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**GEOPHYSICAL ASSESSMENT REPORT**  
**ON THE TOM CLAIMS**  
**SPENCES BRIDGE - CACHE CREEK AREA**  
**KAMLOOPS MINING DIVISION**  
**BRITISH COLUMBIA**

NTS 92 I/11W,

Latitude / 50°34' N  
Longitude / 121°18' W

By  
**Peter G. Dasler M.Sc. FGAC**

DECEMBER 11, 1988

**18,388**

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

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## SUMMARY

The Tom Property is a significant epithermal precious metal style target transversed by the Trans-Canada highway, approximately 25 kilometers south of Cache creek in southern B.C.

The property has a long history as a gypsum occurrence, and is readily recognised from the highway because of the intense gossan formation. It was most recently considered as a massive sulphide style deposit by Cominco Ltd., who held the property from the mid 1970's until late 1986. The geophysical surveys from their work highlight the style of the epithermal alteration along a significant north-south trending fault zone. The present interpretation, is supported by the Cominco geophysical data, the recent IP and resistivity survey described in this report, field observations, and microscope studies. It is believed that the vein gypsum is part of the zoning of the epithermal event.

Geochemical soil sampling in areas of shallow overburden or outcrop produced very large anomalies in copper, lead, zinc and mercury.

The potential for gold mineralization has never been recorded against the property, however placer gold is known from the area. There is also speculation that one of the short adits on the property was constructed to investigate gold mineralization in quartz veins in the schist adjacent to the main zone of epithermal style alteration. Gold bearing quartz veins were mined 10 kilometres to the south of the property, just north of Spences Bridge, and gold-moly mineralization was mined at the Martel Mine in Venables Valley 3km to the west.

This assessment report describes 360 metres of IP and Resistivity traverse completed across one of the interpreted fault zones. The traverse shows a steeply dipping silicified zone with potential sulphide mineralization at depth. This survey further defines the orientation of the main fault and its alteration envelope. A work programme for drilling of the recognised vein fault system is included. Stage 1 of this programme is budgetted at \$90,000.

## INTRODUCTION

The Tom property is situated on the west margin of the Quesnel Trough Structural Province in metamorphosed andesitic and rhyolitic rocks. The volcanoclastic sequence has been locally intruded by diorite, dacite and rhyolite dykes and plugs, and there is ample evidence of hydrothermal alteration in the surrounding rocks.

The claims are traversed by the Trans-Canada highway, and access is easily achieved to all parts of the property from there, or via farm access tracks.

Gypsum mineralization on the property has been prospected since 1898, but was never developed save for several short adits. In the late 1970's Cominco explored the potential of a Kuroko type massive sulphide deposit as the source of the alteration halos, but after geophysical work and eight short percussion drill holes, the programme was discontinued.

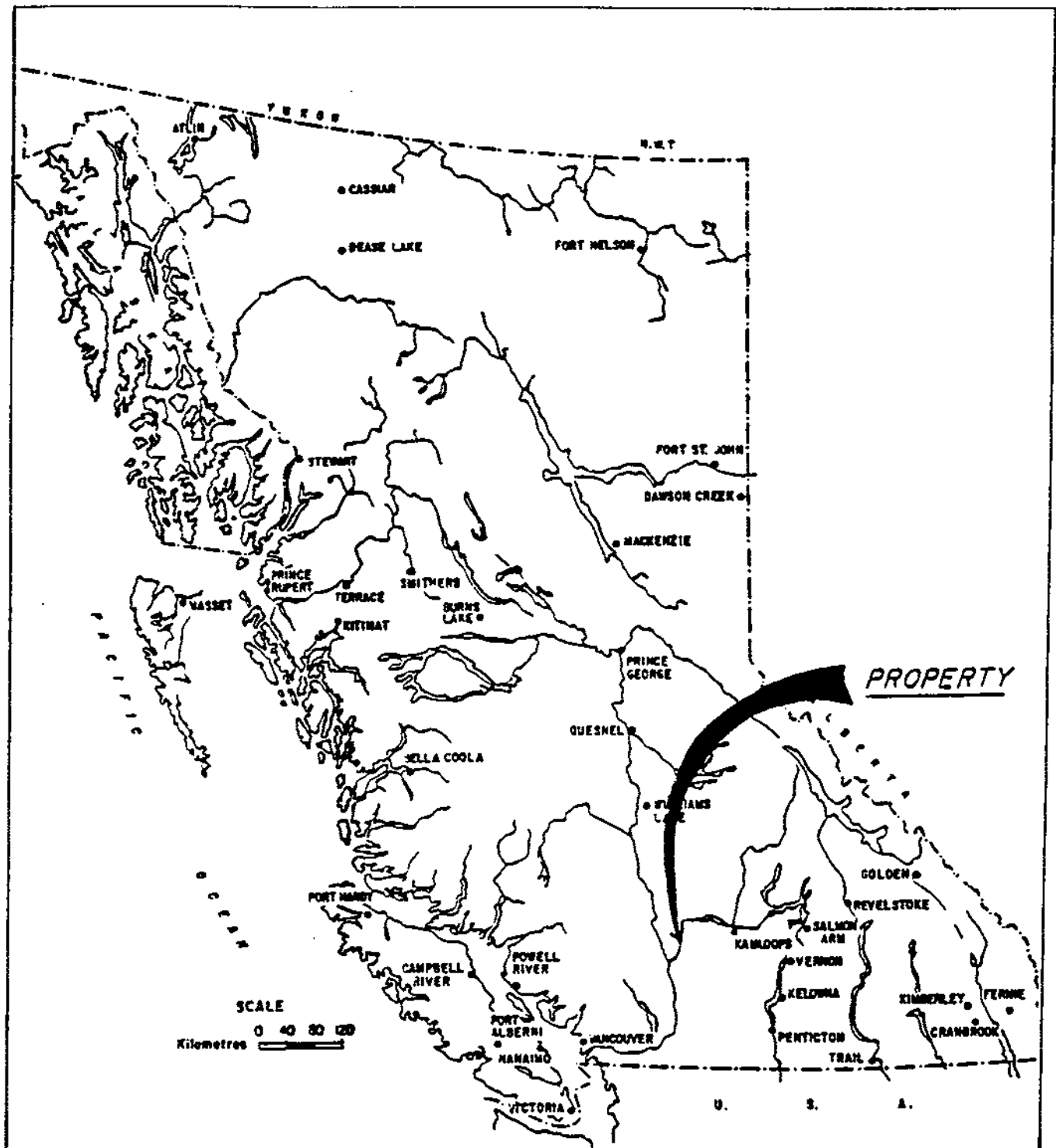
In 1986 the property lapsed from Cominco's control, and was staked by the author, because of the potential for epithermal style gold mineralization.

## LOCATION AND ACCESS

The property straddles the Trans-Canada highway approximately 317 kilometers east of Vancouver, and approximately half way between Spences Bridge and Cache Creek.

The Highland Valley pumping building on the Thompson river is opposite the property, near the old railway station of Spatsum.

The main showings are visible from the highway, and can be accessed from a small dozer track about 150 meters long from the highway or via farm tracks off the old Venables Valley road, which is about one kilometer north of the road showings.



**TOM PROPERTY**  
**PROPERTY LOCATION**

Scale: as shown      Figure No 1

## PHYSIOGRAPHY AND VEGETATION

The property lies between 300 and 600 meters above sea level, and from the west, where there is some moderate relief, the property levels off onto two flat river terraces. The highway climbs the interface of the high terrace and the present river valley flat.

Most of the claims are sagebrush and grass covered, with pine trees occurring sporadically. On the western side of the property there are significantly more pine trees, and sage brush is predominant in the east. There is scattered pasture land under government lease, over most of the terrace area.

Rainfall is low, with precipitation mainly as light snow in the winter months. Arid grassland to desert conditions prevail.

## PROPERTY

The property is recorded in the Kamloops Mining District, British Columbia, and comprises 16 metric units.

Claim	Units	Record No	Expiry*
Tom 1	12	6863	11 Dec. 1989
Tom 2	4	6864	11 Dec. 1989

\* with the acceptance of this report.

## HISTORY

About 1898, a prospector by the name of Munroe discovered the gypsum deposits and staked three claims over the main showings. He drove a small tunnel about 25 feet into the deposit and sunk a small winze at the end of it in a deposit of extremely pure gypsum<sup>1</sup>. This gypsum was reported to have been used to chink the log cabins of the settlers and the buildings used as waystations of the Cariboo stage lines.

In 1907 the claims were restaked and surveyed as the Hart, Flora, Marie, and Belle, but again these lapsed in 1912, after very little work was performed. The claims subsequently were held from time to time, by various interested parties, but no real development has ever been attempted. A tunnel of about 100 feet was reported to have been excavated in the east bank of the south gossanous zone, above and east of the original workings of Monroe. This

tunnel is reported to have cut several pure lenses of gypsum, but no development was attempted

A second tunnel was driven in the west wall of the north gossan, and this apparently was an attempt to intercept bedrock to check for molybdenum and silver value<sup>1</sup>. Later in 1973 three drill holes were completed to the north of the main showing, but the logs are not available.

All this exploration and prospecting appears to have been aimed at developing the gypsum mineralization into a mineable deposit. It was not until about 1974, when El Paso Mining and Milling Co. carried out geophysical mapping and soil geochemistry surveys that gold and copper-lead-zinc sulphide mineralization appeared possible. (NB The long adit to the south was postulated to have been in search of gold within quartz stringer veins<sup>2</sup>, but there is no record of their findings).

When Cominco acquired the ground in 1978 the property was considered to potentially host massive sulphide Kuroko style mineralization. They completed mapping of the property, and soil sampled the high terrace areas. A geophysical survey of IP resistivity and conductivity produced several anomalies coincident with the geochemical survey (Cu-Pb-Zn-Hg). Drilling of 1950 feet of percussion coring followed. One of these holes did not reach bedrock, the others intercepted pyritized metavolcanics, but no economic massive sulphide mineralization. Only the first hole was analyzed for gold content. These values only reached 20 ppb.

The main showing lapsed from Cominco's control in the following years, and the rest of the property expired in late 1986. The 2 post claim overlying the main showing lapsed in early 1987, and was subsequently staked by the author.

The property is very similar to the "Silica" property of BP- Selco, immediately to the north. According to assessment reports from this property there was background gold mineralization within the volcanics of 10-200 ppb. In one reverse circulation drill hole, however, a 5 foot section of core reported as "consolidated overburden" assayed 0.11 opt gold. This assay is most significant as the rock drilled most probably was alteration around a vein system. It was not recognised as such, because the drill targets were massive sulphide deposits.

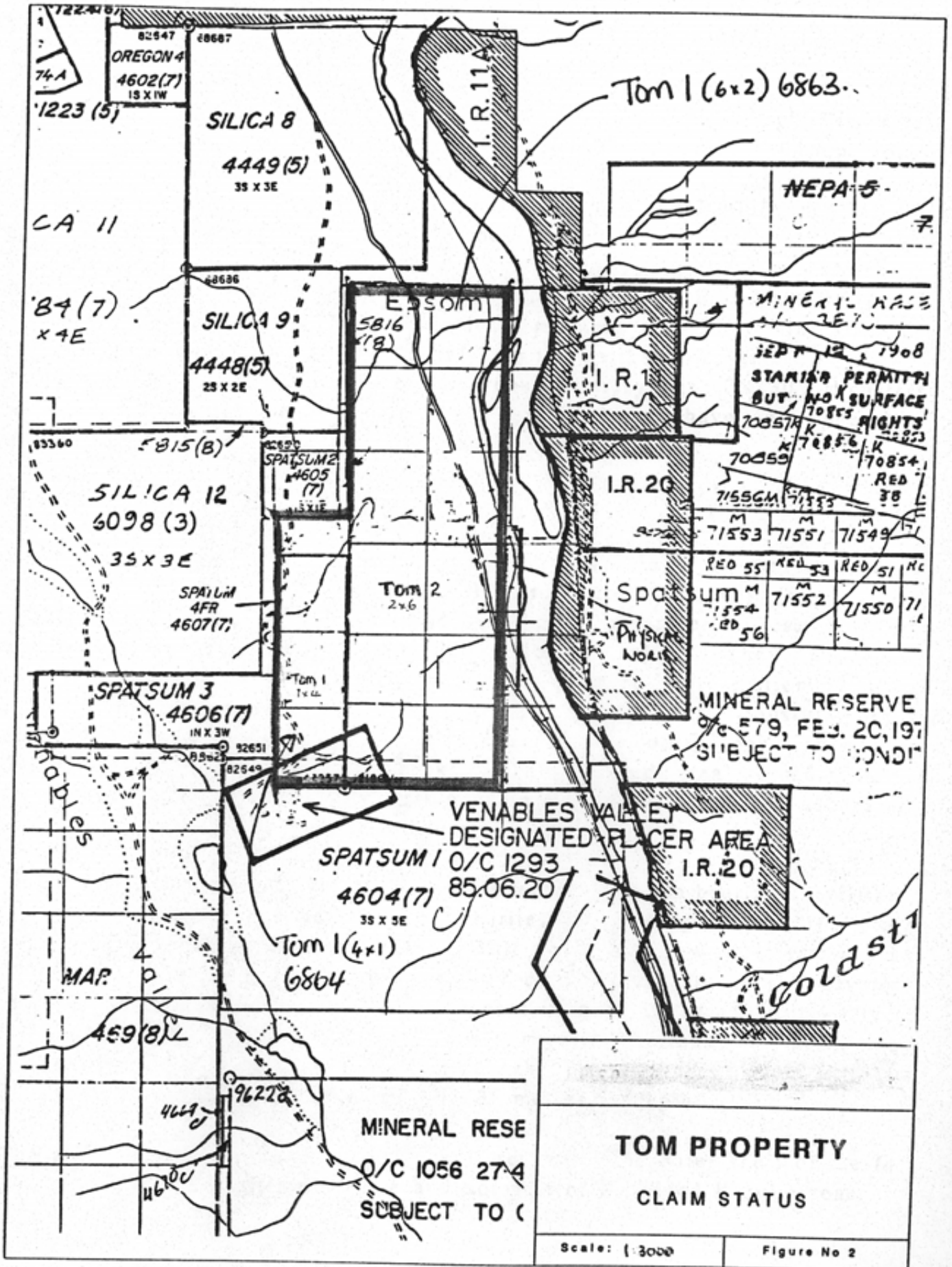
Daiwan Engineering Ltd.

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MINISTRY OF ENERGY, MINES  
AND TECHNICAL SERVICES

APR 10 1989

MINERAL TITLES FILE ROOM



OREGON 4  
4602(7)  
15 X 1W

SILICA 8  
4449(5)  
35 X 3E

SILICA 9  
4448(5)  
25 X 2E

SILICA 12  
6098(3)  
35 X 3E

SPATSUM 4FR  
4607(7)

SPATSUM 3  
4606(7)  
IN X 3W

SPATSUM 1 O/C 1293  
4604(7) 85.06.20  
35 X 3E

Tom 1 (6x2) 6863

Tom 2  
2x6

Tom 1 (4x1)  
6864

MINERAL RESERVE  
O/C 579, FEB. 20, 1971  
SUBJECT TO CONDIT

VENABLES VALLEY  
DESIGNATED PLACER AREA

**TOM PROPERTY**

CLAIM STATUS

Scale: 1:3000

Figure No 2



## REGIONAL GEOLOGY

The property lies on the west margin of the Quesnel Trough Structural Province, in what is mapped as Paleozoic Cache Creek Group rocks (greenstone, chert, argillite, minimal limestone and quartzite, chlorite and mica schist),<sup>3</sup> map GSC,1386A, Fraser River. In 1977 McKinnon of the BCDM interpreted some of these these rocks as Triassic<sup>2</sup>.

To the southeast of the property the Guichon Creek batholith, of lower Triassic age dominates the geological picture, but the mineralization associated with this intrusive would pre-date the epithermal event.

The Fraser Fault of probable late Cretaceous-Tertiary age lies 30 kilometers to the west of the property, and is most likely to have influenced the mineralization on the property.

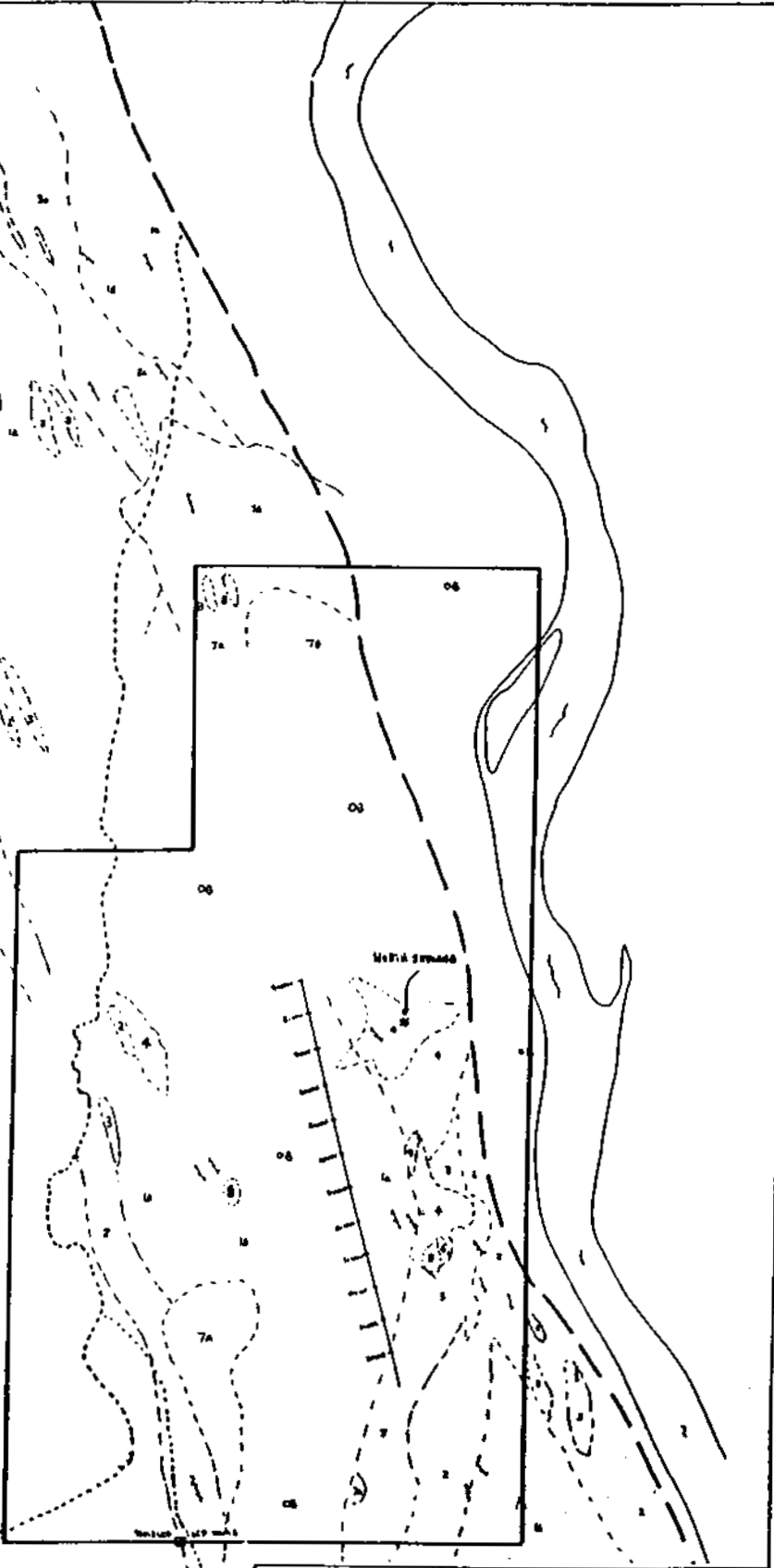
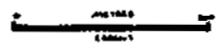
## PROPERTY GEOLOGY

Mapping in 1978 by Cominco determined that the property covers a intercalated sequence of andesite and rhyolite pyroclastics with minor flows and intercalated sediments comprising chert and limestone. These units are northwest striking and have been folded into a syncline. They are locally intruded by diorite, dacite and rhyolite plugs. The re-interpretation based on the geophysical surveys indicates the "rhyolite" as previously mapped consists, in part, of altered mafic volcanics and other members of the Paleozoic/Triassic age suite of rocks. This altered area is most likely intimately related to a northerly striking vein/fault (associated with the Fraser Fault) with probable Eocene age epithermal alteration.

The outcrops of highly leached and altered (gypsum-bearing, pyritized, silicified and containing trace talc and barite) and weakly mineralized (trace sphalerite, galena and chalcopryrite) rhyolitic pyroclastics were interpreted by Cominco to represent the gypsum-rich facies which commonly develops adjacent to base rich massive sulphide lenses in deposits of the Kuroko type. Typically in the Kuroko, the favourable rhyolite horizon is overlain by andesite flows and pyroclastics. Here on the property this sequence exists under overburden which at times reaches 30 metres in depth.

The author considers the gypsum facies to represent the outer shell of the *low ph* ("rhyolite" zone) alteration zone and not part of a bedded Kuroko zone.

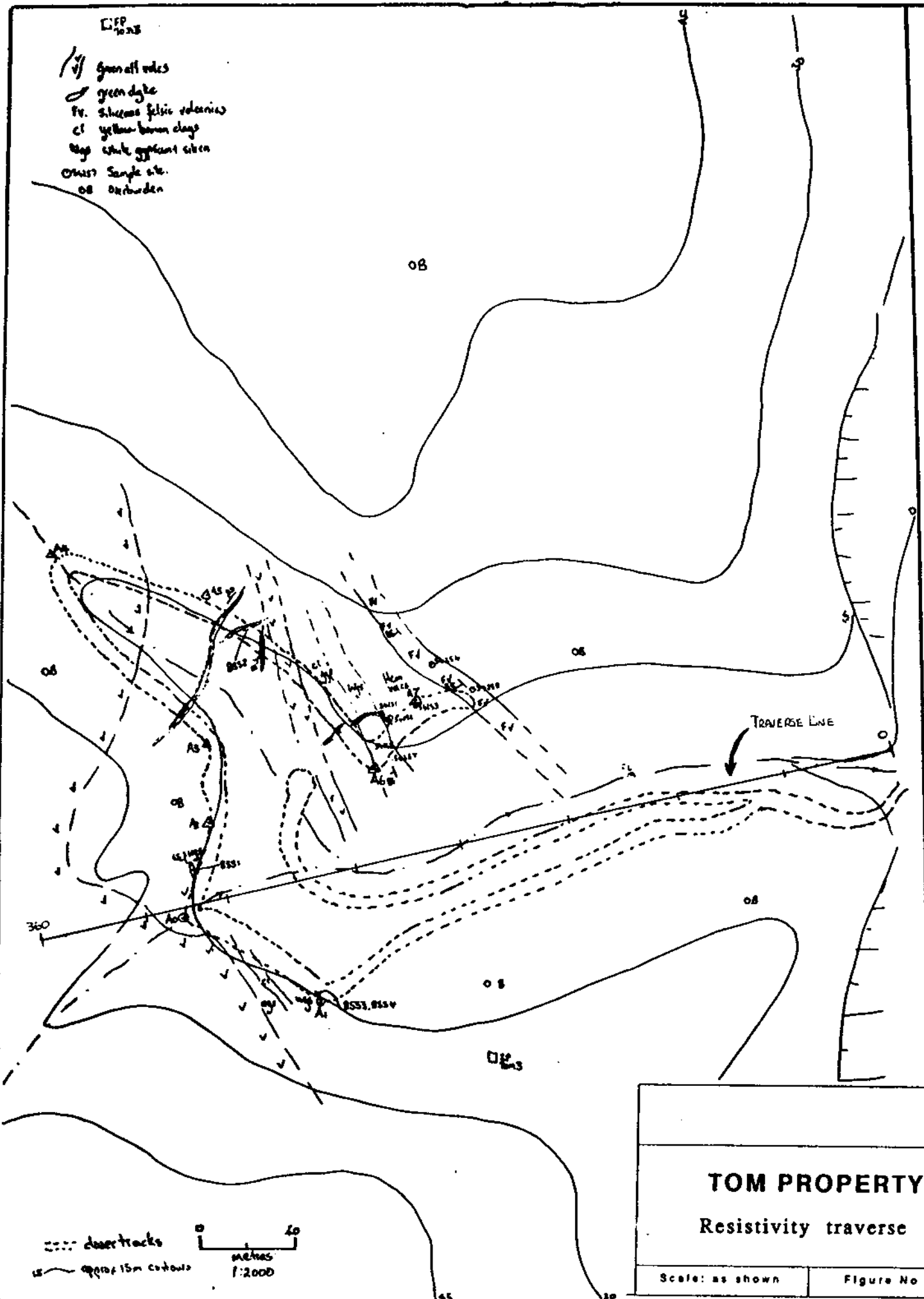
- 1 Intrude & contact
- 2 Dark gneiss
- 3 Light gneiss
- 4 Arched lens & open quartz veins  
filled with calcite, some with hematite
- 5 Limestone
- 6 Dark flint
- 7 Dark flint - calc. dyke
- 8 Grate - pyrite - quartz
- 9
- TRANS-CANADA HIGHWAY
- Secondary roads, tracks
- Geological outcrops



**TOM PROPERTY**  
**PROPERTY GEOLOGY**

DIFF  
IONS

- 1/2 green all rocks
- green dyke
- Fv. shales felsic volcanics
- cl yellow-brown clay
- Wg white argillaceous silt
- OS17 Sample site
- OB Overburden



**TOM PROPERTY**  
Resistivity traverse

Scale: as shown	Figure No 4
-----------------	-------------

The geophysical survey completed by Cominco indicated two weak to moderate anomalies coincident with the subcrop of the "rhyolite" horizon on both limbs of the postulated syncline, and these were interpreted to be the pyrite-rich facies in the Kuroko halo. A magnetometer anomaly and several weak VLF-EM conductors were found to be roughly coincident with some of the IP anomalies. It should be noted however that a pyrite rich zone commonly occurs as a shell around the principal bleached "rhyolite" zone in many epithermal alteration events.

There is very little outcrop on the property in the vicinity of the main zones of alteration near the highway. These zones, 300 metres apart, are exposed by the deep incisions of two small streams as they break over the terrace scarp. On the western portion of the property there is little evidence of similar clay and gypsum alteration, however, there is intense silicification in brecciated metasediments in the vicinity and north of the Tom 1 & 2 LCP (legal corner post).

The linearity of the alteration zones, and the internal zonation is most consistent with epithermal activity along a fault zone, and not from the periphery of a Kuroko deposit.

### MINERALIZATION

The geochemical soil surveys indicated anomalous lead, zinc, copper and mercury in the vicinity of the main showing, and at the southern showing outcrops. The values obtained were at times well above the anomalous threshold, e.g. 1750 ppm Zn against threshold of 150 ppm, and 2260 ppm Pb against threshold 4 ppm. Values away from these zones had occasional spot anomalies, but otherwise were low. This is to be expected with the thick overburden on the property.

Systematic sampling of the outcrop at the northern gossan zone has now been completed for gold content, but no significant values were obtained. The clay alteration restricted the first phase of sampling, because there were numerous slumps and debris slides. The trenching and cleanup programme in December 1987 allowed better sampling and mapping, but no central quartz veining was discovered. The alteration is considerably more intense on the western side of the northern gossan, but there is still limited outcrop in this area.

It is postulated by the author that there is quartz veining in the central fracture fill of this large epithermal style mineralization event. There will most likely be several vein zones. At this stage the southern alteration zone may either be a separate vein system, or be the continuation of the main zone. The geophysical survey indicates that the two zones are continuous

### GEOPHYSICAL SURVEYS

The 1977 IP survey results assisted in the location of the drillholes by Cominco, but were not used to determine the detail of the subsurface, because, as noted by the geophysicist<sup>2</sup>, they only produced distorted pseudosections. This is partially due to the pole-dipole electrode array which was used at the time. This type of survey tends to orient anomalies in the direction of the survey traverse. The author has had some experience with defining the location of the alteration events surrounding epithermal style precious metal mineralization, where to help overcome this problem, dipole-dipole surveys are generally used.

In the 1988 survey the bias was alleviated by using dipole-dipole electrode array.

#### A. Instrumentation

The transmitter used for the induced polarization-resistivity survey was a Model IPT-1, manufactured by Phoenix Geophysics Ltd. of Markham Ontario. It was powered by a 2.0kw motor generator, Model MG-2, also manufactured by Phoenix.

The receiver used was a model Mark IV manufactured by Huntco ('70) Limited of Scarborough, Ontario. This is state-of-the-art equipment, with software-controlled functions, programmable through the front panel.

The Mark IV system is capable of time domain, frequency domain, and complex resistivity measurements.

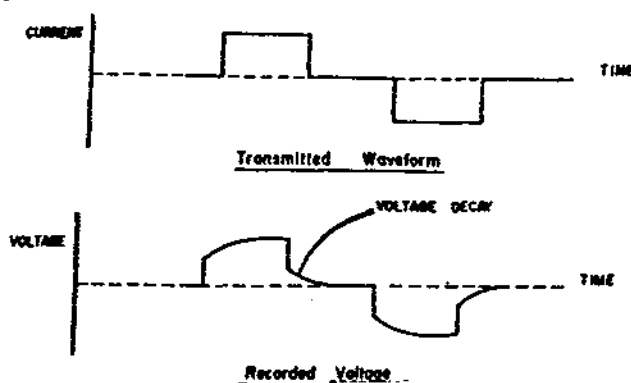
#### B: Theory

When a voltage is applied to the ground, electrical current flows, mainly in the electrolyte-filled capillaries within the rock. If the capillaries also contain certain mineral particles that transport current by electrons (most

sulphides, some oxides, and graphite), then the ionic charges build up at the particle-electrolyte interface, positive ones where the current enters the particle and negative ones where it leaves. This accumulation of charge creates a voltage that tends to oppose the current flow across the interface. When the current is switched off, the created voltage slowly decreases as the accumulated ions diffuse back into the electrolyte. This type of induced polarization phenomena is known as electrode polarization.

A similar effect occurs if clay particles are present in the conducting medium. Charged clay particles attract oppositely-charged ions from the surrounding electrolyte; when the current stops, the ions slowly diffuse back to their equilibrium state. This process is known as membrane polarization and gives rise to induced polarization effects even in the absence of metallic-type conductors.

Most IP surveys are carried out by taking measurements in the "time-domain" or the "frequency-domain".



Time-domain measurements involve sampling the waveform at intervals after the current is switched off, to derive a dimensionless parameter, the chargeability, "M" which is a measure of the strength of the induced polarization effect. Measurements in the frequency-domain are based on the fact that the resistance produced at the electrolyte-charged particle interface decreases with increasing frequency. The difference between apparent resistivity readings at a high and low frequency is expressed as the percentage frequency effect, "PFE".

The quantity, apparent resistivity, computed from electrical survey results is only the true earth resistivity in a homogenous sub-surface. When vertical (and lateral) variations in electrical properties occur, as they always will in the real world, the apparent resistivity will be influenced by the electrode

spacing. A single reading cannot therefore be attributed to a particular depth.

The ability of the ground to transmit electricity is, in the absence of metallic-type conductors, almost completely depending on the volume, nature and content of the pore space. Empirical relationships can be derived linking the formation resistivity to the pore water resistivity, as a function of porosity. Such a formula is Archie's Law, which states (assuming complete saturation) in clean formations:

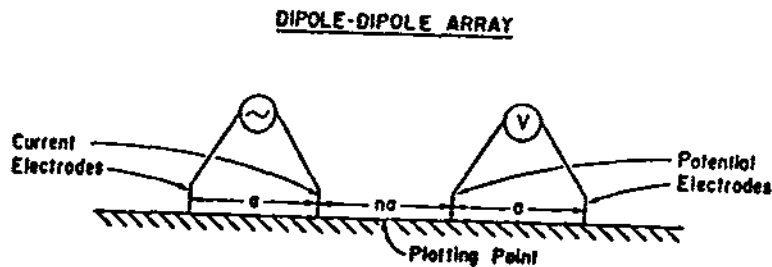
$$\frac{R_o}{R_w} = O^{-2}$$

Where  $R_o$  is formation resistivity,  $R_w$  is pore water  $O$  is porosity

### C Survey Procedure

The IP and resistivity measurements were taken in the time-domain mode using an 8-second square wave charge cycle (2-seconds positive charge, 2-seconds off, 2-seconds negative charge, 2-seconds off). The delay time used after the charge shuts off was 200 milliseconds and the integration time used was 1500 milli-seconds divided into 10 windows.

The configuration used in the field was the dipole-dipole array shown as follows:



The electrode spacing (or dipole length) is denoted 'a' and was chosen as 15 m. The 'n' was read from 1 to 5 dipole separations ('na') which was therefore 15 to 45 m which depends not only on the 'na' spacing but also on the ground resistivity.

The dipole-dipole array was chosen because of its symmetry. Narrow vein-type targets such as may occur on the Tom property can be missed using non-symmetrical arrays such as the pole-dipole.

Stainless steel stakes were used for current electrodes. For the potential electrodes, metallic copper in copper sulphate solution in non-polarizing, unglazed, porcelain pots was used.

One line, 360 metres in length, shown in figure 3, was surveyed to 10 levels of response.

#### d) Compilation of Data

The chargeability (IP) values are read directly from the instrument and no data processing is therefore required prior to plotting. The resistivity values are derived from current and voltage readings taken in the field. These values are combined with the geometrical factor appropriate for the dipole-dipole array, to compute the apparent resistivities.

The chargeability and resistivity data were each plotted in pseudosection form on figure 4, at a scale of 1:1,000. The chargeability data were then contoured at an interval of 5 msec, and the resistivity data at a logarithmic interval. The survey plan of the IP/resistivity lines is shown on the geology map, figure 3.

### INTERPRETATION

For the recent geophysical results and pseudo sections (figure 4) it is apparent that the mineralizing event defined is that of epithermal alteration adjacent to a moderately steeply dipping (eastwards) vein/fault system.

The pyrite alteration halo in the hangingwall of the vein is apparent at depth, between 90 and 135 metres. A silica fill zone shows up on the resistivity profile, occurring near surface at station 195, and dipping to the east, to be at the # 10 level at station 120. This siliceous zone has a high of 199 Ohm-metres. On the eastern side of the siliceous zone defined by the resistivity, there is a zone of much lower resistivity response (67 Ohm-metres). This is interpreted to be a zone of clay alteration in the hanging wall of the silica flood zone, caused by acid leaching by vein forming solutions.

On the western end of the traverse, at station 270, a second zone of high resistivity, with attendant low resistivity drop off is defined. The orientation of this interpreted fault system cannot be defined at depth because of its proximity to the end of the line, and the rapid change in slope.



## CONCLUSIONS

1. The Tom property continues to show epithermal vein fault style alteration.
2. The resistivity survey defines a steeply dipping vein system, dipping east from station 195. This veining has a high resistivity due to silica flooding, and a low resistivity in the hanging wall because of acid leaching. At depth the zone shows some sulphide mineralization.
3. A second zone of silica flooding, apparently along a similar fault zone shows at station 270, however its orientation is not well defined because of surface effects, and the proximity to the end of the survey line.

## RECOMMENDATIONS

1. The geophysical resistivity anomaly defined in the recent survey should be drill tested to the -300 foot level.
2. Further areas of silicification on the property should be soil sampled to test for gold, arsenic, and mercury mineralization. In areas of good response orientation IP and resistivity surveys should be performed.

SUMMARY OF EXPLORATION COSTS (1988)

Field Personnel		
P. Dasler MSc 1 day @ \$225.00		\$225.00
Contract Wages		
Geotronics Surveys 1 day IP crew		\$1500.00
Vehicles		
4X4 2 days at \$85 plus mileage & gas		\$300.00
Equipment & Supplies		
Report Preparation		
P Dasler 1 Day @ \$225		\$225.00
Office Overheads		
Photocopies,		\$50.00
<b>TOTAL EXPENSES</b>		<b>\$2,300.00</b>



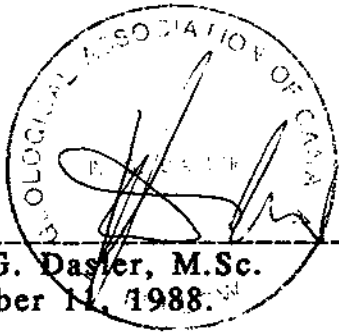
**Daiwan Engineering Ltd.**

(604) 688-1508, 1030-609 Granville Street, Vancouver, B.C. (604) 688-1508

**CERTIFICATE OF QUALIFICATIONS**

I, Peter G. Dasler, do hereby certify that:

1. I am a geologist for Daiwan Engineering Ltd. with offices at 1030-609 Granville Street, Vancouver, British Columbia.
2. I am a graduate at the University of Canterbury, Christchurch, New Zealand with a degree of M.Sc., Geology.
3. I am a Fellow of the Geological Association Of Canada, an Associate Member, in good standing, of the Australasian Institute of Mining and Metallurgy, and a Member of the Geological Society of New Zealand.
4. I have practiced my profession continuously since 1975.
5. This report is based on a personal field work on the Tom property, and from reports of Professional engineers and others working in this area.
6. I own the Tom property claims.

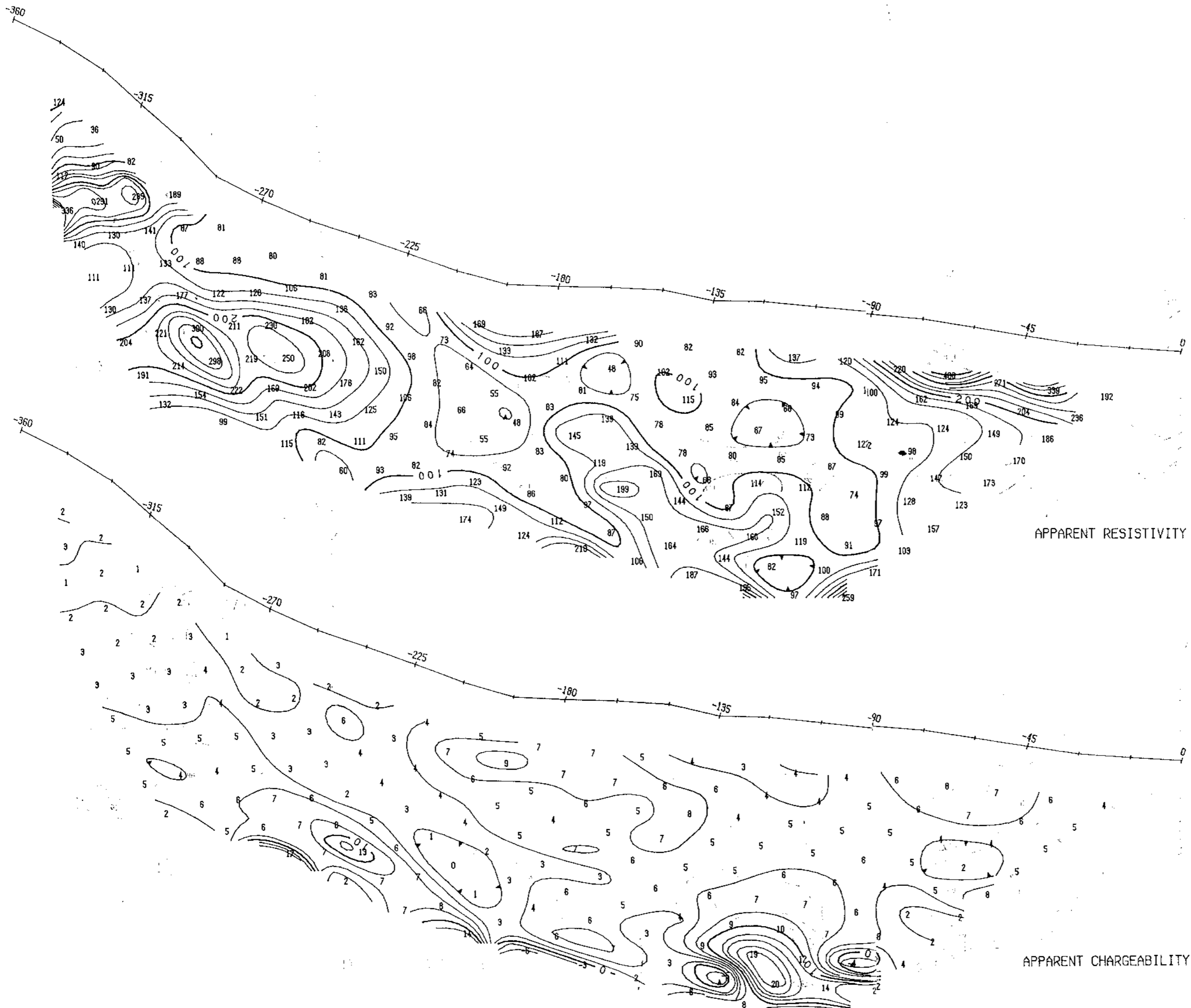
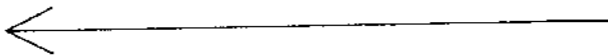


Peter G. Dasler, M.Sc.  
December 14, 1988.

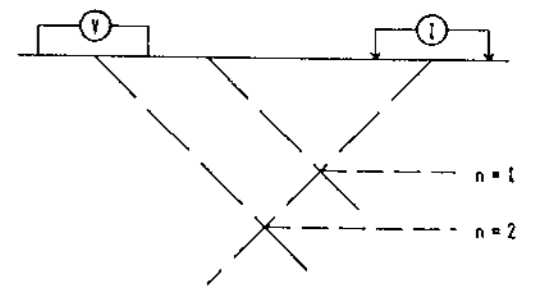
**BIBLIOGRAPHY**

- <sup>1</sup> D. Wilson (1978): BCDM Assessment report 6483
- <sup>2</sup> Cominco (1978): BCDM Assessment Report 8263.
- <sup>3</sup> Rodderick, J.A. et al (1976): Geological Survey Of Canada, Map 1386A, Fraser River.

Survey Direction: Southwest



Pseudosection Plotting Method



LEGEND

Resistivity Contour Interval: 25 Ohm-m

Chargeability Contour Interval: 2 milliseconds  
INSTRUMENTATION

Receiver: Huntec Mark IV  
Transmitter/Generator: Phoenix IPT-1  
2.5 kWatt

SURVEY PARAMETERS

Survey Mode: Time Domain  
Array: Double-Dipole  
Dipole Length: 50 feet (15 metres)  
Dipole separation: n=1 to 10  
Delay Time: 200 milliseconds  
Integration Time: 1500 milliseconds  
Charge Cycle: 8 second square wave

GEOLOGICAL BRANCH  
ASSESSMENT REPORT

18,388



GOTRONICS SURVEYS LTD.

PETER DASLER

TOM CLAIM GROUP

Kamloops Mining Division, B.C.  
APPARENT RESISTIVITY and CHARGEABILITY  
PSEUDOSECTIONS  
LINE 1

Surveyed by GOTRONICS SURVEYS LTD.,  
December, 1988

Drawn by: Geotronics  
Job No.: 88-47  
NTS  
Scale: 1:1000  
Date: Dec/88  
Map No.: