1971 Geological and Geochemical Report

TITLE

AUTHOR

DATE

COMMODITIES

LOCATION-Area

-Mining Division

-Coordinates

-NTS

CLASS

Iskut Silver Mines Ltd. Ray, Joann, Grace Groups

D.G. Allen, P.Eng. (B.C.)

November 1971

Cu, Zn, Pb, Ag

Stewart, B.C.

Liard

Latitude 56°42' Longitude 131°07'

104 B 11

Prospect - Physical Work

AMAX Vancouver Office

Department of Mines and Petroleum Resources ASSESSMENT REPORT

NO. 3374 MAP

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SUMMARY

The Iskut Silver Mines property, consisting of 68 claims, the Ray, Joann and Grace groups is located along the north side of the Iskut River about 25 miles east of its confluence with the Stikine River.

The property is underlain by volcanic and sedimentary rocks of Permian and/or Triassic age which are intruded by a small stock of syenite porphyry. Presumably related to the syenite is an extensive pyrite zone containing erratic weakly disseminated chalcopyrite and a number of quartz-carbonate veins carrying lead-zinc mineralization. Except for abundant pyrite and locally abundant magnetite, no other favourable alteration minerals were found to be developed to any extent.

Geochemical soil, stream sediment and water sampling revealed prominent copper, molybdenum, lead, zinc and silver anomalies. The anomalies are attributed to strong enhancement in a podzolic soil environment reflecting weak mineralization in bedrock.

INTRODUCTION

The Iskut Silver property is located along the north side of the Iskut River about 25 miles east of its confluence with the Stikine River (Figure 1). It lies between elevations 250 feet, the level of the Iskut River and 4000 feet. Access is by air from the Bob Quinn airstrip on the Stewart-Cassiar Highway 35 miles to the northeast.

The property consists of 68 claims: Ray #1-6 incl., Joann #1 and #3, and Grace #1-25 incl., #27, #29-34 incl., #37-64 incl.

The physiography of the area is typical of that of the Coast Range Mountains. The area is extremely rugged with mountain peaks ranging from 5000 to 7000 feet high. Extensive ice fields and large glaciers lie a few miles to the north of the property.

SCOPE OF EXPLORATION PROGRAM

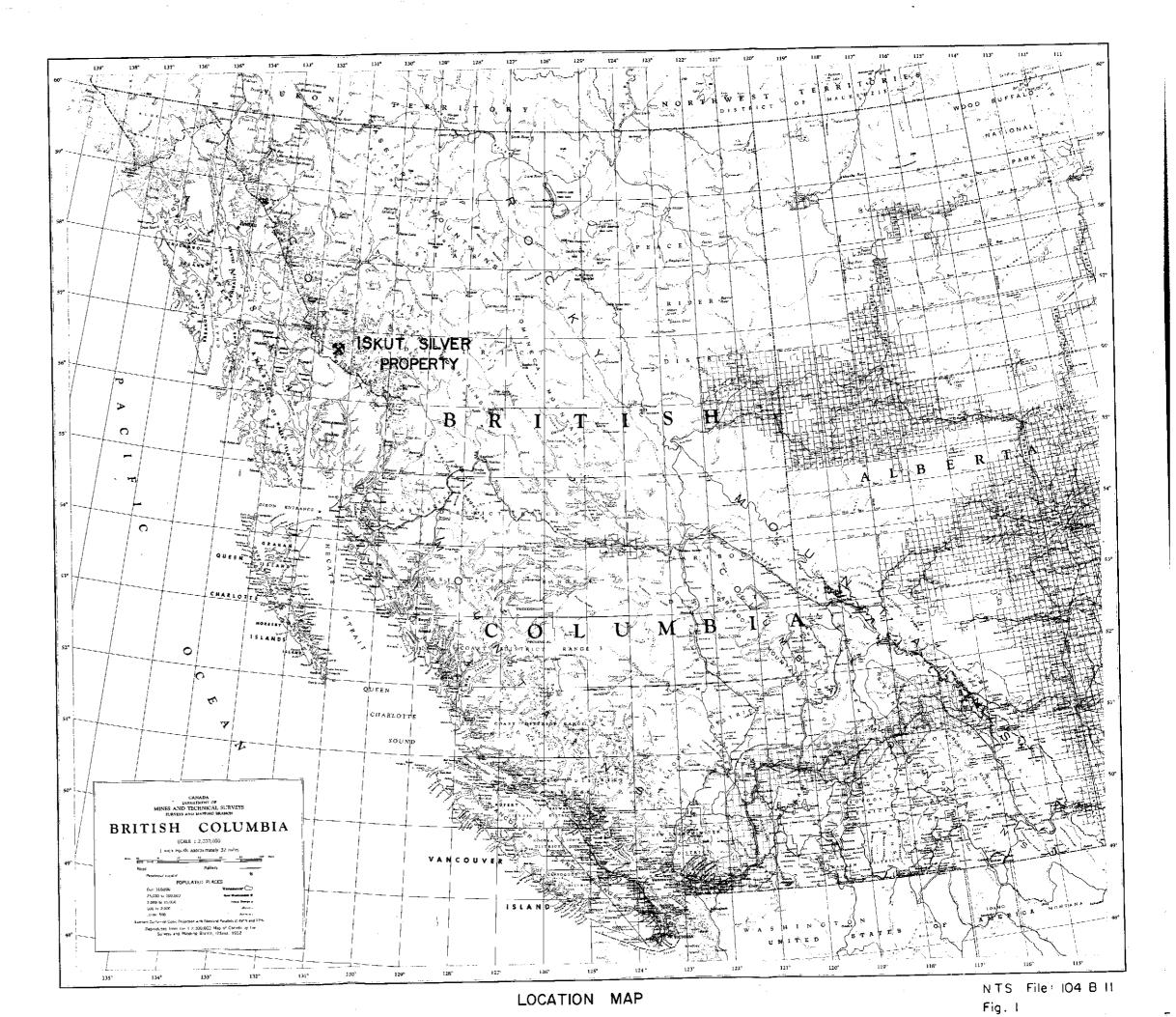
The purpose of the 1971 examination was to carry out geologic mapping and to confirm and investigate copper soil anomalies obtained by Iskut Silver Mines Ltd. The occurrence of syenite intrusions suggested an environment similar to the Galore Creek deposits thirty miles to the north.

REGIONAL GEOLOGY

The Iskut Silver property lies about twenty miles east of the main body of the Coast Crystalline Belt. Batholithic intrusive bodies are also present to the south and east of the property. In the Iskut River area, these rocks intrude pre-Permain metamorphic rocks and uncorrelated Upper Paleozoic and Triassic volcanic and sedimentary rocks. Kerr (1948, G.S.C. Memoir 246) recognized seven distinct phases of intrusive rocks. Within the immediate vicinity of the Iskut Silver property three phases were found: syenite, gneissic granodiorite and quartz monzonite.

Pleistocene or recent volcanic rocks outcrop seven miles

Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 337 % MAP



upstream in the valley of the Iskut River and on Hoodoo Mountain, a volcanic cone seven miles to the northwest.

PROPERTY GEOLOGY

Most of the property is underlain by sheared and weakly foliated volcanic and sedimentary rocks of Permian and/or Triassic age. Intrusive into these rocks is a stock of coarse grained syenite porphyry. Alluvium and glacial drift covers about 95% of the property.

The Permian and/or Triassic rocks have been tentatively divided into two groups (Units 1 and 2, Figure 2).

Unit 1 consists mainly of siltstone and phyllite. To the north of the property the unit is relatively unaltered and well bedded at 113°/48°SW. On the western claims, the rock is phyllitic and locally schistose and contains abundant pyrite.

Unit 2 consists mainly of grey to dark greenish-grey dacitic or andesitic tuff and andesite. The rock is usually very fine grained and in places appears to be weakly bedded. Small white phenocrysts or crystal fragments of feldspar averaging 1 mm is diameter are occasionally present. The rock is weakly to strongly sheared throughout the property. Foliation trends are variable, generally from north to west.

Syenite porphyry (Unit 3) outcrops on the southernmost claims and is apparently part of a larger stock lying on the south side of the Iskut River. The rock is generally coarse grained and brownish grey in color with 15-20% orthoclase phenocrysts ranging in length from 1/4 to 1 inch. The groundmass consists of grey feldspar, 2-5% quartz and 5% biotite in fine grained clots along with 1-2% disseminated pyrite, 2% disseminated magnetite and 1% sphene. A leucocratic porphyritic syenite dyke with small white K-feldspar phenocrysts in a light grey fine grained groundmass occurs on the Grace #1 and #3 claims.

STRUCTURE

The most obvious structural feature is a series of prominent east-north-east lineaments visible on air photos and on the topographic map. Locally the foliation in the volcanic rocks appears to parallel this trend.

Mineral occurrences in the western claims lie in fault zones striking northwesterly and dipping to the southeast.

ECONOMIC GEOLOGY

Mineral occurrences on the property can be classified as two types:

- Lead-zinc mineralization with silver and gold values and in some places, copper in quartz and dolomite veins associated with fault zones.
- 2) Weakly disseminated chalcopyrite in pyritized volcanic rocks.

Pyrite is the most abundant sulphide mineral, occurring disseminated and on fractures and in seams in almost all rocks exposed on the property. Copper mineralization consists of weakly disseminated chalcopyrite with malachite on fractures. Disseminated copper mineralization on the Ray #2 claim, grades up to 0.1% Cu with molybdenum values up to 0.012% Mo. Chalcopyrite is also present with epidote in magnetite-rich pods in volcanic rocks on the Grace #6 and Joann #1 claims. Copper values reported by Iskut Silver Mines from these pods indicate 0.18 and 0.30% Cu over five and eight feet respectively. Traces of chalcopyrite have been observed on fractures and quartz veins cutting the syenite porphyry.

Rare flakes of molybdenite are found in all rock types.

ALTERATION

The most obvious alteration effect is the broad pyrite zone. Pyrite is ubiquitous, comprising up to 15% of the volcanic rocks.

Magnetite occurs abundantly disseminated and as massive pods on the Joann #1 and Grace #6 claims. The magnetite-rich zone has been outlined by magnetic surveys and found to be about 2500 feet long and up to 700 feet wide. Associated with the massive magnetite are epidote and minor amounts of chalcopyrite. Finely disseminated magnetite occurs irregularly distributed throughout the volcanic assemblage.

Quartz veinlets, ranging in size from 1/4 inch to 2 inches, are not uncommon, cutting all rock types. A one to four foot quartz vein contain traces of chalcopyrite occurs on the Grace #46 claim. Elsewhere the veins are generally barren. Within the syenite porphyry body on the Joann #1 claims, a silicified zone approximately 50 feet in diameter was found. The zone consists entirely of barren microcrystalline quartz.

Calcite, mostly in the form of veinlets, is not uncommon in most rock types. Chlorite is widespread in the volcanic rocks. Muscovite is locally developed in some schistose rocks. In a few outcrops on the western claims, the rocks have been intensely bleached.

GEOCHEMISTRY

A number of significant soil and stream sediment anomalies were obtained. The data is presented on Figures 3 and 4 and is discussed by R.E.W. Lett in Appendix I.

CONCLUSION

A very broad pyrite-bearing zone is present on the Iskut Silver Mines property. Presumably it is related to the syenite porphyry body. Within this zone are found low grade disseminated chalcopyrite and quartz veins carrying lead-zinc mineralization.

The soil anomalies appear to be derived from geochemically high metal values in the bedrock. Enhancement of the anomalies due to accumulation of trace metals by secondary oxides in soil and silt has probably occurred.

Donald & alle

AMAX Vancouver Office November 1971

D.G. Allen, P.Eng. (B.C.)

To - D.G. Allen

From - R.E.W. Lett

Subject: Iskut Silver Mines Property - Results of Geochemical Surveys

INTRODUCTION

Previous geochemical prospecting conducted over the property, held by Iskut Silver Mines Limited and located on the Iskut River consisted of detailed soil sampling along several traverses across the area. These were apparently located on well defined roughly east-west trending deep valleys. Samples were analyzed in the field by hot nitric acid digestion followed by colorimetric determination of Cu and Zn. The present examination, made during May 1971, included detailed soil, silt, water, and rock chip sampling. Soil samples were collected at 200 foot centers along north-south orientated traverses and on claim location lines. All significant drainage channels in the area were sampled and a series of composite rock chip collected. The -80m fraction of soils and silts and the -200 m fraction of the rock chips were analyzed by atomic absorbtion technique for Mo, Cu, Ni, Co, Mn, Fe, Ag, Zn and Pb with complementary pH determinations on soil and silt. Water samples were analyzed for pH, Mo, Cu and Zn.

PHYSIOGRAPHY AND CLIMATE

The physiography of the area is typical of that encountered in the Coast Ranges. Mountains in the vicinity of the property rise above 5000 feet and relief ranges from 2000

to 4500 feet. Peaks are sharply scalloped by recent cirque glaciers especially on the north and northwest flanks. The property is located in the mountain foot hills and moderately steep valley slopes alternate with small plateaus that are often dissected by steep sided - roughly eastwest orientated draws, generally with a small drainage channel in the bottom. Creeks draining the eastern part of the property combine and flow through a flat alluvial valley before the final confluence with the Iskut River.

The vegetation is typical of a high rainfall environment i.e. exceeding 100 inches per year. Thick mature sitka spruce and fir with a dense growth of underbrush particularly devils club dominates the steeper slopes. On the alluvial valley floor and the margin of the Iskut River, however, poplar and birch stands are more common.

ENVIRONMENT AND SOIL TYPE

The secondary environment of the region can be attributed to the physiography and climate. The high relief and rainfall combined with effective drainage of the soil have resulted in the development of a strong podzol soil-type, ubiquitious over the entire property. A typical profile consists of a light grey leached AE horizon beneath a thick layer of decaying vegetation and litter humus. A relatively sharp boundary defines the AE from the orange-red sandy BF horizon. This grades into

a red-brown parent clay which consists largely of colluvial material. Although the soil type is predominantly a podzol, impeded drainage in a number of the larger draws has led to the formation of humic gleysols or humic accumulations. Soils on slopes above 1000 feet elevation or where thick forest growth provides sufficient shade, are frozen to within 4-6 inches of the surface. It is probable that although isolated patches may remain frozen throughout the summer, complete thawing of the soil occurs by late July.

Drainage channels are generally deeply incised and the water largely of snow-melt origin. The even textured red silt in the majority of the streams suggests considerable bank material has been washed into the channels probably during the early spring.

DESCRIPTION OF ANOMALOUS AREAS

Drainage Anomalies

The following threshold values have been established for the definition of anomalous drainage channels.

Mo - 6 ppm Ag - 1.5 ppr Cu - 80 ppm Pb - 40 ppr Zn - 200 ppm

West of 0.00E

The regime of the major creek flowing into the Iskut River, west of the property, drains the area to the north and west. Several first order streams have anomalous Cu-Mo-Zn-Pb-Ag values in the silt although metal concentration in the water is

generally below the detection limit. For silt samples (coded L) metal concentration is expressed in ppm. For waters values are in ppb. Values from a number of these drainage channels are tabulated below.

	<u>Mo</u>	Cu	Ni	Со	Mn	Fe 🤉	% Ag	Zn	Pb
7SKW141	0	0							
7SKL142 W143	8	48 0	156	20	720	3.0	0.5	70 324	24
L144 W145	6	64 2	118	20	1380	3.3	0.5	50 272	24
L146 W148	6 0	48 0	144	18	1840	2.8	0.5	20 392	24
L149 W150	18 2	380 0	80	24	600	2.8	0.5	30 308	20
L151		56	98	20	520	2.7	0.5	60 128	14

From the results an area of anomalous Mo, Cu, Zn and Pb can be defined northwest of the property.

To the south streams flow into the major creek from a number of steep sided valleys that cross the central part of the property. There is a strong Mo-Cu-Ag-Zn-Pb association in the silt from the majority of these drainage channels although metal values in the water are below the detection limit.

Results from a number of the streams are tabulated.

	pН	Мо	Cu	Ni	0-					
7SJW19			1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	NT.	Co	Mn	Fe %	Ag	Zn	Pb
L18 W24	6.4 6.1 6.5	0 40 0	0 1120 0	24	36	1840	4.1	2.0	40 440	39
L25 W28	6.2 6.5	58 (0	540 18	24	20	2640	3.8	2.0	110 450	20
L29 W31	6.1 6.5	244 0	680 0	12	24	3160	4.8	0.5	20 180	26
L32 W35	6.4 6.6	30 0	800 0	60	28	2840	4.5	2.0	10 450	56
L36 7SKW91	6.7 6.5	10 0	680 0	180	60	960	4.9	0.5	70 298	24
L 92	6.4	10	840	56	92	3840	3.8	1.0	40 850	68

pH values for both silt and water fall in the range of 6.0 - 7.0 although the pH of water is generally slightly lower than that of silt samples.

From the drainage sample results, a zone of high contrast Zn-Ag-Pb can be defined and this is contained by the base line and lines 45W and 0.00E. The Cu-Mo anomaly is roughly coincident with this zone although it can be extended to line 15E with a lower contrast zone to 28E. Creeks draining the eastern half of the property have lower Zn-Pb and Ag values than in the western drainage regions, although Mo and Cu concentrations are often comparable.

	рН	Мо	Cu	Ni	Co	Mn	Po c			
7SJW60	6.6	2	0			PIII	Fe %	Ag	Zn ·	Pb
L61	6.3	12	2400	80	42	1440			40	
W65	6.6	0	0	- 00	42	1440	4.6	1.0	192	12
L 66	6.5	32	840	140	28	2960	4.7	1 0	20	
W71	6.9	4	0			2,00	**• /	1.0	260	12
L72	6.9	2	160	108	26	920	4.3	1 0	10	
W82	6.0	0	0				7.3	1.0	296	16
L83	6.7	5	268	122	42	960 -	5.5	<u>, </u>	10	
W87	7.0	0	0			200	J. J	0.5	232	34
L 88	6.7	4	108	34	30	1280	5.8		10	
W 91	.7.0	0	0			1200	٥,8	0.5	132	16
L92	6.8	12	96	10	24	1990			10	
						1990	5.3	0.5	192 .	16

Streams flowing to the south and north from the ridge underlain by the syenite porphyry have low contrast silt anomalies or background metal concentration only. In several samples however there is some Mo expression in both silt and water.

	рН	Мо	Cu	Ni	Со	Mn	Fe %	Ασ	Zn	Pb
7SAW19	6.8	2	0						30	
L20 W21	7.4 6.9	3	68 0	60	32	840	3.7	0.5	128	24
L22 W23	7.0	13	70	26	24	1360	3.7	0.5	20 104	20
L24	7.4	10	96	40	22	760	3.0	0.5	20 96	20

Soil Anomalies

Metal concentration in the soil tends to confirm the zones established by the results from silt samples. A high contrast relatively homogeneous Pb-Zn-Ag anomaly is located on lines 4S and 30W. Threshold values for metals in soil are -

 Cu - 150 ppm
 Pb - 20 ppm

 Mo - 20 ppm
 Ag 2.0 ppm

 Zn - 150 ppm

In addition to this Pb-Zn-Ag zone a number of isolated samples over the remainder of the property area have Ag values exceeding 2 pp with a frequent Zn-Pb association. A zone of anomalous Mo-Cu in the soil is confined by the limits 30W to 28E; 10N to Iskut River valley. East of this zone the association is predominantly Cu with isolated Pb-Zn-Ag concentrations. Strong copper anomalies occur on lines 45 and 60E south of the base line and on lines 00E at 26N and 15E at 22N.

Values from line 30W are tabulated since this provides a typical correlation of metal concentration with the relief catena and with corresponding soil type.

Hq	Mo	Cu N	Vi Co	Mn	Fe °	% Ag	Zn	Pb	
7SKS90 89 88 5.4 87 86 7SJS19 20 21 22 23 4.7 26 27 39 33 34 37	2 2 2 6 2 6 14 1 5 10 20 1 27 68 4 4 1 4 1	14 14 14 12 12 14 16 104 12 12 16 10 124 12 176 160 16 12 4 4 8 32	14 8 8 8 4 16 0 10 4 4 6 20 2 16 2 14 0 14 2 18 2 16 2 4 12 14 4 2 20	160 90 950 300 120 480 640 200 120 360 160 280 300 120 60	7.8 5.5 7.4 1.8 7.0 5.1	1.5 0.5 4.0 1.0 3.0 2.5 2.5 1.5 1.5 1.0 0.5 0.5 4.0 3.0	76 72 20 124 100 52 44 72 64 76 148 48	24 14 46 36 24 22 20 32 34 16 40 16 24 24 24	Steep slope Podzol soil type """ Moderate slope and podzol soil type """ Ridge top podzol Soil completely frozen Gentle slope podzol Humic accumulation Podzol -gentle slope Moderate slope podzol """
38 4.7 39	1 1	8 32 12 26 32 48	6	80	5.6 1.4		84 20	24 16	Steep slope podzol Ridge top AE horizon podzo Moderate slope podzol

Analytical Control

During the analysis of the samples two standards are included at regular intervals in the processing to establish analytical control. Tabulated determinations made on these two samples, one anomalous Mo-Cu-Ag-Zn-Pb (L 2) and one in the background range (B 1) are provided.

ROCK CHIP GEOCHEMISTRY

A number of composite rock chips were collected along an eastwest traverse on the low cliff face north of the Iskut River. The majority of chips were from andesites and similar volcanic rocks. Towards the east the outcrops were considerably sheared, brecciated and intensely pyritized.

Values are:

	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb
7 SJT145	2	64	16	20	840	2.9	. 5	164	20
146	1	60	12	18	1160	3.3	6.0	1600	680
147	: 1	26	24	40	100	2.5	. 5	24	12
148	1	600	94	32	1240	2.3	6.5	316	96
149	2	60	12	24	80	2.6	. 5	24	12
150	8	, 24	16	20	40	3.3	.5	20	36

Analyses of Control Samples

	Мо	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb
L2	1	16	26	12	240	1.5	. 5	50	12
	1	18	26	12	250	1.5	. 5	54	12
	. 1	16	26	12	240	1.7	. 5	48	12
	1.	16	24	12	250	1.6	. 5	52	12
	. 1	20	24	12	200	1.8	. \ .5	52	12
	1	20	24	12			.5		12
Bl	64	120	20	16	500	3.3	1.0	252	32
	66	136	20	16			1.5		
	68	128	20	20	560	3.9	1.5	260	38
	64	110	18	18	480	3.2	1.5	2 56	36

DISCUSSION OF RESULTS

The secondary dispersion of the metals is strongly influenced by the specific environments that have developed in the area. These are briefly -

1. The strongly podzolic soil on the hill slope where good drainage, low soil pH and colluvial parent material are major features to be considered in anomaly interpretation.

2. The accumulation of organic material in poorly drained valley bottoms and on talus slopes where immature soils are common.

Both major factors tend to concentrate trace metals. In podzols iron values in the 4-7% range are an indication of accumulation of iron oxides in the B soil horizon with strong absorbtion of trace metals particularly Mo and Cu. Low pH (<5.0) and high Eh encourages the mobility of Cu and Zn but retards the dispersion of Mo and Pb. The majority of isolated anomalies can probably be attributed to this type of concentration or to the presence of humic accumulations.

Significant anomalies are -

- 1. The zone of anomalous Pb-Zn-Ag with associated Cu and Mo defined by drainage samples northwest of the property.
- 2. The high contrast Zn-Pb-Ag anomaly on lines 45-30W. The significance of this zone may be reduced by enhancement of Zn and Ag by manganese oxides in drainage sediment and by iron oxides in the podzolic soil.

The source of metal is probably small Pb-Zn mineral occurrences in the volcanic rocks.

- 3. The zone of Mo-Cu and Cu trending eastwest between lines 30W and 45E. Again there may be appreciable enhancement of metal values by secondary oxides in the soil.
- 4. The Mo anomaly in silt and water from streams draining south from the syenite porphyry. No soil samples were collected and

there is a possibility that Mo may have been mobilized in the active layer of the frozen soil in response to high pH and has entered the drainage regime. It is more probable that minor molybdenite concentrations in the rock type are responsible for the anomalous Mo values.

ASSESSMENT DATA

APPENDIX II

STATEMENT OF COSTS

Ray #1-#6 inclusive

Joann#1 and #3

Grace #1-#25 inclusive, #27, #29-#34 inclusive and #37-#64 inclusive

Work done on above claims from May 20 to May 27, 1971

Geochemical Soil Survey

Silt and Water Survey

Geologic mapping

7.5 line miles
69 locations
4 square miles

Geochemical Samples Analysed

Soil 211 (multi-element, pH on every fifth sample)

Silt 60 (multi-element, pH)

Water 69 (Cu, Mo, Zn, pH)

Rock 28 (multi-element)

Personnel Employed

D.G. Allen, Geologist-in-charge, 601-535 Thurlow Street, Vancouver

R.E. Lett, Geochemist, 601-535 Thurlow Street, Vancouver

J.A. Kerswill, Senior Assistant, Dept. of Geology, University of Western Ontario, London, Ontario.

D.K. Dubetz, Junior Assistant, Dept. of Geology, Queen's University, Kingston, Ontario.

J.R. Slater, Junior Assistant, 2179 West 3rd, Vancouver, B.C.

B.H. Johnston, Junior Assistant, 5711 Riverside Road, Trail, B.C.

Salaries - May 20 to May 27, 1971

D.G. Allen	6 days @ \$50.00/day \$ 300.00
R.E. Lett	6 days @ \$40.00/day 240.00
J.A. Kerswill	6 days @ \$23.33/day 139.98
J.R. Slater	6 days @ \$19.16/day 114.96
D.K. Dubetz	6 days @ \$19.16/day 114.96
B.H. Johnston	6 days @ \$15.83/day 94.98
	\$1004.88

Board

36 man days @ \$ 5.00/day 180.00

Helicopter Access

May	20 -	2 hrs.35 mins.@	\$250.00/hour			645.81
May	27 -	3 hrs.30 mins.@	\$250.00/hour			875.00
				far de legisland Me With Marin Sudah Mila	\$.	1520.81

Coreld & all

Geochemical Sample Analyses

211 soil samples @ \$2.00/sample	\$ 422.00
60 silt samples @ \$2.00/sample	120.00
69 water samples @ \$2.00/sample	138.00
28 rock samples @ \$2.00/sample	<u>56.00</u>
	\$736.00
그들은 말 이번 이름을 모르고 말했다. 그리고 말이 살아 하겠다면 하네요 말했다고 있다.	
Report Preparation and Drafting	\$100.00
그 사람들 마음이 나에게 된다고 있다. 하는데 이렇게 하여 살고 있어요. 하는데 어머니?	
Total	\$3541.69

Ronald & all-

D.G. Allen, P.Eng. (B.C.)

Declared before me at the City Province of British Columbia, this 18 7h

A Commissiones for to one Affidavits within British Columbia or

A Notary with a large the Novince of British Columbia,

SUB-MINING RECORDER

