#### PROPERTY REPORT

## ON A GROUP OF CLAIMS

## \* FOREST KERR MINES LIMITED \*

#### CLAIMS SURVEYED:

PIN GROUP 13408 - 13507

which are located in the Osoyoos Mining Division, of the Province of British Columbia; longitude  $119^{\circ}50$ 'W, latitude  $49^{\circ}35$ 'N.

The survey was conducted during the summer of 1966.

The report is written by C. T. Ritchie, B.Sc., P.Eng.

SULMAC EXPLORATION SERVICES LIMITED
NOVEMBER 16, 1966

82E/12W





880

REPORT OF PROPERTY OF

POREST KERR MINES LIMITED

BRENDA - OKANAGAN LAKES AREA

OSOYOOS MINING DIVISION

PROVINCE OF BRITISH COLUMBIA

SULMAC EXPLORATION SERVICES LIMITED
NOVEMBER 16, 1966

# INDEX

	Page
Entroduction	1
Sumary	1
Property	2
Location	2
Access	2
General Physiography	2
Topography and Vegetation	3
History of the Property	4
Work Performed on the Property	5
Regional Geology	6
Table of Local Formations	9
Economic Geology	9
Geology of the Property	1.2
Geochemical Survey	14
Conclusions	15
Recommendation	16
References	
Certificate	
In Pocket: Sheet 1 and Sheet 2 of # 1, # 2 Geological and Geochemical Survey (Scale: 1" # 400')	

#### INTRODUCTION

During the summer of 1966, a large group of claims held by Forest Kerr Mines Limited near Summerland in the Osoyoos Mining Division of British Columbia was explored by geologists and technicians in the employ of Sulmac Exploration Services Limited. This report discusses the property and the results of the reconnaissance exploration programme which was designed to provide a geological assessment of the holdings and a preliminary evaluation of its mineral potential.

## SUMMARY

The exploration programme consisted of geological mapping combined with surface prospecting, and geochemical surveying for copper and molybdenum.

In one locality an anomalous copper zone was indicated by the geochemical survey.

The most favourable rock type of the region, the White Granodicrite in which the copper and molybdenum minerals of the Brenda Mines Limited property occur, is the prevalent formation of the property.

An induced polarisation survey is recommended for the purpose of outlining the bedrock source of the copper that has been detected in the overburden.

#### PROPERTY

One hundred contiguous unpatented mining claims, identified as the Pin Group and numbered 13408 to 13507 inclusive, comprise the property of approximately 4,300 acres.

## LOCATION

The property is situated in the Osoyoos
Mining Division of British Columbia, at a location eight
miles west of Summerland, a town on the Canadian Pacific
Railway line, and twelve miles north west of Penticton,
the site of the Mining Recorder's office. The center
of the property lies at 49°35' H latitude and 119°50'W
longitude.

## ACCESS

From Summerland on the Canadian Pacific Railway line an all-weather gravel road leads to the claim group, and a bush road suitable for four-wheel-drive vehicles runs through the property.

## GENERAL PHYSIOGRAPHY

Within the Cordilleran Region of British
Columbia, three physiographic sub-provinces trend parallel
to the Pacific coast. The central of these, the Interior

Plateau lying between the great western and eastern mountain systems, occupies a 200 mile wide belt of dissected plateau and lesser mountain ranges. Near the international boundary the Interior Plateau is only about fifty miles wide, and it is in this narrow part, confined by the Cascade Mountains on the west and Monashee Mountains on the east, that the property is situated.

## TOPOGRAPHY AND VEGETATION

The general locality of the claims may best be described as an irregular upland plateau. Sand ridges and hills enclose ponds and small lakes on the western half of the property, which straddles a north-westerly-trending valley. Undulating hills of sand and boulders occupy the central area of the claim group. In the east, a gradual slope rises irregularly to a series of granite ridges, which terminate at east-facing cliffs. The eastern boundary is a sheer escarpment 200 feet higher than the adjoining ground.

The highest elevation on the property is a bluff near the south west corner. The average elevation is approximately 4,400 feet.

Grass and shrubs cover the rolling hills of the west portion. Only in the northwesterly-trending valley does the overburden support a thick growth of conifers.

#### HISTORY OF THE PROPERTY

The property has no recorded history of mining exploration efforts, though itinerant prospectors have probably traversed the area while staking claims in the vicinity. Interest in the general area has been stimulated by recent developments on the Brenda Mines Limited property some twelve miles to the north.

#### WORK PERFORMED ON THE PROPERTY

Mo systematic mining exploration work was done on the property before 1966. In that year Forest Kerr Mines Limited acquired the property and engaged W.A. Read, consulting geologist, residing in West Vancouver, to prepare a general report on the property. Based on his recommendations, a reconnaissance programme was undertaken during the 1966 field season by Sulmac Exploration Services Limited on behalf of Forest Kerr Mines Limited.

The work consisted of line cutting, geological mapping combined with surface prospecting, and geochemical surveying, as tabulated hereunder:

Work Performed	Amount		
Line cutting, chaining, picketing	641 miles		
Geochemical Surveying	1,250 samples		
Geological Surveying	61 miles		

Standard procedures were followed during the course of the work.

A system of base lines and parallel traverse lines, the latter spaced at 400 foot intervals was established, chained, and marked with pickets at stations located every 200 feet along the lines. The lines and stations provided the necessary geographical control for the technical surveys which were performed concurrently.

The geologists traversed the lines, examined the outcrops, noted the lithological, mineralogical, and structural features, and later compiled the field information to produce a geological map on a scale of one inch to four hundred feet.

The geochemical survey covered all picket lines at intervals of one hundred feet except where talus and rock exposures prevented soil sampling. Wherever feasible, an earth auger was utilized to obtain soil at a depth of approximately one foot below the surface. The collected samples were then shipped to the geochemical laboratory of Jens Mogensen, Thorncliffe Park, Toronto, Ontario, where every second sample was analyzed for copper by the hot nitric acid extraction method. Every alternate soil sample was analyzed for its molybdenum content. In order to minimize costs, intermédiate samples were analyzed only when appreciable copper or molybdenum

values were detected on adjacent locations. The metal content of each analyzed sample was then plotted on the geological map for the purpose of effective interpretation.

#### REGIONAL GEOLOGY

Mountains on the east and the Pacific Ocean on the west is geologically complex. Ranging in age from Fre-Cambrian to Tertiary, the sedimentary and volcanic rocks have been subjected to intermittent crustal disturbances, especially in Proterosoic and late Mesozoic to early Tertiary times, when they were severely faulted and folded. Especially during the latter interval, the deformed strata were extensively intruded by granitic batholiths and numbrous lesser igneous bodies. The intrusive action was accompanied by widespread copper, gold, lead, silver and sinc mineralization.

Of the granitic bodies, the most extensive are the Coast Intrusives. They form the core of the Coast Range, and in southern British Columbia they curve eastward to include the area in which the property is located.

Of the regional formations, the Coast Intrusives, a complex system of batholithic rocks, all the most important in relation to the property of Forest Kerr Mines Limited and for this reason they merit a full description. The authority on this igneous complex is H.M.A. Rice, whose "Geology and Mineral Deposits of the Princeton Map-Area", published in 1947 as Memoir 243 by the Geological Survey of Canada, is the chief source of the generalized information presented hereunder.

The complex is regarded as a group of intrusives that are closely related in origin and time of emplacement. All were introduced during the Mesozoic Era, probably before and during the Lower Cretaceous Period. Rice has recognized three distinct types, all designated granodiorite but distinguished by mineral content and classified in the order of their relative ages, from youngest to oldest:

White Granodiorite Red Granodiorite Grev Granodiorite

Much of the Grey Granodiorite, a light grey rock with a granitic texture, is distinctly but inconspicuously foliated. It varies in composition from quarts diorite to granodiorite. The chief rock constituents are plagioclase, quarts, orthoclase, biotite and secondary hornblende.

The Red Granodiorite, coarser in grain and more variable in texture, is composed largely of quarts, plagioclase, pink orthoclase and biotite. The average composition is that of standard granodiorite but variations range from granite to quartz diorite.

The White granodiorite, distinctively light grey to greenish grey in colour, has a comparitively fresh appearance imparted by white feldspar. The principal minerals are quarts, orthoclass, plagioclass, biotite and hornblends. In composition it varies from a basic granodiorite through diorite to gabbro.

Meither the Grey nor the White Granodiorites are cut by aplite dikes, a prominent feature of the Red Granodiorite. The latter has numerous pegmatite phases.

All three types of Coast Intrusives contain accessory magnetite, apatite, titanite and zircon.

The two older types, especially the oldest or Grey Granodicrite, may have evolved from sedimentary rocks that were subjected to intense emanations from neighbouring magmas, possibly from the molten White mass in the case of the Grey and Red Granodicrites, and from both the Red and Grey masses in the case of the Grey.

In geological terminology the youngest of the three Granodiorites is sometimes termed Valhala, while the two older types are included in the less specific term Nelson.

Still younger rocks, the Otter Intrusives of probable Cretaceous age, cut the Granodicrites. Much later in geological history, probably during the Eccene

Period, volcanic flows covered portions of the eroded land surface.

## TABLE OF LOCAL FORMATIONS

Quaternary Recent and Talus, sand, gravel

Pleistocene

Cenozoic Eccene Volcanics

Mesozoic Jurassic to Otter Creek Intrusives

Lower Cretaceous White Granodicrite (Valhala)
Red Granodicrite (Nelson)

Grey Granodiorite (Nelson)

#### RECONOMIC GROLOGY

Although the Cordilleran region accounts
for about one quarter of Canada's annual mineral production,
it is appropriate to mention only the deposits that are
directly associated with the Coast Intrusives, the chief
rock of the property.

The most noteworthy base metal occurrences were discovered in 1892 at Copper Mountain, thirty-five miles south west of the property, where approximately 30,000,000 tons of copper ore have been mined. The deposits occurred in and near the Copper Mountain stock, a differentiated basic intrusive genetically related to the intrusive, which introduced bornite, chalcopyrite, and chalcocite into fractures that had developed over the contact between a gabbroic phase of the intrudive and the enclosing pyroclastic rock.

A few other metal occurrences, especially

small silver deposits, have been found in the Granodiorite. The only significant discovery confined to this rock type is that of Brenda Mines Limited, with some 30,000,000 tons of rock grading 0.25% copper and 0.07% molybdenum being indicated by diamond drilling, and some 56,000,000 tons being geologically inferred.

The Brenda Mines Limited deposit occurs entirely within the intrusive granodiorite. Chalcopyrite and molybdenite have crystallized in the joints and associated fractures of the granodiorite intrusive. The remainder of the massive rock is barren except for occasional sulphide clusters near the fractures.

could have been the granodiorite magma itself. It is conjectured that joint and fracture planes developed in a consolidating volume of the rock at a time when sulphide-bearing solutions still remained in the more liquid phases of the locally crystallising rock. The fractures may have provided channels and sites favourable to sulphide migration and deposition, thus concentrating the economic minerals in visually observable seams. If this improbable hypothesis is correct, a copper deposit of comparable grade but of less conspicuous appearance could occur in chemically similar rock that was not jointed and fractured immediately before final local consolidation. However, the sulphides probably have been derived from a distant

liquid phase of the parent granodiorite magma which could have provided solutions to a large and previously consolidated and jointed portion of the intrusive. In either event, the discovery of the large low-grade copper-molybdenum deposit suggests that the granodiorite masses are favourable prospecting ground.

Under the heading, Regional Geology, the youngest or White Granodiorite is described as having been subjected to two possible intervals of intense metamorphism. The hydrothermal emanations responsible for the metamorphism may have originated in the later Red and Grey Granodiorite magmas. Bearing this concept in mind, the youngest White Granodiorite should be the most favourable youngest host rock of the three types. The fact that the Brenda Mines Limited copper-molybdenum deposit occurs in the White Granodiorite strongly supports this view.

The search for ore therefore should be directed chiefly, though certainly not exclusively, to the White Granodiorite, and the first stage of any exploration programme should include geological mapping in order to outline the most favourable type of rock.

#### GEOLOGY OF THE PROPERTY

A systematic and thorough survey of the property has resulted in a complete and reliable geological map on a scale of one inch to four hundred feet. On the basis of this survey the following description is presented.

overburden, composed mainly of sand containing numerous boulders, comprises about nine tenths of the
land surface. Beneath the unconsolidated mantle the predominant rocks are the White Granodiorite and Red Granodiorite of the Coast Intrusives. The older of Grey Granodiorite of the Coast Intrusives does not outcrop on the
property.

The White Granedicrite is the youngest and most abundant rock of the property. Its constituent minerals are plagicclase, orthoclase, quarts, biotite and amphibole, the latter occurring as needle-shaped prisms either singly or in radiating clusters. The texture is equigranular.

The Red Granodicrite with a similar mineral composition except for a greater abundance of pink orthoclase and a total lack of amphibole, has a porphyritic texture.

A swarm of narrow aplite dikes from three to thirty feet wide and one discontinuous quarts porphyry dike averaging 200 feet in width cut both types of granodiorite.

Hear the western boundary of the property
the granodicrites are overlain by comparatively young
porphyritic andesite carrying hornblends phenocrysts. A
small outlier of this porphyry occurs in the north east
quarter of the claim group and suggests that a volcanic
flow once covered the general locality. The contact

between these flat-lying late volcanics and the earlier formed granodiorites is not exposed, so that a definite opinion of the age relationship cannot be formed. At any rate a system of parallel northerly striking cleavage planes has developed in all types of rock including the porphyry, and this superimposed structural feature indicates that all formations are older than the latest period of deformation.

Of the several rock types on the property, the White Granodicrite merits the greatest attention, as suggested under Economic Geology.

## GEOCHEMICAL SURVEY

The copper content of all assayed soil samples was reported in parts per million by the laboratory and then plotted on the geological map. The same procedure applied to molybdenum results. In the latter case, only positive values were plotted.

Soil samples were taken by hand auger every 100 feet along compass traverse lines at 400 foot spacings. They were taken below the human layer at a depth of one to three feet.

All samples were tested at the Jens Ancher Mogensen Laboratory in Toronto, Ontario, for the presence of molybdenum and total heavy metals.

Molybdenum was tested for by the standard Toluene Dithiol method as quoted in Marshall's Report of Economical Geology, January, 1965. This method measures the soluble molybdenum in the samples. The total heavy metals were also tested for by the standard methods.

of half a gram of soil from each sample being placed in a test-tube together with 5 ml of 60 HCl and boiled in a water-bath for one hour. Every 15 minutes during the boiling process, the test-tubes are shaken. The tubes are then allowed to cool so that the fines settle to the bottom and the clear liquid can be decanted into shaking tubes. Any ferric iron content present in the solution is removed by adding 2 ml of reducing agent. Dithiol solution (iml) is then added, the test-tubes are well shaken and allowed to stand for 15 - 20 minutes. Finally 5 ml of carbon tetrachloride are added and the solution is shaken for one minute. The variation in the green colour of the solution is an indication of the quantity of molybdenum present in the soil sample.

The concentration (ppm) in each sample' is determined by comparing the variations in colour of the solution with previously prepared standards.

Molybdenum was detected at three locations but only in extremely insignificant quantities. Its almost total absence from the soil inconclusively suggests that appreciable concentrations of molybdenum are not likely to exist in the bedrock if the overburden is shallow.

markably uniform over most of the property. The average of all samples was twenty parts of copper per million parts of soil, which is an approximately normal expectation in unmineralized areas.

Only in the west central part of the property were higher than normal copper values detected in the soil. The pattern is narrow and irregular in shape. Its northeasterly trend is more or less parallel with a series of west-facing slopes that are terminated by east-facing scarps, which suggests that the elongation of this anomaly is caused by drainage and deposition of metal in a topographical trap. The source of the copper lies farther to the west, on line 104% near Station 10+00E, where the copper content of the soil is four times

as great as that of the average overburden. A bedrock concentration of copper sulphides is the probable cause of the geochemical anomaly, but the exact position, attitude, and extent of the bedrock mineralization cannot normally be defined by geochemical anomalies, which merely indicate the approximate location.

#### CONCLUSIONS.

- Geological and geochemical surveys covered the entire property.
- (2) The chief rocks of the property are the White Granodiorite and Red Granodiorite of the Coast Intrusives. The most favourable of the three Coast Intrusives, the White Granodiorite, is the more prevalent formation.
- (3) The geochemical survey detected a zone in the overburden containing an appreciably higher than normal copper concentration, and this anomaly may possibly reflect an economic deposit of copper ore in the bedrock of the immediate vicinity.

- (4) The character of the sulphides in the White Granodicrite on the Brenda Mines Limited property suggests that the most promising means of detecting similar mineralization at depth on the Forest Kerr Mines Limited property is the induced polarization geophysical method.
- (5) The esistence of a geochemical anomaly in overburden underlain by favourable rock calls for further exploration work.

## RECOMMENDATION

reconnaissance induced polarisation survey, to be performed over picket lines 92N, 96N, 100N, 104N and 108N between 800S and 3600S, is strongly recommended. It is further suggested that, at the discretion of the supervising geophysicist, detail induced polarisation surveying follow, wherever possibilities of sulphides are detected by the reconnaissance work.

Respectfully submitted,
SULMAC EXPLORATION SERVICES LIMITED

-CEKCUKI

C.T. Ritchie, B. Sc., P. Eng.

# REFERENCES

Little, H.W.	Geology, Kettle River, B. C., Map 15, Geological Survey of Canada, 1961
Read, W.S.	Preliminary Report on Pin Group, April 15, 1966
Rice, H.M.A.	Geology and Mineral Deposits of the Princeton Map Area, British Columbia, Memoir 243, Geological Survey of Canada, 1960
Umpleby, J.B.	Oroville-Wighthawk Mining District, Bulletin Ho. 5, Washington State Geological Survey Board, 1911
Nap 932A	Geological Map of British Columbia, Geological Survey of Canada, 1962
Map 1069A	Victoria-Vancouver, Geological Survey of Canada, 1959
Mineral Claim Map 92H/9E	Department of Mining Petroleum Resources, British Columbia, 1966
Mineral Claim Map 82E/12W (M)	Department of Mining Petroleum Resources, British Columbia, 1966
Mineral Claim Map 82E/12E (M)	Department of Mining Petroleum Resources, British Columbia, 1966
Sheet 83E/NW, Kelowna	Department of Lands & Forests, British Columbia, 1960

Tectonic History and Mineral Deposits of the Western Cordillera, C.I.M., 1966

#### CERTIFICATO

- I, Cicero Theodore Eitchie, of Metropolitan Toronto, County of York, Province of Ontario, hereby certify:
- (1) That I am a geologist and reside at 42 Cameron Crescent, Burrough of East York, Metropolitan Toronto, Province of Ontario.
- (2) That I studied physics and geology and graduated from Dulhousie University in 1938 with the degree of Bachelor of Science.
- (3) That I am a member of the Association of Professional Engineers of the Province of Ontario, (Mining Branch).
- (4) That I have been engaged in mining exploration and have been practising as a mining geologist for more than twelve years.
- (5) That I do not have nor expect to receive any direct or indirect interest in the property discussed in this report or part thereof, nor in the securities of FOREST KERR MINES LIMITED.
- (6) That this report is based on the records and results of work performed during 1966 on the property by Sulmac Emploration Services Limited, on publications of the Geological Survey of Canada, and on a report by W.S. Read dated April 15, 1966.

Dated at TORONTO, Ontario, this 16th day of Hovember.

## STATEMENT OF COST

## to \*FOREST KERR MINES LIMITED\* - RE: Property in Osoyoos Mining Division BRITISH COLUMBIA

Geological Party (1 Two-man Party)				
July 5 - 15 @ \$2/200/mo. July 16 - 31 @ \$2,200/mo. August 1- 15 @ \$2,200/mo.	1	806.00 ,100.00 ,100.00	\$	3,006.00
Geochemical Party (1 Two-man Party)				
July 5 - 15 @ \$2,200/mo. July 16 - 31 @ \$2,200/mo. August 1- 15 @ \$2,200/mo.	1	806.00 ,100.00 ,100.00	\$	3,006.00
Line Cutting (1 Two-man Party)				
July 6 - 15 @ \$1,200/mo. July 16 - 31 @ \$1,200/mo. August 1- 15 @ \$1,200/mo.	\$	400.00 600.00 600.00	\$	1,600.00
Supervision - Senior Geologist				
12 days @ \$50/day 13 days @ \$75/day	\$	600.00 975.00	ş	1,575.00
Soil Samples - Geochemical Analyses			\$	1,717.60
Vehicle Rentals for Local Transportation \$			\$	587.63
Telephone and Telegraph			\$	169.55
Local Travelling and Transportation Cost Over and Above the Vehicle Rental			Ş	219.40
Board Costs			\$	218.84
Drafting Charges				
44 hours @ \$5/hour			\$	220.00
Printing Costs			\$	10.07
Geological and Geochemical Supplies			-	111.05
TOTAL		\$1	2,441.14	

The above was invoiced to and paid by \*FOREST KERR MINES LIMITED\*

# APPENDIX

# List of Personnel employed on Geological and Geochemical

# Survey and Dates

Soil Samplers	W. Smith	July 14, 1966
	B. Smith	July 14, 15, 16-29, 1966 July 11, 12, 1966
	W. Salo L. Monahan	July 11, 12, 1966
		July 18-21, 1966
	R. Martin	July 11-15, and 19, 1966
	W. Gathof	July 11 and August 5, 1966
	R. Brever	July 8-15, 1966
	A. Eden	August 1 - 15, 1966
w.l	B. T. B	Tul. 10 14 10 064
Line Cutters	D. LaPorte	July 13, 14, 18, 26 and 30, 1966
	W. Downton	July 18, 26-28, 1966
	M. Becker	July 22, 1966
	L. Salutin	August 2 - 15, 1966
Geologists	F. McDonald	July 8-15, 19-30, and
Assistants		August 1-7, 1966
	L. Broadhead	July 22, 26 and 27, 1966
	R. Becker	July 16 and August 5, 1966
Geologist	A. Kopare	July 5 to August 11, 1966
Geologist	A. KOPALA	July 5 to August 11, 1900
Geologist	C T Pitchia B Co	November 7, 9, 10, 11, 14
GGGIGGIAC		and 15, 1966
	_ • <b>J</b> •	
Draftsman	D. A. Grant	June 22, Sept. 10, Oct. 4,
		6, 31 and November 7 and
		8, 1966
Typist	J.A. Henry	November 16, 1966



