GEOLOGY AND GEOCHEMISTRY

OF THE

TIER CLAIM GROUP

Claim Sheet 105F/9

Lat.: 61°40'N
Long.: 132°15'W

Claims:

TIER: Claims 1 - 36

WATSON LAKE MINING DISTRICT
YUKON TERRITORY

090 636

by

Eric James Sacks, M. Sc.

Work Completed July 29th, 1979

This report was examined by the Geological Branch and is recommended as being to be considered as representing the amount of $ 6300

Geologist or
Mining Engineer

Considered as representation work under Section 53 (1) Yukon Quartz Mining Act.

Commissioner of Yukon Territory

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SUMMARY

The TIER Claim group is located at 132°15'W, 61°40'N within NTS map sheet 105F/9, Watson Lake Mining District, Yukon Territory. The claims were staked on June 22nd, 1979 to cover a G.S.C. stream sediment Mo-Cu-Ba-F anomaly (16 ppm Mo, 52 ppm Cu, 2500 ppm Ba, 1000 ppb F) generated by the U.R.P. stream sediment - water survey of the Quiet Lake Sheet in 1978.

The TIER Claims are underlain by a sedimentary assemblage of dolomite, chert and black shale, and arenites, and are intruded by fine-grained felsic rocks. The claims are probably cut by a NW trending, SW dipping thrust fault which thrusts older dolomite over younger shale and chert. Whether the intrusives entered the pile pre or post thrusting is unknown. Bright orange gossan overlies shales and felsic intrusives in the center of the claims and may contain molybdite- ferrimolybdite as well as limonite and goethite. Stockwork quartz veining occurs in the cherts and shales.

A large (5000 ft. long) and intense Mo-Zn-Ag soil anomaly overlies the SW quarter of the claims and is most intense over the gossan. Stream sediments and heavy minerals over all portions of the claims contain anomalous Mo, Zn, Cu and Ag. The area immediately south of the claims is drained by a stream whose sediments contain anomalous Mo, Zn, Pb and Ag.

Potential mineralization on the TIER Claims could include Pb-Zn-Ag sulphide mineralization of stratiform or vein type within black shales and/or Mo-Cu porphyry or vein mineralization associated with felsic intrusives.

Systematic mapping, prospecting and soil sampling are recommended.

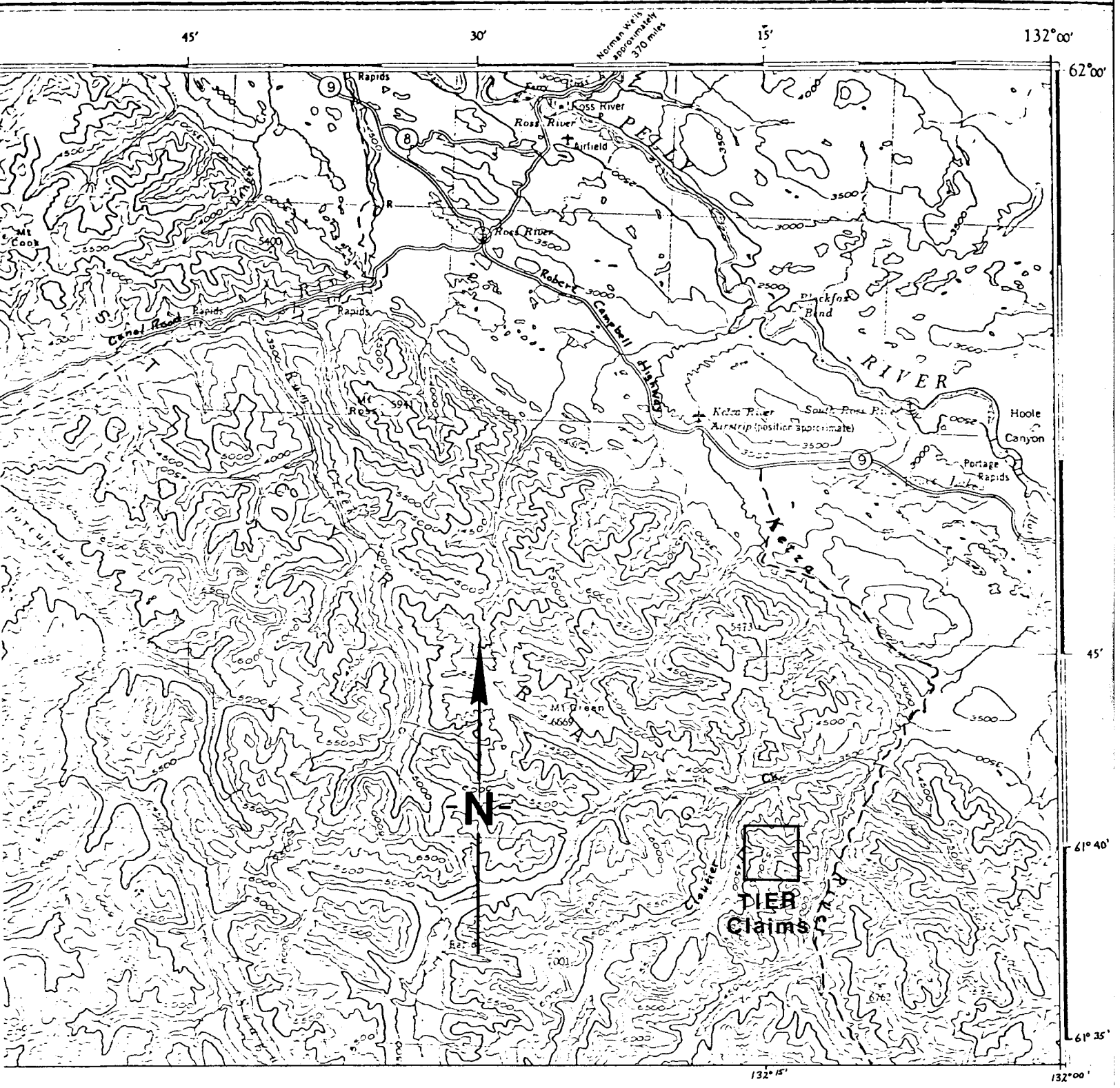

FIGURE 1

LOCATION AND ACCESS OF THE TIER CLAIMS.

Scale 1: = 50,000

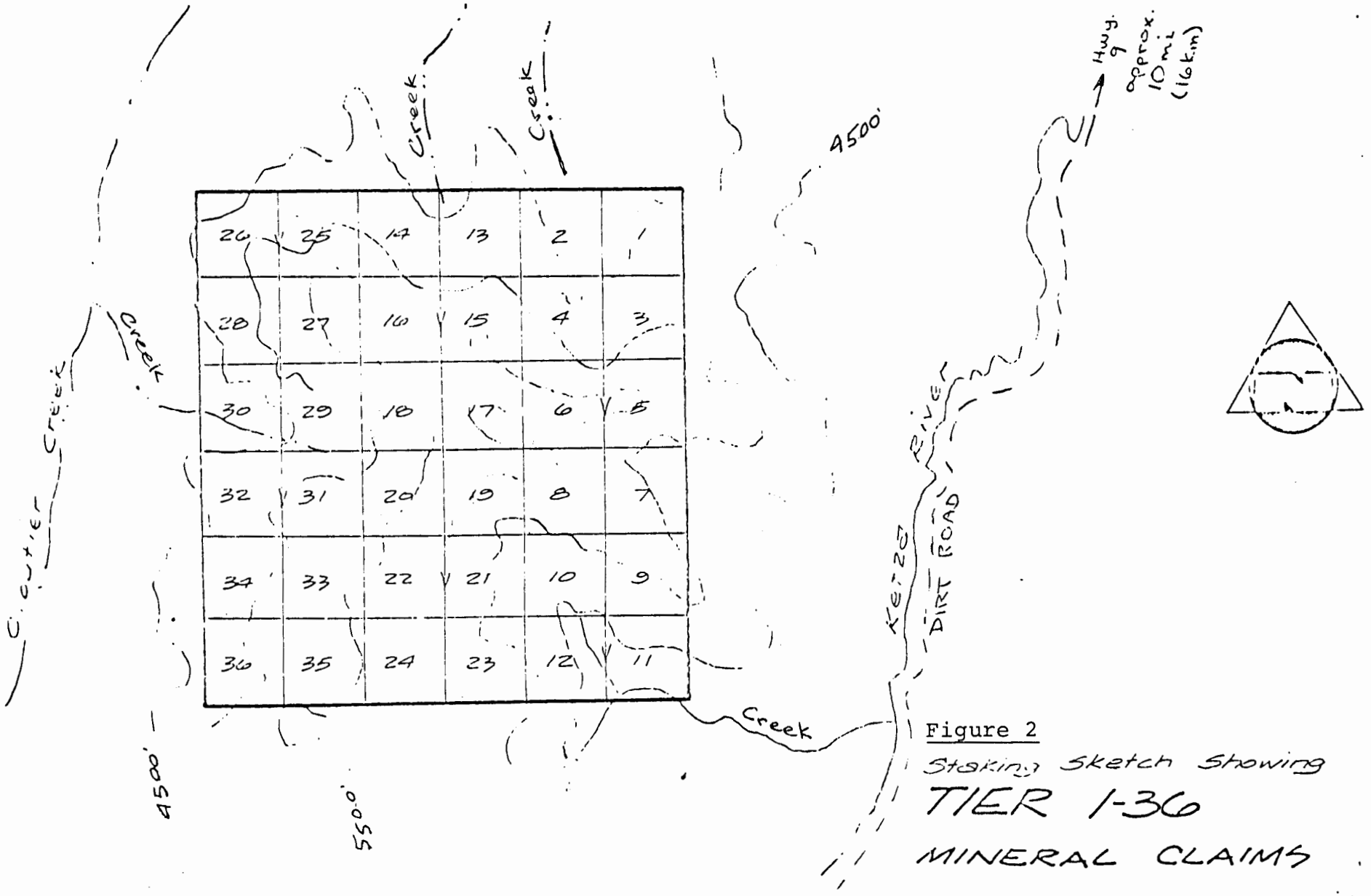

Figure 2

Staking Sketch Showing

TIER 1-36

MINERAL CLAIMS

Watson Lake Mining District

Map Sheet 105 F/9

Scale 1" = 2640'

I. INTRODUCTION

The TIER Claim group was staked on June 22nd, 1979 to cover a G.S.C. - U.R.P. stream sediment and water anomaly. On July 29, 1979 CanadianOxy conducted a reconnaissance geology-geochemistry survey over the claim group. This report presents the results of that survey.

II. LOCATION AND ACCESS

The TIER Claim group is located at 132°15'W, 61°40'N, and comprises 36 individual claims covering an area of 2.9 mi^2 (7.5 km^2). The claims lie within NTS map sheet 105F/9, Watson Lake Mining District, Yukon Territory. (Figure 1 and 2)

The claim group lies approximately 20 mi. (32 km) south-southeast of the town of Ross River and approximately 10 mi. (16 km) south of the Robert Campbell Highway (Highway 9). Access to the claims is via helicopter, approximately 10 to 15 minutes from Ross River. A dirt road runs south from the Robert Campbell Highway along the Ketza River to within 1 mile (1.6 km) east of the claim group.

III. PHYSIOGRAPHY AND VEGETATION

Relief over the TIER Claims is 1800 ft. (550 m) between elevations of 5800 ft. and 4000 ft. (1770 m and 1220 m) above sea level. The topography consists of relatively gentle (10°-40°) slopes with extensive talus cover and some almost vertical, rocky crags. Vegetation consists of buckbrush and trees below 4000 ft. (1220 m) and tundra flora (Labrador Tea, grass) above 5000 ft. (1525 m) (treeline).

IV. PREVIOUS WORK

The area south of the Pelly River, which includes the TIER Claim group, is and has been, the site of extensive prospecting for Pb-Zn-Ag mineralization. Several ongoing drilling and development projects are located in this region. To the author's knowledge, the TIER Claims themselves have not been previously explored. No evidence of previous work was found.

The Quiet Lake map sheet has been geologically mapped by numerous G.S.C. geologists from 1956 to 1976. In 1978 the G.S.C. conducted a helicopter mounted, regional stream sampling survey of the Quiet Lake sheet. The TIER Claims were staked to cover the headwaters of a stream sediment Mo-Cu-Ba-F anomaly (16 ppm Mo, 52 ppm Cu, 2500 ppm Ba, 1000 ppb F). (See Plan 12)

V. WORK COMPLETED - 1979

5.1 Staking

The TIER Claim group was staked on June 22nd, 1979 by MBW Surveys of Whitehorse, Y.T., for CanadianOxy. The claim group comprises 36 individual claims covering an area of 2.9 $mi.^2$ (7.5 km^2).

5.2 Geological Mapping

Hooper conducted reconnaissance mapping and prospecting on July 29th, 1979. Wallis, Sacks and Hooper visited the TIER Claims on August 1st, 1979. (see Appendix IV.) A total of 1.9 man days of work was performed.

5.3 Geochemistry

A total of 11 rock, 20 stream water, 20 stream sediment,

3 heavy mineral and 16 soil samples were collected over the TIER Claims by Jermackowicz, Pelletier and Zayachivsky, all of Canadian Oxy, on July 29th, 1979. All samples were sent to Chemex Labs Limited, Vancouver, B.C., for geochemical analysis. Analytical results are listed in Appendix I. A total of 3-man days of work was performed.

5.4 Summary of Work Completed

Type of Work	Man Days	No. Samples	No. Analyses Cu	Mo	Pb	Zn	Ag	U	Th	Sn	W	F	As	Total
Geological Mapping	1.9													
Geochemistry	3.0													
i) Rock		11	11	11	11	11	11	11	11	11	11	-	-	99
ii) Heavy Min.		3	3	3	3	3	3	3	3	3	3	-	-	27
iii) Sediments		20	20	20	20	20	20	20	20	-	-	-	-	140
iv) Waters		20	-	-	-	-	-	20	-	-	-	20	20	60
v) Soils		16	16	16	16	16	16	16	16	-	-	-	-	112
Helicopter	3.4 Hrs													
T O T A L	4.9	70												438

5.5 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, Samd 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

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VI. GEOLOGY

6.1 General Geology

Templeman-Kluit of the G.S.C. has compiled several previous mapping efforts in the Quiet Lake map sheet. (see References, Appendix V). The TIER Claims are shown to be underlain by a complex, Silurian to Mississippian stratigraphic assemblage comprising black shale and slate, which overlies dolomite and mudstone. This assemblage is underlain by a major, southwest dipping thrust plane. Sequentially below the thrust lies Upper Triassic bioclastic limestone and calcareous siltstone overlying Mississippian chert and

cherty tuff which overlies Upper Devonian and Mississippian black siliceous slate similar to that occurring in the overlying thrust slice.

Mapping by CanadianOxy shows the TIER Claims to be underlain by dolomite overlying chert and black shale overlying quartz and lithic arenites and arkose. The dolomite occupies a central, NW-SE trending ridge and may be a fault bounded thrust slice (Wheeler, et al., 1960), or part of a larger thrust slice (Templeman-Kluit, 1977). The clastic sediments appear to have been intruded by high level, felsic material.

6.2 Table of Formations

Unit	Description
2	Quartz arenite, lithic arenite, arkose
3	Chert, shale, felsic intrusive
1	Dolomite

6.3 Description of Rock Units

Description of rock samples and their element contents are presented in Appendix II.

Unit 1 - Dolomite

This unit consists of a light grey, buff and orange weathering, resistant, medium bedded, fine-grained, vuggy dolomite. Vugs are coated by euhedral quartz and dolomite crystals. (JH-TIER-7)

The unit is characterized by a scintillometer response of 50 cps. (Scintrex BGS-4)

Unit 2 - Chert, shale

This unit comprises fine-grained, dark grey chert (JH-TIER-6B, 8, 10), and schistose, black, fissile shale (JH-TIER-6A), and mudstone (JH-TIER-9). The chert is often cut by fine quartz stockworks and quartz filled fractures occur parallel to bedding in the shale and mudstone. In one sample of mudstone (JH-TIER-9), a cleavage is developed oblique to the bedding plane.

The unit is characterized by a scintillometer response of 50 to 390 cps. in the cherts and 140 to 230 cps. in the shales.

One sample (JH-TIER-5) may be a high level, very felsic intrusive.

Unit 3 - Quartz arenite, lithic arenite, arkose

This unit comprises fine-grained, massive, well indurated quartz arenite (JH-TIER-1) and arkose (JH-TIER-3), and schistose, chloritic lithic arenite (greywacke) (JH-TIER-2, 4). The arkose and quartz arenite are cut by quartz stringers and stained by limonite on fracture surfaces. Traces of disseminated pyrite occur.

The lithic arenite consists of quartz and shale fragments in a fine-grained, schistose and crenulated, chlorite-quartz-feldspar-lithic fragment matrix. Numerous finely laminated limonite boxworks occur. One sample (JH-TIER-4) is coated on fracture surfaces by bright orange gossan, probably consisting of limonite, hematite and goethite.

The unit is characterized by a variable scintillometer response ranging from 170 cps. in arkose to 385 cps. in quartz arenite, to 600 cps. in the lithic arenite with gossan coating.

6.4 Structure

Bedding was observed in the chert-shale unit. In the central portion of the claims, bedding strikes 090T and dips 070°S. Wheeler et al. (1960) report bedding in the northeast corner of the claims in the chert-shale unit at 100T/50°N, hence the possibility of antiformal folding of the chert-shale unit with older, intervening dolomite in the core of the antiform. A second interpretation, presented in Plan 1 and postulated by Wheeler, et al (1960) and Templeman-Kluit (1977), has Silurian to Devonian dolomite thrust from the southwest over Upper Devonian to Mississippian chert and black shale. Both possibilities are open at this time, due to lack of detailed structural data. Plan 1a shows schematic NS crossections illustrating both structural possibilities.

Jointing on the TIER Claims resolves into sets at 090T - 120T/50°-70°S, 090T - 120T/60°N-90°, 00T - 020T/60°-80°W and 160T/45°E. Within the chert-shale and arenite units fractures are usually filled by quartz and/or limonite.

6.5 Metamorphism

The only metamorphic feature noted on the TIER Claim group is the development of schistosity and cleavage in the arenite and chert-shale units. Whether this is a low grade regional effect or related to thrusting, is presently unknown.

6.6 Alteration

Bright orange and yellow gossan zones overlie arenite and the chert-shale intrusive unit in the central parts of the claim

group (See Plan 1). The gossan material consists of limonite, goethite and a bright yellow mineral, presently unidentified. Possibilities include uranium oxide and molybdite-ferrimolybdite. The latter is most likely, as a sample of this material (JH-TIER-5) contains only 1.5 ppm U and soils overlying the gossan zone contain up to 21 ppm Mo; a very high concentration. The sample is currently being analysed semi-quantitatively to determine its trace element content.

6.7 Economic Geology

1. No visible mineralization was noted with the exception of traces of disseminated pyrite in the arenite unit (JH-TIER-1).

2. Extensive bright gossan overlies arenite and chert-shale in the central part of the claim group. A sample of the gossan material is currently being analysed.

3. One sample of lithic arenite (JH-TIER-4) has a scintillometer response of 600 cps. (in situ) and a uranium content of 6.5 ppm; by far the highest on the TIER Claims, however, the potential for economic U mineralization is extremely limited due to the unfavourable geologic environment.

4. The potential exists for Cu-Pb-Zn-Mo sulphide mineralization within the clastic sedimentary units. Accessory elements would include Ag. This mineralization could be of vein replacement or stratiform type. The possibility of carbonate hosted sulphide mineralization within the dolomite unit should also be considered.

5. The possibility exists that the clastic sediments have been intruded by a high level, highly felsic intrusive (JH-TIER-5?). If so, the potential exists for Cu-Mo mineralization of vein or

porphyry type.

VII. GEOCHEMISTRY

Stream sediment, stream water, heavy mineral, rock and soil samples were collected over the TIER Claims and sent to Chemex Labs Ltd., Vancouver B.C. for geochemical analysis. Analytical results are listed in Appendix I and sampling and laboratory procedures are listed in Appendix III.

Mean, possibly anomalous and probably anomalous levels for each element in sediments, waters and heavy minerals were determined at the 50th, 84th and 97th percentile levels of cumulative frequency curves 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 and probably anomalous levels are listed in Table 1.

7.1 Rock Geochemistry (Plan 2, 3)

A total of 11 rock samples were collected over the TIER Claims and analysed for Cu, Mo, Pb, Zn, Ag, U, Th, Sn and W. One sample is currently undergoing 30 element semi-quantitative analysis.

1. 82 and 102 ppm Cu occur in two samples of lithic and feldspathic arenite in the south-central portion of the claim (JH-TIER-2,3). The average Cu content of sedimentary rocks ranges from 10 to 50 ppm. (Levinson, 1974)

2. 1.0 ppm Ag occurs in a sample of schistose mudstone in the northeast portion of the claims (JH-TIER-9).

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

3. 6.5 ppm U and 77 ppm Th occur in a sample of chloritic, schistose, lithic arenite (JH-TIER-4) in the south-central part of the claim group. The U/Th ratio is very low (0.08). U contents of all other rocks range from 0.5 to 1.5 ppm.

7.2 Heavy Mineral Geochemistry (Plan 4, 5, 6)

A total of 3 heavy mineral samples were collected from streams draining the northern and eastern parts of the claims and the extreme southern portion of the claims. Samples were analysed for Cu, Mo, Pb, Zn, Ag, U, Th, Sn and W.

1. 22 ppm Mo and 515 ppm Zn occur in a heavy mineral sample from the northeast corner of the claim group. The Mo value is extremely high and the Zn value is definitely anomalous.

2. 9 ppm Mo occurs in a sample from the eastern part of the claims in a stream draining the central dolomite ridge.

3. 96 ppm Cu, 21 ppm Mo, 820 ppm Zn and 1 ppm Ag occur in a sample just south of the claim group and postulated to be underlain by the arenite unit (Wheeler et al., 1960).

7.3 Stream Sediment Geochemistry (Plan 4, 7, 8)

A total of 20 stream sediment samples were collected over the claims and analysed for Cu, Mo, Pb, Zn, Ag, U and Th. Sample interval was 500 ft. (150 m).

1. 44 to 50 ppm Cu and 12 to 14 ppm Mo occur over a sampled length of 1300 ft. (400 m) in a stream in the north-central portion of the claims. The stream drains dolomite, shale, chert and felsic intrusives.

2. 48 to 62 ppm Cu, 6 to 12 ppm Mo, 194 to 250 ppm Zn and 0.6 ppm Ag occur over a sampled length of 1300 ft. (400 m) in a stream draining chert, black shale and felsic volcanics in the northeast corner of the claims.

3. 28 to 50 ppm Cu, 3 to 8 ppm Mo and 116 to 196 ppm Zn occur over a sampled length of 1300 ft. in a stream draining dolomite in the east-central part of the claims.

4. 38 to 52 ppm Cu, 6 to 13 ppm Mo, 146 to 350 ppm Zn and 0.4 to 1.2 ppm Ag occur over a sampled length of 5300 ft. (1615 m) in a stream draining immediately south of the claim group. The source area is likely to be immediately south of the claim group.

5. A G.S.C. - U.R.P. sediment sample from the stream draining the western part of the claims contained 0.6 ppm Ag and 420 ppm Zn, and the coincident water sample contained 1000 ppb F. (Plan 12)

7.4 Stream Water Geochemistry (Plan 4, 9)

Stream water samples were collected at each stream sediment site and analysed in the laboratory for U, F, and As, and in the field for pH and specific conductivity. (S.C.)

1. 3.0 to 3.8 ppb U occurs in waters draining the north-central part of the claims. Anomalous S.C. (310 to 350 micro mohs/cm) and high pH (8.4 - 8.8) accompany high U contents. Examination of correlation co-efficients indicates excellent correlation between U, pH and S.C. (0.7). Accompanying stream sediments

are low in U (3 ppm). The stream drains dolomite (high pH), chert, felsic intrusives and black shales.

2. 0.4 to 1.4 ppb U accompanied by anomalous S.C. (280 - 430) and high pH (7.8 - 8.1) occur in the east-central part of the claims draining the dolomite ridge. Accompanying sediments are low in U (2 ppm).

3. 0.2 to 0.8 ppb U, anomalous S.C. (61 to 200 m. mohs/cm), and pH occur in the stream just south of the claims. Spot anomalies of up to 200 ppb F also occur.

In summary, high U in waters is accompanied by anomalous S.C. and high pH. U contents in accompanying stream sediments are low. Excellent correlation exists between U, pH and S.C. The significance of this correlation is unknown. The correlation may reflect anomalies due to concentration of background U in a high S.C. - pH environment.

7.5 Soil Geochemistry (Plan 4, 10, 11)

A total of 16 soil samples were collected from talus fines and analysed for Cu, Mo, Pb, Zn, Ag, U and Th.

1. 3 to 22 ppm Mo, 28 to 100 ppm Pb, 58 to 280 ppm Zn and spot highs up to 1.4 ppm Ag occur in a broad, northwesterly trending zone, approximately 5000 ft. (1525 m) long in the southwest quarter of the claim group. Highest Mo and Ag values occur overlying the gossan zone and the felsic in-

trusives in the center of this area. There is a spatial correlation of Mo, Zn, and Ag highs. It should be noted that this "zone" consists of one curved traverse, however, high Mo, Zn and Ag values are persistent along it.

2. 11 and 13 ppm Mo, 28 and 40 ppm Cu, 240 and 295 ppm Zn and 0.2 and 0.4 ppm Ag occur in two samples in the eastern part of the claims. This anomaly is 650 ft. (200 m) in length and defines the source area for anomalous Mo, Cu and Zn in stream sediments and heavy minerals in the stream draining this area. The area is underlain by dolomite, chert, black shale and felsic intrusives.

3. Spot highs of Cu (34 ppm), Mo (4 ppm) and Zn (185 ppm) occur in soils adjacent to the lower reaches of streams containing anomalous contents of the same elements in the northern part of the claims.

VIII. CONCLUSIONS

1. The TIER Claims are underlain by a sedimentary assemblage comprising feldspathic and lithic arenites, chert, black shale and dolomite which has likely been intruded by felsic material. The claims are probably cut by a NW trending and SW dipping thrust fault which has thrust older dolomite over younger cherts and black shales. Whether the felsic intrusion is pre or post-thrust is unknown.

2. Bright orange gossan, possibly containing molybdite, overlies arenite, shale and felsic intrusives in the central part of the claims

and coincides with an intense Mo soil anomaly.

3. Heavy mineral and stream sediment samples from the northern and eastern portions of the claim group contain highly anomalous contents of Mo, Zn and lesser anomalous contents of Cu, Pb, and Ag. Geology in this area is poorly understood to comprise 'black shales, cherts and possibly felsic intrusives

4. Strong Mo, Zn and Ag anomalies occur in sediments and heavy minerals draining the area immediately south of the claims. The area is probably underlain by arenites, chert and black shale.

5. The potential for U mineralization is extremely poor. U water anomalies do occur, however, in the north-central parts of the claims, but may simply reflect the good correlation with anomalous specific conductivity.

6. Potential mineralization on the TIER Claims would include Pb-Zn-Ag sulphides in black shales and Cu-Mo porphyry or vein mineralization (note; stockwork quartz veins in the cherts) associated with high level, fine-grained, felsic intrusives.

IX. RECOMMENDATIONS

1. Systematic 1" = 400 ft. scale geological mapping and prospecting should be conducted over the TIER Claims.

2. Systematic soil surveys at 800 ft. by 200 ft. centers should be carried out.

3. The area immediately to the south of the claims should be prospected and possibly staked.

4. Emphasis during mapping should be placed on delineating gossan zones, felsic intrusives, black shales and unravelling the complex structure.

5. 1" = 400 ft. air photo blowups should be used for all future work.

6. All streams traversed by the soil survey should be sampled for sediment and heavy minerals and the samples analysed for base metals and Ag.

Respectfully submitted

Eric James Sacks

Eric J. Sacks, M. Sc.

Toronto,

November 1979.

APPENDIX I

ANALYTICAL RESULTS

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 49361

INVOICE NO. 31943

Th-32440

RECEIVED Aug. 3/79

ANALYSED Aug. 16/79

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

ATTN: WATSU-Rock CC. E. Sacks

SAMPLE NO. :	PPM Cu	PPM Mo	PPM Pb	PPM Zn	PPM Ag	PPM U	PPM Th	PPM Sn	PPM W
JH-OXY-1	52	1	1	16	0.2	1.0	< 1	1	1
2	8	2	4	22	0.2	1.0	< 1	1	1
3	6	1	1	52	0.4	< 0.5	< 1	1	3
4	2	1	2	16	0.1	< 0.5	< 1	1	1
5	46	2	2	28	0.1	23.0	6	1	1
6	4	1	4	40	0.1	4.5	51	3	1
7	26	1	4	62	0.1	6.5	6	1	3
8	8	1	10	10	0.1	14.0	39	1	3
9	62	1	2	28	0.1	< 0.5	3	1	1
9a	28	1	4	52	0.1	< 0.5	4	2	1
JH-OXY-10	8	1	16	40	0.1	9.0	40	1	1
ES-CLO-1a	4	2	4	8	0.1	< 0.5	31	1	1
1b	4	3	12	8	0.1	0.5	30	1	1
2	12	1	16	4	0.1	< 0.5	21	1	1
3	10	2	10	8	0.4	1.0	35	1	1
4	98	2	2	50	0.2	0.5	4	1	1
5	16	1	120	8	2.0	1.0	14	1	1
6a	52	1	4	22	0.1	0.5	2	1	1
ES-CLO-6b	8	1	2	50	0.1	0.5	5	1	1
JH-Tier-1	2	3	16	2	0.2	0.5	16	1	2
2	102	1	4	88	0.1	0.5	4	1	1
3	82	2	2	46	0.2	1.0	4	1	1
4	6	2	10	74	0.2	6.5	77	1	4
5	4	2	14	8	0.1	1.5	35	1	2
6a	6	2	26	14	0.4	0.5	11	1	2
6b	4	1	2	24	0.1	1.5	2	1	1
7	2	1	1	6	0.1	1.5	< 1	1	1
8	4	1	8	6	0.2	0.5	4	1	1
9	40	1	10	50	1.0	0.5	6	1	1
10	4	1	2	2	0.2	< 0.5	2	1	1
JH-Bigox-1	6	1	2	60	0.2	2.0	21	1	1
2	4	1	1	90	0.1	1.5	19	1	1
3	2	1	8	28	0.2	3.5	54	2	200
4	2	1	4	28	0.2	7.5	38	2	2
5	2	1	6	14	0.1	10.0	30	1	1
JH-Bigox-6	Missing	-	next page	-	-	-	< 1	-	-
ES-Bigox-1	4	1	4	20	0.1	1.5	33	1	8
2a	2	1	8	10	0.1	9.0	39	1	20
ES-Bigox-2b	6	2	14	22	0.6	25.5	40	1	20

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: Hart Biddle

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

CHEMEX LABS LTD.

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 49353

TO: Canadian Occidental Petroleum Ltd.,
Minerals Division
311 - 215 Carlingview Dr.,
Rexdale, Ont.,
M9W 5X8

INVOICE NO. 31746

RECEIVED August 3, 1979

ANALYSED August 10, 1979

ATTN: WATSU - TIER - WATERS
c.c. Penticton

SAMPLE NO. :	PPB U	PPB F	PPB As
79 WT 1300	3.0	50	<2
1401	3.6	50	<2
1402	3.6	55	<2
1403	3.8	55	<2
1409	0.2	35	<2
1410	0.2	30	<2
1411	0.2	35	<2
1412	0.2	30	<2
1509	0.2	20	<2
1510	0.4	30	<2
1511	0.4	200	<2
1512	0.4	200	<2
1513	0.2	20	<2
1514	0.4	140	<2
1515	0.8	155	<2
1516	0.6	120	<2
1517	0.4	25	<2
1520	0.4	20	<2
1521	0.4	25	<2
79 WT 1522	1.4	50	<2

CTA MEMBER CANADIAN TESTING ASSOCIATION

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AREA CODE: 604
TELEX: 043-52597

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 49343

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

INVOICE NO. 31920

RECEIVED Th-32448 Aug. 3/79

ATTN: WATSU-Tier-Stream Silts CC. E. Sacks

ANALYSED Aug. 16/79

SAMPLE NO. :	PPM Cu	PPM Mo	PPM Pb	PPM Zn	PPM Ag	PPM U	PPM Th
79 WT 1300	50	14	8	114	0.2	3.0	10
1401	44	12	6	82	0.1	3.0	9
1402	50	14	8	114	0.1	3.0	9
1403	50	12	10	114	0.1	3.0	8
1409	48	11	8	240	0.2	2.5	11
1410	56	9	8	250	0.6	2.0	10
1411	52	6	10	196	0.6	1.5	9
1412	62	12	6	194	0.6	3.0	11
1509	38	11	14	146	0.8	1.5	12
1510	52	11	16	198	0.8	5.0	13
1511	42	6	18	350	0.6	4.0	12
1512	50	11	12	168	0.1	2.5	13
1513	50	7	26	210	1.2	2.5	12
1514	48	13	18	260	0.4	3.0	15
1515	42	10	18	270	0.6	3.0	14
1516	40	9	16	200	0.6	2.5	14
1517	40	9	22	220	1.0	2.0	16
1520	50	8	8	196	0.4	2.0	11
1521	38	3	6	120	0.1	2.0	8
79 WT 1522	28	4	6	116	0.1	2.5	9

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: Hank Biddle

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AREA CODE: 604
TELEX: 043-52597

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 49350

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

INVOICE NO. 32463, Th - 32606

RECEIVED Aug. 3/79

ANALYSED Sept. 7/79

ATTN: WATSU-TIER-Heavy Minerals E. Sacks

SAMPLE NO. :	PPM Cu	PPM Mo	PPM Pb	PPM Zn	PPM Ag	PPM Sn	PPM W	PPM U	PPM Th (N.A.)
79 WT 1409	44	22	6	515	0.2	1	1	2.5	4
1514	96	21	40	820	1.0	1	1	4.5	12
1522	44	9	52	152	0.2	1	1	2.0	5

	Total	-10 fraction	-10 magnetic	-10 Non mag.
79 WT 1409	601	398	0.00	11.32
1514	376	270	0.04	5.42
1522	737	484	0.01	14.11

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: Hart Biddle

212 BROOKSBANK AVE.
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TELEPHONE: [redacted] 984-0221
AREA CODE: 604
TELEX: 043-52597

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 49325

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

INVOICE NO. 31828
Th-32440

RECEIVED Aug. 3/79

ANALYSED Aug. 13/79

ATTN: WATSU-Tier-Soils CC. E. Sacks

SAMPLE NO. :	PPM Cu	PPM Mo	PPM Pb	PPM Zn	PPM Ag	PPM U	PPM Th
79 WT 1343	14	9	52	58	0.8	1.0	16
1344	58	3	28	280	0.1	< 0.5	10
1345	8	3	34	26	0.1	1.5	31
1346	14	21	100	62	0.4	0.5	38
1347	12	12	82	38	1.4	< 0.5	34
1348	12	4	94	48	0.2	< 0.5	52
1349	12	22	76	62	0.1	< 0.5	40
1350	18	5	30	148	0.2	1.0	22
1351	14	3	34	92	0.1	0.5	9
1404	24	2	10	84	0.2	< 0.5	8
1405	28	4	14	184	0.8	1.0/	20
1406	12	1	2	20	0.1	0.5	7
1407	16	4	8	120	0.2	0.5	9
1408	34	4	18	186	0.1	1.0	12
1518	40	13	22	295	0.4	1.0	11
79 WT 1519	28	11	34	240	0.2	1.0	12

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: Howard Biddle

X-RAY ASSAY LABORATORIES

LIMITED

45 LESMILL ROAD DON MILLS ONTARIO M3B 2T8 445-5755

Certificate of Analysis

NO. 6429 PAGE 1 of 1

TO. Canadian Occidential Petroleum Ltd.
Ste. 311 - 215 Carlingview Dr.
Rexdale, Ontario

RECEIVED December 14, 1979 INVOICE NO. 6429

SAMPLE(S) OF 1 rock SUBMITTED TO US SHOW RESULTS AS FOLLOWS:

Element	Sens*	Concentration JH-TIER-5	Element	Sens*	Concentration JH-TIER-5
Antimony	(4)	ND	Manganese	(1)	ND
Arsenic	(4)	ND	Mercury	(4)	ND
Beryllium	(2)	ND	Molybdenum	(3)	FT
Bismuth	(2)	ND	Nickel	(1)	ND
Cadmium	(4)	ND	Silver	(1)	ND
Cerium	(5)	ND	Tantalum	(5)	ND
Columbium	(4)	ND	Thorium	(3)	ND
Chromium	(4)	ND	Tin	(2)	FT
Cobalt	(3)	ND	Titanium	(2)	T
Copper	(1)	FT	Tungsten	(4)	ND
Gallium	(2)	FT	Uranium	(3)	ND
Germanium	(1)	ND	Vanadium	(2)	FT
Iron	(2)	M	Yttrium	(3)	ND
Lead	(2)	FT	Zinc	(4)	ND
Lithium	(4)	ND	Zirconium	(4)	T

LEGEND

Key To Symbols

H - 10% plus	L - 0.1-1%	
MH - 5-15%	TL - 0.05-0.5%	
M - 1-10%	T - 0.01-0.1%	
LM - 0.5-5%	FT - 0.01% or less	
	ND - Not detected	

*Sensitivity (limit of detection)

1- 0.0005-0.001%
2- 0.001-0.005%
3- 0.005- 0.01%
4- 0.01 - 0.05%
5- 0.05 - 0.1%

Note: Better sensitivities can be obtained with special techniques, if and when required.

X-RAY ASSAY LABORATORIES LIMITED

CERTIFIED BY J Eaq

DATE January 11, 1980

APPENDIX II - ROCK DESCRIPTIONS AND ELEMENTAL CONTENTS

Sample No. (Scint-BGS-4)	Name	Description	Analyses (ppm) Cu	Mo	Pb	Zn	Ag	U	Th	Sn	W	U/Th
JH-TIER-1 (385)	Impure Quartz arenite	Fine gr., dk. grey, massive well indurated; trace disseminated Py; limonite fracture fillings; one fracture surface filled by vuggy, euhedral quartz.	2	3	16	2	0.2	0.5	16	1	2	.03
JH-TIER-2 (210)	Schistose lithic arenite	Angular fragments of qtz., shale in schistose, chloritic matrix; well indurated; pods limonite and limonite filling fine fractures; possibly brecciated; crenulated foliation.	102	1	4	88	0.1	0.5	4	1	1	.13
JH-TIER-3 (170)	Arkose (Feldspathic arenite)	F. grained; angular qtz frags. in finer grained, well indurated arkosic matrix; crosscutting quartz stringers; lt stain adjacent to quartz stringers and fracture surfaces.	82	2	2	46	0.2	1.0	4	1	1	.25
JH-TIER-4 (600)	Schistose lithic arenite	As JH-TIER-2, gossan.	6	2	10	74	0.2	6.5	77	1	4	.08

APPENDIX II - ROCK DESCRIPTIONS AND ELEMENTAL CONTENTS

Sample No. (Scint-BGS-4)	Name	Description	Analyses (ppm) Cu	Mo	Pb	Zn	Ag	U	Th	Sn	W	U/Th
JH-TIER-5 (390)	Felsic intrusive or volcanic?	Fine grained, massive; fracture surfaces coated with very bright orange and yellow gossan (limonite, goethite, hematite, molybdite?); very dense.	4	2	14	8	0.1	1.5	35	1	2	.04
JH-TIER-6A (230)	Black shale	Thinly laminated, fissile, black shale.	6	2	26	14	0.4	0.5	11	1	2	.05
JH-TIER-6B	Chert	Fine grained, dk grey; qtz stockwork veining; limonite fracture filling; gossan.	4	1	2	24	0.1	1.5	2	1	1	.75
JH-TIER-7 (50)	Dolomite	Light grey, fine grained; vugs coated by euhedral quartz crystals or dolomite crystals; massive.	2	1	1	6	0.1	1.5	<1	1	1	1.5
JH-TIER-8 (90)	Chert	Fine grained, grey, quartz stockwork veining.	4	1	8	6	0.2	0.5	4	1	1	.12
JH-TIER-9 (140)	Schistose mudstone	Dark grey, moderately indurated, fine but irregularly laminated, cleavage developed oblique to foliation, quartz fracture filling.	40	1	10	50	1.0	0.5	6	1	1	.08

APPENDIX II - ROCK DESCRIPTIONS AND ELEMENTAL CONTENTS

Sample No. (Scint-BGS-4)	Name	Description	Analyses (ppm) Cu	Mo	Pb	Zn	Ag	U	Th	Sn	W	U/Th
JH-TIER-10 (50)	Chert	Dark grey with fracture surfaces bleached white.	4	1	2	2	0.2	<5	2	1	1	<.25

Appendix III - Sampling and Laboratory Procedures

I. SAMPLING PROCEDURES

A) Heavy Minerals

1. A sample site is selcted which exhibits maximum sorting of stream bed material. Active (below water) or previously active (dry now but previously below water) sites may be chosen. Leading edges or sides of gravel bars with large boulders are most attractive. In practice, the ideal case is rare and one chooses the best possible site.

2. Gravel and cobble material is shoveled into a large (18" to 24") gold pan into which 1/4" holes have been drilled. The material is vigourously shaken in still water so that - 1/4 in. material passes the screen into a second, matching pan. Enough -1/4 in. material is collected to fill an 18" x 24" poly bag (usually one large pan or two smaller ones). The -1/4" material is returned to camp.

3. The - 1/4 in. material is panned to achieve a concentrate of heavy minerals and aggregates containing heavy minerals. Approximately 80% of the original material (20 - 25 lbs) is discarded while a 1 - 2 lb. concentrate is obtained. The concentrate is sealed in a plastic or cloth bag (cloth is preferred as it allows

the sample to dry, thus reducing shipping weight) and then sent to the laboratory for geochemical analysis.

B) Stream Sediment

1. A presently or previously active stream site is selected which exhibits minimum sorting ie. quiet water, and accumulation of fine sandy and silty material. If the stream is too active, material can be obtained from bank-moss which acts as a trap, or by digging out the lee of large boulders.

2. Three to four handfuls of material is collected and after squeezing to remove excess water is placed in high wet-strength, heavy duty, prenumbered kraft envelopes. The samples are dried in the field and then sent to the laboratory for geochemical analysis.

C) Stream Water

1. A 4 oz. poly bottle is rinsed with the sample site water at least three times then filled fully and tightly capped. The sample is tested in the field for pH and specific conductivity, then sent to the laboratory for geochemical analysis.

2. Care should be taken to avoid contamination by always collecting waters up-stream from a heavy mineral or sediment sample site.

D) Soil

1. 'B' horizon or talus fine material is sampled.

2. Three to four handfuls of material are collected into heavy duty, high wet-strength kraft envelopes which are dried in the field and then sent to the laboratory for analysis.

E) Sample Site Information Card

1. At each soil or stream sample site, an 80 column field data card is completed. The sampler records such information as sample number, location and type, depth of stream, sample composition, vegetation, drainage, etc. Separate cards are used for stream and soil samples in order to record pertinent information.

II. 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. $\geq$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°c 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 ($HClO_4$-HNO_3) 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.

Element	Bkgd. Corr.	Flame Type	Wave Length hm	Detection Limit	Chemex Standard	± 1 Std. Deviation
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 anaylsed 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^{o}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 X 10^{10} to $10^{15}/cm^2$.

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, $HClO_4$-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 Na_2CO_3-K_2CO_3-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) F in 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 $NaCO_3$-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 Conducitvity (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 TIER Claim Group.

TIER Claims (1-36) NTS 105F9 August 1, 1979

Commodity (Ag-Mo-Zn-Pb) RHW, EJS, JH

Over 2000 feet of relief, from buckbrush and trees below 4000 feet to above trieeline at 5000 feet. Relatively gentle slopes with extensive talus and some rocky crags. No need for picketed lines, but need airphoto blow-ups to sort out specific details of the topography, however, 1:50,000 topographic do exist for these claism.

As with CLO, the geology is complex, according to Templeman-Kluit(1977); the eastern NW-SE 6000 foot ridge is made SDd = Silurian and ?Lower Devonian, resistant, light grey, buff and orange weathering, medium bedded dolomite-mudstone-calcarenite with many shallow water sedimentary features.

Stratigraphically above this, to the west, lies uDMs = Upper Devonian and Mississippian black, recessive weathering, with rusty streaks, and thin bedded, black siliceous slate interbedded chert greywacke and grit; includes lenses of intermediate to acid volcaniclastic rocks.

Below the grey dolomite ridge of SDd, lies a major thrust plane, sequentially below this lies:

uKsc = Upper Triassic, dark grey and buff weathering, recessive, thin bedded bioclastic limestone and calcareous siltstone, this unit overlies -

Mt. = Mississippian, rusty orange weathering resistant, apple green and dark grey chert and cherty tuff, which overlies -

uDMs, for which see above.

The extremely striking gossan, marked on Templeman-Kluit's map is a bright-vividly so, tomato ketchup stain running down a west-facing spur. No obvious mineralization is present. The gossan would lie in unit uDMs.

APPENDIX V

REFERENCES

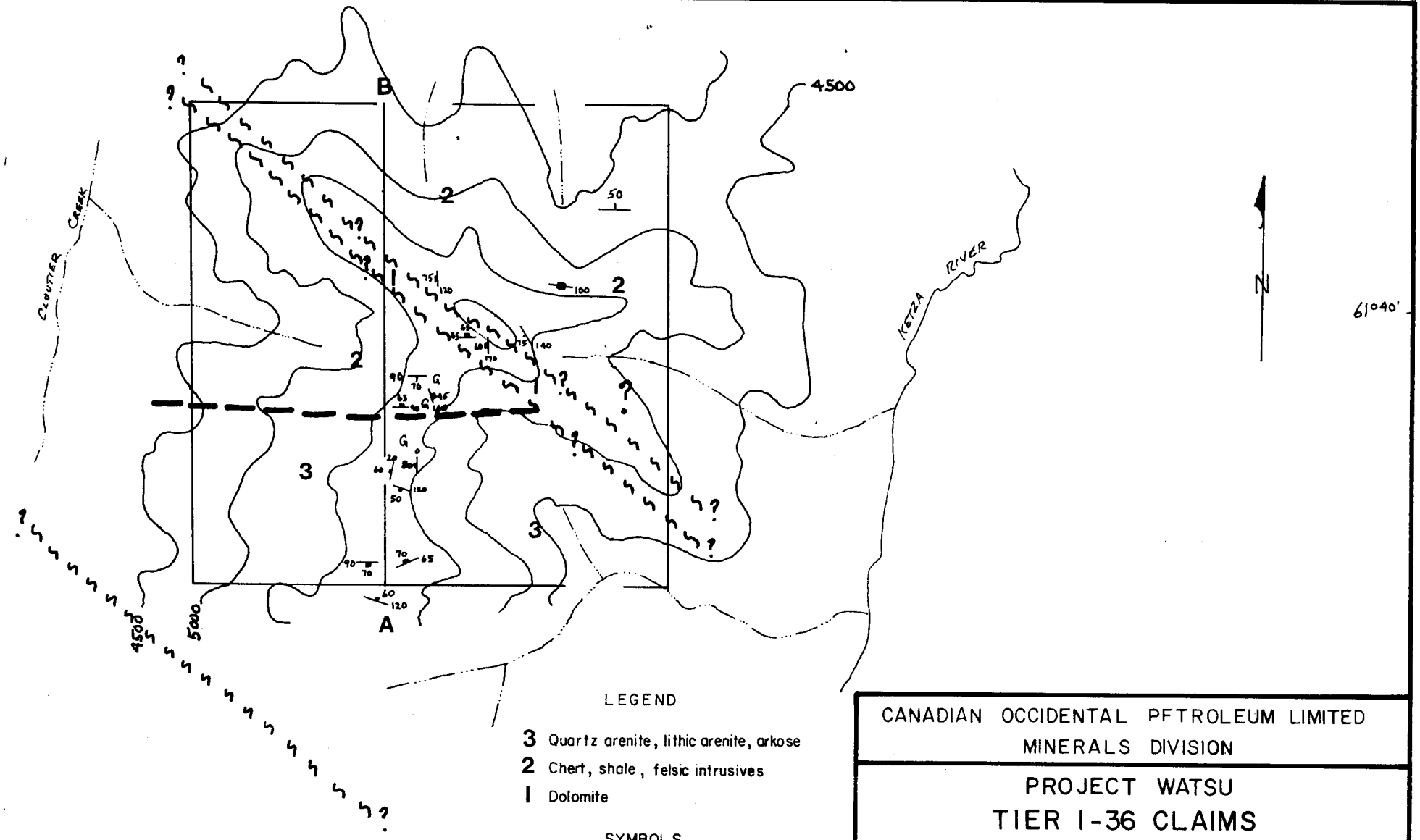
1. G.S.C. (1978): U.R.P. Stream Sediment and Water Geochemical Survey, Southern Yukon Territory, 1978 - Quiet Lake Sheet NTS 105F; O.F.R. 564.

2. Levinson, A. (1974): Introduction to Exploration Geochemistry; Applied Publishing, Calgary.

3. Templeman-Kluit, D.J. (1977): Quiet Lake (105F) and Finlayson Lake (105G) Map Areas; G.S.C. O.F.R. 486.

4. Wheeler, J., Green, L. and Roddick, J. (1960):

Geology of Quiet Lake Map Sheet, Yukon Territory; G.S.C. Map 7 - 1960, Preliminary Series, Sheet 105F.



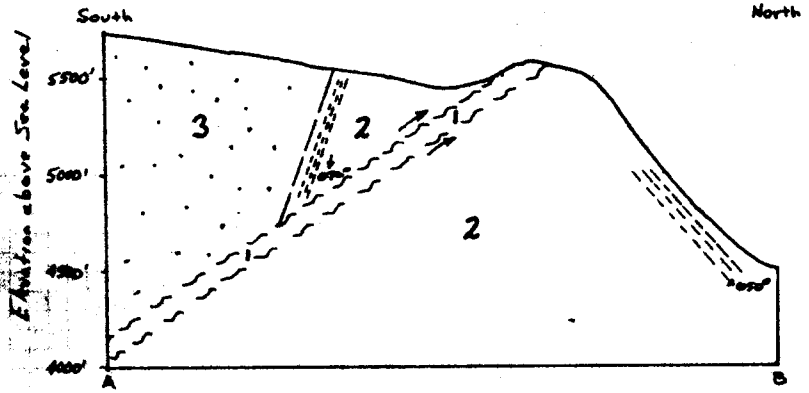
CANADIAN OCCIDENTAL PETROLEUM LIMITED
MINERALS DIVISION

PROJECT WATSU
TIER I-36 CLAIMS
YUKON TERRITORY

GEOLOGY

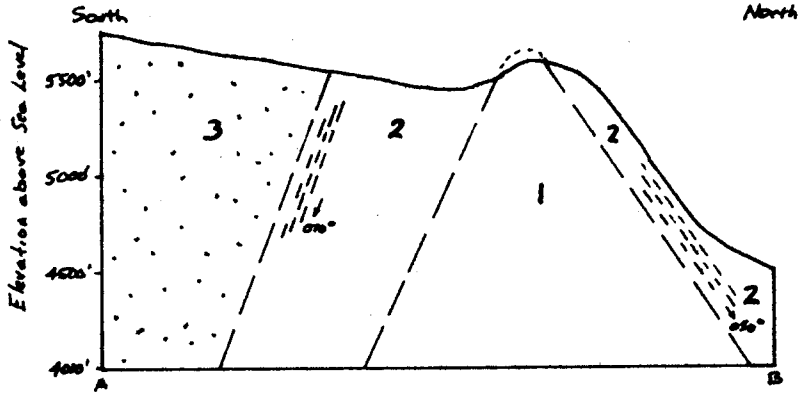
Scale: 1" = 2640' (1/2 mile) PLAN 1 September, 1979

PLAN 1a - Schematic Vertical Sections A-B (South to North) Illustrating Possible Structural Interpretations of the TIER Claim Group.



1 - Structural Interpretation of Wheeler, et al. (1960) -

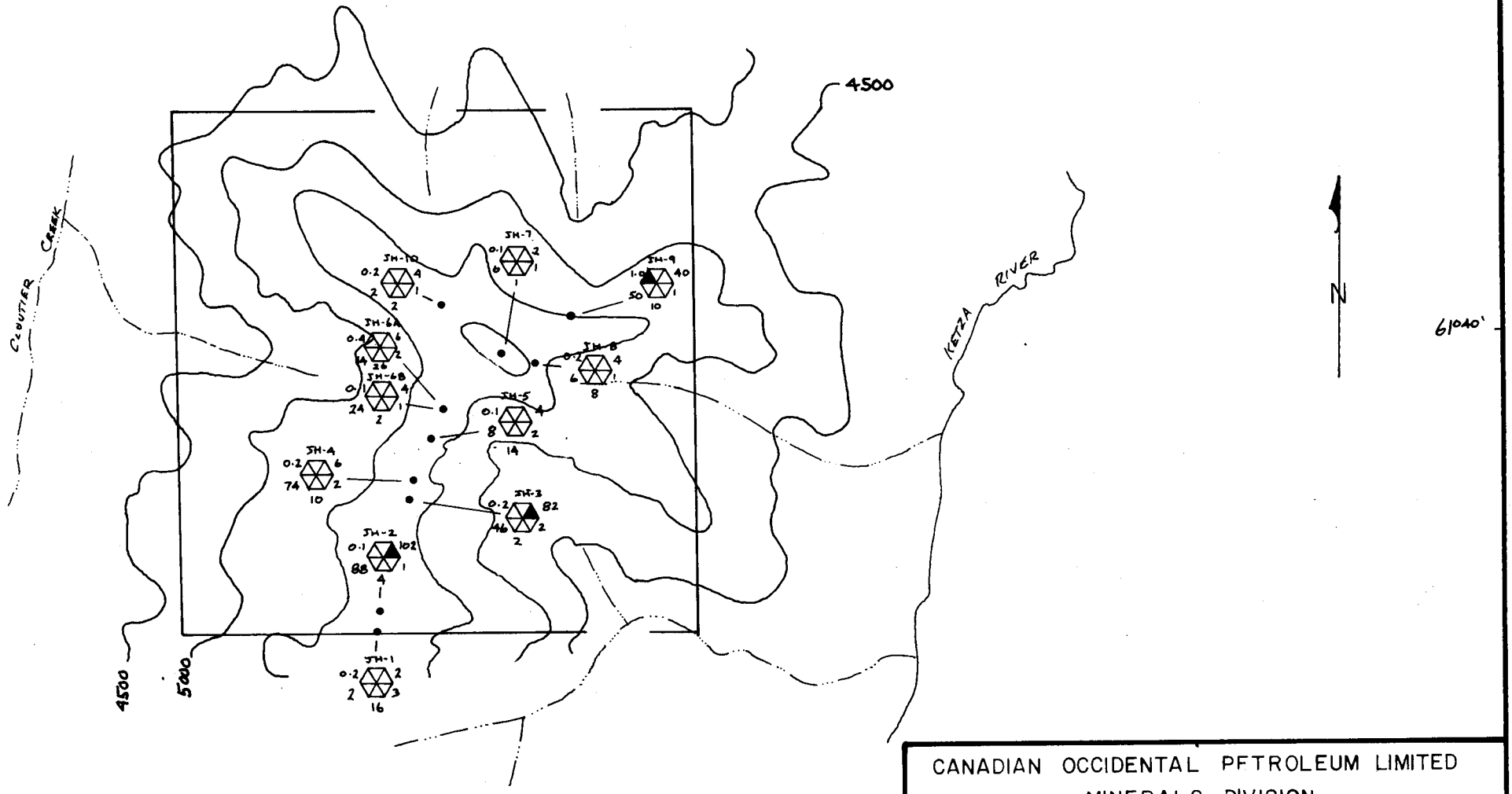
Southern part of claims comprise thrust sheet thrust to the northwest with older dolomite (UNIT 1) overlying younger chert and shale (UNIT 2). In this case there is no relation between variable dips in the chert-shale unit. This case is illustrated in PLAN 1.



2 - Alternative Structural Interpretation - Antiformal Fold -

In this case the older dolomite (UNIT 1) lies in the core of an antiform with chert and shale (UNIT 2) on the flanks of an asymmetric fold.

Horizontal Scale: 1" = 2640'



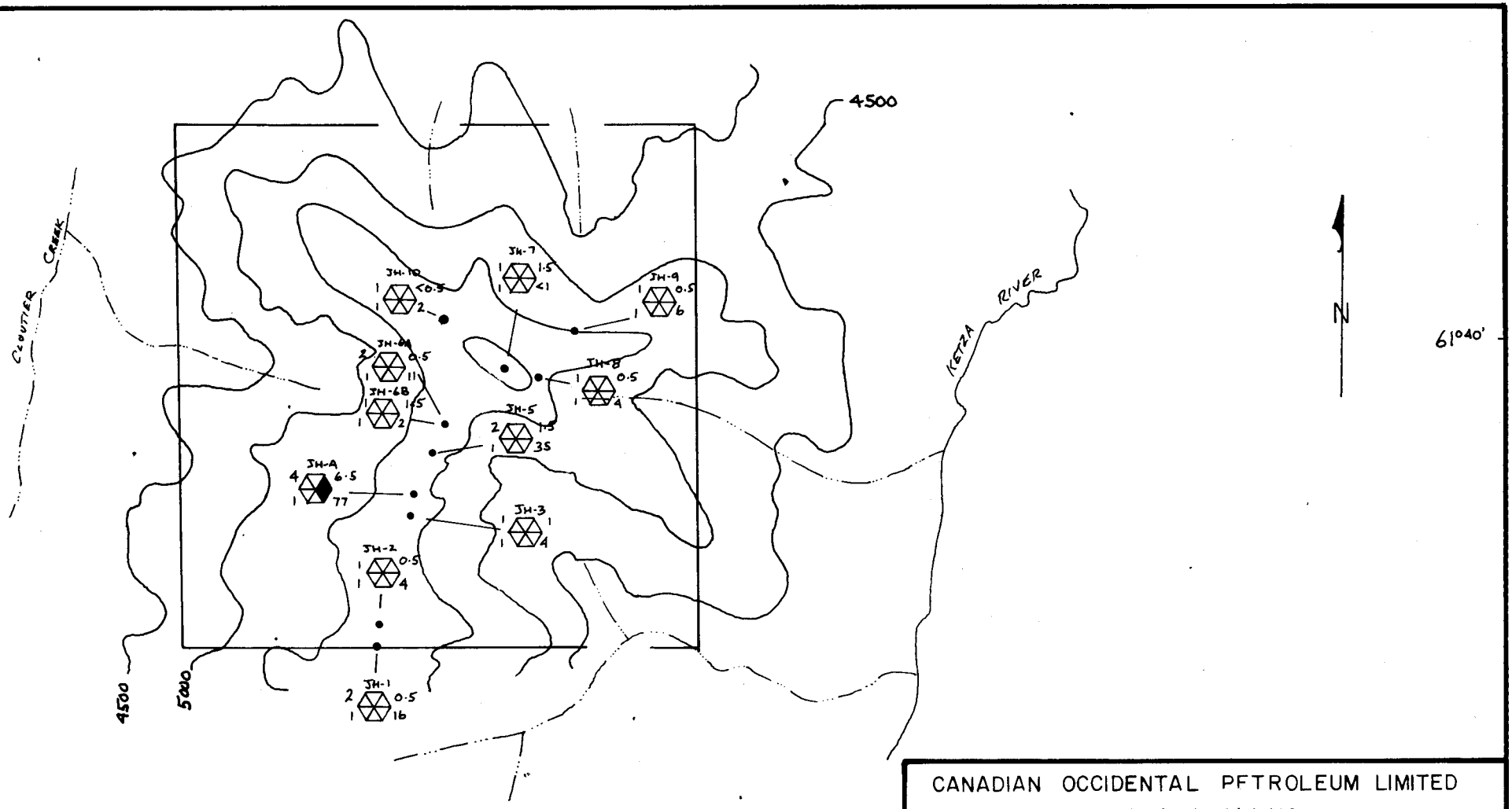
CANADIAN OCCIDENTAL PETROLEUM LIMITED
MINERALS DIVISION

PROJECT WATSU
TIER I-36 CLAIMS
YUKON TERRITORY

ROCK GEOCHEMISTRY

Cu - Mo - Pb - Zn - Ag

Scale: 1" = 2640' (1/2 mile) PLAN **2** September, 1979



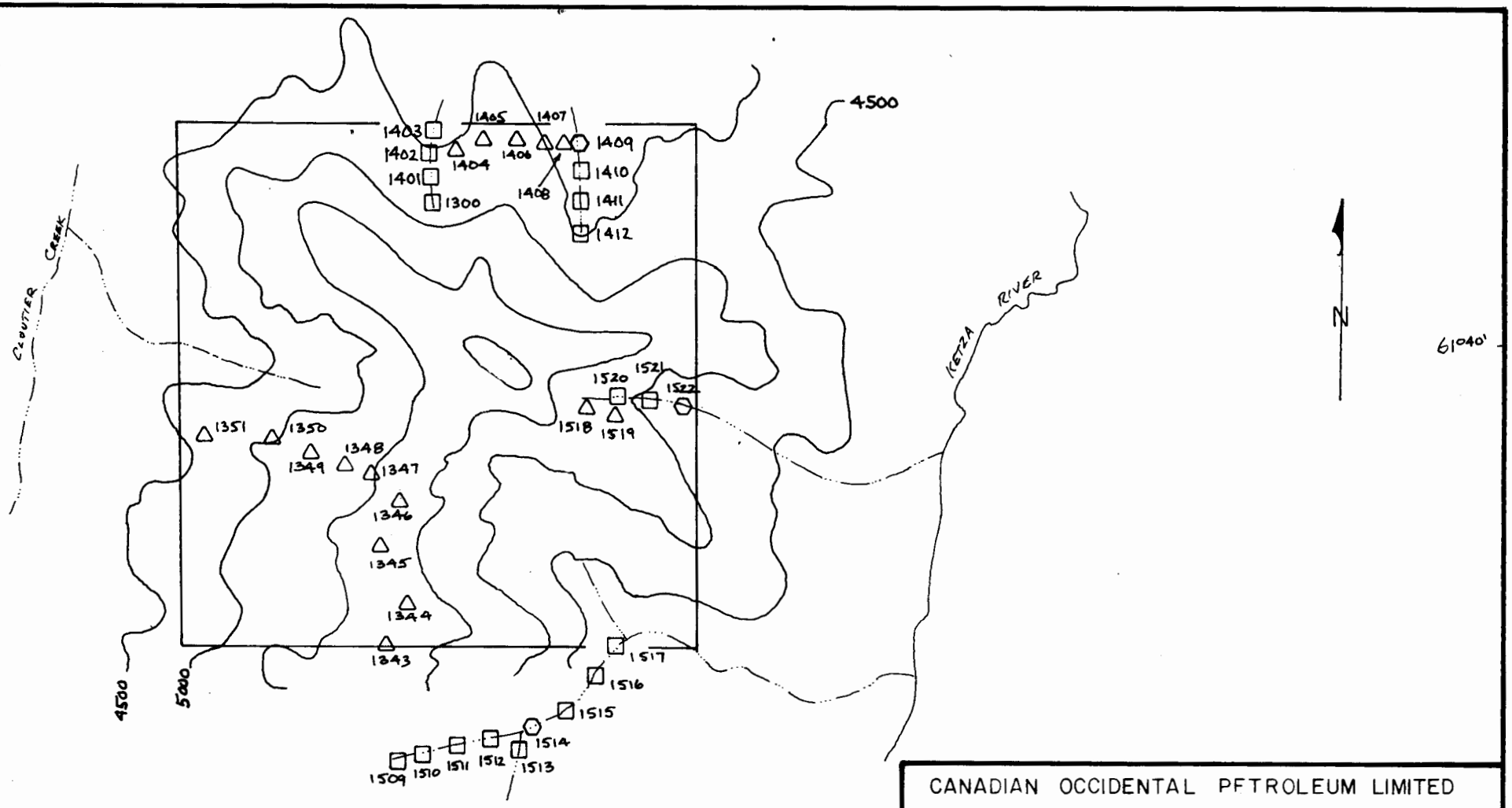
CANADIAN OCCIDENTAL PETROLEUM LIMITED
MINERALS DIVISION

PROJECT WATSU
TIER I-36 CLAIMS
YUKON TERRITORY

ROCK GEOCHEMISTRY

U - Th - Sn - W

Scale 1" = 2640' (1/2 mile) PLAN 3 September, 1979



LEGEND

△ Soil

▣ Sediment & water

⬡ Heavy mineral & sediment & water

132° 15'

CANADIAN OCCIDENTAL PETROLEUM LIMITED
MINERALS DIVISION

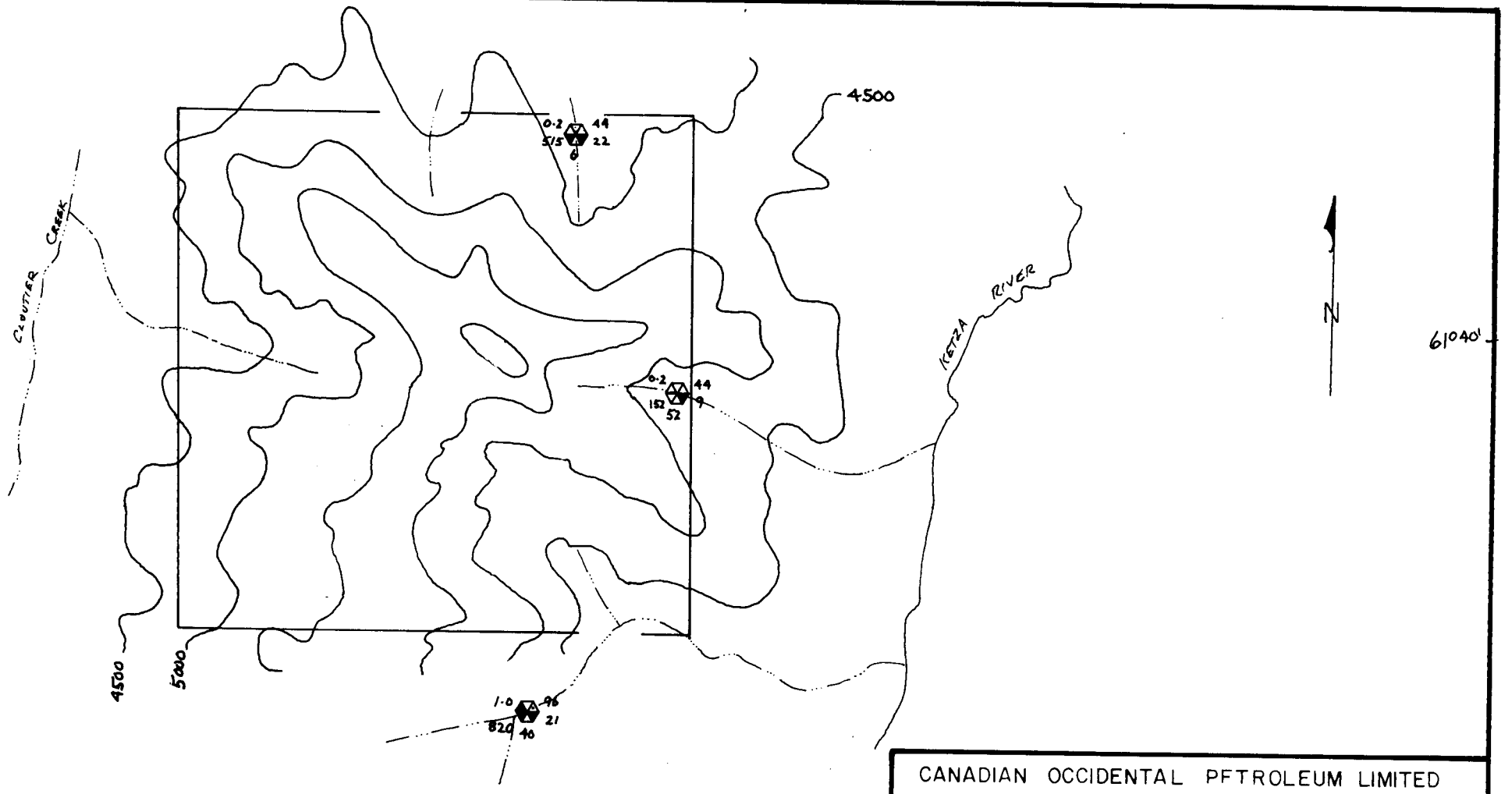
PROJECT WATSU

TIER I-36 CLAIMS

YUKON TERRITORY

SAMPLE LOCATION

Scale: 1" = 2640' (1/2 mile) PLAN 4 September, 1979



LEGEND

ppm Ag ppm Cu
ppm Zn ppm Mo
ppm Pb

	Cu	Mo	Pb	Zn	Ag	
Poss. Anomalous	63	3.5	89	200	.4	
Prob. Anomalous	165	8.5	280	440	.95	

132°15'

PLAN 5

CANADIAN OCCIDENTAL PETROLEUM LIMITED
MINERALS DIVISION

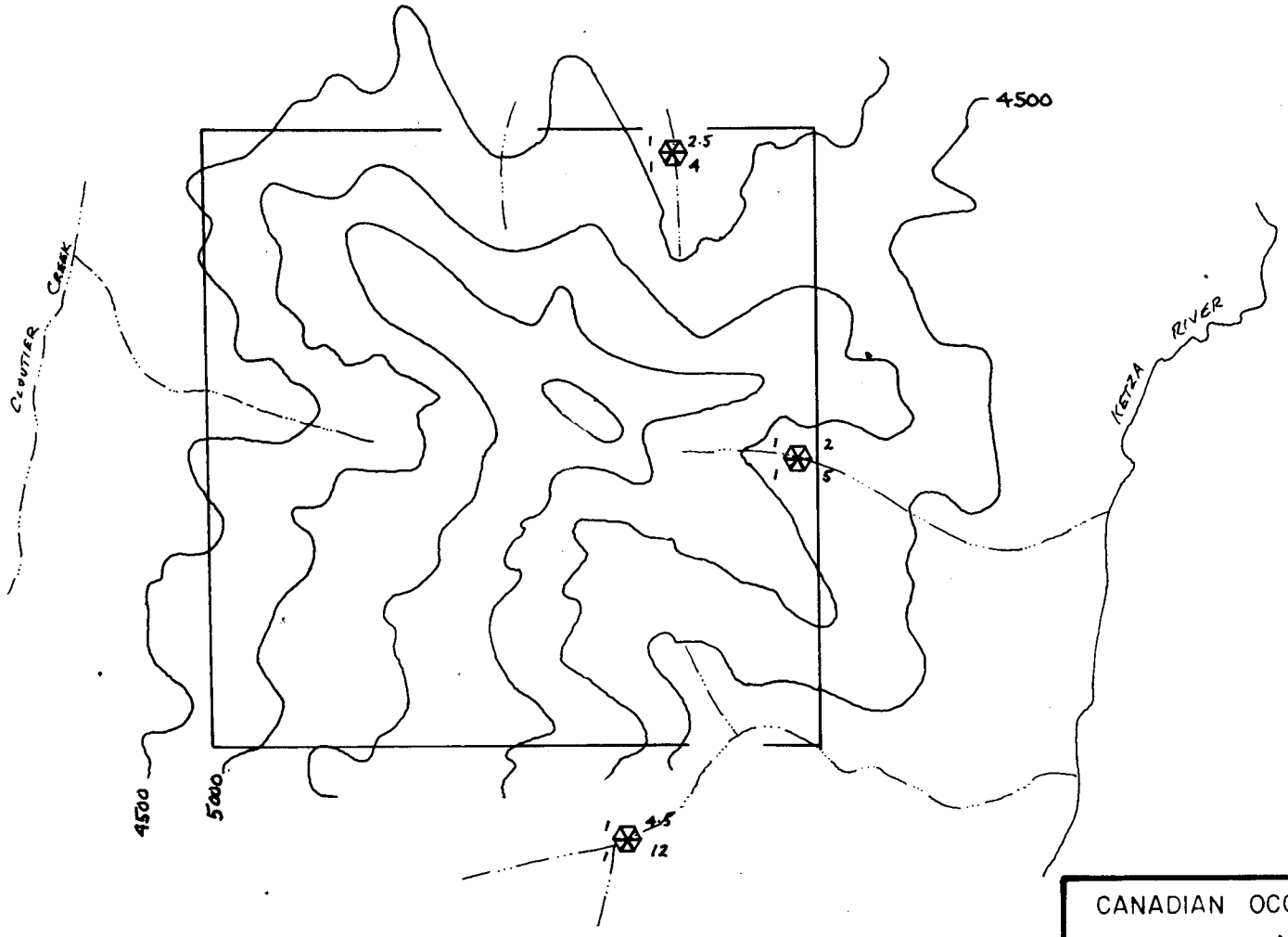
PROJECT WATSU
TIER I-36 CLAIMS
YUKON TERRITORY

HEAVY MINERAL GEOCHEMISTRY

Cu - Mo - Pb - Zn - Ag

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

September, 1979



61°46'

LEGEND

ppm W ⊛ ppm U
ppm Sn ppm Th

	U	Th	Sn	W		
Poss. Anomalous	24	330	38	60		
Prob. Anomalous	120	1200	300	160		

PLAN **6**

132° 15'

CANADIAN OCCIDENTAL PETROLEUM LIMITED
MINERALS DIVISION

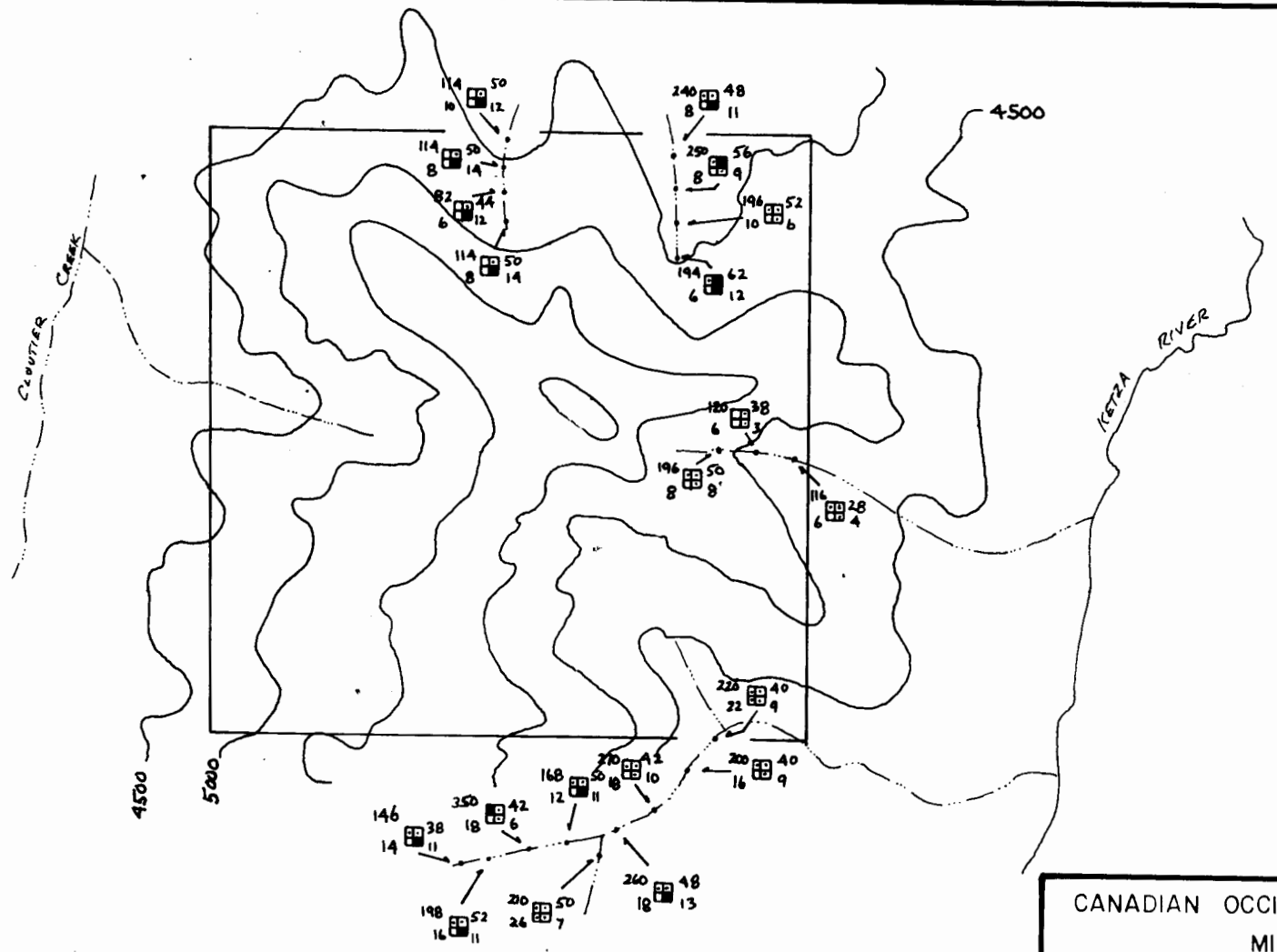
PROJECT WATSU
TIER I-36 CLAIMS
YUKON TERRITORY

HEAVY MINERAL GEOCHEMISTRY

U - Th - Sn - W

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

September, 1979



LEGEND

ppm Zn ⊞ ppm Cu
ppm Pb ⊞ ppm Mo

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

PLAN **7**

132°15'

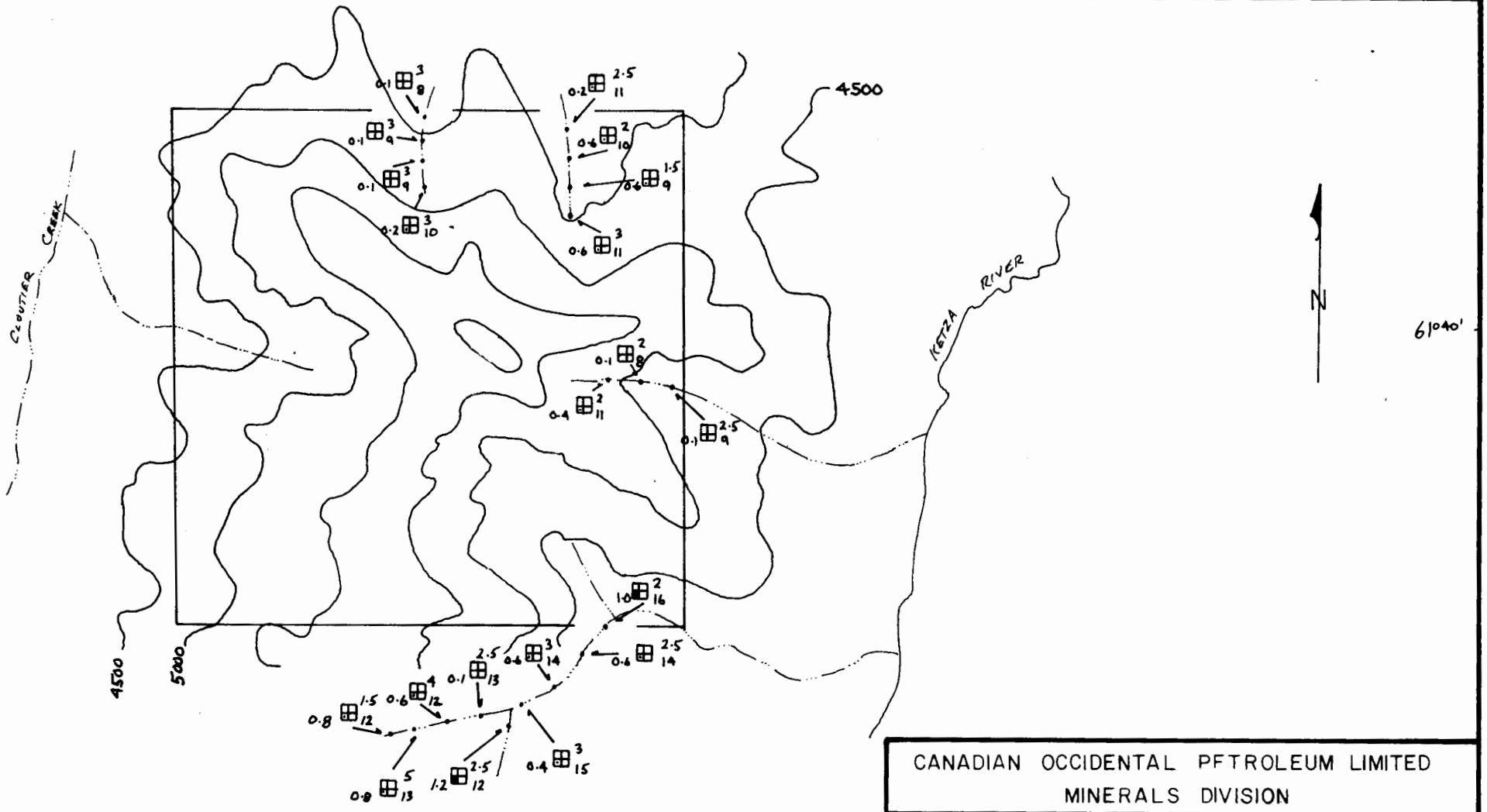
CANADIAN OCCIDENTAL PETROLEUM LIMITED
MINERALS DIVISION

PROJECT WATSU
TIER I-36 CLAIMS
YUKON TERRITORY

STREAM SEDIMENT GEOCHEMISTRY
Cu - Mo - Pb - Zn

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

September, 1979



LEGEND

ppm Ag ⊞ ppm U / ppm Th

	U	Th	Ag
Poss. Anomalous	17	29	<.1
Prob Anomalous	38	50	1

PLAN 8

132°15'

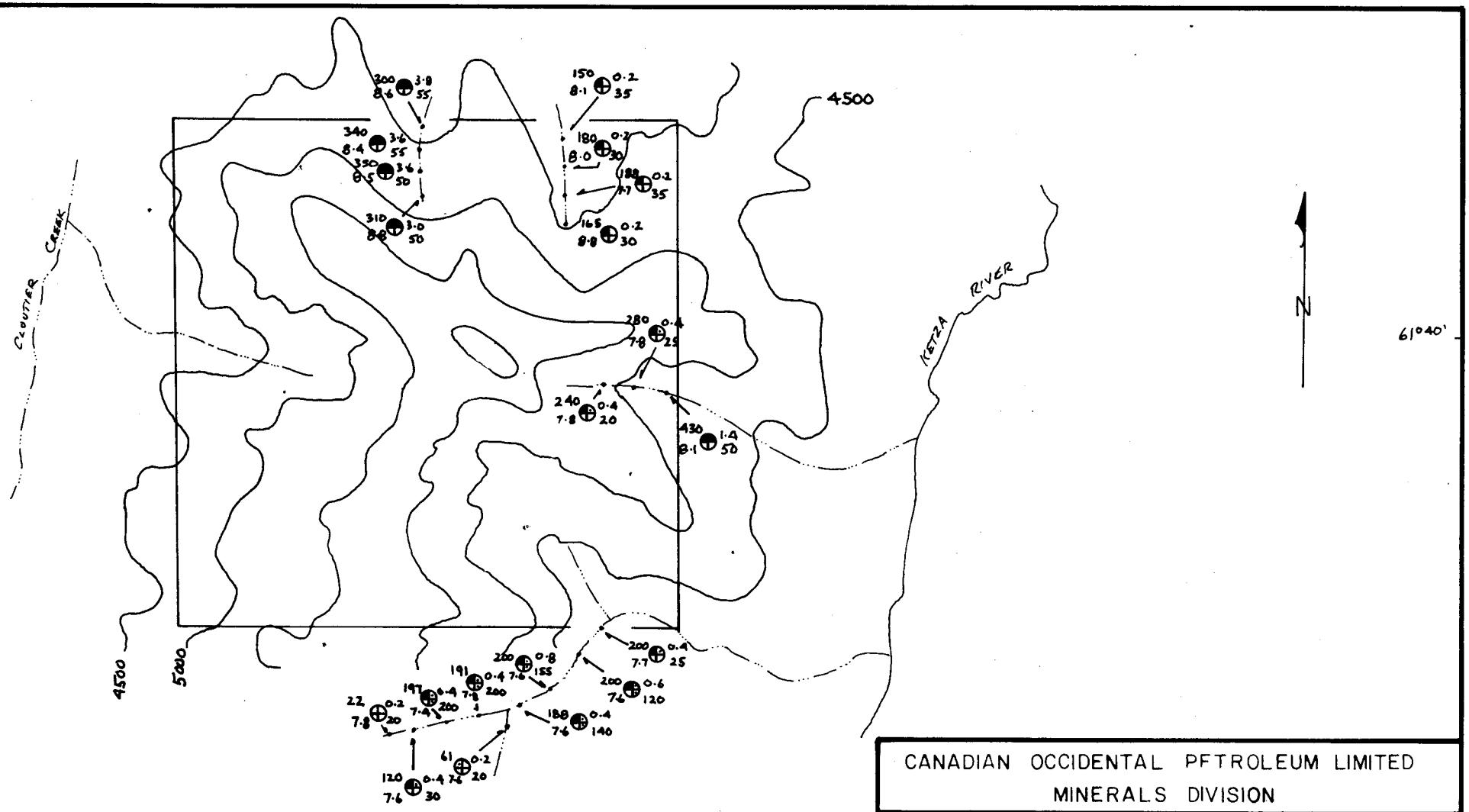
CANADIAN OCCIDENTAL PETROLEUM LIMITED
MINERALS DIVISION

PROJECT WATSU
TIER I-36 CLAIMS
YUKON TERRITORY

STREAM SEDIMENT GEOCHEMISTRY
U - Th - Ag

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

September, 1979



	U	F	As	S.C.		
Poss. Anomalous	.25	100	-	46		
Prob. Anomalous	.85	210	-	100		

LEGEND

S.C. ⊕ ppb U
pH ppb F

All As values less than 2ppb

PLAN 9

CANADIAN OCCIDENTAL PETROLEUM LIMITED
MINERALS DIVISION

PROJECT WATSU

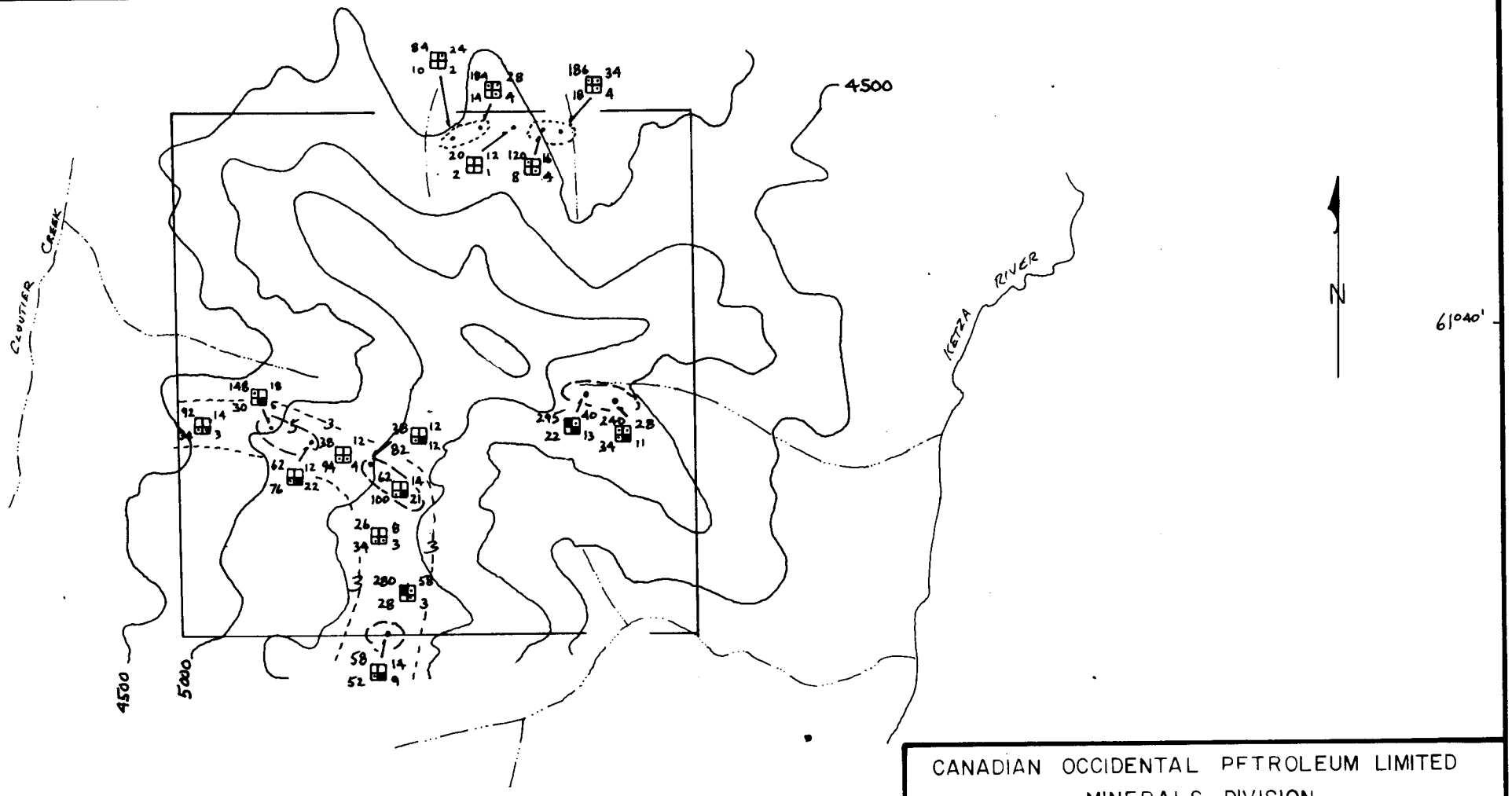
TIER I-36 CLAIMS

YUKON TERRITORY

STREAM WATER GEOCHEMISTRY
U - F - As - pH - S.C.

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

September, 1979



LEGEND

ppm Zn / ppm Pb ⊞ ppm Cu / ppm Mo

	Cu	Mo	Pb	Zn		
Poss. Anomalous	22	2.5	32	115		
Prob. Anomalous	120	5	150	270		

– – – 5ppm Mo

----- 3ppm Mo.

PLAN 10

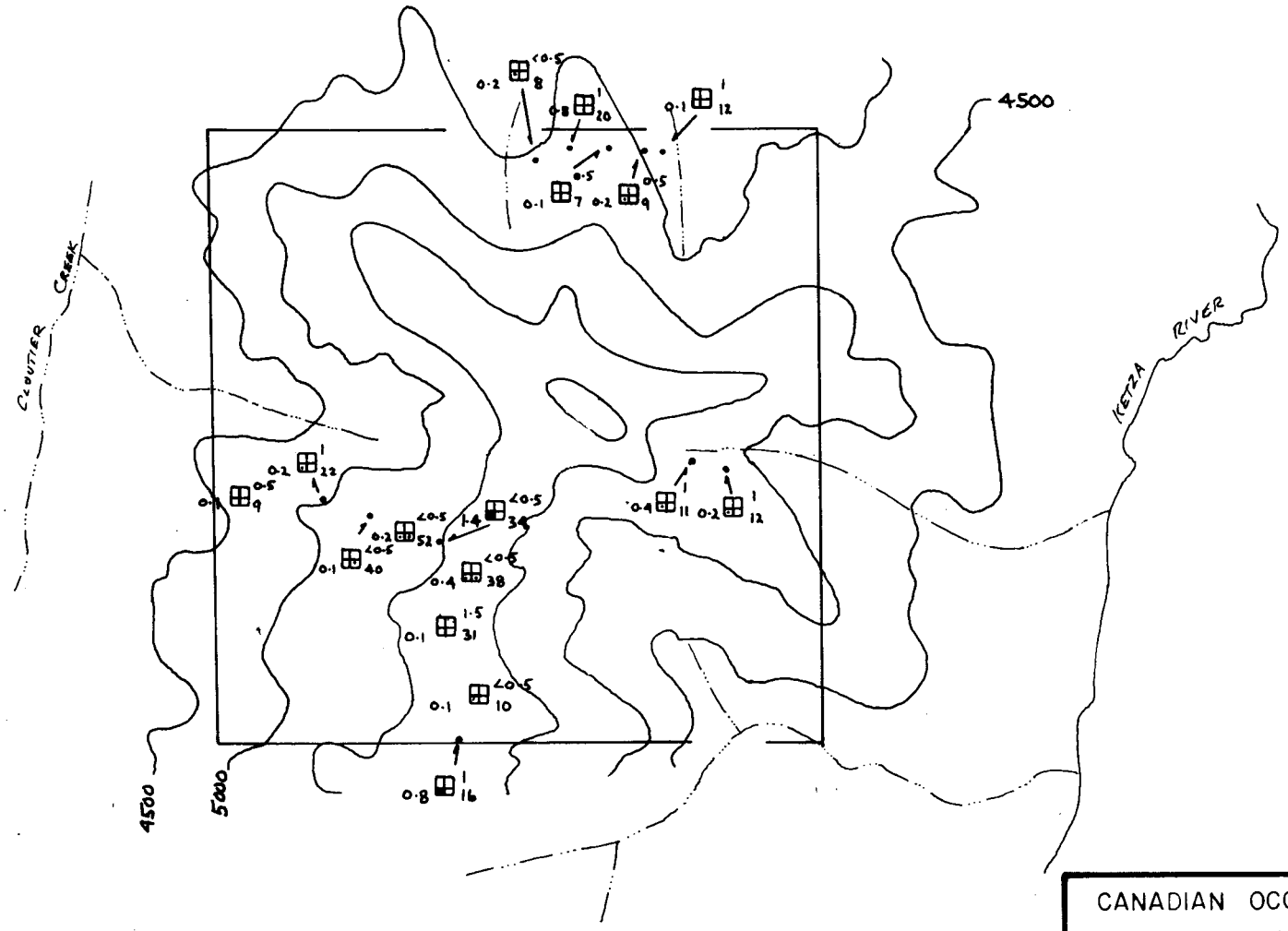
CANADIAN OCCIDENTAL PETROLEUM LIMITED
MINERALS DIVISION

PROJECT WATSU
TIER I-36 CLAIMS
YUKON TERRITORY

SOIL GEOCHEMISTRY
Cu - Mo - Pb - Zn

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

September, 1979



LEGEND

ppm Ag ⊞ ppm U / ppm Th

	U	Th	Ag
Poss. Anomalous	7	36	.1
Prob. Anomalous	30	75	.8

PLAN II

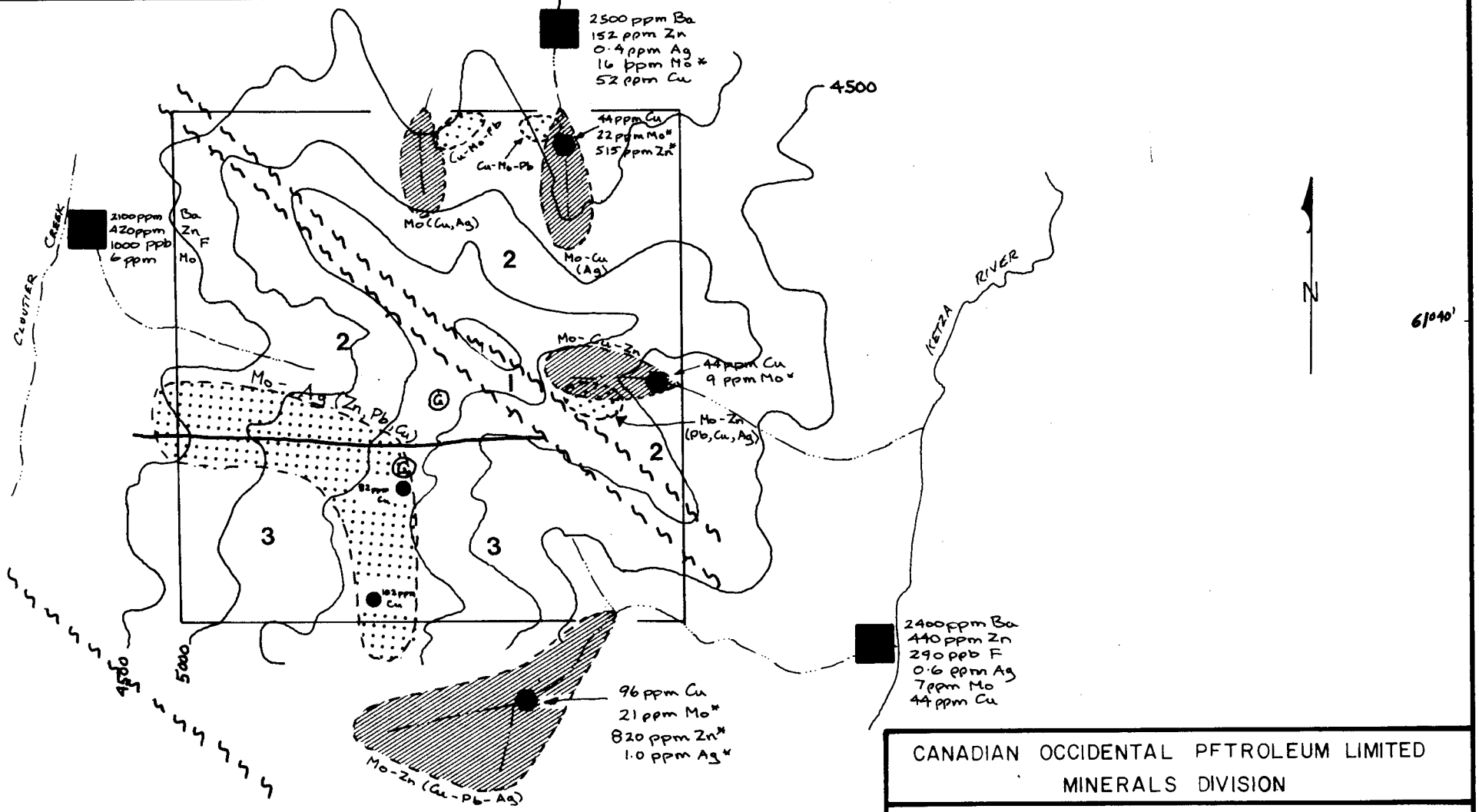
CANADIAN OCCIDENTAL PETROLEUM LIMITED
MINERALS DIVISION

PROJECT WATSU
TIER I-36 CLAIMS
YUKON TERRITORY

SOIL GEOCHEMISTRY
U - Th - Ag

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

September, 1979



LEGEND

Geology

3 Quartz arenite, lithic arenite, arkose

2 Chert, shale, felsic intrusive

1 Dolomite

Geological Contact

Fault (inclined)

G Gossan

Soil Geochemistry Anomaly: Mo > 3ppm; Ag > 0·2ppm; Zn > 115ppm; Pb > 32ppm; Cu > 22ppm

Stream Sediment Anomaly: Mo > 3ppm; Ag > 0·1ppm; Zn > 115ppm; Pb > 21ppm; Cu > 28ppm

Heavy Mineral Geochemistry

Rock Geochemistry

1978 G.S.C. – U.R.P. stream sediment, water

132°15'

CANADIAN OCCIDENTAL PETROLEUM LIMITED
MINERALS DIVISION

PROJECT WATSU
TIER I-36 CLAIMS
YUKON TERRITORY

COMPILATION OF GEOLOGY & GEOCHEMISTRY

Scale: 1" = 2640' (1/2 mile) PLAN 12 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 geolgist 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 TIER 1-36

Record Numbers YA 44734 - YA 44769

		Pro-rated[1] Costs
Salaries and Benefits		$1,443.93
Travel and Accommodation		880.15
Drafting and Reproduction		309.21
Consultant		433.91
Camp costs and Supplies		991.10
Rental of Equipment		165.18
Other Work		422.71
	Sub-total	$4,645.46
Helicopter 3.4 hr. at $340/hr.[2]	$1,156.00	
Geochemical 438 analyses[3]	750.76	$1,906.76
	Total	$6,552.60

Notes

[1] Pro-rated on basis of 4.9 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. and X-Ray Assay Labs of Don Mills, Ont. (See attached Cost Breakdown).

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 at $310/hr	hrs.	GEOCHEMISTRY 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 1&2	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 3&4, 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 5&6	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 7&8	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 TIER CLAIM GROUP

GEOCHEMICAL COST BREAKDOWN

INVOICE #[1]	# OF SAMPLES	DESCRIPTION	COST[2]
31943	11	Cu, Mo, Pb, Zn, Ag, U, Sn, W	$157.85
32440	27	Th	135.00
31746	20	U, F, As	185.00
31920	20	Cu, Mo, Pb, Zn, Ag, U	141.00
32448	20	Th	100.00
32463	3	Cu, Mo, Pb, Zn, Ag, Sn, W, U	76.80
32606	3	Th	15.00
31828	16	Cu, Mo, Pb, Zn, Ag, U	112.80
6429*	1	Multielement	15.00
		SUB-TOTAL	$938.45
			less 20%
		TOTAL	$750.76

1 - all invoices from Chemex Labs unless otherwise noted
2 - cost includes preparation of samples
* - X-Ray Assay Laboratories