

AUSTRALIA HILL
Report of Work
on the
JAP 1-11, OMEGA 1-4 & JAY 1-2
NTS 116B03
Long. 139° 07' W, Lat. 64° 02' N
Dawson Mining District, Yukon
15 October 1991

David A. Downing, P. Eng.

SUMMARY

Australia Hill, in the Dawson Mining District Yukon, has all the earmarks of a large bulk tonnage epithermal gold deposit. A massive kaolinitic alteration zone in the bedrock and overlying gravels contains topaz, fluorite, tourmaline and gold. It is situated over major northwest trending fault structures that parallel the Klondike valley, the Tintina Trench and are found at the base of the prolific White Channel Gravel placer deposits. There has been no previous evaluation of Australia Hill as an epithermal gold deposit.

A geologic model for Australia Hill is the Grew Creek deposit 380 km to the southwest. It also is located immediately southwest of the Tintina Trench along northwest trending faults with an extensive alteration zone. Past exploration in the Dawson area for another Grew Creek focused on Tertiary rhyolites as the host for this type of deposit. Australia Hill is adjacent to one of these rhyolite intrusions and one that is known to be mineralized. Lack of bedrock exposure precluded exploration to the northwest of this rhyolite intrusion towards Australia Hill. Australia Hill was not recognized as a White Channel placer deposit at that time.

Development of an effective low-cost exploration technique for the evaluation of epithermal gold deposits has only been achieved within the last two years. Application of shallow seismic or radar techniques for delineating clay alteration zones has yet to be applied in the Klondike. Frozen ground may limit the usefulness of seismic but similar radar surveys have been successful at Australia and Wounded Moose Creeks in the Klondike for profiling gravel stratigraphy and bedrock.

Preliminary test work conducted during the summer of 1990 provides some guidance for future exploration. Sample collection, processing and assaying techniques are critical. Visible colours from panning were not reflected in results from the assay laboratory. VLF-EM surveying appears to map graphitic fault zones that may also be geologic contacts. The present 1:50,000 scale geologic mapping could be improved upon at a scale of 1:10,000. Magnetometer surveying should record any ultramafic rocks from tectonic melange zones, if they exist on the property.

It is recommended that an initial property evaluation be conducted at Australia Hill. The evaluation requires acquisition and compilation of basic topographic, geophysical, geochemical and geologic data. Compiled data may then be used to sell, option or raise funds for further stages of exploration. The cost of a preliminary exploration program is estimated at \$5,000. Subsequent exploration would employ shallow geophysical techniques and require a budget of \$22,000. Exploration on this property will become increasingly easier as the placer operations expose more bedrock. It is essential that bedrock be examined and sampled as it is exposed by the placer operations as it will subsequently be covered again.

**TABLE OF
CONTENTS**

Title Page	
Summary	1
Table of Contents	2
Introduction	3
Location and Access	3
Claim Location Map (1:50,000)	4
Property Status	5
History	5
Economic Geology	6
Geology Map (1:50,000)	7
Property Geology	8
Sampling Results	9
Geophysics	10
Electromagnetic Map (1:10,000)	11
Conclusions	12
Recommendation	12
Proposed Budget	13
Selected Bibliography	14
Statement of Costs	15
Statement of Qualifications	16

INTRODUCTION

Throughout western North America, large tonnage, low grade gold deposits have revolutionized the gold mining industry over the last ten years. Formed from hot spring activity at the surface they are characterized by extensive alteration zones of clay minerals, specific trace element and mineral suites and an age of less than 120 million years. Typically they are genetically related to volatile rich intrusions of rhyolitic composition emplaced along major fault structures. Australia Hill has the earmarks of such a deposit.

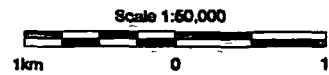
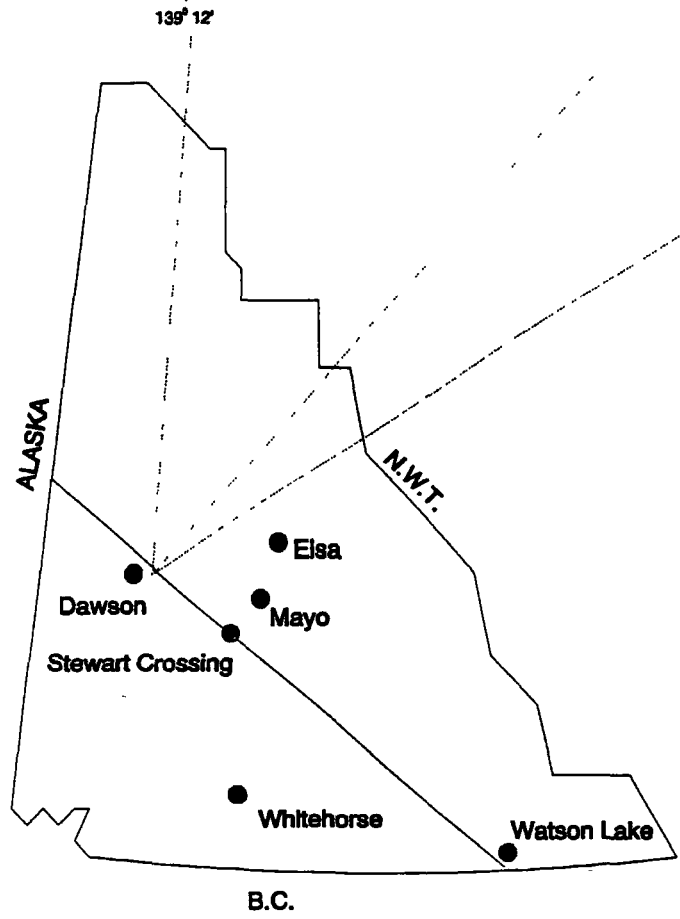
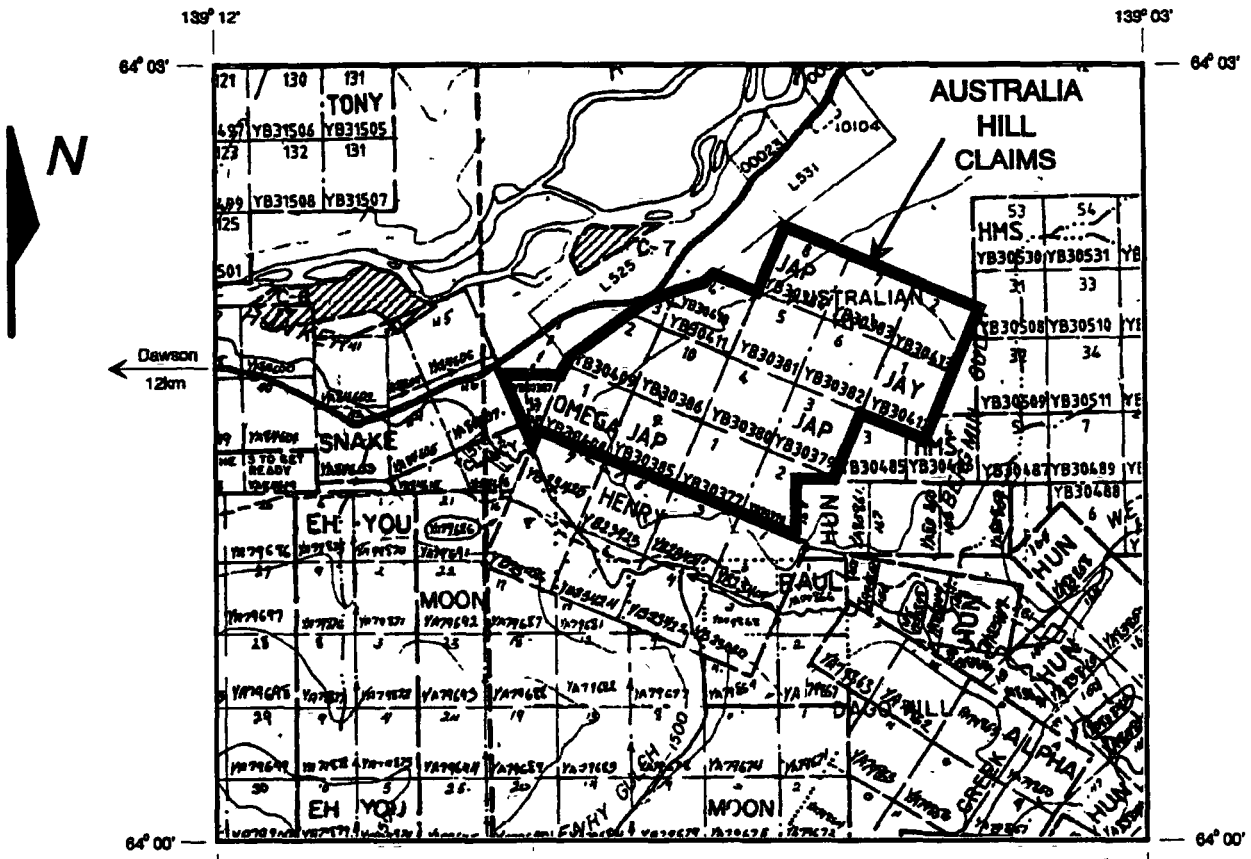
The Dawson area is famous for the goldrush of 1898. In excess of 200 million kilograms of gold have been produced from Klondike placer deposits since that time. The most productive dredging ground in Yukon was on Hunker Creek from the foot of Australia Hill downstream to the Klondike River.

During the field season of 1990 a preliminary evaluation of the Australia Hill claims was undertaken. The purpose of the evaluation was threefold. Firstly to confirm the presence of gold and indicator elements; secondly to examine the potential extent of the target zone(s); thirdly, to test geochemical and geophysical responses. The results of this initial investigation have been used as the basis for the recommended exploration program described at the conclusion of this report.

The work occurred in two phases. Jesse Duke of Noranda Exploration Company Limited and an assistant examined the claims and collected samples for description and assay on 16 July 1990. From 16 - 20 August 1990, further samples were collected and processed. Two lines were run to test magnetic and electromagnetic response across the claims.

LOCATION AND ACCESS

Australia Hill is located 12 km east of Dawson City, Yukon in the Dawson Mining District. The claims are bordered by the Klondike highway on the north and the Hunker road on the west. Several four wheel drive trails provide access to the bulk of the property. The Dawson airport is 2 km to the east along the Klondike highway. Figure 1 indicates the location of Australia Hill.



MERCED INC.
**AUSTRALIA HILL
LOCATION & CLAIM MAP**
Figure 1

PROPERTY STATUS

A 16 claim block was staked on 12 May 1990 covering Australia Hill from the Klondike highway and Hunker road east to Bergmin Gulch. The claims, staked under the Yukon Quartz Mining Act, cover ground already held under the Yukon Placer Mining Act. The placer claims entered production during 1991. The quartz claims are the JAP 1-11, OMEGA 1-4 and JAY 1-2 with grant numbers YB 30377-387, YB 30408-411 and YB 30412-413 respectively. The expiry date for the claims will advance to 12 May 1993 should this report be accepted for assessment purposes. Further exploration work on the claims to the value of \$100/claim may be filed to extend the date of expiry provided the work is completed prior to the date of expiry. Cash may be paid in lieu of the work.

HISTORY

The area of Hunker Creek from the foot of Australia Hill downstream along the Klondike River was known as the Golden Mile. The richest area of the Klondike it was included the famous Anderson and Boyle concessions.

The hardrock history pertinent to Australia Hill is recent even though it lies within the Klondike gold fields. From the gold rush until 1980 prospectors focused their prospecting on quartz veins containing gold. It wasn't until 1982 that a paper was published by Dirk Templeman-Kluit describing the clay alteration at the base of the White Channel gravels as being epithermal in origin. No comprehensive exploration for such a target was initiated until 1985 following a remapping of the Klondike by Ruth Debicki.

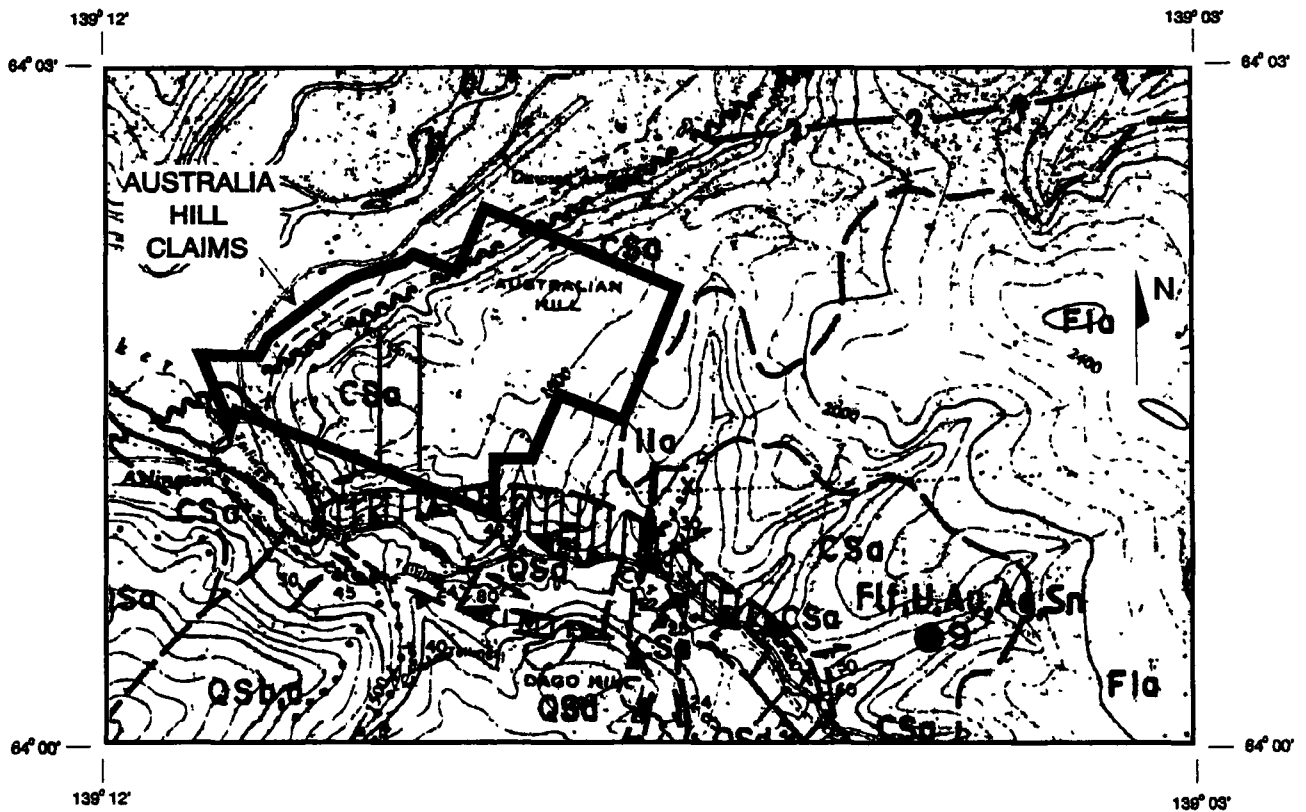
ECONOMIC GEOLOGY

The basic geology of the Dawson area includes rocks of three categories. Triassic and older rocks make up the majority of the bedrock. They were originally sedimentary, volcanic and intrusive rocks but have been strongly metamorphosed to the schists so prevalent today. Diabase dikes of early Cretaceous age and/or older intrude the older metamorphic rocks. Late Cretaceous to Early Tertiary felsic and intermediate volcanics, intrusives and associated sedimentary rocks are the youngest rocks in the area. They are correlative with the rocks of the Mount Nansen - Carmacks Group and the Nisling Range Alaskites. Figure 2 records the 1:50,000 scale geology of the property and environs as mapped by Ruth Debicki.

A period of compressional tectonism followed by subsequent extension resulted in the many gold bearing quartz veins discovered by the early prospectors. These mesothermal veins are genetically related to the thrust faults that developed in reaction to the stress and to the ultramafic rocks located on the soles of the faults.

Epithermal mineralization is recognized in the Late Cretaceous to Early Tertiary volcanic rocks. Tertiary miarolitic quartz-feldspar rhyolite porphyry is a known source of uranium, gold, silver and base metals. These intrusions appear to have a spatial relationship to the contemporaneous northwest - southeast strike slip faulting that resulted in the development of the Tintina Trench and Klondike River valley. Similarly, the intense hydrothermal alteration found in the lower sections of the White Channel gravel and underlying bedrock, where it has been mined for gold, would also appear to be spatially related to the northwest - southeast trending fault zones.

Topaz is recovered by placer mining operations in the lower Hunker Creek area including Australia and Dago Hills. In the southwestern U.S. topaz is employed as an indicator in epithermal gold exploration programs. Two other indicator minerals commonly used are tourmaline and fluorite, both of which are reported on Australia Hill.

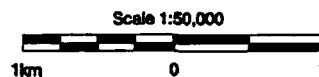


LEGEND

- LATE CRETACEOUS TO EARLY TERTIARY**
- INTERMEDIATE INTRUSIVE AND VOLCANIC ROCKS, AND ASSOCIATED SEDIMENTARY ROCKS**
- II** Iia massive dark grey weathering intrusive andesite
- FELSIC INTRUSIVE AND VOLCANIC ROCKS**
- FI** Fla light-coloured quartz feldspar rhyolite porphyry
- TRIASSIC OR OLDER**
- ROCKS OF VARYING GRADE AND DEGREE OF DEFORMATION**
- QUARTZOFELDSPATHIC SCHISTOSE ROCKS**
- QS** QSa blocky weathering light grey to pinkish grey feldspar quartz schist
- QSp buff to pale green weathering well foliated muscovite-feldspar-quartz schist with quartz and feldspar porphyroclasts, and lithic fragments
- QSD buff weathering well foliated muscovite-feldspar-quartz schist
- CARBONACEOUS ROCKS**
- CS** CSa massive to foliated dark grey to black carbonaceous quartzite and muscovite-quartz schist

SYMBOLS

- Fault or lineament, location known, approximate and estimated
- Thrust fault, known and approximate
- Geological boundary, location known and approximate
- Tectonic melange
- Schistosity and gneissosity; (horizontal, inclined, and vertical)
- Small outcrops; area of outcrop
- Mineral occurrence with commodity indicated



MERCED INC.

**AUSTRALIA HILL
GEOLOGY MAP**

Figure 2

**PROPERTY
GEOLOGY**

The property as examined to date has little naturally outcropping bedrock. Stripping, trenching, road building and mining by the placer miners has exposed some sections of the overlying gravel down to bedrock.

The top of the hill is a relatively flat plateau incised by small gulches. It is an old valley floor uplifted 90 - 100 metres above the present valley bottom. Bedrock is covered with approximately 80 metres of fluvial gravels and a thin vegetative mat.

The uppermost gravel is the coarse brown Klondike glacial-fluvial outwash gravel containing moderately well sorted, well rounded sand to cobble sized material. The clasts are of quartz, carbonaceous shale, chert and schist. There are ice wedges up to 10 metres long in the gravel. The lithology is mostly of local derivation with minor exotic clasts such as the chert coming from the Selwyn Basin in the eastern Yukon. This unit shows a multitude of high energy fluvial depositional features including gross graded bedding. The unit is 45 - 50 metres thick.

Under the Klondike gravel, the White Channel gravel is 30 - 35 metres thick. It is a clast supported gravel with a sericitic matrix. The lithology includes quartz, sericitic schist, and occasionally granodiorite. The schist and granodiorite clasts are badly decomposed.

The bedrock, where exposed, is quartz-sericite schist with minor quartz veins and lenses. It has been undergone strong hydrothermal alteration resulting in a high clay content for at least a depth of 1.5 metres as has the overlying white channel gravel through the lower 3.5 metres. This bedrock is different from that recorded on the 1:50,000 scale geology map (Figure 2). To the north of the tectonic melange unit is quartz sericite schist. At some unexposed point to the north it is assumed that there is a geologic contact with the black carbonaceous unit recorded on the geology map. The contact is question may be a fault contact as it is to the west around Jackson and Lovett hills. This contact, assuming it is a fault contact, is undoubtedly recorded as the VLF-EM geophysical anomaly.

Poorly exposed fault zones filled with black graphitic gouge cut the bedrock along an east-west trend. The surface expression of these zones is a distinct change in the surface of the drill roads from schist gravel to black clay.

SAMPLING RESULTS

Initial sampling results are inconclusive and only serve to indicate the need for extreme caution in sampling and assaying technique. Samples that are carefully panned contain fine visible gold (colours), and yet gold has failed to be recorded using standard assay techniques.

Notwithstanding, the sampling and assaying problems for gold, the few samples collected and assayed show two distinct mercury geochemical signatures. The *white channel* gravels display only background levels of mercury at less than 40ppm and typically 5 - 10 ppm. The black graphitic material runs at greater than 50 ppm mercury and is typically 150 - 200 ppm mercury. This conclusion is, of course, preliminary as it is based upon so few samples.

Panned samples contained 20 - 180 colours per pan and averaged 40 colours. Several 1mm - 2mm sized topaz's were recovered. Eldorado Mining's placer operation on the south side of the hill gold recoveries had 20% -10 mesh +30 mesh, 60% -30 mesh +60 mesh and 20% -60 mesh, (Placer Mining Section 1991, p.74). Recoveries of -60 mesh gold were felt to be poor. The other two placer operations on the hill have also had fine gold recovery problems.

Comparison of the placer gold distribution and the discrepancy between hardrock panning results and assays, suggests that a large portion of the gold may be in the -60 mesh fraction, but is not in the micron size range. The acid leach used in the atomic absorption spectroscopy method would have efficiently extracted any micron sized gold. Panning of bedrock samples, however, indicates several milligrams visible gold per 1000 cubic centimeter.

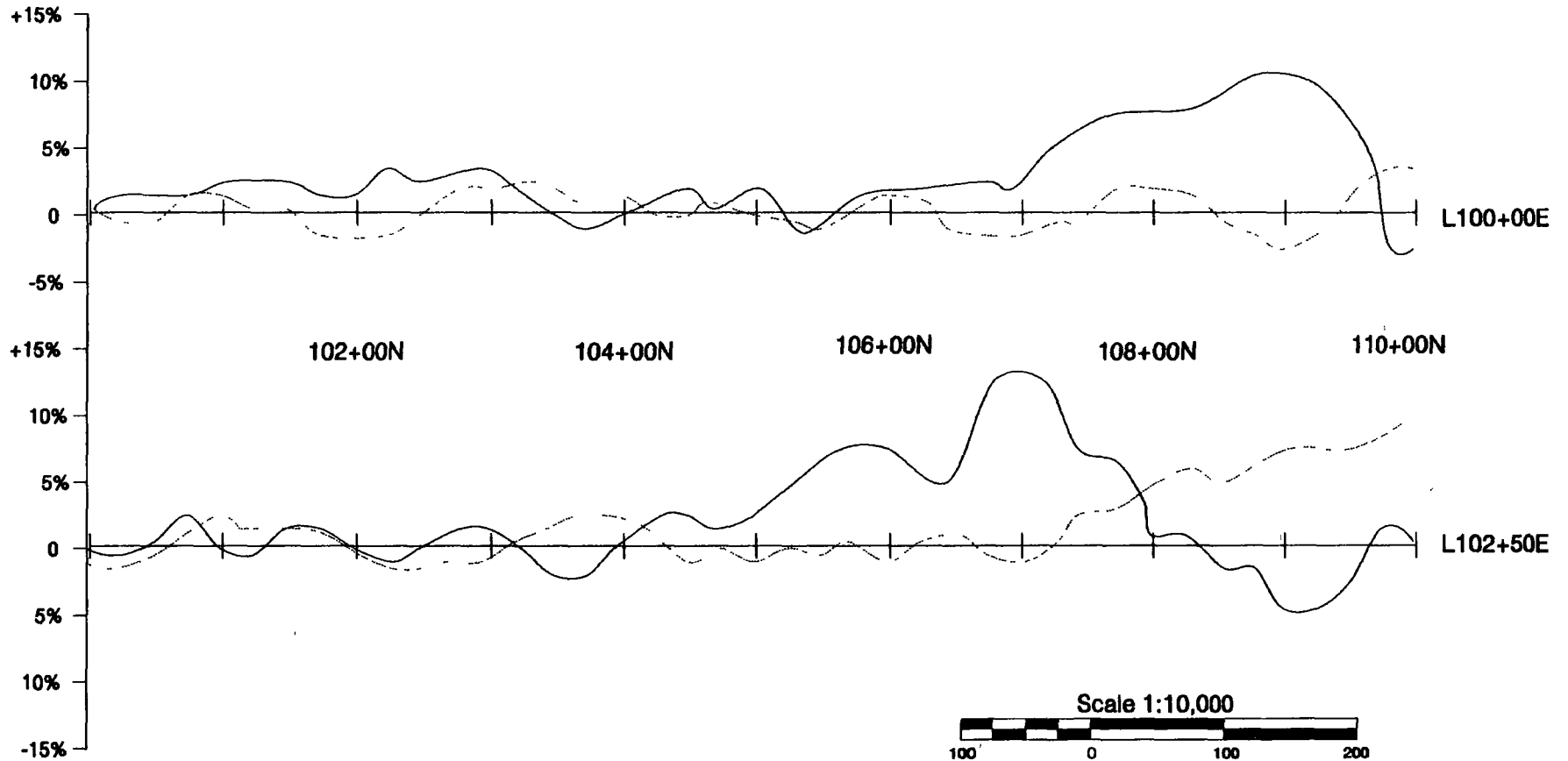
In future all samples should be of a constant and recorded volume. They should be wet screened for size classification and the individual fractions should have the heavy minerals separated using a gravity technique. The heavy mineral fraction should be visually examined for an estimate of the visible gold. The whole of each individual fractions should be assayed using an appropriate fire assay technique. The the size distribution of gold particles is a critical for design of recovery systems and will influence the economics of any potential orebody.

GEOPHYSICS

A test grid was established on the claims for the purpose of checking magnetic and electromagnetic response. Two lines of 1000 metres with 25 meter stations were run 250 meters apart (See Figure 2).

The magnetic survey was inconclusive and recorded only typical topography of the klondike schist. A magnetometer survey should differentiate between the tectonic melange unit and the schist. A more extensive survey should be conducted to detect and map any ultramafics as occur on the south edge of the property. The survey was conducted during a period of moderate magnetic noise. Should a survey be run during a quieter magnetic period, it may be used to map subtle differences between the klondike schist and carbonaceous rocks.

The Very Low Frequency - Electromagnetic (VLF-EM) survey was more successful in revealing subsurface details. Both lines recorded anomalous cross-overs at the northern extent of the survey. The cross-overs are interpreted as reflecting a graphitic fault zone that may also represent the geologic contact between klondike schist and carbonaceous rocks. The trend of the anomaly is basically coincident with an area of black clay exposed by placer access trails to the west crossing the face of the hill just above the bedrock rim. The results of the test lines are plotted on Figure 3. The plotted results have been Frazer filtered and thus the highest positive values represent the most conductive zones.



Instrument - Geonics EM-16

Station - Seattle, Washington

— Frazer filtered in-phase component

- - - Filtered out-of-phase component (quadrature)

Scale 1:10,000



MERCED INC.

**AUSTRALIA HILL
VLF-EM TEST MAP**

Figure 3

CONCLUSIONS

All the key components of an epithermal gold deposit exist at Australia Hill. Tertiary topaz bearing rhyolite is located on a regional strike slip structure with a large clay alteration zone bearing topaz, tourmaline, flourite and gold.

This type of deposit has only been recognized in the area for less than ten years and Australia Hill has never been evaluated as such.

A new geophysical exploration method (radar), capable of delineating the clay alteration zones associated with epithermal deposits has been perfected recently.

Visually identified gold from panned samples does not correlate with the geochemical results of acid leach atomic absorption for gold.

Test geophysics indicate that a VLF-EM survey may be useful in delineating graphitic shear zones. A magnetometer survey could be used to map ultramafic rocks in tectonic melange zones although the test lines did not locate any.

RECOMMENDATION

Baseline data is required to effectively evaluate the property on a preliminary basis. A compilation and summary of the presently available information should be assembled. It should include a literature search for both historical and recent data pertinent to the project. Air photographs and a satellite image should be acquired and examined for structural features. A preliminary base map should be prepared showing topography, claim locations, current workings and roads, drainage and any obvious geology. If possible, exposed altered bedrock should be screened to appropriate size fractions and examined for visible gold, topaz, flourite and tourmaline. Rejects from the screening should be assayed for gold and mercury. This initial phase is estimated to cost \$5,000.

A second phase of exploration would employ geophysical methods to delineate the extent of the alteration halo and define the locations of the northwest - southeast trending fault structures. Station to station radar is the suggested method of mapping the alteration and a VLF-EM survey should be effective in tracing the faults. Both methods require the establishment of a picketed grid. The estimated cost is \$22,000.

PROPOSED COSTS

Literature search and basic research 2 days @ \$400/day - geologist	\$ 800
Air photographs and satellite image	500
20 Gold & Mercury Trace Element Determinations @ \$20.00	400
Groundwork for base-map 3 days @ \$400/day - geologist 3 days @ \$200/day - prospector	1,600
Report writing and drafting 3 days @ \$400/day - geologist	1,200
Food, transport & accommodation	500

Total Phase I	\$ 5,000

10km Radar @ \$1,500/km	\$ 15,000
10km VLF-EM @ \$200/km	2,000
10km Line cutting @ \$150/km	1,500
Report writing and drafting 5 days @ \$400/day - geologist	2,000
Contingency	1,500

Total Phase II	\$ 22,000

TOTAL PROJECT COST	\$ 27,000

SELECTIVE BIBLIOGRAPHY

Bostock, H.S. 1942. Ogilvie, Yukon Territory; Geol. Surv. Can.
Map 711A.

Burt, D.M., Sheridan, M.F., Bikun, J.V., Christiansen, E.H., 1982. Topaz rhyolites - distribution, origin, and significance for exploration; in *Economic Geology*, Vol. 77, p.1818-1836.

Debicki, R.L. 1985. Bedrock geology and mineralization of the Klondike area (east), 115O/9, 10, 11, 14, 15, 16 and 116B02; Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada. Open File, 1:50,000 scale map with marginal notes.

Dufresne, M.B., Morison, S.R. and Nesbitt, B.E., 1986. Evidence of hydrothermal alteration in White Channel sediments and bedrock of the Klondike area, west-central Yukon; in *Yukon Geology*, Vol. 1, Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p.44-49.

Duke, J.L., and Godwin, C.J., 1986. Geology and alteration of the Grew Creek epithermal gold-silver prospect, south-central Yukon; in *Yukon Geology*, Vol. 1, Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p.72-82.

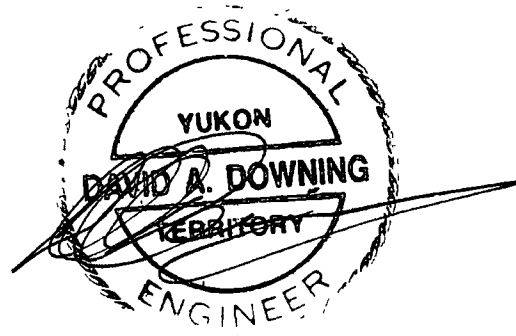
Cooksley, J.W., 1990. Use of seismic geophysics in the detection of epithermal precious metal deposits in the western U.S.; in *Explore*, The Association of Exploration Geochemists Newsletter, January 1990, p.1,3,4.

Jackson, L.E., Gordey, S.P., Armstrong, R.L. and Harakal, J.E., 1986. Bimodal Paleogene volcanics near Tintina Fault, east-central Yukon, and their possible relationship to placer gold; in *Yukon Geology*, Vol. 1, Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p.139-147.

Placer Mining Section 1991. Yukon Placer Industry 1989 to 1990; Mineral Resources Directorate, Yukon, Indian and Northern Affairs Canada.

STATEMENT OF COSTS

Research, project supervision, report writing and drafting	\$ 2,250
Sample collection, panning and assaying	1,400
Test geophysics, magnetometer and VLF-EM	800
<hr/>	
Total	\$ 4,450
<hr/>	



STATEMENT OF QUALIFICATIONS

I, David A. Downing, of 14 Buttercup Place, in the City of Whitehorse, Yukon, Canada, do hereby certify:

1. That I am a consulting geological engineer, with an office located at #3 - 1114 First Avenue, in the City of Whitehorse, Yukon.
2. That I am a graduate of Queen's University, Kingston, in Kingston, Ontario, Canada, where I obtained a Bachelor of Science Degree in Geological Engineering (Mineral Exploration and Resource Evaluation Option) in 1978.
3. That I am a registered Professional Engineer (Geological); in the Association of Professional Engineers of the Yukon Territory - #0832.
4. That I have practised my profession as an engineer and geologist for the past fourteen years.
5. That I have examined the Australia Hill property as defined by the quartz claims listed in this report.
6. That I have personally prepared this report from information documented by Noranda Exploration Co. Ltd. and Merced Inc.. That I did not supervise the work described herein.

Dated this 15th day of October, 1991, at the City of Whitehorse, Yukon Canada.



David A. Downing, P. Eng.