April 26, 2010 EBA File: W23101159.013

Yukon Energy Corporation
2 Miles Canyon Road
Whitehorse, Yukon Y1A 6S7

Attention: David Morrison
President and CEO

Subject: Desk-top Study - Geothermal Potential in the Swift River Area, Yukon and British Columbia

1.0 INTRODUCTION

EBA Engineering Consultants Ltd. (EBA) is presently managing a Yukon geothermal exploration program for Yukon Energy Corporation (YEC). The Swift River Region was identified by the project team as an area that includes favourable geology units that should be evaluated for geothermal potential. Recent volcanics, from late Tertiary to Quaternary time, occur throughout a large area of north-central British Columbia and across the border into the Yukon. Lava flows, basalt plateaus, cinder fields and cinder cones from this volcanism cover vast areas south of the study area, with Mt. Edziza (2787 m asl) in the Stikine Plateau being the most notable and also the Level Mountain Range west of Dease Lake and northwest of the Stikine River.

The Swift River study area in south-central Yukon and adjacent British Columbia includes the Cassiar Mountains, Dorsey Range and south to the Atsutla Range. The approximate study area boundaries extend to Morley River and Morley Lake in the west, to the west edge of the Liard Plain in the east, and to the Tuya Lake – Jennings River, BC area in the south. The northern boundary of the study area extends to the south shore of Wolf Lake and the headwaters of Irvine and Cabin Creeks in the Yukon. The area is within the Liard First Nation and Teslin Tlingit Council traditional territories in the Yukon and within the Dease River First Nation traditional territories in BC. The study area extends about 100 km south of the Alaska Highway (Figure 1).

2.0 PURPOSE AND METHODS

The purpose of the project was a desk-top exercise to study the geology north and south of the Swift River area and to ascertain and evaluate the occurrences of recent volcanic deposits. Recent volcanic activity could indicate that magmatic heat sources (magma) may be closer to the surface, i.e., that these areas could have a higher geothermal gradient.

Evaluation of the Swift River Area (Phase 013 of the Yukon Geothermal Exploration Project) included literature research and review of previous geological mapping and reports. The geology of the study area was researched by internet searches and by compiling regional geology mapping and reports available at resource libraries and the Geological Survey of Canada (GSC). In order to better understand the regional geological setting, geology adjacent to the study area was also reviewed,

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particularly in the Dease Lake mapsheet to the south that has significant exposures of the young volcanics.

3.0 RESULTS AND DISCUSSION

3.1 BACKGROUND GEOLOGICAL SETTING

The geology unit of interest is relatively young volcanics of the Northern Cordilleran Volcanic Province (or Stikine Volcanic Belt), named for the Stikine Volcanics of the Stikine River map area to the southeast, including Mount Edziza on the Stikine Plateau and the adjacent Spatsizi Plateau.

The Northern Cordilleran Volcanic Province (NCVP) is a large area of recent volcanism that stretches from just north of Prince Rupert into the Yukon Territory and the Alaska border (Figure 1). It is the most active volcanic region in Canada, containing more than 100 volcanoes, three of which erupted in the last few hundred years (two witnessed by people). These volcanoes formed due to extensional cracking of the crust in response to the Pacific Ocean plate dragging northward along the edge of the North American plate, toward the Aleutian subduction zone. This belt includes Mt. Edziza, Level Mtn., Tseax Cone (240 years), Lava Fork (360 years), and Ruby Mtn. (103 years) in BC and Volcano Mountain in the Yukon, also a target of the Yukon-Wide Geothermal Exploration project. Mount Edziza and the surrounding volcanoes make up one of the largest areas of young volcanic activity in Canada. The largest and oldest is the Level Mountain Range that occupies an area of 1,800 km^2, has a volume of more than 860 km^3 and occurs just south of the study area. The most recent eruptions, which postdate the last glaciation, are represented by rough irregular flow surfaces with collapsed lava tubes, pahoehoe [relatively smooth, free flowing] lava and undisturbed ash and bombs (GSC, 1957).

The NCVP is adjoined by a cluster of volcanic plugs in central British Columbia. The southern boundary of the NCVP is parallel with south-western Stikinia and is characterized by separate volcanic vents and erosional remains of lavas south of the small community of Stewart. The eastern boundary of the NCVP is the Cassiar Terrane. The northern and western boundaries are adjoined by the Yukon-Tanana and Cache Creek terranes with volcanics in eastern Alaska and weathered remains of older lava flows just north and west of Dawson City in west-central Yukon (GSA 2000).

The NCVP is part of an area of intensive earthquake and volcanic activity around the Pacific Ocean called the Pacific Ring of Fire. However, the NCVP is commonly interpreted to be part of a gap in the Pacific Ring of Fire between the Cascade Volcanic Arc further south and the Aleutian Arc further north; although it is recognized to include over 100 independent volcanoes that have been active in the past 1.8 million years. At least three of them have erupted in the past 360 years, making it the most active volcanic area in Canada.

The NCVP has been a zone of active volcanism since it began to form 20 million years ago. Unlike other parts of the Pacific Ring of Fire, the NCVP has its origins in continental rifting – an area where the Earth's crust and lithosphere is being pulled apart (GSC 2008). This differs from other portions of the Pacific Ring of Fire as it consists largely of volcanic arcs formed by subducting oceanic crust at oceanic trenches along continental margins circling the Pacific Ocean (USGS 1999).

The continental crust at the Northern Cordilleran Volcanic Province is being stretched at a rate of about 2 cm per year. When the stored energy is suddenly released by slippage across the fault at irregular intervals, it can create very large earthquakes, such as the magnitude 8.1 Queen Charlotte Islands earthquake of 1949 (NRC 2008). These movements in the North American crust can cause the near surface rocks to fracture along steeply dipping faults parallel to the rift zone. Hot magma rises between these fractures to create passive or effusive eruptions. Volcanoes within the NCVP are located along short northerly trending segments which in the northern part of the volcanic province are unmistakeably involved with north-trending rift structures, including synvolcanic grabens and grabens with one major fault line along only one of the boundaries (half-grabens) (Wood, 2001). Grabens are indicative of tensional forces and crustal stretching.

Two major north-trending faults hundreds of kilometres long extend along the east and west boundaries of the NCVP (Tintina and Denali fault systems), which extend from northern British Columbia to central Alaska and have been tectonically active since the Cretaceous period as strike-slip faults. The volcanics comprising the NCVP are consistent with the rifting environment. (Wood, 2001).

Seismic activity within the study area is relatively subdued compared to other areas of northern BC and the Yukon, although the Tintina Trench near the eastern boundary of the study area has a more defined linear trend of increased seismic activity.

Active or recently active thermal springs are found in several areas along the western flank of the Stikine Volcanic Plateau, including Elwyn springs (36°C), Taweh springs (46°C), and inactive springs near Mess Lake. All three hydrothermal areas are near the youngest lava fields on the plateau and are probably associated with the most recent volcanic activity at Mount Edziza. No reports of hot springs within the study area were found.

The presence of hot springs in the NCVP indicates the existence of magmatic heat. Thermal springs form if water percolates deeply through the crust and heats up from the primal magmatic heat under the surface. After the groundwater is heated, the heated groundwater rises to the surface to form a hot spring. In some cases, the heated groundwater may rise along extensional faults related to rifting. The Lakelse Hot Springs near Lakelse Lake Provincial Park in northern British Columbia, near Terrace, is interpreted to be one such example. With a temperature of 89 C, the springs are the hottest in Canada. It is also possible that the magma associated with the Nass Valley eruption 250 years ago to the north rose along the same north trending fault lines fueling the Lakelse Hot Springs (NRC 2009).

3.2 RESULTS AND STUDY AREA GEOLOGY

The study area is included in the Tuya Volcanic Field. Extensive basalt of the Tuya Formation can be seen from the Alaska Highway west of the Rancheria road side lodge. These volcanics were deposited by recent (Tertiary to Quaternary time) events that have been emplaced within older units throughout the area. The number and size of these occurrences of recent volcanics increases from north to south and large areas south of the study area are covered by volcanic flows (Figure 2).

Geology of the study area has been mapped by the GSC at 1:250,000 scale. The young volcanic units of interest for this study were reviewed mainly on three mapsheets (Table 1).

TABLE 1 RECENT VOLCANIC UNITS MAPPED IN AND SOUTH OF THE STUDY AREA

TIME		DESCRIPTION	LOCATION	AREA	NTS Mapsheet
Tertiary (?) and Quaternary	65.4 Ma to present	vesicular olivine basalt;	Yukon	Wolf Lake	105B
Tertiary (?) and Quaternary	65.4 Ma to present	Tuya Formation: lava, tuff, agglomerate, recent volcanic vent;	BC	Jennings River	104O
Late Tertiary to Quaternary	23.7 Ma to present	basalt, olivine basalt; minor trachyte and rhyolite;	BC	Dease Lake	104J

Although outside the study area, the geology of the Dease Lake area was reviewed because the target volcanics have the most prominence in this area and occupy greater than one-fifth of the mapsheet, including the flat-lying basalt of Level Mountain on the Stikine and Nahlin Plateau.

Only one relatively small occurrence of recent volcanics could be found mapped in the Yukon. It occurs on the Alaska Highway at Spencer Creek, about 30 km east of Daughney Lake. Additional occurrences are found along the Alaska Highway in BC and throughout all but the area between Swan Lake and Klinkit Lake in the northwest quadrant of map 104O. Numerous small occurrences of the Tuya Formation occur along the Alaska Highway where it follows the Swift River. Flat-lying olivine basalt at least 75 m thick occurs in the Rancheria River valley. The top of the basalt is marked by a relatively flat bench, but the base is everywhere concealed by drift. The most prominent occurrences are located in the southeast quadrant of the mapsheet in the area of Tuya Lake where they form numerous prominent mountains and buttes (Metah Mountain, Isspah Butte, Mount Josephine, Ash Mountain and Tuya Butte).

4.0 CONCLUSIONS AND RECOMMENDATIONS

The geological setting in the study area is favourable for geothermal exploration. Small exposures of recent volcanics are found throughout a large portion of the Swift River region over an extensive area. Hot springs, including the highest thermal spring water temperature in Canada, are associated with similar volcanics south of the study area; however, no thermal springs are known to occur within the study area.

Evidence of recent volcanic activity throughout the region suggests there is potential for elevated geothermal gradient. Remnant heat from this activity at relatively shallow depth and connective geology to deeper magma sources may be expected.

Based on the findings of this program, it is probable that an elevated geothermal gradient could occur in the study area. Options to explore this possibility include a winter open-water survey to prospect for thermal springs, a summer field reconnaissance to measure field parameters at water features located at exposed areas of young volcanics, and drilling to directly measure sub-surface temperature and interpolate the geothermal gradient.

To further advance geothermal exploration in this area, a cost-effective follow-up to this study is a winter open-water survey, which could probably be accomplished in one to two days. A summer program to assess water features at the occurrences of Tuya Formation volcanics is also a feasible next step, but there are about 75 occurrences of the volcanics in the study area, some quite extensive with multiple water features, and a helicopter-supported program over about three days would likely be required to carry out this exploration task. Mobilization would be from Whitehorse with a crew based in Teslin to carry out the work.

A drilling program would typically be required to evaluate the geothermal gradient. Another option would be to investigate the extent of mineral exploration at base metal occurrences near Tootsee Lake in the east-central part of the study area. If diamond drill holes were advanced during property development, one or more of these may be open and available for monitoring of deep water temperature. Helicopter support would likely be required to access the site, but the work would likely be completed in one day. There is a moderate to high risk that caving of boreholes or other blockages could preclude access to the full borehole depth.

Beyond technical factors, there are other issues relating to suitable proximity to power grids, land use and ownership, and other social and economic factors that should be assessed at an early stage of geothermal resource assessment but are outside the scope of this work. The distance from the existing power transmission grid and remote access likely precludes further development at this time and advancement of an extensive exploration program is not recommended until an economic analysis concludes that development would be cost-effective. However, proceeding with potential assessment of geothermal gradient using existing boreholes from mineral exploration could provide a useful assessment of the geothermal potential for minimal cost.

5.0 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.

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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Attachments: Figure 1: Location Map
Figure 2: Study Area and Geology
Appendix A: EBA's General Conditions

6.0 REFERENCES

Catalogue of Canadian volcanoes “Lava Fork”. Geological Survey of Canada. Retrieved October 10, 2009 from http://gsc.nrcan.gc.ca/volcanoes/cat/volcano_e.php?id=svb_lfk_040.

Catalogue of Canadian volcanoes “Stikine volcanic belt”. Geological Survey of Canada. Retrieved October 1, 2009 from <http://gsc.nrcan.gc.ca/volcanoes/cat/belt_stikine_e.php>.

Fuller, T., and L. Jackson . Government of Yukon. *Quaternary Geology of the Yukon Territory.* , Retrieved November 27, 2009 from http://www.geology.gov.yk.ca/pdf/quaternary_geology.pdf

Gabrielse, H. 1969. Geology southwest of Jennings River, Parallel Creek and Cottonwood River. Geological Survey of Canada. (Map 18-1968) (map scale 1:250 000)

Gabrielse, H. and Souther J.G. 1956. Roots, E.F. (1958). Geology Dease Lake, British Columbia. Geological Survey of Canada. (Map 21-1962). (map scale 1:253 440)

Gabrielse, H. 1998. Geology of Cry Lake and Dease Lake Map Areas, North-Central British Columbia. Geological Survey of Canada. Bulletin 504.

Geological Society of American Bulletin. 2000. Distribution, nature, and origin of Neogene-Quaternary magmatism in the northern Cordilleran volcanic province, Canada. Geological Society of America Bulletin. pp. 1280-1293. Retrieved October 2, 2009 from http://www.eos.ubc.ca/~krussell/epapers/GSAB_ER2000.pdf.

Government of Canada. *M8.1 Queen Charlotte Island Earthquake of August 22, 1949.* , 2008. Retrieved from November 11, 2009. <http://earthquakescanada.nrcan.gc.ca/histor/20th-eme/1949-eng.php>.

Government of Canada. Geoscape Guide for Terrace, B.C. , Web. November 11, 2009. http://www.bowserbasin.ca/pdf/Terrace%20Guide.pdf .

Harder, M., and J.K. Russell. "Thermal State of the Mantle Lithosphere beneath the Northern Cordilleran Volcanic Province, British Columbia." The Lithoprobe Celebratory Conference: From Parameters to Processes Revealing the Evolution of a Continent . Canadia's National Lithoprobe Department of Earth & Ocean Sciences, the University of British Columbia. Vancouver, BC. (Abstract of a Poster)

Hart, C. Government of Yukon. *Geological Framework of the Yukon Territory.* Retrieved November 11, 2009 from http://www.geology.gov.yk.ca/pdf/bedrock_geology.pdf

Kious, J., and R.I. Tilling . "Understanding Plate Motions." This Dynamic Earth: The Story of Plate Tectonics. United States Geological Survey, 2008. Retrieved October 10, 2009 from http://pubs.usgs.gov/gip/dynamic/understanding.html#anchor19173262

Nelson, J.L. and Bradford, J.A. 1993. Geology of the Midway-Cassiar Area, Northern British Columbia (104O, 107P)

Poole, W.H., Roddick, J.A. and Green L.H. (1980). Geology Wolf Lake, Yukon Territory. Geological Survey of Canada, (Map10-1960) (map scale 1:253 440)

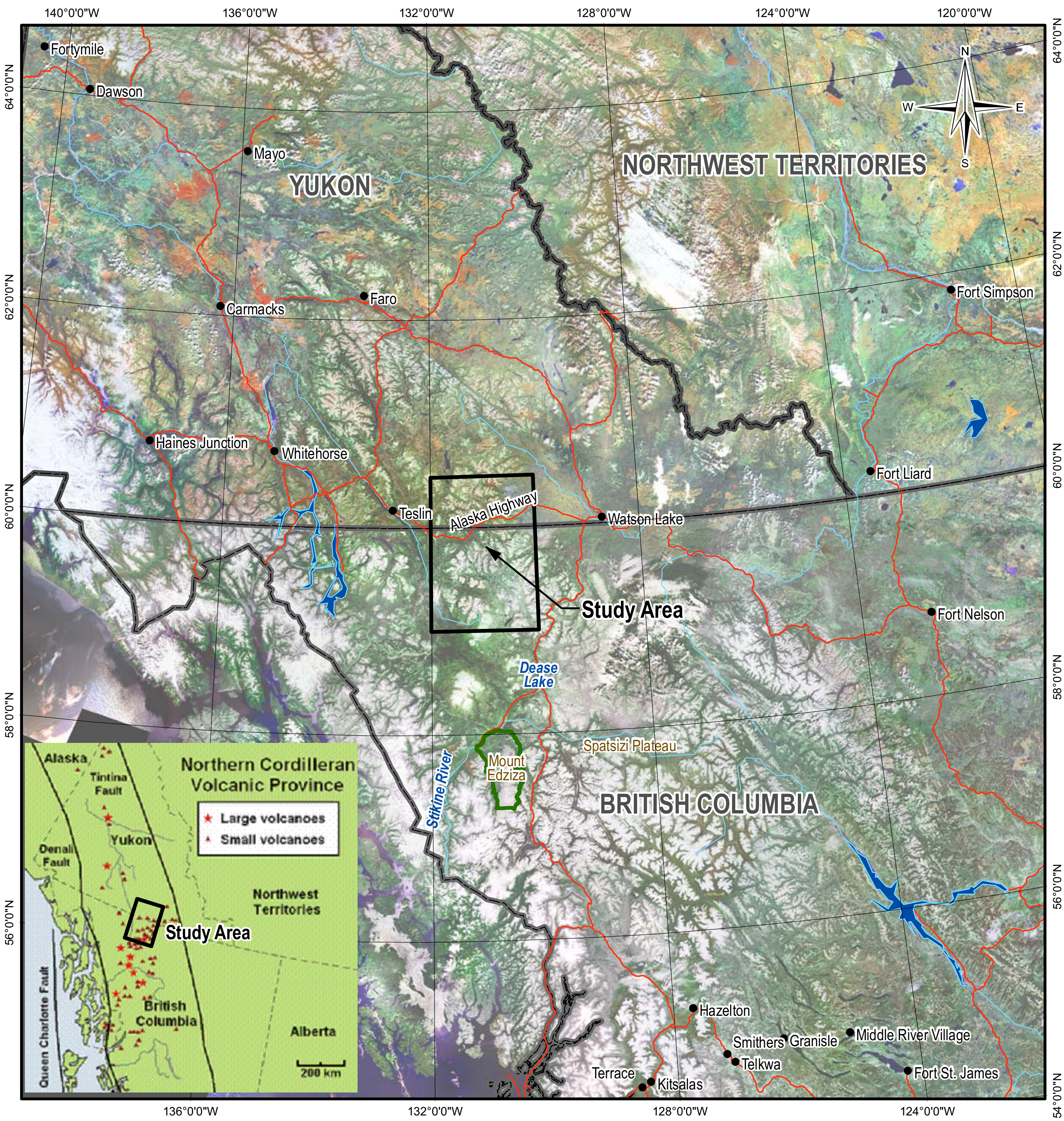
Price, L.L. and Gabrielse, H. 1963. Geology Cassiar District, British Columbia. Geological Survey of Canada. (Map 111OA).(map scale 1:253 440)

Smithsonian Institution. Level Mountain. Global Volcanism Program. Retrieved March 30, 2009 from http://www.volcano.si.edu/world/volcano.cfm?vnum=1200-05-

Stevens, R.A. and Harms, T.A. 2000. Bedrock Geology of the Dorsey Range, southern Yukon Territory and northern British Columbia. Geological Survey of Canada, Open File 3926 (map scale 1:100 000)

Wood, C. A.and Kienle, J. 2001. Volcanoes of North America: United States and Canada. Cambridge, England: Cambridge University Press. pp. 109, 111, 114, 121, 123, 125, 126, 129. ISBN 9780521438117. OCLC 27910629.

FIGURES



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LEGEND

- Study Area
- Populated Place
- Major Road
- Watercourse
- Waterbody
- Mount Edziza Provincial Park
- Provincial Boundary

NOTES

Base data source:
ESRI Data Maps

ISSUED FOR USE

YEC 2009 GEOTHERMAL EXPLORATION PROGRAM

Study Area Location Map

PROJECTION	DATUM
Albers	NAD83

Scale: 1:6,000,000
100 50 0 100
Kilometres

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Figure 1

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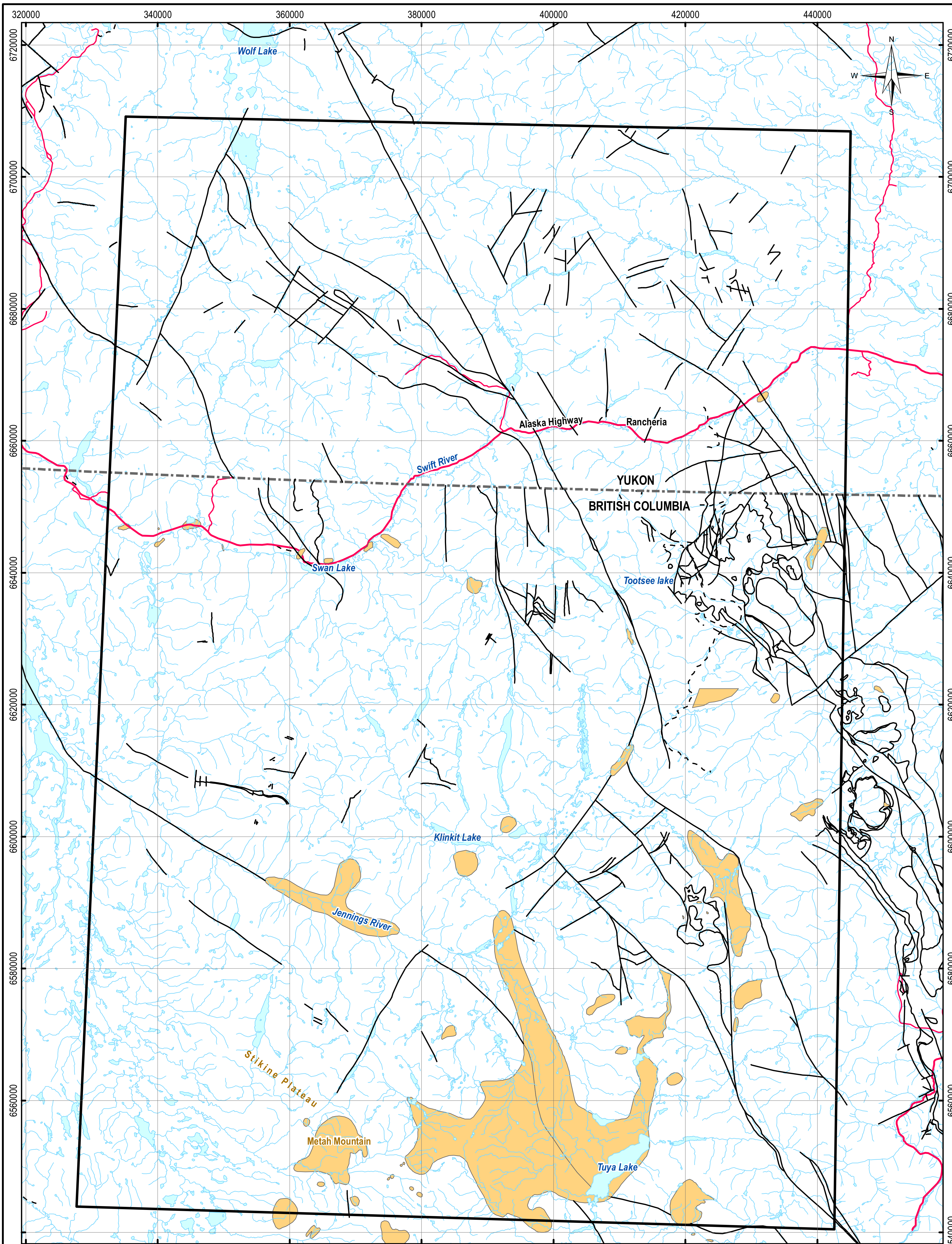

LEGEND

- Study Area
- Yukon-BC Border
- Limited Use Road
- Road
- Trail
- Watercourse
- Waterbody
- Tuya Volcanics (general location)
- Fault

NOTES
Base data source:
NTS 1:250,000
BC Ministry of Energy, Mines, and Petroleum Resources

ISSUED FOR USE

YEC 2009 GEOTHERMAL EXPLORATION PROGRAM

Study Area & Geology

PROJECTION	DATUM
UTM Zone 9	NAD83

Scale: 1:550,000
10 5 0 10
Kilometres

FILE NO.
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PROJECT NO.	DWN	CKD	REV
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Figure 2

APPENDIX

APPENDIX A EBA'S GENERAL CONDITIONS

GEO-ENVIRONMENTAL REPORT – GENERAL CONDITIONS

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

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

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