CANADIAN OCCIDENTAL PETROLEUM LTD.
MINERALS DIVISION

GEOLOGY AND GEOCHEMISTRY OF THE SHAR 3, 4, 9, 11 CLAIMS

CLAIM SHEET NO. 104-O-9E

Lat.: 59°40'N
Long.: 130°08'W

Claims:

SHAR 3	-	18	Units
SHAR 4	-	18	Units
SHAR 9	-	18	Units
SHAR 11	-	4	Units

LIARD MINING DIVISION
BRITISH COLUMBIA

R.M. Kuehnbaum, M.Sc.
Work Completed July 2 and August 18, 1980

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SUMMARY

A total of eight man-days were spent on the property. Stream sediment and soil sampling, prospecting and geological mapping were accomplished. It is believed that the stream bearing high Pb-Zn-Ag values found by the Geological Survey of Canada was relocated. Near the headwaters of this stream, over a 125-meter interval, sediment values increase abruptly for Pb, Zn and Ag and high values persist downstream almost to the junction with main valley stream.

Prospecting in the area of the sediment anomaly has revealed rare, small cobbles of hydrothermally altered, pyrite-bearing (?) granitic rocks. These contain no visible economic sulphide mineralization, yet on analysis have values of 285-3000 ppm Pb, 84-5700 ppm Zn, and 3 ppm - 1 oz/ton Ag, and up to 155 ppb Au. Since the anomalous stream sediment values are restricted to the one stream it is felt that the float of very local origin and is not glacially transported.

Soil sampling has revealed two Zn anomalies. Anomaly A covers an area of 200 x 400 meters, open to the west, to the west of the anomalous stream. The main anomaly (B) is defined by a broad (400 x 800 m) zone of dispersion of Zn-in-soil and contains spot-anomalous Pb and Ag values. The anomaly trends northeasterly and straddles the anomalous stream in the approximate area of the increase in Pb-Zn-Ag-in-sediment values. Radiometric data shows a poorly delineated, northeasterly trending anomaly roughly

coinciding with Anomaly B.

Geologic mapping and air-photo interpretation suggests that the local topography is controlled by joint sets within the biotite-quartz monzonite which underlies the entire mapped area. The most prominent set is north-easterly trending. Consequently, as indicated by soil geochemistry and radiometric data, bedrock mineralization may consist of hydrothermally altered (potassium-enriched) quartz monzonite controlled by a northeasterly trending joint/fracture pattern (a "porphyry-type" system).

Very detailed soil sampling and radiometric surveys in the area of the anomalous stream would be needed to test this hypothesis. A VLF-EM survey might help to locate major structures if present and detailed mapping of these might reveal any alteration zones. Diamond drilling could ensue if the above surveys yield positive results.

I. INTRODUCTION

The SHAR 3 and 4 Mineral Claims were staked on June 10, 1979 in order to cover the headwaters of a stream with high values in Pb, Zn and Ag in sediment, as documented by the Geological Survey of Canada Open File Report 561. The SHAR 9 mineral claim was staked on July 7, 1979 to cover a high value U in sediment, F in water detailed in the same Open File Report. CanadianOxy conducted semi-reconnaissance scale mapping, prospecting and geochemical surveys over the claims in 1979. On July 2, 1980, CanadianOxy carried out detailed stream sediment sampling in order to relocate the anomalous Pb-Zn-Ag stream. Having achieved positive results, on August 12, 1980, the SHAR 11 mineral claim was staked to fill a gap between SHAR 3-4 and SHAR 9 and further stream sediments and soil sampling and geologic mapping/prospecting were done in the area of the Pb-Zn-Ag anomalous stream on August 18, 1980. This report outlines the results of these surveys.

II. LOCATION AND ACCESS

The SHAR 3, 4, 9, 11 Claims are recorded on claim map 104-0-9E in the Liard Mining Division. The property is located north of Toozaza Creek and south of Little Rancheria River (Fig. 1), approximately 64 km northwest of Cassiar, B.C. Access is by helicopter from Cassiar or from Rancheria on the Yukon portion of the Alaska Highway.

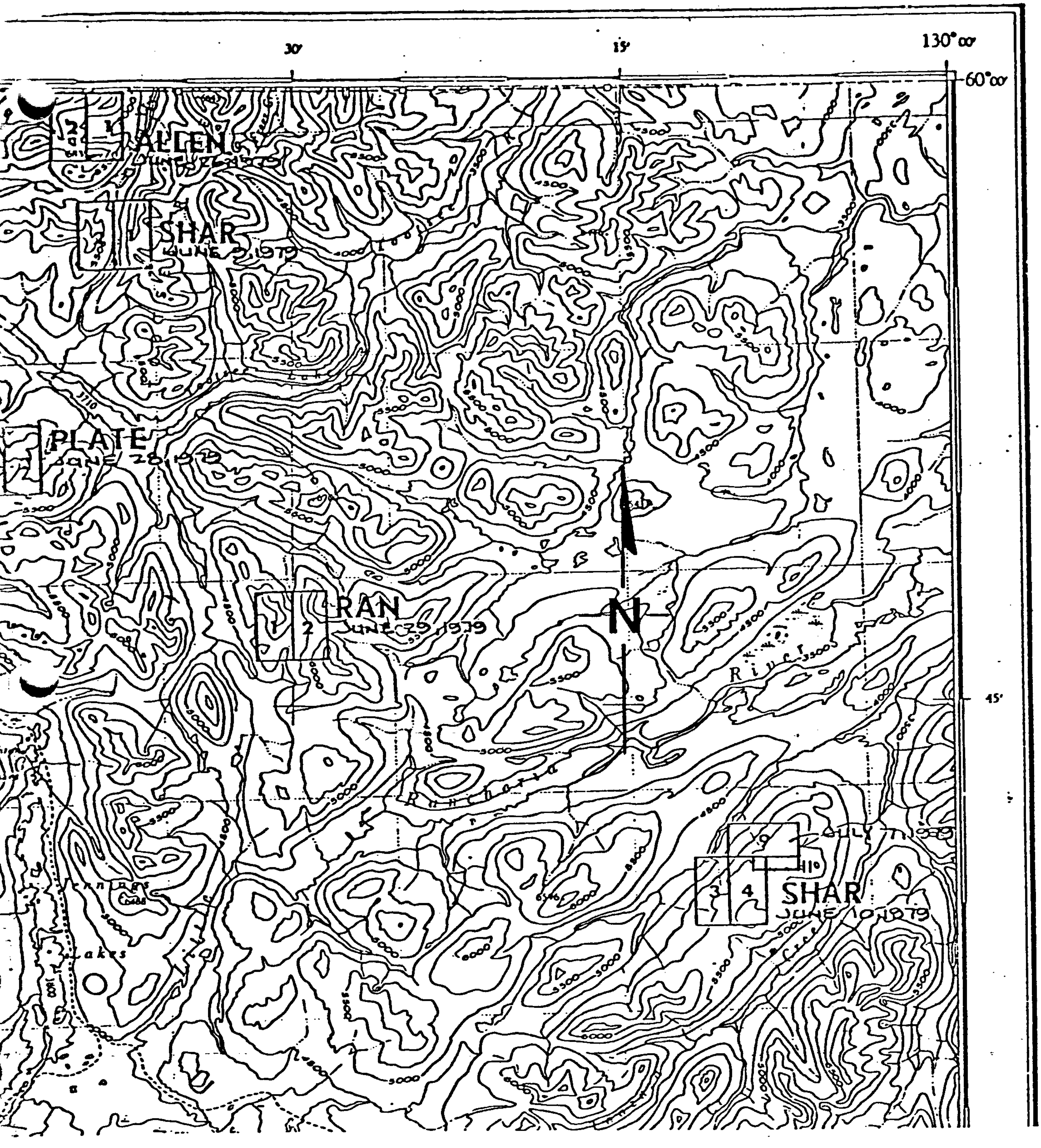

Figure 1

Location and Access of SHAR 3,4, 9, 11 Claims

NTS 104-0/9E

Scale 1:250,000

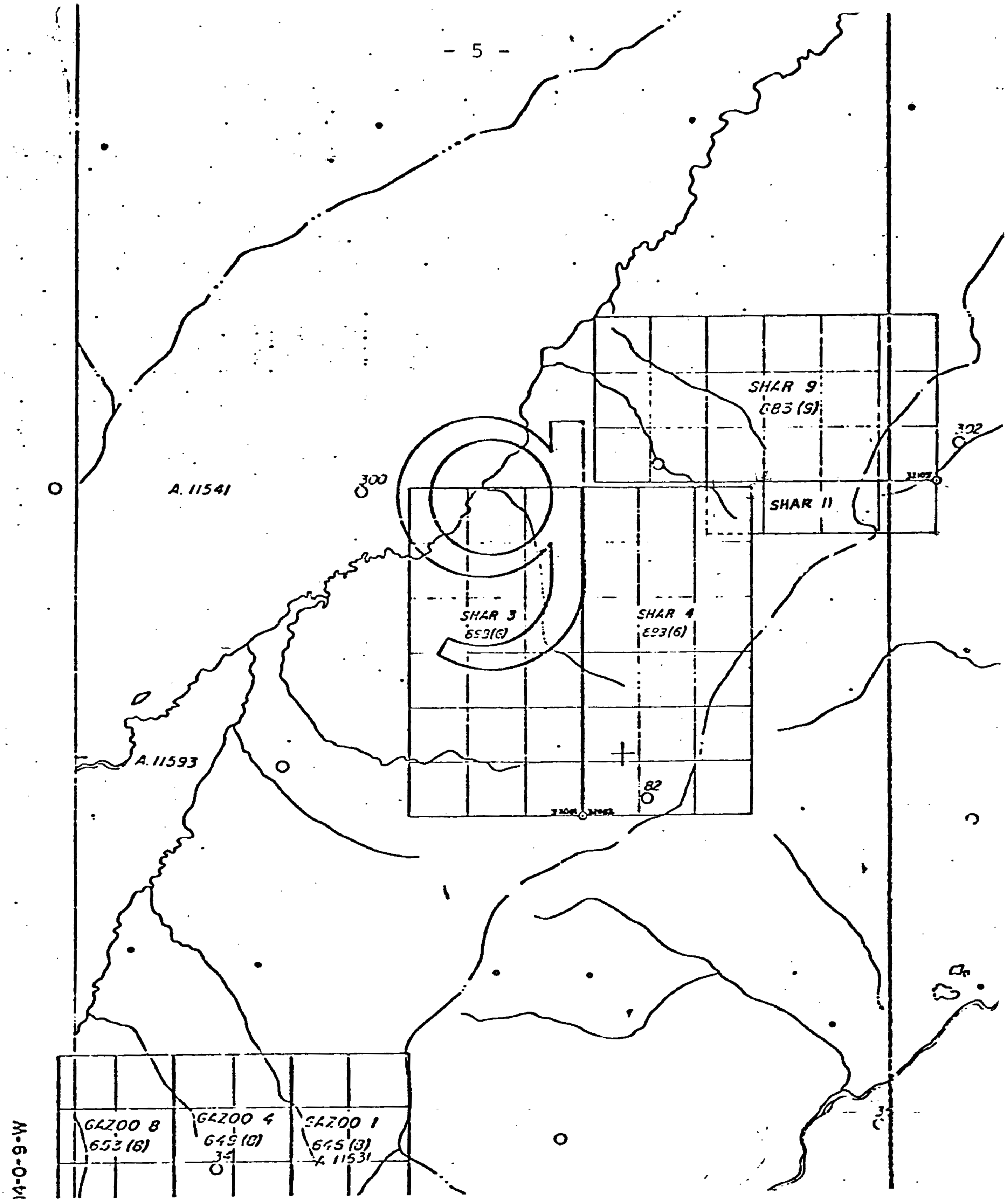

Figure 2

Staking Sketch Showing SHAR 3, 4, 9, 11, ~~Mineral~~ Claims

NTS 104-0/9E
Scale: 1:50,000

III. PHYSIOGRAPHY AND VEGETATION

Most of the four claim groups lie on an elevated, gently sloping plateau which drops quickly to a stream valley in the western parts of SHAR 3 and SHAR 9. Several deeply cut creeks drain the plateau to the western valley. On the plateau vegetation is sparse and consists of grass and linchen on extensive outcrop and felsenmeer. In the stream valley, slopes are thick with small conifers (balsam).

IV. PREVIOUS WORK

The Geological Survey of Canada conducted geological mapping of the Jennings River map sheet (104-0) between 1944 and 1967 (Gabrielse, 1968). The Geological Survey of Canada in 1978 carried out a low-density (one sample/13 km^2) stream sediment and water sampling survey (Uranium Reconnaissance Program) of the same sheet, the results of which were released on June 8, 1979, as Open File Report 561. CanadianOxy staked the SHAR 3 and 4 Claims to cover a co-incident high value Pb-Zn-Ag stream sediment sample (150 ppm Pb, 380 ppm Zn, 3.5 ppm Ag) of the G.S.C. results. The SHAR 9 Claim was staked to cover a co-incident high value $U\text{-}F_w$ (82.8 ppm U, 270 ppb F_w) sample.

Subsequent to the 1979 staking of SHAR 3, 4, 9 (Fig. 2), CanadianOxy carried out geological mapping (2.4 man-days) and stream sediment sampling surveys (3 man-days). The party (Sacks, 1979) was unable to replicate the results of the Geological Survey of Canada but located a stream sediment on SHAR 4 that was somewhat more anomalous (38 ppm U, 30 ppm Th, 390 ppm Zn, 198 ppm Pb and 4.2 ppm Ag). Sacks' (1979) data is not shown on 1980 maps since it is difficult to locate his samples on the 1980 scale (1:5000).

V. CLAIM STATUS

No assessment credit has been applied for on the basis of 1980 work. Pending acceptance of 1979 assessment work, the claim status can be summarized tentatively as follows:

Claim Name	No. Units	Date Staked	Date Recorded	Valid Until
SHAR 3	18	June 10/79	June 19/79	June 19/81?
SHAR 4	18	June 10/79	June 19/79	June 19/81?
SHAR 9	18	July 7/79	July 18/79	July 18/81?
SHAR 11	4	Aug. 12/80	Aug. 15/80	Aug. 15/81

VI. WORK COMPLETED - 1980

6.1 Claim Staking

On August 12, 1980, R.M. Kuehnbaum located the SHAR 11 mineral claim to cover potentially mineralized ground on the basis of anomalous stream sediment Pb-Zn-Ag results. The claim consists of 4 units and has a legal corner post adjacent to that of SHAR 9.

6.2 Geological Mapping

On June 3, 1980, Wallis, Kuehnbaum and Tetu of CanadianOxy, and C.F. Gleeson, Consultant, briefly visited the Property to evaluate its status and to assess work required for the 1980 season. A total of 2/3 man-day was spent.

Kuehnbaum spent one man-day on July 2, 1980, carrying out geological mapping and prospecting on the break of slope down to the main western valley. This is at the head of the three creeks which were geochemically sampled and roughly at the lowermost area of outcrop before valley-fill glacial rubble and trees are encountered. On August 18, 1980, Kuehnbaum spent one additional man-day mapping and prospecting in the creek that was found to be anomalous in Pb-An-Ag in sediments.

6.3 Geochemistry

On the first attempt to locate the anomalous stream, a total of 78 stream sediment samples were taken from the three main creeks draining the plateau. M. Mattiacci, B. McNeill, and A. Jarvis carried out 3 man-days of work on July 2, 1980. Subsequent to locating the anomalous zone, B. McNeill, R. Hauseux and C. Richardson returned on August 18, 1980 to carry out follow-up soil sampling and additional stream sediment sampling (3 man-days); 93 soil and 5 stream sediment samples were taken. All were sent to Chemex Labs Ltd., N. Vancouver, B.C., for geochemical analysis. Analytical results and procedures are present in Appendices I and III.

6.4 Radiometric Survey

During the soil and stream sediment sampling programs, radiometric readings were recorded at most sample sites in order to attempt to assist in mapping possible lithologic boundaries. All readings were taken with Urtec UG-130 instruments on the TC_1 channel at 10-second intervals.

6.5 Summary of Work Completed

Type of Work	Man Days	No. of Samples	No. of Analyses Pb (ppm)	Zn (ppm)	Ag (ppm)	Au (ppb)	Total
Geologic Mapping	3.7						
Geochemistry	6.0						
i) Sediments		84	84	84	84		252
ii) Soils		94	94	94	94		282
iii) Rocks		11	11	11	11	3	36
Helicopter Hrs (Bell 206B)	4.3						
TOTAL	9.7	189	189	189	189	3	570

6.6 Names and Addresses of Personnel

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G. Tetu — Project Geologist
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B. McNeill — Junior Assistant
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A. Jarvis — Junior Assistant
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R. Hauseux — Junior Assistant
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VII. GEOLOGY

7.1 General Geology

The Geological Survey of Canada geological map sheet 104-O (Gabrielse, 1968) shows that SHAR 9 is underlain by Silurian and Devonian dolomite, sandy dolomite and dolomitic sandstone contacting Devono-Mississippian slate, argillitic and greenstones of the Sylvester Group. SHAR 3 and 4 and southwestern SHAR 9 are underlain by Mid-Cretaceous biotite-quartz monzonite and granodiorite of the Cassiar Batholith which cuts the older sedimentary and volcanic rocks.

The CanadianOxy crew in 1979 confirmed Gabrielse's map and revealed a perthite-megacrystic phase within the quartz monzonite and thermal metamorphism of the sediments and volcanic rocks. Mapping in 1980 revealed a continuum between the quartz monzonite and granodiorite and located several dykes and small bodies of muscovite-biotite quartz monzonite. Metavolcanic rocks were not mapped.

7.2 Table of Formations (Plan 1)

Unit		Description
MID-CRETACEOUS		
CASSIAR BATHOLITH		
1	1a	Biotite-quartz monzonite to granodiorite
	1b	Biotite-muscovite quartz monzonite
	1c	Aplite
DEVONO-MISSISSIPIAN		
2		Greenstone, meta-basalt, chert, slate (not observed)
SILURIAN-DEVONIAN		
3		Dolomite, sandy dolomite, dolomitic sandstone (not observed)

7.3 Description of Rock Units (Plan 1)

Description of individual rock samples are presented in Appendix II along with geochemical analyses.

Unit 1 1a) Biotite-quartz monzonite/granodiorite; 1b) biotite-muscovite quartz monzonite; 1c) aplite

In the area examined, the headwaters of the three creeks which had detailed stream sediment sampling, large areas of outcrop are exposed. These comprise a monotonously uniform, grey-weathering, medium-grained, massive to vaguely foliated, equigranular biotite-quartz monzonite with about 5% biotite (1a). It appears that the unit becomes marginally granodioritic marked by a slight decrease in K-feldspar content and accompanying increase in biotite (up to 10%), towards the west. This change is gradational. Sacks (1979) observed K-feldspar-megacrystic variants but these were not seen during the present study. This unit has a scintillometer response of generally 180-235 cps. Local variations to as high as 300 cps are thought to be due to increased K-feldspar content.

Dykes (at 150°) of white-weathering, medium-grained, slightly foliated, slightly saccharoidal biotite-muscovite (1%) quartz monzonite (1b) occur locally. Sacks found these to be generally less than 1 meter wide, but one large body was found during the present survey (Plan 1).

Aplite veins (1c) are rare, and were only observed in the anomalous creek valley. All are less than 20 cm wide.

Unit 2 Greenstone, meta-basalt, chert, slate

Described as Unit 6 of Gabrielse (1968), this group was not mapped during the present survey but was observed in the eastern part of SHAR 9. Sacks (1979) located amygdaloidal meta-basalt.

Unit 3 Dolomite, dolomitic sandstone, sandy dolomite

This unit, mapped by Gabrielse (1968), was observed during neither the 1979 nor 1980 CanadianOxy surveys.

In the anomalous stream, float of altered quartz monzonite was located during prospecting/mapping; this is discussed under sections "Metamorphism and Alteration" and "Economic Geology".

7.4 Structure

The quartz monzonite is well-jointed on a series of wide-spaced sets. The pattern is evident on air photographs, and the major joints and fractures(?) have been plotted on Plan 1. These correspond well with sets measured in outcrop, the most prominent of which are (a) 020°-040°/60°NW-90°, (b) 150°/70°SW-90°, (c) 120°/50°SW, and (d) 90°/50°-55°N. The orientation of the main valley northwest of the claims appears to be controlled by the northeasterly trending joint/fracture set. Subsidiary drainages on the property are controlled by the northerly and northwesterly trending joint/fracture set. The biotite-muscovite-quartz monzonite (1b) is cut by only one of the four joint sets that cut the biotite-quartz monzonite (1a), and in fact strikes parallel to one of these sets. This suggests that the emplacement of 1b was controlled by one of these sets (b), and that sets (a), (c) and (d) are contemporary, and that set (b) is later.

7.5 Metamorphism and Alteration

The quartz monzonites which outcrop in the mapped area are basically unaltered except by surface weathering (this study and Sacks, 1979). Chloritization of biotite and hematization of K-feldspar are typical effects. Slight deuteric (?) epidotization of the plagioclase component of the rock was observed in several localities. Sacks (1979) draws attention to the thermal metamorphism of the greenstone to hornfels following regional metamorphism to the greenschist facies.

Within the anomalous stream, float of questionable origin was located during the follow-up prospecting/mapping by Kuehnbaum. These rocks are of altered quartz monzonite and/or other granitic rocks. Some display a weak deuteric (?) alteration that has been enhanced by surface weathering and are characterized by pervasive limonite-staining and kaolinization of feldspars. Other rare, rounded cobbles of limonite-stained, hydrothermally altered quartz monzonite are characterized by intense alteration of feldspar to kaolinite, the presence of muscovite and chlorite and trace to several percent of disseminated, very fine-grained pyrite and/or arsenophyrite (?) (80CA14235R to

14239R). Whether such altered rock are of local or exotic origin is unknown.

7.6 Economic Geology

No mineralization of economic interest was observed in outcrop on the SHAR 3-4-9-11 claims, except for trace pyrite and pyrrhotite in a joint/fracture in the central stream (Plan 1). All mineralized rock found during prospecting/mapping in the northern anomalous creek valley occurs as float, generally as well-rounded, small cobbles. The glacial overburden in this area varies in thickness from probably 1 meter in the headwaters of the creek to in excess of 50 meters at the lower reaches of the mapped area of the creek, and consists of a boulder till which is composed of a mixture of sand derived from the comminution of granitic rocks, and boulders of quartz monzonite. Tertiary volcanic rocks - principally vesicular basalt - account for about one percent of the overburden.

The mineralized cobbles are very rare and were located principally in or very close to the stream bed. The rock is a hydrothermally altered quartz monzonite (?) characterized by kaolinized felsdpar, the alteration (to chlorite) or the total absence of biotite, and trace to several percent disseminated pryte ± arsenopyrite (see section 7.5). These minerals may also occur as partial in-fillings of open spaces in the rocks. No economic sulphides are visible, but they contain elevated amounts of Pb, Zn, and Ag (see section 7).

VIII. GEOCHEMISTRY

8.1 Statistical Treatment of Results

8.1.1 Control Samples

Before packing soil and sediment samples for shipment, a split of approximately every 30th sample was taken and renumbered. For the purpose of spot-checking analytical reproducibility. The results are tabulated below:

Table 1

Control Sample Results

Control	Original	Pb		Zn		Ag (ppm)	
80-CA-14000SS	14060SS	8	4	70	60	0.1	0.1
14001SS	14100SS	12	14	84	78	0.1	0.1
(14002SS	14032SS	56	76	162	270	0.1	1.8)
14244SS	14123	4	4	66	62	0.1	0.1
14245SS	14170	6	8	66	64	0.1	0.1
14246SS	14209	8	8	48	48	0.1	0.1

Duplicate results are within the accepted reproducibility limits, with the exception of sample 14002SS/14032SS. Sample 14032SS is within the anomalous stream and is surrounded by other stream sediment samples with Ag values of 1.2 to 10 ppm for 800 meters upstream and downstream, and the 1.8 ppm Ag value is entirely consistent. It is felt, therefore, that an error was made in the recording of the split original and the discrepancy can be ignored.

8.1.2 Frequency Distribtuion

Frequency distribution diagrams and cumulative frequency curves were constructed for Pb, Zn, and Ag in both the stream sediments and soil sample population.

The anomalous population of each was defined by drawing an arbitrary free-hand best-fit curve through the "normal" distribution population, anomalous being defined as the intersection of the curve with the absissa. Excluding the anomalous population, the remaining data was recalculated to cumulative percent, a cumulative diagram drawn (except for Ag in soils), and the mean (50th percentile) and probably anomalous (97th percentile or 2 standard deviations from the mean) were measured. Results are summarized below:

TABLE 2

Mean, Probably Anomalous and Anomalous Level

Stream Sediments

	Pb	Zn	Ag (ppm)
Mean	16	98	0.1
Prob. Anom.	50-60	136-160	0.4
Anomalous	+60	+160	+0.4
Range	4-390	46-1200	0.1-10

Table 3

Mean, Probably Anomalous and Anomalous Levels

Soils

	Pb	Zn	Ag (ppm)
Mean	8	51	0.1
Prob. Anom.	16-20	90-100	
Anomalous	+20	+100	+0.1
Range	4-310	30-1600	0.1-3.6

Tabulated data and diagrams are presented in Appendix IV.

8.2 Rock Geochemistry (Plan 1)

A total of 13 rock samples were collected in the valley of the anomalous stream, and were analyzed for Pb, Zn and Ag. Trace element contents and assays are listed in Appendix I, and in Appendix II with descriptions of the samples.

Statistical treatment of the results was not carried out due to insufficient data. There is, however, a marked distinction between mineralized and unmineralized samples. Fresh quartz monzonite, surface-weathered(?) quartz monzonite and pegmatite contain 4-68 ppm Pb, 48-138 ppm Zn, and 0.1-1.2 ppm Ag.

The five samples of hydrothermally altered intrusive rock containing visible sulphide mineralization contain 285-3000 ppm Pb, 84-5700 ppm (0.57%) Zn, and 3.0 ppm-1.00 oz/ton Ag. There is a negative correlation between Pb and Ag content, indicating that the high Ag values may not be due to Ag substitution in galena but rather a discrete Ag-bearing phase. A positive correlation exists between Pb and Zn values, and there is little correlation between Zn and Ag.

Three samples with the highest Ag values (14236R, 14237R and 14241R) were analyzed for Au. Au were found to contain elevated amounts of Au (35-155 ppb). Although not of economic concentrations, the Au adds another aspect of potential to the property.

8.3 Stream Sediment Geochemistry (Plan 2)

A total of 79 stream sediment samples were taken from the three main creeks draining the property to the northwest. Five samples were taken from two other minor, intermittent streams in the same area. All samples were analyzed geochemically for Pb, Zn and Ag (Appendix I).

From Plan 2, it is readily evident that the most easterly of the three main drainages sampled in the source of the original high value sample taken by the Geological Survey of Canada (150 ppm Pb, 380 ppm Zn, 3.5 ppm Ag). Almost all samples below approximately 5500 ft elevation carry anomalous Pb, Zn and Ag, and probably anomalous to weakly anomalous Zn values persist above that elevation. Values increase abruptly from 34 to 450 ppm Pb, 138 to 1200 ppm Zn, and 0.1 to 3.8 ppm Ag within a distance of 125 meters. The first Pb-Zn-Ag anomalous stream sediment sample is approximately 100 meters upstream from the highest (in elevation) occurrence of sulphide-bearing hydrothermally altered intrusive float found in the stream gulley. It is apparent that either: a) both the float and the anomalous stream sediment values are derived from a bedrock source in the immediate vicinity, or; b) the anomalous stream sediment values are derived from the sulphide-bearing float which is itself glacially transported from a distant source. Although no other streams were prospected in detail, possibility (b) must be ruled out since the two streams on either side of the anomalous stream do not bear significant anomalous Pb-Zn-Ag values in the stream sediment. In addition, the sulphide-bearing float is relatively very incompetent due to its intense alteration, and such a rock would not be expected to survive glacial transport for great distances. The roundness of the cobbles is probably due to their lack of physical strength rather than length of transport. In conclusion, stream sediment data tend to suggest a very local bedrock source for the Pb-Zn-Ag mineralization found in the main anomalous stream.

Anomalous Ag values (0.6 and 1.0 ppm) were located in the headwaters of the central main stream. Low anomalous Pb, Zn and Ag values were encountered in a single sample taken at the junction of two streams near the headwaters of the westernmost main stream. As mentioned above, probably anomalous to low anomalous Zn values persist in stream sediments from the main anomalous stream above the area of sulphide-mineralized float. These samples suggest mineralized float or bedrock near the top of the plateau.

Anomalous samples from the lowermost portion of the streams northwest of the claim can be discounted because of the very thick overburden in the area.

At every fourth or fifth stream sediment sample site, water samples were taken for pH and specific conductivity measurement. In the three main streams sampled, pH decreases and specific conductivity increases downstream (Plan 2). In the central and western streams, pH decreases very regularly from 8.0-7.1 and 7.45-7.20, respectively, while specific conductivity increases from 10-24 umhos/cm and 6.5-19.6 umhos/cm, respectively. The pH decrease downstream is probably due to the addition of groundwater from till at lower elevations, into the drainage system; dissolved solid content (reflected by S.C.) increases accordingly. The relatively high pH of waters at the heads of all creeks (7.45-8.0) suggests alteration within the quartz monzonite at upper elevations, although there are no significant differences between the anomalous Pb-Zn-Ag-in-sediment stream and the non-anomalous streams. In the anomalous stream, downstream changes in pH and specific conductivity are more irregular and somewhat abrupt at the area of increase in Pb-Zn-Ag content and mineralized float (Plan 5).

8.4 Soil Geochemistry (Figs. 3 to 5, Plan 5)

During the follow-up survey, a total of 93 soil samples were taken on 6 lines parallel to the anomalous stream in the vicinity of the abrupt increase in Pb-Zn-Ag anomalies in stream sediments. All were analyzed for Pb, Zn and Ag.

The soil values in the small recce grid area were contoured at: 15, 25 and 50 ppm for Pb; 70, 80, 120, 160 and 200 ppm for Zn and; 0.3 and 0.5 ppm for Ag (see Figs. 14, 16 and 17 for statistical data; Figs. 3 to 5 for contoured values). Plan 5 shows the generalized distribution of the principal anomalies described below.

Anomaly A

Anomaly A is a 7-station +70 ppm zinc anomaly crossing two parallel lines in the northwest part of the sampled area. Almost all zinc values are statistically anomalous or probably anomalous (96-1600 ppm Zn). Five of the samples contain statistically anomalous or probably anomalous Pb values (20-150 ppm Pb). There are no corresponding Ag anomalies. The Pb-Zn anomaly covers an area of 200m x 400m and is open to the west. No trend is defineable and the anomaly's source is unknown.

Anomaly B

Although the anomalous Zn cut-off value is 100 ppm, Anomaly B was outlined by the 70 ppm contour since it most clearly shows the dispersion trend for Zn to be broadly northeastly, and it is likely the lower limit of a second population of Zn-in-soil values (Fig. 17). The range of Zn

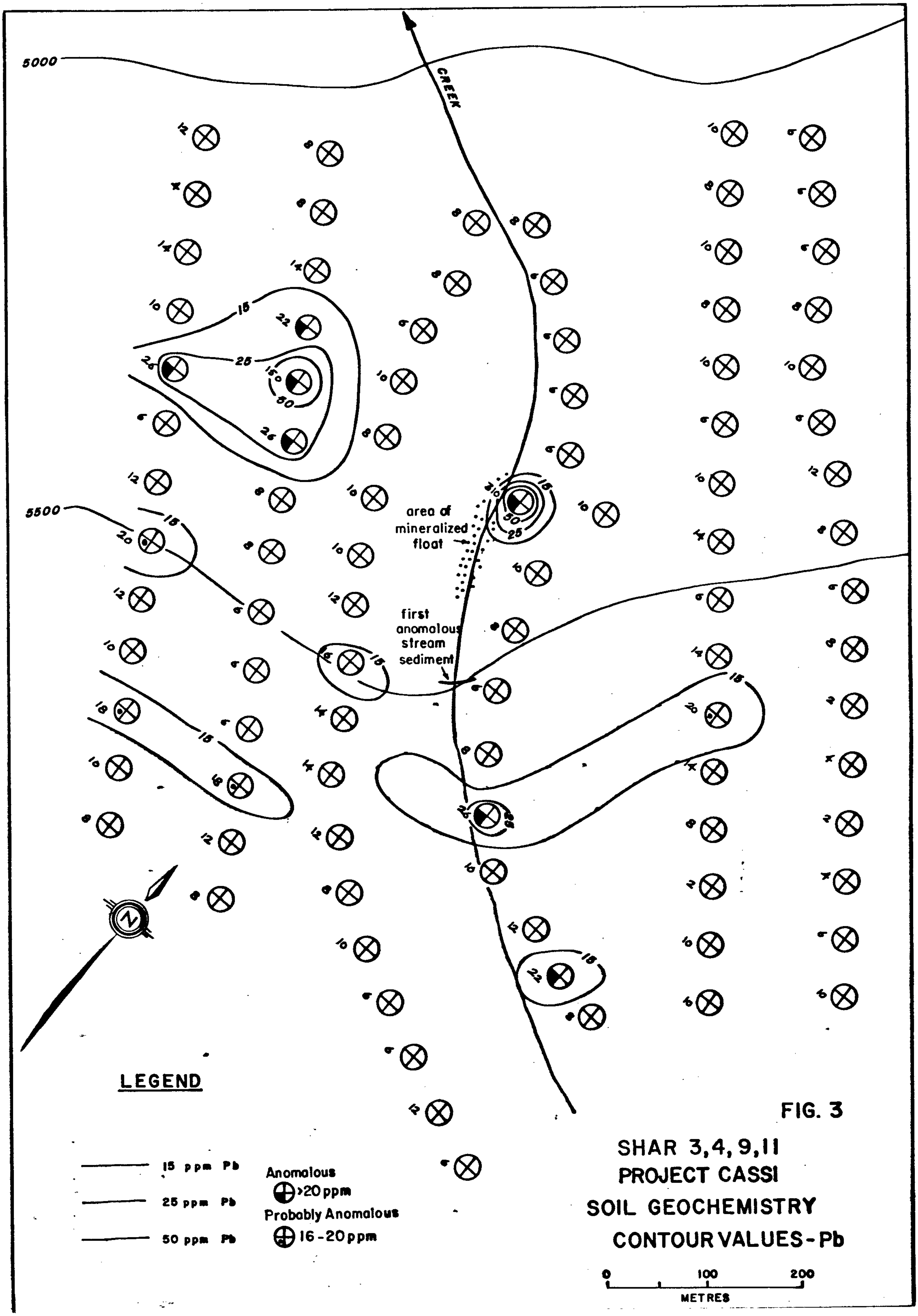

FIG. 3

SHAR 3,4,9,11
PROJECT CASSI
SOIL GEOCHEMISTRY
CONTOUR VALUES - Pb

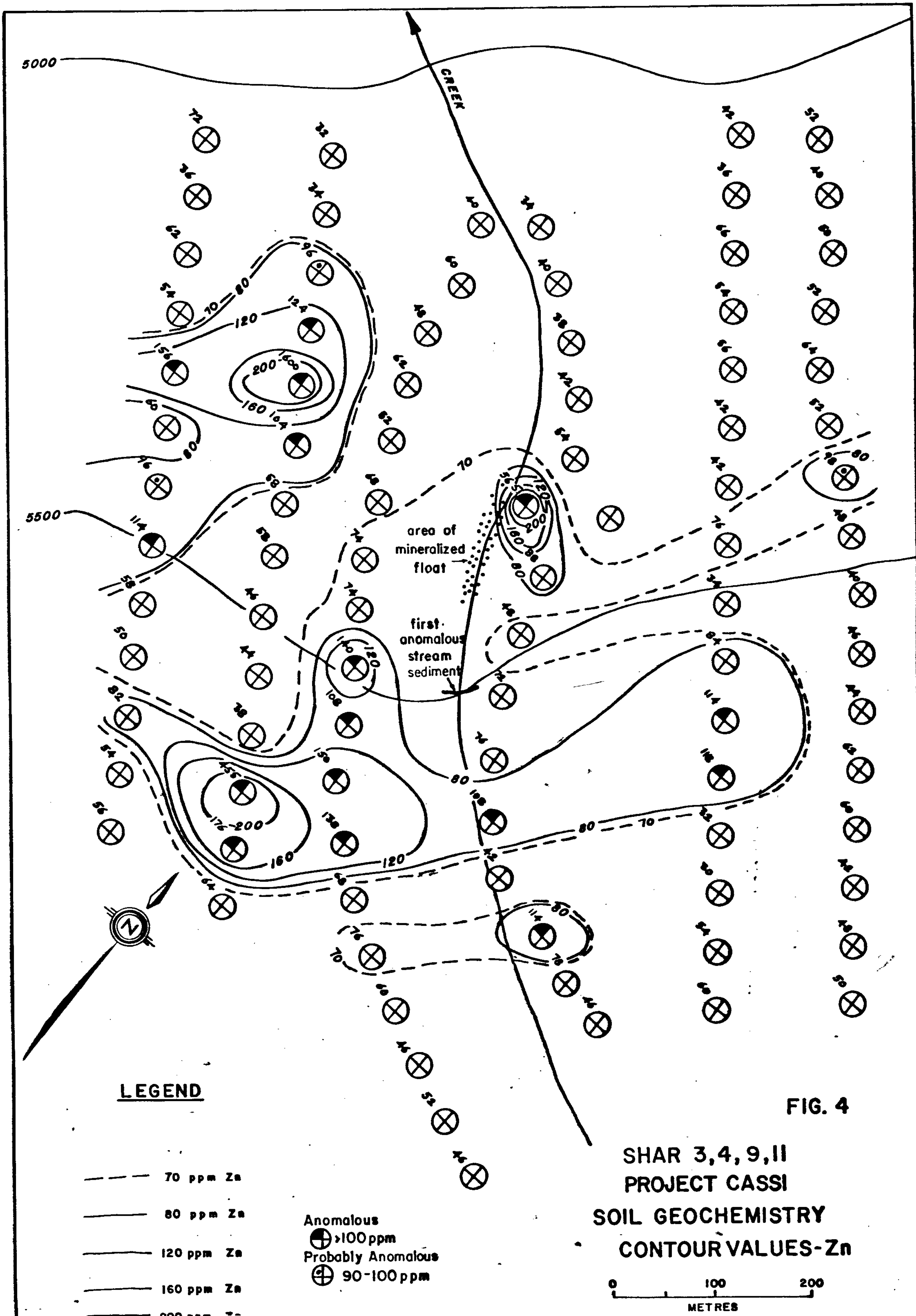

FIG. 4

SHAR 3,4,9,11
PROJECT CASSI
SOIL GEOCHEMISTRY
CONTOUR VALUES-Zn

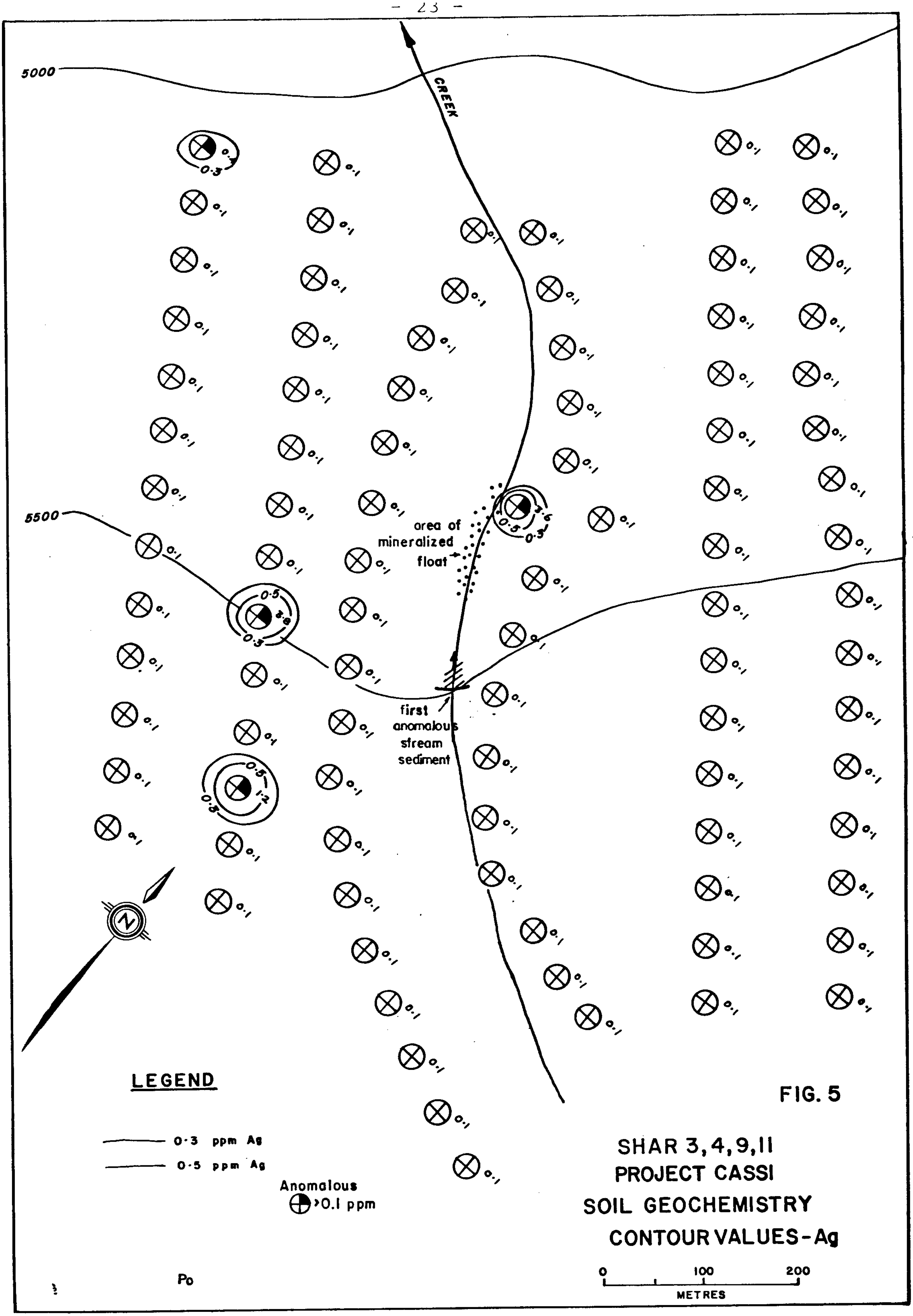

FIG. 5

SHAR 3,4,9,11
PROJECT CASSI
SOIL GEOCHEMISTRY
CONTOUR VALUES - Ag

in the area is 72-565 ppm Zn, and the anomaly encloses 18 samples although only 10 samples have +90 ppm Zn. Only three of these have associated Pb anomalies (18-310 ppm Pb) and only two have associated Ag anomalies (1.2 and 3.6 ppm Ag). An isolated 3.8 ppm Ag soil anomaly occurs just east of Anomaly B.

Anomaly B may comprise two subparallel zones, encompassing an area of 800 meters x 400 meters (maximum).

The highest Pb and Zn values occur near the stream bed (sample 80CA14239, 565 ppm Zn, 310 ppm Pb, 3.6 ppm Ag). Although the Zn trend is generally northeasterly, this sample may imply that mineralization (or mineralized float) may be confined to the stream valley suggesting that mineralization is related to a northwesterly trending fracture/joint system.

No soil pits were dug in the soil sampled area. All samples, however, were taken from the "B" horizon.

Mean and anomalous levels for Pb, Zn and Ag are higher (except for the mean for Ag) for stream sediments than for soils (Table 3 and 4, section 8.1.2). The reason for this is unclear but there are two possibilities: (a) there is a dilution of geochemical values by till, or (b) there is a concentrating mechanical factor in the streams. This dilemna could be solved by digging pits within areas of thick tills and taking a heavy mineral sample in the anomalous stream.

IX. RADIOMETRICS Plan 4

Radiometric readings were taken at all geochemical sample stations (Plan 4), except along the main anomalous stream due to a malfunctioning instrument. A histogram and cumulative frequency curve were established (Figs. 6 and 7). It is apparent that there are no radiometric anomalies, and values above the 97th percentile (270 cps) were considered probably anomalous. Plan 4 was contoured at 180 cps (the median), 220, 260 and 300 cps.

From Plan 4 almost all values above 220 cps are from the central and western drainages which show maxima at mid-elevations. This may be a combination of mass effect (readings taken in the bottoms of rather steep-walled valleys) and the fact that outcrop is abundant in the general areas of the higher count-rates (outcrop count-rates from 180-235 cps, section 7.3).

In the grid area, count-rates are generally low (<225 cps) but there is a very vague northeasterly trend to the 180 cps contour. This may reflect the general attitude of small outcrop bluffs or areas of large blocks of quartz monzonite. On the other hand, if the mineralized cobbles found in the stream valley are of local origin, it can be rationalized that the alteration of quartz monzonite involved the addition of potassium (kaolinization) and that the radiometric trend reflects a K-enrichment in a bedrock source for the float.

X. CONCLUSIONS

From 1980 surveys at the SHAR 3, 4, 9, 11 Claims, the following conclusions can be drawn.

a) The mapped area of the property is underlain by biotite quartz monzonite, locally grading into granodiorite, of the Cretaceous Cassiar Batholith. The quartz monzonite has been cut by dyke-like bodies of biotite-muscovite quartz-monzonite and aplite.

b) A well-developed joint pattern has been mapped in the intrusive rocks; the surface expression of the pattern is evident on air photography and the prominent trend appears to be north-easterly. Northerly and northwesterly trends control the drainage pattern in the area studied.

c) Glacial overburden, consisting of the quartz monzonite boulder till with sandy matrix, is very thin near the plateau-like ridge top, increasing in thickness to approximately 50 meters at tree-line elevation.

d) With the exception of surface weathering effects- typified by chloritization of biotite and limonitization of K-feldspar - no altered intrusive rock outcrops. Float of hydrothermally altered (?) granitic rocks, including sulphide-bearing material, was located in the stream found to be anomalous in Pb, Zn, and Ag.

e) Stream sediment sampling of the three major northwesterly draining streams has relocated the stream from which the original Pb-Zn-Ag co-incident high value sample was collected by the Geological Survey of Canada in 1978. In the anomalous stream, Pb, Zn, and Ag values in sediments increase very abruptly within a 125-meter interval, thereby accurately locating the first point of entry of metals into the stream. Other Pb, Zn and Ag point anomalies were located in other streams.

f) Stream water data (pH) suggest the alteration of quartz monzonite near the headwaters of the sampled streams, although the anomalous stream shows no difference compared to other streams. In the immediate area of the rise in Pb, Zn and Ag in stream sediment, rare, small cobbles of limonite-stained, hydrothermally altered (kaolinized?), pyritiferous (?) granitic rock were located in and near the stream bed. These were found to contain 285-3000 ppm Pb, 84-5700 ppm Zn and 3 ppm - 1 oz/ton Ag and up to 155 ppb Au. These are believed to be of local origin and not glacially tranported.

g) Soil sampling on either side of the anomalous Pb-Zn-Ag -in-sediment stream reveals a broad, northeasterly-trending zinc-in-soil anomaly (400 m x 800 m) which crosses the anomalous stream at roughly the point at which the Pb-Zn-Ag mineralized float was found. Spot Pb and Ag anomalies are contained within this zone. The trend of the anomaly may reflect mineralization within the northeasterly-trending joint/fracture set. A second 200 x 400 meter Zn±Pb±Ag soil anomaly was located to the northeast, but its origin is unclear.

h) Radiometrics have delineated a vaguely northeasterly anomaly roughly coincident with the main Zn±Pb±Ag in-soil-anomaly; this may reflect a zone of K-addition in an alteration zone.

i) The potential for economic mineralization consists primarily of a fracture-related mineralized alteration ("porphyry") system within the biotite-quartz monzonite.

XI. RECOMMENDATIONS

In the area of the Pb-Zn-Ag anomalous stream and mineralized float, it is recommended that a detailed grid be accurately laid out. Since it is uncertain whether or not there is a prominent structurally related alteration zone in the quartz monzonite and if there is - which way it trends, a few variously oriented VLF-EM lines could help to delineate the trend of any major structures. Since the main structure is quite possible northeasterly trending, VLF-EM may not be successful since the Seattle and Cutler signals come in from the south-southeast and southeast, respectively.

The following work should be carried out:

1. Depending on the success of VLF-EM orientation lines, as outlined above, a detailed VLF survey to localize any major structural zones in the quartz monzonite.
2. Detailed soil sampling on a square grid to eliminate bias in contouring results. Sampling should be on 15 m x 15 m centres. Pits would be dug in relevant areas. A heavy mineral sample should be taken in the anomalous stream.
3. Detailed radiometric survey on the grid to map out possible potassic alteration zones within the quartz monzonite.
4. Mapping tied to the grid, on a scale of 1:2,000, with attention paid to: fracture/alteration systems, if any; the localization of sulphide-bearing float.
5. Hand trenching/blasting in areas of mineralized float, provided overburden is not too deep.
6. If 1-5 are successful, diamond drilling should be contemplated, possibly one or two 60-meter Winkie holes as an initial test.
7. In areas where other spot anomalous Pb-Zn-Ag values are known in stream sediments, follow-up stream sediment and soil sampling should be carried out, in addition to prospecting.
8. After thorough assessment has been made, it should be decided which units of the SHAR 3, 4, 9 and 11 Claims should be relinquished.

Respectfully submitted,

R.M. Kuehnbaum

Toronto, Ontario
October, 1980

PROJECT WATSU

1980

Statement of Expenditures

Claims SHAR 9 & 11

Record Numbers 883, 1531

1)	Salaries & Benefits	$ 2,541[1]
2)	Helicopter flying - 2.1 hours @ $305/hour	641[2]
3)	Scintillometer rentals (Urtec)	337[3]
4)	Geochemical Analyses - 186	851[4]
5)	Other Work	437
	Total	$ 4,807

Notes:

[1]Pro-rated on basis of 9.7 man-days worked on claims conducting geological/geochemical/geophyscial surveys out of a total of 511 man-days spent on Project Watsu surveys, unit cost @ $262/man-day.

[2]Helicopter flying completed by Northern Mountain Helicopters Inc., Prince George, B.C., unit cost @ $305/hr.

[3]Pro-rated on basis of 9.7 man-days worked on claims conducting geophysical surveys out of a total of 461 man-days spent on Project Watsu surveys, unit cost @ $34.70/man-day.

[4]Geochemical analyses completed by Chemex Labs of Vancouver, B.C., unit cost @ $4.58/sample/

AUTHOR'S QUALIFICATIONS

R.M. KUEHNBAUM

R.M. Kuehnbaum graduated from the University of Toronto, Toronto, Ontario with a Bachelor of Science in geology in 1971 and obtained a Master of Science degree from the University of Toronto in 1973.

Since graduation he has worked as a mineral exploration geologist for Union Carbide Exploration Corporation until February 1980, carrying out assignments in Brazil, Portugal and Canada, and for Canadian Occidental Petroleum Ltd. (February '80 to present).

While employed with Canadian Occidental he has carried out and supervised mineral exploration projects in the Yukon and British Columbia.

He is currently a member of the Canadian Institute of Mining and Metallurgy and the Geological Association of Canada.

REFERENCES

Gabrielse, H., 1968 — Geology, Jennings River, Paper 68-55. Geological Survey of Canada

Sacks, E., 1979 — Geology and Geochemistry of the SHAR 3, 4 and 9 Claims. Report of Canadian Occidental Petroleum Ltd., Minerals Division, January, 1980.

APPENDIX I

ANALYTICAL RESULTS

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: (604)984-0221
TELEX: 043-52597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

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

CERT. # : A8010993-001-A
INVOICE # : 40551
DATE : 19-NOV-80
P.O. # : NONE
CASSI-SHAR 3,4,9,11

Sample description	Prep code	AU-FA+AA ppb					
80 CA 14236 R	214	155	--	--	--	--	--
80 CA 14237 R	214	100	--	--	--	--	--
80 CA 14241 R	214	35	--	--	--	--	--

Certified by ....

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: 984-0221
AREA CODE: 604
TELEX: 04-352597

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CERTIFICATE OF ASSAY

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

ATTN:

CERTIFICATE NO. 70123

INVOICE NO. 39401 N/C

RECEIVED Sept. 12/80

ANALYSED Nov. 22/80

SAMPLE NO. :	oz/ton Silver
80CA-14237R	1.17

Previous result on Cert. 70382 was value for a different sample.

MEMBER CANADIAN TESTING ASSOCIATION

REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA

CHEMEX LABS LTD.

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NORTH VANCOUVER, B.C.
CANADA V7J 2C1
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AREA CODE: 604
TELEX: 04-352597

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CERTIFICATE OF ASSAY

CERTIFICATE NO. 70382
INVOICE NO. 40103
RECEIVED Oct. 8/80
ANALYSED Oct. 31/80

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

ATTN:

Cassi Shar 3-4-9-11 Rocks

SAMPLE NO. :	% Zn	oz/ton Ag
80 CA 14235R	0.56	
80 CA 14236R		0.64
80 CA 14237R		~~0.06~~
80 CA 14241R		0.96

Originally on A8010174

MEMBER CANADIAN TESTING ASSOCIATION

REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA

CHEMEX LABS LTD.

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NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: 984-0221
AREA CODE: 604
TELEX: 04-352597

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CERTIFICATE OF ASSAY

TO: CANADIAN OCCIDENTAL PETROLEUM LTD.
Minerals Division
Ste. 311 - 215 Carlingview Drive
Rexdale, Ontario
ATTN: M9W 5X8 From Geochem A8010174-001

CERTIFICATE NO. 70123
INVOICE NO. 39401
RECEIVED Sept. 12/80
ANALYSED Oct. 6/80

SAMPLE NO. :	Zn %	Ag Oz/Ton
80 CA 14235R	0.57	
80 CA 14236R		0.64
80 CA 14237R		1.00
80 CA 14241R		0.96

REGISTERED ASSAYER, PROVINCE OF BRITISH COLUMBIA

CTA MEMBER CANADIAN TESTING ASSOCIATION

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Rexdale Ontario
M9W 5X8

CERT. # : A8010174-001-A
INVOICE # : 38565
DATE : 09-SEP-80

CASSI SHAR3-4-9-11 R

Sample description	Pb ppm	Zn ppm	Ag ppm	
80-CA-14230R	16	52	0.9	--
80-CA-14231R	26	76	0.3	--
80-CA-14232R	4	48	0.4	--
80-CA-14233R	8	62	0.4	--
80-CA-14234R	68	138	0.6	--
80-CA-14235R	3000	>4000	3.0	--
80-CA-14236R	285	870	>20.0	--
80-CA-14237R	790	84	>20.0	--
80-CA-14238R	1450	475	15.0	--
80-CA-14241R	2000	570	>20.0	--
80-CA-14242R	32	54	1.0	--
80-CA-14243R	12	68	1.2	--

CTA
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ASSOCIATION

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TO : Canadian Occidental Petroleum Ltd.,
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Ste. 311-215 Carlingview Dr.,
Rexdale Ontario
M9W 5X8

CERT. # : A8010172-001-A
INVOICE # : 38564
DATE : 10-SEP-80

CASSI SHAR3-4-9-11 S

Sample description	Pb ppm	Zn ppm	Ag ppm	
80-CA 14044	10	60	0.1	--
80-CA 14045	10	54	0.1	--
80-CA 14046	2	30	0.1	--
80-CA 14047	8	32	0.1	--
80-CA 14048	14	113	0.1	--
80-CA 14049	20	114	0.1	--
80-CA 14050	14	84	0.1	--
80-CA 14051	6	34	0.1	--
80-CA 14052	14	76	0.1	--
80-CA 14053	10	36	0.1	--
80-CA 14054	10	42	0.1	--
80-CA 14055	6	42	0.1	--
80-CA 14056	10	56	0.1	--
80-CA 14057	8	54	0.1	--
80-CA 14058	10	66	0.1	--
80-CA 14059	8	36	0.1	--
80-CA 14089	6	52	0.1	--
80-CA 14090	6	40	0.1	--
80-CA 14091	6	50	0.1	--
80-CA 14092	8	52	0.1	--
80-CA 14093	10	64	0.1	--
80-CA 14094	6	52	0.1	--
80-CA 14095	12	98	0.1	--
80-CA 14096	8	48	0.1	--
80-CA 14097	6	40	0.1	--
80-CA 14098	8	46	0.1	--
80-CA 14099	2	44	0.1	--
80-CA 14123	4	62	0.1	--
80-CA 14124	2	60	0.1	--
80-CA 14125	4	42	0.1	--
80-CA 14126	6	48	0.1	--
80-CA 14127	4	34	0.1	--
80-CA 14144	8	56	0.1	--
80-CA 14145	10	54	0.1	--
80-CA 14146	18	82	0.1	--
80-CA 14147	10	50	0.1	--
80-CA 14148	12	58	0.1	--
80-CA 14149	20	114	0.1	--
80-CA 14150	12	96	0.1	--
80-CA 14151	6	60	0.1	--

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Rexdale Ontario
M9W 5X8

CERT. # : A8010172-002-A
INVOICE # : 38564
DATE : 10-SEP-80

CASSI SHAR3-4-9-11 S

Sample description	Pb ppm	Zn ppm	Ag ppm	
80-CA 14152	26	156	0.1	--
80-CA 14153	10	54	0.1	--
80-CA 14154	14	62	0.1	--
80-CA 14155	4	36	0.1	--
80-CA 14156	12	72	0.4	--
80-CA 14157	8	32	0.1	--
80-CA 14158	8	34	0.1	--
80-CA 14159	14	96	0.1	--
80-CA 14160	22	124	0.1	--
80-CA 14161	150	1600	0.1	--
80-CA 14162	26	104	0.1	--
80-CA 14163	8	58	0.1	--
8[illegible]A 14164	8	58	0.1	--
8[illegible]CA 14165	6	46	3.8	--
80-CA 14166	6	44	0.1	--
80-CA 14167	6	38	0.1	--
80-CA 14168	18	455	1.2	--
80-CA 14169	12	176	0.1	--
80-CA 14170	8	64	0.1	--
80-CA 14184	6	46	0.1	--
80-CA 14185	12	52	0.1	--
80-CA 14186	6	46	0.1	--
80-CA 14187	6	60	0.1	--
80-CA 14188	10	76	0.1	--
80-CA 14189	8	68	0.1	--
80-CA 14190	12	138	0.1	--
80-CA 14191	14	150	0.1	--
80-CA 14192	14	108	0.1	--
80-CA 14193	16	140	0.1	--
80-CA 14194	12	74	0.1	--
80-CA 14195	10	74	0.1	--
80-CA 14196	10	68	0.1	--
80-CA 14197	8	52	0.1	--
80-CA 14198	10	62	0.1	--
80-CA 14199	6	48	0.1	--
80-CA 14200	8	60	0.1	--
80-CA 14201	8	40	0.1	--
8[illegible]A 14202	8	34	0.1	--
8[illegible]A 14203	6	40	0.1	--
80-CA 14204	6	38	0.1	--

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Rexdale Ontario
M9W 5X8

CERT. # : A8010172-003-A
INVOICE # : 38564
DATE : 10-SEP-80

CASSI SHAR3-4-9-11 S

Sample description	Pb ppm	Zn ppm	Ag ppm	
80-CA 14205	6	42	0.1	--
80-CA 14206	6	54	0.1	--
80-CA 14207	10	54	0.1	--
80-CA 14208	10	88	0.1	--
80-CA 14209	8	48	0.1	--
80-CA 14210	6	72	0.1	--
80-CA 14211	8	76	0.1	--
80-CA 14212	26	108	0.1	--
80-CA 14213	10	42	0.1	--
80-CA 14214	12	114	0.1	--
80-CA 14215	22	78	0.1	--
80-CA 14216	8	46	0.1	--
80-CA 14239	310	565	3.6	--
80-CA 14244 } control	4	66	0.1	--
80-CA 14245 } control	6	66	0.1	--
80-CA 14246 } control	8	48	0.1	--

Certified by .... [signature]

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Rexdale Ontario
M9W 5X8

CERT. # : A8010176-001-A
INVOICE # : 38566
DATE : 09-SEP-80

CASSI-SHAR3-4-9-11SS

Sample description	Pb ppm	Zn ppm	Ag ppm	
80-CA-14139SS	8	94	0.1	--
80-CA-14140SS	4	46	0.1	--
80-CA-14141SS	6	46	0.1	--
80-CA-14142SS	6	92	0.1	--
80-CA-14240SS	74	280	0.2	--

Certified by ....

MEMBER
CANADIAN TESTING
ASSOCIATION

CHEMEX LABS LTD.

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NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: 984-0221
AREA CODE: 604
TELEX: 04-352597

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 54193
INVOICE NO. 36933
RECEIVED July 5/80
ANALYSED July 15/80

TO: Canadian Occidental Petroleum Ltd.,
Minerals Division,
Ste. 311 - 215 Carlingview Dr.,
Rexdale, Ont. M9W 5X8 CC. Watson Lake, Y.T.
ATTN: Shar 3,4, 9 Silts Cassi Project

SAMPLE NO. :	PPM Pb	PPM Zn	PPM Ag	
14000S 80-CA	8	70	0.1	
14001	12	84	0.1	control
14002	56	162	0.1	
14016	44	184	0.2	
14017	30	210	0.1	
14018	24	164	0.1	
14019	18	190	0.1	
14020	20	190	0.1	
14021	42	116	0.1	
14022	34	138	0.1	
14023	450	1200	3.8	
14024	390	900	3.2	
14025	425	630	10	
14026	142	470	5.4	
14027	124	410	2.8	
14028	76	210	2.8	
14029	94	260	2.0	
14030	76	225	1.8	
14031	74	255	1.4	
10432	76	270	1.8	
14033	72	230	1.6	
14034	64	180	1.2	
14035	60	150	1.6	
14036	74	210	1.6	
14037	66	220	1.4	
14039	70	140	1.4	
14040	52	125	1.2	
14041	6	85	0.4	
14054	10	100	0.2	
14060	4	60	0.1	
14061	30	125	1.0	
14062	28	90	0.6	
14063	42	120	0.2	
14064	32	110	0.2	
14065	36	115	0.1	
14066	22	100	0.2	
14067	20	90	0.1	
14068	14	90	0.2	
14069	16	100	0.2	
14070SS 80-Ca	14	100	0.1	

CERTIFIED BY: Hart Bichle

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: 984-0221
AREA CODE: 604
TELEX: 04-352597

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 54194
INVOICE NO. 36933
RECEIVED July 5/80
ANALYSED July 15/80

TO: Canadian Occidental Petroleum Ltd.,
Minerals Division,
Ste. 311 - 215 Carlingview Dr.,
Rexdale, Ont. M9W 5X8 CC. Watson Lake, Y.T.

ATTN: Shar 3, 4, 9 Silts Cassi Project

SAMPLE NO. :	PPM Pb	PPM Zn	PPM Ag
14017SS 80-CA	22	110	0.1
14072	16	115	0.1
14073	14	90	0.1
14074	14	96	0.1
14075	14	84	0.1
14076	16	104	0.1
14077	14	118	0.2
14078	14	100	0.1
14079	18	112	0.1
14080	14	88	0.1
14081	12	102	0.1
14082	18	90	0.4
14083	10	58	0.1
14084	22	94	0.1
14085	32	128	0.8
14086	20	90	0.1
14087	36	220	0.8
14088	6	72	0.1
14100	14	78	0.1
14101	10	64	0.1
14102	14	106	0.1
14103	10	64	0.1
14104	6	62	0.1
14105	64	190	0.8
14106	30	126	0.2
14107	32	136	0.4
14108	34	132	0.2
14109	22	110	0.2
14110	32	114	0.1
14111	36	122	0.1
14112	14	92	0.1
14113	22	102	0.1
14114	10	88	0.1
14115	28	114	0.2
14116	18	104	0.1
14117	22	102	0.1
14118	16	96	0.1
14119	14	78	0.1
14120	16	86	0.1
14121 80-CA	14	72	0.1

CTA MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: Hart Bichler

CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA V7J 2C1
TELEPHONE: 984-0221
AREA CODE: 604
TELEX: 04-352597

• ANALYTICAL CHEMISTS • GEOCHEMISTS • REGISTERED ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 54195
INVOICE NO. 36933
RECEIVED July 5/80
ANALYSED July 15/80

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

CC. Watson Lake, Y.T.

ATTN: Shar 3,4, 9 Silts Cassi Project

SAMPLE NO. :	PPM Pb	PPM Zn	PPM Ag
80-CA 14122SS	14	88	0.1

MEMBER CANADIAN TESTING ASSOCIATION

CERTIFIED BY: Hart Bichler

APPENDIX II
Table 4

ROCK DESCRIPTIONS

SHAR 3-4-9-11 CLAIMS

80-CA-14230R float	Massive, medium-grained, equigranular quartz monzonite, 20% quartz, 60% plagioclase. Plagioclase altered to brownish clays (?). Mafic minerals absent through weathering. Limonite-stained. Pb 16, Zn 52, Ag 0.9 (ppm)
80-CA-14231R float	Massive, coarse-grained (pegmatite) granite. Coarse K-feldspar 40%; plagioclase 35%; quartz 20%, sericite + chlorite (in patches) 5%. Rock lightly limonite-stained. Sample sent has visible coarse pyrite (<1%). Pb 26, Zn 76, Ag 0.3 (ppm)
80-CA-14232R	Massive, medium-grained, equigranular biotite-quartz monzonite, 20% quartz, 20% K-feldspar; 55% plagioclase; 5% biotite, mostly chloritized. Alteration due to surface weathering. Pb 4, Zn 48, Ag 0.4 (ppm)

80-CA-14233R

Whitish-grey, massive, medium-grained, equigranular(biotite)-quartz monzonite. 15% K-feldspar; 20% quartz; 55% plagioclase; 10% completely chloritized biotite. Alteration due to surface weathering.

Pb	Zn	Ag (ppm)
8	62	0.4

80-CA-14234R

Massive, medium-grained (biotite)-quartz monzonite. Plagioclase a dirty brown colour due to surface weathering (?), and all or most biotite chloritized. 20% K-feldspar, 15% quartz, 60% plagioclase, 5% chlorite (after biotite).

Pb	Zn	Ag (ppm)
68	138	0.6

80-CA-14235R
float

Cobble of limonite-stained, massive, medium-grained, highly altered granitic rock. Approximately 5% quartz, 5% chlorite + muscovite, 85% plagioclase intensely altered to a white clay mineral (?), and <2% arsenopyrite (?) + pyrite, fine-grained, finely disseminated.

Pb (ppm)	Zn (%)	Ag (ppm)
3000	0.57	3.0

80-CA-14236R
float

Same as 14235R, but contains vuggy fillings of pyrite or arsenopyrite and very fine-grained disseminated arsenopyrite (?). Both <2%.

Pb	Zn (ppm)	Ag (oz/ton)	Au (ppb)
285	870	0.64	155

80-CA-14237R
float

Same as 14235 but contains ±2-3% finely disseminated pyrite or arsenopyrite (?). A thin (1 mm) open-space, partially euhedral quartz-filled veinlet runs across the specimen.

Pb	Zn (ppm)	Ag (oz/ton)	Au (ppb)
790	84	1.00	100

80-CA-14238R
float

Same as 14235, but contains <<1% extremely fine-grained sulphide, usually associated with sericite books.

Pb	Zn	Ag (ppm)
1450	475	15.0

80-CA-14241R
float

Same rock type as 14235R, trace very fine-grained disseminated pyrite.

Pb	Zn (ppm)	Ag (oz/ton)	Au (ppb)
2000	570	0.96	35

80-CA-14242R
float

Limonite-stained, medium-grained quartz monzonite. Surface - weathered with all plagioclase now altered to whitish clays. No mafic minerals (leached).

Pb	Zn	Ag (ppm)
32	54	1.0

80-CA-14243R

Altered quartz monzonite; slightly limonite-stained (on surface and throughout).

Pb	Zn	Ag (ppm)
12	68	1.2

80-GT-1

Slightly limonite-stained biotite quartz monzonite. From 15 cm wide fracture/joint zone. Contains trace pyrite, pyrrhotite.

Pb	Zn	Ag (ppm)
12	48	0.1

APPENDIX III - SAMPLING AND LABORATORY PROCEDURES

I. SAMPLING PROCEDURES

A) 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.

B) 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.

C) 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.

D) 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) 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.

ii) Soils

Same procedure as for stream sediments.

iii) 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.

B. Elemental Analyses

i) ppm Lead, Zinc, Silver, (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. Pb, Zn and Ag 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
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

A = Air acetylene flame

N = Nitrous oxide - acetylene flame

ii) 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.

iii) 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

STATISTICAL TREATMENT OF

RADIOMETRIC

AND

GEOCHEMICAL

DATA

FREQUENCY DISTRIBUTION TABLES

FREQUENCY DISTRIBUTION DIAGRAMS

CUMULATIVE FREQUENCY CURVES

TABLE 5

FREQUENCY DISTRIBUTION - RADIOMETRICS

Interval cps	Frequency	Cumulative Frequency	Cumulative Percentage
121-140	16	16	11.4
141-160	33	49	35.0
161-180	42	91	65.0
181-200	17	108	77.1
201-220	12	120	85.7
221-240	11	131	93.6
241-260	3	134	95.7
261-280	3	137	97.9
281-300	2	139	99.3
301-320	1	140	100.0
	140		

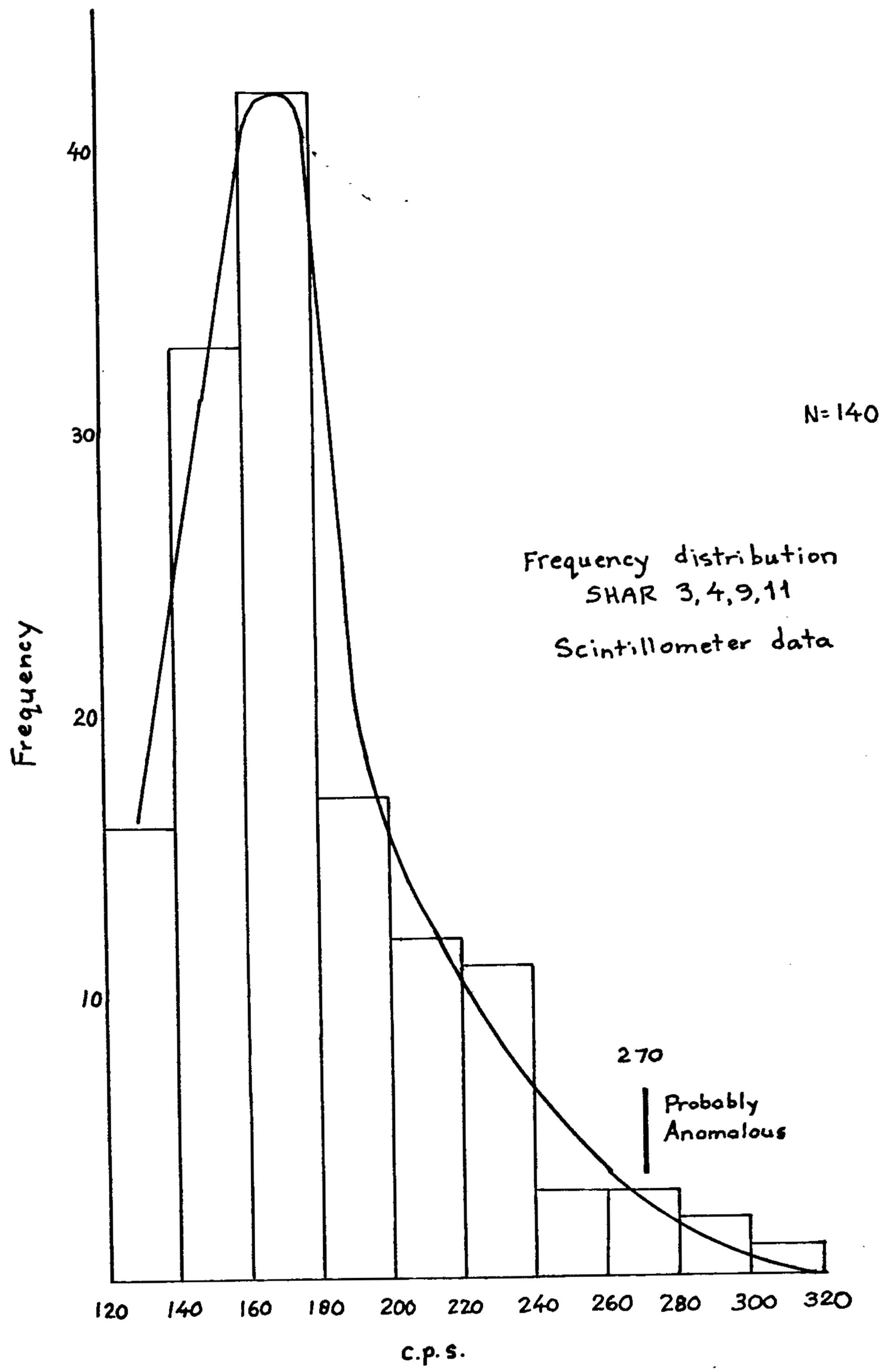
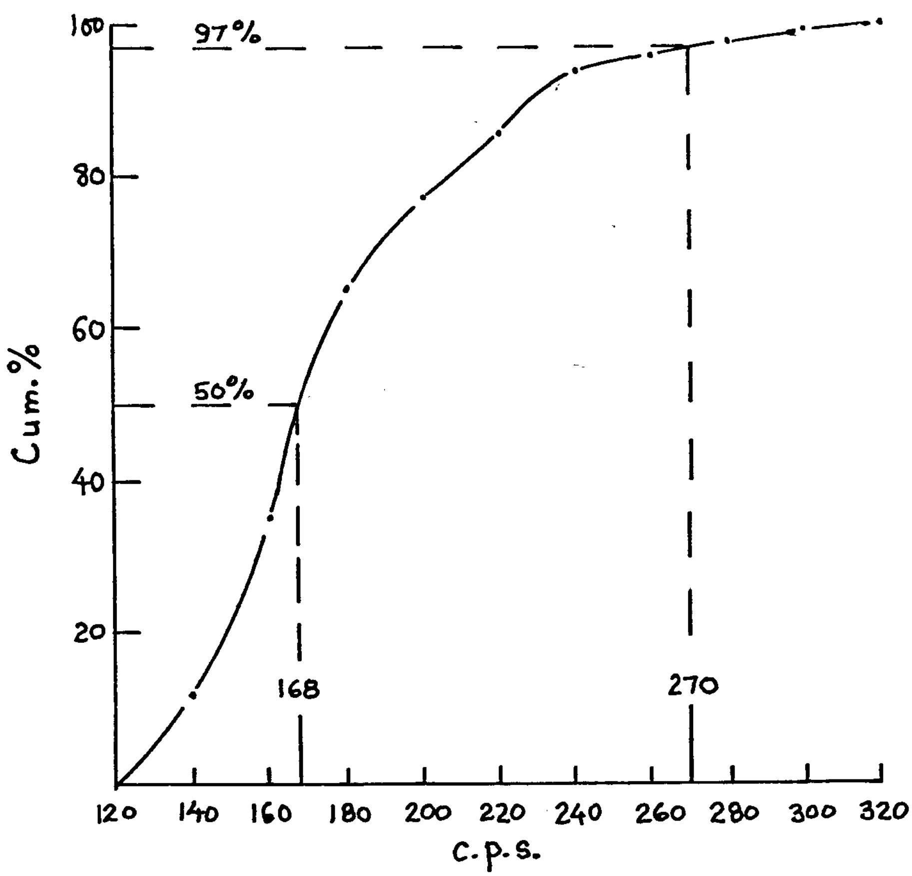

N=140
Frequency distribution
SHAR 3,4,9,11
Scintillometer data
Frequency
40
30
20
10
270
Probably
Anomalous
120
140
160
180
200
220
240
260
280
300
320
c.p.s.

Figure 6



Cumulative Frequency Curve
SHAR 3, 4, 9, 11
SCINTILLOMETER DATA

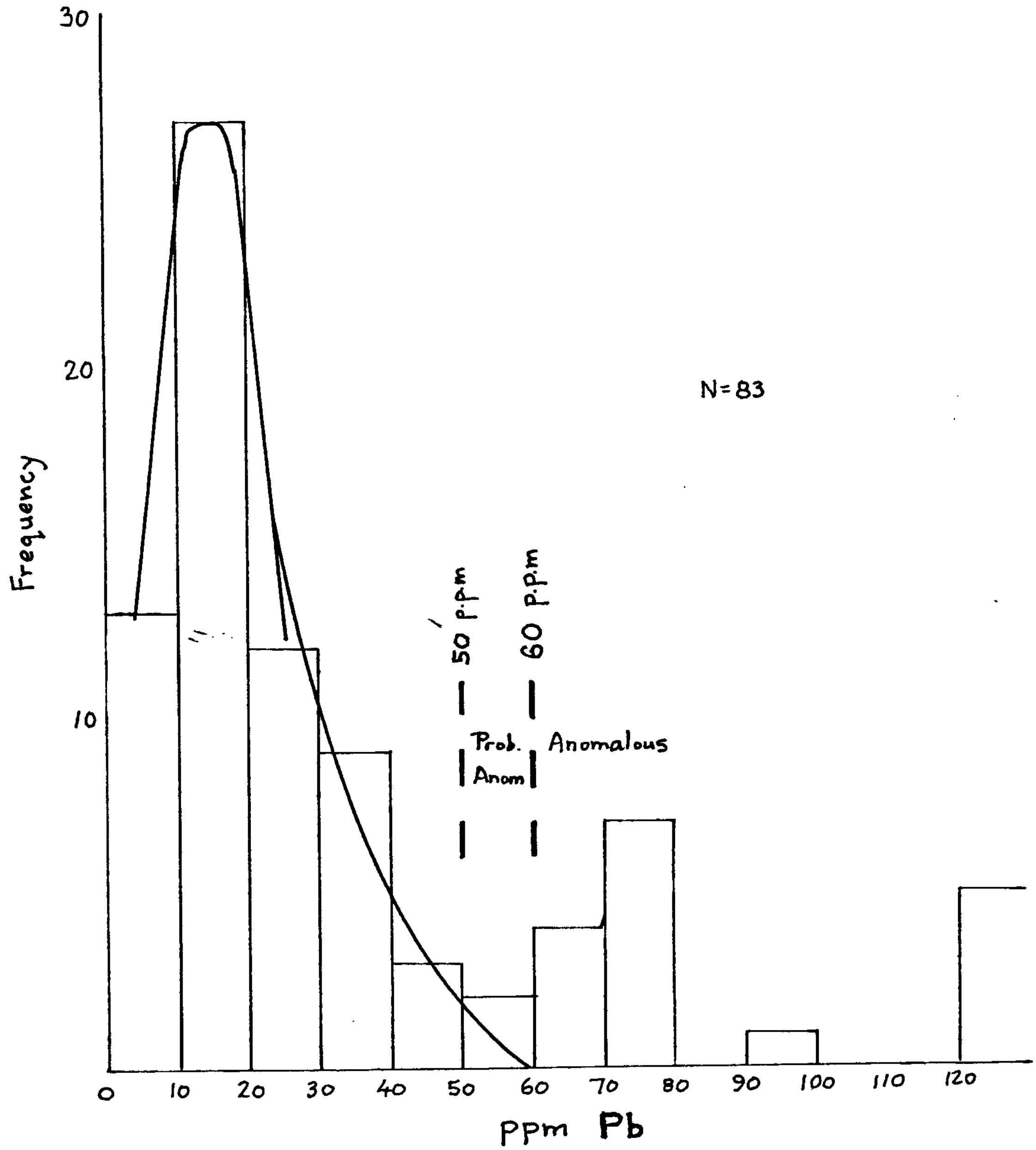
Figure 7

TABLE 6

FREQUENCY DISTRIBUTION FOR STREAM SEDIMENTS

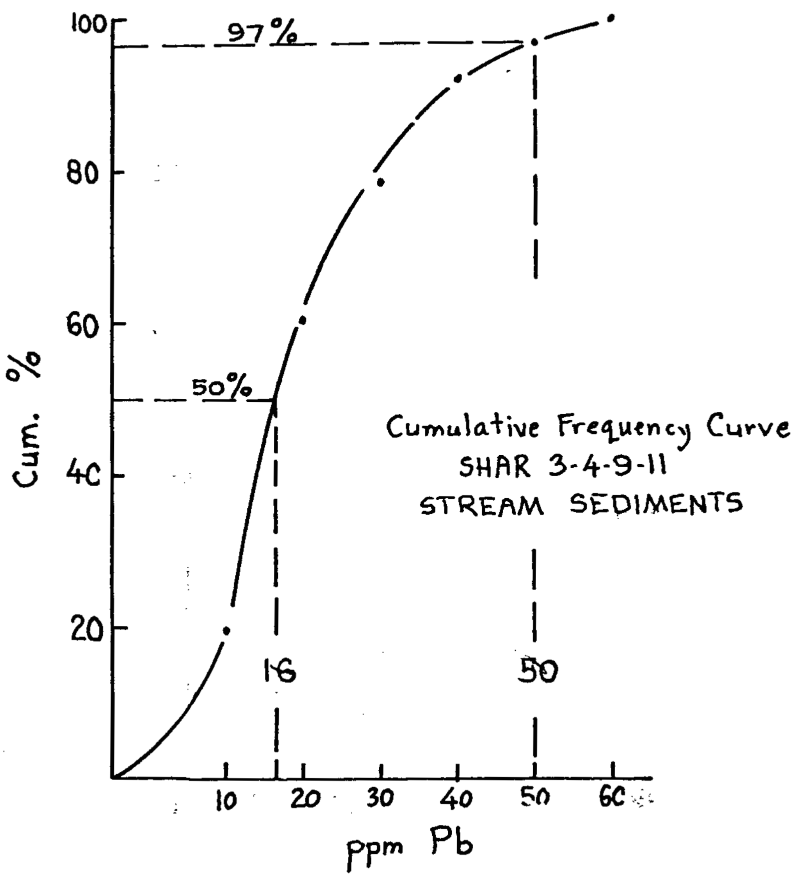
LEAD

Interval ppm	Frequency	Cumulative Frequency	Cumulative Percentage
0-10	13	13	19.7
11-20	27	40	60.6
21-30	12	52	78.8
31-40	9	61	92.4
41-50	3	64	97.0
51-60	2	66	100.0
61-70	4		
71-80	7		
81-90			
91-100	1		
101-110			
111-120			
+120	5		
	83		



Frequency Distribution
SHAR 3, 4, 9, 11
STREAM SEDIMENTS

Figure 8



100
80
60
40
20
97%
50%
Cum. %
Cumulative Frequency Curve
SHAR 3-4-9-11
STREAM SEDIMENTS
16
50
10
20
30
40
50
60
ppm Pb

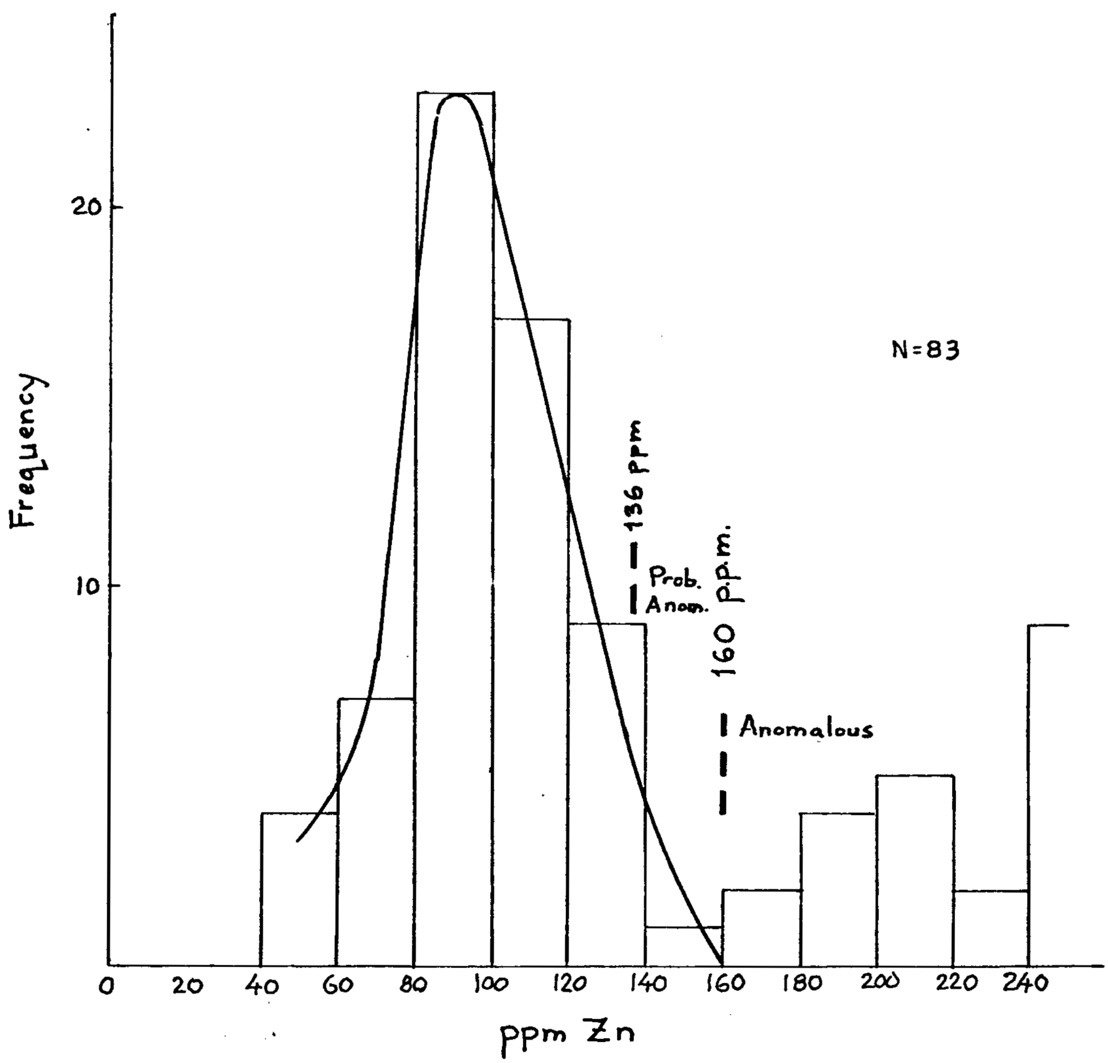
Figure 9

TABLE 7

FREQUENCY DISTRIBUTION FOR STREAM SEDIMENTS

ZINC

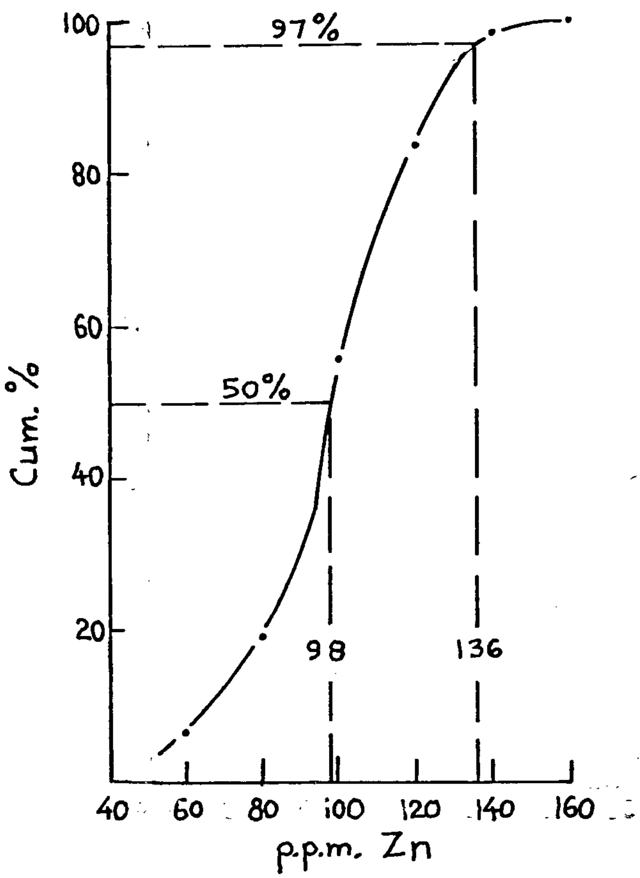
Interval ppm	Frequency	Cumulative Frequency	Cumulative Percentage
41-60	4	4	6.6
61-80	7	11	18.0
81-100	23	34	55.7
101-120	17	51	83.6
121-140	9	60	98.4
141-160	1	61	100
161-180	2		
181-200	4		
201-220	5		
221-240	2		
+240	9		
	83		



Frequency Distribution
SHAR 3,4,9,11

STREAM SEDIMENTS

Figure 10



Cumulative Frequency Curve
SHAR 3,4,9,11
STREAM SEDIMENTS

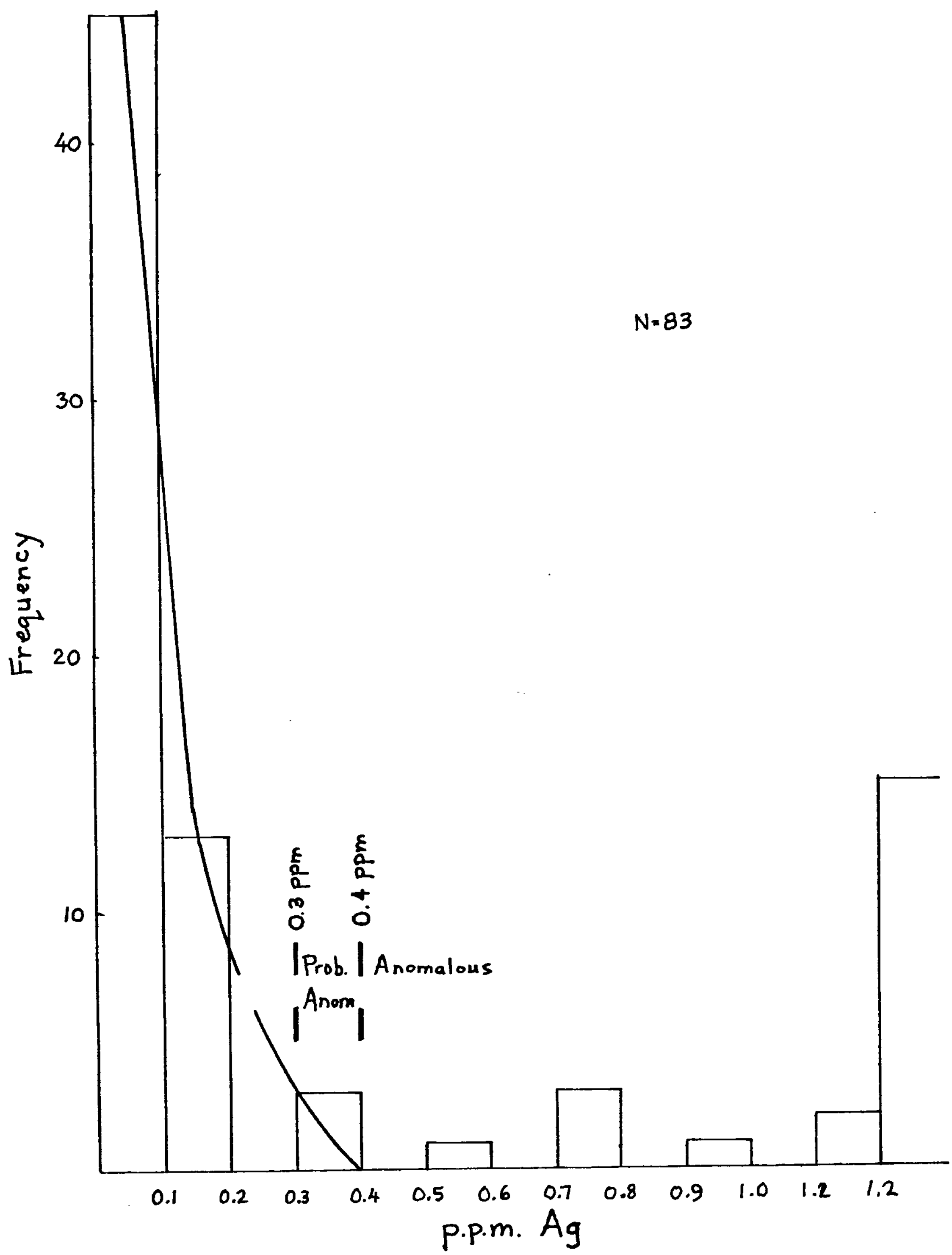
Figure 11

TABLE 8

FREQUENCY DISTRIBUTION FOR STREAM SEDIMENTS

SILVER

Interval ppm	Frequency	Cumulative Frequency	Cumulative Percentage
0.1	45	45	73.8
0.2	13	58	95.1
0.3		58	95.1
0.4	3	61	100.0
0.5			
0.6	1		
0.7			
0.8	3		
0.9			
1.0	1		
+1.0	17		
	83		

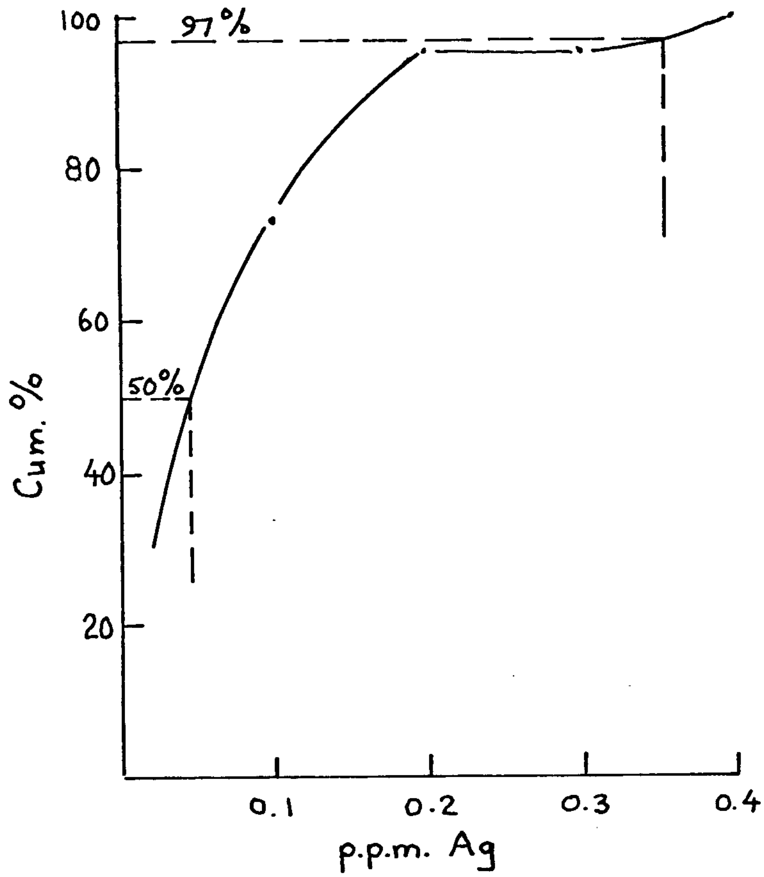


Frequency Distribution

SHAR 3,4,9,11

STREAM SEDIMENTS

Figure 12



Cumulative Frequency
SHAR 3,4,9,11
STREAM SEDIMENTS

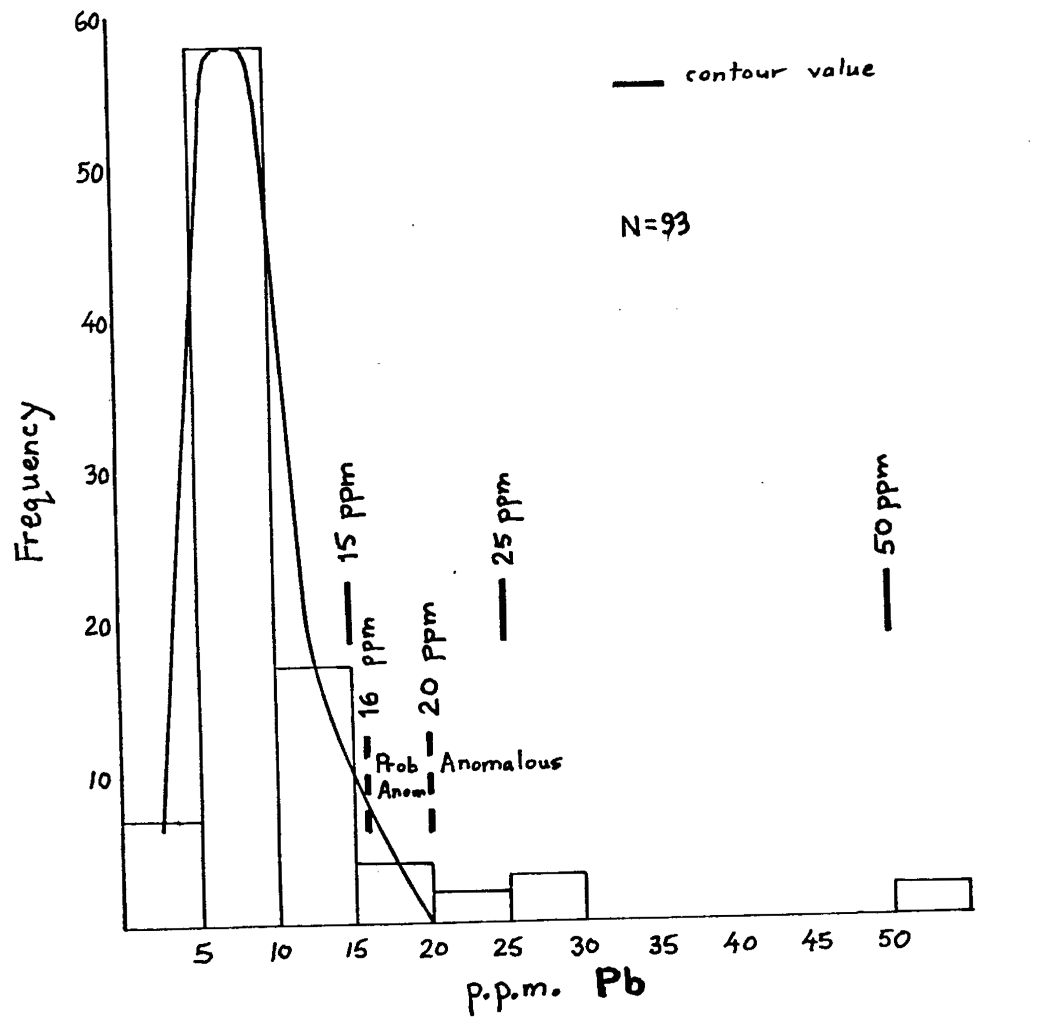
Figure 13

TABLE 9

FREQUENCY DISTRIBUTION FOR SOILS

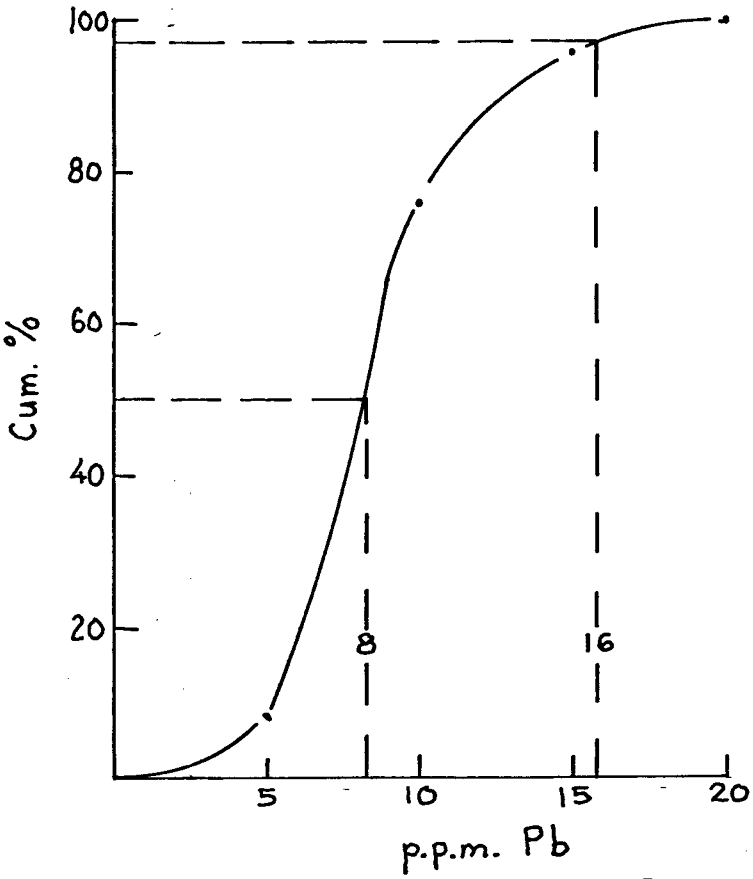
LEAD

Interval ppm	Frequency	Cumulative Frequency	Cumulative Percentage
0-5	7	7	8.1
6-10	58	65	75.6
11-15	17	82	95.3
16-20	4	86	100.0
21-25	2		
26-30	3		
+30	2		
	93		



Frequency Distribution
SHAR 3,4,9,11
SOILS

Figure 14



Cumulative Frequency Curve
SHAR 3,4,9,11
SOILS

Figure 15

TABLE 10

FREQUENCY DISTRIBUTION FOR SOILS

SILVER

Interval ppm	Frequency	Cumulative Frequency	Cumulative Percentage
0.1	89	89	100.0
0.2			
0.3			
0.4	1		
0.5			
+0.5	3		
	93		

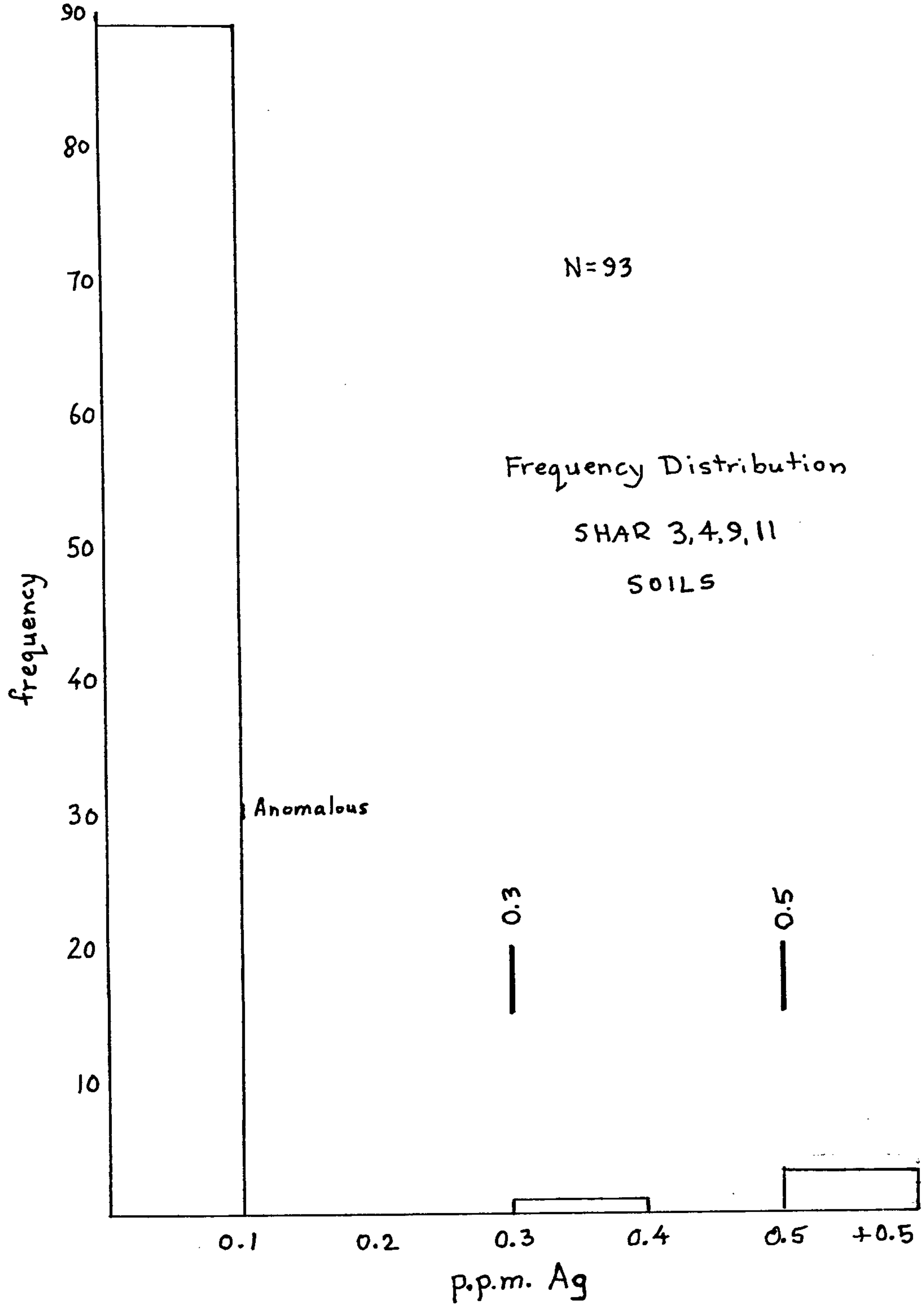

90
80
70
60
50
40
30
20
10
frequency
N=93
Frequency Distribution
SHAR 3,4,9,11
SOILS
Anomalous
0.3
0.5
0.1
0.2
0.3
0.4
0.5
+0.5
p.p.m. Ag

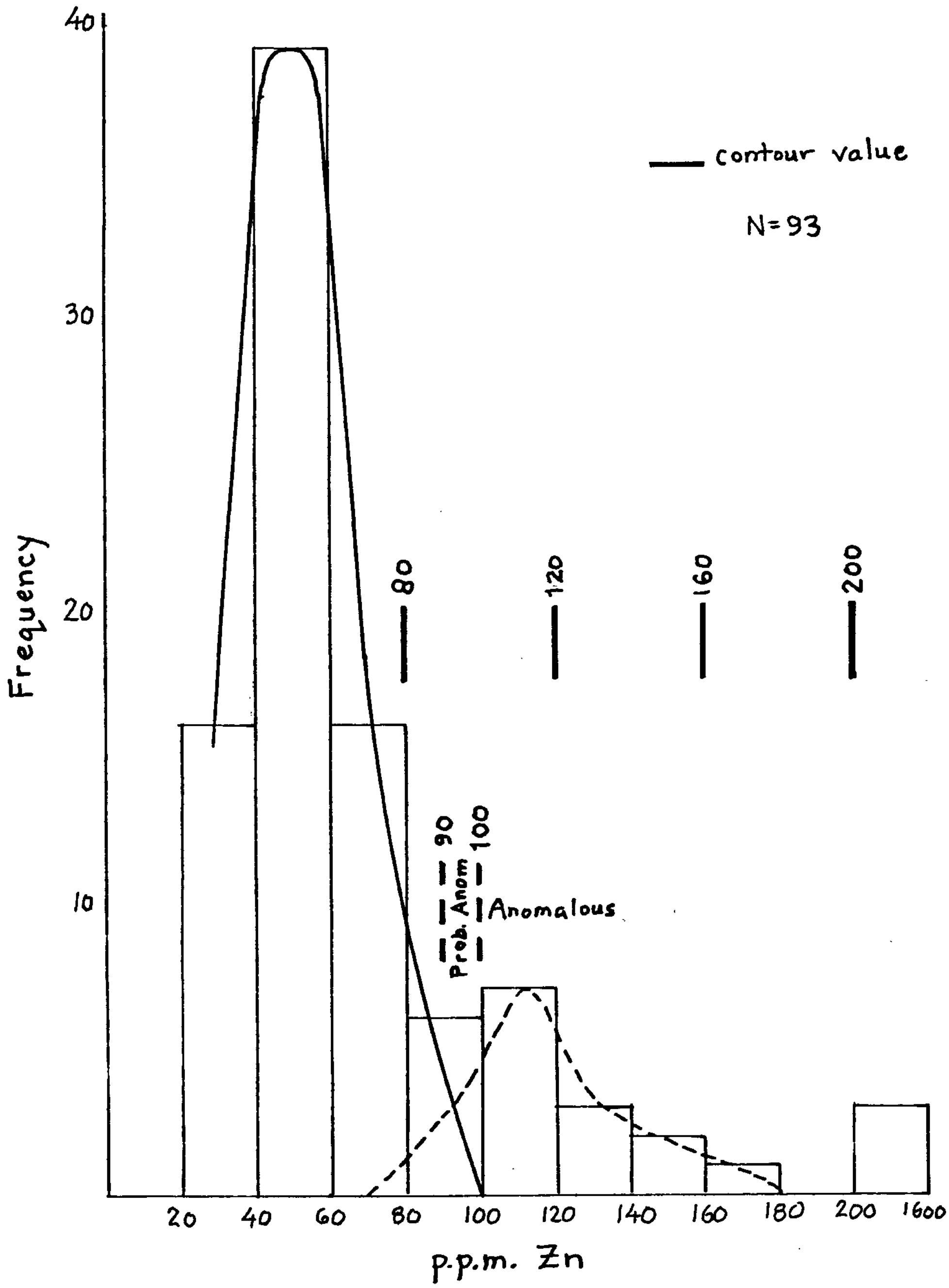
Figure 16

TABLE 11

FREQUENCY DISTRIBUTION FOR SOILS

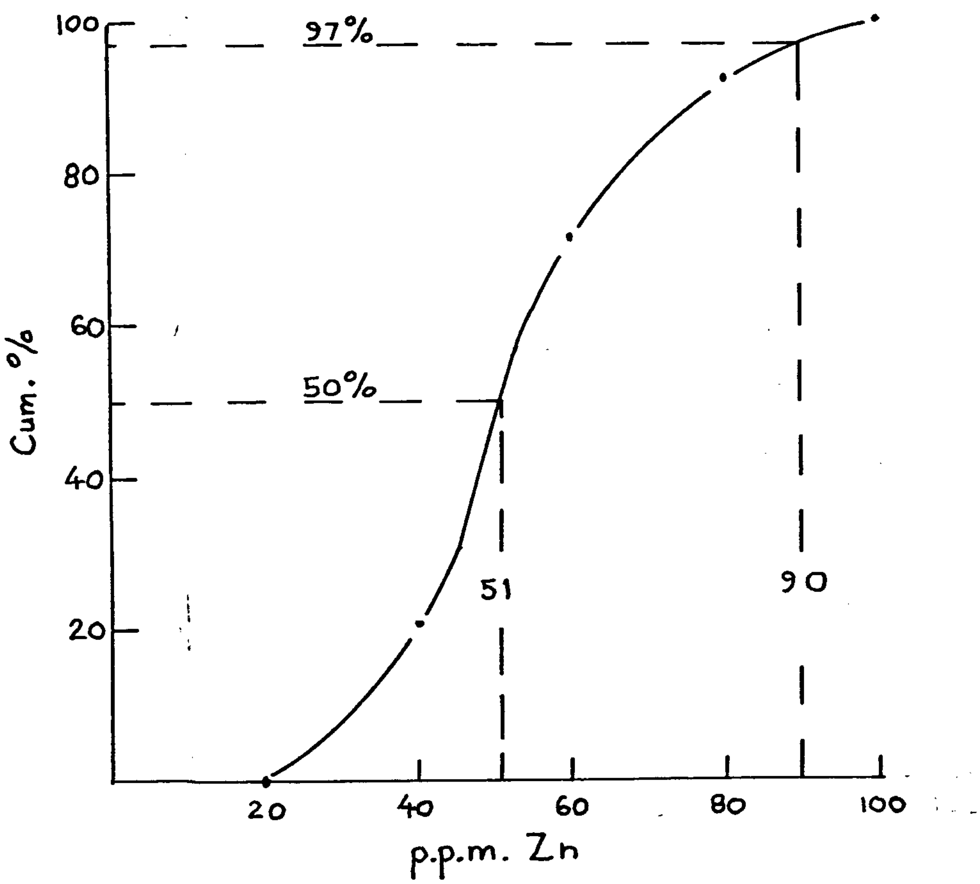
ZINC

Interval ppm	Frequency	Cumulative Frequency	Cumulative Percentage
0-20	-	-	-
21-40	16	16	20.8
41-60	39	55	71.4
61-80	16	71	92.2
81-100	6	77	100.0
101-120	7		
121-140	3		
141-160	2		
161-180	1		
181-200			
+200	3		
	93		



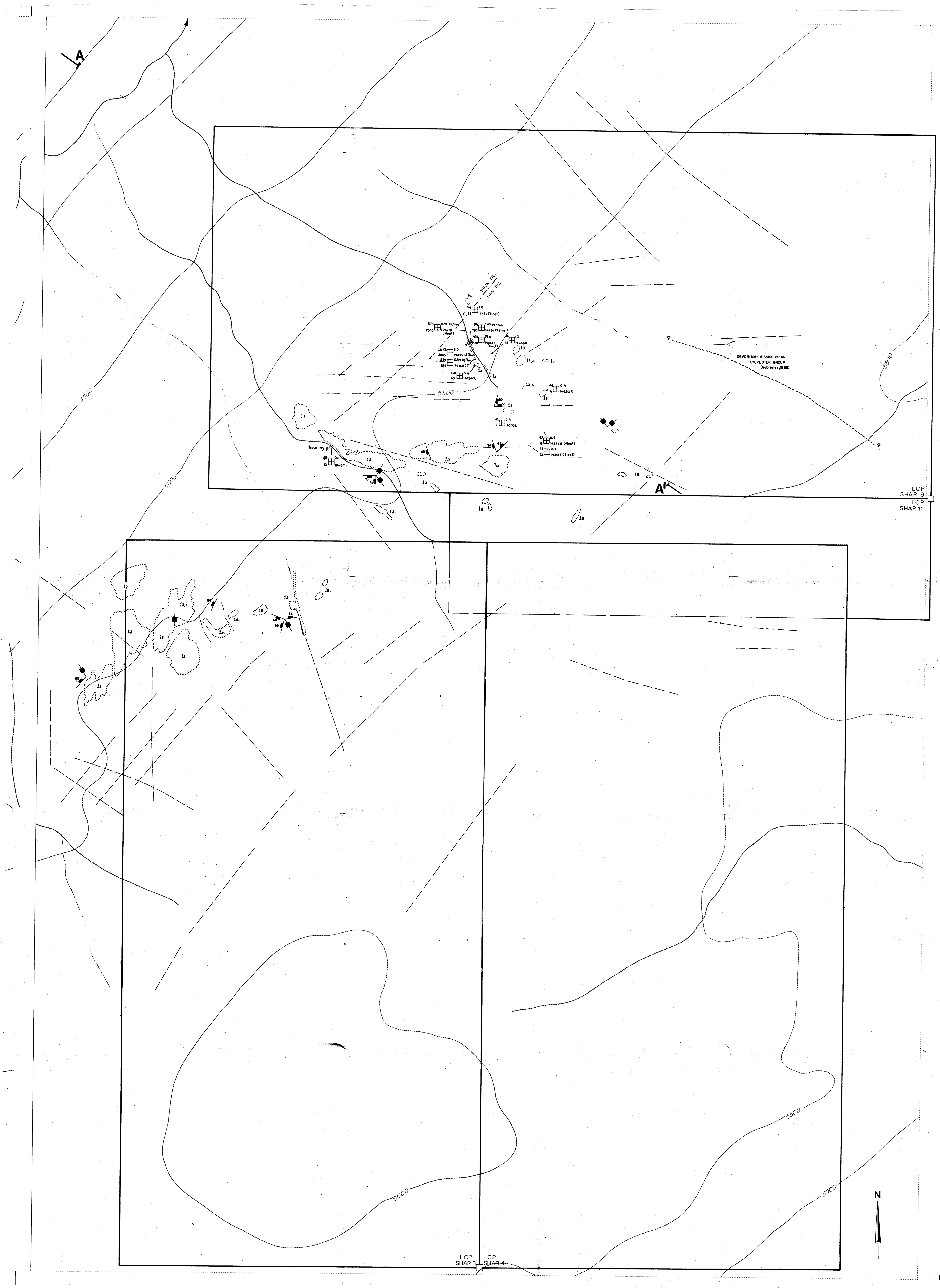
Frequency Distribution
SHAR 3,4,9,11
SOILS

Figure 17



Cumulative Frequency
SHAR 3,4,9,11
SOILS

Figure 18



LEGEND

MID-CRETACEOUS

Cassiar Batholith

1 1a Massive to vaguely foliated, equigranular, medium-grained biotite-quartz monzonite; locally grading into granodiorite; locally K-feldspar megacrystic

1b Vaguely foliated, equigranular to saccharoidal medium-grained biotite-muscovite quartz monzonite

1c Aplite, as thin dykes

SYMBOLS

- - - - - geologic boundary

— — lineament (joint, fracture) visible on air photograph

outcrop

joint; inclined, vertical

ppm Zn ppm Ag ppm Pb SOCA sample number — rock sample location and value

claim boundary

legal corner post

A ... A' cross section

Claim post

Claim boundary

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 9376

CANADIAN OCCIDENTAL PETROLEUM LTD.
MINERALS DIVISION

PROJECT CASSI
SHAR 3,4,9,11 CLAIMS

LIARD MINING DIVISION,
BRITISH COLUMBIA

N.T.S. 104-O

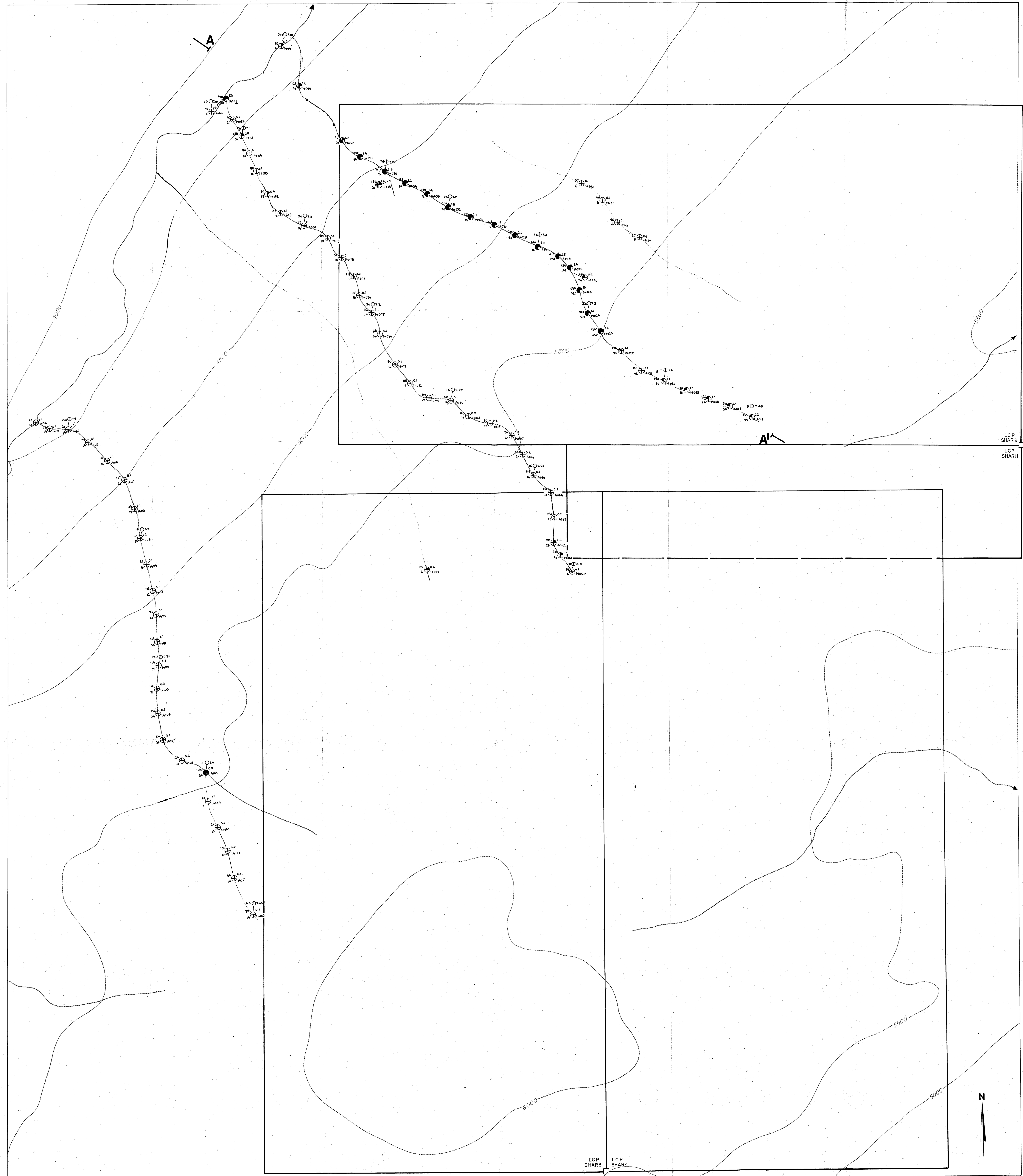
GEOLOGY & ROCK GEOCHEMISTRY

100 50 0 100 200 300 400

SCALE IN METRES

PLAN 1 R.K./p.f./Nov.80

1



Legend
Heavy Waters
Sc pH
Stream Sediments
All values in ppm
Zn Ag
Pb 80 CA sample number
ANOMALOUS
>160 >0·4
>60
PROBABLY ANOMALOUS
137-160 0·4
51-60
A A' Cross section
Claim post
Claim boundary

CANADIAN OCCIDENTAL PETROLEUM LTD.
MINERALS DIVISION

PROJECT CASSI
SHAR 3,4,9,11 CLAIMS

LIARD MINING DIVISION,
BRITISH COLUMBIA

N.T.S. 104-O

STREAM SEDIMENT GEOCHEMISTRY

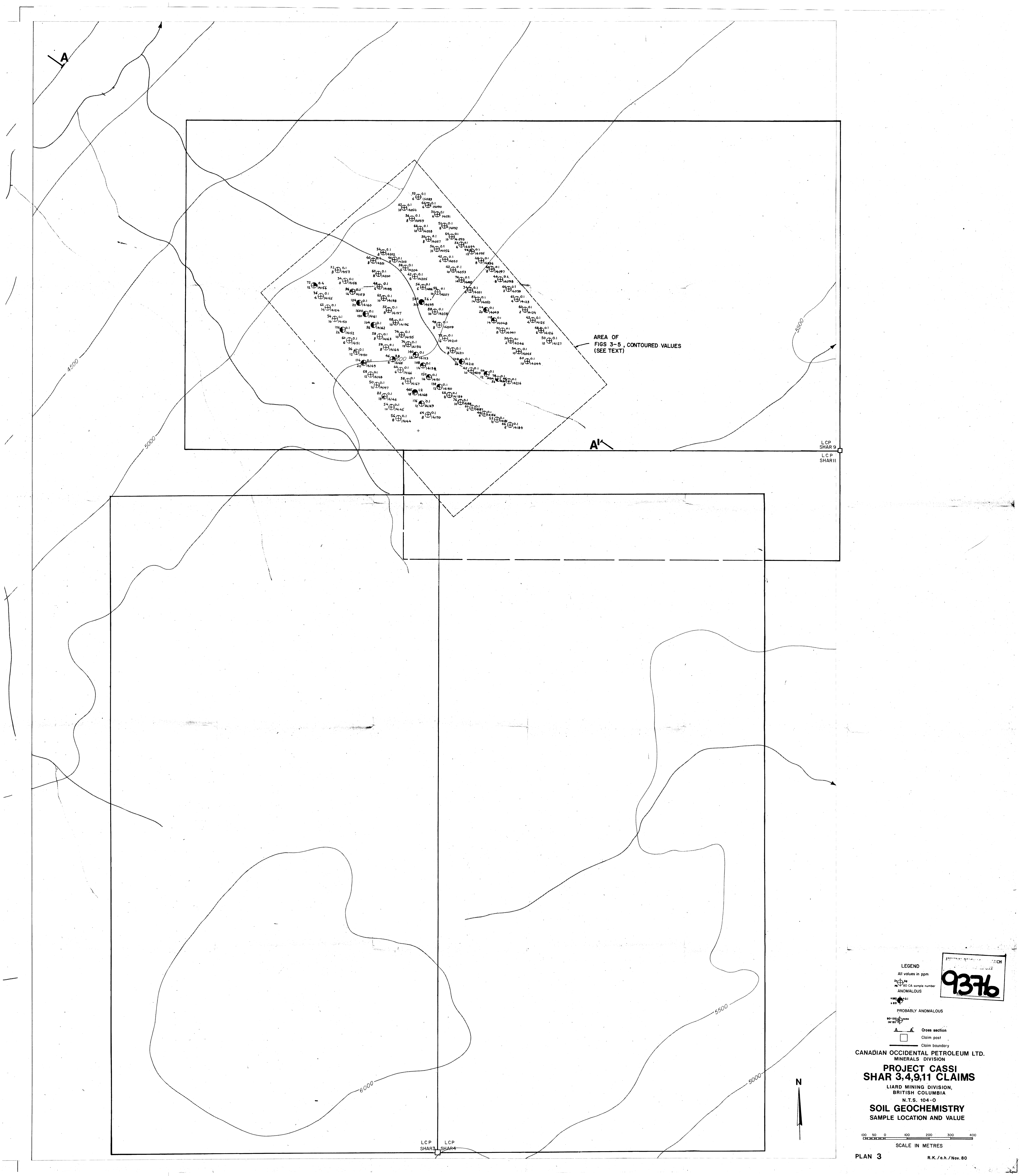
SAMPLE LOCATION AND VALUE

Pb, Zn, Ag.

100 50 0 100 200 300 400
SCALE IN METRES

PLAN 2

R.K./a.h./Nov.80


A
A'
AREA OF
FIGS 3-5, CONTOURED VALUES
(SEE TEXT)
4500
5000
5500
6000
LCP
SHAR 9
LCP
SHAR 11
LCP
SHAR 3
LCP
SHAR 4
N
LEGEND
All values in ppm
Zn Ag Pb 80 CA sample number
ANOMALOUS
+100 +0.1 +20
PROBABLY ANOMALOUS
90-100 none 16-20
Cross section
Claim post
Claim boundary
9376
CANADIAN OCCIDENTAL PETROLEUM LTD.
MINERALS DIVISION
PROJECT CASSI
SHAR 3,4,9,11 CLAIMS
LIARD MINING DIVISION,
BRITISH COLUMBIA
N.T.S. 104-O
SOIL GEOCHEMISTRY
SAMPLE LOCATION AND VALUE
100 50 0 100 200 300 400
SCALE IN METRES
PLAN 3
R.K./a.h./Nov.80

LEGEND

Readings and contours in c.p.s.
Urtec model UG 130 TC_1 at 10 sec.

—— 180 ——
– – 220 – –
······ 260 ······
······ 300 ······

Probably anomalous
◉ >270 cps

A.....A Cross Section
□ Claim post
—— —— Claim boundary

CANADIAN OCCIDENTAL PETROLEUM LTD.
MINERALS DIVISION

PROJECT CASSI
SHAR 3,4,9,11 CLAIMS

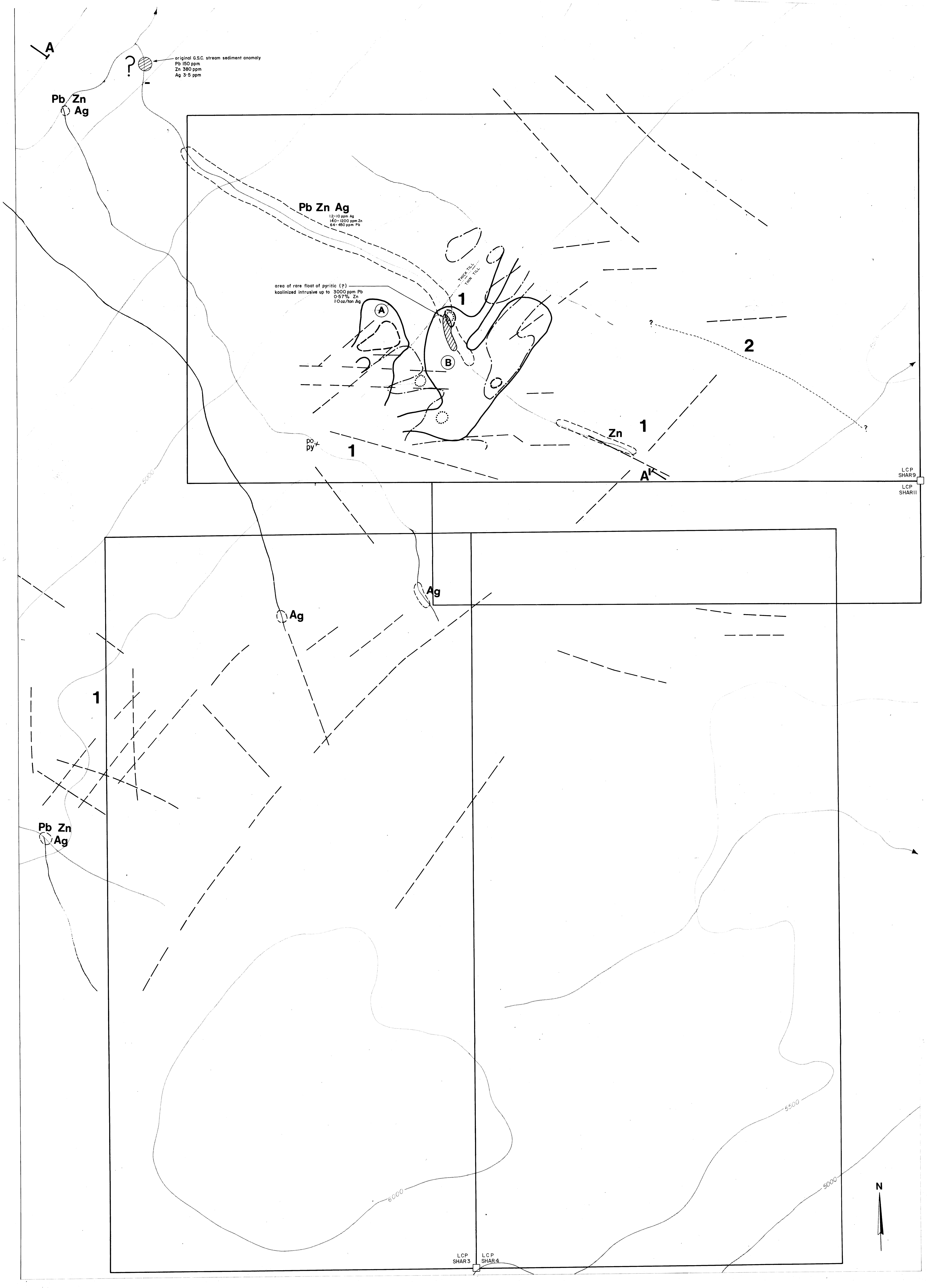
LIARD MINING DIVISION,
BRITISH COLUMBIA
N.T.S. 104-O

SCINTILLOMETER SURVEY
CONTOURED VALUES

100 50 0 100 200 300 400
SCALE IN METRES

PLAN 4

R.K. / a.h. / Nov. 80



LEGEND

air photo lineament (joint/fracture)
stream sediment anomalies with anomalous metal (s)
radiometric trend in grid area ≥180 cps
soil Zn 70 ppm
soil Pb 25 ppm
soil Ag 0·5 ppm
(A) anomaly
py pyrite

MID-CRETACEOUS
Cassiar Batholith
1 Quartz monzonite
DEVONIAN & MISSISSIPPIAN
Sylvester Group
2 Metavolcanic rocks (Gabrielse 1968)

SYMBOLS
geologic boundary
lineament (joint, fracture) visible on air photograph

claim boundary
legal corner post
A......A' cross section

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
NO. 9376

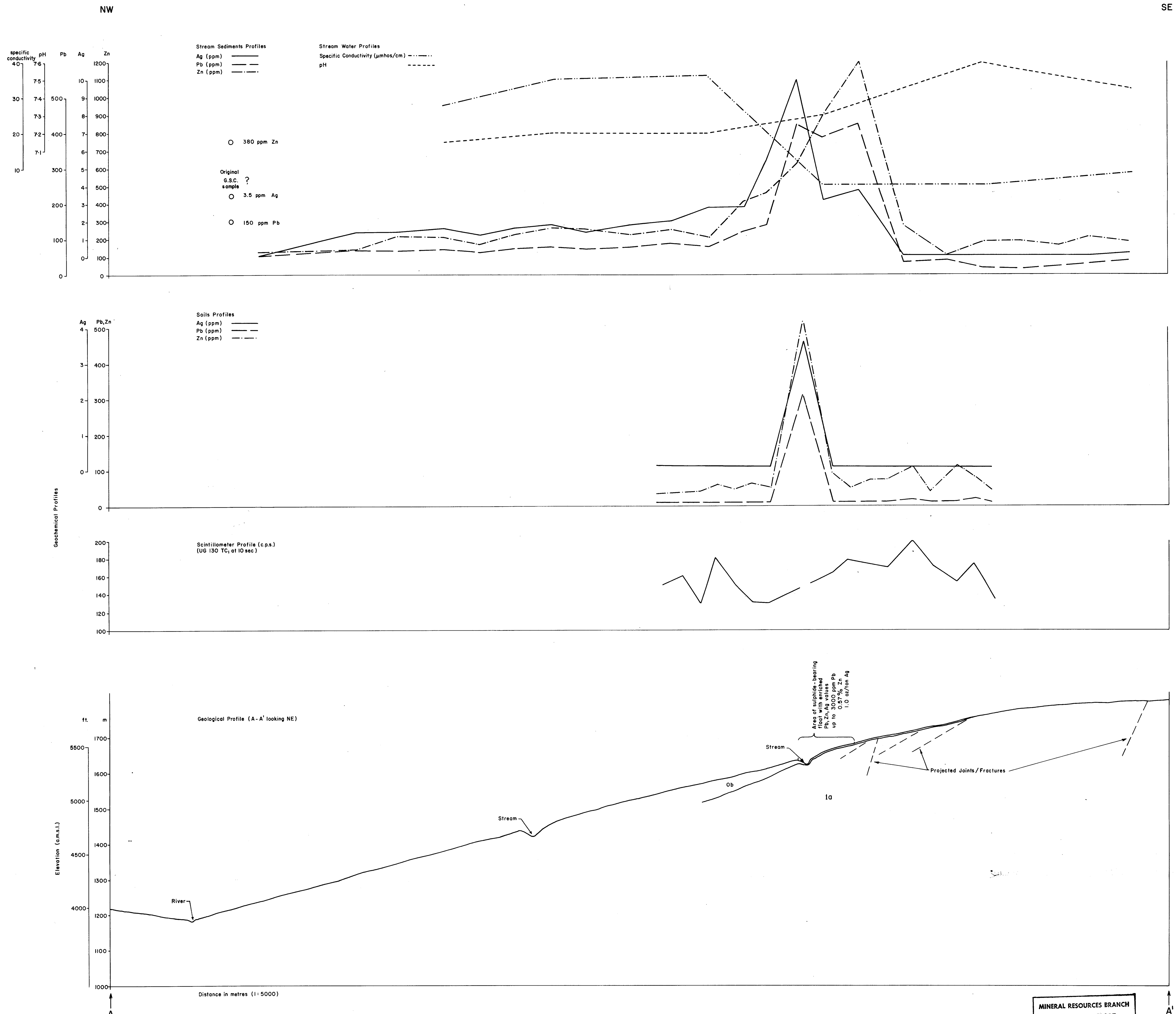
CANADIAN OCCIDENTAL PETROLEUM LTD.
MINERALS DIVISION

PROJECT CASSI
SHAR 3,4,9,11 CLAIMS
LIARD MINING DIVISION,
BRITISH COLUMBIA
N.T.S. 104-O

COMPILATION MAP

100 50 0 100 200 300 400
SCALE IN METRES

PLAN 5 R.K./p.f./Nov.80



LEGEND

CRETACEOUS

Cassiar Batholith

1a. Biotite-quartz monzonite

SYMBOL

— — joint/fracture

CANADIAN OCCIDENTAL PETROLEUM LTD.
MINERALS DIVISION

PROJECT CASSI
SHAR 3, 4, 9, 11 CLAIMS

LIARD MINING DIVISION,
BRITISH COLUMBIA
N.T.S. 104-O

R.K./p.f./Nov. 80 PLAN 6