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GEOPEKO

A DIVISION OF PEKO-WALLSEND OPERATIONS LIMITED

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PROGRESS REPORT - E.L. 24/73

DIAL RANGE - 1980 FIELD SEASON

**OPEN FILE**

R.R. LARGE.  
DEVONPORT.

MAY, 1981.

001

PROGRESS REPORT ON E.L. 24/73 FOR THE 1980 SEASON.

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E.L. 24/73 - REPORT

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INTRODUCTION

This report covers geological investigations carried out on Exploration Licence 24/73 under the terms of a joint venture between Geopeko and Pennzoil of Australia during the period January to December 1980.

E.L. 24/73 is situated to the South of Penguin in Northern Tasmania and covers Cambrian sediments and volcanics of the Dial Range Trough. Exploration to date has concentrated on copper and tin mineralization within the Cateena Group and Lobster Volcanics at the base of the Cambrian sequence.

Previous investigations by Geopeko (see Large and Herrmann, 1980) defined a number of geochemical and geophysical targets for follow-up on the Dial Mine Grid. Four diamond holes were drilled in the period September-October 1980 to test the best targets.

During November 1980 a reconnaissance drainage survey was carried out over the eastern portion of the E.L. to search for further tin mineralization.

SUMMARY AND CONCLUSIONS

1. Four holes were drilled in the 1980 season to test for Sn-Cu mineralization on the Dial Mine Grid.

DDH 7: drilled to test a magnetic anomaly intersected no significant mineralization, however a thick sequence of dolomitic and calcareous sediments was revealed at the base of the Cateena Group. This sequence represents an ideal host for massive sulphide-tin mineralization of the Rension Bell and Cleveland type.

DDH 8: drilled to test an SP anomaly, intersected pyritic breccias carrying a trace of copper on the contact of the Lobster Creek Volcanics and the Cateena Group.

DDH 9: drilled to test an SP anomaly, intersected mudstones, greywackes and grits of the Cateena Group carrying no significant mineralization.

DDH 10: drilled to test a soil tin-copper anomaly intersected an horizon of weakly stanniferous oxidized pyritic breccias (74 metres of 209ppm Sn) followed by a zone of silty sandstones carrying stratiform and crosscutting pyrite-chalcocite mineralization averaging 0.68%Cu over 20 metres.

2. The tin mineralization in the sedimentary breccias is considered to be of hydrothermal replacement origin and may relate to the emplacement of Devonian Granite, at depth, into the Dial Trough. Potential exists for ore-grade tin mineralization in the sediment breccias closer to their granite source in favourable structural traps.

3. The copper mineralization in DDH 10 is concentrated in silty sandstone layers and is possibly of primary sedimentary origin, although further investigations are required to substantiate this contention.
4. Drainage sampling over the far eastern portions of the E.L. has revealed further tin anomalies in the Cateena Group and copper anomalies in the Motton Spillite.

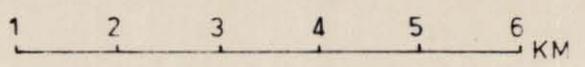
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RECOMMENDATIONS

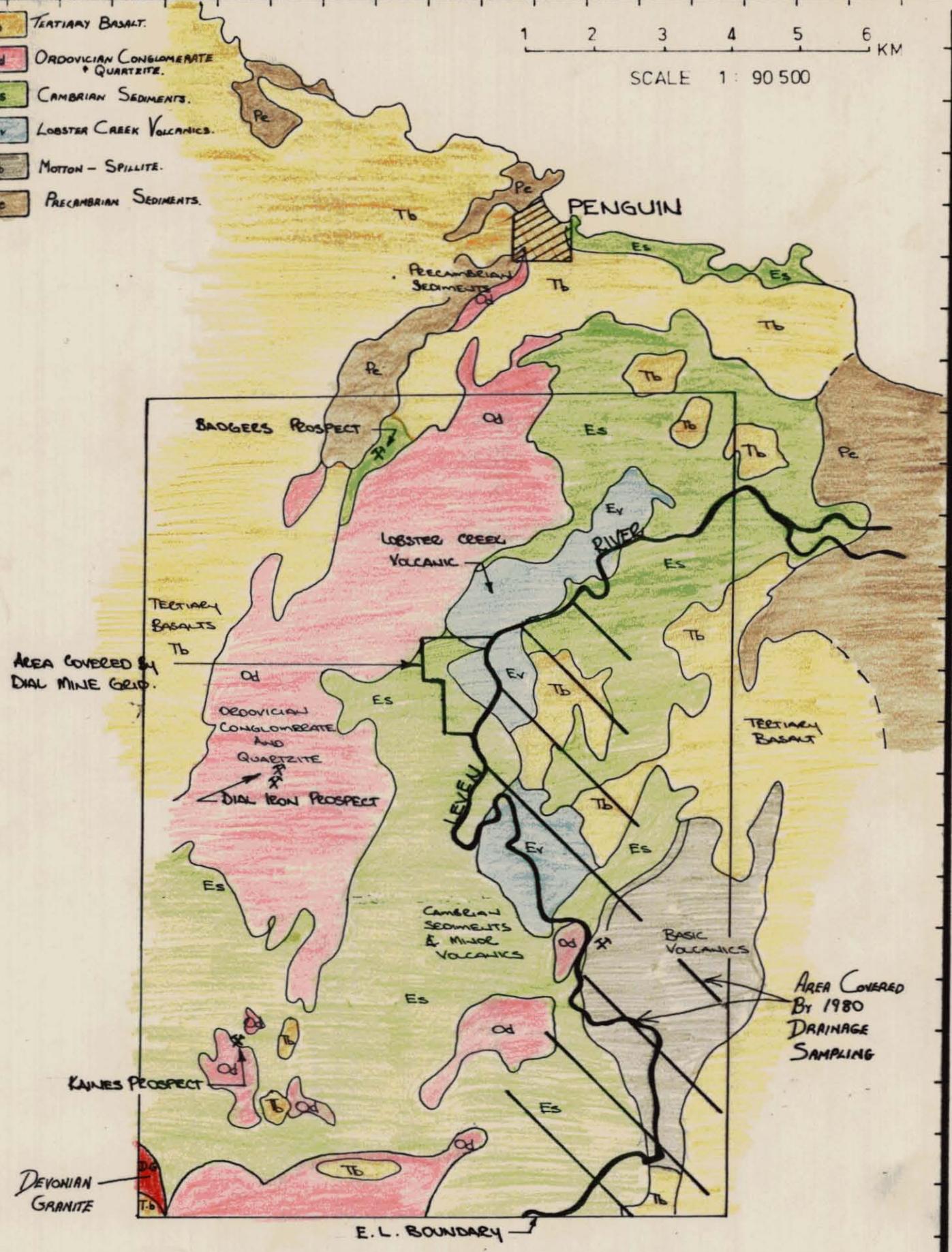
1. Follow-up the copper and tin mineralization in DDH 10 with geological mapping, soil sampling and drilling.
2. Extend the Dial Mine Grid north to assess the M.I.P. anomalies previously defined by Pennzoil.
3. Follow-up the tin and copper drainage anomalies revealed over the eastern portion of the E.L.
4. Conduct a regional panned concentrate drainage sampling programme plus geological mapping over the Cambrian sediments in the south-western portion of the E.L. adjacent to the Mt. Husetop granite.
5. Evaluate previous gravity data over the Dial Range Trough and conduct fill in traverses where required to assess the likelihood of shallow granite intrusions.

007

- Tb TERTIARY BASALT.
- Od ORDOVICIAN CONGLOMERATE & QUARTZITE.
- Es CAMBRIAN SEDIMENTS.
- Ev LOBSTER CREEK VOLCANICS.
- Eb MOTTON - SPILLITE.
- Pc PRECAMBRIAN SEDIMENTS.



SCALE 1 : 90 500



936008



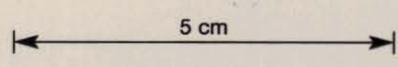
GEOPEKO LIMITED  
DEVONPORT, TASMANIA.

Scale: 1:90,500

No TS 24/73

DATE:  
GEO:  
DWN:  
CHKD:

FIG 1: SIMPLIFIED GEOLOGY  
FROM BURNS. (1964)  
PROSPECT LOCATION DIAGRAM.  
E.L. 24/73 DIAL RANGE, TASMANIA.



DRILLING - DIAL MINE GRID

Four of the five targets defined by prospect development in the 1979 season (see Large and Herrmann, 1980) where tested by drilling. Plotted positions of the drill holes are shown on the geology map; Plan 1.

DDH 7

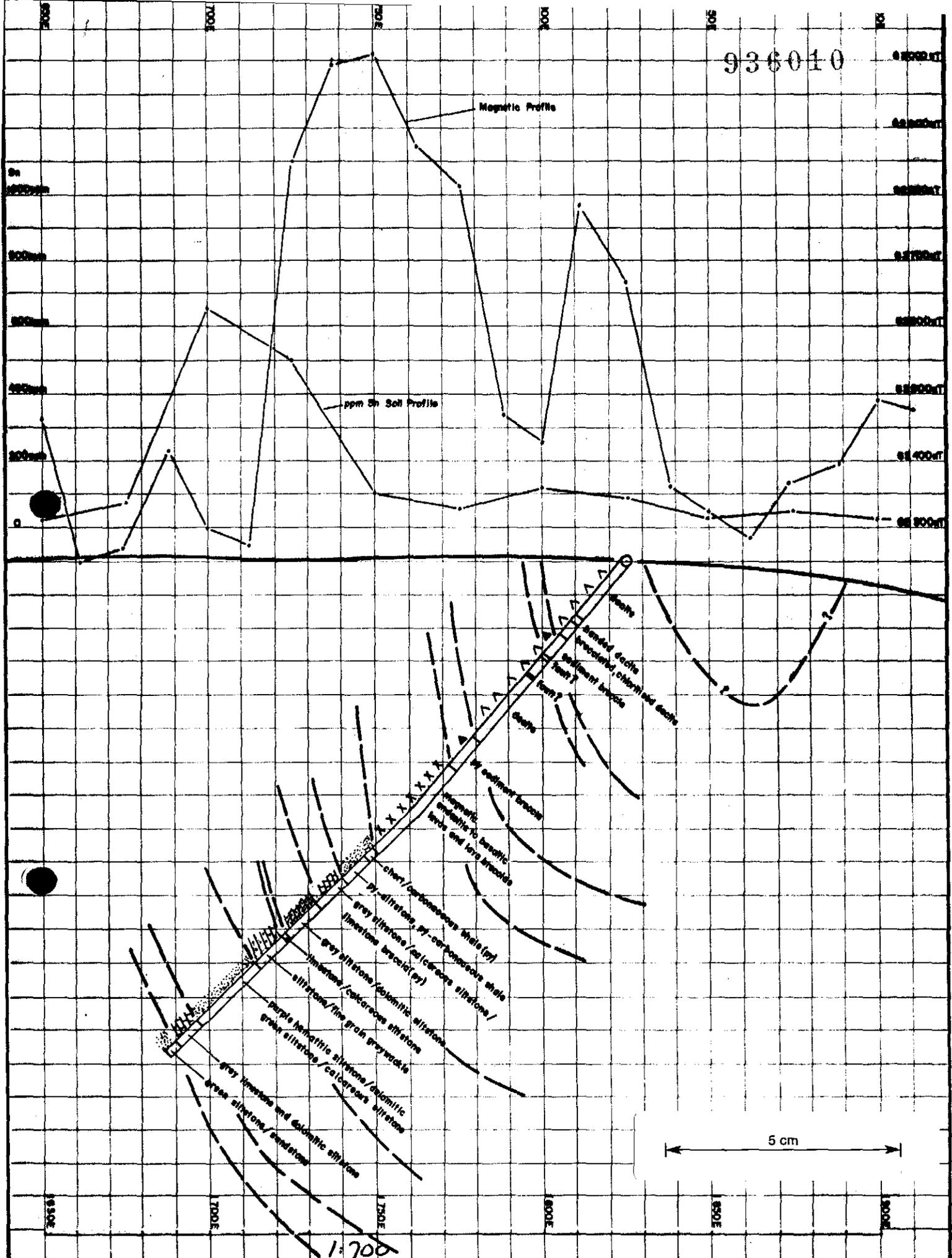
This hole was designed to test the coincident magnetic and tin soil geochemical anomaly situated around 3000N, 1700E. The geological log and assays are given in Appendix I and a cross section shown on Figure 2 and Plan 2.

The hole collared in a sequence of coarse dacites (referred to as trachy-basalts by Pontifex-Appendix 2) which had been mapped on the surface as part of the Lobster Creek Volcanic complex. At 69.6m the hole passed out of the dacite into dolomitic-pyritic sediments breccias (70.7-81.8m) and then into a sequence of andesitic to basaltic lava flows. From 115m to the end of the hole at 200m the lithologies are dominated by dolomitic and pyritic siltstones plus cherts, massive dolomites, limestones, carbonaceous dolomites and greywacke siltstones.

The basalt lavas intersected from 81.8 to 115.1m are strongly magnetic and account for the surface magnetic anomaly.

Assays returned from half core are given in Appendix I and indicate no significant tin or copper mineralization throughout the hole. The highest tin values of 240ppm (16-17m) and 260ppm (50.5-51.5m) relate to quartz-pyrite veinlets cutting the dacite. Background tin values of (5 to 20ppm occur within the dolomitic-pyritic sedimentary sequence. The soil tin anomaly between 1700E and 1925E remains unexplained by the drill hole.

936010



5 cm

1:700

GEOPEKO  
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SCALE: 1:700  
DATE: 17 MARCH '91  
GEOLOGIST: R.L.  
DRAWN: R. TOBINONI

DIAL MINE GRID  
D.D.H 7  
SECTION 3000N

009  
FIG 2.

10 17

010

Although DDH 7 intersected no significant mineralization it has revealed the presence of a thick succession of dolomitic and calcareous sediments which represent an ideal host rock for tin mineralization of the Rension Bell and Cleveland type.

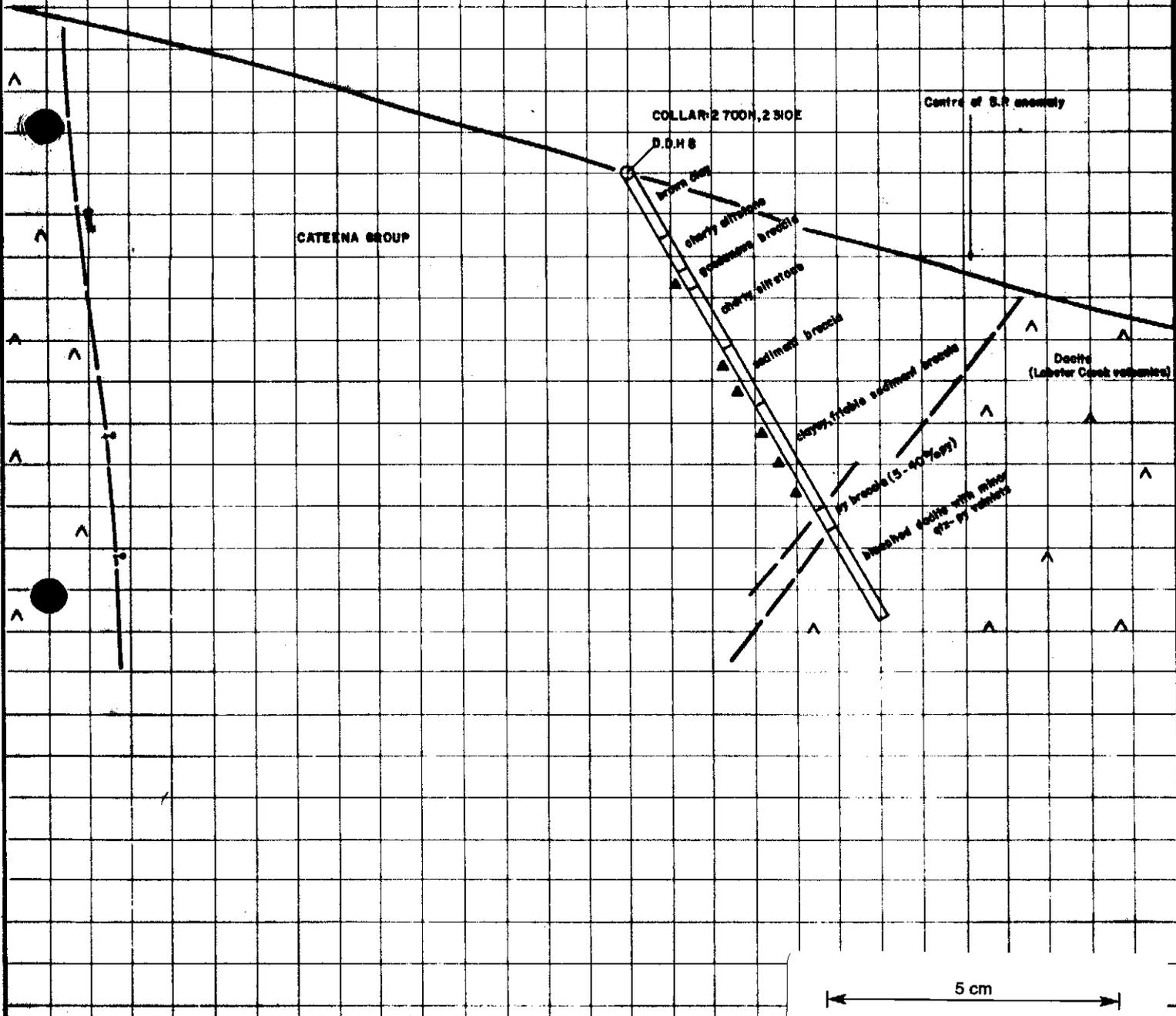
DDH 8

This short hole was drilled to test the southern end of an SP anomaly located at the contact of the Cateena Group and Lobster Creek Volcanics around 2700N, 2350E. The geological log is given in Appendix I and geological section in Figure 3.

Many problems were encountered drilling the hole due to the fractured and porous rocks. Poor core recovery occurred throughout.

The hole intersected pyritic cherty siltstones and siltstone breccias to a depth of 49.2m and then passed into altered dacite of the Lobster Creek Volcanics to the end of the hole at 61.5m.

Strongly pyritic sediment breccias occurred on the contact (46.6-48.0m) with a pyrite content from 5 to 40%. Minor pyrite-quartz veinlets occur within the altered dacite and carry a trace of chalcopyrite. The SP anomaly is adequately explained by the pyrite in the breccia and the quartz veins. Minor copper mineralization (0.17%Cu) and tin (290ppm Sn) was recorded in the pyritic breccias, however no other significant mineralization occurs in the drill hole.



1:350

5 cm

**GEOPEKO**  
A DIVISION OF PERO WALLSEND



SCALE: 1:350
DATE: 17 MARCH '81
GEOLOGIST: R.L.
DRAWN: R.TOGNONI
CHECKED:

**DIAL MINE GRID**  
**SECTION ALONG DDH 8**  
**BEARING: 075° GRID**

011

FIG 3

DDH 9

This hole was drilled to test a sharply defined SP anomaly associated with some old copper workings in the Cateena Group around 2000N, 2050E. The geological log is given in Appendix 1 and the cross section in Plan 3 and Figure 4.

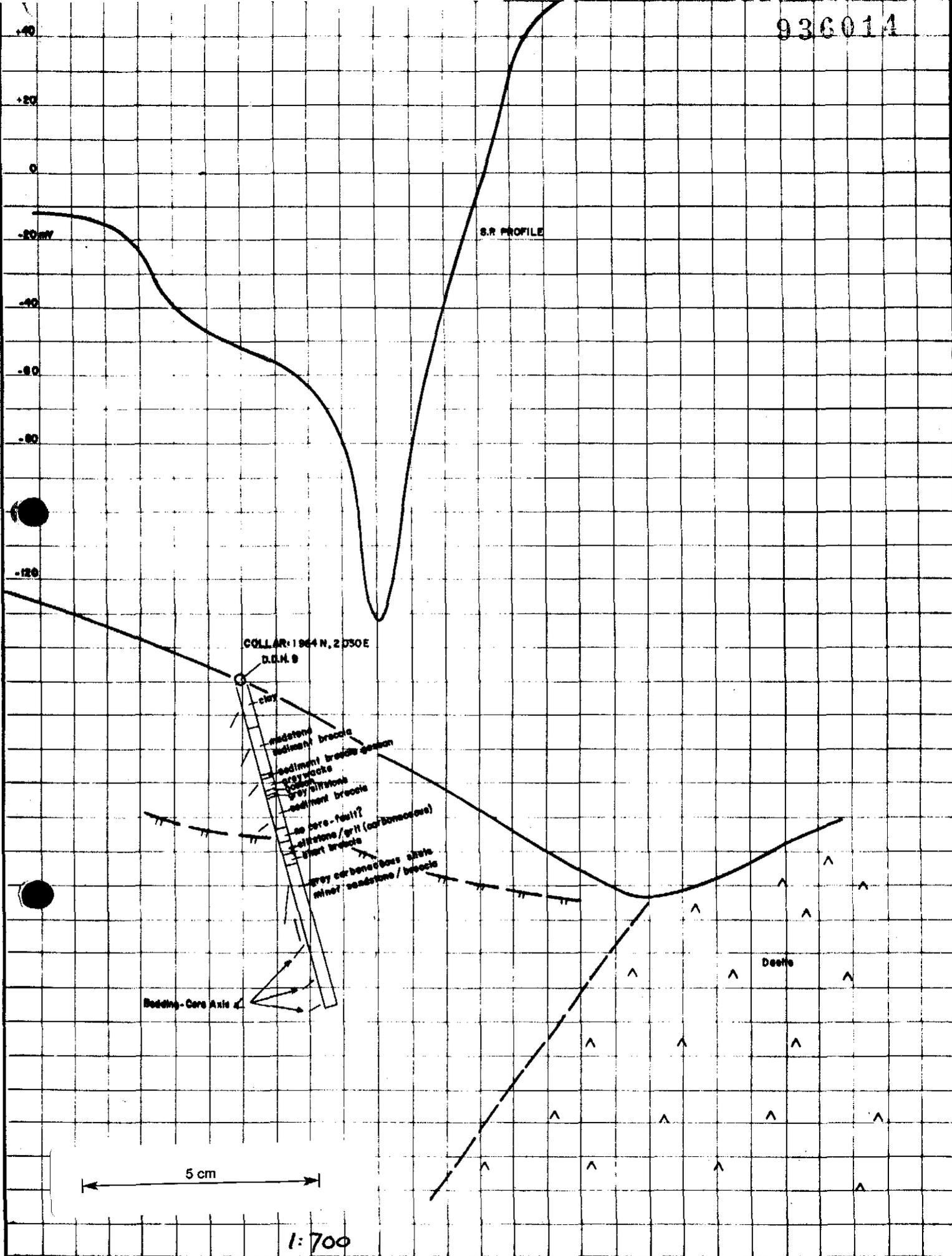
The hole intersected a sequence of siltstones, greywackes, grits and breccias carrying no significant mineralization. Iron staining and minor gossanous zones indicative of pyrite are developed in the sediments from the surface to 41m depth, however no significant tin or copper values were revealed.

A zone of no core recovery occurs from 45.6 to 49.0m and may represent a major fault. Streaming potentials developed in the fault maybe the cause of the SP anomaly. The dominant lithology from 57 to 100m is grey weakly carbonaceous siltstones which may also have contributed to the SP anomaly. These grey siltstones are similar to those intersected in DDH 4, 200m to the north.

DDH 10

The final hole in the drilling programme was designed to test the tin-copper soil geochemical anomaly developed over gossanous sediment breccias exposed on the crest of the hill around 2400N, 1700E.

The geological log with assays is given in Appendix 1 and a cross section on Plan 4.



1:700

**GEOPEKO**  
 A DIVISION OF PERO WALLBEND

SCALE: 1:700
DATE: 17 MARCH '81
GEOLOGIST: R.L.
DRAWN: R. TOGNONI
CHECKED:

**DIAL MINE GRID**  
**SECTION ALONG D.D.H. 9**  
**BEARING: 030° GRID**

013  
 FIG 4.

014

Due to extreme oxidation of the sediments and breccias in this area major difficulties were encountered during drilling and very poor core recoveries were recorded for most of the hole.

The hole intersected a sequence of heavily oxidized, porous and iron stained sediment breccias from 41 to 115m followed by siltstones and sandstones from 115 to 163m and finished in sediment breccias from 163 to 199.5m.

Two separate zones of weak mineralization were revealed.

<u>Depth</u>	<u>Mineralization type</u>	<u>Range</u>	<u>Average</u>
41 - 115m	fine cassiterite in heavily oxidized sediment breccias	30 - 620ppm	209ppm Sn over 74 metres
117 - 137m	disseminated stratiform and vein type pyrite-chalcocite in silty sandstones	0.07 - 7.28% Cu	0.68%Cu over 20 metres

The sediment breccias although now heavily leached, oxidized and in places gossanous probably contain 5-20% pyrite and 10-30% dolomite in the primary zone. Fragment types are commonly siltstone, dolomite, limestone, chert and occasional rhyolite (?). Many of the calcareous and strongly pyritic fragments are now leached and replaced by iron oxide coated vugs (see Figure 5). These breccias are not considered to be of volcanic origin but are rather syn-sedimentary breccias formed during early phases of mass sediment slippage down the slope of the depositional basin. A mineralogical description by H.W. Fander of mineralized breccia from the interval 95-97m is given in Appendix 4.

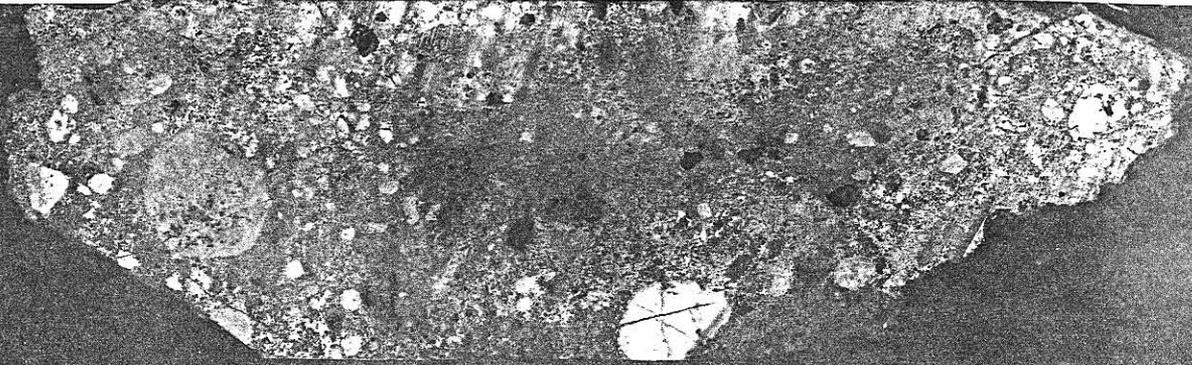
015

The zone of copper mineralization from 117 to 127m consists of fine disseminated and veintype pyrite plus chalcocite within a sequence of white to pink fine sandstones with interlaminated green siltstones. The disseminated pyrite-chalcocite typically occurs as stratiform layers within the sandstones and is strongly indicative of a syngenetic style of mineralization (see Figures 6 & 7). The crosscutting pyrite-chalcocite occurs principally along syn-sedimentary microfaults related to early soft sediment disruption of the sand-silt layers (see Figure 7). At 132.5-132.8m a massive pyrite-chalcocite band occurs in a zone of poor core recovery within the siltstones. The 0.5m interval including the band assayed 7.28%Cu. Due to the poor core recovery over this interval it is not possible to ascertain whether this is a sulphide vein or stratiform band.

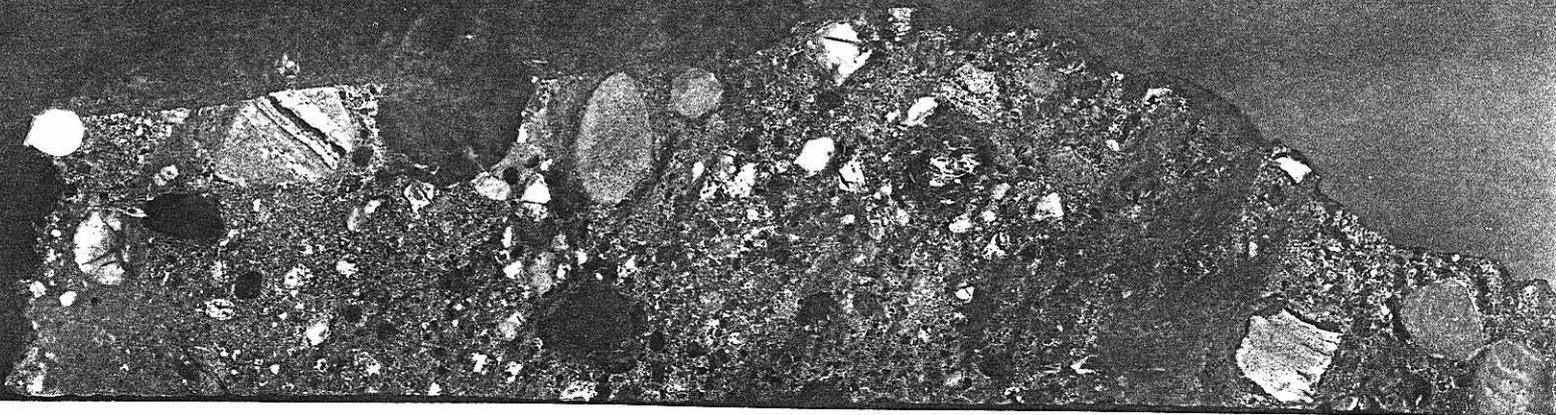
#### Discussion of Copper Mineralization in DDH 10

Three possibilities exist for the genesis of the copper mineralization in DDH 10.

1. The pyrite is syngenetic while the chalcocite is secondary and formed by supergene enrichment below the heavily leached breccia horizon.
2. The iron-copper mineralization is volcanogenic and associated with hydrothermal exhalations.
3. The iron-copper mineralization is deposited in a shallow water relatively oxidized environment akin to Red Bed sedimentary copper formation.



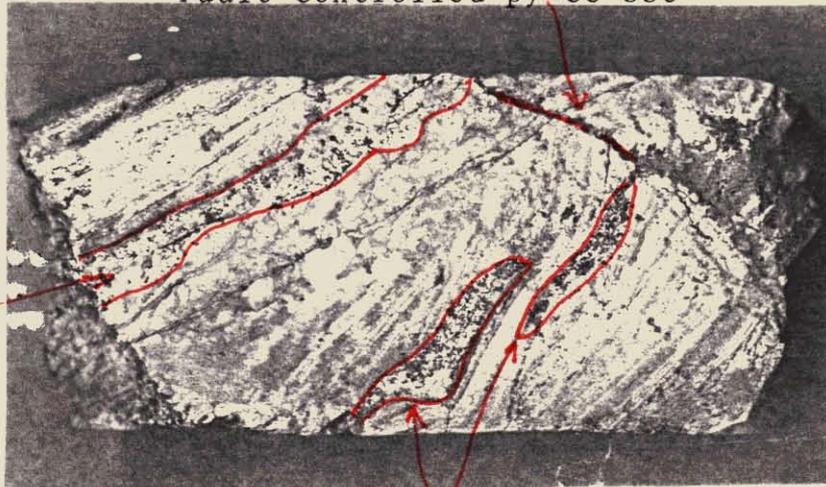
DDH 10 85.3m.



DDH 10 47.0m.

Figure 5: Core from the oxidized pyritic sediment breccia horizon in DDH 10

Fault controlled py-cc sst



Dendritic py-cc in white sst

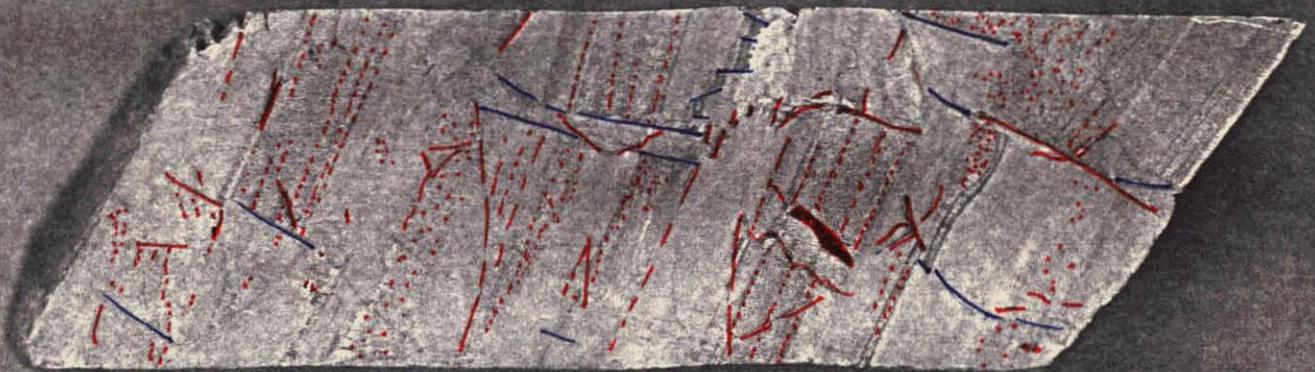
Disseminated py-cc in sst

Lighter areas - white sandstone

Darker areas - silty sandstone

Figure 6 : Drill Core showing texture of py-cc mineralization, DDH 10, 123.4m

See Appendix 4 for petrographic description.



-  Pyrite-chalcocite as fine disseminations
-  Pyrite-chalcocite filling micro faults
-  Non mineralization micro faults

Darker bands are fine sandstone layers  
while lighter bands are green siltstone

Figure 7 : Drill Core showing texture of py-cc  
mineralization DDH 10, 126.7m

See Appendix 4 for petrographic  
description.

019

Although a supergene origin for the copper is possible, in the writers opinion it is unlikely. The delicate stratiform nature of the pyrite-chalcocite within the sandy layers and confinement of cross cutting mineralization to syn-sedimentary micro-faults is not typical of supergene blanket formation. The siltstone-sandstone sequence is the most impermeable unit and yet it contains the highest copper grades; this is not in accord with secondary accumulation of the copper.

Due to the lack of any volcanic material in the succession intersected by DDH 10 it is unlikely that the mineralization is volcanogenic in origin. Also the complete lack of lead, zinc values and the high copper to pyrite ratio is totally unlike the volcanogenic style of mineralization.

The repeated lamination of green siltstones with white to pink sandstones over the mineralized interval indicates subtle changes in redox from slightly reducing to slightly oxidizing conditions during sedimentation.

The pyrite-chalcocite mineralization is concentrated in the more oxidized sandstone layers, a feature in common with the Red Bed style of mineralization. The confinement of the mineralization to this alternating sequence and lack of mineralization in the massive sandstone and siltstone horizons below strongly suggests a redox sedimentary control.

These features suggest to the writer that the mineralization is primary syngenetic, that it is controlled by redox conditions during the deposition of the sandy sediments, and has undergone mild remobilization during diagenesis and possibly again later during Taberabberan folding.

020

REAPPRAISAL OF MINERALIZATION MODEL

The results from DDH 7 and DDH 10 have lead to a reappraisal of the mineralization model presented by Large and Herrmann (1980) in the previous Annual Report. In that report it was suggested that the tin-copper mineralization maybe syngenetic-volcanogenic and related to the emplacement of the Lobster Creek Volcanic complex and associated later hydrothermal activity within the Cateena Group sediments.

The antipathetic nature of the mineralization in DDH 10 i.e. tin is concentrated in the sedimentary breccias with minor copper, while copper is concentrated in the silty-sandstones with negligible tin, suggests the possibility of separate origins for tin and copper.

As stated previously the major concentration of copper maybe of primary sedimentary origin and controlled by redox conditions in the basin of sedimentation.

However the tin mineralization occurring both in the sedimentary breccias and the quartz-pyrite veins in the Lobster Creek Volcanics probably has a different genesis. Most evidence points to the Mt. Husetop granite of Devonian age as the likely source of the tin. Tin and tungsten mineralizaion is known to be associated with the granite at Kara and <sup>Grates</sup> Kaines Prospect and it is possible that a phase of the granite intrudes into the Dial Range Trough at depth. <sub>(Grates Creek Trough)</sub> The major E-W fault cutting the sediments and volanics on the Dial Mine grid may have represented a focus for mineralization emainating from the granite. The calcareous and pyritic sediment breccias are certainly a suitable host rock for tin deposition from the granite.

With this model in mind good potential for ore grade tin mineralization exists down dip along the sediment breccia horizons in closer proximety to the granite intrusion.

022

REGIONAL DRAINAGE GEOCHEMISTRY

In November 1980 a short programme of drainage sampling was undertaken over the eastern portion of the E.L. to supplement the drainage sampling in 1979.

Both panned concentrate and minus 80 mesh samples were collected at twenty one sites from small streams draining into the Leven River. The samples were analysed for Cu, Pb, Zn, Ag, Fe, Au, Sn and W. Results are listed in Appendix 3 and Plans 5,6,7 and 8. Comments on the three metals of primary interest, Sn, W and Cu are given below.

**Tin:** The background values for tin in the panned concentrates range from less than 5ppm to 40ppm with the threshold value arbitrarily selected at 50ppm. The 1979 sampling defined a zone of anomalous tin values in streams draining the Catenna Group and Lobster Creek Volcanics on the western side of the Leven River around the Dial Mine Grid. The 1980 sampling outlined a further two anomalous streams with values of 600ppm and 60ppm Sn on the eastern side of the Leven River in the same general area.

Sampling in the south eastern portion of the E.L. revealed only one anomalous tin value (150ppm Sn) at 423000mE, 5 433 000mN from a stream draining the Radford Creek Mudstone.

No anomalous values of tin were revealed by the minus 80 mesh sampling.

**Tungsten:** No anomalous values were recorded in either the panned concentrate or minus 80 mesh sampling.

023

Copper: Drainage copper values vary markedly according to the country rock type.

The 1979 survey returned minus 80 mesh values of 2 to 50ppm over the Cateena Group and Lobster Creek Volcanics with isolated anomalies upto 620ppm (Stantons Creek draining the mineralization on the Dial Mine Grid).

The 1980 sampling returned background values of 5 to 35ppm Cu over the Cateena Group whilst streams draining the Motton Spillite gave 75 to 160ppm. Because of the high background of copper in the Motton Spillite it is very difficult to identify anomalous values relating to mineralization within this lithology.

The panned concentrate copper values for the 1980 survey are roughly similar to the minus 80 mesh values (see Appendix 3 ). One exception is the panned concentrate value (KD 1605) of 440ppm Cu recorded in a stream at 423 500mE, 5 432 700N draining the Motton Spillite. This stream also returned an anomalous lead value of 330ppm.

FORWARD PROGRAMME

The following programme is proposed for the 1981 field season.

Dial Mine Grid:

1. Further mineralogical and petrological studies of samples of the tin bearing sediment breccias and copper bearing sandstones from DDH 10. It is important to establish the mineralogy and grain size of the tin mineralization in the breccias and to gain further evidence regarding the genesis of the chalcocite-pyrite mineralization in the silty sandstones.
2. Detailed mapping, soil sampling and costeaning in the vicinity of DDH 10 to trace the strike extent of the copper mineralization on the surface. Detailed inspection of the Pennzoil drill holes No's 1, 2, 3, 5 to check for intersections of copper bearing sandstones not previously analysed.
3. Drilling to follow up the intersection of 20m of 0.68% copper in DDH 10. One deep hole to intersect the mineralization below the depth of oxidation is proposed. This hole could also check the primary tin grade in the pyritic breccias.
4. Extension of the Dial Mine Grid north to cover Pennzoil's reconnaissance M.I.P. anomalies. These anomalies occur over Cateena Group Sediments close to the Lobster Creek Volcanic contact about 500m north of DDH 7. Pennzoils DDH 6 was drilled to test one of the anomalies but may have been terminated short of the target. Jacro sampling and geological mapping on the grid extension would be followed up by Dipole-Dipole IP if the geochemical results are encouraging.

Programme for Outside Areas - E.L. 24/73

1. Panned concentrate drainage sampling for Sn, W and regional mapping over the Cambrian sediments and volcanics adjacent to the Mt. Housetop granite in the S.W. portion of the E.L.
2. Assessment and contouring of previous gravity data from B.M.R. compilations for the Dial Trough. This may provide information on granite emplacement in the Trough.
3. Geological follow up of
  - I. The Sn drainage anomaly developed in two streams east of the Dial Mine Grid.
  - II. The Sn drainage anomaly at 423 000E, 5 433 000N.
  - III. The Cu-Pb anomaly draining the Motton Spillite at 423 500E, 5 432 700N.

APPENDIX 1

Diamond Drill logs and Assays

DDH 7

DDH 8

DDH 9

DDH 10

027

GEOPEKO - DIAMOND DRILL CORE LOG.

PROJECT: Dial Range E.L. 24/73

AREA: Dial Mine Grid

HOLE NO: DDH7

PROPOSED: R.R. Large, July 1980

COLLAR CO-ORDINATE: 3000N, 1825E

INCLINATION: -50°

AZIMUTH: 270° Grid

COLLAR SURVEYED: R.R. Large

FINAL DEPTH: 200m

PURPOSE OF HOLE: To test coincident magnetic anomaly and soil Sn anomaly.

SUMMARY RESULT: No significant mineralization.  
An horizon of magnetic andesitic to basaltic lavas intersected from 81.8 to 115.1m explains the magnetic anomaly. Dolomitic and calcareous siltstones intersected from 127-200m may provide a good host for tin mineralization.

028

GEOLOGICAL LOG DIAL RANGE DDH 7

0 - 6

Augered no core

6 - 22.8

Massive dacite (Lobster Creek Volcanics).  
Varies from light green to dark green with a fine felted texture. Irregular narrow veinlets of white and pink feldspar are common. These vary from 0.5mm to 3mm thick are generally discontinuous and typically orientated  $60-90^{\circ}$  to long core axis. The dacite has a spotted green texture, the spots being caused by 1-4mm aggregates of dark green chlorite (or tourmaline?) Minor pyrite and tourmaline (?) is developed on some joint surfaces. Three pyrite-quartz-minor feldspar veins occur between 16.5 to 16.9m. The veins are  $\frac{1}{2}$ -2cm wide and orientated parallel to one another at  $20^{\circ}$  to lca. Crystalline pyrite occurs on the margins of the veins with quartz and feldspar crystals growing toward the vein centres. No ore minerals were observed. The dacite is not cleaved and cores well.

22.8 - 24.3

Banded dacite.

Similar to the above but showing compositional banding at an angle of  $80^{\circ}$  to lca. The bands are 2-5cm thick and show grading from a dark green coarser grained ferromagnesian rich base to a pink felsic top. The bands grade up the hole.

029

24.3 - 29.7

Brecciated and chloritised dacite. Fragments of pink to green dacite vary from 3mm up to 100mm across and occur in a matrix of fine grained black chlorite. White feldspar-quartz veinlets are common. The top of the zone is marked by a 2cm thick band or bed of f.g. chlorite at 45° to lca. This may represent a chloritised sediment layer. Flame structures extend from the chlorite bed? up into the dacite. Elsewhere the chlorite occurs in the breccia matrix or as wipy veins cutting the dacite. At 25.2 a f.g. light green contact occurs which may represent a chilled dacite flow base. This zone is interpreted to represent mixed dacite lavas and tuff breccias showing intense hydrothermal alteration with chlorite.

A vugy quartz-feld-hematite vein with minor py and cpy occurs at 27.3m. Pyrite is virtually absent throughout the chloritised zone. The base of the dacite breccia against the sediment breccias is marked by a 10cm band of laminated f.g. chlorite rock - possibly a chloritised sediment. This band is folded and brecciated.

29.7 - 38.0

Sediment breccia.

Breccia composed of fragments of chert sandstone, argillite, rhyolite and dacite in a porous weakly pyritic aranceous matrix. Fragments are subrounded to angular and vary from 2mm up to 4cm but average about 5mm. The section is friable and poorly cored with 60% core recovery. A weak alignment of frags indicates bedding at 45° to lca.

The very broken and puggy zone from 36 to 38m may represent a fault.

38.0 - 45

Massive dacite with minor feldspar veinlets and rare tourmaline patches.

45 - 47.4

Badly broken section of dacite may represent a fault.

47.4 - 69.6

Massive fine grained dacite as before with feldspar veinlets throughout.

51 - 51.1 Pyrite-qtz-feld vein with minor hematite. 25° to 1ca. Alteration adjacent to vein has caused bleaching in the dacite.

58.0m 1cm thick feld-qtz-py-hem vein at 15° to 1ca.

56 - 68.5 The dacite exhibits a molted texture caused by an irregular distributions of ferromag minerals. These patches may be rich in chlorite, tourmaline or hornblende. A thin section is required. The fine grained nature of the dacite over this interval suggests it is an extrusive rather than an intrusive.

63.6 1cm py-qtz-calc vein.

- 68.5 - 69.6 Spotted dacite.  
The spots average 3mm diam. and are composed of f.g. tourmaline (?). They occur in a f.g. pink dacitic matrix.
- 69.6 - 69.8 Sediment breccia.
- 69.8 - 70.7 Chloritised dacite breccia.
- 70.7 - 81.8 Pyritic sediment breccia. Angular to sub rounded fragments of mudstone, sandstone, chert, dolomite banded rhyolite and minor dacite in a pyritic dolomitic matrix. Fragments average 0.5 - 2cm. In places the breccia has a dark green dacitic matrix. At the top of the sequence bedding is at 45° to lca.
- Pyrite content varies from 3 to 8% and is generally concentrated in the matrix.
- 81.8 - 115.1 Andesitic to basaltic lavas (magnetic).
- 81.8 - 95.6 Fine grained dark grey magnetic andesites and andesite breccia. Fine grained andesite flows predominate and are separated by zones of andesite breccia composed of lighter coloured angular fragments of altered andesite in an andesite matrix. Minor calcite veinlets occur throughout. The andesite flows vary from 0.5m to 20m thickness down the core while the breccias vary from 30cm to 1.0m thickness. A 0.5cm thick vein of quartz-hematite-pyrite-chalco-pyrite occurs at 92m. The breccias probably represent the flow tops and bottoms of the lavas.

032

95.6 - 115.1 Coarse grained magnetic andesitic to basaltic lavas with minor zones of fine grained andesitic breccias. Calcite veinlets are common. A green/pink calc-silicate zone with bedding at 10° to lca occurs at 100.5 - 100.8m. The bottom 1.5m of the andesite is broken, altered and pyritic.

115.1 - 118

Carbonaceous dark grey shales and cherts with 2-5% disseminated pyrite. These sediments are well laminated with bedding at 80° to lca. Pyrite also occurs in thin laminations and as small 1-3mm concretions in the black shales.

118 - 127.5

Interbedded grey pyritic cherty\*siltstones and black pyritic carbonaceous siltstones. Bedding at 70° to lca. Pyrite occurs in the cherty siltstones as disseminations along preferred laminations and varies from 5% to 15%. Some of the cherty siltstones may be rich in barite (check Ba analyses). Some of the carbonaceous siltstone (particularly 123.5 - 126.6) are strongly graphitic.

127.5 - 136.5

Laminated grey siltstones interbedded with calcareous siltstones and calcareous siltstone breccias. Bedding is 45 to 70° to lca. Pyrite mineralization is patchy but tends to be concentrated in the breccias. Much of the carbonate has been dissolved out leaving voids within the breccias.

\*Note: Thin section description (KR 6618-see appendix 2) indicates the cherty siltstones may be silicified dolomites.

The carbonate rich intervals are

127.5 - 127.8

131.2 - 131.3

131.8 - 132.0

132.6 - 133

133.9 - 134.6

135.7 - 136.1

136.5 - 149.7

Light grey dolomitic siltstones. (TS KR6619)

Massive poorly bedded with laminations only in the upper section. Bedding is at  $50^{\circ}$  to lca.

Rare beds of calcareous siltstone.

149.7 - 150.6

Limestones, calcareous siltstones and dolomitic siltstones. It is difficult to determine the calcite/dolomite ratio. One bed 5cm thick of coarsely crystalline limestone is interbedded with laminated calcareous siltstone.  $b \wedge lca = 50^{\circ}$ .

150.6 - 157.5

Massive siltstone and fine grained greywacke. Light green to light pink in colour. The fine greywackes are graded up the hole.  $b \wedge lca \sim 70^{\circ}$ . The greywackes are weakly dolomitic? Minor qtz-dolomite  $\pm$  py veinlets cut the siltstones. A 1cm thick hem-qtz-py vein occurs at 155.6m.

157.5 - 158.3

Grey weakly pyritic dolomitic siltstone.

$b \wedge lca \sim 80^{\circ}$ .

Pyrite (<5%) occurs in fine laminations parallel to bedding.

158.3 - 161.9

Massive cream to light pink siltstones.

034  
161.9 - 186.8

Interbedded purple hematitic siltstones,  
green siltstones and minor calcareous  
siltstones.

161.9 - 162.1 Dark purple hem siltstone

162.1 - 162.4 Calcareous siltstone

162.4 - 162.7 Dark purple siltstone.  
Minor bedded pyrite.

162.7 - 164.8 Laminated cream-pink siltstone  
b  $\Delta$  lca  $\sim 55^{\circ}$

164.8 - 165 Limestone bed.

165 - 166.7 Purple siltstone

166.7 - 167 Limestone/siltstone interbeds.

167 - 168.7 Calcareous purple/white siltstone  
Minor scour and fill and X-bedding structures.  
b  $\Delta$  lca  $80^{\circ}$ . Some beds grade upwards  
from a white carbonate rich base becoming  
more purple and hematite rich toward the  
top.

168.7 - 173 Purple hematitic siltstone  
with minor grey sandy and dolomitic beds.  
b  $\Delta$  lca  $80-90^{\circ}$ .

173 - 175.8 White limestones and interbedded  
calcareous dolomitic (?) siltstones  
b  $\Delta$  lca  $\sim 85^{\circ}$ .

175.8 - 180.2 Pink siltstones and fine cream greywackes. Fine disseminated pyrite (  $< 2\%$  ) occurs in the greywackes.

180.2 - 181.4 Sheared and broken core of green and purple siltstones. This is an early shearing causing pelletoid development.

181.4 - 181.6 White limestone bed.

181.6 - 186.8 Purple siltstones and f.g. cream greywackes b  $\wedge$  lca  $\sim 80^\circ$ .

186.8 - 195.2

Laminated grey limestones, with minor calcareous siltstones and carbonaceous siltstones. Limestones dominate and form 70% of the interval. They are carbonaceous in places, generally well bedded with only minor disturbance associated with carbonate veining. A 10cm thick carbonate vein occurs at 188m. The calcite/dolomite ratio is not determined.  
b  $\wedge$  lca  $\sim 65^\circ$ .

195.2 - 200m

Green siltstones and minor cream sandstones, and light purple siltstones. Quartz-calcite veining at  $80^\circ$  to lca from 199-199.4m.  
b  $\wedge$  lca  $\sim 65^\circ$ .

E.O.H.

## APPENDIX NO. 1

ANALYTICAL RESULTS DIAL MINE GRID DDH 7

SAMPLE NO.	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Sn ppm	W ppm
KR 6151	15-16	1.0	2	680	75	1	10	(10
6152	16-17	1.0	10	50	40	2	240	(10
6153	17-18	1.0	(2	20	60	2	15	(10
6154	21-22	1.0	(2	15	65	1	10	(10
6155	22-23	1.0	10	15	55	1	35	(10
6156	23-24	1.0	2	15	70	1	(5	(10
6157	24-25	1.0	90	20	70	2	5	(10
6158	25-26	1.0	25	20	80	1	5	(10
6159	26-27	1.0	10	20	90	1	5	(10
KR 6160	27-28	1.0	10	20	80	1	10	(10
6161	28-29	1.0	2	20	100	2	15	(10
6162	29-30	0.8	15	25	100	2	(5	(10
6163	30-31	0.7	30	20	90	1	(5	(10
6164	31-32	0.5	30	20	75	1	(5	(10
6165	32-33	0.6	30	25	90	1	(5	(10
6166	33-34	0.5	30	30	70	1	5	(10
6167	34-35	0.7	30	25	70	1	(5	(10
6168	35-36	0.5	20	20	60	1	(5	(10
6169	36-37	0.6	30	20	60	1	5	(10
KR 6170	37-39	1.2	5	10	75	(1	(5	(10
6171	39-40	0.9	2	15	65	1	10	(10
6172	50.5-51.5	1.0	2	20	70	2	260	(10
6173	53-54	1.0	(2	15	100	2	(5	(10
6174	54-55	0.7	2	10	100	2	(5	(10
6175	55-56	0.8	(2	15	90	2	(5	(10
6176	56-57	1.0	(2	15	80	2	(5	(10
6177	57-58	1.0	(2	15	70	1	15	(10
6178	58-59	1.0	(2	20	70	1	5	(10
6179	59-60	1.0	10	10	90	1	15	(10
KR 6180	60-61	1.0	(2	10	80	1	(5	(10
6181	61-62	1.0	(2	10	90	1	5	(10
6182	62-63	1.0	(2	20	60	1	20	(10
6183	63-64	0.9	2	30	60	1	20	(10
6184	64-65	1.0	2	20	70	1	(5	(10
6185	65-66	1.0	10	20	90	1	(5	(10
6186	66-67	1.0	2	20	95	1	(5	(10
6187	67-68	1.0	(2	20	110	1	(5	(10
6188	68-69	1.0	2	20	120	1	(5	(10
6189	69-70	1.0	30	15	160	1	(5	(10
KR 6190	70-71	0.8	10	20	225	1	(5	(10
6191	71-72	0.9	40	30	70	(1	(5	(10
6192	72-73	0.8	50	25	55	1	(5	(10
6193	73-74	1.0	25	25	40	1	(5	(10
6194	74-75	1.0	20	25	30	2	(5	(10
6195	75-76	1.0	15	30	30	2	5	(10
6196	76-77	1.0	10	30	40	2	5	(10
6197	77-78	1.0	40	25	45	2	20	(10
KR 6198	78-79	1.0	65	30	35	2	(5	(10

037

936038 30.

## APPENDIX NO 1 cont.

DIAL MINE GRID DDH 7

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Sn ppm	W ppm
KR 6199	79-80	1.0	35	30	90	2	(5	(10
6200	80-81	1.0	20	30	50	1	15	(10
6201	81-82	1.0	70	25	80	1	5	(10
6202	82-83	1.0	55	25	70	1	(5	(10
6203	112-113	1.0	235	20	125	1	(5	(10
6204	113-114	1.0	260	30	135	2	(5	(10
6205	114-115	1.0	165	25	70	2	(5	(10
6206	115-116	1.0	40	40	20	2	(5	(10
6207	116-117	1.0	50	55	10	2	(5	(10
6208	117-118	1.0	50	45	10	2	(5	(10
6209	118-119	1.0	30	30	5	2	5	(10
KR 6210	119-120	0.8	20	25	2	1	10	(10
6211	120-121	1.0	20	30	10	2	10	(10
6212	121-122	1.0	30	30	5	2	10	(10
6213	122-123	1.0	30	60	10	3	5	(10
6214	123-124	1.0	35	65	10	2	(5	(10
6215	124-125	1.0	55	60	10	3	(5	(10
6216	125-126	1.0	85	55	10	3	5	(10
6217	126-127	1.0	75	60	10	3	(5	(10
6218	127-128	1.0	30	60	20	2	(5	(10
6219	128-129	1.0	30	210	190	3	(5	(10
KR 6220	129-139	1.0	30	135	260	2	(5	(10
6221	130-131	1.0	50	85	0.28%	3	5	(10
6222	131-132	1.0	30	70	10	3	(5	(10
6223	132-133	1.0	10	60	10	2	(5	(10
6224	1330134	1.0	10	60	20	2	(5	(10
6225	134-135	1.0	35	60	15	2	5	(10
6226	135-136	1.0	20	50	10	2	(5	(10
6227	136-137	1.0	15	60	10	2	5	(10
6228	137-138	1.0	35	60	15	2	(5	(10
6229	138-139	1.0	15	50	10	2	5	(10
KR 6230	139-140	1.0	10	50	20	3	(5	(10
6231	140-142	2.0	20	50	10	3	(5	(10
6232	142-144	2.0	15	50	10	3	(5	(10
6233	144-146	2.0	10	55	30	3	(5	(10
6234	146-148	2.0	50	50	30	2	(5	(10
6235	148-150	2.0	90	45	20	2	5	(10
6236	150-152	2.0	20	50	15	2	5	(10
6237	152-154	2.0	(2	40	20	2	10	(10
6238	154-156	2.0	(2	40	20	2	10	(10
6239	156-158	2.0	(2	50	20	2	15	(10
KR 6240	158-160	2.0	5	50	25	2	10	(10
6241	160-162	2.0	(2	50	20	2	10	(10
6242	162-164	2.0	(2	40	15	1	(5	(10
6243	164-166	2.0	10	45	20	1	30	(10
6244	166-168	2.0	(2	55	15	3	(5	(10
6245	168-170	2.0	(2	45	15	2	(5	(10
KR 6246	170-172	2.0	(2	40	15	2	(5	(10

038

936039

31.

DIAL MINE GRID DDH 7

## APPENDIX NO 1 cont.

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Sn ppm	W ppm
KR 6247	172-174	2.0	25	50	20	2	(5	(10
6248	174-176	2.0	20	50	15	2	(5	(10
6249	176-178	2.0	(2	45	20	2	(5	(10
KR 6250	178-180	2.0	(2	40	20	2	(5	(10
KR 6051	180-182	2.0	10	20	15	2	(5	(10
6052	182-184	2.0	5	30	35	2	10	(10
6053	184-186	2.0	2	20	15	2	(5	(10
6054	186-188	2.0	300	20	20	2	(5	(10
6055	188-190	2.0	30	30	20	2	.5	(10
6056	190-192	2.0	190	40	20	2	(5	(10
6057	192-194	2.0	130	40	15	2	(5	(10
6058	194-196	2.0	25	25	15	1	5	(10
6059	196-198	2.0	2	20	20	(1	5	(10
KR 6060	198-200	2.0	20	20	20	1	5	(10

039

GEOPEKO - DIAMOND DRILL CORE LOG.

PROJECT: Dial Range E.L. 24/73

AREA: Dial Mine Grid

HOLE NO: DDH 8

PROPOSED: R.R. Large, July 1980

COLLAR CO-ORDINATE: 2700N, 2310E

INCLINATION: -60°

AZIMUTH: 075°

COLLAR SURVEYED: R.R. Large

FINAL DEPTH: 61.5m

PURPOSE OF HOLE: Test an SP anomaly on the contact of the Cateena Group and the Lobster Creek Volcanics.

SUMMARY RESULT: Pyritic sediment breccias with weak copper mineralization were intersected adjacent to the Lobster Creek Volcanic contact.

GEOLOGICAL LOG DIAL RANGE DDH 8

- 0 - 9m Auger drilling of brown clay.
- 9 - 13.3 Massive fine grained grey-brown cherty. Siltstones and siltstone breccia. Irregular patchy alteration and fragmental texture in places. Fragments are 5mm to 20mm across commonly with a porous texture, some fragments are weathered out leaving cavities. No bedding lamination is present. Minor disseminated pyrite is concentrated in veinlets, completely or partly oxidized to iron oxides.
- 13.3 - 15.9 Oxidized gossanous breccia. About 10-20% sulphide (pyrite) concentrated both in the matrix and fragments within the breccia. Orientation of breccia fragments is random and gives no indication of bedding. Fragments vary from 2mm up to 40mm.
- 15.9 - 24.25 Massive grey cherty siltstones with minor beds of siltstones breccia. Pervasive fine pyrite occurs in a network of minor veinlets throughout the siltstones. Pyrite content averages 3-5%.
- 24.25 - 32.0 Breccia-conglomerate. Fragments subrounded to angular of siltstone. sandstone and chert in a siltstone matrix. Fragments average 5mm to 15mm. Minor oxidized pyrite occurs throughout the matrix, generally less than 3% py.

041

- 32 - 46.6 Oxidized and friable clay-rich breccia conglomerate. Very poor core recovery due to clayey friable nature. No sulphide.
- 46.6 - 48.0 Strongly pyritic breccia. Massive pyrite fragments plus fragments of pyritic shale and sandstones occur in a pyritic matrix. Pyrite content varies 5 to 40%. No other sulphides visible. Orientation of fragments is at 15° to long core axis.
- 48.0 - 49.2 Weakly pyritic sediment breccia - very poor core recovery.
- 49.2 - 61.5 Altered dacite. Bleached white composed of 1-2mm patches of chlorite distributed through a white saccharoidal quartz-feldspathic groundmass. Very different to the dacite intersected in DDH 7, being far more felsic in composition. Massive pyrite-quartz veins cut the dacite at the following intervals;
  - 56.0 - 56.01
  - 57.75 - 57.77
  - 58.00 - 58.03
  - 59.16 - 59.18
 The veins cut at right angles to the long core axis and display zones of fine grained alteration up to 20cm on either side. The alteration is dominantly sericite and fine pyrite.

E.O.H.

042

936043 35.

## APPENDIX NO. 1

ANALYTICAL RESULTS

DIAL MINE GRID DDH 8

SAMPLE NO-	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	Sn ppm	W ppm
KR 6061	10-11	0.8	115	20	15	1	10	100	(10
6062	11-12	0.9	125	20	15	1	15	130	(10
6062A	12-13	1.0	275	25	30	1	5	160	(10
6063	13-14	1.0	425	65	40	2	20	75	(10
6064	14-15	1.0	270	35	20	1	10	55	(10
6065	15-16	0.7	580	45	85	2	5	65	(10
6066	16-17	0.8	660	20	45	1	10	90	(10
6067	17-18	0.8	520	20	40	1	10	95	(10
6068	18-20	0.9	80	20	15	(1	15	65	(10
6069	20-21	0.9	95	25	15	(1	10	90	(10
KR 6070	21-22	1.0	55	20	10	(1	10	75	(10
6071	22-23	0.8	90	25	20	1	10	65	(10
6072	23-24	0.8	115	20	15	1	10	70	(10
6073	24-25	1.0	145	20	15	1	5	60	(10
6074	25-36	0.5	315	20	30	1	15	65	(10
6075	26-28	0.5	260	30	40	2	10	350	(10
	28-30.2	No core							
6076	30.2-32.3	0.9	380	45	70	2	10	365	(10
	32.3-36.5	No core							
6077	36.5-38	0.4	170	45	60	2	10	15	(10
	38-40	No core							
6078	40-42.8	0.4	95	30	20	2	15	10	(10
	42.8-45.4	No core							
6079	45.4-46.5	0.2	80	25	35	1	10	15	(10
KR 6080	46.5-47	0.5	0.15%	90	75	4	15	265	(10
6081	47-48	0.75	0.20%	70	40	4	10	320	(10
6082	48-49	0.3	70	30	20	1	10	35	(10
	49-50	No core							
KR 6083	50-52	0.9	10	20	35	1	5	15	(10

043

GEOPEKO - DIAMOND DRILL CORE LOG.

PROJECT: Dial Range E.L. 24/73

AREA: Dial Mine Grid

HOLE NO: DDH 9

PROPOSED: R.R. Large, July 1980

COLLAR CO-ORDINATE: 1964N, 2030E

INCLINATION: -75<sup>0</sup>

AZIMUTH: 030<sup>0</sup> Grid

COLLAR SURVEYED: R.R. Large

FINAL DEPTH: 100m

PURPOSE OF HOLE: To test SP anomaly with weak coincident Sn-Cu soil geochemistry.

SUMMARY RESULT: No significant mineralization.  
SP maybe caused by fault at 45.6 - 49m  
or weakly carbonaceous mudstones.

GEOLOGICAL LOG DDH 9 DIAL RANGE

- 0 - 6.0m No core
- 6.0 - 18.8 Cream to brown clay and claystone.  
Represents decomposed fine grained siltstones
- 18.8 - 23.5 Light green claystone - weak bedding.  
Laminations indicate angle of bedding to long  
core axis is 20-30°.
- 23.5 - 28.2 Brown mudstones and siltstones. Angle  
of bedding lca at 25m is 15°.
- 28.2 - 33.6 Coarse grained sandstones, grits and fine  
breccias. Grits are composed of black,  
grey and white chert and cherty  
siltstone fragments 0.5 to 5mm  
in size packed in a sandy matrix. Grading  
is present in places indicating a  
facing up the hole. Bedding is at 80° to lca
- 33.6 - 34.0 Vuggy quartz-iron oxide gossan. The angle  
of the gossan walls to lca varies from 70  
to 10°. This may be an oxidized pyrite-  
quartz vein. No evidence of base metals  
is visible.
- 34.0 - 35.0 Laminated grey siltstone. Bedding to lca  
is 80°.
- 35.0 - 37.0 Grits and siltstone with iron oxide  
staining and minor gossanous veins in places.
- 37.0 - 41.0 Fine cherty breccias and grits. Minor  
iron oxide staining. Breccias have a  
well packed framework with litte matrix.

045

- 41.0 - 43.2 Laminated grey and cream siltstones with minor fine breccias. Bedding to lca is 70-90°.
- 43.2 - 45.6 Cherty breccia with black chert, grey chert and quartz fragments varying from 2mm to 10mm.
- 45.6 - 49.0 No core  
Cavity filled with clay. Maybe a fault zone.
- 49. - 56.9 Black cherty breccias, grits and minor carbonaceous siltstones.
- 49 - 50 Black cherty breccia.
- 50 - 51.7 Grey grits
- 51.7 - 53.5 Intermixed carbonaceous siltstones and grits.
- 53.5 - 56.3 Coarse black cherty breccia. Fragments of black chert and grey chert 5-20mm across in a coarse sandy matrix. Rosettes of pyrite are characteristically developed on the fractures.
- 56.3 - 56.9 Grey grits.
- 56.9 - 100m Dominantly grey siltstones interbedded with minor greywacke-sandstones, grits and breccias. The grey colouration maybe due to carbonaceous material however no graphite is present. Angle of bedding to lca varies down the hole.

<u>Meterage</u>	<u>Angle to lca</u>
68	0-20°
69	10°
71.5	40°
74	20°
77	40°
85	70°

046

<u>Meterage</u>	<u>Angle</u>
90	80°
96	80°
100	80°

A breakdown into units is as follows;

56.9 - 62.6 Grey siltstone

62.6 - 64.8 Grey sandstone

64.8 - 69.6 Interbedded grey siltstone and sandstone.

69.6 - 72.4 Greywacke-sandstone with minor breccias at the base.

72.4 - 75.1 Grey siltstone minor grits.

75.1 - 76.5 Greywacke sandstone.

76.5 - 84.0 Grey siltstone with minor greywacke and grit beds.

84.0 - 87.5 Grits and Breccias

87.5 - 92.5 Grey siltstone

92.5 - 93.5 Graded bed ranging from breccia at the base ( <30mm fragments) to a fine greywacke at the top.

93.5 - 100 Grey siltstones.

E.O.H.

047

936048 40.

## APPENDIX NO. 1

ANALYTICAL RESULTS

DIAL MINE GRID DDH 9

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Sn ppm	W ppm
KR 6086	25-26	1	80	20	70	2	80	(10
6087	26-27	1	300	25	25	3	50	(10
6088	27-28	1	240	35	20	2	15	(10
6089	28-29	1	225	30	15	1	15	(10
6090	29-30	0.9	180	35	15	1	20	(10
KR 6091	30-31	0.9	120	40	10	1	20	(10
6092	31-32	1	75	30	5	1	20	(10
6093	32-33	1	135	30	10	1	35	(10
6094	33-34	0.6	560	45	30	1	35	(10
6095	34-35	0.5	360	30	310	1	25	(10
6096	35-36	0.4	295	35	45	1	40	(10
6097	36-37	0.3	300	45	40	2	100	(10
6098	37-38	0.7	145	30	15	1	50	(10
6099	38-39	0.4	135	30	10	1	50	(10
KR 6100	39-40	0.5	95	30	5	1	45	(10
KR 6601	40-41	0.6	60	35	10	1	40	(10
6602	41-42	0.3	100	40	10	1	75	(10
6603	42-43	0.4	200	55	20	2	25	(10
6604	43-44	0.5	135	45	15	1	35	(10
6605	44-45.6	0.25	170	45	60	1	30	(10
6606	49-52	1.0	100	30	20	2	15	(10
6607	52-53	0.8	75	25	20	1	35	(10
6608	53-54	0.4	85	30	160	2	30	(10
6609	54-55	0.6	90	40	240	2	15	(10
KR 6610	55-56	0.9	165	40	350	1	15	(10
6611	56-57	1.0	100	45	135	2	20	(10
6612	57-58	1.0	110	50	60	2	(5	(10
6613	58-59	1.0	100	50	65	2	20	(10

048

GEOPEKO - DIAMOND DRILL CORE LOG.

PROJECT: Dial Range E.L. 24/73

AREA: Dial Mine Grid

HOLE NO: DDH 10

PROPOSED: R.R. Large, July 1980

COLLAR CO-ORDINATE: 2410N, 1790E

INCLINATION: -50°

AZIMUTH: 270° Grid

COLLAR SURVEYED: R.R. Large

FINAL DEPTH: 199.5m

PURPOSE OF HOLE: Test a Sn-Cu soil geochemical anomaly over the Cateen Group sediment breccias.

SUMMARY RESULT: Anomalous tin (100-560ppm) was revealed in the oxidized breccias from 41-115m. Copper mineralization (chalcocite and pyrite) occurs as possible syngenetic sulphides over the interval 117-137m averaging 0.68%Cu.

049

GEOLOGICAL LOG DIAL RANGE DDH 10

- 0 - 6m No core-tricone bit
  
- 6 - 7m Highly oxidized, friable and porous sediment breccia. Fragments 2mm to 20mm are typically weathered out to leave a porous sandy framework. Some fragments are pyrite rich and have oxidized to iron oxide boxworks.
  
- 7 - 15 Cream and light brown clay probably the remnants of decomposed siltstones.
  
- 15 - 18.3 Massive medium grained cream sandstone with siltstone and clay bands. Siltstone beds show an angle of  $70^{\circ}$  to long core axis.
  
- 18.3 - 20 Oxidized sandstone with abundant boxworks after disseminated pyrite. Oxidized pyrite averages about 5 - 10%.
  
- 20 - 24 Massive sandstone and minor clay bands. Fractures are commonly filled and coated with iron oxides after pyrite. Bedding at  $85^{\circ}$  to lca.
  
- 24 - 41 Massive cream and light brown clay with occasional beds of friable sandstone. The clay is probably after massive siltstone and mudstone.
  
- 41 - 54.4 Oxidized and porous sediment breccias, with 2 - 10% oxidized pyrite. Some sections are strongly chloritic while others are clay rich and decomposed.

050

- 54.4 - 65.0                      Gossanous and silicified breccias.  
Similar to previous interval but showing more mineralization (pyrite only?). Very friable core and completely oxidized.
  
- 65.0 - 115                      Decomposed heavily oxidized brown to red mineralized sediment breccias as before. Fragments average 3 to 10mm. Pyrite content was probably 5-10% now all leached and redeposited as iron oxides.
  
- 115 - 116.2                      Light brown siltstone-sandstone.
  
- 116.2 - 125.0                      Cream to pink siltstone and fine sandstone. Fine pyrite and chalcocite occurs disseminate throughout, particularly in the pink sandy layers. Crosscutting pyrite and chalcocite occurs in gashes and veinlets at right angles to the bedding. These sulphides are probably remobilised from the laminated sulphides. Soft sediment deformation including slumping and micro brecciation are common. Sulphides are particularly abundant in the deformed zones.  
Overall the pyrite and chalcocite content is 2-5%. The ratio of py:cc is difficult to determine because of the fine grain size. Overall Cu grade is probably 0.4-0.5%.
  
- 125-126.1                      Grey to black laminated carbonaceous shale. No mineralization evident.

- 051
- 126.1 - 130.5 Laminated light green shales and pink fine sandstone carrying 2-3% fine pyrite and minor chalcocite. Cu content probably 0.3-0.4%. Soft sediment brecciation is common. Many of the sandstone layers are graded with facing down the hole. Sulphides are concentrated at the base (up hole) of the laminations.
- 130.5 - 132.5 Badly broken core of green-pink siltstones. 1-2% pyrite and chalcocite?
- 132.5 - 132.8 Massive pyrite and chalcocite-quartz band badly broken core and poor core recovery. Difficult to determine whether this is a vein or bed.
- 132.8 - 138.7 Green-pink siltstone and fine sandstone with minor brown sandstone. 1-2% pyrite and chalcocite is present in disseminated syngenetic form in the green-pink siltstone and fine sandstones. The brown sandstones appear to be barren. Soft sediment brecciation is common.
- 138.7 - 141 Brown and grey siltstones. Syngenetic sulphides are rare.

- 141 - 151.4                      Brown oxidized sandstone and siltstones  
with abundant iron oxides on fractures.
- 151.4 - 160.5                    Coarse oxidized pyritic sandstones.  
Pyrite is evenly distributed through the  
sandstone (2-5%) and also occurs in  
oxidized quartz bearing veinlets 2-10mm thick.
- 160.5 - 163.2                    Siltstone-sandstone.  
Badly broken section-maybe a fault.
- 163.2 - 181.5                    Siliceous and gossanous mineralized  
breccia with patches of green chloritic  
cherty siltstone. Pyrite is completely  
replaced by iron oxide boxworks, and  
varies from 5 to 20% of the rock.
- 181.5 - 188                      Unoxidized chloritic and pyritic sediment  
breccia.
- 188 - 193.5                      Oxidized sediment breccia and minor siltstone  
C  $\wedge$  b  $\sim$  70°
- 193.5 - 199.5                    Unoxidized green chloritic and decomposed  
sediment breccia.

E.O.H.

## APPENDIX NO. 1

ANALYTICAL RESULTS

DIAL MINE GRID DDH 10

SAMPLE NO.	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Sn ppm	W ppm
KR	20-22	1.2	270	45	10	1	85	10
6621	22-23	1.0	170	50	5	1	60	20
6622	23-24	1.0	200	25	5	1	70	20
6623	41-42	0.7	430	15	5	1	115	20
6624	42-43	0.8	720	35	5	1	310	(10
6625	43-44	0.6	220	20	5	1	255	10
6626	44-45	0.7	680	50	25	2	190	(10
6627	45-46	0.6	720	70	15	2	620	(10
6628	46-47	0.8	580	55	10	1	190	(10
6629	47-48	0.9	530	40	25	1	225	10
KR 6630	48-49	0.7	550	45	50	1	280	(10
6631	49-50	0.8	490	65	70	1	385	(10
6632	50-51	0.75	165	40	70	1	40	(10
6633	51-52	0.8	90	40	80	1	30	(10
6634	52-53	0.8	50	45	50	1	125	(10
6635	53-54	0.9	230	25	25	1	250	10
6636	54-55	0.75	195	20	20	1	165	30
6637	55-56	0.6	230	20	10	1	180	20
6638	56-57	0.9	560	20	15	1	240	(10
6639	57-58	0.7	640	30	25	2	205	10
KR 6640	58-59	0.6	800	25	10	2	205	10
6641	59-61	0.9	980	25	15	2	160	(10
6642	61-63	0.8	700	40	25	1	155	(10
6643	63-65	1.5	590	50	5	1	130	(10
6644	65-67	1.0	700	75	10	1	125	50
6645	67-69	1.8	0.13%	100	10	2	210	(10
6646	69-71	1.1	780	40	15	1	235	(10
6647	71-73	1.5	800	35	55	1	285	(10
6648	73-75	1.3	840	35	65	1	155	20
6649	75-77	1.4	210	15	15	2	30	(10
KR 6650	77-79	1.4	160	35	10	1	45	(10
6251	79-81	1.6	550	35	15	1	250	(10
6752	81-83	1.4	640	30	25	1	175	(10
6753	83-85	1.1	430	25	25	1	225	(10
6754	85-87	1.0	800	65	15	1	155	(10
6755	87-91	0.4	680	40	10	1	145	10
6756	91-95	2.0	280	60	20	2	280	40
6757	95-97	2.0	400	30	55	2	560	(10
6758	97-99	1.7	540	40	45	1	250	10
6759	99-101	2.0	310	60	45	1	315	(10
KR 6760	101-105	0.8	640	40	20	1	135	10
6761	105-109	1.6	0.11%	75	50	1	195	(10
6762	109-111	1.1	720	60	30	1	160	(10
6763	111-113	1.4	640	65	30	4	100	20
6764	113-115	1.3	560	55	70	1	130	10
6765	115-117	2.0	450	45	105	3	50	(10
6766	117-119	1.9	0.56%	55	135	3	45	(10
KR 6767	119-120	1.0	0.60%	35	40	1	40	(10

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DIAL MINE GRID DDH 10

APPENDIX NO cont.

SAMPLE NO	METRES	CORE RECOVERED	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Sn ppm	W ppm
KR 6786	120-121	1.0	4150	5	65	X	50	25
6787	121-122	1.0	2900	10	90	X	35	X
6788	122-123	1.0	4400	5	65	X	50	X
6789	123-124	1.0	3.4%	10	205	0.5	50	X
KR 6790	124-125	0.4	5700	10	275	X	35	15
6791	125-126	1.0	5600	5	60	X	50	X
6792	126-127	1.0	2500	X	55	X	70	10
6793	127-128	1.0	2450	X	45	X	55	X
6794	128-129	1.0	710	X	70	X	35	X
6795	129-130	1.0	1850	X	65	X	30	X
6796	130-131	1.0	2150	X	85	X	30	X
6797	131-132	1.0	2750	5	170	X	55	X
6798	132-132.5	0.5	1.0%	5	95	0.5	45	X
K 6768	132.5-133	0.3	7.28%	80	70	7	25	(10
6799	133-134	0.5	1450	X	20	X	35	X
KR 6800	134-135	1.0	2300	X	15	X	35	X
KR 8301	135-136	1.0	2500	5	20	X	35	X
8302	136-137	1.0	3050	X	10	X	45	X
8303	137-138	1.0	900	X	10	0.5	30	X
8304	138-139	1.0	645	X	15	X	30	X
8305	139-140	1.0	350	X	15	X	30	X
8306	140-141	1.0	435	X	15	2.0	45	X
8307	141-142	0.6	365	X	10	1.5	30	10
8308	142-143	1.0	390	5	10	1.0	45	10
8309	143-146	0.6	200	5	10	1.0	35	X
KR 8310	146-147	1.0	90	10	10	X	55	X
8311	147-149	1.3	330	10	5	X	45	10
8312	149-150	1.0	425	20	15	X	50	X
KR 8313	150-151	1.0	210	15	30	X	55	10
KR 6769	151-153	1.8	330	40	25	1	40	(10
6770	153-155	2.0	250	20	15	1	40	20
6771	155-157	2.0	250	30	15	1	35	10
6772	157-159	2.0	660	25	10	1	50	(10
6773	159-161	1.6	200	15	30	1	45	(10
6774	161-163	2.0	220	25	15	1	35	10
6775	163-165	1.5	380	40	10	1	95	30
6776	165-167	1.4	550	65	10	2	90	(10
6777	167-169	1.0	300	30	10	2	100	10
6778	169-171	1.0	220	15	5	1	135	(10
6779	171-175	1.1	280	20	5	1	80	(10
KR 6780	175-179	1.2	350	15	5	2	115	20
6781	179-183	0.8	165	10	65	2	80	(10
6782	183-187	0.6	250	15	65	2	35	(10
6783	187-190	0.7	340	10	25	3	105	20
6784	190-195	1.3	230	15	60	1	105	(10
KR 6785	195-199.5	1.2	140	15	60	1	70	(10

X = (5

X = (0.5

X = (10

APPENDIX 2

Petrographic descriptions of core samples DDH 7

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# Pontifex & Associates Pty. Ltd.

TEL. 332 6744  
A.H. 31 3816

26 KENSINGTON ROAD, ROSE PARK  
SOUTH AUSTRALIA

P.O. BOX 91, NORWOOD  
SOUTH AUSTRALIA 5067

## MINERALOGICAL REPORT NO. 3078

31st October, 1980

TO: Mr. Ross Large,  
Supervising Geologist  
Geopeko Ltd.,  
P.O. Box 598  
DEVONPORT, Tasmania 7310

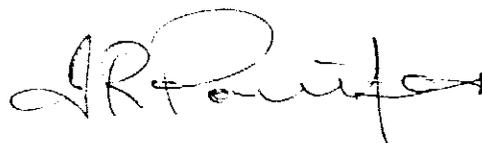
YOUR REFERENCE: Your letter dated 1/10/80

MATERIAL: Drill Core samples

IDENTIFICATION: KR6614 to KR6621

WORK REQUESTED: Petrographic examination,  
with comments on possible  
tin mineralisation

SAMPLES & SECTIONS: Returned to you  
with this report



PONTIFEX & ASSOCIATES PTY. LTD.

COMMENTS

The rocks in this suite are basaltic volcanics overlying pyritic dolomites and siltstones with a layer (?intrusion) of dolerite (KR6617).

No definite tin minerals were identified in this section.

It is possible that the suite may be compared in a very generalised sense with some Tasmanian sulphide-rich tin lodes (e.g. Queen Hill) which are believed to have been formed by hydrothermal replacement of dolomite layers. At Queen Hill however, the dolomites overly altered basalts, whereas the dolomites in this batch underlie altered basalts (or trachy-basalts).

None the less, the extensive silicification and pyrite enrichment of the laminated dolomite KR6618, does suggest pervasive hydrothermal replacement.

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Dial Mine Grid : DDH 7, 27.2m.

KR6614 : breccia of ?trachy-basaltic  
 fragments in a quartz-chlorite  
 carbonate matrix,  
 with minor pyrite

Angular fragments of trachy-basalt to over 30 mm across, are the main component in this rock, set in a matrix of fine-grained quartz-chlorite rock with abundant (25 - 30%) euhedral carbonate rhombs 0.1 - 0.5 mm across.

The trachy-basalt consists essentially of leucoxene-carbonate-chlorite-albite and alkali feldspar. Feldspar laths are up to 0.5 mm long with interstitial carbonate and chlorite and scattered leucoxene grains. Accessory quartz occurs in most fragments, probably the result of alteration. In one fragment there are volcanic quartz phenocrysts of possible xenocrystal origin.

The rock is cut by granular to sheared veins of quartz with carbonate and chlorite. Trace pyrite grains in the rock (to 0.5 mm) are adjacent to veins of quartz or carbonate.

Dial Mine Grid : DDH 7, 54m.

KR6615 : porphyritic basalt or trachy-basalt  
with fairly extensive, adularia,  
quartz-chlorite-sericite alteration

Partly to completely sericitised plagioclase phenocrysts to 2 mm across, occur within a silicified groundmass with plagioclase laths, also partly sericitised to 0.6 mm; chlorite, secondary interstitial quartz and adularia, scattered magnetite and leucoxene grains. Much of the chlorite is probably after ferromagnesian grains (pyroxene?). Minor prismatic to acicular apatite grains are scattered.

The rock is cut by adularia veins which suggests that much of the interstitial adularia is also of secondary origin.

Dial Mine Grid : DDH 7, 75.8m.

KR6616 : breccia of silty carbonate rocks  
(dolomites), also pyritic and  
dolomitic siltstones

Fragments of fine-grained dolomite and dolomitic-siltstone up to 15 mm long, are the main components in this rock. The dolomites are mostly micritic with scattered small pyrite cubes, minor quartz and small prisms of tourmaline (to 0.2 mm). Some have thin sparry layers or are sparry throughout.

The siltstone fragments have scattered quartz grains to 0.05 mm in a fine-grained matrix with 5 - 7% scattered pyrite grains to 0.1 mm, or scattered dolomite rhombs about 0.1 mm across.

One fragment consists of pyritic very fine quartz sandstone.

The whole rock matrix consists of clouded micritic dolomite with minor scattered quartz grains to 0.2 mm, and pyrite to 0.6 mm. This pyrite appears to be indigenous to the original sediment.

061

Dial Mine Grid : DDH 7, 112.5m.

KR6617 : altered magnetite-rich dolerite,  
with minor pyrite and chlorite veins

This is a typical oxide-rich dolerite with pyroxene replaced by chlorite and minor biotite. The plagioclase laths are about 1 - 2 mm long and altered to albite and sericite. There is about 10% scattered magnetite, and rare interstitial quartz and granophyre (containing alkali feldspar, as indicated by staining). Acicular apatite is concentrated into the quartz and granophyre patches. Coarser prismatic apatite is also present.

The rock is cut by schistose quartz-chlorite veins with minor magnetite. The minor pyrite (<1%) is scattered randomly and appears to be unrelated to the veins.

Dial Mine Grid : DDH 7, 126.4m.

KR6618 : laminated (graphitic and pyritic) dolomite extensively silicified, apparently by epigenetic quartz carrying pyrite

This rock appears to be primarily a thin layered micritic dolomite, with extremely fine graphitic foliae in some layers. Original bedding has been disrupted and extensively parted by the apparent intrusion of (?epithermal) quartz (40%), some of which forms stellate patches to 4 mm, possibly after a prismatic (?evaporitic) mineral.

Abundant fine (0.01 to 0.2 mm) pyrite (25%) is widespread mainly in quartz (where it may be interpreted as epigenetic), but partly layered within dolomite (where it may be interpreted as syngenetic).

Dial Mine Grid : DDH 7, 139.6m.

KR6619 : interlayered pyritic dolomite and  
sericite schist

Dolomite layers in this slide about 5 mm thick,  
are interlayered with quartz-poor sericite schist.

The dolomite layers have tension gashes filled by  
coarser dolomite, quartz and sericite. The dolomite is fine  
grained to very fine grained with a lenticular texture involving  
different grain sizes and different amounts of quartz, pyrite  
and leucoxene, on a scale of about 0.5 mm. The pyrite appears  
to be syngenetic.

The sericite schist has lenses about 0.1 - 0.4 mm  
thick with up to 40% pyrite and 10% quartz, and a diffuse layer  
0.8 mm wide with 15% pyrite. The intervening layers are poor  
in pyrite (0 - 3%) and quartz (0 - 5%). The pyrite in these  
lenses also appears to be syngenetic.

One of the pyritic layers is disrupted by a lens of  
coarse dolomite with quartz 3mm long; smaller similar lenses  
occur in the sericite schist.

The contact between the dolomite and sericite  
schist appears to be of a tectonic nature, with pyritic lenses  
(in part folded) cutting out against the dolomite.

Dial Mine Grid : DDH 7.

KR6620 : pyritic silty dolomite;  
veins of coarser crystalline dolomite  
± quartz calcite and pyrite

Most of this section consists of vaguely thin bedded, silty, microcrystalline dolomite. The 'silt' is mainly fine detrital quartz ± minor pelitic material; some of the silica however may be cherty. Fine pyrite (7 - 10%) is evenly dispersed, almost certainly syngenetic.

A single coarser crystalline (0.3 mm) band, which carries correspondingly coarser quartz and pyrite, partly layered, but mainly in loose aggregates, appears to be a remobilised, or possibly an intrusive vein. Thinner veins of coarse anhedral dolomite ± trace quartz, also ± calcite, cut the rock with similar orientation to the pyritic band.

KR6621 : interlaminated, weakly pyritic limestone  
and dolomite cut by pyrite-bearing  
quartz-calcite veins

This rock has thin lenses and nodules of calcite arranged into thin interrupted laminae in a matrix of dolomite micrite. The calcite lenses are coarser grained (50 microns) than the dolomite (5 microns). The nodules grade into layer-parallel vein-like pods with calcite grains to 0.6 mm across, columnar quartz and pyrite. Minor fine syngenetic pyrite is scattered in diffuse lenses throughout.

Discordant veins to 1.5 mm wide consist of granular (0.4 mm) calcite with minor quartz and anhedral pyrite (0.5 mm); some of the pyrite grains are partly embedded in the vein wall.

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AUSTRALIAN LABORATORY SERVICES PTY. LTD.

PAGE 1 OF 1

CONSULTING CHEMISTS & ANALYSTS

OFFICE & LABORATORY  
44 Balaclava Street  
WOOLLOONGABBA Q 4102  
Ph (07) 391 6799  
A/H 353 2830  
TELEX ALSEV 42344

LABORATORY REPORT

Batch No.: L114  
Date Received 13/11/80  
Date Completed 18/12/80

Client: GEOPEKO LIMITED,  
Address: P.O. BOX 217,  
GORDON,  
N.S.W.

Area Contact: DR. ROSS LARGE,  
Address: P.O. BOX 598,  
DEVONPORT, TAS. 7310.

Order No.: KP 2459

Sample Type: CONCENTRATES

No. of Samples: 21

SAMPLE NO.	Cu	Pb	Zn	Ag	Fe	Au	Sn	W
	M	M	M	M	%	b	M	M
	1	1	1	1	1	120-A	XRF 1A	XRF 1A
KD 1602	25	50	105	1	2.12	100	150	<10
KD 1603	50	50	100	2	7.80	10	10	<10
KD 1605	X 440	330	45	1	4.20	40	<5	<10
KD 1607	50	50	85	1	7.80	15	<5	<10
KD 1609	80	50	145	2	15.6	30	<5	<10
KD 1611	25	25	50	1	5.00	10	<5	<10
KD 1613	110	50	120	2	16.0	10	<5	<10
KD 1615	85	45	105	1	16.0	10	<5	<10
KD 1617	35	40	85	1	10.2	<3	<5	<10
KD 1619	115	50	100	2	15.2	10	<5	<10
KD 1621	15	25	55	1	4.00	10	<5	<10
KD 1623	15	25	50	1	2.40	5	<5	<10
KD 1625	80	50	175	2	16.4	10	<5	<10
KD 1627	45	35	95	1	6.20	20	<5	<10
KD 1629	15	55	140	1	6.40	5	<5	<10
KD 1631	5	25	30	1	3.60	10	<5	<10
KD 1633	2	20	25	1	0.76	<3	15	<10
KD 1635	5	20	45	1	1.32	<3	40	<10
KD 1638	15	25	35	1	3.60	5	60	<10
KD 1640	<2	20	30	1	4.40	10	610	<10
KD 1642	10	35	60	1	2.56	25	<5	<10

Drainage Sampling Results  
 Panned Concentrates  
 Appendix 3.

UNITS LEGEND ----- M - Parts per million      b - Parts per billion      % - percent  
 g - Grams                                      a - Absorbance

Signature: *A. J. Finlayson*

936065 57.

CONSULTING CHEMISTS & ANALYSTS

OFFICE & LABORATORY  
44 Balaclova Street  
WOOLLOONGABBA Q 4102  
Ph (07) 391 6799  
A/H 353 2830  
TELEX ALSEV 42344

LABORATORY REPORT

Batch No.: L113  
Date Received: 13/11/80  
Date Completed: 18/12/80

Client: GEOPEKO LIMITED,  
Address: P.O. BOX 217,  
GORDON,  
N.S.W.

Area Contact: DR. ROSS LARGE,  
Address: P.O. BOX 598,  
DEVONPORT, TAS. 7310.

Order No.: KP 2460

Sample Type: -00#

No. of Samples: 22

SAMPLE NO.	Cu		Pb		Zn		Ag		Fe		Au		Sn		W	
	m	m	m	m	m	m	m	m	z	b	m	m	m	m	m	m
	1	1	1	1	1	1	1	1	1	120-A	XRF 1A					
KD 1601	20	20	60	1	1.86	10	<5	<10								
KD 1604	115	60	140	2	10.0	10	<5	<10								
KD 1606	95	60	115	2	8.40	5	<5	<10								
KD 1608	75	50	130	2	10.4	5	<5	<10								
KD 1610	100	50	155	2	12.8	15	<5	<10								
KD 1612	90	40	115	2	8.40	15	<5	<10								
KD 1614	110	40	125	2	12.0	5	<5	<10								
KD 1616	130	50	105	2	12.0	10	<5	<10								
KD 1618	105	40	105	2	9.20	10	<5	<10								
KD 1620	160	45	120	2	12.0	5	<5	<10								
KD 1622	45	30	90	2	5.00	10	<5	<10								
KD 1624	35	40	115	1	3.00	10	<5	<10								
KD 1626	120	45	175	2	11.6	5	<5	<10								
KD 1628	75	50	185	1	7.20	10	<5	<10								
KD 1630	15	55	120	1	2.72	5	<5	<10								
KD 1632	5	20	25	<1	1.52	10	<5	<10								
KD 1634	5	15	15	1	0.48	10	<5	<10								
KD 1636	10	20	85	1	1.66	10	<5	<10								
KD 1637	30	40	60	1	2.66	15	<5	<10								
KD 1639	35	45	75	1	5.60	10	5	<10								
KD 1641	10	20	55	1	2.32	10	<5	<10								
KD 1643	20	35	85	1	3.60	5	<5	<10								

Drainage Sampling Results  
Minus 80 Mesh.

UNITS LEGEND: m - Parts per million, g - Grams, b - Parts per billion, a - Absorbance, % - percent

Signature: *A. G. Finlayson*

066

936067

APPENDIX 4

Petrographic description of mineralized samples  
from DDH 10.

067

936068 DEVONPORT

# GEOPEKO



OLD COAST ROAD, QUOIBA, VIA DEVONPORT, TAS., 7310.  
P.O. BOX 598, DEVONPORT, TASMANIA, 7310, AUSTRALIA.

PHONE (004) 24 4931  
TELEX AA59056

8-5-81

Mr. W. Fander,  
Central Mineralogical Services,  
231 Magill Road,  
MARYLANDS...5069  
South Australia.

Dear Wally,

Please describe the mineralogy and petrology of the two enclosed core samples by polished-thin section.

Do you consider the copper mineralization to be primary or due to secondary enrichment. Note these samples come from above the limit of oxidation. What is the pyrite/chalcocite ratio in the stratiform bands compared with the crosscutting veinlets? Is the chalcocite after chalcopyrite?

Regards,

  
ROSS LARGE.  
Supervising Geologist.

068

936069

Central Mineralogical Services



39 Beulah Road  
Norwood, S.A. 5067  
Telephone 42 5659

Dr. R.R. Large  
Supervising Geologist  
Geopeko  
P.O. Box 598  
DEVONPORT / TAS. 7310

4th June, 1981

REPORT CMS 81/5/19

YOUR REFERENCE:	Letter dated 8.5.1981
DATE RECEIVED:	12th May, 1981
SAMPLE NOS.:	KR 8314, KR 8315
SUBMITTED BY:	R.R. Large
WORK REQUESTED:	Petrology/Mineralogy

*H.W. Fander*  
H.W. Fander, M. Sc.

063

936070

CENTRAL MINERALOGICAL SERVICES

Date 4th June, 1981

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

Job No. CMS 81/5/19 Date Received: 12.5.1981

Reference Letter dated 8.5.1981 - R.R. Large

Sample No. KR 8314

Nature of Sample: D.D. Core DDH 10, 126.7m.

DESCRIPTION SECTION No. 37048

IDENTIFICATION
KR 8314
Mineralised Siltstone Breccia

a. Hand Specimen:

Pale, fine-grained, banded, brecciated rock with sulphide grains and crosscutting veins.

b. Microscopic:

This rock may be termed a shale/siltstone breccia; it shows several different phases of sulphide formation.

The rock is markedly banded or laminated, and is composed of silty, more quartzose bands grading into finer silt (clastic quartz and white mica flakes) and recrystallized argillite (now illite-sericite). The silty bands were brecciated prior to consolidation and were evidently partly lithified at an early stage; the blocky fragments are set in an argillaceous matrix probably representing liquidised argillite (originally thixotropic); this matrix is now recrystallized to illite-sericite.

The coarser bands contain the bulk of the Cu sulphides, which were clearly deposited prior to intraformational brecciation; thus, this stage of mineralisation was evidently early diagenetic, perhaps even syngenetic. Later sulphides are epigenetic, partly of local origin and partly introduced.

The sulphides in silty bands are small, irregular patches of extremely finely-intergrown chalcocite and digenite with thin cuprite rims; some patches appear to replace an earlier mineral (?carbonate, ?evaporite). Minor traces of pyrite shreds are seen. The crosscutting veins consist mainly of relatively coarse pyrite crystals with intergrown marcasite and associated patches of spongy digenite; veinlets and patches of digenite are also present and are thought to represent remobilised material now showing an epigenetic relationship to the rock.

H.W. Fander, M. Sc.

070

936071

CENTRAL MINERALOGICAL SERVICES

Date 4th June, 1981

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

Job No. CMS 81/5/19 Date Received: 12.5.1981

Reference Letter dated 8.5.1981 - R.R. Large

Sample No. KR 8315

Nature of Sample: D.D. Core DDH 10, 123.4 m.

DESCRIPTION SECTION No. 37049

IDENTIFICATION
KR 8315
Mineralised Altered Siltstone

a. Hand Specimen:

Pale argillic rock with dark sulphidic bands.

b. Microscopic:

This is a mineralised siltstone, in which there is evidence of weak, but pervasive metasomatism, whose relationship to the sulphide minerals is not clear.

The rock consists of silt-sized, angular grains of quartz and interstitial fine kaolinite; there are kaolinitic patches, and small aggregates of recrystallized quartz containing minute carbonate grains, suggesting silicification of more extensive carbonate lenses or bands. Fine, very pale needles of tourmaline are abundant throughout, randomly distributed and orientated, sometimes forming thin bands; traces of fine rutile are associated. Occasional grains of detrital zircon occur and confirm a sedimentary origin.

The kaolinite and tourmaline are essentially metasomatic, though perhaps partly derived from the sediment itself.

The sulphides comprise pyrite and digenite, with traces of covellite and blaubleibender covellite; thin cuprite films also occur. Pyrite is present as originally euhedral crystals, now showing all stages of replacement by digenite; there are also composite grains of digenite with ultrafine cloudy masses of colloform pyrite suggesting very low temperature of formation; these grains contain abundant submicroscopic pyrite, considerably reducing the Cu content. The distribution of the sulphides is more or less in bands, apparently influenced or governed by relict bedding. In contrast to the previous rock, pyrite evidently was the earliest sulphide to form; the style of mineralisation is reminiscent of the diagenetic occurrences at Gunpowder (Mammoth) and Mt. Gunson.

H.W. Fander, M. Sc.

071

936072

DEVONPORT

# GEOPEKO



OLD COAST ROAD, QUOIBA, VIA DEVONPORT, TAS., 7310.  
P.O. BOX 598, DEVONPORT, TASMANIA, 7310, AUSTRALIA.

PHONE (004) 24 4931  
TELEX AA59056

11-5-81

Mr. W. Fander,  
Central Mineralogical Services,  
231 Magill Road,  
MARYLANDS.....5069  
South Australia.

Dear Wally,

Enclosed is sample KR 8316 which represents quarter core through a 2 metre zone of friable and heavily oxidized sediment breccia within Dundas Group rocks of North Western Tasmania. The half core from this interval assayed 560ppm tin.

Could you please undertake a mineralogical analysis and determine the tin mineral present and grain size.

Regards,

ROSS LARGE.  
Supervising Geologist.

072

936073

Central Mineralogical Services



39 Beulah Road  
Norwood, S.A. 5067  
Telephone 42 5659

Dr. R.R. Large  
Supervising Geologist  
Geopeko  
P.O. Box 598  
DEVONPORT / TAS. 7310

4th June, 1981

REPORT CMS 81/5/20

YOUR REFERENCE:	Letter dated 11.5.1981
DATE RECEIVED:	12th May, 1981
SAMPLE NOS.:	KR 8316
SUBMITTED BY:	R.R. Large
WORK REQUESTED:	Petrology/Mineralogy

*H.W. Fander*

H.W. Fander, M. Sc.

073

936074

**CENTRAL MINERALOGICAL SERVICES**

Date 4th June, 1981

**SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)**

<b>IDENTIFICATION</b>
KR 8316
Tourmalinised Pebbly, Lithic Sandstone

Job No. CMS 81/5/20 Date Received: 12.5.1981

Reference Letter dated 11.5.1981 - R. Large

Sample No. KR 8316

Nature of Sample: D.D. Core DDH 10, 95-97m.

**DESCRIPTION** SECTION No. 37050

**a. Hand Specimen:**

Pale, grey-green, coarse clastic rock (core); abundant earthy hematite.

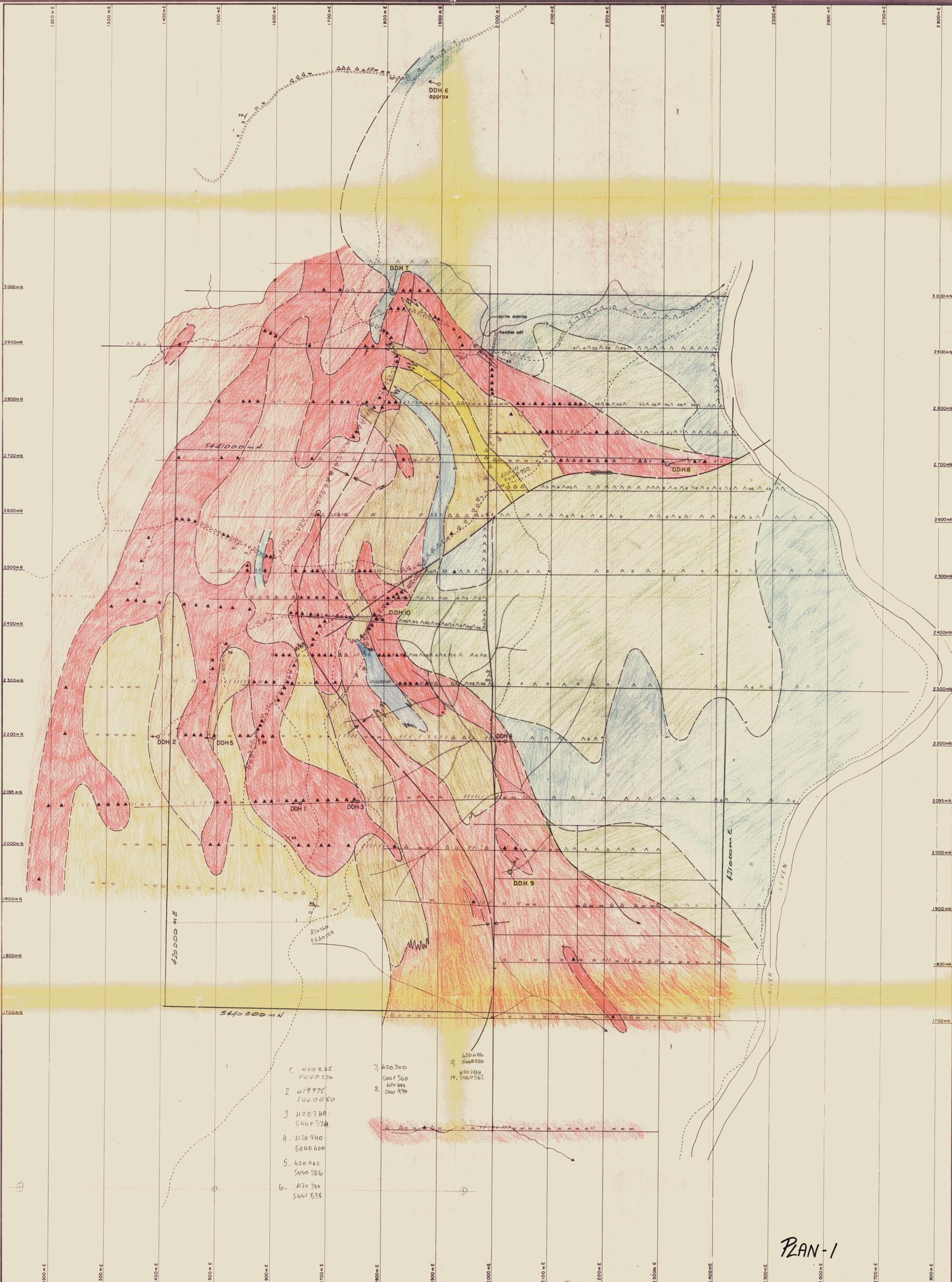
**b. Microscopic:**

Portion of the solid core was used to prepare a thin-section, and finer material was crushed and panned to obtain a concentrate.

The rock is a strongly tourmalinised pebbly, gritty, lithic sandstone; it contains traces of cassiterite which are believed to be associated with tourmalinisation, but this is a logical inference rather than actual observation (because of the paucity of cassiterite). The framework consists of rounded grains, from sand to pebble size, of orthoquartzite, vein-quartz, quartzose siltstones, and thoroughly tourmalinised sediments; the grains are set in a matrix of smaller quartz grains and fine, matted, pale needles of tourmaline with interstitial earthy hematite. There are many cavities, due to leaching of ?carbonate or removal of other minerals, and these are lined with tourmaline needles.

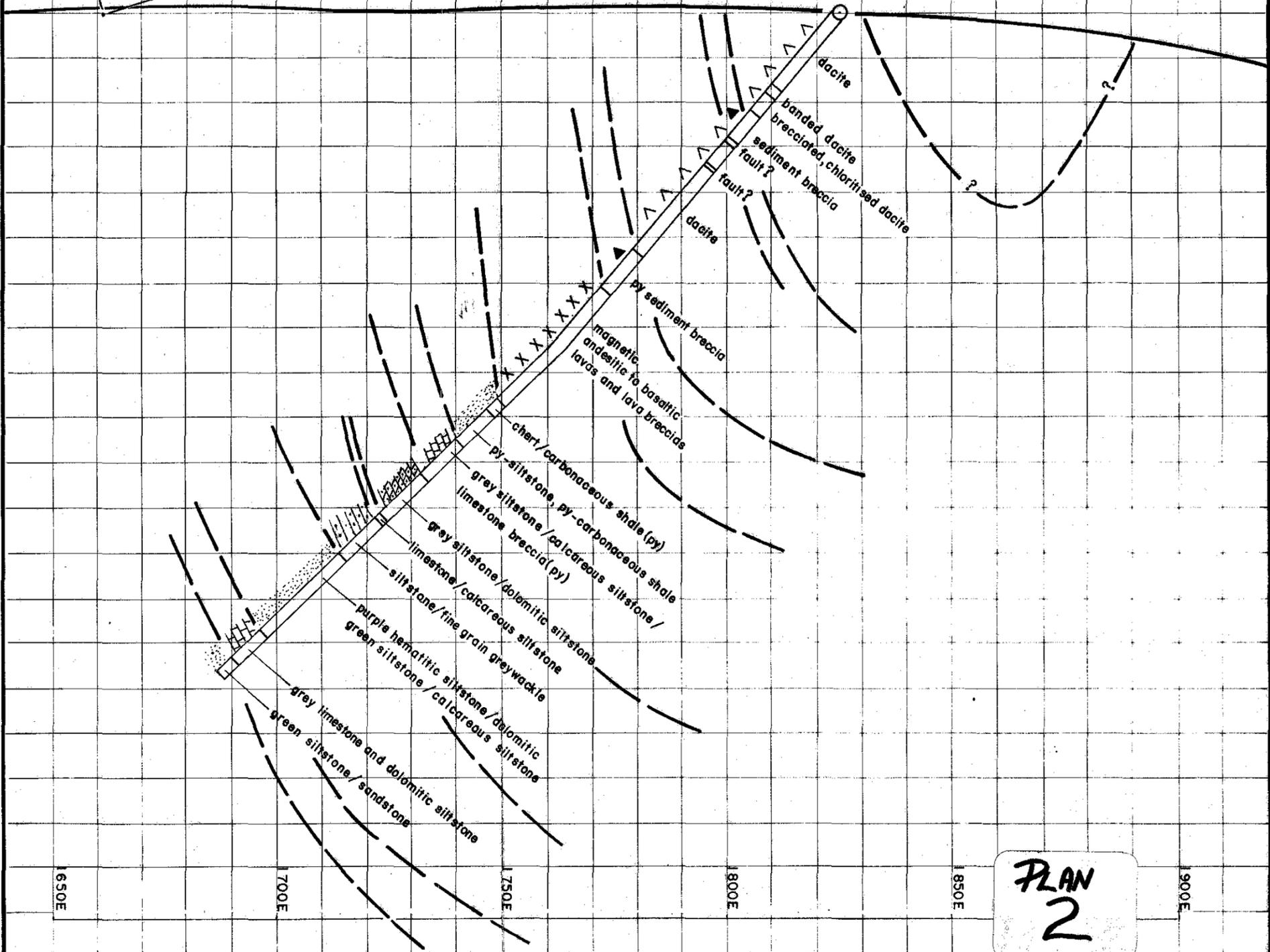
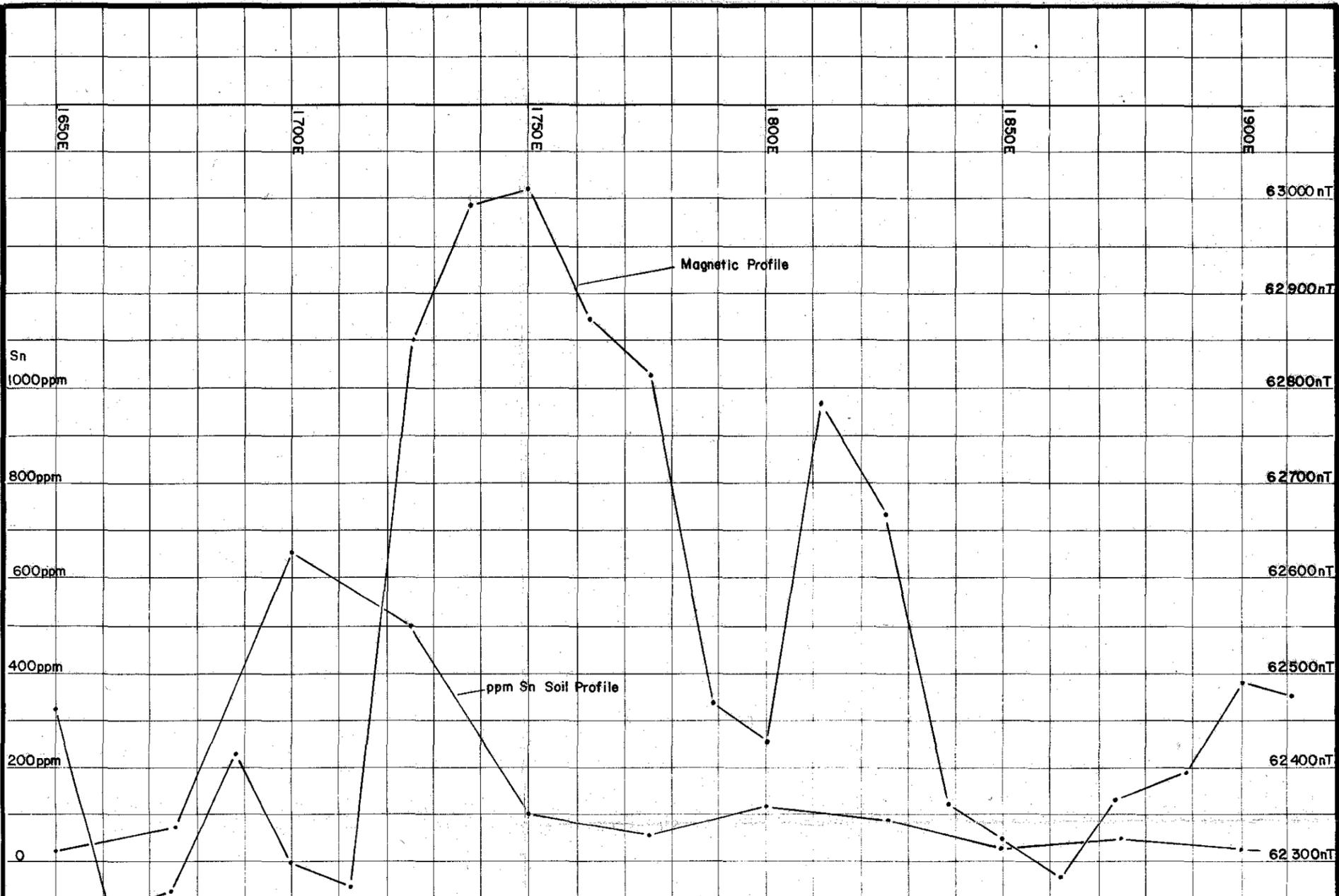
The panned concentrate consists dominantly of earthy hematite and hematite/tourmaline grains, minor quartz, traces of rutile, zircon and cassiterite; this mineral occurs as fractured grains (i.e. portions of larger crystals) up to 200  $\mu$  in size, sometimes hematite-pigmented. Clearly, coarser cassiterite must have been present.

H.W. Fander, M. Sc.

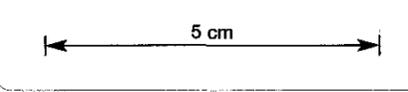


<b>LEGEND</b> <b>GATEENA GROUP</b> 19-15  Gossanous and ferruginous sediment breccia 19-58  Dominant shales, mudstones, argillites 19-56  Dominantly massive grey sandstones, minor greywackes (fe-indicates iron oxide veining after pyrite) 19-3  Siliceous fine breccia and coarse grits 19-40  Dacitic crystal tuff 19-33  Rhyolitic tuffs 19-65  Interbedded argillaceous breccias, sandstone, mudstone, shale, greywacke and minor dacitic tuffs (undifferentiated)		<b>LOBSTER CREEK VOLCANIC</b> 19-41  Massive dacite and porphyritic dacite 19-46  Altered dacite (sericite, clays) commonly cut by quartz - FeO veins (after Qtz-py)		 SCALE 1:2500 No TS 24/73-10 E.L. 24/73 DIAL MINE GRID, TASMANIA <b>GEOLOGY MAP</b> INTERPRETATION 93075 114	DATE JULY 80 GEOLOGIST CDS RRL DRAWN JPM CHECKED RL
1. 420235 5440370 2. 419975 5440460 3. 420340 5440374 4. 420840 5440400 5. 420062 5440386 6. 420380 5441538		7. 420300 5441340 8. 420890 5441990 9. 420496 5440220 10. 420204 5440562			

PLAN-1



PLAN  
2

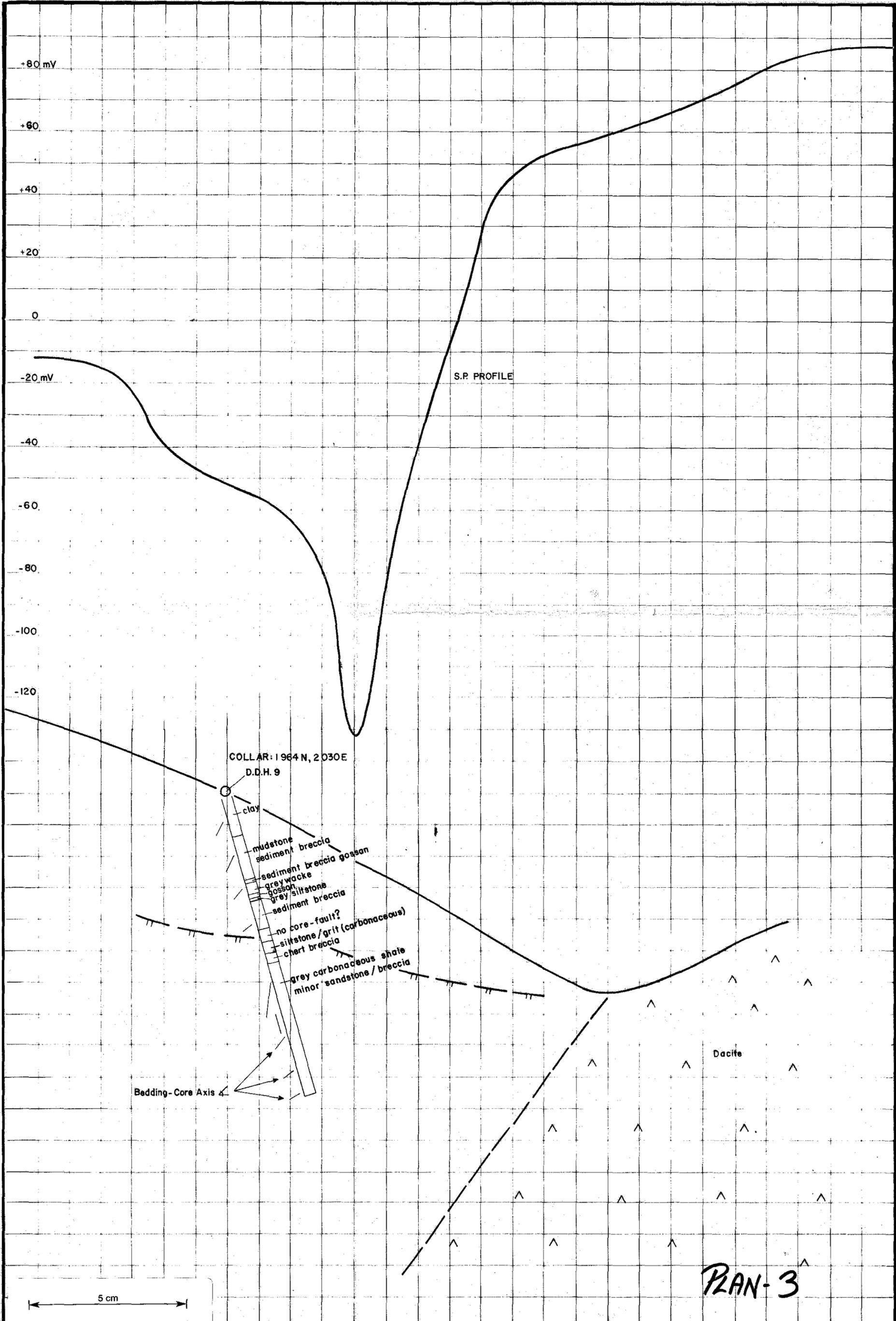


**GEOPEKO**  
A DIVISION OF PEKO-WALLSEND

SCALE:
DATE: 17 MARCH '81
GEOLOGIST: R.L.
DRAWN: R. TOGNONI
CHECKED:

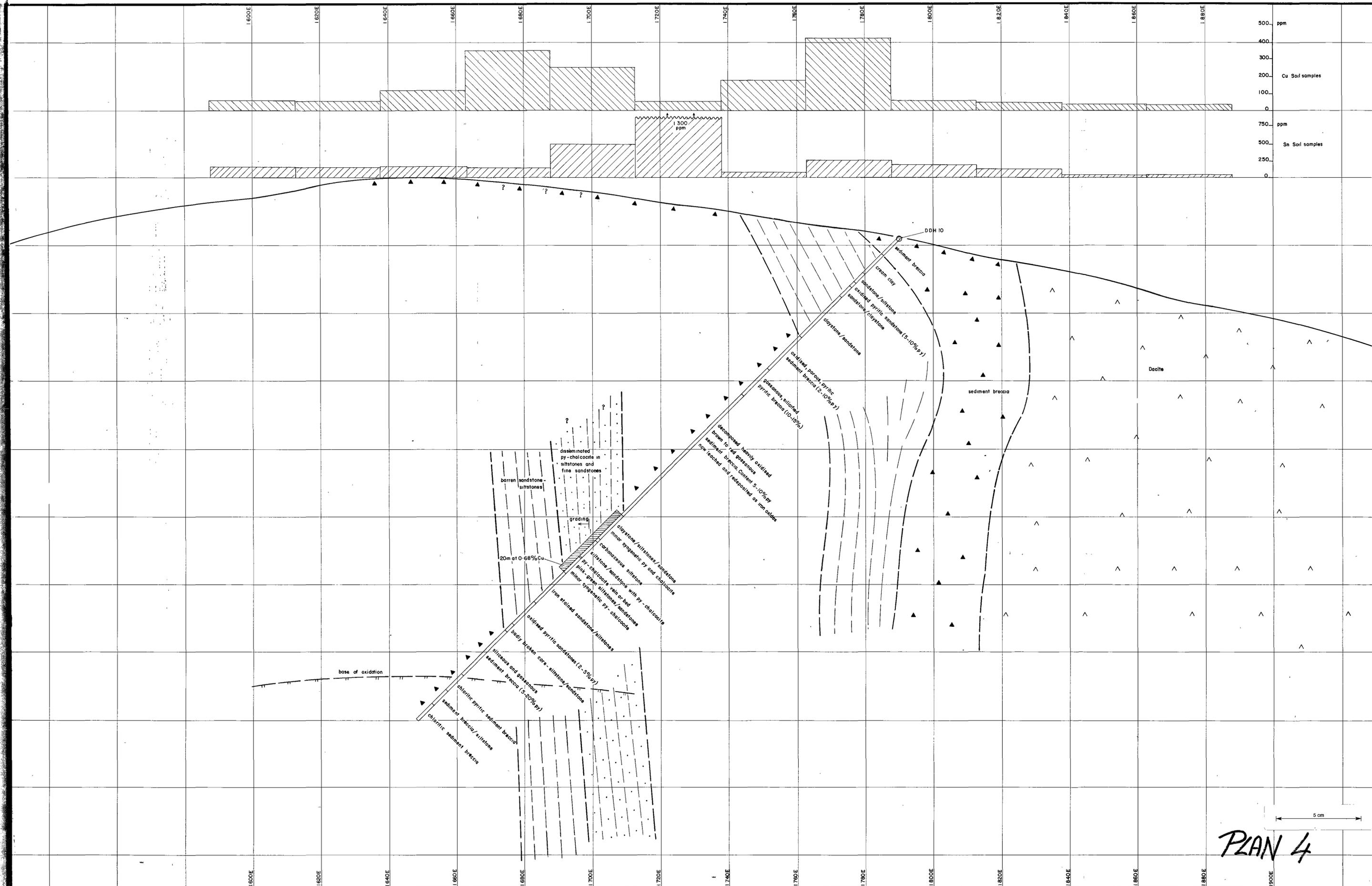
**DIAL MINE GRID**  
**D.D.H 7**  
**SECTION 3000N**

936076 115  
TS 24/73-17



PLAN-3

<p><b>GEOPEKO</b> A DIVISION OF PEKO WALLSEND</p> 	SCALE: 1:1000	<p><b>DIAL MINE GRID</b> <b>SECTION ALONG D.D.H. 9</b> BEARING: 030° GRID</p> <p>936077 116 TS24/73-19</p>
	DATE: 17 MARCH '81	
	GEOLOGIST: R.L.	
	DRAWN: R. TOGNONI	
	CHECKED:	



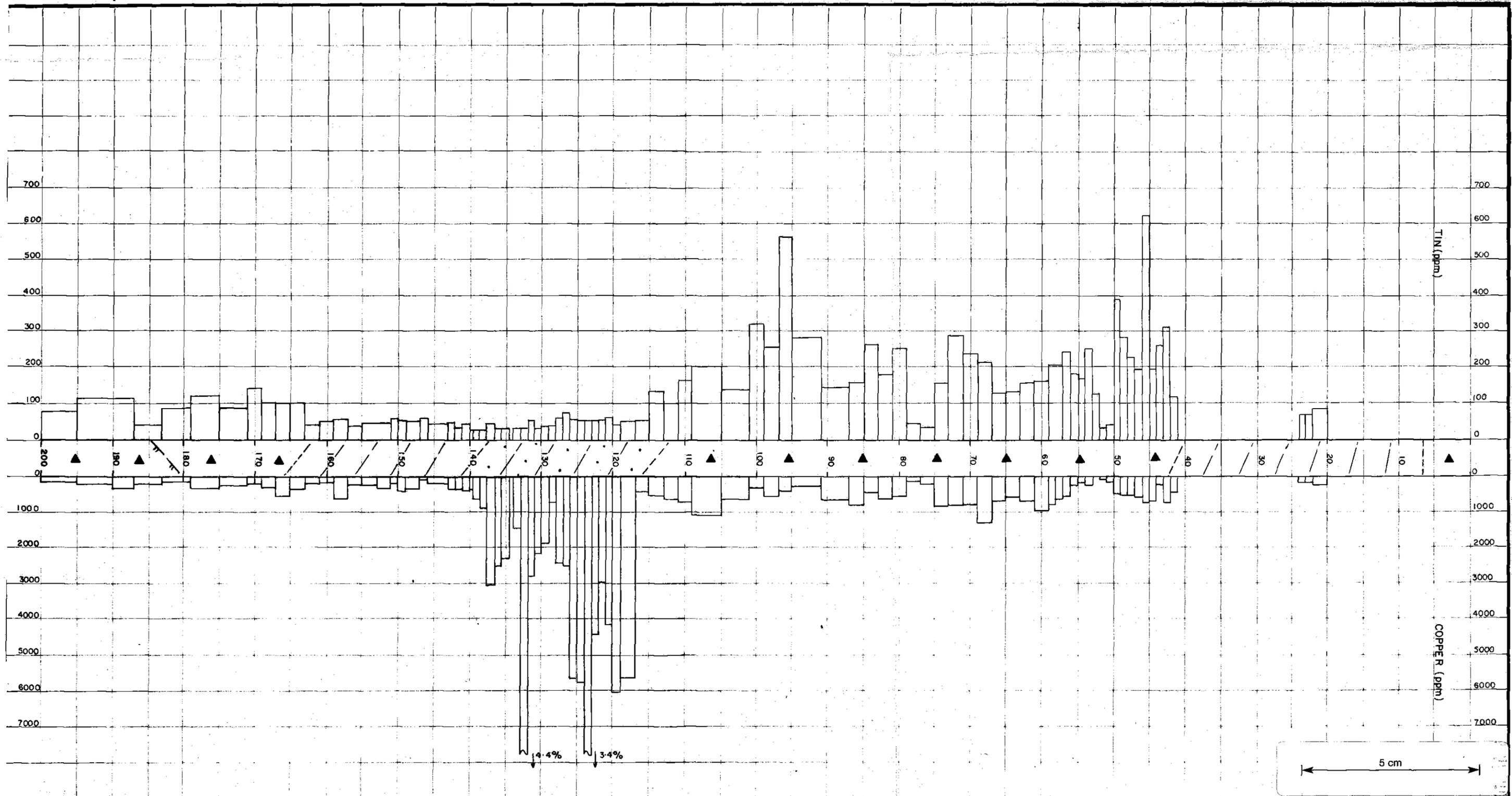
500 ppm  
400  
300  
200  
100  
0  
750 ppm  
500  
250  
0

Cu Soil samples  
Sn Soil samples

5 cm

PLAN 4

 DATE 17 MARCH '81 GEOLOGIST R.L. DRAWN RTOSHONI CHECKED	GEOPEKO LIMITED	
	No. 875.24/73-20	
	DIAL MINE GRID	
	936078	D.D.H. 10 PROFILE
SECTION 2400N		117



PLAN-4a

936079

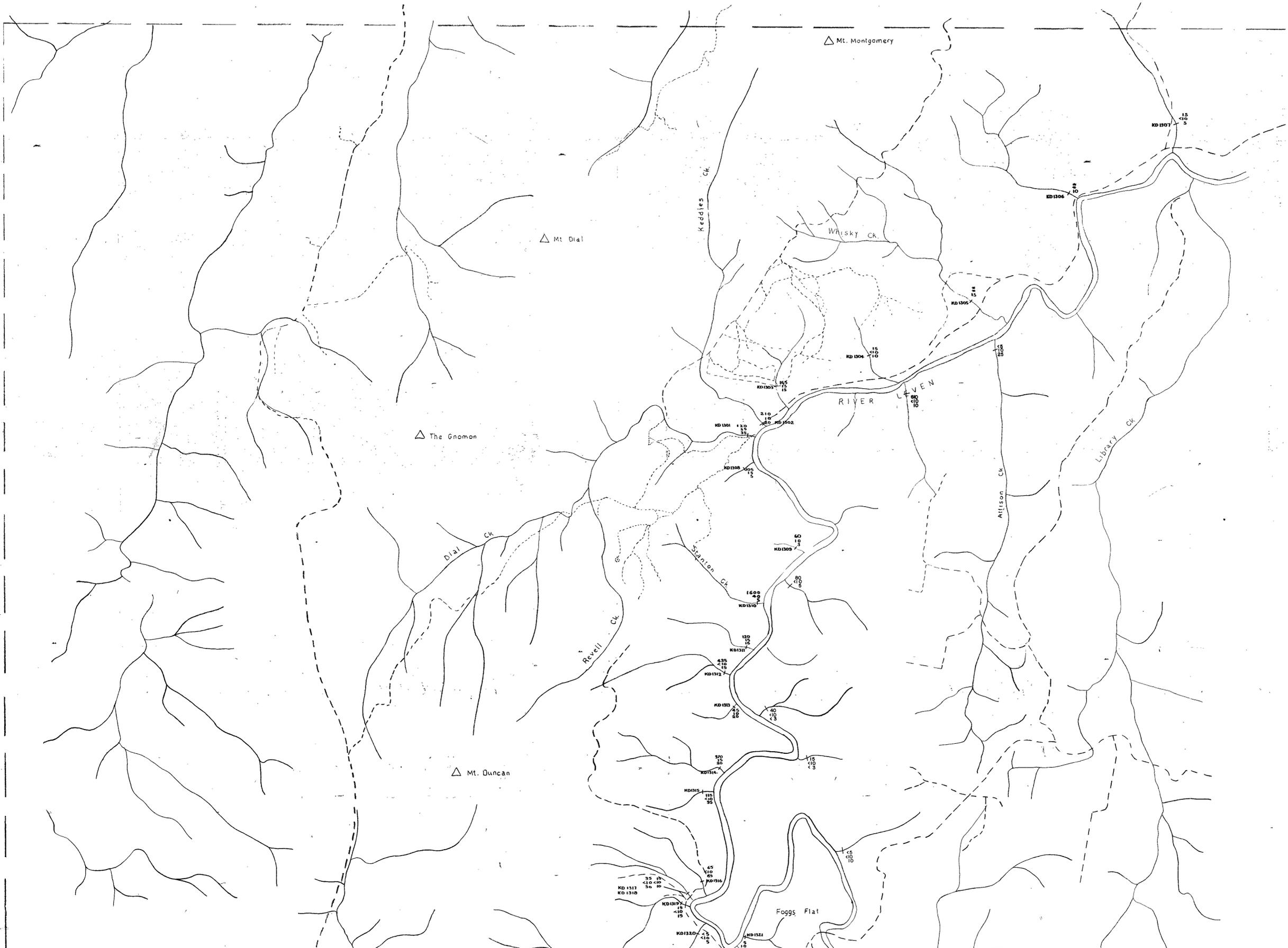
<b>GEOPEKO</b> A DIVISION OF PEKO WALLSEND 	SCALE:
	DATE: 17 MARCH '81
	GEOLOGIST: R.L.
	DRAWN: R.TOGNONI
CHECKED:	

DIAL MINE GRID  
 DD.H 10 PROFILE  
 Cu, Sn RESULTS

118

TS 24/73-21

81-1591



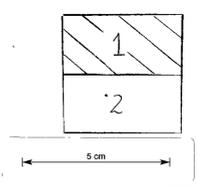
PLAN-5

**LEGEND:**

435 ppm Sn  
 <10 ppm W  
 15 ppb Au  
 KD 1312 ..... Sample Number

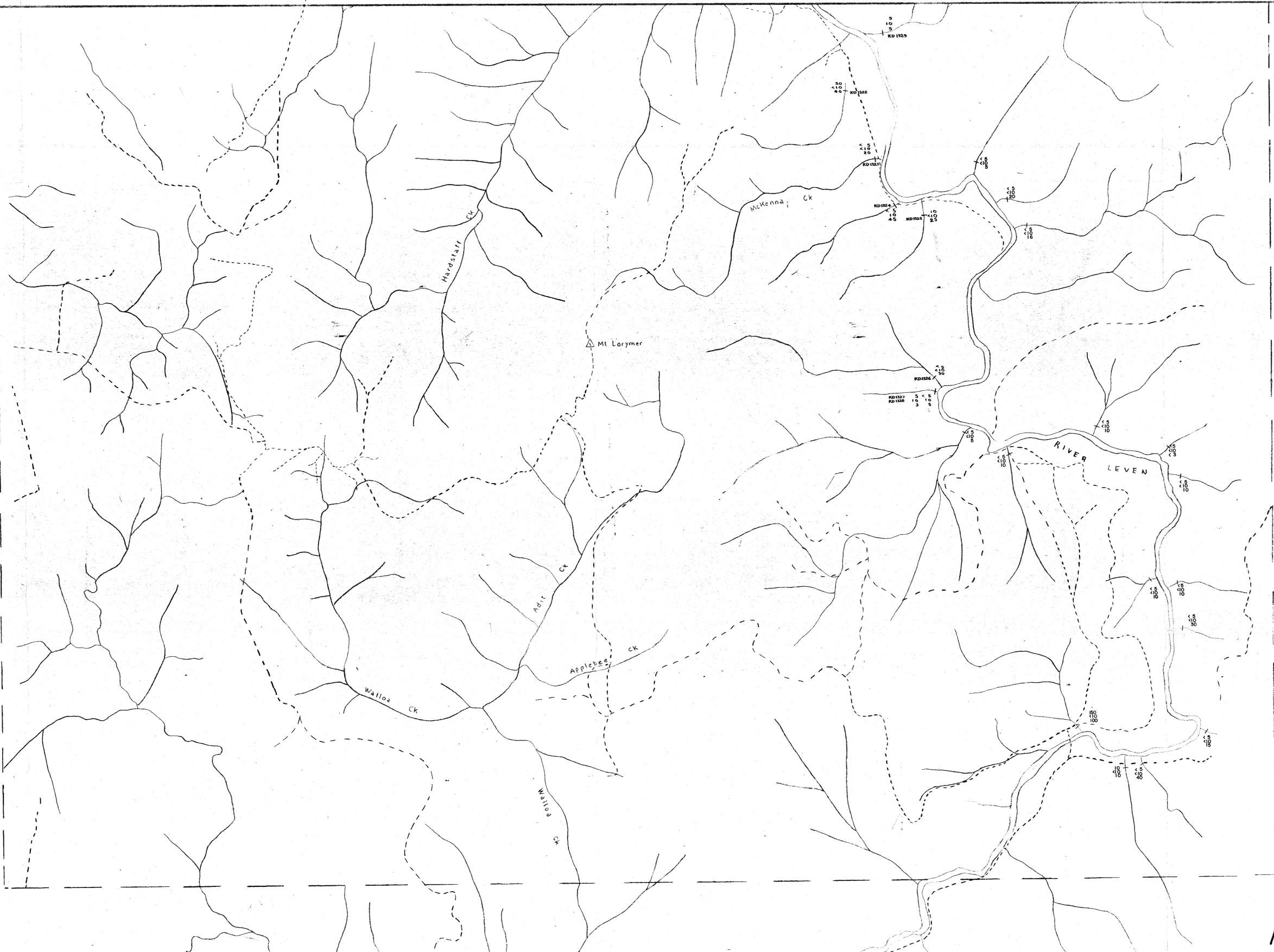
\* Insufficient sample for analysis  
 Note: Leroy stenciled values - 1980 sampling  
 Hand written values - 1979 sampling

Preparation: pulverised concentrates;  
 Analysis: Sn, W by XRF  
 Au. by method 120 A (A.L.S.Br.s)



DATE: July 1980  
 GEOLOGIST: C.D.S.  
 DRAWN: C.D.S.  
 7.P.M.  
 CHECKED:

GEOPEKO 936080  
 A DIVISION OF PEKO-WALLSEND OPERATIONS LTD  
 No. TS24/73-5  
 SCALE: 1:10 000 approx  
 E.L. 24/73 DIAL RANGE, TASMANIA  
**PANNED CONCENTRATE SAMPLE RESULTS**  
 Sn W Au  
 119



PLAN-6

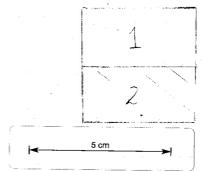
936081

**LEGEND**

120 ppm Sn  
 15 ppm W  
 15 ppm Au  
 KD 1321 Sample number

Note: Leroy stenciled values - 1980 sampling  
 Hand written values - 1979 sampling

Preparation: pulverised concentrates  
 Analysis: Sn W by XRF  
 Au by method 120 A (A.L.S.)



July 1980  
 C.O.S.  
 F.P.M.  
 Edm.

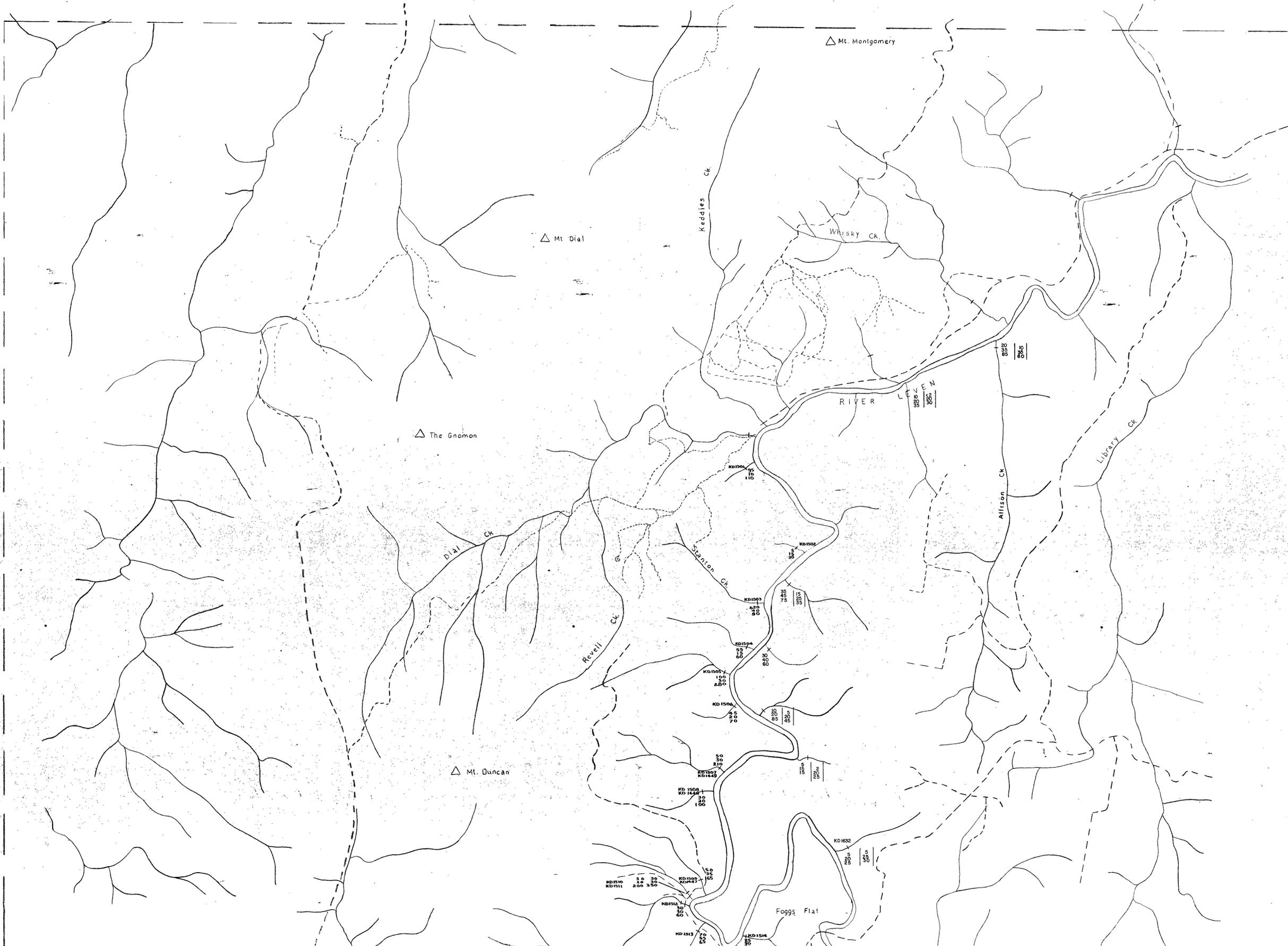
1:10 000 approx. TS24/73-6

E.L. 24/73 DIAL RANGE, TASMANIA

**PANNED CONCENTRATE SAMPLE RESULTS**

**Sn W Au**

120

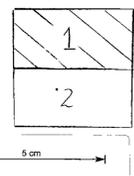


PLAN-7

LEGEND :

KD 1507 Sample number  
 Note: Leroy stenciled values - 1980 sampling  
 Hand written values - 1979 sampling  
 Preparation: Sieved to -80 mesh  
 Analysis: Cu, Pb, Zn by AAS. (A.L.S. Bris)

Cu  
 Pb  
 Zn  
 Pan Concentrate, Nov 1980 Survey



DATE: JULY 1980  
 GEOLOGIST: C D S  
 DRAWN: C D S  
 CHECKED: J P A

GEOPEKO  
 A DIVISION OF PEKO-WALLSEND OPERATIONS LTD  
 No. TS24/73-7  
 SCALE: 1:10,000 approx  
 E.L. 24/73 DIAL RANGE, TASMANIA  
**STREAM SEDIMENT SAMPLE RESULTS**  
 Cu Pb Zn  
 930082 121  
 31-1591



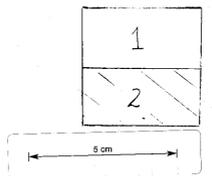
# PLAN-8

**LEGEND:**

KD 1507 Sample number  
 50 ppm Cu  
 30 ppm Pb  
 210 ppm Zn  
 Preparation: sieved to -80 mesh  
 Analysis: Cu, Pb, Zn by AAS (A.L.S. Dirs.)

Note: Leroy stenciled values - 1980 sampling  
 Hand written values - 1979 sampling

Cu  
 Pb  
 Zn Pan Concentrate: Nov 1980 Survey



DATE: JULY 80  
 GEOLOGIST: C.D.S.  
 DRAWN: C.D.S.  
 CHECKED: J.P.M.

GEOPEKO  
 A DIVISION OF PEKO-WALLSEND OPERATIONS LTD.  
 SCALE: 1:10000 approx  
 No. TS24/73-8  
 E.L. 24/73 DIAL RANGE, TASMANIA  
 930083  
**STREAM SEDIMENT SAMPLE RESULTS**  
 Cu Pb Zn 122