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# NORANDA EXPLORATION COMPANY LIMITED

(Norpex Division)

REPORT ON THE

MORRISON PROPERTY

MORRISON LAKE (SMITHERS) B. C.

CAINECA MINING DIVISION

55° 12' 126° 20'

R. Voolverton 1963 The Morrison Lake deposit is a large sub-economic porphyry copper. The showings are approximately 1/2 mile from the east shore and about 1 1/2 miles north of the south end of Morrison Lake, at latitudes 55° 12' and longitudes 126° 20', and about 45 miles northeast of Smithers, B. C.

The Morrison Lake area was silt sampled by boat in September, 1961 using a helicopter for transporting the boat and crew to the lake. Lab results obtained during the winter of 1961 - 1962, indicated an anomaly of 517 ppm sol. copper, 900 ppm total copper, and 10 ppm total molybdenum on the small creek which drains the mineralized zone. During a follow-up in May, 1962, mineralized float and euterop was found in the creek about 1/4 of a mile from Morrison Lake. The Elles #1 to #16 mineral claims were immediately staked.

The property is located on a mile wide plateau which is about 150 feet above lake lovel. Local relief on the plateau is about 300 feet. The overburden varies from sere on the hills to 20 or 30 feet in the draws. Small jackpine cover the plateau with larger spruce and balsam in the draws and swampy areas and peplar and birth on the slopes. Although patches of devils club, under brush and dead-fall exist, some areas are almost park-like.

Initially, supplies were flown in from Smithers by Ominess Airlines. Later, a 5 mile jeep read was built from the property south to Hatchery Arm on Babine Lake, where a wharf was built. Heavy supplies, such as drilling equipment, was transported by read from Smithers to Smithers Landing on Babine Lake and by barge from the Landing to the Hatebery Arm wharf.

#### GEOLOGY

#### Regionals

The Morrison Lake area has not been geologically mapped by the government. However, G.S.C. map 971 A (Smithers - Fert St. James) includes the Babine Lake area to the south, Takla Lake to the east, and the Hazelton area to the west of Morrison Lake.

The showings occur in and adjacent to a porphyry stock and poriphoral sills and dynas which intrude Hazeltan(?) sodiments. Sodiments similar to the younger Sustat Group are present northwest and southeast of the property. Either the mineralization occurs in a "window" caused by the thrust faulting or near a regional contact between the two sedimentary series. Along the northeast shore of Morrison Lake, the younger sediments strike northwesterly and dip about 45° or more to the southwest. They form the falls in the creek near camp and are also present near the west end of the 7 M trench.

Rock Types:

Palecone

faulting alteration and mineralization faulting porphyry intrusion pro-mineral dynos and aplite position in anomanae observation of the second second

ne observed

Sustut(?) sediments.

Crotacoous Jurassio felding(?) Haselton(?) sediments.

The above sequence is based on field observations. Several this sections were examined by C. C. Sheng and his report is included as an appendix.

folding

The Haselton rocks at Morrison include silicified siltstone, limestone and quartaite. The silicified siltstone is . described by Sheng as a low grade metamorphosed highly siliceeus argillaceeus rock. It contains discominated angastite (in the biotite altered contact phase around the perphyry bodies), varying anounts of biotite, with minor epidete and calcite. What was mapped and logged as lime-siltstone is a light brownish soft rock which does not always react with HOL. It may be an alteration phase of the siltstone. A short section of altered argillaceous limestone was observed in one drill hole. The quartaite mapped in the transhes may only be more highly silicified sections of the siltstone since distinct bands of quartaite were not present in the drill core.

The younger (Sustui?) sediments include shale, sendstand and conglemerate. Their structural relation to the Hauslton is not clear. At the falls in the creek near camp these sediments strike nearly east-west and dip 70° to the west. Near the east end of the 7 north trench a vertical band of conglomerate striking north-south may be intruded by perphysize.

Large splite dykes are present in the 27 north transh area. Minor molybdenite is associated with these dykes as shown in D.D.H. #4. A few pre-mineral diorite(?) dykes were found in the drill holes in the oreak zone. The composition varies but they are fractured, altered and mineralized, mainly with pyrite. The post-mineral dykes are fresh and unfractured.

Two types of feldspar perphyry were distinguished. The silicified and kaolinized perphyry as well as the loss altered part of the main stock were elassified as "grey perphyry". The dark colored biotite altered phase was mapped and logged as "perphyry". Zones of "grey" perphyry were found in the darker perphyry so that apparently silicification and kaolinization along shear zones and fractures proceeded the biotite alteration.

# Structure:

The perphyry stock appears to have intruded the faulted and sheared axial plane zone of a vertical fold in the Hazelton sediments. Associated peripheral intrusives are generally concordant although not always.

The axial plane of the large fold has apparently been faulted several times. There is a strong topographic linear through the creek and beaver pend area which can be correlated with gouge senes and poor core recovery in the drill halos under the creek some. Older breeciated areas were found in this some which are comented with quarts carrying pyrite, minor chalcopyrite and traces of melybdenite.

Some drag folds are probably present in the west trenches although good bodding was found in only a few places.

# Alteration:

The strongest kaelinization was found along the fault in the creek some where the foldspars have been completely kaelinized. The narrow "grey porphyry" found elsewhere probably indicates minor kaelinization along pre-alteration fractures and shears.

Silicification is widespread although best developed in the sediments near perphyry contacts. Within the stock, it is restricted to quarts filled breecein and gouge monos along the preminent linear. Biotite alteration forms a "rim" along the edge of the stock in both the porphyry and sediments. It is also present in the peripheral perphyry bedies and adjacent sediments. Mineralizations

> The sulfides present are concentrated within the bietite altered contact some and include pyrite and pyrrhetite with minor shalcopyrite, bernite and melybdenite. The best copper values (see D.D.H. #1 and #2) occur near the perphyry-sediment contacts. However, the highest grade sample (8 foot channel of 0.9% Cu) was taken in the narrow kaelinized zone in the creek. Minor molybdenite is also present in the splite dynes which are weakly minoralized. Within the contral zone of the stock the sulfides are concentrated in the quarts filled breecia and shear zones along the linear.

> A silver-white silver(7) mineral was observed by Shang in a polished section of biotite altered porphyry. Magnetite is present in both the sediments and perphyry. As shown and the magnetometer map, it forms a "rim" which is almost coincident with the biotite halo.

#### YORK DONE

#### Stakings

Camps

A total of 113 full sized claims (see map) and 1 fraction were staked.

Claim	Lecator	Record Date	Record No.
Ellen #1 - 16	R. Veelverton	June 4/63	19692 - 19707
Pish #1	D.A. Lowrie	June 19/63	20319
Alva 1 - 34			20320 - 20353
Nellie 1 - 20	R. Voolverten	June 28/63	22006 - 22025
Morce 1 - 22	I. Saunders	July 9/63	20650 - 20671
Ellen #3 Practice	R. Voolverten	Aug. 13/63	21640
Velf 1 - 20	A. Ratherford	Beyt. 5/63	21720 - 21729

A camp was built on the shore of Morrison Lake about 1/4 of a mile from the showings. Two 14 x 16 feet text frames, an office shack, core shack, heliport, and small wharf were constructed.

Line Cutting:

About 130,000 feet of lines spaced at 200 feet intervals were out of which about 55,000 feet were contracted to MaWillion

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Whyte, Sorle and Goble at \$75.00 per line mile. A rough flagged grid using the read south from camp as a base line was established for recommaissance soil sampling. This is referred to as the Valf grid as eppered to the Ellem grid on the showings.

# Surveying and Mappings

The Ellen #1 - #6, 9 - 14, and #3 fractional elains were surveyed by McWilliam, whyte, Serle, and Goble, B. C. Land Surveyors and the lots recorded in the Omineca Land District.

llen	和	N.C.	498	Los	6842	Ellen	19	M.C.	60	Lot	6848	
	n	W	-	9	6847	90	#10	98	-		6853	
	#3	60	-	86	6843	00	#11		-	88	6849	
	#4	Ħ	-	10	6846		#12	-	-	60	6852	
	#5		-		6844 .	00	#13		-	-	6850	
00	#6		-		6845	•	#14		-		6851	
							13	Craat	1.00	1.00	- Lot	685

Most of the West trenches were plane tabled. However, the 17, 21 and 23 north trenches and the trenches east of the sreek were surveyed by transit and not geologically mapped in detail. The base lines and turn-offs were surveyed by transit using slope distances. Drill holes 1, 2, and 3 were located by plane table, #4 by transit, #5 and #6 by chain and compass from existing survey stations, and #7 by chain and compass from grid stations. Elevations for holes #4 to #7 are approximations. Float along the grid lines was mapped prior to the trenching.

Geochemistry and Geophysics:

Soil samples were taken on the grid at 100 foot intervals. Initially they were analyzed by cold acid extraction which gave extremely high values along shear senes and at the base of slopes. The samples were re-run for total copper content which, although still reflecting topography, did outline a broad anomalous some. The results, however, were of little value in spotting drill heles.

The self potential method was applied but although it indicated anomalous somes, it did not help locate drill targets.

Both the 1,800 and 5,000 sysle J.E.M. were used. Some small angles were obtained in the zone of interest. The best J.E.M. anomaly (and coincident S.P.) was found on the eastern page trenching indicated a pyrite-pyrrhetite

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An askamia survey proved to be the most reliable method of detailing the interesting none. The biotite alteration some, because of its associated magnetite content, gave maghighs whereas the central part of the intrusive and the major linear were expressed by a mag. low. The small high mag. anomaly, west of the sore base line at 12 north may be due to a concentration of pyrrhotite. Unfortunately, the first askania used required repairs before completion of the survey. The results of the work using the second askania de not cerrelate very well with the initial work.

# Bulldosing:

A D-7E Cat, was rented from Fort George Contractors of Prince George for several weeks. A 5 mile read for 4 wheel drive vehicles was built from Hatchery Arm on Babine Lake to the Merrison Camp. A wharf was built and leading area cleared at Babine Lake. From easy, three access reads were built, one to the west some at 25 month on the sere base line, one to the east some at about 12 month on the 15 east base line, and one to the north west corner of the grid mear 56 month and 35 west. Slightly more than 10,000 feet of eat. trenching was done on the east and west somes.

# Blasting and Sampling:

Pits were blasted in the eat. trenches using a pienjar drill. Grab samples were taken from these pits only in the 17, 21, 25 and 27 north trenches in the west zone. Two small trenches were blasted and mucked out in the 25 north cat. trench.

#### Drilling:

Canadian Longyear contracted two drilling jobs, one in August (AX) and the other (AX wireline) in October, 1963. Holes 1, 2, 3 and 4 were completed under the first contract and holes 5, 6 and 7 were drilled in October giving a total of 2,406 feet of drilling.

# Assessment:

Sixteen years assessment was applied to Ellen #1 to #16, Ellen #3 fraction, and Alva #1 and #2 mineral claims. An Additional year was applied to the Ellen claims which were legally surveyed.

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Job	Man Days	(Noranda)	and or	Contract Cost
Staking	28			
Camp	40			
Line Cutting	94 +14	(Wolf grid)	)	\$ 1,012,50
Surveying & Mapping	54			In the second second
Geochem.	31			
Geophysics	72			
Road & Stripping	20 (Su	pervision)		\$ 6,877.61

# CONCLUSION

The Morrison Property is a fairly typical sub-economic perphysy copper deposit. The mineralization is related to the faulting and fracturing of biotite altered and silicified porphysy and sediments. The best results (336 feet of 0.49% Cu) were obtained in D.D.H. No. 1 mear the northern end of the stock and the intersection of the fault zone and altered rim of the intrusive. Slightly higher grade mineralization may exist east of D.D.E. #1 and could conceivably be extended a few hundred feet north and south from this hele. However, the possible tennage and grade would probably be submarginal. Therefore, further work is not recommended.

RY/kt

R. Voolverten, Geelegist.

April, 1964.

# THE MICROSCOPIC STUDY ON THE DRILL CORES.

MORRISON LAKE B.C.

# SUMMARY

Feidspar porphyrite (E-1-175.4) and the low grade metamorphosed argiliaceous rock (high silica content) (E-1-268, E-1-280) are the rock types shown by the drill cores.

Chalcopyrite, a minor amount silver white minerals (E-1-175.4) and bornite (E-1-268) are observed in the sections. The chalcopyrite occurs as fine grains disseminated in the rocks and in the quartz veinlets, fine fractures which cut the rocks. The grain size of the chalcopyrite varies from extremely fine to visible grains.

Bornite crystals are partly replaced by the chalcopyrite.

The fine fractures and quartz veinlets appear to be the controlling features for the copper mineralization in the rocks.

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