2398

94K/6W

GEOCHEMICAL - GEOLOGICAL FIELD REPORT

MUNDEE MINES LTD. SHAW CLAIM GROUP

CHURCHILL COPPER AREA, B.C.

LIARD MINING DISTRICT

SEPTEMBER - OCTOBER 1969

FIELD REPORT BY: David G. Mark, B.Sc.

Electronics Surveys

517 - 602 West Hastings Street, Vancouver, British Columbia, Canada ✡ Telephone 688-4342

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Geotronics Surveys

GEOCHEMICAL AND GEOLOGICAL FIELD REPORT SUBMITTED TO MUNDEE MINES LTD.

SHAW CLAIM GROUP, CHURCHILL COPPER AREA, B.C.

September - October 1969

INTRODUCTION:

Soil sampling and geological mapping were undertaken on the Shaw Claim Group, composed of 34 claims, from September 18 to 22, 1969. The object was to find out if there are any copper showings existing on the property, and if the geology is similar to that of the Churchill Copper Mine.

The claims are located about 105 miles west of Fort Nelson in the Rocky Mountains, in the Liard Mining District, at the confluence of the Magnum and Delano Creeks, which is about three miles south of the Churchill Copper Mine. Access is by the Churchill Copper haulage road which leaves the Alaska Highway at Mile 401 and passes through the northern end of the property about 28 miles from the highway. The author and assistant stayed in an excellent cabin situated about 13 miles from the property, at the bridge crossing of the Racing River.

The topography of the whole area, in general, is extremely rugged. The elevation varies from under 3,000 feet in the broad U-shaped river valleys to over 9,000 feet on the mountain

peaks. The claim group itself is composed largely of Mount Roosevelt. Towards the northern end flows Delano Creek in an easterly direction and on Shaw claim 34, Magnum Creek joins Delano. From the creek and southwards, is talus slide with an incline from 30 to 45°. The talus slide area is interspersed with minor bluffs and extends for about 1500 horizontal feet to the major bluffs. The rock bluffs are cut by draws through which streams flow northerly towards Delano Creek.

The climate of the area could be termed sub-arctic. Temperatures can thus dip to a minimum of -60° in January to a maximum of about 90° F in July. Freeze-up starts approximately mid-October and break-up around April or May. There are thus only four or five months of exploration season, and snow can fall anytime during these months. For the two weeks previous to the 5 days spent on the Shaw group, the weather varied from hot, sunny days (70° temperatures) to rain and snow. For the first 2 of the days it snowed, and for the last 3, the skies were partially clear, though during much of these days clouds hung almost to creek level.

GEOCHEMICAL SURVEY:

1. Survey Procedure

The original plans were to take soil samples every 100 feet along lines following the contour of the mountain for two reasons:

1) steepness, making it difficult taking samples on lines going up the mountain.
2) contouring the mountain side provides less chance of

missing any copper anomalies which would tend to leach downhill from the origin.

However the plan was subsequently abandoned due to shale talus rock and snow. It was then decided to soil sample the bottom of the slide at creek level where soil, in most cases, could be obtained easily and where there was a minimum of snow. Two lines were thus run up the creek, one on each side.

In addition, soil samples were taken previously, north of the creek supposedly on the Ole group owned by Great Northern Petroleums and Mines Ltd. but which are actually on the Shaw 31 - 34 claims. Thus these Shaw claims are overstaked. According to Tom Rolston, staker of the Shaw group, the Shaw claims were staked previous to the Ole group and thus take ownership.

The soil sample lines were chained, compassed and marked with blue flagging tape at each soil sample station. The samples were taken every 100 feet and the sample lines followed the contour of the hill at creek level. In many places, no sample was taken because of talus or outcropping.

The soil samples were dug with a rock-pick, which seemed to be more effective in this area because of the heavy moss and much rock. The type of soil collected was clayish and was probably closer to a C-type than a B.

2. Testing Procedure

The Holman copper field test was used to analyse all the soil samples. It is a simple test, and as long as proper lab

methods are observed, reliable results can be obtained.

The Holman being a field test, the samples do not need to be dried, and silt or soil found in the field is usually fine enough to test without being screened. However, some of the samples were quite rocky and were thus sifted by an 80-mesh screen. A small portion of a fine-grained soil sample is put into a test-tube. A weak acid buffer solution is added and then a chemical indicator. It is well shaken and a color is obtained. If green, the reading is negative; if colorless (the end point) or red, the reading is positive. Measured amounts of indicator are added to a red solution until the end point is reached. The amount of indicator required for this determines the reading, and thus the units are milliliters of indicator. The results are shown in figure 1. A reading of 2 or more is considered positive.

3. Discussion of Results

Many of the samples when being tested effervesced, indicating a high amount of carbonate. This will give an unwanted positive reading and thus must be corrected by adding more buffer solution. There is then a certain amount of error in this, and some of the readings are probably more positive than they should be.

There are a number of groups of anomalous readings on the two lines that parallel the creek. Of particular interest is the one centering around L-2S, 13W since it has high readings. It is quite likely that the source of these positive readings is

copper sulphide. The other anomalous readings indicate that there is copper on the hill above the results, but what kind, and to what extent is completely unknown. The results immediately downstream from Magnum Creek must be discounted because of contamination by leaching from Churchill Copper's ore body. These samples were used only as a test.

It must be remembered that the Holman test is a semi-quantitative one and therefore is more of a copper indicator than a copper measure. If one desires greater accuracy, then the samples should be tested by hot acid extraction which measures the total number of copper ions in the soil. The Holman test measures only those ions of minerals that are easily dissolved.

GEOLOGICAL MAPPING:

The geology of the ore deposits of the Churchill Copper mine, the Davis Keays deposit and the Largo deposit are all similar. The principal sulphide, chalcopyrite, is found in a quartz-calcite vein which in turn is in a country rock of highly contorted argillite. It seems the mineralization is associated with near-vertical basic dykes which are usually 100 feet wide, and strike about northeast-southwest.

The author made several traverses in the area of the Lee, Ole, and Shaw claims. He recognized about eight different rock types which are shown on the geological map (figure 2) and are separated according to time sequence.

The oldest rock recognized was an argillite-shale and is

of the Windermere type according to John R. Vail in his M.Sc. thesis. It is a grey-black rock with alternate light-dark bands of bedding which usually dip about 20° in a southerly direction. It has 3 sets of fractures, with one being parallel to the bedding and the strongest, usually, being approximately perpendicular to the bedding. Sometimes the fractures produce small sharp angular pieces of rock. The strike and dip vary from place to place. There are also found veinlets of calcite, and sometimes quartz, varying in width from 1/10 inch to 1 or 2 inches. This seems to be the same rock type as the host rock for the upper ore deposits in this area. Vail feels this is of the Proterozoic age. The rock is found in outcroppings along the creeks and in the lower elevations of the mountains.

The argillite is cut by near-vertical green basic dykes, designated by rock-unit 2, that generally runs southwest-northeast. By the color, the probable mineral composition is that of andesite. The rock is fine-grained with the fabric of the rock generally becoming coarser in the larger dykes. In the larger dykes also, there is a strong set of fractures parallel to the strike of the dyke and a weaker set perpendicular to it, dipping approximately 75° to the southwest. There are also veinlets of calcite, quartz, and epidote cutting the andesite disconcordantly. Specks of pyrite and the odd speck of chalcopyrite have been seen in the andesite.

It is difficult to say what part of the sequence rock-unit 3 is in because of limited outcropping (west of Shaw group on the

Lee group). It is shale that on appearance is alternate bands of buff and grey colors. The buff bonds, green below the weathered surface, are 3 to 5 feet wide, softer and break in lamellar planes parallel to the bedding. The grey bands, grey-green below the weathered surface, are 1 to 2 feet thick, harder and thus more angular. One set of fractures goes through both bands striking south with vertical dip. A second set is limited to grey bands and strikes S 60 E with a dip of 60° to southwest. The whole bed seems to be approximately 100 feet thick or more.

What is called a red shale, unit 4, varies in color from red to grey and in rock type, from a metamorphosed shale to almost a quartzite. The buff-colored surface is weathered so that very thin ridges stick out, which are usually curved. Calcite and quartz stringers cut perpendicular to the bedding and contain a few specks of pyrite and chalcopyrite. There was also noticed an unidentified purple or wine-red mineral with blocky cleavage and occuring with quartz. The thickness seemed to vary from 100 to about 300 feet.

Rock-units 5 and 6 were deposited in roughly the same time, since up a bluff on Mount Roosevelt there was noticed alternate bands of purple and grey conglomerate. However, they were separated because the purple conglomerate always occurred first and there is a definite contact between the two. The rocks of the purple conglomerate vary in diameter from 1/20 inch to 5 inches and almost all are dark purple. The grey conglomerate has rocks

the same size but generally of a grey or green color. West of Magnum Creek, the purple conglomerate is about 30 feet thick and the grey conglomerate about 15 feet thick. The conglomerate beds, as do rock-units 4, 7, and 8 in this locality, dip approximately 20° to S 40 E.

Above this, in same location, is 30 feet of a green quartzite, some of it with purple bands going through it.

Rock-unit 8 is a buff weathered grey-black shale at least 100 feet thick. It does not have any cleavage or fractures.

Many of the rock units mentioned above are not shown on the Shaw Group, but nevertheless were noticed on the Mount Roosevelt bluffs.

The outwash of most of the streams coming off Mount Roosevelt contained many reddish purple rocks, most of which were sandstones and conglomerates. Copper float was found in the outwash of the stream on the east end of the property but is probably of no consequence. It was a rounded shale rock with small veinlets of chalcocite (or perhaps tetrahedrite) in it. The surface was stained with malachite.

RECOMMENDATIONS:

Because of snow, only a limited amount of work could be done on the property. Thus the following recommendations are given for follow-up when the weather permits:

1) Run a few more soil sample lines contouring the side of

the mountain at higher elevations.

2) An e.m. should pick up the massive copper mineralization found in this country. It is thus thought that an e.m. survey would be quite useful. Lines should be run from the creek and uphill to the bottom of the bluffs.

3) A prospector should be put on the property for thorough examination of the geology.

Respectfully submitted,

David Mark, B.Sc.
Geophysicist

BIBLIOGRAPHY

MENZIES, M. M. (1951) Geology and Mineralogy of the Strangward Copper Property, South Tetsa River, B. C.
University of British Columbia, M. A. Sc. thesis.

VAIL, John R. (1957) Geology of the Racing River Area, B. C.
University of British Columbia, M. Sc. thesis.

WILLIAMS, M. Y. (1944)" Geology Along the Alaska Highway, Fort Nelson to Watson Lake".
Geological Survey of Canada, paper 44.28

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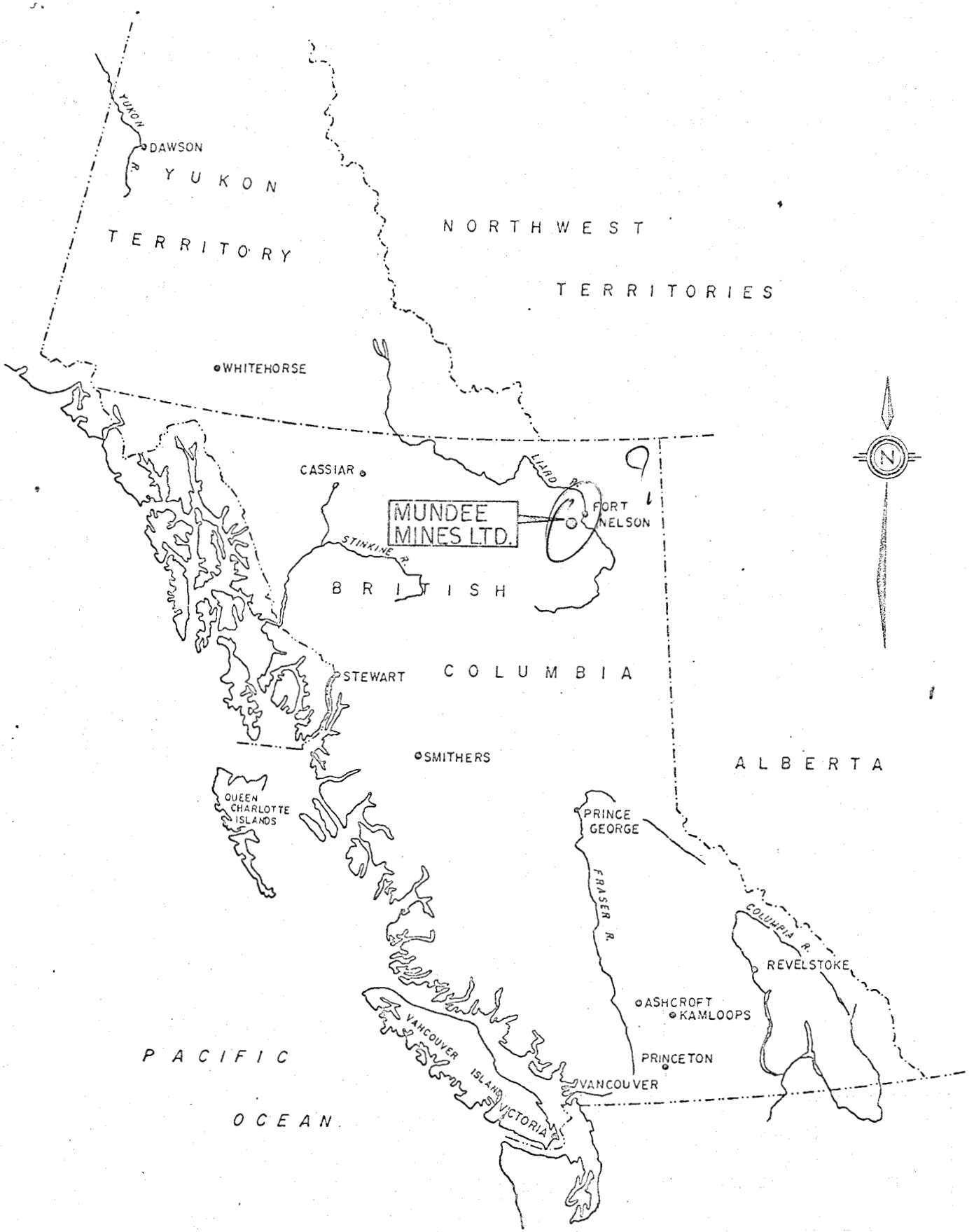
RESUME OF TECHNICAL AND FIELD EXPERIENCE OF DAVID MARK, B.SC.

EDUCATION :

Graduate of University of British Columbia in Science (B.Sc.) in Geophysics.

EXPERIENCE IN INDUSTRY

1. Prospecting and geological evaluation for New Taku Mines Ltd. during exploration season of 1965.
2. Field supervisor for geophysical and geochemical work and prospecting for Mastadon - Highland Bell Mines Ltd. during exploration season of 1966.
3. Field supervisor in geochemical work and geological mapping for Anaconda (Can.) Company during exploration season of 1967.
4. Field geophysicist for Geo-X Surveys Ltd. during exploration season of 1968.
5. Presently geophysicist for Geotronics Surveys Ltd., Vancouver, B.C.
6. Experience in various geophysical instrument surveys; magnetometer, electromagnetic, self potential, gravity, induced polarization, restivity and seismic methods.
7. Member of British Columbia Geophysical Society.
8. P. Eng. applied for with Association of Professional Engineers of B.C.



E.P. SHEPPARD & ASSOCIATES LTD.

MUNDEE MINES LTD.

LOCATION MAP

SCALE: 1"=150 MILES

E. P. SHEPPARD & ASSOCIATES LTD.
CONSULTING GEOLOGISTS
314-402 WEST PENDER STREET,
VANCOUVER 3, B.C.

May 7, 1970

Mr. Tom Rolston
Geotronics Surveys
517-602 W. Hastings Street
Vancouver, B. C.

Dear Mr. Rolston:

At your request I have reviewed the references cited below and examined the report prepared by employees of your Company,"Geochemical-Geological Field Report, Mundee Mines Ltd., Shaw Claim Group, Churchill Copper Area, B.C."

The 34-claim group is located about 105 west of Fort Nelson in the Rocky Mountains, at the confluence of Magnum and Delano Creek, which is approximately 3 miles south of the Churchill Copper Mine. Access is by the Churchill Copper haulage road which leaves the Alaska Highway at Mile 104 and passes through the north part of the claims 28 miles from the highway. The topography is rugged and elevation varies from less than 3000 feet in the broad U-shaped river valleys to over 9000 feet on the mountain peaks.

Geology. The area is underlain by Windermere type grey-black argillite shale, cut by near-vertical green basic dykes trending southwest-northeast. The series exhibits 3 sets of fracturing. The principal deposits of the area - Churchill Copper, Davis-Keays, Largo Mines - are vein deposits containing chiefly chalcopyrite in quartz-calcite veins. They are associated with basic dykes over 100 feet in width, striking SW-NE which is the direction of one set of fracturing.

Geochemical Survey. The survey was laid out to follow the contours of the mountain side with sampling at 100'

intervals. However, contouring was subsequently abandoned owing to shale talus, rock and snow. It was decided to sample the bottom of the slide where soil was obtainable and snow did not hamper operations.

There are a number of groups of anomalous readings on the two lines that parallel the creek. The anomaly of particular interest centers on L-2S, 13W. The other anomalies indicate that there is copper on the hill above the results. The results downstream must be discounted as contamination from leaching of Churchill Copper's orebody.

It is felt that several additional soil sample lines should be run, contouring the mountain side at higher elevations. An electromagnetic survey should be carried out across the anomalous areas, followed by careful prospecting of the areas outlined by the soil sampling and the claim group in general.

The Geochemical-Geological report and maps submitted by your Company show careful preparation and professional presentation. I am satisfied that the field work performed was of the same high quality as that carried out on assignments where your crews were under my direct supervision.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA E. P. SHEPPARD

E. P. Sheppard

E. Percy Sheppard, P. Eng.
Consulting Geologist

REFERENCES:

Menzies, M.M., Geology & Mineralogy of the Strangward Copper Property, South Tetsa River, B.C.

Vail, J. R., Geology of the Racing River Area, B.C.

Williams, M.Y., Geology Along the Alaska Highway, Ft. Nelson to Watson Lake. G.S.C.,Paper 44.28

* * *

S:d

GREAT NORTHERN
PETROLEUMS AND MINES LTD.

OLE GROUP

CHURCHILL COPPER approx. 3 miles

Magnum Creek

LEE GROUP

CHURCHILL COPPER mill and townsite approx. 7.5 miles

Delano Creek

Copper float

31

32

33

34

2

1

12

11

22

21

14

13

3

4

23

24

SHAW CLAIM GROUP

15

16

5

6

25

26

7

8

Delano Creek

LEE GROUP

GREAT NORTHERN
PETROLEUMS AND MINES LTD.

N

LEGEND

- soil sample lines
- rock outcropping with contact line
- rock bluff
- road
- 25 attitude of dikes and sedimentary beds
- creek
- 8 light grey shale
- 7 green quartzite
- 6 grey conglomerate
- 5 red-purple conglomerate
- 4 red shale
- 3 shale - alternating bands of green and grey
- 2 andesite dike
- 1 grey - black shale/argillite

MUNDEE MINES LTD.

SHAW CLAIM GROUP

CHURCHILL COPPER AREA, LIARD M.D.

GEOLOGICAL MAP
type of survey

scale	date	job no.	sheet no.	drawn by
1" = 400'	Sept. 1969	69-43	2	J E W

Geotronics Surveys Ltd.
Geophysical Surveys, Ground & Airborne
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GREAT NORTHERN

PETROLEUMS AND MINES LTD.

OLE GROUP

CHURCHILL COPPER APPROX. 3 miles

MAGNUM CREEK

LEE GROUP

LEE GROUP

GREAT NORTHERN PETROLEUMS AND MINES LTD.

DELANO CREEK

SHAW 31

SHAW 32

SHAW 33

SHAW 34

L-5S

L-8S

L-8S

L-12S

L-C

L-2S

L-4S

CHURCHILL COPPER MILL AND TOWNSITE APPROX. 7.5 miles

DELANO CREEK

SHAW 1

SHAW 2

SHAW 12

SHAW 11

W.P.

Baseline

SHAW 21

SHAW 22

SHAW 13

SHAW 14

SHAW 3

SHAW 4

W.P.

L0-15S

L4W-15S

W.P.

SHAW 23

SHAW 24

SHAW 15

SHAW 16

SHAW 5

SHAW 6

SHAW 25

SHAW 26

SHAW 17

SHAW 18

SHAW 7

SHAW 8

SHAW 27

SHAW 28

SHAW 19

SHAW 20

SHAW 9

SHAW 10

SHAW 29

SHAW 30

N

30°

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 2398 MAP #3

LEGEND

- rock bluff
- road
- creek
- claim post
- assumed location of claim post
- W.P. witness posts
- anomalous areas

2398

E. P. SHEPPARD PROFESSIONAL ENGINEER BRITISH COLUMBIA

MUNDEE MINES LTD.

SHAW CLAIM GROUP

CHURCHILL COPPER AREA, LIARD M.D.

type of survey: Geochemical - soil sampling - results are semiquantitative values from Holman Cu test.

scale	date	job no.	sheet no.	drawn by
1"= 400'	Sept 1969	69-43	1	DBM

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