

682

Geological Report
on the
O. P. Group
Liard Mining Division
Province of British Columbia

Claim numbers 1 - 15 inclusive

Record numbers 15348 - 15362

Location: 131° 37' 14" W. Long. 57° 10' 57" N. Lat.

Mapping by R. Hindson, Geology student Carleton University

Supervision by G. R. Kent, M. Sc., F. G. A. C

Ownership: FCE Explorations Limited

Date: July 4 - 8th inclusive, 1965

R. Hindson,
Sept 29th, 1965

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~~#~~ MAP - Geology of the O. P. Group

CERTIFICATE

I George Robert Kent, hereby certify:

1. That I am a geologist and reside at 22 St. Dennis Drive, Apt. 12, Toronto, Ontario.
2. That I am a fellow of the Geological Association of Canada.
3. That I graduated from Saint Francis Xavier University Antigonish, N. S. in 1956 with the degree of Bachelor of Science, and from Dalhousie University in 1962 with the degree of Master of Science in geology.
4. That I have been engaged in geological work continuously for 13 years and that three years of this experience has been in the Province of British Columbia.
5. I am employed as a geologist by Watts, Griffis and McQuat Limited, Toronto, Ontario and that I have been in their employ since September, 1962.

George R. Kent, M. Sc.

GEOLOGY

The claims are underlain almost entirely by Mesozoic sedimentary rocks consisting mainly of limestones, greywacke, and quartzite which trend in a north to northwesterly direction. They are intersected by a strong northwesterly trending vertical fault which appears to have an unknown dextral displacement. A pronounced topographic linear suggests that the fault has regional proportions and is probably the same one which occurs on the east side of Galore Creek.

Thin bands of hard baked hornfels occur intermittently along the fault and some thin highly weathered volcanics strike easterly and are dragged to some extent along the fault.

Old trenches and pits revealed some pyrite and pyrrhotite mineralization occurring in gossanized and weathered volcanics near the southeast and southwest boundaries of the claim group.

GEOCHEMISTRY

A few stream silt samples and some soil samples were taken on the eastern claims and have been plotted on the enclosed plan. Laboratory checks are not presently available on all the samples but those that are complete confirm the initial field tests. A number of anomalous highs are due to pyrite, pyrrhotite mineralization associated with minor chalcopyrite in volcanics.

O. P. GROUP

SUMMARY AND CONCLUSION

The O. P. Group of 15 full size mineral claims does not show evidence of significant igneous activity. The rocks are mainly fresh looking except where slightly altered and mineralized with iron sulphides. A strong north-westerly trending vertical fault extends from the easternmost claims across Galore Creek to the southeast, and for an unknown distance in the other direction. The claims appear to be completely underlain with sediments which have been slightly metamorphosed.

Much of the group is covered with névé and many of the slopes are precipitous and impassable.

RECOMMENDATIONS

It is recommended that work credits be filed for assessment purposes and as many claims as possible should be retained pending further development in the general area.

LOCATION

The O. P. Group of 15 mineral claims is located about one and one half miles north of the center of the Stikine Copper deposit and is southwest of the confluence of Galore Creek and the Scud River. Relief varies from 2,000 - 5,000 feet.

Dated at Toronto,
Ontario Sept 28, 1965.

Respectfully submitted by

R. Hindson
R. Hindson. *RH*

George R. Kent
George R. Kent, M. Sc.F.G.A.C.

APPENDIX

1. FIELD GEOCHEM. METHOD - COPPER
2. LABORATORY METHODS - COPPER
3. LABORATORY METHODS - MOLYBDENUM

FIELD TEST FOR GOLD EXTRACTABLE COPPER (CxCu)

15521
METHOD "A" - BENZENE AND HEXANE AS SOLVENTS

A. Preparation of Dithizone Stock Solution (0.01%)

Place one dithizone strip in a one litre polyethylene bottle and add 100 mls. of Benzene measured by means of the polyethylene graduated cylinder. Stopper bottle and shake for about three minutes until all the dithizone has been dissolved from the strip. Store the solution in a clean thermos flask in the coolest place possible.

Prepare fresh solutions once a week.

B. Preparation of Field Strength Dithizone Solution (0.001%)

Measure 25 mls. of the STOCK solution (prepared as above) into a graduated cylinder and then add Hexane up to the 250 ml. mark. Pour into a wash bottle for field use. Prepare daily, as required. Reject dithizone solutions when a fading or yellowing of colour is noted.

C. Test Procedure (Use the top of liquid surfaces (meniscus) in measuring out volumes.)

1. Pelletise a sample of fresh soil and eject pellet into test-tube.
2. Add 5 mls. of buffer - to first graduation mark on the tube.
3. Add 1 ml. of FIELD STRENGTH dithizone solution - to second graduation mark on the tube.
4. Stopper tube and shake vigorously for 15 seconds.
5. Allow the dithizone and aqueous phases to separate out completely and then observe the colour of the floating dithizone layer. If still green or blue-grey, record test results as 1.
6. If the colour is purple or pink, add another 1 ml. increment of the dithizone solution - to third mark on the tube.
7. Stopper and shake tube for 5 seconds. If the floating layer is now green, record result as 2.

8. If colour of floating layer is still purple or pink, repeat the procedure of adding 1 ml. increments of dithizone and shaking for 5 seconds after each addition, until a blue-grey or green end-point is obtained. Record the total number of millilitres of dithizone added including the first 1 ml. addition.

The test-tube is graduated at 5, 6, 7, 10 and 15 mls. so that for an obviously high anomaly, the test procedure can be speeded up by adding dithizone in larger increments in step 8, viz: 3 millilitres (to the 10 ml. mark) and then 5 mls. (to the 15 ml. mark) if the end point has not yet been reached.

9. It is preferable in detailed surveys, to record the actual number of mls. of dithizone added as a measure of the cold extractable copper present. In general reconnaissance a coarse division of the results can be made to conform to the TEM classification, viz:

<u>Total mls of Dithizone</u>	<u>Classification</u>
1	Background
2	Low Anomaly
5	Medium Anomaly
10	High Anomaly
10	Peak Anomaly.

The objection to this is that actual background may be higher in some areas than the general classification would indicate and I think it is preferable to record the results as 1, 2, 3, etc. until the true background has been established.

D. Equipment and Reagents

- 2 Polyethylene 1 litre bottles
- 2 Stoppered pyrex test-tubes graduated at 5, 6, 7, 10 and 15 mls.
- 2 Pelletisers for dispensing 1/10 gm. of fine silt or soil.
- 2 250 ml.-wash bottles, one graduated at 200 mls. Used for dispensing Buffer and Dithizone.
- 1 Field Pack to accommodate the above equipment. 3
- 1 Polyethylene Graduated Cylinder, 250 ml. capacity, graduated in 5 ml. divisions.
- 4 Litres CuCa Buffer 3 litres
- 4 Litres Hexane ✓
- 1 Litre Benzene ✓
- 20 Dithizone Strips ✓
- Soil Sample Bags, Laboratory Report Forms, Work Orders
- 1 Thermos Flask ✓

NOTES

1. Benzene and Hexane are highly volatile and flammable solvents. They may be unacceptable for transport by air, especially at high altitude flying. In this case Xylene will have to be substituted for both solvents but the test will be four times slower and the procedure will have to be adapted to Method "B" below.
2. Benzene and hexane may be purchased locally in Vancouver and perhaps elsewhere. The reagents must be of highest purity and certified free of aromatic hydrocarbons. British Drug Houses supply acceptable grades.
3. As a rough guide, a test result of 2 is approximately equivalent to 10 ppm of free extractable copper in the soil, with the given dithizone strength.

METHOD "B"

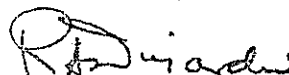
This is similar to Method "A" except that Xylene replaces Benzene and Hexane and this modifies the shaking times involved.

Thus in Step 4 of the procedure shake for 2 minutes instead of 15 seconds.

In Step 8 and all subsequent dithizone additions, shake for 30 seconds instead of 5 seconds.

Apart from making the test of longer duration, the extra shaking time increases the bleaching effect that organic matter has on the dithizone layers. A large proportion of organic matter may interfere to such an extent that low anomalies may be completely masked by the interference which produces watery green or yellow colours completely unrelated to copper content. Avoid high organic material if possible.

RAD:ph
30th December, 1963.
Toronto, Ontario.


R. A. Dujardin

January 17th, 1964.

TO: ALL TECHNICAL PERSONNEL

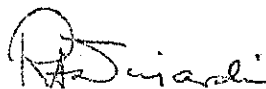
FR: R. A. Dujardin

ADDENDUM TO COLD EXTRACTABLE COPPER TEST INSTRUCTIONS

The question has been raised as to the "shaking time" involved in the CxCu test where benzene alone is used as the solvent (see previous circular dated December 30th, 1963), and not a hexane-benzene mixture.

In this case, the shaking time is 2 minutes for the first addition of dithizone and 30 seconds for each subsequent addition as in the method given for the case where xylene alone is used (Method B, page 3).

Please attach this addendum to the previous memorandum or add a note to the effect in the instructions that Method 'B' (longer shaking time) applies to benzene as well.



R. A. Dujardin

Determination of Copper with 2,2'-diquinolyl
in Soil and Sediment Samples

Abbreviated Operating Instructions

Procedure:

1. Weigh 0.1 g. of sieved sample into a Pyrex test tube (16 x 150 mm.).
2. Mix with 0.5 g. of potassium bisulphate and fuse.
3. Leach with 5 ml. of 1M-hydrochloric acid.
4. Add 5 ml. of water and mix.
5. Pipette a 2 ml. aliquot into 10 ml. of buffer solution contained in an 18 x 180 mm. test tube, previously calibrated at 10 and 12 ml.
6. Add 2 ml. of 0.02% 2,2'-diquinolyl solution.
7. Cork the tube and shake vigorously for 30 sec.
8. Compare with standards.
9. If above the top standard, add another 2 ml. of diquinolyl solution and shake for a further 30 sec.
10. If still above the top standard, repeat with a sample aliquot of 0.1 ml. and dilute to 12 ml. with 0.5M-hydrochloric acid at stage 5.

Copper in p.p.m. = $50 \times \frac{(\text{pg. of copper in matching standard}) \times (\text{ml. of solvent phase})}{(\text{ml. of sample aliquot})}$

(ml. of sample aliquot)

Standards:

To twenty test tubes, calibrated at 10 and 12 ml., and each containing 10 ml. of buffer solution, add respectively 0, 0.2, 0.4, 0.6, 0.8, 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10, 12, 14, 16, 18 and 20 $\mu\text{g.}$ of copper. Dilute to 12 ml. with 0.5M-hydrochloric acid, add 2 ml. of diquinolyl solution, cork the tube and shake vigorously for 30 sec.

Reagents:

1. Potassium bisulphate: fused, powder.
2. 1M-hydrochloric acid: mix 40 ml. of acid (sp. gr. 1.18) with 400 ml. of water.

b.

3. 0.5M-hydrochloric acid: mix 20 ml. of acid (sp.gr. 1.18) with 420 ml. of water.
4. 0.02% 2,2'-diquinolyl solution: dissolve 40 mg. in 200 ml. of amyl alcohol.
5. 0.01% dithizone: dissolve 40 mg. in 400 ml. of carbon tetrachloride and store in a vacuum flask.
6. Buffer solution: dissolve 200 g. of sodium acetate (trihydrate), 100 g. of potassium sodium tartrate (tetrahydrate) and 20 g. of hydroxylamine hydrochloride in water, and dilute to one litre. Extract with 0.01% dithizone until free from copper and then remove the excess of dithizone by extraction with carbon tetrachloride.
7. Standard copper solutions: 100 µg. of copper per ml.- dissolve 200 mg. of cupric sulphate (pentahydrate) in 0.5M-hydrochloric acid and dilute to 500 ml. with this acid.
10 µg. of copper per ml.- dilute 10 ml. of the 100 µg. per ml. solution to 100 ml. with 0.5M-hydrochloric acid.
1 µg. of copper per ml.- dilute 10 ml. of the 10 µg. per ml. solution to 100 ml. with 0.5M-hydrochloric acid.

Remarks:

1. The range covered is 5 - 2000 p.p.m. with an aliquot of 2 ml. and 1000 - 20,000 p.p.m. with an aliquot of 0.1 ml.
2. Results may be obtained within $\pm 25\%$ at the 95% confidence level over the range 5 - 20,000 p.p.m.
3. 100 samples can be analysed per man-day of 8 hours.
4. The buffer solution should be at pH 6.05 ± 0.15 and the optimum pH range for the final aqueous phase is 4.0 - 9.0.
5. For further information see H. Almond, U.S. Geol. Surv. Bull. 1036-A, 1955.

Geochemical Prospecting Research Centre,
Department of Mining Geology,
Royal School of Mines,
Imperial College,
London, S.W. 7.

July, 1962.

Determination of molybdenum in soil, sediment and rock samples

Abbreviated Operating Instructions

Procedure:

1. Weigh 0.25 g. of sieved sample into a nickel crucible (15 ml.) containing 1.25 g. of fusion mixture.
2. Mix the sample and flux, and fuse until frothing has ceased.
3. Allow the melt to cool, add approx. 2 ml. of water and leave overnight.
4. Transfer to a calibrated test tube and adjust to 5 ml. with water washings from the crucible.
5. Bring to the boil and ensure that the melt has completely broken up.
6. Mix thoroughly then allow to cool and settle.
7. Pipette a 2 ml. aliquot of the clear solution into 2 ml. of 2.5% hydroxylamine hydrochloride solution contained in a 16 x 150 mm. test tube previously calibrated at 2 ml.
8. Shake the tube to liberate carbon dioxide and leave to cool below 30°C.
9. Add 0.5 ml. of 1% dithiol solution.
10. Shake gently at frequent intervals over a period of 20 min.
11. Compare with standards.
Molybdenum in p.p.m. = 10 x μg . of molybdenum in matching standard.

Standards:

To twelve test tubes containing 2 ml. of 2.5% hydroxylamine hydrochloride, add respectively 0, 0.2, 0.4, 0.6, 0.8, 1.0, 2.0, 3.0, 4.0, 5.0, 7.0 and 10.0 μg of molybdenum. Dilute to 4 ml. with water and add 0.5 ml. of 1% dithiol solution. Shake gently at frequent intervals over a period of 20 min.

Reagents:

1. Fusion mixture: Mix thoroughly 500 g. of anhydrous sodium carbonate (A.R.), 400 g. of sodium chloride (A.R.) and 100 g. of potassium nitrate (A.R.)
2. 2.5% hydroxylamine hydrochloride: dissolve 25 g. of hydroxylamine hydrochloride in 900 ml. of concentrated hydrochloric acid (sp. gr. 1.18) and dilute to 1 litre with water.

b.

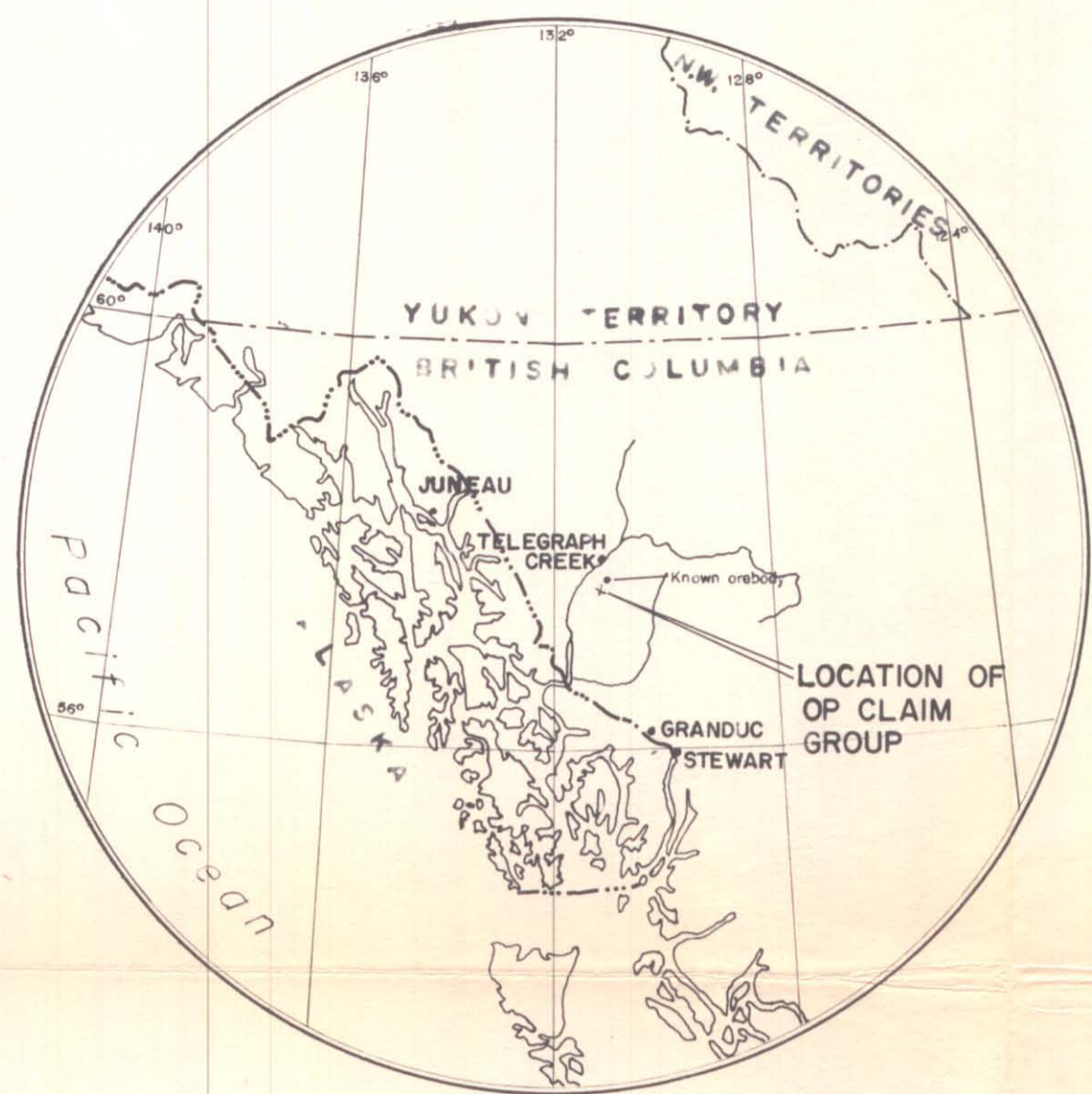
3. 1% dithiol solution: weigh 0.5 g. of zinc dithiol into a 50 ml. stoppered cylinder, add 1 ml. of hydrochloric acid (sp. gr. 1.18) and shake for 10 sec. Dilute to 50 ml. with amyl acetate and mix well.
4. Standard molybdenum solutions: 100 μ g. of molybdenum per ml. - dissolve 125 mg. of sodium molybdate (di-hydrate) in water and dilute to 500 ml.
10 μ g. of molybdenum per ml. - dilute 10 ml. of the 100 μ g. per ml. solution to 100 ml. with water.
1 μ g. of molybdenum per ml. - dilute 10 ml. of the 10 μ g. per ml. solution to 100 ml. with water.

Remarks:

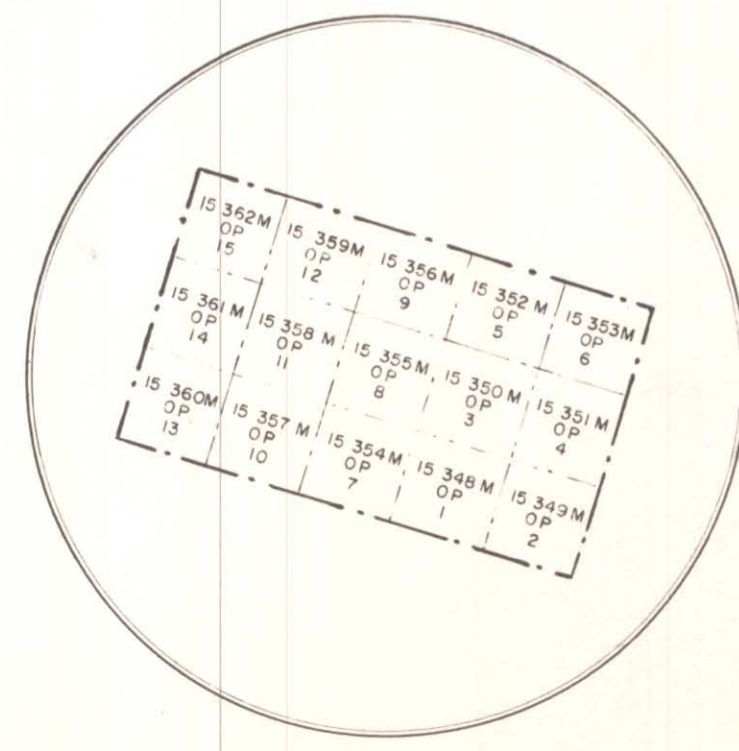
1. The range covered is 1-100 p.p.m. as described above, but this may be extended to 2000 p.p.m. by using an aliquot of 0.1 ml.
2. Results may be obtained within $\pm 40\%$ at the 95% confidence level over the range 1-2000 p.p.m.
3. 60 samples can be analysed per man-day of 8 hours.
4. See A.A. North, *Analyst*, 1956, 81, 660-668 for further information.

Geochemical Prospecting Research Centre,
Department of Mining Geology,
Royal School of Mines,
Imperial College of Science & Technology,
London, S.W. 7.

July, 1962.

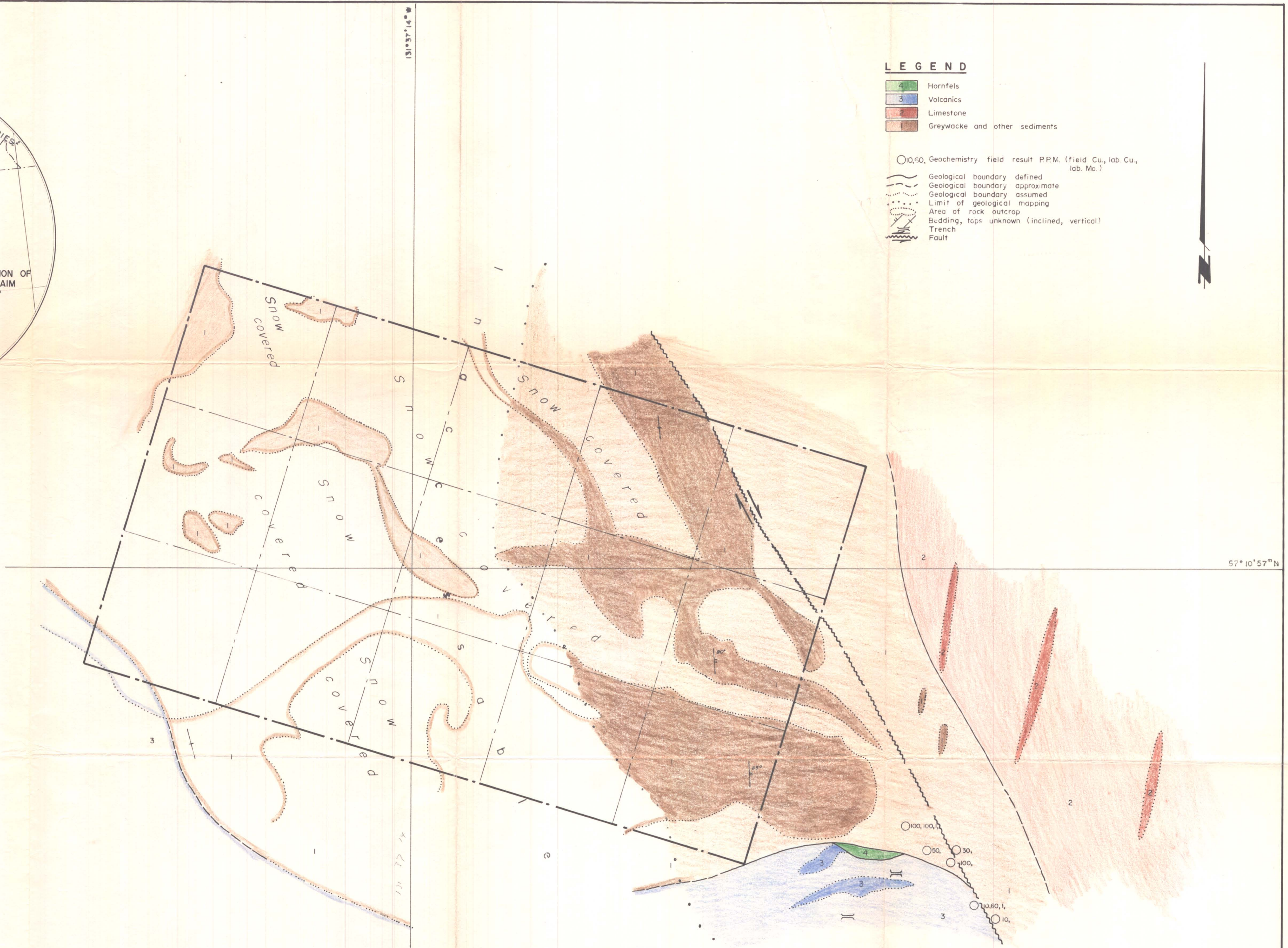


LOCATION MAP
Miles 100 75 50 25 0 100 Miles



KEY MAP

Feet 3000 0 3000 Feet



- LEGEND**
- 1 Hornfels
 - 3 Volcanics
 - 2 Limestone
 - 4 Greywacke and other sediments
- 10,60, Geochemistry field result P.P.M. (field Cu, lab. Cu, lab. Mo.)
- Geological boundary defined
 - - - Geological boundary approximate
 - · · Geological boundary assumed
 - · · Limit of geological mapping
 - · · Area of rock outcrop
 - Bedding, tops unknown (inclined, vertical)
 - Trench
 - Fault

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 682 MAP #1

WATTS, GRIFFIS & McQUAT LIMITED
P.C.E. EXPLORATIONS LIMITED — CANADIAN SUPERIOR EXPLORATIONS LIMITED
— COAST ARC PROJECT —
GEOLOGY OF THE "OP" CLAIM GROUP
LIARD MINING DIVISION
Stikine River Area B.C.

682
(MI)

Feet 0 500 1000 1500 3000 Feet

SEPTEMBER 1965.

To accompany geological report by R. Hindson geology student, on the OP group Southwest of the junction of Galore Creek and Scud River area, B.C. Dated September 1965.
Supervised by G. H. Kent M.Sc. P.S.A.C.