0385d/0112A

GEOLOGICAL AND GEOCHEMICAL REPORT

ON THE

OAK GROUP

(Oak 1, Oak 2, Oak 3 and Brent 1 Mineral Claims)

Victoria Mining Division
NTS 92B-13W
Latitude 48°53'N by Longitude 123°50'W

by

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DATE: JUNE 1, 1984

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SUMMARY

The Oak Group is located on Vancouver Island approximately 22 km northwest of Duncan and 13 km southwest of Ladysmith. This report documents a regional mapping, rock geochemical and stream geochemical survey for volcanogenic massive sulphides in Sicker Group meta-volcanics.

Myra Formation lithologies and sediment/sill unit rocks of the Paleozoic Sicker Group are located in the southern and northern portions of the Oak Claim Group respectively. Features in Myra Formation rocks permissive for massive sulphide mineralization are sericite and chlorite schists, locally low $Na_2O/(Na_2O + K_2O)$ ratios, quartz eye porphyries, copper mineralization at the Sharon showing, local massive pyrite lenses and volcanic stratigraphy. Rocks in the vicinity of the Sharon showing have low $Na_2O/(Na_2O + K_2O)$ ratios, are commonly chloritic and have major element signatures indicating an andesitic composition. The showing may be basal or along strike to blind massive sulphide mineralization. Sericite and chlorite schist located along strike to the west of the Sharon showing represent altered rhyodacites and are good targets for blind massive sulphide mineralization despite only weak silt and heavy mineral stream geochemical responses.

1 INTRODUCTION

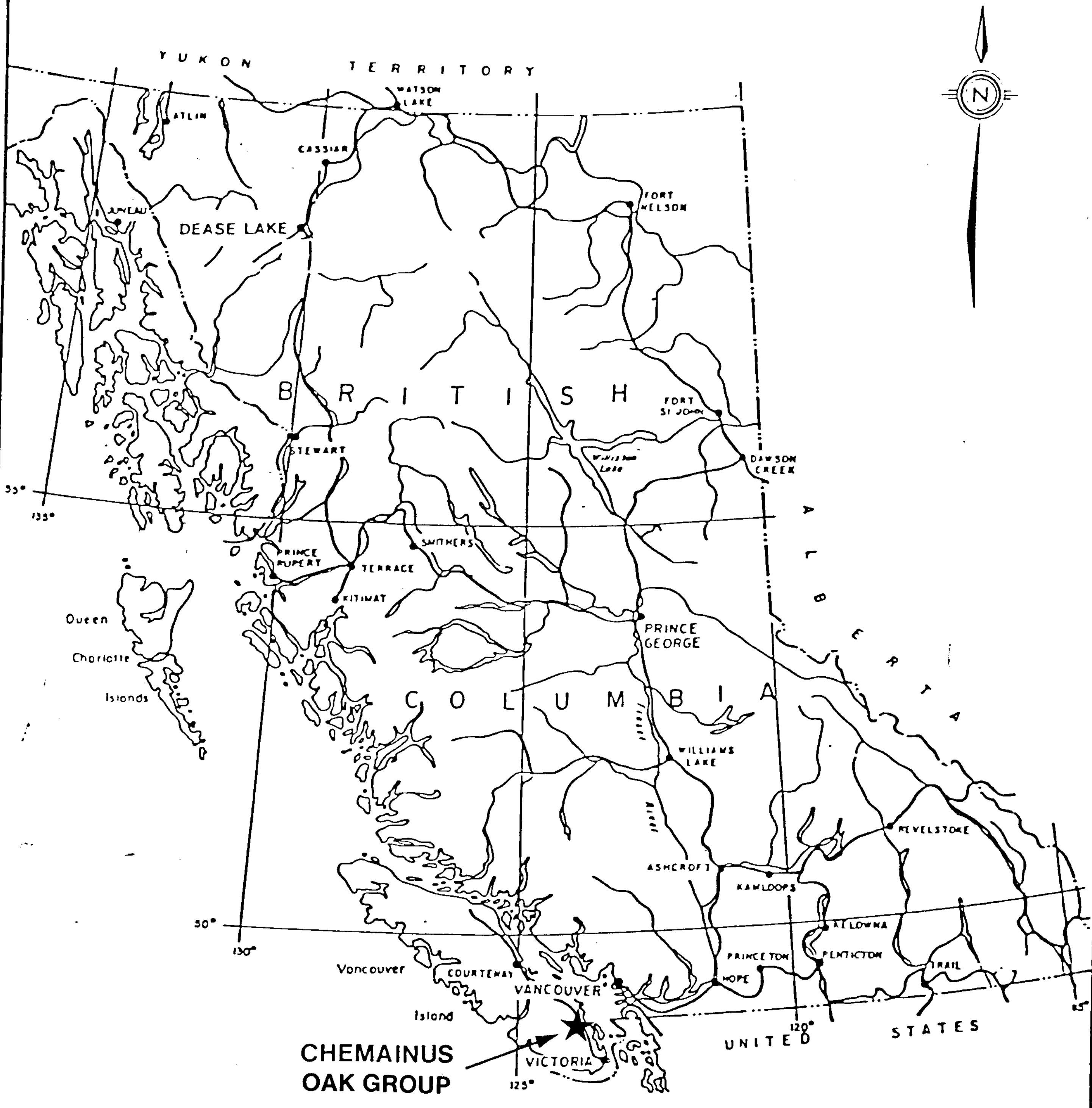
1.1 Location and Access

The Oak Group is located in southeastern Vancouver Island, approximately 15 km northwest of Duncan and 10 km west of Chemainus. Access to the property is gained by 2 wheel drive vehicle from the town of Chemainus, east along the Copper Canyon forestry access road and north by 4 wheel drive along the Holyoak Creek forestry access road.

Much of the prospect is covered with secondary cedar and fir growth after early, 1920-1960, logging operations. Four-wheel drive access roads transect the entire property. Relief varies between 700 and 1100 metres.

1.2 Property

The Oak Group comprises 4 mineral claims aggregating 46 contiguous units. Claim names, record numbers, month of record, units and anniversary dates are listed below in Table 1. Claim locations are shown on Figure 2.



ESSO MINERALS CANADA

CHEMAINUS PROJECT
OAK GROUP
PROPERTY LOCATION MAP

0 100 200 MILES
0 100 200 400 KILOMETRES

FIGURE. I

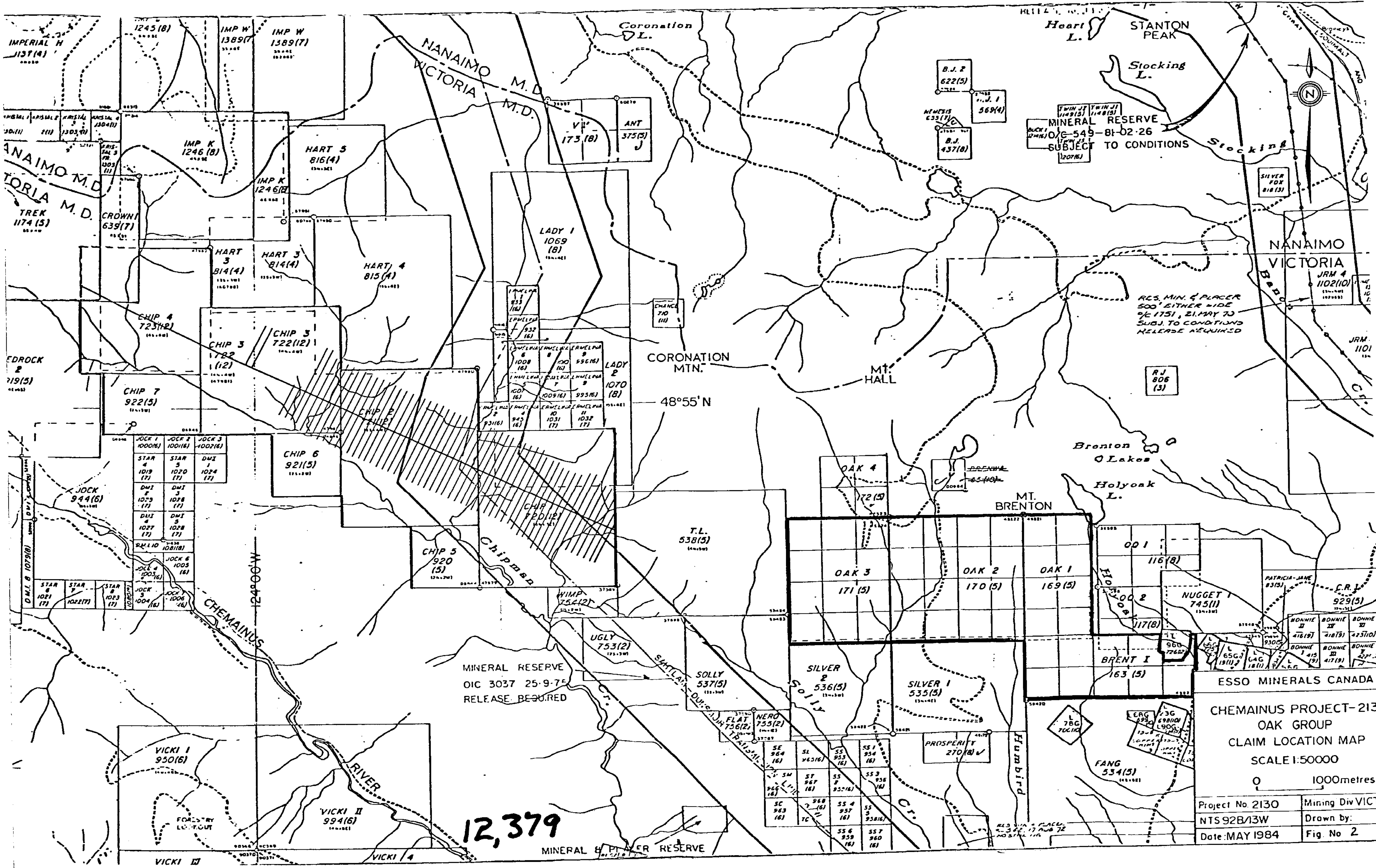

ESSO MINERALS CANADA
CHEMAINUS PROJECT-213
OAK GROUP
CLAIM LOCATION MAP
SCALE 1:50000
0 1000metres
Project No. 2130
NTS 92B/13W
Date: MAY 1984
Drawn by:
Fig. No 2
NANAIMO M.D.
VICTORIA M.D.
NANAIMO
VICTORIA
CORONATION MTN.
MT. HALL
MT. BRENTON
STANTON PEAK
Coronation L.
Heart L.
Stocking L.
Bronton Lakes
Holyoak L.
48°55'N
124°00'W
MINERAL RESERVE O/C 549-81-02-26 SUBJECT TO CONDITIONS
MINERAL RESERVE OIC 3037 25-9-75 RELEASE REQUIRED
MINERAL & PLACER RESERVE
RES. MIN. & PLACER 500' EITHER SIDE O/C 1751, 21 MAY 73 SUBJ. TO CONDITIONS RELEASE REQUIRED
CHEMAINUS RIVER
Chipman
Solly Cr.
Humbird
OAK 1 169(5)
OAK 2 170(5)
OAK 3 171(5)
OAK 4 172(5)
OO 1 116(8)
OO 2 117(8)
BRENT I 163(5)
SILVER 1 535(5)
SILVER 2 536(5)
NUGGET 1 745(1)
T.L. 538(5)
FANG 534(5)
PROSPERITY 270(8)
SOLLY 537(5)
UGLY 753(2)
LADY 1 1069(8)
LADY 2 1070(8)
CHIP 1 720(12)
CHIP 3 722(12)
CHIP 4 723(12)
CHIP 5 920(5)
CHIP 6 921(5)
CHIP 7 922(5)
HART 3 814(4)
HART 4 815(4)
HART 5 816(4)
IMP K 1246(8)
CROWN 639(7)
TREK 1174(5)
JOCK 944(6)
VICKI I 950(6)
VICKI II 994(6)
FORESTRY LOOKOUT
12,379

Table 1

LAND RECORD

Claim	Record No.	Month of Record	Units	Anniv. Date
Oak 1	169	5	8	May 11, 1984
Oak 2	170	5	16	May 11, 1984
Oak 3	171	5	12	May 11, 1984
Brent 1	163	5	10	May 11, 1984
			46	

1.3 History of the Property

The Brent 1 mineral claim overlies what is believed to have been the Pauper C.G. claim (L 31G) crown granted in 1903. The B.C.M.M. Annual Reports for 1924 and 1927 report underground development of a pyritized schist belt, 60 feet wide. An undated map by Sharon Copper Mines Ltd. shows three parallel adits 150 feet, 5 feet and 35 feet long, driven northwesterly into the east facing slope at an elevation of 2375 feet. Three diamond drill holes and two crosscuts have sampled a zone of disseminated pyrite and chalcopyrite. The crosscuts averaged 36 feet of 1.45% Cu and 40 feet of 0.80% Cu respectively. The drill holes, consisting of two flat holes and one minus 30^{0} hole totalling 915 feet, were drilled in a northerly direction from the adit openings. Low copper values were obtained over the entire length of the holes with an increase in values in the vicinity of the crosscut trend. The highest value reported was 25 feet averaging 0.93% Cu in quartz near the entrance of the most southerly adit.

In 1966 and 1967 Cominco Ltd. carried out geological mapping, a geochemical soils survey and an induced polarization survey (Tikkanen 1967) on the Tot and Rum claims, for which base metal rights were optioned from the Canadian Pacific Oil and Gas Limited, who controlled the E & N Railway land grant.

Imperial Oil Limited staked the Mons 4 mineral claim in 1976 and upon surrender of the E & N mineral rights to the Crown in 1978 the claim was abandoned and restaked as Brent 1. The Oak 1, 2 and 3 claims were staked at the same time and covered anomalies outlined by a Scintrex airborne electromagnetic and magnetic survey. Imperial Oil carried out minor geologic mapping, a self potential survey and drilled four holes on this block of claims now known as the Oak Group. Traces of copper in pyritic quartz-sericite schist were noted in one drill hole sited on the Brent 1 claim (Somerville 1979). A section of the Brent 1 claim was grid mapped -- as part of this work (Holbek 1980). In 1982 parts of the claim group were reconnaissance mapped (Marr and Fuchter 1982) and an HLEM and magnetometer survey were done on the Brent 1 claims (Cooper 1983).

1.4 Details of 1984 Program

Up to 1983 geophysical surveys have played a dominant role in the exploration of the Oak Group claims. Fieldwork completed in the 1984 program included geological mapping of road cuts, streams and cliff faces and rock and stream gechemical sampling. This fieldwork was designed to provide a comprehensive reconnaissance-scale geological and geochemical picture that would help direct further exploration of the Oak Group.

Details of the exploration work are summarized in Table 2. Geological data is plotted on a 1:10,000 scale (Map 1). Silt and heavy mineral stream sediment samples are located on Map 2. Rock samples are located on Maps 1 and 2.

Table 2

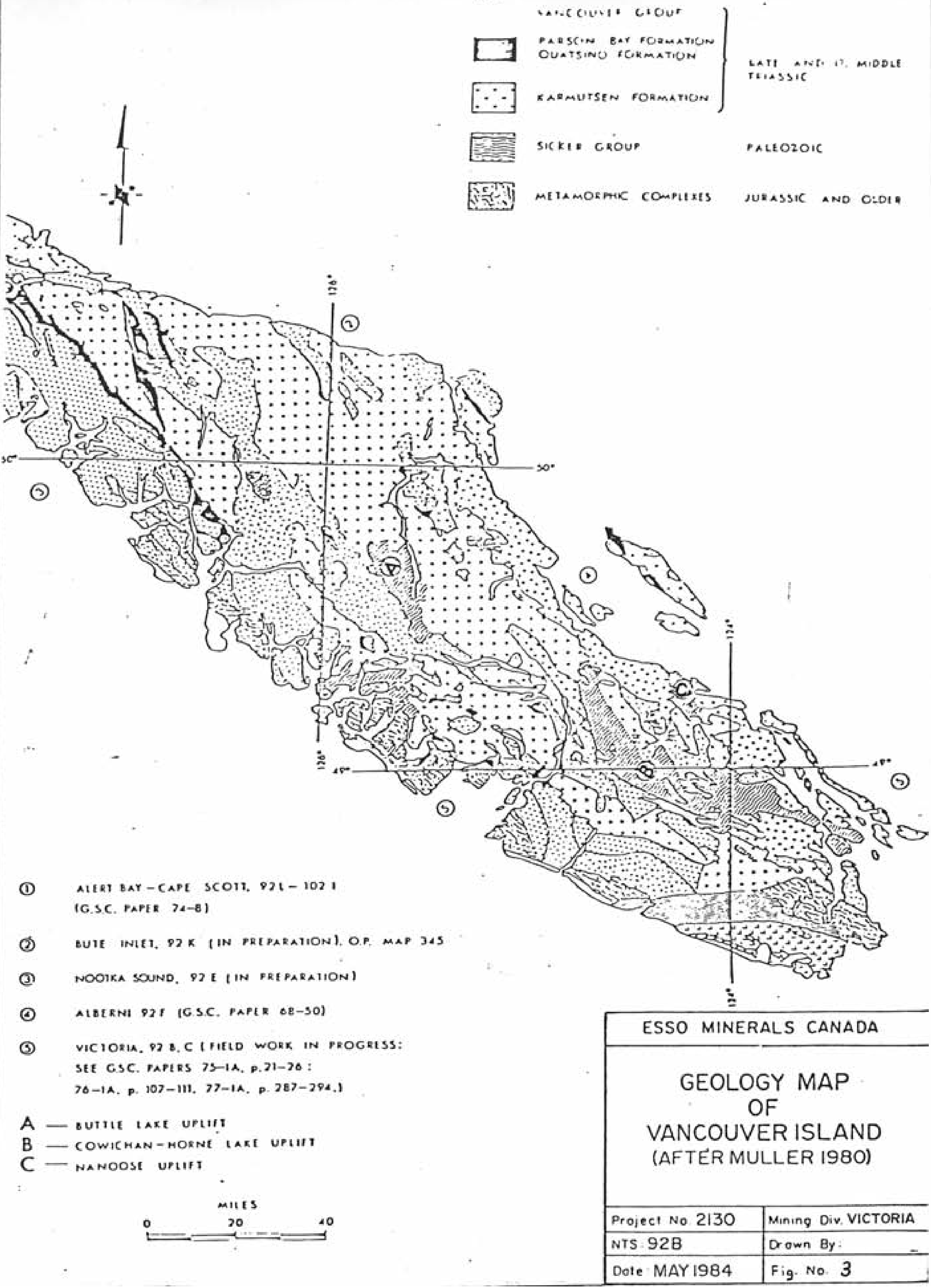
1984 WORK SUMMARY

Geological Mapping 12 km2 at 1:10,000 scale	
*Geochemical Sampling	10 silt samples 9 heavy mineral samples 13 rock samples

*All analysed for Au, Ag, As, Cu, Pb, Zn and Sb; major element chemistry done on rock samples.

1.5 Regional Geology

Figure 3 is a regional geology map of Vancouver Island (after Muller, 1980) illustrating the three inliers of Sicker Group volcanics and sediments and the location of the Oak Group. The detailed geology of the project area is shown on Figure 4.


VANCOUVER GROUP
PARSON BAY FORMATION
QUATSINO FORMATION
KARMUTSEN FORMATION
LATE AND (?) MIDDLE TRIASSIC
SICKER GROUP
PALEOZOIC
METAMORPHIC COMPLEXES
JURASSIC AND OLDER
126°
50°
124°
49°
A
B
C
① ALERT BAY – CAPE SCOTT, 92L – 102 I (G.S.C. PAPER 74-8)
② BUTE INLET, 92 K (IN PREPARATION), O.F. MAP 345
③ NOOTKA SOUND, 92 E (IN PREPARATION)
④ ALBERNI 92 F (G.S.C. PAPER 68-50)
⑤ VICTORIA, 92 B, C (FIELD WORK IN PROGRESS: SEE G.S.C. PAPERS 75-1A, p. 21-26; 76-1A, p. 107-111, 77-1A, p. 287-294.)
A — BUTTLE LAKE UPLIFT
B — COWICHAN-HORNE LAKE UPLIFT
C — NANOOSE UPLIFT
MILES
0 20 40
ESSO MINERALS CANADA
GEOLOGY MAP OF VANCOUVER ISLAND (AFTER MULLER 1980)
Project No. 2130
Mining Div. VICTORIA
NTS 92B
Drawn By:
Date MAY 1984
Fig. No. 3

The Sicker Group encompasses the entire sequence of Paleozoic volcanic and sedimentary rocks on Vancouver Island. It is exposed in three structural culminations: 1. Buttle Lake Uplift, 2. Cowichan-Horne Lake Uplift and 3. Nanoose Uplift. The Cowichan-Horne Lake Uplift, extending from Port Alberni to Saltspring Island, hosts the Twin J deposit and the Oak Group claims.

All units of the Sicker Group are displayed in the Cowichan-Horne Lake inlier.

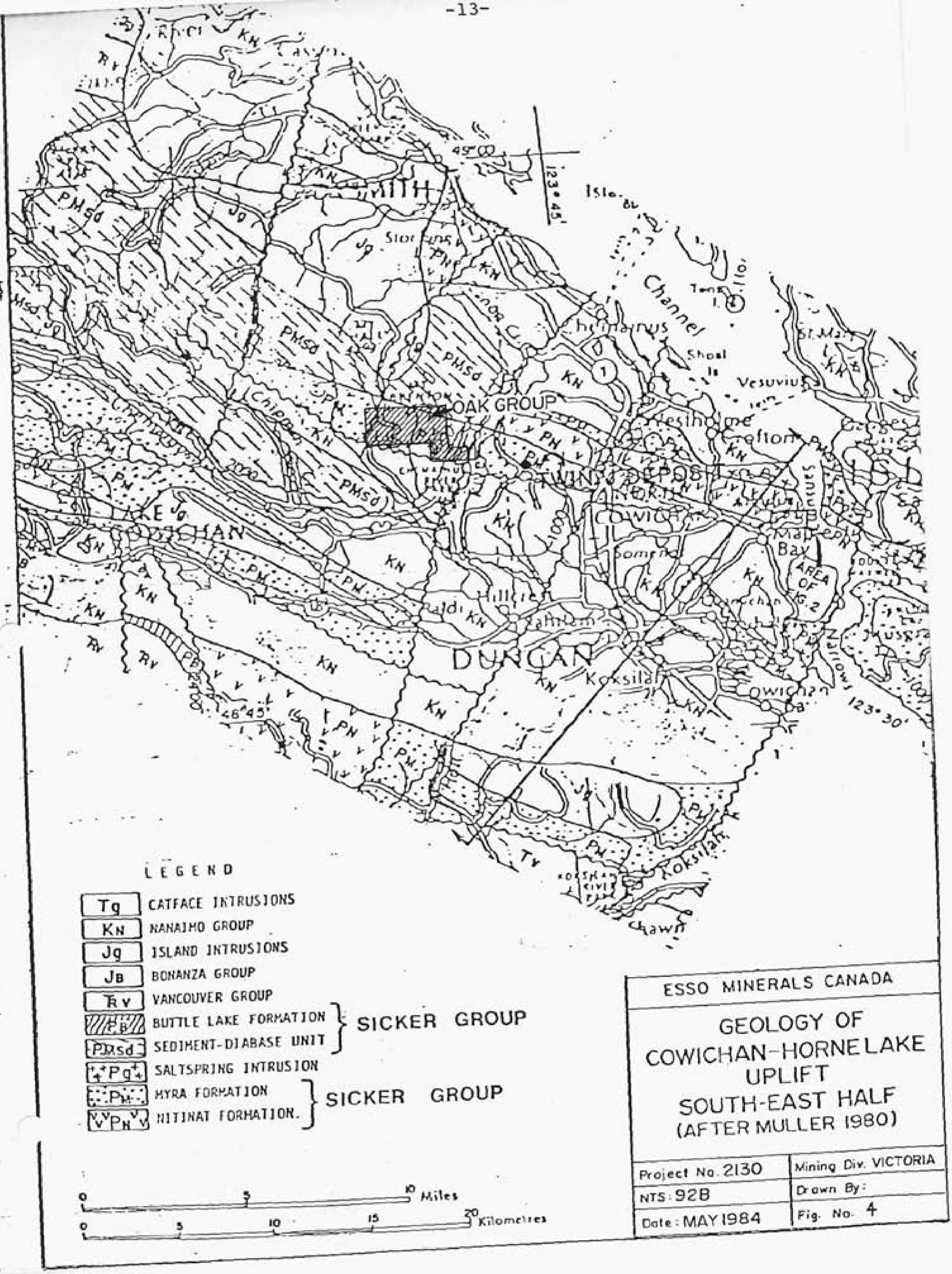
Buttle Lake Formation: Mid Pennsylvanian to Early Permian limestone with minor interbedded chert.

Sediment/Sill Unit: thinly bedded to massive argillite, siltstone and chert intruded by plagiophyric diabase sills.

Myra Formation: basic-felsic banded tuff, breccia and flows; minor argillite, siltstone and chert.

- Nitinat Formation: pillowed or agglomeritic metabasaltic lavas, basic tuffs.

The Oak Group claims overlap a northwest-southeast trending belt of Myra formation schists that extends southeast from Chipman Creek via Mount Sicker and Maple Mountain to central Saltspring Island. The rocks are strongly deformed, largely isoclinally folded and segmented by Tertiary strike slip and "tear" faults. Noteable rock types include sericite and chlorite schists that commonly contain quartz eyes.


OAK GROUP
DUNCAN
Channel
Vesuvius
Koksilah
123°45'
123°30'
48°45'
LEGEND
Tg CATFACE INTRUSIONS
KN NANAIMO GROUP
Jg ISLAND INTRUSIONS
JB BONANZA GROUP
TRv VANCOUVER GROUP
PB BUTTLE LAKE FORMATION
PMsd SEDIMENT-DIABASE UNIT
SICKER GROUP
Pg SALTSPRING INTRUSION
PM MYRA FORMATION
PN NITINAT FORMATION.
SICKER GROUP
0 5 10 Miles
0 5 10 15 20 Kilometres
ESSO MINERALS CANADA
GEOLOGY OF
COWICHAN-HORNE LAKE
UPLIFT
SOUTH-EAST HALF
(AFTER MULLER 1980)
Project No. 2130
Mining Div. VICTORIA
NTS: 92B
Drawn By:
Date: MAY 1984
Fig. No. 4

2 GEOLOGY OF THE OAK GROUP

2.1 Introduction

Sicker Group lithologies of Mississippian to Devonian age are thought to occupy most of the Oak claim group although wide areas of the property are covered by glacial till (Map 1). Units of the Myra Formation occur in the southern portion of the area and are overlain to the north by the Sediment/Sill Unit. Foliations in these units are moderately to steeply dipping; the local relation between foliation and bedding is generally unknown. Although only a single inferred north-northeast fault is shown on Map 1 a second similarly-trending fault probably underlies the extensive glacial till located south of Mount Brenton. Gross geological characteristics suggest step-like left-lateral movement between the fault-bounded blocks.

Younger (Jurassic?) andesite and feldspar porphyry dikes or sills crosscut the Myra Formation. The terminology documented by Muller (1980) for the Sicker Group and used by Everett and Cooper (1984) on the Chip Claims will be employed here to maintain consistency between different parts of the same belt of rocks.

2.2 Glacial Till

Major deposits of glacial till are located east of Silver Creek and south of Mount Brenton between Humbird and Holyoak Creeks. In the latter area 60 to 80 meter thick sections of till are exposed in Humbird Creek. A drill hole in the northern section of this patch of till (CHEM #3, located on Map 1) intersected 7 m of glacial debris. The thickness of till in other parts of these areas is unknown but probably averages between 5 and 10 m. Other areas of the prospect are commonly covered by a thin skin (1-2 m) of till and forest cover.

The till is characterized by subangular pebbles of mainly fine-grained mafic volcanic or intrusive material that are supported by a greenish clayey-sand matrix. Gabbro, diorite, 'flower porphyry' (Muller 1980) or glomeroporphyritic porphyry (Holbek 1980) and lithic pebbles are also common. Huge rounded boulders of granite or granodiorite occur along Humbird Creek.

The till is commonly well indurated and is not eroded by small creeks. Soil horizons are well-developed in much of the till; the 'B' horizon is generally .5 m thick.

2.3 Jurassic (?) Intrusions

Andesite and feldspar porphyry dikes or sills intrude mainly the Myra Formation at the western and eastern extremities of the claim group. The andesite dikes/sills are green, fine-grained, .5 to 1 m wide and generally altered to chlorite, carbonate and epidote. They locally crosscut the trend of the foliation but are themselves foliated and cut by penetrative slip cleavage that is related to crenulation folds in the sericite schist. The andesite dikes/sills have been mapped in five localities and in two of these 3 parallel dikes/sills have been mapped. In 3 of the five localities trends are remarkably consistent at 105^{o}. At the other localities they are 124 and 135^{o}. Dips are normally vertical, although one dike at the eastern end of the claim group crosscuts gabbro-plagiophyric diabase and dips moderately northeast.

Green feldspar porphyry dikes/sills have been mapped by Holbek (1980) in the vicinity of the Sharon showing at the western end of the claim group. The porphyry has a maximum thickness of 50 m; it is in these thicker bodies that plagioclase phenocrysts constitute 10 to 20% of the rock and are commonly altered to epidote. Thinner dikes or sills also contain plagioclase although locally they are devoid of phenocrysts and are similar to andesite dikes/sills - both in texture and intrusive style. The andesite and feldspar porphyry dike/sill may be phases related to the same event that is significantly younger (perhaps Jurassic?) than the deposition of Myra Formation Units.

2.4 Sediment-Sill Unit

Outcrop or mappable float of sediments or volcanics that comprise this part of this unit are not abundant except at the northwest end of the claim group where green chert occurs over several hundred meters. The chert is thinly banded to massive and contains 1-2% fine-grained pyrite in fractures and as disseminations. Locally it has a silicified tuffaceous appearance. Further north in Silver Creek, black cherty siltstone or argillite also contains disseminated pyrite.

Grey chert, green to grey to maroon rhyolite to dacitic tuff and argillite were noted by Somerville (1979) in CHEM 3 to 5; pyrite and graphite occur locally in all of these rocks. Somerville also noted chloritized andesites in some of these holes but does not comment on their origin. They could be related to the andesite or feldspar porphyry dikes or sills discussed above.

Gabbros and plagiophyric diabase, the intrusive components of the Sediment-Sill Unit, outcrop in three major areas: in Silver Creek, on Mount Brenton and east of the Sharon showing. Muller (1980) mapped plagiophyric diabase and locally flower gabbro (sic) on Mount Brenton. Flower gabbro was not observed on the Oak Group except as rounded boulders derived from till. The intrusives range from holocrystalline fine to medium grained gabbro-diorite, in the area east of the Sharron showing to plagiophyric diabase on Mount Brenton. The diabase is characterized by medium to coarse grained plagioclase set in a dark fine-grained to microcrystalline matrix. The intrusives are typically fresh although weak chlorite, epidote veins and quartz veins occur locally. Magnetite is a common accessory in both intrusives. A 0.5 m wide andesite dike cuts the gabbro east of the Sharron showing.

2.5 Myra Formation

The Myra Formation covers much of the southern portion of the claim group and is host to the Sharon showing in the southeast end of the claims and the Twin-J sulphide deposit located on Mount Sicker to the east. Three main rock or alteration types have been noted - sericite schist, sericite chlorite schist and chlorite schist. With more detailed mapping and exposure these could be subdivided into quartz eye-bearing or tuffaceous. Quartz eyes in the various schists are relatively easily recognized irrespective of the type of alteration; the eyes range from 1 to 5 mm in size and appear transparent in hand specimens. Tuffaceous textures are not as easily discerned particularly in the fine grained sericite schists. Tuffaceous rocks that are only weakly altered to chlorite and carbonates outcrop in Holyoak Creek where minor graphitic argillite occurs as float. The tuffs or tuffaceous sediments are strongly foliated near contacts of fine grained intrusive rocks. One particularly well preserved section of the volcanic pile has a very shallow dip of 10° to the southeast.

Sericite schists are characterized by white-colored, fine grained textures or porphyritic textures in the quartz eye bearing units. Outcrops are generally well foliated and locally approach a papery schist. Some areas appear to consist almost entirely of sericite although very fine-grained quartz is a likely component in the harder outcrops. Pyrite is locally abundant (1 to 5%) and occurs in thin (2 to 4 cm thick) sulphide lenses that parallel foliation in a rock quarry west of the Sharon showing at the southern boundary of the claim group.

Sericite chlorite schist is an intermediate between sericite and chlorite schist. The distinctive pale emerald green color of this unit is probably imparted by a green sericite or an intermediate sericite-chlorite alteration product.

Chlorite schist is most common in the vicinity of the Sharon showing. Predictably textures are preserved better in these dark to light green rocks than in the sericite schists and in some areas deformed tuffaceous and breccia textures are recognized. Near the adits of the Sharon showing fine to medium grained, commonly euhedral pyrite comprises 1 to 10% of the rock. The Sharon showing appears to overlap the transition from sericite to chlorite schist.

2.6 Structure

Well developed foliation is the main structural feature and is found throughout the claim group. Trends vary from 105 to 125° and dips from vertical in the west to subvertical or moderate in the east. In the area of the Sharon showing dips to foliations are moderate to the northeast. Holbek (1980) suggests the area has been isoclinally folded and that axial planes dip to the northeast. Although isoclinal folds near the Sharon showing are interpretive, Muller (1980) has documented similar-style folds in other areas of the Sicker Group. Where noted, lineations in the plan of foliations are of shallow plunge.

Jointing or fracture cleavage and crenulation slip cleavage are features of many outcrops in the claim group. Fracture cleavage has variable attitude depending on the competency of the rock involved but generally trends are 020 to 040° and dips are subvertical. Symmetrical kink and S or Z crenulations that have folded earlier foliation planes, and associated crenulation slip cleavage are features in widely scattered outcrops. Minimal data (6 measurements) indicate two ranges or trends to the slip cleavage - 162 to 176° and 010 to 065°. Significantly fold axes plunge vertically. A compressive force or a shear couple parallel to the schistosity are therefore possible; it may have also caused the fracture cleavage.

3 GEOCHEMISTRY

3.1 Silt and Heavy Mineral Stream Geochemistry

Geochemical analyses of silt and heavy mineral stream samples are tabulated in Appendix C and plotted on Maps 3 and 4. Rigorous statistical treatment of this analytical data is not warranted because of the low sample populations. However, observation of the data groups indicate variable concentration, depletion or lack of change in elemental abundances between stream silts and heavy mineral separates. Cu and Pb exhibit about a 50% and Ag a 20% average increase in concentration, whereas, As, Au and Sb show a decrease although this decrease may not be significant in view of low total abundances of these elements. Mo and Zn show no change between the two sample mediums; this is due to low total abundance for Mo and probably even distribution of Zn in both mediums. Some of the variations noted between silts and heavy mineral separates may be caused by changes in lithologies local to specific sample sites. Analyses of the -80 fraction of some of the samples from heavy mineral sample sites would provide a more direct comparison but this is not warranted at this time because of the low values.

Observation of the data also indicates that there are no strong anomalies in either silts or heavy minerals draining the various parts of the property. However, near the Sharon showing in Holyoak Creek, one heavy mineral sample (4EH108) recorded the highest values for nearly every element analysed.

Above background Cu, Pb, and Sb in silts occur at the northern edge of the claim group west of Mount Brenton; they probably reflect relatively high background values in granite that is located north of this area. A weak Zn and Au anomaly (4ES008) occurs in a small tributary of Silver Creek. Quartz-pyrite veins that crosscut sericite schist were mapped in this creek.

3.2 Rock Sample Geochemistry

One sample of gabbro, andesite dike and weakly altered tuff, five samples of sericite schist and four of chlorite schist were analysed for major and trace elements (see Appendix A for sample descriptions and C for analyses). An additional sample (15069) that consisted mainly of massive pyrite lenses in sericite schist was also analysed for comparative purposes.

Except for some pyrite-bearing rocks, none of these samples were particularly anomalous in base or precious metals. Chip samples taken from the openings at the two adits (15070 and 15071) contained up to 30% pyrite and above background Cu (.09 and .2%), Zn, Ag and Sb values. A sample (15069) of more massive pyrite from the quarry located west of the Sharon showing is anomalous in Mo (42 ppm), As, Au (108 ppb) and Sb.

Cu in the gabbro and Zn, Ag and Sb values in the andesite dike rock are significantly higher than in chlorite and sericite schists except for the three samples that contain abundant pyrite.

Various major elements can be used to determine or confirm original host lithologies and alteration assemblages. Al_2O_3 and TiO_2 are commonly cited as immobile elements in hydrothermally altered rocks. A comparison of TiO_2 values in these rocks indicates that the gabbro (2.5%), andesite dike (0.9%) and chlorite and sericite schists (0.1 to 0.6%) are relatively easily distinguished lithologies. TiO_2 contents of sericite and chlorite schists in general fall between the range for tuffs and quartz-eye schists (Tyee rhyolite) analysed by Holbek (1980, see Holbek's Fig. 3.2). Recalculation of these analyses to 100%, as was done for Holbek's analyses, would increase the TiO_2 content by 5 to 10% in many cases.

Assuming that Al_2O_3 and TiO_2 are relatively immobile but that absolute abundances of these major elements can be diluted by alteration minerals like quartz, sulphides or carbonates then the Al_2O_3/TiO_2 ratio may provide a more accurate signature of the pre-alteration host lithology (see Table 3). The gabbro ($Al_2O_3/TiO_2 = 6.3$) and andesite dike (21) have fairly distinct ratios compared to eight of the chlorite and sericite schists (these vary between 39 and 84). These higher ratios probably reflect a more felsic composition of original host lithologies (rhyolite to dacite?). However, the composition of the remaining three samples of schist (15070 to 15072) have a distinct signature (between 13 and 23); it probably reflects a more mafic original host composition (cf andesite dike). These 'andesitic' samples were obtained from the eastern end of the Oak Group near the Sharon showing.

Table 3

MAJOR ELEMENT RATIOS

Sample No.	Rock Type Alteration	Al_2O_3/TiO_2	$Na_2O/(Na_2O + K_2O)$
15059	Gabbro	6.3	0.86
15060	Chlorite Schist	39	0.73
15062	Sericite Schist	61	0.07
15063	Chlorite Schist	69	0.45
15064	Andesite Dike	21	0.63
15065	Sericite Schist	73	0.54
15066	Chlorite Schist	59	0.50
15067	Sericite Schist	79	0.11
15068	Sericite Schist	84	0.01
15069	Pyrite Lenses	62	0.03
15070	Chlorite Schist	23	0.03
15071	Chlorite Schist	18	0.06
15072	Sericite Schist	13	0.13

To further establish the pre-alteration composition of host lithologies the samples are plotted on a triaxial graph that incorporates many major elements (Fig. 5, after Church 1975). The graph roughly confirms the compositions indicated by the Al_2O_3/TiO_2 ratios despite the fact that many of the major elements used in this plot are known to be mobile in hydrothermal environments. This is particularly true of the alkali elements in sericitic-type alteration.

Soda depletion and potassium enrichment are features commonly noted in hydrothermal alteration closely associated with massive sulphide deposits. Consequently the $Na_2O/(Na_2O + K_2O)$ ratio has been used as a guide to exploration for massive sulfide deposits; low ratios are found close to ore. Calculation of this ratio for the samples analysed indicates two ranges (see Table 3); those between .45 and .86 (gabbro, andesite dike, 3 samples of chlorite schist and one of sericite schist) and those between .01 and .13 (4 sericite schist and 2 chlorite schist). The two samples of chlorite schist that have low ratios are from the adits of the Sharon showing. Two samples of sericite schist with low ratios are located in the west end of the property while the other two are located in the east end of the property near the quarry and in Holyoak Creek. These analyses provide additional evidence for a geological environment that is permissive for blind massive sulphide mineralization.

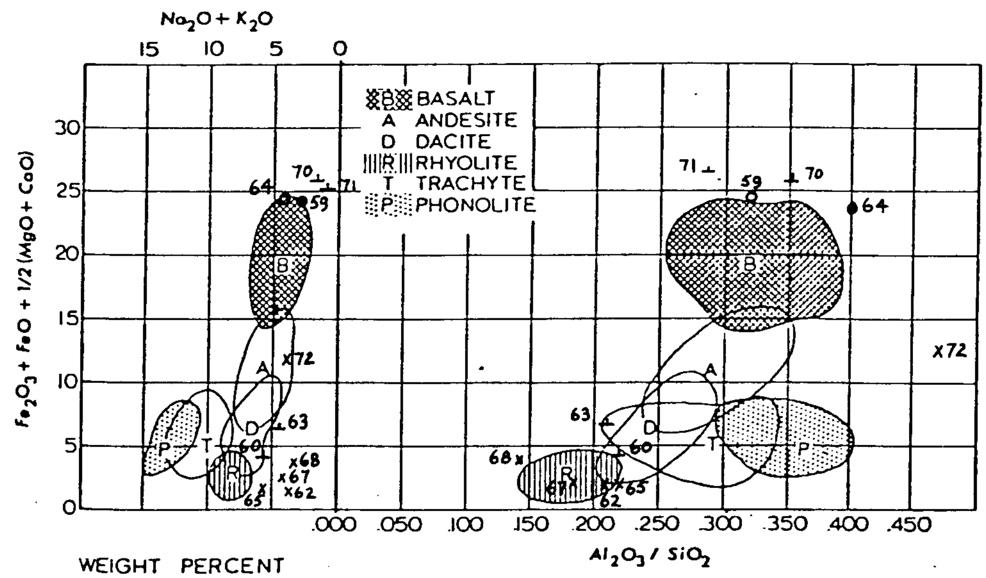


Figure 5: Triaxial plot showing fields of variation of most common volcanic rocks; contours are inclusive of two-thirds of total points counted for each rock type. Letters designating rock types are positioned near Daly's (1933) averages. Samples from the Oak Group are also plotted and located by the last two digits of the sample numbers (see Table 4). o Gabbro; • Andesite Dike; - Chlorite schist; x Sericite Schist (after Church 1975).

4 CONCLUSIONS AND RECOMMENDATIONS

1. Areas of the Myra Formation that warrant further geological, geochemical or geophysical work to assess the possibility of blind massive sulphide mineralization include the area of the rock quarry west of the Sharon showing and broad patches of Myra Formation rocks in the western half of the claim group. The large patch of till between Humbird and Holyoak Creek cannot be investigated using conventional techniques because of thick till cover. However, large sections of the till at the west end of the claim group could probably be relatively easily explored because cover in this area is generally thin.

2. Features in the Myra Formation on the Oak claims permissive for massive sulphide mineralization are the sericite and chlorite schists, locally low $Na_2O/(Na_2O + K_2O)$ ratios, quartz eye porphyries, the characteristics of the Sharon showing, local massive pyrite lenses, and, where recognized, the volcanic stratigraphy. Massive sulphide mineralization at the Twin J and Buttle Lake deposits occur in Myra Formation rocks that have similar features.

3. Limited analytical data suggests chlorite and sericite schists in the vicinity of the Sharon showing were originally andesitic in composition. The rocks have low $Na_2O/(Na_2O + K_2O)$ ratios despite the relatively high local chlorite content. The showing could be interpreted as an environment that is basal or along strike to blind massive sulphide mineralization. Sericite and chlorite schists located along strike to the west of the Sharon showing represent altered rhyodacites and are good targets.

4. Silt and heavy mineral stream geochemistry provided subtle anomalies in Holyoak Creek and parts of Silver Creek. No strong geochemical anomalies were noted.

5. The Sediment Sill Unit does not have much economic mineral potential based on the geology observed in the Oak Claim Group.

REFERENCES

Church, B. N., 1975, Quantitative Classification and Chemical Comparison of Common Volcanic Rocks: G.S.A. Bull., v. 86, p. 257-263.

Clapp, C. H., 1918, Duncan Sheet - Vancouver Island: Map 42A publication #1192, Canada Dept. of Mines.

Cooper, W. G., 1983, HLEM and magnetometer survey of Brent 1 Mineral Claim, Victoria Mining Division, Vancouver Island: Esso Resources Canada Limited, 10 p.

Daly, R. A., 1933, Igneous Rocks and the Depths of the Earth: New York, McGraw-Hill Book Co., 508 p.

Everett, C. C. and Cooper, W. G., 1984, Geological, geochemical and geophysical report on Chemainus Project, Victoria Mining Division: Esso Resources Canada Limited, 89 p.

Holbek, P. M., 1980, Geology and Geochronometry of the Sharon Volcanogenic Prospect, Mt. Brenton Area, Southwestern B.C.: B. Sc. Thesis, University of British Columbia, 53 p.

Muller, J. E., 1977, Geology of Vancouver Island: G.S.C. O.F. 463.

Muller, J. E., 1980, The Paleozoic Sicker Group of Vancouver Island, British Columbia: GSC Paper 79-30, 22 p.

Tikkanen, G. D., 1967, I.P. and Resistivity Survey CPOG Property, Grid no. 1, Duncan Area, B.C.: Assess. Rept. #936, 6 p.

Somerville, R., 1979, Diamond Drill Hole Report for Holes Chem No. 1 to 6 on the Brent 1, QQ1, Oak 2 and 3 and VV claims in the Nanaimo and Victoria Mining Divisions: Esso Resources Canada Limited, 6 p.

Walcott, P. E., 1979, A report on a Self-potential Survey, Sharon Zone, Chemainus Area, Vancouver Island, B.C.: Esso Resources Canada Limited, 3 p.

STATEMENT OF QUALIFICATION

I am a Bachelor of Science graduate from the University of New Brunswick (May 1977) and have been employed as an exploration geologist within the mining industry for eight years; the last five years with Esso Resources Canada Limited.

Cal Everett

CAL C. EVERETT

STATEMENT OF QUALIFICATION

I received a Bachelor of Applied Science Degree from the University of British Columbia (1974) and a Doctor of Philosophy from the Australian National University (1982). Between degrees I was employed as an exploration geologist for four years in Papua New Guinea. I have been employed for the past two years by Esso Resources Canada Limited as an exploration geologist.

R. M. BRITTEN

SUMMARY OF COSTS: OAK GROUP

Wages	
Senior geologist: 9.5 days; $258/day; between April 30 to May 10 (includes report writing)	2450
Geologist 5 days; $192/day; between April 26 to May 2	960
Technician 8 days; $179/day; between April 27 to May 9	1432
Food and Accommodation	
12 days; $50/day; April 30 to May 4	600
Transportation	
4/4 Truck; 1 week; $250/week; April 29 to May 5	250
Fuel	100
Ferry	60
Analyses	
- 10 Heavy Mineral Separates - analysed for Au, Ag, As, Cu, Mo, Pb, Sb, Zn; $39/sample	390
11 silt samples - analysed for Au, Ag, As, Cu, Mo, Pb, Sb, Zn; $19/sample	209
14 rock - analysed for Au, Ag, As, Cu, Mo, Pb, Sb, Zn; $22/sample	308
13 rock - classical whole rock analyses; $25/sample	325
Drafting material and typing report	122
TOTAL	7206

[signature]

LIST OF PERSONNEL

Ron Britten (Senior Geologist)
198 E. 20th
Vancouver, B.C.
V5V 1L9

Calvin Everett (Project Geologist)
1201 - 1515 Eastern Ave.
North Vancouver, B.C.
V7L 4R2

Kirk Simpson (Geotechnician)
84 - 3441 E. 49th
Vancouver, B.C.
V5S 1M1

APPENDIX A

Rock Samples Descriptions

Field #	TS #	Geochem #	Description
4R31		15059	Gabbro - dark grey, fine-grained, chloritized
4R32		15060	Chlorite schist - thinly laminated or foliated
4R33		15061	Quartz-pyrite vein
4R34		15062	Sericite schist - FeOxide stained, papery
4R35		15063	Chlorite schist
4R36		15064	Andesite dike or sill - green chloritized
4R37		15065	Sericite schist - FeOxides
4R38		15066	Crystal tuff (?) - Chlorite
4R39		15067	Sericite schist - papery, FeOxide stained
4R43		15068	Sericite schist - fine-grained
4R44		15069	Massive pyrite lenses - in sericite schist
4R45		15070	Pyrite aggregates - in sericite chlorite or chlorite schist
4R46		15071	Pyrite aggregates - in chlorite schist
4R47			Crystal tuff (?) - chlorite schist
4R48			Andesite sill - fine grained, carbonate chlorite rich
4R49			Tuff - chlorite, magnetite rich
4R50		15072	Sericite schist
		15073	Standard

APPENDIX B

Sample Preparation and Analytical Methods

Stream silt and heavy mineral samples were collected in 1 or 2 partially filled kraft bags (3.5 x 8 inch gussett) and sent to Min-En's Laboratory in Vancouver for multielement analysis. About 200 g (silts) to 500 g (for heavy mineral separation) of -20 mesh material was obtained on site. Silt samples were sieved to -80 mesh and analysed whereas all of the -20 mesh fraction from a 400 g split of the sample was used in the flotation technique to prepare heavy mineral separates. The flotation technique involved a floculant that is added to coagulate the fine hydroxides and the whole sample is later centrifuged in a TBE-Methyl Iodide Mixture (S.G. = 3.1). Both heavy minerals and coagulated hydroxides are sunk while the lighter components are floated off and discarded. Magnetite is then separated in a field designed to leave pyrrhotite and ilmenite in the 'non-magnetic fraction.' The total percentage weight of the 'non-magnetic fraction' is recorded and the separate is then analysed.

Preparation of rock samples for analysis simply involved pulverizing to -100 mesh. In-house standards were added to the rock sample (15073) and heavy mineral (4EH110) sample suites to monitor the accuracy and precision of the analytical techniques.

Analytical methods involved a nitric perchloric digestion and atomic absorption finish for Mo, Cu, Pb, Zn and Ag. Sb was done by aqua regia digestion with an atomic absorption finish, As by acid digestion and spectrophotometric finish and Au by fire analysis. Whole rock analyses were done using a lithium tetraborate fusion and atomic absorption finish.

APPENDIX C

Geochemical Results

MIN-EN Laboratories Ltd.
Specialists in Mineral Environments
705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX: 04-352828

GEOCHEMICAL ANALYSIS CERTIFICATE

COMPANY ESSO MINERALS CANADA
PROJECT 2130
ATTENTION R BRITTEN

FILE 4-243
DATE MAY 14/84

We hereby certify that the following are the results of the geochemical analysis made on 10 samples submitted.

SAMPLE NUMBER	MO PPM	CU PPM	PB PPM	ZN PPM	AG PPM	AS PPM	AU PPB	SB PPM
4ES001	2	32	40	40	1.0	8	3	1
4ES002	1	46	8	24	0.9	6	3	2
4ES003	1	23	10	32	0.8	1	8	1
4ES004	2	38	6	38	0.8	2	6	4
4ES005	1	29	10	36	1.0	5	10	1
4ES006	1	30	14	34	0.8	5	10	10
4ES007	2	84	12	54	1.0	1	5	20
4ES008	2	48	10	62	0.8	4	14	4
4ES009	1	62	12	56	0.8	8	6	8
4ES010	2	46	8	44	0.8	6	2	6

AU PPB - FIRE

AU PPB - FIRE

Certified by [signature]

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Specialists in Mineral Environments
705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX: 04-352828

GEOCHEMICAL ANALYSIS CERTIFICATE

COMPANY ESSO MINERALS CANADA
PROJECT NO 2130
ATTENTION R. BRITTEN

FILE NO 4-243
DATE MAY 15/84
HM FLOATATION -20MESH

We hereby certify that the following are the results of the geochemical analysis made on 11 samples submitted.

SAMPLE NUMBER	MO PPM	CU PPM	PB PPM	ZN PPM	HM %	AG PPM
4EH100	1	38	16	30	9.81	0.8
4EH101	1	80	24	46	26.10	1.0
4EH102	2	70	26	55	15.88	1.0
4EH103	3	62	25	40	9.60	0.8
4EH104	1	82	24	53	9.91	1.1
4EH105	1	70	22	44	13.34	1.0
4EH106	1	56	20	49	9.03	1.2
4EH107	2	72	24	47	9.14	1.4
4EH108	1	110	26	62	9.94	1.3
4EH109	1	104	28	63	10.05	1.4
.H110	2	20	30	62	6.38	1.5

Certified by [signature]

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COMPANY ESSO MINERALS CANADA
PROJECT NO 2130
ATTENTION R. BRITTEN

FILE NO 4-243
DATE MAY 15/84
HM FLOATATION -20MESH

We hereby certify that the following are the results of the geochemical analysis made on 11 samples submitted.

SAMPLE NUMBER	AS PPM	AU-PPB FIRE	SB PPM
4EH100	1	6	4
4EH101	2	9	2
4EH102	<1	3	4
4EH103	2	4	6
4EH104	2	10	3
4EH105	1	3	5
4EH106	3	1	8
4EH107	2	3	4
4EH108	8	14	10
4EH109	6	6	30
EH110	5	428	12

Certified by [signature]

MIN-EN Laboratories Ltd.

Specialists in Mineral Environments
705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524

TELEX: 04-352828

GEOCHEMICAL ANALYSIS CERTIFICATE

COMPANY ESSO MINERALS CANADA
PROJECT NO 2130
ATTENTION R. BRITTEN

FILE NO 4-243
DATE MAY 15/84

We hereby certify that the following are the results of the geochemical analysis made on 15 samples submitted.

SAMPLE NUMBER	MO PPM	CU PPM	PB PPM	ZN PPM	AG PPM	AS PPM
15059	4	172	22	28	1.0	4
15060	1	46	9	40	0.6	4
15061	4	18	10	52	0.6	3
15062	1	18	76	21	1.3	34
15063	1	6	16	33	0.8	1
15064	4	11	32	218	1.8	1
15065	1	6	5	24	0.2	<1
15066	2	14	12	32	0.5	3
15067	1	9	9	10	0.4	1
15068	1	18	10	11	0.4	5
15069	42	76	10	32	0.8	33
15070	4	1950	18	112	2.0	1
15071	6	900	30	102	1.3	2
15072	1	54	42	91	1.0	2
15073	10	64	43	86	0.6	15

Certified by [signature]

MIN-EN Laboratories Ltd.

Specialists in Mineral Environments

705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX: 04-352828

GEOCHEMICAL ANALYSIS CERTIFICATE

COMPANY ESSO MINERALS CANADA
PROJECT NO 2130
ATTENTION R. BRITTEN

FILE NO 4-243
DATE MAY 15/84

We hereby certify that the following are the results of the geochemical analysis made on 15 samples submitted.

SAMPLE NUMBER	AU-PPB FIRE	SB PPM
15059	1	32
15060	1	2
15061	3	15
15062	36	1
15063	2	25
15064	3	65
15065	1	1
15066	2	1
15067	2	2
15068	4	1
15069	108	82
15070	14	95
15071	5	106
15072	1	36
15073	1	27

Certified by [signature]

MIN-EN Laboratories Ltd.
Specialists in Mineral Environments
705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

PHONE: (604) 980-5814 OR (604) 988-4524 TELEX: 04-352828

CERTIFICATE OF ASSAY

COMPANY ESSO MINERALS CANADA
PROJECT 2130
ATTENTION R BRITTEN

FILE 4-243
DATE MAY 29/84

We hereby certify that the following are assay results for samples submitted.

SAMPLE NUMBER	AL2O3 %	BA %	CAO %	FE2O3 %	K2O %	MGO %
15059	15.70	.026	11.00	16.70	.47	5.08
15060	14.90	.080	1.21	3.33	1.40	0.68
15062	14.60	.247	0.07	2.07	3.58	0.19
15063	14.40	.101	4.83	3.22	2.46	2.62
15064	19.00	.047	5.45	18.90	1.43	5.45
15065	16.00	.088	0.20	2.16	2.72	0.41
15066	15.80	.187	1.97	3.11	2.31	1.25
15067	14.30	.133	2.13	1.86	3.70	0.34
15068	9.28	.144	0.03	3.58	3.72	1.15
15069	4.33	.026	0.32	46.50	0.33	3.16
15[illegible]0	12.60	.062	0.66	22.10	1.49	7.19
15071	11.10	.063	0.54	23.20	1.29	6.03
15072	23.10	.090	0.64	11.28	3.80	3.07
15073	19.20	.013	1.14	5.21	6.46	0.27

Certified by [signature]

MIN-EN LABORATORIES LTD.

MIN-EN Laboratories Ltd.

Specialists in Mineral Environments

705 WEST 15th STREET NORTH VANCOUVER, B.C. CANADA V7M 1T2

PHONE: (604)980-5814 OR (604)988-4524 TELEX: 04-352828

CERTIFICATE OF ASSAY

COMPANY ESSO MINERALS CANADA
PROJECT 2130
ATTENTION R BRITTEN

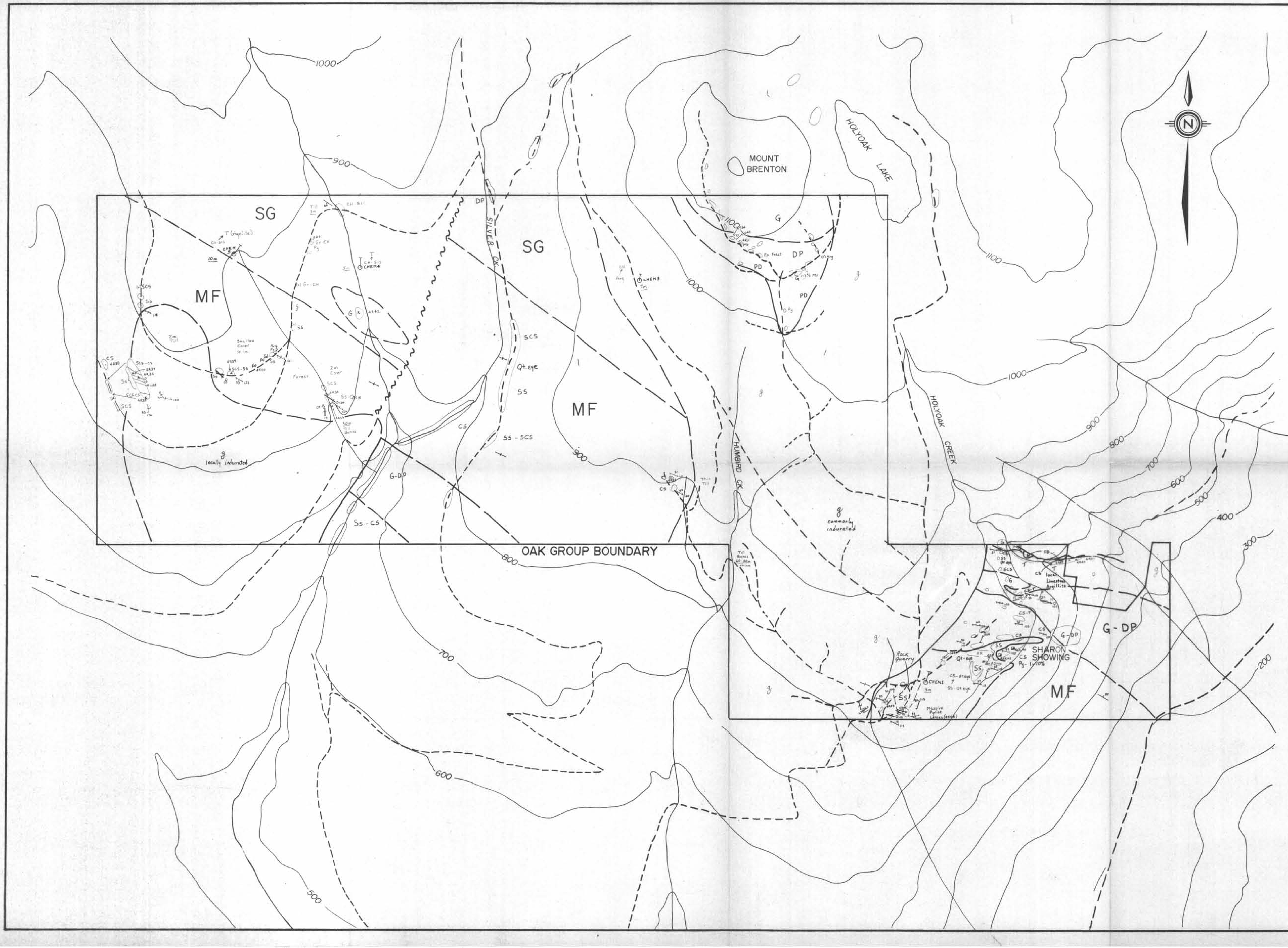
FILE 4-243
DATE MAY 29/84

We hereby certify that the following are assay results for samples submitted.

SAMPLE NUMBER	MNO2 %	NA2O %	P2O5 %	SIO2 %	SR %	TIO2 %	LOI %
15059	0.28	2.90	0.24	48.90	.009	2.49	.10
15060	0.06	3.72	0.12	68.80	.031	0.38	.60
15062	0.01	0.26	0.05	68.60	.004	0.24	1.60
15063	0.07	2.02	0.03	69.80	.024	0.21	1.80
15064	0.21	2.39	0.41	47.00	.005	0.91	2.70
15065	0.05	3.19	0.02	73.30	.019	0.22	.60
15066	0.08	2.27	0.03	74.60	.030	0.27	.20
15067	0.05	0.47	0.02	77.30	.004	0.18	.60
15068	0.01	0.05	0.01	68.00	.004	0.11	1.10
15069	0.02	0.01	0.01	22.40	.005	0.07	20.80
15 0	0.37	0.05	0.02	36.20	.007	0.56	11.10
15071	0.34	0.08	0.01	39.10	.006	0.63	13.20
15072	0.17	0.55	0.24	49.10	.017	1.79	4.10
15073	0.29	7.68	0.02	60.70	.009	0.39	.90

Certified by ______

MIN-EN LABORATORIES LTD.



LEGEND

Quaternary

g Glacial till

Jurassic ?

Andesite dikes

FP Feldspar Porphyry

Mississippian Devonian

SICKER GROUP (SG)

SEDIMENT SILL SUCCESSION

PD Plagiophyric Diabase

G Gabbro

Gr-CH Green Chert

CH-SIS Cherty Siltstone

MYRA FORMATION (MF)

Ss Sericite Schist

SCs Sericite Chlorite Schist

Cs Chlorite Schist

- Mine shaft
- Outcrop
- Float
- Geologic boundary-positive
- -inferred
- Fault-inferred
- Stream
- Contours-100m. interval
- 4 wheel drive roads or tracks
- Claim line
- Rock sample location
- Silt sample location
- Bedding (tops unknown)
- Foliation
- Foliation with lineation
- Jointing, fracture cleavage
- Crenulation slip cleavage
- Z crenulation slip cleavage
- S crenulation slip cleavage
- Quartz vein
- Antiform
- Till 2m. thickness
- Till 2m. minimum thickness
- Horizontal projection of diamond drill hole

Arg Argillite

T Tuff

Ep Epidote

Mt Magnetite

Py Pyrite

Qt Quartz

GEOLOGICAL BRANCH ASSESSMENT REPORT

12,379

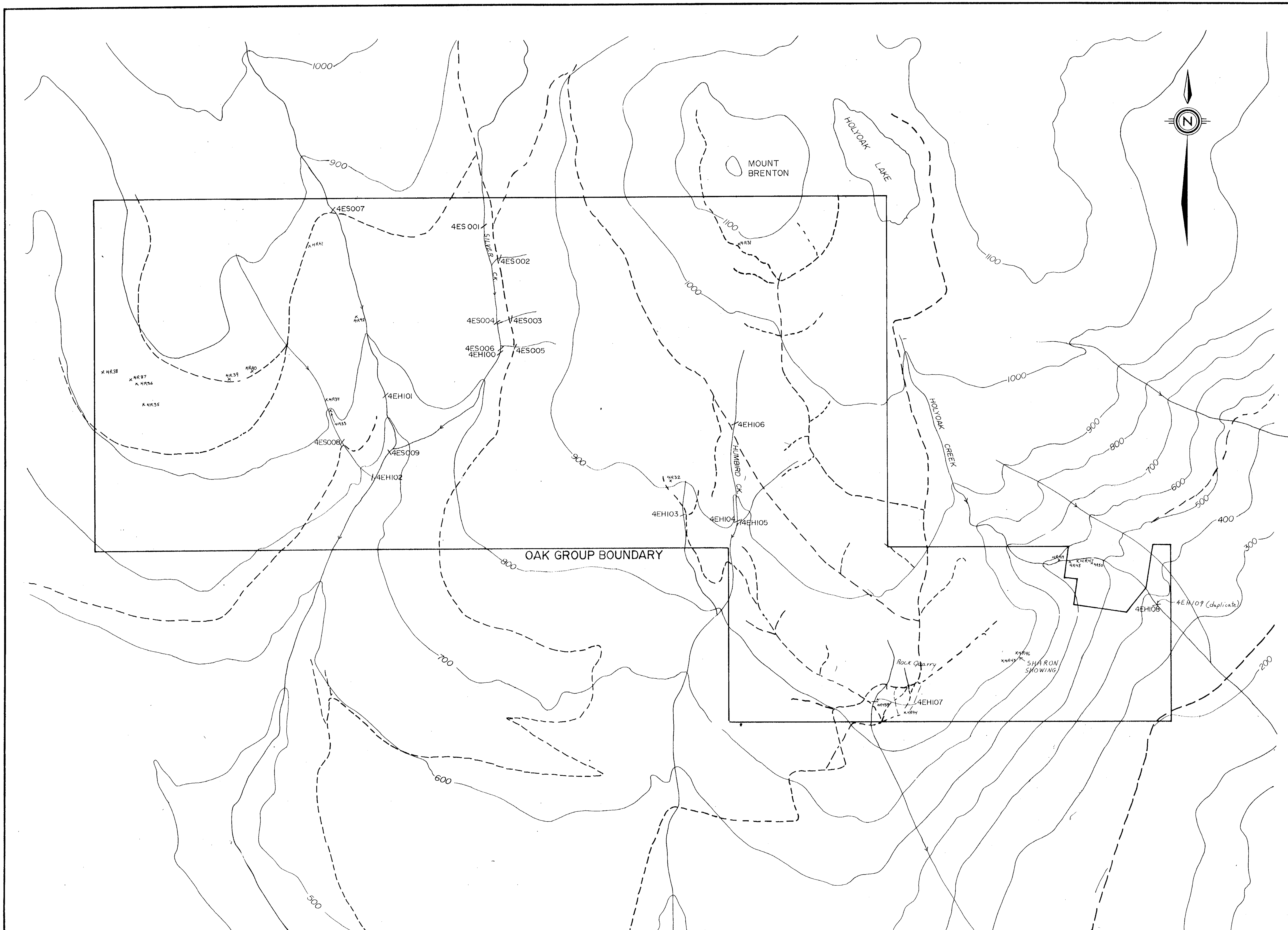
SCALE 1:10,000

0 500 m.

ESSO MINERALS CANADA

CHEMAINUS PROJECT
GEOLOGY
of the
OAK GROUP

Project No. 2130	Mining Division VICTORIA
NTS 92B/13W	Drawn By:
Date: MAY 1984	Map No. 1



LEGEND

- 100 Contours–100m. interval
- 4wheel drive roads or tracks
- Claim line
- Stream
- Silt sample location
- 4EH101, 4ES003 – Sample numbers
  - –'H' indicates Heavy Mineral Sample
  - –'S' indicates Silt Sample
- 4R32 – Rock sample

GEOLOGICAL BRANCH
ASSESSMENT REPORT

12,379

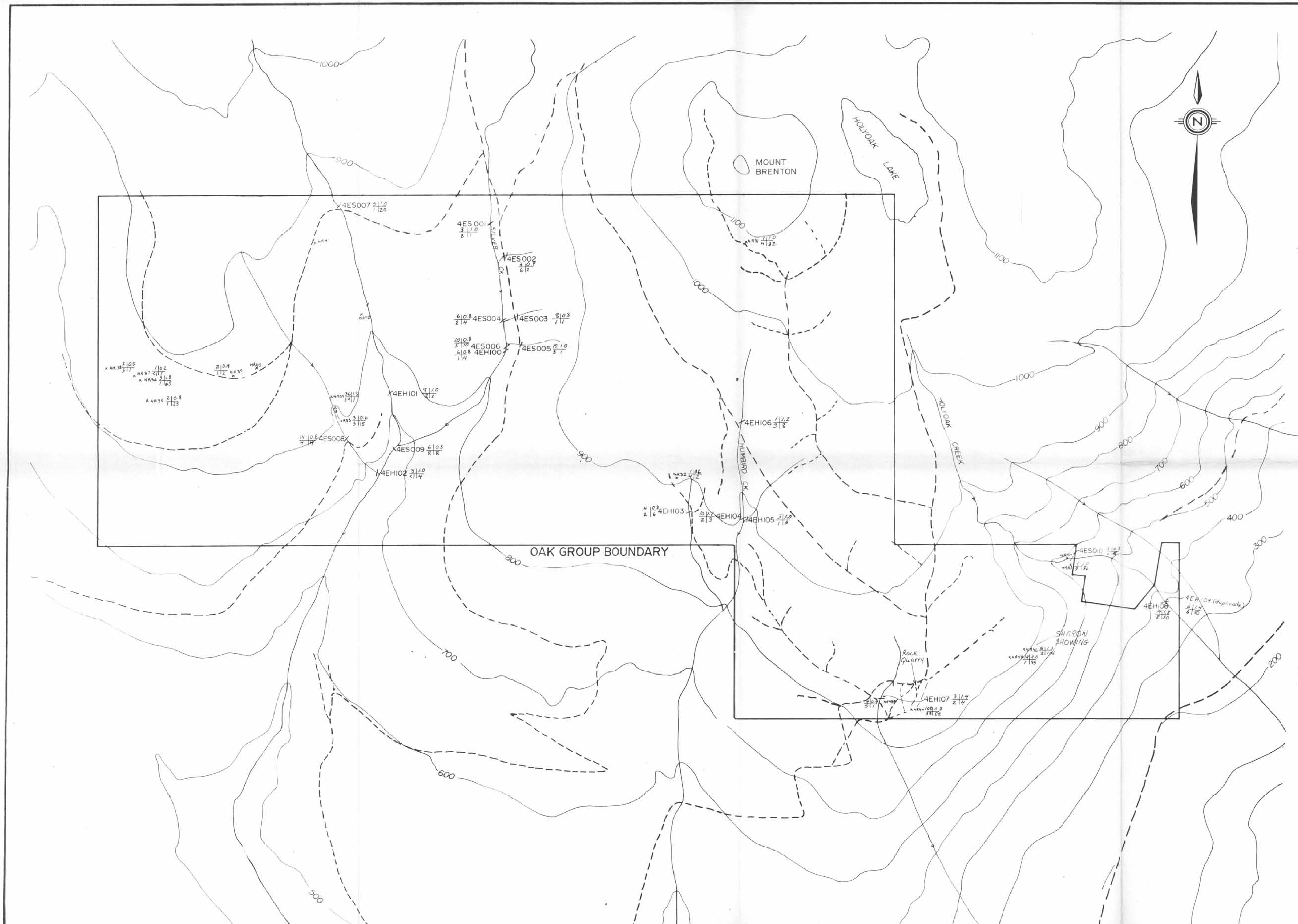
SCALE 1:10,000

0 500m.

ESSO MINERALS CANADA

CHEMAINUS PROJECT
SAMPLE LOCATION MAP
OAK GROUP

Project No. 2130	Mining Division VICTORIA
NTS 92B/13W	Drawn By:
Date: MAY 1984	Map No. 2



LEGEND

- Contours–100m. interval
- 4wheel drive roads or tracks
- Claim line
- Stream
- Silt sample location
- 4EH101 / 4ES003 – Sample numbers
  - 'H' indicates Heavy Mineral Sample
  - 'S' indicates Silt Sample
- 4R32 – Rock sample
- 3 | 0.6 / 4 | 8 — Au(ppb) | Ag(ppm) / As(ppm) | Sb(ppm)

GEOLOGICAL BRANCH
ASSESSMENT REPORT

12,379

SCALE 1:10,000

0 500 m.

ESSO MINERALS CANADA

CHEMAINUS PROJECT

OAK GROUP

1984 GEOCHEMICAL RESULTS

Au,Ag,As,Sb

Project No 2130	Mining Division VICTORIA
NTS 92B/13W	Drawn By
Date MAY 1984	Map No 3

MOUNT BRENTON
HOLYOAK LAKE
HOLYOAK CREEK
SILVER CK.
HUMBIRD CK.
OAK GROUP BOUNDARY
SHARON SHOWING
Rock Quarry
4ES001
4ES002
4ES003
4ES004
4ES005
4ES006
4ES007
4ES008
4ES009
4ES010
4EH100
4EH101
4EH102
4EH103
4EH104
4EH105
4EH106
4EH107
4EH108
4EH109 (duplicate)
1000
900
800
700
600
500
400
300
200
1100
N
LEGEND
100 Contours-100m. interval
4wheel drive roads or tracks
Claim line
Stream
Silt sample location
4EH101 4ES003 Sample numbers
-'H' indicates Heavy Mineral Sample
-'S' indicates Silt Sample
4R32 - Rock sample
2|68 / 26|50 — Mo(ppm)|Cu(ppm) / Pb(ppm)|Zn(ppm)
GEOLOGICAL BRANCH ASSESSMENT REPORT
12,379
SCALE 1:10,000
0 500m.
ESSO MINERALS CANADA
CHEMAINUS PROJECT
OAK GROUP
1984 GEOCHEMICAL RESULTS
Mo, Cu, Pb, Zn
Project No. 2130
Mining Division VICTORIA
NTS 92B/13W
Drawn By:
Date: MAY 1984
Map No. 4