658

NORANDA EXPLORATION COMPANY LIMITED

GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL SURVEY

of the

LAKEVIEW - DIVIDEND PROPERTY

ONE MILE WEST

of

OSOYOOS, B. C.

49° NORTH 119° 30' WEST

D. E. Pegg December, 1964 82 E/4

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LIST OF MAPS IN FOLDER

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Department of Mines and Potroleum Resources ASSESSMENT REPORT NO. 658 MAP

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INTRODUCTION

Location:

The calims are located approximately one mile to the west of Osoyoos, B. C. and one mile north of the United States border.

Topography:

Much of the area is rolling side-hill with sage brush on the lower slopes, and sparse jack-pine and spruce on the higher ground. Elevations vary from 1200 feet to 2800 feet.

The climate is arid and consequently the drainage system consists of numerous small dry gullies and a few intermittent streams.

Overburden above the 1300 foot level is moderate to shallow in depth. Below this, the topography changes to sandy flats where overburden is reported to be one hundred feet deep in some places, and probably increasingly deeper to the north-east.

History:

In the 1890's and again in the 1930's, gold was produced from quartz replacement veins at the Fairview Camp near Oliver, B. C. These occurred both in granite and volcanics. This type of ore was also mined near Oroville, Washington (to the south). At the same time small tonnages of copper-lead-zinc-silver ore were mined from the Dividend Property. (See G. S. C. Memoir 179) An estimated 30,000 tons, assaying up to one ounce in gold were found there in skarn. Pyrrhotite, chalcopyrite and magnetite were also prominent.

Smaller tonnages containing minor gold and copper were also developed in the 1930's on the Lakeview and Manx claims, but were not otherwise exploited.

Development of these and other gold showings revealed widespread, though probably minor, chalcopyrite mineralization, varying greatly in amount from place to place. - PAGE 2 -

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SCHEDULE OF CLAIMS

KEN BUTLER: (R. R. #1, Osoyoos, B. C.)

Located Claims:	Chukar 1, 2, 3, 4, 5, 6, 7, 8 Fr., 9 Fr. Quail Fr. Moly 1, 2, 3 Fr., 4 Hub 1 Fr., 2 Fr., 3 Fr., 4
Leased Claims:	Molka, Rhone Fr., Blue Bell - Bertha Fr.
Crown Grants:	Gem, Whistler
One half Interest in Located Claims:	Cat Fr., Tiger Fr., Lion Fr.

D. P. SIMPSON: (Box 321, Osoyoos, B. C.)

Leased Claims:	Eagle Fr., Bullseye Fr., California, Lakeview, Treasury, Copper King, Bull Frog Fr., Ianto, Orient, Lakeview Extension, Gold Hill
Crown Grants:	Dividend, Manx, Osoyoos - Heclar Fr., Little - Manx Fr., Dividend Fr.
One half Interest in Located Claims:	Cat Fr., Tiger Fr., Lion Fr.

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NORANDA EXPLORATION COMPANY LIMITED

COST OF GEOLOGICAL, GEOCHEMICAL AND GEOPHYSICAL SURVEYS of the LAKEVIEW - DIVIDEND GROUPS OF MINERAL CLAIMS

OSOYOOS, B. C. - 1964

Professional Engineering:

Supervisory, field	3 days @ \$35.00/day 20 days @ \$20.00/day	\$ 105.00 400.00
Laboratory	3 days @ \$15.00/day	45.00
Office - Drafting	17 days @ \$15.00/day	255,00

Labor:

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Soil	sampling, survey assistant, geophysical	
	assistant (average 1 man/day 20 days)	
	20 man days @ \$13.00/day	260,00

TOTAL COST: \$1,065.00

Marine

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GEOLOGICAL, GEOPHYSICAL, GEOCHEMICAL SURVEY

General Data:

Geology:

An intrusive stock of granodiorite, probably related to the Okanagan batholith, extends from six miles north of the U. S. border into Washington State. The granodiorite is grey-green, medium to coarse grained and is composed of quartz, plagioclase and hornblende. It is slightly gneissic in places. The granodiorite adjoins, and possibly underlies, carboniferous sediments and altered volcanics of the Anarchist series. The formation consists mainly of schistoze to massive greenstones, micaceous quartzites and minor crystalline limestone. Some altered diorite appears to be intruded into the Anarchist series and is quite similar to the Anarchist greenstones, often making geologic separation difficult and incomplete.

There are many small scattered mineralized zones of chalcopyrite in quartz shears or veins, which appear to follow fault zones in both the quartzites of the Anarchist series and in the granitic rocks of the Osoyoos batholith.

Many of the more prominent shears have been trenched or blasted. The purpose of this survey by Noranda was to check the possibility of finding either a large low grade ore body of copper, or small high grade gold-copper ore body similar to that already mined at the Dividend Property.

Mineralization:

The common metallic minerals are pyrrhotite, magnetite, chalcopyrite and arsenopyrite in a gangue of altered limestones and volcanics developed to silicate skarn or garnetite. Non-metallics in the skarn are garnet, epidote, diopside and wollastonite.

Cockfield (G. S. C. Memoir 179) believes the sulphide mineralization has followed development of this skarn.

The most probable source of the sulphide deposits seems to be the Osoyoos batholith, rather than the small diorite intrusions, since the latter are altered to the same degree as the country rock. (i.e. Anarchist series)

Techniques:

Station Control:

Detail grid was established by compass, nylon chain and flagging tape. Visibility was generally good because of the relatively treeless slopes, so that this system worked well.

In the reconnaissance work, points were located by reference to topographic features and surveyed claim corners.

(1) Geochemical Survey:

This property appeared to be especially suited to geochemical soil sampling, since there is a considerable area with apparent shallow overburden related by the natural weathering processes to the bedrock. On the flats, the Okanagan white silts would not be suitable for soil sampling.

Transported material or "silts", as found in the principal drainage channels, were sampled on a reconnaissance basis, roughly at 500 foot intervals. The silts were a combination of true stream silt and side hill sluff soil. This was taken into consideration in interpretation.

The "True Soil" profile in the general area of this property appeared slightly modified from the Hypothetical profile.

Hypothetical Soil Profile

- Horizons of <u>illuviation</u>

(accumulation of material

by deposition or precip-

itation from percolating

<u>Solum</u> (True Soil)	 Maximum biological action Maximum <u>eluviation</u> (i.e. removal of materials suspended or dissolved in water) 	A 1	 Organic debris - partly decomposed Dark coloured horizon humus rich Light coloured -
		n2	- prair coroured -

- maximum eluviation - Prominent to faint - Loose structure
- B Brown to orange brown horizons
 Accumulation of clay minerals or iron and organic.
 Compact, blocky structure

Parent material derived by weathering

water)

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Techniques: (Cont'd)

Soil horizon differentiation is normally governed by the five major factors of parent material, relief, climate, biological activity and time.

In the Lakeview - Dividend area, the dominant factors appear to be climate and biological activity (or lack of same), with the latter strongly influenced by the former. To summarize these influences:

Climate - predominates

Arid climates restrict weathering, leaching, plant growth, and eluviation (removal). The ratio of precipitation to percolation favours downward percolation. Incomplete leaching favours alkaline character and high base-exchange clays.

<u>Biological Activity</u> is a function of vegetation. In a dry climate, there is less vegetation to produce soil organic matter and the high temperatures which predominate much of the year.

<u>Parent Material</u> of granodiorite and greenstone schist is only moderately permeable and is resistant to decay.

<u>Relief</u>, where steep slopes promote shallower soil and less percolation and less distinct horizon development.

<u>Time</u> is an adverse influence in that the soils are relatively young in this area.

The resultant soil at this property is light brown, slightly alkaline with little or no humus, except on benches adjoining the main drainage units.

Noranda has a large, modern laboratory in Vancouver, especially adapted for large scale geochemical processing of samples.

The samples are processed for total copper content using KHSO₄ fluxing agent, then fused and analyzed colorimetrically for parts per million with biquinoline.

Magnetometer Survey:

Instrument - Sharpe Magcrometer ES 180, #172 Manufactured by E. Sharpe and Associates of Toronto, Ontario.

This instrument is portable, self leveling and self orienting. It has a total range of 100,000 gammas and possible

Techniques:

Magnetometer Survey: (Cont'd)

accuracy to ± 20 gammas.

Control: All values of the survey must be considered as relative gamma values since no precise tie was made with any government base station. Stations of relative stability were referred to as base checks for magnetic control.

Self Potential Survey:

Instrument - A Noranda designed portable geophysical potentiometer using porous pots. Range 0 to 1,000 millevolts.

This instrument measures the potential difference or voltage between base station and other stations on the grid, mainly caused by

- 1. Chemical actions (oxidation of sulphides)
- 2. Earthcurrents moving through rock of different resistivity.

Electromagnetic Survey:

Instrument - Crone Jr. E. M. 1800 c.p.s. - 480 c.p.s. Junior E. M. developed by Crone Geophysics, Toronto, Ontario - a division of Noranda Mines Limited. The basic principles

are similar to those for standard E. M. instruments but some modifications, including new developments to compensate for steep slopes, have been incorporated. It is of very light weight, involves no interconnecting cables, and permits rapid coverage.

- Operations: The crew consists of chief coil operator and helper coil operator. Each coil has transmitter and receiver. A spacing of 200 feet between coils is normally maintained and the readings are taken at 100 foot intervals, noted as dips in degrees, and plotted half way between the operators. A 400 foot spacing between section lines is good for fair detail.
- <u>Observations</u>: The penetration of this instrument is slightly in excess of 100 feet at 200 foot coil spacing and is quite suitable for this type of exploration work.

Geochemical Survey:

Preliminary "Silt" Sampling: (400 Scale Map)

The more prominent drainage units were sampled at approximately 500 foot intervals for total copper.

Because of the very arid nature of the area, many of the samples taken were not true silts but rather were taken as "soil-silts".

Background appears to be in the range of 50 to 75 parts per million.

A number of trains ran as high as 500 p.p.m. All of these appear associated with, or else downstream from old workings, or else adjacent to small chalcopyrite showings which are as yet relatively undisturbed.

Two "trains" to the north of the Treasury claim (Sample Numbers F 1620/450 p.p.m.; D 761/350 p.p.m.) were checked on two cross lines by soil sampling and magcrometer.

A two foot wide shear zone in granodiorite with quartz and minor chalcopyrite was noted just upstream from F 1620.

Detail - Lakeview-Dividend:

Geochemical Survey on Detail Grid: (200 Scale Map)

High readings seem related to their proximity to known showings, trenches, dumps or to downslope location from same. The Lakeview and the Dividend mineralization outcrops in many locations and there appears to be widespread surface contamination from old workings as reflected in some soil sample readings, and confirmed by observations.

The vicinity of the Lakeview and the Dividend seems to have been thoroughly explored from both surface and underground by previous investigators.

Magnetometer Survey:

Detailed magnetometer was run over the Lakeview and the Dividend Grids.

There appears to be little variation from a general background reading of 5800 to 6400 gammas, with the following exceptions.

 (i) Vicinity of 7 West/6 North - a spot high of 12,400 gammas is related to a small sulphide zone, one foot wide, of pyrite, chalcopyrite, magnetite and arsenopyrite. This is located near the portal of a small adit to the east of the old Dividend workings. The magnetic high appears quite isolated, and distinctly related to this magnetite. Magnetometer Survey: (Cont'd)

 (ii) Erratic high and low values on Manx portion, lines 20 West, 24 West, 28 West all south of 8 South. (See "Manx" - this report)

Electromagnetic Survey - Main Grid: (200 Scale Map)

Two lines were run over Dividend workings and three lines over Lakeview workings - 200 foot spacing.

No obvious conductors were revealed. Further detail was done in the vicinity of the magnetic high noted at 7 West/6 North in both northerly and easterly directions. No conductors were revealed.

(E. M. on Manx - See Manx below)

Self Potential Survey:

Limited self potential was run to check its suitability for tracing mineralization in this area.

Line 7W from ON to 12N was checked. Drill holes (#5, #6, Sheep Creek Mines) and surface exposures show scattered fine sulphides in this area to the south west of California Claim.

Readings obtained were insignificant, varying from -22 to +20 millevolts.

Other Claims of Interest:

Gem - Molybdenite: (40 Scale Plan with Geology)

On the Gem Claim, there is a long trench which exposes chalcopyrite - molybdenite mineralization in restricted structural situations within the granodiorite. The granodiorite is fractured, epidotized and chloritized along a strong set of small East-West shears carrying small lenses and slips of malachite to the east and merging into a 3 foot wide pink - pegmatite dyke at the west end. There are several other small individual showings in this vicinity but the whole is surrounded by much barren rock so that there does not appear to be room for a structure of favourable size for an ore body.

Logs of drill holes in the molybdenum showing on the Gem Claim were plotted on the Geological Maps. The mineralization did not respond to E. M. or Magnetometer Surveys. Molka: (200 Scale Map)

General:

The Molka Claim is underlain by volcanics (greenstone) of the Anarchist series, mineralized with scattered chalcopyrite. The greenstone is strongly sheared and fractured, with the strongest shears and most prominent joint sets striking northerly or easterly and generally dipping steeply to the northwest. Subsidiary cross-fractures with chlorite and epidote cut the rocks adjacent to the shears.

Chalcopyrite and malachite appear in the stronger shears and fractures as fine stringers, and malachite is sparsely scattered through the interveining cross fractured rock. South West Corner:

This area is low rolling and accessable. There is a considerable exposure of volcanics. A short adit (less than 20 feet) has been driven by former operators on a one foot wide quartz vein (?) containing scattered chalcopyrite. The country rock is greenstone.

Prospecting was done in detail but the size and attitude of the vein was insignificant for detailed geophysics. North East Corner:

Work was done in the vicinity of a small skarn zone on the possibility of extending the size and mineralization of the skarn. Mr. Butler had previously drilled a hole into 25 feet of skarn and greenstone one hundred feet north west of the outcrop. There is extensive overburden to the north.

Extensive prospecting was done by Noranda. Some investigation with Jr. E. M. (Electromagnetic) and magcrometer (magnetometer) showed weak response. The magcrometer showed less than 500 gammas above background in the vicinity of the skarn exposure and also adjacent to Mr. Butler's trench. The general weak response appears to indicate a very minor skarn zone and the absence of strong sulphides.

The particular area appears unsuitable for further work.

Cat Fraction: (200 Scale Map)

A drill hole (#12 Sheep Creek Mines) on a weak S. P. anomaly (Sheep Creek Mines) intersected altered diorite with minor scattered sulphides. There was visible chalcopyrite and molybdenite over six inches at 203'. Overburden is 119 feet.

Magnetometer and E. M. reconnaissance showed no significant response.

Manx: (See 200 Scale Geology - Mag., E.M., Soil on Main Grid)

The Manx claim lies above and to the south-west of the Lakeview-Dividend Claims. There is considerable outcrop consisting mainly of lime silicate skarn or garnetite and altered greenstone.

There are a few scattered shallow trenches on small showings of magnetite in skarn and on narrow veins of chalcopyrite mineralized quartz.

The magcrometer showed some outstanding but very erratic high and low readings, probably consistant with the irregular nature of the skarn and the small irregular, spotty nature of the magnetite mineralization.

Any mineralization as indicated by the magnetics would probably be very limited in size.

Some E. M. reconnaissance on lines 20W, 24W, 28W in the general vicinity of some of these Mag. highs showed no significant conductors. Some further random test lines with Jr. E. M. (not indicated on E. M. Map) showed negative responses.

Detail:- Geochemical Anomaly - Treasury:

Two cross lines were run over several easterly sloping gullies to the north of the Treasury Claim where reconnaissance silting has revealed highs as noted in Section #1 of this report (also see appropriate maps). The E. M. and Magcrometer lines showed no response.

Soil sampling detail on this area gave readings of 50 to 75 p.pm. which for the property appear to be background only.

D. E. Pegg, Geologist.

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APPENDIX I

GEOCHEMICAL SAMPLING AND PROCESSING DETAIL

Sample Bags:

Samples are collected in special Kraft brown paper bags of high wet strength (30 pounds or more). These are $3\frac{1}{2}$ " x 10", are open at one of the long ends where they are precreased for folding to close, and have pre-punched holes to facilitate handing in the laboratory dryer. Pertinent information is written on the outside of the bag. The paper allows for quick drying of the sample.

Silt Samples:

Stream sediments or "silts" are taken from the stream channel, preferably selected clear of side-bank sloughing. A minimum of 100 to 200 grams of the fine water-lain silt is taken. Care is taken to note width, depth and relative velocity of stream, as well as rock types, presence of swampy area, sand, gravel and boulders. For silts two samples "A" and "B" are taken within a few feet of one another at each silt location to give a check. The spread in sample locations depends on the type of information required. For reconnaissance, there may be one-half mile spread on any particular stream, while for detail work the interval is usually 500 feet, or less if desired.

Soil Samples:

Soil samples are collected by digging through the top organic layer to the "B" Horizon with a hoe-like tool called a mattock. A type of shovel or auger would also suffice for this operation. In the arid climate of this property vegetation is scarce, so the "A" Horizon is thin or lacking and it is necessary to dig 6 inches or less to the "B" Horizon. A handful-size quantity of material is removed to one of the bags, taking care not to contaminate the sample. Again, where necessary, a rough estimate of soil type is noted, including presence of sand, gravel, clay, organic material and bed-rock in the vicinity.

Usually only one soil sample is taken.

APPENDIX I

Preparation of Samples:

Samples are first dried as much as possible in the field. They are further dried by mechanical driers while still in their individual containers, in the Laboratory at Vancouver. The samples are then screened to minus 80 mesh, the course material discarded, and portions of the fines are weighed out for testing for various elements.

For soluble copper test, 0.2 grams is necessary, and 0.1 grams for total copper test.

The rest of the sample is catalogued and stored for future use if necessary.

Laboratory Procedures:

There are many general procedures for chemical analysis of soils and silts for copper and other minerals.

Noranda maintains its own laboratory and has some minor refinements in their process. Essentially, for measuring total copper content of a sample 0.5 grams of $KHSO_4$ fluxing agent is added to a carefully weighed portion of the minus 80 mesh fraction, then fused, put into solution, and analyzed colorimetrically for parts per million with biguinoline reagent.

To measure the <u>soluble</u> copper in a sample of soil or silt, the copper is extracted from the sample by hot HCl. The parts per million of copper are determined colorimetrically with dithizone reagent.



SCALE: 1 INCH to 4 MILES

DOMINION OF CANADA:

PROVINCE OF BRITISH COLUMBIA.

To WIT:

In the Matter of

Cost of Geological, Geophysical and Geochemical Surveys of the Lakeview - Dividend Groups of Mineral Claims, Osoyoos, B. C. - 1964

I, DANIEL E. PEGG

of 1050 Davie Street, VANCOUVER 5, B. C.

in the Province of British Columbia, do solemnly declare that

THE FOLLOWING MEN WERE PRESENT TO DO WORK

Professional Engineering:	~							
Supervisory, Field:	•							
Alex D. K. Burton		3	days	ø	\$35.00	per	day	\$105.00
Daniel E. Pegg		10	days	0	\$20,00	per	day	400,00
James D. Knauer		10	days	Ø	\$20,00	per	day	400,00
Laboratory:								
Peter Rossbacher		3	days	0	\$15.00	\mathtt{per}	day	45.00
Office - Drafting:	~							
Daniel E. Pegg		10	days	Ø	\$15.00	per	day	
Mary Redman	-	7	days	Ø	\$15.00	per	day	255.00
Labor:								
Soil Sampling, Survey As	sist	an	t, Ge	opl	nysical	Ass	istant:	
Darryl Johnson		20	days	0	\$13.00	\mathbf{per}	day	260.00
								\$1.065.00

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Dan S. Declared before me at the , in the of Province of British Columbia, this Ma 1965 , A.D. day of Commissioner for Julying Affidavits within British Columbia or A Notary Public in and for the Province of British Columbia. ***** 0

























