

GEOLOGY AND GEOCHEMISTRY
OF THE
CO CLAIM GROUP



Claim Sheet 105B/12W

Lat. : 60° 34'N

Long. : 131° 50'W

Claims:

CO 1 - 36



Watson Lake Mining District
Yukon Territory

by:

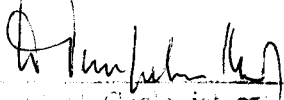
Eric James Sacks, M.Sc.

090 635

Work Completed July 7 and 22, 1979.

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of

\$ 3500



~~Assistant Geologist or~~
Resident Mining Engineer

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

Commissioner of Yukon Territory

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SUMMARY

The CO 1-36 Mineral Claims are located at 131° 50'W, 60° 34'N within NTS map sheet 105B/12W, approximately 40 mi. (65 km) north of the Alaska Highway in southern Yukon Territory.

The claims were staked on June 15, 1979, to cover the stream sediment and water U - Cu - Mo - F anomaly in Eagle Nest Creek which was discovered by the G.S.C. - U.R.P. survey of the area in 1978.

Subsequent work by Canadian Oxy personnel on July 22, 1979, indicates the claims to be underlain by Devonian-Mississippian quartzite cut by plagioclase porphyry andesite dykes and quartz veins. Sampling of Eagle Nest Creek did not replicate the G.S.C. stream sediment results however, it did replicate water results. Anomalous contents of U (2.8 ppb) and F (210 ppb) in stream waters correlate with anomalous specific conductivity and high pH.

Soil sampling revealed a 2000 ft. (610m) long, N-S trending U-Mo-Cu anomaly in the SW corner of the claim group with up to 47 ppm U, 5 ppm Mo and 22 ppm Cu. Several other single station U, Cu, Mo and Ag anomalies and high background Zn contents were found.

Potential economic mineralization on the CO Claims is likely to be skarn related. Systematic soil sampling and radiometric surveys and fill-in stream sampling are recommended.

I. INTRODUCTION

The CO 1-36 Mineral Claims were staked on June 15, 1979, to cover the headwaters of a U-Cu-Mo-F stream sediment - water anomaly discovered during the 1978 G.S.C. - U.R.P. survey of the Wolf Lake (NTS 105B) map sheet. On July 22, 1979, stream sediment - water and soil samples were collected by Canadian Oxy to test the anomaly. This report presents the results of that survey.

II. LOCATION AND ACCESS

The CO Claims are located within NTS map sheet 105B/12W (Wolf Lake) at approximately $131^{\circ} 50'W$, $60^{\circ} 34'N$. The claims lie along the southern side of Eagle Nest Creek approximately 4.5 mi (7.2 km) west of the south end of Wolf Lake and 40 miles (65 km) north of the Alaska Highway. (Figure 1) The claim group comprises 36 claims covering an area of 3 mi^2 (7.8 km^2) within the Watson Lake Mining District, Yukon Territory. (Figure 2).

Access to the claims is via helicopter, approximately 20 minutes from the Alaska Highway. Wolf Lake which is large enough to support fixed-wing, float equipped aircraft is approximately 5 minutes from the claims by helicopter.

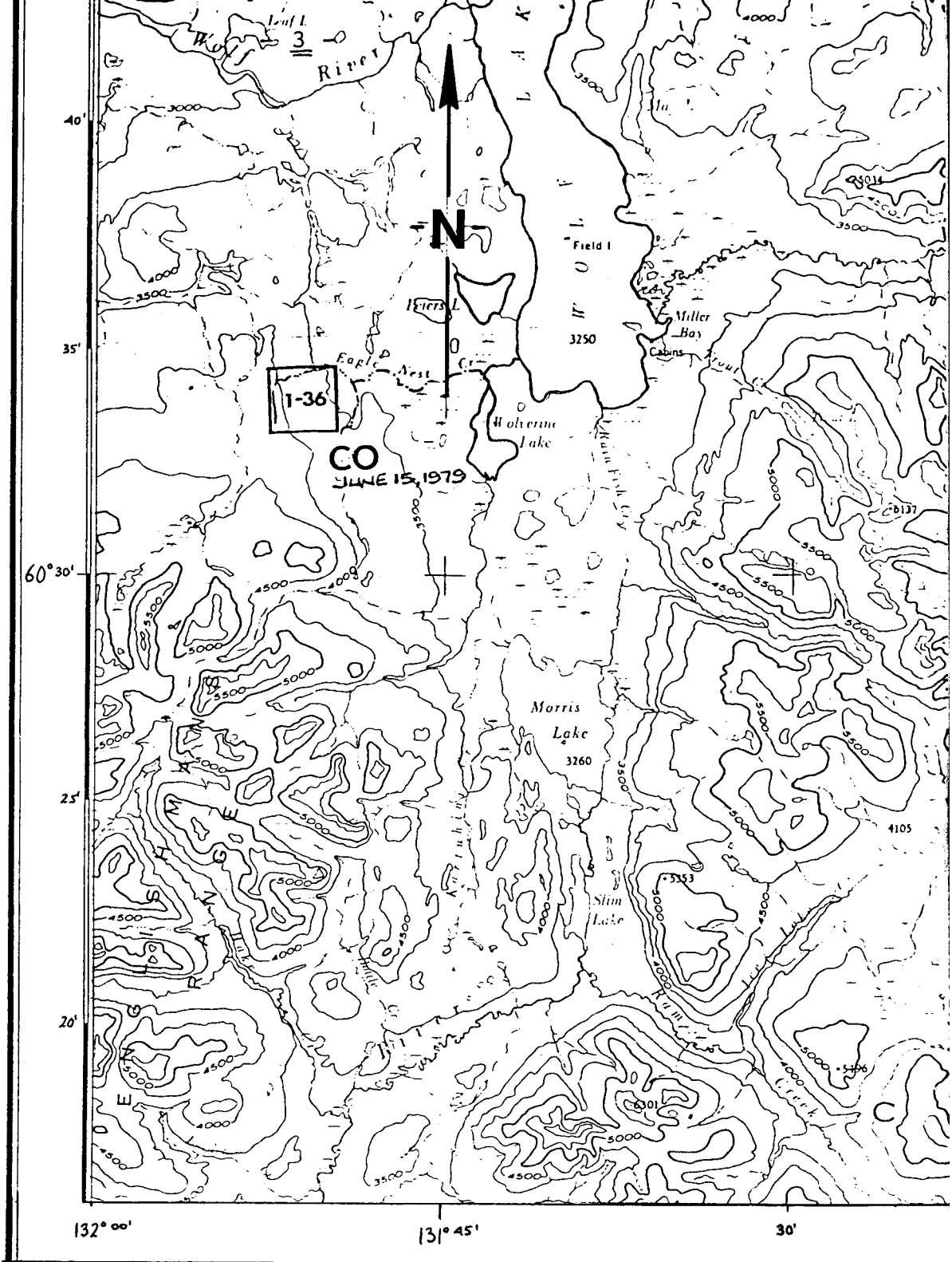


FIGURE 1
LOCATION AND ACCESS OF CO CLAIMS
NTS 105B/12W
Scale: 1"=4mi (1:250,000)

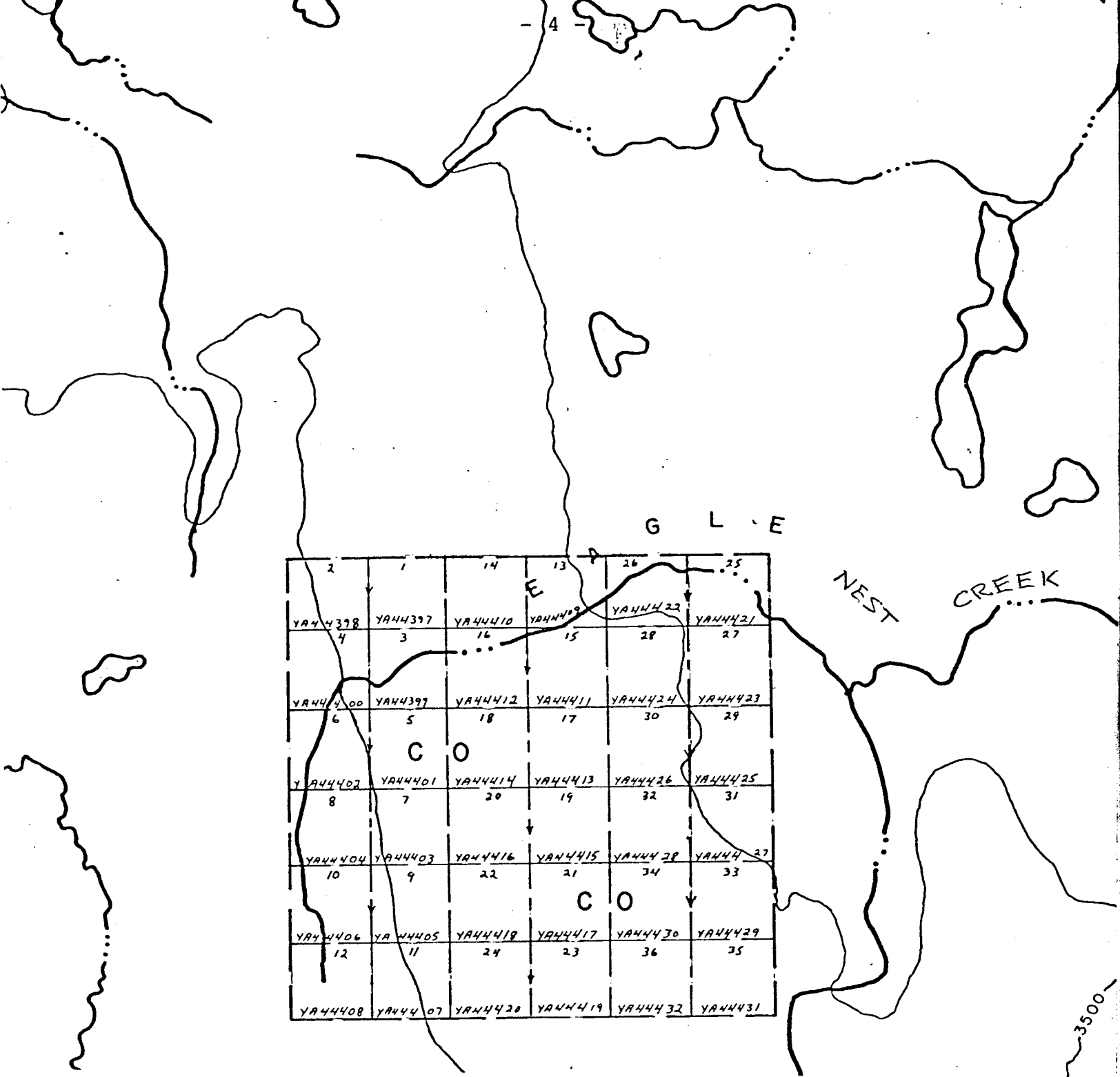


FIGURE 2
STAKING SKETCH SHOWING CO 1-36 MINERAL CLAIMS

NTS 105B/12W

Scale: 1" = 2640'

III. PHYSIOGRAPHY AND VEGETATION

Relief over the CO Claims is approximately 500 ft (150 m). The entire claim group lies on a very gentle plateau entirely below the tree line. Eagle Nest Creek traverses the western and northern parts of the claim group.

Vegetation consists of moderate conifer growth with thick, tangled underbrush.

Topography presents no obstacle to systematic work on the CO Claims.

IV. PREVIOUS WORK

To the author's knowledge, the CO Claims have not been previously examined. No evidence of previous work was found.

The Wolf Lake map sheet was geologically mapped by Poole et al (1960) at a scale of 1" = 4 mi (1:250,000) during the period 1951 to 1959.

The G.S.C. conducted a stream sediment sampling survey over the entire Wolf Lake sheet during the summer of 1978. Data was released on June 15, 1979, and the CO Claims staked the same day to cover moderate U-Mo-Cu stream sediment and F water anomalies (68.6 ppm U, 5 ppm Mo, 96 ppm Cu, 360 + 450 ppb F) in Eagle Nest Creek. The area is underlain by Devonian to Mississippian meta-sediments comprising chert, hornfels marble, skarn and tremolitic marble and quartzite.

V. AVAILABLE MAP COVERAGE

- 1 - 1:250,000 topographic - NTS 105B (Wolf Lake)
- 2 - 1:50,000 topographic - not available for NTS 105B /12W
- 3 - 1" - 2640' (1/2 mi) - claim sheet 105B/12, Watson Lake Mining District, available from Mining Recorder's office Watson Lake, Y.T.

VI. WORK COMPLETED -1979

6.1 Staking

The CO 1-36 Mineral Claims were staked for Canadian Oxy by MBW Surveys Limited, Whitehorse, Y.T. on June 15, 1979. The claims cover an area of approximately 3 mi² (7.8 km²).

6.2 Geological Mapping

There is no outcrop on the CO Claims and thus no mapping was performed. Dr. R. H. Wallis and J. Hooper of Canadian Oxy. paid a brief visit to the claims on July 7, 1979. (See Appendix IV).

6.3 Soil Geochemistry

A total of 49 soil samples were collected by Pelletier and Zayachivsky of Canadian Oxy on July 22, 1979. All samples were sent to Chemex Labs Limited, Vancouver, B.C. and analyzed for Cu, Mo, Pb, Zn, Ag, U and Th for a total of 343 analyses. Two man-days of work were performed. Analytical results are listed in Appendix I.

6.7 Names and Addresses of Personnel

Dr. R. H. Wallis Canadian Occidental Petroleum Ltd. Minerals Division 311 - 215 Carlingview Drive Rexdale, Ontario M9W 5X8	Chief Geologist
E. J. Sacks, M.Sc. Same address as above	Project Geologist
J. Hooper Same address as above	Senior Assistant
E. Jermakowicz Same address as above	Junior Assistant
C. Pelletier Same address as above	Junior Assistant
B. Zayachivsky Same address as above	Junior Assistant
Dr. C. F. Gleeson C. F. Gleeson and Associates Ottawa, Ontario	Consulting Geochemist

VII. GEOLOGY

There is no outcrop on the CO Claims, however one outcrop was found approximately 1000' (300m) NE of the NE corner of the claims.

7.1 General Geology

Mapping by Poole, et. al (1960) at a scale of 1:250,000 (1" = 4 mi) show the CO Claims to be underlain by Pleistocene glacial material. Areas on all sides, however, are underlain by Devonian to Mississippian metasediments consisting of chert, hornfels, argillite, slate, phyllite, quartzite, limestone, skarn,

tremolitic marble and dolomite. No structural features were noted.

7.2 Table of Formations (PLAN 1)

The following units are described from the outcrop visited by R. Wallis and J. Hooper and lying just to the NE of the claims. Rock descriptions are listed in Appendix II, along with elemental analyses.

<u>Unit</u>	<u>Description</u>
2	Plagioclase porphyry andesite dyke
1	Quartzite with segregation quartz veins

7.3 Description of Rock Units

7.3.1 Unit 1 - Quartzite with segregation quartz veins. This unit comprises well foliated, fine-grained, white to pink to grey quartzite with sparse hematite and limonite. (Sample CO-1). A lineation of quartz grains on the foliation plane was noted. Segregation quartz veins are present.

Veins of massive quartz from 0.5" to 2" (1.3 to 5 cm) wide transgress the quartzite (Sample CO-2). The veins consist of bull quartz with pods of earthy and specular hematite and numerous irregular veinlets with limonite fillings.

7.3.2 Plagioclase porphyry andesite dyke.

This unit comprises a 1 ft (0.3 m) wide 360T/90° dyke cutting the quartzite. It consists of greenish, sub to euhedral plagioclase phenocrysts up to 1/8" (3mm) in size set in an aphanitic to fine crystalline, dark grey andesitic groundmass. (Sample CO-3).

Traces of limonite are present as stain on fracture surfaces.

7.4 Structure

The plagioclase porphyry andesite dyke is vertical, trends at 360T and it cuts older quartzite.

The quartzite exhibits a foliation at 135T/60° SW. Lineation of quartz grains plunges at 170T/47° S.

The transgressive quartz veins are cut by well developed joints at 040T/90°.

7.5 Metamorphism

The quartzite is well foliated and mineral lineation is developed on the foliation planes, however the plagioclase porphyry andesite dyke appears to be unmetamorphosed indicating that the dyke intruded the quartzite after the conclusion of the regional metamorphic event.

7.6 Alteration

No significant alteration was noted.

7.7 Economic Geology

No mineralization was observed.

7.8 Summary of Geology and Economic Geology

The CO Claims are underlain directly by Pleistocene glacial sediments of unknown depth. Mapping by G.S.C. geologists and observation of nearby outcrop suggest that the CO Claims are underlain by regionally metamorphosed, Devonian to Mississippian quartzite cut by quartz veins and younger, unmetamorphosed plagioclase

porphyry andesite dykes. No visible alteration or mineralization was noted.

Potential mineralization on the CO Claims is likely to be related to skarn development within the Devonian-Mississippian meta-sedimentary pile as the G.S.C. has included marble and skarn within this unit (Unit 8 of Poole (1960)), however, no evidence of this has been found on the claim group to date.

VIII. GEOCHEMISTRY

The primary medium sampled on the CO Claims was B-horizon soil due to the predominance of overburden cover and paucity of streams and outcrop. Two sites on Eagle Nest Creek were sampled where crossed by soil traverses and samples from the outcrop visited by Wallis and Hooper were also analysed.

Laboratory procedures are listed in Appendix III.

Mean, possibly anomalous and probably anomalous levels for each media were determined from cumulative frequency distributions constructed from the project WATSU regional follow-up survey data. In the case of soil samples the combined data from all claim groups examined during project WATSU was used. Mean, possibly anomalous (84th percentile) and probably anomalous (97th percentile) levels for each media are presented in Table 1.

TABLE 1

Mean, Possibly Anomalous and Probably Anomalous Levels -
Soils, Sediments, Waters, Heavies.

Note: levels chosen from cumulative frequency curves at 50th, 84th and 97th percentiles, respectively.

A. Heavy Minerals

	ppm Cu	ppm Pb	ppm Zn	ppm Ag	ppm Mo	ppb Au	ppm Sn	ppm W	ppm U	ppm Th
Mean	24	17	75	.05	1.5	<10	2.3	15	3.8	44
Poss. Anom.	63	89	200	.38	3.5	19	38	60	26	330
Prob. Anom.	165	280	440	.95	8.5	3150	300	160	120	1200

B. Stream Sediments

	ppm Cu	ppm Pb	ppm Zn	ppm Ag	ppm Mo	ppm Sn	ppm W	ppm U	ppm Th
Mean	11	5	58	<.1	<1	<1	<1	2.5	13
Poss. Anom.	28	21	115	<.1	3	2	5	17	29
Prob. Anom.	54	59	320	1	11	5	16	38	50

C. Soils

	ppm Cu	ppm Pb	ppm Zn	ppm Ag	ppm Mo	ppm Sn	ppm W	ppm U	ppm Th
Mean	8	8	48	<.1	<1	<1	<1	2	14
Poss. Anom.	22	32	115	.1	2.5	1	7.5	7	36
Prob. Anom.	120	150	270	.8	5	2	40	30	75

D. Stream Waters

	ppb U	ppb F	m.mhos/cm S.C.
Mean	.25	19	18
Poss. Anom.	.85	100	46
Prob. Anom.	2.5	210	100

8.1 Rock Geochemistry (PLAN 1)

Three samples were collected from an outcrop 1000 feet (300 m) NE of the claims and analysed for U, Th and F, (Appendix 1); rock descriptions are listed in Appendix II.

1) The quartzite contains 1.5 ppm U and <1 ppm Th for a U/Th ratio greater than unity. The sample is low in F (40 ppm).

2) The quartz vein sample contains 0.5 ppm U (detection limit) and <1 ppm Th for a U/Th ratio greater than 0.5. The sample is low in F (60 ppm).

3) The plagioclase porphyry andesite contains 1 ppm U, 11 ppm Th and 245 ppm F.

8.2 Stream Sediment Geochemistry (PLAN 2,3,4)

Two samples were collected from Eagle Nest Creek which drains the CO Claims and were analysed for Cu, Mo, Pb, Zn, Ag, U and Th. Results are listed in Appendix I.

There is no significant geochemical response in stream sediments. One sample from the NE corner contains 14 ppm U which, while not anomalous, is high background. The results of the G.S.C. (96 ppm Cu, 68.6 ppm U) survey were not replicated.

8.3 Stream Water Geochemistry

Water samples were collected in conjunction with stream sediments and analysed by Chemex Labs Limited for U, F and As and in the field for pH and specific conductivity. Analytical results are listed in Appendix I.

- 1) Both samples contain anomalous amounts of U (1.2 and 2.8 ppb) and F (135 and 210 ppb).
- 2) pH is high as would be expected in terrain covered by overburden and possibly underlain by carbonates.
- 3) Specific conductivities are anomalous in both cases (136 and 210 micro-mohs/cm).
- 4) One sample from the NE corner contains 7 ppb As; the highest value obtained during project WATSU.

Hence, anomalous U contents in stream waters correlate with high pH and specific conductivity as well as with high F. The significance of these correlations is presently unknown.

8.4 Soil Geochemistry (PLAN 2,6,7)

B-horizon soils were collected along two traverses at 500 ft. (150 m) intervals. All samples were partially dried in the field and then sent to Chemex Labs Limited, Vancouver, B.C. and analysed for Cu, Pb, Zn, Ag, Mo, U and Th. Analytical results are listed in Appendix I.

1) 10 to 47 ppm U, 5 ppm Mo and 22 ppm Cu occur within a 2000 ft (610 m) N-S trending anomaly in the SW corner of the claims. Anomalous Mo and Cu values occur in the center of the U anomaly. (PLAN 8).

2) 22 to 26 ppm Cu, 0.6 ppm Ag, 10.5 ppm U and 3 ppm Mo occur spottily within an E-W trending area over 2000 ft (610 m) in the east-central portion of the claims. All of the above values are possibly anomalous only.

3) A single-station U anomaly (12.5 ppm) occurs in the northwest section of the claim group. In the NE corner there is a coincident single-station U (8.5 ppm) - Mo (3 ppm) anomaly.

4) 3 ppm Mo (moderately anomalous) occurs in a N-S trending area over 1000 ft (300 m) in the western part of the claims north of the main U anomaly.

5) Zn values range from 18 to 104 ppm.

In summary, the main soil anomaly is a 2000 ft. (610 m) long N-S trending area containing U, Mo and Cu in the SW corner of the claims. 1.2 ppb U in waters occurs downstream from this site.

Moderate Cu, U and Mo anomalies occur scattered throughout the claim group.

IX. CONCLUSIONS

1. PLAN 8 presents a compilation of geology and geochemistry.
2. The CO Claims are probably underlain by Devonian to Mississippian, regionally metamorphosed quartzite cut by quartz veins, and unmetamorphosed plagioclase porphyry andesite dykes. None of rock samples contain significant uranium, however, above normal F is present in the plagioclase porphyry andesite.
3. Waters from Eagle Nest Creek, which drains the CO Claims, contain anomalous U (1.2 to 2.8 ppb) which correlates with anomalous specific conductivity and high pH. The significance of this correlation is unknown.
4. There are no above normal geochemical responses in stream sediments. The G.S.C. results showed 96 ppm Cu and 68.6 ppm U in a sediment sample from Eagle Nest Creek. The values obtained by Cdn. Oxy are 4 ppm Cu and 14 ppm U. However, high F contents in stream waters did replicate the original values.
5. A strong, N-S trending, 2000 ft (610 m) long U-Mo-Cu soil anomaly occurs in the SW corner of the claim group.

High U in waters occur downstream from this site.

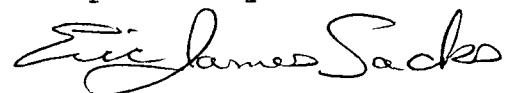
Other soil anomalies in U, Cu, Mo and Ag are generally single-station and scattered.

6. Potentially economic mineralization on the CO Claims is likely to be of skarn type within Devonian-Mississippian meta-sediments. At present, the source of U on the CO claims is not known.

X. RECOMMENDATIONS

1. Systematic soil and scintillometer surveys should be carried out over the entire claim group. A minimum line separation of 800 ft (240 m) is recommended. Any out-crop discovered during these surveys should be thoroughly examined. Samples should be analysed for Cu, Mo, Pb, Zn, Ag, U and W.
2. Fill-in sediment and water sampling of Eagle Nest Creek should be performed. A sample spacing of 500 ft (150 m) is suggested. The correlation of U-F-pH and S.C. in waters should be examined.
3. The original G.S.C. sample site should be resampled if possible. Heavy mineral samples should be obtained as well.
4. All samples presently on hand should be analyzed for W.

Respectfully submitted,

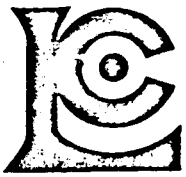


ERIC JAMES SACKS, M.Sc.

Toronto, Ontario
November, 1979.

APPENDIX I

ANALYTICAL RESULTS



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CHEMEX LABS LTD.

ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

TO: Canadian Occidental Petroleum Ltd.,
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Ste. 311 - 215 Carlingview Dr.,
Rexdale, Ont.

ATTN: WATSU-CO-Soils

CC. E. Sacks

CERTIFICATE NO. 49327

INVOICE NO. 31828

RECEIVED Th-32440
Aug. 3/79

ANALYSED Aug. 13/79

SAMPLE NO. :	PPM Cu	PPM Mo	PPM Pb	PPM Zn	PPM Ag	PPM U	PPM Th
79 WT 0199	12	2	10	56	0.1	1.0	14
0200	12	1	1	32	0.1	12.5	5
1122	12	1	8	84	0.1	4.0	12
1123	6	1	2	32	0.1	1.0	9
1124	28	3	8	104	0.1	8.5	11
1126	6	2	6	38	0.1	0.5	10
1127	2	1	4	6	0.1	1.0	10
1128	6	2	4	38	0.1	1.0	11
1129	16	3	6	56	0.1	6.0	9
1130	4	1	4	46	0.1	0.5	11
1131	4	1	4	24	0.1	< 0.5	8
1132	8	1	12	144	0.1	0.5	11
1133	6	2	6	42	0.1	0.5	10
1134	6	1	6	58	0.1	1.0	9
1135	6	2	10	34	0.1	1.0	8
1136	18	2	8	72	0.1	3.0	12
1137	2	1	4	12	0.1	1.0	9
1138	8	3	1	90	0.1	0.5	1
1139	18	1	2	46	0.1	10.5	6
1140	26	2	12	96	0.6	4.0	19
1141	22	2	8	76	0.2	4.0	17
1142	22	1	8	78	0.2	4.5	17
1143	26	1	8	72	0.6	5.0	19
1144	6	1	8	28	0.1	1.0	8
1145	10	2	6	54	0.1	1.0	8
1146	8	1	8	34	0.1	1.0	9
1147	10	1	1	54	0.1	1.5	2
1148	4	1	1	18	0.1	1.0	1
1149	4	1	1	38	0.1	1.0	1
1150	4	1	1	22	0.1	0.5	1
1201	6	1	10	30	0.1	0.5	9
1202	6	2	8	36	0.1	1.0	10
1203	4	1	2	8	0.1	1.0	9
1204	8	3	6	32	0.1	1.0	12
1205	4	1	2	18	0.1	1.0	8
1207	12	3	6	96	0.1	1.0	9
1208	8	3	2	28	0.1	2.5	12
1209	6	2	6	26	0.1	1.0	9
1210	4	2	8	42	0.1	1.0	11
9 WT1211	4	1	4	56	0.1	0.5	9



MEMBER
CANADIAN TESTING
ASSOCIATION

CERTIFIED BY:

Hart Biddle



CHEMEX LABS LTD.

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• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

TO: Canadian Occidental Petroleum Ltd.,
 Minerals Division,
 Ste. 311 - 215 Carlingview Dr.,
 Rexdale, Ont.

ATTN: WATSU-CO-Soil CC. E. Sacks

CERTIFICATE NO. 49328
 INVOICE NO. 31828
 RECEIVED Th-32440
 Aug. 3/79
 ANALYSED Aug. 13/79

SAMPLE NO. :	PPM Cu	PPM Mo	PPM Pb	PPM Zn	PPM Ag	PPM U	PPM Th
79 WT 1212	22	1	10	62	0.2	12.0	10
1213	6	1	1	104	0.1	0.5	<1
1214	12	2	4	62	0.1	13.0	3
1215	16	1	12	52	0.1	10.0	8
1216	4	1	6	26	0.1	1.0	10
1217	8	1	10	74	0.1	2.0	13
1218	22	5	2	44	0.1	21.0	1
1219	6	5	2	48	0.1	47	2
79 WT 1220	18	1	10	58	0.1	9.5	11



MEMBER
 CANADIAN TESTING
 ASSOCIATION

CERTIFIED BY: *Hart Bielle*

Appendix II - Descriptions of Rock Samples, U, F and Th
Contents and U/Th Ratios

<u>Rock No.</u>	<u>Name</u>	<u>Description</u>	<u>ppm U</u>	<u>ppm F</u>	<u>ppm Th</u>	<u>U/Th</u>
CO-1	Quartzite	Well foliated, white to grey to pink quartzite; sparse hematite, limonite	1.5	40	< 1	< 1.5
CO-2	Quartz Vein	Massive quartz with pods earthy and specular hematite altering to limonite, irregular fractures with limonite filling	0.5	60	< 1	< 0.5
CO-3	Plagioclase porphyry andesite	Greenish sub to euhedral plagioclase phenocrysts up to 1/8" (3mm) set in dark grey, ophanitic andesitic groundmass; trace limonite as stain	1.0	245	11	0.09

APPENDIX III - LABORATORY PROCEDURES

A. Sample Preparation

i) Heavy Minerals

1. Samples dried and weighed.
2. Screen - 10 mesh material from sample and weigh; weigh and retain +10 mesh material left on screen.
3. Use -10 mesh fraction for heavy liquid separation.
4. Transfer -10 mesh (fine) fraction into a 1000 ml. separatory funnel containing 200 mls. of tetrabromoethane (S.G. 2.96).
5. Shake sample gently in heavy liquid. Particles of fines adhering to sides of the separatory funnel can be washed into the heavy liquid by slowly rotating the funnel at an oblique angle. The "heavies" (S.G. >2.96) will slowly settle to the bottom of the heavy liquid.
6. Drain the "heavies" into a small filter funnel. Drain excess heavy liquid and light materials into a separate filter funnel. Collect all heavy liquid into a waste receiving bottle.
7. Save light minerals (S.G. <2.96). Wash "heavies" fraction with methanol to remove residual tetrabromoethane. Use the same procedure on light minerals fraction. Dry both fractions and weigh. Retain the "lights" in a suitable sealed container. Save 0.5 gm of "heavies" in a plastic vial for visual examination.
8. Pulverize the remaining "heavies" in an agate mortar and pestle and homogenize before weighing for analyses.

9. Analyse the "heavies" powder for appropriate elements. The number of elements analysed for is determined by the amount of "heavy" material obtained in separation.

ii) Stream Sediments

1. Samples are sorted and dried at 50^oc for 12 to 16 hours.
2. Dried material is then screened to obtain the -80 mesh (177 micron) fraction. The rest of the material is discarded.
3. -80 mesh fraction material is weighed and analysed for appropriate elements.

iii) Soils

Same procedure as for stream sediments.

iv) Rocks

1. Entire sample is crushed.
2. If necessary (>250 gms.). The sample is split on a Jones splitter, the reject is retained for a short period.
3. The split fraction is pulverized in a ring grinder such that 90% passes a 200 mesh (74 micron) sieve.
4. The -200 mesh material is weighed and analysed for the appropriate elements.

v) Waters

See individual element descriptions for U and F.

B. Elemental Analyses

i) ppm Copper, Lead, Zinc, Silver, Molybdenum (Atomic Absorption)

1. A 1.0 gm portion of -80 mesh soil or stream sediment or -200 mesh rock flour or pulverized "heavies" is digested in concentrated, hot, perchloric - nitric acid (HClO₄-HNO₃) for 2 hours.

2. Digested sample is cooled and made up to 25 mls. with distilled water.

3. Solution is mixed and solids allowed to settle.

4. Cu, Pb, Zn Ag and Mo are determined by atomic absorption, using background correction for Pb and Ag analyses.

<u>Element</u>	<u>Bkgd. Corr.</u>	<u>Flame Type</u>	<u>Wave Length hm</u>	<u>Detection Limit</u>	<u>Chemex Standard</u>	<u>+ 1 Std. Deviation</u>
Cu	No	A	324.7	1 ppm	71 ppm	+ 3
Pb	Yes	A	217.0	1 ppm	59 ppm	+ 1
Zn	No	A	213.8	1 ppm	52 ppm	+ 3
Ag	Yes	A	328.1	0.2 ppm	8.5 ppm	+ 0.5
Mo	No	N	313.3	1 ppm	25 ppm	+ 1

A = Air acetylene flame.

N = Nitrous oxide - acetylene flame.

ii) ppm Tin (Sn) (Atomic Absorption)

1. A 1.0 gm sample of -80 mesh soil or stream sediment, -200 mesh rock flour or pulverized "heavies" is scintered with ammonium iodide.

2. The resulting tin-iodide is leached with a dilute HCl - ascorbic acid solution.

3. The TOPO complex is then extracted into MIBIC (Methyl isobutyl ketone) and analysed via atomic absorption.

4. Detection limit: 1 ppm Sn

iii) ppm Tungsten (W) (Colourimetric)

1. 0.5 gm of -80 mesh soil or stream sediment, -200 mesh rock flour or pulverized "heavies" is fused with potassium bisulfate and leached with HCl.

2. The reduced form of W is complexed with toluene 3, 4 dithiol and extracted into an organic phase.

3. The resulting colour is visually compared to similarly prepared standards. (Colourimetric method)

4. Detection limit: 2 ppm W

iv) ppb Gold (Au) (Atomic Absorption)

1. A 5 gm sample of -200 mesh rock flour or pulverized "heavies" is ashed at 800°C for 1 hour.

2. Ashed material is digested with aqua regia twice to dryness.

3. Digested material is taken up in 25% HCl.

4. Au is extracted as the bromide into MIBK and analysed via atomic absorption.

5. Detection limit: 10 ppb Au

v) ppm Thorium (Th) (Neutron Activation)

1. 1 gm of -80 mesh soil or stream sediment, -200 mesh rock flour or pulverized "heavies" is weighed into a polyethelene vial and heat sealed.

2. Samples, along with standards, are then irradiated

for sufficient periods to receive a neutron dose of $1-3 \times 10^{10}$ to $10^{15}/\text{cm}^2$.

3. Following irradiation, samples are cooled for at least one week and thorium determined by the measurement of its characteristic gamma ray, using a semiconductor (Ge (Li)) detector.

4. Detection limit: 1 ppm Th

vi) Uranium (U) (Fluorimetry)

A) Uranium in soils, stream sediments, "heavies", rocks.

1. 1 gm of -80 mesh soil or stream sediment, -200 mesh rock flour or pulverized "heavies" is digested with hot, $\text{HClO}_4\text{-HNO}_3$ to strong fumes of HClO_4 for approximately 2 hours.

2. The digest is diluted to volume and mixed.

3. An aliquot is extracted into MIBK with the acid of an aluminum nitrate-tetrapropyl ammonium hydroxide salting solution. (TPAN)

4. Uranium in the MIBK is determined by evaporating a portion of the MIBK in a platinum dish and fusing with a mixture of $\text{Na}_2\text{CO}_3\text{-K}_2\text{CO}_3\text{-NaF}$.

5. The fluorescence of the fused flux is measured to determine the uranium content.

6. Detection limit: 0.5 ppm U

B) Uranium in Water

1. A portion of the sample is filtered to remove sediment (if necessary), is acidified and then evaporated to dryness.

2. Residue is leached with a small volume of HCO_3 .

3. Uranium in the leachate is extracted into MIBK, with the aid of TPAN salting solution.

4. Uranium is determined as for solid materials, above by fluorimetry.

5. Detection limit: 0.2 ppb U

vii) Fluorine (F) (Specific Ion Electrode)

A) Fin soils, stream sediments, rocks, "heavies"

1. 0.25 gm of -80 mesh soil or stream sediment, -200 mesh rock flour or pulverized "heavies" is fused with a 2:1 $\text{NaCO}_3\text{-KNO}_3$ mixture.

2. The melt is leached with water and citric acid, adjusted to pH 5.5 and the activity measured with a fluoride specific ion electrode.

3. Detection limit: 10 ppm F

B) F in Waters (Potentiometric)

1. An aliquot of the sample is filtered and treated with an equal volume of Total Ionic Strength Adjustment Buffer (TISAB) consisting of glacial acetic acid, sodium chloride and cyclohexanediamine tetraacetic acid.

2. The resulting solution is stirred for 3 minutes to allow the fluoride electrode to stabilize.

3. The F concentration is read from a specific ion meter which is calibrated frequently with freshly prepared standard fluoride solutions.

4. Detection limit: 0.02 ppb F

viii) ppb Arsenic (As) (Atomic Absorption)

a) As in waters

1. An aliquot of water is acidified with HCl and then reduced with potassium iodine to reduce As (V) to As (III).

2. A portion of this solution is further reduced with sodium borohydride to arsine, AsH_3 .

3. The volatile arsine is swept into a heated cell in an atomic absorption spectrophotometer and decomposed to free arsenic to determine the arsenic concentration.

4. Detection limit: 2 ppb As

ix) pH

1. pH in waters was determined in the field, using a portable pH meter.

2. The meter was standardized by means of buffer solutions, every 10th sample to minimize meter drift.

x) Specific Conductivity (S.C.)

1. S.C. in waters was determined in the field, using a portable S.C. meter.

2. The electrode was washed in a standard water, after each determination, to minimize and standardize contamination.

Appendix IV - Comments of R. H. Wallis' Examination of
CO Claims

July 8th, 1979

CO CLAIMS

Commodity (U + F)

RHW and JH

There are no outcrops on this claim group but within 1000' of NE corner there are outcrops as shown on Wolf Lake geology sheet (1st outcrop NE of capital E. of Eagle Nest Creek)

Unit 8 of Poole - Upper Devonian/Mississippian = a variety of meta-sediments.

Rocktypes:

- 1) Well foliated, fine-grained quartzites, white to grey in colour with sparse hematitic and rare limonite
Foliation: strike $135^{\circ}/59^{\circ}$ southwest
plunge of lineation $170^{\circ}/47^{\circ}$ S
- 2) Segregation quartz veins
- 3) transgressive quartz veins (1/4" to 2" wide)
cut by well developed joints, 040° /vertical.
- 4) Cut by 360° strike, vertical dip, plagioclase porphyry andesite dyke 1 foot wide.

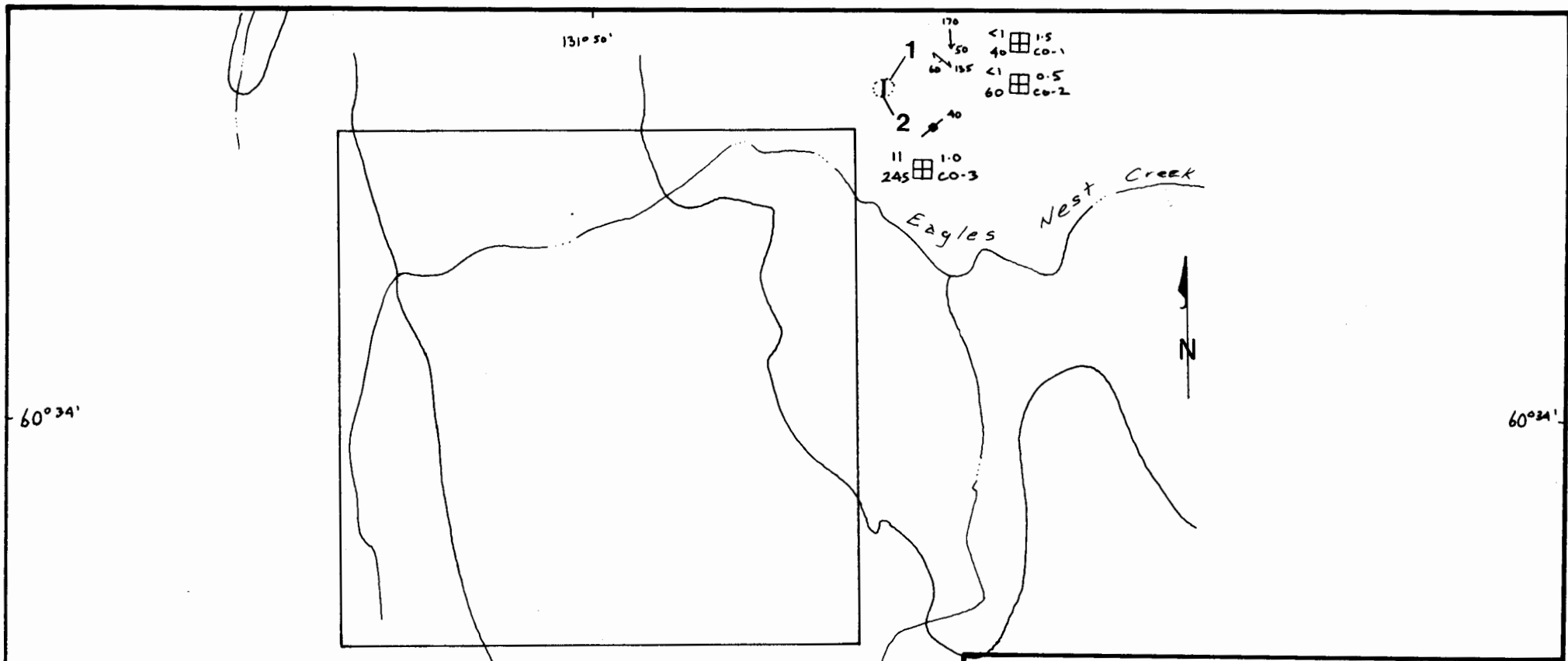
Rock samples of (1); (2); (4)

The entire claim group lies on a very gentle plateau entirely below tree line, needs a baseline and tie lines and then compass and topofil in all the soil geochem and scint lines.

Appendix V - References

1. Poole, W. et al (1960): Geology of Wolf Lake, Yukon Territory; G.S.C. Map 10-1960, Preliminary Series.

2. G.S.C. (1979): Regional Stream Sediment and Water Geochemical Reconnaissance, Yukon Territory 1978; G.S.C. OFR 563, NTS 105B.




LEGEND

- 2 : Plagioclase porphyry andesite dyke
 1 : Quartzite; segregation quartz veins

SYMBOLS

- ↔ Foliation (inclined)
 → Mineral lineation (inclined)
 ⇩ Jointing (vertical)

ppm Tl ppm U
 ppm F  Sample No.

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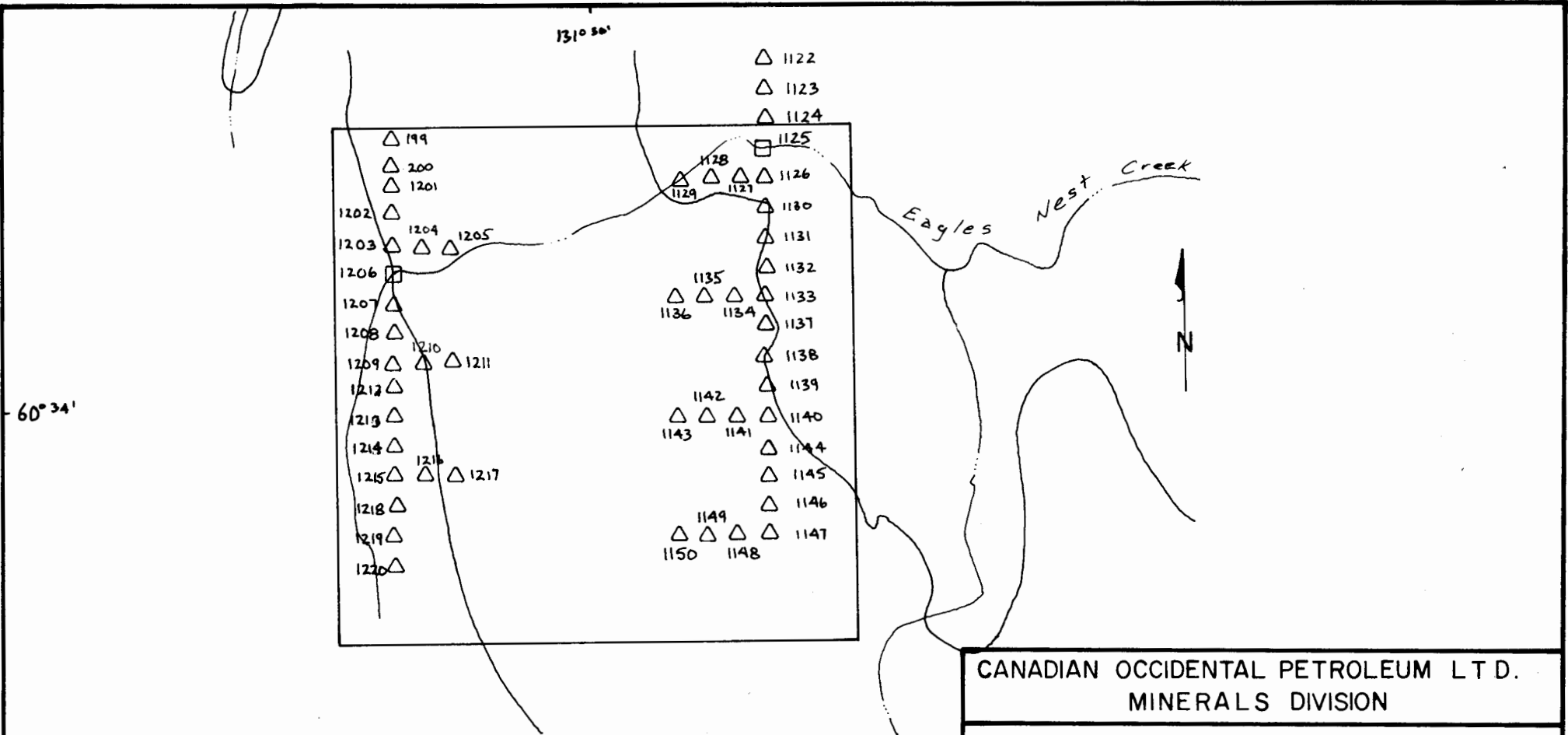
PROJECT WATSU
 CO CLAIMS
 YUKON TERRITORY

GEOLOGY &
 ROCK GEOCHEMISTRY

PLAN I

Scale: 1" = 2640' (1/2 mile)

September, 1979



△ 199	△ 1122
△ 200	△ 1123
△ 1201	△ 1124
△ 1202	□ 1125
△ 1203	△ 1128
△ 1204	△ 1127
△ 1205	△ 1126
□ 1206	△ 1180
△ 1207	△ 1131
△ 1208	△ 1132
△ 1209	△ 1133
△ 1210	△ 1134
△ 1211	△ 1135
△ 1212	△ 1136
△ 1213	△ 1137
△ 1214	△ 1138
△ 1215	△ 1139
△ 1216	△ 1140
△ 1217	△ 1141
△ 1218	△ 1142
△ 1219	△ 1143
△ 1220	△ 1144
	△ 1145
	△ 1146
	△ 1147
	△ 1148
	△ 1149
	△ 1150

LEGEND

- △ SOIL
- STREAM SEDIMENT + WATER

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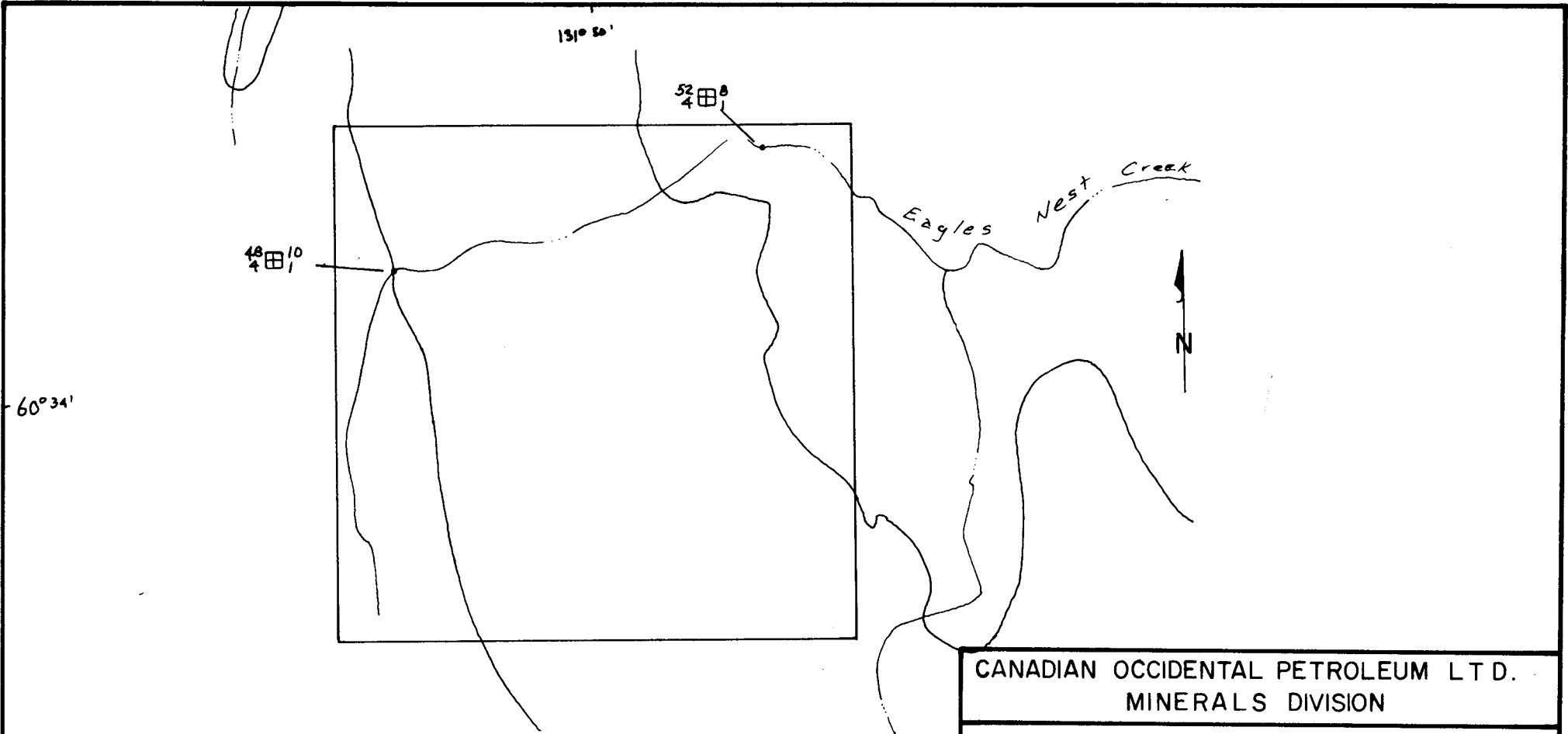
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YUKON TERRITORY

SAMPLE LOCATION

PLAN 2

Scale: 1" = 2640' (1/2 mile)

September, 1979



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PROJECT WATSU
CO CLAIMS
YUKON TERRITORY

STREAM SEDIMENT GEOCHEMISTRY
Cu - Mo - Pb - Zn

LEGEND

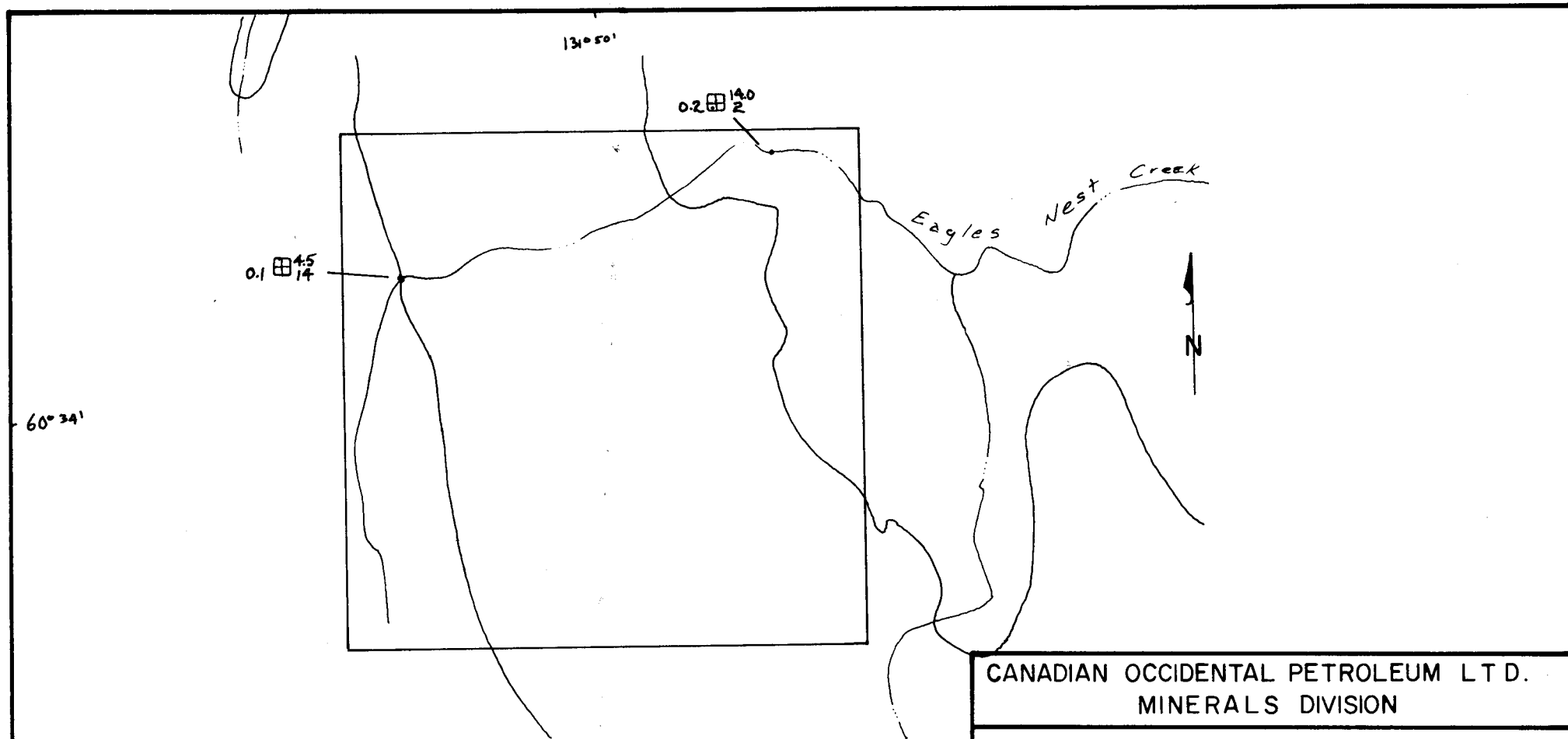
ppm Zn ppm Cu
ppm Pb ppm Mo

	Cu	Mo	Pb	Zn
Prob. Anomalous	54	11	59	320
Poss. Anomalous	28	3	21	115

Scale: 1" = 2640' (1/2 mile)

PLAN 3

September, 1979



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PROJECT WATSU
CO CLAIMS
YUKON TERRITORY

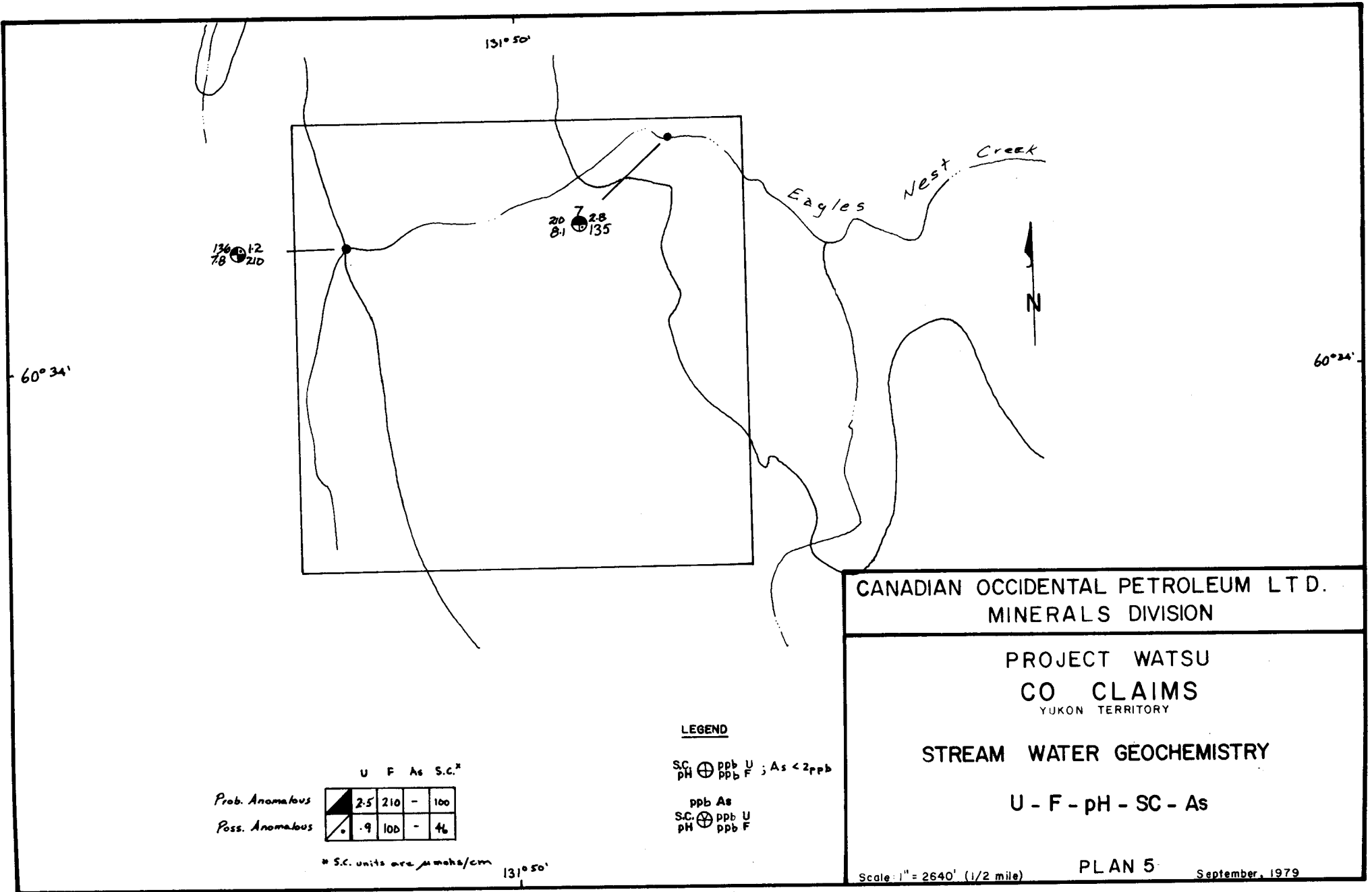
STREAM SEDIMENT GEOCHEMISTRY
U - Th - Ag

LEGEND

ppm Ag \boxtimes ppm U
ppm Th

U Th Ag

Prob. Anomalous	\blacktriangle	30	60	1
Poss. Anomalous	\circ	17	29	<1



136
78

12
210

20
8.1

7

2.8
135

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PROJECT WATSU
CO CLAIMS
YUKON TERRITORY

STREAM WATER GEOCHEMISTRY

U - F - pH - SC - As

LEGEND

SC ⊕ ppb U ; As < 2ppb
pH ⊕ ppb F

ppb As
SC ⊕ ppb U
pH ⊕ ppb F

Prob. Anomalous

Poss. Anomalous

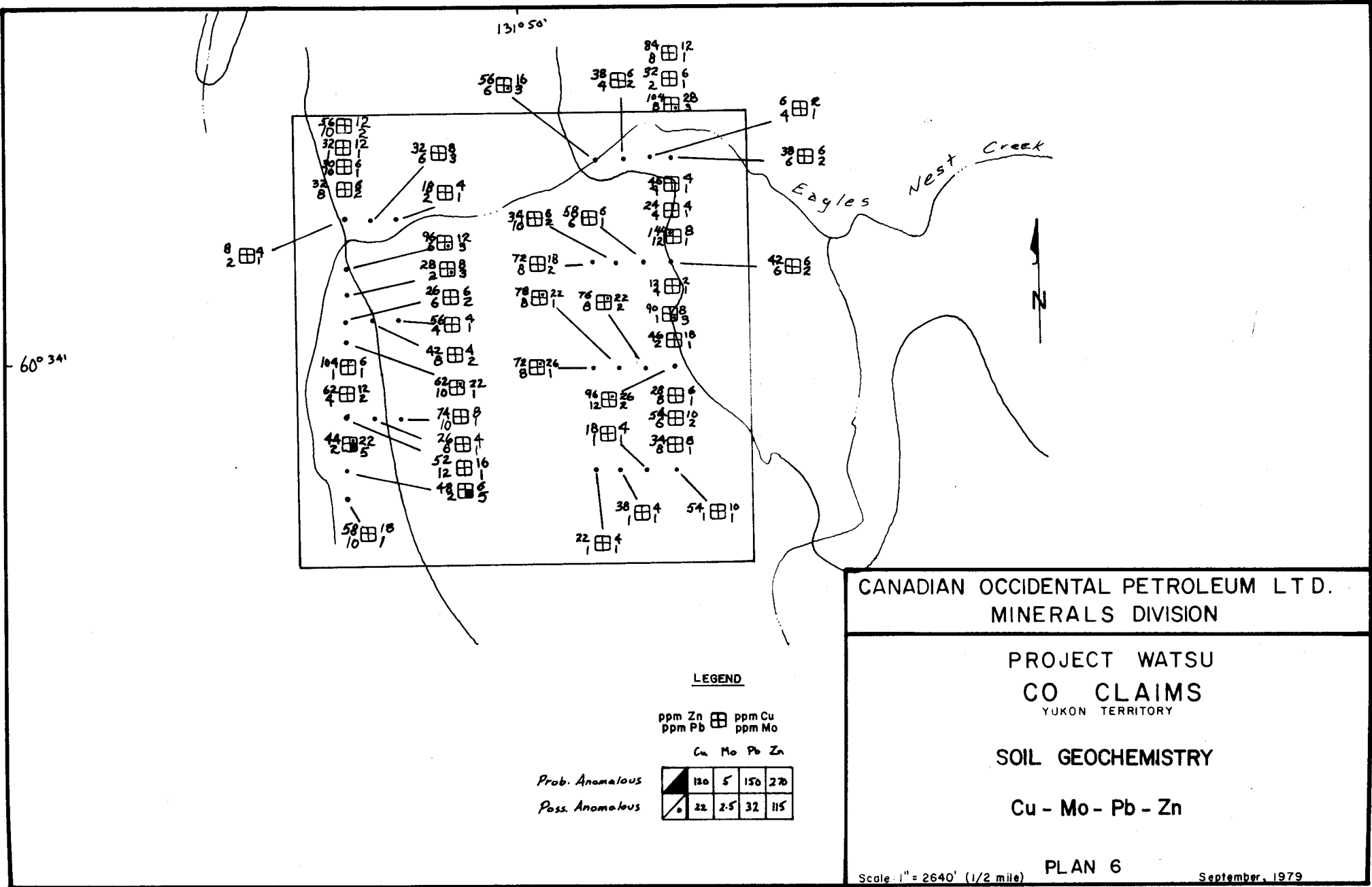
	U	F	As	S.C.*
Prob. Anomalous	2.5	210	-	100
Poss. Anomalous	.9	100	-	46

* S.C. units are $\mu\text{mols/cm}$

Scale: 1" = 2640' (1/2 mile)

PLAN 5

September, 1979



CANADIAN OCCIDENTAL PETROLEUM LTD.
MINERALS DIVISION

PROJECT WATSU
CO CLAIMS
YUKON TERRITORY

SOIL GEOCHEMISTRY

Cu - Mo - Pb - Zn

PLAN 6

Scale: 1" = 2640' (1/2 mile)

September, 1979

LEGEND

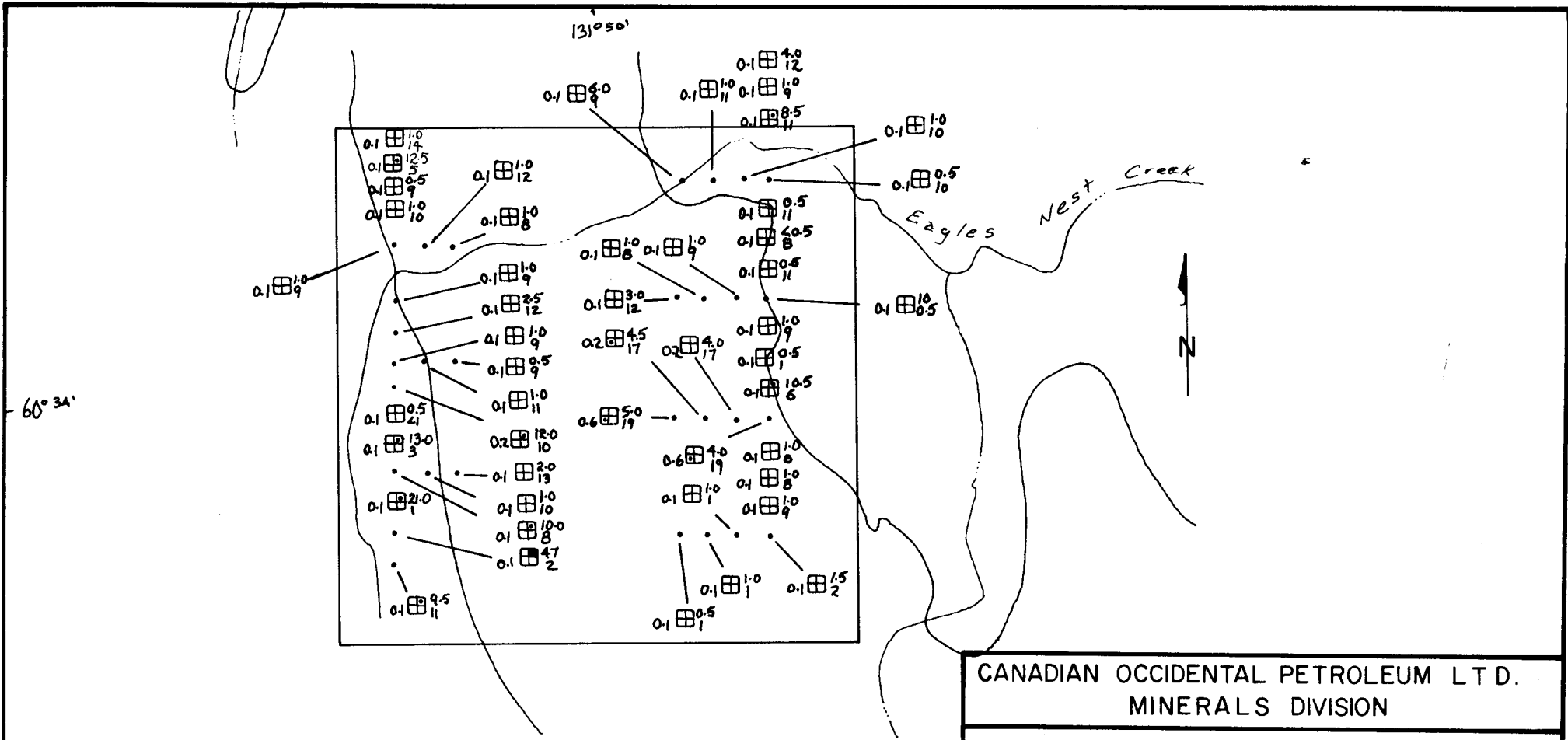
ppm Zn □ ppm Cu
ppm Pb □ ppm Mo

Cu Mo Pb Zn

Prob. Anomalous

Poss. Anomalous

■	130	5	150	270
◐	22	2.5	32	115



CANADIAN OCCIDENTAL PETROLEUM LTD.
MINERALS DIVISION

PROJECT WATSU
CO CLAIMS
YUKON TERRITORY

SOIL GEOCHEMISTRY
U - Th - Ag

LEGEND

ppm U \square ppm Th
ppm Ag \square ppm Th

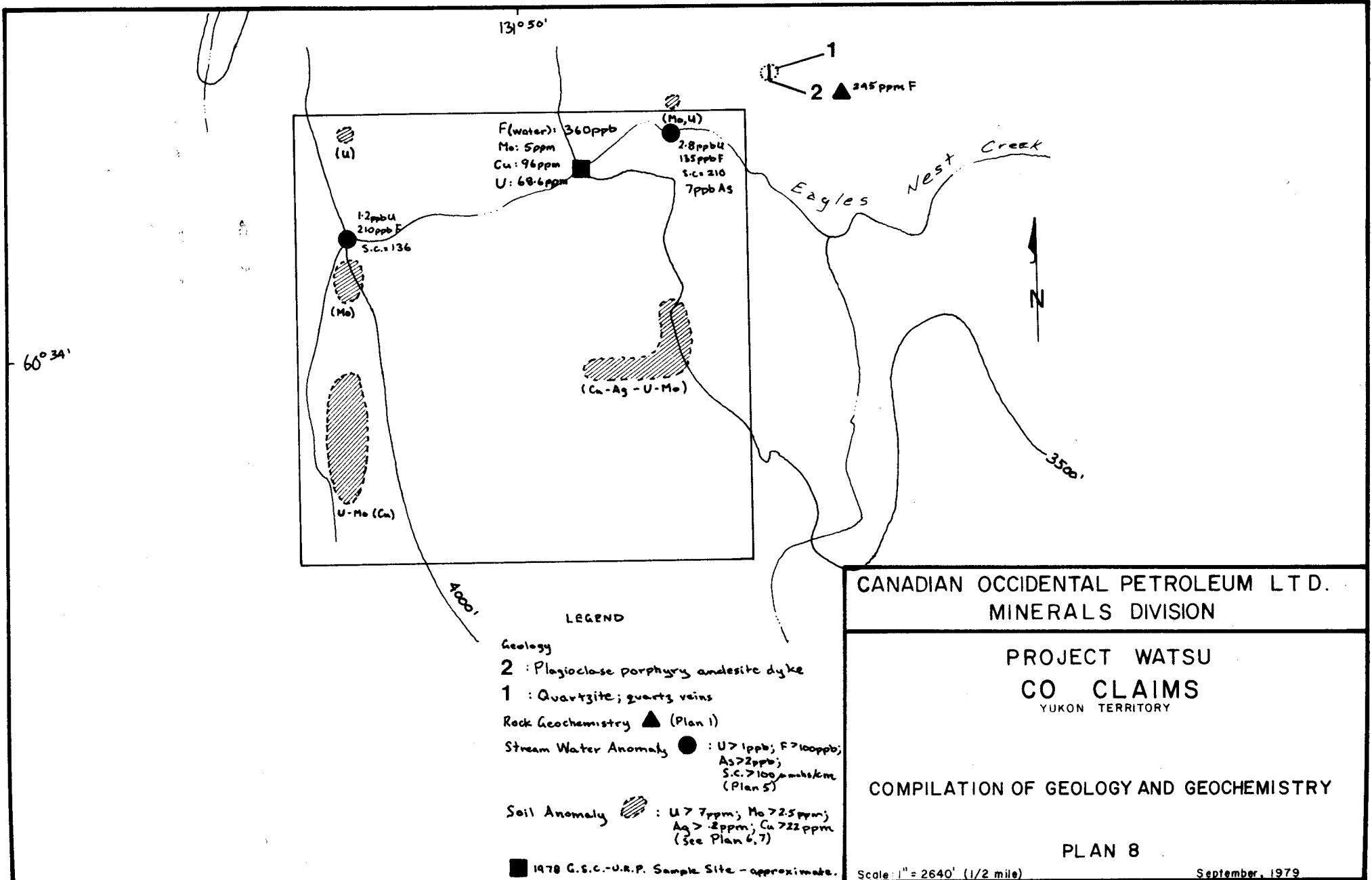
U Th Ag

Prob. Anomalous	\square	30	75	.8
Poss. Anomalous	\square	7	36	.1

Scale: 1" = 2640' (1/2 mile)

PLAN 7

September, 1979



LEGEND

Geology

- 2 : Plagioclase porphyry andesite dyke
- 1 : Quartzite; quartz veins

Rock Geochemistry ▲ (Plan 1)

Stream Water Anomaly ● : U > 1ppb; F > 100ppb;
As > 2ppb;
S.C. > 100 μ mols/km
(Plan 5)

Soil Anomaly ▨ : U > 7ppm; Mo > 2.5ppm;
Ag > .2ppm; Cu > 22ppm
(See Plan 6,7)

■ 1978 G.S.C.-U.R.P. Sample Site - approximate.

CANADIAN OCCIDENTAL PETROLEUM LTD.
MINERALS DIVISION

PROJECT WATSU
CO CLAIMS
YUKON TERRITORY

COMPILATION OF GEOLOGY AND GEOCHEMISTRY

PLAN 8

Scale: 1" = 2640' (1/2 mile)

September, 1979

Author's Qualifications

Eric J. Sacks

- Education - Graduated Queen's University,
Kingston, Ontario
M.Sc. in Geology, 1978
- Graduated University of Toronto,
Toronto, Ontario
B.Sc. in Geology, 1977

Work Experience - Employed as field exploration geologist
with Canadian Occidental Petroleum Ltd., Minerals Division,
Toronto, Ontario since 1978. Carried out and supervised
mineral exploration programs in B.C. and Yukon.

Statement of Expenditures

Claims CO 1-36

Record Numbers YA 44397 - YA 44432

		<u>Pro-rated¹ Costs</u>
Salaries and Benefits		\$ 648.30
Travel and Accommodation		395.16
Drafting and Reproduction		138.83
Consultant		194.80
Camp costs and Supplies		445.01
Rental of Equipment		74.16
Other Work		189.63
	Sub-total	<u>\$2,085.89</u>
Helicopter 2.7 hr. at \$340/hr.	\$ 918.00	²
Geochemical 372 analyses	<u>535.24</u>	³
		<u>\$1,453.24</u>
	Total	<u>\$3,539.13</u>

Notes

¹ Pro-rated on basis of 2.2 man-days worked on claims conducting geological/geochemical/geophysical surveys out of a total of 115.6 man-days spent on these surveys during Project Watsu (see attached breakdown on following sheet).

² Helicopter flying completed by Associated Helicopters Ltd.

³ Geochemical analyses completed by Chemex Labs, Vancouver, B.C. (see attached Cost Breakdown).

PROJECT J

BC CLAIM GROUPS	TOTAL NO. OF MAN DAYS	PRO-RATED COSTS							SUB-TOTAL "A"	REAL COSTS				SUB-TOTAL "B"	TOTAL "A" + "B"
		SALARIES & BENEFITS	TRAVEL & ACCOMMODATION	DRAFTING & REPRODUCTION	CONSULTANTS	CAMP COSTS & SUPPLIES	EQUIPMENT RENTAL	OTHER WORK		HELICOPTER		GEOCHEMISTRY			
										at \$310/hr	hrs.	cost	# ana		
ALLEN	4.3	1267.12	772.36	271.35	380.75	869.78	144.96	370.63	4076.95	620.00	2.0	617.80	385	1237.80	5314.75
ASP	5.0	1473.40	898.10	315.53	442.73	1011.38	168.56	430.97	4740.67	682.00	2.2	627.28	396	1309.28	6049.95
COT	3.0	884.04	538.86	189.32	265.64	606.83	101.13	258.58	2844.40	620.00	2.0	378.24	201	998.24	3842.64
KAZ	5.0	1473.40	898.10	315.53	442.73	1011.38	168.56	430.97	4740.67	527.00	1.7	854.64	454	1381.64	6122.31
MAR	1.0	294.68	179.62	63.11	88.55	202.28	33.71	86.20	948.15	310.00	1.0	62.40	18	372.40	1320.55
NEED	5.0	1473.40	898.10	315.53	442.73	1011.38	168.56	430.97	4740.67	837.00	2.7	966.36	560	1803.36	6544.03
PLATE	5.4	1591.27	969.94	340.77	478.15	1092.29	182.04	465.45	5119.91	961.00	3.1	793.24	464	1754.24	6874.15
RAN	5.4	1591.27	969.94	340.77	478.15	1092.29	182.04	465.45	5119.91	1209.00	3.9	775.28	524	1984.28	7104.19
SHAR 162	5.4	1591.27	969.94	340.77	478.15	1092.29	182.04	465.45	5119.91	1023.00	3.3	639.36	402	1662.36	6782.27
SHAR 364, 9	5.4	1591.27	969.94	340.77	478.15	1092.29	182.04	465.45	5119.91	1488.00	4.8	480.04	619	2268.04	7387.95
SHAR 566	5.4	1591.27	969.94	340.77	478.15	1092.29	182.04	465.45	5119.91	899.00	2.9	750.36	469	1649.36	6769.27
SHAR 768	5.4	1591.27	969.94	340.77	478.15	1092.29	182.04	465.45	5119.91	837.00	2.7	749.28	460	1586.28	6706.19
SUB-TOTAL (1)	55.7	16413.66	10004.78	3514.99	4932.03	11266.77	1877.72	4801.02	52810.97	10013.00	32.3	7994.28	4952	18007.28	70818.25
YUKON CLAIM GROUPS										at \$340/hr					
BIG OX	5.6	1650.21	1005.87	353.39	495.86	1132.74	188.78	482.69	5309.54	1020.00	3.0	879.76	541	1899.76	7209.30
BORDER	1.1	324.15	197.58	69.42	97.40	222.50	37.08	94.81	1042.94	204.00	0.6	165.16	101	369.16	1412.10
CLO	3.9	1149.25	400.52	246.11	345.33	788.87	131.47	336.16	3697.71	1224.00	3.6	316.96	185	1540.96	5238.67
CO	2.2	648.30	395.16	138.83	194.80	445.01	74.16	189.63	2085.89	918.00	2.7	535.24	372	1453.24	3539.13
GOAT	5.5	1620.74	987.91	347.08	487.01	1112.51	185.41	474.07	5214.73	782.00	2.3	1266.48	807	2048.48	7263.21
ICE	4.2	1237.66	754.40	265.04	371.90	848.56	141.59	362.32	3982.47	782.00	2.3	798.64	351	1280.64	5263.11
LICK	5.2	1532.34	934.02	328.15	460.44	1051.83	175.30	448.21	4930.29	748.00	2.2	920.36	546	1668.36	6598.65
MOX	5.9	1738.61	1059.75	372.32	522.43	1193.42	198.90	508.54	5593.97	1292.00	3.8	1205.04	705	2497.04	8091.01
OXY	4.6	1355.53	826.25	290.29	407.31	930.47	155.07	396.49	4361.41	884.00	2.6	732.44	449	1616.44	5977.85
PISA	5.6	1650.21	1005.87	353.39	495.86	1132.74	188.78	482.68	5309.54	714.00	2.1	757.96	512	1471.96	6781.50
SAL	5.6	1650.21	1005.87	353.39	495.86	1132.74	188.78	482.78	5309.54	1190.00	3.5	497.12	411	1687.12	6996.66
TIER	4.9	1443.93	880.15	309.21	433.91	991.10	165.18	422.71	4645.46	1156.00	3.4	750.76	438	1906.76	6552.60
WOX	5.6	1650.21	1005.87	353.39	495.86	1132.74	188.78	482.69	5309.54	952.00	2.8	841.08	579	1793.08	7102.62
SUB-TOTAL (2)	59.9	17651.35	10759.22	3780.01	5303.97	12116.23	2019.28	5162.98	56793.41	11866.00	34.9	9367.00	5997	21233.00	78026.41
TOTALS (1+2)	115.6	34065.00	20764.00	7295.00	10236.00	23383.00	3897.00	9964.00	109604.00	21879.00	67.2	17361.28	10949	39240.28	148844.66

THE CO CLAIM GROUP
GEOCHEMICAL COST BREAKDOWN

<u>INVOICE #</u> ¹	<u># OF SAMPLES</u>	<u>DESCRIPTION</u>	<u>COST</u> ²
31253	3	F, U	\$ 21.00
32113	3	Th	15.00
31746	2	U, F, As	18.50
31900	2	Cu, Mo, Pb, Zn, Ag, U	14.10
32440	51	Th	255.00
31828	49	Cu, Mo, Pb, Zn, Ag, U	345.45
		SUB-TOTAL	\$699.05 less 20%
		TOTAL	\$535.24

1 - all invoices from Chemex Labs unless otherwise noted

2 - cost includes preparation of samples