



### ASSESSMENT REPORT TITLE PAGE AND SUMMARY

#### TITLE OF REPORT: Geophysics Results for Snake Creek, Atlin, BC Placer Investigations

TOTAL COST: \$9,292.50

AUTHOR(S): Jim Coates SIGNATURE(S):

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): P-1-561 2014-2017 issued May 14, 2014 STATEMENT OF WORK EVENT NUMBER(S)/DATE(S): 5639323

YEAR OF WORK: 2016

PROPERTY NAME: Wess/Pine

CLAIM NAME(S) (on which work was done): 252642, 252644, 252645, 252646, 252647, 252648, 252649, 252662, 402962, 402961

COMMODITIES SOUGHT: Placer gold

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN:

MINING DIVISION: Atlin NTS / BCGS: 104N11 LATITUDE: 59.62100 LONGITUDE: -133.430000 (at centre of work) UTM Zone: 8 EASTING: 588565

NORTHING: 6610251

OWNER(S): Brian Wess

MAILING ADDRESS: 695 Fitzpatrick Road Kelowna, BC V1X 5E2

OPERATOR(S) [who paid for the work]: Brian Wess

MAILING ADDRESS: 695 Fitzpatrick Road Kelowna, BC V1X 5E2

REPORT KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude. **Do not use abbreviations or codes**) placer Snake Creek Atlin REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS: N/A

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (in metric units)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic	800m total		\$9,292.50
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for)			
Soil			
Silt			
Rock			
Other			
DRILLING (total metres, number of holes, size, storage location)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling / Assaying			
Petrographic			
Mineralographic			
Metallurgic			
PROSPECTING (scale/area)			
PREPATORY / PHYSICAL			
Line/grid (km)			
Topo/Photogrammetric (scal	e, area)		
Legal Surveys (scale, area)			
Road, local access (km)/trail			
Trench (number/metres)			
Underground development (metres)			
Other			\$9 292 50
		COST	ψ0,202.00

# BC Geological Survey Assessment Report 36751



## Geophysical Results Snake Creek, Atlin BC Placer Investigations

GEOPHYSICAL REPORT on the Snake Creek Property (Wess/Pine) Atlin Mining Division

Date: July 20, 2016 NTS Map Sheet: 104N11 UTM Zone: 8 EASTING: 588565 NORTHING: 6610251

Claim Numbers: 252642, 252644, 252645, 252646, 252647, 252648, 252649, 252662, 402962, 402961

By: Jim Coates Kryotek Arctic Innovation Inc. 173-108 Elliott Street Whitehorse, Yukon Y1A 6C4

For Brian Wess 695 Fitzpatrick Road Kelowna, BC V1X 5E2



GEOPHYSICAL REPORT on the Snake Creek Property (Wess/Pine) Atlin Mining Division NTS 104 N/11W

### Summary

The Snake Creek placer property is located west of Surprise Lake, near Atlin BC. The property consists of the active Snake Creek valley as well as a number of glaciofluvial meltwater drainage channels, which are currently dry. Snake Creek is adjacent and parallel to Otter Creek (a productive modern placer creek) and Pine Creek (a major historical placer producer).

The survey used electrical resistivity tomography to determine depths to bedrock and material types in several cross-valley survey locations. These surveys will aid in further exploration by identifying deep incised channels in bedrock where placer gold is likely to be concentrated.

Kryotek Arctic Innovation Inc. conducted a total of seven (7) high-resolution geophysics surveys with a total length of 0.8 km, for Brian Wess on the Snake Creek placer property west of Surprise Lake and near Pine Creek, Atlin, BC. The survey lines were conducted throughout the property using a Lippmann 4-point Resistivity System. The surveys were conducted by James Coates, Astrid Grawehr and Devon McDiarmid of Kryotek Inc. in June 2016.

Claims 252642, 252644, 252645, 252646, 252647, 252648, 252649, 252662 were investigated.



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## Introduction

This geophysical survey was conducted in 2016 to identify deep placer channels on the Snake Creek property. The active creek channel and several glaciofluivial meltwater channels were investigated. Placer gold in these channels may be sourced from local quartz vein systems as well as being redistributed during deglaciation flood events from placer gold found in the upstream gravels of Otter Creek.

Seven electrical resistivity surveys were conducted to identify width of channel, depth to bedrock and locations of anomalously deep channel regions which may have concentrated placer gold. These areas were identified for follow-up trenching or drilling investigation.

## **Location and Access**

The property is located approximately 15 km east of the town of Atlin, BC. The claim block is centered at UTM Zone: 8 EASTING: 588565 NORTHING: 6610251. Access to the property is via the gravel Surprise Lake Road, which runs alongside the property. A number of existing roads and trails cross the property and provide access for exploration activities.



Figure 1- Location of Resistivity Surveys on Snake Creek Placer Claims, Atlin BC



2018-03-14, 12:21 PM



Figure 2- Location of Snake Creek claims on British Columbia Map

### Physiography, Vegetation and Climate

The Atlin area is located just east of the Coast Mountains on the Teslin Plateau. The town of Atlin lies on the east shore of Atlin Lake, the largest natural lake in British Columbia, at an elevation of 700 m. The topography is moderately rugged with slopes of up to 30° rising from the Pine Creek valley floor at an elevation of 1,000 m to mountains well over 2,000 m. The immediate area of the property consists of short steep hills and wide, U-shaped valleys striking northeast and northwest. Glaciers occupied many of the valleys in Pleistocene time and deposited up to 100 m of glaciofluvial till during their retreat. Till cover is thin or non- existent above the valley floor, giving way to felsenmeer and outcrop at higher elevations. The tree line is at approximately 1,100 m on north facing slopes and 1,500 m on south-facing slopes (From Dandy, 1987).

### **Regional and Local Bedrock Geology**



The Snake Creek property is underlain by Cache Creek Group metasediments and basic volcanics intruded by Pennsylvanian and Permian age ultramafics and minor amounts of Tertiary olivine basalt (Dandy, 1987).

Major shear and fracture directions in this area are known to be 030°, 060° and 170°. Hidden shears/faults may occur parallel to or underlie many of the placer gold producing creeks. This is especially true of the Pine Creek/Surprise Lake linear, which strikes 060°. The valleys of Birch, Boulder, Otter and Ruby Creeks, which all strike approximately 170°, are thought to be tension gashes or fractures related to the Pine Creek/Surprise Lake linear. These linears are believed to be related to gold mineralization, as many of the lode showings and all the

auriferous veins in the locality have similar orientations (Dandy, 1987).

The auriferous veins found in the vicinity are likely a major source of placer gold in the Snake Creek drainage.



Figure 3 -Regional Bedrock Geology (From Dandy, 1987)



# Methodology

Resistivity was used for this area as the electrical properties of overburden, schist bedrock and mineralized fault systems are distinct and easily definable. A Lippmann 4- point Resistivity System was used. This system allows over 100 m of depth penetration.

This survey used 3 m electrode spacing in a combined Wenner-Schlumberger array format.

Data was collected and inverted using AGI Earth Imager 2D software. Noisy data points and electrodes with poor contact resistance were removed and data was filtered for spikes or depressions in resistivity. The software produced two- dimensional tomograms using a smoothed, least squares damped and robust inversion parameters. Preliminary interpretations were conducted on the processed data.

### DC Electrical Resistivity Tomography

This technique injects a direct electrical current into the ground surface, and then measures the voltage that remains at a number of distances from the injection point. As different soils have different resistances to electrical current, a tomogram (subsurface diagram) of resistivity can be produced.

#### Earth Imager 2D Software

Earth Imager 2D software (Advanced Geosciences Inc.) was used to invert and process the geophysics data. This software produces two-dimensional tomograms of resistivity data. The images were processed using both smoothed and robust inversion parameters in order to clarify transitions between material types as well as resistivity properties of those materials.

#### Data Interpretation

The images were interpreted by James Coates and features such as thawed regions, ice-rich permafrost, competent bedrock, degraded bedrock and top of bedrock contours were identified. James Coates has ten years of experience performing geophysics surveys in permafrost areas commercially and academically at the doctoral level.

These are preliminary interpretations. The central Yukon area is a unique landscape with complex and poorly understood surficial and bedrock geology. Best efforts were made to identify ground material types based on surface



exposure, borehole and test pit data as well as experience in the area. Geophysical readings and interpretations are complicated by the presence of permafrost, which greatly alters geophysical properties of soil.

Interpretations are subjective and highly dependent on the experience of the interpreter. General principles and assumptions followed in the interpretation are as follows:

- 1. Fine-grained materials over 600 Ohm/m are generally frozen.
- 2. Frozen gravels and ice-rich materials have much higher resistivity (up to 100,000 Ohm/m).
- 3. Frozen granite bedrock (as well as granite boulders) has a relatively low resistivity, similar to the thawed overburden in the area. There is little difference between frozen and thawed granite.
- 4. Frozen schist can have a very high resistivity due to the presence of interstitial water.
- 5. High-induced polarization chargeability in bedrock can indicate mineralization and faulting.
- 6. Low induced polarization chargeability in bedrock appears to indicate massive buried ice.
- 7. Low resistivity can indicate thawed and saturated areas.
- 8. Contrasts between resistivity readings indicate transitions between materials and are more important than absolute values.
- 9. Resistivity is the primary tool. IP sections are only provided when it provides insights in addition to the findings from resistivity data. As a result only resistivity images will be labeled, with supplementary information on the IP sections where relevant.

### Limitations

The electrical resistivity and induced polarizations method provide an estimate of subsurface conditions only at the specific locations where lines were conducted and only to the depths penetrated, and within the accuracy of the method. Data gathered represents a hemispherical cross-section extending downwards from the surface. Results are more accurate closer to the surface and become more general with increasing depths. The presence of permafrost is a major complicating factor and can cause changes in resistivity of up to several orders of magnitude.

These data are indirect and the interpreted features subjective in nature, with identified anomalies based on a visual assessment of the characteristic signatures in the data coupled with information from nearby boreholes and test pits.



Interpretation is largely based on the experience of the operator with the specific equipment and terrain types. Certain material types can be very similar in resistivity, resulting in ambiguous results.

#### **Geophysical Disclaimer**

Subsurface information shown on these drawings was obtained solely for use in establishing design controls for the project. The accuracy of this information is not guaranteed and it is not to be construed as part of the plans governing construction of the project. It is the client's responsibility to inquire of the owner if additional information is available, to make arrangements to review the same prior development to conduct whatever site investigation or testing may be required, and to make their own determinations as to all subsurface conditions.

James Coates and Kryotek Arctic Innovation Inc. accept no liability whatsoever for any use or application of this information by any and all authorized or unauthorized parties.

This is a preliminary report with limited analysis. Complete analysis and detailed interpretation of each geophysics image has not been conducted. This report should serve only as a guide to understanding ground conditions surrounding boreholes and/or test pits, and is not to be used for planning or construction purposes.



Waypoint	Latitude	Longitude
SL1 start	59.61040° N	133.40557° W
SL1 end	59.60997° N	133.40671° W
SL2 start	59.62097° N	133.42509° W
SL2 end	59.62013° N	133.42677° W
SL3 start	59.61940° N	133.42203° W
SL3 end	59.61960° N	133.42122° W
SL4 start	59.61816° N	133.42026° W
SL4 end	59.61842° N	133.41953° W
SL5 start	59.62298° N	133.41544° W
SL5 end	59.62286° N	133.41472° W
SL6 start	59.62270° N	133.41838° W
SL6 end	59.62212° N	133.41924° W
SL7 start	59.61320° N	133.45450° W
SL7 end	59.61232° N	133.45392° W

# **Geophysical Survey Locations**

Table 1. GPS Co-ordinates for geophysical lines



# **Geophysical Results**

## Survey SL1



This survey runs east to west across Snake Creek at the upper end of the claim block. Bedrock is relatively consistent at 5-6 meter depths with some minor incised channels. This area was likely glacially scoured and any remaining gold has been concentrated from glacial till and glacio-fluvial materials sourced from further upslope, where gold-bearing quartz veins are common.

Approximately 650 cubic meters of material per linear yard of creek. Approximate depth of main channel: 6 meters



### Survey SL2

This survey runs east to west across the mouth of Snake Creek where it joins the main Pine Creek Valley. Bedrock is exposed on both ends of the survey. The valley is deeply incised into bedrock. At this point the gradient of Snake Creek drops sharply, making this an ideal depositional environment for any gold being carried down the Snake Creek glacial melt-water channel during the last deglaciation. Fluvial gravels are present on the surface across the creek valley. Bedrock varies between 3 and 6 meters in depth with several defined channels,

Figure 2– Line SL 2



which would act as gold traps. The deepest channel is directly beneath the modern creek location.

The area west of the creek itself appears to have had some historical mining activity. There is a drill casing at 50 meters on the horizontal scale. Water is visible in the casing 3 meters below the ground surface. Evidence of test pitting is widespread across the area.

Approximately 400 cubic meters of material per linear yard of creek. Approximate depth of main channel: 6 meters



### Survey SL3

This survey runs southwest to northeast across Snake Creek approximately 300 meters upstream of SL2, where Snake Creek runs through a deeply incised canyon. Surrounding bedrock shows signs of glacial scouring while the creek itself is within a bedrock depression. A large hill of till is present to the east. Bedrock is 3-5 meters deep across the creek channel with several undulations. There appears to be a deep channel on the eastern end of the survey which extends under the till hillside. This would be a good exploration target as the till may have buried and protected pre-glacial deposits. Large mineralized quartz veins were observed on the surface nearby.

Approximately 144 cubic meters of material per linear yard of creek. Approximate depth of main channel: 5 meters



### Survey SL4



This survey runs southwest to northeast across Snake Creek. Gently undulating bedrock is present to the southwest and a large bedrock hill 20-30 meters high covered with till is present to the northeast. The creek is incised into bedrock to a depth of 5-6 meters in the deepest part of the main channel, which is 20 meters wide. Large boulders are present in the creek bed.

Approximately 54 cubic meters of material per linear yard of creek. Approximate depth of main channel: 5 meters



### Survey SL5

Figure 5– Line SL 5

This survey runs west to east across the large, dry drainage channel located behind the Pelly Camp. The survey shows a deep center channel 5 meters deep with a secondary upper channel 3-4 meters deep partly up the eastern hillside. This is likely a glacial melt-water spillway, which changed elevations due to glacial ice level in the Pine Creek Valley. Both valley walls are tall, steep and



covered in glacial till. There is a possibility that water flow from Otter Creek once travelled down this channel.

Approximately 117 cubic meters of material per linear yard of creek. Approximate depth of main channel: 7 meters



### Survey SL6

This survey runs north to south across the large dry drainage channel approximately 200 meters downstream of SL5. The channel is much wider and shows a mature fluvial environment with river incision into previously deposited material. Large boulders are found in the valley bottom across the channel. Both sides of the channel are steep and covered in till. This was likely a high-volume glacial melt-water spillway carrying water from the Otter creek region down the valley along the ice margin. The bottom of the valley is flat bedrock 5-6 meters deep with some deeper incised channels. These would be good test pit locations. A fault between volcanic and meta-sedimentary bedrock, likely the Pine Creek Fault, runs down the middle of the valley, crossing this survey at approximately 60 meters on the horizontal scale. The fault and rock contact may be a local bedrock gold source and good test pit location. A secondary channel 10-15 meters deep is present on the south hillside. This is likely the downstream continuation of the channel found in SL5.

Approximately 500 cubic meters of material per linear yard of creek. Approximate depth of main channel: 7 meters



### Survey SL7



This survey is located near the lower end of the claim blocks in an abandoned meltwater drainage channel which parallels Pine Creek. The main channel is bouldery gravel, has a smooth bedrock contact and is 3-4 meters deep. There may be significant groundwater in this channel. What appears to be a secondary channel towards the south end of the survey is likely glacial till. Dump piles from two test pits in this area showed no fluvial gravel, mostly till and some talc bedrock.

Bedrock exposed on the north side of the channel was fine-grained dark and volcanic. The contact between the talc and volcanic bedrock is likely a continuation of the Pine Creek fault. A test pit near the contact at 180 on the horizontal scale is a good test pit location.

Approximately 140 cubic meters of material per linear yard of creek. Approximate depth of main channel: 5 meters



## **Conclusions and Recommendations**

Both the modern Snake Creek Valley and adjacent abandoned glaciofluvial drainage channels are incised into bedrock to depths of 5-7 m. This indicates that they are modern channels, likely developed during the last deglaciation. It is unlikely that ancient tertiary gravels such as found in Otter and Spruce creeks will be found in these shallow channels.

The gold potential within these channels includes placer gold sourced from local quartz vein systems and gold glacially redistributed during glaciation from placer deposits further upstream and up-ice. The main drainage channel running parallel to Pine creek is likely the remains of the major ice-marginal stream draining the Surprise Creek valley during the Wisconsian deglaciation 10-15,000 years BPE.

Test pitting and/or drilling in the locations indicated along the survey lines will further identify extent and grade of placer gold deposits.



## References

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# **Statement of Costs**

#### Kryotek Arctic Innovation Inc. 173-108 Elliott Street Whitehorse YT Y1A6C4 8673361597 agrawehr@kryotekinc.com http://www.darksidedrilling.ca GST Registration No.: 817746712

## INVOICE

INVOICE TO Brian Wess and Annett Nicols

And Annett Nicols Surprise Lake Atlin BC

KRYOTEK

INVOICE # BW2016A DATE 11-07-2016 DUE DATE 10-08-2016 TERMS Net 30

<b>DETAILS</b> Geophysical Surveys (7)	LOCATION Surprise Lake,	Atlin	PROJECT NA Placer Investig	<b>ME</b> gations	
ACTIVITY		QTY	RATE	TAX	AMOUNT
Lippmann 4-Point Resistivity Syst (\$2,500/day)	em	2.50	2,500.00	GST	6,250.00
Interpretation and Reporting (\$1,0 sum)	000 lump	1	1,000.00	GST	1,000.00
Per Diems (\$200/person/day)		8	200.00	GST	1,600.00
Payment is due August 10, 2016. 2% intere accounts later than 30 days.	est will be charged on	SUBTOTA GST @ 5 TOTAL BALANCI	AL % E DUE	\$9	8,850.00 442.50 9,292.50 <b>9,292.50</b>



# **Statement of Qualifications**

#### **James Coates**

I, James Coates of 173-108 Elliott Street, Whitehorse, Yukon, Canada DO HEREBY CERTIFY THAT:

1. I am a Consulting Geomorphologist with current address at 173-108 Elliott Street, Whitehorse, Yukon, Canada, Y1A 6C4.

2. I am a graduate of the University of Calgary (B.Sc., 2004, Geography) and the University of Ottawa (M.Sc., 2008, Geography), University Laval PhD (Deferred, 2011).

3. I have practiced my Profession as a Geomorphologist continuously since 2008.

4. I am a former Placer Geological Technician with the Yukon Geological Survey and Co-Author of the Yukon Placer Atlas.

5. I am a specialist in the use of Electrical Resistivity Tomography for placer gold exploration.

#### Astrid Grawehr

I, Astrid Grawehr of 173-108 Elliott Street, Whitehorse, Yukon, Canada DO HEREBY CERTIFY THAT:

1. I am a practicing geoscience technician with approximately 3,000 hours of field experience.

2. I am a geophysics technician with over 1,000 hours of field time conducting resistivity/IP surveys.

3. I am a graduate of Bishop's University (B.A. Geography, 2008).

4. I am Director of Operations of Kryotek Arctic Innovation Inc.