1982 ASSESSMENT REPORT

GEOLOGY, GEOCHEMISTRY, GEOPHYSICS AND TRENCHING

on the

THE TA HOOLA CLAIMS

Ta Hoola 1-6 (Record Nos. 3332-3337), Ta Hoola 9 (3572)
and Ta Hoola 10-13 (Record Nos. 3856-3859)

Owner: SMD Mining Co. Ltd.
330 - 1130 West Pender Street
Vancouver, B.C. V6E 4A4

and

TRENCHING

on the

RO CLAIMS

RO 15-18 (Record Nos. 51144-51147), and RO 29, 31 and 32
(Record Nos. 51555, 51557-58)

Owner: Anaconda Canada Exploration Ltd.
1600 - 1500 West Georgia Street
Vancouver, B.C. V6G 2Z6

Kamloops Mining Division
Latitude: 51°36'N
Longitude: 120°28'W
NTS 92-P/9W

Operator: SMD Mining Co. Ltd.
330 - 1130 West Pender Street
Vancouver, B.C. V6E 4A4

By Paul Ruck

November 1982

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SUMMARY AND DISCUSSION OF RESULTS

The Ta Hoola property consists of 17 claims comprising 256 units. Ta Hoola 1-13 claims were staked in 1982 to cover an area of silver, lead, copper and molybdenum mineralization. Silver 1-4 claims were staked in November, 1982. SMD Mining also acquired in 1982, an option on seven two-post claims owned by Anaconda Canada Exploration Ltd. which are internal to SMD's claims. The potential exists for finding any or all of the following deposit types on the Ta Hoola claims:

(1) Bulk-tonnage silver and lead ± copper deposit
(2) Gold-rich porphyry copper deposit
(3) Porphyry copper-molybdenum deposit

Field work on the Ta Hoola and RO claims in 1982 consisted of 100 km of linecutting and clearing, chaining, and flagging; soil, stream sediment and rock geochemical surveys comprising 1974 soil samples analyzed all or in part for arsenic, silver, lead, copper, zinc and molybdenum, 82 stream sediment samples analyzed for arsenic, silver, lead, copper and molybdenum, and 775 rock samples collected from outcrops and trenches and analyzed all or in part for arsenic, silver, lead, copper, zinc and molybdenum; 80 km of I.P. and resistivity, magnetic and VLF surveys; geological mapping at 1:5000 scale; and 631 m of trenching.

Geological mapping on the Ta Hoola and RO claims has outlined the upper Triassic - lower Jurassic (Nicola Group) volcanic and sedimentary stratigraphy. The rocks are interpreted to be part of an island-arc assemblage formed in a restricted shallow marine environment.

The stratigraphic sequence from oldest to youngest is:

(1) Volcanic facies comprising a thick succession of andesitic flows, tuff and pyroclastic breccias, porphyritic augite andesites and basalts.

(2) Volcanic-epiclastic facies consisting of interbedded lapilli and ash tuff, and argillite, siltstone and intraformational conglomerate/breccias.

(3) Predominantly sedimentary facies composed of volcanic conglomerate and tuffwacke deposited from lahars or debris flows.

(4) Brief reef-building period (?) marked by the formation of cherty dolomite.

(5) Intrusions comagmatic with the volcanic rocks and consisting of early, predominantly diorite plugs and dykes.

(6) Intrusion of later (possibly Jura-Cretaceous or younger?) stocks of microgranite porphyry.

(7) Interbedded volcanic and coarse epiclastic sequence of andesite agglomerate, tuff and greywacke, reflecting renewed volcanic activity during the middle Jurassic.

The Ta Hoola claims lie within a belt of complexly folded and regionally block faulted rocks. A dominant northwest structural grain, consistent with the regional setting is indicated by geological mapping and airphoto analysis.

Tight isoclinal folding with minor inclined folding is inferred from the sedimentary rocks in the northeastern part of the claims. The rocks strike northwest and dip both to the northeast and southwest at moderate to steep angles. The fold axes trend parallel to bedding, but their plunge is not known.

The rocks on the property have undergone block faulting as well as some strike slip faulting.

Block faulting is inferred from airphotograph interpretation, geophysical surveys and geological mapping. A large fault zone, trending 130° to 140°, roughly coincides with the contact between the predominantly volcanic and volcanic-epiclastic rocks suggesting that this stratigraphic interface constituted a plane of weakness along which faulting occurred.

Numerous small strike faults were observed in the trenches excavated in 1982. The trends of the faults are variable, striking north, west, northwest and northeast, usually with steep dips. These faults appear to be late stage structures and may reflect structural adjustments related to the intrusion of the diorite and microgranite stocks, during reactivation of deep-seated structures.

The emplacement of the microgranite stock has imposed a schistosity on the adjacent volcanic rocks which parallels the stock margin and dips between 30° and 80° away from the intrusion. Co-genetic with the intrusion of the microgranite stock, is the formation of a relatively narrow biotite-hornfels contact aureole and a broader crackle-breccia zone characterized by its angular fragments and their lack of apparent rotation.

The rocks on the property have undergone varying degrees of alteration and pyritization accompanied by disseminated and fracture-filling chalcopyrite, argentiferous galena, molybdenite and pyrrhotite mineralization, related to metasomatic and hydrothermal activity during the culmination of volcanism and the emplacement of the diorite and younger microgranite stocks.

The diorite intrusives, related to upper Triassic subalkaline volcanism, are believed to be responsible for the arsenic and associated molybdenum and copper mineralization, and accompanying carbonate and silica alteration found in Areas 1 to 4 on the Ta Hoola claims

The microgranite stock which outcrops in the central part of the Ta Hoola 1-6 claims was emplaced during a second, younger plutonic stage and was accompanied by biotite-hornfelsing, crackle-brecciation, metasomatism, widespread silver-lead, copper and molybdenum mineralization, and hydrothermal alteration of the indurated volcanic rocks. A sample of galena from this area is presently being dated by lead isotope analysis by Dr. C. Godwin at U.B.C. This would yield the age of the mineralization, and if the mineralization is coeval with the microgranite porphyry, the approximate age of the stock.

The silver-lead mineralization is unique in the Quesnel Trough and is known only in the Ta Hoola project area.

A possible sequence of alteration and mineralization for the Ta Hoola claims is as follows:

(1) Intrusion of dioritic stocks comagmatic with subalkalic volcanism and accompanied by deuteric alteration (epidote-carbonate-chlorite).

(2) Hydrothermal As $\pm$ minor Cu and Mo mineralization accompanied by pervasive and irregular vein carbonate $\pm$ silica $\pm$ albite alteration and pyritization.

(3) Later hydrothermal alteration comprising fracture-controlled calcite-quartz ± richterite ± hematite alteration.

(4) Regional lower greenschist facies metamorphism resulting in widespread chlorite-carbonate ± silica alteration of the volcanic rocks.

(5) Intrusion of calc-alkaline microgranite stocks accompanied by crackle-brecciation, biotite-hornfels contact metamorphism and widespread, porphyry-style molybdenum and copper mineralization.

(6) Epithermal silver-lead mineralization associated with fracture-controlled, metasomatic chlorite-carbonate-pyroxene-richterite ± chalcedony ± albite alteration which flooded and partially replaced crackle-brecciated and biotite hornfelsed rock fragments.

(7) Hydrothermal carbonate-chlorite ± richterite ± chalcedony veining along fractures.

(8) Late stage (bull) quartz flooding along dilational fractures in the microgranite stock and adjacent volcanic rocks.

Six areas of primary interest have been identified by geological, soil geochemical and geophysical (I.P., Magnetometer and VLF) surveys. Areas 1 and 2 are located on Ta Hoola 9-12 and Areas 3 to 6 are located on Ta Hoola 1-6 and RO claims. Areas 3 and 5 were explored by four trenches, totalling 631 m in length, excavated and chip sampled by SMD Mining in 1982.

Area 1 is underlain by moderately carbonatized augite andesite crystal lapilli tuffs which have been brecciated and subsequently veined with quartz-calcite.

A lead soil anomaly with weakly supportive silver contents coincides with a weak VLF conductor and a relatively depressed magnetic response within a high magnetic background. P.F.E. response directly over the area is low, but relatively higher on the southwest and northeast flanks of the soil anomalies.

Area 2 encompasses a strong lead-zinc-arsenic soil anomaly with supportive copper and silver contents. The underlying rocks are thought to be augite andesite agglomerate and flow breccia, however there are no outcrops to substantiate this.

Stream sediments show supportive metal contents in the stream draining the anomalous area indicating their usefulness in identifying areas of potential mineralization.

A strong VLF conductor and a pronounced I.P. response coincide with the soil anomaly.

Area 3, near Littlemore Friendly Lake, contains a northwest-trending, strong rock geochemical arsenic anomaly with elevated molybdenum, lead and copper concentrations.

The Littlemore Friendly Trench, comprising 220 m, was excavated in 1982 to investigate mineralization originally discovered by SMD Mining in 1981 in altered and strongly fractured basalt exposed in an old Anaconda trench.

The mineralization occurs in strongly fractured and brecciated, and intensely altered magnetite-rich basalts. The alteration consists of granular patches and irregular veins of carbonate with minor silica and albite. Pyrite occurs as dusty to fine-grained, subhedral disseminated grains and ranges between 3 to 5% (up to 15%) locally.

The mineralized zone lies between a northwest-striking regional fault to the west and the volcanic-sedimentary interface to the east.

Reconnaissance scale soil sampling outlined a broad area of elevated arsenic concentration stretching for about 3.5 km southeast between the Littlemore Friendly Lake Grid and Area 2 on the Ta Hoola 9 Grid but did not define its sources.

Area 3 has a strong magnetic signature and lies at the edge of a broad area of high magnetic response which may reflect the areal extent of the mafic volcanic host rocks. I.P. and VLF coverage is incomplete and as a result reponses are not definitive.

A northwest-trending aeromagnetic "high" encompasses Areas 1 to 3 and could indicate the presence of one or more buried dioritic intrusives. The aeromagnetic response is similar to those which correlate with known dioritic intrusions elsewhere in the Quesnel Trough (eg. Copper Mountain). These intrusions often occur along or adjacent to major regional faults.

On the Ta Hoola property, dioritic rocks have been mapped on both the southwest and northeast sides of an apparent regional fault which extends from the east arm of Friendly Lake, south through Frying Pan and Meadow Lakes.

The high background magnetic response in Area 3, which undoubtedly reflects the high magnetite content in the basaltic outcrops exposed in the trenches, may also be a reflection of an unexposed dioritic intrusive which could be located just north of Littlemore Friendly Lake.

Drilling is required to assess the potential in Areas 1-3.

Area 4 contains an arsenic soil anomaly with weakly supportive molybdenum and copper contents that overlies moderately to strongly siliceous and pyritic pyroclastic and epiclastic rocks which locally have been epidotized, carbonatized and pyrrhotized.

A strong magnetic anomaly occurs near 112+20N, 130+00E on the eastern flank a large resistivity high and correlates with a small, but high contrast P.F.E. anomaly.

A resistivity high occurs over the highly siliceous rocks between lines 107+32N and 114+64N in contrasts to the strike-equivalent rocks to the northwest and southeast. The siliceous character of the rocks may be primary or more likely epigenetic. A northwest-trending resistivity low and coincident VLF conductor is located west of the arsenic soil anomaly and corresponds to the position of an inferred major fault zone.

Trace element analyses of rock samples collected from outcrops in Area 4 in 1981 indicated substantial arsenic, nickel, copper, lead and silver enrichment has occurred along the volcanic-sedimentary interface.

The arsenic, silver and base metal enrichment may be the result of physico-chemical changes related to the volcanic-sedimentary interface, such as the boiling of hydrothermal fluids in response to reduced confining pressures. The high pyrite and silica content in the rocks of Area 4 may be part of the alteration assemblage along the contact.

Soil and rock geochemical data from the 1982 field program substantiates the results of the trace element study and the theory that metal enrichment is related to lithological change across the volcanic-sedimentary interface.

Area 5 encompasses a large area of coincident silver, lead and copper soil anomalies that overlie silver-lead mineralized, faulted, crackle-brecciated and biotite-hornfelsed andesitic tuffs and minor flows exposed in Trenches 100 and 101. These trenches are located on the RO 29 and 31 claims, between lines 100+00N and 102+44N on the Main Grid.

Trench 100, comprising 231 m, extends and crosses the west end of an old Anaconda trench adjacent to Anaconda's diamond drill holes 66-2 and 68-3, which intersected low-grade silver-lead mineralization. Trench 101 is located about 100 m northwest of Trench 100 adjacent to Anaconda's diamond drill hole 67-4 which also intersected silver-lead mineralization.

The strongest (silver-lead) mineralization occurs in the crackle-brecciated rocks in the trenches where argentiferous galena is intergrown with a metasomatic chlorite-carbonate-pyroxene-richterite ± chalcedony ± albite alteration assemblage which flooded and permeated outwards from fractures in the crackle-breccia. The presence of chalcedony, which occurs as a hydrothermal product, and richterite, which occurs in skarns or as a hydrothermal product, suggests an epithermal origin for the silver-lead mineralization found in the area.

The assay results of 85 selected rock chip samples, containing at least 15 ppm silver and/or 4,000 ppm lead, indicated an overall silver:lead ratio of 1:1.27 with individual sample ratios varying between 0.32:1 and 2:37:1.

Trenches 100 and 101 confirmed the presence and character of the silver-lead mineralization intersected in Anaconda's trenches and drill holes in Area 5 and demonstrated it to be more widespread than previously indicated.

Magnetic response over the area is low, probably reflecting the alteration observed in the rocks. Several P.F.E. "highs" occur on the fringes of the soil anomalies. A pronounced resistivity "trough" corresponds with the position of the northwest extension of the regional (East) Friendly Lake - Frying Pan Lake -Meadow Lake topographic lineament (fault) which passes through the core of the mineralization. A prominent, northwest-striking VLF conductor correlates with the position a large fault zone exposed in Trenches

100 and 101. Some of the lesser VLF conductors coincide with some of the P.F.E. anomalies.

Cross-sectional drilling or closely spaced grid percussion drilling is required to further assess the mineralization in Area 5.

Area 6 contains two coincident copper-silver soil anomalies underlain by crackle-brecciated hornfelsed andesite tuffs adjacent to the microgranite porphyry stock. No geophysical surveys were performed in Area 6.

A large, molybdenum anomaly surrounded by several smaller copper, lead and silver anomalies occur in the soils between Area 4 and Areas 5 and 6 centered at 101+22N, 115+00E. The geophysical data from this area was not definitive in outlining a concentration of sulphides. An I.P. survey using a 200 to 300 m electrode spacing would be more appropriate in the search for a large and possibly deep porphyry deposit which could occur under this area. The I.P. survey undertaken in 1982 was designed to identify smaller deposit types.

Diamond and percussion drilling conducted in the vicinity of the Ta Hoola 1-6 claims by previous operators was directed towards low grade silver-lead mineralization and copper-molybdenum deposits. The drilling identified low-grade, but widespread silver-lead mineralization in a large breccia zone in Area 5 with the potential to host a bulk tonnage deposit. The molybdenum-copper mineralization, while subeconomic, is significant in that it proves the geological environment has the potential to host a porphyry deposit.

Geochemical surveys, trenching, and drilling have demonstrated that precious and base metal mineralization is present on the Ta Hoola property. Geophysical surveys (I.P., magnetometer and VLF) were useful in interpreting the soil anomalies and structure, especially in areas lacking outcrop.

The widespread occurrence of disseminated pyrite and other sulphide minerals in the rocks produced a high background response in the I.P. and Resistivity data. The low contrast between anomalies and background made interpretation and evaluation of the anomalies difficult.

A thick blue-grey boulder clay was found in areas trenched. The clay, whose distribution is unknown, could be a geochemical barrier, which would account for the poor soil geochemical results in some areas. It would also create problems for geophysical surveys, particularly EM methods.

A trenching program was successful in exploring the character and distribution of the silver-lead mineralization on the claims. It proved to be a cost-effective method of acquiring geological and geochemical data on a "first-pass" basis.

More work is required to further define the anomalous zones particularly around the intrusive stocks and plugs and along the volcanic-sedimentary interface.

A substantial drilling and trenching program is required to assess the potential of mineralization discovered to date.

Detailed geological, geochemical and geophysical surveys are needed to further explore the base and precious metal potential of areas on the property which have returned encouraging results but have received only cursory attention.

CONCLUSIONS

Based on exploration work to date, the following conclusions can be drawn:

(1) Detailed geochemical and geophysical surveys delineated six areas of primary interest.

(2) The argentiferous base metal prospects in Areas 5 and 6 are related to microgranite porphyry intrusions and the potential for a blind porphyry deposit is high in the adjacent region to the east.

(3) The property offers excellent potential for precious and base metals and additional exploration is easily justified.

INTRODUCTION

General

This report describes field work undertaken on the Ta Hoola and RO claims between May and October, 1982, as part of a continuing program to explore for bulk silver-lead, and copper deposits associated with calc-alkaline intrusives and alkaline volcanic and intrusive rocks.

Work carried out included: geological mapping, geochemical soil and rock sampling, induced polarization, ground magnetometer and VLF surveying, trenching, and line cutting.

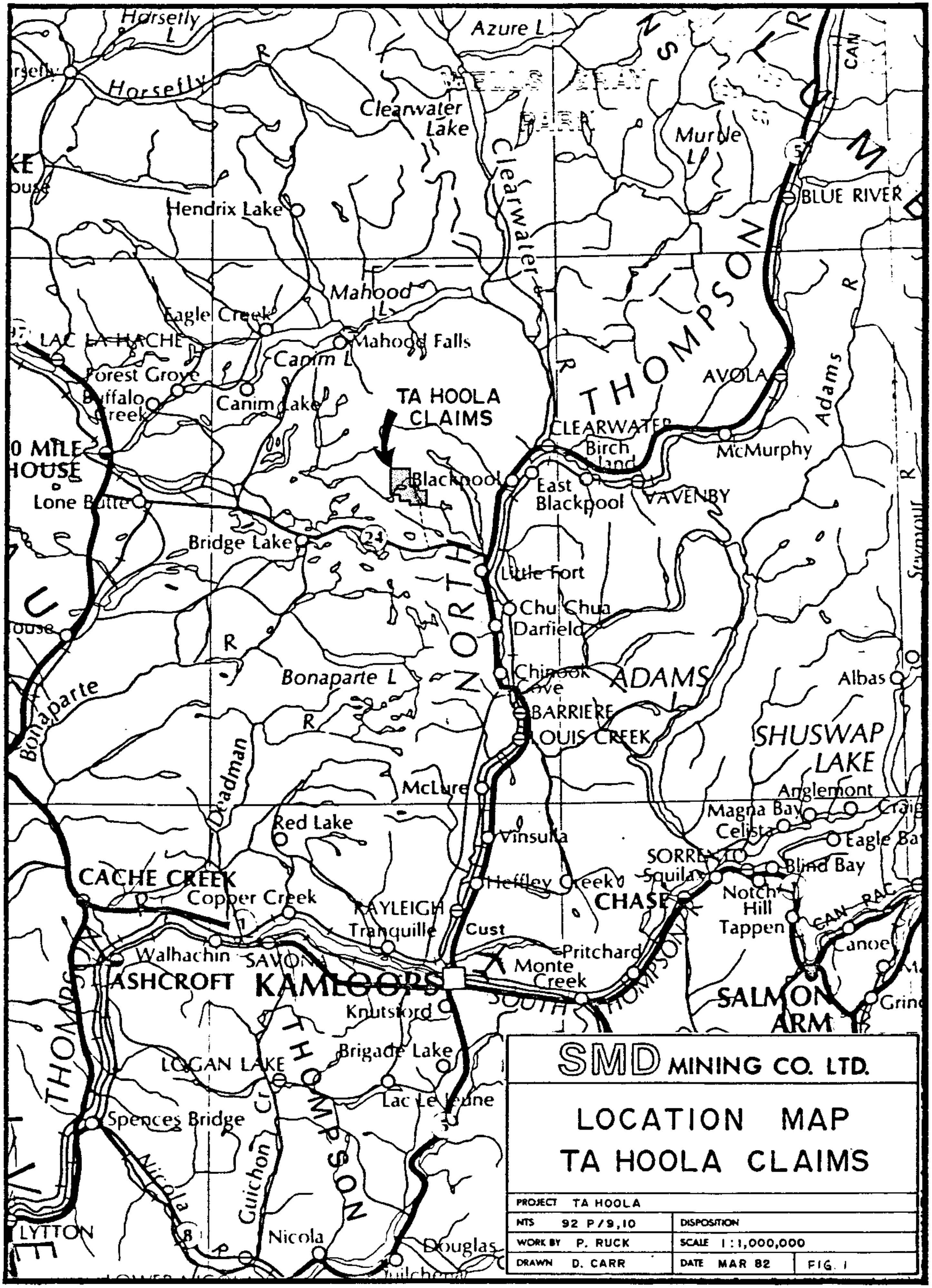
Location, Access and Communications

The Ta Hoola and RO claims are located at latitute 51°35'N; longitude 102°27'W, 26 km northwest of Little Fort, B.C. (Figure 1). Access to the property is via Highway No. 24 west from Little Fort for 17.6 km, then north along the Balco Logging Company road for about 16 km and continuing for another 9 km along an old drill road to Friendly Lake. A four-wheel drive vehicle is necessary in wet weather conditions.

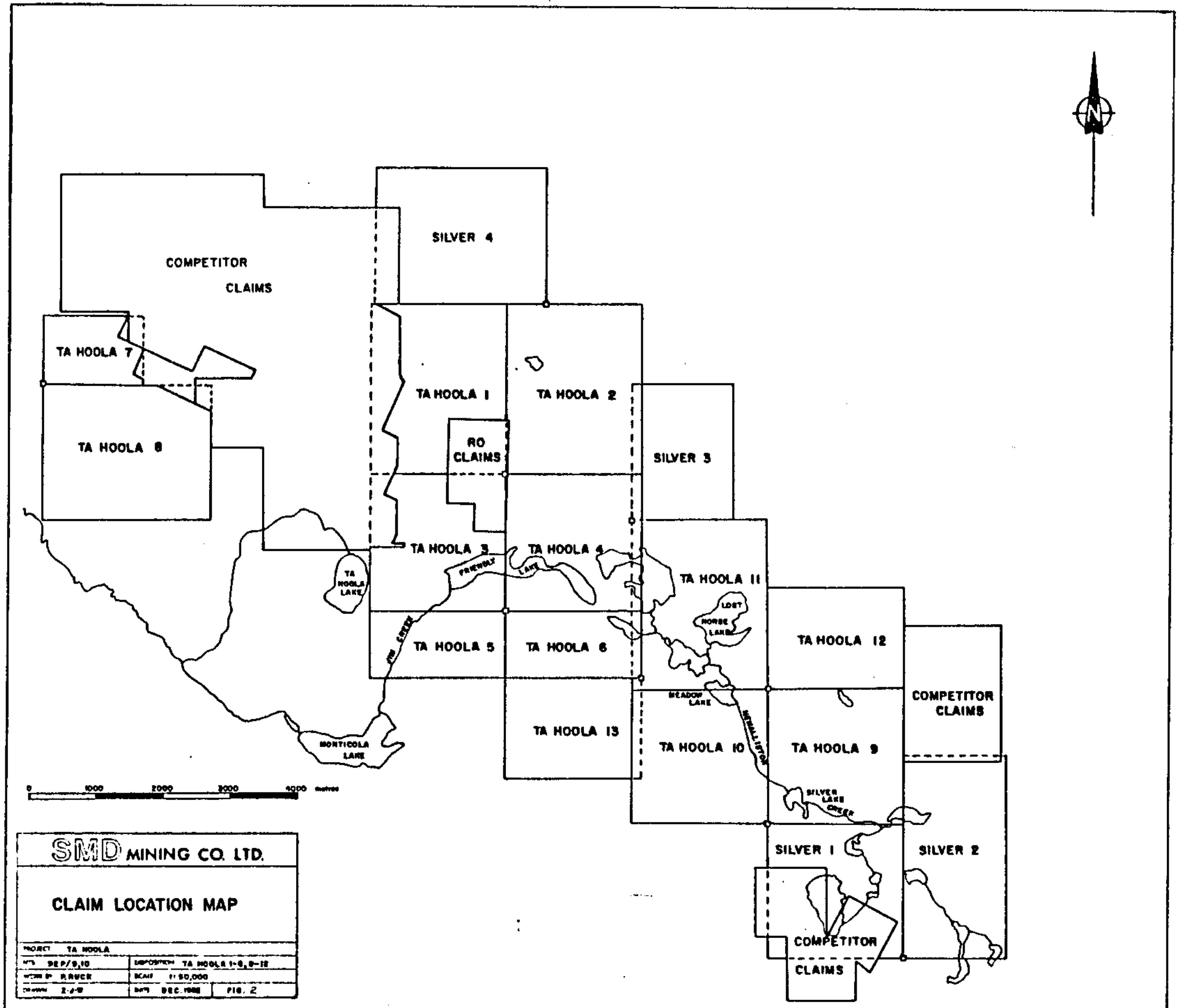
Good radio-telephone communications are accessible via B.C. Tel's Mobile Telephone Network using a VHF radio-telephone on YR Frequency (Channel 10, Clinton, B.C.). A model VTR-74B radio-telephone (13 channels, auto scanning, simplex mode) manufactured by International Systcoms Ltd. was used.

Property

SMD Mining Co. Ltd. owns a 100% interest in 17 mineral claims comprising 256 units. Silver 1 to 4 claims were staked in mid-November, 1982. The company also holds under option seven two-post claims owned by Anaconda Canada Exploration Ltd., which are internal to SMD's claims (Figure 2). All the claims are located in the Kamloops Mining Division. The claim names, record numbers, recording dates and number of units are as follows:



SMD MINING CO. LTD.			
LOCATION MAP **TA HOOLA CLAIMS**			
PROJECT	TA HOOLA		
NTS	92 P/9,10	DISPOSITION	
WORK BY	P. RUCK	SCALE	1:1,000,000
DRAWN	D. CARR	DATE	MAR 82 — FIG. 1


COMPETITOR
CLAIMS
SILVER 4
TA HOOLA 7
TA HOOLA 8
TA HOOLA 1
TA HOOLA 2
RO
CLAIMS
SILVER 3
TA HOOLA 3
TA HOOLA 4
TA
HOOLA
LAKE
TA HOOLA 11
LOST
HORSE
LAKE
TA HOOLA 5
TA HOOLA 6
TA HOOLA 12
MEADOW
LAKE
COMPETITOR
CLAIMS
TA HOOLA 13
TA HOOLA 10
TA HOOLA 9
MONTICOLA
LAKE
SILVER
LAKE
CREEK
0
1000
2000
3000
4000
SILVER 1
SILVER 2
COMPETITOR
CLAIMS
N
SMD MINING CO. LTD.
CLAIM LOCATION MAP
TA HOOLA
1:50,000
FIG. 2

SMD Mining Co. Ltd. Claims

Name	Record No.	Date of Recording	No. of Units
Ta Hoola 1	3332	81/03/17	20
Ta Hoola 2	3333	81/03/17	20
Ta Hoola 3	3334	81/03/17	16
Ta Hoola 4	3335	81/03/17	16
Ta Hoola 5	3336	81/03/17	8
Ta Hoola 6	3337	81/03/17	8
Ta Hoola 7	3338	81/03/17	6
Ta Hoola 8	3339	81/03/17	20
Ta Hoola 9	3572	81/06/16	16
Ta Hoola 10	3856	81/10/16	16
Ta Hoola 11	3857	81/10/16	20
Ta Hoola 12	3858	81/10/16	12
Ta Hoola 13	3859	81/10/16	12
Silver 1	4242	82/11/17	16
Silver 2	4243	82/11/17	18
Silver 3	4244	82/11/17	12
Silver 4	4245	82/11/17	20
		Total	256 units

Claims held under option from Anaconda

RO 15	51,144	65/08/16	1
RO 16	51,145	65/08/16	1
RO 17	51,146	65/08/16	1
RO 18	51,147	65/08/16	1
RO 29	51,555	65/09/8	1
RO 31	51,557	65/09/8	1
RO 32	51,558	65/09/8	1
		Total	7 two-post claims

Previous Exploration

Previous exploration activity by former owners comprised geological, geochemical (stream sediments, soils and trenching) and geophysical surveys, and percussion and diamond drilling. Copper, molybdenum and silver-lead mineralization reflecting, respectively, disseminated or stockwork-type and vein network deposits were discovered peripheral to the borders of several small microgranite porphyry stocks located north and northwest of Friendly Lake.

The area was mapped by the G.S.C. between 1963-65 and the B.C. Department of Mines and Petroleum Resources in 1970.

The property and adjoining ground has been held and subsequently dropped by Anaconda American Brass Ltd.(1965-68), United Copper Corporation (1966-68), Imperial Oil Ltd. (1972-73), Prism Resources (1972), Barrier Reef Resources (1972-73), Cities Service Mineral Corp. (1973-75), Meridian Resources (1977) and Commonwealth Mining (1979-1982).

Anaconda has maintained, by cash-in-lieu payments, seven two-post claims (RO 15-18, 29, 31, 32) which were optioned to SMD Mining Co. Ltd. in 1982.

G. Rayner currently owns the Bogg 1-3 claims, which are located partly within the western half of the Ta Hoola 1 and 3 claims, as well as the Bogg 4-6 claims which adjoin the Ta Hoola 7 and 8 claims. The Bogg claims were re-staked by Rayner in March, 1982 following abandonment for re-staking of the COM 5, BOG and FRI claims.

Physiography, Climate and Vegetation

The property lies within the Thompson Plateau, a subdivision of the Interior Plateau, and is characterized by rounded hills, rolling uplands and numerous small lakes. The Thompson Plateau, in the claim area, is underlain by differentially weathered, folded and block faulted Mesozoic rocks which has resulted in a moderately dissected, irregular surface between 1067 and 1525 m elevation.

Layers of glacial overburden between 0.5 to 5 m thick are widespread and obscure much of the bedrock.

Vegetation consists mainly of spruce, fir, balsam and jack pine, with some poplar. Underbrush is moderate to thick and consists mainly of tag alder and willow.

Climate is typical of the B.C. Central Interior. Winter temperatures range between -40° and 0°C; summer temperatures range between 2° and 38°C. Precipitation averages 45 cm at Little Fort, with about twice that amount in the property area. Accumulated snow fall ranges between 2 and 4 m.

Roads to the property are open to four-wheel drive vehicles between mid-May and the end of the November.

LINECUTTING

Grid Locations

Four grids were established on the Ta Hoola claims in 1982. The Main and Littlemore Friendly Lake (L.M.F.L.) Grids are located within the Ta Hoola 1-6 claims, and the Ta Hoola 9 and Extension Grids are located on the Ta Hoola 9-12 claims.

Forty-four km (lines 80+06N to 119+52N) of the pre-existing but overgrown Main Grid were clear-cut and re-chained. An additional 25 km of new lines were cut and chained between established lines in the central part of the Main Grid so that east-west crosslines are spaced about 100 m apart.

The L.M.F.L. Grid, on the Ta Hoola 4 claim, comprises 3.2 km of cut and chained lines.

Approximately 25 km of lines were cut on the Ta Hoola 9 and Extension Grids. The Ta Hoola 9 Grid consists of approximately 20 km of cut and chained lines, spaced at 100 m intervals. The baseline (10+00NE) trending 135^{o} was tied into the legal corner post located at 10+00NE, 10+00SE.

The Extension Grid consists of a cut and chained baseline (17+96NE) and tieline (8+31NE), and flagged and chained crosslines spaced 200 m apart.

Drawings TA2-1 and TA2-2 (in map pocket) show the extent of the grids established on the Ta Hoola 1-6 and 9-12 claims.

GEOLOGY

Regional Setting

The Ta Hoola project is located within the Quesnel Trough, a 2000 km long, north-trending belt of predominantly Upper Triassic and Lower Jurassic volcanic and derived sedimentary rocks situated between the Proterozoic and Paleozoic strata of the Omineca Geanticline to the east and the Pinchi Geanticline to the west (Figure 3) (Campbell and Tipper, 1971).

The Quesnel Trough was the site of widespread volcanism accompanied by the emplacement of granodiorite and diorite plutons during the Late Triassic. A brief period of quiescence at the end of the Triassic was followed by renewed volcanism and sedimentation in the Early Jurassic which culminated during the Middle Jurassic with the uplifing and subsequent erosion of the Quesnel Trough.

Much of the western and central parts of the Quesnel Trough are underlain by Late Cretaceous-Early Tertiary felsic volcanic rocks and Late Tertiary olivine plateau basalts.

Reconnaissance mapping by the Geological Survey of Canada between 1963 and 1965 (Campbell and Tipper, 1971) indicated the property area is underlain by Upper Triassic Nicola Group volcanic and sedimentary rocks. A subsequent, more detailed study of the area by Preto (1970) outlined the presence of considerable quantities of intrusive rocks of probable Upper Triassic-Lower Jurassic age. These rocks vary compositionally between diorite and granite. The microgranite porphyries which intrude the Triassic rocks in the area, may be of Jura-Cretaceous age.

The volcanic lithofacies consist of alkaline and calc-alkaline basalts and andesites erupted from subaqueous fissures associated with regional block faulting.

Epiclastic and pyroclastic rocks with plutonic fragments, intrusive breccias and small plutons or stocks of diorite, monzonite and syenite mark the development of volcanic centres during the waning stages of volcanism. The plutons, in part, intrude their own volcanic material. A late fumarolic or hydrothermal stage, related to the intrusion of the plutons, introduced volatiles and various metals into the vent areas and extensively altered and mineralized large volumes of shattered volcanic rocks.

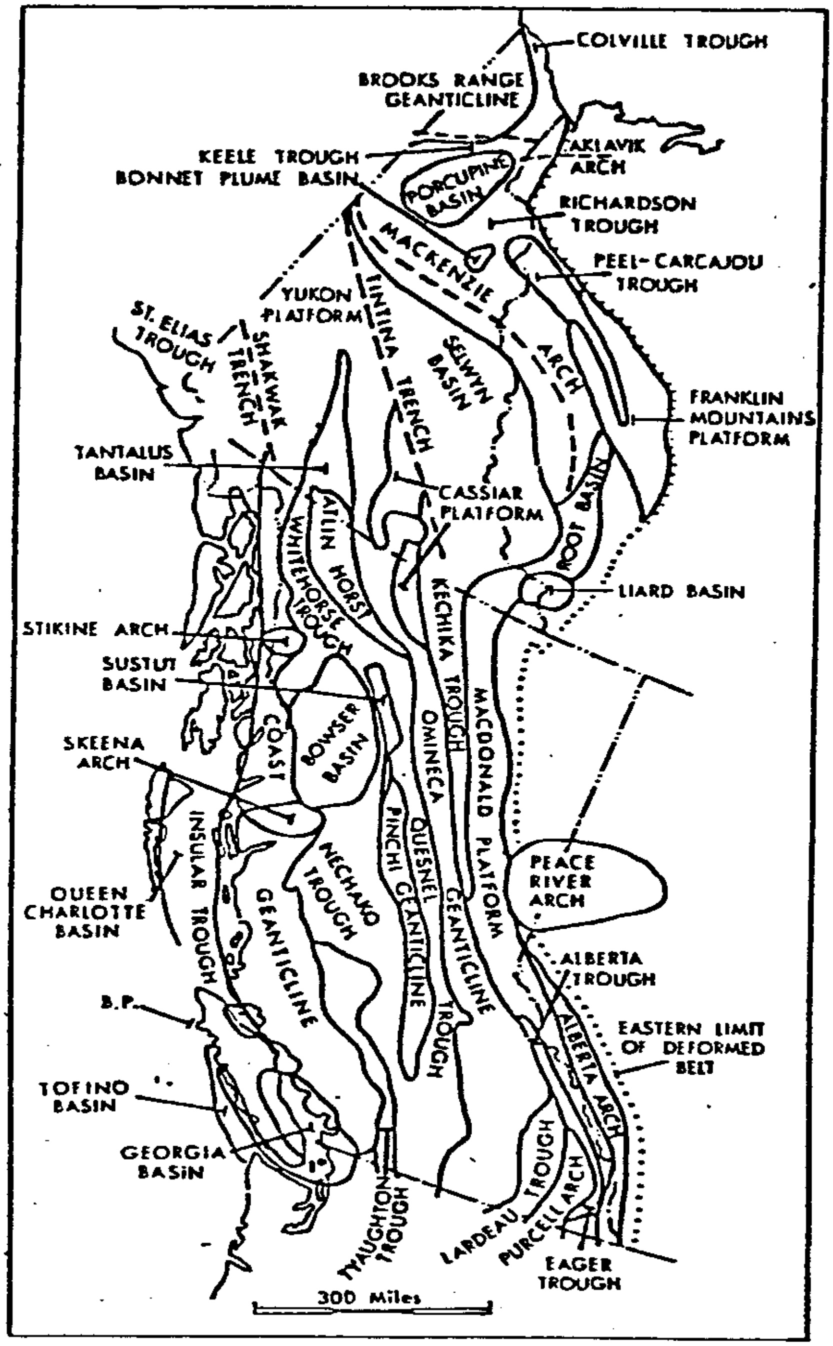


Figure 3: Tectonic Framework of the Canadian Cordillera.
(after Wheeler et al., 1972)

The Copper Mountain, Caribou Bell, Afton copper deposits and many other porphyry occurrences, and subvolcanic stockwork or disseminated sulphide deposits are directly associated with this late hydrothermal activity.

Local Geology

An extensive sequence of andesitic pyroclastic rocks and interbedded flows, epiclastic sediments, and intrusive rocks of upper Triassic (Nicola Group) to lower-middle Jurassic age underlie the Ta Hoola 1-6 and 9-12 claims (Drawings TA2-1 and TA2-2). The rocks are interpreted to be part of an island-arc assemblage formed in a shallow marine environment.

The stratigraphic sequence from oldest to youngest is:

(1) Proximal volcanic facies consisting of a thick succession of andesitic flows, tuff and pyroclastic breccias, porphyritic augite andesites and basalts.

(2) Distal volcanic-epiclastic facies comprising interbedded lapilli and ash tuff, and argillite, siltstone and intraformational conglomerates.

(3) Sedimentary facies composed of volcanic conglomerate and tuffwacke deposited from lahars.

(4) Brief reef-building period marked by the formation of cherty dolomite.

(5) Intrusions comagmatic with the volcanic rocks and consisting of diorite plugs and dykes.

(6) Intrusion of microgranite porphyry stocks of uncertain age, possible Jura-Cretaceous or younger.

(7) Interbedded volcanic and coarse epiclastic sequence of andesite agglomerate, tuff, and greywacke, marking renewed volcanic activity during the early to middle Jurassic.

Locally, block faulting is common. The sedimentary rocks appear to have been tightly folded along northwest-trending axes.

Outcrop exposure is 5 to 10% and unevenly distributed, providing a corresponding uncertainty in interpretation.

The claims were mapped on a scale of 1:5,000 by direct mapping on grids as well as using other means such as topographic base maps, airphotographs, and pace and compass tie-ins to the grids.

Property Geology

The Nicola Group rocks which outcrop on the property have been divided into 4 main units on the basis of lithology.

Map Unit 1:

This unit has been divided into six sub-units and comprises mainly fine to coarse-grained andesititic pyroclastic rocks, and minor andesite and porphyritic augite andesite flows.

Sub-unit 1a - Andesite flows. This rock outcrops immediately west of Friendly Lake and in the northwest corner of the property. These rocks are generally dark green, massive, fine to medium-grained and frequently contain tiny phenocrysts of plagioclase and/or augite. Less commonly they may be amygdaloidal and contain very fine-grained magnetite.

The flows appear to be unaltered or only slightly altered. The plagioclase phenocrysts have been weakly saussuritized and rocks locally contain silica-epidote-carbonate stringers.

Pyrite content is less than 1% and commonly disseminated. Locally it can vary up to 3 to 5%, occurring in small fractures or as medium to coarse-grained disseminated clots.

Sub-unit 1b - Andesite tuff-breccia. These rocks occur northwest, south and west of Friendly Lake, are massive, and consist of a fine-grained, dark green (tuffaceous?) andesitic matrix containing subangular to subrounded predominantly andesite with subordinate plutonic diorite fragments, 2 to 5 cm in size. The coarse fragments comprise 20 to 30% of the rock. The plutonic fragments are derived from subvolcanic plutons and indicate the proximity of a volcanic centre. Locally it is thinly interbedded with either lapilli tuff, tuff or porphyritic augite andesite flows.

This unit has not been pervasively altered. However, where it has been strongly fractured, it has undergone moderate to strong epidote, carbonate, silica and chlorite alteration along the fractures.

The pyrite content can vary from 3 to 7% but is commonly less than 1%.

Sub-unit 1c - Andesite crystal and/or lithic tuff. This is the dominant lithology on the property, occurring north, west and south of Friendly Lake. These rocks are commonly massive, dark green or greyish green, aphanitic to fine grained and may contain up to 5% broken plagioclase and augite phenocrysts, and rock fragments 2 to 4 mm in size. Locally it may be interbedded with andesite flows.

In the northwest part of the claims, the tuff is occasionally finely laminated and interbedded with lapilli tuff and tuff-breccia.

Towards the central to northeastern part of the property, they are interbedded with siliceous ash tuff and siltstone. South of Friendly Lake the tuff is commonly weakly schistose and locally sheared.

This rock unit has been weakly propyllitized over a large area south of Friendly Lake. North of Friendly Lake, this unit has been extensively crackled, hornfelsed and metasomatized by the intrusion of a large microgranite stock. The alteration is discussed in more detail under "Mineralization and Alteration".

The pyrite content of the tuff is variable, ranging from almost nil to about 10% locally. It is generally finely disseminated but also occurs as disseminated coarse-grained clots or as fracture fillings.

Sub-unit 1d - Andesite ash tuff. This rock type was only observed in the northeastern part of the Main Grid (between lines 108+54N and 114+64N). It is massive, aphanitic to fine-grained, medium to dark green, moderately siliceous and may contain tiny pyroxene and/or plagioclase phenocrysts up to 0.5 mm in size. It is often thinly interbedded with andesite crystal and lithic tuffs, laminated ash tuff (sub-unit 2b) and ash tuff conglomerate/breccia.

This unit appears to be unaltered. Locally fractures have been filled with silica and occasionally, carbonate stringers. Pyrite content varies between nil to about 1%, and occurs as finely disseminated euhedral grains.

Sub-unit 1e - Porphyritic augite (hornblende) andesite. These rocks occur as flows and dykes, ranging in size from 50 cm to hundreds of metres in width, and interlayered with or intruding the other volcanic and sedimentary rocks found on the property. Locally they may occur as flow breccias. Their ubiquity suggests they were formed intermittently throughout the volcanic cycle.

These rocks consist of massive, greyish-green to dark green, very fine-grained, holocrystalline groundmass, containing 10 to 50% black augite phenocrysts varying from 2 to 5 mm in size. Up to 10% plagioclase phenocrysts may be present.

Alteration is common along fractures and varies in intensity and type. In the centre of the property, near the microgranite stock, they are moderately to strongly altered and host stringers of carbonate-epidote-chlorite-silica and sometimes richterite, a blue-coloured, sodic amphibole. Elsewhere they are less altered and occasionally are epidotized and/or carbonatized along fractures. The plagioclase phenocrysts have been weakly saussuritized. Their pyrite content is less than 1% throughout, except in the more intensely fractured and altered locales. There, it can range up to 5% in coarse-grained disseminations or in fractures.

Subsidiary sub-units $1e_1$, and $1e_2$ - Pyroclastic rocks related to sub-unit 1e, rocks belong to $1e_1$, and $1e_2$ consist of medium- to coarse-grained (lapilli-tuff and agglomerate), and fine-grained (ash tuff) pyroclastics, respectively, and are interlayered with rocks of sub-unit 1e that outcrop on the Ta Hoola 9 and Extension Grids.

They are typically massive and medium to dark green coloured. Fragments in the coarser pyroclastics are composed of amygdaloidal and porphyritic augite andesite, variable in size and shape, and are matrix supported. The matrix comprises a fine-grained ash tuff, containing up to 10% augite and hornblende phenocrysts, and about 5% plagioclase phenocrysts, which vary from 1 to 3 mm in size.

The fine-grained pyroclastics ($1e_2$) are similar to the matrix in the lapilli-tuff and agglomerate.

Alteration is common and varies in type, intensity and style. Carbonatization is moderate to strong and generally pervasive, but also occurs in stringers and vugs. Chloritization is weak to moderate, and pervasive. Saussuritzation of plagioclase phenocrysts is evident locally.

Three outcrops between lines 16+00SE to 18+00SE and between stations 14+00NE to 15+00NE on the Ta Hoola 9 Grid are brecciated with strong quartz-carbonate (± albite) open-space filling and pervasive silicification.

Outcrops of crystal lapilli tuff on line 19+00SE have been weakly to moderately silicified.

Pyrite content is generally less than 1% throughout and is usually finely disseminated as subhedral to euhedral grains. It may range up to 3-5% in the brecciated and strongly altered outcrops where it occurs as fine- to medium-grained fracture fillings accompanied by traces of galena and magnetite.

Sub-unit 1f - Basalt. This unit was observed only in 3 trenches northeast of the east end of Friendly Lake. The extent of this rock type is unknown due to the lack of outcrop.

The rock is massive, fine- to medium-grained, dark green, and often amygdaloidal.

Alteration is strong in the southernmost trench and consists mainly of carbonate, chlorite hematite, richterite, and minor amounts of epidote, silica, albite and chalcedony. The amygdules are filled with carbonate.

Pyrite is finely disseminated and usually less than 1% except in the southern trench where it can be as high as 15%. Magnetite is abundant locally.

Map Unit 2:

This unit marks the transition from predominantly volcanic to sedimentary rocks. Interbedded lapilli tuff, ash tuff and ash tuff conglomerate/breccia, and siltstone-argillite and silstone-argillite conglomerate or breccia comprise this unit. The lithologies are generally gradational into one another on a large scale, although locally they exhibit sharp interfingering contacts. Thin porphyritic augite (hornblende) andesite flows or dykes, and andesite crystal tuffs outcrop locally. Six such sub-units have been identified.

Sub-unit 2a - Lapilli tuff. This rock type occurs as thin beds of massive, dark grey, medium- to coarse-grained rock interbedded with, and gradational to ash tuff in the northeastern part of the property. In the extreme northeastern area of the claims, this unit is interlayered with greywacke and augite andesite agglomerate.

The fragments are subangular to subrounded, 4 to 15 mm in size, composed of tuffaceous material and comprise 30 to 40% of the rock. The matrix is fine grained and tuffaceous.

This rock types appears to be unaltered. Locally fractures have been filled with silica and minor amounts of carbonate. Pyrite was seldom observed.

Sub-unit 2b - Ash tuff (massive, laminated, crystal and/or lithic). Thinly bedded, aphanitic to fine-grained, light greenish-grey to dark grey and siliceous ash tuff predominate in the northeastern part of the claims. Ash tuff also outcrops in an area east of Friendly Lake in an old trench between Littlemore Friendly and Lost Horse Lake, and on the east side of Ta Hoola 9 claim. It is also interbedded with andesite tuff in the central part of the claims.

Locally, tiny plagioclase phenocrysts, 1 to 2 mm in size, are present. Elsewhere, in slightly coarser units, angular to subangular lithic fragments up to 3 mm can be observed.

Silica-carbonate and occasionally epidote stringers occur locally in fractures.

Pyrite content varies between 0.5 and 7% locally, and is present as finely disseminated grains or massive fracture fillings. Pyrrhotite occurs in minor amounts (1 to 2%) in a few of the outcrops.

Sub-unit 2c - Ash tuff conglomerate/breccia (siliceous). Observed in the southeastern part of Ta Hoola 2 claim, it occurs as greenish-grey beds sharply interfingering with ash tuff and andesite tuff. It comprises 60 to 70% angular to subangular tuff fragments 1 to 4 cm, in a very fine-grained, compact siliceous matrix.

Alteration consists of silica and carbonate fracture fillings. Pyrite content is generally 1 to 2% but can range up to 7% locally. It occurs as either disseminated grains in the matrix or as massive stringers in fractures. Pyrrhotite is also present in minor amounts (1 to 2%) as medium to coarse-grained disseminated clots, mainly within the matrix.

Sub-unit 2d - Siltstone (massive, laminated). This unit is found in the southern part of Ta Hoola 2 claim and is commonly interbedded with argillite, forming sub-unit 2e. Thin beds of siltstone are interlayered with ash tuff (2b) in the eastern part of Ta Hoola 9 claim.

This rock type occurs as light to dark grey, fine-grained, massive and laminated thin beds. It closely resembles an ash tuff, but is slightly coarser grained and less siliceous.

Alteration is not apparent, except locally where weak carbonate fracture filling has occurred.

Pyrite content of this unit is variable, but it is generally less than 0.5% and occurs as finely disseminated grains.

Sub-unit 2e - Argillite-siltstone (interbedded). This rock unit outcrops in the northeastern part of the claims as thin lenses interbedded with ash tuff and greywacke. The argillite is very fine-grained, dark grey to black, fissile and thinly but discontinuously interbedded with fine-grained massive and laminated siltstone (similar to sub-unit 2d).

The argillite is often recessive in outcrop.

The siltstone, which comprises about 60 to 70% of the rock type, weathers more prominently. It often slumped into the argillite layers, producing soft sediment deformation structures which are useful in determining stratigraphic tops.

No alteration was observed.

Pyritization is very weak, though some argillite bands are highly pyritiferous.

Sub-unit 2f - Siltstone-argillite conglomerate/breccia. The conglomerate /breccia is very limited in the sedimentary sequence, and was only observed in the northeastern part of the claims. It is massive, dark greyish-brown and comprises 60 to 70% subangular clasts of siltstone and argillite, 3 to 10 mm in size, supported in a fine- to medium-grained matrix of similar composition. It is probably derived from the erosion of siltstone and siltstone-argillite.

It is weakly carbonatized, which could be of either primary or diagenetic origin, or related to hydrothermal processes.

Pyrite content is generally less than 0.5%.

Map Unit 3:

Unit 3 consists mainly of epiclastic rocks comprising volcanic conglomerate interbedded with tuffwacke. They probably formed from mud flows or lahars produced during tectonic activity in a volcanic environment. The volcanic conglomerate is often gradational to the tuffwacke, although locally their contacts can be sharp and erosional.

Unit 3 rocks are interbedded with Unit 2 rocks throughout the northeastern part of the property, reflecting a dynamic sedimentary environment.

Sub-unit 3a - Volcanic conglomerate. This rock type frequently occurs in small lenses in the sedimentary sequence. It is massive, dark grey, and is composed of subrounded clasts consisting or about 30% siltstone, 20% argillite and 20 to 30% tuff in a fine-grained matrix. It differs from Sub-unit 2f in that it contains tuff fragments and the clasts are more rounded.

Alteration is not evident.

Pyrite content ranges between 0.5 to 1% and occurs as finely disseminated euhedral to subhedral grains in the matrix.

Sub-unit 3b - Tuffwacke. This is the second most abundant lithology in the sedimentary sequence. The tuffwacke is a massive, dark grey, medium to coarse-grained rock composed of 80% angular to subangular siltstone, argillite and tuff fragments, 2 to 8 mm in size. Locally fragments as large as 25 mm were observed. It is readily distinguished by its angular, black argillite fragments.

No alteration was observed.

Pyrite occurs sporadically as finely disseminated grains and overall is less than 0.5%.

Map Unit 4:

White to buff, massive, medium-grained, crystalline dolomite laced with thin chert ribbons was found in only one outcrop on Line 107+32N near 126+50E. It probably represents a brief reef-building episode in the geological succession.

No other occurrences of this rock have been reported in the area.

Map Unit 5:

Dark green, massive, medium- to coarse-grained diorite outcrops in several places on the property. Because of limited exposures, the mode of occurrence of this unit is not well known, other than it appears to be as dykes or small stocks intrusive into the rocks of Units 1 and 2. It could also be the result of "dioritization" of intrusive andesite.

The rock is composed of 30 to 40% mafics, comprising subhedral to euhedral augite and hornblende, and 60 to 70% anhedral plagioclase. Locally the diorite may be porphyritic, containing augite phenocrysts up to 5 mm in size.

Some of the diorite outrcrops appear to be unaltered. Locally the plagioclase has been saussuritized and the augite partially replaced by hornblende.

Pyrite content is generally less than 1%.

Map Unit 6:

Medium- to coarse-grained, massive microgranite porphyry (locally equigranular) stock occurs in the central part of Ta Hoola 1 and is approximately 1000 m in diameter.

The K-spar phenocrysts are subhedral to euhedral, 2 to 4 mm in size, often zoned and perthitic and comprise about 60% of the rock. The groundmass is a fine-grained granular aggregate of K-spar, plagioclase and quartz. Mafic minerals are rare and where present, consist of fine-grained anhedral grains of either hornblende or biotite.

The microgranite stock exhibits some textural and compositional variations. It is only slightly coarser grained in its central part. Megascopically the unit can be classified as a syenite, however the few thin sections examined have a quartz content that ranges between 7 - 10%. Some quartz flooding has occurred, indicated by small quartz veins occupying dilational fractures in the microgranite.

No alteration was observed. However, this might be obscured by the deep weathering the rock has suffered.

Pyrite was seldom observed, although the microgranite contains rusty grains which may have been pyrite or hematite.

Several outcrops of microgranite occur peripheral to the main stock at distances between 200 to 1000 m. These may be dykes, but the lack of exposure precludes the establishment of their structural relationship to the country rocks.

Map Unit 7:

Unit 7 rocks have been divided into two sub-units comprising augite andesite agglomerate and greywacke. They are coarsely interlayered with minor lapilli and ash tuff. These rocks occupy the extreme northeastern corner of the property.

Sub-unit 7a - Augite andesite agglomerate is commonly massive, coarse grained, grey to greenish-grey and consist of large subrounded fragments and bombs of scoriaceous and amygdaloidal augite andesite in a finer grained tuffaceous matrix of similar composition. The fragments range in size between 4 to 15 cm and comprise 20 to 50% of the rock. These rocks are very similar to Subsidiary Sub-unit 1e.

Alteration consists of moderate to strong pervasive carbonatization and weak chloritization.

Pyrite content is very low.

Sub-unit 7b - Greywacke is massive, medium to coarse-grained, grey to dark grey and composed of subangular to subrounded clasts of agglomerate, tuff, siltstone and argillite. Locally it contains interfingering layers of polymictic conglomerate consisting of subrounded clasts of siltstone, tuff and augite andesite agglomerate in a compact, fine-grained matrix. The conglomerate layers appear to be thin, both vertically and laterally.

Alteration consists primarily of carbonate, chlorite and minor sericite.

Pyrite was seldom observed.

Structural Geology

The Ta Hoola claims lie within a belt of complexly folded and regionally block faulted rocks. Poor outcrop exposure and the lack of marker beds precludes a detailed structural interpretation. Geological mapping and airphoto analysis indicates a dominant northwest structural grain that is consistent with the regional setting.

Folds:

The entire claim area has probably been folded, but only in the sedimentary rocks in the northeastern part of the claims can folding be inferred. Structural data show that the folds are tight and isoclinal. Overturned bedding, recognized in a few outcrops indicates the folds are also inclined. The fold axes are closely spaced, 25 to 300 m apart, and their general trend is parallel to bedding which strikes 120° to 140°. The plunge on the fold axes is not known.

Faults:

The rocks on the property have undergone block faulting as well as some strike slip faulting.

Block faulting of the rocks on the claims is inferred from airphotograph interpretation because poor outcrop exposure prevents direct observation. Some of the topographic lineaments observed on the airphotographs are taken as reflections of block faulting for the following reasons.

(1) The lineaments, some of which have a pronounced resistivity expression, coincide with abrupt changes in lithology, alteration or structure.

(2) Rocks of different ages are juxtaposed along these lineaments.

(3) Shearing and slickensiding on joint surfaces and narrow breccia or strong fracture zones are present in outcrops exposed along or near these lineaments.

Where slickensides were observed, the movement appears to have been vertical with virtually no rotational component. No fault surfaces were sufficiently exposed to ascertain the relative movements of the fault blocks.

Numerous small strike slip faults were observed in the trenches excavated in 1982. The trends of these faults are variable, striking north, west, northwest, and northeast. The dips are usually steep (80° to 90°), although locally some of the fault zones are nearly horizontal. The last displacement appears to be parallel to strike as indicated by horizontal slickensides.

Locally, some of the faults and associated shear zones exhibit oblique slip faulting where the dip component is very small relative to the strike component.

These faults are probably secondary or late stage faults. Some of them have been healed by a late stage hydrothermal assemblage of quartz-carbonate-richterite ± chalcedony and subsequently cross-cut by other faults, or exhibit post-mineralization displacement evidenced by slickensiding of richterite. These faults may reflect structural adjustments related to the intrusion of the diorite and microgranite stocks and accompanying brecciation, during reactivation of deep-seated structures.

Schistosity:

South of Friendly Lake, the volcanic rocks have developed a weak to moderate schistosity which commonly trends 110° to 130° and dips south 55° to 90°. One shear zone 2 m wide, striking 130° and dipping 80° NE, was observed locally. The cause of the foliation in this area is not apparent.

North of Friendly Lake, the volcanic rocks within 200 m of the microgranite stock are weakly to strongly schistose. The schistosity parallels the stock margin and dips between 30° to 80° away from the intrusion.

Elsewhere on the property, the volcanic rocks possess a variable schistosity with steep dips.

Joints:

Joints are present in many outcrops, as moderately to steeply dipping conjugate sets. However, insufficient data and poor outcrop exposure preclude an evaluation of their relationship to the folds and faults.

Glacial Geology

Approximately 70% of the claim area is covered by glacial overburden ranging between 1 to 10 m in thickness. The direction of the last ice movement was from north-northwest to south-southeast. This was deduced from a few glacial striae found in scattered outcrops on the claims.

The glacial overburden consists of a thin discontinuous layer of impervious blue-grey lodgement till overlain by outwash deposits. Glacial erratics are common.

MINERALIZATION AND ALTERATION

Introduction

The alteration and mineralization found in the Ta Hoola and RO claims area is believed to be the result of two disparate plutonic events. The first event, related to Upper Triassic volcanism in the Quesnel Trough, resulted in numerous small dioritic plugs intruding comagmatic volcanic rocks in the property area. A second, much younger, plutonic event, possibly Jura-Cretaceous (?) or younger (?) in age emplaced the microgranite stocks found in the project area.

The first plutonic event is believed to be responsible in part for the arsenic, molybdenum and copper mineralization; and accompanying carbonate and silica alteration found in Areas 1 to 4 on the Ta Hoola 2, 4 and 9-12 claims.

In the Quesnel Trough, dioritic intrusives are spatially and temporally associated with copper with minor gold (Afton).

The microgranite stock, which outcrops on the Ta Hoola 1 and 2 claims, was emplaced during the second stage of plutonism, and crackle-brecciated and biotite-hornfelsed the indurated volcanic country rocks.

Zoned (?) molybdenum, copper and silver-lead mineralization accompanied subsequent (sodium?) metasomatism and hydrothermal alteration of the volcanic rocks in the central part of the Ta Hoola and RO claims. The apparent metal zoning in this area may be related to the microgranite stock, or to a buried intrusive centred below the area of molybdenum mineralization (Rebagliati, pers. comm., 1982).

The widespread silver-lead mineralization found in Area 5 on the RO claims is unique in the Quesnel Trough and is known only in the Ta Hoola project area (Rebagliati, pers. comm.). It is believed to be related to (sodium?) metasomatism associated with the intrusion of the microgranite stock. Other silver-lead showings in the project area are associated with similar rocks.

The types and occurrences of the mineralization and alteration in the project area will be described in further detail below.

Target Definition

The exploration targets are bulk-tonnage base and precious metal deposits. The potential exists for finding any or all of the following deposit types in the project area:

(1) Bulk-tonnage silver and lead ± copper deposit.
(2) Gold-rich porphyry copper deposit.
(3) Porphyry copper-molybdenum deposit.

Sulphide Mineralization and Alteration

Sulphide mineralization on the Ta Hoola and RO claims consists of galena, chalcopyrite, bornite, molybdenite, pyrrhotite and pyrite occurring as fine-to coarse-grained disseminations or as thin fracture fillings. Pyrite is the most widespread sulphide mineral, occurring in variable amounts ranging from trace to 7%. In many parts of the property, it is impossible to determine whether the pyrite is syngenetic or epigenetic in origin.

Most of the rocks on the Ta Hoola and RO claims exhibit varying degrees and types of alteration.

On the claims, the areas of the strongest alteration host sulphide mineralization and generally occur in andesitic pyroclastics and flows. Five areas with base and precious metal mineralization are discussed below.

<u>Area 1</u>

Ta Hoola 9 claims, Lines 15+00SE to 19+00SE between 12+00NE and 16+00NE.

Minor amounts of pyrite with trace amounts of chalcopyrite occur in pervasively and vein carbonatized, brecciated augite andesite crystal lapilli tuffs. The extent of the mineralization and brecciation is unknown due to lack of outcrop.

<u>Area 3</u>

Ta Hoola 4 claim, Littlemore Friendly Lake Grid

The basalts underlying this area are mineralized and altered. Pyrite occurs as dusty to fine-grained subhedral disseminated grains and varies between trace up to 15% locally. Three alteration assemblages are present.

(1) Pervasive chloritization-carbonatization ± epidotization (related to regional metamorphism and/or deuteric processes).

(2) Patchy, granular and fracture-controlled calcite ± silica ± albite alteration.

(3) Fracture-controlled calcite ± richterite ± hematite ± chalcedony stringers and veins.

Arsenic, molybdenum and copper mineralization, with minor silver and lead coincide with strong pyritization and Type 2 alteration. Some chalcopyrite and a few specks of molybdenite were observed in the most pyritiferous rocks.

The mineralization lies between a large northwest-striking regional topographic lineament (fault) on the west and by the volcanic-sedimentary interface on the east. Diorite stocks outcrop to the south and southwest on Ta Hoola 6 claim, however a positive aeromagnetic anomaly immediately to the southeast of Area 3 suggests the presence of a buried (diorite?) stock.

<u>Area 4</u>

Ta Hoola 2 claims, Lines 101+22N to 121+96N between 120+00E and 132+00E.

Moderately to strongly pyritiferous and siliceous interbedded andesite pyroclastics and epiclastic rocks occur in the central (lines 109+76N to 113+40N) and northern (lines 117+08 to 119+52N) parts of this area, immediately east of a probable major structural break which partially coincides with the volcanic-sedimentary interface. The high silica content may be primary, or more likely, epigenetic since strike-equivalent rocks to the south and between Lines 113+42N and 117+08N are less siliceous and pyritic.

Moderate to strong, fracture-filling and patchy epidotization and carbonatization occur locally in the siliceous rocks between Lines 109+76N and 113+42N. Pyrrhotite is present up to 5% locally, as medium- to coarse-grained disseminated clots.

Arsenic with minor molybdenum and copper mineralization is associated with the strongly siliceous and pyritiferous rocks.

Area 5

Ta Hoola 3 and RO 29, 31, 32 claims, Lines 93+90N to 103+00N between 101+00E and 114+00E.

This area is underlain by biotite-hornfelsed, crackle-brecciated, metasomatised and hydrothermally altered andesite tuffs which have been exposed in old trenches excavated by Anaconda.

The biotite-hornfels is most evident within a 200 to 300 m wide zone adjacent to the microgranite stock. The hornfels is characterized by the formation of very fine-grained biotite (and possibly hornblende) which lends a very dark green to black colour to the rock. The hornfelsing was produced by contact metamorphism related to the intrusion of the microgranite stock.

The rocks in this area and parts of Ta Hoola 1, 2 and 4 claims, peripheral to the microgranite stock exhibit a distinctive crackled or brecciated appearance, characterized by angular fragments, 5 to 50 mm in size, and their lack of apparent rotation. The close correlation between the distribution of the crackle-breccia and the hornfels suggests that both formed synchronously with the intrusion of the microgranite.

The crackle-brecciated, hornfelsed rocks have been flooded and partially replaced by a fracture-controlled metasomatic (skarn?) chlorite-carbonate-pyroxene-richterite ± chalcedony ± albite assemblage. A hydrothermal assemblage comprising cross-cutting carbonate-chlorite-richterite-chalcedony stringers and veins was superimposed on the metasomatic alteration.

Argentiferous galena, and traces of chalcopyrite are intimately associated with the metasomatic alteration.

Area 6

RO 15-18 and Ta Hoola 1 claims.

The extent of mineralization and alteration in this area is unknown owing to a lack of outcrop. In nearby outcrops, minor amounts of pyrite, chalcopyrite and galena occur in crackle-brecciated and biotite-hornfelsed andesitic pyroclastic adjacent to the microgranite stock. Some carbonate-chlorite-richterite, and silica fracture-filling stringers were observed in a few outcrops.

Other Alteration

All the volcanic rocks in the project area exhibit weak to moderate, pervasive chloritization and carbonatization, probably the result of low-grade regional metamorphism.

Chlorite and silica stringers are present in fractured outcrops of volcanic rock, especially within the crackle-brecciated zone surrounding the microgranite stock. This alteration may be related to hydrothermal activity and locally can be intense.

A broad zone of pervasive carbonatization is present south of Friendly Lake. The cause of the alteration is not readily apparent, although there is a prominent northeast-trending topographic lineament (possibly reflecting a fault) present. The andesitic tuffs in this region are also foliated and sheared in many places. The alteration could be related to these structural features in some way.

Several small zones of relatively strong epidotization (up to 5% of the total rock) were found on Ta Hoola 2 and 3 claims outside of Areas 4 and 5. The epidote occurs in clots, patches or in fractures. Only one outcrop is pervasively epidotized.

Epidotization is spatially associated with zones of 3% to 7% pyrite, carbonatization and copper anomalies in soils.

GEOCHEMISTRY

Introduction

Soil, stream sediment and rock geochemical samples were collected on the Ta Hoola and RO claims. All samples were analyzed for copper, lead, silver and in certain areas, zinc, molydenum and arsenic. All the samples were shipped to Acme Analytical Laboratories Ltd. in Vancouver, where Mr. Dean Toye, B.Sc., Certified B.C. Assayer supervised the analyses. All sample pulps have been retained for possible future use.

Soil

Soil samples collected on the Ta Hoola claims were analyzed for copper, lead, silver, and in specific areas, arsenic, molybdenum and zinc. The results of the soil geochemical survey are shown on Drawings TA2-6 to 11 and TA2-13 to 17 (in map pockets). The anomaly thresholds were established by statistical (Ruck, 1981) and empirical methods.

A total of 1,974 soil samples were collected on the grids at 50 m intervals on lines spaced 100 m apart. Some of the samples were also taken along compass lines and roads throughout the property (Drawings TA2-18 and TA2-19, in map pockets).

The samples, weighing approximately 450 g were collected in numbered wet-strength kraft paper bags from the "B" horizon. Where necessary, notes pertaining to the sample location and drainage direction were made at each sample site. The samples were air dried prior to shipment.

All samples analyzed for copper, lead, silver, molybdenum, zinc and arsenic were screened to minus 80 mesh and split into 5 g samples for analysis by induced coupled spectrometry (ICP).

Stream Sediments

Stream sediment samples were collected from Four Pound Creek and Jim Creek on the Ta Hoola 1-6 Grid, and from the drainage system on the Ta Hoola 9 Grid. The sampling was done on a trial basis to assess the usefulness of sediments in an effort to identify areas with mineralization potential. The samples were analyzed for arsenic, silver, lead, copper and molybdenum (Drawings TA2-3 and TA2-17). The stream sediments from creeks draining areas with soil anomalies, contained elevated metal contents, indicating their usefulness in confirming areas of potential mineralization.

A total of 82 stream sediment samples were taken at 100 - 200 m intervals along the main streams and upstream from the junction of tributaries (Drawings TA2-18 and TA2-19).

The samples, weighing approximately 1 kg were collected in numbered perforated olefin bags and air dried prior to shipment.

The samples were screened to minus 80 mesh. A 5 g split sample was analyzed for arsenic, silver, lead, copper and molybdenum by ICP.

Rock

A total of 775 rock samples were analyzed for silver, lead copper, molybdenum, zinc and arsenic (by ICP). These samples include 117 continuous (1 m) chip samples from outcrops and old trenches in the vicinity of rock and soil anomalies found in 1981 (Appendix A); (Drawing TA2-20); and 658 continuous (1 m) chip samples each weighing 2-3 kg from four trenches excavated by SMD Mining in September, 1982 (See "Trenches").

GEOPHYSICS

Introduction

Induced polarization and resistivity, ground magnetometer and VLF-EM surveys were performed on the Ta Hoola 1-6, Ta Hoola 9 and Littlemore Friendly Lake Grids. A total of 80 km were surveyed between June and August, 1982.

The induced polarization (I.P.) and resistivity survey was conducted by Phoenix Geophysics Ltd., and the magnetometer and VLF surveys were done by SMD Mining in-house geophysical crews.

Induced Polarization Survey

The I.P. and Resistivity survey was undertaken to detect any metallic mineralization not detected by previous work and to further evaluate the source of geochemical anomalies (Drawings TA2-21 to TA2-24).

A Phoenix Model IPV-1 I.P and Resistivity Receiver unit in conjunction with a Phoenix Model IPT-1 I.P. and Resistivity Transmitter unit were used, measuring the apparent resistivity and degree of "ground" polarization at frequencies of 4.0 Hz and 0.25 Hz. The apparent resistivity measurements (the reciprocal of conductivity) are normalized in units of ohm-m and the polarization measurements are recorded as percent frequency effect (P.F.E.). Metal factor values (M.F.) which related the degree of polarization to the apparent resistivity of a rock mass, are calculated according to the formula:

$$M.F. = (P.F.E. \times 1000)/Resistivity$$

A dipole-dipole electrode array was used exclusively, with an inter-electrode spacing of 50 m. Four dipole separations were recorded.

The I.P. and Resistivity survey results are the subject of another report being submitted by P. Cartwright (Appendix B) (also see "References").

Ground Magnetometer Survey

The ground magnetics survey was undertaken to:

(1) aid in mapping the different lithological units

(2) indicate the presence of hidden fault zones

(3) determine if and where alteration has significantly affected the magnetic pattern of the rocks.

The survey employed a Geometrics G816 proton precision magnetometer. Readings were taken at 25 m intervals along grid lines spaced approximately 100 m apart, and were corrected for diurnal drift using a Canadian Mining Geophysics MR-10 base station recorder. Instrument drift was checked by running the magnetometer traverses in closed loops.

The magnetic survey results shown on Drawings TA2-25 and -26 and TA2-35 and -36 (in map pockets), are reported separately by R. Matthews in Appendix C of this report.

VLF-EM Survey

The VLF-EM survey was performed to locate major fault zones and the presence of conductive sulphide mineralization, particularly in the vicinity of geochemical anomalies (Drawings TA2-27 to TA2-36).

A Geonics EM-16 unit was employed and measurements of the in-phase and quadrature components of the primary field were recorded for both Seattle, Washington (18.6 kHz) and Cutler, Maine (17.8 kHz) at a 25 m station spacing.

The results of the VLF survey are reported separately by R. Matthews in Appendix C of this report.

GEOCHEMICAL AND GEOPHYSICAL SURVEY RESULTS

Six areas of primary interest have been identified by geological, soil geochemical and geophysical surveys. Areas 1 and 2 are located on the Ta Hoola 9 Grid (Drawings TA2-35). Areas 3 to 6 are located on the Main Grid (Drawing TA2-37).

Area 1

Ta Hoola 9 claim, Lines 15+00SE to 19+00SE between 12+00NE and 16+00NE

A lead soil anomaly with weakly supportive silver values overlie moderately (pervasive and veined) carbonatized augite andesite crystal lapilli tuffs.

Outcrops in this area have been brecciated and subsequently veined with quartz-calcite.

The soil anomalies also coincide with a possible weak VLF conductor and a relatively low magnetic response encompassed by a larger area of higher magnetic intensity. P.F.E. response directly over the area is low, but is relatively higher on the southwest and northeast flanks of the soil anomalies. A moderately high resistivity response corresponds with the P.F.E. low, whereas pronounced resistivity lows occur on the flanks of the soil anomalies.

Area 2

Ta Hoola 12 claim, Lines 6+00SE to 12+00SE between 13+00NE and 20+00NE

A strong lead-zinc-arsenic anomaly with supportive copper and silver contents were found in an area believed to lie near the volcanic-sedimentary interface.

Although there are no outcrops in this area, the underlying rocks are thought to be augite andesite agglomerate and flow breccia.

Stream sediments from the stream draining the anomalous area contain low, but supportive metal contents.

The soil anomaly coincides with a strong VLF-EM conductor and a pronounced I.P. response (high P.F.E. and low resistivity). The magnetic response is not definitive.

Areas 1 and 2 are interpreted to be possible source areas within a much larger geochemically anomalous area. Other potential source areas may be identified by extending the detailed surveys to the north and south.

Area 3

Ta Hoola 4 claim, Littlemore Friendly Lake Grid

A strong rock geochemical arsenic anomaly supported by elevated molybdenum, lead and copper concentrations was partly delineated by trenching by SMD Mining in 1982.

The weak soil geochemical response in this area may be partly explained by the presence of a relatively impervious blue-grey lodgement till layer (exposed in the trench) which overlies the bedrock. The widely spaced soil samples indicate that the arsenic extends southeastward for about 3.5 km to merge with the arsenic anomaly on the Ta Hoola 9 Grid.

The mineralization occurs in pyritic, carbonate, minor silica (?) altered mafic volcanic rocks. The extent of the altered rocks is unknown since outcrop is limited to the trenches. Another trench, excavated by Anaconda in 1966, is located about 450 m north of SMD's trench and contains virtually unaltered basaltic andesite.

The zone lies between two primary structural features, a large northwest-striking regional fault to the west (inferred from airphoto interpretation and geophysical data) and the volcanic-sedimentary interface to the east.

The zone has a strong, positive magnetic signature (due to the magnetite content of the rock) and lies within a broader area of high magnetic response. The ground magnetic response corroborates the aeromagnetic results.

I.P. and VLF-EM results are not definitive.

Area 4

Ta Hoola 2 claim, Line 101+22N to 121+96N between 120+00E and 132+00E.

An arsenic soil anomaly with weakly supportive molybdenum and copper contents coincides with an area of high resistivity immediately east of the volcanic-sedimentary interface.

The underlying interbedded pyroclastic and epiclastic rocks are moderately to strongly siliceous, and locally show moderate to strong epidotization, carbonatization and pyritization. The high silica content may be primary or more likely, epigenetic. The rocks are moderately pyritic, particularly in the southern part of the area, and locally pyrrhotitic.

A positive magnetic anomaly located in the vicinity of Line 112+20N, 130+00E on the eastern flank of a resistivity high, probably reflects the high pyrrhotite content in the rocks and corresponds to a small but high contrast P.F.E. anomaly.

The large resistivity anomaly corresponds with the distribution of strongly siliceous rocks.

A northwest-trending resistivity "low" and coincident VLF conductor, located west of the arsenic anomaly, corresponds to the position of a major fault zone inferred from geological mapping and airphoto interpretation.

Area 5

Ta Hoola 3 and RO Claims

Several coincident silver, lead and copper soil anomalies occur in an area partially explored by trenching, and diamond drilling by Anaconda between 1966 and 1968, and by additional trenching by SMD Mining in 1982 (see Trenches).

Outcrop is restricted to the trenches where low-grade silver-lead mineralization occurs in strongly crackle-brecciated, hornfelsed, faulted, fractured and altered (pyroxene-calcite-feldspar ± richterite ± silica) andesitic tuff. The mineralization occurs in and between the lobes of the soil anomalies which may reflect a much larger mineralization zone partially masked by geochemically unfavourable overburden conditions.

The magnetic response over the area is generally low, possibly reflecting the alteration observed in the rocks (i.e., destruction of magnetite).

Several frequency effect "highs" underlie or occur on the fringes of the soil anomalies. A pronounced resistivity "trough" (Drawing TA2-22) corresponds with the position of a regional topographic lineament which passes through the core of the geochemical anomaly.

A prominent VLF conductor, apparently striking northwest, correlates with a large fault zone exposed in the trenches. Lesser VLF conductors correlate with some of the P.F.E responses.

Area 6

RO Claims

Two coincident copper-silver anomalies occur in this area. They overlie crackle-brecciated and hornfelsed volcanic rocks adjacent to the main micrgranite porphyry stock.

No geophysical surveys were performed in this area.

TRENCHES

Introduction

Four trenches, totalling 631 m in length, were excavated and chip sampled by SMD Mining in 1982 (Drawing TA2-37 to TA2-40). One trench, located at percussion hole 74-18 within Area 3 on the Ta Hoola 4 claim, was dug to further assess the mineralization discovered in outcrop exposed in an old Anaconda trench and percussion drill cuttings (Hole 74-18) discarded by Esso Minerals (1974).

The other three trenches were excavated on the RO claims between Lines 96+00N to 102+00N of the Main Grid to assess the characteristics and distribution of silver-lead mineralization previously discovered in Anaconda's diamond drill holes and trenches.

The trenching cost approximately 23.00/linear metre and includes direct costs such as the machine hours, fuel, mob/demob, and room and board, but not sampling costs.

Results

<u>Littlemore Friendly Lake Trench</u> (Area 3)

This trench, comprising 220 m was excavated in two sections essentially at right angles to each other (Drawing TA2-37).

Mineralization was originally discovered by SMD Mining in 1981, in a grab sample of carbonatized and strongly fractured basalt and in Esso Minerals' discarded percussion drill cuttings. The samples contained anomalous concentrations of copper (175-571 ppm), molybdenum (33-76 ppm) and arsenic (141-300 ppm).

A northwest-trending zone of mineralization was exposed in two sections of the trench, one in the north wing, the other in the east wing (Drawing TA2-37). The north wing mineralization ranges between 128 and 514 ppm Cu, 10 and 88 ppm Mo, and 40 to 600 ppm Au over 20 m in strongly fractured and brecciated, and intensely carbonate-altered magnetite-rich basalt. Alteration, which occurs in granular patches and irregular veins, is predominantly carbonate consisting of calcite with minor silica and albite. Pyrite occurs as dusty to fine-grained, subhedral disseminated grains and comprises about 10% of the rock (up to 15% locally). The mineralization in the north wing is "open" to the north.

The east wing mineralization ranges between 1.5 and 3.9 ppm Ag, 160 and 508 ppm Cu, 107 and 843 ppm Mo, and 100 and 390 ppm As across 21 m. The rocks have been strongly fractured and altered. Alteration consists of pervasive chloritization, carbonatization and epidotization, superposed by patchy, granular and fracture controlled calcite ± silica ± albite alteration. Some richterite and hematite is present in late stage calcite-quartz veins. Pyrite content ranges between 3 to 5% and is fine-grained and disseminated.

Further work is required to assess the potential in this area.

Trench 96 (96+25N, 108+85E; Area 5)

The trench, located on the Main Grid in the southeast corner of RO 32 claim was excavated to investigate the southern extension of the silver-lead-copper soil anomaly located in the area of Trenches 100 and 101.

Andesite flows and tuffs overlain by a 1-10 m thick blue-grey, boulder clay till, were exposed for a length of 50 m (Drawing TA2-38).

The rocks are weakly to moderately fractured and altered. Alteration consists of weakly pervasive chloritization, silicification and epidotization with superposed epidote ± carbonate ± quartz veining observed in sample intervals TA-2-0-8685 to 8687.

Pyrite and pyrrhotite contents vary between trace to about 1%. The pyrite occurs as fracture fillings and as fine-grained disseminated, subhedral grains. Pyrrhotite is disseminated in fine to medium-grained clots.

The only significant mineralization found was in fragments of a 15 cm (estimated) wide quartz vein in strongly chloritized volcanic rock removed from the flooded southeastern end of the trench. The samples contained 0.6% Cu, 1.7% Pb and 68.3 ppm Ag.

Trench 100 (100+65N, 107+00E; Area 5

Located on the RO claims between Lines 100+00N near 106+50E and 101+22N, 107+75E of the Main Grid, this trench, comprising 231 m, extends and crosses the west end of an old Anaconda trench adjacent to Anaconda's diamond drill holes 66-2 and 68-3 (Drawing TA2-39). Both holes intersected low-grade silver-lead mineralization.

The trench exposes mainly fractured, faulted, crackle-brecciated, mineralized, and altered biotite hornfelsed andesitic tuffs. Alteration is moderate to strong and comprises three main types:

A. Pervasive carbonate-chlorite-epidote
B. Pervasive and patchy fracture-controlled chlorite-carbonate-pyroxene-richterite ± chalcedony ± albite (with relic biotite hornfels fragments)
C. Carbonate-chlorite ± richterite ± chalcedony veining

A tan-coloured, very siliceous (felsic?) hematitic, fine-grained, brecciated and bedded rock outcrops in two sections of the trench (sample locations TA2-0-8510 and TA-2-0-8664 to 8667). The fragments consist of angular to subangular ash tuff and biotite-hornfelsed andesitic crystal tuff, and exhibit graded bedding. The rock is probably an intraformational ash-tuff breccia. Because of its distinctive character and lack of alteration, it could serve as a marker horizon.

The strongest mineralization appears to be associated with Type B alteration in crackle-brecciated rocks. Galena is intergrown with a chlorite-carbonate-pyroxene-richterite-chalcedony-albite assemblage which flooded and permeated outwards from fractures in the crackle-brecciated rocks.

Pyrite is generally less than 1% and is usually fine-grained and disseminated.

The trenching substantiated the presence and character and extended the limits of the mineralization intersected in holes 66-2 and 68-3.

Trench 101 (101+52N, 106+05E; Area 5

This trench, located on the RO claims between Lines 101+22N, 105+50E and 102+44N near 106+50E of the Main Grid, strikes N 55°E and is about 125 m long.

Anaconda intersected silver-lead mineralization in diamond drill hole 67-4 which was collared adjacent to the trench (Drawing TA2-40).

The trench exposes fractured, faulted, crackle-brecciated and biotite hornfelsed andesite tuffs and minor flows.

Alteration types and intensities, as well as the character of the galena mineralization are similar to those observed in Trench 100 located about 100 m to the southeast.

The trench confirmed the presence and character of the alteration, brecciation and mineralization encountered in hole 67-4.

Trenches 101 and 102 confirmed the presence and character of the silver-lead mineralization in the area, and demonstrated it to be more widespread than previously indicated.

Table 1 lists the assay results of selected rock chip samples from Trenches 100 and 101 which contained at least 15 ppm silver and/or 4,000 ppm lead. The silver:lead ratios are also tabulated. The overall ratio is 1:1.27 with individual sample silver:lead ratios ranging between 0.32:1 and 2.37:1.

More work is needed in Area 5 to assess its potential.

TABLE 1

Silver-Lead Assays of Selected Chip Samples
Trenches 100 and 101 on the RO Claims

Location	Sample No. TA20-	Assays Ag (oz/ton)	Pb (%)	Silver:Lead Ratio
TRENCH 101	8312	0.65	0.59	1.10
	8339	0.31	0.55	0.58
	8340	0.42	0.68	0.62
	8341	0.52	0.56	0.93
	8342	0.06	0.10	0.60
	8343	0.67	0.60	1.12
	8344	0.65	0.44	1.48
	8353	0.59	0.36	1.64
	8360	0.46	0.79	0.58
	8366	0.69	0.61	1.13
	8370	1.10	1.70	0.65
	8371	0.29	0.50	0.58
	8372	0.66	0.94	0.70
	8373	0.10	0.31	0.32
	8374	0.61	1.09	0.56
	8375	0.76	1.60	0.475
	8376	0.63	1.32	0.48
	8377	0.29	0.68	0.43
	8385	0.49	0.90	0.54
	8390	0.51	0.61	0.84
	8395	0.72	1.42	0.51

Location	Sample No. TA20-	Assays Ag (oz/ton)	Pb (%)	Silver:Lead Ratio
	8396	0.94	1.54	0.61
	8401	0.79	1.21	0.65
	8404	0.53	0.39	1.36
	8405	0.41	0.34	1.21
	8427	0.39	0.76	0.51
	8434	0.57	0.68	0.84
	8435	0.79	0.54	1.46
TRENCH	8437	0.44	0.75	0.59
100 - North	8442	1.88	3.27	0.575
Section	8443	0.79	1.44	0.55
	8444	1.03	2.04	0.505
	8445	1.39	2.93	0.47
	8450	0.41	0.88	0.47
	8466	0.55	0.95	0.58
	8476	0.41	0.79	0.54
	8489	0.39	0.28	1.39
	8490	0.40	0.30	1.33
	8511	0.43	0.56	0.77
	8515	0.82	1.20	0.68
	8518	0.65	0.50	1.30
	8522	2.83	2.42	1.17
	8523	1.22	1.68	0.73
	8524	1.74	3.22	0.54
	8525	0.47	0.63	0.75
	8526	0.23	0.27	0.85
	8527	0.22	0.26	0.85
	8528	1.02	1.24	0.81
	8529	0.63	1.05	0.60
	8530	0.94	1.26	0.75
	8531	0.40	0.51	0.78
	8532	0.59	0.93	0.63

Location	Sample No. TA20-	Assays Ag (oz/ton)	Pb (%)	Silver:Lead Ratio
	8533	0.95	1.46	0.65
	8534	0.31	0.48	0.65
	8535	1.20	1.61	0.75
	8536	0.84	0.86	0.98
	8537	0.68	0.75	0.91
	8538	0.80	0.77	1.04
	8539	0.31	0.30	1.03
	8541	0.67	0.82	0.82
TRENCH	8602	0.48	-	-
100 -	8607	1.53	1.83	0.84
East Section	8608	0.39	0.55	0.71
	8609	0.59	0.78	0.76
	8610	0.61	0.60	1.02
	8611	0.39	0.38	1.03
	8612	0.35	0.32	1.09
	8613	0.27	0.26	1.04
	8614	0.70	0.85	0.82
	8620	0.76	0.56	1.36
	8621	1.39	1.06	1.275
	8622	0.45	0.19	2.37
	8626	0.54	0.45	1.20
	8627	0.52	0.41	1.27
	8639	0.83	0.65	1.28
	8640	1.03	0.85	1.21
	8641	0.04	0.01	4.00
	8643	2.21	2.20	1.00
	8644	3.10	3.22	0.96
	8647	0.83	1.31	0.63
	8649	0.75	1.01	0.74
	8650	0.16	0.18	0.89

OVERALL Ag:Pb RATIO - 1:1.27

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APPENDIX A

ROCK GEOCHEMICAL ANALYSES

Mineralized or Altered Grab Samples From the Ta Hoola Claims

Sample #	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	As ppm
TA2-0-9001	2	96	15	65	.3	84
TA2-0-9002	3	42	3	26	.2	27
TA2-0-9003	1	50	3	8	.2	12
TA2-0-9004	3	73	3	11	.5	10
TA2-0-9005	1	121	62	156	2.2	21
TA2-0-9006	1	53	9	58	.1	12
TA2-0-9007	1	76	11	71	.2	300
TA2-0-9008	4	3	12	58	2.8	2
TA20-9010	1	40	3		.1	23
TA20-9011	51	355	34		1.0	238
TA20-9012	1	73	6	11	.2	30
TA20-9013	2	22	4	17	.1	16
TA20-9009		33	58	36	.4	65
TA20-9014		16	4826	15	25.8	14
TA2R-9015		139	21	112	.4	9
TA20-9016		12	2	19	.1	2
TA20-9017		102	7	42	.7	18
TA20-9018		78	8	24	.8	10
TA20-9501	2	8	3	6	.1	6

Continuous (1m) Chip Samples From the Ta Hoola 1-6 Claims

Sample #	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	As ppm
TA20-8000	4	39	3	20	.3	25
TA20-8001	53	571	41	109	2.1	227
TA20-8002	33	175	22	109	1.1	141
TA20-8003	35	189	39	74	1.4	261
TA20-8004	52	257	35	94	1.3	282
TA20-8005	51	203	25	87	1.0	182
TA20-8006	64	271	37	109	1.5	300
TA20-8007	50	279	33	99	1.4	290
TA20-8008	76	371	41	303	1.7	222
TA20-8009	60	223	34	120	1.7	264
TA20-8010	53	214	33	106	1.3	247
TA20-8011	50	246	42	84	1.2	300
TA20-3012	2	62	4		.3	4
TA20-8013	2	64	3		.1	16
TA20-8014	2	44	6		.2	10
TA20-8015	3	38	5		.3	13
TA20-8016	1	123	4		.3	5
TA20-8017	2	96	4		.3	5
TA20-8018	2	68	3		.3	4
TA20-8019	1	67	5		.1	2
TA20-8020	2	246	3		.5	7
TA20-8021	1	208	7		.4	5
TA20-8022	1	224	6		.5	2

Continuous (1m) Chip Samples From the Ta Hoola 1-6 Claims

Sample #	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	As ppm
TA20-8023	5	144	4		1.2	44
TA20-8024	2	99	3		1.2	27
TA20-8025	5	58	4		.1	40
TA20-3026	2	70	4		.2	45
TA20-8027	6	12	4		.2	110
TA20-8028	3	15	8		.3	130
TA20-8029	4	72	1		.3	18
TA20-8030	4	21	5		.1	26
TA20-8031	5	36	4		.1	54
TA20-8032	3	38	3		.1	32
TA20-8033	2	45	2		.2	84
TA20-8034	4	66	4		.1	35
TA20-8035	2	54	4		.3	76
TA20-8036	5	46	2		.3	56
TA20-8037	6	98	4		.2	50
TA20-8038	5	68	1		.3	180
TA20-8039	2	40	2		.1	21
TA20-8040	4	88	4		.3	44
TA20-8041	2	30	3		.2	16
TA20-8042	1	60	3		.3	64
TA20-8043	1	36	3		.4	12
TA20-8044	1	80	3		.4	11
TA20-8045	1	12	3		.2	16
TA20-8046	1	34	3		.4	6
TA20-8047	6	86	4		.4	3
TA20-8048	4	58	2		.5	9
TA20-8049	3	38	4		.4	23
TA20-8050	1	45	4		.3	14
TA20-8051	2	42	5		.2	14
TA20-8052	1	30	3		.2	7
TA20-8053	1	44	3		.3	6
TA20-8054	1	46	4		.4	8
TA20-0855	2	48	4		.4	8
TA20-8056	1	43	3		.5	4
TA20-8057	3	32	4		.4	8
TA20-8058	1	45	4		.4	10
TA20-8059	2	29	4		.3	9
TA20-8060	1	42	3		.3	14
TA20-8061	1	38	3		.2	14
TA20-8062	3	26	2		.2	13
TA20-8063	42	285	66		1.2	6
TA20-8064	8	245	46		1.0	4
TA20-8065	14	192	20		1.2	4
TA20-8066	3	128	168		5.8	6
TA20-8067	9	180	118		4.1	8
TA20-8068	8	152	30		.7	4
TA20-8069	7	174	42		.8	2
TA20-8070	4	126	20		.6	6
TA20-8071	14	158	37		.8	2

Continuous (1m) Chip Samples From the Ta Hoola 1-6 Claims

Sample #	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	As ppm
TA20-8072	17	260	28		1.4	5
TA20-8073	10	357	34		.4	2
TA20-8074	4	109	26		.8	4
TA20-8075	10	191	26		.7	3
TA20-8076	26	204	34		.9	6
TA20-8077	46	254	47		1.0	5
TA20-8078	21	329	21		.9	8
TA20-8079	33	357	49		1.6	7
TA20-8080	19	226	10		.4	5
TA20-8081	14	303	37		1.1	7
TA20-8082	1	39	5		.1	11
TA20-8083	1	43	3		.1	12
TA20-8084	1	22	6		.1	13
TA20-8085	2	30	2		.1	25
TA20-8086	6	71	4		.1	2
TA20-8087	4	59	29		.3	3
TA20-8088	7	48	7		.5	3
TA20-8089	4	52	13		.2	2
TA20-8090	1	40	7		.1	36
TA20-8091	11	28	5		.2	13
TA20-8092	1	34	3		.1	15
TA20-8093	1	32	3		.1	8
TA20-8094	9	140	19		1.2	3

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ICP GEOCHEMICAL ANALYSIS

A .500 GRAM SAMPLE IS DIGESTED WITH 3 ML OF 3:1:3 HCL TO HNO3 TO H2O AT 90 DEG.C. FOR 1 HOUR. THE SAMPLE IS DILUTED TO 10 MLS WITH WATER.
THIS LEACH IS PARTIAL FOR: Ca,P,Mg,Al,Ti,La,Na,K,W,Ba,Si,Sr,Cr AND B.   Au DETECTION 3 ppm.
AU1 ANALYSIS BY AA FROM 10 GRAM SAMPLE.   SAMPLE TYPE - ROCK CHIPS

DATE RECEIVED SEPT 7 1982   DATE REPORTS MAILED Sept 15/82 ASSAYER [signature] DEAN TOYE, CERTIFIED B.C. ASSAYER

S.M.D.C.   PROJECT # TA HOOLA   FILE # 82-1058   PAGE # 1

SAMPLE #	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm
TA-A	61	93	36	68	2.0	23	22	831	5.42	267	5	2	2	153	3	67	3	68	5.55	.12	3	73	2.76	41	.03	2	.49	.01	.68	2
TA-B	31	122	28	64	.8	25	34	865	5.84	270	4	ND	2	123	3	9	2	64	5.24	.14	3	65	2.40	42	.02	2	.42	.01	.52	2

Analyses of two grab samples from the Gold Zone in the Littlemore Friendly Lake Trench.

APPENDIX B

TA HOOLA IP/RESISTIVITY REPORT -

PHOENIX GEOPHYSICS

(Under Separate Cover)

APPENDIX C

TA HOOLA GEOPHYSICAL REPORT - R. Matthews, Ph.D.

TA HOOLA - GEOPHYSICAL REPORT

An In-house crew completed magnetic and VLF surveys on two grids within the Ta Hoola project area during the 1982 summer field season. The Ta Hoola 9 Grid is located in the southeastern part of the project area, south of Lost Horse Lake, and straddling claims Ta Hoola 9-12. The Ta Hoola Main Grid is located in the central portion of the Ta Hoola Project area, in the vicinity of Friendly Lake. The area surveyed is mainly incorporated within claims Ta Hoola 3 and 4.

VLF-EM results were obtained for both Seattle and Cutler, and have been presented as profiles, as well as contour maps of the Fraser filtered in-phase data (TA2-27 to -34). The magnetic results are presented as contour maps, with a contour interval of 200 gammas (TA2-25 and -26).

IP/resistivity coverage was completed by Phoenix Geophysics Ltd. on both these grids. Both the IP and resistivity data have also been filtered using the scheme discussed by Fraser (Geophysical Prospecting, 1981, 29, 639-651). This filter yields a single output value per station, which reflects all levels of the pseudosection, and is suitable for contouring in plan. Application of this filter also results in a shift of the anomalous response to a point overlying the source body. These field programs followed on an orientation program carried out the previous summer. Detailed mapping, as well as soil and rock geochemistry has been carried out in the survey area. Geophysical compilation maps (Drawings TA2-35 and 36, in map pocket) have been prepared for the two grids, and the results are discussed with particular reference to six geochemically anomalous areas.

Ta Hoola 9 Grid

The VLF results are very noisy, and in a number of cases can be related to topographic features. The profile data has been carefully screened with regard to anomaly shape and amplitude, quadrature response and possible topographic relationship. The Fraser filtered results proved to be a very useful aid in this screening process. The results for the Cutler transmitting station are particularly erratic and noisy, because of the poor grid orientation with respect to this station. In general the Cutler results correspond closely to topographic features, and have been generally used to eliminate any suspect anomalies from the Seattle dataset, i.e., to distinguish between current channeling and inductive effects. The most significant VLF anomalies are plotted on Drawing TA2-35. A number of potentially interesting VLF axes, generally trending north-south have been obtained from the Seattle results.

The magnetic results have outlined a complex magnetic high in the south-eastern corner of the grid. The overall pattern indicates a north-west trend, and a distinct magnetic gradient is observed in the eastern portion of the grid, possibly reflecting a contact between volcanic and sedimentary units.

The Fraser filtered IP and resistivity results have also been summarized on Drawing TA2-35. The IP background is high across the grid (>4%), indicating the presence of disseminated sulphide mineralization throughout the survey area. However, two distinctly anomalous areas (> 8%) have been defined; a fairly broad zone to the north, extending off the grid, and a smaller zone in the extreme south. The filtered resistivity data has outlined a resistivity high trending across the centre of the grid, possibly indicating the presence of a silicified unit. This high is flanked by two smaller highs, and a broad resistivity low is outlined in the north-west. This low corresponds approximately to the broad IP anomaly. Both the IP and resistivity results confirm a general north-south geological trend.

Two anomalous geochemical areas have been located within the grid (Areas 1 and 2) shown on Drawing TA1-35. Area 1 correlates with the magnetic high. It is also associated with a resistivity high, and appears to be flanked by a number of localized IP anomalies, with the strongest anomaly located to the southwest. A poorly defined curvilinear, VLF anomaly is seen to flank Area 1 to the west and north. Initially it was interpreted that this area is directly underlain by a basic plug. Although outcrop on the grid is sparse, the area seems to be characterized by brecciated, altered andesitic pyroclastics. This alteration would be consistent with the complex magnetic pattern observed.

The second geochemically anomalous area (Area 2) appears to have quite a different setting. It has no distinct magnetic association, apart from the fact it is located just to the west of the interpreted geological contact. This area however corresponds to an arm of the broad IP anomaly, and the flank of the broad resistivity low. It also correlates closely with a north-south strong VLF trend, and is indeed flanked to the west by a second VLF conductor axis. It is interpreted that the VLF anomalies, in particular in the vicinity of Area 2, are caused by sulphide mineralization concentrated along fractures and/or controlled by block faulting. This model could also account for the IP anomalies in this area. Thus a potentially excellent environment for mineralization has been defined. The indications are that Area 2 is open to the north, and it is recommended that the grid be extended to fully define this anomalous area.

In general a north to north-northeast geophysical trend is indicated. The geophysical pattern obtained also confirms the presence of block faulting thoughout the area. A possible east-west break is indicated cross-cutting the grid. The best evidence for this feature is observed in the disjointed pattern of VLF conductors in the central part of the grid. However some evidence for this break can also be seen in the IP and magnetic results.

The area to the immediate south of the grid would also appear to be potentially interesting, and further work in this area should be considered. The poorly defined resistivity high, located in the west part of the grid, which appears to be fracture controlled, also might warrant further study. This area, however, should be regarded as a lower priority target.

Ta Hoola Main Grid

The various datasets have been screened according to the procedures outlined in the preceding sections, and are summarized on Drawing TA2-36.

The VLF data obtained on the main grid is again very noisy, and demonstrates strong topographic correlation. The VLF conductors plotted on Drawing TA2-36 are judged to be true bedrock responses. A very complex pattern of VLF conductor axes is obtained from the Seattle results with a basic northwesterly trend. The area in the southwest corner of the grid appears to be particularly complex.

The magnetic results have defined the edge of a distinct magnetic high in the southeast corner of the grid. The area to the north of this high is characterized by a generally low magnetic signature, with a number of localized, but significant magnetic highs. A series of scattered magnetic highs is also observed in the western portion of the grid.

The overall IP background is of the order of 2%, significantly lower than that on Grid 9. However, the eastern portion of the survey area is dominated by two northwest-trending, extensively anomalous IP Zones (> 8%). A very distinct break is observed between the two zones. Two potentially interesting east-northeast trends are also observed in this part of the grid near DDH 66-3 and 250 m north of PDH 74-15. A few scattered anomalies were also obtained in the west-central portion of the grid.

The general pattern observed in the filtered resistivity data is a series of alternating highs and lows, again with a general northwest trend. Two very distinct northwest-trending lows traverse across the central part of the grid. Both the southwest and northeast areas of the grid exhibit complex responses with the northeast area being a little better resolved. Two fairly distinct resistivity highs have been defined, bounded by linear resistivity lows. A general northwest trend is apparent, disrupted by a northeast pattern.

The outlines of four geochemically anomalous areas (Areas 3-6) are also shown on Drawing TA2-36. Area 6, enclosing two coincident silver-copper soil anomalies, is located outside the survey area, and thus its geophysical relationship cannot be discussed in any detail. It is, however, located just to the south of a microgranite porphyry, outlined by previous geophysics and mapping, and should be regarded as a primary target area. The present geophysical coverage indicates that a strong, northwest-trending resistivity low, almost certainly representing a major structural break, extends into this area. A number of potentially interesting VLF conductors may also extend into this anomalous area.

Area 3 has been outlined on the basis of arsenic, molybdenum and copper mineralization found in outcrop. Although the geophysical coverage in this area is incomplete a definite correlation with the dominant magnetic high is observed. The magnetic high is interpreted to be caused by an intrusive plug. A resistivity low is indicated flanking this magnetic high, possibly reflecting the presence of a controlling structure. Note also the coincident break in the magnetic pattern at the west end of Line 93+90N. The magnetic high is also potentially controlled by an east-west structure, located to the north. Further geophysical coverage in this area is recommended to fully resolve the setting of the observed mineralization.

Area 4 encompasses an arsenic soil anomaly with weak molybdenum and copper concentrations, and is located in a very complex geophysical environment. A distinct northwesterly break in the geophysical results in observed directly to the west of this area. It is characterized by a distinct linear resistivity low, which correlates closely with a relatively strong VLF conductor, as well as a break in the anomalous IP pattern. This break is interpreted as a faulted contact between the sedimentary and volcanic units. The only evidence for this contact in the magnetic data is in the northern part of the area.

A second possible contact/fracture zone is indicated, east and parallel to the main break. This second feature is best represented in the VLF data. Area 4 in general corresponds to a zone of increased anomalous IP response (> 5%) and the best target within the area is located in the vicinity of line 112+20N (IP response > 11%). This target area is characterized by a discrete, strong magnetic high, and an apparent disruption in the VLF conductor axis. Pyrrhotite in outcrop has been observed in the vicinty of this magnetic high.

A resistivity high is located in the region, centred at 110+00N, 128+00E and occurs on the west flank of the strong IP anomaly (> 11%). A resistivity low corresponds with this IP anomaly and both are open to the east. The resistivity high is interpreted to be caused by a silicified unit, again with a northwesterly trend, and the IP anomaly is thought to reflect sulphides concentrated along fractures.

Area 5 outlines a complex pattern of coincident silver, lead and copper soil anomalies. This area is dominated on the geophysical compilation map by a broad, linear resistivity low trending northwest across the anomalous area. This low reflects a major structural disruption which extends to the northwest and southeast, and has a distinct topographic expression. A number of short strike-length VLF conductors also traverse the area. A series of IP anomalies (> 5%) are also observed in the western part of the area. It is interesting to note that these anomalies apparently form a rough circular pattern on the filtered IP map (Drawing TA2-21).

Three potentially interesting target areas have been located within this anomalous region: -

1. The area between percussion drill holes 74-10 and 11. This area is characterized by the best VLF response within the survey area, and cross-cuts the resistivity feature. It is possibly related to the IP anomaly located immediately west of the resistivity low.
2. The area south of diamond drill holes 67-6 and 7. Again a good VLF response was obtained, disrupted in the vicinity of the resistivity low. Two magnetic lows flank the east side of a confined IP anomaly.
3. The southwest corner of the anomalous area immediately north of Friendly Lake. There, a small magnetic high is flanked by weak VLF conductors. Coverage to the south is required to close off, and better define this anomalous pattern.

A number of other interesting features have been outlined on the Ta Hoola Main Grid. A second strong, northwest-striking linear resistivity low, possibly reflecting a parallel fault system, flanks the main low, and occurs west of Area 3. The extreme southwestern region appears to be particularly disrupted by faulting. A major structural break is indicated just north of Friendly Lake, and trends northeast through the boundary between Areas 3 and 4.

There is also some evidence for a second parallel, northeast-southwest structural break, e.g., in the disrupted VLF conductors and resistivity pattern in the central portion of the grid, and the drawn out pattern in the magnetic and IP data in the eastern part of the grid.

These features lead us to locate two other potentially interesting areas:-

1. The northeast-trending IP anomaly, flanking the dominant magnetic high, immediately north of Area 3.
2. The area located at the extreme western end of Friendly Lake. This area is characterized by a resistivity high, and a series of small magnetic highs and flanking VLF conductors.

Both these areas have an anomalous geochemical expression. A third possible target area is located north of drill holes 74-6 and 7. This area corresponds to a resistivity high, and is flanked by VLF conductors, reflecting block faulting. An area of anomalous IP responses is located 400 m farther to the north, and is flanked to the west by a complex series of magnetic lows.

Conclusions

The geophysical coverage has enabled us to define a number of major structural features within the survey area. The area is highly complex, but is in general characterized by a sequence of interbedded volcanic and sedimentary units, with a predominant northwesterly strike. Fracturing and block faulting is common throughout the area.

The anomalous geochemical areas have been discussed with regard to their geophysical relationship. Although each area differs in detail, some broad characteristics are indicated. Areas 1 to 4 are closely associated with a major geological contact. These four anomalous areas seem to fall into two groups. Areas 1 and 3 are characterized by a magnetic high flanked by IP anomalies and VLF conductors (resistivity high?), whereas Areas 2 and 4 seem to be associated more directly with VLF conductor axes, and IP anomaly and a resistivity low. However, neither of these two groups correspond exactly to a distinct pattern, but all four areas are potentially excellent areas for hosting mineralization.

Area 5 seems to have quite a different geophysical setting. It is associated directly with a series of short strike-length VLF conductors, as well as a poorly defined region of IP anomalies. All five areas represent good drill targets.

A number of other interesting target areas have been located on the two grids, and further work is recommended particularly south of the Ta Hoola 9 grid and in the vicinity of Area 3. It is hoped that the final interpretation of the IP and resistivity results being prepared by Phoenix Geophysics Ltd., will help better resolve some of these anomalous areas.

R.B. Matthews
Senior Geophysicist

APPENDIX D

EXPENDITURES ON THE TA HOOLA AND RO CLAIMS

STATEMENT OF COSTS
TA HOOLA 1-6, 13 CLAIMS

PHYSICAL WORK

Linecutting, chaining and flagging

BEMA Industries		
20.79 km @ $310/km	$ 6,444.90	
9 man days labor for extra clearing	1,605.00	
Equipment rental (3 days @ $125.40/day)	376.20	$ 8,426.10
SMD Mining Crews (42.3 km)		
11 man days @ $177/day	$ 1,947.00	
18 man days @ $150/day	2,700.00	
20 man days @ $101/day	2,020.00	
44 man days @ $75/day	3,300.00	
Chain saw rental - 20 days @ $12.50/day x 2 saws	500.00	
4 x 4 Truck (including rental, fuel, maintenance and repairs) - 25 days @ $47/day	1,175.00	
Camp Costs - 93 man days @ $35/day	3,255.00	14,897.00

Trenching

Backhoe Rental - 47.5 hrs. @ $80/hour	$ 3,800.00	
Fuel - 800 litres @ $0.40/litre	320.00	
Camp Costs - 6 man days @ $35/day	210.00	4,330.00
(1) **TOTAL PHYSICAL WORK**		$ 27,653.10

TECHNICAL FIELD WORK

Geological Survey

Geologist x 33 man days @ $177/day	$ 5,841.00	
Geologist x 19 man days @ $150/day	2,850.00	
Geological Technician x 2 man days @ $101/day	202.00	
Junior Assistant x 2 man days @ $75/day	150.00	

Trench (Geological) Mapping

Geologist x 12 man days @ $177/day	2,124.00	
Total Geological Survey		$ 11,167.00

Geochemical Surveys (soil, stream sediment, rock and trench sampling)

Soil Sampling		
11 man days @ $101/day	$ 1,111.00	
22 man days @ $75/day	1,650.00	2,761.00
Stream sediment sampling		
3 man days @ $101/day	$ 303.00	
6 man days @ $75/day	450.00	753.00
Rock sampling		
2 man days @ $177/day	$ 354.00	
14 man days @ $101/day	1,414.00	
32 man days @ $75/day	2,400.00	4,168.00
Trench sampling		
10 man days @ $150/day	$ 1,500.00	
13 man days @ $112/day	1,456.00	
18 man days @ $101/day	1,818.00	
9 man days @ $75/day	675.00	5,449.00

Analyses		
1347 soil samples (Ag, Pb, Cu, Mo, As and/or Zn by ICP) @ $4.00/sample	$ 5,388.00	
1347 soil sample prep. and pulverizing @ $1.75/sample	2,357.25	
57 stream sediment samples (Mo, Cu, Pb, Ag, As by ICP) @ $4.00/sample	228.00	
57 stream sediment sample prep. and pulverizing @ $1.75/sample	99.75	
117 rock samples (Cu, Pb, Ag, As, Mo and/or Zn by ICP) @ $4.00/sample	468.00	
117 rock sample prep. @ $2.50/sample	292.50	
232 trench rock samples (Cu, Pb, Ag, Mo, As by ICP) @ $4.00/sample	928.00	
2 trench rock samples by ICP @$5.50/sample	11.00	
234 trench sample prep and drying @ $3.50/sample	819.00	10,591.50
Shipping Costs		
Soil, stream sediments and rock samples	$ 366.35	
Trench rock samples	398.85	765.20
Total Geochemical Surveys		$ 24,487.70
<u>Geophysical Surveys</u>		
I.P./Resistivity (Phoenix Geophysics Ltd.) 59.55 km @ $490/km	$29,179.50	$ 29,179.50
Ground Magnetics Survey (59.55 km)		
14 man days @ $126/day	$ 1,764.00	
G816 Proton Magnetometer rental 14 days @ $10.90/day	152.60	
MR-10 Base Station Recorder rental 14 days @ $11.40/day	159.60	2,076.20
VLF-EM Survey (59.55 km)		
27 man days @ $126/day	$ 3,402.00	
EM-16 rental 27 days @ $10.30/day	278.10	3,680.10
Total Geophysical Surveys		$ 34,935.80

Field Support

Camp Costs (includes room and board, equipment rental, maintenance and repair)		
543 man days @ $35.00/day	$19,005.00	
Camp Cooks Wages		
70 man days @ $88/day	6,160.00	
14 man days @ $75/day	1,050.00	
4 x 4 Truck (includes rental, fuel, maintenance and repairs)		
110 days @ $47/day	5,170.00	
Total Field Support		$ 31,385.00

(2) TOTAL TECHNICAL FIELD AND SUPPORT COSTS $101,975.50

DATA COMPILATION, REPORT PREPARATION, PUBLICATION AND OFFICE SUPPORT

Geological Report			
Compilation	3 man days @ $177/day	$ 531.00	
	2 man days @ $313/day	626.00	
Writing	2 man days @ $177/day	354.00	
Drafting	5 hours @ $15.00/hr.	75.00	$ 1,586.00
Geochemical Report			
Compilation	2 man days @ $177/day	$ 354.00	
	6 man days @ $313/day	1,878.00	
Writing	3 man days @ $177/day	531.00	
Drafting	60 hours @ $15.00/hr.	900.00	3,350.00
Geophysical Report			
Compilation	1 man day @ $177/day	$ 177.00	
	4 man days @ $313/day	1,252.00	
	5 man days @ $300/day	1,500.00	
Writing	4 man days @ $177/day	708.00	
	3 man days @ $300/day	900.00	
Drafting	55 hours @ $15.00/hr.	825.00	5,362.00
Report Typing			
P. Wilson	40 hrs @ $10.51/hr.	$ 420.00	
Boardroom Business Services (Word processing)	4 hrs. @ $25.00/hr	100.00	520.40
Map Printing and Report Publishing Costs		$ 2,200.00	2,200.00

(3) TOTAL DATA COMPILATION, REPORT PREPARATION, PUBLICATION AND OFFICE SUPPORT — $ 13,331.40

GRAND TOTAL (Sum of (1), (2) and (3)) — $142,960.00*

* The amount recorded on October 15, 1982 was $80,000.00.

STATEMENT OF COSTS
TA HOOLA 9-12 CLAIMS

PHYSICAL WORK

Linecutting SMD Crew (4.4 km)		
5 man days @ $101/day	$ 505.00	
5 man days @ $75/day	375.00	
Flagging and Chaining (4.4 km)		
2 man days @ $75/day	150.00	
Chainsaw Rental		
6 days @ $12.50/day	75.00	
4 x 4 Truck (includes rental, fuel, maintenance and repairs)		
6 days @ $47/day	282.00	
Camp Costs		
12 man days @ $35/day	420.00	$ 1,807.00
(1) TOTAL PHYSICAL WORK		$ 1,807.00

TECHNICAL FIELD WORK

Geological Survey		
Geologist x 12 man days @ $177/day	$ 2,124.00	
Geologist x 6 man days @ $150/day	900.00	
Geological Technician x 6 man days @ $101/day	606.00	
Total Geological Survey		$ 3,630.00
Geochemical Surveys (soil and stream sediments)		
Soil sampling		
11 man days @ $101/day	$ 1,111.00	
23 man days @ $75/day	1,725.00	
		$ 2,836.00
Stream sediment sampling		
1 man day @ $101/day	$ 101.00	
2 man days @ $75/day	150.00	251.00
Analyses		
627 soil samples (Ag, Pb, Cu, Zn, As by ICP) @ $4.00/sample	$ 2,508.00	
627 soil sample prep and pulverizing @ $1.75/sample	1,097.25	
25 stream sediment samples (Ag, Pb, Cu, Mo, As by ICP) @ $4.00/sample	100.00	
25 stream sediment sample prep and pulverizing @ $1.75/sample	43.75	3,749.00
Shipping Costs	$ 151.00	151.00
Total Geochemical Surveys		$ 6,986.00
Geophysical Surveys		
I.P./Resistivity Survey (Phoenix Geophysics) 19.8 km @ $490/km	$ 9,702.00	$ 9,702.00
Ground Magnetics Survey (19.8 km)		
4 man days @ $126/day	$ 504.00	
G618 Proton Magnetometer Rental 4 days @ $10.90/day	43.60	
MR-10 Base Station Recorder Rental 4 days @ $11.40/day	45.60	593.20

VLF-EM Survey (19.8 km)		
6 man days @ $126/day	$ 756.00	
EM 16 rental		
6 days @ $10.30/day	61.80	817.80
Total Geophysical Surveys		$ 11,113.00
Field Support		
Camp Costs (includes room and board, equipment rental, maintenance and repairs)		
167 man days @ $35/day	$ 5,845.00	
Camp Cook's Wages		
36 man days @ $88/day	3,168.00	
4 x 4 Truck (includes rental, fuel, maintenance and repairs)		
30 days @ $47/day	1,410.00	
Total Field Support		$ 10,423.00
(2) TOTAL TECHNICAL FIELD AND SUPPORT COSTS		$ 32,152.00

DATA COMPILATION, REPORT PREPARATION, PUBLICATION AND OFFICE SUPPORT

Geological Report			
Compilation	1 man day @ $177/day	$ 177.00	
	1 man day @ $313/day	313.00	
Writing	1 man day @ $177/day	177.00	
Drafting	5 hours @ $15.00/hr.	75.00	$ 742.00
Geochemical Report			
Compilation	3 man days @ $177/day	$ 531.00	
	3 man days @ $313/day	939.00	
Writing	1 man day @ $177/day	177.00	
Drafting	45 hours @ $15.00/hr.	675.00	2,322.00
Geophysical Report			
Compilation	2 man days @ $177/day	$ 354.00	
	2 man days @ $313/day	626.00	
	3 man days @ $300/day	900.00	
Writing	2 man days @ $177/day	354.00	
	2 man days @ $300/day	600.00	
Drafting	35 hours @ $15.00/hr.	525.00	3,359.00
Report Typing			
P. Wilson	24 hrs @ $10.51/hr.	$ 252.24	
Boardroom Business Services (word processing)	3 hours @ $25.00/hr.	75.00	327.24
Map Printing and Report Publishing Costs		$ 1,300.00	1,300.00
(3) TOTAL DATA COMPILATION, REPORT PREPARATION, PUBLICATION AND OFFICE SUPPORT			$ 8,050.24
GRAND TOTAL (Sum of (1), (2) and (3)			$ 42,009.24*

• The amount recorded on October 15, 1982 was $35,200.00

STATEMENT OF COSTS
RO 15-18, 29, 31, 32 CLAIMS

PHYSICAL WORK

Trenching

Backhoe Rental		
116 hours @ $80/hr.	$ 9,280.00	
Fuel		
1600 litres @ $0.40/litre	640.00	
Camp Costs		
12 man days @ $35/day	420.00	$ 10,340.00

(1) TOTAL PHYSICAL WORK	$ 10,340.00

TECHNICAL FIELD WORK

Trench (Geological) Mapping and Supervision

Geologist x 7 man days @ $177/day	$ 1,239.00	
Party Chief x 6 man days @ $150/day	900.00	
Total Geological		$ 2,139.00

Trench Geochemistry

Sampling		
1 man day @ $177/day	$ 177.00	
10 man days @ $150/day	1,500.00	
16 man days @ $112/day	1,792.00	
16 man days @ $101/day	1,616.00	$ 5,085.00
Analyses		
404 rock samples (Cu, Pb, Ag, Mo, As by ICP) @ $4.00/sample	$ 1,616.00	
404 rock sample prep and drying @ $3.50/sample	1,414.00	3,030.00
Shipping Costs	$ 602.10	602.10
Total Trenching Geochemistry		$ 8,717.10

Field Support

Camp Costs (includes room and board, equipment rental, maintenance and repairs)		
71 man days @ $35/day	$ 2,485.00	
Camp Cook's wages		
15 man days @ $75/day	1,125.00	
4 x 4 Truck (includes rental, fuel, maintenance and repairs)		
20 days @ $47/day	940.00	
Total Field Support		$ 4,550.00

(2) TOTAL TECHNICAL FIELD AND SUPPORT COSTS $ 15,406.10

DATA COMPILATION, REPORT PREPARATION, PUBLICATION AND OFFICE SUPPORT

Geological and Geochemical Report			
Compilation 3 man days @ $177/day	$ 531.00		
1 man day @ $150/day	150.00		
Writing 2 man days @ $177/day	354.00		
Drafting 32 hours @ $15.00/hr.	480.00	$ 1,515.00	
Report Typing			
Boardroom Business Services (word processing) 2 hours @ $25.00/hr.	$ 50.00	50.00	
Map Printing and Report Publishing Costs	$ 251.00	251.00	
(3) TOTAL DATA COMPILATION, REPORT PREPARATION, PUBLICATION AND OFFICE SUPPORT		$ 1,816.00	
GRAND TOTAL (Sum of (1), (2) and (3)		**$ 27,562.10**	

APPENDIX E

PERSONNEL

TA HOOLA PROJECT STAFF

Name	Position	Activity	Rate/Day
C.M. Rebagliati	Exploration Manager	Geological Consulting	$313.00
P. Ruck	Geologist	Geological mapping, geophysical interpretation, linecutting, trenching, chip sampling, report preparation, project management.	$177.00
D. Chan	Geologist	Geological mapping, linecutting, report compilation.	$150.00
R. May	Geological Technician	Geological mapping, linecutting, soil, stream sediment, and rock chip sampling, trenching, data compilation, camp mob./demob.	$101.00
J. Graham	Junior Assistant	Soil, stream sediment and rock chip sampling, trenching, linecutting, geophysical data compilation.	$ 75.00
N. Lowe	Junior Assistant	Soil, stream sediment and rock chip sampling, trenching, linecutting, geophysical data compilation.	$ 75.00
S. Davies	Camp Cook		$ 88.00
J. Laidlaw	Geophysical Technician	Magnetic and VLF-EM survey, data reduction and compilation.	$126.00
G. Aust	Geophysical Technician	Magnetic and VLF-EM survey, data reduction and compilation.	$126.00
L. Lindinger	Party Chief	Trench mapping, rock chip sampling, data compilation, camp mob./demob.	$150.00
D. Bush	Senior Assistant	Trench mapping, rock chip sampling, data compilation, camp demob.	$112.00
J. Berger	Junior Assistant	Linecutting.	$ 75.00
B. Kramarchuck	Junior Assistant	Linecutting.	$ 75.00
L. Spoade	Camp Cook	Casual Employee.	$ 75.00
J. Lynds	Camp Cook	Casual Employee	$ 75.00

APPENDIX F

STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, Paul Ruck, of the Municipality of Burnaby, in the Province of British Columbia, hereby certify the following:

I am a geologist currently employed with SMD Mining Co. Ltd. at 330 - 1130 West Pender Street, Vancouver, B.C.

I am a Graduate of the University of Ottawa with a B.Sc. Geology (1978). I subsequently obtained the degree of M.Sc. Applied (Mineral Exploration) from McGill University in 1981.

I have worked as an exploration geologist while attending post-graduate school at McGill University.

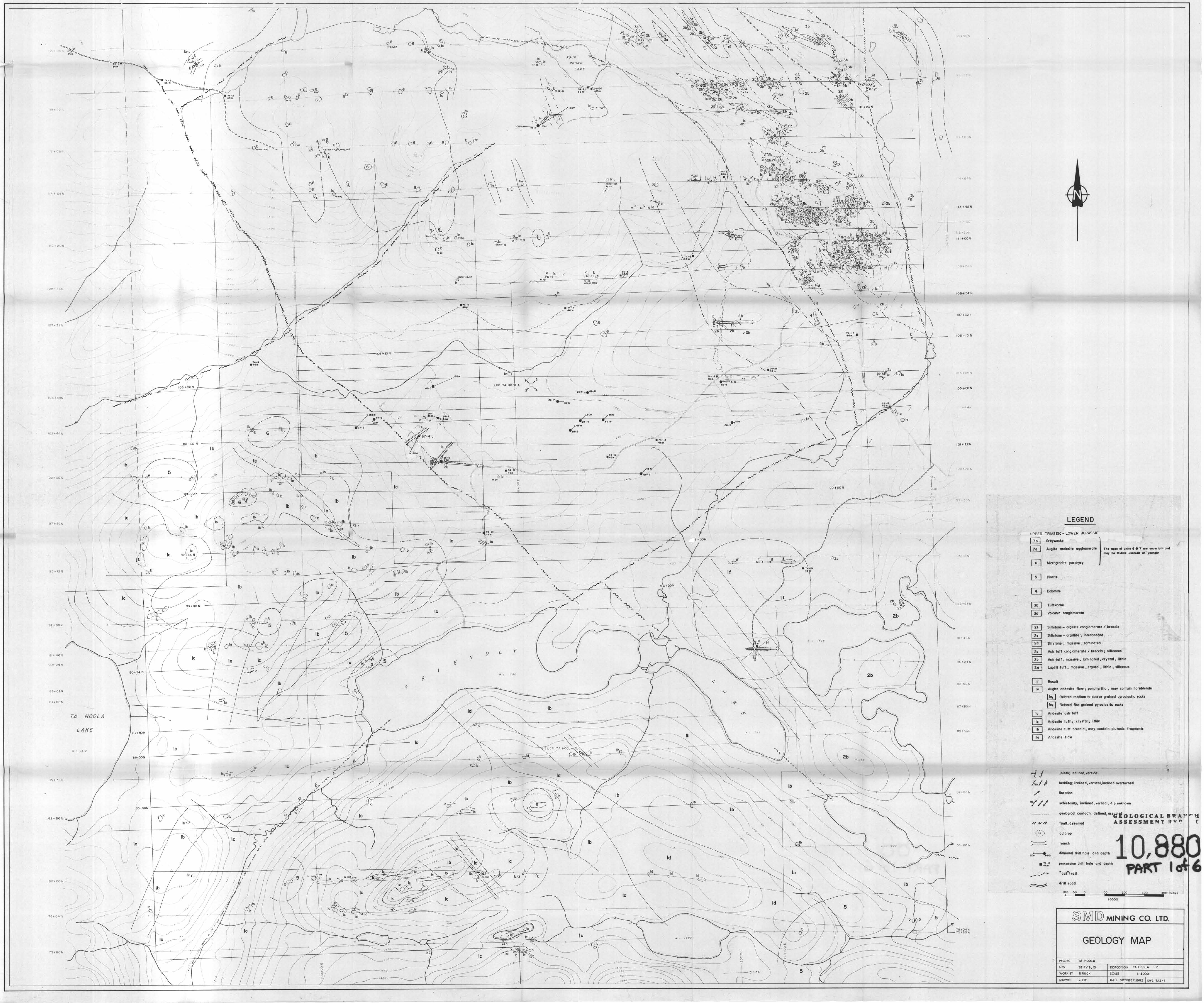
I am a member of the Canadian Institute of Mining and Metallurgy and the Geological Association of Canada.

I hold no interest in the properties or securities of SMD Mining Co. Ltd. nor do I expect to receive any interest directly or indirectly.

This report is based on work completed between May 25, 1982 and November 30, 1982, and upon the reports of the British Columbia Ministry of Mines.

Paul Ruck

Paul Ruck
November 30, 1982


FOUR POUND LAKE
LCP TA HOOLA
FRIENDLY LAKE
TA HOOLA LAKE
LEGEND
UPPER TRIASSIC - LOWER JURASSIC
7b Greywacke
7a Augite andesite agglomerate
6 Microgranite porphyry
The ages of units 6 & 7 are uncertain and may be Middle Jurassic or younger
5 Diorite
4 Dolomite
3b Tuffwacke
3a Volcanic conglomerate
2f Siltstone – argillite conglomerate / breccia
2e Siltstone – argillite ; interbedded
2d Siltstone ; massive , laminated
2c Ash tuff conglomerate / breccia ; siliceous
2b Ash tuff ; massive , laminated , crystal , lithic
2a Lapilli tuff ; massive , crystal , lithic , siliceous
1f Basalt
1e Augite andesite flow ; porphyritic , may contain hornblende
1e1 Related medium to coarse grained pyroclastic rocks
1e2 Related fine grained pyroclastic rocks
1d Andesite ash tuff
1c Andesite tuff ; crystal , lithic
1b Andesite tuff breccia , may contain plutonic fragments
1a Andesite flow
joints; inclined, vertical
bedding; inclined, vertical, inclined overturned
lineation
schistosity; inclined, vertical, dip unknown
geological contact; defined, assumed
fault; assumed
outcrop
trench
diamond drill hole and depth
percussion drill hole and depth
"cat" trail
drill road
100 50 0 100 200 300 400 metres
1:5000
GEOLOGICAL BRANCH ASSESSMENT REPORT
10,880
PART 1 of 6
SMD MINING CO. LTD.
GEOLOGY MAP
PROJECT TA HOOLA
NTS 92 P/9, 10
DISPOSITION TA HOOLA 1-6
WORK BY P. RUCK
SCALE 1:5000
DRAWN Z.J.W.
DATE OCTOBER, 1982
DWG. TA2-1

LEGEND

UPPER TRIASSIC – LOWER JURASSIC

7b	Greywacke	The ages of units 6 & 7 are uncertain and may be Middle Jurassic or younger
7a	Augite andesite agglomerate	
6	Microgranite porphyry	
5	Diorite	
4	Dolomite	
3b	Tuffwacke	
3a	Volcanic conglomerate	
2f	Siltstone – argillite conglomerate / breccia	
2e	Siltstone – argillite ; interbedded	
2d	Siltstone ; massive , laminated	
2c	Ash tuff conglomerate / breccia ; siliceous	
2b	Ash tuff ; massive , laminated , crystal , lithic	
2a	Lapilli tuff ; massive , crystal , lithic , siliceous	
1f	Basalt	
1e	Augite andesite flow ; porphyritic , may contain hornblende	
$1e_1$	Related medium to coarse grained pyroclastic rocks	
$1e_2$	Related fine grained pyroclastic rocks	
1d	Andesite ash tuff	
1c	Andesite tuff ; crystal , lithic	
1b	Andesite tuff breccia , may contain plutonic fragments	
1a	Andesite flow	

joints; inclined, vertical
bedding, inclined, vertical, inclined overturned
lineation
schistosity; inclined, vertical, dip unknown
geological contact; defined, assumed
fault; assumed
outcrop
trench
diamond drill hole and depth
percussion drill hole and depth
"cat" trail
drill road

GEOLOGICAL BRANCH
ASSESSMENT REPORT

10,880

PART 1 of 6

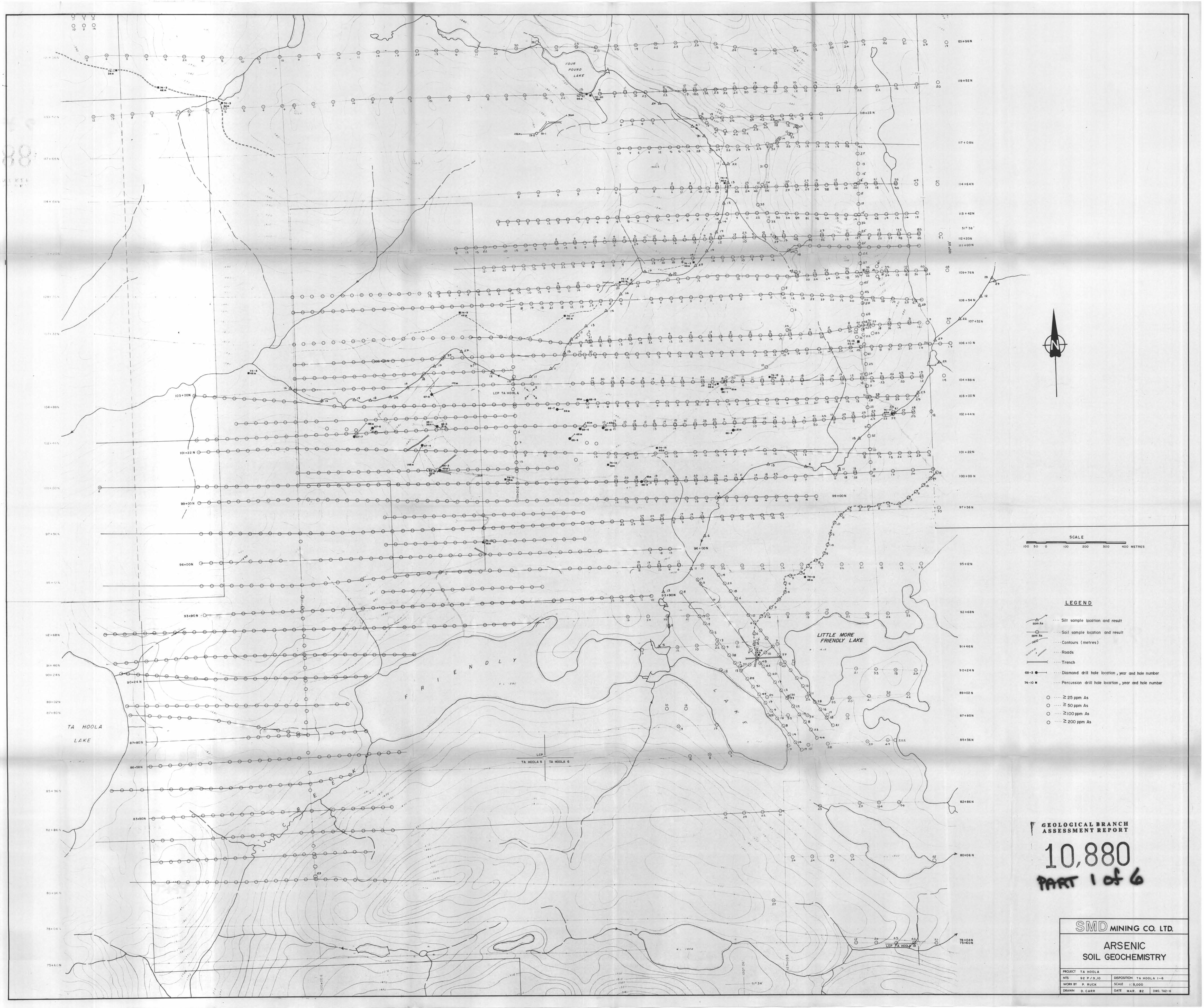
SCALE 1:5000

200 100 0 100 200 300 metres

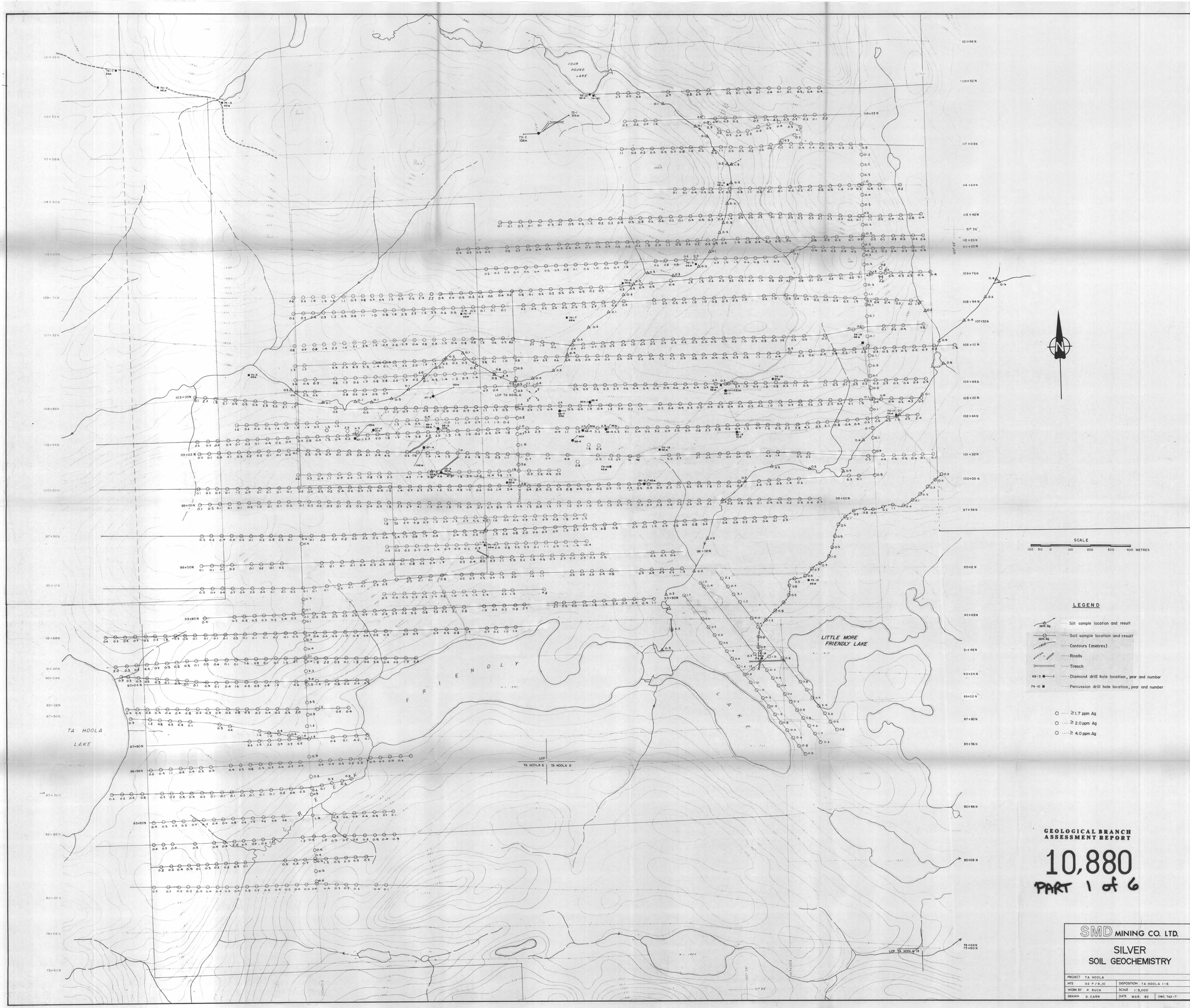
SMD MINING CO. LTD.

GEOLOGY MAP

PROJECT TA HOOLA			
NTS 92 P/10	DISPOSITION TA HOOLA 9-12		
WORK BY P. RUCK	SCALE 1:5000		
DRAWN SG	DATE AUG. 1982	DWG. TA2-2	



FOUR POUND LAKE
LITTLE MORE FRIENDLY LAKE
FRIENDLY LAKE
TA HOOLA LAKE
CREEK
LCP TA HOOLA 4
LCP
TA HOOLA 5
TA HOOLA 6
LCP TA HOOLA
SCALE
100 50 0 100 200 300 400 METRES
LEGEND
ppm As ···· Silt sample location and result
ppm As ···· Soil sample location and result
1410 ···· Contours (metres)
···· Roads
···· Trench
68-3 ···· Diamond drill hole location, year and hole number
74-10 ···· Percussion drill hole location, year and hole number
···· ≥ 25 ppm As
···· ≥ 50 ppm As
···· ≥ 100 ppm As
···· ≥ 200 ppm As
GEOLOGICAL BRANCH
ASSESSMENT REPORT
10,880
PART 1 of 6
SMD MINING CO. LTD.
ARSENIC
SOIL GEOCHEMISTRY
PROJECT TA HOOLA
NTS 92 P/9,10
DISPOSITION TA HOOLA 1-6
WORK BY P. RUCK
SCALE 1:5,000
DRAWN D. CARR
DATE MAR. 82
DWG. TA2-6


FOUR POUND LAKE
LITTLE MORE FRIENDLY LAKE
FRIENDLY LAKE
TA HOOLA LAKE
CREEK
LCP TA HOOLA
LCP
TA HOOLA 5
TA HOOLA 6
LCP TA HOOLA 13
SCALE
100 50 0 100 200 300 400 METRES
LEGEND
ppm Ag ···· Silt sample location and result
ppm Ag ···· Soil sample location and result
1410 ···· Contours (metres)
···· Roads
···· Trench
68-3 ···· Diamond drill hole location, year and number
74-10 ···· Percussion drill hole location, year and number
···· ≥ 1.7 ppm Ag
···· ≥ 2.0 ppm Ag
···· ≥ 4.0 ppm Ag
GEOLOGICAL BRANCH
ASSESSMENT REPORT
10,880
PART 1 of 6
SMD MINING CO. LTD.
SILVER
SOIL GEOCHEMISTRY
PROJECT TA HOOLA
NTS 92 P/9,10
DISPOSITION TA HOOLA 1-6
WORK BY P. RUCK
SCALE 1:5,000
DRAWN D. CARR
DATE MAR. 82
DWG. TA2-7