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PENNZOIL OF AUSTRALIA LIMITED

Progress Report to 30th April, 1977

EXPLORATION LICENCE NO. 24/73

Dial Range Project - Tasmania

OPEN FILE

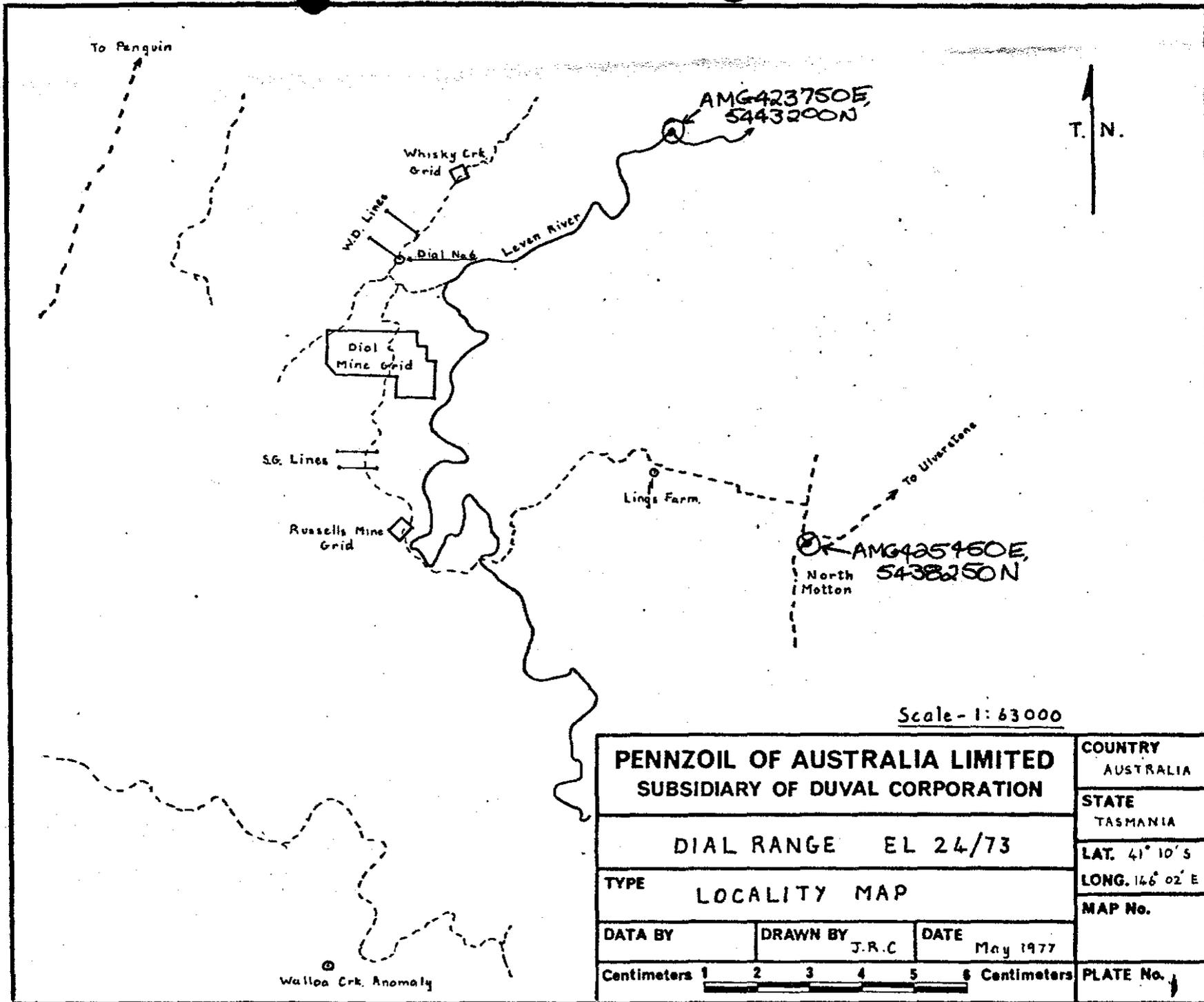
T.B. Scott
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AMG REFERENCE POINTS ADDED

16 May, 1977

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311003

5 cm

Scale - 1:63000

PENNZOIL OF AUSTRALIA LIMITED			COUNTRY
SUBSIDIARY OF DUVAL CORPORATION			AUSTRALIA
DIAL RANGE EL 24/73			STATE
TYPE LOCALITY MAP			TASMANIA
DATA BY			LAT. 41° 10' S
DRAWN BY J.R.C.			LONG. 146° 02' E
DATE May 1977			MAP No.
Centimeters 1 2 3 4 5 6 Centimeters			PLATE No.

INTRODUCTION

This report covers exploration carried out on the Dial Range Project area between the period November, 1976 and April, 1977.

During this period follow-up geochemical work was carried out on several outlying targets generated in our earlier reconnaissance program. Detailed geophysical work and subsequent diamond drilling was completed on the Dial Mine Grid and its immediate environment. The following report summarises the results of this work and recommends a future program to either discover any economic mineralization or eliminate the area as a potential target.

SUMMARY OF PROGRAM

Geochemical/Geological

Line cutting, soil sampling and geological mapping was carried out over the Walloa Creek and Russells Mine anomalies and within the Dial Mine Grid environment. A total of 183 soil samples were collected and assayed for Cu, Pb, Zn.

Geophysics

Magnetic Induced Polarization (M.I.P.) surveys were carried out by Scintrex over 18 lines in the Dial Mine Grid environment and other target areas.

Drilling

Four diamond drill holes, totalling 683.60 metres were drilled by Longyear of Australia using a Longyear 38 rig.

PROGRAM1. Geochemical

1.1. Russells Mine Grid. (Refer Map No. 40245)

Russells Mine consists of 2 adits (only one located) driven horizontally into the bank of Hardstaff Creek approximately 2kms south of the Dial Mine Grid. Minor pyrite and chalcopyrite is reported to have been encountered in a 50cm wide "fissure".

In response to anomalous copper and lead results obtained from rock chip and soil samples collected near the mine during the 1975/76 reconnaissance program, a small three line grid was cut and soil sampled.

A weak copper soil anomaly with associated anomalous lead and zinc values was defined. Peak values of 170ppm Cu, 135ppm Pb and 164ppm Zn are associated with ferruginous sedimentary rocks occurring up-slope from the adit entrance. These results are considered of no significance. As evidence for any significant mineralization is lacking, no further work is planned.

1.2. Walloa Creek Anomaly. (Refer Map No. 40244)

The 1975/76 reconnaissance program located a copper soil anomaly over the Ordovician/Cambrian boundary in the vicinity of the Walloa Creek/Adit Creek junction in the southern portion of the exploration licence.

A further three lines were soil sampled to test the anomaly along strike. The results were non definitive and partly reflect the variable soil profile conditions. High copper values were encountered but these did not reach the previously recorded high of 680ppm. There is, however, an anomalous zone trending away from the Ordovician contact into the Cambrian sequence. Highest copper values were obtained from the conglomerates at the junction of the geochemical trend and the geological contact.

Cambrian rocks consist of volcanics and sedimentary rocks overlain unconformably by Ordovician quartz conglomerate. The conglomerates appear to occur as outliers controlled by a possible south west plunging syncline, faulted off to the south east.

No follow-up program has as yet been planned for this area, but further work is recommended.

2. Geophysical - M.I.P. Survey

A total program of some 18 lines, generally 500 metres long, of M.I.P. traversing was carried out by Scintrex Pty. Ltd. between the 6th and 21st of January, 1977. The program was mainly centred on the Dial Mine Grid, but limited traverses were carried out at other localities, namely:

Whiskey Creek approximately 1km north of the Dial Mine Grid.

Reconnaissance lines to the south of the grid (2), around 500 to 700 metres and to the north of the grid (4) between 200 and 800 metres.

Lings Farm, a locality some 3kms east south east of the grid and across the Leven River.

Each of these areas will be discussed in turn. It is, however, worth recording at this point the summary by Scintrex of their report on the Dial M.I.P. program.

"A magnetic induced polarization survey executed in the Dial Range area has revealed a number of induced polarization responses that are considered to be highly significant and worthy of detailed ground follow-up. The impression at the Dial Mine area is of limited strike length segregations of coarse grained sulphides (or graphite) within a disseminated halo, while at the WD Grid and SG Grids, substantial induced polarization responses require detailed exploration. Other areas surveyed showed anomalies of lesser amplitude."

WD and SG Grids refer to work north and south of the Dial Mine Grid.

2.1. Dial Mine Grid. (Refer Map No. 40246)

M.I.P. traverses were carried out over the major portion of the grid. The technique was applied in an endeavour to resolve some of the ambiguities experienced from the earlier gradient array I.P. survey carried out over the grid. This survey had indicated a broad zone of high chargeability containing units of even higher chargeability. It was hoped that the M.I.P. would indicate which of the units of higher chargeability is of the most significance. Only the zones of greatest significance are discussed here. Reference is made to the accompanying plan showing composite data of M.I.P., gradient array and any other pertinent data.

A trend of significant M.I.P. chargeability anomalies occurs on lines 2200N, 2300N and 2400N between 1100E and 1200E. Gradient array I.P. was not run over this trend so no correlation is possible. An open soil geochemical trend with a peak copper value of 410ppm occurs to the south and slightly offset from the geophysical trend. This anomaly, although significant, is regarded as a low priority target and has not as yet been tested.

A second trend of M.I.P. anomalies occurs along the course of Revells Creek on lines 2400N, 2300N and 2200N with a possible continuation to lines 2095N and 2000N around 1400E - 1500E. This trend on 2200N corresponds with a gradient array chargeability peak, a Turam conductor axis and a pole dipole anomaly from the previous survey. This composite anomaly constituted the target for drill holes 2 and 5. (Refer 3.3).

The geophysical response from the gossanous pyroclastic hill which forms the central feature of the Dial Mine Grid is interesting. The gradient survey showed a high chargeable response right across the hill within which were bands of higher chargeability. A single line,

pole dipole traverse across the hill showed no response indicating a depth of weathering greater than the penetration of the method, (n=2=50 metres). The M.I.P. also showed a nil to very weak chargeable response. So again geophysics gave an ambiguous answer to the composition of the rocks below this significant geological and geochemical anomaly. The hill therefore constituted a drill target for holes 1 and 3. (Refer 3.1.).

The last significant geophysical response occurs on the eastern side of the grid around 2000E between lines 2300N and 2000N and possibly continuing both to the north and south. It is dominantly a gradient array trend with supportive M.I.P. and pole dipole anomalies. On line 2200N the composite gradient and pole dipole anomaly around 1950E was drilled in hole 4. To the south on line 2095N the composite gradient and M.I.P. anomaly at 2000E occurs approximately 25 metres west of the Dial Mine adit.

On the basis of the geophysical data three of the above trends have been drill tested.

2.2. Whiskey Creek Grid

Previous geochemical/geophysical work on the Whiskey Creek Grid was inconclusive (1975 Annual Report) and two lines were surveyed with M.I.P.

One broad weak chargeability response was obtained. This was possibly caused by pyritic black shale which outcrops in Whiskey Creek.

No significant results were obtained over the Lobster Creek Keratophyre/Cateena contact where a small Pb, Zn anomalous gossan outcrops. This mineralization is thus considered only localized.

2.3. Between Dial Mine Grid and Whiskey Creek - (Lines WD 500 and WD 800)

Two lines were cut to facilitate reconnaissance M.I.P. traverses over scree covered areas between the Dial Mine Grid and Whiskey Creek Grid. The discovery of gossanous mullock from an old prospecting shaft on WD 500 led to geochemical sampling of the lines. No base metal anomalies were encountered.

The M.I.P. however, gave substantial chargeability responses (maximum - 4 milligamma/gamma) on both lines. A sharp increase in conductivity immediately east of the anomaly was inferred to indicate the contact between the Lobster Creek Keratophyre and the Cateena formation. The anomaly on line WD 500 was subsequently drill tested. (Refer 3.4.).

2.4. North of Dial Mine Grid (Lines NG 200 and NG 300)

Two lines 200 and 300 metres respectively north of the Dial Mine Grid covered outcropping brecciated gossan, coarse pyroclastics and gossanous siltstone/shale. Rock chip and soil sampling showed no base metal anomalies.

There is poor correlation between the M.I.P. profiles of the two lines. No significant response was obtained but a narrow - 4 milligamma/gamma peak on NG 300 at 50E does occur 25m to the east of the outcropping brecciated gossan.

The combination of poor geochemistry and moderate M.I.P. response makes this a low priority area.

2.5. South of Dial Mine Grid (Lines SG 500 and SG 700)

Two lines 500 and 700 metres respectively south of the Dial Mine Grid gave irregular weakly anomalous soil geochemical results with isolated highs of 220ppm Cu and Pb and 248ppm Zn. Lithologies observed are sedimentary and tuffaceous and include minor weakly gossanous agglomeratic tuffs.

A significant, 4 to 5 milligamma/gamma M.I.P. response was recorded on the eastern portion of line SG 700, inferring a series of 4 small separate shallow sources. Although incomplete, this pattern is also recognised on SG 500.

Poor correlation of geological and geochemical evidence fails to enhance this substantial geophysical anomaly.

2.6. Lings Farm.

On Lings Farm there are two areas, 500 metres apart, of base metal rock chip anomalism, with the intervening area covered by Tertiary basalts. Country rock lithologies are similar at both localities and one gossan sample from an old prospecting pit assayed 5000ppm Pb and 5200ppm Zn. M.I.P. was considered the most suitable prospecting method to test for a substantial sulphide body connecting the two areas beneath the basalt cover.

Two lines 150 metres apart were surveyed. The induced polarization response was modified by a surficial conductive layer which could be the effect of the basalt and pre basalt land surface. A 3 milligamma/gamma chargeability response was recorded but is not considered sufficient to warrant drill testing.

3. Diamond Drilling

The result of the drilling program at Dial has been somewhat disappointing in not determining the presence of economic sulphides. It has, however, eliminated a target area which had attracted a lot of our attention and indicated a potential environment which had hitherto been regarded as of lesser merit. This problem, of just where we are focusing our attention, is dominantly a function of the poor geological control at Dial due to soil, scree and vegetation cover.

The program of drilling has again mainly been restricted to the Dial Mine Grid and its environment. Four holes were drilled in the program for a total metreage of 683.60 metres. This program brings the total number of holes drilled at Dial to six and a total aggregate metreage of 944.61 metres.

3.1. Dial Range No. 3. 2100N, 1752W. Total depth 205.00 metres. (Refer to Drill Section Plan 2100N, No. 40207).

The hole was designed to test the same target as that drilled in Dial Range No. 1, but within the zone of primary sulphide rather than the completely oxidised section encountered to 85 metres in hole 1.

The hole encountered a mixed sedimentary/tuffaceous sequence. Oxidation extends to a depth of 80.50 metres (drilled depth) above which the rocks are strongly leached, weathered and argillized. As in hole 1 mineralized agglomerates were again intersected in the oxidation zone. Pyritic agglomerates were however encountered immediately below the water table where supergene chalcocite enrichment occurs. Three broad lithological divisions are recognised in the hole.

0 to 33.80m. Argillized fine grained sedimentary rocks predominate over minor tuffaceous horizons.

33.80 to 87.70m. A tuffaceous sequence with minor sedimentary rocks. Coarse massive sulphided agglomerates, mostly leached, predominate and incorporate a 1.45 metres intercept of massive gossan at 43 metres. Geochemical values from the leached agglomerates are comparable to those of hole 1 with 2400ppm Cu obtained from the massive gossan. Estimated original sulphide content of the agglomerates is variable but is generally in excess of 5%.

Near the limit of oxidation chalcocite occurs in leached and pyritic agglomerates and includes a zone of 1.29% Cu over 2.15 metres at around 81 metres.

89.70 to 205.00m. This section is characterized by a mixture of fine to coarse grained sedimentary rocks, coarse lithic tuffs and white felspathic crystal tuff. Pyrite content is sparse and with arsenopyrite and chalcopyrite occur in quartz veins, in localized coarse lithic tuffs and along coarser grained layers in sedimentary rocks.

The fine grained sandstone/siltstone shows slumped bedding, and occasional graded bedding indicates an upward younging of the sequence. This lithotype is fairly distinctive and is also recognised in holes 1, 2 and 5.

The white crystal tuff is a similarly distinctive rock, occurring also in holes 2 and 5, and possibly hole 1. Contacts of the crystal tuff are generally gradational into lithic tuffs and coarse sandstone.

No direct lithological correlations can be made between holes 1 and 3, which suggests that rapid facies changes have taken place in the environment. Broad correlations however indicate the rocks have a shallow apparent dip along section 2095N.

The intersection of pyritic agglomerates below the oxidation level has shown that these rocks contain minimal primary base metal mineralization. Also, the nature of the sedimentary rocks and indication of rapid facies changes suggest an unstable environment of deposition unsuitable for the accumulation of large or extensive massive sulphide deposits.

3.2. Dial Range No. 4. 2200N, 2025E. Total depth 133.60 metres.
(Refer to Drill Section Plan 2200N, No. 48164)

The hole was designed to test a strong geophysical trend (gradient array, pole dipole and M.I.P.) in the vicinity of the old Dial Mine adit and adjacent workings.

The geological section encountered in this hole was very interesting, consisting of a mixed sequence of thinly laminated siltstone/shales and tuffs including a chalcopyrite bearing, pyritic cherty tuff.

Soft grey agglomeratic tuffs predominate to a depth of 53.25 metres. Below this, thinly laminated siltstone/shale occurs to a depth of 113.00 metres. These are carbonaceous in part and contain ubiquitous disseminated and vein pyrite. The bedding is evenly laminated and no other sedimentary structures are evident. Deposition was obviously in a quiescent, low energy environment, very different to that envisaged for holes 1, 2, 3 and 5.

Between 113.00 to 118.00m a porous pyritic cherty tuff was intersected with a sulphide content averaging 30% to 40%. Base metal mineralization comprises spotty chalcopyrite and the zone averages 0.37% Cu over the 5 metre intersection.

The rest of the hole contains a sequence of partly pyritic cherty tuffs, tuffaceous agglomerates and some quartz eye rhyolitic tuff. The hole was stopped due to bad drilling conditions and poor core recovery.

The massive pyritic section with weak disseminated chalcopyrite in close association with the underlying cherty? tuffite and quartz eye rhyolite plus the presence of overlying black shales make this the most interesting environment yet encountered on the Dial prospect.

3.3. Dial Range No. 5. 2200N, 1500E. Total depth 160.60 metres.
(Refer to Drill Section Plan 2200N, No. 40208)

The hole was designed to test a strong geophysical trend along the course of Revells Creek and to intersect the unoxidised geological section encountered in hole 2. The hole encountered terrible ground conditions and caved on the rod string when the hole was at 129.60 metres causing the loss of the hole and 50 metres of rods. The hole was deflected at 67.50 metres and re-drilled to a total depth of 160.60 metres where it was stopped short of the geophysical target.

The section intersected consists of a sedimentary/tuffaceous sequence and the three broad lithological zones recognised in hole 3 also appear to apply to this hole. Total oxidation extends to a depth of 75.30 metres and there is partial oxidation to a depth of 122.40 metres. Minor supergene chalcocite occurs between these two levels.

0 to 36.50 metres. Argillized sedimentary rocks predominate but coarse agglomerates occur in a minor tuffaceous horizon.

36.50 to 126.60 metres. A tuffaceous section with prominent coarse gossanous or pyritic agglomerates. Most are leached but a 2.20 metre pyritic section at 96 metres contains chalcocite and assayed 0.67% Cu. This pyritic section (10-20% py) would be the cause of the Turam anomaly centred at 1430E.

A high pyrite content (10-15%) is also contained in fine grained tuffs (tuffites?) from 116.50 to 119.60 metres.

126.60 to 160.60 metres. Mixed tuffs and sedimentary rocks of this section comprise coarse lithic sandstone, fine grained sandstone/siltstone, coarse lithic tuffs and white felspathic crystal tuffs. These rocks all compare with those in the lower portions of hole 1, 2 and 3. Graded bedding in the fine grained sandstone indicates upward younging of the sequence.

A re-evaluation of hole 2 has been made in the light of the unoxidised section obtained in hole 5 and some correlation can be made between the two. The fault contact between the volcanoclastic section and sediments in hole 2 is now considered not to be present, and rocks occurring towards the bottom of hole 5 correlate broadly with rocks around the volcanoclastic/sediment contact in hole 2. Specific correlations also appear possible.

As hole 5 never reached the geophysical target a definite answer to its origin has not been obtained. However, we believe that if the fault contact does not exist and the correlation between holes 2 and 5 is correct, then the source must have been tested in hole 2 and therefore lies within the low pyrite content sedimentary rocks. On the face of it the sedimentary rocks do not appear to contain enough sulphide to cause the significant anomaly we see. Scintrex, after evaluating the data, do not believe the anomaly source has been found.

An explanation, however, may lie in the effects of differential weathering of the highly reactive volcanoclastic assemblage and the less reactive sedimentary rocks causing the low pyrite sediments to occur close to the surface adjacent to the deeply weathered and therefore nil pyrite volcanoclastics. The net effect being a reversal of the pattern one would expect from the geology. The effect is also compounded due to topography where the sediments occur in the valley and therefore closer to surface due to erosion whilst the volcanoclastics occur on the valley slopes under greater surface cover. Scintrex regards this model as a possible explanation, but unlikely.

A possible generalized lithological correlation with hole 3 can also be recognised where the lower sedimentary/tuffaceous section was drilled for 115 metres without intersecting significant sulphide.

3.4. Dial Range No. 6. (Refer to Drill Section Plan WD 500. No. 48166)

Located approximately 500 metres north of the grid and 40 metres east of origin on reconnaissance line WD 500. Total depth 184.50 metres. The hole was designed to test a strong M.I.P. chargeability anomaly along the contact of the Lobster Creek Keratophyre with an associated small gossanous agglomerate occurrence on a small shaft dump. Lack of geological control was a problem in selecting a drill site.

The hole intersected Lobster Creek Keratophyre to a depth of 155.20 metres where there was a sharp change to argillized rocks of the Cateena formation. The keratophyre is a mineralogically homogenous, porphyritic, acid to intermediate rock. Typically it contains amphibole phenocrysts and segregations and feldspar phenocrysts and occasional monolithologic xenoliths. Textural variations occur towards the contact and a chill margin is present, grading into an auto breccia zone right at the contact.

From 155.20 to 184.50 metres is a mixed tuffaceous/sedimentary sequence containing disseminated pyrite. The tuffs are bedded, partly agglomeratic and have a high clay (ash) matrix content. These are dissimilar to the hard coarse massive agglomerates encountered in holes 1, 2, 3 and 5. Pyritic content, especially near the contact, is up to 5%. Included in the tuffs is a minor zone of siliceous quartz eye tuff.

The sedimentary sequence is fine grained and partly carbonaceous/calcareous. These are the first Cambrian carbonate rocks encountered in our Dial Range investigations. Bedding is extensively disrupted and fragmented by pressure solution and possible gravitational loading. Fine grained pyrite occurs mainly within the thin carbonaceous layers.

No base metal mineralization was encountered in the hole.

Although the sequence of volcanoclastics intersected contained a fairly low pyrite content to around an average 2 - 3%, in contrast to the adjoining Lobster Creek Keratophyre which has only trace pyrite, sufficient sulphide was intersected to explain the M.I.P. anomaly.

It was hoped that this hole would help explain the stratigraphic relationship between the Lobster Creek Keratophyre and the Cateena Formation. Observations from the drilled contact include:-

- 1) The contact is sharp and strongly discordant to bedding within the Cateena Formation.
- 2) The lithic tuffs do not contain Lobster Creek Keratophyre fragments.
- 3) There is no strong thermal alteration of the Cateena rocks.
- 4) The actual contact consists of puggy clay with siltstone fragments indicating possible tectonic movements.
- 5) The keratophyre at the contact show auto brecciation.
- 6) The keratophyre chill margin extends to 3 metres.

The debate therefore continues as to whether the keratophyre is a viscous extrusive related to the volcanism evident in Dial Grid environment, or a subsequent intrusion.

CONCLUSIONS

The extensive occurrence of gossanous pyroclastics on the Dial Mine Grid has been eliminated as a potential environment for economic sulphide accumulations. Drilling has shown that the environment is a large pyritised volcanoclastic/sediment sequence probably near a vent but too unstable to allow accumulation of an extensive sulphide body.

The geological sequence encountered in drill hole 4 indicated the presence of a very favourable environment for economic sulphides. The intersection of five metres of very heavy pyrite with weak chalcopyrite in close association with acid cherty rocks and quartz eye rhyolite tuff and overlain by black shales is highly encouraging.

Target areas like Whiskey Creek, Russells Mine and Lings Farm have been eliminated after geochemical or geophysical examination.

RECOMMENDATIONS

With the prospective area at Dial being reduced to the environment around hole 4 and the adjacent old Dial Mine adit, a relatively limited program of exploration is recommended. This program is as follows.

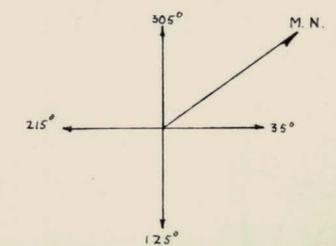
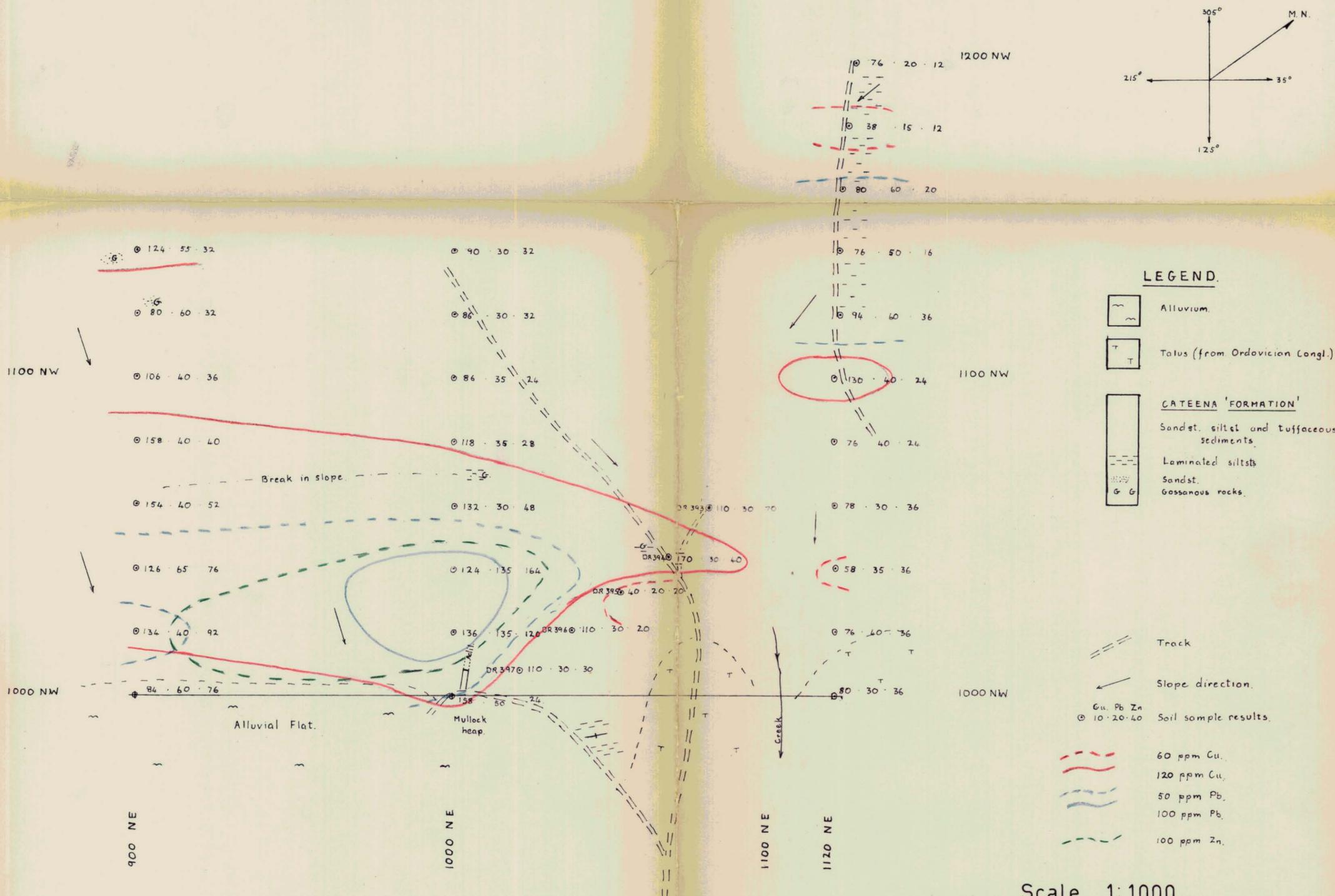
- a) An M.I.P. program utilising the already emplaced electrode in hole 4 to trace the strike of the favourable sequence. The program would not be as extensive as our previous effort and would probably only involve some 2km of traversing on 5 or 6 lines. It is also recommended that pole dipole be run over the same lines as it has shown itself effective in delineating the target drilled in hole 4. The method is cheap and fast and would not overly increase the cost of the program.
- b) Two diamond drill holes totalling around 300 metres are recommended as the minimum requirement to test the environment should the geophysics show suitable targets.
- c) A rough estimate of the cost of completion of the above is:-

a) Geophysics	\$ 5,000
b) Drilling 300m x \$60	18,000
	<hr/>
	\$23,000
Overhead 20%	4,600
	<hr/>
	\$27,600
	<hr/>

311015

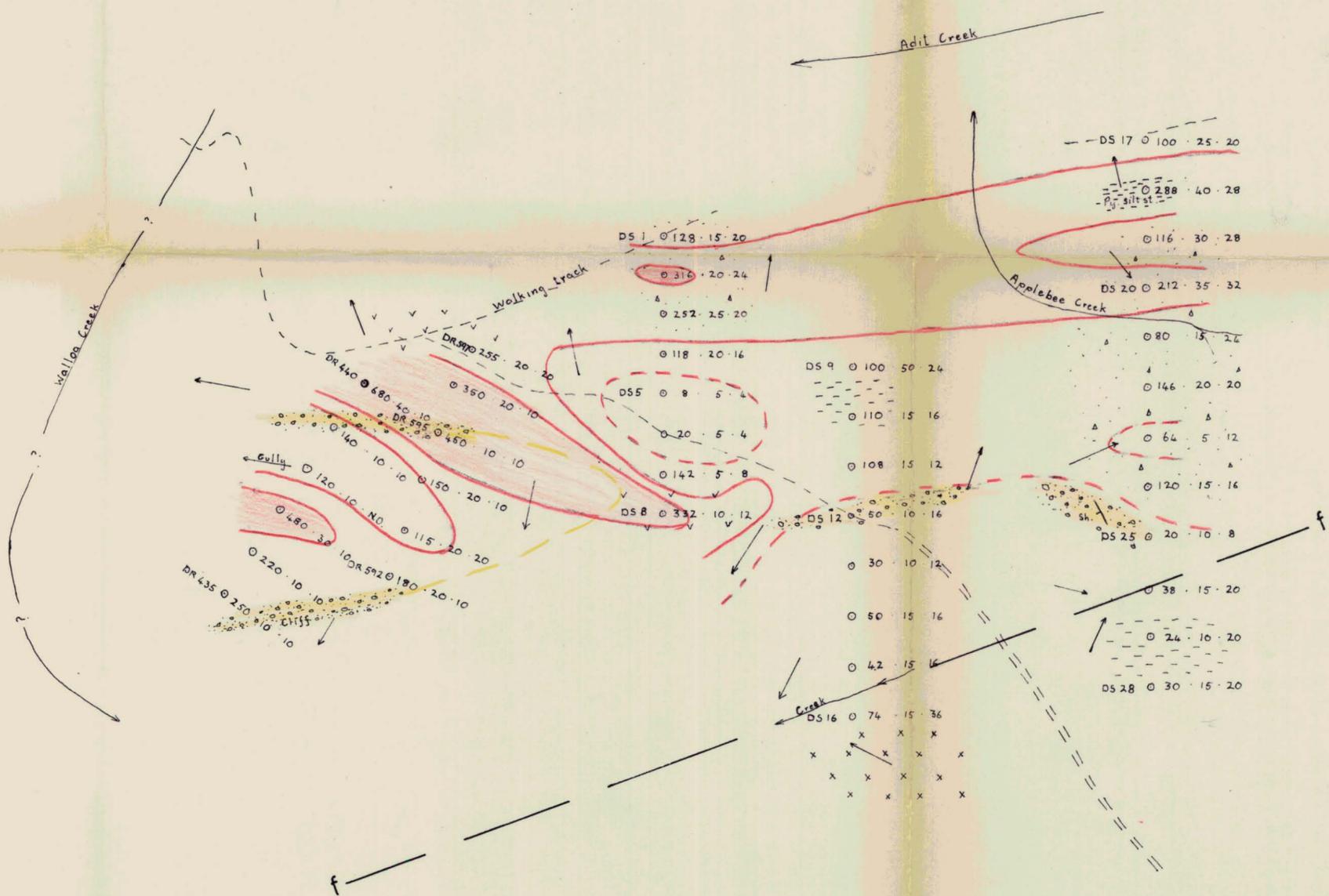
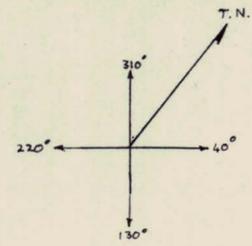
LIST OF PLANS

1. DIAL RANGE EL 24/73 LOCALITY MAP.
2. RUSSELLS MINE GRID (MAP NO. 40245)
3. WALLOA CREEK ANOMALY (MAP NO. 40244)
4. DIAL MINE GRID (MAP NO. 40246)
5. DRILL SECTION PLAN 2100N (MAP NO. 40207)
6. DRILL SECTION PLAN 2200N (MAP NO. 48164).
7. DRILL SECTION PLAN 2200N (MAP NO. 40208)
8. DRILL SECTION PLAN WD 500 (MAP NO. 48166)



267

PENNZOIL OF AUSTRALIA LIMITED			COUNTRY.
SUBSIDIARY OF DUVAL CORPORATION			AUSTRALIA
Dial - Russels Mine Grid			STATE.
			TASMANIA
TYPE			LATITUDE. 41° 12'
Surface features / Geochem.			LONGITUDE. 146° 3'
DATA BY J.R.C.	DRAWN BY J.R.C.	DATE Nov. 1976.	MAP No.
			40245
Centimeters 1	2	3	4
5	6	7	8
9	Centimeters		PLATE No. 2



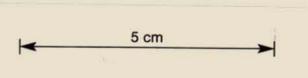
Legend

- Quartz rich conglomerate - ORDOVICIAN
- Quartz poor conglomerate and coarse sandstone
- Fine grained sediments - CAMBRIAN
- Weathered volcanics/tuffs?
- Porph. keratophyre

- Cu, Pb, Zn (ppm) Soil samples
- Slope direction
- Track
- Road

- 75 ppm Cu.
- 150 ppm Cu.
- 300 ppm Cu.

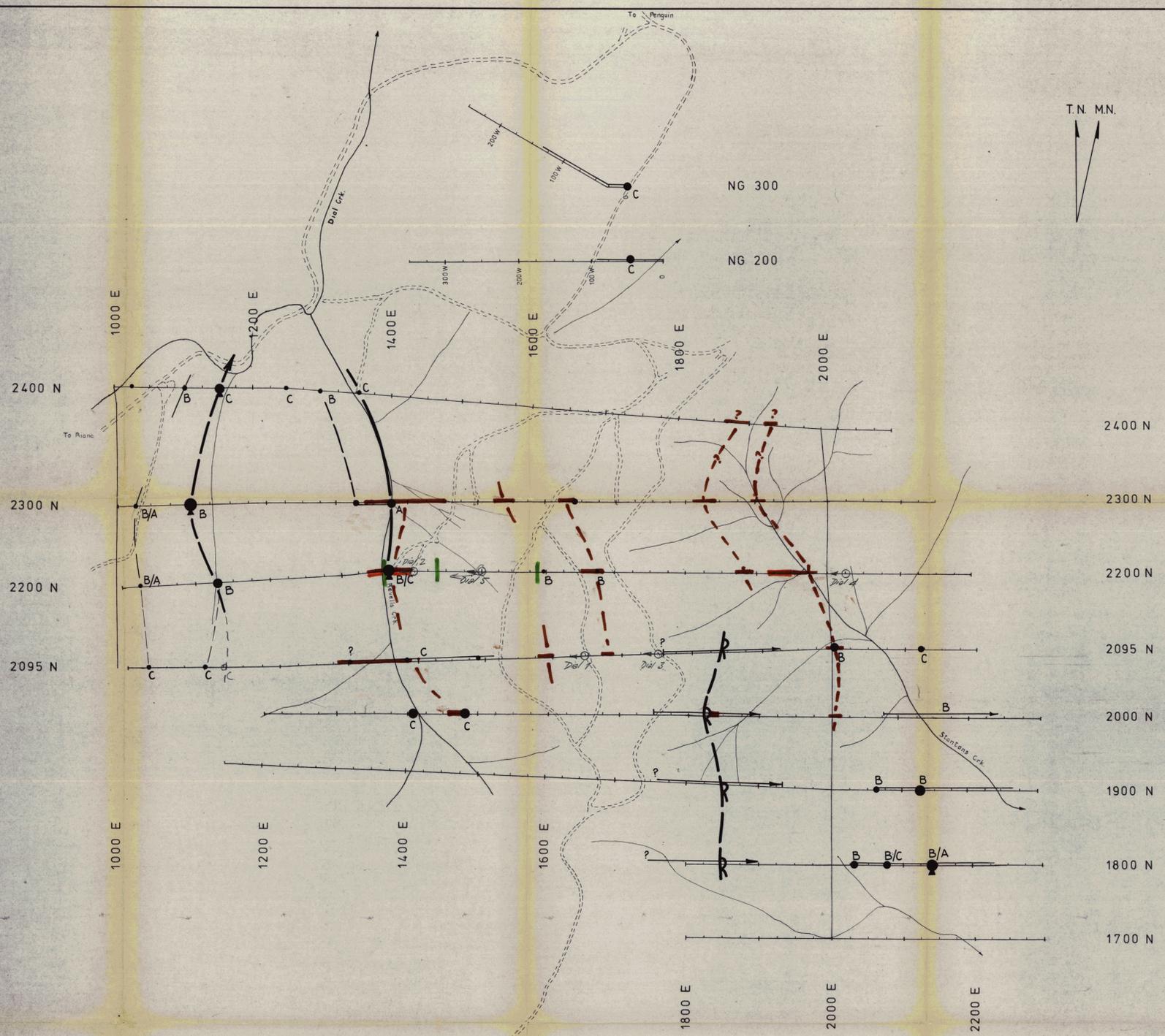
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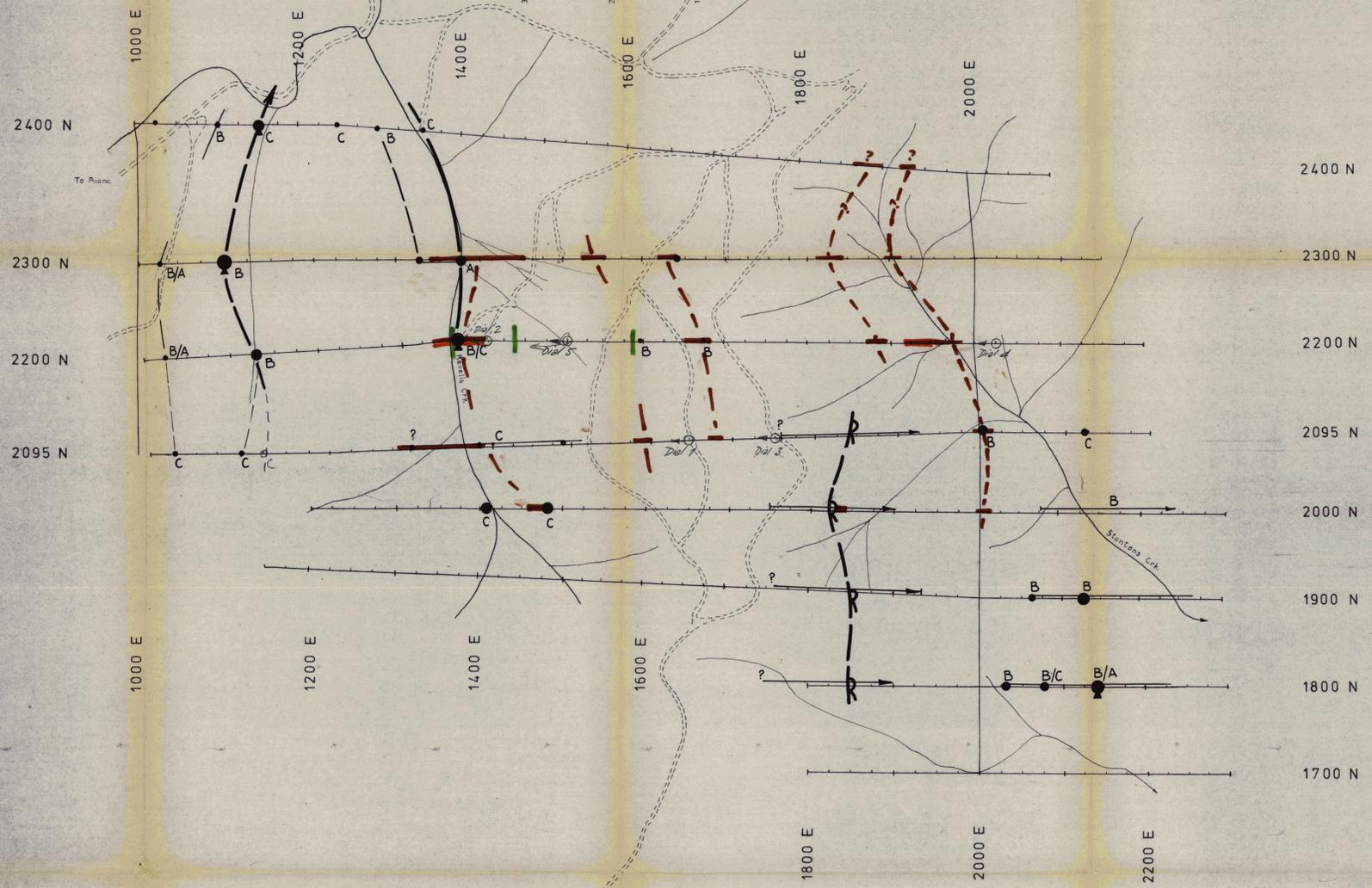
77-1213

PENNZOIL OF AUSTRALIA LIMITED			COUNTRY.
SUBSIDIARY OF DUVAL CORPORATION			Australia
Dial - Wallog Crk. Anomaly			STATE.
Surface features / Geochem			Tasmania
TYPE			LATITUDE. 41° 15'
DATA BY J.R.C. DRAWN BY J.R.C. DATE Nov. 76			LONGITUDE. 146° 03'
Centimeters 1 2 3 4 5 6 7 8 9 Centimeters			MAP No.
			40,244
			PLATE No. 3



T.N. M.N.

NG 300
NG 200



LEGEND

- Major change in rock type
- Minor internal polarization response
- Moderate " " "
- Major " " "
- Broad zones of " " "
- Anomaly type - host resistive with respect to enclosing rocks
- A " " " no contrast " " " "
- B " " " " " " " " " " " "
- C " " " " " " " " " " " "
- Gradient Array Anomaly
- Pole-Dipole Anomaly
- Tuzam conductor Axis

CREEKS ACCESS TRACKS

311018
SCALE 1:2500

5 cm

77-1213

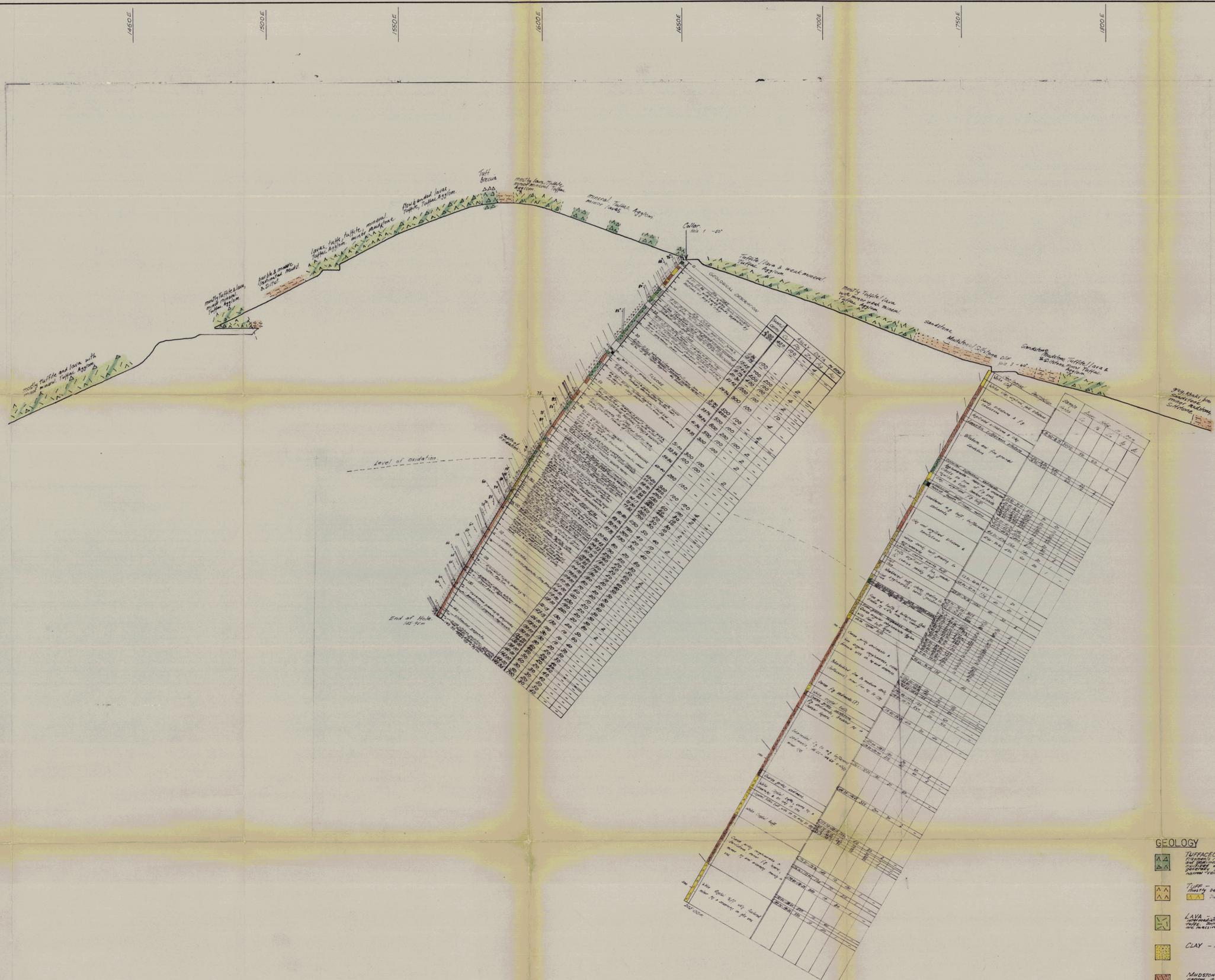
PENNZOIL OF AUSTRALIA LIMITED
SUBSIDIARY OF DUVAL CORPORATION

DIAL RANGE EL 24/73

M.I.P SURVEY

Surveyed & Compiled by SCINTREX Pty. Ltd.

COUNTRY AUSTRALIA
STATE TASMANIA
LATITUDE 44° 10' S
LONGITUDE 144° 01' E
MAP No. 2
LOT 2, 4, 6

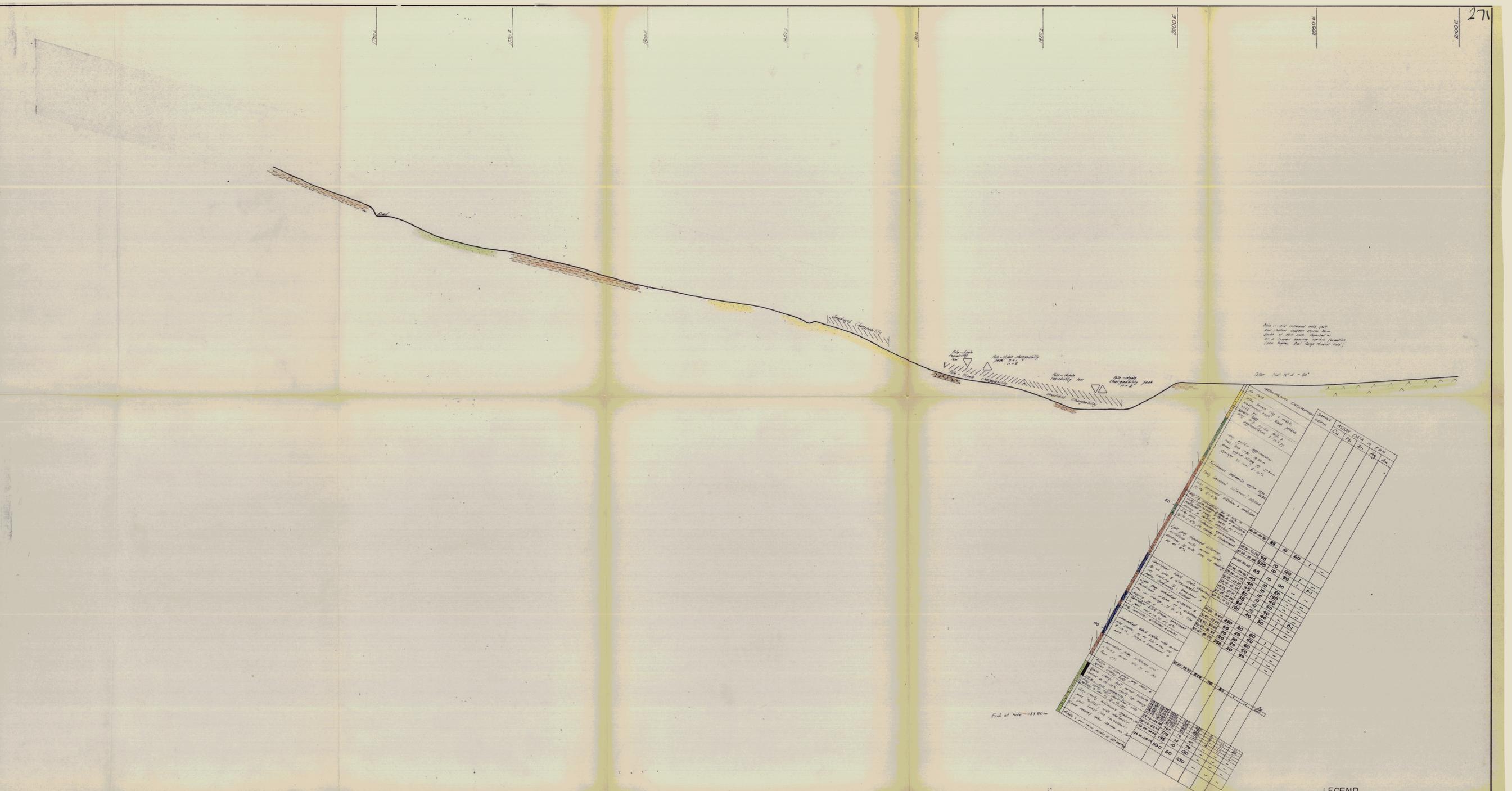


LEGEND

- GEOLOGY**
- TUFFACEOUS AGGLOMERATE - coarsely fragmental with small rock fragments in a siliceous tuffaceous matrix. Usually friable when fresh, but becomes more massive and more resistant to weathering when weathered. Contains small fragments of lava, tuffite, and tuffaceous agglomerate.
 - TUFF - Includes thin tuff, lapilli tuff and ash tuff. Mostly dense, some massive. Contains small fragments of lava, tuffite, and tuffaceous agglomerate.
 - LAVA - Includes siliceous and basaltic (in the ground) tuffite, minor tuffite. Fine grained, dense, crystalline tuffite and tuffaceous matrix. Usually massive, but may be fragmental when weathered. Contains small fragments of lava, tuffite, and tuffaceous agglomerate.
 - CLAY - mostly after decomposed tuffite and lava.
 - MUDSTONE / SILTSTONE - Laminated mudstone and siltstone with massive, crystalline, or sandy mudstone. Contains small fragments of lava, tuffite, and tuffaceous agglomerate.
 - Laminated Black Slate, sometimes py as bands also cross-cutting veins, prominent in parts with lateral fragments.
 - Coarse sandstone, greenish, yellow, conglomerate and shaly breccia. Traces of pyrite in sand but as disseminated in sandstone.
- MINERALISATION**
- Massive Sulphide (Massive goethite)
 - 1-10% Sulphide (Strongly limonitic goethite)
 - <1% Sulphide (Nearly limonitic)

Scale 1cm = 5m
 0m
 311019 77-1213

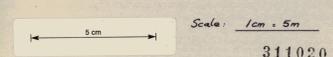
PENNZOIL OF AUSTRALIA LIMITED SUBSIDIARY OF DUVAL CORPORATION		COUNTRY Australia
EL. 24/73 DIAL RANGE		STATE Tasmania
DRILL LOG - DIAL RANGE Nos 1, 3 ON SECTION 2100N		LATITUDE 41° 03'
DATA BY JMB	DRAWN BY JMB	DATE 15-5-75
Centimeters 1 2 3 4 5 6 7 8 9 10		Centimeters 1 2 3 4 5 6 7 8 9 10
inches 1 2 3 4 5 6 7 8 9 10		Centimeters 1 2 3 4 5 6 7 8 9 10
inches 1 2 3 4 5 6 7 8 9 10		Centimeters 1 2 3 4 5 6 7 8 9 10
MAP No. 40,207		PLATE No. 5



No. of Assay	ASSAY DATA IN PERCENT		
	Cu	Pb	Zn
1	0.5	0.1	0.2
2	0.8	0.2	0.3
3	1.2	0.3	0.4
4	1.5	0.4	0.5
5	1.8	0.5	0.6
6	2.1	0.6	0.7
7	2.4	0.7	0.8
8	2.7	0.8	0.9
9	3.0	0.9	1.0
10	3.3	1.0	1.1
11	3.6	1.1	1.2
12	3.9	1.2	1.3
13	4.2	1.3	1.4
14	4.5	1.4	1.5
15	4.8	1.5	1.6
16	5.1	1.6	1.7
17	5.4	1.7	1.8
18	5.7	1.8	1.9
19	6.0	1.9	2.0
20	6.3	2.0	2.1
21	6.6	2.1	2.2
22	6.9	2.2	2.3
23	7.2	2.3	2.4
24	7.5	2.4	2.5
25	7.8	2.5	2.6
26	8.1	2.6	2.7
27	8.4	2.7	2.8
28	8.7	2.8	2.9
29	9.0	2.9	3.0
30	9.3	3.0	3.1
31	9.6	3.1	3.2
32	9.9	3.2	3.3
33	10.2	3.3	3.4
34	10.5	3.4	3.5
35	10.8	3.5	3.6
36	11.1	3.6	3.7
37	11.4	3.7	3.8
38	11.7	3.8	3.9
39	12.0	3.9	4.0
40	12.3	4.0	4.1
41	12.6	4.1	4.2
42	12.9	4.2	4.3
43	13.2	4.3	4.4
44	13.5	4.4	4.5
45	13.8	4.5	4.6
46	14.1	4.6	4.7
47	14.4	4.7	4.8
48	14.7	4.8	4.9
49	15.0	4.9	5.0
50	15.3	5.0	5.1
51	15.6	5.1	5.2
52	15.9	5.2	5.3
53	16.2	5.3	5.4
54	16.5	5.4	5.5
55	16.8	5.5	5.6
56	17.1	5.6	5.7
57	17.4	5.7	5.8
58	17.7	5.8	5.9
59	18.0	5.9	6.0
60	18.3	6.0	6.1
61	18.6	6.1	6.2
62	18.9	6.2	6.3
63	19.2	6.3	6.4
64	19.5	6.4	6.5
65	19.8	6.5	6.6
66	20.1	6.6	6.7
67	20.4	6.7	6.8
68	20.7	6.8	6.9
69	21.0	6.9	7.0
70	21.3	7.0	7.1
71	21.6	7.1	7.2
72	21.9	7.2	7.3
73	22.2	7.3	7.4
74	22.5	7.4	7.5
75	22.8	7.5	7.6
76	23.1	7.6	7.7
77	23.4	7.7	7.8
78	23.7	7.8	7.9
79	24.0	7.9	8.0
80	24.3	8.0	8.1
81	24.6	8.1	8.2
82	24.9	8.2	8.3
83	25.2	8.3	8.4
84	25.5	8.4	8.5
85	25.8	8.5	8.6
86	26.1	8.6	8.7
87	26.4	8.7	8.8
88	26.7	8.8	8.9
89	27.0	8.9	9.0
90	27.3	9.0	9.1
91	27.6	9.1	9.2
92	27.9	9.2	9.3
93	28.2	9.3	9.4
94	28.5	9.4	9.5
95	28.8	9.5	9.6
96	29.1	9.6	9.7
97	29.4	9.7	9.8
98	29.7	9.8	9.9
99	30.0	9.9	10.0

LEGEND

- GEOLOGY**
- TERTIARY AGGLOMERATE - Coarsely fragmental with pebbles and fragments of quartz, feldspar, mica, etc. Matrix is a fine-grained sandstone, some of which is highly siliceous and contains small amounts of sulphide.
 - TUFF - Includes tuff, lapilli tuff and ash tuff mostly basal, some massive.
 - LAVA - Includes siliceous acid lavas (fine grained) tuffic minor amounts of basaltic and andesitic lavas and a small amount of basaltic andesite. Some of the lavas are highly siliceous and contain small amounts of sulphide.
 - CLAY - mostly after decomposed tuffs and lavas.
 - MUDSTONE (SLTSTONE) - Laminated mudstone and siltstone with some intercalations of sandstone. Some narrow zones of coarse grained sandstone. Some contain small amounts of sulphide and thin bedded bedding plane sandstone. Some intercalations occur in sandy beds.
 - Laminated Black Slate, argillaceous or sandy also cross-cutting veins, associated in parts with mineral fragments.
 - Coarse sandstone, greyish, pebbly conglomerate and shaly breccia. Some of pebbles in veins and in discontinuities in sandstone.
- MINERALISATION**
- Massive Sulphide (Massive gossan)
 - 1-10% Sulphide (Strongly limonitic, gossanic)
 - <1% Sulphide (Weakly limonitic)



311020 77-12/3 271

PENNZOIL OF AUSTRALIA LIMITED SUBSIDIARY OF DUVAL CORPORATION		COUNTRY: Australia
EL24/73 DIAL RANGE		STATE: Tasmania
TYPE DRILL LOG - ON SECTION 2200N		LATITUDE: 42° 46' S
DATA BY T.S. JRC DRAWN BY J.P.S. DATE 31-3-77		LONGITUDE: 146° 50' E
Centimeters 1 2 3 4 5 6 7 8 9		MAP No. 48, 164
		PLATE No. 6

