

4930

EMANCIPATION MINES LTD.

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6W,
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Report on the
HOPE CLAIMS
New Westminster Mining Division, B.C.

Dr. G. C. Stephens

July, 1973

Department of
Mines and Technical Resources
ASSESSMENT REPORT
NO. 4930 MAP

TO PROTECT OUR CLIENTS, THE PUBLIC AND OURSELVES, ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS AND AUTHORIZATION FOR PUBLICATION OF STATEMENTS, CONCLUSIONS AND EXTRACTS FROM OUR REPORTS MUST RECEIVE OUR WRITTEN APPROVAL

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INTRODUCTION

During the period from June 4 to June 29, 1973, geologic mapping (at a scale of 1" = 500') and a limited program of soil sampling was undertaken on a group of 32 mineral claims, located on the Coquihalla River approximately 16 miles northeast of Hope, B.C. In addition, tape-compass surveys were made of the major roads and trails within the property. Claim posts were located by altimeter survey and tied to major roads.

During this same period, a limited program of diamond drilling was undertaken by K. Warren Geiger and Jon Stewart on a sulphide-bearing felsite dyke located near the southern boundary of the property.

LOCATION AND ACCESS

The Hope Claims are located in the northern Cascade Mountains north of the Coquihalla River, between Fifteen Mile Creek and Ladner Creek. Elevations within the claims area vary from approximately 1,200 to 4,000 ft. The entire area is below tree line and is covered by dense vegetation. Soil cover on most of the steep hillside is relatively thin; however, in some locations, at lower elevations, thick sequences of glacial till obscure the underlying bedrock.

Access to the property is from Hope via the Kakawa Lake road then by a dirt logging road which parallels the Coquihalla River. A branch of this logging road parallels the course of Ladner Creek and thus provides access to the northern portion of the property. All of this road, except for a short segment near the northern end of the property, is passable by 2-wheel drive vehicles.

An older road and footpath lead from the intersection of this logging road and the abandoned Kettle Valley Railroad right-of-way to the main workings of the Emancipation Mine. Portions of this road are passable by 4-wheel drive vehicle.

CLAIMS

The Emancipation Mines property is located within the New Westminster Mining Division and consists of 32 full mineral claims and Mineral Lease M-35, comprising lots #1299 and 1300.

Claim names and record numbers of the Hope Group are as follows:

<u>CLAIM NAME</u>	<u>RECORD NUMBER</u>
Hope 1 - 9	25391 - 25399
Hope 10	27779
Hope 11 - 18	28472 - 28479
Hope 19	28529
Hope 20 - 28	26578 - 26586
Hope 29 - 32	28530 - 28533

HISTORY

The Hope claims are centered on the northwesterly-trending contact between the greenstones and serpentinites of the Cache Creek Group (Permian) and the younger Ladner Slate (Upper Jurassic). Numerous gold prospects and workings are located in a 12 mile section of the so-called serpentine belt along this contact. Exploration and development of some of these properties began as early as 1910. Development of the Emancipation Mine began in 1914. During the period from 1914 to 1933 a total of 12,000 tons of ore were shipped from the mine; gold production totalled 2,977 ozs. B.C. Minister of Mines Reports (1915 - 1933) discuss the geology and the development of the mine during this period. The regional geology of the Coquihalla River area, as well as the geology of the Emancipation workings, is discussed by Cairnes (1924).

In 1971, nineteen claims, centered on the old Emancipation workings, were staked by Jon A. Stewart and K. Warren Geiger, who also acquired mineral lease M-35. Subsequently Stewart and Geiger staked an additional thirteen claims (May-June 1973), bringing the total number of claims to 32.

In 1973 a report on the underground workings of the Emancipation was prepared by A.R. Bullis for Aquarius Mines. Bullis remapped the old workings and completed a limited sampling program. The results of his study indicated that further exploration of the Hope Claims was warranted, and the property was subsequently optioned to Emancipation Mines. Although remnants of the old mining operations abound, no usable mining machinery or facilities remain on the property.

STRATIGRAPHY

Greenstones of the Cache Creek Group underlie the western portion of the claims group. The base of the Cache Creek sequence is not exposed within the property. The Cache Creek rocks are chiefly fine to medium-grained, dark grey to dark green, equigranular to porphyritic greenstones. The original composition of the greenstones varied from andesite to basalt (Cairnes, 1924). The serpentinites within the area appear to have been derived by alteration of some of the more mafic greenstone units. At one locality this change is well-exposed; "unaltered" greenstone grades into partially serpentinitized greenstone and then into the true serpentinite. Contacts between the serpentinites and the greenstone are rarely exposed, but may be either sharp or gradational in nature. The sharp contacts are often shear zones. Minor disseminated sulphides were observed locally within the greenstones; they include pyrite, chalcopyrite and pyrrhotite (?). No nickel-bearing minerals were observed.

Thin section studies of two greenstone samples collected on the 1st and 3rd levels of the mine have the following modal compositions (Carswell, 1973):

<u>Sample 1 - Tuff</u>		<u>Sample 2 - Greenstone</u>
Plagioclase	20%	60%
Chlorite	30%	17%
Calcite	35%	--
Actinolite	--	15%
Biotite	5%	--
Opaques	--	4%
Other	10%	4%

Sample 1 - was collected approximately 5 feet west of the Boulder Vein on the first

level. Both the calcite, which occurs as veinlets or scattered replacement patches, and the secondary biotite probably formed during emplacement of the vein system.

Sample 2 is a more typical greenstone collected on the third level of the mine, a few feet east of the Dyke Vein. Hydrothermal alteration effects are much less pronounced and include the development of minor amounts of secondary sericite, calcite (?) and epidote.

The serpentinite bodies are rather uniform in appearance. They are typically fine-grained, equigranular and blackish green in colour. The serpentinites are generally massive although locally they contain talcose shear zones which, in some cases are sulfide-bearing and may contain associated gold mineralization (Cairnes, 1924). The serpentinites are typically veined with sparse, thin (1/16") veinlets of "pseudofibre" asbestos with irregular orientations.

Fault and shear zones within the serpentinites often result in a blocky, highly fractured, rock with polished and slickensided surfaces, but no development of secondary minerals.

Small intrusive bodies of diorite are present within the southwestern portion of the map area. They vary from fine to medium-grained and are equigranular in texture. In hand specimen, the medium-grained variety displays a "diabasic" texture, suggestive of dykes, sills or small shallow intrusive bodies.

Some, but not all, of the diorite masses have been subjected to moderate hydrothermal alteration. Cairnes (1924) believes that the intrusion of the diorite was the controlling factor in the alteration of the greenstones to serpentine, and also of the gold mineralization. Although this may be true, there is no evident correlation between the degree of alteration of the diorite and the serpentinitization of the surrounding greenstones.

Although Cairnes envisioned the diorite as being a large intrusive body (1924, Fig.4); the current mapping suggests a series of smaller sill or dyke-like bodies of no preferred orientation. (An alternate hypothesis is that the diorite represents a small

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pluton which is only partially unroofed.) The nature of the petrologic and structural relations between the diorite and the older host rocks merits further study.

Unconformably overlying the Cache Creek rocks is the Ladner Slate. The Ladner Slate consists predominantly of a group of fine-grained slaty to shaly, thin-bedded to massive, medium-grey to black shales and slates. In the northern portion of the map area, a basal conglomerate is present at the contact of the Cache Creek rocks. This conglomerate is at least 200 feet thick and consists of well rounded volcanic and granitic pebbles, which vary in size from 1/4 to 1 inch in diameter, within a massive black shaly matrix.

Interbedded with this shale conglomerate is a medium-grained, medium-grey conglomeratic quartz-rich sandstone. This sandstone is approximately 200 feet thick and contains no well-defined bedding plane features or cross-beds. The sandstone is exposed only along the logging roads and logged-off hillside near the northwestern edge of the property. Both of these conglomeratic units apparently thin toward the south and are absent at the contact between the Cache Creek rocks and the Ladner Slate north of the Emancipation Mine adits.

The last major rock type within the map area consists of a series of feldspathic dykes which occur predominantly, but not exclusively, within the Ladner Slate. These dykes are medium-grained, equigranular to porphyritic, and light to medium-grey in colour. Two thin sections were examined from these dyke rocks. Their modal compositions are as follows (Carswell, 1973):

	<u>Sample 3 - Trachyte</u>	<u>Sample 4 - Plagioclase porphyry</u>
Plagioclase (Albite)	85%	70%
Chlorite	--	15%
Carbonate (secondary)	10%	--
Quartz	--	10%
Other	5%	5%

The feldspathic dykes often contain disseminated sulfides (chiefly pyrite and/or arsenopyrite) as well as large, irregularly-trending quartz veins or stockworks. In most cases, the quartz is confined to the central portion of the dyke and does not

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not occur in the surrounding slates. Whereas the dykes are chiefly concordant with the cleavage in the surrounding slates, the quartz veins show no such control.

STRUCTURE

The relative lack of stratigraphic markers within the map area makes detailed structural interpretations difficult. The Cache Creek greenstones are apparently derived from a series of volcanic flows and tuffs ranging in composition from andesite to basalt. However no distinctive volcanic units or flow features were identified. The serpentine bodies, which were presumably derived from the more basic rocks, seem to trend NW-SE in the northern portion of the map area, and for this reason it is believed that the general trend of the Cache Creek rocks is approximately parallel to that of the Ladner Slate. The contact between these two units is unconformable and trends approximately N30W and dips steeply to the southwest. As mentioned earlier, the basal conglomerate of the Ladner Slate thins and disappears toward the south.

Within the Slate bedding and cleavage are co-planar, except in the hinge areas of isoclinal folds. Determination of stratigraphic tops, based on cross-bedding or graded bedding, is possible in some outcrops and confirms the fact that the sequence is isoclinally folded. However because of the lack of distinctive marker beds, or sufficient top criteria, the sequence of folds could not be established. The hinges of small isoclinal folds are exposed in three locations within the map area. These fold axes trend N30-40W and are approximately horizontal.

The cleavage within the slates developed as a response to the flattening which took place during the last phases of folding. A very weak second cleavage, which cuts the primary cleavage, is present in several outcrops. It trends approximately N05E-N05W and dips steeply northwest to vertical.

In general, the trend of the bedding and cleavage within the Ladner Slate is N25-40W with dips which vary from vertical to 50° SW (i.e. the sequence is overturned toward the northeast). The only deviation from this general trend is in the northeast corner

of the map area where the dips become much more shallow and the strike becomes more variable. This area is believed to be the crestal region of a moderately large isoclinal anticline. This structure may be the counterpart of a large syncline located along Dewdney Creek, south of the map area (G.S.C. Geol. Map 737A, 1944).

As a result of the severe flattening undergone by the slates, many of the more silty layers within the sequence contain tension fractures which have the same strike as the bedding, but which dip perpendicular to it (Fig.3).* These tension fractures are either open or quartz-filled. Rarely, disseminated sulfides are present within the quartz fracture fillings (location 77 - 73).

Most quartz veins within the slate post-date the cleavage and are parallel to it. However, a few thin (1/8") early quartz veins have been crenulated and deformed by the cleavage. Likewise most of the felsite dykes post-date the cleavage, but in one instance, a felsite dyke appeared to have a faint secondary 'foliation' imposed on it parallel to the cleavage in the surrounding slates.

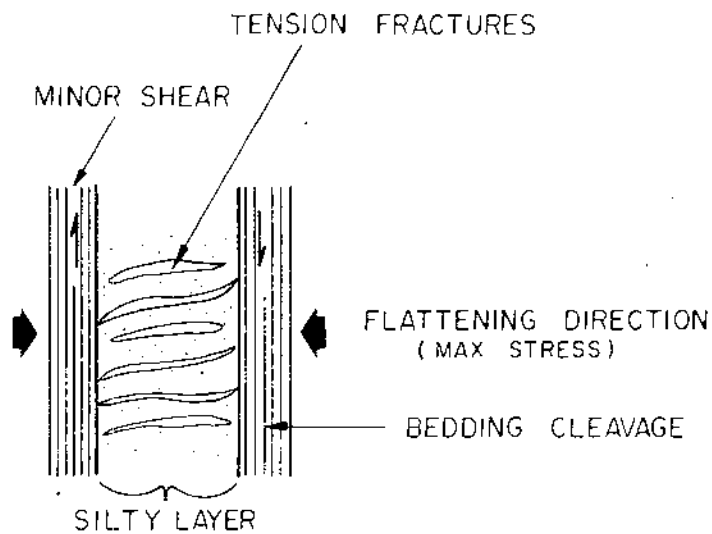
Major faults are difficult to identify within the map area, again because of the lack of suitable marker horizons. However, several high angle reverse and bedding plane thrust faults are present in the road cuts exposed along the new logging road. In general, the thrusts (and reverse faults) appear to have moved toward the northeast. Because these faults are indicative of compressive stresses, and post-date the cleavage, they probably represent the last stages of the major deformation within the area.

The orientation of structural features (especially the quartz veins and felsite dykes) is strongly controlled by the cleavage orientation within the Ladner Slate (Fig.4).* The majority of the quartz veins strike northwest and have dips which vary from shallow toward the northeast to shallow toward the southwest. The felsite dykes also strike northwest, but they dip almost exclusively toward the southwest.

These same features in the Cache Creek rocks, show much less structural control (Fig.5).*

*Pages 7A, 7B and 7C

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NO. **4930** MAP **#4**

FIGURE 3

LADNER SLATE

POLES TO QUARTZ VEINS (+)
 DYKES (O)
 FAULTS / SHEARS (Δ)

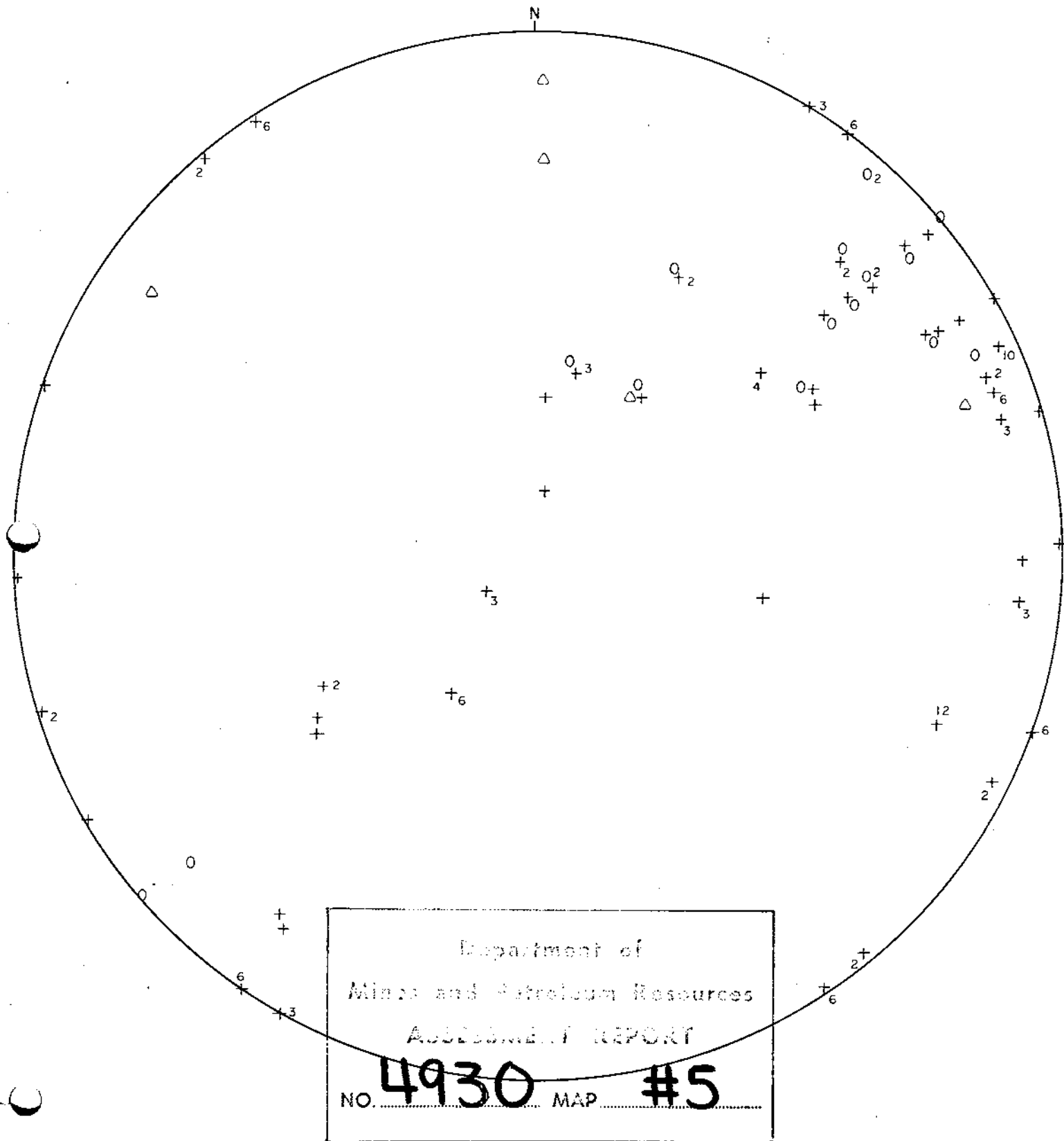


FIGURE 4

CACHE CREEK COMPLEX

POLES TO QUARTZ VEINS (+)
 DYKES (O)
 FAULTS / SHEARS (Δ)

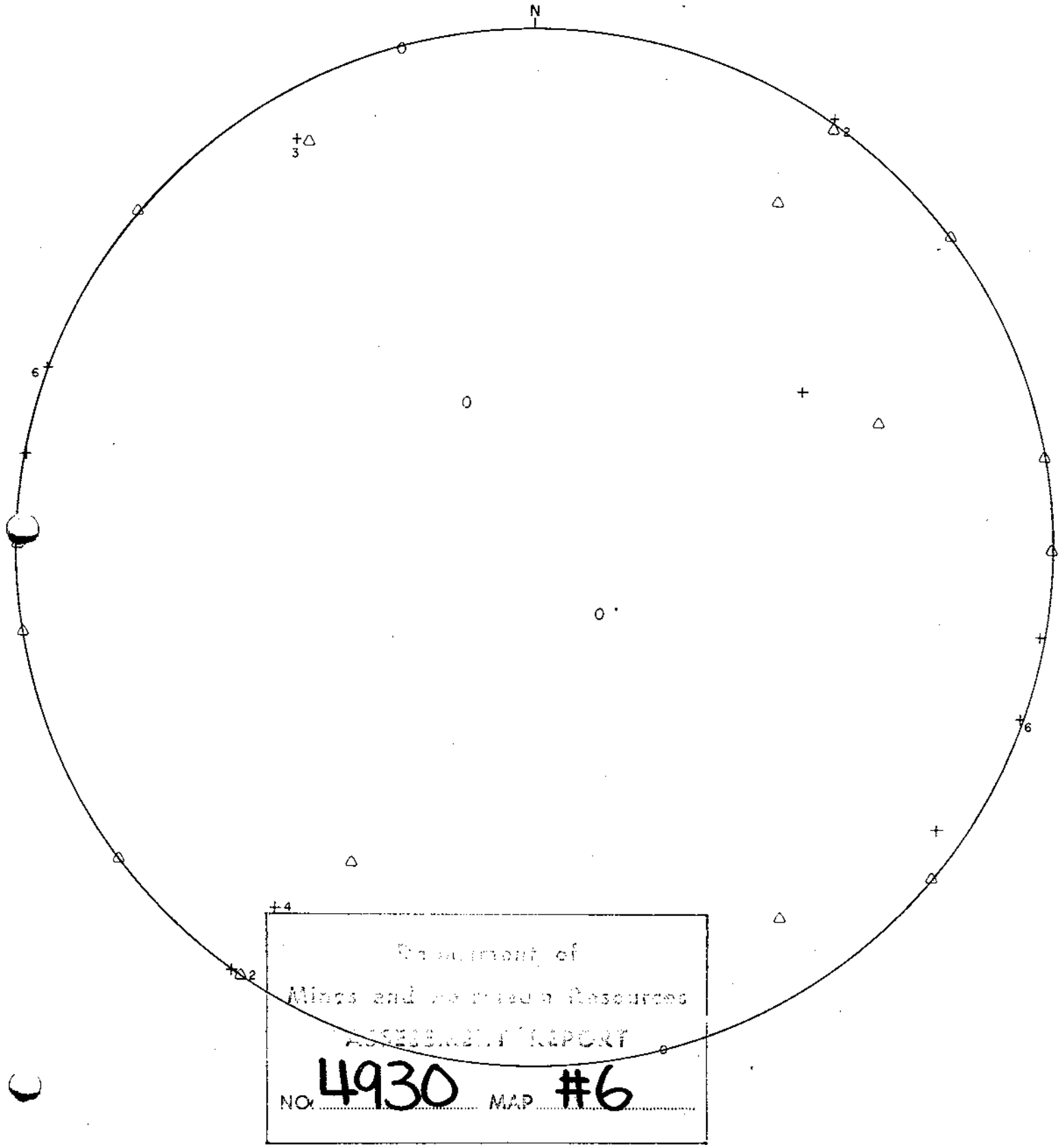


FIGURE 5

Based on limited data, two possible very weak trends seem to be present in the greenstones. The first strikes northwest with dips toward the northwest and southeast, and the second strikes northeast with variable dips toward the northwest and southeast. This second trend is readily apparent on the geologic map (Fig. 1) and has not been developed within the Ladner Slate because of the pronounced cleavage within these rocks. These two general trends are also apparent in the minor structures (veins and shears) shown on the map of the mine workings (Bullis, 1973).

Cairnes (1924) reported in detail on the mine geology of the Emancipation property and noted that the best ore is located at the intersection between the Hanging Wall (Dyke) Vein and the Flat-crossing Vein. Using the attitudes reported by Cairnes for these two veins (N15W 40-45SW and N55W 45NE respectively) the intersection is found to trend N35-40W and plunge approximately 15° - 20° to the northwest. It is probable that this trend is representative of any other mineralized intersections within this same vein system. The main vein system is effectively bordered on the east by the Footwall (Boulder) Vein, which trends N15W 55SW.

ALTERATION AND MINERALIZATION

Three major types of mineralization were observed within the Emancipation map area. The first, and most important, is the association of sulfides with white quartz veins. This is typified by the mineralization of the mine area proper and by a 1 - 2 foot wide quartz vein which outcrops at an elevation of 2,000 feet along 'Camp Creek'. The source of this vein quartz is unknown and only minor wallrock alteration effects are present. Alteration products include sparse secondary biotite, minor sericite, calcite, saussuritization of the plagioclase, and silicification of the wall rock.

The second major type of mineralization accompanies the felsite dykes and associated quartz/calcite veins and consists of disseminated sulfides (pyrite, pyrrhotite)(?), arsenopyrite, and chalcopyrite) within the quartz veins and the host dyke rock. The best example of this type of mineralization is the sulfide bearing dyke and vein system developed near Tangent Creek along the abandoned railroad right-of-way.

Disseminated sulfides and secondary calcite also occur within the slates adjacent to this dyke. In this type of mineralization, the quartz veins are almost certainly genetically related to the felsite dykes.

The third type of mineralization consists of disseminated sulfides within the Ladner Slate and Cache Creek rocks with no associated dykes or quartz veins. The dominant sulfide mineral is pyrite, although traces of chalcopyrite and arsenopyrite are also present. Some of the sulfides within the slates lie along the cleavage planes or are flattened in the plane of the cleavage, and thus are interpreted as pre-tectonic (syngenetic ?) sulfides. Other sulfides however are euhedral and bear no relation to the cleavage; these are post-tectonic (epigenetic). This third type of mineralization is believed to be of relatively little importance with regard to the gold mineralization.

The felsite dykes and their associated quartz veins (type 2 mineralization) are probably related to the post-Lower Cretaceous intrusives which are abundant to the northeast of the property (G.S.C. Geol. Map 737A, 1944). The first type of mineralization seems to have no obvious genetic relationship to any of the rocks within the map area. Cairnes (1924), however, believes that the diorite intrusives within the area are the source for these veins. Although the diorites range from unaltered to moderately well altered (argillic alteration of the plagioclase, and partial chloritization of the amphiboles) there is no clear-cut evidence for Cairnes statement. An alternate hypothesis is that the quartz was derived from the greenstones during serpentinization.

The primary area of mineralization is located near the contact between the Cache Creek rocks and the Ladner Slate and, in the vicinity of the mine, is bounded on the east by the southwest dipping Boulder Vein. A similar gold-quartz occurrence has been developed on the Aurum property to the northwest of the claims group (B.C. Min.Mines Bull. No.1, 1932, p.77). The Aurum occurrence is described as "a wide silicified zone in the slates, including many small stringers of quartz . . . no particular body of quartz has been cut in the tunnel".

The Aurum occurrence may be a northerly continuation of the Emancipation system

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in that both of these gold occurrences are "type 1" mineralization and are both located near the greenstone-slate contact.

Within the Emancipation Mine gold values are extremely variable. Assay values are as follows:

		<u>High</u>	<u>Low</u>	<u>Average</u>	
Boulder Vein	11 samples	0.22 oz/ton	Tr.	0.037	(Bullis, 1973)
Dyke Vein	8 "	0.68 oz/ton	Tr.	0.15	(Bullis, 1973)

All together a total of 12,000 tons of ore were mined from the Emancipation and yielded 2,997 ozs. of gold, for an average grade of 0.25 oz/ton (Bullis, 1973).

High grade gold ore is reported in the 1932 B.C. Minister of Mines Annual Report from the winze below the main workings within the mine. 'The winze sunk on the 'Hanging Wall' Vein in the Dawson ((Emancipation)) Mine has reached a depth of 137 feet on the rake of the ore. The average width of mineralized quartz in the winze measures two feet. At the bottom of the winzethe ore rake flattens considerably and a sub-level is being driven in a southeasterly direction. A sample across a five foot face in this drift taken by the superintendent assayed \$293.00 per ton'. These lower workings are reported as water-filled in August 1933, and as far as can be determined, have not been examined since. A chip sample across 8 feet in the centre of the Reverse (?) Vein from the caved adit near Tangent Creek assayed 0.40 oz/ton gold and 0.10 oz/ton silver (B.C. Minister of Mines Annual Report, 1933, p. A175). Thus it appears that the Reverse (Flat-lying) Vein extends to depth under the main stoped-out area and contains reasonably high gold values.

DIAMOND DRILLING PROGRAM

A diamond drilling program was undertaken on a felsite dyke approximately 13 feet wide, and located just southeast of Tangent Creek along the abandoned railroad right-of-way. Three holes totalling 100 feet were drilled normal to the strike of the dyke (Fig. 6). The dyke contains numerous irregularly trending, mineralized, quartz and calcite veins, as well as disseminated sulfides within the dyke itself (type 2 mineralization). Pyrite, pyrrhotite, arsenopyrite and chalcopyrite are

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present. This dyke is reported by Cairnes (1924) to contain "auriferous arsenopyrite". Assays of the core, however, yield gold concentrations which vary from "trace" to .001 oz/ton. Assays on a similar mineralized quartz-bearing dyke, exposed along the main logging road yield values of Trace Au and .02 oz/ton Ag. Thus it is concluded that the mineralized felsite dykes are of little economic importance within the map area.

GEOCHEMICAL SURVEY

Soil samples were collected from the 'B' horizon along three lines approximately perpendicular to the strike of the greenstone-slate contact (Fig.2). The samples were collected at 100 foot intervals adjacent to the contact and 200 foot intervals along the remainder of the lines.

In general, samples from the serpentine-greenstone complex were analyzed for nickel and copper and samples from the Ladner Slate for copper and gold. Portions of lines 1 and 3 were also analyzed for arsenic (to determine whether or not it might act as a "pathfinder" element for the gold.

High nickel values were encountered in the areas underlain by serpentine, however, no nickel-bearing sulfides were identified. High nickel values in the serpentine and not in the adjacent greenstone cast some doubt on the formation of the serpentine by simple alteration of the greenstones. Additional work is indicated in the highly anomalous areas.

Anomalous copper values lie immediately east of the greenstone-slate contact along lines 1 and 3. These anomalous copper values may be useful in determining the extent of the Emancipation vein system.

Gold values are weakly anomalous in the vicinity of the old mine workings. Line 3, Station 4+00W also yielded an anomalously high value, however, this sample is unique in that it was collected from the 'A' horizon and the high value probably indicates a slight enrichment of gold in the organic materials.

Rock geochemistry samples from various sulfide-bearing quartz veins and host rocks yield no significant gold values (Fig.2).

High arsenic values were encountered at Line 1, Stations 7+00N and 8+00N. No apparent cause for these anomalies was detected during the current field program. Re-examination of this area would be desirable. These samples may reflect a buried arsenopyrite-bearing dyke or vein.

CONCLUSIONS

- 1) The primary target for gold mineralization consists of a quartz vein system located near the contact between the Ladner Slate and the underlying Cache Creek rocks. This type of mineralization is present at the Emancipation Mine and at the Aurum Mine to the N.W. The possibility exists that the intervening area along the contact may also contain a gold-bearing quartz vein system.
- 2) Significant quantities of gold ore may exist below the present Emancipation workings. The vein system has never been explored fully at depth, but encouraging gold values were discovered in the Lower Adit prior to closure of the mine.
- 3) The quartz and sulfide-bearing felsite dykes located within the Ladner Slate do not carry significant associated gold.
- 4) Anomalously high nickel values are present within the serpentines. No nickel sulfides were observed in outcrop. The nickel may be in the form of nickel-bearing silicates. Additional study is indicated.

RECOMMENDATIONS

- 1) A grid should be located within the southwestern portion of the property, centered on the old mine workings. Detailed geologic mapping (1" = 200') and soil sampling should then be carried out from this grid. Mapping of the Cache Creek complex and associated intrusives to the west of the Emancipation Mine should be carried out in order to identify the source and controls of the mineralized quartz-vein system. This may entail thin section petrography to determine

the origin of the serpentinite bodies, and the nature and extent of hydrothermal alteration effects within these rocks.

- 2) An attempt should be made to locate the Boulder Vein and any other major quartz veins encountered on surface. The overburden is generally thin and a limited amount of trenching may be useful in this regard.
- 3) The lower adit of the mine should be retimbered, remapped and sampled. In addition, the upper-most adit (approximately 200 feet above the main workings) should be mapped.
- 4) Samples should be collected for rock geochemistry (and ore petrography) from areas with highly anomalous nickel values. This will determine the nature of the nickel mineralogy (i.e. sulfide or silicate).
- 5) Ladner Creek should be prospected in the vicinity of the "Teague Mineral Claim" (approximately one mile upstream from the mouth of the creek).

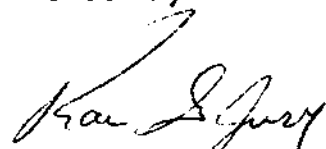
COST STATEMENT

Costs of conducting the geological survey work herein described in 1973 are as follows:

May 28 - 31	Dr. G.C. Stephens, Geologist	\$ 462.50
May 10 & 27	R. Jury, Supervision	250.00
June 1 - 30	Dr. G.C. Stephens, Geologist	2,062.50
June 1 - 29	D. Boulton, Assistant	1,312.50
June 1, 17, 18	R. Jury, Supervision	500.00
July 1 - 12	Dr. G.C. Stephens, Geologist	550.00
Accommodation & Board		697.94
Truck use on project		610.00
Assaying & geochemical soils analysis		<u>414.50</u>
	Total Project Cost:	<u><u>\$6,859.94</u></u>

Respectfully submitted,
 "G. C. STEPHENS"
 G. C. Stephens, Ph.D.

Endorsed by:


 R. G. Jury, P. Eng.

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REFERENCES

- 1) B.C. Minister of Mines Reports (1915 - 1937) in literature compilation on Hope Group by K. Warren Geiger
- 2) Bullis, A.R. (1973), Report on Hope Group: (unpublished report for Aquarius Mines).
- 3) Cairnes, C.E., (1924), Coquihall Area, British Columbia; Geological Survey of Canada, Memoir 139.
- 4) Cairnes, C.E. (1929), The Serpentine belt of Coquihalla Region, Yale District, B.C. : Geological Survey of Canada, Summary Report, Pt.A.
- 5) Carswell, H.T. (1973), Petrography of four rocks from the Hope Claims (unpublished report).
- 6) Geological Survey of Canada (1944), Geologic Map Hope. B.C. #737 A.



FRASER LABORATORIES LIMITED

1175 W. 15th STREET, NORTH VANCOUVER, B.C.

Mr. R.G. Jury, P. Eng.,
Alrae Engineering Ltd.,
1175 West 15th Street,
North Vancouver, B.C.

Dear Sir,

re: Analytical Method for Soils

The following is the analytical method used for the geochemical soils program of Emancipation Mines Ltd.

Method:

The samples were dried at approximately 120° F and 10 to 20 grams of minus 80 mesh was sieved.

A 1.0 gram sample of minus 80 mesh was digested for 3 hours on a hot plate with a mixture of 2 mls nitric acid and 4 mls perchloric acid.

The samples were diluted to 25 mls with demineralized water, and the concentration determined against matrix standards with a Tectron AA5 atomic absorption spectrophotometer.

Arsenic was determined by evolving arsine from a 5 ml aliquot of sample solution into a solution of silver diethyldithiocarbamate in pyridine. The absorbance of the colour complex was measured with a Spectronic 20 colorimeter.

The gold was determined with atomic absorption by extracting a 10 gram dissolution with methyl iso-butyl ketone.

Yours very truly,
FRASER LABORATORIES LTD.

per: *R. M. Samuels*

R.M. Samuels,
Registered Assayer, Province of B.C.



APPROXIMATE LOCATION OF "LEASER DISCOVERY"

- SYMBOLS**
- Attitude of Cleavage
 - Inclined
 - Vertical
 - Inclined Shear Zone
 - Vertical Shear Zone
 - Axis of Anticline
 - Creek
 - PSM
 - Thrust
 - Talouse Shear Zone
 - TS Thin Section Sample
 - ASR
- LEGEND**
- LADNER SERIES**
- 1 Shale and slate
 - 2 Conglomeratic sandstone
 - 3 Shale conglomerate
- CACHE CREEK COMPLEX**
- 4 Diorite
 - 5 Serpentine
 - 6 Greenstone

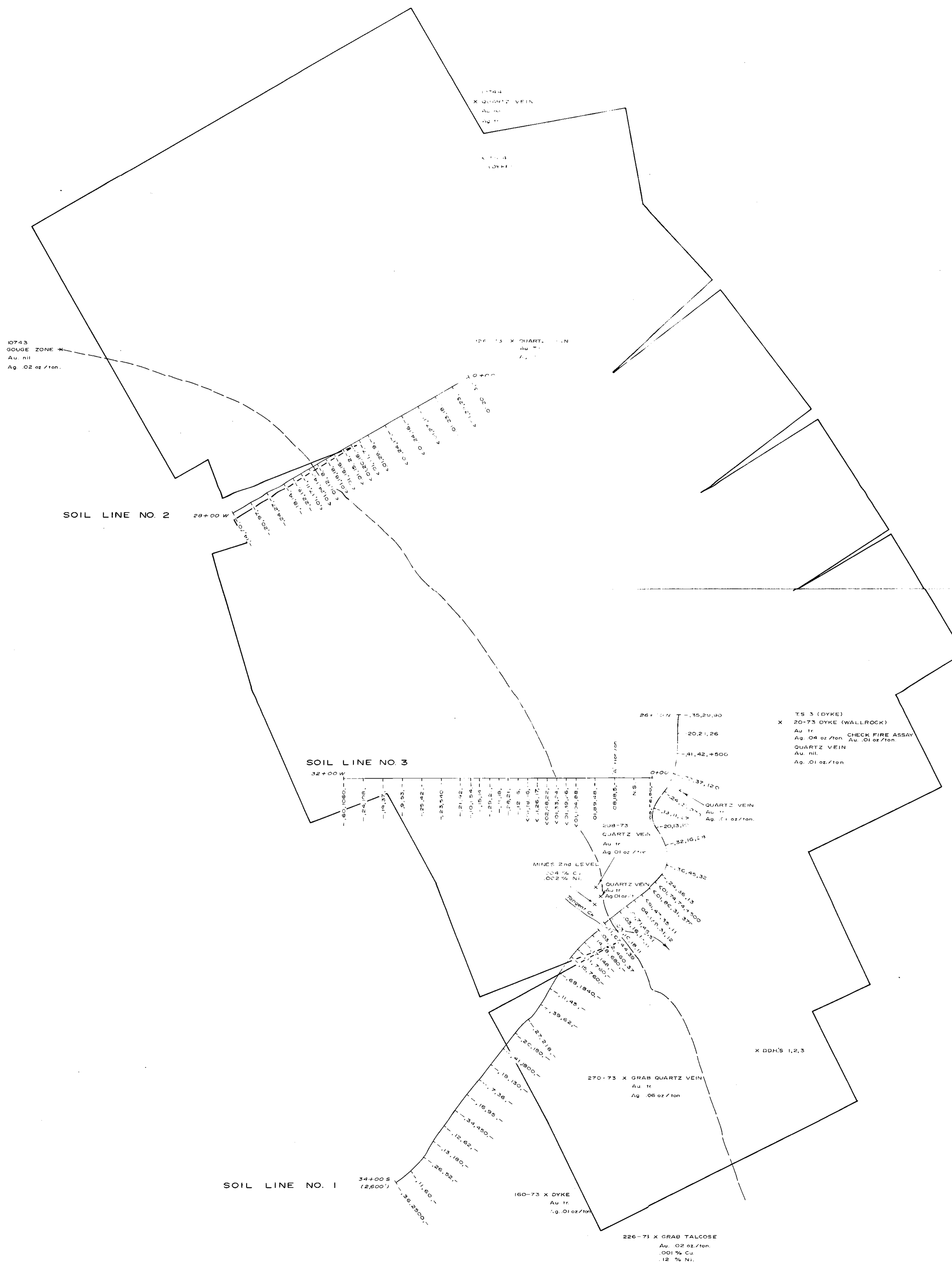
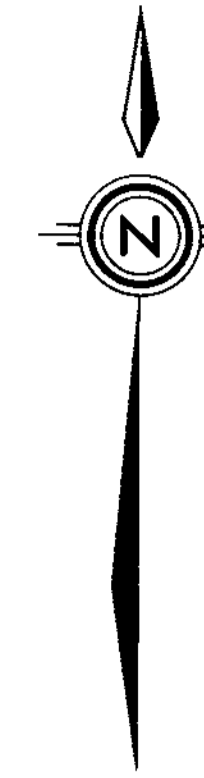
Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 4930 MAP #1

NOTE: To accompany assessment report by G.C. Stephens dated July 30th 1975 on the Hope 1 to 32 mineral claims and mineral lease M 28 in the Coquihalla River Area, New Westminster Mining Division, B.C.

Submitted by *Tom B. Gray*

5M OR

ALRAE ENGINEERING LTD. <small>GEOLOGICAL ENGINEERING & CONSULTANTS - VANCOUVER - TORONTO</small>	
EMANCIPATION MINES LTD.	
HOPE CLAIMS GEOLOGY MAP	
SCALE: 1" = 500'	DRAWN:
DATE: JULY 30, 1975	CHECKED:
REVISED:	MAP NO. 510-1



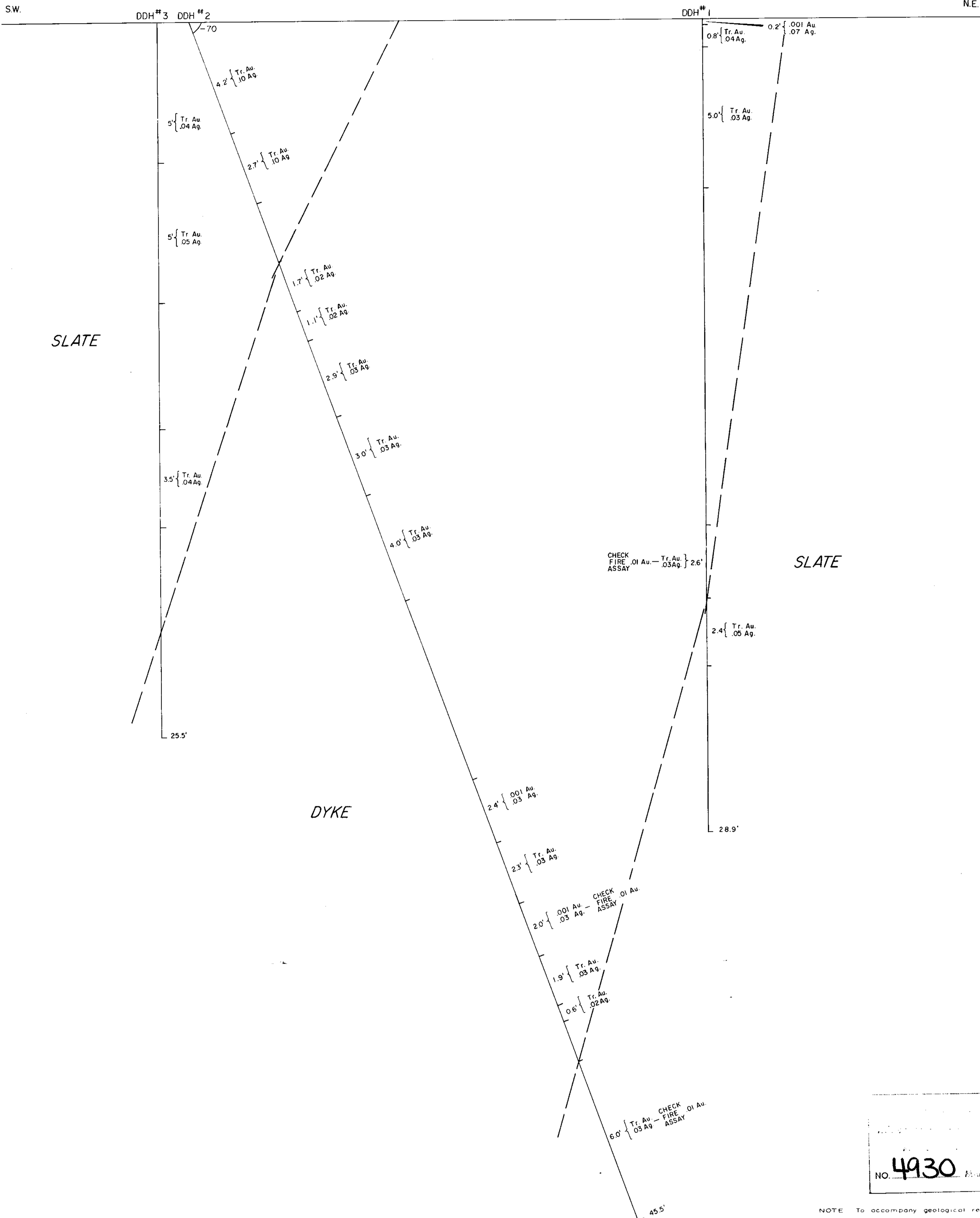
SOILS ANALYSES
01,74,74,+500 Au ppm, Cu ppm, Ni ppm, As ppm.

NO. 4930 #2

NOTE: To accompany geological report by Dr. G.C. Stephens, dated July 30th, 1973 on the Hope 1 to 32 mineral claims and mineral lease M-28 in the Cogholls River Area, New Westminster Mining Division, B.C.

Endorsed by *Rae & Gray*
4930 M2

ALRAE ENGINEERING LTD.	
EMANCIPATION MINES LTD.	
HOPE CLAIMS SOIL GEOCHEMISTRY & SAMPLING PLAN OVERLAY FOR GEOLOGY PLAN	
SCALE 1" = 500'	PREPARED
DRAWN	CHECKED
DATE JULY 30, 1973	CHECKED
FILED	MAP NO. 550-2



NO. **4930** MAP **#3**

NOTE: To accompany geological report by Dr G.C. Stephens, dated July 30th 1973, on the Hope 1 to 32 mineral claims and mineral lease M 28 in the Coquihalla River Area, New Westminster Mining Division, B.C.

Endorsed by [Signature]

ALRAE ENGINEERING LTD. CONSULTING ENGINEERS & GEOLOGISTS, VANCOUVER, CANADA	
EMANCIPATION MINES LTD	
HOPE CLAIMS SECTION OF DDH#1 TO 3	
SCALE: 1" = 2 FT	DESIGNED:
DATE: APRIL 1974	DRAWN:
REVISED:	CHECKED:
	MAP NO. 550-3

4930 M3