

NORTHSTAR COPPER MINES LTD. (N.P.L.)

To bring shareholders and prospective shareholders up to date on the Northstar Copper Mines Ltd. sedimentary copper showings, certain work has been completed on the property.

Our Consulting Geologist, Dr. Wm. H. White, recommended that Dr. A.J. Sinclair be employed to prepare geological and plane table maps of the area. This has now been completed. The proposed grid for use in geochemical and geophysical surveys has been cut out.

A two mile trail has been cut open from Kaza Lake to the showings and a campsite is under way. A helicopter pad has been constructed right on the main outcrop and the first diamond drill station prepared.

The strike length of our sedimentary shale bed has been increased considerably by trenching using a percussion drill and blasting.

It is gratifying to know that the bed is still rich in copper across its full 20 ft. width.

A full development program will be instituted as soon as practicable this spring.

Robert M. Tait

On July 13, 1966, guided by Mr. Robert Tait, the writer made a brief examination of copper showings on claims said to be owned or controlled by North Star Explorations, Ltd. The showings are on the southeast end of the Caribou Heart range, a small outlier of the Hogen Ranges, some 90 airline miles north-northeast of Smithers, B. C.

Present access is by air to a small lake near or on the property at elevation 4,000 feet. However, from the head of Takla Lake to the property is only 25 miles across a gently-rolling, timbered terrain that would offer little difficulty to road construction.

According to G.S.C. Map 922A (McConnell Sheet) rocks on the property belong to the Upper Division of the Takla group, probably Lower or Middle Jurassic age, that includes marine sedimentary as well as volcanic rocks. No granitic rocks are shown on the map nor recognized in the vicinity.

Outcrops are scarce on this smooth south and southeast-facing slope of Caribou Heart range. The lower slopes are well timbered and at greater elevation the surface is mantled by heather and upland grasses. Indications are, however, that drift cover is not very thick. Copper mineralization is visible at two places where open cuts have been made. These workings are very shallow and neither reaches fresh rock.

MAIN SHOWING

The main showing, a little below timber-line at about elevation 5200 feet, is at the lower extremity of a crescent-shaped scar of an old landslide. This is a bed about 20 feet thick of siltstone composed of thin alternating dark- and light-coloured layers. The rock is closely jointed and friable but evidently not folded nor metamorphosed. At the only place where its attitude could be measured the bed strikes a few degrees east of north and dips about 60 degrees eastward. The dip of the bed is roughly in the same direction as the more gentle inclination of the surface. The bed is concealed south of the main showing by drift and to the north by landslide debris.

Assuming regular upright structure, the siltstone bed is overlain to the east by light green clastic rock, possibly tuff. It is underlain in stratigraphic succession (exposed along the rim of the landslide scar) by 150 feet of dark-coloured, fine-grained clastic rock, possibly sub-greywacke; next by 200 feet of thick-bedded grey limestone; and finally by at least 100 feet of dark-coloured lava with trachytic texture and prominent plagioclase phenocrysts, provisionally called basalt.

At the main showing the siltstone bed is poorly exposed in a sidehill cut about 30 feet long oriented roughly normal to the strike. Throughout this distance the rock is copper-stained. Most joints carry very thin films of malachite

and hematite, but there is little or no limonite gossan. Copper sulphide minerals in the siltstone are in particles so small as to be almost invisible under a hand lens. However, microscopic examination of a polished specimen revealed the presence of bornite and chalcopyrite in ratio of about 4:1. Grains of highly irregular shape disseminated throughout the fabric of the rock range in size from 100 microns (1/10th mm) down to a few microns. No pyrite or other metallic minerals were observed.

Most of the exposure was too weathered to be sampled. However, a channel sample of reasonably fresh material was taken from the central part of the main showing representing 6 feet true width. This assayed#:

Gold, 0.005 oz/ton; silver, 0.20 oz/ton; and copper, 2.65

Some 200 east of and downhill from the main showing veins up to $\frac{1}{2}$ -inch thick composed of native copper and calcite were found in landslide rubble blocks of basalt. The original position of this material must have been somewhere on the rim of the slide scar in the basalt unit. The native copper is probably supergene.

NORTH SHOWING

Some 1200 feet westerly from the main showing and at an elevation about 200 feet higher a small pit dug in the bank

of a shallow stream exposed rotten, broken, black siltstone or shale that showed some copper stain and, under the lens, a few particles of bornite. A grab sample of this material assayed[#]:

Gold, trace; silver, 0.40 oz/ton; and copper, 1.57%

Rock exposed in the nearby stream bed is a coarse-grained clastic rock, possibly an agglomerate, unlike any of the rock units associated with the main showing. Evidently this showing is separate from and not a repetition of the main showing.

CONCLUSIONS

These showings are the first discovery in B.C. known to the writer of sedimentary copper deposits. The type is well-known elsewhere - for example, the Kupferschiefer that has been mined for centuries at Mansfield, Germany, and the White Pine Mine, Michigan. Under very special conditions copper accumulated to economic grade in ancient marine sediments having great lateral continuity. Though very little is known of the deposits in the Caribou Heart range, they are of sufficient significance to warrant a good deal of study and exploration.

Respectfully submitted,

July 30th, 1966

Wm. H. White, P.Eng.

Assayer: J. R. Williams & Son, Vancouver, B. C.

Recommendations

The mining property of North Star Explorations Ltd., in the Caribou Heart range, Omineca Mining Division, should be actively explored by surface trenching, geological and geochemical surveying, followed as predicated by initial results by diamond drilling. No type of geophysical survey is recommended at this time. A prime necessity for the lay-out of a detailed program of exploration is a geological and topographic map, and this should have top priority. Such Mapping may show that some claims can be dropped and others staked to cover extensions of the mineral deposits more efficiently.

For the balance of this season a four-man crew of good hand miners should be employed for surface trenching. Unless overburden becomes too deep laterally along the sub-crop, trenches should be excavated to fresh rock across the horizon of the main showing at intervals of from 100 to 200 feet. Line-cutting in preparation for a geochemical survey and geological mapping could also be started this year.

Funds amounting to \$100,000 should be made available for this season's and next season's exploration work. Estimated expenditures are tabulated below:

Professional supervision	\$10,000
Line-cutting	5,000
Geochemical Survey	7,000
Trenching and other surface work	15,000
Mapping and surveying	5,000
Diamond drilling	50,000
Camp and overhead	8,000

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CERTIFICATE

This is to certify that:

- (a) I, William H. White, am a resident of Vancouver, B.C., at the above address which is also my office.
- (b) Since 1946 I have been a registered Professional Engineer (Geological) of B.C. and a member in good standing of the Association of Professional Engineers of the Province of British Columbia.
- (c) I hold a B.A.Sc. degree in Mining Engineering and an M.A.Sc. degree in Geological Engineering from the University of British Columbia and a Ph.D. degree in geology from the University of Toronto.
- (d) I have none, nor expect to have any, but professional interest in properties owned or controlled by North Star Explorations, Ltd., nor in the Company.
- (e) I personally examined the showings described in this report on July 13th, 1966, said to be on claims owned or controlled by North Star Explorations, Ltd.; however, I did not confirm location records nor claim ownership.

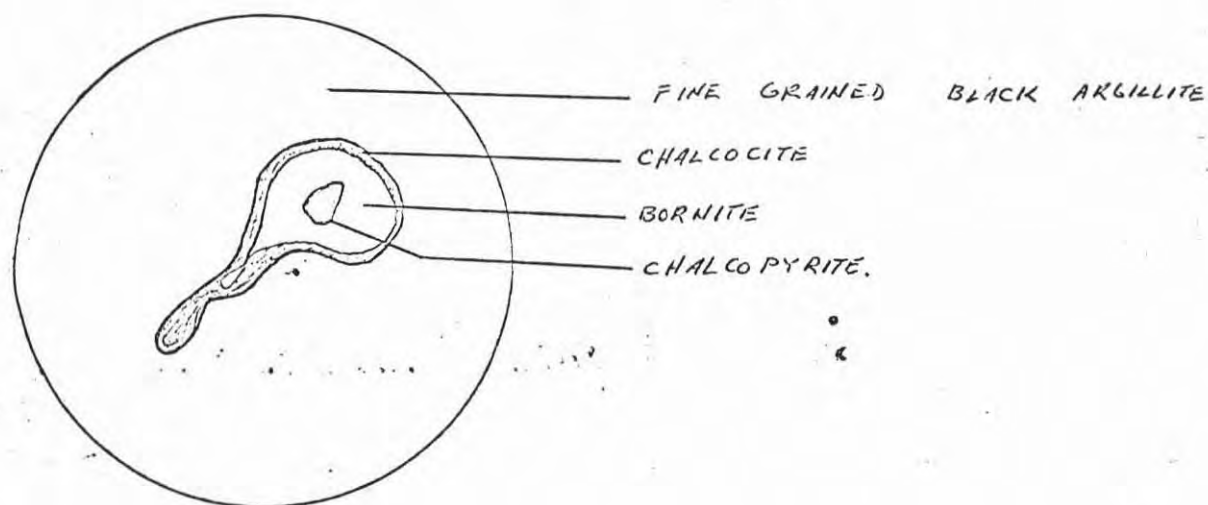
(signed) _____

Wm. H. White, P.Eng.

MINERALIZATION (BORNITE, CHALCOHITE, CHALCOPYRITE & CUPRITE)

OBSERVED, WAS RESTRICTED TO A VERY FINE GRAINED BLACK ARGILLITE LIGHTLY BANDED WITH QUARTZ-RICH SILTSTONE. THE PRIMARY MINERALIZATION IS IN THE ARGILLITE. SECONDARY MINERALIZATION (CUPRITE) APPEARS IN THE QUARTZ RICH SILTSTONE.

SPECIMENS OBSERVED WERE OF HIGHLY FRACTURED AND WEATHERED MATERIAL. A SAMPLE ASSAYING 2.6% COPPER CONSISTED OF A VERY FINE GRAINED BLACK ARGILLITE CONTAINING VERY FINE GRAINED SULPHIDES (NOT VISIBLE TO THE NAKED EYE) IN A FRESH SURFACE, AND A COATING OF CARBONATE STAIN (MALACHITE) ON A WEATHERED SURFACE. UNDER A 200X BINOCULAR MICROSCOPE A SAMPLE SULPHIDE GRAIN APPEARS:



THEORIES TO DATE!

- MINERALIZATION COULD BE SUPERGENE SULPHIDES WITH SECONDARY ENRICHMENTS.
- FRAMBOIDAL TEXTURES OBSERVED WERE SIMILAR TO THOSE CHARACTERISTIC OF MANSFIELD SHALE --- CAN SUPPOSEDLY BE FORMED BY HYDROTHERMAL SOLUTIONS.
- * - PRIMARY MINERALIZATION IN A RELATIVELY UNALTERED BLACK ARGILLITE --- GOOD POSSIBILITY OF SEDIMENTARY DEPOSITS.