Arctic Geophysics Inc.

Geophysical Surveys • Prospecting • Consulting

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Geophysical Survey with 2D Resistivity Pine Creek, British Columbia

ON PLACER TENURES 566534 AND 573637

ATLIN MINING DIVISION

NTS MAPSHEET 104 N/11

LONGITUDE: 133 – 29' – 10" N LATITUDE: 59 – 36' – 04" W

WORK PERFORMED ON AUGUST 18, 2010

OWNER: MARDELL MARTINDALE – BOX 24 TAGISH YT. Y0B1T0

OPERATORS: BRIAN SCOTT – BOX 77 TAGISH YT. Y0B1T0

ALAN DENDYS – BOX 31450 WHITEHORSE YT. Y1A6K8

CONSULTANT: ARCTIC GEOPHYSICS INC. – BOX 747 DAWSON CITY YT Y0B1G0

AUTHORS: PHILIPP MOLL and STEFAN OSTERMAIER

DATE SUBMITTED: APRIL 10, 2011

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1. Introduction

This geophysical investigation was done for Brian Scott and Alan R. Dendys.

The survey, using 2D Resistivity, was conducted to prospect the ground for placer mining interests.

The ground was tested with one 620m-measuring line, depth 100m.

2. List of Claims

Tenure Number ID	**Claim Name**	**Owner**
566534	723	MARTINDALE, MARDELL
573637	895	MARTINDALE, MARDELL

3. Location

The placer claims 723 (ID: 566534) and 895 (ID: 573637) are located in the valley of *Pine Creek* downstream of the confluence with *Birch Creek*, just past the bridge over the creek.

4. Access

The property is accessed by truck via the Surprise Lake Road from the town of Atlin, 13.5 km. to the west.

5. Goal

The survey was focussed on measuring and interpreting following **subsurface characteristics**:

Placer Prospecting

1. Depth and topography of bedrock
   - Paleochannels
2. Sedimentary stratification
   - different ground materials
3. Permafrost conditions
4. Groundwater table

6. Method

The **Resistivity** measurement is the foundation for the interpretation of the subsurface conditions at this **placer** prospection. Resistivity investigations usually allow for good interpretation of bedrock and overburden.

Resistivity

Resistivity systems inject low frequency alternating current into the ground. Serial electrodes produce plenty of current flow fields of different size and shape which are systematically covering the subsurface below the measuring line. Material chances in the subsurface deform the electrical field which is recorded by potential electrodes measuring voltage fluctuations created by variations in the resistivity of the ground.

Resistivity is an excellent geophysical method for the detection of very shallow and deep layer interfaces in nearly all surface and subsurface conditions in Yukon/BC. Measuring shallow interfaces for a long distance is more economic than with seismic. The depth penetration is much higher than with ground penetrating radar. In ground with disturbing influences such as discontinuous permafrost, measurements with Resistivity promise more reliable interpretations as with geophysical methods purely based on signal reflection (time domain methods). Resistivity doesn't measure a signal delay, it measures a material property. A lightweight system is available for flexible use with a small crew.

7. Use of Geophysical Method

7.1. Instrumentation

For this survey a lightweight, custom-built 2D RESISTIVITY and INDUCED POLARIZATION (IP) imaging system with rapid automatic data acquisition was used. The system includes:

- "4 POINT LIGHT" EARTH RESISTIVITY METER[1]
- 100 ELECTRODE CONTROL MODULES[2]
- 100 STAINLESS STEEL ELECTRODES[3]
- 500m MULTICORE CABLE: CONNECTOR SPACING: 5m[4]

This system weighs approximately 60 kg which is about one third of regular standard equipment. It can be run with a 12V lead battery. The equipment facilitates high mobility and rapid data acquisition.

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[1] Constructed and produced by LGM (Germany)
[2] Ditto
[3] Constructed and produced by GEOANALYSIS.COM (Germany)
[4] Ditto

7.2. Data Acquisition

The **data acquisition** is carried out by automatic activation of 4-point-electrodes. Thus several thousand measurements are taken, one every 1-2 seconds. The AC transmitter current of 0.26 to 30 Hz is amplified by electrode control modules, up to a maximum of 100mA and 400V peak to peak. The voltage measured at the receiver electrodes (M, N) is also amplified.

In this geoelectrical survey the **Schlumberger-array** was used. This array is appropriate to image horizontally running layers as is needed for placer prospecting.

7.3. Processing

The measured Resistivity data were processed with the **RES2DINV** inversion program[5].

7.4. Interpretation

The geophysical data collected in this survey are the only available subsurface information. They cannot be linked with other local geophysical information or technologically acquired data, except that which was acquired during the survey.

The Interpretation of the measured data is supported by:

Experience	- measuring practice with Resistivity/IP in Yukon/BC since 2005
Discussion	- with customer, and within Arctic Geophysics team
Comparison	- between geophysical and technological information found in other surveys
Observation	- of surficial conditions in the field
Sources	- Bedrock Geology Map[6]

7.5. Profile image

In the **Resistivity profile** the interpreted layer interfaces are marked with a black line. Please be aware: The profiles show **ground-layers approximately 15% thicker** than they are in reality. The thickening of the model layers is caused by the inversion software. The correction factor of 0.85 for the determination of the true layer thickness has been established by the Arctic Geophysics Inc. team on the basis of numerous geoelectrical profiles verified by drilling, trenching, and mining done by our customers.

The **graphical markings** showing the interpreted layer interfaces in the profiles (using the black lines) are done accordingly to the data structure in the profile itself. This means: the layers there will also show up approximately 15% thicker than they are in reality. In the interpretation text the layer thicknesses and depths have been recalculated to the expected real values.

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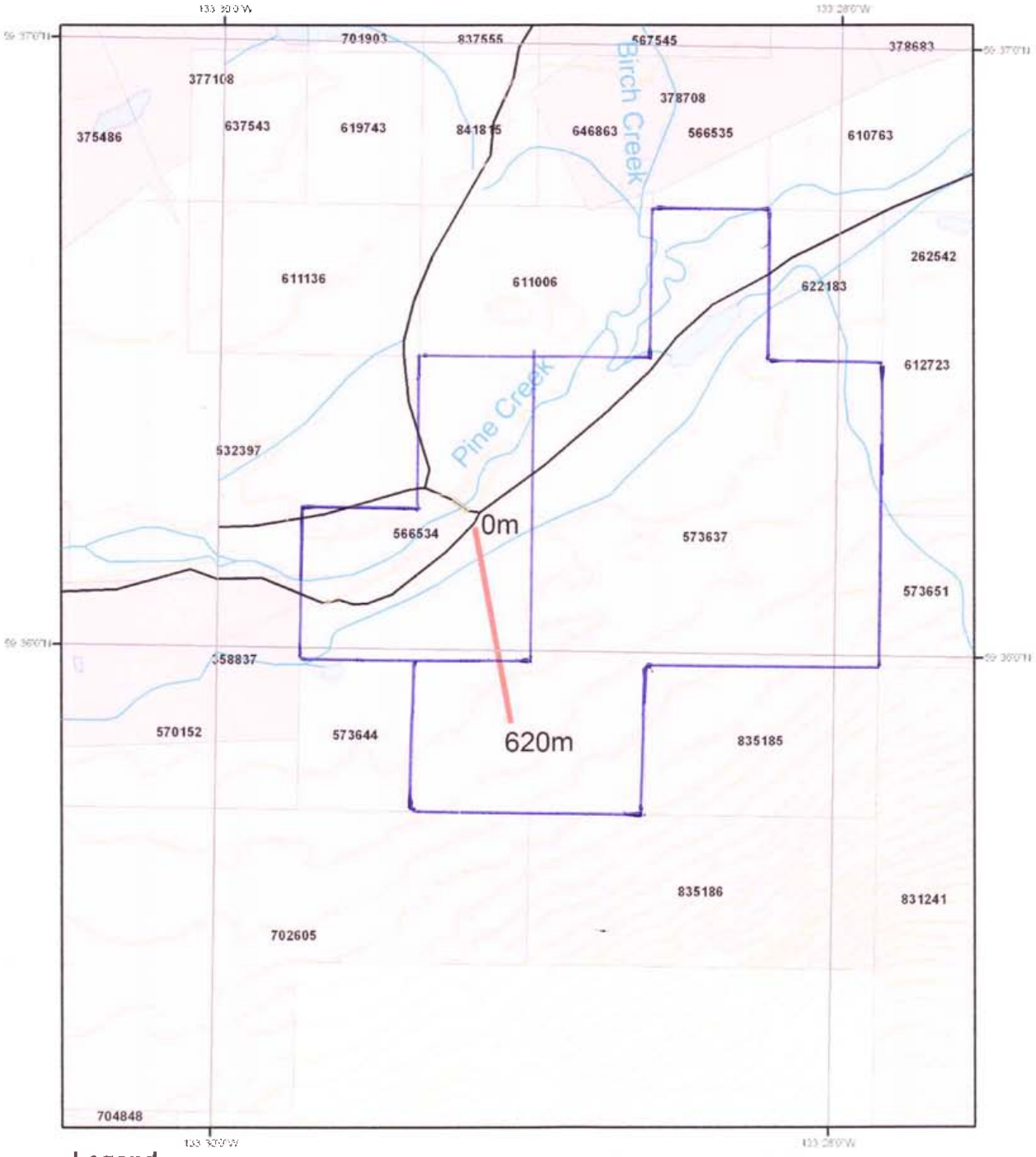
[5] Produced by GEOTOMO SOFTWARE (Malaysia)

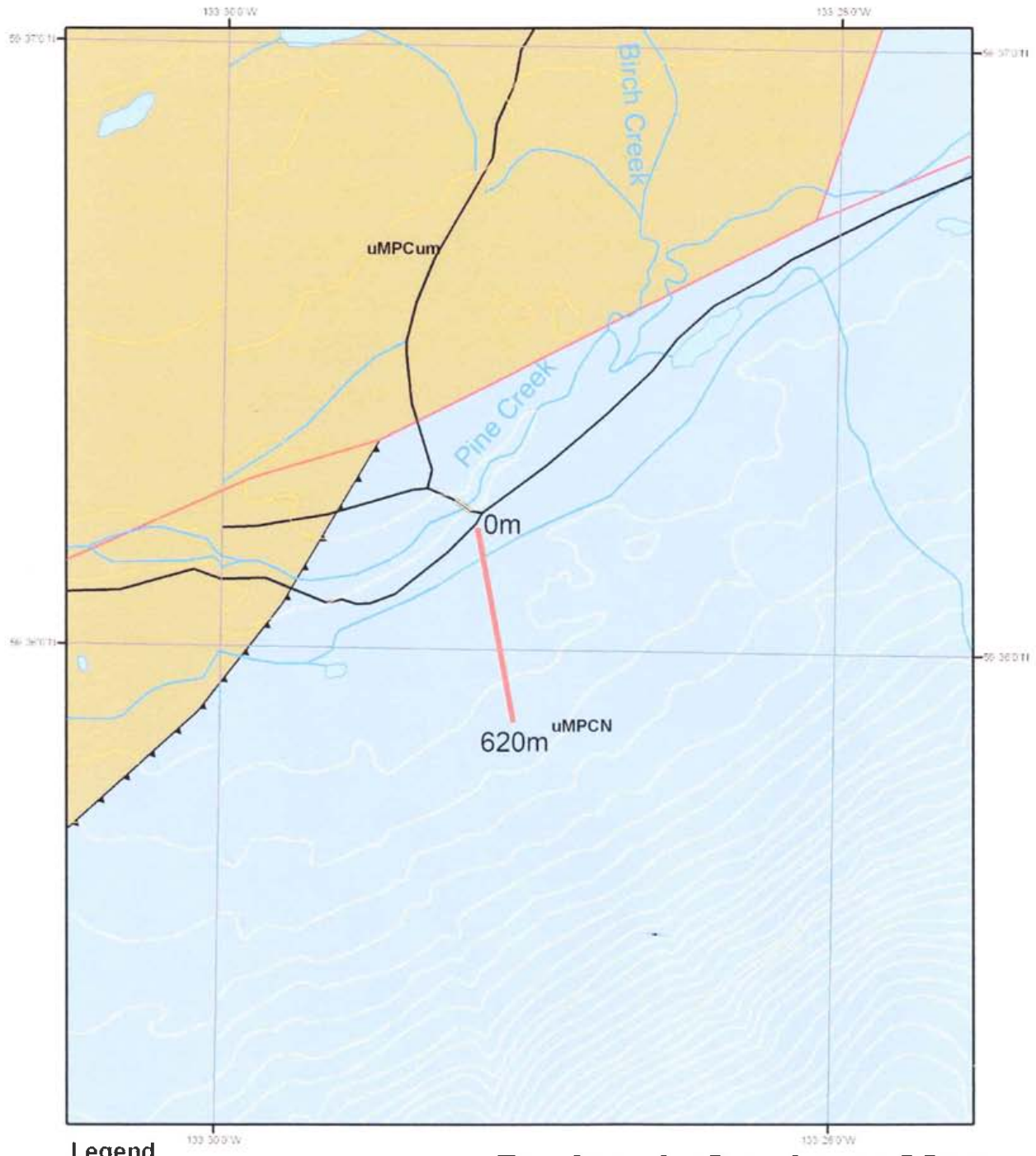
[6] Gordey, S.P. and Makepeace, A.J. (comp.) 1999: Yukon bedrock geology in Yukon digital geology, S.P. Gordey and A.J. Makepeace (comp.); Geological Survey of Canada Open File D3826 and Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Open File 1999-1(D)

8. Resistivity Survey at Pine Creek

Survey Map 104N/11



Bedrock Geology Map 104N/11



Legend

- measuring line
- contour line
- road
- water course
- water body

Bedrock geology

- uMPCN
- uMPCum

Faults

- Fault
- Thrust

Bedrock Geology Map

104N11 (Atlin)

Scale 1:15.000

0 200 400 800 1.200 1.600 Meters

uMPCN: Nakina mafic volcanic breccia: ocean island basalt and MORBs. Locally metamorphosed to greenstone and amphibolite grade.

uMPCum: Oceanic crustal ultramafic rocks: peridotite, dunite, pyroxenite, generally serpentized; locally includes pods of nephrite jade and small bodies of listwanite, rodingite and talc.

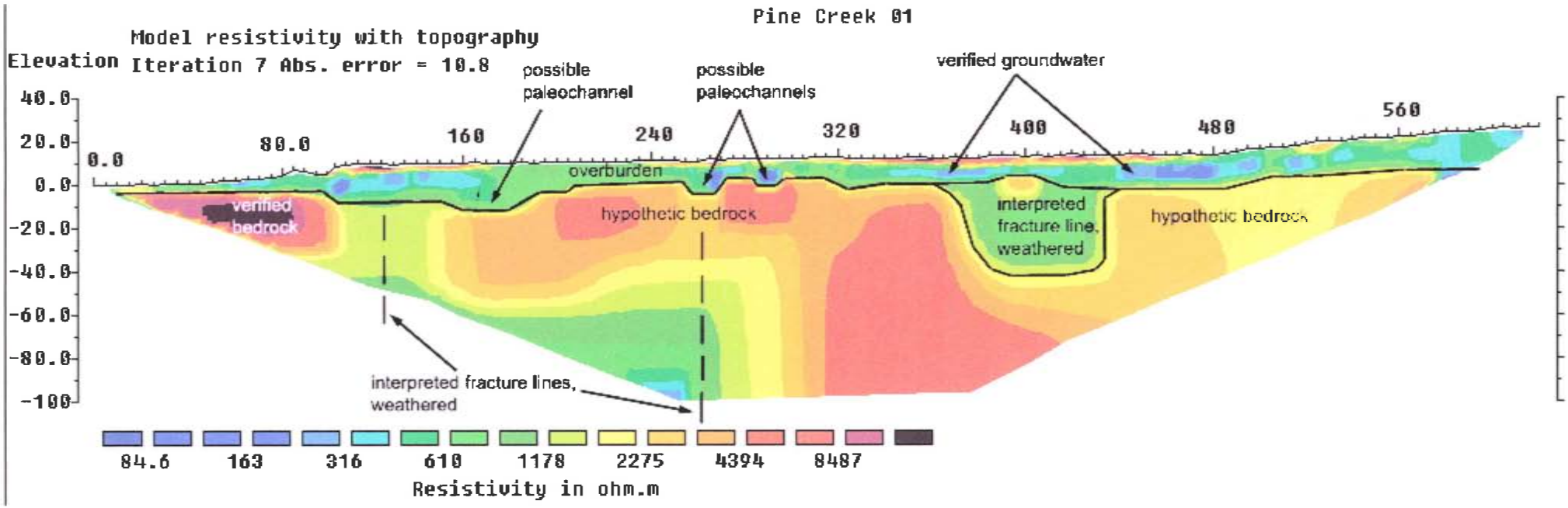
Measurement

Preliminary Note!

The subsurface information of this study is an interpretation.

Pine Creek Line 01

Line: Cross valley	**Horizontal/vertical measure:** in [meter]	**Data acquisition:** Stefan Ostermaier
View: Upstream	**Vertical measure:** in [meter]	**Processing:** Stefan Ostermaier
Electrodes: 100, spacing 5m	**Vertical exaggeration factor:** 0.92	**Interpretation:** Philipp Moll, Stefan Ostermaier



Interpretation

The **surface** of the whole measuring line is forested.

The resistivity profile is located on the left limit of the Pine Creek valley. Close to the beginning of the profile it crosses a water channel.

From 0-50m in the profile, the **bedrock** is very shallow, which was verified by trenching: Bedrock was found in only 1m depth.

At 125m, 260m and 400m the continuity of the interpreted **bedrock** is disturbed. Such a contrast of the resistivity data usually indicates a change of the bedrock type. In this particular case however, the Bedrock Geology Map shows a thrust and a **fault** in the vicinity of the profile. The existence of fault gouge would explain the heterogeneity of the interpreted bedrock[7].

From 100-190m, there seems to be an 18m deep **paleochannel** in the bedrock which shows poor conductivity[8]. At 260m and 290m there seem to be two additional channels that might be 13m and 11m deep respectively.

At 0-500m, the surface of the measuring line is very dry. At 500-580m, a small stream is running on the surface, it disappears underground at 500m. Consequently, there is a lot of **groundwater** that can be identified in the **overburden** (blue, turquoise), especially in the deeper parts of the channels (in particular at 260m and 290m) and in the shallow depression in the bedrock from 400 to 500m. The groundwater was verified by the customer when he tried to dig a trench at the possible channel at 290m.

[7] The fractures of the fault gouge would be filled with groundwater. This increases the conductivity respectively decreases the Resistivity. The fractured rock starts chemical weathering which increases the pore volume of the rock that is filled with water collecting a high amount of solved minerals. The resistivity is reduced even more. Larger fractures in the rock could have been filled with water saturated sediments. – All these factors could have significantly decreased the resistivity of the local bedrock.

[8] The poor conductivity is typical for the basalts indicated in the Bedrock Geology Map.

9. Recommendations

The interpretation of the subsurface conditions, based on the profile, should be verified by technological methods.

The following table shows some suitable locations in the profile to verify overburden and bedrock. The already confirmed presence of groundwater suggests drilling[9] as the main method to confirm the interpreted targets.

Once the channels have been confirmed, it might be a good idea to do some additional 2D Resistivity.

Profile	**Location in the profile [m]**	**Depth [m]**
01	checking hypothetical channels	
	175m	18m
	260m	13m
	290m	11m

[9] Although the bedrock should be fairly shallow, the groundwater makes it doubtful that a good sample can be obtained with an Auger Drill.

10. References

Literature

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Press F., Siever R., Grotzinger J., Thomas H.J. Understanding Earth, W.H. Freeman and Company, New York (2004)

Robb L. Introducing to Ore-Forming Processes, Backwell Science Ltd., 2005

Maps

Massey, N.W.D., MacIntyre, D.G., Desjardins, P.J. and Cooney, R.T., 2005: Digital Geology Mapof British Columbia: Whole Province, B.C. Ministry of Energy and Mines, Geofile 2005-1,scale 1:250,000

11. Qualification

Stefan Ostermaier

- Study of geology, University of Tübingen, Germany
- Visit of geophysical field courses, University of Karlsruhe and University of Stuttgart, Germany
- Geological prospecting for precious metals and minerals in the Yukon and Alaska since 2001
- Geophysical Surveying for Mining Exploration in the Yukon since 2005
- Study of computer science, University of Stuttgart, Germany

Stefan Ostermaier

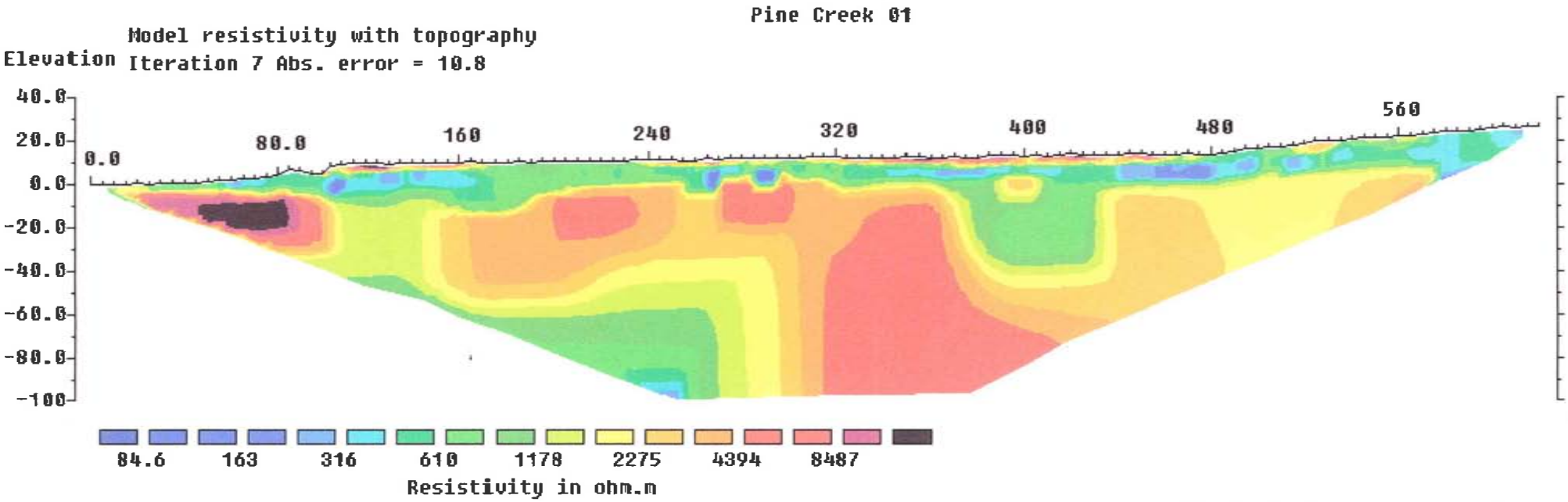
Philipp Moll

- Study of geology, University of Freiburg, Germany
- Visit of geophysical field courses, University of Karlsruhe and University of Stuttgart, Germany
- Geological Prospecting for precious metals and minerals in the Yukon, NWTs, and Alaska since 1989
- Geophysical surveying for Mining Exploration in the Yukon since 2005
- Study of biology and German language and literature, University of Freiburg, Germany
- Apprenticeship of precision mechanic, Tools Factory Hermann Bilz, Zell, Germany

Philipp Moll

12. Addendum

Profile raw



GPS-Data

Pine Creek Line01

Accuracy 3-4m

Profile [m]	Latitude / Longitude
0	N59 36 12.1 W133 29 10.1
5	N59 36 11.9 W133 29 10.1
10	N59 36 11.7 W133 29 10.2
15	N59 36 11.6 W133 29 10.1
20	N59 36 11.4 W133 29 10.1
25	N59 36 11.2 W133 29 10.1
30	N59 36 11.0 W133 29 10.0
35	N59 36 10.9 W133 29 10.1
40	N59 36 10.7 W133 29 10.1
45	N59 36 10.6 W133 29 10.1
50	N59 36 10.4 W133 29 10.1
55	N59 36 10.3 W133 29 10.0
60	N59 36 10.1 W133 29 10.0
65	N59 36 10.0 W133 29 10.0
70	N59 36 09.8 W133 29 10.0
75	N59 36 09.7 W133 29 10.1
80	N59 36 09.5 W133 29 10.0
85	N59 36 09.4 W133 29 10.0
90	N59 36 09.2 W133 29 09.9
95	N59 36 09.1 W133 29 09.8
100	N59 36 09.0 W133 29 09.9
105	N59 36 08.8 W133 29 09.9
110	N59 36 08.6 W133 29 09.9
115	N59 36 08.5 W133 29 09.9
120	N59 36 08.3 W133 29 09.9
125	N59 36 08.2 W133 29 09.8

Profile [m]	Latitude / Longitude
130	N59 36 08.0 W133 29 09.8
135	N59 36 07.9 W133 29 09.7
140	N59 36 07.7 W133 29 09.7
145	N59 36 07.5 W133 29 09.7
150	N59 36 07.4 W133 29 09.6
155	N59 36 07.2 W133 29 09.6
160	N59 36 07.0 W133 29 09.5
165	N59 36 06.8 W133 29 09.4
170	N59 36 06.7 W133 29 09.3
175	N59 36 06.5 W133 29 09.2
180	N59 36 06.4 W133 29 09.1
185	N59 36 06.2 W133 29 09.1
190	N59 36 06.0 W133 29 09.1
195	N59 36 05.9 W133 29 09.1
200	N59 36 05.7 W133 29 09.1
205	N59 36 05.6 W133 29 09.0
210	N59 36 05.4 W133 29 09.1
215	N59 36 05.3 W133 29 09.0
220	N59 36 05.1 W133 29 08.9
225	N59 36 05.0 W133 29 08.9
230	N59 36 04.8 W133 29 08.8
235	N59 36 04.7 W133 29 08.7
240	N59 36 04.5 W133 29 08.6
245	N59 36 04.4 W133 29 08.5
250	N59 36 04.3 W133 29 08.5
255	N59 36 04.1 W133 29 08.4

Profile [m]	Latitude / Longitude
260	N59 36 03.9 W133 29 08.3
265	N59 36 03.8 W133 29 08.2
270	N59 36 03.6 W133 29 08.2
275	N59 36 03.4 W133 29 08.1
280	N59 36 03.3 W133 29 08.0
285	N59 36 03.1 W133 29 07.9
290	N59 36 03.0 W133 29 07.9
295	N59 36 02.9 W133 29 07.8
300	N59 36 02.7 W133 29 07.8
305	N59 36 02.5 W133 29 07.7
310	N59 36 02.4 W133 29 07.6
315	N59 36 02.2 W133 29 07.5
320	N59 36 02.0 W133 29 07.5
325	N59 36 01.9 W133 29 07.4
330	N59 36 01.7 W133 29 07.3
335	N59 36 01.5 W133 29 07.2
340	N59 36 01.4 W133 29 07.2
345	N59 36 01.2 W133 29 07.1
350	N59 36 01.1 W133 29 07.0
355	N59 36 00.9 W133 29 06.9
360	N59 36 00.8 W133 29 06.8
365	N59 36 00.6 W133 29 06.8
370	N59 36 00.4 W133 29 06.7
375	N59 36 00.3 W133 29 06.6
380	N59 36 00.2 W133 29 06.6
385	N59 36 00.0 W133 29 06.5

Profile [m]	Latitude / Longitude
390	N59 35 59.9 W133 29 06.4
395	N59 35 59.7 W133 29 06.3
400	N59 35 59.6 W133 29 06.3
405	N59 35 59.4 W133 29 06.2
410	N59 35 59.2 W133 29 06.2
415	N59 35 59.1 W133 29 06.1
420	N59 35 58.9 W133 29 06.1
425	N59 35 58.8 W133 29 06.0
430	N59 35 58.6 W133 29 05.9
435	N59 35 58.5 W133 29 05.8
440	N59 35 58.3 W133 29 05.7
445	N59 35 58.2 W133 29 05.7
450	N59 35 58.0 W133 29 05.5
455	N59 35 57.9 W133 29 05.5
460	N59 35 57.7 W133 29 05.4
465	N59 35 57.6 W133 29 05.2
470	N59 35 57.4 W133 29 05.1
475	N59 35 57.3 W133 29 05.1
480	N59 35 57.1 W133 29 05.0
485	N59 35 56.9 W133 29 05.0
490	N59 35 56.8 W133 29 04.9
495	N59 35 56.6 W133 29 04.9
500	N59 35 56.4 W133 29 04.8
505	N59 35 56.3 W133 29 04.7
510	N59 35 56.1 W133 29 04.6
515	N59 35 56.0 W133 29 04.5

Profile [m]	Latitude / Longitude
520	N59 35 55.8 W133 29 04.4
525	N59 35 55.7 W133 29 04.4
530	N59 35 55.5 W133 29 04.3
535	N59 35 55.4 W133 29 04.2
540	N59 35 55.2 W133 29 04.1
545	N59 35 55.1 W133 29 04.0
550	N59 35 54.9 W133 29 03.9
555	N59 35 54.7 W133 29 03.8
560	N59 35 54.6 W133 29 03.8
565	N59 35 54.4 W133 29 03.7
570	N59 35 54.3 W133 29 03.6
575	N59 35 54.1 W133 29 03.5
580	N59 35 54.0 W133 29 03.4
585	N59 35 53.8 W133 29 03.3
590	N59 35 53.6 W133 29 03.2
595	N59 35 53.5 W133 29 03.1
600	N59 35 53.4 W133 29 03.1
605	N59 35 53.2 W133 29 02.9
610	N59 35 53.1 W133 29 02.8
615	N59 35 53.0 W133 29 02.7
620	N59 35 52.8 W133 29 02.6

Cost

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Invoice # 20100826b

Date: August 26th, 2010

Services provided:

Quantity	Description	Amount $CAN
Transportation		
3 days	Truck 4x4 @ $CAN 40.-- / day	120.--
1130 Km	Km @ $CAN 0.45	508.50
3/4 day	Driving (for two operators) @ 250.-- / day (Gladstone - Atlin)	375.--
Geophysical Survey		
1 day	Geoelectrical 2D-Resistivity Survey run by two operators @ $ CAN 900.00 / day at Pine Creek, Atlin	900.--
1 day	Solar System @ 30.-- / day	30.--
1 day	Generator @ 30.-- / day	30.--
1/4 day	Computer work @ 250.-- / day	62.50
1/2 day	Writing Report @ 250.-- / day	125.--
2	Printing / Shipping 30.-- day	60.--
	NET Amount	**$ 2 211.--**
GST Number 846363216RT0001	**G.S.T. (5%)**	**$ 110.55**
Total Due		**2 321.55**