:	
Date Received:	Sep 22, 2009
Date Reported:	Sep 29, 2009
Report Number:	1252244

		Reference Number	704058-23	704058-24		
		Sample Date	Sep 20, 2009	Sep 14, 2009		
		Sample Time	NA	NA		
		Sample Location				
		Sample Description	LC / L09S-111	LC / L09S-04		
		Matrix	Water	Water		
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Phosphorus	Total Dissolved	mg/L	0.016	0.013		0.003
Metals Dissolved						
Mercury	Total Dissolved	ug/L	<0.01	<0.01		0.01
Aluminum	Dissolved	mg/L	<0.005	<0.005		0.005
Antimony	Dissolved	mg/L	0.0006	0.0004		0.0002
Arsenic	Dissolved	mg/L	0.0004	0.0006		0.0002
Barium	Dissolved	mg/L	0.069	0.068		0.001
Beryllium	Dissolved	mg/L	<0.00004	<0.00004		0.00004
Bismuth	Dissolved	mg/L	<0.001	<0.001		0.001
Boron	Dissolved	mg/L	0.010	0.010		0.004
Cadmium	Dissolved	mg/L	0.00008	0.00007		0.00001
Chromium	Dissolved	mg/L	0.0014	0.0017		0.0004
Cobalt	Dissolved	mg/L	0.00006	0.00005		0.00002
Copper	Dissolved	mg/L	<0.001	<0.001		0.001
Iron	Dissolved	mg/L	<0.01	<0.01		0.01
Lead	Dissolved	mg/L	<0.0001	<0.0001		0.0001
Lithium	Dissolved	mg/L	0.005	0.006		0.001
Manganese	Dissolved	mg/L	0.0002	<0.0002		0.0002
Molybdenum	Dissolved	mg/L	0.0013	0.0015		0.0001
Nickel	Dissolved	mg/L	0.002	0.002		0.001
Selenium	Dissolved	mg/L	0.0006	0.0007		0.0006
Silver	Dissolved	mg/L	<0.00001	<0.00001		0.00001
Strontium	Dissolved	mg/L	0.082	0.092		0.001
Sulfur	Dissolved	mg/L	5.8	6.3		0.2
Thallium	Dissolved	mg/L	0.00005	0.00005		0.00001
Thorium	Dissolved	mg/L	<0.0004	<0.0004		0.0004
Tin	Dissolved	mg/L	0.0011	<0.0001		0.0001
Titanium	Dissolved	mg/L	<0.0004	<0.0004		0.0004
Uranium	Dissolved	mg/L	0.0013	0.0014		0.0004
Vanadium	Dissolved	mg/L	0.0011	0.0013		0.0001
Zinc	Dissolved	mg/L	0.028	0.033		0.001
Zirconium	Dissolved	mg/L	<0.0001	<0.0001		0.0001

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Analytical Report

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

Approved by: Andrew Garrard

Andrew Garrard, BSc
General Manager

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Methodology and Notes

Bill To:	EBA Engineering Consulting Lt	Project:		Lot ID:	**704058**
Report To:	EBA Engineering Consulting Lt	ID:	W23101159.029	Control Number:	
	Calcite Business Centre	Name:	Geothermal	Date Received:	Sep 22, 2009
	Unit 6, 151 Industrial Road	Location:	Yukon	Date Reported:	Sep 29, 2009
	Whitehorse, YT, Canada	LSD:		Report Number:	1252244
	Y1A 2V3	P.O.:			
Attn:	Stephan Klump	Acct code:			
Sampled By:	SK				
Company:	EBA				

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water	APHA	*	Conductivity, 2510	23-Sep-09	Exova Surrey
Alk, pH, EC, Turb in water	APHA	*	Electrometric Method, 4500-H+ B	23-Sep-09	Exova Surrey
Alk, pH, EC, Turb in water	APHA	*	Titration Method, 2320 B	23-Sep-09	Exova Surrey
Anions by IEC in water (Surrey)	APHA	*	Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	24-Sep-09	Exova Surrey
Mercury Low Level (Total) in water	EPA	*	Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	25-Sep-09	Exova Surrey
Metals SemiTrace (Dissolved) in water	US EPA	*	Metals & Trace Elements by ICP-AES, 6010B	24-Sep-09	Exova Surrey
Phosphorus - total dissolved (low level)	APHA	*	Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	23-Sep-09	Exova Surrey
Trace Metals (dissolved) in Water	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	24-Sep-09	Exova Surrey
Trace Metals (dissolved) in Water	US EPA	*	Metals & Trace Elements by ICP-AES, 6010B	24-Sep-09	Exova Surrey

** Laboratory method(s) based on reference method*

References

APHA	Standard Methods for the Examination of Water and Wastewater
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Comments:

- The ion balance was outside the range 90 - 110% for lot 704058. Field filtered samples were used for cations analysis, lab filtered samples were used for anions and dissolved phophorus.

Bodycote TESTING GROUP

LOT: ____ Control Number ____

Environmental Sample Information Sheet

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

See reverse for your nearest Bodycote location and proper sampling protocol

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 Rd, Whitehorse, YT, Y1A 2V3	QA/QC Report [x]	Address: Unit 6, 151 Industrial Rd, Whitehorse, YT, Y1A 2V3	
	Report Result:		Report Result:
Attention: Stephan Klump	Fax [ ]	Attention:	Fax [ ]
Phone: 867-668-3068	Mail [x]	Phone: 867-668-3068	Mail [ ]
Fax: 867-668-4349	Courier [ ]	Fax: 867-668-4349	Courier [ ]
Cell:	e-mail [x]	Cell:	e-mail [ ]
e-mail: sklump@eba.ca	e-Service [ ]	e-mail:	e-Service [ ]

Information to be included on Report and Invoice

Project ID: W23101159.029
Project Name: Geothermal
Project Location: Yukon
Legal Location:
PO#:
Proj. Acct. Code:
Agreement ID:

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: ____
Bodycote Authorization: ____

Sample Custody (Please Print)
Sampled by: SK
Company EBA Signature
I authorize Bodycote to proceed with the work indicated on ...
Date: 2[illegible]-Sep Initial:
Received by: Samp. Temp.
Waybill #: Date
Company Time

RECEIVED SEP 2[illegible] 2009

Special Instructions / Comments
All "Dissolved Metals" samples (200 ml) are field-filtered and preserved (HNO_3).
All samples for Si analysis (L09S-XXD) are field-filtered and preserved (HNO_3).

Please indicate which regulations you are required to meet:

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

[ ] Check here if Bodycote is required to report results directly to a regulatory body (Please include contact information)

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

	Sample Identification	Location	Depth IN	CM	M	Date/Time Sampled	Matrix	Sampling Method	Number of Containers	TW33F	TDP	F	Si
1	L09S-5	LC				15-Sep-09	Water	Grab	2	X	X	X	
2	L09S-5D	LC				15-Sep-09	Water	Grab	1				X
3	L09S-09	LC				15-Sep-09	Water	Grab	2	X	X	X	
4	L09S-13	LC				15-Sep-09	Water	Grab	2	X	X	X	
5	L09S-13D	LC				15-Sep-09	Water	Grab	1				X
6	L09S-23	LC				15-Sep-09	Water	Grab	2	X	X	X	
7	L09S-23D	LC				15-Sep-09	Water	Grab	1				X
8	L09S-44	LC				16-Sep-09	Water	Grab	2	X	X	X	
9	L09S-44D	LC				16-Sep-09	Water	Grab	1				X
10	L09S-49	LC				16-Sep-09	Water	Grab	2	X	X	X	
11	L09S-49D	LC				16-Sep-09	Water	Grab	1				X
12	L09S-51	LC				16-Sep-09	Water	Grab	2	X	X	X	
13	L09S-51D	LC				16-Sep-09	Water	Grab	1				X
14	L09S-57	LC				17-Sep-09	Water	Grab	2	X	X	X	
15	L09S-57D	LC				17-Sep-09	Water	Grab	1				X

Enter tests above (✓ relevant samples below)

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

Bodycote TESTING GROUP

LOT: ______ Control Number ______

Environmental Sample Information Sheet

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

See reverse for your nearest Bodycote location and proper sampling protocol

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 Rd, Whitehorse, YT, Y1A 2V3	QA/QC Report [x]	Address: Unit 6, 151 Industrial Rd, Whitehorse, YT, Y1A 2V3	
	Report Result:		Report Result:
Attention: Stephan Klump	Fax [ ]	Attention:	Fax [ ]
Phone: 867-668-3068	Mail [x]	Phone: 867-668-3068	Mail [ ]
Fax: 867-668-4349	Courier [ ]	Fax: 867-668-4349	Courier [ ]
Cell:	e-mail [x]	Cell:	e-mail [ ]
e-mail: sklump@eba.ca	e-Service [ ]	e-mail:	e-Service [ ]

Information to be included on Report and Invoice

Project ID: W23101159.029
Project Name: Geothermal
Project Location: Yukon
Legal Location:
PO#:
Proj. Acct. Code:
Agreement ID:

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: ______
Bodycote Authorization: ______

Sample Custody (Please Print)
Sampled by: SK
Company EBA Signature
I authorize Bodycote to proceed with the work work indicated on this form:
Date: 21...
Received by: Sample Temp.
Waybill #: Date
Company Time

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[ ] Check ... is required to report results directly to a regulatory body (Please include contact information)

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

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Condiftion of containers/coolers upon arrival at lab

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	TW33F	TDP	F	Si								
1	L09S-76	LC		18-Sep-09	Water	Grab	2	X	X	X									
2	L09S-76D	LC		18-Sep-09	Water	Grab	1				X								
3	L09S-98	LC		18-Sep-09	Water	Grab	2	X	X	X									
4	L09S-98D	LC		18-Sep-09	Water	Grab	1				X								
5	L09S-441	LC		16-Sep-09	Water	Grab	2	X	X	X									
6	L09S-441D	LC		16-Sep-09	Water	Grab	1				X								
7	L09S-103	LC		19-Sep-09	Water	Grab	2	X	X	X									
8	L09S-111	LC		20-Sep-09	Water	Grab	2	X	X	X									
9	L09S-04	LC		14-Sep-09	Water	Grab	2	X	X	X									
10																			
11																			
12																			
13																			
14																			
15																			

Enter tests above (✓ relevant samples below)

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