

YUKON ENERGY CORPORATION

GEOLOGICAL MAPPING AND GEOCHEMISTRY PARTRIDGE CREEK WARM SPRING NORTH OF STEWART CROSSING, YUKON



REPORT

APRIL 2012
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1.0 INTRODUCTION

EBA, A Tetra Tech Company, has been conducting a geothermal exploration program for Yukon Energy Corp. assessing the geothermal potential of multiple sites throughout southern and central Yukon. This is with a view of identifying potential medium- and high-temperature geothermal resources that can be used to generate electrical power. The exploration activities have now been focused on areas within an economically reasonable distance from the existing power grid.

A preliminary geothermal assessment of the Partridge Creek Warm Springs (PCWS) conducted in 2010 and 2011 came to the conclusion that the area is among the more favourable for continued geothermal exploration (EBA, 2011).

This report presents the results of geological mapping of the area of the Partridge Creek Warm Spring and the results of a comprehensive geochemical assessment of the thermal water. The springs are located in the central Yukon about 50 km northwest of Stewart Crossing and 15 km north of the McQuesten River Bridge on the Klondike Highway (Figures 1 and 2). The information collected will be used to enhance the understanding of the geological conditions in which the thermal spring occurs and to guide further sub-surface exploration of the area.

The Partridge Creek Warm Spring (PCWS) is a shallow (less than 150 mm deep) pond less than 10 m average diameter, located at the base of a sub-vertical, about 5 m-high bluff of granitic bedrock. The springs are sourced from numerous gaseous vents on the floor of the pond. There was no odour associated with the springs.

2.0 PURPOSE AND SCOPE

Based on the results of the preliminary geothermal assessment of the PCWS, EBA conducted geological mapping in the area of the warm spring to collect structural and lithological data and completed geochemical analysis of the thermal water to further characterize the warm spring and refine the preliminary geothermal model.

The scope of services for this project phase included:

- Air photo interpretation to identify potential bedrock outcrops and targets for ground reconnaissance;
- Site visit by EBA representatives Jack Dennett, P.Geo. and Stephan Klump, Ph.D. on July 26 and 27, 2011;
- Geological mapping of bedrock outcrops in the area of the PCWS (see Figure 3);
- Structural measurements at bedrock outcrops to identify dominant fracture and fault orientations;
- Sampling of thermal water at PCWS;
- Hydrochemical and isotope analysis including routine chemistry, dissolved metals, stable isotopes (^2H and ^{18}O), tritium (^3H), carbon-13 (^{13}C), and radiocarbon (^{14}C);
- Data interpretation and refinement of preliminary geothermal model for PCWS; and,

- Report presenting methods, findings, results, analysis, discussion and recommendations for this assignment.

3.0 METHODS

Fieldwork to carry out geology mapping was completed by Jack Dennett, P.Geo. and Stephan Klump, Ph.D. of EBA on July 26 and 27, 2011. Helicopter support was provided by Horizon Helicopters of Whitehorse using a Robinson R44 Raven helicopter.

3.1 Geological Mapping

3.1.1 Air Photo Interpretation

EBA carried out a stereoscopic air photo interpretation (API) using 1:40,000-scale air photos that were obtained from the Yukon Government Energy, Mines and Resources Library. The API was used to look for indications of the following:

- Bedrock outcrops for later ground reconnaissance;
- Fault traces and morphological lineaments that might indicate underlying geological structures or lithologic contacts;
- Gross features of bedrock lithology and erosion;
- Existing springs or seeps;
- Vegetation lineaments potentially related to underlying structural bedrock;
- Anomalous or dead vegetation areas potentially indicating warm/hot water seeps or springs (or former springs);
- Details useful for accessing and traversing the target areas;
- Areas of potential hazard from natural features; and,
- Primary and backup helicopter landing zones (for field planning in case of emergency).

3.1.2 Geological Ground Reconnaissance

Significant features identified during the API were marked on air photos and used in conjunction with enlarged 1:50,000 NTS topographic maps for orientation and field navigation.

The scope of the geological reconnaissance included the following:

- Initial aerial reconnaissance by helicopter for site overview, reconnaissance mapping of outcrops, traverse route planning, and safety (spotting wildlife);
- Identify and map rock staining or mineral precipitation that could be potentially related to past hydrothermal activity. This would include documenting any surface encrustation (e.g., opal or travertine); and,

- Map main rock lithologies, key geological structures and other geological features where exposed to help define the geological setting.

During the geological investigation rock types at outcrops in the area of the thermal spring were mapped and sampled. Structural measurements such as joint, fault and bedding plane orientations were taken. Each structural measurement and observed rock type was recorded with corresponding GPS locations. Structural measurements were later plotted on a Stereonet (Figure 4) to determine dominant orientations.

Given the remote location and for efficiency, field programs were carried out with helicopter support. Prior to fieldwork each 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.

3.2 Hydrogeochemistry of the PCWS

Field parameters measured during the site visits included: temperature, pH, electrical conductivity, total dissolved solids, and dissolved oxygen. 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	Garmin handheld GPS	1 m	~7 m
pH	YSI Multimeter	0.01 pH units	0.1
EC	YSI Multimeter	0.01 μ S/cm	2% full scale
TDS	YSI Multimeter	1 ppm	2% full scale
Temperature	YSI Multimeter	0.1°C	0.5°C
Dissolved O ₂	YSI Multimeter	0.01 mg/L	0.1 mg/L

Water samples were analyzed for hardness, alkalinity, cations and anions, dissolved metals and environmental isotopes of oxygen (oxygen-18), hydrogen (deuterium and tritium), and radiocarbon (carbon-14). 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 (SiO₂) 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) and radiocarbon (¹⁴C) were 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 (HNO₃).

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.

3.2.1 Geothermometer

There is a wide range of empirical chemical geothermometer formulas in the literature. 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 (SiO₂) 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.

We have chosen to use the classic alkali formula no. 1 (Fournier and Truesdell, 1973) with the constant term $B = 1/3$ (assuming subsurface temperatures are over 100°C) and no.3 which is an updated formula using the world database of geothermal fluids.

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 study.

In applying the silica geothermometer, we assumed that for the waters sampled in this program, silicon (Si) is always bound as silica (SiO₂). The measured silicon concentrations were then multiplied by 2.14 which is the ratio of atomic weights of Si and SiO₂. This calculated SiO₂ value was then used in the silica geothermometer formula.

Table 2: Common Geothermometer Formulas

#	Formula	Source	Comment
Alkali-based formulas			
1	$T^{\circ}\text{C} = \{1647 / [(\log(\text{Na}/\text{K}) + B(\log(\sqrt{\text{Ca}}/\text{Na}) + 2.06) + 2.47))] - 273.15$	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	$T^{\circ}\text{C} = [1217 / (\log(\text{Na}/\text{K}) + 1.483)] - 273.15$	Fournier, 1981	Alkali formula using Na and K only
3	$T^{\circ}\text{C} = [876.3 / (\log(\text{Na}/\text{K}) + 0.8775)] - 273.15$	Diaz-Gonzalez and Santoyo, 2008	Updated using world database of geothermal fluids
4	$T^{\circ}\text{C} = [1289 / (\log(\text{Na}/\text{K}) + 1.635)] - 273.15$	Verma and Santoyo, 1995	Updated using an error propagation method, with Fournier's original data
Silica-based formulas			
5	$T^{\circ}\text{C} = [1309 / (5.19 - \log\text{SiO}_2)] - 273.15$	Fournier, 1981	Silica form is quartz with no steam loss; best for T > 180°C
6	$T^{\circ}\text{C} = [1522 / (5.75 - \log\text{SiO}_2)] - 273.15$	Fournier, 1981	Silica form is quartz with steam loss from reservoir; best for T > 180°C
7	$T^{\circ}\text{C} = [1032 / (4.69 - \log\text{SiO}_2)] - 273.15$	Garcher and Arehart, 2008	Silica form is chalcedony; best for T = 180-140°C
8	$T^{\circ}\text{C} = [731 / (4.52 - \log\text{SiO}_2)] - 273.15$	Garcher and Arehart, 2008	Form is amorphous silica; best for T < 140°C
9	$T^{\circ}\text{C} = -44.119 + 0.24469(\text{SiO}_2) - 1.7414 \text{E-}4(\text{SiO}_2)^2 + 79.305\log(\text{SiO}_2)$	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.

4.0 RESULTS AND DISCUSSION

The warm spring site is characterized as a small, shallow pond with numerous gaseous vents in the centre area. Average depth of the pond is about 0.12 m. The pond is about 19 m long in the E-W direction and about 5 m wide (Photos 6 and 8). Gas emitting from vents is relatively constant but low volume (small bubbles); the highest temperature recorded at vents in the centre of pond is 25.2°C.

Numerous boulders with white precipitate are concentrated in the central area of the pond; the white precipitate is also prevalent on boulders and cobbles within the shallow outflow stream. The floor of the pond is colluvium (sand, gravel, cobbles, boulders and silt); most of the lithology of the colluvium is coarse-grained granite, but there are some fine-grained igneous units that may originate from fluvial deposits or from dykes within the local granite unit.

4.1 Geology

The study area is located near the north boundary of the Tintina Trench, a 15 km to 25 km-wide, northwest-oriented, linear, continental-scale geological feature. The Trench is described as a zone of intense fracturing, faulting and shearing, and is host to numerous economic mineral deposits. There is a distinct change in geology from southwest of the Trench to northeast of the trench (Figure 2).

The PCWS is located near the southern edge of the Two Sisters Batholith of the Coast Intrusion complex. Recent mapping of regional geology indicates that the area is dominated by two main units (GSC, 2001):

- Late Cretaceous and Early Tertiary post-accretion plutons – Coast Intrusions (granite, granodiorite, quartz monzonite) (LKqM: McQueston Suite – medium to coarse-grained, locally porphyritic, and potassium-feldspar megacrystic biotite with muscovite granite and quartz monzonite); and,
- Upper Proterozoic to Lower Cambrian Hyland Group (PCH4); quartzose clastic rocks mostly(?) equivalent to PCH1 (thin to thick bedded, brown to pale green shale, fine to coarse grained quartz-rich sandstone, grit, and quartz pebble conglomerate; minor argillaceous limestone; phyllite, quartzofeldspathic and micaceous psammite, gritty psammite and minor marble but may include younger units).

However, detailed mapping in the study area found that the quartzite-schist rock unit mapped during the field program south of the granitic intrusive correlates with Ordovician or Earlier Yukon Group meta-sediments (schist, quartzite, phyllite and limestone) mapped by Bostock (1949) and are not included with the unit descriptions for the Hyland Group.

Table 3 shows all field stations that were investigated during the site visit in July 2011. The field geologists recorded GPS coordinates of each field station, described the outcropping bedrock, and collected structural data where possible. Figure 3 shows the local geology and all field stations assessed as part of this project.

The intrusive unit in the study area was typically massive to weakly foliated, coarse-grained granite with pegmatitic plagioclase feldspar. Photos 1, 2, 5, 9, 16-18 show granitic bedrock outcrops in the area of the PCWS.

The metasedimentary unit found in the Partridge Creek valley downstream of the batholith was medium grey, medium-grained quartzite and schist; quartz-biotite schist with muscovite foliation planes; some medium- to medium-fine grained quartzite; quartzite with schist foliations planes; siliceous, fine-grained, quartzite-biotite schist; rare quartz augens (e.g., Photos 10,11, and 14).

Bedrock at the warm springs is representative of the Two Sisters Batholith, a Coast Intrusion probably included within the Tombstone Suite (mKT): quartz-biotite-hornblende porphyritic clinopyroxene granite. A prominent, 5 m-high outcrop/bluff of coarse-grained, quartz-biotite-muscovite-feldspar-granite with porphyritic feldspar crystals (one to six cm long) forms the north edge of the warm spring pond. This outcrop has a linear east-west orientation and forms the northern boundary of outcrop against the unconsolidated Quaternary deposits of the valley floor. It is assumed to be the footwall of an east-west oriented fault.

Drainages in the area are deeply incised into the local bedrock with linear orientations that correspond with regional fault direction trends, north-northwest (Partridge Creek) and west-southwest (Warm

Springs; Photo 15). Results of the Stereonet plot of structural measurements recorded in the field (Figure 4) indicate that the majority of the strong jointing is steeply dipping (60° to 90°) east-northeast, with some minor dipping steeply to the west-southwest. Strike direction of the jointing in granitic rocks is highly variable from north to south and there was no significant cluster to suggest a strong trend in any one direction.

There was a trend in joint orientations in the quartzite-schist (Yukon Group): steeply dipping toward northeast or southwest. Foliation orientation also showed a trend, with a dip direction toward east and fairly flat lying with dip angles of about 10 to 35° .

A contact between competent granite and deeply-weathered granite at SK-10 strikes SE-NW (150 - 160°) and dips towards the northeast at an angle of about 60° (Photo 13). This potential fault strike is aligned to intersect the PCWS and intersects the major SW-NE-trending structure identified in the geophysical survey (EBA, 2012) that follows the unnamed creek valley adjacent to the warm springs. These faults possibly represent the flow path for ascending thermal water. The extensive alteration and deep weathering of the granitic bedrock along the structure at SK-10 (Photo 12) provides further evidence of a significant fault structure.

4.2 Hydrogeochemistry

4.2.1 Chemistry of the PCWS

Table 4 presents a summary of the chemistry and isotope analytical results. The laboratory reports and certificates 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 $\pm 5\%$ is considered satisfactory. The calculated ion balance of 5.1% indicates that analytical results were generally within acceptable limits, all major cations and anions were included in the analyses and that there can be a general degree of confidence in the accuracy of the results.

The water samples can be classified based on their major ion chemical composition, taking into account all major anions and cations exceeding 10 meq-%. 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 chemical composition of the sample taken in July 2011 is very similar to the composition of samples collected from the warm spring in October 2010 (EBA 2011). The thermal water can be characterized as sodium-bicarbonate-sulphate ($\text{Na-HCO}_3\text{-SO}_4$) type water with low mineralization. The sample taken in July 2011 confirmed the high fluoride concentration observed in the samples analyzed previously. The high fluoride concentration is typical for groundwater originating in granitic rocks which often contain fluoride-bearing minerals, such as fluorite.

Boulders with white precipitates are concentrated in the central area of the pool (Photos 6 and 7). The precipitates extend to about 10 cm above the current water level of the pool. The same white precipitate is also prevalent on boulders and cobbles within the shallow outflow stream of the warm spring pool. These precipitates, likely opaline silica sinter, are evidence for changes in the range of historic (or seasonal) warm spring discharge, suggesting that the rate of discharge has varied over the life of the warm spring complex.

No further thermal springs were discovered in the study area. Small cold springs in the area (e.g., SK-1 and SK-3; see Photo 3) show very low mineralization and cold water temperatures which indicates shallow groundwater discharge at the valley bottoms (see Table 3).

4.2.2 Geothermometry

EBA used geothermometer methods to estimate subsurface geothermal reservoir temperatures as described in Section 3.2.1. Table 5 summarizes the temperatures estimated for the different geothermometer methods applied. The temperature obtained from the Na-K-Ca geothermometer (Fournier and Truesdell, 1973) strongly depends on the chosen parameter $B = 1/3$ for temperatures $> 100^{\circ}\text{C}$ or $B = 4/3$ for temperatures $< 100^{\circ}\text{C}$. As mentioned above, EBA used $B = 1/3$ assuming that the maximum reservoir temperature is $> 100^{\circ}\text{C}$ which is in agreement with the temperature estimates using the silica geothermometer. The alkali geothermometer is usually less affected by mixing and dilution than the silica-based geothermometer because it uses concentration ratios rather than absolute concentrations. However, this is only true if the majority of the alkali elements originate from the thermal water component. Because a tritium concentration below detection limit and a low radiocarbon concentration suggest little mixing with shallow groundwater, it can be assumed that the geothermometer results are probably not significantly affected by mixing and dilution.

The estimated subsurface temperatures for the sample collected in July 2011 are very similar to those determined based on the chemical composition of the samples collected in October 2010 (EBA, 2011).

It is important to note that the geothermometers do not provide any information on the depth and location of these temperature conditions.

Table 5: Geothermometer Results for Partridge Creek Warm Spring

	Na-K-Ca	Na-K	SiO ₂
	122°C	95°C	116°C
Reference:	Fournier & Truesdell, 1973	Diaz-Gonzales & Santoyo, 2008	Verma & Santoyo, 1995

4.2.3 Isotope Geochemistry

Figure 5 presents the results of the oxygen-18 and deuterium stable isotope analyses along with the Global Meteoric Water Line (GMWL) and Local Meteoric Water Line (LMWL) for Mayo. The results are expressed in per mil units (parts per thousand) relative to Standard Mean Ocean Water (SMOW). The sample collected from PCWS plots close to the LMWL for Mayo. The fact that the stable isotope sample plots close to the LMWL indicates that the spring water is of local meteoric origin. Stable isotopic fractionation, which can be typical for high-temperature geothermal waters with high residence times, was not observed.

The tritium concentration in the sample collected from PCWS was $< 0.05 \pm 0.4$ TU¹. This indicates a mean residence time of more than about 60 years. It also suggests that the thermal water is likely not significantly diluted with shallow groundwater which typically has a short residence time and would contain detectable amounts of tritium.

EBA also collected a water sample for radiocarbon analysis from PCWS. The radiocarbon (¹⁴C) concentration in the sample was 10.29 ± 0.07 pmc². The radiocarbon analysis yields additional information on the residence time of the thermal water of the PCWS. The measured radiocarbon concentration of 10.29 ± 0.07 pmc is fairly low and corresponds to a conventional radiocarbon age of $18,205 \pm 55$ years BP³. This radiocarbon age suggests that the thermal water represents water that was in last contact with the atmosphere during the Pleistocene about 18,000 years ago. Since the sample was taken from the pool forming the PCWS, a slight contamination with atmospheric CO₂ can be expected. The fact that the observed radiocarbon concentration is low and assuming a slight contamination with modern atmospheric CO₂ suggests that the actual residence time of the thermal water might even be larger than 18,000 years. It also supports the conclusion that the thermal water does not contain any significant admixture of younger shallow groundwater.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The advanced geological and geochemical characterization of the PCWS improved our understanding of the warm spring and the geothermal potential of the area. The following conclusions can be made from this study:

- Partridge Creek Warm Spring is located near the southern extent of the Two Sisters Batholith within McQuesten Suite granite and quartz monzonite on a major, east-west trending fault at the intersection of a north-northwest oriented fault. The southern contact of the batholith meets Yukon Group quartzite and schist.
- Jointing structures in the granitic rock are consistently steeply dipping but lack a consistent strike direction. Jointing and foliation in the metasediments mapped south of the batholith are more consistent: jointing is typically steeply-dipping toward northeast or southwest. Foliation is typically shallow-dipping to the east.
- The northeast – west-southwest oriented fault of the unnamed stream near the warm springs likely represents a suitable structure to provide a flow path for ascending thermal water.
- The new chemistry results for the PCWS are in agreement with results obtained from the reconnaissance study conducted in 2010 (EBA, 2011).

¹ TU – Tritium Unit: 1 TU corresponds to $3H/2H = 10^{-18}$ or $1 \text{ TU} = 0.1181 \text{ Bq/kg}$ (3.193 pCi/kg)

² Per cent modern carbon (pmc) means absolute per cent modern relative to the NBS oxalic acid standard corrected for decay since 1950.

³ BP – “Before Present” refers to before 1950 because it predates large scale atmospheric testing of nuclear weapons, which altered the global ratio of carbon-14 to carbon-12.

- The thermal water can be characterized as sodium-bicarbonate-sulphate (Na-HCO₃-SO₄) type water with low mineralization and relatively high fluoride concentration which is typical for water originating in granitic rocks.
- Tritium and radiocarbon concentrations observed in the thermal water indicate a long residence time of the water in the order of several ten thousand years. These data also suggest that the thermal water does not contain any considerable amount of young, shallow groundwater.
- Geothermometer temperatures were found to be in the order of 100 to 120°C.
- Direct temperature information from the subsurface would be required to confirm or reject the results of the geothermometer application. Such direct temperature measurements can only be obtained from a thermal gradient drill hole that is drilled into bedrock to a depth of several hundred meters.
- Testing of the geothermal gradient is recommended as the next stage of exploration. Drilling a minimum of two boreholes to a depth of about 300m is recommended to provide ground temperature and geology data. This work would entail either the construction of a winter road following a relic trail (Photo 4) up the Partridge Creek Valley, or a helicopter-supported program. Costs for this program would be in the order of \$0.5 million.
- Prior to further investment in exploration, staking of mineral claims to cover the structural anomaly associated with the warm spring is recommended. The land is presently open to staking of mineral claims and there has been some recent claims staking in the region.

6.0 CLOSURE

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

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TABLES

Table 3	Field Stations
Table 4	Partridge Creek Warm Spring Laboratory Analytical Results

Table 3: Field Stations

Field Station	UTM (Zone 8, NAD83)		Lithology	Description	Joint	Foliation
	Easting	Northing				
SK-1	387272	7065219		Spring; EC: 13 uS/cm, TDS: 6 ppm, pH: 7.28, T: 0.0 C		
SK-2	387208	7065221	Granite	Coarse grained, pegmatitic, quartz, feldspar, biotite; boulders may have moved, use data with caution	073/79, 106/65, 090/65, 095/71	
SK-3	386897	7065465	Granite	Spring; EC: 40 uS/cm, TDS: 20 ppm, pH: 7.28, T: 0.7 C		
SK-4	385886	7065677	Granite	Coarse grained, pegmatitic, quartz, feldspar, biotite	044/75, 050/76, 122/79, 030/89	
SK-5	385813	7065813	Granite	Coarse grained, pegmatitic, quartz, feldspar, biotite	061/71, 060/72, 059/70	
SK-6	385854	7066070	Granite	Coarse grained, pegmatitic, quartz, feldspar, biotite	139/59, 131/69	
SK-7	385799	7066295		Warm Spring; EC: 391 uS/cm, TDS: 194 ppm, pH: 8.84, T: 22.5 C		
WP6	384491	7065927	Sedimentary	Outcrops; fly-over (no place to land)		
WP7	385246	7066050	Sedimentary	Outcrops; fly-over (no place to land)		
WP8	385753	7065775	Sedimentary	Outcrops; fly-over (no place to land)		
WP9	385718	7065601	Sedimentary	Outcrops; fly-over (no place to land)		
WP10	385245	7065243	Sedimentary	Outcrops; fly-over (no place to land)		
WP11	385631	7064808	Sedimentary	Outcrops; fly-over (no place to land)		
WP12	385911	7064633	Granite	Outcrops; fly-over (no place to land)		
WP13	387214	7065105	Granite	Outcrops; fly-over (no place to land)		
SK-8	382324	7064729	Schist	Strongly foliated, quartz veins, mica on foliation	034/85, 199/84, 210/78	048/25, 048/21
SK-9	382558	7064813	Schist	Strongly foliated, quartz veins, mica on foliation		
SK-10	385946	7066257	Granite	Cut bank at creek across warm spring; some competent rock at south end of outcrop (isolated block of granite?); strongly weathered/alterated; completely disintegrated detritus; white/orange; outcrop strike: ~45deg	124/50, 129/65	
				Contact between detritus and competent granite	059/56, 073/60	
SK-11	386064	7066419	Granite	Competent rock; no measurements possible		
	387196	7064523	Schist	Strongly foliated, quartz veins, mica on foliation	018/85, 014/89, 206/89, 250/80	105/31, 068/12, 100/34
JD-P1	385290	7066887	Granite	Pegmatitic, coarse grained granite with xenoliths. Orthoclase feldspar crystals up to 7 cm x 2 cm. Quartz crystals up to 1 cm in diameter. Biotite and monzonite 2-3 mm.	090/35, 090/90, 302/72, 090/80, 239/80	
JD-P2	385355	7066886	Granite	50 M east of JD-P1	215/06, 091/80, 251/80, 038/80, 041/70, 212/20, 114/75, 100/50	
JD-P3	385482	7066933	Granite	Prominent outcrops on south side of tributary, above mouth of tributary into Partridge Creek. Coarse grained pegmatitic granite - orthoclase feldspar crystals.	030/80, 298/80, 150/15, 160/80, 030/90, 108/80, 004/85, 150/90, 132/85, 057/82, 001/90,	
JD-P4	385369	7066996	Granite	Sinusoidal foliation joint. Prominent large outcrop on north side of tributary. Joint faces are parallel with tributary valley orientation. This substantiates the interpretation from air photo that this linear feature is a fault.	309/65, 019/90, 124/25, 264/70, 018/75, 030/20, 083/90	
JD-P5	385360	7067180	Granite	Small outcrop (~ 3m2) of pegmatitic granite	198/75	
JD-P6	385482	7067226	Granite	Sparse openings of outcrop along forested ridge.	032/90, 115/75, 095/90	
JD-P7	385748	7067406	Granite	At granite outcrop on east slopes of Partridge Creek	141/90, 020/85, 165/80	
JD-P8	385882	7067297	Granite	Small outcrop on forested ridge, granite.	019/90, 297/80, 348/85, 270/85	
JD-P9	385875	7067239	Granite	Small (~1.5 m2) granite outcrop	026/90, 260/65, 302/75	
JD-P10	385772	7065999	Granite	Course grained pegmatitic granite		
JD-P11	385797	7065860	Granite	Outcrop at base of slope on west side of Partridge Creek		
JD-P12	385863	7065497	Gravel	Exposed 2.5 m high cut slope of old trail on east side of Partridge Creek on south side of tributary channel (flowing water). Sub angular with some sub-rounded gravel and sand.		
JD-P13	385974	7065045	Granite	Series of granite outcrops along base of east valley slope of Partridge Creek	187/85, 059/90, 064/90, 153/85	
JD-P14	385979	7065024	Granite	Granite outcrop on east bank of Partridge Creek		
JD-P15	385993	7064879	Schist	Boulder train of sub-crop, two exposures. Medium grained schist, medium gray quartz biotite schist with muscovite foliations, some medium grained		
JD-P16	385932	7064981	Granite	Granite floate, east bank of Partridge Creek		
JD-P17	385932	7064981	Granite	Course grained granite outcrop, east bank slop of Partridge Creek. Sub-crop, no strucutre measrements as questionable orientation.		
JD-P18	385924	7064943	Granite	Coarse grained granite subcrop/outcrop		
JD-P19	385865	7064820	Schist	Subcrop/boulder train of fine grained schist		
JD-P20	385872	7064825	Granite	East bank slop of Partridge Creek, 6 m north of JD-19, boulder train of course grained granite, continuous exposures of subcrop/outcrop north of here to JD-P18		
JD-P21	385847	7064791	Schist	Significant boulder train/subcrop of medium-fine grained quartzite and schist.		
JD-P22	385831	7064764	Schist	3m wide boulder train of subcrop. Medium gray quartzite, fine grained with schist foliations.		
JD-P23	385912	7064777	Schist	50 m wide, 25 m high exposure of blocky, siliceous talus of medium grey, fine and medium grained quartzite and schist		
JD-P24	385864	7064696	Schist	20 m wide, 7 m high blocky talus/subcrop slope of fine grained quartz biotite schist		
JD-P25	386109	7069644	Schist	Coarse, blocky boulder train talus going up slope for 125 m - quartzite and schist		
JD-P26	385985	7064887	Schist	Blocky, siliceous schist/quartzite unit talus. East bank of Partridge Creek.		

Note: All structural data indicate dip direction/dip.

Table 4
Partridge Creek Warm Spring Laboratory Analytical Results

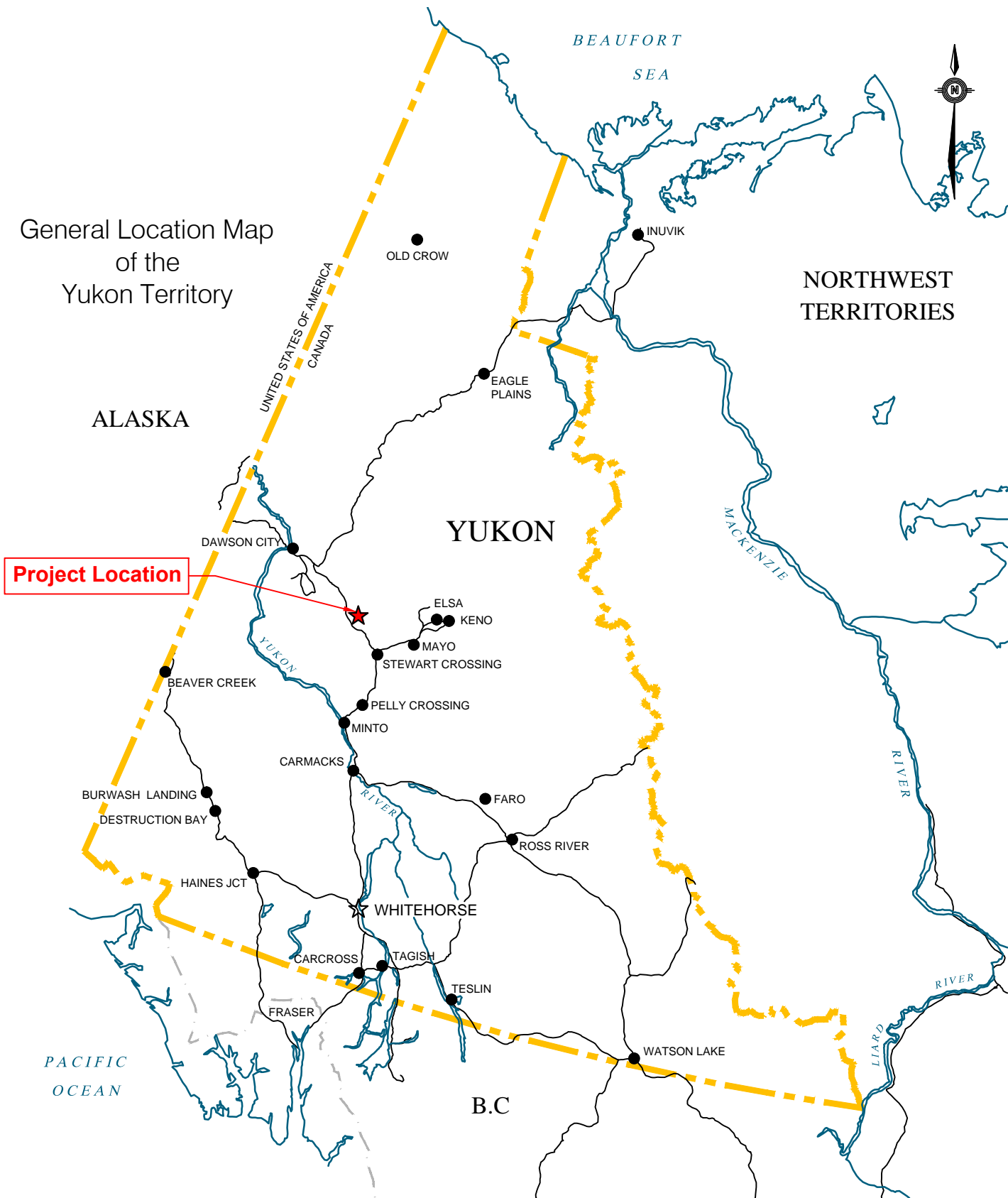
LocCode	PC-S-1	PC-S-2	PC-S-3	PCWS
SampleCode	SDG_PC-S-1	SDG_PC-S-2	SDG_PC-S-3	SDG_PCWS
Sampled Date-Time	10/20/2010	10/20/2010	10/20/2010	7/27/2011
Lab Report Number	1373911	1373911	1373911	1457323

Method_Type	ChemName	Units	EQL				
Inorganic Nonmetallic Parameters	Phosphorus	mg/L	0.003	0.02	0.024	0.018	<0.01
Metals Dissolved	Aluminium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005
	Antimony	mg/L	0.0002	0.0006	0.0005	0.0004	<0.0002
	Arsenic	mg/L	0.0002	0.0026	0.0026	0.0026	0.0041
	Barium	mg/L	0.001	<0.001	<0.001	0.001	0.001
	Beryllium	mg/L	0.00004	<0.00004	<0.00004	<0.00004	0.00008
	Bismuth	mg/L	0.001	<0.001	<0.001	<0.001	<0.001
	Boron	mg/L	0.004	0.29	0.292	0.292	0.473
	Cadmium	mg/L	0.00001	<0.00001	<0.00001	<0.00001	0.00003
	Chromium (III+VI)	mg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004
	Cobalt	mg/L	0.00002	<0.00002	<0.00002	<0.00002	<0.00002
	Copper	mg/L	0.001	<0.001	<0.001	<0.001	<0.001
	Lead	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Lithium	mg/L	0.001	0.163	0.166	0.159	0.238
	Mercury	mg/L	0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Molybdenum	mg/L	0.0001	0.019	0.0189	0.0185	0.0246
	Nickel	mg/L	0.001	<0.001	<0.001	<0.001	<0.001
	Selenium	mg/L	0.0006	<0.0006	<0.0006	<0.0006	<0.0006
	Silver	mg/L	0.00001	<0.00001	<0.00001	<0.00001	<0.00001
	Strontium	mg/L	0.001	0.054	0.055	0.053	0.075
	Sulphur as S	mg/L	0.2	21	21.7	20.8	22
	Thallium	mg/L	0.00001	<0.00001	<0.00001	<0.00001	0.00002
	Thorium	µg/L	0.4	0.5	<0.4	<0.4	<0.4
	Tin	mg/L	0.0001	0.0002	0.0005	0.0004	0.0001
	Titanium	mg/L	0.0004	<0.0004	<0.0004	<0.0004	0.0012
	Uranium	µg/L	0.4	1.7	1.8	2.1	2.1
	Vanadium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Zinc	mg/L	0.001	<0.001	<0.001	<0.001	0.002	
Zirconium	µg/L	0.1	0.7	0.4	0.4	0.9	
Routine Water	Alkalinity (Bicarbonate)	mg/L	5	100	100	100	100
	Alkalinity (Carbonate)	mg/L	6	<6	<6	<6	<6
	Alkalinity (Hydroxide) as CaCO ₃	µg/L	5000	<5,000	<5,000	<5,000	<5,000
	Alkalinity (total) as CaCO ₃	mg/L	5	88	86	85	87
	Calcium	mg/L	0.1	6.2	6.5	6.5	6.2
	Chloride	mg/L	0.02	11.2	10.9	10.8	11.9
	Fluoride	mg/L	0.01	9.37	9.24	9.11	10.5
	Iron	mg/L	0.005	<0.005	<0.005	<0.005	0.025
	Magnesium	mg/L	0.1	0.2	0.2	0.3	<0.1
	Manganese	mg/L	0.001	0.004	0.005	0.003	0.003
	Nitrate (as N)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01
	Nitrite (as N)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01
	Phosphorus	mg/L	0.01	0.01	<0.01	0.02	<0.01
	Potassium	mg/L	0.1	2.3	2.3	2.4	2.3
	Silicon	µg/L	50	29,300	29,000	28,400	31,300
	Sodium	mg/L	0.1	75.9	74.5	72	73.7
Sulphate	mg/L	0.6	63.2	65	62.4	66.1	
TDS	mg/L	1	301	299	291	308	
Hardness as CaCO ₃	mg/L	5	16	17	17	16	
δ ¹⁸ O	‰		-21.49	-21.81	-21.87	-22.27	
δ ¹⁸ O (laboratory duplicate)	‰		-	-	-	-22.31	
δ ² H	‰		-172.20	-171.00	-171.00	-171.10	
δ ² H (laboratory duplicate)	‰		-172.52	-171.50	-171.29	-170.94	
E ³ H	TU	0.8	<0.8 ±0.3	<0.8 ±0.3	<0.8 ±0.3	<0.05 ±0.4	
E ³ H (laboratory duplicate)	TU	0.8	-	-	-	-	
δ ¹³ C	‰		-	-	-	-14.93	
¹⁴ C	pmc		-	-	-	10.29 ± 0.07	

FIGURES

Figure 1	Site Location Map
Figure 2	Regional Geology Map
Figure 3	Local Geology Map with Field Stations
Figure 4	Stereographic Projection of Structural Data
Figure 5	Plot of Stable Isotope Data with Meteoric Water Line

General Location Map
of the
Yukon Territory



CLIENT



YUKON ENERGY CORPORATION

**YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM
PARTRIDGE CREEK WARM SPRINGS, YUKON**

LOCATION PLAN

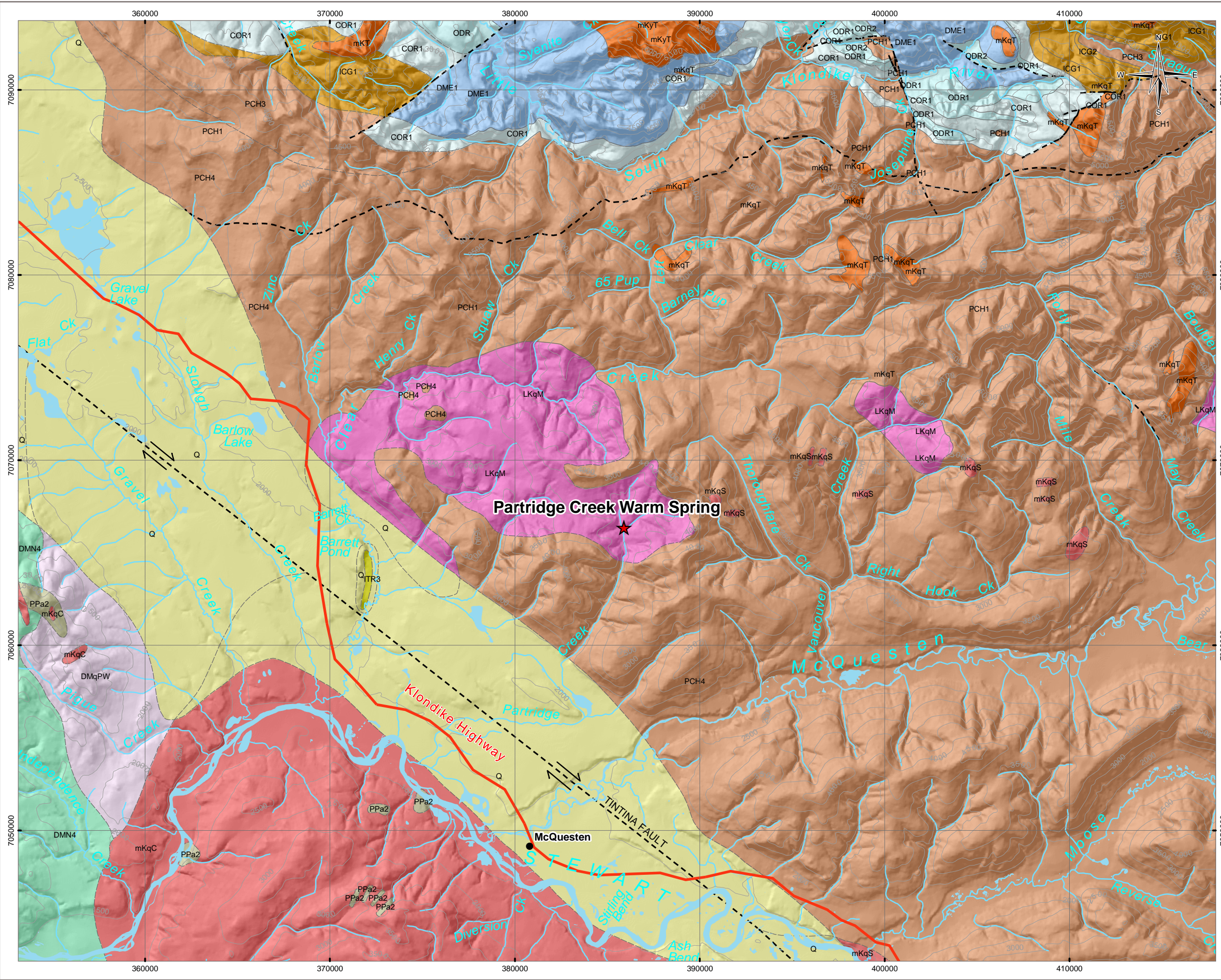


eba
A TETRA TECH COMPANY

PROJECT NO. W23101159.118	DWN CB	CKD JTD	REV 0
OFFICE EBA-WHSE	DATE April 10, 2012		

Figure 1

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LEGEND

- ★ Partridge Creek Warm Springs
- Community
- Road
- Elevation Coutour (ft)
- Waterbody
- Fault**
 - Defined
 - - - Undefined
- Contact**
 - Defined
 - - - Undefined

NOTES
Base data source: Geomatics Yukon

STATUS
ISSUED FOR USE

**Yukon Geothermal
Exploration Project**

**Bedrock Geology
Partridge Creek Warm Spring**

PROJECTION UTM Zone 8	DATUM NAD83	CLIENT YUKON ENERGY
Scale: 1:200,000		
FILE NO. W23101159.116_Fig_6_Geological_Map.mxd		
PROJECT NO. W23101159.117	DWN KRR	CKD SK
OFFICE EBA-WHSE	DATE April 11, 2012	APVD 0

Figure 2

BEDROCK GEOLOGY LEGEND

UNIT	DESCRIPTION
QUATERNARY	
Q	Q: QUATERNARY unconsolidated glacial, glaciofluvial and glaciolacustrine deposits; fluvial silt, sand, and gravel, and local volcanic ash, in part with cover of soil and organic deposits

LOWER TERTIARY, MOSTLY (?) EOCENE	
ITR	ITR: ROSS mixed bimodal volcanics (basalt (1), rhyolite (2)) and terrestrial clastics (3), dominantly along or near Tintina Fault; farther removed, scattered occurrences of rhyolitic lava and dykes (4) are also included
3	brown, thin bedded, claystone, siltstone, shale and coal; arkosic or chert rich, thick bedded micaceous sandstone; thick bedded to massive pebble to boulder, chert-quartz conglomerate

LATE CRETACEOUS	
LKqM	LKqM: MCQUESTON SUITE medium- to coarse-grained, locally porphyritic and K-feldspar megacrystic biotite muscovite granite and quartz monzonite;

MID-CRETACEOUS	
mKC	mKC: CASSIAR SUITE medium to coarse grained, equigranular to porphyritic rocks of largely felsic (q) composition; includes minor (?) amounts questionably of more intermediate composition (g)
g	granodiorite, biotite-muscovite granodiorite, quartz diorite, biotite quartz monzonite, granite (Cassiar Suite)
q	medium to coarse grained, equigranular to porphyritic (K-feldspar) granite and biotite quartz monzonite; biotite-hornblende quartz monzonite and granodiorite (Cassiar Suite)
mKS	mKS: SELWYN SUITE plutonic suite of intermediate (g) to more felsic composition (q) and rarely syenitic (y); equivalent felsic dykes (f); complete compositional gradation so that these designations are somewhat arbitrary
q	equigranular to porphyritic (K-feldspar) biotite hornblende muscovite granite, quartz monzonite and granodiorite; porphyritic biotite hornblende granite with large smoky grey quartz phenocrysts and locally K-feldspar phenocrysts (Selwyn Suite)
mKT	mKT: TOMBSTONE SUITE plutonic suite dominated by felsic (q) to syenitic (y) compositions
y	medium- to coarse-grained biotite-hornblende-clinopyroxene syenite, quartz syenite; tourmaline orbicular granite; hornblende biotite alkali-feldspar syenite; hornblende-biotite monzogranite; clinopyroxenite, diorite, and pseudoleucite tinguaite (Tombstone Suite)
q	medium- to coarse-grained, locally porphyritic biotite hornblende, clinopyroxene granite, quartz monzonite and granodiorite (Tombstone Suite)

PROTEROZOIC AND PALEOZOIC	
PPa	PPa: AMPHIBOLITE metamorphosed mafic rocks including amphibolite (1) and ultramafic rocks (2) of unknown association; i.e.) may belong in part or entirely to Nisling, Nasina, and Slide Mountain assemblages and (3), mafic-ultramafic intrusions within Nasina assemblage
2	variably altered and serpentized ultramafic rocks

DEVONIAN AND MISSISSIPPIAN	
DME	DME: EARN complex assemblage of submarine fan and channel deposits (1), (5) within black siliceous shale and chert (2), (4) and including separated small occurrences of felsic volcanic rocks (3); barite common, and many occurrences of stratiform Pb-Zn
1	thin bedded, laminated slate with thin to thickly interbedded fine to medium grained chert-quartz arenite and wacke; thick members of chert pebble conglomerate; black siliceous siltstone; nodular and bedded barite; rare limestone (Earn Gp., Portrait Lake and Prevost)

LATE DEVONIAN TO MISSISSIPPIAN	
DMPW	DMPW: PELY GNEISS SUITE - SOUTHWEST variably deformed granitic rocks of predominantly felsic (q) to intermediate composition (g) southwest of Tintina Fault
q	foliated equigranular medium-grained muscovite quartz monzonite; moderately to strongly foliated K-feldspar augen-bearing quartz monzonitic to granitic gneiss (S. Fiftymile Batholith, Mt. Burnham Orthogneiss,)

DEVONIAN, MISSISSIPPIAN AND(?) OLDER	
DMN	DMN: NASINA graphitic quartzite and muscovite quartz-rich schist (1), (3)-(5), and(?) (6) with interspersed marble (2) and probable correlative successions (7) - (9)
DMN4	4 quartzite, micaceous quartzite, quartz muscovite (chlorite; feldspar augen) schist, and minor metaconglomerate and metagrit as in (1), but may locally include significant Klondike Schist Assemblage

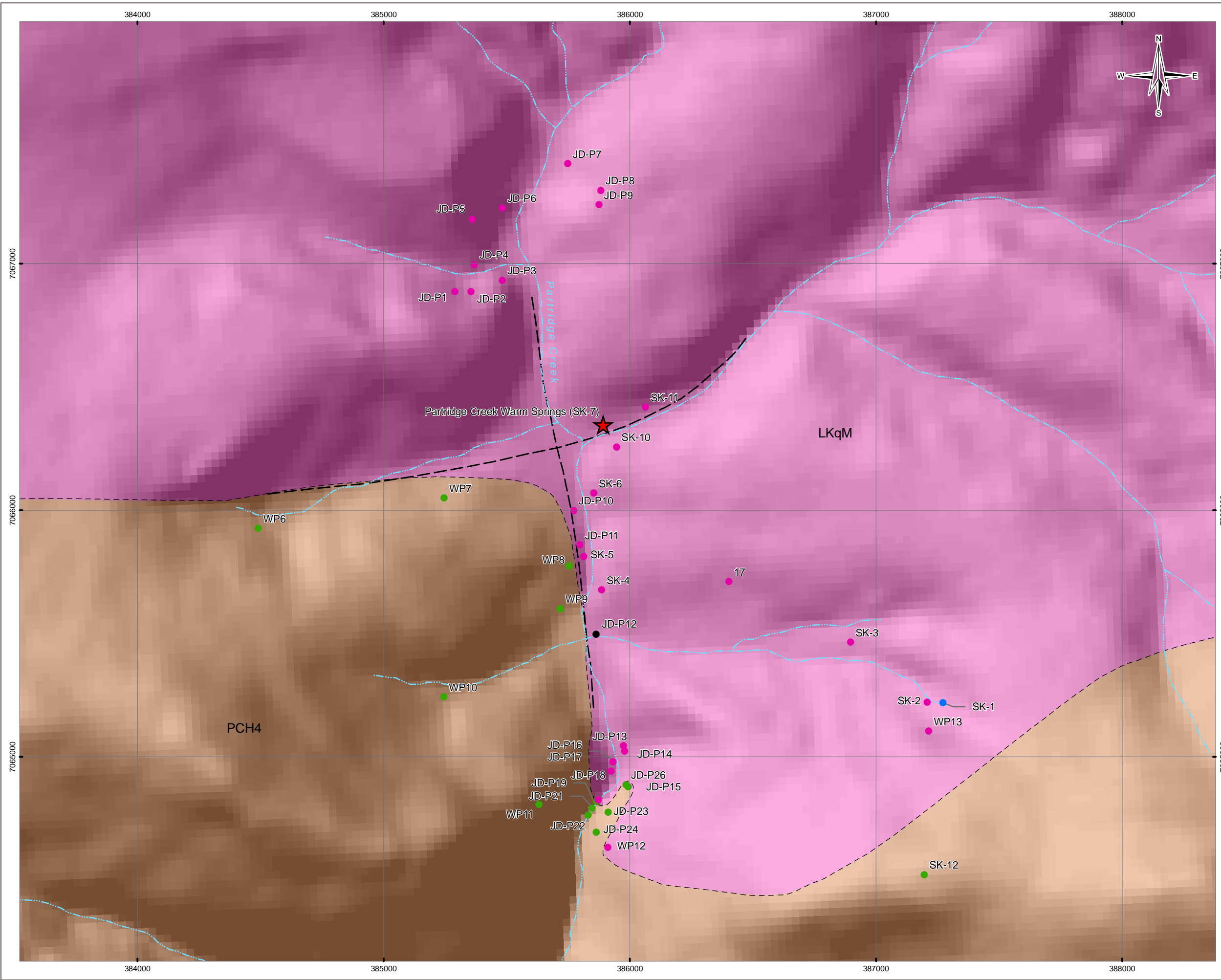
ORDOVICIAN TO LOWER DEVONIAN	
ODR	ODR: ROAD RIVER - SELWYN black shale and chert (1) overlain by orange siltstone (2) or buff platy limestone (3); locally contains beds as old as Middle Cambrian (4); correlations with basinal strata in Richardson Mountains include: ODR1 with CDR2 (upper part) and ODR2 with CDR4 (Road River Gp.)
1	black, gun-blue, or silvery white weathering black graptolitic shale and black chert; resistant grey weathering, thin to medium bedded, light grey to black, greenish grey or turquoise chert; minor argillaceous limestone (Road River Gp., Duo Lake and Elmer Creek)
2	rusty dark green to orange buff weathering, pyritic, burrowed, thin to thick bedded, argillite and dolomitic siltstone with members or partings of black shale and chert; minor bright orange dolostone (Road River Gp., Steel)

UPPER CAMBRIAN AND ORDOVICIAN	
COR	COR: RABBITKETTLE basinal limestone (1) that may locally include older and younger basinal pelitic strata undivided (2)
1	thin bedded, wavy banded, silty limestone and grey lustrous calcareous phyllite; limestone intraclast breccia and conglomerate; massive to laminated, grey quartzose siltstone and chert and rare black slate; local mafic flows, breccia, and tuff (Rabbitkettle)

LOWER CAMBRIAN	
ICG	ICG: GULL LAKE dominantly fine clastic assemblage (1) with local volcanic units (2)
1	shale, siltstone and mudstone, locally bioturbated, with minor quartz sandstone; rare green-grey chert; local basal limestone and limestone conglomerate; phyllite to quartz-muscovite-biotite schist (garnet sillimanite staurolite andalusite) (Gull Lake)

UPPER PROTEROZOIC TO LOWER CAMBRIAN	
PCH	PCH: HYLAND consists upwards of coarse turbiditic clastics (1), limestone (2) and fine clastics typified by maroon and green shale (3); may include younger (4) units; includes scattered mafic volcanic rocks (5) (Hyland Gp.)
1	thin to thick bedded, brown to pale green shale, fine to coarse grained quartz-rich sandstone, grit, and quartz pebble conglomerate; minor argillaceous limestone; phyllite, quartzofeldspathic and micaceous psammite, gritty psammite and minor marble (Hyland Gp., Yusezyu)
2	grey weathering, dark grey to grey white, thin to thick bedded, very fine crystalline limestone, locally sandy; calc-silicate and marble; may locally include carbonate members within (1) or (4) (Hyland Gp., Algae Lake , limestone member of Yusezyu)
3	distinctive, recessive, maroon weathering, interbedded maroon and apple-green slate; "Oldhamia" trace fossils; rare grey chert; locally basal member and interbeds of quartz siltstone, sandstone and quartz-pebble conglomerate (Hyland Gp., Narchilla , Senoah , Arrowhead Lake)
4	quartzose clastic rocks as described in (1); mostly(?) equivalent to (1) but may include younger units (Hyland Gp., mostly(?) Yusezyu)
PCH2	

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LEGEND


- ★ Partridge Creek Warm Springs
- Granite/Quartz Monozite
- Quaternary Sand and Gravel
- Quartzite and Schist
- Spring
- Faults
- - - Contact
- Watercourse
- McQueston Suite
(granite, granodiorite, quartz monzonite)
- Yukon Group
(schist, quartzite, limestone and shale)

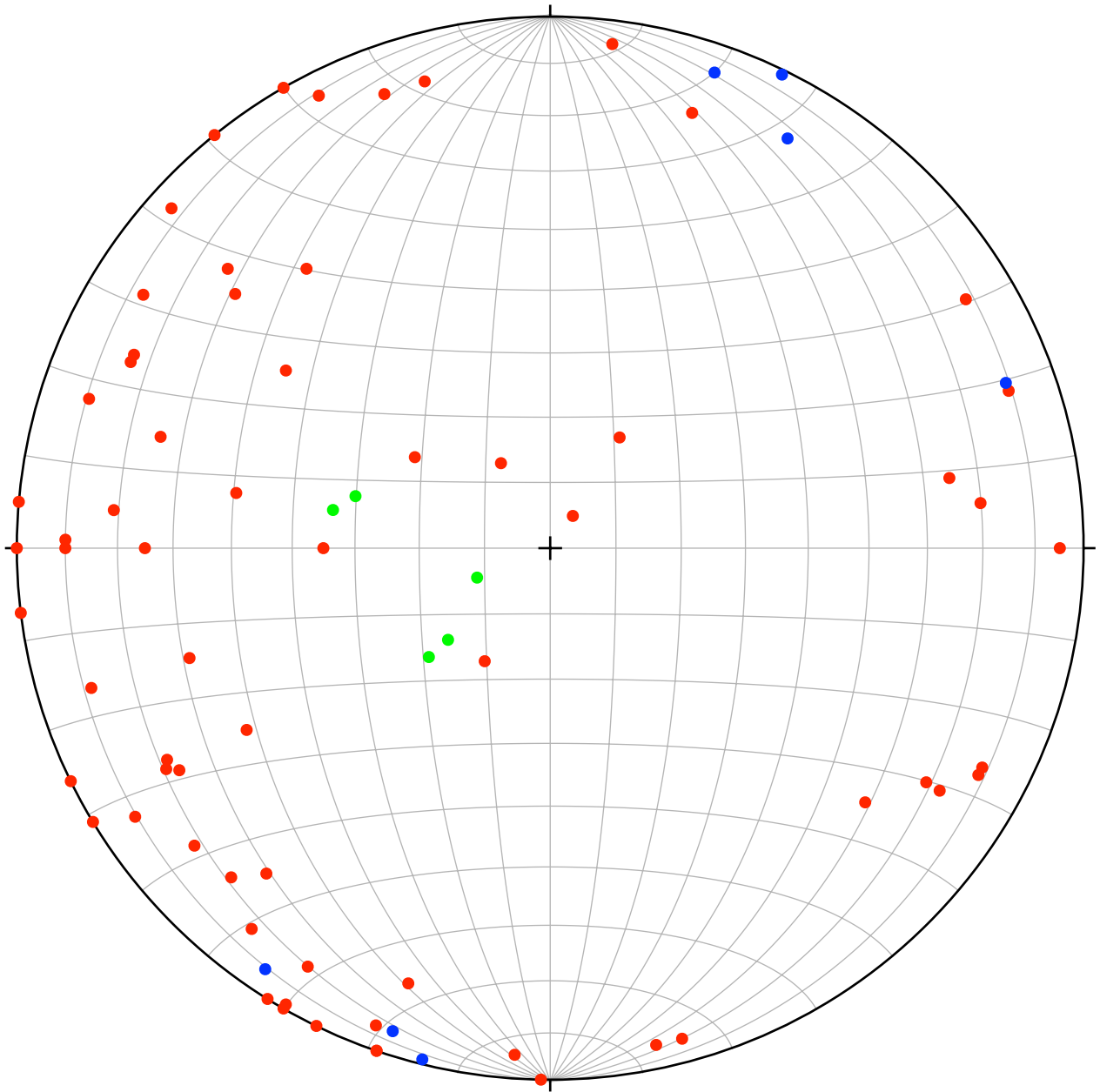
NOTES
Base data source:
Geomatics Yukon

STATUS
ISSUED FOR USE

**Yukon Geothermal
Exploration Project**

**Bedrock Geology
Partridge Creek Warm Spring**

PROJECTION UTM Zone 8	DATUM NAD83	CLIENT YUKON ENERGY
Scale: 1:15,000 200 100 0 200 Meters		 A TETRA TECH COMPANY
FILE NO. W23101159.117_Field_Stations.mxd	PROJECT NO. W23101159.117	DATE April 11, 2012
DWN KRR	CKD SK	APVD XXX
REV 0	Figure 3	



LEGEND

- Granite - Joints
- Schist - Joints
- Schist - Bedding

Equal Area Projection
Lower Hemisphere

STATUS
ISSUED FOR USE

CLIENT



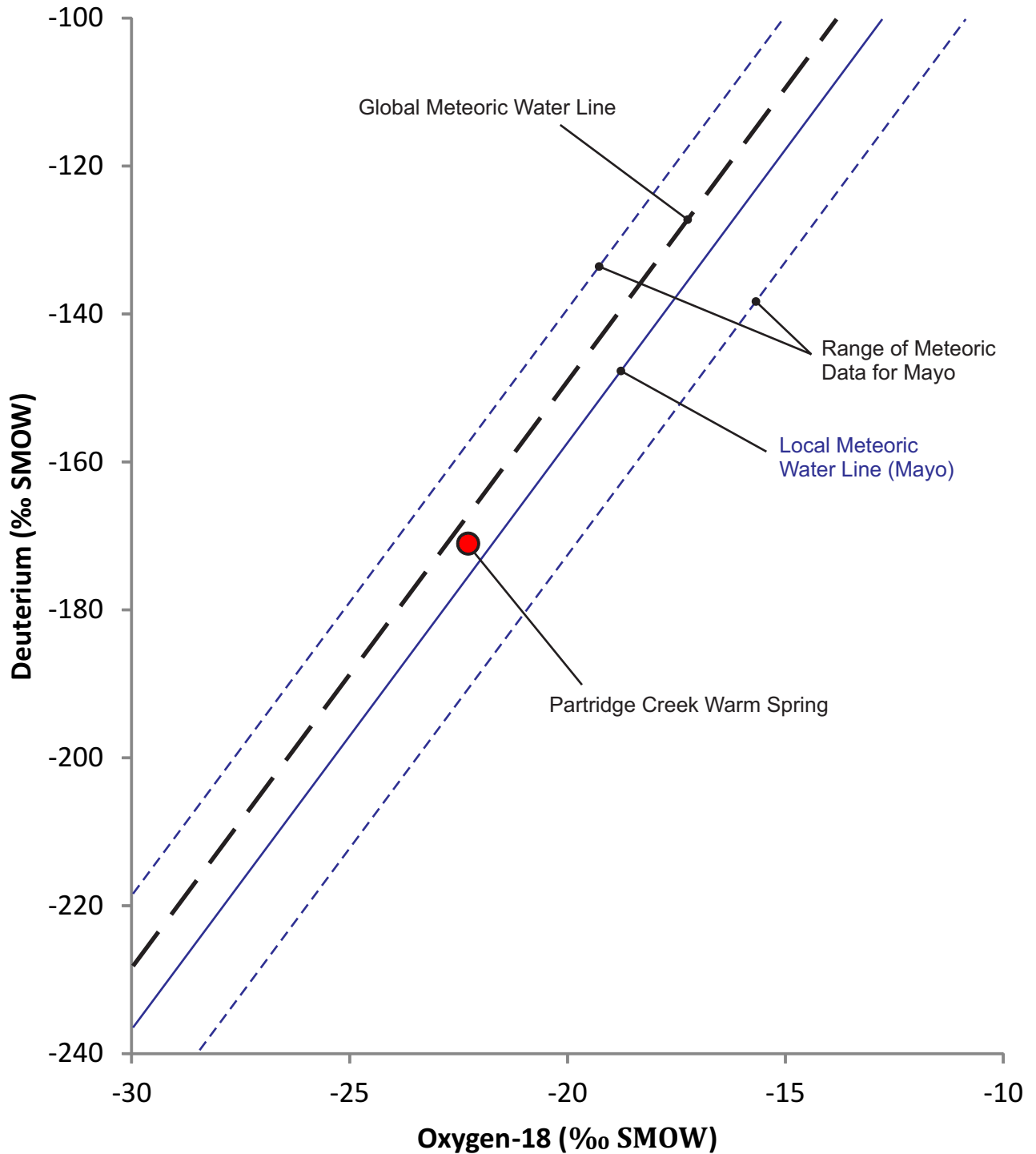
A TETRA TECH COMPANY

**GEOLOGICAL MAPPING AND GEOCHEMISTRY
PARTRIDGE CREEK WARM SPRING**

**Stereographic Projection of
Structural Data**

PROJECT NO. W23101159.117	DWN SK	CKD JTD	APVD	REV 0
OFFICE EBA-WHSE	DATE March 30, 2012			

Figure 4



LEGEND

- 1) LMWL - Local (Mayo) Meteoric Water Line from Birks, Edwards, Gibson, Michel, Drimmie, and MacTavish, Canadian Network for Isotopes in Precipitation, University 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

STATUS
ISSUED FOR USE

CLIENT

YUKON ENERGY



A TETRA TECH COMPANY

**GEOLOGICAL MAPPING AND GEOCHEMISTRY
PARTRIDGE CREEK WARM SPRING**

**Plot of Stable Isotope Data
with Meteoric Water Line**

PROJECT NO. W23101159.117	DWN SK	CKD JTD	APVD	REV 0
OFFICE EBA-WHSE	DATE March 30, 2012			

Figure 5

PHOTOGRAPHS

Photo 1	Granite outcrop (SK-2)
Photo 2	Coarse grained, pegmatitic granite (SK-2)
Photo 3	Cold spring and granite outcrop (SK-3)
Photo 4	Old overgrown trail in Partridge Creek valley (looking south)
Photo 5	Granite outcrop (SK-5)
Photo 6	Partridge Creek Warm Spring with granite outcrop
Photo 7	Partridge Creek Warm Spring with white precipitates on granite boulders
Photo 8	Partridge Creek Warm Spring with granite outcrop
Photo 9	Coarse grained granite outcrop at Partridge Creek Warm Spring
Photo 10	Strongly foliated schist (SK-8)
Photo 11	Strongly foliated schist (SK-8)
Photo 12	Granite detritus forming cut bank at unnamed creek south of Partridge Creek Warm Spring (SK-10)
Photo 13	Contact between competent granite and granitic detritus (potential fault, SK-10)
Photo 14	Schist outcrop (SK-12)
Photo 15	Fault-derived tributary valley of upper Partridge Creek with granite outcrops.
Photo 16	Coarse-grained feldspar porphyry granite of the Two Sisters Batholith.
Photo 17	Coarse-grained granite pegmatite of the Two Sisters Batholith.
Photo 18	Coarse-grained feldspar porphyry granite of the Two Sisters Batholith.



Photo 1: Granite outcrop (SK-2).

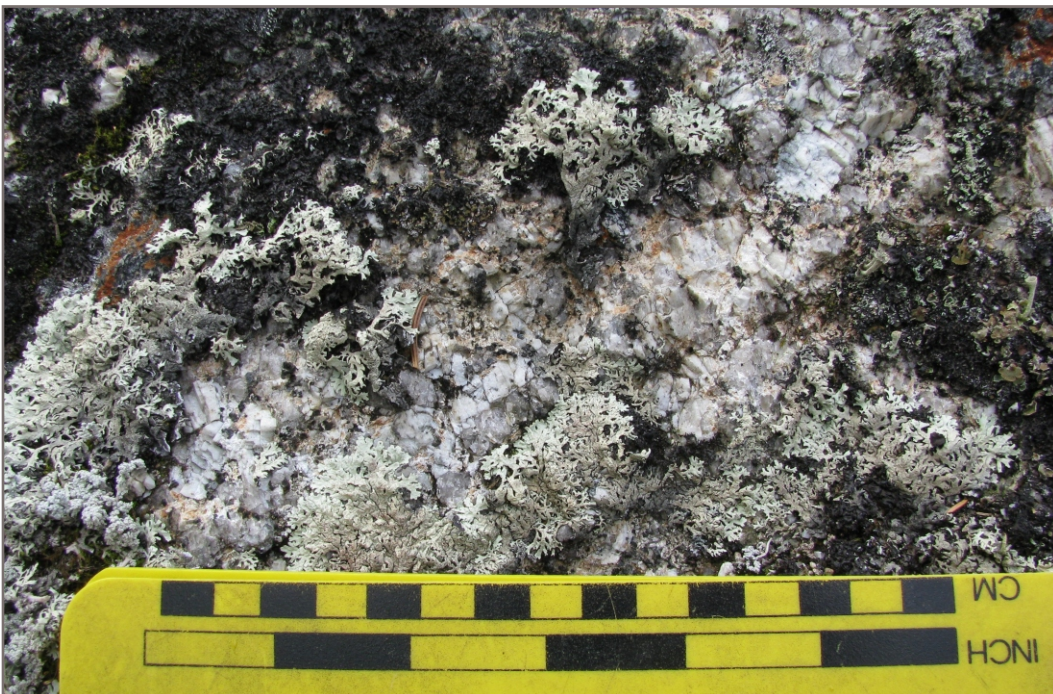


Photo 2: Coarse grained, pegmatitic granite (SK-2).



Photo 3: Cold spring and granite outcrop (SK-3).



Photo 4: Old overgrown trail in Partridge Creek valley (looking south).



Photo 5: Granite outcrop (SK-5).



Photo 6: Partridge Creek Warm Spring with granite outcrop.



Photo 7: Partridge Creek Warm Spring with white precipitates on granite boulders.



Photo 8: Partridge Creek Warm Spring with granite outcrop.



Photo 9: Coarse grained granite outcrop at Partridge Creek Warm Spring.



Photo 10: Strongly foliated schist (SK-8).

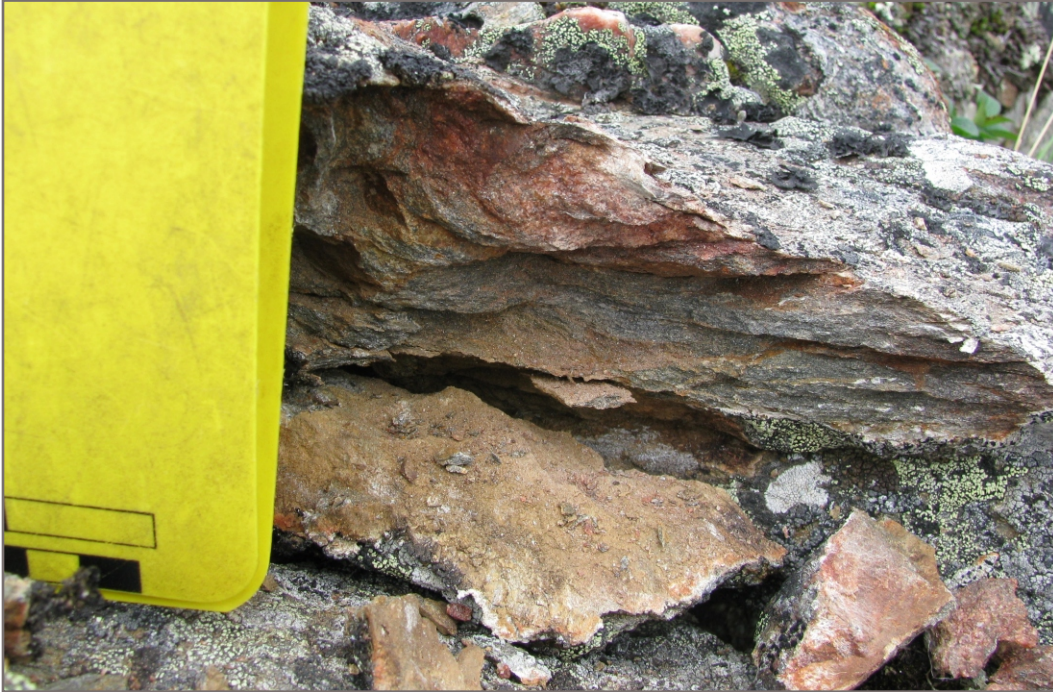


Photo 11: Strongly foliated schist (SK-8).



Photo 12: Granite detritus forming cut bank at unnamed creek south of Partridge Creek Warm Spring (SK-10).



Photo 13: Contact between competent granite and granitic detritus (potential fault, SK-10).



Photo 14: Schist outcrop (SK-12).

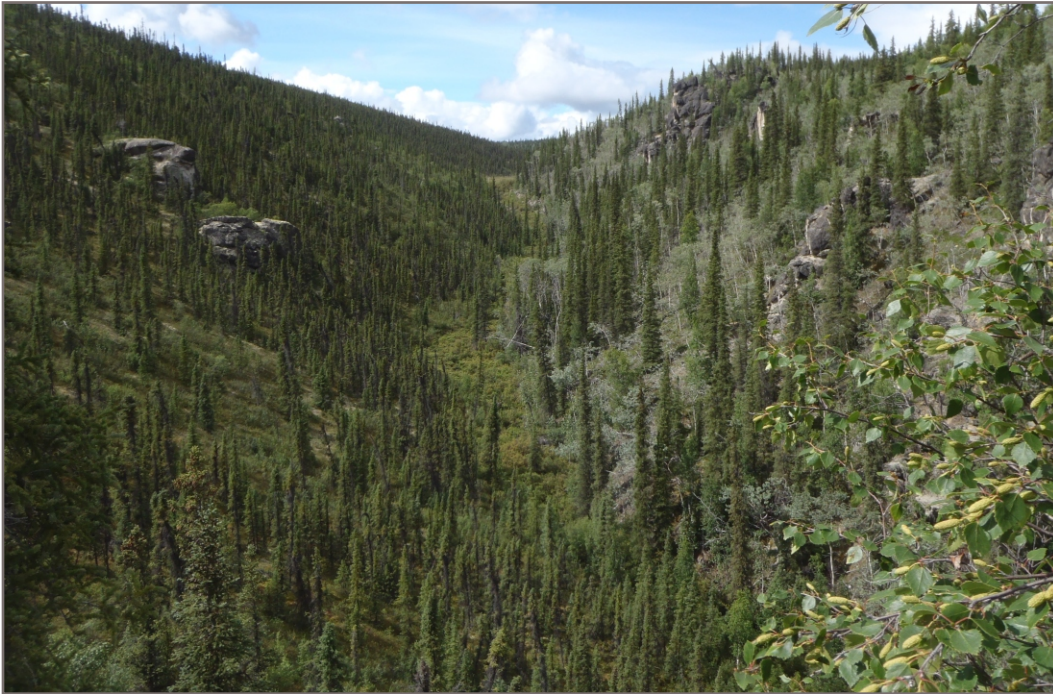


Photo 15: Fault-derived tributary valley of upper Partridge Creek with granite outcrops (JD-P3). Looking west.



Photo 16: Coarse-grained feldspar porphyry granite of the Two Sisters Batholith (JD-P1).



Photo 17: Coarse-grained granite pegmatite of the Two Sisters Batholith (JD-P3).



Photo 18: Coarse-grained feldspar porphyry granite of the Two Sisters Batholith (JD-P3).

APPENDIX A

APPENDIX A EBA'S GENERAL CONDITIONS

GENERAL CONDITIONS

GEO-ENVIRONMENTAL REPORT

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

1.0 USE OF REPORT AND OWNERSHIP

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

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

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

2.0 ALTERNATE REPORT FORMAT

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

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

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

3.0 NOTIFICATION OF AUTHORITIES

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

4.0 INFORMATION PROVIDED TO EBA BY OTHERS

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

APPENDIX B

APPENDIX B LABORATORY REPORTS

Report Transmission Cover Page

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Contact & Affiliation	Address	Delivery Commitments
Stephan Klump EBA Engineering Consultants Ltd -	Unit 6, 151 Industrial Road, Calcite Business Whitehorse, Yukon Territory Y1A 2V3 Phone: (867) 668-2071 Fax: (867) 668-4349 Email: 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 [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report
Ingrid Fuller EBA Engineering Consultants Ltd -	Unit 6, 151 Industrial Road, Calcite Business Whitehorse, Yukon Territory Y1A 2V3 Phone: (867) 668-2071 Fax: (867) 668-4349 Email: ifuller@eba.ca	On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report

Notes To Clients:

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

Sample Custody

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Sample Disposal Date: November 06, 2011

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

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

The following charges apply to extended sample storage:

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

Return Sample, collect, to the address below via:

Greyhound

DHL

Purolator

Other (specify) _____

Name _____

Company _____

Address _____

Phone _____

Fax _____

Signature _____

Analytical Report

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Reference Number	817869-1
Sample Date	Jul 27, 2011
Sample Time	NA
Sample Location	
Sample Description	Partridge / PCWS
Matrix	Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Phosphorus	Total Dissolved	mg/L	<0.003		0.003
Ammonia - N		mg/L	0.05		
Metals Dissolved					
Aluminum	Dissolved	mg/L	<0.005		0.005
Antimony	Dissolved	mg/L	<0.0002		0.0002
Arsenic	Dissolved	mg/L	0.0041		0.0002
Barium	Dissolved	mg/L	0.001		0.001
Beryllium	Dissolved	mg/L	0.00008		0.00004
Bismuth	Dissolved	mg/L	<0.001		0.001
Boron	Dissolved	mg/L	0.473		0.004
Cadmium	Dissolved	mg/L	0.00003		0.00001
Chromium	Dissolved	mg/L	<0.0004		0.0004
Cobalt	Dissolved	mg/L	<0.00002		0.00002
Copper	Dissolved	mg/L	<0.001		0.001
Lead	Dissolved	mg/L	<0.0001		0.0001
Lithium	Dissolved	mg/L	0.238		0.001
Molybdenum	Dissolved	mg/L	0.0246		0.0001
Nickel	Dissolved	mg/L	<0.001		0.001
Selenium	Dissolved	mg/L	<0.0006		0.0006
Silver	Dissolved	mg/L	<0.00001		0.00001
Strontium	Dissolved	mg/L	0.075		0.001
Sulfur	Dissolved	mg/L	22.0		0.2
Thallium	Dissolved	mg/L	0.00002		0.00001
Thorium	Dissolved	mg/L	<0.0004		0.0004
Tin	Dissolved	mg/L	0.0001		0.0001
Titanium	Dissolved	mg/L	0.0012		0.0004
Uranium	Dissolved	mg/L	0.0021		0.0004
Vanadium	Dissolved	mg/L	<0.0001		0.0001
Zinc	Dissolved	mg/L	0.002		0.001
Zirconium	Dissolved	mg/L	0.0009		0.0001
Mercury	Total Dissolved	mg/L	<0.00001		0.00001
Metals Extractable					
Mercury	Total Dissolved	mg/L	<0.00001		0.00001
Metals Total					
Aluminum	Total	mg/L	0.013		0.005
Antimony	Total	mg/L	<0.0002		0.0002

Analytical Report

Bill To: EBA Engineering Consultants
 Report To: EBA Engineering Consultants
 Calcite Business Centre
 Unit 6, 151 Industrial Road
 Whitehorse, YT, Canada
 Y1A 2V3
 Attn: Stephan Klump
 Sampled By: SK
 Company: EBA

Project: W23101159.117
 ID: W23101159.117
 Name: YEC Geothermal
 Location: Partridge Creek
 LSD:
 P.O.:
 Acct code:

Lot ID: **817869**
 Control Number:
 Date Received: Aug 2, 2011
 Date Reported: Aug 8, 2011
 Report Number: 1457323

Reference Number 817869-1
 Sample Date Jul 27, 2011
 Sample Time NA
 Sample Location
 Sample Description Partridge / PCWS
 Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued					
Arsenic	Total	mg/L	0.0037		0.0002
Barium	Total	mg/L	<0.001		0.001
Beryllium	Total	mg/L	0.00010		0.00004
Bismuth	Total	mg/L	<0.001		0.001
Boron	Total	mg/L	0.469		0.004
Cadmium	Total	mg/L	0.00002		0.00001
Calcium	Total	mg/L	6.56		0.05
Chromium	Total	mg/L	<0.0004		0.0004
Cobalt	Total	mg/L	<0.00002		0.00002
Copper	Total	mg/L	<0.001		0.001
Iron	Total	mg/L	0.038		0.01
Lead	Total	mg/L	<0.0001		0.0001
Lithium	Total	mg/L	0.237		0.001
Magnesium	Total	mg/L	0.13		0.05
Manganese	Total	mg/L	<0.005		0.005
Molybdenum	Total	mg/L	0.0250		0.0001
Nickel	Total	mg/L	<0.001		0.001
Phosphorus	Total	mg/L	<0.01		0.01
Potassium	Total	mg/L	2.4		0.1
Selenium	Total	mg/L	<0.0006		0.0006
Silicon	Total	mg/L	33.3		0.05
Silver	Total	mg/L	<0.00001		0.00001
Sodium	Total	mg/L	79.3		0.02
Strontium	Total	mg/L	0.076		0.001
Sulfur	Total	mg/L	21.9		0.1
Tellurium	Total	mg/L	<0.0001		0.0001
Thallium	Total	mg/L	0.00002		0.00001
Thorium	Total	mg/L	<0.0004		0.0004
Tin	Total	mg/L	<0.0001		0.0001
Titanium	Total	mg/L	<0.001		0.001
Uranium	Total	mg/L	0.0020		0.0004
Vanadium	Total	mg/L	<0.0001		0.0001
Zinc	Total	mg/L	0.001		0.001
Zirconium	Total	mg/L	0.0007		0.0001
Routine Water					
pH	at 25 °C		8.64		

Analytical Report

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Reference Number 817869-1
Sample Date Jul 27, 2011
Sample Time NA
Sample Location
Sample Description Partridge / PCWS
Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Routine Water - Continued					
Electrical Conductivity	µS/cm at 25 C	385			1
Calcium	Dissolved mg/L	6.2			0.1
Iron	Dissolved mg/L	0.025			0.005
Magnesium	Dissolved mg/L	<0.1			0.1
Manganese	Dissolved mg/L	0.003			0.001
Phosphorus	Dissolved mg/L	<0.01			0.01
Potassium	Dissolved mg/L	2.3			0.1
Silicon	Dissolved mg/L	31.3			0.05
Sodium	Dissolved mg/L	73.7			0.1
Bicarbonate	mg/L	100			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	87			5
Chloride	Dissolved mg/L	11.9			0.05
Fluoride	Dissolved mg/L	10.5			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	66.1			0.6
Hardness	as CaCO3 mg/L	16			5
Total Dissolved Solids	Calculated Value mg/L	308			1

Approved by: 
 Mathieu Simoneau
 Laboratory Operations Manager

Quality Control

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Inorganic Nonmetallic Parameters

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Phosphorus	mg/L	0.0001	-0.003	0.003	yes
Ammonium - N	ug/L	-85.61	-110.00	10.00	yes
Date Acquired: August 04, 2011					

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Ammonium - N	ug/L	100.93	85	115	yes
Date Acquired: August 04, 2011					
Phosphorus	mg/L	105.00	80	120	yes
Ammonium - N	ug/L	124.98	70	130	yes
Date Acquired: August 04, 2011					

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Ammonium - N	mg/L	0.74	0.73	0.58	0.87	yes
Date Acquired: August 04, 2011						

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Phosphorus	mg/L	<0.003	<0.003	20	0.050	yes
Ammonia - N	mg/L	0.04	0.04	20	0.50	yes
Date Acquired: August 04, 2011						

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Phosphorus	mg/L	0.437	0.356	0.446	yes
Date Acquired: August 03, 2011					

Metals Dissolved

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Aluminum	mg/L	0.294	0.300	-9.690	10.290	yes
Antimony	mg/L	0.0802	0.0750	-9.9150	10.0650	yes
Arsenic	mg/L	0.0628	0.0649	-9.9251	10.0549	yes
Barium	mg/L	0.209	0.200	-9.791	10.190	yes
Beryllium	mg/L	0.0768	0.07520	-9.91480	10.06520	yes
Boron	mg/L	0.087	0.087	-9.903	10.077	yes
Cadmium	mg/L	0.06090	0.05800	-9.93200	10.04800	yes
Chromium	mg/L	0.0661	0.0675	-9.9225	10.0575	yes
Cobalt	mg/L	0.0808	0.07980	-9.91020	10.06980	yes
Copper	mg/L	0.059	0.057	-9.933	10.047	yes
Lead	mg/L	0.175	0.1527	-9.8373	10.1427	yes
Molybdenum	mg/L	0.0616	0.05999	-9.93001	10.04999	yes
Nickel	mg/L	0.226	0.220	-9.770	10.210	yes
Selenium	mg/L	0.1150	0.1099	-9.8801	10.0999	yes
Silver	mg/L	0.01710	0.01499	-9.97501	10.00499	yes
Strontium	mg/L	0.051	0.050	-9.940	10.040	yes

Quality Control

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Metals Dissolved - Continued

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Thallium	mg/L	0.07180	0.06508	-9.92492	10.05508	yes
Vanadium	mg/L	0.7350	0.75000	-9.24000	10.74000	yes
Zinc	mg/L	0.140	0.130	-9.860	10.120	yes

Date Acquired: August 03, 2011

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Sulfur	mg/L	2.5	2.4	30	3.0	yes

Date Acquired: August 03, 2011

Metals Extractable

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Mercury	ng/L	0	-9.99	9.99	yes

Date Acquired: August 08, 2011

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Mercury	ng/L	110.40	85	115	yes

Date Acquired: August 08, 2011

Metals Total

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	-0.019	-0.08	0.10	yes
Iron	mg/L	-0.0159	-0.030	0.030	yes
Magnesium	mg/L	0.016	-0.06	0.06	yes
Manganese	mg/L	-0.0017	-0.0098	0.0022	yes
Phosphorus	mg/L	-0.0009	-0.033	0.027	yes
Potassium	mg/L	-0.0206	-0.30	0.30	yes
Silicon	mg/L	0	-2.55	3.15	yes
Sodium	mg/L	-0.0033	-0.23	0.19	yes

Date Acquired: August 03, 2011

Calcium	mg/L	-0.0187	-0.13	0.17	yes
Iron	mg/L	-0.0051	-0.029	0.031	yes
Magnesium	mg/L	-0.013	-0.09	0.09	yes
Manganese	mg/L	-0.0021	-0.0098	0.0022	yes
Phosphorus	mg/L	-0.0073	-0.033	0.027	yes
Potassium	mg/L	-0.012	-3.83	4.09	yes
Silicon	mg/L	0.0054	-2.40	3.00	yes
Sodium	mg/L	0.0465	-0.23	0.19	yes

Date Acquired: August 03, 2011

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	98.91	90	110	yes

Quality Control

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Metals Total - Continued

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Iron	mg/L	107.30	70	130	yes
Magnesium	mg/L	98.62	90	110	yes
Manganese	mg/L	97.90	90	110	yes
Phosphorus	mg/L	98.52	90	110	yes
Potassium	mg/L	95.52	85	115	yes
Silicon	mg/L	92.10	80	120	yes
Sodium	mg/L	96.42	90	110	yes

Date Acquired: August 03, 2011

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Aluminum	mg/L	1.20	1.200	-8.790	11.190	yes
Antimony	mg/L	0.316	0.3000	-9.6900	10.2900	yes
Arsenic	mg/L	0.243	0.2590	-9.7310	10.2490	yes
Barium	mg/L	0.822	0.798	-9.192	10.788	yes
Beryllium	mg/L	0.299	0.30000	-9.69000	10.29000	yes
Boron	mg/L	0.35	0.349	-9.641	10.339	yes
Cadmium	mg/L	0.234	0.23200	-9.75800	10.22200	yes
Calcium	mg/L	5.98	5.98	-4.01	15.97	yes
Chromium	mg/L	0.263	0.2700	-9.7200	10.2600	yes
Cobalt	mg/L	0.318	0.31900	-9.67100	10.30900	yes
Copper	mg/L	0.23	0.228	-9.762	10.218	yes
Iron	mg/L	1.28	1.276	-8.714	11.266	yes
Lead	mg/L	0.670	0.6100	-9.3800	10.6000	yes
Magnesium	mg/L	5.70	5.43	-4.56	15.42	yes
Manganese	mg/L	1.51	1.4968	-8.4930	11.4870	yes
Molybdenum	mg/L	0.241	0.24000	-9.75000	10.23000	yes
Nickel	mg/L	0.884	0.880	-9.110	10.870	yes
Potassium	mg/L	3	3.00	-6.99	12.99	yes
Selenium	mg/L	0.434	0.4400	-9.5500	10.4300	yes
Silver	mg/L	0.0662	0.05996	-9.93000	10.05000	yes
Sodium	mg/L	5.09	4.89	-5.10	14.88	yes
Strontium	mg/L	0.20	0.200	-9.790	10.190	yes
Thallium	mg/L	0.276	0.26000	-9.73000	10.25000	yes
Vanadium	mg/L	2.93	3.00000	-6.99000	12.99000	yes
Zinc	mg/L	0.537	0.520	-9.470	10.510	yes

Date Acquired: August 03, 2011

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Calcium	mg/L	37.4	38.0	20	0.05	yes
Iron	mg/L	3.94	3.88	20	0.050	yes
Magnesium	mg/L	11.2	11.4	20	0.05	yes
Manganese	mg/L	0.120	0.122	20	0.0050	yes
Phosphorus	mg/L	0.092	0.093	20	0.050	yes

Quality Control

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Metals Total - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Potassium	mg/L	1.0	1.0	20	0.10	yes
Silicon	mg/L	9.10	9.31	20	0.10	yes
Sodium	mg/L	7.03	7.22	20	0.10	yes
Sulfur	mg/L	4.2	4.2	20	0.0	yes
Date Acquired: August 03, 2011						

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	0	-0.05	0.05	yes
Iron	mg/L	-0.015	-0.031	0.029	yes
Magnesium	mg/L	0.0037	-0.05	0.07	yes
Manganese	mg/L	-0.0015	-0.007	0.001	yes
Phosphorus	mg/L	0.0009	-0.04	0.04	yes
Potassium	mg/L	-0.0163	-0.4	0.4	yes
Silicon	mg/L	0.0017	-0.20	0.25	yes
Sodium	mg/L	0	-0.2	0.2	yes
Date Acquired: August 03, 2011					
Calcium	mg/L	0.0225	-0.13	0.16	yes
Iron	mg/L	-0.016	-0.024	0.025	yes
Magnesium	mg/L	-0.0193	-0.07	0.08	yes
Manganese	mg/L	-0.0022	-0.009	0.002	yes
Phosphorus	mg/L	0.0018	-0.14	0.16	yes
Potassium	mg/L	-0.0103	-0.8	0.8	yes
Silicon	mg/L	-0.0006	-1.76	2.02	yes
Sodium	mg/L	0.0385	-0.3	0.4	yes
Date Acquired: August 03, 2011					
Chloride	mg/L	0.00501606	-0.20	0.20	yes
Fluoride	mg/L	0	-0.10	0.10	yes
Nitrate - N	mg/L	0.0433833	-0.03	0.03	yes
Nitrite - N	mg/L	0	-0.10	0.10	yes
Sulfate (SO4)	mg/L	0.0145306	-1.0	1.0	yes
Date Acquired: August 03, 2011					

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	98.10	91	109	yes
Iron	mg/L	102.30	0	0	yes
Magnesium	mg/L	99.33	91	109	yes
Manganese	mg/L	95.90	90	110	yes
Phosphorus	mg/L	94.86	90	110	yes
Potassium	mg/L	93.80	85	115	yes
Silicon	mg/L	90.58	80	120	yes
Sodium	mg/L	96.66	90	110	yes

Quality Control

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Routine Water - Continued

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Date Acquired:	August 03, 2011				
Chloride	mg/L	100.15	85	115	yes
Fluoride	mg/L	99.65	85	115	yes
Nitrate - N	mg/L	98.75	85	115	yes
Nitrite - N	mg/L	106.01	90	110	yes
Sulfate (SO4)	mg/L	95.19	85	115	yes
Date Acquired:	August 03, 2011				
Chloride	mg/L	96.32	85	105	yes
Fluoride	mg/L	97.77	82	102	yes
Nitrate - N	mg/L	88.64	88	108	yes
Nitrite - N	mg/L	98.53	99	119	yes
Sulfate (SO4)	mg/L	98.29	90	110	yes

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
T-Alkalinity	mg/L	10	10	8	11	yes
Date Acquired:	August 03, 2011					
Calcium	mg/L	1	1.00	0.90	1.10	yes
Magnesium	mg/L	0.8	0.91	0.82	1.00	yes
Manganese	mg/L	0.346	0.374	0.336	0.412	yes
Potassium	mg/L	0.5	0.5	0.4	0.6	yes
Sodium	mg/L	0.8	0.8	0.7	0.9	yes
Date Acquired:	August 03, 2011					
Nitrite - N	mg/L	1.52	1.19	1.08	1.60	yes
Date Acquired:	August 03, 2011					

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Calcium	mg/L	17.3	16.9	30	1.00	yes
Iron	mg/L	<0.005	<0.005	30	0.060	yes
Magnesium	mg/L	2.8	2.8	30	1.00	yes
Manganese	mg/L	<0.001	<0.001	30	0.015	yes
Phosphorus	mg/L	0.18	0.18	30	0.10	yes
Potassium	mg/L	0.3	0.3	30	1.0	yes
Silicon	mg/L	7.63	7.64	30	0.15	yes
Sodium	mg/L	8.8	8.8	30	1.0	yes
Date Acquired:	August 03, 2011					
Hardness	mg CaCO3/L	140	142	20	1.000	yes
Date Acquired:	August 03, 2011					
pH		8.71	8.71	2		yes
Electrical Conductivity	dS/m at 25 C	0.575	0.565	10	0.005	yes
Bicarbonate	mg/L	322	325	10	10	yes

Quality Control

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Routine Water - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Carbonate	mg/L	13	13	10	10	yes
Hydroxide	mg/L	<5	<5	10	10	yes
P-Alkalinity	mg/L	11	11	10	5	yes
T-Alkalinity	mg/L	286	289	10	5	yes
Chloride	mg/L	1.93	1.92	15	0.25	yes
Fluoride	mg/L	<0.01	<0.01	15	0.50	yes
Nitrate - N	mg/L	0.09	0.09	15	0.05	yes
Nitrite - N	mg/L	<0.01	<0.01	15	0.50	yes
Sulfate (SO4)	mg/L	92	93	15	0.5	yes
Date Acquired: August 03, 2011						

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Chloride	mg/L	1.26	1.27	6	0.01	yes
Fluoride	mg/L	0.20	0.19	6	0.01	yes
Nitrate - N	mg/L	0.29	0.29	12	0.05	yes
Nitrite - N	mg/L	0.32	0.31	6	0.01	yes
Sulfate (SO4)	mg/L	4.3	4.2	6	0.0	yes
Date Acquired: August 03, 2011						

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
pH		9.93	9.17	10.81	yes
Electrical Conductivity	µS/cm at 25 C	212	165	243	yes
P-Alkalinity	mg/L	28	7	55	yes
T-Alkalinity	mg/L	96	90	101	yes
Date Acquired: August 03, 2011					
pH		8.01	7.88	8.12	yes
Date Acquired: August 03, 2011					
Electrical Conductivity	µS/cm at 25 C	30	0	2	yes
Date Acquired: August 03, 2011					
Electrical Conductivity	µS/cm at 25 C	1380	1323	1503	yes
Date Acquired: August 03, 2011					
Electrical Conductivity	µS/cm at 25 C	1	-2	2	yes
Date Acquired: August 03, 2011					

Trace Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	0.089	-10	10	yes
Antimony	µg/L	0.001	-0.4	0.2	yes
Arsenic	µg/L	0.023	-0.5	0.5	yes
Barium	µg/L	-0.013	-0	0	yes
Beryllium	µg/L	0.002	-0.10	0.10	yes

Quality Control

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Trace Metals Dissolved - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Bismuth	µg/L	-0.026	-1.0	1.0	yes
Boron	µg/L	1.827	-6	5	yes
Cadmium	µg/L	-0.012	-0.03	0.03	yes
Chromium	µg/L	0.009	-0.1	0.2	yes
Cobalt	µg/L	-0.023	-0.07	0.07	yes
Copper	µg/L	-0.142	-1	1	yes
Lead	µg/L	0.002	-0.1	0.1	yes
Lithium	µg/L	-0.018	-1	1	yes
Molybdenum	µg/L	-0.01	-0.31	0.29	yes
Nickel	µg/L	-0.028	-1	1	yes
Selenium	µg/L	0.1	-1.7	1.3	yes
Silver	µg/L	-0.007	-0.05	0.05	yes
Strontium	µg/L	0.007	-0	0	yes
Thallium	µg/L	-0.002	-0.03	0.03	yes
Thorium	µg/L	-0.045	-1.5	1.5	yes
Tin	µg/L	-0.098	-3.0	3.0	yes
Titanium	µg/L	0.006	-0.2	0.2	yes
Uranium	µg/L	-0.002	-0.03	0.03	yes
Vanadium	µg/L	0.001	-0.35	0.35	yes
Zinc	µg/L	-0.034	-2	4	yes
Zirconium	µg/L	-0.007	-0.1	0.1	yes
Date Acquired: August 03, 2011					
Aluminum	µg/L	1.204	-6	6	yes
Antimony	µg/L	-0.01	-0.4	0.3	yes
Arsenic	µg/L	0.002	-0.4	0.3	yes
Barium	µg/L	-0.006	-0	1	yes
Beryllium	µg/L	-0.002	-0.10	0.10	yes
Bismuth	µg/L	-0.118	0.0	0.0	yes
Boron	µg/L	4.488	-18	19	yes
Cadmium	µg/L	-0.016	-0.03	0.03	yes
Chromium	µg/L	-0.004	-0.1	0.2	yes
Cobalt	µg/L	-0.012	-0.30	0.30	yes
Copper	µg/L	-0.158	-1	1	yes
Lead	µg/L	0.003	-0.3	0.4	yes
Lithium	µg/L	0.026	-0	0	yes
Molybdenum	µg/L	-0.005	-0.95	0.85	yes
Nickel	µg/L	0.006	-1	1	yes
Selenium	µg/L	0.208	-1.7	1.7	yes
Silver	µg/L	-0.01	-0.67	0.47	yes
Strontium	µg/L	0.046	-2	4	yes
Thallium	µg/L	-0.002	-0.06	0.06	yes
Thorium	µg/L	-0.223	-0.7	0.5	yes

Quality Control

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Trace Metals Dissolved - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Tin	µg/L	-0.211	-3.8	4.0	yes
Titanium	µg/L	0.057	-0.3	0.2	yes
Uranium	µg/L	0.002	-0.04	0.02	yes
Vanadium	µg/L	-0.005	-0.30	0.30	yes
Zinc	µg/L	0.261	-11	19	yes
Zirconium	µg/L	-0.012	-0.0	0.0	yes
Date Acquired:	August 03, 2011				
Mercury	ug/L	<0.01	-9.99	9.99	yes
Date Acquired:	August 08, 2011				

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	97.56	70	130	yes
Antimony	µg/L	99.60	85	115	yes
Arsenic	µg/L	101.20	90	110	yes
Barium	µg/L	97.82	90	110	yes
Beryllium	µg/L	102.56	90	110	yes
Bismuth	µg/L	96.16	90	110	yes
Boron	µg/L	96.08	70	130	yes
Cadmium	µg/L	103.20	90	110	yes
Chromium	µg/L	97.68	90	110	yes
Cobalt	µg/L	100.80	90	110	yes
Copper	µg/L	102.84	90	110	yes
Lead	µg/L	100.76	90	110	yes
Lithium	µg/L	95.38	90	110	yes
Molybdenum	µg/L	96.88	90	110	yes
Nickel	µg/L	102.34	90	110	yes
Selenium	µg/L	101.60	90	110	yes
Silver	µg/L	0.18	0	0	yes
Strontium	µg/L	99.12	90	110	yes
Thallium	µg/L	98.92	90	110	yes
Tin	µg/L	98.88	90	110	yes
Titanium	µg/L	99.16	90	110	yes
Uranium	µg/L	100.68	85	115	yes
Vanadium	µg/L	95.76	90	110	yes
Zinc	µg/L	106.56	90	110	yes
Zirconium	µg/L	102.20	90	110	yes
Date Acquired:	August 03, 2011				

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Mercury	ug/L	0.22	0.24	0.21	0.27	yes
Date Acquired:	August 08, 2011					

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
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Quality Control

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Trace Metals Dissolved - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Aluminum	µg/L	13	14	20	20	yes
Antimony	µg/L	<0.2	<0.2	20	1.0	yes
Arsenic	µg/L	0.3	0.3	20	1.0	yes
Barium	µg/L	3	3	20	5	yes
Beryllium	µg/L	<0.04	<0.04	20	1.00	yes
Boron	µg/L	9	9	20	5	yes
Cadmium	µg/L	0.15	0.15	20	0.50	yes
Chromium	µg/L	2.7	2.9	20	5.0	yes
Cobalt	µg/L	0.02	0.03	20	0.50	yes
Copper	µg/L	4	4	20	5	yes
Lead	µg/L	<0.1	<0.1	20	0.5	yes
Lithium	µg/L	3	4	20	5	yes
Molybdenum	µg/L	0.2	0.3	20	0.50	yes
Nickel	µg/L	<1	<1	20	5	yes
Selenium	µg/L	<0.6	<0.6	20	0.5	yes
Silver	µg/L	0.01	<0.01	20	0.50	yes
Strontium	µg/L	36	38	20	0	yes
Thallium	µg/L	<0.01	<0.01	20	0.10	yes
Thorium	µg/L	<0.4	<0.4	10	0.1	yes
Tin	µg/L	<0.1	<0.1	20	0.5	yes
Titanium	µg/L	<0.4	0.4	20	0.5	yes
Uranium	µg/L	<0.4	<0.4	20	0.10	yes
Vanadium	µg/L	2.1	2.3	20	0.50	yes
Zinc	µg/L	46	52	20	5	yes
Zirconium	µg/L	<0.1	<0.1	20	0.5	yes
Date Acquired:	August 03, 2011					
Mercury	ug/L	<0.01	<0.01	20	0.05	yes
Date Acquired:	August 08, 2011					

Trace Metals Total

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	1.122	-7	7	yes
Antimony	µg/L	0.003	-0.4	0.2	yes
Arsenic	µg/L	-0.03	0.0	0.0	yes
Barium	µg/L	-0.002	-0.1	0.2	yes
Beryllium	µg/L	0.005	-0.10	0.10	yes
Bismuth	µg/L	-0.013	-3.0	3.0	yes
Boron	µg/L	0.961	-6	5	yes
Cadmium	µg/L	-0.011	0.00	0.00	yes
Chromium	µg/L	0.017	0.0	0.0	yes
Cobalt	µg/L	0	-0.06600	0.06600	yes
Copper	µg/L	0.033	-0.830	0.790	yes

Quality Control

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Trace Metals Total - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Lead	µg/L	0.006	0.000	0.000	yes
Lithium	µg/L	-0.006	-0	0	yes
Molybdenum	µg/L	0.006	-0.31	0.29	yes
Nickel	µg/L	-0.032	-1	1	yes
Selenium	µg/L	0.047	-1.7	1.3	yes
Silver	µg/L	-0.005	-0.07	0.05	yes
Strontium	µg/L	0.015	-0.3	0.3	yes
Tellurium	µg/L	-0.035	-0.7	0.7	yes
Thallium	µg/L	0.001	-0.03	0.03	yes
Thorium	µg/L	-0.031	-1.50	1.50	yes
Tin	µg/L	-0.099	-3.0	3.0	yes
Titanium	µg/L	0.018	-0.4	0.4	yes
Uranium	µg/L	-0.002	-0.0	0.0	yes
Vanadium	µg/L	-0.001	-0.30	0.30	yes
Zinc	µg/L	0.145	-2	4	yes
Zirconium	µg/L	0	-0.1	0.1	yes
Date Acquired: August 03, 2011					
Aluminum	µg/L	4.164	-4	8	yes
Antimony	µg/L	0.007	-0.6	0.4	yes
Arsenic	µg/L	0.053	-0.6	0.6	yes
Barium	µg/L	0.2	-0.1	0.1	yes
Beryllium	µg/L	0.002	-0.09	0.09	yes
Bismuth	µg/L	-0.123	0.0	0.0	yes
Boron	µg/L	4.032	-12	11	yes
Cadmium	µg/L	-0.019	-0.08	0.08	yes
Chromium	µg/L	0.03	-0.1	0.2	yes
Cobalt	µg/L	-0.026	-0.07500	0.08700	yes
Copper	µg/L	-0.127	-1.930	1.430	yes
Lead	µg/L	0.011	-0.150	0.210	yes
Lithium	µg/L	-0.005	-0	0	yes
Molybdenum	µg/L	-0.031	-1.67	1.81	yes
Nickel	µg/L	-0.026	-1	1	yes
Selenium	µg/L	0.109	-2.5	1.5	yes
Silver	µg/L	-0.008	-0.13	0.07	yes
Strontium	µg/L	0.017	-0.2	0.2	yes
Tellurium	µg/L	-0.08	-0.2	0.2	yes
Thallium	µg/L	-0.002	-0.32	0.34	yes
Thorium	µg/L	-0.223	-1.75	0.95	yes
Tin	µg/L	-0.201	-0.5	0.4	yes
Titanium	µg/L	0.135	-0.2	0.3	yes
Uranium	µg/L	-0.003	-0.5	0.5	yes
Vanadium	µg/L	0.011	-0.30	0.30	yes

Quality Control

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
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Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Trace Metals Total - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Zinc	µg/L	0.365	-4	6	yes
Zirconium	µg/L	-0.013	-0.1	0.1	yes
Date Acquired: August 03, 2011					

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	100.68	70	130	yes
Antimony	µg/L	100.44	85	115	yes
Arsenic	µg/L	101.00	90	110	yes
Barium	µg/L	98.72	90	110	yes
Beryllium	µg/L	103.60	90	110	yes
Bismuth	µg/L	97.28	90	110	yes
Boron	µg/L	100.00	70	130	yes
Cadmium	µg/L	104.76	90	110	yes
Chromium	µg/L	100.42	90	110	yes
Cobalt	µg/L	100.14	90	110	yes
Copper	µg/L	100.68	90	110	yes
Lead	µg/L	102.92	90	110	yes
Lithium	µg/L	98.26	90	110	yes
Molybdenum	µg/L	97.04	90	110	yes
Nickel	µg/L	100.58	90	110	yes
Selenium	µg/L	102.12	90	110	yes
Silver	µg/L	0.18	0	0	yes
Strontium	µg/L	99.88	90	110	yes
Thallium	µg/L	100.20	90	110	yes
Tin	µg/L	100.84	85	115	yes
Titanium	µg/L	98.36	90	110	yes
Uranium	µg/L	105.08	85	115	yes
Vanadium	µg/L	98.54	90	110	yes
Zinc	µg/L	102.06	90	110	yes
Zirconium	µg/L	103.80	90	110	yes
Date Acquired: August 03, 2011					

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Aluminum	µg/L	2220	2310	15	100	yes
Antimony	µg/L	<0.2	<0.2	15	2.0	yes
Arsenic	µg/L	1.8	1.8	15	2.0	yes
Barium	µg/L	109	105	15	10.0	yes
Beryllium	µg/L	0.07	0.1	15	0.40	yes
Boron	µg/L	11	9	15	40	yes
Cadmium	µg/L	0.02	0.03	15	0.10	yes
Chromium	µg/L	6.3	6.7	15	6.0	yes
Cobalt	µg/L	1.64	1.69	15	0.20000	yes
Copper	µg/L	14	7	15	5.000	yes

Quality Control

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
Unit 6, 151 Industrial Road	Location: Partridge Creek	Date Reported: Aug 8, 2011
Whitehorse, YT, Canada	LSD:	Report Number: 1457323
Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Trace Metals Total - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Lead	µg/L	1.3	1.0	15	1.000	yes
Lithium	µg/L	3	3	15	10	yes
Molybdenum	µg/L	1.3	1.3	15	0.20	yes
Nickel	µg/L	6	7	15	10	yes
Selenium	µg/L	<0.6	<0.6	15	5.0	yes
Silver	µg/L	0.01	0.01	15	0.10	yes
Strontium	µg/L	304	316	15	10.0	yes
Tellurium	µg/L	<0.1	<0.1	20	0.5	yes
Thallium	µg/L	0.02	0.02	15	0.10	yes
Thorium	µg/L	<0.4	<0.4	15	1.00	yes
Tin	µg/L	<0.1	<0.1	15	1.0	yes
Titanium	µg/L	66.0	67.3	15	1.0	yes
Uranium	µg/L	1.2	1.2	15	1.0	yes
Vanadium	µg/L	7.8	8.1	15	0.40	yes
Zinc	µg/L	14	10	15	10	yes
Zirconium	µg/L	0.7	0.6	15	1.0	yes

Date Acquired: August 03, 2011

Methodology and Notes

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
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Company: EBA		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water	APHA	* Alkalinity - Titration Method, 2320 B	03-Aug-11	Exova Surrey
Alk, pH, EC, Turb in water	APHA	* Conductivity, 2510 B	03-Aug-11	Exova Surrey
Alk, pH, EC, Turb in water	APHA	* pH - Electrometric Method, 4500-H+ B	03-Aug-11	Exova Surrey
Ammonia-N in Water	APHA	* Titrametric, 4500-NH3 C	04-Aug-11	Exova Surrey
Anions by IEC in water (Surrey)	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	03-Aug-11	Exova Surrey
Mercury Low Level (Total) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	08-Aug-11	Exova Surrey
Metals SemiTrace (Dissolved) in water	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	03-Aug-11	Exova Surrey
Metals SemiTrace (Total) in Water	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	03-Aug-11	Exova Surrey
Phosphorus - total dissolved (low level)	APHA	* Preliminary Acid Hydrolysis, Ascorbic Acid Reduction Method, 4500-P B,E	03-Aug-11	Exova Surrey
Trace Metals (dissolved) in Water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	03-Aug-11	Exova Surrey
Trace Metals (dissolved) in Water	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	03-Aug-11	Exova Surrey
Trace Metals (Total) in Water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	03-Aug-11	Exova Surrey
Trace Metals (Total) in Water	US EPA	* Metals & Trace Elements by ICP-AES, 6010C	03-Aug-11	Exova Surrey

* Reference Method Modified

References

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

Comments:

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

Methodology and Notes

Bill To: EBA Engineering Consultants	Project:	Lot ID: 817869
Report To: EBA Engineering Consultants	ID: W23101159.117	Control Number:
Calcite Business Centre	Name: YEC Geothermal	Date Received: Aug 2, 2011
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Y1A 2V3	P.O.:	
Attn: Stephan Klump	Acct code:	
Sampled By: SK		
Company: EBA		

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

Client: Klump
 EBA Engineering Consultants Ltd.
 Project #: W23101159.117

ISO# 2011514
 Location:
 1 for 18O, 2H, E3H,
 13C,DIC/AMS - Rafter

Environmental Isotope Lab
 4/10/2012
 1 of 1

#	Sample	Lab#	$\delta^{18}\text{O}$	Result	Repeat	$\delta^2\text{H}$	Result	Repeat	E^3H	Result	$\pm 1\sigma$	Repeat	$\delta^{13}\text{C}$	Result	Repeat
			H_2O	VSMOW		H_2O	VSMOW						DIC/AMS	PDB	
1	PCWS 27-Jul-11	267730	X	-22.27	-22.31	X	-171.10	-170.94	X	<0.05	0.4		X	-14.93	

EC	HC03
uS/cm	mg/L
390	~100

Tritium is reported in Tritium Units.
 1TU = 3.221 Picocuries/L per IAEA, 2000 Report.
 1TU = 0.11919 Becquerels/L per IAEA, 2000 Report.

To Contact uwEILAB:
 519 888 4732

Rick Heemskerk
 uwEILAB Manager
 rkhmskrk@uwaterloo.ca
 519 888 4567 ext 35838



NZA 37968
R 32841
Job No 108093
Measured 21-Oct-11
Issued 26-Oct-11

Accelerator Mass Spectrometry Result

This result for the sample submitted is for the exclusive use of the submitter.
All liability whatsoever to any third party is excluded.

Sample ID 267730
Description Gas: CO2
Submitter A. Richard Heemskerk University of Waterloo - Environmental Isotopes Laboratory

* **Radiocarbon Age** **18205 ± 55 BP** $\delta^{13}\text{C} = -14.9\text{‰}$
** **Per cent modern** = 10.29 ± 0.07 $\delta^{14}\text{C} = -894.9 \pm 0.7\text{‰}$ $\Delta^{14}\text{C} = -897.1 \pm 0.7\text{‰}$

* Reported age is the conventional radiocarbon age before present (BP)

** Per cent modern means absolute per cent modern relative to the NBS oxalic acid standard (HOxI) corrected for decay since 1950.

Age, $\Delta^{14}\text{C}$, $\delta^{14}\text{C}$ and absolute per cent modern are as defined by Stuiver Polach, Radiocarbon 19:355-363 (1977)

The reported errors comprise statistical errors in sample and standard determinations, combined in quadrature with a system error component based on the analysis of an ongoing series of measurements on an oxalic acid standard.

For the present result the system error component is conservatively estimated as 0% (= ± 0 radiocarbon years).