'77-#153-#

GEOPHYSICAL REPORT
CINDY CLAIM
48° 49'-30"N - 124°-11'W
Cowichan Lake Area, Victoria, M.D.

Owner: G. MacDonald

Work Done By: Canex Placer Limited

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6297

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PROFILES - COWICHAN LAKE PROPERTY, B.C.

Line 34N

Line 40N

Line 45N

Line 50N

Line 70N

Line 74N

Line 93N

Map #1 LOCATION OF GEOPHYSICAL LINES (at back of report in envelope) Fig. 2

CANEX PLACER LIMITED
EXPLORATION DIVISION

MEMO TO: D. C. Rotherham/W. S. Pentland/File 92-C-16(E) November 29, 1976

FROM: R. A. Rivera

RE: Geophysical Investigations in the Vicinity of the Blue Grouse Mine, Cowichan Lake, B.C.

BACKGROUND

The copper deposits on Blue Grouse Hill were first exploited prior to 1920 to yield a cumulative 2,113 s. tons of ore grading over 6% Cu. In 1954-57 the property, under the ownership of the Cowichan Lake Copper Co. Ltd., shipped another 15,451 s. tons trading 6.09% Cu and 0.5 oz/s. ton Ag of development ore prior to the commissioning of a mill (Shuttleworth, 1957). Total production to date has been 273,338 s. tons grading 2.95% Cu (Malcolm, 1965 and 1976), almost all from underground workings.

The property was evaluated by Placer during the excitement of the mid-1950s, when very encouraging results were being announced relating to the exploration and development activity on the property (Geo. Cross, 1956). For reasons of small size and other negative aspects, the company did not take a position on the property at that time (see correspondance in grid file).

Production ceased at the mine in the early 1960s and the property was allowed to lapse in the 1970s. Most recently, Mr. George MacDonald, brother of Mr. O.G. MacDonald who was president of Cowichan Copper Co. Ltd., has obtained control of the property and, in early 1976 offered the property to Canex Placer.

The lowest level in the Blue Grouse Mine (1100' level) was examined by Canex Placer geologists on June 7 and 8, 1976 (Pentland, 1976). Although no samples were obtained, the conclusion was reached that very little tonnage potential was represented by a 15.44% Cu sample obtained by the vendor from a crosscut near the face of this level (D. Rotherham, Pers. Comm.). Not willing to abandon the area entirely, and feeling that previous exploration work on the property had been primitive by today's standards, a small-scale geophysical trial survey was scheduled. Because of the massive sulfide nature of the targets and the moderately rugged terrain, the shootback E-M method was chosen as the main exploration tool, supplemented with VLF and magnetic surveys.

LOCATION

Accessability to the property is excellent as shown by figures 1a and 1b. Located on the northeast slope of a 1700 ft. elevation hill, the Blue

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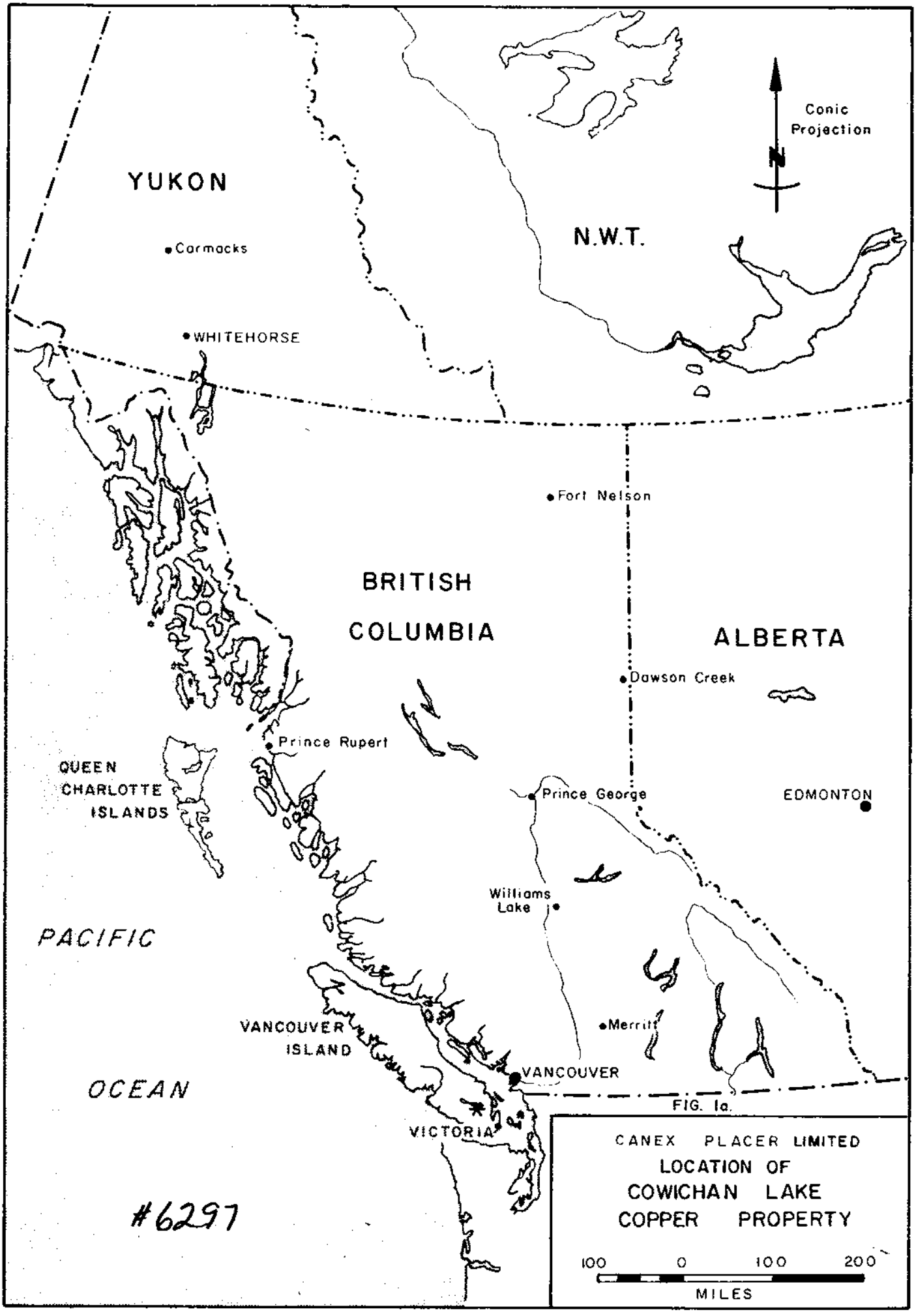
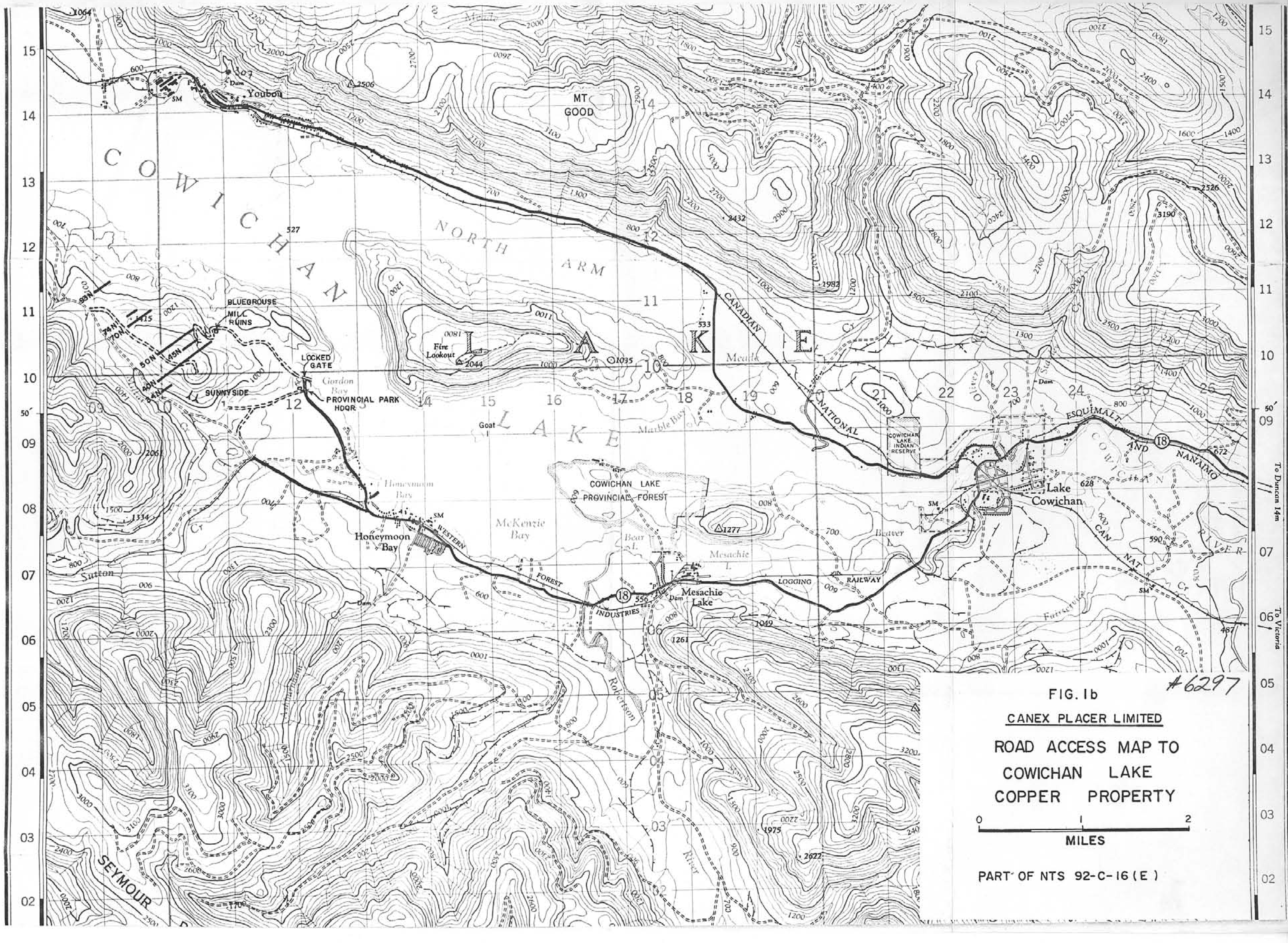

Conic Projection
N
YUKON
N.W.T.
Carmacks
WHITEHORSE
Fort Nelson
BRITISH COLUMBIA
ALBERTA
Dawson Creek
Prince Rupert
QUEEN CHARLOTTE ISLANDS
Prince George
EDMONTON
Williams Lake
PACIFIC
OCEAN
VANCOUVER ISLAND
Merritt
VANCOUVER
FIG. Ia.
VICTORIA
#6297
CANEX PLACER LIMITED
LOCATION OF
COWICHAN LAKE
COPPER PROPERTY
100 0 100 200
MILES



COWICHAN LAKE
NORTH ARM
Youbou
MT GOOD
BLUEGROUSE MILL RUINS
LOCKED GATE
SUNNYSIDE
PROVINCIAL PARK HQ
Fire Lookout
Honeymoon Bay
McKenzie Bay
COWICHAN LAKE PROVINCIAL FOREST
Mesachie Lake
Lake Cowichan
CANADIAN NATIONAL
ESQUIMALT AND NANAIMO
WESTERN FOREST INDUSTRIES
LOGGING RAILWAY
COWICHAN LAKE INDIAN RESERVE
SEYMOUR
To Duncan 14m
To Victoria
#6297
FIG. Ib
CANEX PLACER LIMITED
ROAD ACCESS MAP TO
COWICHAN LAKE
COPPER PROPERTY
0 1 2
MILES
PART OF NTS 92-C-16 (E)

Grouse Mine workings and the exploration area can be reached with a vehicle by either of two approaches as shown on figures 1b and 2. Accomodation can be obtained in the town of Lake Cowichan, 9 miles by paved road east of the property. Water for drilling is available from a small lake 3000 ft. east of the mill ruins, or from Cowichan Lake.

A network of now overgrown logging roads criss-crosses the entire property. These could be reopened at a very minimal cost since no significant earth moving would be involved.

PROPERTY

No investigations were made in this study to verify the ownership-of-record and validity of the claims on this property. According to Malcolm, 1976, eleven crown granted claims and a number of newly located units are involved.

GEOLOGY

The regional geology is described in Fyles, 1955 and the most detailed description of the property's geology is in Malcolm, 1965. A useful description of the mineralization is found in Shuttleworth, 1957. Briefly, the host rocks for the mineralization are the Franklin Creek volcanics and associated sediments (including intercalated limestone units), which are a subdivision of the Triassic Vancouver group. The Sutton limestone, another subdivision of the Vancouver group, overlies the Franklin Creek volcanics and is a potential host for scarn mineralization. The base of the Franklin Creek volcanics disconformably overlies the Permian and older Sicker group calcareous sediments.

Total thickness of the Franklin Creek sub-unit is thought to be in the range of 6000 to 10,000 ft. in the vicinity of the Blue Grouse property. The Sutton Limestone's thickness is quite variable, ranging to 500 ft.

The abundant exposures of Sutton limestone on the Blue Grouse property suggests that the mineralization is situated near the top of the Franklin Creek sub-unit. The predominantly basaltic rocks of this unit, the Sutton limestone and the argillaceous sediments overlying the Sutton limestone are the three major units mapped on the property.

Swarms and small irregular masses of feldspar porphyry intrusives cut the Vancouver series rocks in the mine area. These intrusives are thought to be related to the Saanich granodiorite of Upper Jurrassic/Lower Cretaceous age which is extensively exposed in southern Vancouver Island. The copper deposits on the property have been attributed to replacement of favourable stratigraphic units by hydro-thermal processes related to, but younger than, the feldspar porphyry intrusives. The intrusive rocks are especially prevalent near the ore zones, and have been seen to cut the mineralized bodies. While the development of a garnet-actinolite scarn in which many of the mineralized bodies are found is compelling evidence for this mode of origin,

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one zone (the E zone) has definite syngenetic characteristics (Shuttleworth, 1957, p 7). Clearly a volcanogenic mode of origin, with later remobilization, cannot be definitely ruled out; however, the absence of rhyolitic rocks in the Franklin Creek series would argue against such a model.

The sulfide mineral composition of the ore zones on the Blue Grouse property typically consists of chalcopyrite, pyrrhotite, pyrite and occasionally magnetite and sphalerite. These zones are typically small in size, being folded tabular bodies with two long dimensions in the order of several hundred feet and thickness in the order of 10 feet. The largest ore zone developed in the 1950s (H zone) had a tonnage of about 0.20 million s. tons grading 4.5% Cu (undiluted) (Shuttleworth, 1957, p 10).

AVAILABLE DATA--PREVIOUS EXPLORATION WORK

Unfortunately very little data has been made available for the evaluation of this property's potential. No detailed underground geologic maps (or engineering maps), and more importantly, no exploration diamond drill hole maps and logs are available to document the extensive exploration work done by the Cowichan Copper Co. A plan composit map of underground workings is presented at 1:2400 scale in Malcolm, 1965.

The base map used in this report (figure 2) for presenting the results and compiling other information was obtained from Malcolm, 1965. This is a 1:6000 scale geologic map of a 14 sq. mi. area centered on the mine property. Unfortunately, it appears that air photographs may have been used to generate this map and evidence for serious distortion of road positions was found in our work (compare figures 2 and 4). Another uncertainty is in the geologic interpretation. The geology given in Malcolm, 1976 does not agree in the Sunnyside area with that shown on the earlier map. It does not help matters to find that the map obtained from the B.C. Assessment Office in Victoria has some obvious, and perhaps some not-so-obvious, errors in colouring. (A black/white copy of this map gives only trends, since no symbols were used for the various mapped units).

Extensive self potential work was done on the property in the 1950s. The results of these apparently well-executed surveys are presented in various ways. (Note that the sign has been inverted in the SP data display so that the normal negative anomaly over a conductor is shown as a positive peak.) First, the results from the area including both the Blue Grouse and Sunnyside workings are given in Skerl, 1954. A portion of the upper access road, an unnamed portal (assumed to be the 1340 level) and a north arrow are the only ties to information shown on the base map. Second, the results from the area northwest of the Blue Grouse Mine were made available as three 1:600 scale work sheets by the vendor (see figure 5, a 1:1200 scale reduction of these maps). The only tie on these maps is a road/creek intersection at the extreme northwest end of the surveyed area (no north arrow provided). An attempt was made to compile these results on to Figure 2 so that the interrelationship of SP anomalies to our geophysical results could be assessed. In view of the above, an uncertainty of $\pm$ 150 ft. attaches to the plotted positions.

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The third presentation of SP results is in Malcolm, 1965. All closures of the 200 millivolt contour are compiled on to the 1:6000 scale geochemical map. The recompilation shown on figure 2 at a 300 mv threshold gives a more precise definition of the anomaly sources. The Malcolm map shows some anomalies off the areas covered in the previously mentioned two survey areas indicating that additional SP work is available in the Cowichan Copper Co. files. The vendor, Mr. MacDonald, reports that he himself obtained most of the SP data on the property.

The results of a cold extractable semiquantitative Cu, Co, Ni specific soil geochemical survey (Rubeanic Acid Paper method, D. Rotherham, Pers. Comm.) are shown in Malcolm, 1965. Samples were obtained mostly along roadways in a loose network of traverses. Widespread anomalous indications were obtained in areas remote from the known mineralization.

Two magnetic anomalies are reported in Malcolm, 1965. These, it turns out, were defined by compass deviations and, in view of the small anomalies encountered in our magnetic work, are not considered valid.

WORK DONE, EQUIPMENT, PROCEDURES, PRESENTATION

The property was visited by J.M. Thornton and the writer from September 8 - 11, 1976. A total of 1.8 line miles of shootback E-M, VLF and magnetic traversing was done on 6 parallel lines bearing N55°E and spaced as shown on figure 2. Control was by compass and chain tied to starting points on the network of roads shown on the base map. Pink, numbered flags were placed every 50 ft. along these lines.

The approach used was to obtain data over (a) the old workings to see if a response was obtained by the mineralized material left in the walls of stopes; (b) the "new" showing 2000 ft. south of the Blue Grouse Mine, and (c) the strong SP anomalies found by others northwest of the Blue Grouse Mine.

The shootback E-M unit used was a Crone CEM operated in the vertical loop transmitter mode with a 200 ft. coil separation and at two frequencies (1830 and 390 Hz). The short coil spacing gives only a 100 ft. depth of exploration for this survey, but is necessary for definition of the weak anomalies expected from the small targets. Both dip angle and field strength at null were recorded, summed and plotted at the midpoint between the coils. Readings were generally taken every 100 ft. along the line. It is apparent from the results that there is an offset of -2° in the inclinometers for the pair of coils used in this survey and the zero line for dip angle should be taken at -2°.

The VLF survey was made using a Crone Radem unit tuned into the nearby VLF transmitter NPG at Seattle. The very strong signal necessitated an attenuator setting at 008 on the amplifier of this unit. The direction to the transmitting station from our survey area is approximately 117° making the tilt angle measurement direction 027. This is 28° off the traverse direction of 055, close enough to yield anomalies for conductors trending with the expected 145° direction. Three parameters were measured at each 50 ft. station along the line, being: Dip angle of the coil axis from the vertical, maximum horizontal field strength and field strength at null.

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The magnetic field was measured at each 50 ft. station using a vertical component Scintrex MF-2 flux gate magnetometer. In keeping with the "profile only" use of the data, no diurnal corrections were applied. According to the NOAA preliminary reports, no magnetic storms were recorded during the period of this survey.

A short IP survey of our line 70N and a new line 74N was undertaken on September 17 by the vendor using Mr. Glenn White and his Huntec equipment. The survey was run using a dipole-dipole array with N=1 except for 2 readings taken at N=2. The results, presented on two profile sheets showing only resistivity and chargeability, were made available to us in October.

The data, including the IP results, are presented as a stack of profiles plotted over a geologic section along each line traversed and are attached here as 7 individual sheets. Line locations are shown in plan on figure 2, but no plan presentation of our results is given. In view of the two different versions of the geology described above, no contacts have been plotted on figure 2. The geology plotted on the profiles is that as shown in Malcolm, 1965.

RESULTS

General - Generally, the results can be described as negative. No significant anomaly was recorded by the shootback survey which leads to the conclusion that no significant massive sulfide mineralization is present within 100 ft. of the surface on the six traverses made. Taking -3^{o} as our minimum detectable resultant dip angle anomaly and taking into consideration the -2^{o} bias on the profiles, we find only one reading which could be classed as probably anomalous! (Line 70N, Sta 23E). Since this coincides with the estimated location of a 300 mv SP anomaly, we might consider the indication confirmed if it were not for the absence of VLF anomaly at the site.

The powerline running along the main road along the southwest side of the property caused problems on the west ends of the traverses. Its effect can be seen clearly as an increase in the "field strength at null" profiles of the shootback survey. Evidently a pulsed load was pulling power at about a ½ second period, making it very difficult to obtain nulls, particularly in the afternoon of September 9 (line 45N). This interference was particularly strong at 1830Hz so that the extreme west end of line 40N and all of line 34N were traversed using 390Hz and 5010 Hz instead.

A strong regional gradient is present in the VLF field which undoubtedly is due to topography. This can best be seen in the longer profiles, lines 40N, 50N and 70N. The VLF field is folded so as to be parallel to the earth's surface, thus giving an eastward tilt to the polarization ellipse axis on the western side of the hill and vice versa on the eastern side. Zero dip angles are observed only at the top of the hill. Surprisingly, there are very few VLF anomalies superimposed on this regional trend. The presence of carbonaceous shales, faults and sulfide bodies shown on the geologic map had led us to expect many anomalous events.

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The magnetic profiles are full of character as would be expected from a predominantly basaltic environment. Since the inclination of the earth's field is 71° at this site, interpretation of the magnetic results is fairly straightforward.

More specific interpretations follow:

Line 34N - The main selling point for this property was the "new" showing described as a 700 ft. long zone of bedded sulfides in a limey tuff on which trenching had determined a 7 ft. thickness grading 8% Cu (Malcolm, 1976). With some pains, this showing was found, 700 ft. due south of the location indicated by the vendor. (sketch of the geology is shown on figure 3). Line 34N was laid out to determine if a significant tonnage of sulfide mineralization was represented by the very small, high grade showing at the trench.

Unfortunately, the results are quite emphatic. No sizable sulfide deposit is present near the surface underneath the line itself. Some weak anomalies were encountered, however, which may represent thin mineralized zones. A 6° VLF event at 10+70E and the 240 gamma magnetic high at 11+60E are the more encouraging anomalies. A questionable VLF event at 13+00E may actually just represent a contact at 12+50E and the 340 magnetic high at 13+50 may be a normal event in the basaltic host rocks. Highly detailed magnetic and VLF surveys in the vicinity of this showing will undoubtedly clarify these relationships; however, the weakness of the responses is not very encouraging.

Lines 40N, 45N and 50N - It was desired to determine the geophysical responses in the immediate area of the Blue Grouse Mine. While the near surface mineralization has certainly been removed, we might expect some response from the lower grade margins left behind. Much scarn is still evident around the open stope which daylights near 45N, 33E.

In the electromagnetic results, only three weak and questionnable anomalies were found. The first is a 2° shootback EM anomaly on line 40N, Sta 32-50E near a 70 MV SP anomaly in a highly favourable geologic setting near the old workings. There is no confirmation of this even in either the VLF or magnetic results. If this anomaly represents massive mineralization, its size must be very small.

The second E-M anomaly is on line 50N, Sta 28+50E, being a 2° shootback event. Again, this coincides with a 650 MV SP anomaly in a favourable geologic environment and again, since there is no confirmation on the VLF and magnetic traces, the source is likely to be very small in size.

The third E-M anomaly is on line 50N, 30+20E being a 6° VLF crossover with some expression on the horizontal field strength. The geology is favourable, the magnetics are inconclusive and the shootback E-M is negative over this event which suggests that one of the mapped faults in the area is responsible.

The magnetic results on these 3 lines are full of information. The noisy

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NOTES

1. VERY WEAK SCARN DEVELOPMENT IN GREENISH VOLCANIC Rx. VERY MINOR SULFIDES.

2. ZONE OF 3 - 1FT THICK SCARN FINGERS. PYRITE WITH SOME Cu Ox STRAINS.

3. GARNET SCARN IN GREENISH CALC. SILICATE, SLIGHTLY METAMORPHOSED VOLCANIC Rx, SULFIDES BUT NO Cu NOTED.

4. PROBABLE SITE OF HIGH GRADE SAMPLE REPORTED BY MALCOLM. HIGH MASSIVE STYLE Py IN A GARNET SCARN 8 - 20 FT THICK. NOTED FAIR CHALCOPYRITE CONTENT BUT NOT ABLE TO BREAK THROUGH Mn Ox COATINGS TO GIVE CAREFULL LOOK.

SUMMARY

A GARNET SCARN WITH IRREGULAR SULFIDE CONTENT, OFTEN MASSIVE, IN A LIMEY INTERBED IN THE GREENISH FINE GRAINED VOLC. Rx.

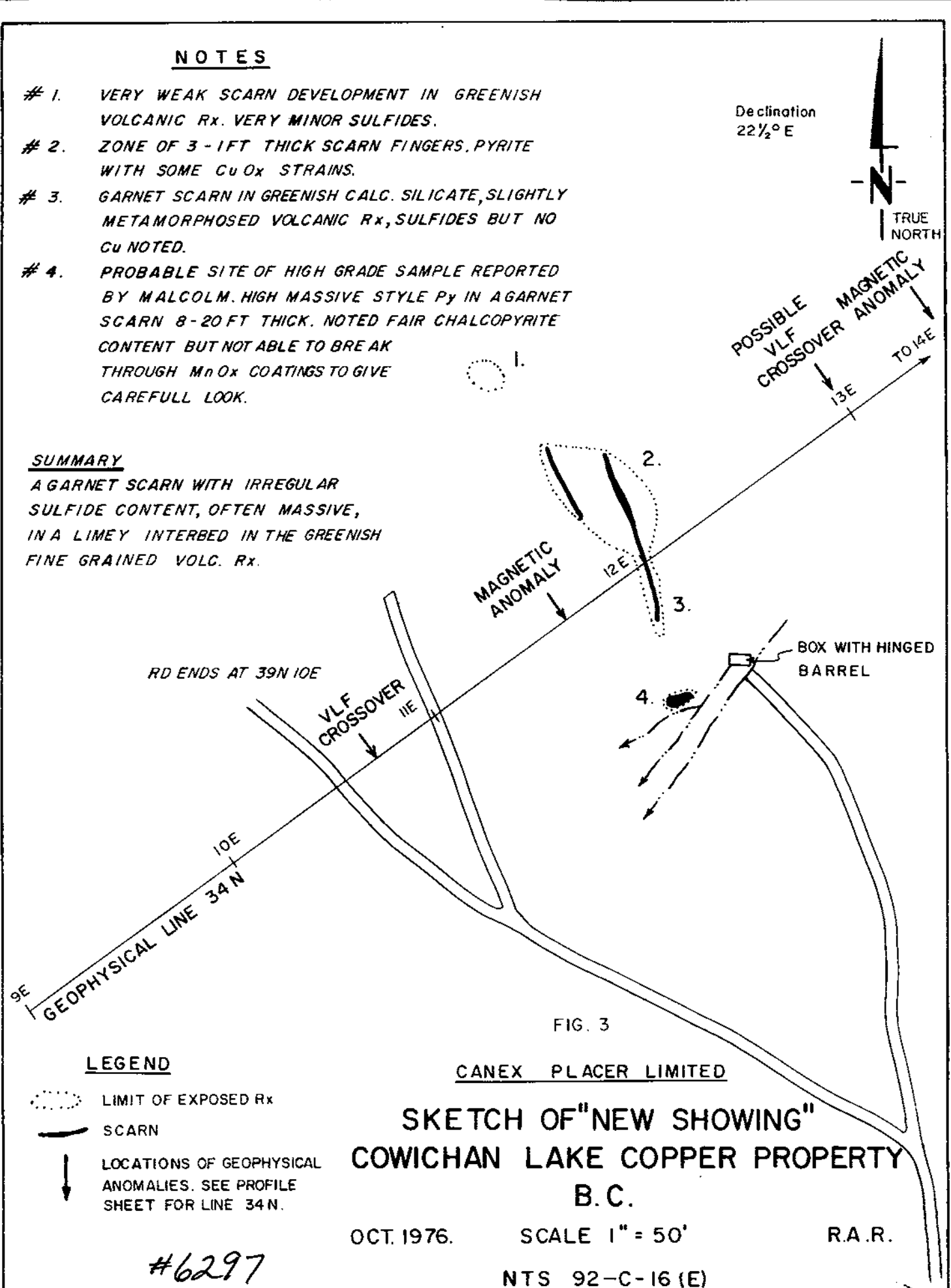

FIG. 3

LEGEND

- LIMIT OF EXPOSED Rx
- SCARN
- LOCATIONS OF GEOPHYSICAL ANOMALIES. SEE PROFILE SHEET FOR LINE 34N.

CANEX PLACER LIMITED

SKETCH OF "NEW SHOWING" COWICHAN LAKE COPPER PROPERTY B.C.

OCT. 1976. SCALE 1" = 50' R.A.R.

NTS 92-C-16 (E)

0 50
FEET

#6297

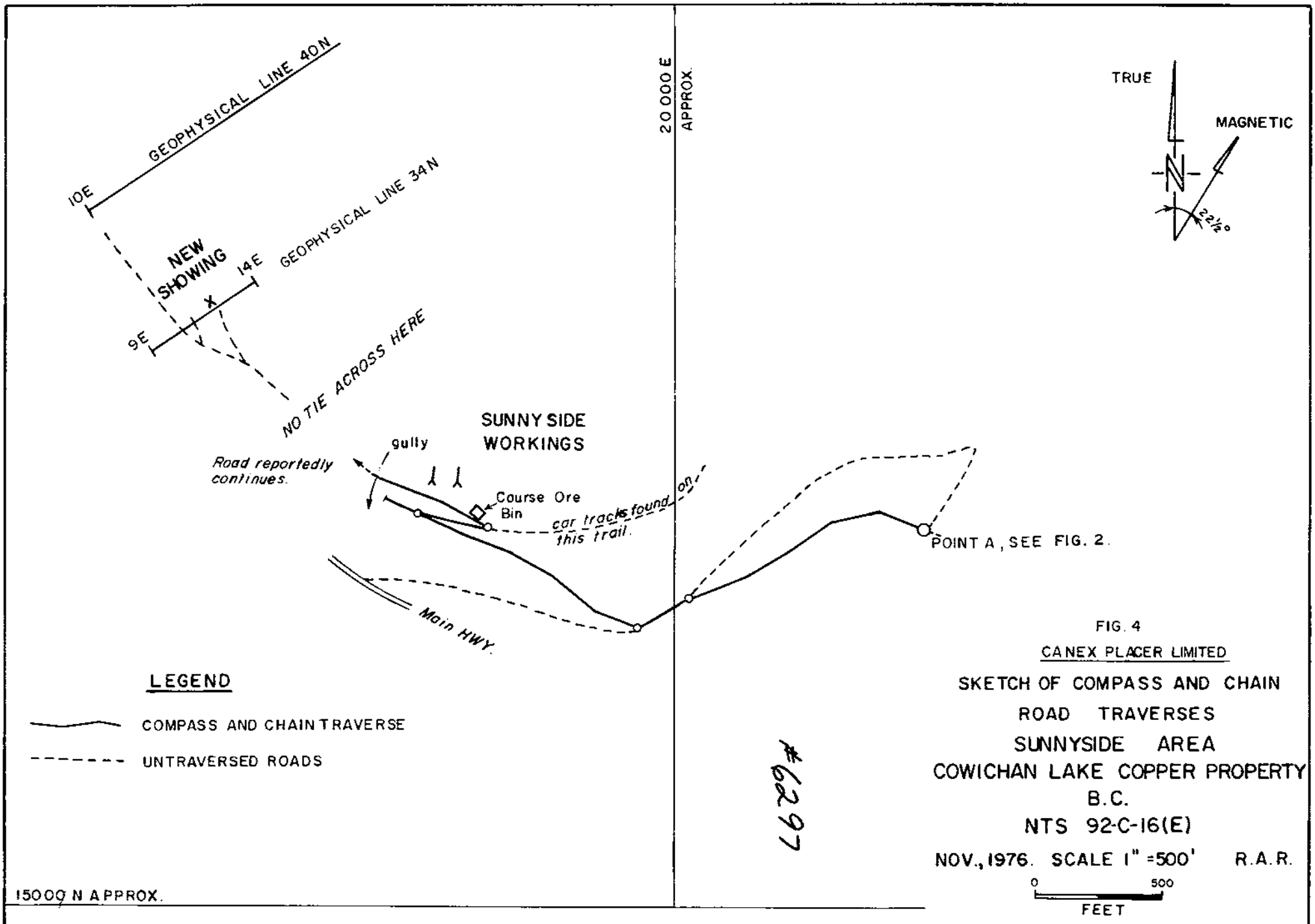

FIG. 4

CANEX PLACER LIMITED

SKETCH OF COMPASS AND CHAIN ROAD TRAVERSES

SUNNYSIDE AREA

COWICHAN LAKE COPPER PROPERTY

B.C.

NTS 92-C-16(E)

NOV., 1976. SCALE 1" =500' R.A.R.

profile of line 50N represents the expected response from basalt flows and pyroclastics. Detailed surveys in this area might successfully map individual high frequency anomalies which could lead to a useful interpretation of the structure and folds. An 800 gamma anomaly found at the east end of line 40N is the strongest and widest individual magnetic anomaly encountered in the survey. The source appears to be a portion of the amygdaloidal basalt almost completely surrounded by feldspar porphyry stocks and we might expect some scarn/magnetite/sulfides (?) to be present. Unfortunately, no E-M response is evident from the zone whose maximum depth is 100 ft.

A one reading 500 gamma magnetic high at 45N, 34E is of interest since it is near the old workings. The lack of confirmation with E-M and its narrow halfwidth indicate that the source may be metal trash.

Lines 70N, 74N and 93N - These three lines were designed to evaluate the sources of the strong SP anomalies shown on figure 5, north of the mine. The geology in this area is much simpler (and probably less favourable) than that in the mine area. We are evidently higher in the stratigraphic section, since all of the SP anomalies in the area plot either on the shale unit overlying the Sutton limestone or on the basalt directly underneath the Sutton limestone. There are fewer feldspar porphyry stocks, and there is less of the complex faulting and folding which characterises the known mineralized area.

There appears to be a -3^{o} bias in the shootback EM profile on line 70N, the last line run in this job. This shift from -2^{o} to -3^{o} makes the -5^{o} reading at 23N even less likely to be a valid anomaly. As noted before, this feature coincides with a 300 MV SP anomaly, but is not confirmed by anything unusual in the VLF or magnetic traces. While no other "possible anomalous" event is present in the shootback profiles for these lines, two questionable events are present in the VLF results from line 70N. At 17+50E, a horizontal field strength peak suggests a small conductor. At 25E, a sudden steepening of the dip angle profile and changes in both field strength profiles suggest a contact with the more conductive rocks to the west. Note the gradual rise to the west of the 1830Hz field strength shootback profiles due to the powerline.

Another feature of interest is a 550 gamma magnetic anomaly at line 70N, 21+60E. A shallow west dip, 25 ft. depth and a minimum 1% (vol.) magnetite content suggests that the thin basalt bed mapped between the Red Beds and the Sutton limestone and plotted at 23E is actually at 21½E. In view of the positional uncertainties, a 150 ft. offset is not out of the question. Note that if this interpretation is true, then the 300 MV SP anomaly source is at the Red Bed/basalt contact (the base of the Red Beds). It is surprising to find the active magnetic profile from the shale map unit on the west sides of both lines 70N and 93N. Evidently this map unit contains volcanic members.

The induced polarization data is quite puzzling. A substantial (3 x background) chargeability high is present in unusually resistive rocks on line 70N. There is a very rough correspondence between the magnetic and

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chargeability traces here but certainly the small magnetite content cannot be responsible for the polarization anomaly. On line 74N, there is a strong suggestion that both the chargeability highs and the resistivity highs have surficial sources, since much weaker effects were obtained on the N=2 readings. The N=1 profiles probably represent only the upper 30 - 50 ft. of ground. A very strong resistivity break is registered at around 24E line 70N with the more conductive rocks to the east! This is just the opposite situation to that interpreted from the VLF profile. Unfortunately the I.P. survey ends in the middle of this contact, and so the full picture is not disclosed.

Line 93N, unfortunately does not appear to cross the strongest part of the S.P. anomaly it was designed to test. This is the result of a layout error in the field based on the generalized plotting of the anomaly position in Malcolm, 1965. There is no guarantee, however, that the S.P. anomaly positions shown on figure 2 are the correct ones, since no firm common tie point is available.

CONCLUSIONS AND RECOMMENDATIONS

The lack of a strong electrical and magnetic response over the "new" showing on line 34N bodes ill for its tonnage potential. The line passes a few tens of feet NW of the well mineralized main part of the showing, so the negative results suggest only the southeast and downdip dimensions to have potential. Ultra detail magnetics and VLF surveys will be helpfull in determining the southeastern extent, but only drilling can disclose the presence of the thin sulfide zone in the downdip direction. The survey should use lines spaced 100 ft. apart, and stations every 25 ft. with closer coverage over the outcropping sulfides. The extent of this coverage should be determined from the results, but lines at 30N to 36N and stations from 9E to 14E would be the minimum. This is less than one line mile and would require less than two days to run, taking into account the steep hillside and necessity of putting in tight control. The sulfide zone, of course, should be systematically sampled.

While it appears incontestable that a strong self potential (550 mv) anomaly was recorded over the main orebody near line 45N, 32E, the several other strong S.P. anomalies north and west of the mine do not appear to have been caused by massive sulfides. The sources of these anomalies remains problematical since no strongly unusual effects were encountered with our electromagnetic surveys over their plotted positions. Some unusually surficial electrical phenomena is recorded by the very sketchy I.P. results on line 74N which may be a clue to the cause of the S.P. anomalies, but the geologic meaning of this evidence eludes the writer. Analysis of the S.P. data indicates 50-100 ft. depths for the sources of these anomalies.

Detailed magnetic surveys hold some promise for unravelling the structure in the basalt and perhaps even in the shale map units on the property. The economic value of this information, apart from the direct use of magnetics to find magnetic ore, would be in helping decipher the existing exploration data

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on the property. These data should be obtained, if possible, from the Cowichan Copper Co., since they form the best background for a geologic evaluation of the property's potential. All diamond drill hole locations and logs, as well as underground geologic maps, would be required.

The geophysical test work reported herein does not represent an exhaustive evaluation of this property's economic potential. The depth of exploration is only in the order of 100 ft. for the E-M tools used on the widely spaced traverses. Further exploration will demand a geologic interpretation of ore controls and a projection of favourable zones to define drill targets. Electromagnetic drill hole geophysical methods may be called for in the evaluation of the 50 ft. radius cylinder of ground either side of the drill hole, but the role of surface E-M surveys is limited.

The geophysical work described in this report was undertaken in the slim hope that the "new" showing and the S.P. anomalies represented significantly large mineralized zones. With these hopes dashed, the conclusion remains that the property's potential lies in small, difficult to find, probably blind ore zones, most likely too small for development by our company. No further work is recommended unless the vendor encouters enough encouragement in his work to suggest the presence of larger mineralized bodies.

R. A. Rivera

RAR:jpt
c.c. G. MacDonald, vendor

Enclosures: References
Summary of approximate costs
Figures: 1a) Property Location Map
1b) Property Access Map, 1:50,000 scale
2) Location map for geophysical lines and data compilation, 1:6,000 scale (in pocket)
3) Sketch of "new showing"
4) Road chain and compass traverses, Sunnyside Area, 1:6,000 scale
5) Self Potential (SP) results north of Blue Grouse Mine (reduction of Vendor's work sheet) (in pocket)
Set of seven geophysical profile sheets showing topography and geology, as well; 1:4,800 scale (bound at end of report)
Lines 34N, 40N, 45N, 50N, 70N, 74N, and 93N.

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Sheppard, E.P., 1956, Report on Cowichan Copper Company Ltd., Cowichan Lake, Vancouver Island, B.C.: Report of Mine Examination

Shuttleworth, H.R., 1957, Report on Cowichan Copper Blue Grouse Property: Mine Manager's Report dated March 27.

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SUMMARY OF APPROXIMATE COSTS

FIELD WORK

4 crew-days including 1 day travel @ $250/day		$ 1,000.00
Living Expenses, 8 man days @ $20/day		160.00
Transportation, 3 days @ $20/day		60.00
Mobilization/demobilization transportation costs:		
$15 + 10¢ x 200 mi. + $35 ferry		70.00
Equipment Rental:		
Magnetometer -- 4 days @ $10	$ 40.00	
VLF unit -- 4 days @ $10	40.00	
CEM unit (3 coils, 1 spare) Sept. 6-16	235.00	
Part of cost of shipping the CEM unit back to Toronto	25.00	340.00
Misc. field supplies		20.00
TOTAL FIELD WORK		$ 1,650.00

OFFICE WORK

Preparation -- 1½ man days @ $150.00	$ 225.00
Data analysis & writing report -- 4½ man days @ $150.00	675.00
Drafting -- 4 man days @ $50.00	200.00
Reproductions	30.00
TOTAL OFFICE WORK	$ 1,130.00

TOTAL FOR JOB: $ 2,780.00

E. & O. E.
November 30, 1976

Robert A. Rivera
R. A. Rivera

700 BURRARD BUILDING • 1030 WEST GEORGIA STREET • VANCOUVER, B.C., CANADA V6E 3A8 • (604) 682-7082

STATEMENT OF QUALIFICATIONS

I, Robert A. Rivera, with Business address in Vancouver, British Columbia and Residential address in Steveston, British Columbia hereby certify that:

1. I am a Geophysicist.

2. I am a Graduate of the University of California at Berkeley with a B.S. in 1963 and an M.S. in 1965.

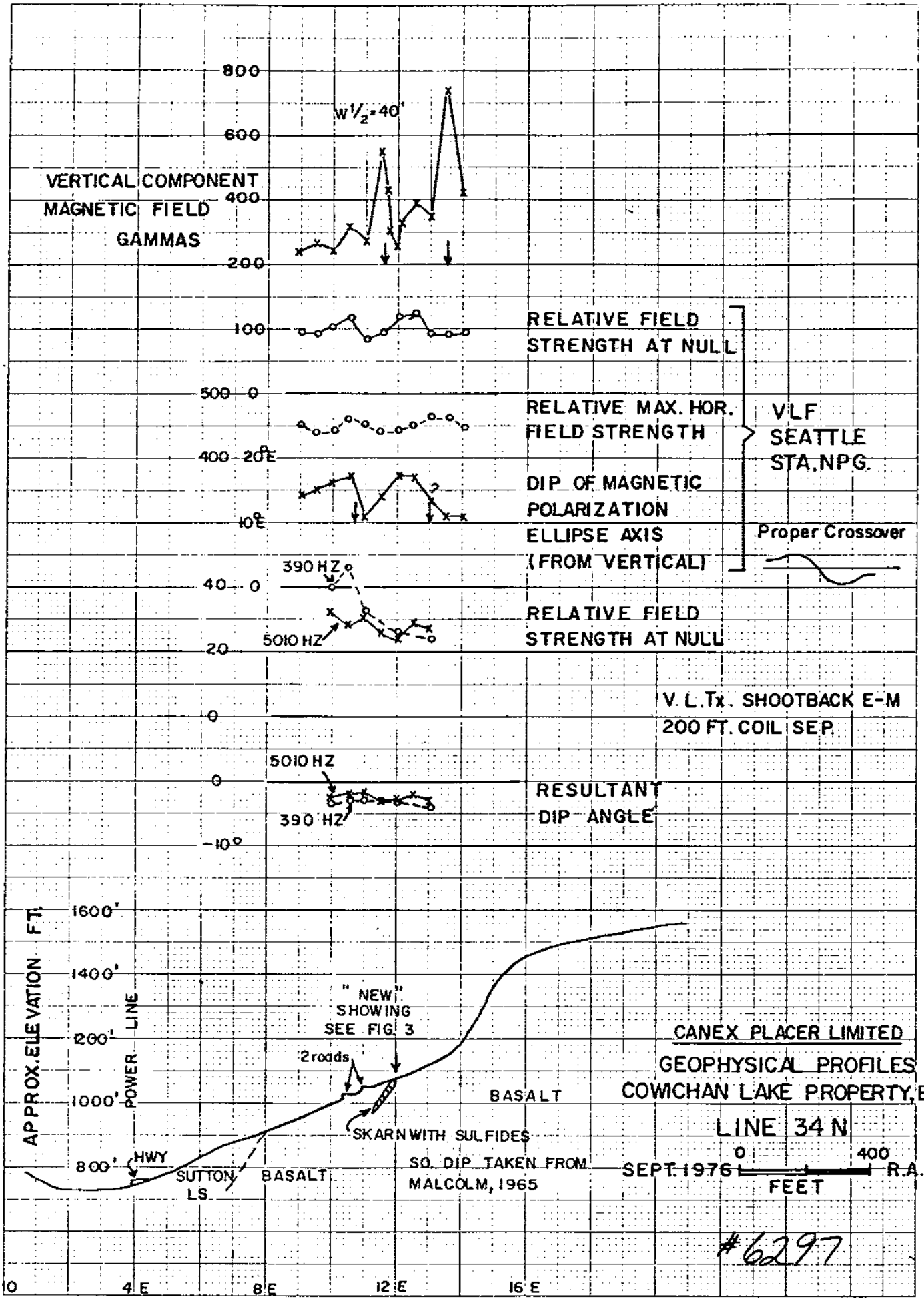
3. I am a member of the Association of Professional Engineers of British Columbia, Number 9643.

4. I personally participated in the 1976 field work which is the subject of this report and am responsible for the geophysical interpretations stated herein.

Respectfully submitted,

Robert A. Rivera

Robert A. Rivera, P. Eng.



VLF SEATTLE STA. NPG.

RELATIVE FIELD STRENGTH AT NULL

RELATIVE MAX HOR. FIELD STRENGTH

DIP OF MAGNETIC POLARIZATION ELLIPSE AXIS (FROM VERTICAL)

MAG.

Proper Crossover

RELATIVE FIELD STRENGTH AT NULL

V.L.Tx SHOOTBACK E-M
200 FT. COIL SEP.

18 30 HZ

390 HZ

5010 HZ

RESULTANT DIP ANGLE

VERTICAL COMPONENT MAGNETIC FIELD GAMMAS

MIN FS @ NULL

MAX FS

DIP ANGLE

ALONG R.D.

70MV S.P. ANOMALY

2X4 marked #37

APPROX. ELEVATION FT.

1500'

1000'

600'

POWER LINE

Main HWY

SUTTON LS

Skid trail

GULLY

BASALT

TUFF, AGGLOMERATE

SKARN

f.p.

1340 level

1100 level

TUFF, AGGLOM.

TRAILS

FELDSPAR PORPHY.

BASALT

Rd

FELDSP. PORPHY.

Geology from Malcolm, 1965.

0 4E 8E 12E 16E 20E 24E 28E 32E 36E 40E 44E 48E

CANEX PLACER LIMITED

GEOPHYSICAL PROFILES

COWICHAN LAKE PROPERTY, B.C.

LINE 40N

SEPT. 1976. R.A.R.

0 400 FEET

#6297

47 1240

47 1240

VERTICAL COMPONENT MAGNETIC FIELD GAMMAS

1000
800
600

REPEAT

RELATIVE FIELD STRENGTH AT NULL

100

VLF : SEATTLE STA. NPG.

RELATIVE MAX. HOR. FIELD STRENGTH

600 — 0

DIFFERENT DAYS
DIFFERENT FIELD STRENGTHS

500 — 10°E

400 — 0

DIP OF MAGNETIC POLARIZATION ELLIPSE AXIS (FROM VERTICAL)

POSSIBLY DUE TO METALLIC REFUSE AND TRACK

Proper Crossover

10°W

20°W

40

RELATIVE FIELD STRENGTH AT NULL

20

V.L.Tx SHOOTBACK E-M
200 FT. COIL SEP.

0

1830 HZ

0

RESULTANT DIP ANGLE

390 HZ

-10°

OPEN HOLES

POLE

-20°

1500'

SUTTON LS

BASALT

F.P.

BASALT

APPROX. ELEVATION FT.

1340 level

F.P.

TUFF AGLOM.

1340 NORTH PORTAL

BASALT

1100 level

BASALT

1000'

Geology from Malcolm, 1965.

600'

0 4E 8E 12E 16E 20E 24E 28E 32E 36E 40E 44E

CANEX PLACER LIMITED

GEOPHYSICAL PROFILES

COWICHAN LAKE PROPERTY, B.C.

LINE 45 N

SEPT., 1976. 0 400 FEET R.A.R.

#6297

VERTICAL COMPONENT MAGNETIC FIELD GAMMAS

900 200 700 100 500

PROBABLY DUE TO METAL TRASH ON ROAD.

RELATIVE FIELD STRENGTH AT NULL

500 0 300

← FS AT NULL

RELATIVE MAX. HOR. FIELD STRENGTH

400

400

← MAX FS

VLF SEATTLE STA. NPG.

300 10°E

DIP OF MAGNETIC POLARIZATION ELLIPSE AXIS (FROM VERTICAL)

0

0

Proper Crossover

10° W

DIP ANGLE

20° W

40

RELATIVE FIELD STRENGTH AT NULL

20

V.L. Tx. SHOOTBACK E-M 200 FT COIL SEP.

0

0

1830 HZ RESULTANT DIP ANGLE

390 HZ

650 M V S.P. ANOMALY

10°

170 MV S.P. ANOMALY

overgrown road

BASALT

SCARN

20°

Rd.

TUFF, AGLOM.

F.P.

RED BEDS

TUFF AGL.

Trail

APPROX. ELEV. FT.

1500'

BASALT

1340 level

POWER LINE

SUTTON LS

BASALT

Trail

Main Rd

1000'

BASALT

F.P.

BASALT

Geology from Malcolm, 1965.

600'

0 4 E 8 E 12 E 16 E 20 E 24 E 28 E 32 E 36 E 40 E 44 E

CANEX PLACER LIMITED

GEOPHYSICAL PROFILES

COWICHAN LAKE PROPERTY, B.C.

LINE 50 N

SEPT., 1976 0 400 FEET R.A.R.

#6297

47 1240

20 x 20 TO THE INCH • 10 x 15 INCHES
KEUFFEL & ESSER CO. U.S.A.

RESISTIVITY
Ohm-m

3000

1000

INDUCED POLARIZATION
SURVEY
DIPOLE - DIPOLE
ARRAY: A = 100'
N = 1
N = 2

(BY GLENN WHITE)

300

5

CHARGEABILITY
MILLISECONDS

2.5

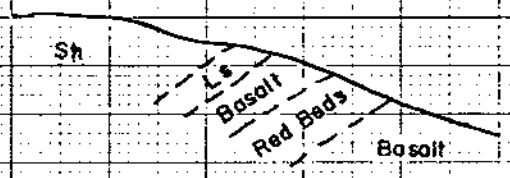
0

APPROX. ELEVATION FT.

1400'

1200'

1000'



Geology from Malcolm, 1965.

CANEX PLACER LIMITED

GEOPHYSICAL PROFILES
COWICHAN LAKE PROPERTY, B.C.

LINE 74 N

SEPT. 1976. 400 FT. R.A.R.

#6297

0 4E 8E 12E 16E 20E 24E

RESISTIVITY
Ohm-m
3000
1000
300
100

INDUCED POLARIZATION
SURVEY
DIPOLE-DIPOLE
ARRAY A = 100'
N = 1
(BY GLENN WHITE)

CHARGEABILITY
MILLISECONDS
5
2.5
0

VERTICAL COMPONENT
MAGNETIC FIELD
GAMMAS
800
700
600
500
400

Ampl = 550γ
West Dip, Depth = 25 ft
K τ = .12
Kmin = .0025 (vol % mT

VLF:
SEATTLE
STA. NPG.

Proper Crossover

RELATIVE FIELD
STRENGTH AT
NULL
100
0

RELATIVE
MAX. HOR. FIELD
STRENGTH
600
500

Contact?

DIP OF MAGNETIC
POLARIZATION
ELLIPSE AXIS
(FROM VERTICAL)
400
0
10°W

RELATIVE FIELD
STRENGTH AT NULL
40
20°W
20
0

V.L.Tx SHOOTBACK E-M
200 FT COIL SEP.

1830 HZ
390 HZ

RESULTANT
DIP ANGLE
0
-10°

APPROX.
ELEVATION
FT.
1600'
1400'
1200'
1000'

300 MV
S.P. ANOM.

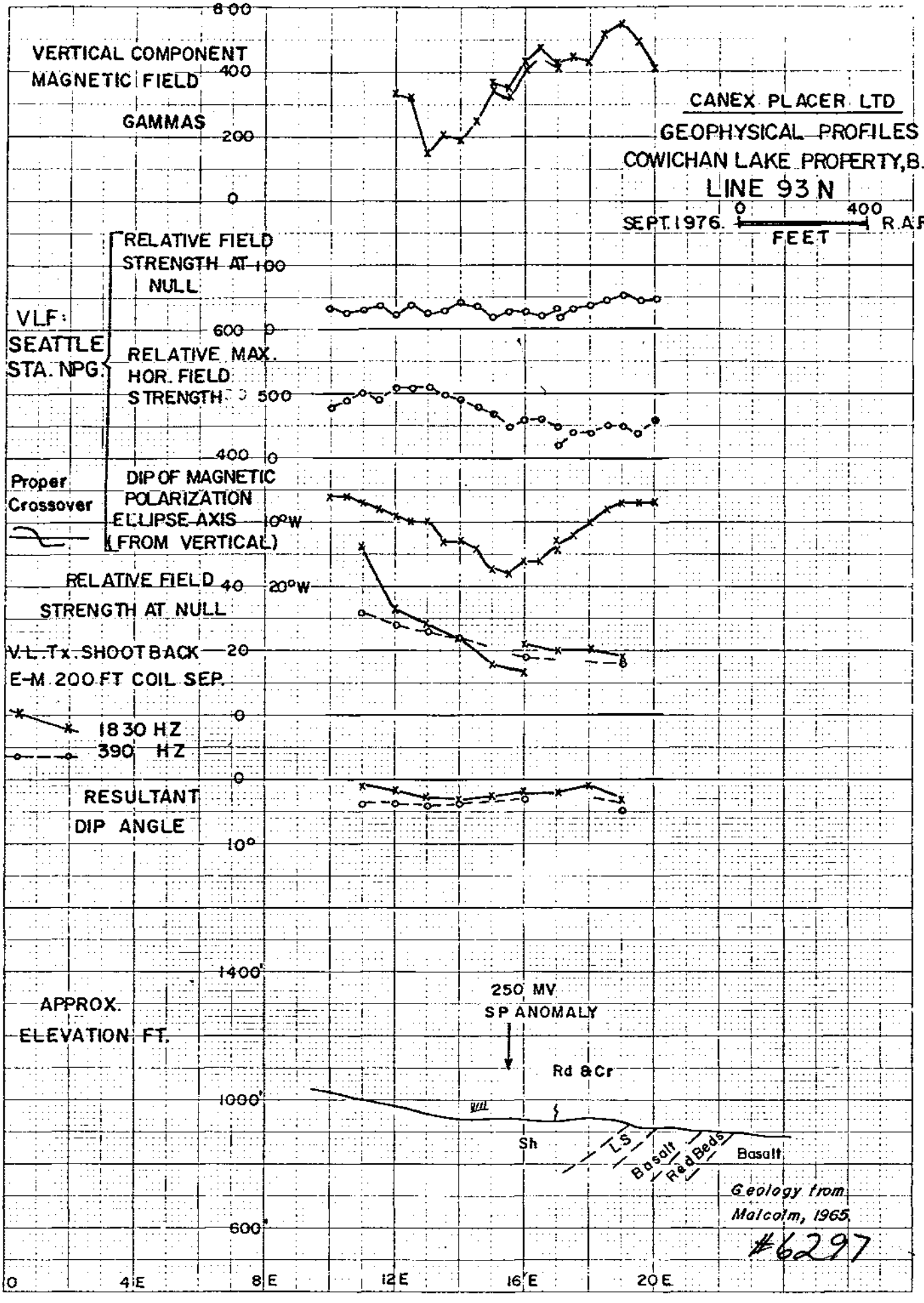
Sh
LS
Basalt
Red Beds
Basalt
OLD TRENCH

Geology from Malcolm, 1965.

0 4E 8E 12E 16E 20E 24E 28E

CANEX PLACER LIMITED
GEOPHYSICAL PROFILES
COWICHAN LAKE PROPERTY, B.C.
LINE 70 N
SEPT. 1976. 400FT. R.A.R.

#6297



L.C.P. CINDY Mineral Claim
Record No. 37 (4)
Tag No. 17696

L.C.P. JOY Mineral Claim
Record No 52(6)
Tag No. 15378

25 000 N
20 000 N
15 000 N
15 000 E
20 000 E

TRUE
MAGNETIC
22½E

COWICHAN LAKE

THE ONLY TIE TO SP MAP IS THIS CR/RD INTERCEPT

APPROX. LIMITS OF SP SURVEY SHOWN ON FIG. 5

APPROX. LIMITS OF SP SURVEY SHOWN IN GEERL, 1954

720 MV
250 MV
700 MV
80 MV
250 MV
60 MV
200 MV
300 MV
170 MV
100 MV
550 MV
650 MV
180 MV
70 MV
80 MV
140 MV
60 MV

LINE 93N
LINE 74N (I.P. ONLY)
LINE 70 N
LINE 50 N
LINE 45 N
LINE 40N
LINE 34 N

CROWN GRANTS

POWER LINE ALONG THIS ROAD

1100 Portal
MILL (RUINS)
1340 Portals
stopes
BLUE GROUSE
Pole
Trail surveyed with chain & compass
"NEW" SHOWING
SUNNYSIDE WORKINGS
Car tracks found on this trail
POINT A
TO GORDON BAY PROV. PK.
SEE SURVEYED ROAD TRAVERSE IN THIS AREA
Highway

Younger Conglomerate + Sandstone

Locked gate at Gordon Bay Provincial Park.

1000
1500
2000

LAKE

LEGEND

- DRIVEABLE ROAD
- OVERGROWN ROAD
- 300 MV — SP ANOMALIES SHOWING 300 AND 400 MV CONTOURS WITH AMPLITUDE OF ANOMALY. GEOPHYSICAL LINE CIRCLED LOCATION SHOWS WHERE TIED TO ROAD NETWORK.
- OPEN HOLES (STOPES)
- MAIN UNDERGROUD ACCESS FROM MALCOLM, 1965.

NOTE: THE BASEMAP IS A TRACING FROM THE GEOLOGIC MAP IN MALCOLM, 1965. SERIOUS DISCREPANCIES IN SOME ROAD POSITIONS HAVE BEEN ENCOUNTERED.

6297 M-1

FIG. 2.

DRAWN: J.L.	SCALE 1" = 500'	CANEX PLACER LIMITED	LOCATION OF GEOPHYSICAL LINES
	DATE: OCT. 1976.	COWICHAN LAKE PROSPECT, V.I.S., B.C. (BLUE GROUSE MINE)	
NTS 92 - C - 16 (E)			