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PROSPECT 7602

CSR LIMITED

MINERALS EXPLORATION AND DEVELOPMENT GROUP

RENEWAL REPORT - 1986

EXPLORATION LICENCE 15/76

DUNDAS, TASMANIA

EMR 108/86

VOLUME 1

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KEYWORDS

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GEOPHYSICS

DUNDAS

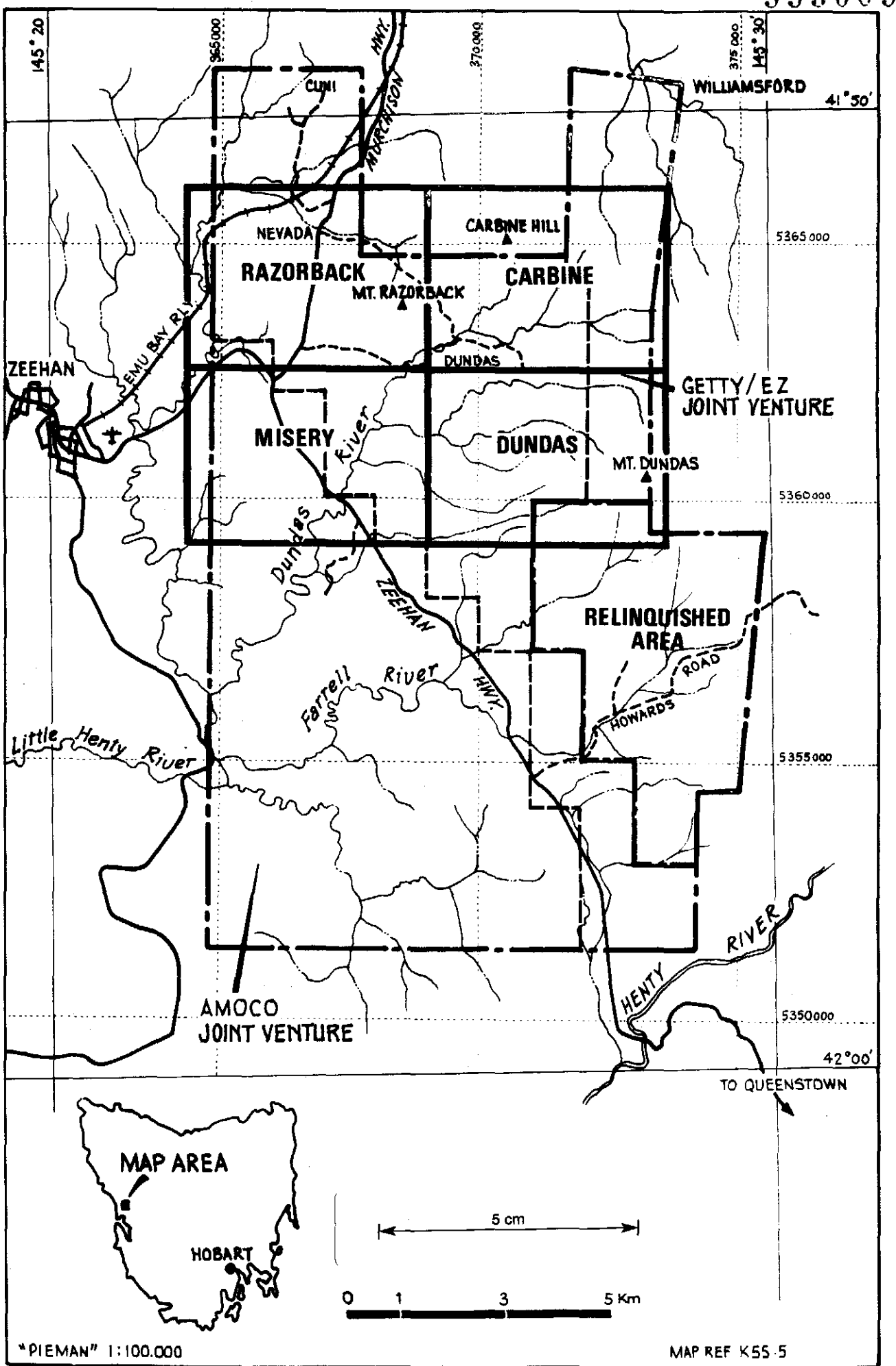

FIG. 1. LOCATION MAP E.L. 15/76 DUNDAS, TASMANIA

1. INTRODUCTION

Exploration Licence 15/76 (EL 15/76) was granted to CSR Limited on 2nd August, 1976. The Licence originally covered an area of 145 km^2 situated east of Zeehan on the west coast of Tasmania (Figure 1). It extends south from Melba Flats and Williamsford to the Henty River and west from Mt. Dundas to the Little Henty River.

This area contains small silver/lead/zinc deposits (Dundas), a small tin orebody (Mt. Razorback), small copper/nickel shows (Cuni/Lead Blocks), small complex lead/antimony-rich sulphides with minor Sn, Ag, Bi, W (Montezuma) and several minor lead/zinc/silver concentrations (Mariposa). There is also potential for silver/lead/zinc mineralisation with tin sulphides in the upper units of the Oonah Formation (Oonah-Mine type), copper/zinc/silver/tin associations in the acid volcanics of the Dundas Group, and Renison-style replacement tin deposits.

Prior to 1976, the area was intensely prospected by many companies and individuals, and was investigated by government researchers. Since 1976, CSR has undertaken exploration to evaluate the Licence. Recently, portions of the Licence were joint ventured to Amoco, now known as Cyprus Minerals, (west of the Murchison Highway) and EZI/Getty (northeast Montezuma area). This latter joint venture is now with EZI/Little River Goldfields after the Australian demise of Getty.

In August, 1984, the area of the Licence was reduced by 21.78 km^2 to comply with the Department of Mines revised Exploration Licence conditions.

On 2nd August, 1985, the reduced 124 km^2 area was renewed for a further 12 month period. This report summarises the investigations completed during this period to 2nd August, 1986.

The Licence has to be relinquished on 2nd August, 1987 unless economic or sub-economic mineralisation is located.

2. SUMMARY

Exploration of EL 15/76 by CSR Limited and, to a markedly lesser degree, by two groups of joint venture partners (Cyprus and EZI/Little River Goldfields) continued through 1985 and early 1986.

Cyprus continued infill gridding and "Wacker" bedrock sampling on the Leatherwood, Amber Creek, Pyramid and Berry Creek grids. Several moderately anomalous geochemical zones require follow-up. A trial hydrocarbon analysis produced inconclusive results while a structural study supported the theory that the Pb/Zn mineralisation is pre-Devonian. Post mineralisation structural upgrading (Devonian) is important.

EZI/Little River Goldfields did no further work in the Montezuma area. The only work remaining is a deep drill hole in Line 18.

CSR continued investigations in the Cuni area with low-level airborne magnetics. Several interesting anomalies were further investigated by ground magnetics and diamond drilling with technically successful but economically disappointing results. The Carbine Dighem anomaly was soil sampled and traversed with IP, producing significant anomalies. A re-logging of the Geophoto drilling explained the anomalies as due to the presence of graphitic shales with thin veins of Pb/Zn. Gordon Limestone areas at Ewarts Creek and Razorback West were gridded and bedrock sampled. A significant anomaly on the Razorback West grid requires further work. Regional work shows the Misery Hill magnetic anomaly and the Dundas/ Razorback area require further investigations.

3. GENERAL INFORMATION

The sealed Murchison Highway diagonally bisects the Licence area and a series of unsealed roads, tracks and old tramways give reasonable access to most parts of the area.

All but the northeast portion of the Licence is drained by tributaries of the westerly-flowing Little Henty-Henty River system. The northeast is drained by the headwaters of the Ring River which flows into the westerly-draining Pieman River system. Most of the streams are small and steep; typically "young" streams. On the flat areas of the easily eroded Gordon Limestone (southwest) the streams form swamps.

Vegetation in areas of Silurian, Devonian and Ordovician sedimentary rocks is generally button grass with local patches of dense ti-tree/sword grass/bowrah scrub. The remainder of the Licence is covered by temperate rainforest with patches of dense "horizontal" scrub. Small areas of open, cleared grassland are present near Dundas and Cuni.

In 1981, Amoco Minerals Australia Company expressed an interest in obtaining exploration rights to areas of Ordovician Gordon Limestone. A Joint Venture Agreement between CSR and Amoco was finalised in December, 1981 under which Amoco assumed responsibility for exploration of the portion of EL 15/76 to the southwest of the Murchison Highway (Figure 1). This Joint Venture continues although Amoco's interest is via the fully-owned Cyprus Minerals.

In late 1981, EZI and Getty Oil Development Company Ltd. approached CSR with a view of joint venture exploration of the Montezuma area of EL 15/76. A Heads of Agreement was signed in early 1982 covering the old Geophoto Montezuma Grid and the CGFA Grid (Figure 1). With the Australian demise of Getty, all of Getty's interests were eventually purchased by Little River Goldfields. The Joint Venture is now between CSR, EZI and Little River Goldfields.

4. PREVIOUS EXPLORATION

A brief resume of all available previous exploration and prospecting data plus details of 1982 exploration is given in MacNamara and Ellis (1983). The 1983, 1984 and 1985 exploration is detailed in Ellis (1983), Ellis (1984) and Ellis (1985) respectively.

Since 1982, Amoco have established grids and completed geochemical drainage, soil and rock-chip sampling, magnetic, gravity, IP and EM surveys, costeaning and drilling over the Gordon Limestone. Geophysical and/or geochemical anomalies have been located in most of the gridded areas.

EZI/Getty have re-cut and extended CGFA grids and completed soil geochemistry, geological mapping and magnetic, Dighem and Genie EM surveys, followed by drilling. The main anomalies are along the Montezuma Fault zone.

Since 1982, CSR has gridded areas of anomalous drainage geochemistry at Howards Road, Cuni, South Nevada and Nevada, and has completed soil geochemistry, geological mapping and magnetics and VLF-EM surveys. Dighem anomalies have been gridded and EM traverses completed, and airborne magnetic anomalies have also been gridded and traversed by magnetics and VLF-EM. Lithogeochemical analyses and detailed geological mapping of the Licence have been completed.

5. GEOLOGY

The geology of the area was described by Blissett (1962). Brown (1982) has re-mapped and reviewed the geology of the northern half of the Licence while Corbett (1985) has re-mapped the southern half.

A brief summary of the geology of the area is included in MacNamara and Ellis (1983). More detailed geological descriptions of individual prospects are contained in Ellis (1982), and recent geological mapping is shown in Jones (1982a, 1982c, 1983), Kary and Jones (1983), Sainty (1982) and MacNamara (1983a, 1983b, 1983c).

Detailed geology of the northern half of the Licence is summarised in Ellis (1984).

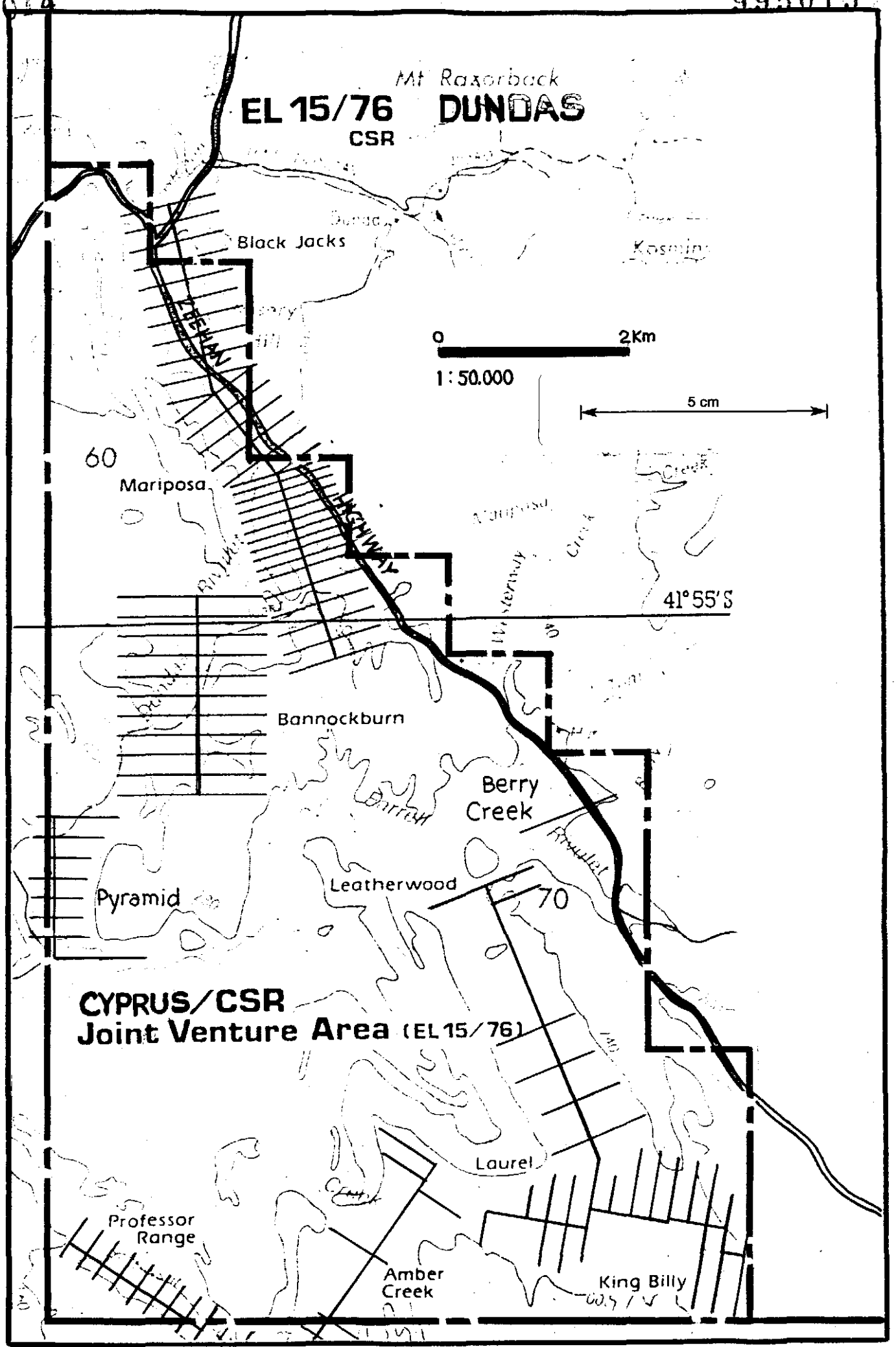

FIG. 2 CSR/CYPRUS JOINT VENTURE AREA AND GRIDS

6. AMOCO JOINT VENTURE AREA

Cyprus Minerals' main exploration target is the Irish-style lead/zinc/silver deposits in the Ordovician Gordon Limestone.

6.1 Current Exploration

Exploration by Amoco/Cyprus during the reporting period included a structural evaluation of the Joint Venture area (**Figure 2**), further grid cutting and Wacker bedrock sampling in the southern portion of the area and an evaluation of the hydrocarbon content of the Crotty Quartzite. Detailed results of this work have been reported by Jones, 1986 (**Appendix I**).

6.1.1 Gridding

Initially, it was planned to cut grid lines at 400 m spacings over all unexplored areas of Gordon Limestone. However, budget constraints and the slowness of the cutting resulted in the line spacing being increased.

During the July, 1985 to June, 1986 period, 10 lines totalling 7250 m were cut. These were made up of 3 lines on the Amber Creek grid, 4 lines on the Leatherwood grid, 1 line at Berry Creek and 2 lines in the Pyramid area. All lines were pegged at 50 m intervals for "Wacker" bedrock sampling.

6.1.2 Bedrock Geochemistry

Wacker bedrock sampling was completed on the 10 lines. An anomalous zone over 150 m on Line 53250N in the Amber Creek grid peaked at 2120 ppm Pb and 730 ppm Zn. This anomaly extends northwards

to Line 53250N (weakly) but did not appear on the southern line 52200N.

In the Leatherwood grid area, the northern line (54400N) showed two 150 m wide anomalous zones peaking at 1440 ppm Zn/215 ppm Pb (western) and 1800 ppm Zn/1540 ppm Pb (eastern). The western zone may extend southwards to Line 54000N, but in a much weaker form (415 ppm Zn/115 ppm Pb) and even to line 53600N where there is a very weak Zn anomaly. Line 53600N shows an isolated anomalous value of 3820 ppm Zn at its eastern end.

The two lines of the Pyramid grid showed anomalous Pb/Zn values near the eastern contact of the Limestone with the underlying Moina Sandstone. Peak values of 1040 ppm Zn and 1140 ppm Pb were observed.

Line 56350N at Berry Creek showed several isolated Zn anomalies to 2200 ppm. These were of little interest as there was no corresponding elevated Pb values (peak of 500 ppm).

Many of the "Wacker" anomalies were thought to relate to contact effects of the Gordon Limestone, particularly with the Crotty Quartzite. Rock samples from a mine dump on Line 55300N of the Pyramid grid showed very low base metal values.

6.1.3 Surface Geochemistry

Lines 18N and 22N of the old Geophoto Amber Creek grid were Ao (vegetation) sampled. Samples were despatched to the Department of Mines. No work was completed on these samples. Despite the technique apparently working at the Oceana Mine,

CSR, after discussions with Dr. W. Bates (Baker?), believe the thickness of the fluvioglacials and the possible presence (common elsewhere) of impermeable clay horizons render the technique unreliable in this area.

6.1.4 Hydrocarbon Analysis

The Irish-based Thermasearch Limited claim to have defined a pathfinder method of locating Irish-style mineralisation. Their method was used to analyse 2 g Crotty Quartzite rock samples and 10 core samples. The core samples were from a section through the limestone and mineralisation at the Oceana, while the Crotty Quartzite samples were from Amber Creek, Leatherwood, Ewarts to South Nevada areas.

Initial results were confusing with many contradictions. Thermasearch have been requested to re-evaluate the work.

6.1.5 Structural Analysis

Dr. D.M. Ransom completed a structural evaluation of the joint venture area with emphasis on the relationship of the mineralisation to folding, bedding, faulting, deformational strain and remobilisation.

Despite offering a different interpretation to some of the factual observations, it does not offer any new ideas on the best method of locating an economic ore body. However, it does provide complementary information to the photo-interpretation of the geology of the area.

6.2 Further Exploration

Some drill tracks and costeans remain to be backfilled and rehabilitated at the end of the programme.

Further infill gridding to at least 400 m spacings with corresponding Wacker sampling is required in the southern areas.

Reconnaissance surveys are required over structurally favourable areas in an attempt to define "growth faults".

The magnetic zone near the Farrell Rivulet, with associated anomalous Sn drainage geochemistry, requires further work.

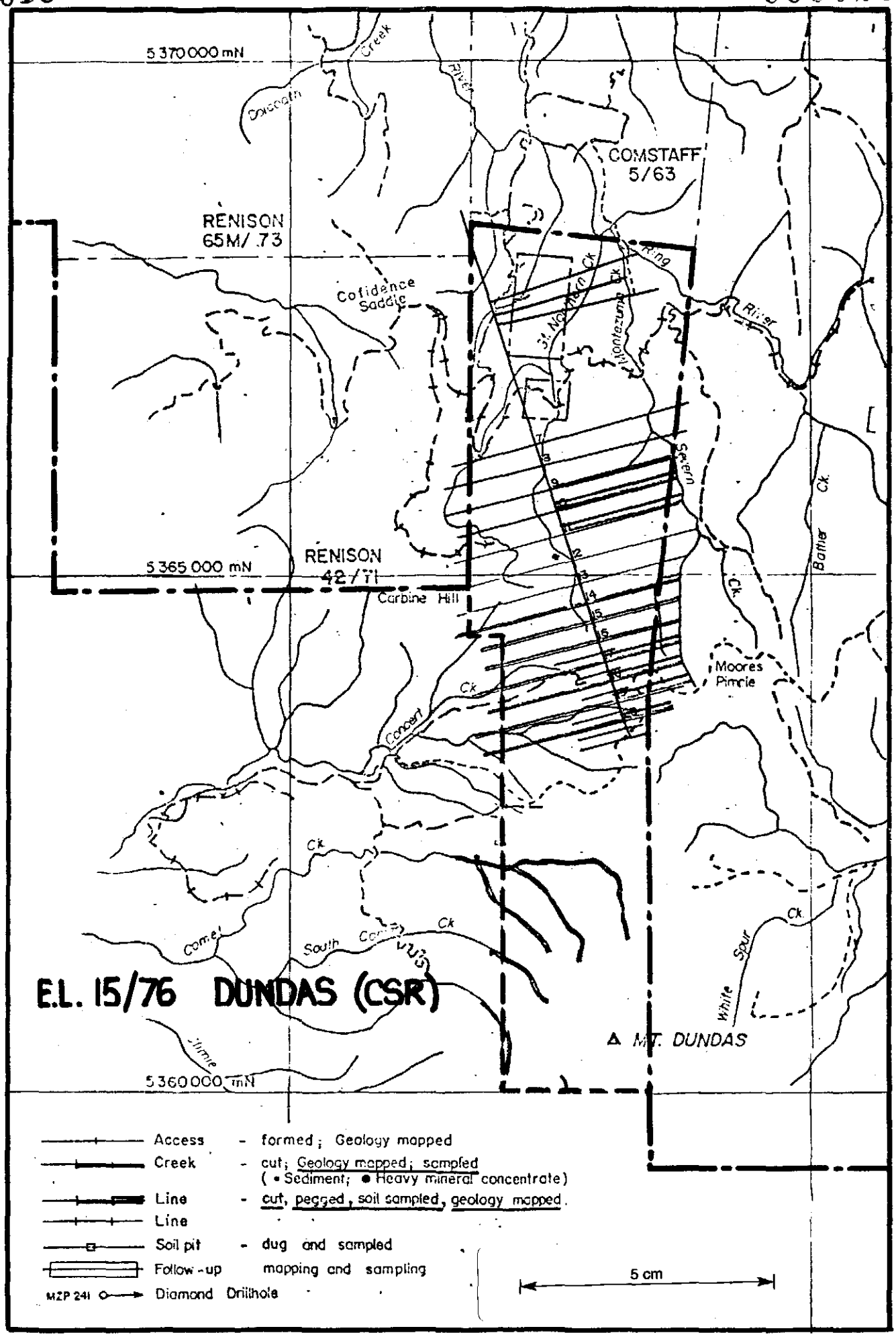

FIG. 3 EZ/LITTLE RIVER GOLDFIELDS JOINT VENTURE AREA AND GRIDS

7. EZI/LITTLE RIVER GOLDFIELDS JOINT VENTURE AREA

The main exploration target in the 14 km^2 Montezuma area (Figure 3) is Renison-style, carbonate-hosted tin mineralisation. Lead/zinc, complex sulphide or gold-rich deposits are of secondary interest.

7.1 Current Exploration

The only change in the status of the joint venture since July, 1985 has been in the joint venture partners. Following the decision by Getty Oil Development Company Ltd. to withdraw from exploration in Australia, their share of the joint venture was purchased by Little River Goldfields N.L.

No work has been undertaken on the joint venture area in the current 12 month period.

7.2 Future Exploration

The only outstanding anomalous area is the Line 18 intersection of the Maestries Dolomite Conglomerate with the Montezama Fault. This area remains a possible site for Renison-style replacement Sn mineralisation. An 800 m hole is required to test a zone 500 m below surface.

The only other area of possible interest is the western edge of the area adjacent to Renison's EL 42/71. A review of all data on this area is necessary.

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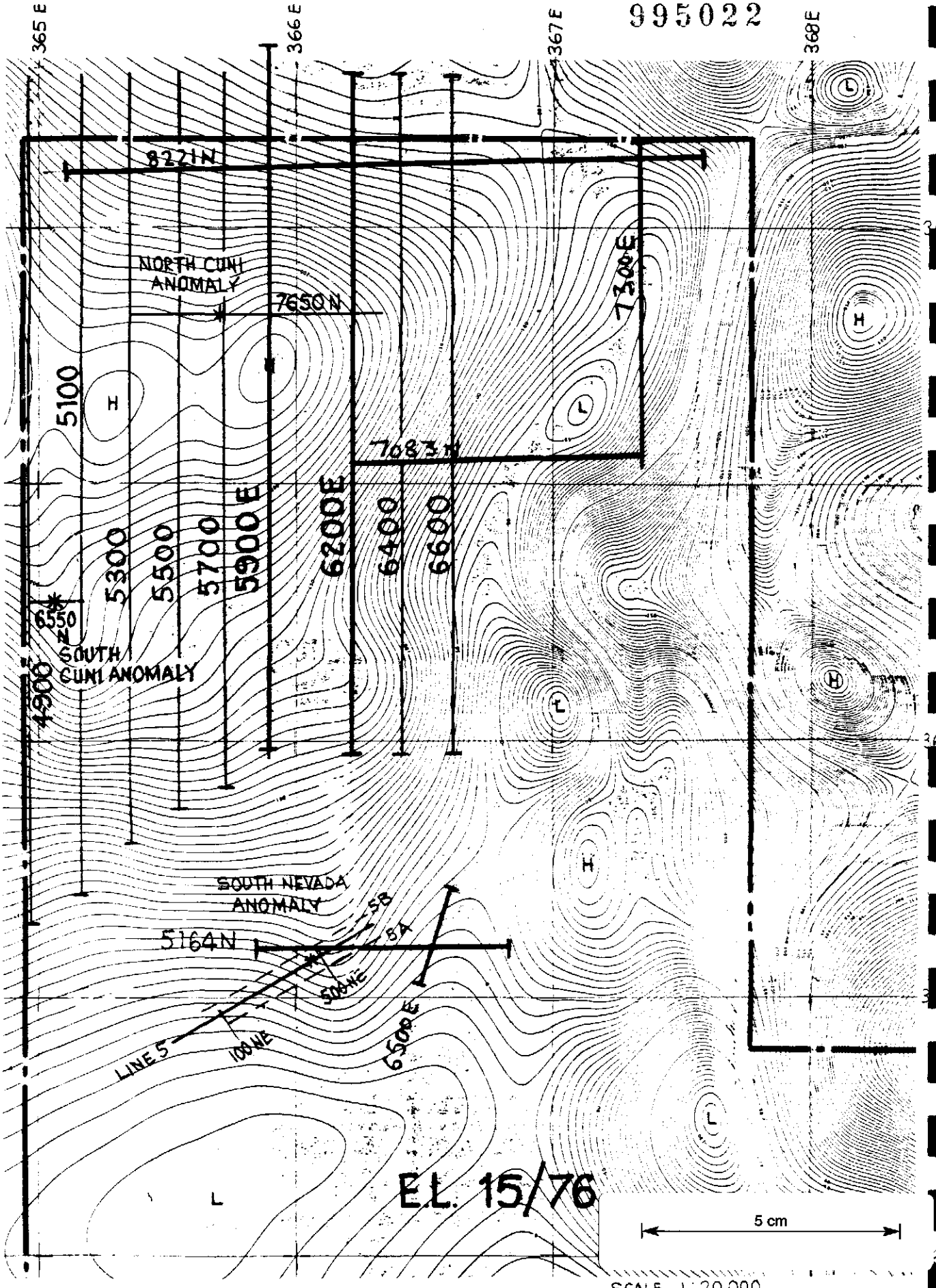


FIG. 4 CSR AEROMAGNETIC CONTOURS CUNI AREA
E.L. 15/76 DUNDAS
SHOWING GROUND MAGNETIC TRAVERSES

8. 100% CSR AREA

The 51 km^2 central strip operated by CSR alone, includes the Cuni and Dundas mineral fields.

The exploration target in this area is Renison-style, replacement tin mineralisation.

8.1 Current Exploration

Exploration continued on the airborne magnetic anomaly in the Cuni area (closely-spaced, low-level aeromagnetics, ground magnetics, Wacker bedrock sampling and drilling) and the Carbine EM anomaly (IP and relogging of old holes). New areas of interest were defined at the Razorback West and the Ewarts Limestone areas. Some regional work was undertaken.

8.1.1 Cuni Airborne Magnetic Anomaly

The large sub-circular magnetic anomaly observed in the re-worked Geoex airborne data (Figure 4) was traversed by two ground magnetic lines 5900E and 6200E. The results of these traverses (Ellis, 1985) suggested the presences of a deep, magnetic, possibly granitic body (700-800 m below surface) with two shallow (250-300 m) east-west anomalies on the flanks. These secondary anomalies may represent alteration zones (mineralisation) around the deeper body. Preliminary results from a CSAMT survey over line 5900E confirmed the presence of the deeper body (Ellis, 1985).

In order to define the magnetic anomalies, a further seven north-south lines totalling 27.5 km were cut over the sub-circular feature at 200 m

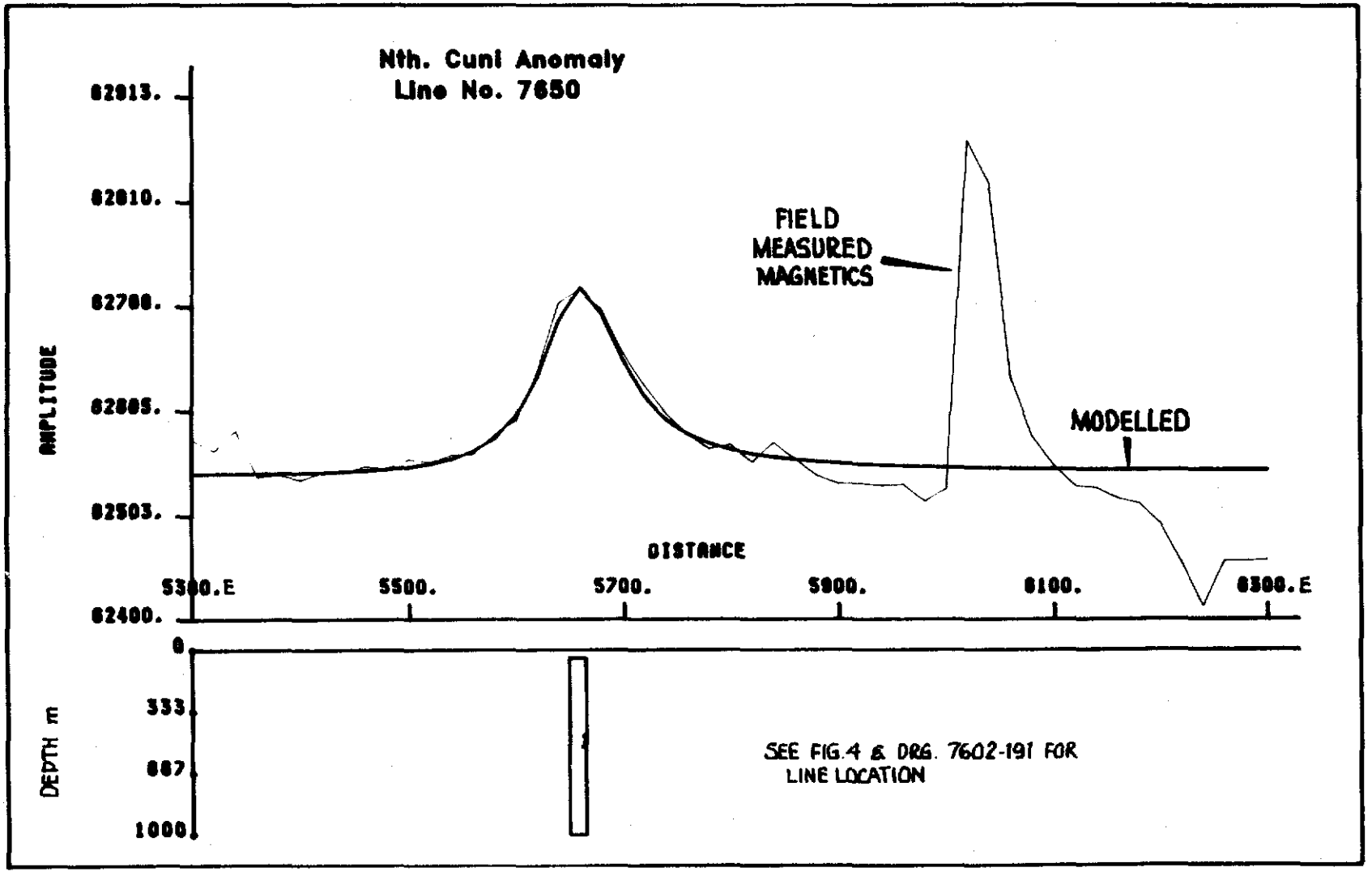
spacings (DRG No. 7602-11). These lines (4900E to 6600E) were traversed with geological mapping and ground magnetic readings at 25 m intervals.

Survey results and magnetic modelling (Appendix II, DRG No. 7602-194) indicated that the main aeromagnetic anomaly was at a depth of 400-600 m from the surface and was continous from east to west. It is still thought that this anomaly is related to a granitic body. The shallower anomalies, although appearing on most profiles, do not show continuity between profile. Although these results showed some promising anomalies, drill targets could not be defined.

The accuracy of the ground magnetic traverse on line 5900E was confirmed by the final results of the CSAMT survey (Appendix III). These showed the presence of a resistive structure at a minimum depth of about 200 m in the area of 7500N to 8100N.

The ground magnetics and CSAMT traverse only slightly altered the exploration model of a 400-600 m deep, granite-related magnetic body surrounded by smaller, higher-level (200-300 m below surface) magnetic bodies. At this stage, it was thought that these smaller bodies could be alteration zones or pyrrhotite-replacement bodies in Crimson Creek/Success Creek carbonate horizons.

In order to define drill targets, a low-level, close-spaced airborne geophysical survey was undertaken (cheaper and more detailed than cutting lines and traversing with ground magnetics) by Geometrics. This was expanded to cover both the Cuni aeromagnetic anomaly and the adjoining area of Gordon Limestone to the south. The survey covered



NO.	ACTIVE	X1	X2	Y1	Y2	Z1	Z2	SUSC	DIP	ALPHA	QKR	RI	RA
1	YES	5650	5665	6000	9000	45	1000	·0050	90	12	0.00	0	0

FIG. 5 NORTH CUNI ANOMALY GROUND MAGNETIC PROFILE LINE 7650 N

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the northwest corner of the Licence south to the Dundas Road and east to the foot of Mt. Razorback (DRG Nos. 7602-191, 7602-192, Appendix IV). East-west lines were flown at 100 m spacings and nominally 70 m above ground while north-south tie-lines were flown at 1 km intervals. — vol. 4 - Records

The main features evident from the survey were the highly erratic responses of the ultramafic complex to the east, the presence of the circular anomaly in the north (with associated subsidiary anomalies) and the circular low, south of the Nevada area and west of the Murchison Highway (with associated surrounding anomalies). Four areas of anomalies were selected for further evaluation:

Anomaly A	- North Cuni 365730mE, 5367550mN
Anomaly B	- South Cuni
Anomaly C	- South Nevada
Anomalies D & E	- Dundas Road

The peak of each of these anomalies was located on the ground and then traversed by ground magnetometer perpendicular to the axis of the anomaly (Appendix V). This enabled drill targets to be modelled and defined.

(a) <u>North Cuni Anomaly</u>

The ground and aeromagnetic traverses defined a strong, north-south elongated oval anomaly caused by a near vertical body starting at 45 m below the surface (Figure 5). A second anomaly on the ground traverse represented a near-surface, narrow feature and may be associated with a meta-dolerite dyke observed in this area (Cuni line of Cu/Ni mines).

TABLE 1

REMANENCE PHYSICAL PROPERTY RESULTS - HOLE CG5

Depth	Jnrm	I°nrm	k	Q
111.1	326	-25	45	7.5
	32	-85		
114.1	755	-42	200	6.0
	738	-42		
123.3	2027	-49		
	1846	-49		
130.6	96	-51	90	2.1
	134	-41		
136.1	1006	-36	200	7.7
	924	-39		
141.8	821	-45	300	4.2
	760	-50		
150.3	15	+62	140	0.3
	44	+65		

Where Jnrm = measured natural remanence in ugauss (m/Am SI)

I°nrm = inclination of natural remanent vector from vertical (up-core) axis

k = magnetic susceptibility in cgs x 10^{-6} units

Q = Koenigsberger ratio

The Q values defined are calculated as the ratio of the remanent vector field strength versus the vector strength due to induction (i.e. kF where F is the local Earth field strength, taken here as 0.625 Gauss). Q values are a direct indicator of remanence effects over that anomalism produced solely by induction. The Q values determined by these tests suggest a 7-11 times contribution to observed anomalism attributable to remanence. This quite adequately explains the association between the low magnetic susceptibilities measured on the core and the observed magnetic data.

It was originally proposed to drill hole CG5 towards the west along Line 7650N from coordinate 5770E and at an angle of -50°. This site was in a large area of swamp. The drill hole location was changed to 5775E 7730N as this was the closest area of solid ground readily accessible from pre-existing tracks. Only limited bulldozer work was required to gain access to the site. The direction of the hole was changed to 235° magnetic in order to intersect the main portion of the anomaly.

Drilling of CG5 commenced on 24th March, 1986 and was completed to a depth of 256.0 m by 11th April. The hole intersected a series of shales, sandstones (some with calcareous cement) and siltstones (DRG No. 7602-196, Appendix VI). Pyrite was common throughout the hole, with the zone from 110.0 to 139.5 m containing fine, disseminated pyrrhotite in a sandstone unit. Traces of chalcopyrite and sphalerite were observed in some veins. Magnetic susceptibility readings were taken every 0.2 m, and although very weak responses were noted over small concentrations of pyrrhotite, most readings registered no magnetism. Seven core samples (5 from the pyrrhotite zone, 1 from the underlying pyrrhotite zone and 1 from a pyrrhotite vein area) were laboratory tested for remanence effects. The results of this testing (Table 1) showed the remanence effects were sufficient to explain the observed air and ground magnetic anomalies despite the lack of magnetic susceptibilites measured in the core. A dip of 80° to the east (consistent with observed core/bedding angles) would put the

820

No.	ACTIVE	X1	X2	Y1	Y2	Z1	Z2	SUSC	DIP	ALPHA	QKR	RI	RA
2	YES	4970	5015	6000	7000	20	1000	·0007	85	12	0·00	0	0

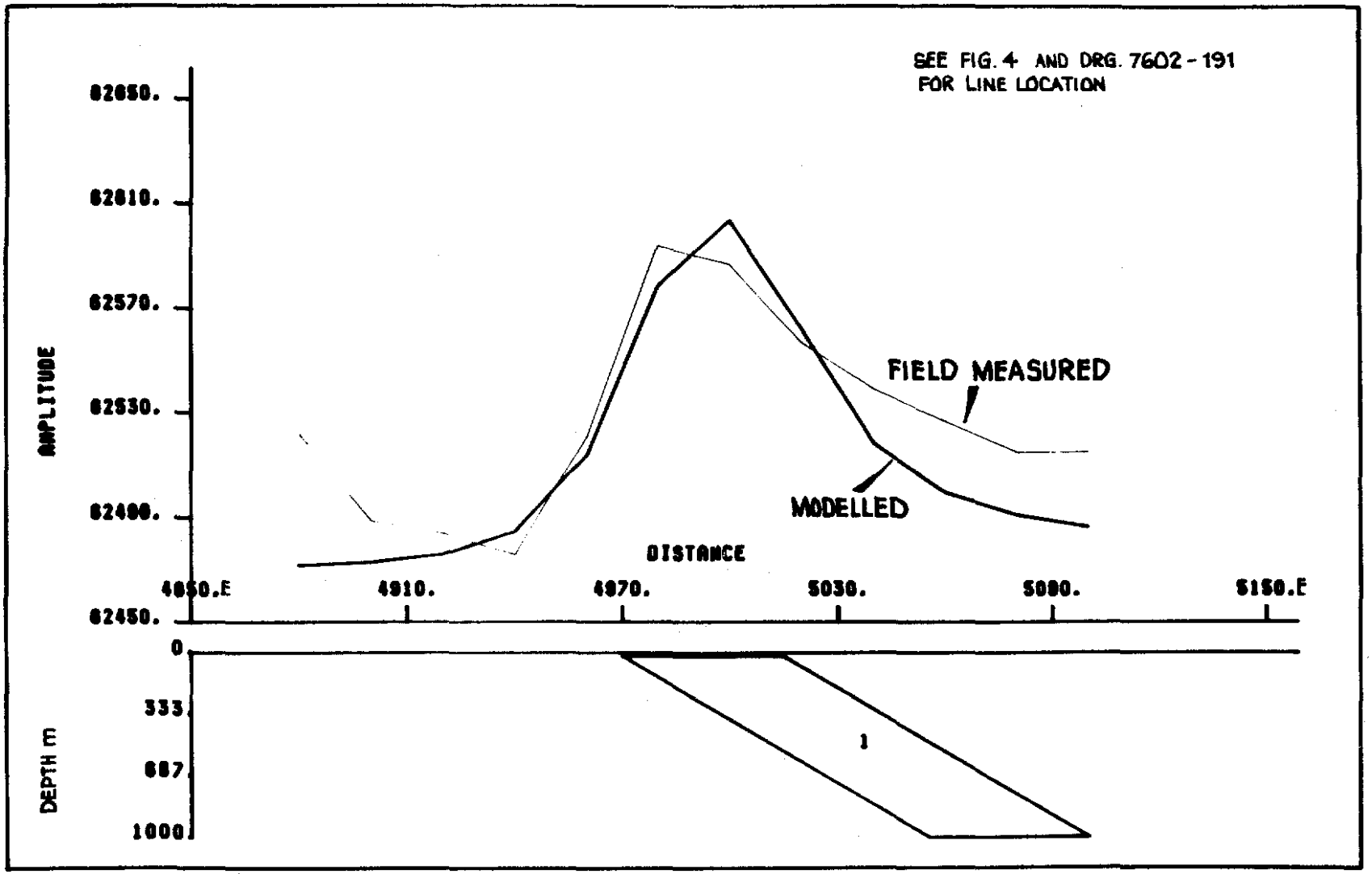

FIG. 6 SOUTH CUNI ANOMALY GROUND MAGNETIC PROFILE LINE 6550N

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ground magnetic anomaly at about the position of the pyrrhotite-bearing sandstone unit observed in the drill core.

Drill core samples were also taken for geochemical analysis and thin section evaluation. Of 91 samples analysed for Cu, Pb, Zn, Ag, Sn, W and As, with some for Au, there were only 5 samples with significantly anomalous values (Appendix VII). No samples contained anomalous Sn, W, Ag or Au. Sample A272401 had anomalous Zn (5800 ppm); samples A272448, A272388, A272390 had anomalous Pb (155, 630, 155 ppm) and Zn (1100, 440, 3500 ppm); and sample A272364 had anomalous Cu (120 ppm), Pb (2200 ppm) and Zn (3900 ppm). As these were isolated anomalies and related to veins, they are of little economic significance. With the lack of encouraging geochemical results, and in particular the low Sn values, only minor petrological work will be continued.

(b) South Cuni Anomaly

The aeromagnetics defined a strong north-south elongated anomaly plunging to the north on the western edge of EL 15/76. This was ground traversed with magnetics near the southern end (line 6550N) where the anomaly was believed to be closer to the surface. The modelling of this east-west profile (**Figure 6**) showed the anomaly to be due to a near vertical to steeply east-dipping body starting 20 m below the surface.

It was proposed to drill hole CG4 on a grid east azimuth along Line 6550N from coordinate

4925E at a declination of -50°. This area was in the centre of a large ti-tree swamp making vehicular access impossible. The nearest road access was 1.2 km to the south with swamps around the Little Henty River covering most of that distance. A helicopter was used to mobilise a Longyear 38 drilling rig to the area with operator access by foot along the grid lines.

Drilling of CG4 commenced on 22nd March, 1986, and was completed to 226.7 m by 4th April. The hole intersected a series of sandstones, tuffs, siltstones and shales (DRG No. 7602-197, Appendix VI). Most of the hole consisted of lithic sandstones and tuffs with one zone (116.3 to 164.9 m) of shale containing fine, disseminated pyrite, minor pyrrhotite and traces of chalcopyrite and sphalerite. Again, magnetic susceptibility measurements made every 0.2 m gave zero readings.

In an attempt to determine why the ground magnetic anomaly was not substantiated in the drill core, the zone of the anomaly was traversed with "Wacker" bedrock sampling. Lithological changes observed during the "Wacker" sampling, i.e. from grit to shale to grit, were similar to those observed in the core. Correlations between the surface "Wacker" and the cored hole samples placed this 80° east-dipping shale unit beneath the magnetic anomaly at the modelled depth of 20-30 m. Thus, the shale unit probably contains sufficient pyrrhotite with the pyrite to give a remanence effect responsible for the magnetic anomaly.

No.	ACTIVE	X1	X2	Y1	Y2	Z1	Z2	SUSC	DIP	ALPHA	QKR	RI	RA
1	YES	450	500	-500	500	40	1000	·0019	90	12	0	0	0
2	YES	365	385	-500	500	20	1000	·0020	90	12	0	0	0

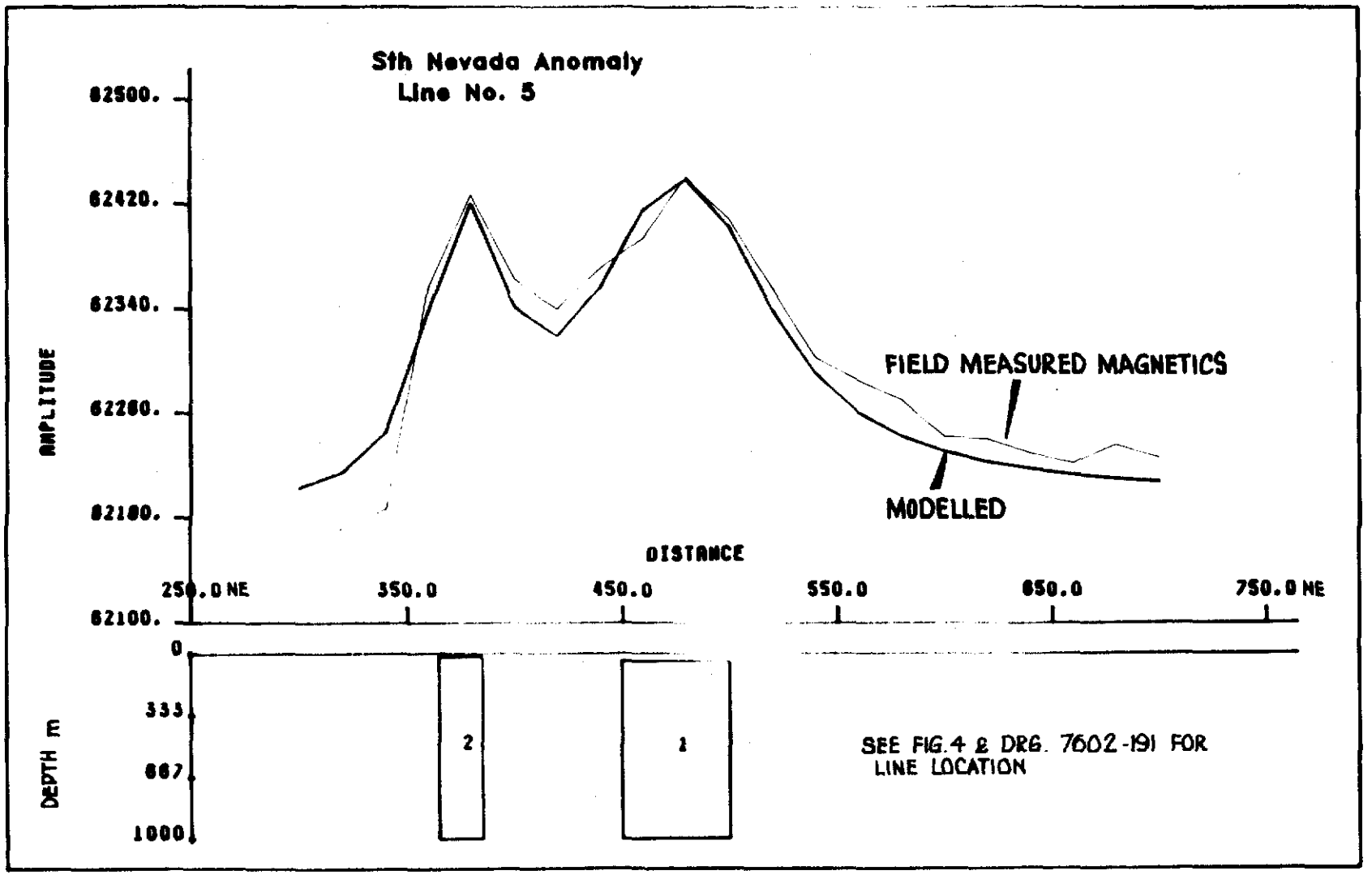


FIG.7 SOUTH NEVADA ANOMALY GROUND MAGNETIC PROFILE LINE 5

031
230966

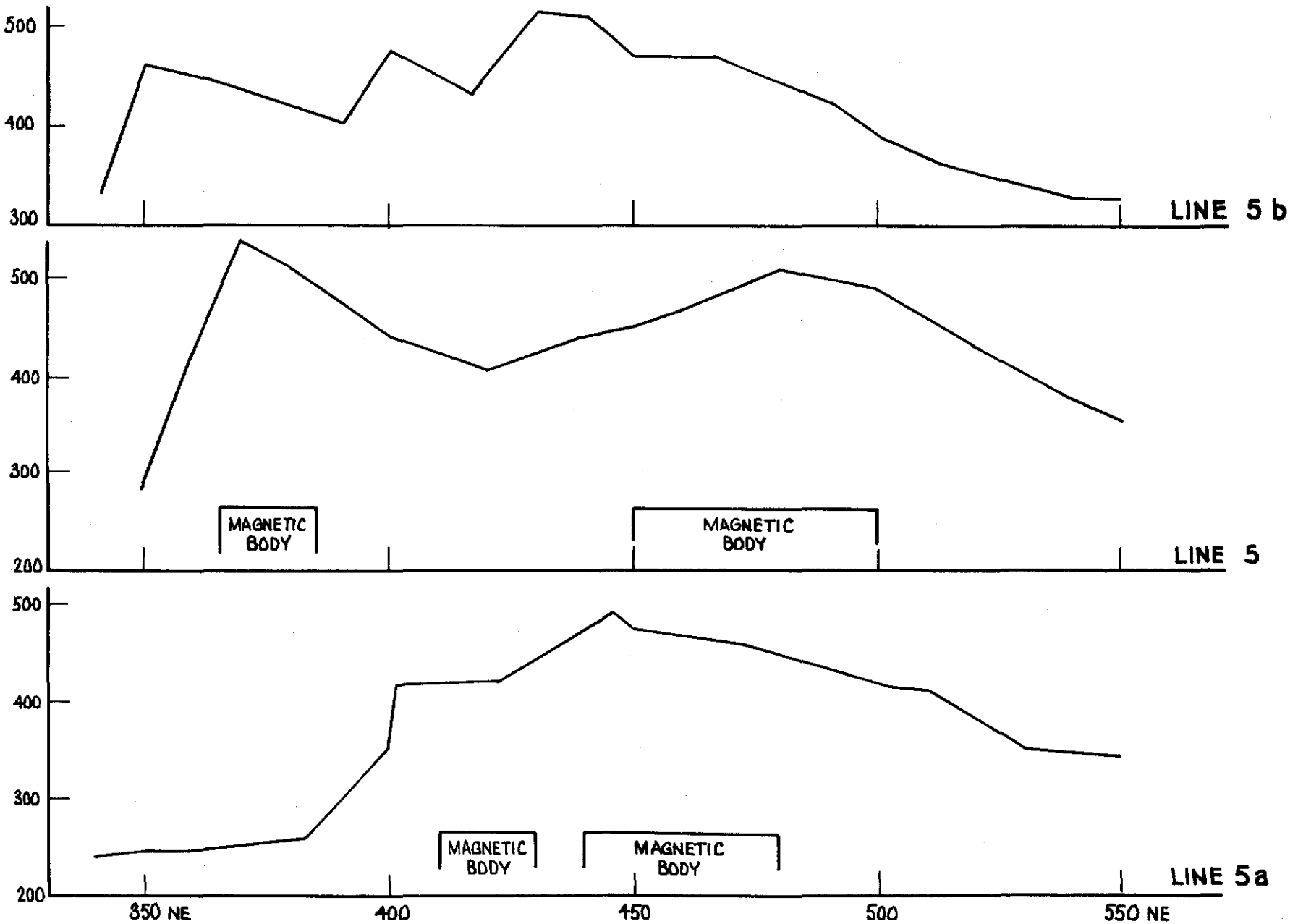
Drill core samples were also taken for geochemical analysis (including the Wacker samples) and thin section evaluation. Of 92 drill core samples analysed for Cu, Pb, Zn, Ag, Sn, W, As, and some for Au, and 10 "Wacker" bedrock samples analysed for Cu, Pb, Zn, Ni, Bi, Ba, As, Sn and W, there were no significantly anomalous samples (Appendix VII and Appendix VIII). With the lack of encouraging geochemical results, particularly the low Sn values, only minor petrological work will be continued.

(c) **South Nevada Anomaly**

The aeromagnetics defined a discrete, circular anomaly in the Nevada Grid area. This had been observed earlier (Macnamara, 1983b) but was interpreted, from the one profile, as being very near-surface. The area was ground traversed using an extension of Line 5 of the South Nevada Creek grid (Ellis, 1985). Two separate anomalies were observed. The modelling of this northeast-southwest magnetic profile (Figure 7) showed the anomalies to be due to vertical bodies starting 20 and 40 m below the surface. The profiles of the magnetic traverses 50 m to the northwest (Line 58) and southeast (Line 5A) showed some correlation of the anomalies (Figure 8).

Drill hole CG3 was planned to intersect both anomalies and to possibly intersect the Gordon Limestone thought to underlie the swamp area to the south. The hole (at AMG coordinates 5365200N 365165E) was given a bearing of 195° magnetic at a declination of -50°. Site

033



SEE FIG. 4 & DRG 7602-191 FOR LINE LOCATION

FIG. 8 SOUTH NEVADA ANOMALY - GROUND MAGNETIC PROFILES - LINES 5, 5a, 5b

9950034

access was gained via an old logging track along the South Nevada ridge to within 300 m of the site and then by about 150 m of dozing and 150 m of natural ground.

Geological mapping in the area (DRG Nos. 7602-198 and 7602-199) showed the main rocks in the area to be shales and siltstones of the Hodge Slate near the hole collar, sandstones of the Crimson Creek Formation on the hills to the north, and conglomerates and grits of the Razorback Conglomerate on the hill to the south. In the swamp to the north, small outcrops of limonite are thought to be "bog-iron"-type deposits. The swamp to the south was thought to be underlain by the Gordon Limestone, although several areas of conglomerate (originally thought to be Tertiary Gravels) were noted. Most outcrops in the area dip steeply (70-80°) to the south-southeast (perpendicular to the drill hole direction). Apart from the limonitic deposits (non-magnetic), there was no explanation for the magnetic anomalies.

Soil geochemistry in the area of the magnetic anomalies showed anomalous Pb (Macnamara, 1983b).

Drilling of CG3 commenced on 1st March, 1986 and was completed to a depth of 331.3 m on 23rd March. The hole intersected 83.5 m of green-grey shales with minor sandstone bands (Hodge Slate), conglomerate with sands, grits and minor shales (Razorback Conglomerate) to 327.9 m and limestone (Gordon Limestone) to the end of the hole (DRG No. 7602-198,

Appendix VI). Magnetic susceptibility measurements at 0.2 m intervals (Appendix IX, DRG No. 7602-193) showed three zones of strong responses within the conglomeratic unit. These correspond to three peaks within the main anomaly on the profile of the traverse along the line of the drill hole (DRG No. 7602-198). The magnetic response appears to be caused by magnetic fragments of volcanics (green rock fragments) and matrix within the conglomerate.

Core samples were taken for geochemical analysis and thin section evaluation. Of 99 samples analysed for Cu, Pb, Zn, Ag, Sn, W, As, plus some for Au, none were significantly anomalous (Appendix VII). Several samples of veins contained slightly anomalous Cu (to 680 ppm) or Zn (to 510 ppm). In view of the lack of encouraging geochemical results, particularly the low Sn values, only minor petrological work will be continued.

(d) Dundas Road Anomalies

The aeromagnetics defined a discrete circular anomaly in an area of high gradient adjacent to the Dundas Road (Anomaly D). This anomaly may be related to a north-northeast trending, weak anomaly (Pine Plantation Anomaly) in the vicinity of the Murchison Highway (Anomaly E). The Dundas Road anomaly was particularly interesting because of its coincidence with an unexplained Dighem anomaly (Ellis, 1984).

Magnetometers, VLF-EM and detailed geological mapping traverses were completed from the

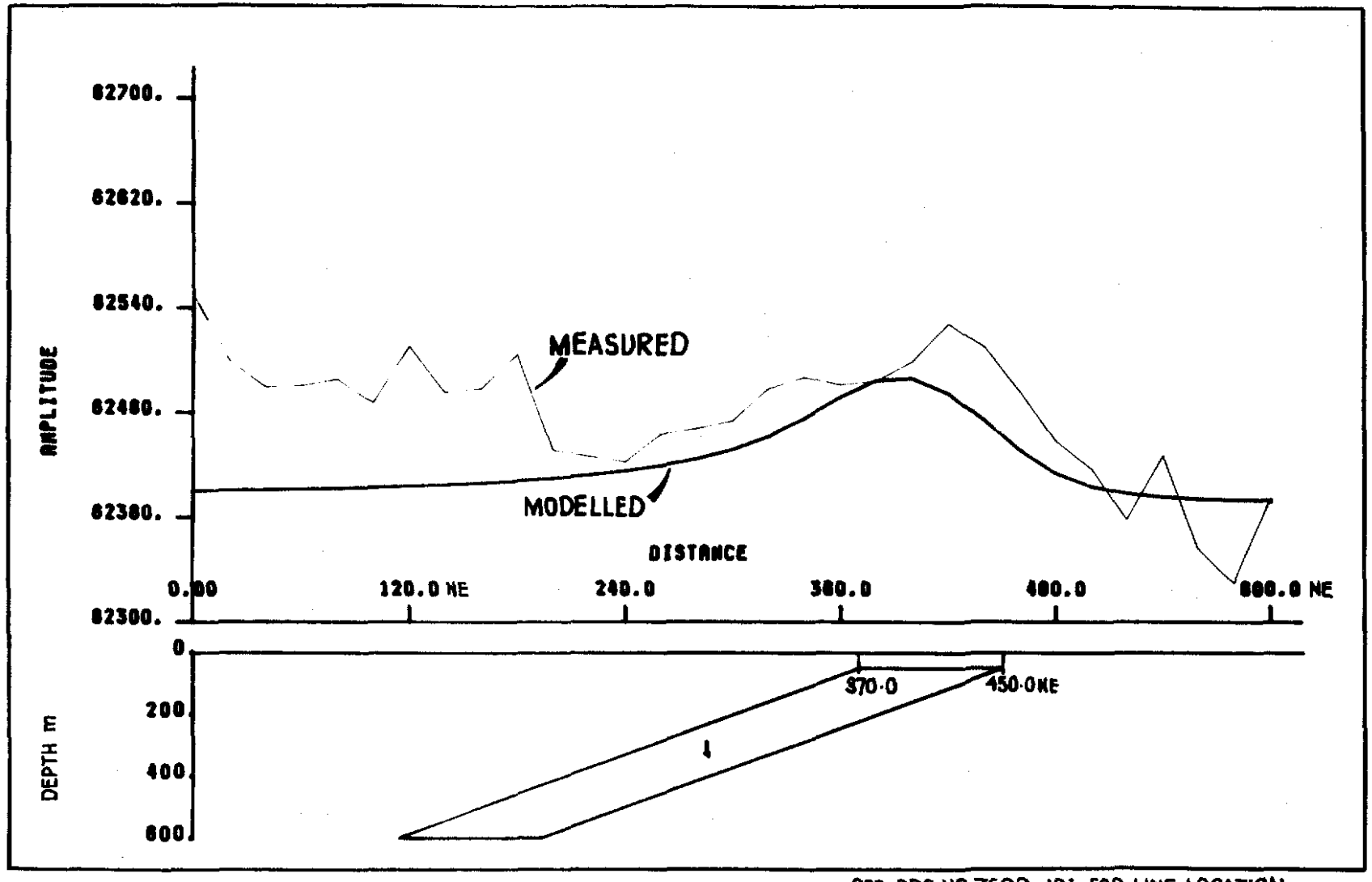


FIG. 9 DUNDAS ROAD ANOMALY - GROUND MAGNETIC PROFILE

93503?

Dundas Road in a northeasterly direction towards Mt. Razorback. Modelling of the magnetics was difficult due to the spiky irregular nature of the responses (Figure 9), but it showed a body dipping at 65° to the southwest and starting 50 m below the surface. The position of this body corresponded to a weak VLF-EM cross-over (DRG No. 7602-200) and a distinct change in the soil type, while the modelled dip of the body was similar to the observed bedding. However, there was no observable explanation for the magnetic anomaly.

Drill hole CG6 (azimuth 040°m, declination 45°) was designed to intersect the top of the magnetic body. The closest position to drill from was at the top of the conglomerate rise (320 m to the northeast) along the traverse from the road at AMG coordinates 5363175mN 367295mE). Access to this site was gained via tracks through an old, burnt-out pine plantation and along the conglomerate ridge. The only bulldozer work required was minor repairs to two small creek crossings.

Hole CG6 commenced on 12th April, 1986 and was completed to a depth of 187.2 m by 24th April. This included a redrill of the top 30 m (CG6A) due to lack of core recovery in the soft shales. The holes intersected 81.4 m of red shale with minor sandstone and conglomerate, then conglomerate with minor sandstone and shales to 132.4 m, and green shales to the bottom of the hole (DRG No. 7602-200, Appendix VI). Magnetic susceptibility measurements at 0.2 m intervals (Appendix IX, DRG No. 7602-201) showed several zones of strong

responses within the conglomeratic unit. The magnetic response appears to be caused by magnetite in green, magnetic volcanics and magnetite within the matrix of the conglomerate (similar to in CG3).

Core samples were taken for geochemical analysis and thin section evaluation. Of 64 samples analysed for Cu, Pb, Zn, Ag, Sn, W, As, plus some for Au, there were only 4 samples with slightly anomalous Cu or Zn values. These anomalous samples (to 590 ppm Cu or 1900 ppm Zn) were related to minor mineralised veins with chalcopyrite, galena and sphalerite. In view of the lack of encouraging geochemical results, particularly the low Sn values, only minor petrological work will be continued.

The Pine Plantation anomaly was traversed with magnetics, detailed geological mapping and "Wacker" bedrock sampling. The magnetics (DRG No. 7602-202) showed a broad, magnetic high in a zone covered by gravel and a limonitic, laterite-type cover. To the west of the anomaly, geological mapping showed a series of shales dipping at 50-60° to the west. The "Wacker" bedrock drilling intersected a series of sands and shales but did not explain the magnetic anomaly. Analyses of the "Wacker" samples (Appendix X) showed a slight increase in Zn, Ni and minor Cu in the area of the magnetic anomaly.

The magnetic anomaly was explained during a trial of Mr. N. Poltock's portable drill rig. A short 8.5 m diamond drill hole intersected a

series of sandstones, fine and coarse conglomerates, many of which contained fragments of magnetic volcanics. These rocks were similar to those intersected in DDH-CG3 and DDH-CG6. Two samples analysed for Cu, Pb, Zn, Ag, Sn, W, As and Au showed no anomalous values.

No further work is required on this anomaly.

8.1.2 Carbine EM Anomaly

The Dighem anomaly located in 1982/83 and investigated by surface impedance and VLF-EM measurements (TSIM and VLF resistivity) in 1983/84 (Ellis, 1984), and by geological mapping, VLF-EM and magnetics in 1984/85 (Ellis, 1985) was further investigated in 1985/86.

Fraser-filtering of the VLF-EM data (Appendix XI) showed that the VLF-EM readings mainly represented noise and thus VLF surveys were likely to be unreliable in this area.

Three old Geophoto grid lines (72N, 52N and 40N) were soil sampled to test the reliability of the Geophoto soil geochemistry results. Results of the CSR analyses (Appendix XII) confirmed the Geophoto results showing a northeast-trending zone of anomalous Pb (to 4350 ppm), Zn (to 670 ppm) and As (to 440 ppm) with minor associated Cu (to 370 ppm). This trend was parallel to the anomalous VLF-EM trend. Further work was required to define a drill target.

The rugged terrain and thick bush around this grid make time-domain EM techniques

uneconomical. Thus a gradient array, time domain IP survey was undertaken in an attempt to explain the Dighem anomaly and possibly locate sulphide mineralisation in the geophysically and geochemically anomalous zone (DRG No. 7602-3).

Initially, the current electrodes were placed near the top of the Montezemma track and on the Razorback-Grand Prize Road in order to cover the entire survey area. However, a low current transfer made these sites unsuitable. Closer current electrodes were chosen (Appendix XIII) and the survey was completed in two halves (eastern and western). The eight lines between 40N and 68N were traversed with 25 m stations and 100 m dipole spacings.

Only resistivity data have been plotted (DRG No. 7602-195) as the very low resistivities made repeatability of chargeability readings difficult and unreliable (Appendix XIII). Self potential measurements gave no trends, which was believed to be due to surficial noise caused by the uncharacteristically low resistivities. These resistivities indicate a "low" of 1-2 ohm metres trending northerly from 300W on Line 40N (Line 1) to 100W on Line 68N (Line 15). This highly conductive and continuous unit reflects conductivities typical of very massive sulphides or uniform graphitic units.

Geophoto drilled two holes in the Carbine area in 1972. The recorded logs of these holes were very brief, but showed that the holes intersected shales and sandstones of the Dundas Group or Crimson Creek Formation with no mineralisation. As these two holes were in or

adjacent to the zone of low resitivity and anomalous geochemistry/geophysics (DRG No. 7602-3), the core from the two holes was located in the Department of Mines core store and was logged. Brief logs of the hole showed DDH-CW1 contained shales and siltstones to about 51 m, then 6 m of a meta-dolerite underlain by 5 m of graphitic shale, 20 m of sandstone/shale with graphite on the joints, 15 m of meta-dolerite and 50+ m of shale with graphite on the joints. DDH-CW2 contained shales and siltstones to about 93 m, then 20 m of meta-dolerite underlain by 6 m of shale and 8 m of meta-dolerite.

The graphitic shale and zone of graphitic joints in DDH-CW1 were tested with a multimeter and found to be very conductive over significant intervals; i.e. sufficiently conductive to produce a "chicken-wire" effect which could explain the low resistivity zone.

Samples from DDH-CW1 and DDH-CW2 were taken for geochemical analysis and petrological examination. The geochemical analyses (Appendix XIV) showed the graphitic shales in DDH-CW1, and the shales between the meta-dolerites in DDH-CW2, had anomalous Pb/Zn values (to 450 ppm Pb and 2350 ppm Zn in CW1 and to 940 ppm Pb and 3950 ppm Zn in CW2). These values are sufficient to explain the surface geochemical anomalies. However, no anomalous Sn or Au values were found to explain the drainage anomalies observed by Macnamara (1983). The petrological examination of the samples (Appendix IV) revealed the presence of up to 12% graphite (A161947 from 204 ft in CW1). Only minor sphalerite was observed in one sample from CW1.

042

The presence of the graphitic shales explains the IP, VLF-EM and Dighem anomalies in the Carbine area and the presence of minor vein Pb/Zn in the drill core is sufficient to explain the coincident soil geochemical anomaly. The magnetic anomaly and drainage geochemistry Sn and Au anomalies were not explained.

8.1.3 Limestone Areas

Within EL 15/76, there are two areas of Gordon Limestone which are not covered by the Cyprus JV : the Ewarts Creek area (south of the Farrell Rivulet adjacent to the highway) and the Razorback West area (west of the highway between the Zeehan turnoff and the Nevada Grid). Each of these areas was gridded and traversed with "Wacker" bedrock sampling and ground magnetics. Results for each area are given below.

(a) Ewarts Creek Grid

The Ewarts Creek Grid consists of 13 Lines (DRG No. 7602-203) cut in an east-northeast direction from the Murchison Highway just north of Howard Road (Line 1) to the southern end of the Licence just south of Ewarts Creek (Line 13).

Magnetic responses from traverses over these lines (DRG No. 7602-204) were generally very flat except eastwards from the limestone into the Cambrian Dundas Group sediments. The Cambrian rocks (Line 6) showed strong variation due to their volcanic component. The southern lines also showed some variation due mainly to the presence of large boulders with a magnetic component.

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TABLE 2

HOWARDS ROAD - MINES DEPARTMENT

DRILL HOLE 1

Sample No.	Interval	Lost	W	Cu	Pb	Zn	Bi	Ag	Sn	As	Ba
A161801	217.69-220.69 m	0.5 m	x	3	12	18	6	x	x	16	40
802	223.69	0.94	x	6	16	36	8	x	x	12	35
803	226.69	1.4	x	4	38	350	8	x	x	24	55
804	229.69	1.78	x	4	10	14	6	x	x	10	30
805	232.69		10	5	14	20	4	x	4	16	45
806	235.69	1.13	x	5	16	18	<4	x	x	65	55
807	238.69	0.1	x	6	28	640	8	x	6	16	30
808	241.69	1.5	x	6	18	24	8	x	6	24	165
809	244.69	1.69	x	4	22	48	6	x	x	24	50
810	247.69	1.26	x	5	20	36	6	x	6	20	90
811	250.69	0.66	x	5	22	34	6	x	x	16	20
812	253.69	1.77	x	4	16	50	8	x	x	22	30
813	256.69	1.4	10	3	14	20	4	x	x	14	20
814	259.6	0.47	x	7	18	46	4	x	x	28	50
815	262.69	1.92	x	4	16	55	6	x	x	16	110
816	271.69-274.69	2.07	x	5	26	120	8	x	6	28	35
817	277.69	2.65	x	2	12	22	6	x	x	26	35
818	280.69	0.69	x	3	8	7	4	x	x	10	x
819	283.69	0.35	x	5	12	12	6	x	x	9	20
820	286.69	0.1	x	2	22	9	8	x	x	12	15
821	289.69		x	2	10	9	6	x	4	12	25
822	292.69		x	3	12	9	8	x	4	12	10
826	295.69	0.24	x	4	180	12	6	x	x	20	10
827	298.69	-	x	5	16	10	6	x	x	18	20
828	301.69	0.89	x	5	18	12	6	x	x	20	45
829	303.68	-	x	5	16	14	8	x	x	20	45

Laboratory - Comlabs
Cu, Pb, Zn, Bi by AAS-1
Ag by AAS-3
Sn, W, As, Ba by XRF-1

These large boulders in the southern part of the area also presented problems to the "Wacker" bedrock sampling programme. On Lines 1 to 8 and the western end of Line 13 limestone was intersected in the predicted area, while on Lines 9 to 12 and the eastern end of Line 13 only large boulders and an increased thickness of the glacials were found. Analytical results of the bedrock samples (Appendix XVI) were disappointing with no significantly anomalous values. To complete the study of the limestone in this area, the core from a Mines Department drill hole at Howards Road was examined. The limestone section was sampled and analysed for Cu, Pb, Zn, Bi, Ag, Sn As, Ba and W. Results (Table 2) were very disappointing with no significant anomalies.

No further work is warranted in this area.

(b) Razorback West

The Razorback West grid consisted of three lines (DRG No. 7602-11) cut in a westerly direction from the Murchison Highway in an area north of the Dundas Road turn-off to south of the Nevada Grid area.

Magnetometer traverses over these lines (DRG No. 7602-205) showed generally very flat responses, except for the northern line (Line 5364800mN) which showed a response from the Dundas Group Razorback Conglomerate.

A "Wacker" bedrock sampling programme over these lines showed the southern two lines were

underlain by silty limestone with shale horizons, while the northern line was underlain by maroon and green rocks probably of the Razorback Conglomerate unit (see South Nevada drilling - Section 8.1.1(e)). Analyses of the samples (Appendix XVII) showed a significant zone of anomalous values on the southern lines. Best results were:

Line 5364400N	366700-775E	to 1950 ppm Zn, 360 ppm Pb
Line 5364000N	366450-775E	to 5350 ppm Zn, 540 ppm Pb

An anomalous zone on Line 5364800N at 366250-500E with up to 1900 ppm Zn and 390 ppm Pb was not directly related to the anomalous zone on the southern lines. These anomalies require further investigation.

8.1.4 Regional Work

Regional work consisted of:

(a) a review of past work, and
(b) petrological examination of rock samples.

(a) Historical Review

All past exploration data on the Licence area were studied, located on CSR base plans and evaluated. This information is being compiled into a report which will be forwarded to the Department of Mines when complete.

This work shows that a vast quantity of exploration data are available for the EL 15/76 area, most of which are held at the

Department of Mines. The surface evaluation of the Licence has generally given very discouraging results. These investigations have included regional EM, Af mag, magnetics, Turam EM and Dighem surveys with anomalies being further investigated by ground EM, SP, magnetics, IP, Gun EM, Turam EM, gravity, soil, drainage and rock-chip geochemistry and some drilling.

(b) Regional Petrology

During 1984/85, Mr. P. Kitto (a PHD student) undertook mapping of the EL 15/76 Dundas/ Carbine area. During this work, many rock samples were taken (DRG Nos. 7602-5, 6, 7, 8). Some of these samples were selected for thin section (28 sections) and ore petrological (36 polished slabs) evaluation.

The results of the thin section study (Appendix XVIII) is best studied as a simple description of rocks. Most samples come from separate stratigraphic units although Mr. A.C. Purvis has grouped different types of rocks. From an exploration viewpoint the interesting samples are:

A213195 - the Maestries Dolomitic Conglomerate - comprised of dolomitic clasts

A213193 - originally thought to be a possible correlate of the Maestries Dolomitic Conglomerate but, from the descriptions, being very different

A213194) - chert conglomerates but representing
A213197) possible correlates of the Maestries
A213200) Dolomitic Conglomerate as the chert clasts may be silicified dolomites.

A213199 - sandy graphitic slate
A213233 - graphitic slate
(These descriptions confirm the presence of graphitic shales found in the Carbine Geophoto drill core)
A213234 - dolomitic siltstone from the vicinity of the South Comet Mine

The polished slab examination (Appendix XIX) showed that galena and sphalerite occurred in almost all samples with most samples also containing pyrite. The main tin deposit-associated mineral (pyrrhotite) only occurred in samples from known deposits (Razorback). Chalcopyrite and arsenopyrite generally occurred together in many samples. Most of the mineralisation tends to be vein-related.

8.2 Further Exploration

Thin and polished sections of the Cuni drill core may be made and examined.

The economics of graphite and the mining methods will be examined to determine if further work is required on the Carbine area.

Follow-up of the Razorback West Pb/Zn anomaly in the limestone is required to determine continuity and grades.

A magnetic anomaly in the vicinity of Misery Hill will be traversed and modelled.

The Dundas/Razorback line of mineralisation will be re-examined and possible drill targets defined.

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PDE/SGL
June 1986

APPENDIX I

CYPRUS PROGRESS REPORT

(See accompanying report under separate cover)

Jones, P.A., 1985 Progress Report, July 1985 to June 1986, Cyprus/CSR Joint Venture, Part Exploration Licence 15/76, Dundas, Tasmania.
Cyprus Minerals Australia Company (unpub.)

APPENDIX II

CUNI MAGNETIC DATA

LINES 4900E
5100E
5300E
5500E
5700E
5900E
6200E
6400E
6600E

Line 4900E

East	North	Magnetics
4900.	5325.	62351.0
4900.	5350.	62374.0
4900.	5375.	62394.0
4900.	5400.	62384.0
4900.	5425.	62388.0
4900.	5450.	62381.0
4900.	5475.	62391.0
4900.	5500.	62394.0
4900.	5525.	62405.0
4900.	5550.	62415.0
4900.	5575.	62414.0
4900.	5600.	62416.0
4900.	5625.	62409.0
4900.	5650.	62410.0
4900.	5675.	62426.0
4900.	5700.	62437.0
4900.	5725.	62441.0
4900.	5750.	62431.0
4900.	5775.	62445.0
4900.	5800.	62436.0
4900.	5825.	62454.0
4900.	5850.	62453.0
4900.	5875.	62456.0
4900.	5900.	62464.0
4900.	5925.	62471.0
4900.	5950.	62477.0
4900.	5975.	62468.0
4900.	6000.	62460.0
4900.	6025.	62448.0
4900.	6050.	62446.0
4900.	6075.	62438.0
4900.	6100.	62452.0
4900.	6125.	62496.0
4900.	6150.	62545.0
4900.	6175.	62496.0
4900.	6200.	62610.0
4900.	6225.	62774.0
4900.	6250.	62640.0
4900.	6275.	62649.0
4900.	6300.	62652.0
4900.	6325.	62674.0
4900.	6350.	62689.0
4900.	6375.	62660.0
4900.	6400.	62692.0
4900.	6425.	62629.0

Line 4900E (cont.)

East	North	Magnetics
4900.	6450.	62587.0
4900.	6475.	62518.0
4900.	6500.	62513.0
4900.	6525.	62527.0
4900.	6550.	62546.0
4900.	6575.	62553.0
4900.	6600.	62548.0
4900.	6625.	62572.0
4900.	6650.	62667.0
4900.	6675.	62707.0
4900.	6700.	62793.0
4900.	6725.	62694.0
4900.	6750.	62642.0
4900.	6775.	62550.0
4900.	6800.	62587.0
4900.	6825.	62601.0
4900.	6850.	62564.0
4900.	6875.	62561.0
4900.	6900.	62570.0
4900.	6925.	62564.0
4900.	6950.	62557.0
4900.	6975.	62548.0
4900.	7000.	62549.0
4900.	7025.	62551.0
4900.	7050.	62544.0
4900.	7075.	62553.0
4900.	7100.	62545.0
4900.	7125.	62547.0
4900.	7150.	62556.0
4900.	7175.	62547.0
4900.	7200.	62537.0
4900.	7225.	62545.0
4900.	7250.	62551.0
4900.	7275.	62551.0
4900.	7300.	62551.0
4900.	7325.	62563.0
4900.	7350.	62560.0
4900.	7375.	62552.0
4900.	7400.	62542.0
4900.	7425.	62562.0
4900.	7450.	62550.0
4900.	7475.	62560.0
4900.	7500.	62556.0
4900.	7525.	62550.0
4900.	7550.	62557.0
4900.	7575.	62550.0
4900.	7600.	62547.0
4900.	7625.	62551.0
4900.	7650.	62546.0

Line 4900E (cont.)

East	North	Magnetics
4900.	7675.	62547.0
4900.	7700.	62554.0
4900.	7725.	62559.0
4900.	7750.	62555.0
4900.	7775.	62542.0
4900.	7800.	62537.0
4900.	7825.	62527.0
4900.	7850.	62537.0
4900.	7875.	62538.0
4900.	7900.	62532.0
4900.	7925.	62535.0
4900.	7950.	62531.0
4900.	7975.	62527.0
4900.	8000.	62530.0
4900.	8025.	62523.0
4900.	8050.	62517.0
4900.	8075.	62524.0
4900.	8100.	62504.0
4900.	8125.	62507.0
4900.	8150.	62518.0
4900.	8175.	62519.0
4900.	8200.	62513.0
4900.	8225.	62519.0
4900.	8250.	62490.0
4900.	8275.	62489.0
4900.	8300.	62510.0
4900.	8325.	62514.0
4900.	8350.	62551.0
4900.	8375.	62574.0
4900.	8400.	62527.0
4900.	8425.	62532.0
4900.	8450.	62529.0
4900.	8475.	62516.0
4900.	8500.	62523.0
4900.	8525.	62516.0
4900.	8550.	62502.0
4900.	8575.	62500.0

Line 5100E

East	North	Magnetics
5100.	5525.	62390.0
5100.	5550.	62392.0
5100.	5575.	62384.0
5100.	5600.	62397.0
5100.	5625.	62403.0
5100.	5650.	62413.0
5100.	5675.	62427.0
5100.	5700.	62433.0
5100.	5725.	62440.0
5100.	5750.	62429.0
5100.	5775.	62420.0
5100.	5800.	62418.0
5100.	5825.	62426.0
5100.	5850.	62430.0
5100.	5875.	62448.0
5100.	5900.	62454.0
5100.	5925.	62443.0
5100.	5950.	62447.0
5100.	5975.	62450.0
5100.	6000.	62493.0
5100.	6025.	62499.0
5100.	6050.	62510.0
5100.	6075.	62502.0
5100.	6100.	62505.0
5100.	6125.	62501.0
5100.	6150.	62502.0
5100.	6175.	62512.0
5100.	6200.	62510.0
5100.	6225.	62514.0
5100.	6250.	62522.0
5100.	6275.	62530.0
5100.	6300.	62538.0
5100.	6325.	62532.0
5100.	6350.	62534.0
5100.	6375.	62535.0
5100.	6400.	62532.0
5100.	6425.	62529.0
5100.	6450.	62539.0
5100.	6475.	62541.0
5100.	6500.	62541.0
5100.	6525.	62542.0
5100.	6550.	62543.0
5100.	6575.	62543.0
5100.	6600.	62551.0

Line 5100E (cont.)

East	North	Magnetics
5100.	6625.	62538.0
5100.	6650.	62541.0
5100.	6675.	62543.0
5100.	6700.	62541.0
5100.	6725.	62544.0
5100.	6750.	62548.0
5100.	6775.	62558.0
5100.	6800.	62573.0
5100.	6825.	62581.0
5100.	6850.	62552.0
5100.	6875.	62553.0
5100.	6900.	62556.0
5100.	6925.	62560.0
5100.	6950.	62557.0
5100.	6975.	62532.0
5100.	7000.	62555.0
5100.	7025.	62552.0
5100.	7050.	62556.0
5100.	7075.	62545.0
5100.	7100.	62566.0
5100.	7125.	62640.0
5100.	7150.	62621.0
5100.	7175.	62631.0
5100.	7200.	62604.0
5100.	7225.	62598.0
5100.	7250.	62595.0
5100.	7275.	62590.0
5100.	7300.	62596.0
5100.	7325.	62595.0
5100.	7350.	62603.0
5100.	7375.	62613.0
5100.	7400.	62616.0
5100.	7425.	62604.0
5100.	7450.	62584.0
5100.	7475.	62591.0
5100.	7500.	62572.0
5100.	7525.	62576.0
5100.	7550.	62575.0
5100.	7575.	62579.0
5100.	7600.	62584.0
5100.	7625.	62586.0
5100.	7650.	62582.0
5100.	7675.	62572.0
5100.	7700.	62557.0
5100.	7725.	62543.0
5100.	7750.	62540.0
5100.	7775.	62522.0
5100.	7800.	62540.0

Line 5100E (cont.)

East	North	Magnetics
5100.	7825.	62532.0
5100.	7850.	62541.0
5100.	7875.	62540.0
5100.	7900.	62545.0
5100.	7925.	62534.0
5100.	7950.	62532.0
5100.	7975.	62528.0
5100.	8000.	62517.0
5100.	8025.	62521.0
5100.	8050.	62506.0
5100.	8075.	62496.0
5100.	8100.	62510.0
5100.	8125.	62515.0
5100.	8150.	62522.0
5100.	8175.	62524.0
5100.	8200.	62516.0
5100.	8225.	62517.0
5100.	8250.	62510.0
5100.	8275.	62499.0
5100.	8300.	62487.0
5100.	8325.	62487.0
5100.	8350.	62496.0
5100.	8375.	62489.0
5100.	8400.	62487.0
5100.	8425.	62490.0
5100.	8450.	62489.0
5100.	8475.	62490.0
5100.	8500.	62492.0
5100.	8525.	62483.0
5100.	8550.	62494.0
5100.	8575.	62485.0
5100.	8600.	62492.0

Line 5300E

East	North	Magnetics
5300.	6075.	62464.0
5300.	6100.	62475.0
5300.	6125.	62477.0
5300.	6150.	62480.0
5300.	6175.	62476.0
5300.	6200.	62486.0
5300.	6225.	62496.0
5300.	6250.	62500.0
5300.	6275.	62506.0
5300.	6300.	62492.0
5300.	6325.	62483.0
5300.	6350.	62487.0
5300.	6375.	62487.0
5300.	6400.	62487.0
5300.	6425.	62487.0
5300.	6450.	62496.0
5300.	6475.	62489.0
5300.	6500.	62494.0
5300.	6525.	62500.0
5300.	6550.	62511.0
5300.	6575.	62510.0
5300.	6600.	62523.0
5300.	6625.	62528.0
5300.	6650.	62503.0
5300.	6675.	62525.0
5300.	6700.	62535.0
5300.	6725.	62519.0
5300.	6750.	62528.0
5300.	6775.	62513.0
5300.	6800.	62510.0
5300.	6825.	62522.0
5300.	6850.	62526.0
5300.	6875.	62530.0
5300.	6900.	62540.0
5300.	6925.	62526.0
5300.	6950.	62517.0
5300.	6975.	62517.0
5300.	7000.	62511.0
5300.	7025.	62504.0
5300.	7050.	62507.0
5300.	7075.	62504.0
5300.	7100.	62511.0
5300.	7125.	62512.0
5300.	7150.	62542.0

Line 5300E (cont.)

East	North	Magnetics
5300.	7175.	62552.0
5300.	7200.	62540.0
5300.	7225.	62542.0
5300.	7250.	62530.0
5300.	7275.	62535.0
5300.	7300.	62543.0
5300.	7325.	62536.0
5300.	7350.	62536.0
5300.	7375.	62553.0
5300.	7400.	62558.0
5300.	7425.	62560.0
5300.	7450.	62549.0
5300.	7475.	62570.0
5300.	7500.	62539.0
5300.	7525.	62531.0
5300.	7550.	62548.0
5300.	7575.	62534.0
5300.	7600.	62535.0
5300.	7625.	62559.0
5300.	7650.	62541.0
5300.	7675.	62541.0
5300.	7700.	62536.0
5300.	7725.	62550.0
5300.	7750.	62547.0
5300.	7775.	62565.0
5300.	7800.	62555.0
5300.	7825.	62548.0
5300.	7850.	62579.0
5300.	7875.	62546.0
5300.	7900.	62554.0
5300.	7925.	62545.0
5300.	7950.	62532.0
5300.	7975.	62521.0
5300.	8000.	62531.0
5300.	8025.	62543.0
5300.	8050.	62549.0
5300.	8075.	62541.0
5300.	8100.	62525.0
5300.	8125.	62538.0
5300.	8150.	62541.0
5300.	8175.	62531.0
5300.	8200.	62522.0
5300.	8225.	62502.0
5300.	8250.	62487.0
5300.	8275.	62493.0
5300.	8300.	62477.0
5300.	8325.	62485.0
5300.	8350.	62475.0

Line 5300E (cont.)

East	North	Magnetics
5300.	8375.	62459.0
5300.	8400.	62495.0
5300.	8425.	62459.0
5300.	8450.	62473.0
5300.	8475.	62454.0
5300.	8500.	62474.0
5300.	8525.	62462.0
5300.	8550.	62449.0
5300.	8575.	62464.0

Line 5500E

East	North	Magnetics
5500.	5775.	62415.0
5500.	5800.	62423.0
5500.	5825.	62429.0
5500.	5850.	62430.0
5500.	5875.	62420.0
5500.	5900.	62439.0
5500.	5925.	62434.0
5500.	5950.	62438.0
5500.	5975.	62424.0
5500.	6000.	62425.0
5500.	6025.	62436.0
5500.	6050.	62513.0
5500.	6075.	62605.0
5500.	6100.	62486.0
5500.	6125.	62449.0
5500.	6150.	62465.0
5500.	6175.	62451.0
5500.	6200.	62455.0
5500.	6225.	62458.0
5500.	6250.	62465.0
5500.	6275.	62471.0
5500.	6300.	62471.0
5500.	6325.	62411.0
5500.	6350.	62483.0
5500.	6375.	62551.0
5500.	6400.	62488.0
5500.	6425.	62486.0
5500.	6450.	62496.0
5500.	6475.	62490.0
5500.	6500.	62500.0
5500.	6525.	62495.0
5500.	6550.	62490.0
5500.	6575.	62494.0
5500.	6600.	62504.0
5500.	6625.	62502.0
5500.	6650.	62500.0
5500.	6675.	62498.0
5500.	6700.	62500.0
5500.	6725.	62502.0
5500.	6750.	62513.0
5500.	6775.	62495.0
5500.	6800.	62522.0
5500.	6825.	62517.0
5500.	6850.	62507.0

Line 5500E (cont.)

East	North	Magnetics
5500.	6875.	62537.0
5500.	6900.	62521.0
5500.	6925.	62536.0
5500.	6950.	62514.0
5500.	6975.	62522.0
5500.	7000.	62523.0
5500.	7025.	62524.0
5500.	7050.	62520.0
5500.	7075.	62538.0
5500.	7100.	62544.0
5500.	7125.	62570.0
5500.	7150.	62572.0
5500.	7175.	62586.0
5500.	7200.	62585.0
5500.	7225.	62602.0
5500.	7250.	62590.0
5500.	7275.	62585.0
5500.	7300.	62573.0
5500.	7325.	62566.0
5500.	7350.	62569.0
5500.	7375.	62582.0
5500.	7400.	62577.0
5500.	7425.	62562.0
5500.	7450.	62593.0
5500.	7475.	62601.0
5500.	7500.	62574.0
5500.	7525.	62589.0
5500.	7550.	62594.0
5500.	7575.	62609.0
5500.	7600.	62612.0
5500.	7625.	62610.0
5500.	7650.	62600.0
5500.	7675.	62605.0
5500.	7700.	62602.0
5500.	7725.	62604.0
5500.	7750.	62596.0
5500.	7775.	62607.0
5500.	7800.	62595.0
5500.	7825.	62592.0
5500.	7850.	62588.0
5500.	7875.	62575.0
5500.	7900.	62566.0
5500.	7925.	62556.0
5500.	7950.	62562.0
5500.	7975.	62543.0
5500.	8000.	62538.0
5500.	8025.	62536.0
5500.	8050.	62533.0

Line 5500E (cont.)

East	North	Magnetics
5500.	8075.	62539.0
5500.	8100.	62529.0
5500.	8125.	62525.0
5500.	8150.	62528.0
5500.	8175.	62516.0
5500.	8200.	62509.0
5500.	8225.	62507.0
5500.	8250.	62529.0
5500.	8275.	62515.0
5500.	8300.	62513.0
5500.	8325.	62517.0
5500.	8350.	62501.0
5500.	8375.	62506.0
5500.	8400.	62509.0
5500.	8425.	62512.0
5500.	8450.	62492.0
5500.	8475.	62491.0
5500.	8500.	62521.0
5500.	8525.	62524.0
5500.	8550.	62501.0
5500.	8575.	62484.0
5500.	8600.	62465.0

Line 5700E

East	North	Magnetics
5700.	5950.	62444.0
5700.	5975.	62447.0
5700.	6000.	62452.0
5700.	6025.	62461.0
5700.	6050.	62451.0
5700.	6075.	62451.0
5700.	6100.	62465.0
5700.	6125.	62457.0
5700.	6150.	62463.0
5700.	6175.	62456.0
5700.	6200.	62474.0
5700.	6225.	62473.0
5700.	6250.	62468.0
5700.	6275.	62465.0
5700.	6300.	62468.0
5700.	6325.	62471.0
5700.	6350.	62485.0
5700.	6375.	62480.0
5700.	6400.	62487.0
5700.	6425.	62477.0
5700.	6450.	62475.0
5700.	6475.	62484.0
5700.	6500.	62476.0
5700.	6525.	62479.0
5700.	6550.	62501.0
5700.	6575.	62522.0
5700.	6600.	62535.0
5700.	6625.	62524.0
5700.	6650.	62509.0
5700.	6675.	62531.0
5700.	6700.	62565.0
5700.	6725.	62556.0
5700.	6750.	62538.0
5700.	6775.	62536.0
5700.	6800.	62544.0
5700.	6825.	62520.0
5700.	6850.	62520.0
5700.	6875.	62518.0
5700.	6900.	62515.0
5700.	6925.	62515.0
5700.	6950.	62541.0
5700.	6975.	62548.0
5700.	7000.	62541.0
5700.	7025.	62561.0
5700.	7050.	62547.0

Line 5700E (cont.)

East	North	Magnetics
5700.	7075.	62543.0
5700.	7100.	62562.0
5700.	7125.	62567.0
5700.	7150.	62573.0
5700.	7175.	62572.0
5700.	7200.	62575.0
5700.	7225.	62578.0
5700.	7250.	62596.0
5700.	7275.	62601.0
5700.	7300.	62607.0
5700.	7325.	62614.0
5700.	7350.	62623.0
5700.	7375.	62623.0
5700.	7400.	62649.0
5700.	7425.	62645.0
5700.	7450.	62646.0
5700.	7475.	62653.0
5700.	7500.	62672.0
5700.	7525.	62678.0
5700.	7550.	62697.0
5700.	7575.	62696.0
5700.	7600.	62683.0
5700.	7625.	62665.0
5700.	7650.	62644.0
5700.	7675.	62630.0
5700.	7700.	62614.0
5700.	7725.	62599.0
5700.	7750.	62588.0
5700.	7775.	62577.0
5700.	7800.	62571.0
5700.	7825.	62575.0
5700.	7850.	62570.0
5700.	7875.	62560.0
5700.	7900.	62562.0
5700.	7925.	62559.0
5700.	7950.	62568.0
5700.	7975.	62566.0
5700.	8000.	62569.0
5700.	8025.	62575.0
5700.	8050.	62561.0
5700.	8075.	62544.0
5700.	8100.	62553.0
5700.	8125.	62521.0
5700.	8150.	62515.0
5700.	8175.	62505.0
5700.	8200.	62508.0
5700.	8225.	62496.0
5700.	8250.	62491.0

Line 5700E (cont.)

East	North	Magnetics
5700.	8275.	62487.0
5700.	8300.	62482.0
5700.	8325.	62469.0
5700.	8350.	62483.0
5700.	8375.	62480.0
5700.	8400.	62484.0
5700.	8425.	62463.0
5700.	8450.	62463.0
5700.	8475.	62452.0
5700.	8500.	62455.0
5700.	8525.	62454.0
5700.	8550.	62459.0
5700.	8575.	62441.0
5700.	8600.	62451.0

Line 5900E

East	North	Magnetics
5900.	5975.	62442.0
5900.	6000.	62445.0
5900.	6025.	62441.0
5900.	6050.	62455.0
5900.	6075.	62443.0
5900.	6100.	62458.0
5900.	6125.	62458.0
5900.	6150.	62462.0
5900.	6175.	62467.0
5900.	6200.	62467.0
5900.	6225.	62472.0
5900.	6250.	62477.0
5900.	6275.	62483.0
5900.	6300.	62487.0
5900.	6325.	62486.0
5900.	6350.	62483.0
5900.	6375.	62490.0
5900.	6400.	62493.0
5900.	6425.	62494.0
5900.	6450.	62486.0
5900.	6475.	62483.0
5900.	6500.	62484.0
5900.	6525.	62494.0
5900.	6550.	62487.0
5900.	6575.	62497.0
5900.	6600.	62496.0
5900.	6625.	62499.0
5900.	6650.	62507.0
5900.	6675.	62511.0
5900.	6700.	62508.0
5900.	6725.	62519.0
5900.	6750.	62522.0
5900.	6775.	62507.0
5900.	6800.	62506.0
5900.	6825.	62511.0
5900.	6850.	62511.0
5900.	6875.	62523.0
5900.	6900.	62538.0
5900.	6925.	62546.0
5900.	6950.	62530.0
5900.	6975.	62529.0
5900.	7000.	62528.0
5900.	7025.	62532.0
5900.	7050.	62540.0

Line 5900E (cont.)

East	North	Magnetics
5900.	7075.	62546.0
5900.	7100.	62547.0
5900.	7125.	62556.0
5900.	7150.	62557.0
5900.	7175.	62564.0
5900.	7200.	62573.0
5900.	7225.	62563.0
5900.	7250.	62562.0
5900.	7275.	62566.0
5900.	7300.	62568.0
5900.	7325.	62563.0
5900.	7350.	62578.0
5900.	7375.	62586.0
5900.	7400.	62588.0
5900.	7425.	62576.0
5900.	7450.	62570.0
5900.	7475.	62571.0
5900.	7500.	62560.0
5900.	7525.	62561.0
5900.	7550.	62560.0
5900.	7575.	62557.0
5900.	7600.	62556.0
5900.	7625.	62558.0
5900.	7650.	62549.0
5900.	7675.	62560.0
5900.	7700.	62562.0
5900.	7725.	62560.0
5900.	7750.	62557.0
5900.	7775.	62556.0
5900.	7800.	62562.0
5900.	7825.	62555.0
5900.	7850.	62554.0
5900.	7875.	62557.0
5900.	7900.	62556.0
5900.	7925.	62547.0
5900.	7950.	62544.0
5900.	7975.	62543.0
5900.	8000.	62540.0
5900.	8025.	62517.0
5900.	8050.	62530.0
5900.	8075.	62537.0
5900.	8100.	62520.0
5900.	8125.	62509.0
5900.	8150.	62503.0
5900.	8175.	62506.0
5900.	8200.	62493.0
5900.	8225.	62491.0
5900.	8250.	62487.0

Line 5900E (cont.)

East	North	Magnetics
5900.	8275.	62476.0
5900.	8300.	62477.0
5900.	8325.	62478.0
5900.	8350.	62468.0
5900.	8375.	62461.0
5900.	8400.	62450.0
5900.	8425.	62445.0
5900.	8450.	62454.0
5900.	8475.	62458.0
5900.	8500.	62459.0
5900.	8525.	62459.0
5900.	8550.	62457.0
5900.	8575.	62455.0
5900.	8600.	62438.0
5900.	8625.	62442.0
5900.	8650.	62432.0
5900.	8675.	62429.0
5900.	8700.	62419.0
5900.	8725.	62403.0
5900.	8750.	62394.0
5900.	8775.	62385.0

Line 6200E

East	North	Magnetics
6200.	5900.	62418.0
6200.	5925.	62394.0
6200.	5950.	62444.0
6200.	5975.	62444.0
6200.	6000.	62445.0
6200.	6025.	62453.0
6200.	6050.	62442.0
6200.	6075.	62453.0
6200.	6100.	62428.0
6200.	6125.	62483.0
6200.	6150.	62495.0
6200.	6175.	62495.0
6200.	6200.	62462.0
6200.	6225.	62483.0
6200.	6250.	62464.0
6200.	6275.	62454.0
6200.	6300.	62464.0
6200.	6325.	62461.0
6200.	6350.	62460.0
6200.	6375.	62470.0
6200.	6400.	62465.0
6200.	6425.	62467.0
6200.	6450.	62468.0
6200.	6475.	62467.0
6200.	6500.	62470.0
6200.	6525.	62464.0
6200.	6550.	62461.0
6200.	6575.	62460.0
6200.	6600.	62459.0
6200.	6625.	62458.0
6200.	6650.	62460.0
6200.	6675.	62460.0
6200.	6700.	62458.0
6200.	6725.	62458.0
6200.	6750.	62458.0
6200.	6775.	62461.0
6200.	6800.	62466.0
6200.	6825.	62475.0
6200.	6850.	62479.0
6200.	6875.	62477.0
6200.	6900.	62474.0
6200.	6925.	62480.0
6200.	6950.	62480.0
6200.	6975.	62487.0
6200.	7000.	62490.0

Line 6200E (cont.)

East	North	Magnetics
6200.	7025.	62490.0
6200.	7050.	62494.0
6200.	7075.	62499.0
6200.	7100.	62497.0
6200.	7125.	62498.0
6200.	7150.	62507.0
6200.	7175.	62504.0
6200.	7200.	62503.0
6200.	7225.	62510.0
6200.	7250.	62502.0
6200.	7275.	62527.0
6200.	7300.	62511.0
6200.	7325.	62514.0
6200.	7350.	62513.0
6200.	7375.	62513.0
6200.	7400.	62513.0
6200.	7425.	62513.0
6200.	7450.	62513.0
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6200.	7525.	62519.0
6200.	7550.	62524.0
6200.	7575.	62513.0
6200.	7600.	62501.0
6200.	7625.	62529.0
6200.	7650.	62541.0
6200.	7675.	62536.0
6200.	7700.	62464.0
6200.	7725.	62527.0
6200.	7750.	62527.0
6200.	7775.	62513.0
6200.	7800.	62545.0
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6200.	7950.	62536.0
6200.	7975.	62509.0
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6200.	8025.	62497.0
6200.	8050.	62488.0
6200.	8075.	62476.0
6200.	8100.	62472.0
6200.	8125.	62465.0
6200.	8150.	62460.0
6200.	8175.	62453.0
6200.	8200.	62450.0

Line 6200E (cont.)

East	North	Magnetics
6200.	8225.	62447.0
6200.	8250.	62440.0
6200.	8275.	62434.0
6200.	8300.	62434.0
6200.	8325.	62424.0
6200.	8350.	62417.0
6200.	8375.	62417.0
6200.	8400.	62402.0
6200.	8425.	62396.0
6200.	8450.	62403.0
6200.	8475.	62425.0
6200.	8500.	62420.0

Line 6400E

East	North	Magnetics
6400.	5875.	62348.0
6400.	5900.	62348.0
6400.	5925.	62354.0
6400.	5950.	62353.0
6400.	5975.	62357.0
6400.	6000.	62350.0
6400.	6025.	62365.0
6400.	6050.	62368.0
6400.	6075.	62370.0
6400.	6100.	62362.0
6400.	6125.	62370.0
6400.	6150.	62355.0
6400.	6175.	62393.0
6400.	6200.	62366.0
6400.	6225.	62377.0
6400.	6250.	62373.0
6400.	6275.	62380.0
6400.	6300.	62370.0
6400.	6325.	62376.0
6400.	6350.	62373.0
6400.	6375.	62396.0
6400.	6400.	62375.0
6400.	6425.	62373.0
6400.	6450.	62373.0
6400.	6475.	62373.0
6400.	6500.	62377.0
6400.	6525.	62380.0
6400.	6550.	62381.0
6400.	6575.	62371.0
6400.	6600.	62379.0
6400.	6625.	62376.0
6400.	6650.	62377.0
6400.	6675.	62380.0
6400.	6700.	62377.0
6400.	6725.	62390.0
6400.	6750.	62394.0
6400.	6775.	62393.0
6400.	6800.	62395.0
6400.	6825.	62398.0
6400.	6850.	62398.0
6400.	6875.	62396.0
6400.	6900.	62401.0
6400.	6925.	62403.0
6400.	6950.	62402.0
6400.	6975.	62414.0

Line 6400E (cont.)

East	North	Magnetics
6400.	7000.	62412.0
6400.	7025.	62413.0
6400.	7050.	62420.0
6400.	7075.	62418.0
6400.	7100.	62421.0
6400.	7125.	62422.0
6400.	7150.	62419.0
6400.	7175.	62425.0
6400.	7200.	62431.0
6400.	7225.	62437.0
6400.	7250.	62441.0
6400.	7275.	62448.0
6400.	7300.	62452.0
6400.	7325.	62457.0
6400.	7350.	62466.0
6400.	7375.	62463.0
6400.	7400.	62462.0
6400.	7425.	62460.0
6400.	7450.	62460.0
6400.	7475.	62461.0
6400.	7500.	62466.0
6400.	7525.	62472.0
6400.	7550.	62471.0
6400.	7575.	62470.0
6400.	7600.	62473.0
6400.	7625.	62473.0
6400.	7650.	62480.0
6400.	7675.	62473.0
6400.	7700.	62480.0
6400.	7725.	62476.0
6400.	7750.	62490.0
6400.	7775.	62520.0
6400.	7800.	62485.0
6400.	7825.	62485.0
6400.	7850.	62473.0
6400.	7875.	62459.0
6400.	7900.	62497.0
6400.	7925.	62517.0
6400.	7950.	62527.0
6400.	7975.	62507.0
6400.	8000.	62513.0
6400.	8025.	62486.0
6400.	8050.	62476.0
6400.	8075.	62471.0
6400.	8100.	62467.0
6400.	8125.	62472.0
6400.	8150.	62460.0
6400.	8175.	62454.0

Line 6400E (cont.)

East	North	Magnetics
6400.	8200.	62449.0
6400.	8225.	62431.0
6400.	8250.	62430.0
6400.	8275.	62467.0
6400.	8300.	62420.0
6400.	8325.	62409.0
6400.	8350.	62401.0
6400.	8375.	62399.0
6400.	8400.	62403.0
6400.	8425.	62405.0
6400.	8450.	62396.0
6400.	8475.	62389.0
6400.	8500.	62408.0
6400.	8525.	62412.0
6400.	8550.	62411.0
6400.	8575.	62408.0
6400.	8600.	62419.0
6400.	8625.	62406.0

Line 6600E (cont.)

East	North	Magnetics
6600.	8400.	62428.0
6600.	8425.	62406.0
6600.	8450.	62444.0
6600.	8475.	62420.0
6600.	8500.	62466.0
6600.	8525.	62493.0
6600.	8550.	62487.0
6600.	8575.	62526.0
6600.	8600.	62549.0

Line 6600E

East	North	Magnetics
6600.	5950.	62293.0
6600.	5975.	62297.0
6600.	6000.	62315.0
6600.	6025.	62309.0
6600.	6050.	62309.0
6600.	6075.	62312.0
6600.	6100.	62311.0
6600.	6125.	62310.0
6600.	6150.	62311.0
6600.	6175.	62306.0
6600.	6200.	62307.0
6600.	6225.	62308.0
6600.	6250.	62307.0
6600.	6275.	62314.0
6600.	6300.	62307.0
6600.	6325.	62302.0
6600.	6350.	62305.0
6600.	6375.	62321.0
6600.	6400.	62301.0
6600.	6425.	62312.0
6600.	6450.	62302.0
6600.	6475.	62307.0
6600.	6500.	62305.0
6600.	6525.	62301.0
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6600.	6600.	62314.0
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6600.	6650.	62313.0
6600.	6675.	62313.0
6600.	6700.	62313.0
6600.	6725.	62310.0
6600.	6750.	62309.0
6600.	6775.	62310.0
6600.	6800.	62309.0
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6600.	6850.	62310.0
6600.	6875.	62316.0
6600.	6900.	62321.0
6600.	6925.	62322.0
6600.	6950.	62325.0
6600.	6975.	62327.0
6600.	7000.	62327.0
6600.	7025.	62332.0
6600.	7050.	62343.0
6600.	7075.	62342.0
6600.	7100.	62347.0
6600.	7125.	62346.0
6600.	7150.	62355.0

Line 6600E (cont.)

East	North	Magnetics
6600.	7175.	62350.0
6600.	7200.	62354.0
6600.	7225.	62359.0
6600.	7250.	62365.0
6600.	7275.	62376.0
6600.	7300.	62434.0
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6600.	7375.	62379.0
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6600.	7425.	62388.0
6600.	7450.	62394.0
6600.	7475.	62391.0
6600.	7500.	62396.0
6600.	7525.	62394.0
6600.	7550.	62404.0
6600.	7575.	62407.0
6600.	7600.	62432.0
6600.	7625.	62416.0
6600.	7650.	62422.0
6600.	7675.	62434.0
6600.	7700.	62423.0
6600.	7725.	62443.0
6600.	7750.	62446.0
6600.	7775.	62443.0
6600.	7800.	62442.0
6600.	7825.	62438.0
6600.	7850.	62452.0
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6600.	7900.	62444.0
6600.	7925.	62448.0
6600.	7950.	62453.0
6600.	7975.	62464.0
6600.	8000.	62458.0
6600.	8025.	62474.0
6600.	8050.	62452.0
6600.	8075.	62447.0
6600.	8100.	62437.0
6600.	8125.	62436.0
6600.	8150.	62436.0
6600.	8175.	62428.0
6600.	8200.	62444.0
6600.	8225.	62424.0
6600.	8250.	62425.0
6600.	8275.	62422.0
6600.	8300.	62406.0
6600.	8325.	62415.0
6600.	8350.	62396.0
6600.	8375.	62408.0

APPENDIX III

CSAMT SURVEY DATA

CUNI LINE 5900E

995082

ZONGE ENGINEERING & RESEARCH ORGANIZATION

242 GLEN OSMOND ROAD, FULLARTON, SOUTH AUSTRALIA. 5063

Telephone : 338 1559 Telex : AA88713 (ABCENT)

October 28, 1985.

Job 555

CSR Minerals,
1 O'Connell Street,
Sydney, NSW 2000.

REF:CSAMT surveys completed on the CUNI project, Tasmania (May 1985), for CSR Minerals.

CSAMT data was collected along line 5900E on the CUNI grid. Frequencies from 8HZ to 4096HZ were collected as part of this CSAMT data set. Dates of the survey were the 23rd and 24th May, 1985.

The purpose of the CSAMT survey was to gain additional geophysical data over an apparently flat lying magnetic anomaly (modelled at a depth of 200 to 300 metres by CSR).

CSR is interested in identifying deposits of massive lead/zinc sulfides (not necessarily extraordinarily conductive) associated with certain structural features.

All data collected on this survey line can be assumed to be far field.

Apparent Resistivity

Apparent resistivity essentially shows Lo/Hi/Lo resistivity layering along the length of the survey line. Static offset phenomena is observed both at stations 8050N and 7600N (i.e. changes in resistivity are observed without corresponding changes in phase difference data).

Actually phase difference data indicates a near-surface change occurring between station 8050N and 8100N.

A broad low resistivity trend is identified at depth. Log-depth (frequencies plotted on a uniform depth scale) show near-surface changes in greater detail than is usually observed with the linear-depth plots. However the linear-depth plots show a more accurate spacial presentation of the data; relative depths/depth changes are more readily identified.

Phase Difference

The phase difference log-depth plots shows greater detail in the near surface data than is observed with the linear depth plots. A lateral change is observed between stations 8050N and 8100N which is seen in the 1024HZ, 2048HZ, and 4096 HZ data. A less observable change appears at 7500N (possibly 7600N). An extension of the survey line to the south would have confirmed this. Both changes can be related to a laterally defined contact (note the step changes in phase difference values from 600 milliradians to 500 milliradians).

The phase difference data shows similar Lo/Hi/Lo resistivity layering as was observed with the apparent resistivity data, except more uniformly layered. The decrease noted in the near surface phase values from 600 to 500 milliradians appears to be the result of increasing resistivity values associated with this middle layer, rather than as a result of major structural changes. There appears to be very little change in structure at depth, except for a possible shallow dip to the north.

NORMALIZED/OFFSET BOSTICK RESISTIVITY VS MT DEPTH

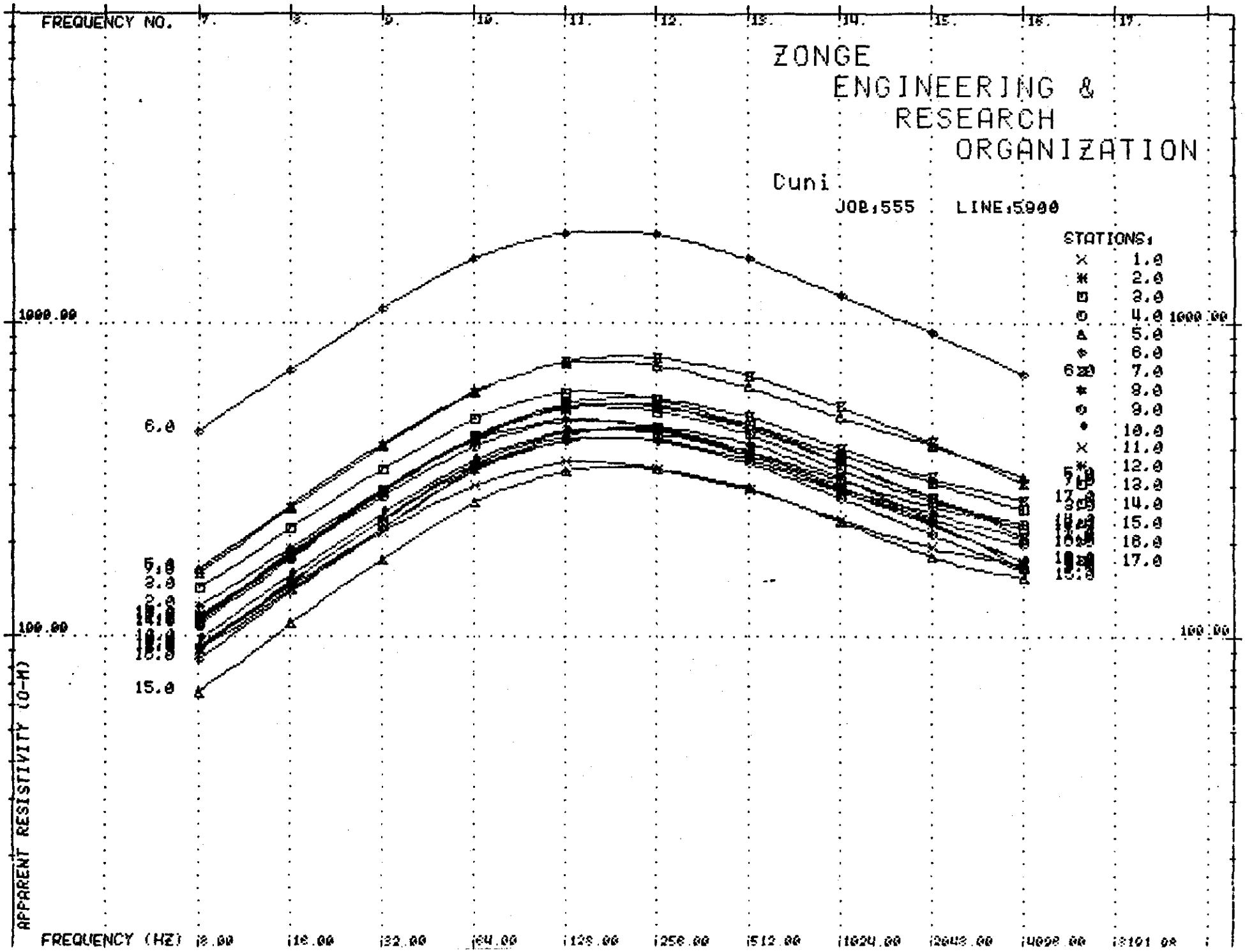
A normalization scheme is included for resistivity data. While this normalization scheme adds little to actual analysis, it is used as an input data set for the Bostick Resistivity vs.MT Depth calculations. This data set is provided which indicates resistive structure occurring at a depth of approximately 200 metres extending south of station 8100N to station 7500N.

The Bostick resistivity gives evidence for an increase in resistivity for this middle resistive layer, rather than a thickening (or change in geometry) of the structure associated with this middle layer.

General Comments

In this discussion, the electrical characteristics of the data are discussed. This data/information may not be directly related to actual geology. More data/information is needed for direct correlation with geology. The observations could possibly be related to weathering patterns, selected geochemical alteration or localized silicification etc. What is of immediate interest is the apparent correlation between the CSAMT data and other geophysical information, and the possible correlation between resistive structures identified by CSAMT and possible targets of interest.

E.Van Reed



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JOB:555 LINE:5900
STATIONS:
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FREQUENCY (HZ)
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1024.00
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083

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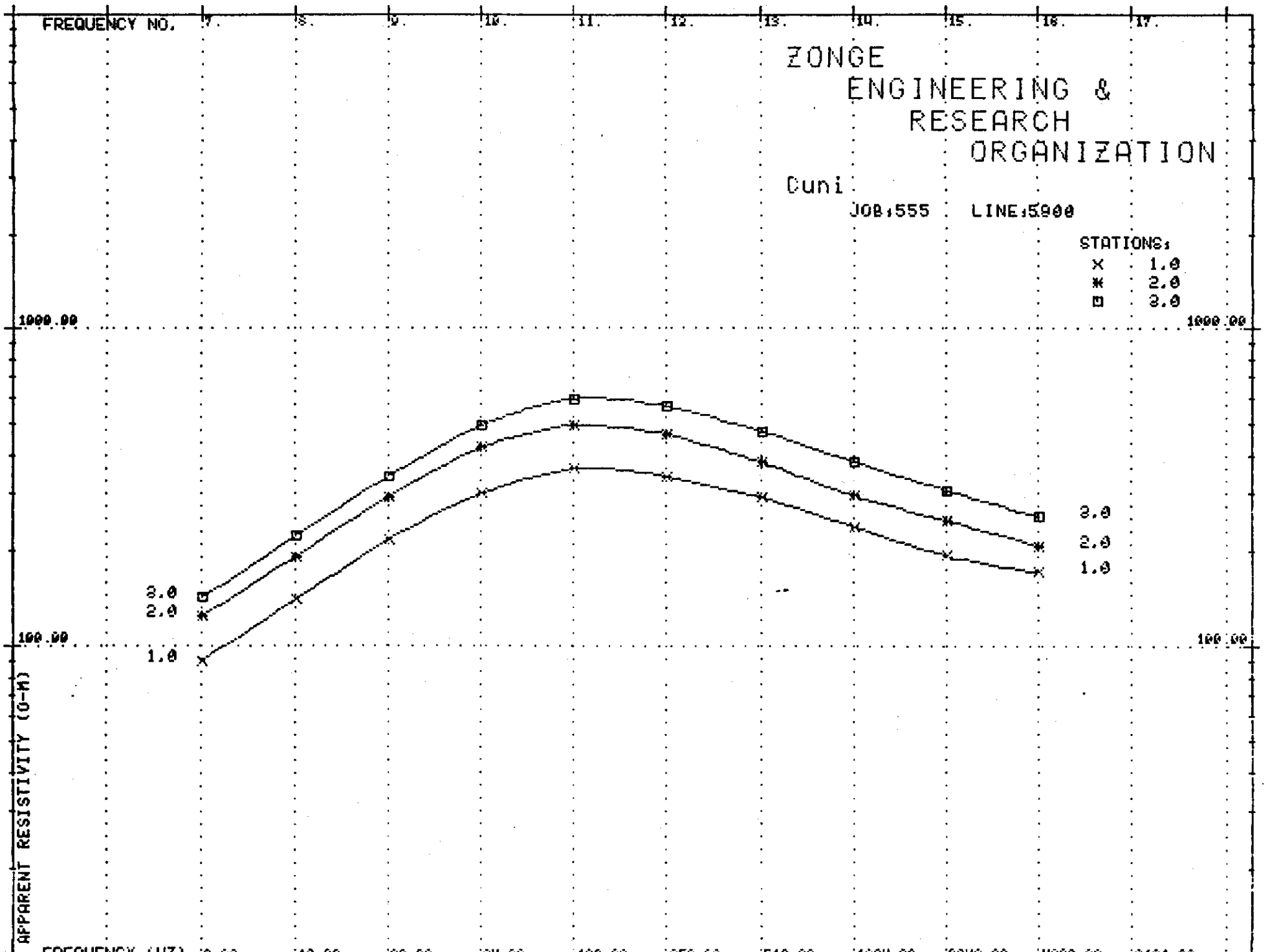
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STATIONS:
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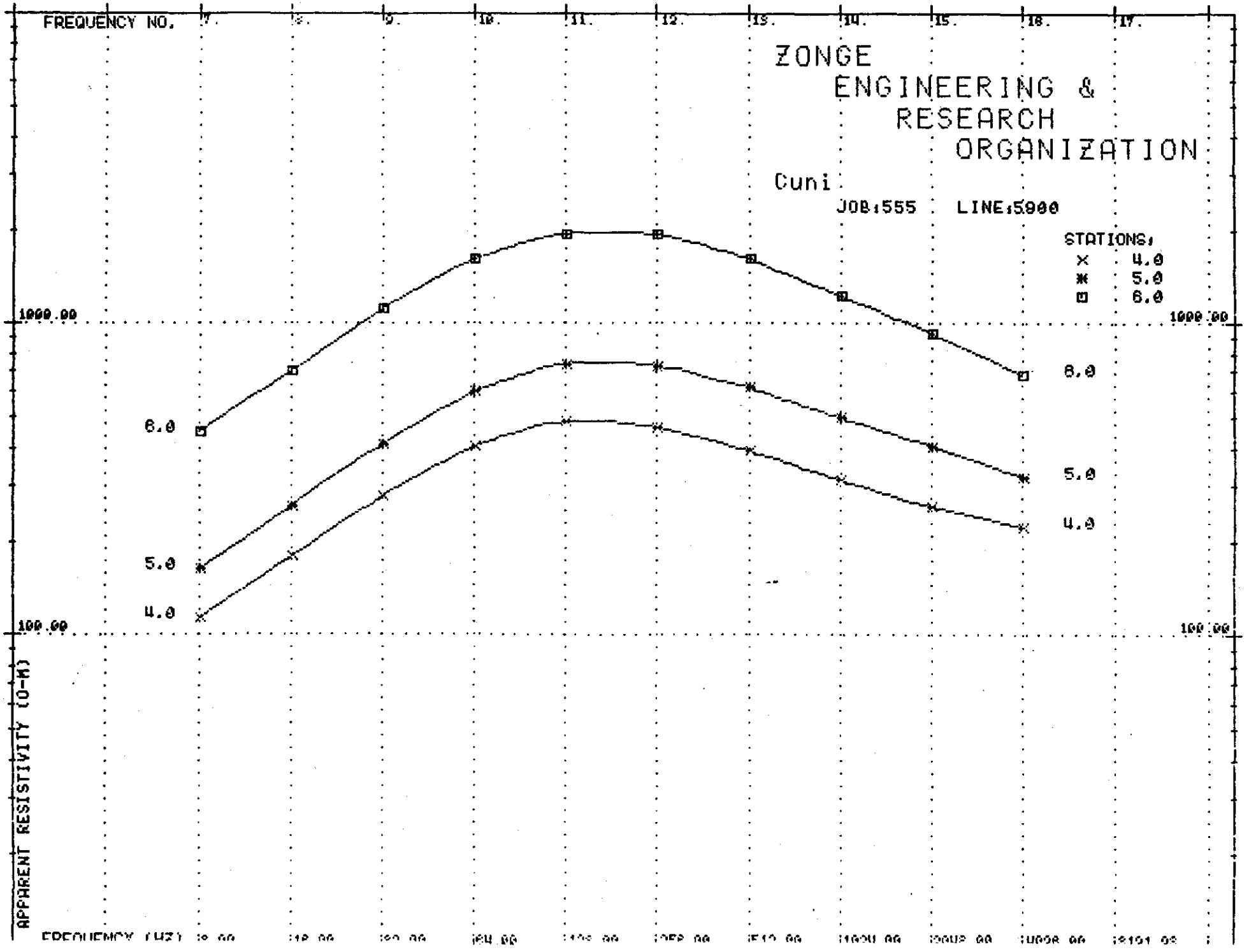
FREQUENCY (HZ)

084

995085


FREQUENCY NO.
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JOB:555 LINE:5900
STATIONS:
× 4.0
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⊡ 6.0
1000.00
100.00
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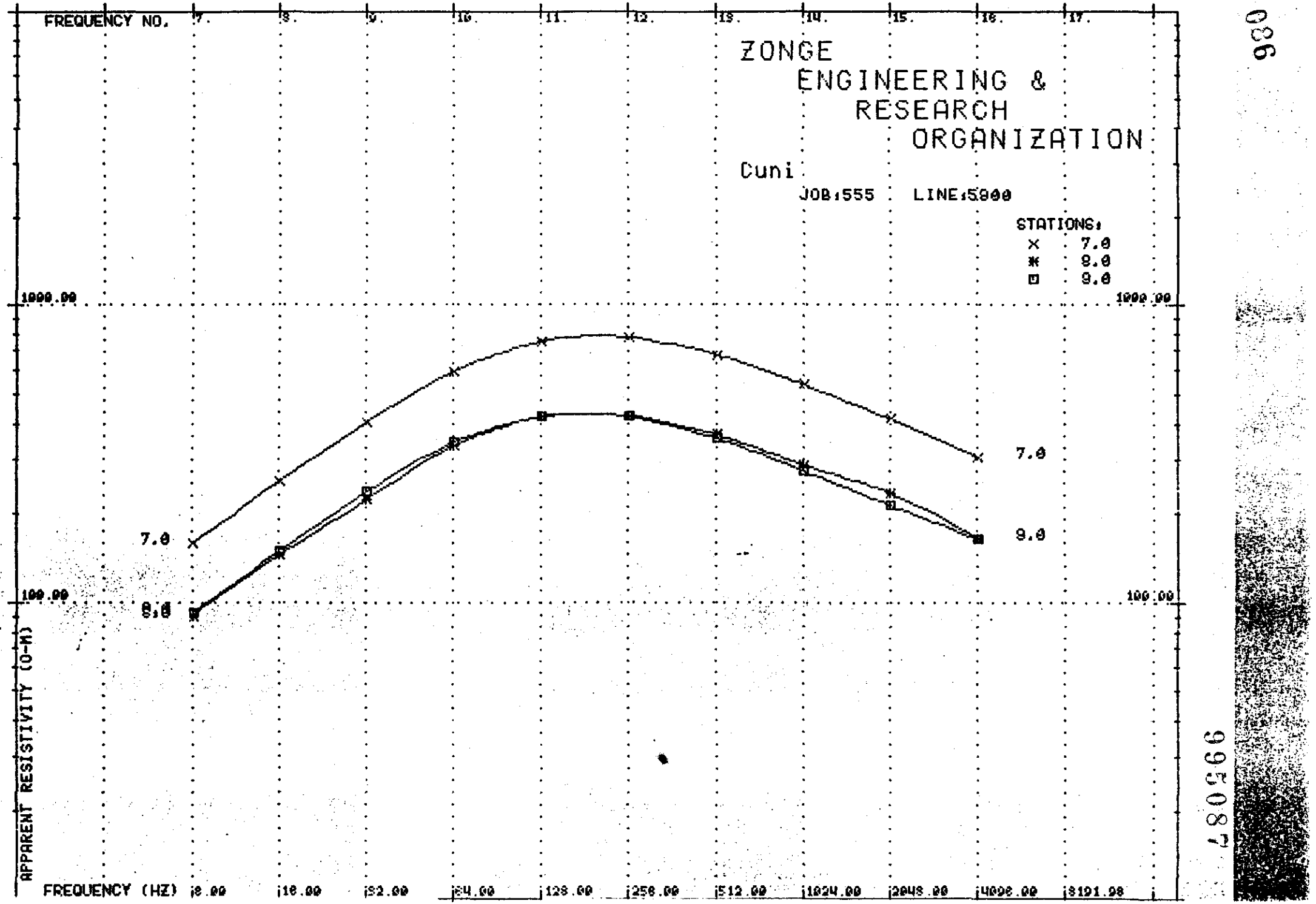
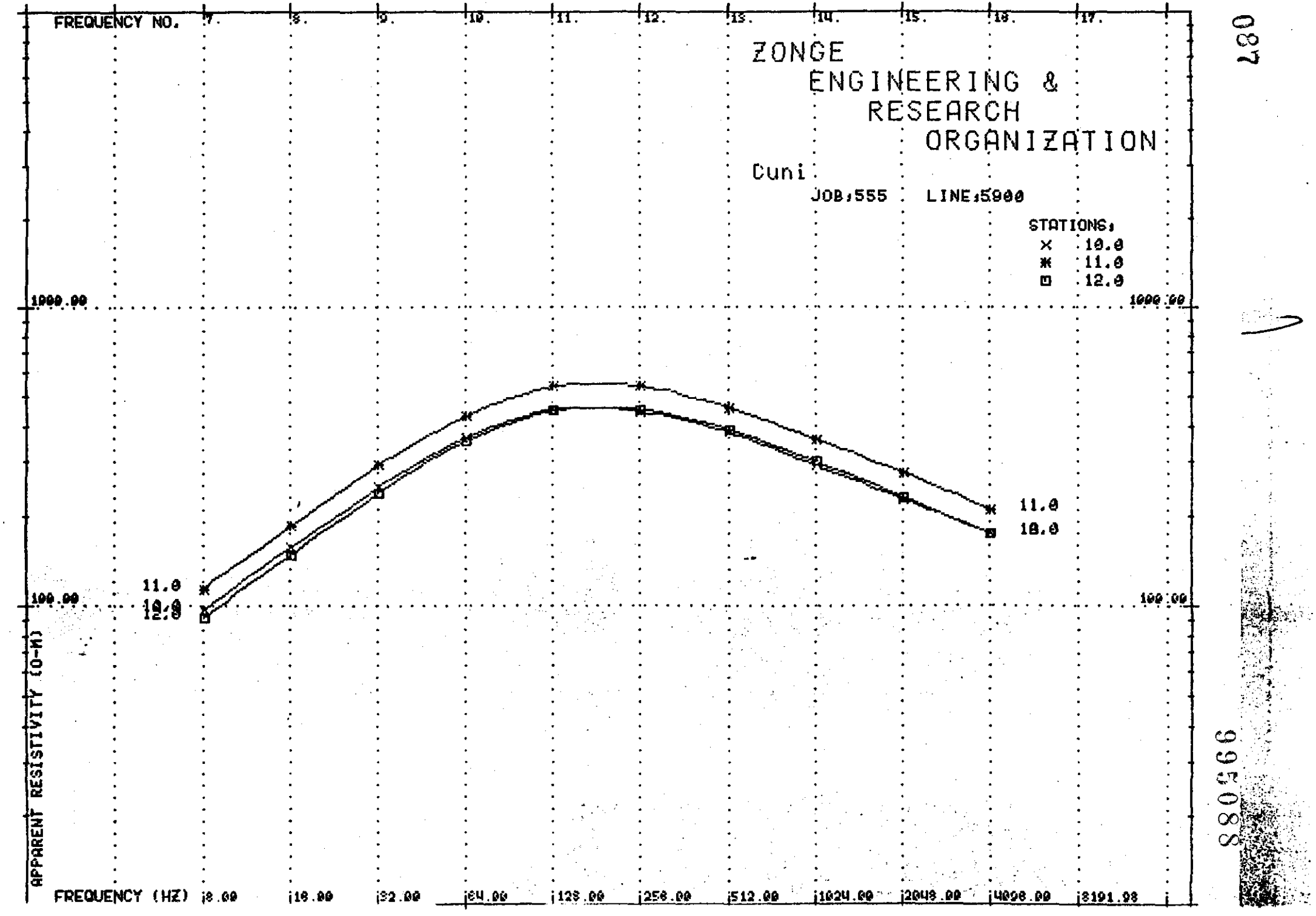
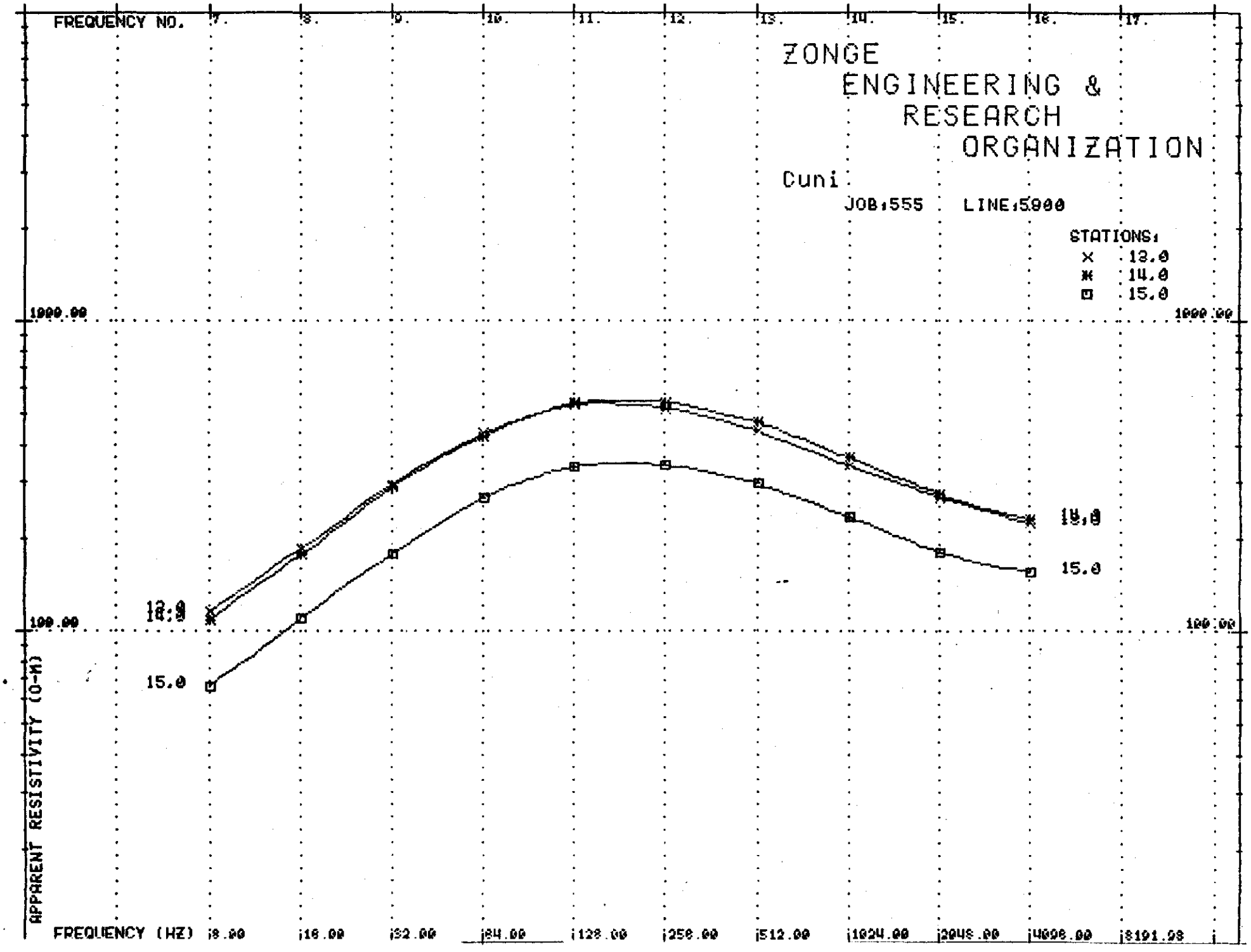
5.0
4.0
APPARENT RESISTIVITY (O-M)
FREQUENCY (HZ)

085

995086

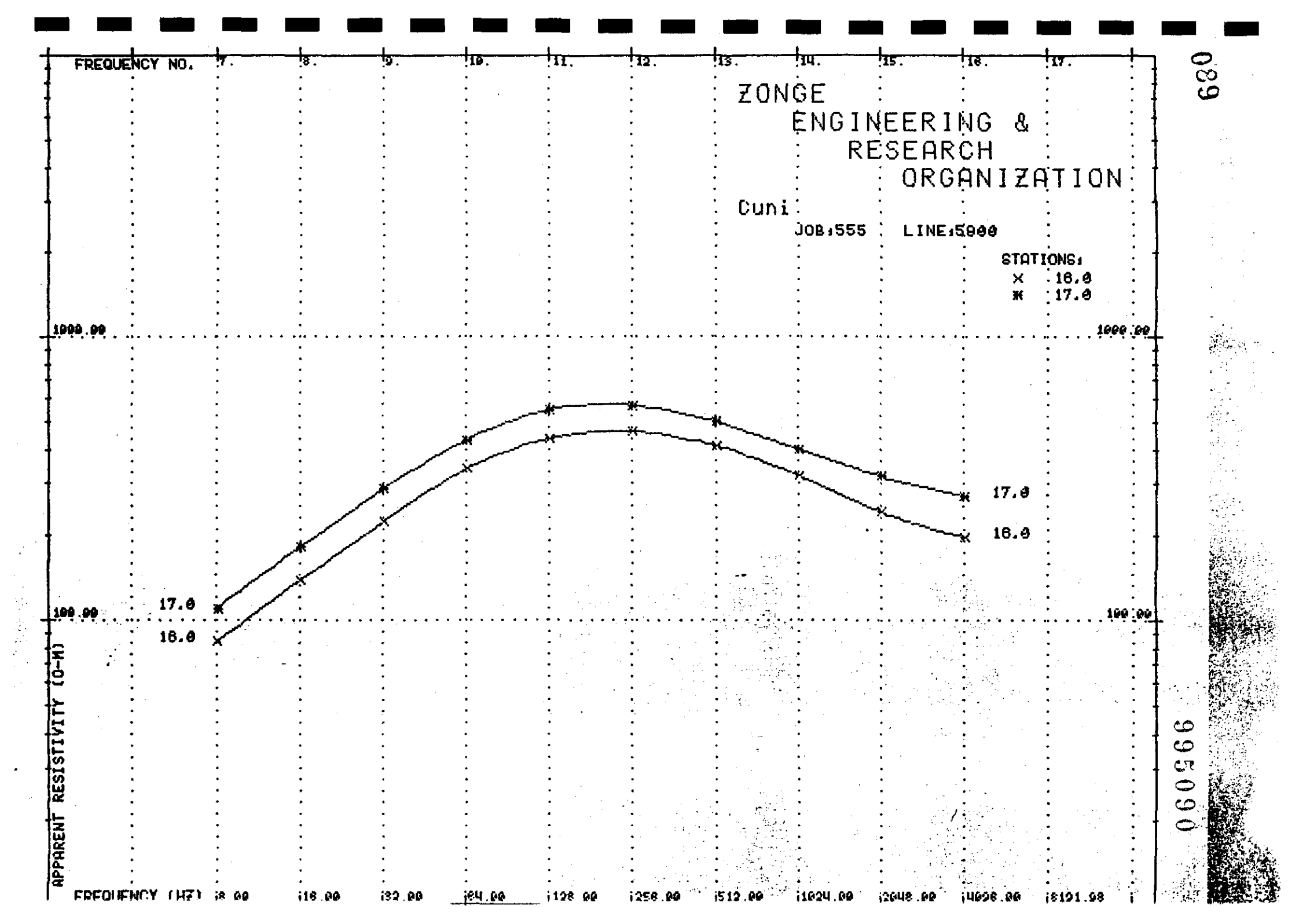

FREQUENCY NO.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
ZONGE
ENGINEERING &
RESEARCH
ORGANIZATION
Cuni
JOB:555 LINE:5900
STATIONS:
× 7.0
* 8.0
□ 9.0
1000.00
100.00
7.0
8.0
9.0
APPARENT RESISTIVITY (O-M)
FREQUENCY (HZ)
8.00
16.00
32.00
64.00
128.00
256.00
512.00
1024.00
2048.00
4096.00
8191.98


FREQUENCY NO.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
ZONGE
ENGINEERING &
RESEARCH
ORGANIZATION
Cuni
JOB;555 LINE;5900
STATIONS;
× 10.0
* 11.0
□ 12.0
1000.00
100.00
11.0
10.0
11.0
10.0
12.0
APPARENT RESISTIVITY (Ω-M)
FREQUENCY (HZ)
8.00
16.00
32.00
64.00
128.00
256.00
512.00
1024.00
2048.00
4096.00
8191.98


FREQUENCY NO.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
ZONGE
ENGINEERING &
RESEARCH
ORGANIZATION
Cuni
JOB:555 LINE:5900
STATIONS:
× 13.0
✱ 14.0
□ 15.0
1000.00
100.00
15.0
APPARENT RESISTIVITY (O-M)
FREQUENCY (HZ)
8.00
16.00
32.00
64.00
128.00
256.00
512.00
1024.00
2048.00
4096.00
8191.98

880

680966


FREQUENCY NO.
7.
8.
9.
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11.
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13.
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15.
16.
17.
ZONGE
ENGINEERING &
RESEARCH
ORGANIZATION
Cuni
JOB:555 LINE:5900
STATIONS:
× 16.0
* 17.0
1000.00
100.00
17.0
16.0
APPARENT RESISTIVITY (O-M)
FREQUENCY (HZ)
8.00
16.00
32.00
64.00
128.00
256.00
512.00
1024.00
2048.00
4096.00
8191.98
680
990090

Line 5900
Cuni
for
CSR MINERALS

CSAMT SURVEY DATA
CAGNIARD RESISTIVITY

values in ohm-meters
<RHO-C

(Plot limits) and LOGARITHMIC CONTOURS (Interval: 0.20)

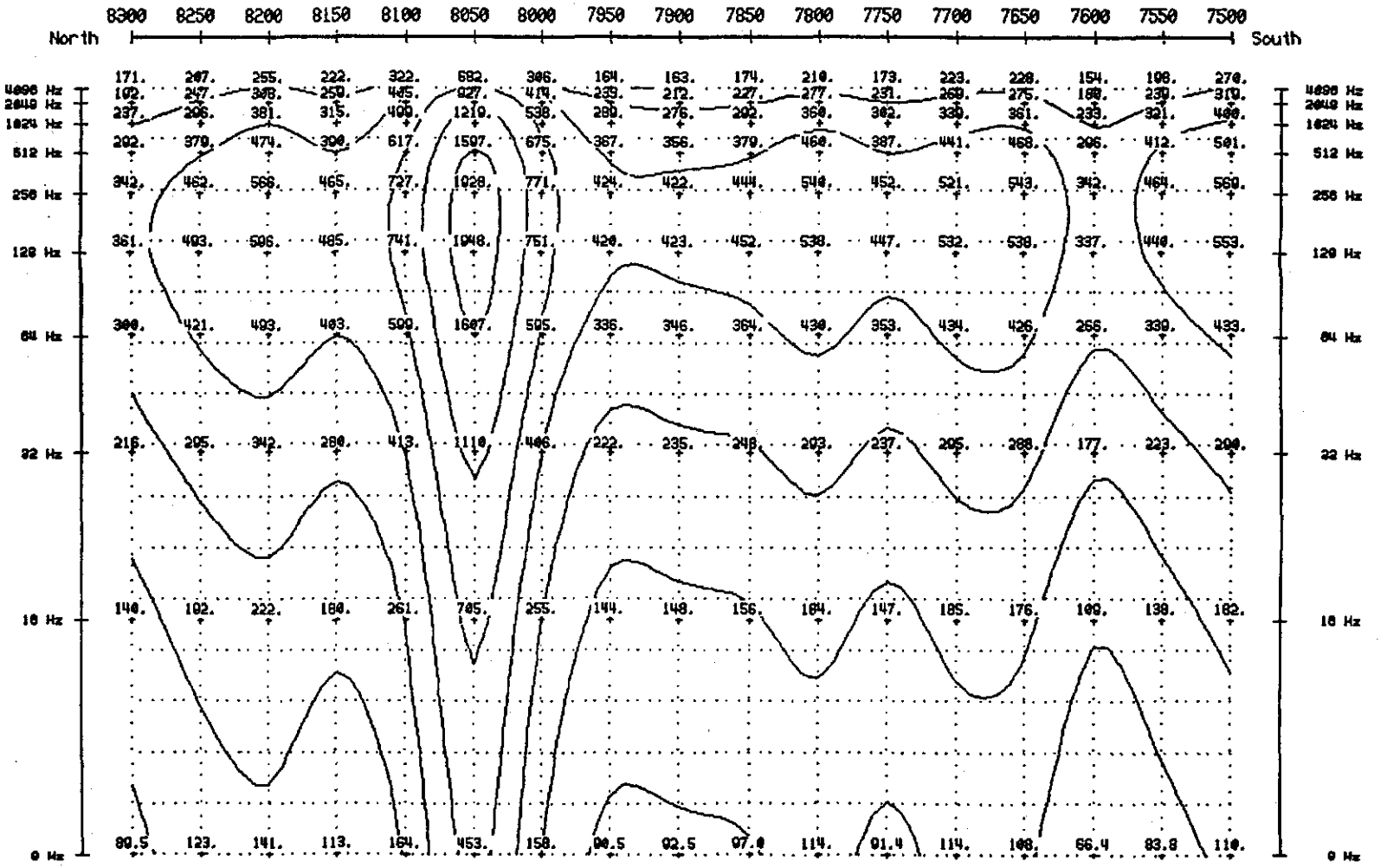
[66.3]
100.
158.
251.
398.
631.
1000.
1585.
[1987.]

Zonge # 555
Plot by CPLOT 3i
Plotted WED, SEP 11 1985

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Date of survey: May 85

Line Orient: North
Dipole Orient: North

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West



090

995091

Line 5900
Cuni
for
CSR MINERALS

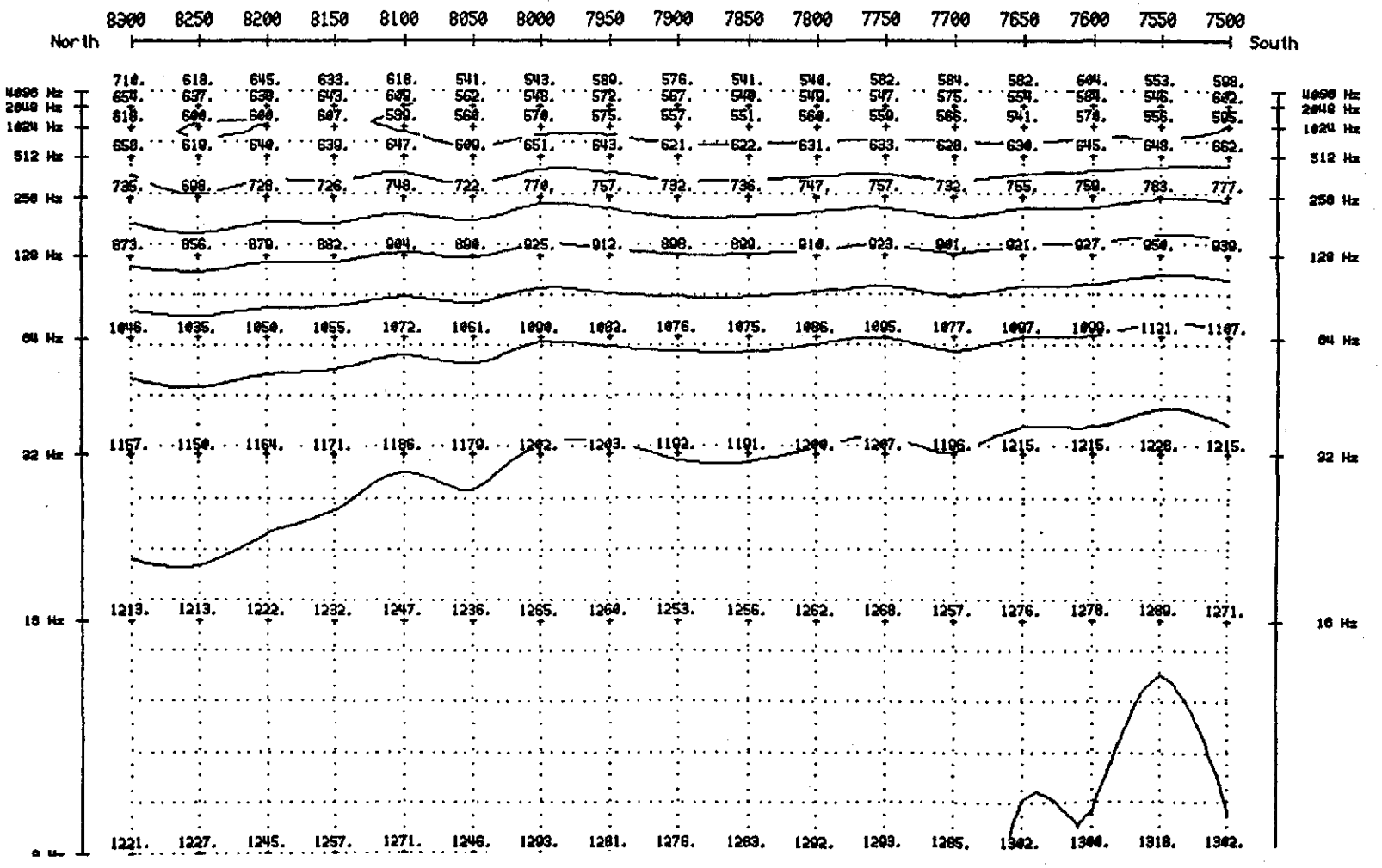
CSAMT SURVEY DATA
PHASE DIFFERENCE (E phase - H phase)
values in milli-radians
<PDIFF

[Plot limits] and ARITHMETIC CONTOURS (Interval: 100.00)
[532.]
600.
700.
800.
900.
1000.
1100.
1200.
1300.
[1318.]

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 85

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West

Zone # 555
Plot by CPLOT 3i
Plotted WED, SEP 11 1985



160

99309

Line 5900
Cuni
for
CSR MINERALS

CSAMT SURVEY DATA
OFFSET NORMALIZED PHASE DIFFERENCE

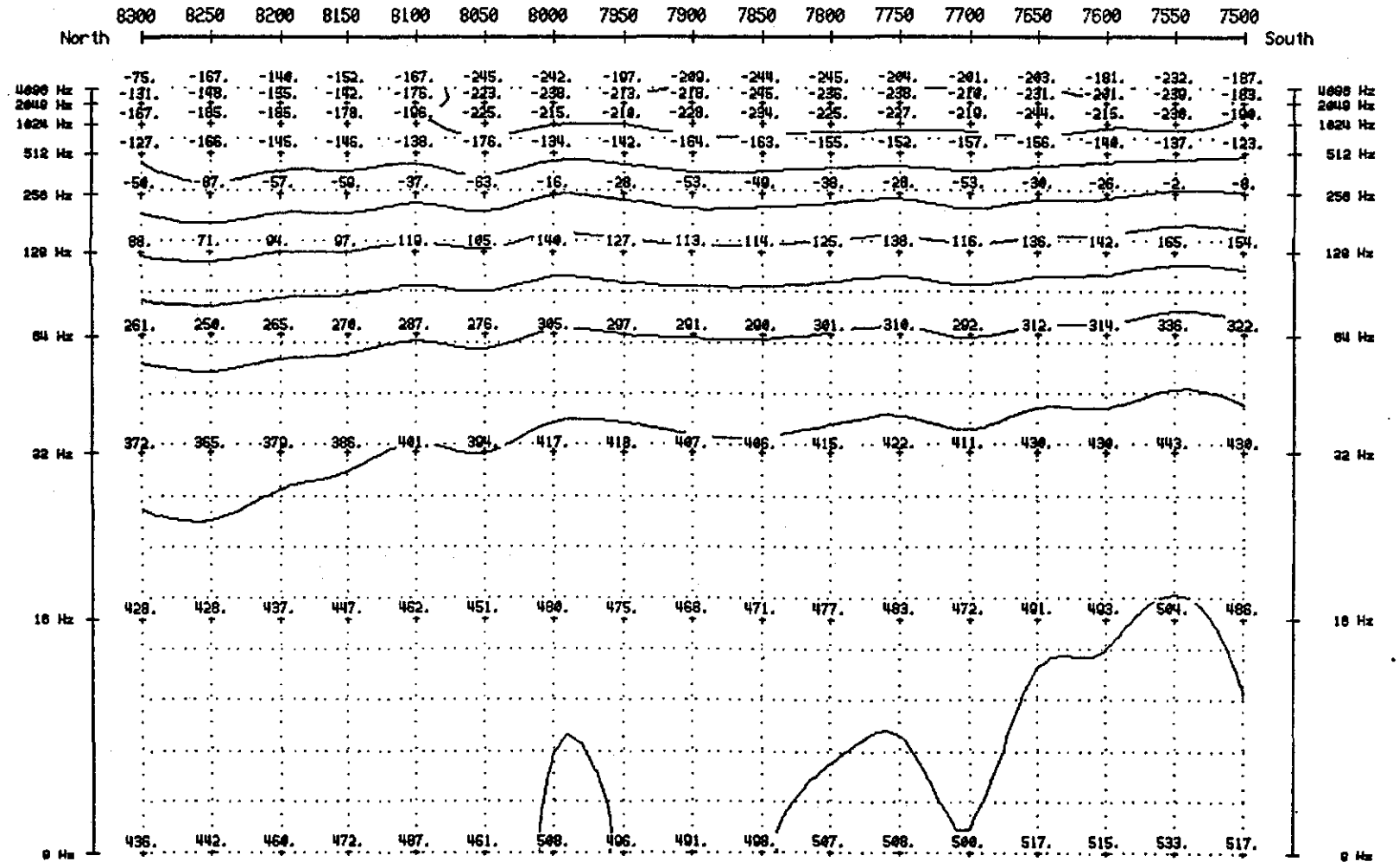
values in milliradians
OFFSET PHZ = NORMALIZED + -785.0 milliradians.
<PDIFF>Z.file>OFFSET

(Plot limits) and ARITHMETIC CONTOURS (Interval: 100.00)
[-253.]
-200.
-100.
0.00
100.
200.
300.
400.
500.
[533.]

Zonge # 555
Plot by CPLOT 3i
Plotted WED, SEP 11 1985

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 85

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West



Line 5900
Cuni
for
CSR MINERALS

CSAMT SURVEY DATA

PDIFF - SLOPE of log(RESISTIVITY) vs log(FREQUENC

Spline curve slope: log-rho vs log-freq
plot is normalized by adding PI/4 * 1000.
<PDIFF>SAVE>SLOPE>N=S-W

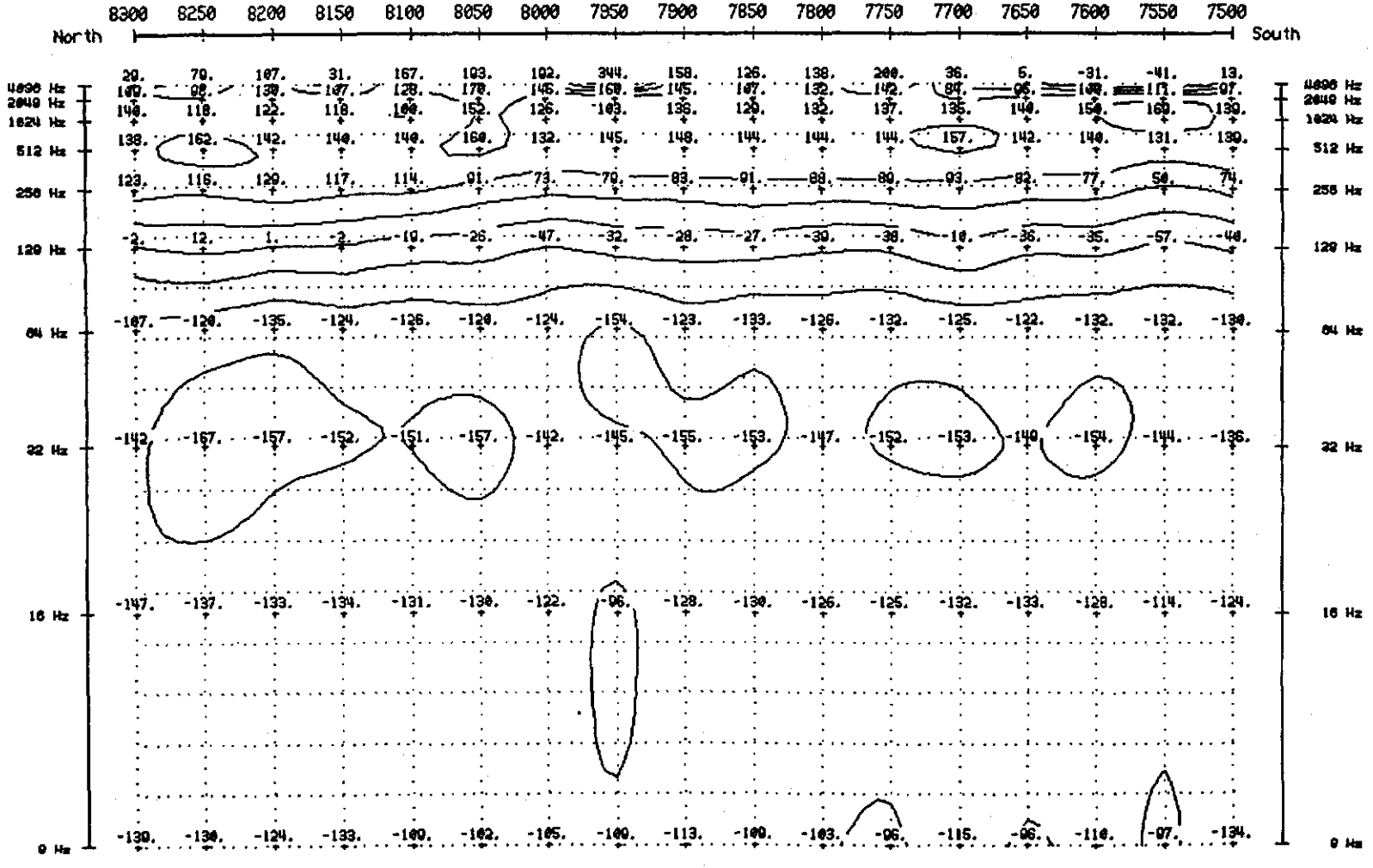
[Plot limits] and ARITHMETIC CONTOURS (Interval: 50.00)

[-167.]	100.
-150.	150.
-100.	200.
-50.0	250.
0.00	300.
50.0	[344.]

Zone # 555
Plot by CPLOT 3i
Plotted WED, SEP 18 1985

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 85

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.4 km
Rx to Tx: West



99509

Line 5900
Cuni
for
CSR MINERALS

CSAMT SURVEY DATA
NORMALIZED RESISTIVITY

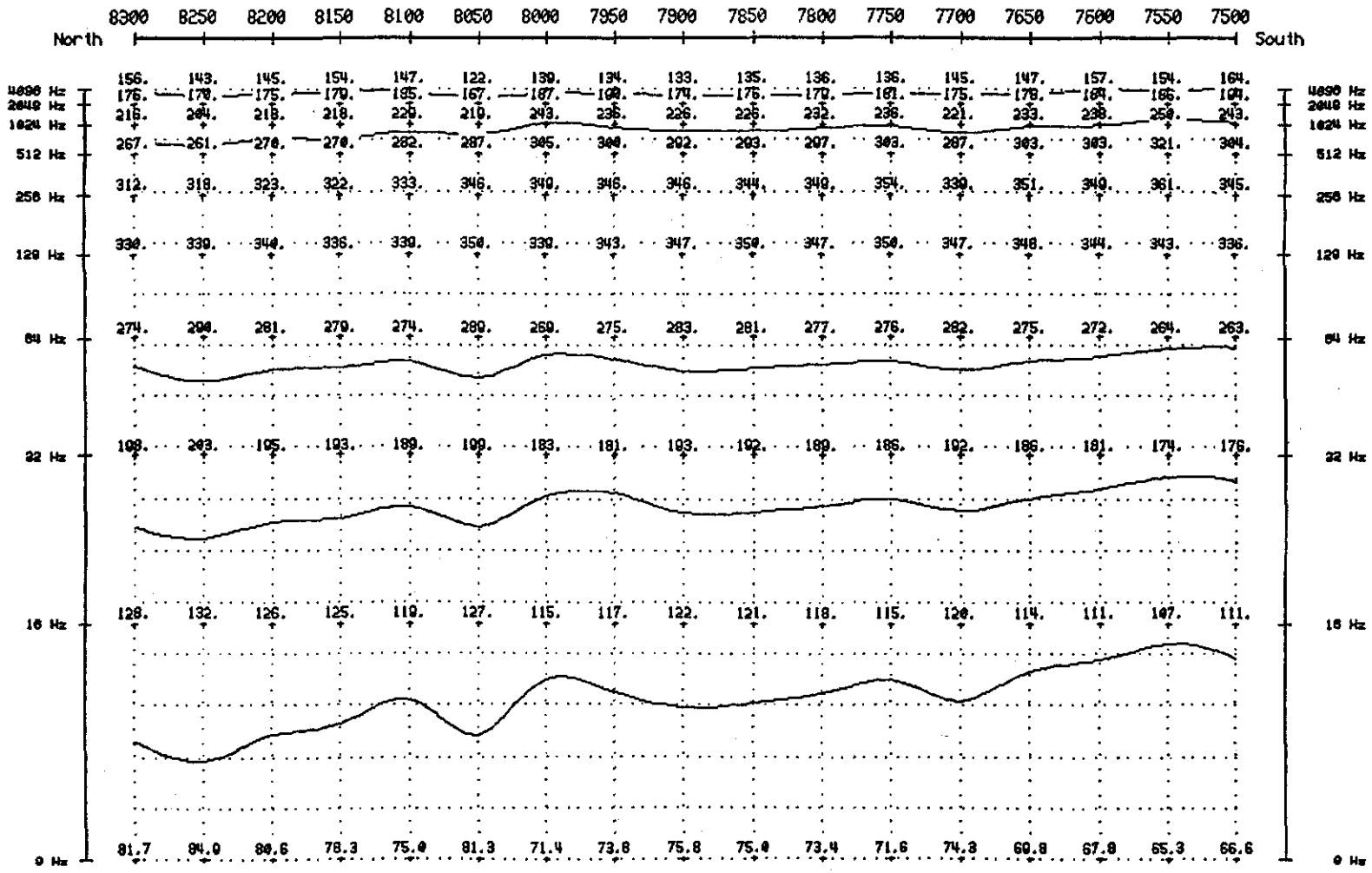
values in ohm-meters
NORM.RHO = RATIO-of-MEAN * 197.8 ohm-meters.
<RHO-C>NORMS>OFFSET

[Plot limits] and LOGARITHMIC CONTOURS (Interval: 0.20)
[65.3]
100.
158.
251.
[383.]

Zonge # 555
Plot by CPLOT 3i
Plotted THU, SEP 12 1985

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 85

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West



990695

Line 5900
Cuni
for
CSR MINERALS

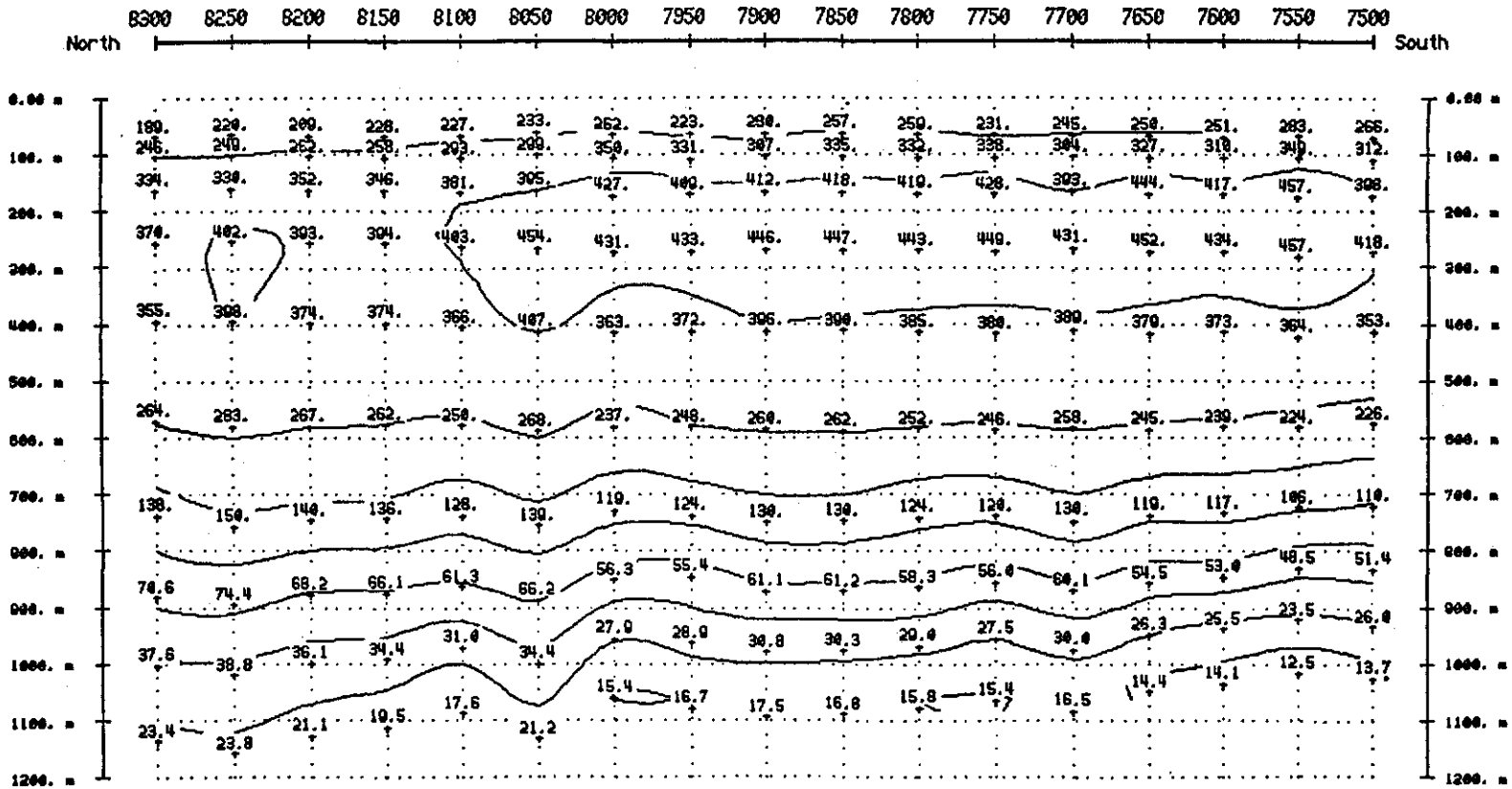
CSAMT SURVEY DATA
RHO values from CAGNIARD RHO and PHASE
using BOSTICK INVERSION
<RHO-C>NORMS>OFFSET>Z.file>SAVE>BOS-D>N=WXS>BOS-M

[Plot limits] and LOGARITHMIC CONTOURS (Interval: 0.20)
[12.5]
15.8
25.1
39.8
63.1
100.
158.
251.
398.
[480.]

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 85

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West

Zonge # 555
Plot by CPLOT 3i
Plotted THU. SEP 12 1985



960966

Line 5900
Cuni
for
CSR MINERALS

CSAMT SURVEY DATA
RHO values from CAGNIARD RHO and PHASE
using BOSTICK INVERSION
<RHO-C>NORMS>OFFSET>Z.file>SAVE>BOS-D>W=WKS>BOS-M

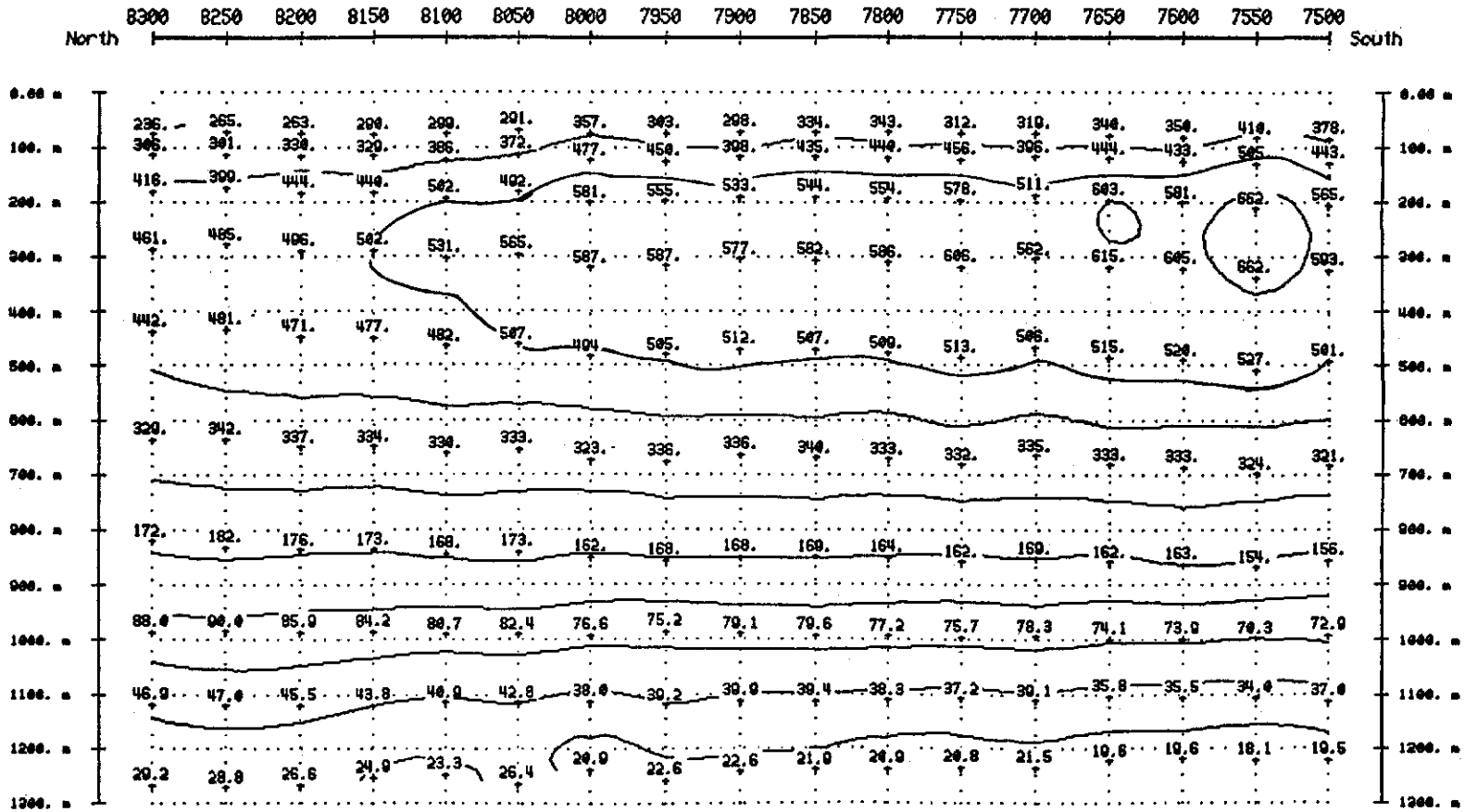
[Plot limits] and LOGARITHMIC CONTOURS (Interval: 0.20)

[18.1]
25.1
39.8
63.1
100.
158.
251.
398.
631.
[685.]

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 85

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West

Zonge # 555
Plot by CPLOT 3i
Plotted THU, SEP 12 1985



990097

Line 5900
Cuni
for
CSR MINERALS

CSAMT SURVEY DATA
NORMALIZED RESISTIVITY

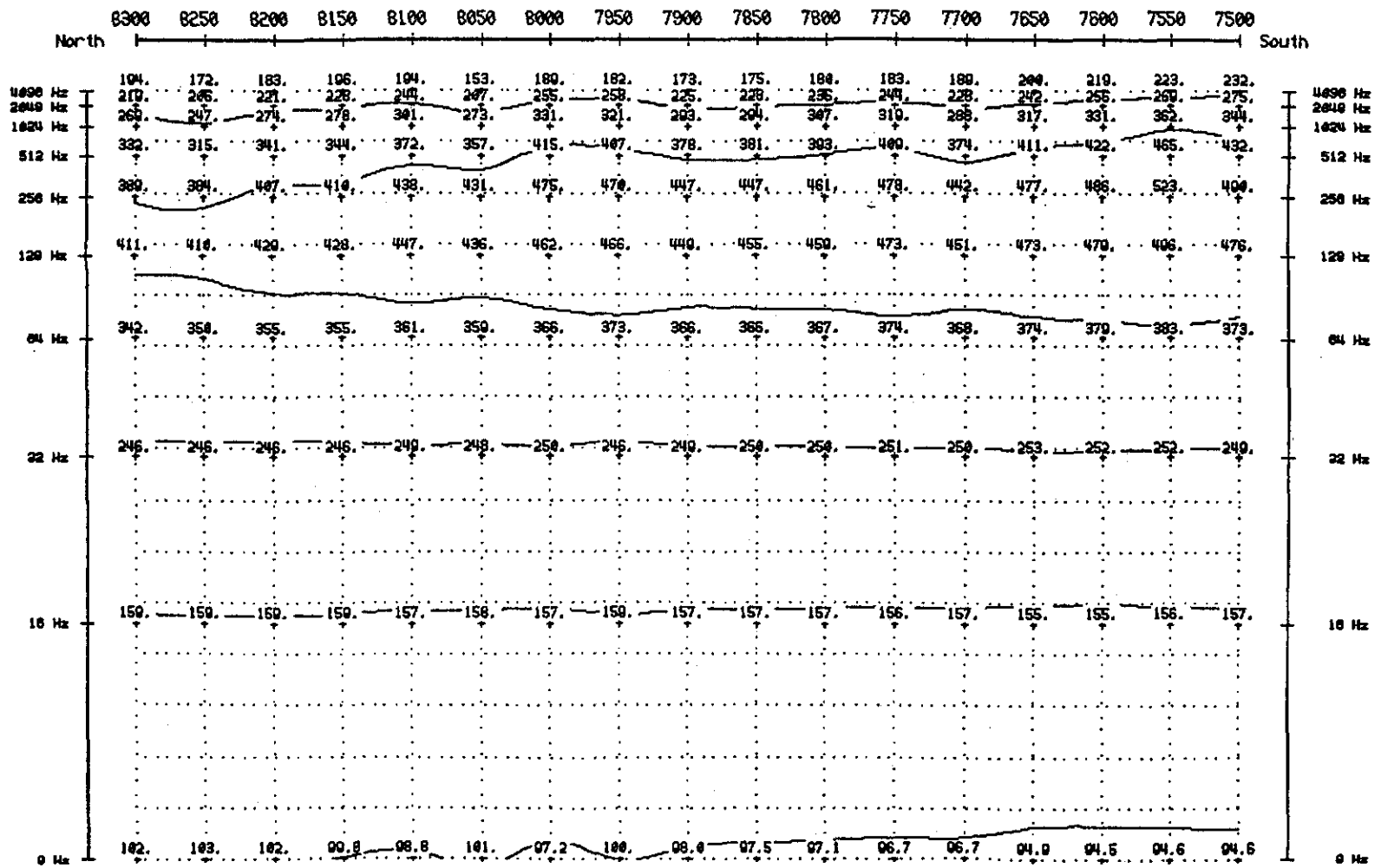
values in ohm-meters
NORM.RHO = RATIO-of-MEAN * 197.8 ohm-meters.
<RHO-C>NORMS>OFFSET

[Plot limits] and LOGARITHMIC CONTOURS (Interval: 0.20)
[94.5]
100.
158.
251.
398.
[525.]

Zonge # 555
Plot by CPLOT 3i
Plotted THU, SEP 12 1985

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 85 *

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West



99098

PRELIMINARY

Line 5900
Cuni
for
CSR MINERALS

CSAMT SURVEY DATA
NORMALIZED RESISTIVITY

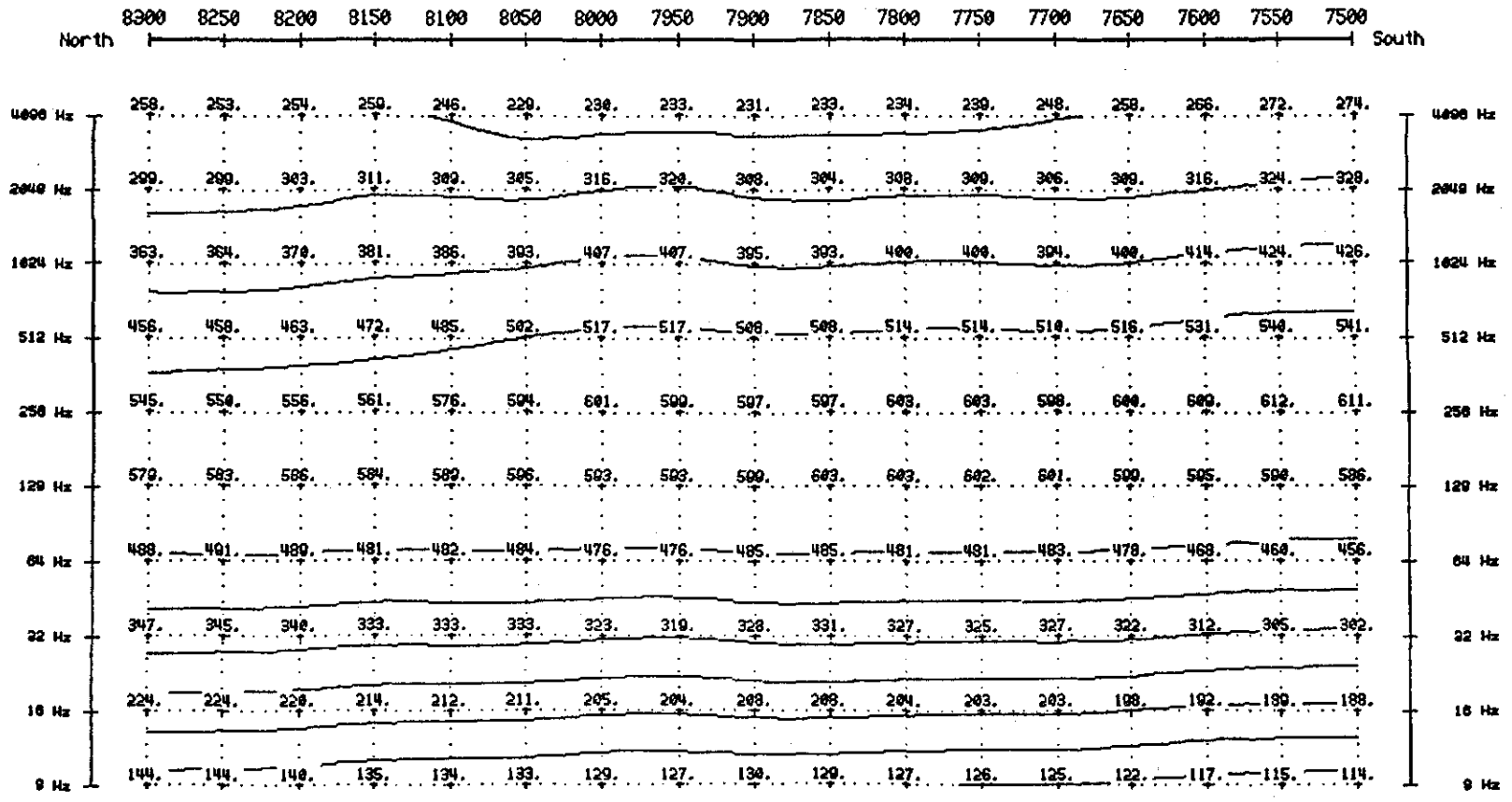
values in ohm-meters
NORM.RHO = RATIO-of-MEAN * 342.1 ohm-meters.
<RHO-C>FLTR-3>NORMS>OFFSET

[Plot limits] and LOGARITHMIC CONTOURS (Interval: 0.10)
[114.]
126.
158.
200.
251.
316.
398.
501.
[1616.]

Zonge # 555
Plot by CPLOT 3i
Plotted FRI, JUN 14 1985

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 85

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West



PRELIMINARY

99099

PRELIMINARY

Line 5900
Cuni
for
CSR MINERALS

CSAMT SURVEY DATA
NORMALIZED RESISTIVITY

values in ohm-meters
NORM.RHO = RATIO-of-MEAN * 224.7 ohm-meters.
<RHO-C>NORMS>OFFSET

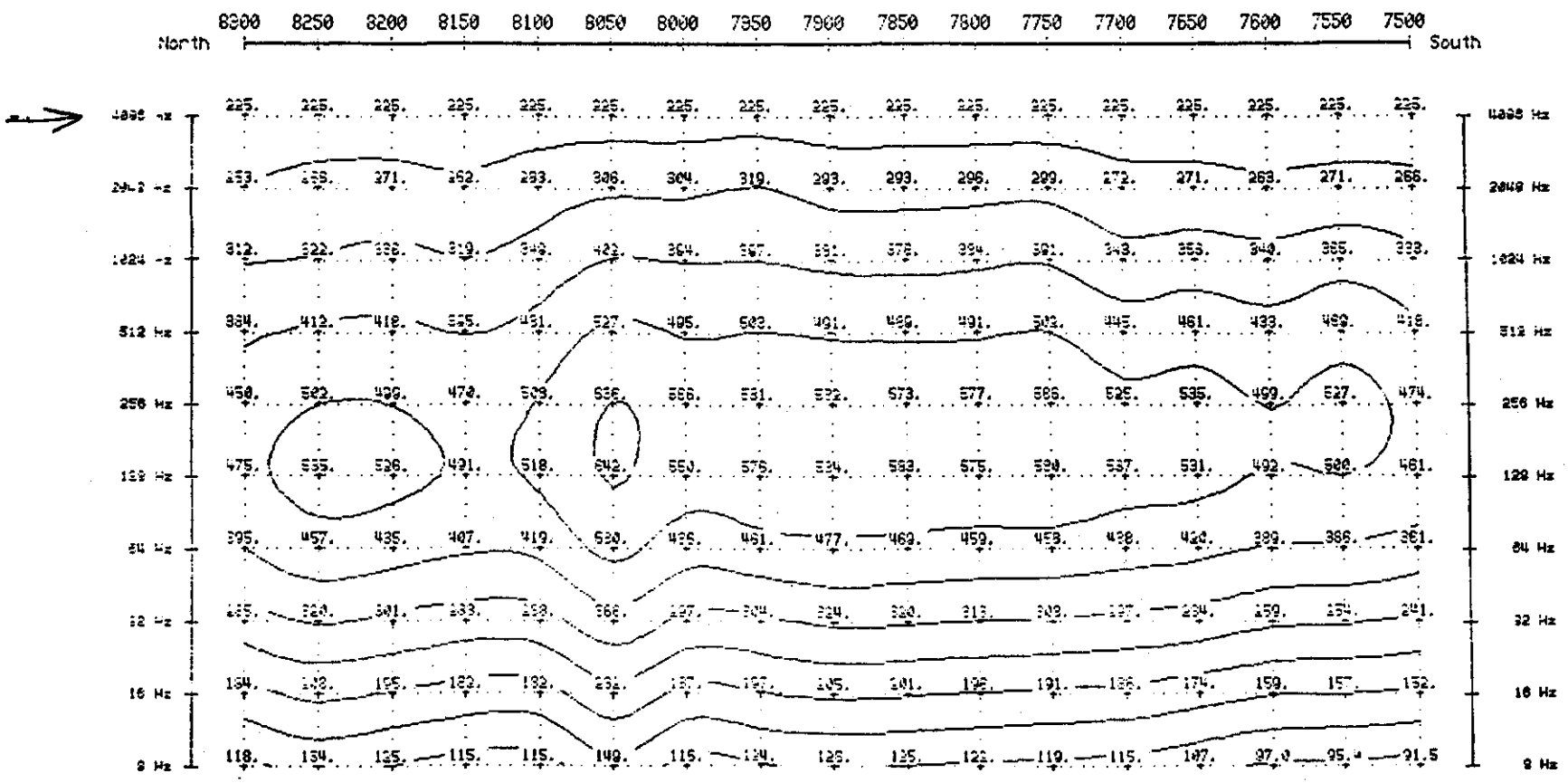
[Plot limits] and LOGARITHMIC CONTOURS (Interval: 0.10)

[91.5]
100.
126.
158.
200.
251.
316.
398.
501.
631.
[653.]

Zonge # 555
Plot by CPLOT 31
Plotted MON, JUN 24 1985

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 95

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West



PRELIMINARY

995100

PRELIMINARY

Line 5900
Cuni
for
CSR MINERALS

CSAMT SURVEY DATA
NORMALIZED RESISTIVITY

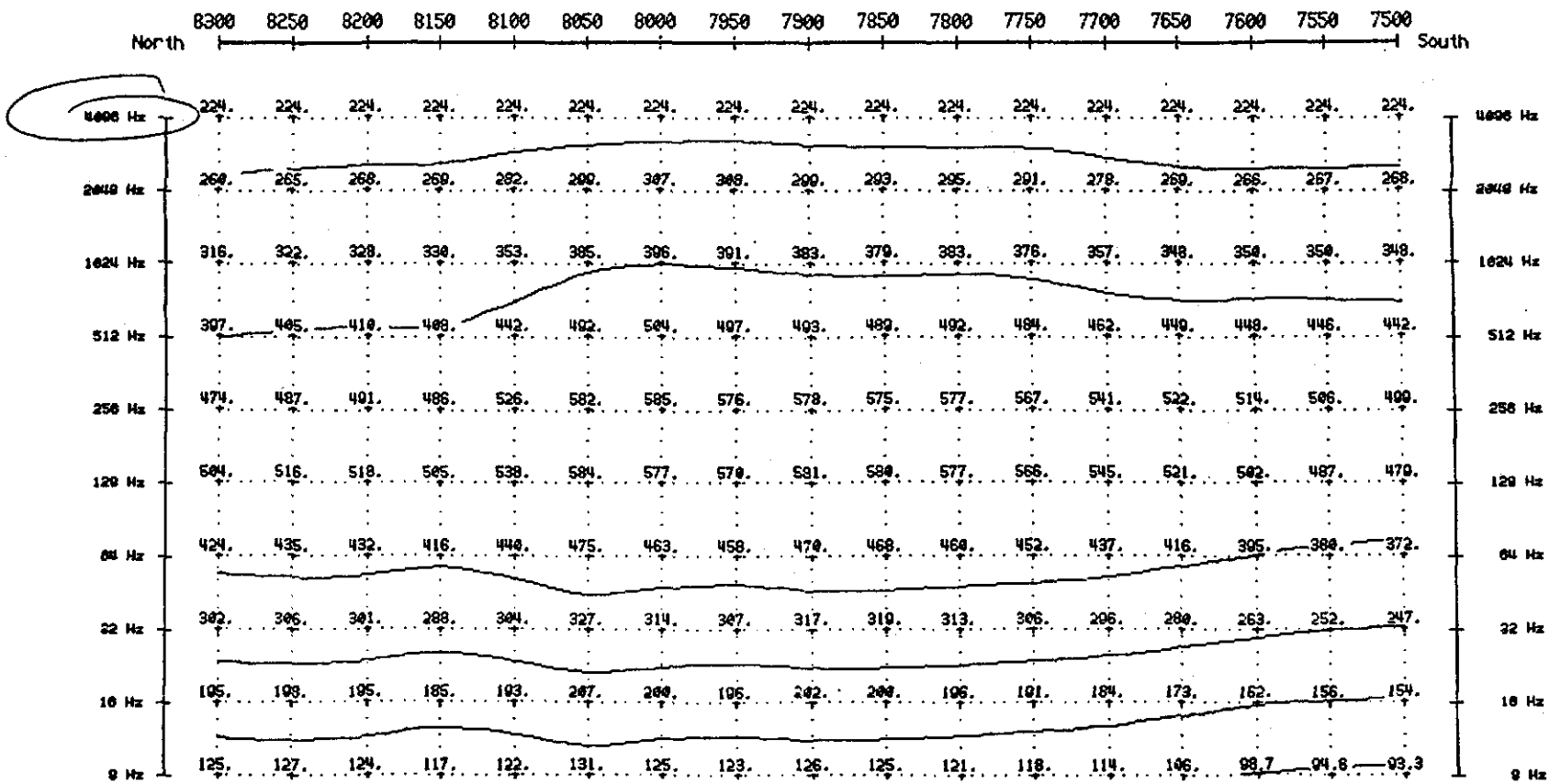
values in ohm-meters
NORM.RHO = RATIO-of-MEAN * 224.3 ohm-meters.
<RHO-C>FLTR-3>NORMS>OFFSET

[Plot limits] and LOGARITHMIC CONTOURS (Interval: 0.20
[93.3]
100.
158.
251.
398.
[599.]

Zonge # 555
Plot by CPLOT 3i
Plotted THU, JUN 13 1985

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 85

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West



	North	8300	8250	8200	8150	8100	8050	8000	7950	7900	7850	7800	7750	7700	7650	7600	7550	7500	South
4096 Hz		224.	224.	224.	224.	224.	224.	224.	224.	224.	224.	224.	224.	224.	224.	224.	224.	224.	
2048 Hz		260.	265.	268.	269.	282.	299.	307.	308.	299.	293.	295.	291.	278.	269.	266.	267.	268.	
1024 Hz		316.	322.	328.	330.	353.	385.	396.	391.	383.	379.	383.	376.	357.	348.	350.	350.	348.	
512 Hz		397.	405.	410.	408.	442.	492.	504.	497.	493.	489.	492.	484.	462.	449.	448.	446.	442.	
256 Hz		474.	487.	491.	486.	526.	582.	585.	576.	578.	575.	577.	567.	541.	522.	514.	506.	499.	
128 Hz		504.	516.	518.	505.	538.	584.	577.	570.	581.	580.	577.	566.	545.	521.	502.	487.	479.	
64 Hz		424.	435.	432.	416.	440.	475.	463.	458.	470.	468.	460.	452.	437.	416.	395.	380.	372.	
32 Hz		302.	306.	301.	288.	304.	327.	314.	307.	317.	319.	313.	306.	296.	280.	263.	252.	247.	
16 Hz		195.	198.	195.	185.	193.	207.	200.	196.	202.	200.	196.	191.	184.	173.	162.	156.	154.	
8 Hz		125.	127.	124.	117.	122.	131.	125.	123.	126.	125.	121.	118.	114.	106.	98.7	94.6	93.3	

PRELIMINARY

995101

PRELIMINARY

Line 5900
Cuni
for
CSR MINERALS

CSAMT SURVEY DATA
CAGNIARD RESISTIVITY

values in ohm-meters
<RHO-C

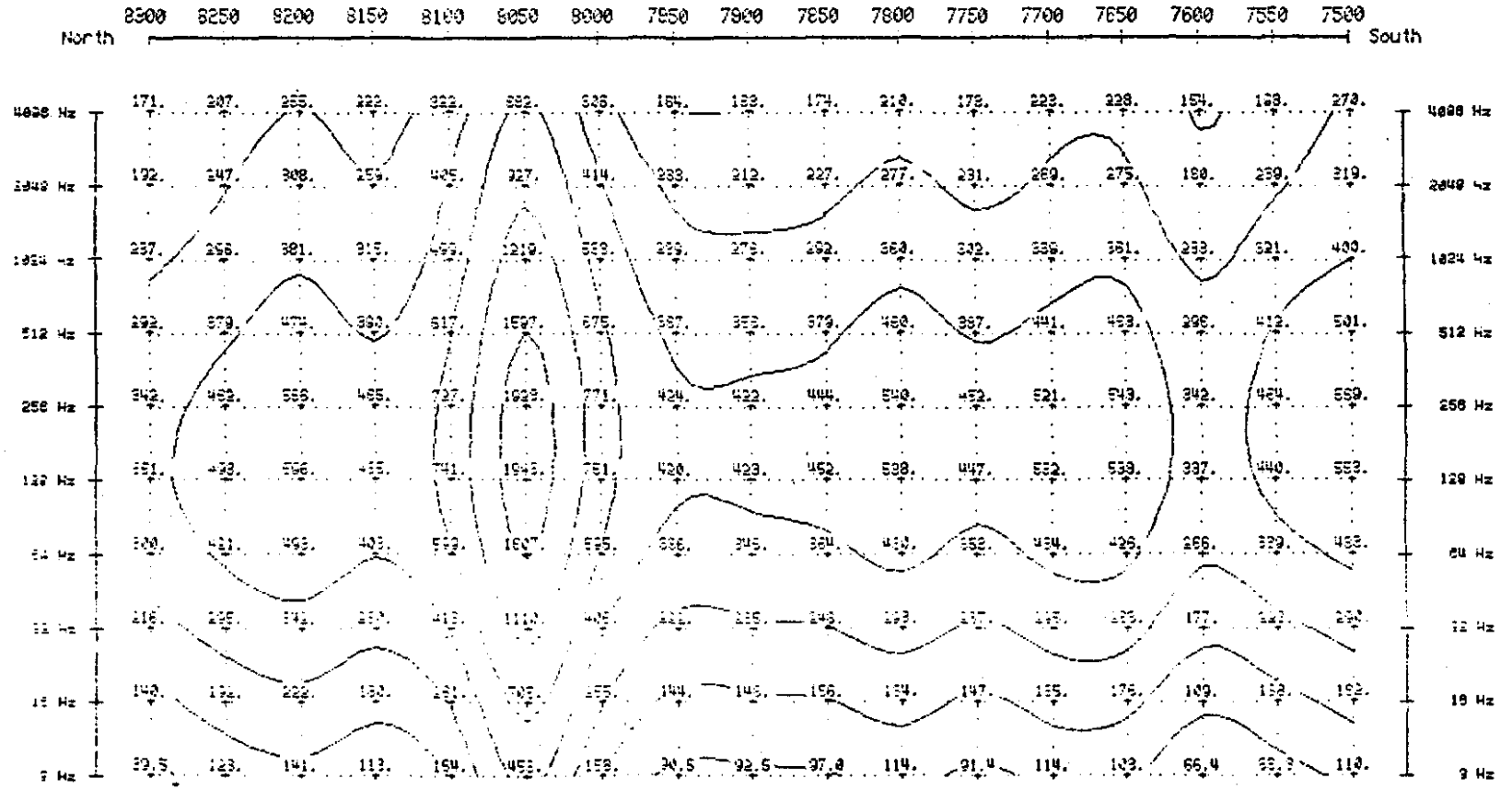
[Plot limits] and LOGARITHMIC CONTOURS (Interval: 0.20)

[66.3]
100.
158.
251.
398.
631.
1000.
1585.
[1950.]

Zonge # 555
Plot by CPLOT 31
Plotted MON, JUN 24 1985

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 85

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West



PRELIMINARY

995102

PRELIMINARY

Line 5900
Cuni
for
CSR MINERALS

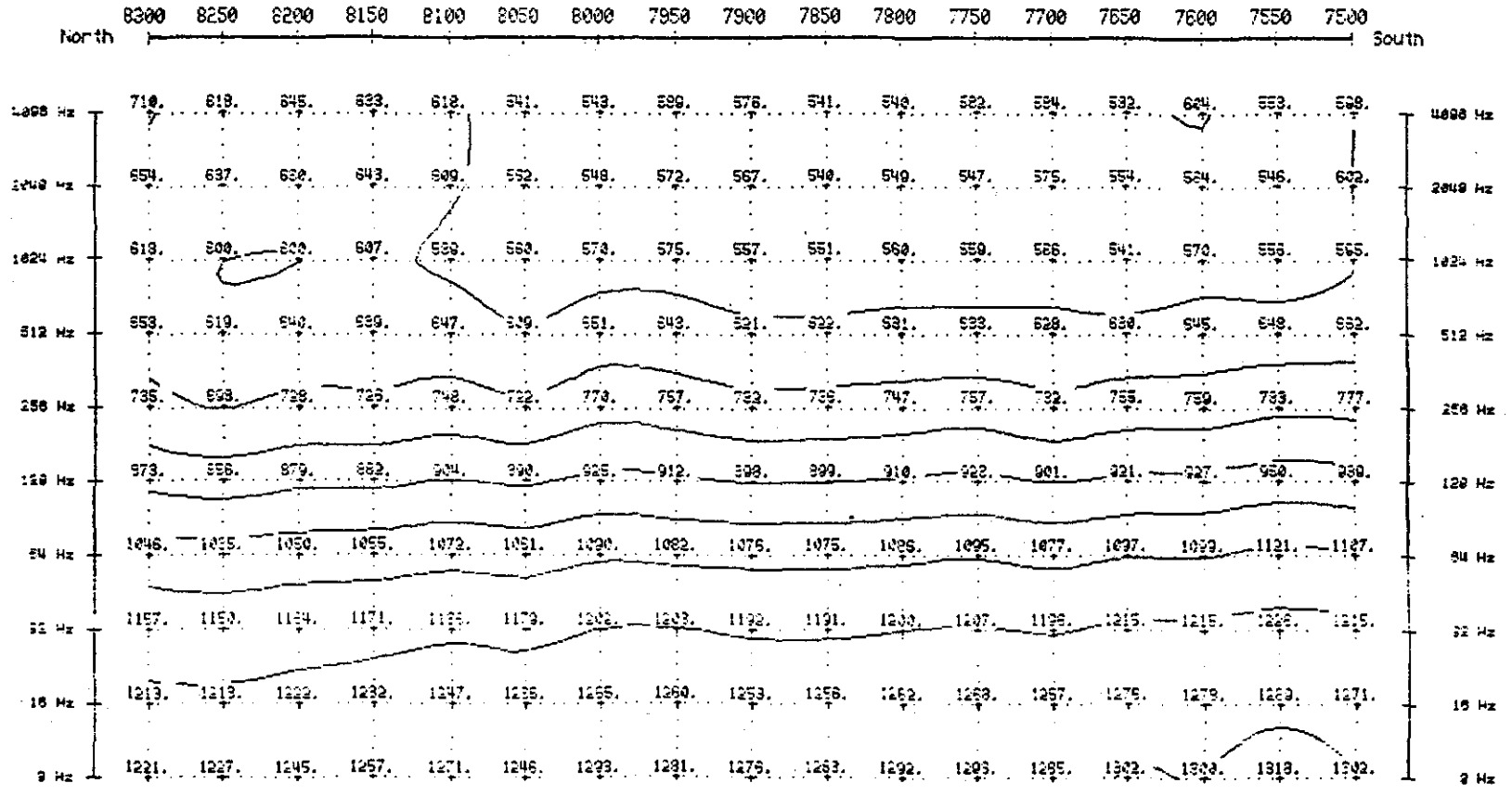
CSAMT SURVEY DATA
PHASE DIFFERENCE (E phase - H phase)
values in milli-radians
<PDIFF

[Plot limits] and ARITHMETIC CONTOURS (Interval: 100.00)
[532.]
600.
700.
800.
900.
1000.
1100.
1200.
1300.
[1318.]

Zonge # 555
Plot by CPLOT 3i
Plotted MON. JUN 24 1985

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 85

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West



PRELIMINARY

995103

PRELIMINARY

Line 5900
Cuni
for
CSR MINERALS

CSAMT SURVEY DATA
OFFSET NORMALIZED PHASE DIFFERENCE

values in millirodians
OFFSET PHZ = NORMALIZED + -785.0 millirodians.
<PDIFF>OFFSET

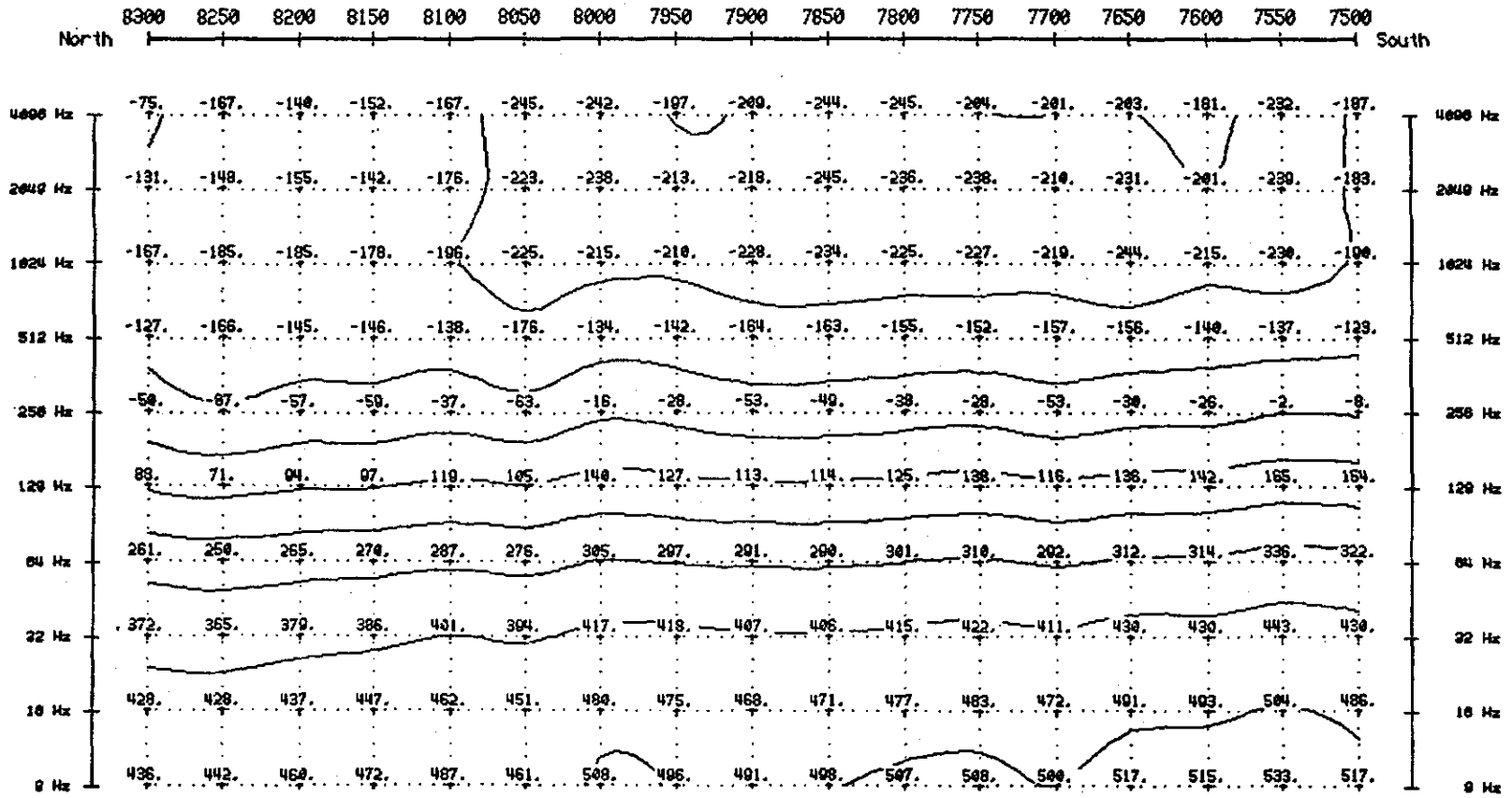
[Plot limits] and ARITHMETIC CONTOURS (Interval: 100.00

[-253.]
-200.
-100.
0.00
100.
200.
300.
400.
500.
[533.]

RECEIVER DATA
Dipole Length: 50.m
Stn. Spacing : 50.m
Line Orient: North
Dipole Orient: North
Date of survey: May 85

TRANSMITTER DATA
Length : 1500 m
Orient. : North
Distance: 5.2 km
Rx to Tx: West

Zonge # 555
Plot by CPLOT 3i
Plotted FRI, JUN 14 1985



PRELIMINARY

69104

995105

APPENDIX IV

CUNI AIRBORNE GEOPHYSICAL DATA

N.B. These data reside on magnetic computer tape entitled

CSR LIMITED, ZEEHAN AREA

LOCATED AIRBORNE DATA

PRG/JM 34A:62

SPECIFICATIONS OF AIRBORNE GEOPHYSICAL SURVEY

1. SURVEY AREA

The area flown in the Zeehan region, and covering the Cuni prospect is indicated on Figure Approximately 355 line kilometres of east-west traverses were flown.

2. SURVEY SPECIFICATIONS

Flight line direction - 090-270 degrees
Flight line spacing - 100 metres
Tie line direction - 000-180 degrees
Tie line spacing - 1000 metres
Sensor terrain clearance - 70 metres
Sampling interval - Approximately 35 metres

The usage of close line spacings and high data density was adopted for this survey due to difficult vehicular and grid-based access. High quality data recovery meant minimal ground based grid preparation and expensive line cutting. To this purpose, the survey was very successful.

Navigation was controlled by three means:

a) electronic (Doppler)
b) visual means, from 1:10000 recently acquired photography
c) in-flight colour video recording of along track position

The overall navigation accuracy is believed better than $\pm$5 metres.

EQUIPMENT

A Piper PA-31 Chieftain (VH-WJK) was used for the survey. Three GeoMetrics airborne proton magnetometers (G-813) were fitted, one in each wing tip and the third mounted in a tail stinger. This configuration permits calculation of horizontal gradients and so provides accurate anomaly placement.

A radar altimeter, and all digital output were recorded by a GeoMetrics Model G-714 geophysical data formatting/recording unit.

Additional to the magnetic field recording, the aircraft was fitted with a GeoMetrics Model GR-800 Differential Gamma Ray Spectrometer measuring the standard energy windows for gamma radiation of Tl-208, Bi-214, K-40, Total Count and Cosmic. The spectrometer was interfaced to a NaI (Ti) crystal detector with a volume of 16.8 litres (1,024 cubic inches).

995108

CSR LTD ARCHIVE TAPE

AREA : ZEEHAN, WESTERN TASMANIA

TYPE : 9 track, 1600 bpi, Blocksize = 4968 Recordsize = 216

1. No Special symbols used.
2. No expansion of file header information.
3. Residual magnetic data tie line levelled and IGRF 2000nt datum removed.
4. Magnetic grid obtained from raw stinger magnetic data and the corrected transverse gradient using a bi-cubic spline method.
5. Test lines are pre flight 70000 series; post are 80000 series traverses are 10000 series; tie lines are 190000 series.
6. Channel description: Data is stored on a record size of 216 chars.

COLUMNS	DESCRIPTION
1 to 6	Date in DDMMYY
7	BLANK
8 to 10	Flight number
11 to 16	Time in seconds after midnight
17	BLANK
18 to 22	Line number
23	BLANK
24 to 29	Fiducial
30	Asterisk if a recovered point
31 to 37	AMG easting co-ordinate in metres
38	BLANK
39 to 45	AMG northing co-ordinate in metres
46	BLANK
47 to 53	Residual magnetic value
54	BLANK
55 to 61	Raw stinger magnetic value
62	BLANK
63 to 69	Raw left wing magnetic value
70	BLANK
71 to 77	Raw right wing magnetic value
78	BLANK
79 to 85	Corrected stinger magnetic value
86	BLANK
87 to 93	Corrected left wing magnetic vlaue
94	
95 to 101	Corrected right wing magnetic value

102 to 109	Raw transverse gradient value	
110 to 117	Raw longitudinal gradient	
118 to 125	Corrected transverse gradient	
126 to 133	Corrected longitudinal gradient	
134 to 140	Radar altimeter value	
141 to 147	Barometric altimeter value	
148 to 154	Raw total field radiometric	
155	BLANK	
156 to 161	Raw potassium value counts	
162	BLANK	
163 to 169	Raw uranium value counts	
170 to 176	Raw thorium value counts	
177 to 183	Corrected total count	CPS
184 to 190	Corrected potassium count	CPS
191 to 197	Corrected uranium count	CPS
198 to 204	Corrected thorium count	CPS
205 to 211	Raw Cosmic counts	
212 to 216	Live time micro-seconds	

APPENDIX V

GROUND MAGNETIC DATA FROM TRAVERSES OVER AIRBORNE ANOMALIES

NORTH CUNI ANOMALY	LINE 7650N CUNI GRID
SOUTH CUNI ANOMALY	LINE 6550N CUNI GRID
SOUTH NEVADA ANOMALY	LINE 5 SOUTH NEVADA CREEK GRID
DUNDAS ROAD ANOMALY	LINE 01
PINE PLANTATION ANOMALY	LINE 47

Dundas E.L. 15/76
Ground Magnetic data from reconnaisance lines.

Line 7650 - North Cuni Anomaly - Ground Magnetic Data

Easting.	Northing.	Magnetics.
5300.	7650.	62577.0
5320.	7650.	62566.0
5340.	7650.	62586.0
5360.	7650.	62541.0
5380.	7650.	62543.0
5400.	7650.	62538.0
5420.	7650.	62545.0
5440.	7650.	62545.0
5460.	7650.	62551.0
5480.	7650.	62549.0
5500.	7650.	62558.0
5520.	7650.	62555.0
5540.	7650.	62562.0
5560.	7650.	62563.0
5580.	7650.	62582.0
5600.	7650.	62596.0
5620.	7650.	62645.0
5640.	7650.	62712.0
5660.	7650.	62726.0
5680.	7650.	62706.0
5700.	7650.	62662.0
5720.	7650.	62630.0
5740.	7650.	62603.0
5760.	7650.	62583.0
5780.	7650.	62568.0
5800.	7650.	62572.0
5820.	7650.	62555.0
5840.	7650.	62574.0
5860.	7650.	62558.0
5880.	7650.	62542.0
5900.	7650.	62534.0
5920.	7650.	62534.0
5940.	7650.	62532.0
5960.	7650.	62533.0
5980.	7650.	62517.0
6000.	7650.	62529.0
6020.	7650.	62871.0
6040.	7650.	62829.0
6060.	7650.	62637.0
6080.	7650.	62580.0
6100.	7650.	62552.0
6120.	7650.	62532.0
6140.	7650.	62530.0
6160.	7650.	62520.0
6180.	7650.	62515.0
6200.	7650.	62495.0
6220.	7650.	62456.0
6240.	7650.	62413.0
6260.	7650.	62458.0
6280.	7650.	62458.0
6300.	7650.	62459.0

Dundas E.L. 15/76
Ground Magnetic data from reconnaisance lines.

Line 6550 - South Cuni Anomaly - Ground Magnetic Data

Easting.	Northing.	Magnetics.
4900.	6550.	62489.0
4920.	6550.	62484.0
4940.	6550.	62476.0
4960.	6550.	62521.0
4980.	6550.	62594.0
5000.	6550.	62587.0
5020.	6550.	62557.0
5040.	6550.	62539.0
5060.	6550.	62527.0
5080.	6550.	62515.0
5100.	6550.	62515.0

Dundas E.L. 15/76
Ground Magnetic data from reconnaisance lines.

Line 5 - South Nevada Anomaly - Ground Magnetic Data

Easting.	Northing.	Magnetics.
300.	5.	62153.0
320.	5.	62172.0
340.	5.	62187.0
360.	5.	62357.0
380.	5.	62427.0
400.	5.	62363.0
420.	5.	62340.0
440.	5.	62371.0
460.	5.	62394.0
480.	5.	62441.0
500.	5.	62409.0
520.	5.	62356.0
540.	5.	62303.0
560.	5.	62285.0
580.	5.	62270.0
600.	5.	62242.0
620.	5.	62240.0
640.	5.	62229.0
660.	5.	62222.0
680.	5.	62236.0
700.	5.	62226.0

Dundas Area
Dundas Road Anomaly
Bearing 045 deg Magnetic

Line 01

East	North Magnetics
0.	1. 62550.0
20.	1. 62500.0
40.	1. 62480.0
60.	1. 62481.0
80.	1. 62486.0
100.	1. 62468.0
120.	1. 62511.0
140.	1. 62476.0
160.	1. 62479.0
180.	1. 62505.0
200.	1. 62432.0
220.	1. 62427.0
240.	1. 62423.0
260.	1. 62444.0
280.	1. 62448.0
300.	1. 62454.0
320.	1. 62479.0
340.	1. 62488.0
360.	1. 62482.0
380.	1. 62485.0
400.	1. 62500.0
420.	1. 62529.0
440.	1. 62511.0
460.	1. 62477.0
480.	1. 62439.0
500.	1. 62418.0
520.	1. 62379.0
540.	1. 62428.0
560.	1. 62357.0
580.	1. 62330.0
600.	1. 62395.0

Dundas Area
Pine Plantation Anomaly
Bearing 047 deg Magnetic.

Line 47

East	North Magnetics
0.	47. 62000.0
20.	47. 62318.0
40.	47. 62338.0
60.	47. 62330.0
80.	47. 62329.0
100.	47. 62317.0
120.	47. 62337.0
140.	47. 62332.0
160.	47. 62342.0
180.	47. 62375.0
200.	47. 62388.0
220.	47. 62396.0
240.	47. 62379.0
260.	47. 62355.0

APPENDIX VI

CUNI DRILL LOGS

SOUTH NEVADA	- DDH CG3
SOUTH CUNI	- DDH CG4
NORTH CUNI	- DDH CG5
DUNDAS ROAD	- DDH CG6
	- DDH CG6A
PINE PLANTATION	- DDH CG7

[redacted] LIN[redacted]D [redacted]AILE[redacted]RIL[redacted]G [redacted]

AREA BDLMDAS | PROJECT NUMBER 602 | DATE STARTED 01/03/86 | DATE COMPLETED 22/03/86 | CONTRACTOR F. ORTNER | DRILLER F. ORTNER

CO-ORDINATES N/S 5365177 | E/W 366100 | COLLAR R.L. [redacted]12 | DEPTH 331.3 | DRILL TYPE [redacted]

AREA OF INFLUENCE | HOLE NUMBER DDH-CG3

STATE TAS | LOCATION WEVADA | INCLINATION -50 | AZIMUTH T/M/GRID 295

LOGGED BY P.D. Ellis | DATE OF LOGGING APRIL 1986

HOLE SIZE & ASSAY TYPE: HQ TO 4 | NQ TO 331.3 | TO

PAGE 1 OF 4

1.16

CORE RECOVERY %	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE 1::	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MINERALISATION TYPE	ACCEPTED ASSAY
0	3.6	0-3.6m NQ-CORE Partially weathered shale - green grey-orange										
0-22	4.0	3.6-27.5m Partially Weathered Shale										
3.0	7.0	generally green grey with Fe stains on some joints										
2.4	10.0	- @ 4.2m graded bedding facing downhole C&B 45°										
2.8	13.0	- broken 6.0-5.0m, 7.5-9.0m, 9.8-10.2m, 18.2-18.3m										
3.3	16.3											
2.9	19.2											
2.5	22.5											
2.7	25.3											
2.6	27.5	27.5-83.5m Green grey Shale C&B 30°					28.3	29.0		2,7,2,1,0,1		
0.66	28.3	generally very fine grained with minor fine sandy bands					32.1	32.2		2,7,2,0,0,2		
2.0	30.2	with darker bands - graded in parts with downhole facings					34.5	35.0		2,7,2,1,0,2		
1.9	32.2	- sand dominates @ 64.3-64.9m										
2.7	34.1	32.4-32.9 - downhole of a sharp contact 60° C&B is 3mm										
3.3	37.4	sized pebbles then sand to 1cm with 60 C&B					62.0	66.0		2,7,2,1,0,3		
3.1	42.5	both units consist of rounded to angular fragments										
3.0	45.6	of shale, siltstones, sandstones, volcanics										
3.3	49.0	77.4-77.7 - sandstone										
2.7	51.7	79.9-93.5 - Sandstone/conglomerate thinning coarse downhole					66.7	66.8		2,7,2,0,0,4		
2.5	54.2	90.7-80.9 - conglomerate to 5mm										
1.0	55.1	80.9-81.5 - SS/Sh contorted and banded					71.0	71.0		2,7,2,1,0,4		
2.0	57.0	81.5-82.5 - SS					77.3	77.4		2,7,2,0,0,6		
1.6	57.6	82.5-83.0 - Sh w/ minor SS					83.5	83.6		2,7,2,0,0,8		
3.1	60.8	83.0-83.1 - congl to 10mm x 1cm sized fragments					83.6	85.3		2,7,2,1,0,5		
3.1	64.9	83.1-83.5 - Sh.					85.1	86.1		2,7,2,1,0,6		
3.0	67.0	Shear 28.3-29.0 - shearing sub // to core, minor qg on joints/shears					86.2	87.4		2,7,2,1,0,7		
1.6	68.7	34.2 - minor bleeding - green jointing @ 30° and 60° to core + ⊥					87.4	88.0		2,7,2,1,0,8		
1.6	70.3	34.5-35.0 - shearing qg on joints @ 45°, 1-2mm qtz carb veins @ 30°+60°					89.6	89.5		2,7,2,0,1,0		
2.6	73.3	40.4-41.0 x 10 veins/m ; 46-47.5 sub // joints ; 70.9 fault - bleached 60°					89.5	90.3		2,7,2,0,0,9		
3.0	76.3	50.7-gh sand vein with rock frags ; 55.4-56.4 qtz carb veins to 5mm @ 60°					90.3	92.7		2,7,2,1,1,0		
3.0	79.3	58.0 bleached @ 65° ; 59.2-60.2 qtz carb veins // core 10mm wide ; 65.2-66m qtz carb					92.7	93.8		2,7,2,0,1,2		
3.1	82.5	veins @ 85° ; 66.3-69.1 qtz carb 3mm @ 60° ; 67.5 sheared + qg ; 71.6-72.2 broken + qg					93.8	1,0,1,6		2,7,2,1,1,1		
2.9	85.3	83.5-85.3m - Conglomerate - purple green - dominantly red and green shale					1,0,1,6	1,0,5,6		2,7,2,1,1,3		
0.6	86.0	fragments in purple-red matrix - minor shale bands - frags to 5cm C&B 60										
2.2	88.3	85.3-86.1m - Fault - broken - dominantly conglomerate - minor qg										
1.1	89.4	86.1-87.4m - Conglomerate - purple red - rock frags to 20mm of red sh,										
3.0	92.5	brown sh, grey sh, SS, volcs, red/grey chert										
3.1	95.6	87.4-89.0m - Conglomerate - green grey - as above - more green grey shale frags.										
3.1	98.7	89.0-89.4m - Contorted Shale/Conglomerate C&B 30° - sheared green grey sh										
1.5	100.3	89.4-90.3m - Contorted Conglomerate C&B 30 - shale fragments in cong										
3.0	103.3	90.3-93.8m - Coarse Sand Grit - green grey sand with shale frags in zones @ 92.0m										
3.0	106.3	C&B 30° - thin 2mm qtz carb veins @ 5/m @ 91m										
3.0	109.3	93.8-105.6m - Conglomerate - purple brown to green - 93.8-101.6 is fine with frags					1,0,3,9	1,0,4,0		2,7,2,0,1,4		
3.0	112.3	to 5mm with some bands to 10mm frags C&B 45° - 101.6-105.3m coarser with										
3.0	115.3	shale, Sh rocks to 50mm in ring <1mm matrix - 105.3-105.6 sandy bands										

95117

[redacted] LIN[redacted]D—D[redacted]ILE[redacted]RILL[redacted]G [redacted]

AREA 0 | PROJECT NUMBER | DATE STARTED | DATE COMPLETED | CONTRACTOR | DRILLER | CO-ORDINATES N/S | E/W | COLLAR R.L. | DEPTH | AREA OF INFLUENCE | DRILL TYPE | HOLE NUMBER DDH-CG3 | PAGE 2 OF 4

STATE | LOCATION | INCLINATION | AZIMUTH T/M/GRID | LOGGED BY | DATE OF LOGGING | HOLE SIZE | & ASSAY TYPE | TO

% CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MIN. TYPE	ACCEPTED ASSAY
2.9	118.3	qtz carb veining @ 95.7-95.8 and 96.6-96.7m, 20mm vein at 105.3					1,06;2	1,06;3		2,7,2,0,1,6		
3.0	121.3	105.6-106.6m - Shale greenish purple grey - finely banded in parts, C&B 30°, fine ss bands to 30mm thick @ 106.1m.					1,06;6	1,1,2;1		2,7,2,1,1,6		
3.0	124.3											
3.0	127.3	106.6-127.3 - Conglomerate C&B 30° - red/brown at contact - prominent C& location at 60° ranging to 30° occas - edges of congl 30° C&B - pebbles of red, green, grey, purple, blood stabs, red grey cream cherts, green ss and rocks in greenish matrix					1,1,2;1	1,1,2;2		2,7,2,0,1,5		
3.0	130.3						1,1,2;4	1,1,9;4		2,7,2,1,1,5		
3.0	133.3						1,1,9;4	1,1,9;5		2,7,2,0,2,0		
3.0	136.3						1,1,9;4	1,2,6;3		2,7,2,1,1,6		
3.0	139.3	106.6-109.2 hngs to 50mm, 109.2-109.7 hngs to 5mm (occas 20mm) 109.2-112.4 hngs to 50mm, 112.4-114.9 hngs to 5mm, 114.9-115.5 hngs to 40mm, 115.5-117.1 hngs to 10mm, 117.1-119.3 hngs to 1mm, 119.3-119.5 vok hng, 119.5-126.5 hngs to 2mm 126.5-127.3 hngs to 40mm.					1,2,6;3	1,2,7;3		2,7,2,1,1,7		
3.0	142.3											
3.0	145.3											
3.0	148.3											
3.0	151.3	106.6-110.8 qtz carb veins <1mm @ 1/m; 108.8-112.1 qtz carb veins to 1cm @ 3/m.										
3.0	154.3	112.1-112.4 mass of thin veins										
3.0	157.3	127.3-128.3m - Shale/Sandstone Interbeds - green grey ss with red green shales qtz carb veins 127.6-128.2					1,2,7;4	1,2,7;5		2,7,2,0,2,6		
3.0	160.3											
3.0	163.3	128.3-130.4m - Grit - green/red grey speckled grit to 1mm (coarser at bp) with some larger pebbles (to 30mm).					1,2,8;3	1,3,0;6		2,7,2,1,1,8		
3.0	166.3											
3.0	169.3	130.4-131.4m - Conglomerate - as above - some pebbles to 50mm.					1,3,0;4	1,3,1;4		2,7,2,1,2,0		
3.0	172.3	131.4-134.7m Grit as above with congl at 132.3-132.4 - mainly qtz carb vein @ 132.5-133.8m - fine qtz carb veins @ 132.6-133.5.					1,3,1;4	1,3,4;7		2,7,2,1,2,1		
3.0	175.3						1,3,3;7	1,3,3;8		2,7,2,0,2,6		
3.0	178.3	134.7-136.5m - Conglomerate - green - pebbles to 70mm - bngs of chert, shale, volcs. Coarse @ 134.7-135.0, 135.2-135.5 and 135.9-136.5 - rest grit coarse ss.					1,3,6;7	1,3,6;5		2,7,2,1,2,2		
3.0	181.3						1,3,5;1	1,3,5;2		2,7,2,0,2,8		
3.0	184.3	136.5-152.3m - Conglomerate - red brown - same as above - 136.5-139.6 coarse to 70mm, 139.6-139.8 grit, 139.8-140.6 coarse, 140.6-140.7 grit, 140.7-144.5 coarse, 144.5-145.2 grit, 145.2-152.3 pebbles to 5cm - qtz carb veins throughout.					1,3,6;5	1,4,3;3		2,7,2,1,2,3		
3.0	187.3						1,3,6;5	1,3,6;6		2,7,2,0,3,0		
3.0	190.3						1,4,3;8	1,5,2;3		2,7,2,1,2,6		
3.0	193.3	20mm veins at 136.7 & 136.9.										
3.0	196.3	152.3-155.3m - Grit green grey sand to 1mm with some to 3mm with thin shale bands. minor qtz carb veins - C&B 20° in shale.					1,5,2;3	1,5,5;3		2,7,2,1,2,5		
3.0	199.3						1,5,2;3	1,5,2;4		2,7,2,0,3,2		
2.9	202.3	155.3-157.2m - Grit red - similar to above but more red ss and less green volc bngs.					1,5,5;3	1,5,7;7		2,7,2,1,2,6		
3.0	205.3	157.2-161.1m - Grit green grey - as above - fines downhole.					1,5,7;2	1,5,7;3		2,7,2,0,3,4		
2.9	208.3	161.1-163.0m - Siltstone/Shale - green grey - minor coarse sand bands at 161.2-161.3 C&B 30° bed grain alignment @ 45°					1,5,7;7	1,6,1;1		2,7,2,1,2,7		
3.0	211.3											
3.0	214.3	163.0-168.6m - Conglomerate - green volc/ss bngs to 50mm in red matrix - minor shale - thin qtz carb veins through - strongest carb veins at 165.6-165.7 and 168.9-169.1 @ C&V 50-70° - qtz @ 168.0-168.1 in green bleached zone					1,6,3;0	1,6,8;6		2,7,2,1,2,8		
3.0	217.3						1,6,5;6	1,6,5;7		2,7,2,0,3,6		
3.0	220.3						1,6,8;0	1,6,8;1		2,7,2,0,3,8		
3.0	223.3	168.6-169.1m - Shale/Siltstone/Grit Interbeds - green - finely laminated C&B 30° similar composition to conglomerate above.					1,6,9;8	1,6,9;9		2,7,2,0,4,0		
2.9	226.3						1,6,9;1	1,7,3;2		2,7,2,1,2,9		
3.0	229.3	169.1-173.2m - Conglomerate Grit - similar to 163.0-168.6m but finer conglomerate generally <3mm with some bngs to 10mm.					169					
3.0	232.3											
3.0	235.3	173.2-173.5m - Shale - green - fissured, massive, fine - minor qtz carb veins										
2.9	238.3	173.2-185.2m - Conglomerate - red with bngs green volc pebbles to 50mm - many fine red ss bngs (to 5mm) + chert.					1,7,3;5	1,7,9;4		2,7,2,1,3,0		
3.0	241.3						1,7,9;4	1,7,9;5		2,7,2,0,4,2		
3.0	244.3	185.2-185.7m - Interbedded Siltstone/Sandstone/Shale - finely bedded green grey C&B 30° 10mm qtz carb vein on contact @ 185.7m.					1,7,9;5	1,8,5;2		2,7,2,1,3,2		
3.0	247.3						1,8,5;6	1,8,5;7		2,7,2,0,4,6		
3.0	250.3	185.7-187.3m - Conglomerate - [redacted] red matrix - coarse (to 50mm) 185.7-188.3m, 188.3-190.6					1,8,5;7	1,9,1;8		2,7,2,1,3,5		

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[redacted] LIM[redacted]D – D[redacted]ILE[redacted]ILL[redacted]

AREA 0 | PROJECT NUMBER | DATE STARTED | DATE COMPLETED | CONTRACTOR | DRILLER | CO-ORDINATES N/S | E/W | COLLAR R.L. | DEPTH | LOGGED BY | DATE OF LOGGING | AREA OF INFLUENCE | DRILL TYPE | HOLE NUMBER PRM-163 | PAGE 3 OF 4

STATE | LOCATION | INCLINATION | AZIMUTH T/M/GRID | HOLE SIZE ____ TO ____ | & ____ TO ____ | ASSAY TYPE ____ TO ____

% CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE 1:	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MIN. TYPE	ACCEPTED ASSAY
3·0	253·3	grit (10cm), 189·0 – 191·8m coarse (to 20mm), 191·8 – 192·2m grit (10cm with					191·3	191·7		217211346		
3·0	256·3	few to 30mm – 192·3 – 192·5 coarse, 192·5 – 195·2m grit, 195·2 – 195·6 coarse					191·7	191·8		217211347		
3·0	259·3	195·6 – 196·0m up to 10mm frags, 196·0 – 197·3m fine					191·8	191·9		217211348		
3·0	262·3	qtz carb veins @ 194·8 and 195·3m.					191·9	191·10		217211349		
2·9	265·3	187·3 – 188·3m – Shale/Grit/Conglomerate – green, bedded, contorted – fine gg					191·3	191·4		217211350		
3·0	268·3	particularly where broken – very few red sh/sh frags.					191·6	191·7		217211351		
3·0	271·3	188·3 – 203·2m – Conglomerate – green [redacted] near 188·3 changing to purple					191·8	203·2		217211352		
3·0	274·3	at 203·2m – generally fragments <10mm – this is the last					200·3	200·4		217211353		
2·9	277·3	conglomerate unit with elongated aligned pebbles – py in					200·4	200·5		217211354		
3·0	280·3	broken areas with minor cbl @ 200·1, 201·3, 201·8 – minor										
3·0	283·3	qtz carb veins										
2·9	286·3	203·2 – 211·5m – Conglomerate – equidimensional pebbles to 5mm – 203·2 – 206·3 green					203·2	206·3		217211355		
3·0	289·3	then red to 209·0 and green to 211·5.					204·1	204·2		217211356		
3·0	292·3	qtz carb veins to 20mm thick @ 204·3, 206·2, 205·3, 203·8, 205·6					206·3	211·5		217211357		
2·9	295·3	205·9, 208·0, 209·2, 210·3, 210·8, 211·2m – broken with py @ 210·3					205·3	206·0		217211358		
3·0	298·3	– 210·4m.					210·3	210·4		217211359		
3·0	301·3	211·5 – 216·1m – Conglomerate – elongated aligned pebbles of red, green, brown, black sh and					211·5	211·6		217211360		
3·0	304·3	green, pink, cream sandstone/lithic/arkose and red, grey, white ch – frags to 40mm										
3·0	307·3	thinly downhole – qtz carb, chl veins @ 3/m to 5mm – larger veins @ 214·6,										
2·9	310·3	215·6.										
3·0	313·3	216·2 – 221·2m – Pebbly Sandstone/grit – gradational from conglomerate – ss with pebbles					216·2	221·7		217211361		
3·0	316·3	to 5mm throughout – gradational to sandstone below					220·6	220·7		217211362		
3·0	319·3	py @ 219·3										
3·0	322·3	221·2 – 236·8m – Sandstone/Grit – as above but finer with less pebbles – fines downhole					221·7	228·3		217211363		
3·0	325·3	and becomes more green grey – larger frags (to 30mm) @ 228·3					228·3	230·6		217211364		
3·0	328·3	fine chl veins, cut by qtz carb veins – <5mm and 4/m – larger veins @					230·1	230·2		217211365		
2·9	331·3	231·8 (20mm), 225·4 (10mm), 227·4 (55mm), 230·2 (10mm) 230·7 (15mm)										
		234·0 (15mm), 235·4 (10mm)										
		236·8 – 238·4m – Pebbly Sandstone/grit – gradational from above – pebbles to 10mm near					236·8	238·6		217211366		
		top and bottom – similar to above but with red frags matrix.					237·3	238·4		217211367		
		– brecciated qtz carb vein @ 237·0 – 15mm thick.										
		238·4 – 261·3m – Laminated Shale/Siltstone/Sandstone – dominantly sh/slst with										
		ss beds @ 239·5 (10mm), 239·6 (20mm) 240·1 (100mm) 240·4 (15mm) 240·6 (10mm)										
		240·8 (30mm), 241·2 (10mm), 241·3 (10mm), 242·0 (20mm), 243·0 (60mm), 243·5										
		– 243·8, 244·4 (10mm), 244·8 (20mm), 246·0 (20mm) 247·5 (100mm), 248·1 (60mm)										
		249·3 (20mm), 249·6 (100mm) 258·3 (30mm) 260·5 (30m) @ CA 30°										
		– sh becomes green at base. – thinly qtz chl carb veins – some with py										
		20mm qtz carb vein at 260·6										
		261·3 – 279·1m – Conglomerate red brown – aligned sh, ch, volc, ss fragments to 50mm – strong					261·3	262·4		217211368		
		veining and silicified @ 261·3 – 263·4 with qtz carb – very coarse					261·5	261·6		217211369		
		pebbles from 263·6 – 268·4 and 272·0 – 274·8 and 276·3 – 276·9					263·4	270·1		217211370		
		qtz carb vein @ 265·6 at CA 30° – broken at 275·2 – 275·3.					270·1	278·1		217211371		
		279·1 – 279·4m – Conglomerate green with many green volc frags – blocked @ 279·0 –					278·1	279·4		217211372		
		279·4m fine red qtz carb py veins					279·1	279·2		217211373		
		279·4 – 295·6m Conglomerate – red brown – grit to 290·8 – very coarse @ 285·0 – 285·2					279·4	286·3		217211374		

99,119

118

[redacted] LIM[redacted]D—D[redacted]ILE[redacted]RILL[redacted]

AREA: D

PROJECT NUMBER:

DATE STARTED:

DATE COMPLETED:

CONTRACTOR:

DRILLER:

CO-ORDINATES N/S:

E/W:

COLLAR R.L.:

DEPTH:

AREA OF INFLUENCE:

DRILL TYPE:

HOLE NUMBER: DDH-C63

PAGE 4 OF 4

STATE:

LOCATION:

INCLINATION:

AZIMUTH T/M/GRID:

LOGGED BY:

DATE OF LOGGING:

HOLE SIZE: TO

& TO

ASSAY TYPE: TO

% CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MIN. TYPE	ACCEPTED ASSAY
		-series of coarse to fine cycles down hole - sharp contact with grit										
		at 295.7 @ 30° then coarse to fine cycles again - broken					279.4	279.5		272078		
		shale zone at 298.5.					286.3	291.3		272151		
		-minor qtz carb veins.					291.3	298.6		272152		
		298.6-310.2m - Conglomerate - green grey with an upper sheared contact.					291.5	291.6		272080		
		- coarse to fine cycles downhole - 304.5-305.2 contorted fine zone.					298.6	298.7		272082		
		20mm qtz carb vein with minor py at 305.6.					298.7	304.0		272153		
		310.2m-314.1m - Chocolate Shale - thinly banded C&B 30° with some					299.4	299.5		272084		
		thin ss horizons.					303.2	303.3		272086		
		-bleached to green cream around qtz carb veins with py @					304.0	310.2		272154		
		311.4 and 312.1 - other veins @ 311.6 and 313.1					309.4	309.5		272088		
		314.1-315.8m - Conglomerate - red brown with thin bands of red shale					311.4	311.5		272090		
		315.8-320.3m - Interbedded Chocolate and Green Shales - purple red at top of					314.9	315.0		272092		
		hole to green at bottom - minor conglomerate bands.					320.3	324.0		272155		
		320.3-327.9m - Conglomerate - green with interbedded green ss and sh.					322.6	322.7		272094		
		-broken shale at 320.6-321.0, shale @ 322.0-322.5 and 323.5-324.0m					324.0	327.9		272156		
		grades from coarse congl (<30mm) @ 324.0 to fine ss @ 327.9.					327.9	329.6		272157		
		327.9-331.3m - Limestone - white grey recrystallised limestone.					327.9	328.0		272096		
		-strongly veined and distorted. - minor py in broken zone					329.6	331.3		272158		
		@ 330.0-331.5m.					331.2	331.3		272098		
		331.3m E.O.H.										
		MAGNETIC SUSCEPTIBILITY LOGS AVAILABLE										

DOWN HOLE SURVEYS WITH EASTMAN SINGLE SHOT

Depth.	Azimuth (Mag)	Angle
60m	195°	-48°
120m	196°	-47°
190m	199°	-46°
259m	201°	-44°
328m	202°	-42°

995120

[redacted] LIM[redacted]D – D[redacted]ILE [redacted]RILL[redacted]

AREA: BDUNDAS | PROJECT NUMBER: 602 | DATE STARTED: 22/03/86 | CO-ORDINATES N/S: 536650 | COLLAR R.L.: 0182 | AREA OF INFLUENCE: | HOLE NUMBER: DD4-C64 1

DATE COMPLETED: 04/04/86 | CONTRACTOR: W. Howe & E. Coast Drilling | E/W: 364925 | DEPTH: 226.7 | DRILL TYPE: 38 | PAGE 1 OF 3

STATE: TAS | LOCATION: CUMI | INCLINATION: -50 | AZIMUTH: 079 | DRILLER: W. Howe | LOGGED BY: WD Ellis | DATE OF LOGGING: APRIL 1986 | HOLE SIZE: OPEN TO 3.0 & NQ TO 226.7 | ASSAY TYPE: TO

% CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MIN. TYPE	ACCEPTED ASSAY
0	3.0	0 – 3.0m NQW - Core - Swamp muds.										
0.55	4.0	3.0 – 37.0m Lithic Sandstone - possibly tuff - light grey green - generally fine grained with some larger irregular shale fragments - minor py as 1mm nodules. - all broken and partially weathered - minor shale bands with C∧B 10°					3.0	12.0		27226.1		
0.3	5.6						9.8	9.9		27216.1		
1.15	7.7						12.0	24.0		27228.4		
2.4	10.7						23.0	23.1		27216.3		
2.9	13.6	- 30-50mm purple shale at 13.0 and 14.0. - 10° joints weathered					24.0	37.0		27226.3		
0.55	14.1	- py on some joints @ 32.0 – 37.0 C∧B 40° and 21.5 – 23.7.					27.3	27.4		27216.5		
0.45	15.2	37.0 – 44.2m - Shale/Siltstone - green grey - similar to ss above but finer - greyer and darker - very broken - minor py on some joints - minor ss bands.					37.0	44.2		27226.4		
0.65	15.7						40.5	40.6		27216.7		
0.7	16.7											
0.92	17.5	44.2 – 62.2m - Sandstone/Tuff - as above but darker - broken @ 48.0 – 48.4 and 48.7 – 49.4m - 52.0 – 54.0 contains many sh fragments. C∧B 15° - graded bedding @ 61.0 – 62.1 with py in coarse bands 5mm qtz carb vein with py @ 55.5, 58.4, 61.1 and with py @ 61.3. - graded bedding shows younging up hole.					44.2	52.2		27226.5		
1.05	18.4						52.2	62.2		27226.6		
0.74	19.4						54.3	54.4		27216.9		
1.26	20.4						61.1	61.2		27216.7.1		
0.55	21.0						62.0	62.1		27217.5		
1.6	22.7	62.2 – 64.2m - Shale/Siltstone - similar to above but finer - minor ss bands and some with fine py. - showing 0 veins @ 63.4 – 64.1 (qtz carb with py + py).					62.2	64.2		27226.7		
1.72	24.2						64.5	64.9		27216.7.7		
0.64	24.9						65.5	65.6		27216.7.8		
2.3	27.0						66.0	66.1		27216.8.1		
0.45	28.1	64.2 – 69.7m - Sandstone - Lithic sandstone/tuff - as above - small sh fragments throughout - minor py nodules. - some more <2mm calcite qtz carb veins. I py					66.3	69.7		27226.8		
1.16	29.2						66.9	67.0		27218.3		
0.65	29.5											
1.15	31.0											
1.15	32.3	69.7 – 71.6m - Sandstone/Sandstone Contact - sub parallel to bed between green grey ss/tuff above and dark grey ss below.					69.7	71.6		27226.9		
0.53	32.9						71.1	71.2		27228.5		
0.4	33.2											
1.26	34.6	71.6 – 84.8m - Sandstone - dark grey, fine, massive, lithic with carbonaceous material giving dark color. - minor qtz carb veins with trace pyrrhotite @ 77.3m. - 78.5 – 79.7 fine calcite, qtz carb veins I pyrrh I py - minor calcite qtz carb veins @ 80.6, 80.9, 81.5, 82.1, 82.9 – 83.1, 84.2.					71.6	78.3		27226.10		
0.96	35.4						77.3	77.4		27218.7		
0.47	36.2						78.3	79.7		27226.11		
0.52	38.0						79.7	84.4		27226.13		
0.58	38.5											
1.17	39.7											
0.5	40.3	84.4 – 85.8m - Vein - sheared broken ss zone with qtz carb vein I py I pyrrh + Cpy					84.4	85.8		27226.14		
0.9	41.4						85.4	85.5		27218.9		
0.7	42.1											
1.42	43.6	85.8 – 94.7m - Sandstone - dark grey, fine, massive - as above but with shale units @ 87.7 – 88.0 and 90.5 – 90.8 C∧B 20° - broken @ 85.8 – 86.2 - sheared @ 92.5 – 93.1 - many <2mm qtz carb veins 87.8 – 87.9 many fine calcite + qtz carb veins - also at 90.5 – 90.6 + 91.1 – 91.5 minor 5mm calcite qtz carb veins @ 91.2 – 93.8 and 94.4 – 94.7.					85.8	90.3		27226.15		
1.3	44.9						90.3	91.5		27226.16		
0.3	45.4						91.5	91.6		27226.17		
1.16	46.7						91.6	91.7		27226.18		
0.56	47.4						91.7	92.5		27226.19		
0.3	48.0						92.5	93.8		27226.20		
0.4	48.4						93.8	94.4		27226.21		
0.6	49.0						94.4	94.7		27226.22		
0.4	49.4	94.7 – 96.6m - Clay Pellet Conglomerate/Sandstone - dark grey claystone pellets to 10mm in a mid grey sandy matrix - minor calcite, qtz carb veins					94.7	96.6		27226.23		
1.0	49.7						95.3	95.4		27226.24		
2.65	52.4											
3.0	55.5											

120

99521

[redacted] LIM[redacted]D—D[redacted]ILE[redacted]RILL[redacted] 317

AREA 0 | PROJECT NUMBER | DATE STARTED | DATE COMPLETED | CONTRACTOR | DRILLER | CO-ORDINATES N/S | E/W | COLLAR R.L. | DEPTH | AREA OF INFLUENCE | DRILL TYPE | LOGGED BY | DATE OF LOGGING | HOLE NUMBER DDH-CG4 | PAGE 2 OF 3 | HOLE SIZE TO | & ASSAY TYPE TO

STATE | LOCATION | INCLINATION | AZIMUTH T/M/GRID

% CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	DUP. TYPE	ACCEPTED ASSAY
3.1	58.6	96.6 – 103.7m – Shale – finely bedded, light green grey shale with some coarse bands – coarse bands consist of sand sized clay/shale frags. C&B varies from 30°–70° – graded bedding shows fining up hole. – minor qtz carb and calcite veins. – contorted @ top and bottom and @ 101.6. – small oolitic nodules @ 104.7.					96.6	100.7		27,2,2,179		
2.53	60.4						98.9	99.0		27,2,2,185		
2.87	64.0						100.7	101.7		27,2,2,180		
3.2	67.1						104.6	104.7		27,2,2,189		
3.2	70.2											
3.2	73.3											
3.1	76.4	103.7–110.3m – Sandstone – dark grey, carbonaceous – basal mm contorted and deformed – C&B 55° (aligned fragments) – minor calcite veins					107.3	110.3		27,2,2,181		
3.1	79.5						109.6	107.3		27,2,2,199		
2.96	82.6	@ 110.2 is comm calcite vein with py.										
3.0	85.7											
0.6	86.3	110.3–111.1m – Shale – finely bedded with C&B 70° – 85 above. – minor coarse					111.3	111.1		27,2,2,182		
2.3	88.7	bands – fine py BS bands // to bedding @ 110.8–111.1 in darker					111.9	111.8		27,2,2,02		
3.0	91.7	zones. – top 4 unit is greenish changing to dark grey at base.										
1.5	93.2											
3.1	96.2	111.1–114.9m – Sandstone/Pellet Conglomerate – dark grey carbonaceous ss with					111.1	111.4		27,2,2,184		
3.0	99.2	clay pellets and ss pellets throughout – sh fragments deformed.					111.2	111.7		27,2,2,04		
1.35	100.1	112.4–112.9m has minor py bands – py in fine calcite veins throughout										
3.0	103.7											
3.0	106.7	114.0–116.3m – Sandstone – mid grey, fine to medium grained with many lithic					111.4	111.6		27,2,2,185		
3.0	109.7	fragments – minor disseminate py and fine (<2mm) calcite veins										
3.0	112.7	throughout.										
3.0	115.7											
3.0	118.7	116.3–166.9m – Interbedded Shale/Siltstone/Sandstone – light and dark					116.3	121.4		27,2,2,186		
3.0	121.7	grey shales interbedded with dark grey to black siltstones and dark					118.4	118.5		27,2,2,06		
3.0	124.7	grey carbonaceous sandstones – fine disseminated py					119.5	119.6		27,2,2,08		
3.0	127.7	throughout – fine calcite veins throughout – some with py – veins					121.4	121.6		27,2,2,187		
3.0	130.7	combe up to 20% of core – py rich vein @ 126.2 (5mm) – qtz carb veins					121.0	121.1		27,2,2,10		
3.0	133.7	@ 116.2 and 132.4–132.6 – qtz carb veins later than calcite but prior					126.1	131.3		27,2,2,188		
3.0	136.7	to deformation – py nodules in veins @ 137.5 & 139.1, qtz carb					129.7	129.8		27,2,2,12		
3.0	139.7	veins @ 128.5, 141.9, 140.8, 140.4, 149.2–151.9, 152.2–152.9,					131.3	136.7		27,2,2,190		
3.0	142.7	– sheared @ 141.5–141.6, 149.0–149.7 – py/pp/calcite nodule at					136.7	141.6		27,2,2,9.1		
3.0	145.7	147.7, py nodule @ 152.8–153.0 – ss with fine py @ 154.6–155.0					136.9	137.0		27,2,2,1.4		
3.0	148.7	black and green shales @ 156.0–160.4m. C&B 30°					141.5	141.6		27,2,2,1.6		
1.9	150.6	py as veins, nodules and bands @ 163.8.					141.6	149.0		27,2,2,9.2		
2.6	153.2	166.9–172.8m – Sandstone with some shale/siltstone – light green grey, fine,					141.8	141.9		27,2,2,1.9		
2.4	155.7	massive ss with minor shale/siltstone bands particularly 166.9–169.1					147.6	147.7		27,2,2,2.1		
1.7	157.4	– shales dark grey with fine py C&B 30°					149.0	149.7		27,2,2,9.3		
1.4	158.8	– fine calcite veins some with py throughout.					149.0	149.1		27,2,2,23		
3.1	162.0						149.7	152.9		27,2,2,9.4		
1.6	163.7	172.8–207.5m – Sandstone/Tuff – fine, green grey with black carbonaceous					151.5	151.6		27,2,2,25		
3.0	166.7	fragments throughout, massive – minor fine calcite veins some					152.9	156.9		27,2,2,9.5		
3.0	169.7	with py throughout – larger veins are 173.9 (10mm), 175.2 (15mm)					153.8	153.9		27,2,2,27		
3.0	172.7	176.7 (20mm) 177.2–178.1 (15mm) 179.2 (10mm) 181.6 (20mm) 184.7 (20mm)					154.7	154.8		27,2,2,24		
3.0	175.7	188.6 (15mm), 194.2 (25mm), 198.7 (25mm), 199.8–199.0, 202.3–207.2					156.0	160.4		27,2,2,9.6		
3.0	178.7	– sh + ss @ 197.7–197.9 and 198.1–198.7					160.1	160.2		27,2,2,3.1		

T5

99[redacted]122

[redacted] LIMITED DETAILED DRILL [redacted]

AREA 0 | PROJECT NUMBER | DATE STARTED | DATE COMPLETED | CONTRACTOR | DRILLER | CO-ORDINATES N/S | E/W | COLLAR R.L. | DEPTH | AREA OF INFLUENCE | DRILL TYPE | LOGGED BY | DATE OF LOGGING | HOLE NUMBER ODH-C65 | PAGE 3 OF 4 | HOLE SIZE | & | ASSAY TYPE | TO

STATE | LOCATION | INCLINATION | AZIMUTH T/M/GRID

125

% CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MINERALIZATION TYPE	ACCEPTED ASSAY
3.0	228.7	- pyrrhotite from 110.0 - 137.8 when changes to py - thin					1.1.1.1	1.1.1.2				MAGNETIC REMANANCE
3.1	231.8	very fine disseminations to massive - thin qtz carb and calcite veins					1.1.4.1	1.1.4.2				"
3.1	234.9	throughout some with py @ 2x 10/m. - some fracture veins					1.2.3.3	1.2.3.4				"
3.1	238.0	@ 113.0 (20mm), 117.4 (10mm) 111.5 (30mm) 127.0 (25mm)					1.3.0.6	1.3.0.7				"
3.0	241.0	- Calcareous cement as bands in ss.					1.3.6.1	1.3.6.2				"
3.0	244.0											
2.55	247.0	139.5 - 142.9m - Interbedded Shale/Sandstone - black shale with light grey fine ss					1.1.6.8	1.1.6.9		27223643		
3.0	250.0	- shale bags in parts of ss - strongly veined by fine calcite					1.1.9.0	1.1.9.1		27223645		
3.0	253.0	and qtz carb - some with py (140.8m) - some with pyrrh (141.9m)					1.2.1.2	1.2.1.3		27223647		
3.0	256.0	- fine pyrrhotite disseminations in ss in parts CAB 60°					1.2.2.0	1.2.8.0		27246246		
							1.2.8.0	1.3.4.0		27234625		
		142.4 - 144.4m - Sandstone - fine grained light grey massive with some sh					1.3.2.7	1.3.2.8		27223649		
		fragments - minor shaley bands - minor calcite veins.					1.3.4.0	1.3.8.5		27246246		
							1.3.5.9	1.3.6.0		27223652		
		144.9 - 162.6m - Interbedded Shale/Sandstone - finely interbedded @ top to					1.3.7.9	1.3.8.0		27223654		
		coarse @ base - ss is light grey - sh is black.					1.3.8.5	1.4.2.4		37246247		
		144.9 - 147.5m has py horizons with small pyrrhotites @ 145.4-145.7					1.4.1.8	1.4.1.9				MAGNETIC REMANANCE
		CAB 46°-50° - fine disseminated py in coarse bands with some very fine					1.4.0.8	1.4.0.9		27223656		
		py with sh. - some cross bedding with asphaltic lensing - qtz carb and					1.4.1.9	1.4.2.0		27223658		
		calcite veins & py are generally thin with 10-20/m.					1.4.2.9	1.4.4.9		27246249		
		147.5 - 157.9m - more calcite veins 20-40/m - most thin - some with					1.4.6.9	1.4.7.5		27246249		
		py - some breccia in veins @ 147.5-147.6 - py @ 148.1, 148.9 -					1.4.6.9	1.4.5.0		27246260		
		150.1 - pyrrhotite ± py @ 150.3 - 150.4 - fine dissem py					1.4.7.5	1.5.2.6		27246261		
		throughout					1.5.0.3	1.5.0.4		27223662		
		157.9 - 162.6m - py to 2% veins - mainly calcite - some qtz/carb					1.5.0.3	1.5.0.5				MAGNETIC REMANANCE
		stringers @ 160.4 - 160.7 with calcite, py, sphal, pyrrh.					1.5.2.6	1.5.7.0		27246262		
							1.5.7.0	1.6.2.6		27246263		
		162.6 - 177.5m - Dominantly Black Shale - mainly dark grey to black finely bedded					1.6.0.5	1.6.0.6		27223664		
		shale - some coarse light grey siltstone horizons. - fine py throughout					1.6.2.6	1.6.3.4		27246266		
		as disseminations & py bands - small pyrrh in qtz carb veins @ 163.7					1.6.3.4	1.6.3.9		27246265		
		- 163.8 with vein extending from 163.6 - 163.9. - py blebs @ 163.9					1.6.3.7	1.6.3.8		27223666		
		- many fine calcite veins <3mm					1.6.3.9	1.6.8.9		27246266		
							1.6.8.8	1.6.8.5		27223668		
		177.5 - 184.4m - Shale/Sandstone - light grey green, banded CAB 75°-45°					1.6.8.9	1.7.2.5		27246267		
		177.5 - 177.1 mostly sh/slst with minor ss bands					1.7.2.5	1.7.7.1		27246268		
		177.1 - 184.4 is slst/ss with sh bands					1.7.2.5	1.7.2.6		27223671		
		177.5 - 178.5 has thin calcite veins with trace pyrrh/arsenopy.					1.7.7.1	1.8.4.4		27246269		
		178.5 - 184.4 only minor thin calcite veins - thicker veins @ 178.2 -										
		178.5 (calcite/qtz/carb) 181.5 (75mm), 184.0 (30mm)										
							1.9.4.4	1.9.8.3		27246271		
		184.4 - 185.4m - Interbedded Shale/Sandstone - sh/slst is black to dark grey					1.9.7.9	1.9.8.0		27223673		
		while ss is light grey CAB 65°-70° - graded bedding lines asphaltic					1.9.8.3	1.9.3.3		27246272		
		- sh finely banded with py bands and fine dissem py - fine					1.9.3.3	1.9.8.4		27246273		
		calcite veins (<0.5mm) throughout - py with veins in shale.					1.9.6.7	1.9.6.8		27223675		

995123

CSR LIMITED DETAILED DRILL LOG

AREA: D | PROJECT NUMBER | DATE STARTED | DATE COMPLETED | CONTRACTOR | DRILLER | CO-ORDINATES N/S | E/W | COLLAR R.L. | DEPTH | AREA OF INFLUENCE | DRILL TYPE | HOLE NUMBER: APH-C65 | PAGE 4 OF 4 | STATE | LOCATION | INCLINATION | AZIMUTH T/M/GRID | LOGGED BY | DATE OF LOGGING | HOLE SIZE TO | & TO | ASSAY TYPE TO

126

% CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	REPL. TYPE	ACCEPTED ASSAY
		198.4-214.1m - Sandstone - light grey, generally massive but with zones of finely banded ss and sh - carbonaceous sh bands @ 200.0-200.2 with py - dissem py in conse ss @ 201.2-201.4, 201.8-201.3 sh/carbonaceous ss @ 204-204.4, 205.2-205.4, 206.4-206.6 sh with py @ 206.7-206.8 - sheared @ 207.4 with qtz carb veni. minor thin sh units in 208-214. qtz vein @ 212.3-212.4 - base has qtz carb veins to 45°					198.4	207.4		27244.4		
							200.0	201.1		27233.7		
							207.4	211.1		27244.5		
		214.1-227.0m - Shale - dark grey with siltstone and minor light grey ss bands - finely banded with some parts massive. C/B 65°-70° - fine dissem py throughout - thin calcite veins numerous some with py - minor pyrite in vein @ 218.3-218.4 qtz carb veni in 222.0-227.0 - @ 227.0 vein with galena qtz carb on shears @ 222.4-222.6, 225.7-226.0, 226.2-226.4.					214.1	222.0		27246.6		
							214.4	214.5		27233.8		
							215.9	216.9		27233.8		
							218.3	218.4		27233.9		
							220.5	220.6		27233.8		
							222.0	227.0		27244.7		
		227.0-243.6m - Interbedded Sandstone/Shale/Siltstone - massive fine light grey ss horizons with interbedded finely banded dark grey to black shale/siltstone/carbonaceous ss - fine carbonaceous veins contain banded & dissem py fine calcite ± py veins throughout @ 228.0-228.1 calcite/qtz carb/galena vein.					226.9	227.0		27233.8		
							227.0	234.9		27246.8		
							228.0	228.1		27233.9		
							234.6	234.7		27233.9		
							234.8	243.6		27244.9		
							238.1	238.2		27233.9		
		243.6-256.0m - Sandstone - light grey with narrow bands of finely banded carbonaceous shale/ss with py C/B 60° - zone of py enrichment and veinlets @ 244.1-245.9.					243.6	244.1		27244.51		
							244.1	245.9		27244.52		
							244.5	244.6		27233.96		
							245.9	250.0		27244.53		
							250.0	256.0		27244.54		
							255.3	255.4		27233.98		
		256.0m EOH.										
		MAGNETIC SUSCEPTIBILITIES TAKEN AT 0.2M INTERVALS ALL GAVE @ ZERO READINGS										
		DOWN HOLE SURVEY WITH EASTMAN SINGLE SHOT										

Depth	Azimuth (Mag)	Angle
55m	235°	-49°
100m	235°	-49°
142m	240°	-47.5°
181m	240°	-44.5°
241m	245°	-36°
256m	246°	-34°

995124

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AREA: 0 | PROJECT NUMBER: | DATE STARTED: | CO-ORDINATES N/S: | COLLAR R.L.: | AREA OF INFLUENCE: | HOLE NUMBER:

STATE: | LOCATION: | INCLINATION: | AZIMUTH T/M/GRID: | DATE COMPLETED: | E/W: | DEPTH: | DRILL TYPE: | PAGE 3 OF 3

CONTRACTOR: | DRILLER: | LOGGED BY: | DATE OF LOGGING: | HOLE SIZE ___ TO ___ & ___ TO ___ ASSAY TYPE ___ TO ___

% CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MIN. TYPE	ACCEPTED ASSAY
3.0	181.7	207.5-210.7m - Sandstone/Shale - Interbedded C&B 30° - finely										
3.0	184.7	bedded shales with massive SS - grey. - many fine					160.4	164.9		272297		
3.0	187.7	calcite veins					161.1	161.2		272233		
3.0	190.7						163.8	163.9		272235		
3.0	193.7	210.7-213.2m - Sandstone/Tuff - as above					164.9	169.1		272298		
3.0	196.7						165.9	166.0		272238		
3.0	199.7	213.2-224.9m - Interbedded Shales/Siltstone/Sandstone-Tuff - overall					169.1	172.8		272299		
3.0	202.7	green grey - shales siltstones finely banded C&B 20-40°					170.8	170.9		272240		
3.0	205.7	- some shales have py banding - many fine calcite veins					172.8	181.7		272301		
3.0	208.7						177.7	177.8		272242		
3.0	211.7	224.9-226.7m - Shale - dark grey, finely banded with thin green grey					179.1	179.2		272244		
3.0	214.7	shale bands - fine calcite veins with 1 pt carb calcite					181.7	190.7		272302		
3.0	217.7	vein					190.7	199.7		272303		
3.0	220.7						194.1	194.2		272246		
3.0	223.7	226.7m EOH					198.8	198.9		272248		
3.0	226.7						190.7	207.5		272304		
							207.5	210.7		272305		
		MAGNETIC SUSCEPTIBILITY READINGS AT 0.2M INTERVALS					207.9	208.0		272251		
		ALL GAVE ZERO RESULTS					210.7	213.2		272306		
							213.2	218.7		272307		
		DOWN HOLE SURVEYS WITH EASTMANN SINGLE SHOT					213.7	213.8		272253		
							218.7	224.9		272308		
		Depth / Azimuth (Mag) / Angle					221.5	221.6		272255		
		30m / 079° / -52°					224.9	226.7		272309		
		60m / 078° / -52°					225.6	225.7		272257		
		121m / 076° / -48°					226.5	226.6		272259		
		180m / 077° / -45°										
		226m / 076° / -43°										

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AREA: DUNDAS | PROJECT NUMBER: 602 | DATE STARTED: 23/03/86 | CO-ORDINATES N/S: 5367730 | COLLAR R.L.: 190 | AREA OF INFLUENCE: | HOLE NUMBER: DDH-C65

STATE: TAS | LOCATION: NICUM | INCLINATION: -50 | DATE COMPLETED: 10/04/86 | CONTRACTOR: F Ostner | E/W: 365775 | DEPTH: 2560 | DRILL TYPE: F49S | PAGE 1 OF 4

AZIMUTH TRUE/GRID: 235 | DRILLER: F Ostner | LOGGED BY: P.D. ELLIS | DATE OF LOGGING: APRIL 1986 | HOLE SIZE & ASSAY TYPE: HQ TO 16.0, NQ TO 256.0

CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE 1:	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MIN. TYPE	ACCEPTED ASSAY
0	16.0	0 - 16.0m - Non-core - orange brown weathered shale/ss.										
1.7	19.0											
1.6	21.0	16.0 - 17.1m - Sandstone - orange brown weathered fine to medium ss black coatings on joints										
2.7	24.4											
2.3	26.5											
1.6	28.0	17.1 - 20.3m - Shale - orange brown weathered clay/shale with minor ss bands.										
3.1	31.0											
3.0	34.0											
1.9	35.9	19.2 - 20.3m - Sandstone - partially weathered green grey lithic sandstone/shale limonite on joints.										
3.1	39.1											
1.9	40.9											
1.8	42.6	20.3 - 21.5m - Shale - weathered to orange brown shale with black joint coatings.										
1.6	44.2											
2.0	46.0											
1.3	47.3	21.5 - 22.2m - Sandstone - partially weathered green grey lithic ss/shale - limonite on joints										
1.7	49.0											
2.8	52.0											
1.6	53.6	22.2 - 24.5m - Shale - green grey partially weathered to orange brown - minor ss band										
1.1	55.0											
3.0	58.0	24.5 - 25.4m - Shale - finely bedded green grey with limonite on joints - C/B 30° ss band @ 24.9 - 25.0.										
1.3	59.3											
2.8	62.1											
0.9	63.0	25.4 - 35.6m - Sandstone - massive, green grey, lithic - minor shale horizons weathered to orange brown @ 27.5-28.0 & 29.9-30.0 limonite on joints - shale @ 29.7-29.8 & 30.4-30.6 thin py vein @ 35.2m.										
0.9	64.0											
0.4	64.8											
1.5	66.1						35.2	35.3		2,7,2,3,1,2		
0.8	67.0											
1.3	68.4	35.6 - 36.1m - Fault? - Pyrite bearing broken zone - shale green grey shale with solution holes - some py - bearing.					35.6	36.1		2,7,2,4,0,1		
0.7	69.0						36.0	36.1		2,7,2,3,1,4		
1.7	70.9											
0.8	72.4	36.1 - 37.1m - Shale - finely bedded green grey with some py bands minor weathering on joints C/B 60°					36.2	36.3		2,7,2,3,1,6		
1.4	73.9											
0.4	74.4											
1.2	76.2	37.1 - 48.3m - Sandstone - light green grey - minor limonite on some joints - some thin (<1cm) py veins - shale bands @ 35.7-35.9, 39.2-39.4, 40.1-40.2, 41.7-41.9, 42.4-42.6 - py + shale/ss bands @ 44.4-45.0 undulating band @ 37.6 C/B 60°										
0.4	77.2											
1.4	79.0											
3.0	82.0											
0.8	82.8											
0.8	84.0	48.3 - 51.5m - Shale - green grey and red to dark grey bedded shale - some coarse band with finely eyelet - ss @ 49.3-49.4					51.3	51.4		2,7,2,3,1,8		
1.5	86.2											
1.4	88.0											
3.0	91.0	51.5 - 56.1m - Sandstone - green khaki grey, massive, fine, lithic (tuffaceous?) - minor limonite on some joints - minor black shale inclusions near downhole contact C/B 35°					56.0					
1.0	92.2											
0.4	93.1											
1.1	94.8											

13

9951126

CSR LIMITED—DETAILED DRILL LOG

CSR

AREA | PROJECT NUMBER | DATE STARTED | CO-ORDINATES N/S | COLLAR R.L. | AREA OF INFLUENCE | HOLE NUMBER: DDH-CS3

STATE | LOCATION | INCLINATION | AZIMUTH T/M/GRID | DATE COMPLETED | CONTRACTOR | DRILLER | E/W | DEPTH | DRILL TYPE | LOGGED BY | DATE OF LOGGING

PAGE 2 OF 4 | HOLE SIZE ____ TO ____ | & ____ TO ____ | ASSAY TYPE ____ TO ____

124

% CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE 1:	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MIN. TYPE	ACCEPTED ASSAY
0·5	96·7	54·1-57·6m - Shale - black, finely bedded with minor ss bands C&B 35°-76°										
2·0	98·8	grey shale band @ 55·0-55·2 - fine py veins (<1mm)					54·1	57·6		27,24,0,2		
1·6	100·0						54·1	54·2		27,23,2,0		
3·1	103·0	57·6-58·3m - Sandstone - khaki grey, massive, fine with minor sh bands										
3·0	106·3	fine disem py @ 57·4					57·6	58·3		27,24,0,3		
3·1	109·0											
3·0	112·0	58·3-61·9m - Interbedded Sandstone/Shale - green grey ss with py interbedded with black					58·3	61·9		27,23,60,6		
3·0	115·0	shale - shale @ 58·1-58·5, 58·4-59·3, 60·3-60·9, 61·5-61·6										
3·0	118·0	61·7-61·8 - fine py on joints throughout.										
3·0	121·0											
3·0	124·0	61·9-77·4m - Shale - dark grey to black with 5-10% py finely disem and					61·9	67·0		27,24,0,5		
3·0	127·0	on joints - minor ss @ 62·0-62·1, 73·1-73·2 - siltstone/sh					67·0	70·8		27,24,0,6		
3·0	130·0	@ 74·6-77·4m - broken @ 63·3-64·9, 65·5-66·1, 66·8-67·0					70·8	74·6		27,24,0,7		
3·0	133·0	67·5-67·7, 70·8-71·4, 73·5-74·0, 75·6-76·0, 76·1-76·5					73·0	73·1		27,23,2,2		
3·0	136·0	76·7-77·0.					74·5	74·6		27,23,2,4		
3·0	139·0						74·6	77·9		27,24,0,8		
3·0	142·0	77·9-78·9m - Sandstone - broken grey, fine with broken shale - rotten? - altered					77·9	78·0		27,24,0,9		
3·0	145·0						78·0	78·1		27,23,2,6		
3·0	148·0	78·9-91·1m - Sandstone - light grey, massive, fine, calcareous cement.					78·9	91·1		27,24,1,1		
3·0	151·0	- minor thin carbonate veins					78·9	79·0		27,23,2,8		
3·0	154·0											
3·0	157·0	91·1-96·1m - Interbedded Sandstone/Shale - grey, fine ss - often broken and rotten					91·1	84·0		27,24,1,2		
3·0	160·0	mixed with dark grey shale - minor py - solution holes from					84·0	86·1		27,24,1,3		
2·2	162·3	bioturb in ss/sh.										
3·2	165·5											
3·1	168·6	96·1-96·5m - Shale - broken black shale with 10% py as veins and fine disem.					86·1	86·5		27,24,1,4		
3·1	171·7											
3·1	174·8	96·5-91·2m - Shale - black, finely bedded with minor thin ss bands having					86·5	87·0		27,24,1,5		
3·1	177·9	up hole - extensively veined (20-30%) of dark calcite veins with					87·6	87·7		27,23,3,0		
3·1	181·0	some py - ss from 88·2-88·5 - calcareous					89·0	91·2		27,24,1,6		
3·0	184·0											
3·0	187·0	91·2-96·4m - Shale/Sandstone - broken, black carbonaceous shale with					91·2	96·4		27,24,1,7		
3·0	190·0	light grey coarse ss bands - 5% py throughout.										
3·0	193·0											
3·0	196·0	96·4-110·0m - Sandstone - finely bedded C&B 45°-75° fine ss with					96·4	99·0		27,24,1,8		
3·0	199·0	carbonaceous horizons (dark) - ss generally light grey - some					97·9	97·9		27,23,3,2		
3·0	202·0	fine disem py particularly @ base - calcite veins throughout					98·2	98·3		27,23,3,5		
3·0	205·0	- most fine bigger veins @ 103·9(4mm), 106·9(10mm) 107·4(15mm)					99·0	101·9		27,24,1,9		
3·0	208·0	97·8(20mm) - nodular nodules @ 101·6-101·7.					104·0	104·1		27,23,3,4		
3·0	211·0						109·9	110·0		27,24,2,1		
3·0	214·0	110·0-139·5m - Sandstone - light grey, fine with minor black carbonaceous					106·4	106·5		27,23,3,9		
3·0	217·0	bands - black spots @ 110·0-111·0 - black bands @ 111·0-111·2, 115·8										
2·4	219·4	-116·1, 117·5-118·2, 119·0-119·3, 119·8-120·1 - black flecks @					110·0	110·6		27,24,2,2		
3·0	222·5	118·4-118·5 - black bands @ 120-121, 125·4-126·4, 126·7-126·9					110·9	111·0		27,23,2,1		
3·9	225·6	131·7-132·0, 133·4-134, 138·2-139·6 - grades/beds @ 132·7-132·8					111·0	12,2·0		27,24,2,3		

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AREA: BDUNDAS | PROJECT NUMBER: 602 | DATE STARTED: 12/04/86 | CO-ORDINATES N/S: 3363/15 | COLLAR R.L.: 216 | AREA OF INFLUENCE: | HOLE NUMBER: BDH-CG6 | PAGE 1 OF 2

STATE: NWS | LOCATION: DUNDAS | INCLINATION: -46 | DATE COMPLETED: 21/04/86 | E/W: 367295 | DEPTH: 1572 | DRILL TYPE: 69J | HOLE SIZE: TO: & ASSAY TYPE: TO:

AZIMUTH M/M/GRID: 040 | CONTRACTOR: F. Ortner | DRILLER: F Ortner | LOGGED BY: P.D. Ellis | DATE OF LOGGING: April 1986

% CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MIN. TYPE	ACCEPTED ASSAY
0	30.6	0 - 30.6m - Open Hole - See BDH-CG6A Log										
0.7	31.2											
1.7	32.9	30.6 - 53.1m - Shale - purple brown finely bedded shale with minor ss bands - minor green shale @ 50.0m. CA 80°					30.6	35.7		27,215,113		
1.3	34.2						35.6	37.1		27,246,111		
1.3	35.7	-ss bands graded with fining upbeds -ss @ 37.0-37.6, 39.1-39.2					35.7	40.5		27,215,114		
3.0	38.8	40.6-40.1, 41.7-41.9, 42.0-37.6, bdy 7-@ 67.9. - ss increases					40.5	48.8		27,215,115		
1.3	40.2	significantly below 40.0 - minor qtz py veins (esaw) @ 33.7 and					48.8	53.1		27,215,116		
1.2	41.7	34.4 bleached fm shale.					50.0	50.1		27,246,113		
1.8	43.2											
3.0	46.2	53.1 - 66.7m - Interbedded Sandstone / Shale / Conglomerate - purple brown					53.1	58.3		27,215,117		
2.3	48.8	shale with green brown ss (congl - green ederr hm green					56.1	56.2		27,246,115		
2.9	51.9	rock frags - frags consist of sh, ch, ss, rocks - green sh					58.3	58.7		27,215,118		
1.7	53.8	@ 58.3 - 58.7 m sh py on joints. - broken @ 56.8 with Fe stain					58.7	66.7		27,215,119		
2.4	56.3	carb veins @ 56.1 m congl. - thin qtz cbl veins @ 62.0 & 62.7					62.3	62.6		27,246,117		
1.2	57.5	qtz carb veins @ 65.0.										
1.2	59.0						66.7	67.9		27,215,120		
2.0	61.2	66.7 - 67.9m - Shale - green to white bleached fine shale - similar texture to					66.8	66.9		27,246,119		
2.0	63.4	ss/ss above but broken and bleached - py on joints.										
2.1	65.5											
2.0	67.5	67.9 - 91.4m - red brown, finely bedded with minor coarse bands of ss CA 85°					67.9	73.2		27,215,121		
1.1	69.1	- rhythmic bedding fining upbeds - bleached zone @ 69.4 - 69.5					73.2	77.7		27,215,122		
0.9	70.2	qtz carb veins @ 70.9 CA V 30°					75.8	75.9		27,246,121		
3.0	73.2	@ 91.4 change of source area to green shale.					77.7	81.6		27,215,123		
1.4	74.7											
3.0	77.7	91.4 - 98.2m - Sandstone - fine to coarse bedded sandstone with variations					81.6	83.6		27,215,125		
2.5	80.4	to conglomerate - minor shale horizons. - variable source					83.6	89.9		27,215,126		
2.1	82.5	areas from red and green dominant.					85.4	85.5		27,246,123		
2.5	85.2	91.4 - 82.7 alternations of red + green source for ss and congl					88.3	88.4		27,246,125		
3.1	88.2	and clay pellet congl. - 90.8 - 92.5 dominantly green					89.2	89.3		27,246,127		
3.0	91.2	source for ss. - 92.5 - 96.2 - red source dominantly with					90.9	92.5		27,215,127		
3.0	94.2	green ss increasing downwards with minor congl. - 96.2 - 98.2					90.4	91.0		27,246,128		
3.0	97.2	dominantly green ss/sh.					92.5	96.2		27,215,128		
3.0	100.2						96.2	99.6		27,215,129		
3.0	103.2	98.2 - 132.6m - Conglomerate - green to red brown with mixture of red sh										
3.0	106.2	- green ss rocks, pebbles and chert. - abundance of					98.2	103.2		27,215,130		
3.0	109.2	green rock frags near may susc areas - minor ss @					103.2	109.2		27,215,131		
2.6	112.8	98.5 - 98.9, 105.0 - 105.1, 107.2 - 107.3, 125.0 - 125.1, 125.2 - 125.7					109.2	111.6		27,215,132		
3.0	115.2	127.8 - 127.7, 129.2 - 129.3 - broken with minor py 114.2 - 116.0					109.5	110.6		27,246,132		
3.0	119.2	broken @ 125.2 - py on joints @ broken 130.2 - 132.6.					111.4	111.6		27,215,133		
3.0	121.2	qtz veins, Tchl, py @ 131.4 - 131.5 and 132.3.					111.8	111.9		27,246,134		
3.0	124.2	green predominates @ 131.7 - 132.6 - fault @ base.					116.0	124.2		27,215,135		
3.0	127.2						124.2	130.2		27,215,136		
3.0	130.2	132.6 - 135.8m - Shale - green, massive, fine shale with minor conglom.					130.2	131.2		27,215,137		
2.1	132.6	qtz carb veins @ 132.6					131.2	132.4		27,215,138		
3.0	135.8						131.4	131.5		27,246,136		

09512 8

CSR LIMITED—DETAILED DRILL LOG

AREA 0 | PROJECT NUMBER | DATE STARTED | DATE COMPLETED | CONTRACTOR | DRILLER | CO-ORDINATES N/S | E/W | COLLAR R.L. | DEPTH | AREA OF INFLUENCE | DRILL TYPE | HOLE NUMBER DDH-C66 | PAGE 2 OF 2

STATE | LOCATION | INCLINATION | AZIMUTH T/M/GRID | LOGGED BY | DATE OF LOGGING | HOLE SIZE ____TO____ | & ____TO____ | ASSAY TYPE ____TO____

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% CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE 1:	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MIN. TYPE	ACCEPTED ASSAY
3.1	139.4	133.8 - 146.1 m - Conglomerate - greenish and coarse - very broken 134.4-134.7					132.4	133.8		2725319		
3.1	142.1	qtz carb + qtz chl veins to 142.3 - major qtz carb vein @					133.5	133.6		2724883		
3.1	145.2	142.3 - 142.4 - other thin veins @ base.					133.6	133.7		2724890		
3.0	148.2						133.8	133.8		2725440		
3.0	151.2	146.1 - 187.2m - Shale green finely banded shale with thin coarse					134.7	134.8		2724892		
3.0	154.2	siltstone bands throughout. CAB 85°/90°					135.8	136.3		2724941		
3.0	157.2	146.1 - 147.8 veined with thin qtz carb					135.9	136.0		2724944		
3.0	160.2	qtz carb veins with bleaching @ 153.1, 161.0, 187.8.					146.3	146.4		2725482		
3.0	163.2	qtz vein @ 162.2 - qtz chl vein @ 163.0					142.3	142.4		2724896		
3.0	166.2	bleached @ 182.4 - 182.9m.					142.6	142.7		2724898		
3.0	169.2						146.1	147.8		2725446		
3.0	172.2	187.2m E O H.					147.8	164.2		2725445		
3.0	175.2						164.8	164.9		2725491		
3.0	178.2						165.1	165.2		2725493		
3.0	181.2						165.2	166.2		2725496		
2.95	184.2						166.2	166.2		2725497		
2.9	187.2						166.2	172.2		2725498		
							172.2	172.9		2725499		
							178.2	182.4		2725500		
							182.4	183.9		2725501		
							182.5	182.6		2725505		
							183.1	183.2		2725507		
							183.8	183.9		2725504		
							183.9	184.2		2725502		
							186.3	186.4		2725111		

MAGNETIC SUSCEPTIBILITIES TAKEN EVERY 0.2M.
Logs available.

DOWN HOLE SURVEYS WITH EASTMANN SINGLE SHOT

Depth	Azimuth (mag)	Dip
31m	-	-45°
61m	034°	-41°
91m	041°	-37°
121m	042°	-33°
157m	043°	-31°
187m	044°	-30°

9951129

[redacted] LIM[redacted]D—D[redacted]ILE[redacted]RILL[redacted]

AREA	BDUNDAS	PROJECT NUMBER	602
STATE	TAS	LOCATION	DUNDAS RD
INCLINATION	-45	AZIMUTH ~~D/M/GRID~~	040
DATE STARTED	220486	DATE COMPLETED	240486
CONTRACTOR	F. Ortner	DRILLER	F Ortner
CO-ORDINATES N/S	5363175	E/W	367294
COLLAR R.L.	216	DEPTH	310
AREA OF INFLUENCE		DRILL TYPE	F49J
HOLE NUMBER	DDH-CG6A	PAGE	1 OF 1
HOLE SIZE	NQ TO 31.0	& ASSAY TYPE	TO
LOGGED BY	P.D. Ellis	DATE OF LOGGING	April 1986

Σ CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MIN. TYPE	ACCEPTED ASSAY
0.0	1.0	0-1.0m Open hole										
0.6	2.1											
1.1	3.6	1.0-1.8m - Shale - grey partially weathered minor siltstone to coarse ss bands										
2.6	7.0											
1.7	9.4											
3.0	12.5	1.8-3.4m - Shale - red brown - oxidised - minor coarse ss bands										
1.4	14.2											
2.0	16.2	3.4-3.9m - Shale - purple brown grey with minor coarse ss bands - joints oxidised										
1.3	18.4											
3.1	21.7											
1.7	23.7	3.9-4.3m - Conglomerate/Sandstone/Shale Interbeds - mainly congl to coarse ss - very oxidised and broken.										
3.0	26.8											
1.1	28.2											
2.6	31.0	4.3-7.0m - Conglomerate - orange brown - weathered - pebbles to 50mm mostly weathered - pebbles are sh/ss/ch.										
		7.0-7.5m - Sandstone - orange brown - weathered - minor very coarse and very fine bands.										
		7.5-8.1m - Siltstone - orange khaki - weathered - minor ss bands.										
		8.1-8.4m - Conglomerate - orange - weathered - pebbles to 50mm - minor ss bands										
		8.4-11.5m - Sandstone - orange khaki - weathered - fine grained with minor congl bands with pebbles to 30mm - minor coarse ss and sh bands. - almost unweathered 10.5-10.8m.					11.7	11.8		272457		
		11.5-15.4m - Sandstone - purple brown grey coarse ss - minor weathering - banded with some fining uphole graded bedding - dominantly lithic C&B 80°										
		15.4-20.5m - Conglomerate - part weathered purple brown to orange brown. - lithic fragments to 40mm - weathered out - some many volcanic frags.										
		20.5-22.8m - Sandstone - purple grey with minor weathering - from fine slst/ss to coarse thin bands to very coarse ss and minor congl bands					29.2	29.3		272459		
		22.8-31.0m - Shale - purple grey brown - thinly banded with minor coarse bands - joints oxidised - congl @ 25.4-25.5, 25.7-25.8, 29.1-29.3m.					~~[illegible]~~	~~[illegible]~~		~~[illegible]~~		
		31.0m EOH										

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995130

USR LIMITED—DETAILED DRILL LOG

CSR

AREA: BDUNDAS
PROJECT NUMBER: 602
DATE STARTED: 25 05 86
DATE COMPLETED: 26 05 86
CO-ORDINATES N/S: 5364060
COLLAR R.L.: 195
AREA OF INFLUENCE:
HOLE NUMBER: DDH-C67
STATE: TAS
LOCATION: PINE PLA
INCLINATION: 0-90
AZIMUTH T/M/GRID:
CONTRACTOR: POLTOCK BROS
DRILLER: N. POLTOCK
E/W: 366898
DEPTH: 80
DRILL TYPE:
LOGGED BY:
DATE OF LOGGING:
PAGE 1 OF 1
HOLE SIZE: AQ TO 8.0
& TO
ASSAY TYPE TO

% CORE RECOVERY	METRES	SUMMARY DESCRIPTION	VISUAL LOG	LOG SCALE	ROCK TYPE	S.G.	START DEPTH	FINISH DEPTH	SAMPLE INTERVAL	SAMPLE NUMBER	MIN. TYPE	ACCEPTED ASSAY
0	0.8	0-0.8m - Open hole										
0.5	1.35											
0.1	1.5	0.8-4.0m - Conglomerate - weathered.										
1.8	3.3											
0.3	3.6	4.0-4.7m - Conglomerate - fine red weathered - volc frags weathered										
0.5	4.1	- some chert, ss, sh, voles					3.5	3.6		272556		
2.7	6.8											
0	7.0	4.7-6.5m - Conglomerate/Sandstone - fine grained - weathered					5.5	5.6		272556		
0	8.0											
		6.5-7.0m - Conglomerate - coarse - chert, ss, sh, volc frags to 50mm.										
		7.0-8.0m Cavity										
		8.0 EOH										

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APPENDIX VII

CUNI DRILL CORE

GEOCHEMISTRY

CSR Limited
Minerals Exploration and Development Group

995133

Correspondence to: THE CHIEF GEOLOGIST
Box 483, G.P.O.
Sydney, N.S.W. 2001
Telephone: (02) 235 8333

FIELD SAMPLE DESPATCH SHEET

17028

Project No. 7602 Project Name DUNDAS - DRILLING Date Required 15/6/86

Date Despatched 1/6/86 Despatcher P.D. ELLIS Despatched per ANSETT

CSR Order No. 44492 Consignment No. E 759233

Lab Name COMLABS PTY. LTD.

Preparation Method PREP 2 (Crushing), PREP 4 (Pulverise)

Element(s)/Method Cu, Pb, Zn, Bi: AAS1; Ag: AAS3; Sn, W, As: XRF1; Au: AAS5G (selected 101→158, 261→309, 401→454, 513→552)

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A272002		RD		CG3 32.1→32.2		
004		"		66.7→66.8		
006		"		77.3→77.4		
008		"		83.5→83.6		
010		"		84.4→84.5		
012		"		93.7→93.8		
014		"		103.4→104.0		
016		"		106.2→106.3		
018		"		112.1→112.2		
020		"		119.4→119.5		
021		CL	ST	STD 12A		
022		CL	ST	STD 13		
024		RD		CG3 127.4→127.5		
026		"		133.7→133.8		
028		"		135.1→135.2		
030		"		136.5→136.6		
032		"		152.3→152.4		
034		"		157.2→157.2		
036		"		165.6→165.7		
038		"		168.0→168.1		
040		"		169.8→169.9		
042		"		179.4→179.5		
044		"		185.6→185.7		
046		"		194.7→194.8		
048		"		195.3→195.4		
049		CL	ST	STD 9		
050		CL	ST	STD 16		
052		RD		CG3 197.6→197.7		
054		"		200.3→200.4		
056		"		200.4→200.5		
058		"		204.1→204.2		
060		"		208.3→208.4		
062		"		210.3→210.4		
064		"		220.6→220.7		
066		"		238.3→238.4		
068		"		230.1→230.2		
070		"		245.6→245.7		
072		"		261.5→261.6		
074		"		279.1→279.2		
075		CL	ST	STD 10		

DISBURSEMENT: WHITE – to Assay Laboratory with order. PINK – to Computer Services. YELLOW – to Head Office filing.
GREEN – field copy

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Minerals Exploration and Development Group

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Correspondence to: THE CHIEF GEOLOGIST
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FIELD SAMPLE DESPATCH SHEET

17029

Project No. 7602 Project Name _____ Date Required 15/6/86

Date Despatched / / Despatcher P Ellis Despatched per _____

CSR Order No. 44492 Consignment No. _____

Lab Name _____

Preparation Method _____

Element(s)/Method SEE FIELD DESPATCH SHEET 17028

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A27206		CL	ST	STD 9		
078		RD		CG3 279.4→279.5		
080		"		291.5→291.6		
082		"		298.6→298.7		
084		"		299.4→299.5		
086		"		303.2→303.3		
088		"		309.4→309.5		
090		"		311.4→311.5		
092		"		314.9→315.0		
094		"		322.6→322.7		
096		"		327.9→328.0		
098		"		331.2→331.3		
099		CL	ST	STD 13		
100		CL	ST	STD 16		
101		RD		CG3 289.3→290.0		
102		"		345.0→350.0		
103		"		420.0→440.0		
104		"		710.0→740.0		
105		"		833.6→853.3		
106		"		853.3→861.1		
107		"		862.2→874.4		
108		"		874.4→890.0		
109		"		895.5→903.3		
110		"		903.3→937.7		
111		"		938.8→1016.6		
112		CL	ST	STD 15		
113		RD		CG3 1016.6→1055.6		
114		"		1066.6→1121.1		
115		"		1124.4→1194.4		
116		"		1194.4→1263.3		
117		"		1263.3→1273.3		
118		"		1283.3→1304.4		
119		CL	ST	STD 17		
120		RD		CG3 1304.4→1314.4		
121		"		1314.4→1347.7		
122		"		1347.7→1365.5		
123		"		1365.5→1433.3		
124		"		1433.4→1523.3		
125		"		1523.3→1555.3		
126		"		1555.3→1577.7		

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995135

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Telephone: (02) 235 8333

FIELD SAMPLE DESPATCH SHEET

17030

Project No. 7602 Project Name _____ Date Required 15/6/86

Date Despatched / / Despatcher P.D. Ellis Despatched per _____

CSR Order No. 44492 Consignment No. _____

Lab Name _____

Preparation Method _____

Element(s)/Method SEE FIELD SAMPLE DESPATCH SHEET 17028

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A27127		RD		C63 157.7→161.1		
128		"		163.0→168.6		
129		"		169.1→173.2		
130		"		173.5→179.4		
131		CL	ST	STD 6		
132		RD		C63 179.5→185.2		
133		"		185.7→191.8		
134		"		191.8→197.3		
135		"		197.3→198.3		
136		"		198.3→203.2		
137		"		203.2→206.3		
138		"		206.3→211.5		
139		"		211.5→216.2		
140		"		216.2→221.7		
141		"		221.7→228.3		
142		"		228.3→236.8		
143		CL	ST	STD 9		
144		RD		C63 236.8→238.4		
145		"		261.3→262.4		
146		"		263.4→270.1		
147		"		270.2→278.1		
148		"		278.1→279.4		
149		CL	ST	STD 15		
150		RD		C63 279.4→286.3		
151		"		286.3→291.3		
152		"		291.3→298.6		
153		"		298.7→304.0		
154		"		304.0→310.2		
155		"		320.3→324.0		
156		"		324.0→327.9		
157		"		327.9→329.6		
158		"		329.6→331.3		
159		CL	ST	STD 12A		
161		RD		C64 9.8→9.9		
163		"		23.0→23.1		
165		"		27.3→27.4		
167		"		40.5→40.6		
169		"		54.3→54.4		
171		"		61.1→61.2		
172		CL	ST	STD 17		

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Minerals Exploration and Development Group 995136

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FIELD SAMPLE DESPATCH SHEET

17031

Project No. 7602 Project Name _____ Date Required 15/6/86

Date Despatched / / Despatcher P.D. Ellis Despatched per _____

CSR Order No. 44492 Consignment No. _____

Lab Name _____

Preparation Method _____

Element(s)/Method SEE FIELD SAMPLE DESPATCH SHEET 17028

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A27217[3]		CL	ST	STD 11		
175		RD		CG64 620·0→620·1		
177		"		620·8→620·9		
179		"		630·5→630·6		
181		"		640·0→640·1		
183		"		660·9→670·0		
185		"		710·1→710·2		
187		"		770·3→770·4		
189		"		850·4→850·5		
191		"		870·8→870·9		
193		"		950·3→950·4		
195		"		980·4→990·0		
197		"		1040·6→1040·7		
199		"		1090·6→1090·7		
200		CL	ST	STD 9		
202		RD		CG64 1110·9→1111·0		
204		"		1120·6→1120·7		
206		"		1180·4→1180·5		
208		"		1190·5→1190·6		
210		"		1220·0→1220·1		
212		"		1290·7→1290·8		
214		"		1360·9→1370·0		
216		"		1410·5→1410·6		
217		CL	ST	STD 10		
219		RD		CG64 1610·8→1610·9		
221		"		1670·6→1670·7		
223		"		1490·0→1490·1		
225		"		1510·5→1510·6		
227		"		1530·8→1530·9		
229		"		1560·7→1560·8		
231		"		1600·1→1600·2		
233		"		1610·1→1610·2		
235		"		1630·8→1630·9		
236		CL	ST	STD 9		
238		RD		CG64 1650·9→1660·0		
240		"		1700·3→1700·4		
242		"		1770·7→1770·8		
244		"		1790·1→1790·2		
246		"		1440·1→1440·2		
249		"		1980·8→1980·9		

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Minerals Exploration and Development Group

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Telephone: (02) 235 8333

FIELD SAMPLE DESPATCH SHEET

17032

Project No. 7602 Project Name _____ Date Required 15/6/86

Date Despatched / / Despatcher P.D. ELLIS Despatched per _____

CSR Order No. 44492 Consignment No. _____

Lab Name _____

Preparation Method _____

Element(s)/Method SEG FIELD SAMPLE DESPATCH SHEET 17028

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A27214		CL	ST	STD 13		
2151		RD		CGG 207.9→208.0		
2153		"		213.7→213.8		
2155		"		221.5→221.6		
2157		"		225.6→225.7		
2159		"		226.5→226.6		
2160		CL	ST	STD 16		
2161		RD		CGG 3.0→12.0		
2162		"		12.0→24.0		
2163		"		24.0→37.0		
2164		"		37.0→44.2		
2165		"		44.2→52.2		
2166		"		52.2→62.2		
2167		"		62.2→64.2		
2168		"		64.2→64.7		
2169		"		69.7→71.6		
2170		"		71.6→75.3		
2171		"		78.3→79.7		
2172		CL	ST	STD 13		
2173		RD		CGG 79.7→84.4		
2174		"		84.4→85.8		
2175		"		85.8→90.3		
2176		"		90.3→92.5		
2177		"		92.5→94.7		
2178		"		94.7→96.6		
2179		"		96.6→102.7		
2180		"		102.7→108.7		
2181		"		108.7→110.3		
2182		"		110.3→111.1		
2183		CL	ST	STD 15		
2184		RD		111.1→114.0		
2185		"		114.0→116.3		
2186		"		116.3→121.4		
2187		"		121.4→126.1		
2188		"		126.1→131.3		
2189		CL	ST	STD 17		
2190		RD		131.3→136.7		
2191		"		136.7→141.6		
2192		"		141.6→149.0		
2193		"		149.0→149.7		

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Minerals Exploration and Development Group

995138

Correspondence to: THE CHIEF GEOLOGIST
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Sydney, N.S.W. 2001
Telephone: (02) 235 8333

CSR

FIELD SAMPLE DESPATCH SHEET

17033

Project No. 7602 Project Name _____ Date Required 15/6/86

Date Despatched / / Despatcher P. D. ELLIS Despatched per _____

CSR Order No. 44497 Consignment No. _____

Lab Name _____

Preparation Method _____

Element(s)/Method SEE FIELD SAMPLE DESPATCH SHEET 17028

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A272294		RD		CG64 149.7→152.9		
295		"		152.9→156.0		
296		"		156.0→160.4		
297		"		160.4→164.9		
298		"		164.9→169.1		
299		"		169.1→172.8		
300		CL	ST	STD 1 1		
301		RD		CG64 172.8→181.7		
302		"		181.7→190.7		
303		"		190.7→199.7		
304		"		199.7→207.5		
305		"		207.5→210.7		
306		"		210.7→213.2		
307		"		213.2→218.7		
308		"		218.7→224.9		
309		"		224.9→226.7		
310		CL	ST	STD 12A		
312		RD		CG65 [illegible]→35.3		
314		"		36.0→36.1		
316		"		36.2→36.3		
318		"		51.3→51.4		
320		"		54.1→54.2		
322		"		73.0→73.1		
324		"		74.5→74.6		
326		"		78.0→78.1		
328		"		78.9→79.0		
330		"		87.6→87.7		
332		"		97.8→97.9		
333		CL	ST	STD 12A [illegible]		
335		RD		CG65 98.2→98.3		
337		"		104.0→104.1		
339		"		106.4→106.5		
341		"		110.8→110.9		
343		"		116.8→116.9		
345		"		119.0→119.1		
347		"		121.2→121.3		
349		"		132.7→132.8		
350		CL	ST	STD 6		
352		RD		CG65 135.9→136.0		
354		"		137.9→138.0		

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FIELD SAMPLE DESPATCH SHEET

17034

Project No. 7602 Project Name _____ Date Required 15/6/86

Date Despatched / / Despatcher P.D. ELLIS Despatched per _____

CSR Order No. 44497 Consignment No. _____

Lab Name _____

Preparation Method _____

Element(s)/Method SEE FIELD SAMPLE DESPATCH SHEET 17028

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A27235 6		RD		CGS 140.8→140.9		
358		"		141.9→142.0		
360		"		144.9→145.0		
362		"		150.3→150.4		
364		"		160.5→160.6		
366		"		163.7→163.8		
368		"		168.4→168.5		
369		CL	ST	STD 10		
371		RD		CGS 172.5→172.6		
373		"		187.4→188.0		
375		"		196.7→196.8		
376		CL	ST	STD 15		
378		RD		CGS 200.0→200.1		
380		"		214.4→214.5		
382		"		215.9→216.0		
384		"		218.3→218.4		
386		"		220.5→220.6		
388		"		226.9→227.0		
390		"		228.0→228.1		
392		"		234.6→234.7		
394		"		239.1→239.2		
396		"		244.5→244.6		
398		"		255.3→255.4		
399		CL	ST	STD 9		
400		CL	ST	STD 17		
401		RD		CGS 35.6→36.1		
402		"		54.1→57.6		
403		"		57.6→58.3		
404		"		58.3→61.9		
405		"		61.9→67.0		
406		"		67.0→70.8		
407		"		70.8→74.6		
408		"		74.6→77.9		
409		"		77.4→78.4		
410		CL	ST	STD 16		
411		RD		CGS 78.9→81.1		
412		"		84.1→84.0		
413		"		84.0→86.1		
414		"		86.1→86.5		
415		"		86.5→89.0		

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FIELD SAMPLE DESPATCH SHEET

17035

Project No. 7602 Project Name _____ Date Required 15/6/86

Date Despatched / / Despatcher P.D. ELLIS Despatched per _____

CSR Order No. 44492 Consignment No. _____

Lab Name _____

Preparation Method _____

Element(s)/Method SEE FIELD SAMPLE DESPATCH SHEET 17028

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A27246		RD		CGS 89.0→91.2		
417		"		91.2→96.4		
418		"		96.4→99.0		
419		"		99.0 101.9		
420		CL	ST	STD 1H		
421		RD		CGS 101.9→110.0		
422		"		110.0→116.0		
423		"		116.0→122.0		
424		"		122.0→128.0		
425		"		128.0→134.0		
426		"		134.0→139.5		
427		"		139.5→142.9		
428		"		142.9→146.9		
429		"		146.9→147.5		
430		CL	ST	STD 17		
431		RD		CGS 147.5→152.6		
432		"		152.6→157.0		
433		"		157.0→162.6		
434		"		162.6→163.4		
435		"		163.4→163.9		
436		"		163.9→168.9		
437		"		168.9→172.5		
438		"		172.5→177.1		
439		"		177.1→184.4		
440		CL	ST	STD 6		
441		RD		CGS 184.4→188.3		
442		"		188.3→193.3		
443		"		193.3→198.4		
444		"		198.4→207.4		
445		"		207.4→214.1		
446		"		214.1→222.0		
447		"		222.0→227.0		
448		"		227.0→234.9		
449		"		234.9→243.6		
450		CL	ST	STD 17		
451		RD		CGS 243.6→244.1		
452		"		244.1→245.9		
453		"		245.9→250.0		
454		"		250.0→256.0		
455		CL	ST	STD 16		

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FIELD SAMPLE DESPATCH SHEET

17036

Project No. 7602 Project Name _____ Date Required 15/6/86

Date Despatched / / Despatcher P.D. ELLIS Despatched per _____

CSR Order No. 46492 Consignment No. _____

Lab Name _____

Preparation Method _____

Element(s)/Method SEE FIELD SAMPLE DESPATCH SHEET 17028

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
AZ74578		RD		CG6 111·7→111·8		
4579		"		29·2→29·3		
4581		"		33·6→33·7		
4583		"		50·0→50·1		
4585		"		56·1→56·2		
4587		"		62·3→62·4		
4589		"		66·8→66·9		
4591		"		75·8→75·9		
4593		"		85·4→85·5		
4595		"		88·3→88·4		
4597		"		89·2→89·3		
4598		CL	STSTD	13		
4600		RD		CG6 90·4→91·0		
4602		"		109·5→109·6		
4604		"		114·8→114·9		
4606		"		131·4→131·5		
4608		"		132·5→132·6		
4610		"		133·6→133·7		
4612		"		134·7→134·8		
4614		"		135·9→136·0		
4616		"		142·3→142·4		
4618		"		142·6→142·7		
4619		CL	STSTD	10		
5021		RD		CG6 148·0→148·1		
5023		"		151·1→151·2		
5025		"		182·5→182·6		
5027		"		183·1→183·2		
5029		"		183·8→183·9		
5031		"		186·3→186·4		
5032		CL	STSTD	13		
5033		RD		CG6 30·6→35·7		
5034		"		35·7→40·5		
5035		"		40·5→48·8		
5036		"		48·8→53·1		
5037		"		53·1→58·3		
5038		"		58·3→58·7		
5039		"		58·7→66·7		
5040		"		66·7→67·9		
5041		"		67·9→73·2		
5042		"		73·2→77·7		

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FIELD SAMPLE DESPATCH SHEET

17037

Project No. 7602 Project Name _____ Date Required 15/6/86

Date Despatched / / Despatcher P. D. ELLIS Despatched per _____

CSR Order No. 44497 Consignment No. _____

Lab Name _____

Preparation Method _____

Element(s)/Method SEE FIELD SAMPLE DESPATCH SHEET 17028

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A27252 3		RD		CGG 77.7→81.4		
5254		CL	ST	STD 14		
5255		RD		GGG 81.4→83.6		
5256				83.6→90.8		
5257				90.8→92.5		
5258				92.5→96.2		
5259				96.2→98.2		
5260				98.2→103.2		
5261				103.2→109.2		
5262		"		109.2→114.2		
5263				114.2→116.0		
5264		CL	ST	STD 11		
5265		RD		CGG 116.0→124.2		
5266				124.2→130.2		
5267				130.2→131.2		
5268				131.2→132.4		
5269				132.4→133.8		
5270				133.8→135.8		
5271				135.8→142.3		
5272				142.3→146.1		
5273		CL	ST	STD 12		
5274		RD		CGG 146.1→147.8		
5275				147.8→154.2		
5276				154.2→160.2		
5277				160.2→166.2		
5278				166.2→172.2		
5279				172.2→178.2		
5280				178.2→182.4		
5281				182.4→183.4		
5282				183.9→187.2		
5284				CGT 3.5→3.6		
5286				5.5→5.6		
5287		CL	ST	STD 6		

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
C63 TS	A 272002	50	32	185	<1	<4	20	30
	A 272004	40	32	140	<1	8	25	10
	A 272006	80	22	140	<1	12	10	7
	A 272008	46	24	130	<1	4	<10	5
	A 272010	42	36	320	<1	4	15	6
	A 272012	38	18	110	<1	6	15	7
	A 272014	12	22	140	<1	10	25	3
	A 272016	190	20	125	<1	<4	10	8
	A 272018	14	26	65	<1	<4	10	<2
STD	A 272020	620	40	115	<1	8	<10	12
STD 12A	A 272021	10	26	12	<1	270	35	<2
STD 13	A 272022	6	6	2	<1	480	30	<2
	A 272024	125	20	100	<1	10	30	<2
	A 272026	14	30	100	<1	14	15	5
	A 272028	80	18	130	<1	18	15	<2
	A 272030	150	240	80	<1	10	20	8
	A 272032	10	22	85	<1	<4	10	7
	A 272034	12	28	135	<1	6	15	4
	A 272036	310	28	105	<1	4	15	5
	A 272038	16	36	260	<1	4	40	5
	A 272040	75	30	290	<1	12	35	8
	A 272042	9	10	48	<1	<4	25	7
	A 272044	680	20	100	<1	<4	25	8
	A 272046	14	22	105	<1	6	<10	8
	A 272048	6	20	95	<1	<4	15	5
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
STD 9	A 272049	3	6	3	<1	28	25	2
STD 16	A 272050	3	<4	2	<1	1.45%	55	6
	A 272052	560	24	280	<1	<4	15	12
	A 272054	32	20	220	<1	6	<10	16
	A 272056	50	20	200	<1	<4	25	6
	A 272058	12	20	105	<1	<4	15	4
	A 272060	14	16	95	<1	<4	10	6
	A 272062	5	22	44	<1	4	<10	2
	A 272064	7	14	80	<1	14	15	4
	A 272066	40	18	105	<1	8	30	2
	A 272068	28	12	55	<1	4	15	<2
	A 272070	90	18	120	<1	8	20	12
	A 272072	32	20	95	<1	4	15	8
	A 272074	22	55	230	<1	<4	35	250
STD 10	A 272075	8	<4	6	<1	38	15	<2
STD 9	A 272076	5	4	4	<1	24	20	4
63 - 65	A 272078	26	30	280	<1	<4	20	22
	A 272080	14	22	140	<1	4	<10	5
	A 272082	46	32	180	1	8	25	300
	A 272084	38	16	40	<1	<4	10	5
	A 272086	9	20	55	<1	<4	15	6
	A 272088	170	20	115	<1	<4	10	5
	A 272090	48	18	85	<1	8	20	3
	A 272092	100	22	120	<1	8	20	9
	A 272094	38	18	65	<1	<4	20	8
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1 XRF2	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272096	110	46	26	1	<4	25	34
	A 272098	6	60	120	1	8	<10	7
STD 13	A 272099	4	4	3	<1	490	<10	<2
STD 16	A 272100	5	<4	3	<1	1.40%	55	2
	A 272101	105	48	350	<1	<4	20	10
	A 272102	55	48	280	<1	12	<10	26
	A 272103	55	28	180	<1	<4	15	5
	A 272104	80	24	200	<1	<4	20	9
	A 272105	100	50	380	1	6	25	9
	A 272106	7	22	165	<1	14	20	7
	A 272107	14	26	200	1	10	20	<2
	A 272108	70	60	420	<1	4	15	7
	A 272109	90	105	270	<1	<4	20	7
	A 272110	120	28	160	<1	4	10	4
	A 272111	85	26	160	<1	6	20	5
STD 15	A 272112	6	<4	3	<1	2900	25	6
	A 272113	90	24	140	<1	<4	10	10
	A 272114	65	22	145	<1	<4	20	8
	A 272115	120	20	150	1	<4	15	12
	A 272116	48	24	155	<1	<4	<10	5
	A 272117	44	22	160	<1	4	15	9
	A 272118	50	20	145	<1	<4	15	10
STD 17	A 272119	5	<4	3	<1	6800	30	7
	A 272120	110	24	145	1	<4	25	10
	A 272121	38	24	155	<1	4	15	9
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1 XRF2	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272122	280	24	125	<1	<4	25	6
	A 272123	390	24	150	<1	6	20	<2
	A 272124	16	22	140	<1	10	20	<2
	A 272125	135	18	130	1	8	10	8
	A 272126	100	22	130	<1	10	15	8
	A 272127	70	20	130	<1	4	10	5
	A 272128	90	22	160	<1	6	10	9
	A 272129	80	16	145	<1	<4	15	6
	A 272130	40	20	130	<1	4	15	8
STD 6	A 272131	155	16	115	<1	6	115	12
	A 272132	60	16	135	1	6	10	5
	A 272133	140	18	125	<1	10	10	2
	A 272134	10	18	105	<1	<4	10	5
	A 272135	20	22	220	<1	4	20	9
	A 272136	50	18	190	<1	<4	20	<2
	A 272137	10	14	130	<1	4	15	3
	A 272138	28	18	140	<1	<4	15	2
	A 272139	10	12	105	<1	8	10	6
	A 272140	9	10	75	<1	<4	25	4
	A 272141	14	8	75	<1	<4	15	<2
	A 272142	20	10	55	<1	<4	15	6
STD 9	A 272143	4	4	4	<1	20	25	<2
	A 272144	18	14	100	<1	6	20	4
	A 272145	42	16	100	<1	<4	20	4
	A 272146	30	22	120	<1	<4	20	5
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	XRF1

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JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272147	42	22	150	<1	<4	15	16
	A 272148	14	38	210	<1	<4	10	60
STD 15	A 272149	3	<4	3	<1	2900	40	4
	A 272150	24	24	140	<1	<4	25	8
	A 272151	8	18	120	<1	<4	15	5
	A 272152	75	20	110	<1	4	10	9
	A 272153	40	10	65	<1	<4	10	4
	A 272154	90	18	85	<1	<4	10	7
	A 272155	24	12	70	<1	8	10	7
	A 272156	110	22	80	<1	6	20	24
	A 272157	160	70	260	1	4	20	22
	A 272158	8	48	510	1	<4	10	16
STD 12A	A 272159	9	20	14	<1	280	45	<2
C64/FS	A 272161	85	14	180	<1	<4	15	6
	A 272163	115	16	140	<1	<4	15	5
	A 272165	80	12	120	<1	4	10	6
	A 272167	75	16	110	<1	<4	10	5
	A 272169	70	16	105	<1	<4	20	2
	A 272171	50	14	100	<1	<4	15	4
STD 17	A 272172	3	<4	4	<1	7000	35	7
STD 11	A 272173	6	4	5	<1	140	<10	<2
	A 272175	65	18	95	<1	4	10	7
	A 272177	75	30	85	<1	8	10	30
	A 272179	90	18	90	<1	12	10	14
	A 272181	18	180	740	<1	8	<10	6
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	XRF1

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O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272183	60	24	130	<1	<4	15	<2
	A 272185	115	42	105	<1	<4	20	4
	A 272187	70	26	145	<1	<4	30	2
	A 272189	38	22	60	<1	<4	10	10
	A 272191	85	38	135	<1	12	<10	14
	A 272193	22	26	70	<1	<4	20	14
	A 272195	115	36	140	<1	<4	20	3
	A 272197	75	32	90	<1	8	15	7
	A 272199	60	40	95	<1	<4	30	18
STD 9	A 272200	3	4	3	<1	24	20	4
	A 272202	90	18	95	<1	4	10	12
	A 272204	50	22	115	<1	10	15	18
	A 272206	28	22	70	<1	<4	10	10
	A 272208	65	22	100	<1	<4	<10	16
	A 272210	24	20	34	<1	<4	25	7
	A 272212	46	22	55	<1	<4	20	14
	A 272214	26	22	32	<1	<4	10	20
	A 272216	16	24	50	<1	<4	10	10
STD 10	A 272217	6	<4	5	<1	28	15	<2
	A 272219	14	24	24	1	12	20	2
	A 272221	65	65	90	1	4	<10	26
	A 272223	100	55	28	1	<4	10	24
	A 272225	44	65	85	<1	4	25	24
	A 272227	48	42	70	<1	8	15	20
	A 272229	42	36	75	<1	4	15	10
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272231	60	24	125	<1	8	20	16
	A 272233	75	55	75	<1	4	25	16
	A 272235	105	44	115	<1	<4	25	16
STD 9	A 272236	6	6	5	<1	22	<10	6
	A 272238	60	16	100	<1	<4	10	2
	A 272240	65	16	140	<1	6	15	6
	A 272242	60	18	70	<1	6	15	2
	A 272244	90	16	75	<1	8	20	7
	A 272246	75	16	65	<1	10	15	4
	A 272248	44	34	30	<1	6	15	9
STD 13	A 272249	3	4	3	<1	480	20	3
	A 272251	55	40	110	<1	4	15	7
	A 272253	12	18	65	<1	8	25	7
	A 272255	90	36	140	<1	<4	20	12
	A 272257	95	60	105	<1	<4	30	22
	A 272259	70	36	110	<1	6	20	40
STD 16	A 272260	7	<4	3	<1	1.42%	80	<2
C64/GS	A 272261	75	18	130	<1	4	25	6
	A 272262	70	14	120	<1	<4	20	5
	A 272263	70	14	110	<1	10	15	2
	A 272264	70	14	105	<1	<4	<10	<2
	A 272265	65	16	115	<1	<4	15	20
	A 272266	60	20	110	<1	4	20	8
	A 272267	65	34	240	<1	<4	20	22
	A 272268	75	24	130	<1	<4	10	9
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1 XRF2	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272269	85	22	110	<1	14	<10	<2
	A 272270	65	20	120	<1	<4	15	2
	A 272271	65	18	110	<1	<4	<10	8
STD 13	A 272272	4	4	4	<1	480	30	5
	A 272273	70	30	110	<1	<4	10	5
	A 272274	135	36	145	<1	<4	30	5
	A 272275	70	30	140	<1	<4	20	18
	A 272276	85	30	170	<1	4	15	14
	A 272277	75	38	125	<1	6	15	20
	A 272278	65	30	125	<1	<4	<10	20
	A 272279	95	22	155	<1	6	20	2
	A 272280	95	20	110	<1	12	15	7
	A 272281	90	46	135	<1	<4	10	40
	A 272282	60	18	95	<1	<4	20	8
STD 15	A 272283	5	4	5	<1	2950	25	4
	A 272284	60	26	95	<1	10	20	14
	A 272285	55	22	95	<1	8	<10	14
	A 272286	48	26	75	<1	<4	10	16
	A 272287	42	24	60	<1	<4	10	12
	A 272288	38	22	70	<1	6	25	14
STD 17	A 272289	5	4	3	<1	6900	55	5
	A 272290	38	24	70	<1	6	35	12
	A 272291	18	26	34	<1	<4	<10	24
	A 272292	30	40	46	<1	<4	15	12
	A 272293	95	70	55	<1	<4	30	20
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	XRF1

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JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272294	30	55	65	<1	8	60	22
	A 272295	36	40	85	<1	4	10	16
	A 272296	50	22	100	<1	12	45	<2
	A 272297	80	55	100	<1	<4	15	14
	A 272298	48	18	100	<1	6	<10	<2
	A 272299	50	22	120	<1	12	15	<2
STD 11	A 272300	8	4	7	<1	130	10	<2
	A 272301	75	16	90	<1	<4	20	12
	A 272302	80	16	85	<1	<4	10	<2
	A 272303	80	20	75	<1	10	15	<2
	A 272304	75	18	85	<1	<4	<10	20
	A 272305	38	22	90	<1	6	10	<2
	A 272306	85	20	95	<1	6	30	26
	A 272307	160	20	150	<1	<4	<10	16
	A 272308	60	28	105	<1	12	15	<2
	A 272309	100	55	170	<1	8	<10	18
STD 12A	A 272310	10	22	14	<1	290	10	18
COS / 75	A 272312	60	20	160	<1	10	15	<2
	A 272314	55	24	600	<1	4	20	<2
	A 272316	70	28	140	<1	10	15	5
	A 272318	75	18	180	<1	4	15	18
	A 272320	55	20	240	<1	<4	20	12
	A 272322	75	22	165	<1	4	<10	5
	A 272324	90	24	145	<1	4	<10	10
	A 272326	70	26	135	<1	<4	25	18
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272328	60	18	110	<1	<4	20	12
	A 272330	80	26	110	<1	8	15	38
	A 272332	55	70	130	3	<4	10	38
STD 12A	A 272333	12	6	9	<1	125	20	<2
	A 272335	100	30	145	<1	4	25	26
	A 272337	65	20	125	<1	<4	10	10
	A 272339	90	18	135	<1	<4	20	<2
	A 272341	60	18	125	<1	<4	10	4
	A 272343	55	18	105	<1	<4	15	7
	A 272345	95	18	115	<1	<4	<10	<2
	A 272347	65	18	130	<1	<4	15	4
	A 272349	60	16	115	<1	<4	30	<2
STD 6	A 272350	145	14	115	<1	6	95	<2
	A 272352	50	22	110	<1	<4	<10	4
	A 272354	55	16	120	<1	<4	<10	10
	A 272356	65	20	85	<1	<4	<10	<2
	A 272358	65	20	90	<1	<4	25	10
	A 272360	75	24	80	<1	8	15	6
	A 272362	60	30	70	<1	<4	25	<2
	A 272364	120	2200	3900	1	<4	20	50
	A 272366	36	85	65	<1	<4	20	<2
	A 272368	65	30	95	<1	<4	15	14
STD 10	A 272369	8	6	6	<1	42	<10	7
	A 272371	55	20	75	<1	8	<10	<2
	A 272373	130	24	170	<1	<4	15	22
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272375	130	22	155	<1	10	30	12
STD 15	A 272376	8	4	7	<1	2750	30	<2
	A 272378	60	20	85	<1	<4	25	3
	A 272380	90	34	65	<1	4	<10	14
	A 272382	75	28	46	<1	<4	<10	<2
	A 272384	32	30	36	<1	8	<10	7
	A 272386	90	30	100	<1	<4	25	12
	A 272388	38	630	440	<1	<4	15	40
	A 272390	14	155	3500	<1	10	20	6
	A 272392	120	36	105	<1	8	15	36
	A 272394	55	36	36	<1	<4	<10	5
	A 272396	60	24	100	<1	<4	20	26
	A 272398	75	24	100	<1	6	30	30
STD 9	A 272399	12	6	9	<1	14	40	4
STD 17	A 272400	5	6	6	<1	6900	40	4
C65/G5	A 272401	80	24	5800	<1	12	35	6
	A 272402	105	55	250	<1	8	55	30
	A 272403	65	20	210	<1	<4	20	10
	A 272404	80	24	420	<1	8	10	7
	A 272405	90	24	270	<1	8	10	28
	A 272406	95	24	110	<1	8	40	18
	A 272407	85	24	105	<1	4	25	18
	A 272408	80	20	140	<1	6	25	18
	A 272409	75	22	105	<1	8	<10	18
STD 16	A 272410	7	4	5	<1	1.45%	65	<2
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1 XRF2	XRF1	XRF1

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JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272411	75	18	110	<1	4	15	<2
	A 272412	85	26	290	<1	6	<10	12
	A 272413	90	26	390	<1	4	20	16
	A 272414	80	26	200	<1	8	<10	18
	A 272415	75	30	110	<1	6	15	22
	A 272416	70	26	80	<1	<4	20	14
	A 272417	90	20	140	<1	18	20	12
	A 272418	70	28	115	<1	<4	25	18
	A 272419	75	22	80	<1	<4	30	6
STD IH	A 272420	70	14	26	<1	<4	65	16
	A 272421	100	22	105	<1	<4	25	<2
	A 272422	60	16	110	<1	<4	<10	3
	A 272423	65	24	115	<1	14	30	<2
	A 272424	65	22	100	<1	<4	15	38
	A 272425	60	20	100	<1	12	25	<2
	A 272426	55	18	95	<1	<4	10	4
	A 272427	65	20	110	<1	26	<10	<2
	A 272428	75	18	95	<1	<4	10	18
	A 272429	70	18	100	<1	14	20	<2
STD 17	A 272430	5	4	5	<1	6700	55	4
	A 272431	65	22	90	<1	16	<10	8
	A 272432	70	20	100	<1	6	15	8
	A 272433	70	95	115	1	<4	<10	8
	A 272434	90	24	90	1	22	35	10
	A 272435	36	20	65	<1	12	25	8
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272436	90	18	90	<1	<4	20	14
	A 272437	95	30	165	<1	<4	<10	34
	A 272438	65	16	95	<1	<4	25	4
	A 272439	60	60	115	1	6	15	28
STD 6	A 272440	145	20	115	<1	4	90	5
	A 272441	70	38	160	<1	8	25	7
	A 272442	85	20	115	<1	<4	20	12
	A 272443	70	24	90	<1	4	15	14
	A 272444	70	20	110	<1	12	10	<2
	A 272445	70	24	105	<1	10	10	38
	A 272446	70	30	105	<1	<4	15	<2
	A 272447	85	38	110	<1	<4	<10	42
	A 272448	75	155	1100 *	<1	<4	20	20
	A 272449	55	24	90	<1	<4	<10	9
STD 17	A 272450	6	4	4	<1	6950	30	2
	A 272451	60	18	105	<1	12	20	<2
	A 272452	60	16	125	<1	10	15	12
	A 272453	65	18	115	<1	<4	15	3
	A 272454	75	16	135	<1	12	50	<2
STD 16	A 272455	4	4	4	<1	1.44%	25	16
66 TS	A 272457	30	28	140	<1	12	20	14
	A 272459	110	24	125	<1	4	15	3
	A 272461	46	30	110	<1	<4	40	4
	A 272463	48	32	210	<1	6	15	26
	A 272465	80	22	125	<1	18	<10	3
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1 XRF2	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272467	7	22	175	<1	16	15	<2
	A 272469	7	85	320	<1	30	20	10
	A 272471	65	20	100	<1	<4	<10	<2
	A 272473	6	22	110	<1	4	35	<2
	A 272475	10	18	90	<1	<4	<10	6
	A 272477	500	16	105	<1	<4	20	22
STD 13	A 272478	4	6	3	<1	420	60	<2
	A 272480	340	28	195	<1	<4	10	4
	A 272482	38	20	105	<1	10	<10	2
	A 272484	32	14	105	<1	<4	15	2
	A 272486	6	14	135	<1	4	30	<2
	A 272488	7	14	115	<1	<4	<10	<2
	A 272490	6	20	70	<1	<4	30	60
	A 272492	5	12	180	<1	18	20	9
	A 272494	6	16	60	<1	<4	35	<2
	A 272496	6	34	75	<1	<4	30	<2
	A 272498	6	16	55	<1	<4	25	<2
STD 10	A 272499	4	4	3	<1	28	60	4
	A 272501	5	22	32	<1	<4	30	<2
	A 272503	70	26	95	<1	<4	35	<2
	A 272505	170	46	55	1	20	35	<2
	A 272507	12	165	1900	<1	<4	<10	26
	A 272509	24	70	320	<1	6	35	14
	A 272511	40	350	730	1	6	15	<2
STD 12	A 272512	5	4	4	<1	480	15	14
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
CG6 GS	A 272513	75	26	140	<1	8	15	<2
	A 272514	200	22	120	<1	<4	15	16
	A 272515	85	20	125	<1	26	<10	9
	A 272516	260	38	175	<1	20	15	12
	A 272517	160	20	155	<1	<4	40	4
	A 272518	36	85	390	<1	4	10	34
	A 272519	30	20	160	<1	6	20	7
	A 272520	12	145	520	1	6	30	7
	A 272521	90	20	155	<1	4	25	6
	A 272522	105	20	125	<1	6	15	9
	A 272523	80	24	130	<1	10	15	9
STD 10	A 272524	4	4	3	<1	930	55	<2
	A 272525	32	22	150	<1	4	55	16
	A 272526	410	20	120	<1	<4	50	12
	A 272527	65	18	125	<1	8	45	20
	A 272528	28	18	120	<1	12	35	4
	A 272529	44	18	120	<1	4	55	30
	A 272530	28	18	110	<1	<4	10	28
	A 272531	590	18	80	<1	<4	<10	24
	A 272532	16	18	90	<1	<4	10	<2
	A 272533	20	16	125	<1	<4	<10	<2
STD 11	A 272534	7	6	5	<1	125	55	<2
	A 272535	46	18	100	<1	<4	40	<2
	A 272536	36	18	120	<1	10	20	<2
	A 272537	18	20	135	<1	12	20	26
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

	SAMPLE	Cu	Pb	Zn	Ag	Sn	W	As
	A 272538	7	16	155	<1	12	35	<2
	A 272539	9	12	110	<1	8	50	<2
	A 272540	6	180	210	<1	4	<10	<2
	A 272541	14	16	65	<1	<4	<10	<2
	A 272542	7	36	115	<1	4	35	22
STD 12	A 272543	7	6	4	<1	65	45	7
	A 272544	7	26	90	1	10	<10	3
	A 272545	26	16	95	<1	20	<10	<2
	A 272546	38	26	95	<1	<4	15	<2
	A 272547	50	32	130	<1	10	20	<2
	A 272548	48	32	110	<1	4	25	30
	A 272549	36	32	110	<1	8	65	28
	A 272550	26	16	115	<1	<4	15	6
	A 272551	18	165	580	<1	<4	10	12
	A 272552	40	65	180	<1	<4	<10	8
C67/13	A 272554	12	18	120	<1	<4	<10	14
	A 272556	5	20	130	<1	10	35	14
STD 6	A 272557	135	16	110	<1	6	75	28
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS3	XRF1	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

SAMPLE	Au
A 272101	<5
A 272102	<5
A 272103	<5
A 272104	<5
A 272105	<5
A 272106	<5
A 272107	<5
A 272108	<5
A 272109	<5
A 272110	<5
A 272111	<5
A 272112	<5
A 272113	<5
A 272114	<5
A 272115	<5
A 272116	<5
A 272117	<5
A 272118	<5
A 272119	<5
A 272120	<5
A 272121	<5
A 272122	<5
A 272123	<5
A 272124	<5
A 272125	<5
UNITS	ppb
SCHEME	AAS5C

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

SAMPLE	Au
A 272126	<5
A 272127	<5
A 272128	<5
A 272129	<5
A 272130	<5
A 272131	<5
A 272132	<5
A 272133	<5
A 272134	<5
A 272135	<5
A 272136	<5
A 272137	<5
A 272138	<5
A 272139	<5
A 272140	<5
A 272141	<5
A 272142	<5
A 272143	<5
A 272144	<5
A 272145	<5
A 272146	<5
A 272147	<5
A 272148	<5
A 272149	<5
A 272150	<5
UNITS	ppb
SCHEME	AAS5C

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

SAMPLE	Au
A 272151	<5
A 272152	<5
A 272153	<5
A 272154	<5
A 272155	<5
A 272156	<5
A 272157	<5
A 272158	<5
A 272261	20
A 272262	<5
A 272263	<5
A 272264	<5
A 272265	<5
A 272266	<5
A 272267	<5
A 272268	<5
A 272269	<5
A 272270	<5
A 272271	<5
A 272272	<5
A 272273	<5
A 272274	<5
A 272275	<5
A 272276	<5
A 272277	<5
UNITS	ppb
SCHEME	AAS5C

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

SAMPLE	Au
A 272278	<5
A 272279	<5
A 272280	<5
A 272281	<5
A 272282	<5
A 272283	<5
A 272284	<5
A 272285	<5
A 272286	<5
A 272287	<5
A 272288	<5
A 272289	<5
A 272290	<5
A 272291	<5
A 272292	<5
A 272293	<5
A 272294	<5
A 272295	<5
A 272296	<5
A 272297	<5
A 272298	<5
A 272299	<5
A 272300	<5
A 272301	<5
A 272302	<5
UNITS	ppb
SCHEME	AAS5C

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

SAMPLE	Au
A 272303	<5
A 272304	<5
A 272305	<5
A 272306	<5
A 272307	<5
A 272308	<5
A 272309	<5
A 272401	<5
A 272402	<5
A 272403	<5
A 272404	<5
A 272405	<5
A 272406	<5
A 272407	<5
A 272408	<5
A 272409	<5
A 272410	<5
A 272411	<5
A 272412	<5
A 272413	<5
A 272414	<5
A 272415	<5
A 272416	<5
A 272417	<5
A 272418	<5
UNITS	ppb
SCHEME	AAS5C

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

SAMPLE	Au
A 272444	<5
A 272445	<5
A 272446	<5
A 272447	<5
A 272448	<5
A 272449	<5
A 272450	<5
A 272451	<5
A 272452	<5
A 272453	<5
A 272454	<5
A 272513	<5
A 272514	<5
A 272515	<5
A 272516	<5
A 272517	<5
A 272518	<5
A 272519	<5
A 272520	<5
A 272521	<5
A 272522	<5
A 272523	<5
A 272524	<5
A 272525	<5
A 272526	<5
UNITS	ppb
SCHEME	AAS5C

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ANALYTICAL REPORT

JOB COM860813
O/N : 44492

SAMPLE	Au
A 272552	<5
UNITS	ppb
SCHEME	AAS5C

APPENDIX VIII

SOUTH CUNI ANOMALY - LINE 6550N CUNI GRID

"WACKER" BEDROCK GEOCHEMISTRY

66 CSR Limited
Minerals Exploration and Development Group

995167

Correspondence to: THE CHIEF GEOLOGIST
Box 483, G.P.O.
Sydney, N.S.W. 2001
Telephone: (02) 235 8333

FIELD SAMPLE DESPATCH SHEET

17027

Project No. 7602 Project Name DUNDAS - SOUTH CUNI Date Required 14/5/86

Date Despatched 30/4/86 Despatcher PDE Despatched per SKYROADS

CSR Order No. 45102 Consignment No.

Lab Name ~~MONKLABS~~ ANALABS

Preparation Method PULVERIZE TOTAL SAMPLE

Element(s)/Method Cu, Pb, Zn, Ni, Bi: 101, Ba: 120, As: 114, Sn: 402, W: 401

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A16221671		BR		6560N 278E		
A16221681		"		" 288E		
A16221691		"		" 300E		
A16221701		"		" 310E		
A16221711		"		" 320E		
A16221721		"		" 268E		
A16221731		"		" 258E		
A16221741		"		" 248E		
A16221751		"		" 238E		
A16221761		"		" 228E		
A16221771		CLST		6X5		
A16221791		CLST		~~6X5~~ 6X10		
A16221741		CLST		~~6X5~~ 6X13		

DISBURSEMENT: WHITE — to Assay Laboratory with order. PINK — to Computer Services. YELLOW — to Head Office filing.
GREEN — field copy

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ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

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ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	999.0 08 3699	16.5.86	45102	1 OF 6

TUBE No.	SAMPLE No.		Cu	Pb	Zn	Ni	Bi	Ba	As	Sn	W
1	A162267	6560N 2780	100	<	165	170	<	90	<	8	x
2	A162268	2880	95	30	175	170	25	125	<	7	x
3	A162269	3006	110	35	185	190	<	115	<	8	x
4	A162270	3106	120	25	195	145	<	110	<	8	x
5	A162271	3206	85	5	160	150	<	100	<	30	x
6	A162272	2686	80	35	190	165	<	130	<	7	x
7	A162273	2586	85	45	170	170	<	110	5	7	x
8	A162274	2486	85	<	190	155	<	110	<	10	x
9	A162275	2786	80	<	150	175	<	135	<	7	x
10	A162276	2286	70	<	145	165	<	120	<	9	x
11	A162277	6x5	115	<	120	70	<	120	10	10	30
12	A162278	6x10	<	<	<	<	<	5	<	7	15
13	A162279	6x13	<	<	<	<	<	5	<	500	x

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APPENDIX IX

DDH-CG3 AND DDH-CG6

MAGNETIC SUSCEPTIBILITY READINGS

DUNDAS EL 15/76

Magnetic susceptibility log from DDH-CG3 sited on Nevada Anomaly.

Depth (metres)	Mag Susc (in cgs x 10-3)
3.7 - 94.1	0.0
94.3	1.4
94.5	1.4
94.7	0.0
94.9	0.0
95.1	0.0
95.3	1.1
95.5	1.1
95.7	0.0
95.9	0.0
96.1	1.4
96.3	1.4
96.5	0.0
96.7	1.4
96.9	0.0
97.1	1.5
97.3	0.0
97.5	0.0
97.7	1.1
97.9	1.4
98.1	1.4
98.3	1.1
98.5	1.5
98.7	1.1
98.9	0.0
99.1	0.0
99.3	0.0
99.5	1.1
99.7	1.8
99.9	0.0
100.1	1.5
100.3	0.0
100.5	0.0
100.7	1.6
100.9	1.5
101.1	1.6
101.3	1.4
101.5	1.5
101.7	1.6
101.9	5.6
102.1	0.0
102.3	2.8
102.5	0.0
102.7	3.1
102.9	1.1
103.1	1.6

Dundas EL 15/76 DDH-CG3 (cont.)

Depth (metres)	Mag Susc (in cgs x 10-3)
103.3	1.8
103.5	2.1
103.7	1.1
103.9	3.1
104.1	2.2
104.3	1.8
104.5	2.3
104.7	1.1
104.9	3.1
105.1	2.4
105.3	1.4
105.5	0.0
105.7	0.0
105.9	0.0
106.1	1.5
106.3	1.6
106.5	1.5
106.7	1.6
106.9	3.1
107.1	3.4
107.3	1.6
107.5	1.5
107.7	1.8
107.9	1.8
108.1	1.7
108.3	1.6
108.5	1.4
108.7	1.6
108.9	1.6
109.1	1.6
109.3	1.8
109.5	1.5
109.7	1.6
109.9	3.6
110.1	3.9
110.3	2.5
110.5	2.4
110.7	1.4
110.9	3.2
111.1	3.0
111.3	0.0
111.5	2.3
111.7 - 112.7	0.0
112.9	1.4
113.1	1.1
113.3	1.4
113.5	1.4
113.7	1.1
113.9	1.5

Dundas EL 15/76 DDH-CG3 (cont.)

Depth (metres)	Mag Susc (in cgs x 10-3)
114.1	1.1
114.3	1.1
114.5	1.1
114.7	1.1
114.9	3.9
115.1	1.8
115.3	1.5
115.5	2.1
115.7	2.0
115.9	2.1
116.1	1.7
116.3	1.5
116.5	1.7
116.7	1.6
116.9	1.6
117.1	1.7
117.3	1.5
117.5	1.1
117.7	1.6
117.9	1.6
118.1	1.5
118.3	2.1
118.5	1.1
118.7	0.0
118.9	0.0
119.1	1.4
119.3	7.2
119.5	1.4
119.7	1.7
119.9	1.4
120.1	0.0
120.3	3.0
120.5	1.8
120.7	1.6
120.9	1.8
121.1	1.6
121.3	1.5
121.5	1.5
121.7	1.6
121.9	1.7
122.1	1.4
122.3	1.6
122.5	1.4
122.7	1.5
122.9	1.1
123.1	0.0
123.3	0.0
123.5	1.1
123.7	1.5

Dundas EL 15/76 DDH-CG3 (cont.)

Depth (metres)	Mag Susc (in cgs x 10-3)
123.9	1.5
124.1	1.8
124.3	1.8
124.5	1.4
124.7	1.6
124.9	1.7
125.1	1.7
125.3	2.1
125.5	1.8
125.7	1.8
125.9	1.8
126.1	2.1
126.3	1.6
126.5	1.7
126.7	1.8
126.9	2.1
127.1	2.1
127.3	2.1
127.5	0.0
127.7	0.0
127.9	0.0
128.1	0.0
128.3	1.7
128.5	1.7
128.7	1.7
128.9	1.4
129.1	1.4
129.3	0.0
129.5	1.4
129.7	0.0
129.9	0.0
130.1	0.0
130.3	0.0
130.5	2.1
130.7	0.0
130.9	0.0
131.1	1.6
131.3	1.6
131.5	1.8
131.7	1.5
131.9	1.4
132.1	0.0
132.3	1.1
132.5	0.0
132.7	0.0
132.9	0.0
133.1	0.0
133.3	0.0
133.5	0.0

Dundas EL 15/76 DDH-CG3 (cont.)

Depth (metres)	Mag Susc (in cgs x 10-3)
133.7	0.0
133.9	0.0
134.1	0.0
134.3	0.0
134.5	0.0
134.7	1.4
134.9	0.0
135.1	1.4
135.3	0.0
135.5	0.0
135.7	0.0
135.9	1.9
136.1	3.8
136.3	0.0
136.5	2.3
136.7	3.3
136.9	2.1
137.1	1.9
137.3	0.0
137.5	1.4
137.7	2.8
137.9	2.1
138.1	1.6
138.3	0.0
138.5	1.6
138.7	2.8
138.9	2.1
139.1	1.4
139.3	0.0
139.5	1.7
139.7	2.4
139.9	2.4
140.1	1.8
140.3	1.8
140.5	3.7
140.7	1.5
140.9	1.6
141.1	2.1
141.3	1.7
141.5	1.6
141.7	1.5
141.9	0.0
142.1	2.4
142.3	2.3
142.5	4.2
142.7	1.8
142.9	1.6
143.1	1.4
143.3	1.7

Dundas EL 15/76 DDH-CG3 (cont.)

Depth (metres)	Mag Susc (in cgs x 10-3)
143.5	1.7
143.7	2.3
143.9	3.0
144.1	1.8
144.3	0.0
144.5	0.0
144.7	0.0
144.9	0.0
145.1	1.1
145.3	0.0
145.5	1.6
145.7	1.4
145.9 - 147.1	0.0
147.3	1.1
147.5	0.0
147.7	1.5
147.9	2.4
148.1	2.8
148.3	2.5
148.5	2.6
148.7	2.5
148.9	1.7
149.1	1.4
149.3	1.1
149.5	1.5
149.7	1.6
149.9	1.7
150.1	1.4
150.3	1.5
150.5	1.1
150.7	1.1
150.9	1.5
151.1	1.5
151.3	1.5
151.5	0.0
151.7	1.1
151.9	1.5
152.1	1.6
152.3	0.0
152.5	0.0
152.7	0.0
152.9	0.0
153.1	0.0
153.3	1.1
153.5	0.0
153.7	0.0
153.9	0.0
154.1	0.0
154.3	0.0

Dundas EL 15/76 DDH-CG3 (cont.)

Depth (metres)	Mag Susc (in cgs x 10-3)
154.5	0.0
154.7	1.1
154.9	0.0
155.1	1.4
155.3	1.4
155.5	0.0
155.7	0.0
155.9	0.0
156.1	0.0
156.3	0.0
156.5	0.0
156.7	0.0
156.9	0.0
157.1	1.1
157.3	1.1
157.5	0.0
157.7	0.0
157.9	0.0
158.1	1.1
158.3 - 164.7	0.0
164.9	2.4
165.1 - 173.9	0.0
174.1	1.6
174.3	1.4
174.5	1.1
174.7	1.4
174.9	1.1
175.1	0.0
175.3	0.0
175.5	0.0
175.7	1.5
175.9	1.1
176.1	2.1
176.3	2.1
176.5	1.5
176.7	1.5
176.9	1.4
177.1	1.6
177.3	1.4
177.5	1.1
177.7	1.7
177.9	1.5
178.1	0.0
178.3	0.0
178.5	1.8
178.7	0.0
178.9	0.0
179.1	0.0
179.3	3.9

Dundas EL 15/76 DDH-CG3 (cont.)

Depth (metres)	Mag Susc (in cgs x 10-3)
179.5	1.7
179.7	2.4
179.9	1.6
180.1	0.0
180.3	0.0
180.5	0.0
180.7	1.1
180.9	1.6
181.1	2.1
181.3	2.1
181.5	1.4
181.7	1.4
181.9	1.5
182.1	1.7
182.3	2.3
182.5 - 187.5	0.0
187.7	1.5
187.9	1.4
188.1 - 237.7	0.0
237.9	1.1
238.1	1.6
238.3	1.4
238.5 - 242.1	0.0
242.3	1.4
242.5	1.1
242.7 - 243.5	0.0
243.7	1.5
243.9	1.5
244.1	1.5
244.3	1.5
244.5	0.0
244.7	1.4
244.9	0.0
245.1 - 245.9	0.0
246.1	1.7
246.3	1.4
246.5	0.0
246.7	0.0
246.9	0.0
247.1	1.4
247.3	1.1
247.5	1.4
247.7	1.7
247.9	1.7
248.1	1.5
248.3	1.1
248.5	1.9
248.7	1.7
248.9	0.0

Dundas EL 15/76 DDH-CG3 (cont.)

Depth (metres)	Mag Susc (in cgs x 10-3)
249.1	1.1
249.3	0.0
249.5	1.6
249.7 - 250.7	0.0
250.9	1.1
251.1 - 254.9	0.0
255.1	1.1
255.3 - 258.5	0.0
258.7	1.5
258.9	0.0
259.1	1.4
259.3	0.0
259.5	0.0
259.7	0.0
259.9	1.4
260.1 - 261.3	0.0
261.5	1.7
261.7 - 272.5	0.0
272.7	1.5
272.9	2.4
273.1	0.0
273.3	0.0
273.5	1.4
273.7	1.5
273.9 - 298.9	0.0
299.1	4.7
299.3	2.8
299.5	3.2
299.7	4.5
299.9	3.3
300.1	4.5
300.3	3.3
300.5	4.5
300.7	3.0
300.9	4.5
301.1	2.1
301.3	2.6
301.5	4.0
301.7	6.3
301.9	2.8
302.1	2.9
302.3	2.6
302.5	2.9
302.7	4.0
302.9	2.9
303.1	1.8
303.3	1.1
303.5	4.0
303.7	3.4

Dundas EL 15/76 DDH-CG3 (cont.)

Depth (metres)	Mag Susc (in cgs x 10-3)
303.9	2.4
304.1	1.7
304.3	2.4
304.5	0.0
304.7	0.0
304.9	0.0
305.1	0.0
305.3	0.0
305.5	1.4
305.7	0.0
305.9	1.1
306.1	1.8
306.3	1.6
306.5	1.8
306.7	0.0
306.9	0.0
307.1	0.0
307.3	0.0
307.5	0.0
307.7	1.8
307.9	0.0
308.1	0.0
308.3	3.0
308.5	2.1
308.7	0.0
308.9	0.0
309.1	1.6
309.3 - 313.9	0.0
314.1	1.4
314.3	1.4
314.5	1.5
314.7	0.0
314.9	1.6
315.1	1.4
315.3	1.1
315.5 - 317.3	0.0
317.5	1.1
317.7 - 331.3	0.0

Magnetic Susceptibility Values
Dundas EL 15/76
Drillhole CG-6

Depth (Metres)	Susceptibility (cgs x 10-3)
0.0	0.0
99.2	0.0
99.4	1.6
99.6	0.0
102.0	0.0
102.2	1.0
102.4	0.0
102.6	2.2
102.8	0.0
103.0	0.0
103.2	0.0
103.4	0.0
103.6	0.0
103.8	1.7
104.0	0.0
104.2	0.0
104.4	2.2
104.6	0.0
105.4	0.0
106.6	4.1
106.8	0.0
107.0	0.0
107.2	1.2
107.4	0.0
107.6	0.0
107.8	0.0
108.0	0.0
108.2	1.0
108.4	0.0
108.6	0.0
108.8	0.0
109.0	0.0
109.2	0.0
109.4	1.0
109.6	3.4
109.8	0.0
110.4	0.0
110.6	1.2
110.8	0.0
113.2	0.0
113.4	2.2
113.6	2.1
113.8	1.8
114.0	0.0
114.2	0.0
114.4	1.0
114.6	0.0

CG-6 Magnetic
Susceptibilities (cont.)

114.8	2.5
115.0	1.8
115.2	0.0
115.4	1.0
115.6	0.0
115.8	1.0
116.0	0.0
116.2	1.0
116.4	0.0
116.6	0.0
116.8	0.0
117.0	1.7
117.2	1.1
117.4	0.0
117.6	2.2
117.8	3.2
118.0	1.2
118.2	0.0
118.4	1.0
118.6	2.2
118.8	1.8
119.0	0.0
119.2	0.0
119.4	6.4
119.6	2.1
119.8	1.3
120.0	1.0
120.2	2.1
120.4	1.0
120.6	1.9
120.8	1.7
121.0	1.9
121.2	3.3
121.4	1.9
121.6	1.3
121.8	1.3
122.0	1.2
122.2	0.0
122.4	1.7
122.6	1.0
122.8	0.0
123.0	0.0
123.2	1.0
123.4	0.0
123.6	1.9
123.8	0.0
124.0	0.0
124.2	1.5

CG-6 Magnetic
Susceptibilities (cont.)

124.4	0.0
124.6	0.0
124.8	0.0
125.0	0.0
125.2	0.0
125.4	0.0
125.6	0.0
125.8	0.0
126.0	0.0
128.2	0.0
128.4	2.8
128.6	1.0
128.8	1.0
129.0	0.0
129.2	0.0
129.4	0.0
129.6	0.0
129.8	1.0
130.0	1.3
130.2	4.8
130.4	0.0
137.4	0.0
137.6	3.2
137.8	1.8
138.0	0.0
138.2	1.7
138.4	3.0
138.6	4.5
138.8	1.9
139.0	2.4
139.2	1.8
139.4	0.0
139.6	0.0
139.8	0.0
140.0	0.0
140.2	0.0
140.4	1.5
140.6	1.3
140.8	1.3
141.0	0.0
149.8	0.0
150.0	1.0
150.2	0.0
166.4	0.0
166.6	1.0
166.8	0.0
168.0	0.0
168.2	1.0

CG-6 Magnetic
Susceptibilities (cont.)

168.2	0.0
168.8	0.0
169.0	1.5
169.2	0.0
169.4	0.0
169.6	0.0
169.8	1.0
170.0	1.0
170.2	0.0
170.4	0.0
170.6	0.0
170.8	0.0
171.0	1.0
171.2	0.0
172.2	0.0
172.4	1.0
172.6	0.0
172.8	0.0
173.0	1.0
173.2	1.3
173.4	0.0
173.6	1.0
173.8	0.0
174.0	0.0
174.2	0.0
174.4	1.0
174.6	0.0
174.8	1.0
175.0	0.0
175.2	0.0
175.4	0.0
175.6	1.0
175.8	0.0
187.0	0.0

APPENDIX X

PINE PLANTATION ANOMALY - LINE B

"WACKER" BEDROCK GEOCHEMISTRY

CSR Limited
Minerals Exploration and Development Group

Correspondence to: THE CHIEF GEOLOGIST
Box 483, G.P.O.
Sydney, N.S.W. 2001
Telephone: (02) 235 8333

995185

FIELD SAMPLE DESPATCH SHEET

17026

Project No. 7602 Project Name DUNNS - PINE PLANTATION Date Required 1/5/86

Date Despatched 13/4/86 Despatcher PDG Despatched per SKYROADS

CSR Order No. 44499 Consignment No.

Lab Name ANALABS

Preparation Method PULVERIZE TOTAL SAMPLE (CODE 14)

Element(s)/Method Cu, Pb, Zn, Ni, Bi: 101, Ba: 120, As: 114, Sn: 402, W: 401

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A18438 11		BR		100E		
A18438 17		"		112.5E		
A18438 13		"		125E		
A18438 14		"		137.5E		
A18438 15		"		150E		
A18438 16		"		162.5E		
A18438 17		"		175E		
A18438 18		CL	BL	WHITE SHALE		
A18438 19		BR		187.5E		
A18439 10		"		200E		
A18439 11		"		212.5E		
A18439 12		"		225E		
A18439 13		"		237.5E		
A18439 14		"		250E		
A18439 15		"		262.5E		
A18439 16		"		275E		
A18439 17		"		287.5E		
A18439 18		"		300E		
A18439 19		"		312.5E		
A18440 10		CL	BL	[redacted] WHITE SHALE		
A18461 14		BR		325E		
A18461 15		"		337.5E		
A18461 16		"		350E		

DISBURSEMENT: WHITE – to Assay Laboratory with order. PINK – to Computer Services. YELLOW – to Head Office filing.
GREEN – field copy

185

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

995186

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
				OF

TUBE No.	SAMPLE No.		Cu	Pb	Zn	Ni	Bi	As	Ba	Sn	W
1	A184381	100 E	10	5	190	130	x	2	120	7	x
2	A184382	112.5E	40	20	175	105	20	16	120	4	x
3	A184383	125E	25	10	120	95	20	x	95	5	x
4	A184384	137.5E	40	5	100	95	10	6	153	9	10
5	A184385	150E	60	5	140	110	x	2	105	6	10
6	A184386	162.5E	20	10	130	120	20	x	140	9	x
7	A184387	175E	30	5	105	80	x	x	70	4	x
8	A184388	BLANK	10	5	20	x	x	x	105	8	x
9	A184389	187.5E	30	5	190	70	10	2	110	7	x
10	A184390	200E	15	10	165	115	x	2	75	5	x
11	A184391	212.5E	65	30	130	120	20	x	45	6	x
12	A184392	225E	75	10	165	100	20	x	75	10	10
13	A184393	237½E	75	x	55	60	30	x	90	8	10
14	A184394	250E	65	x	25	70	20	7	110	6	x
15	A184395	262.5E	45	5	40	75	10	4	80	9	10
16	A184396	275E	70	35	35	40	20	7	85	6	x
17	A184397	287.5E	80	10	35	55	40	5	85	x	x
18	A184398	300E	55	40	105	120	10	2	70	4	10
19	A184399	312.5E	25	x	20	65	20	3	50	9	10
20	A184400	BLANK	5	10	35	10	x	2	135	7	x
21	A184614	325E	40	10	115	100	30	3	70	4	x
22	A184615	337.5E	55	x	120	115	20	4	80	5	10
23	A184616	350E	15	x	760	140	10	14	75	3	x
24											
25											

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER _____

APPENDIX XI

CARBINE GRID

VLF-EM DATA WITH FRASER FILTERING

995188

Aluminium, Minerals And Chemicals Division

TO P D ELLIS

REFERENCE GWH/SW.26.16

FROM G W HOWELL

DATE 26 JULY 1985

FRASER FILTERING OF CARBINE VLF DATA

Enclosed is the fraser filtered VFL (inclination), and a print out of the fraser filtered data.

The photos show the fraser filtered data to consist mostly of noise.

To explain why fraser filtering, using a 25m sample interval, will not work on the Carbine Grid I have included with this memo a brief outline of what fraser filtering is, and why Carbine style data can't be processed in this way.

pp

G W HOWELL

FILTER DESIGN AND CHARACTERISITCS

The filter operator was designed to meet the following criteria.

1. It must phase shift the dip-angle data by 90 degrees so that crossovers and inflections will be transformed into peaks to yield contourable quantities.

2. It must completely remove dc and alternate long spatial wavelengths to increase resolution of local anomalies.

3. It must not exagerate the station to station random noise.

4. It must be simple to apply.

The first two criteria are met by using a simple difference operator.

M2 - M1. Where M1 and M2 are any consecutive data points.

The third criterion is met by applying a smoothing or low pass operator to the differences,

f23 = (M3 + M4) - (M1 + M2) Where f23 is the value assigned to the mid point of M2 and M3.

The characterisitics of fraser filtering are as follows

1. All frequencies are shifted by 90 degrees.

2. Noise having a wavelength equal to the station spacing and dc bias are completely removed.

3. Max amplitude occurs for wavelengths of 125m.

WHY FILTERING CANT WORK FOR CARBINE VLF DATA

With the data we have it appears to have a large amplitude, short wavelength component. (ie the data is very spikey).

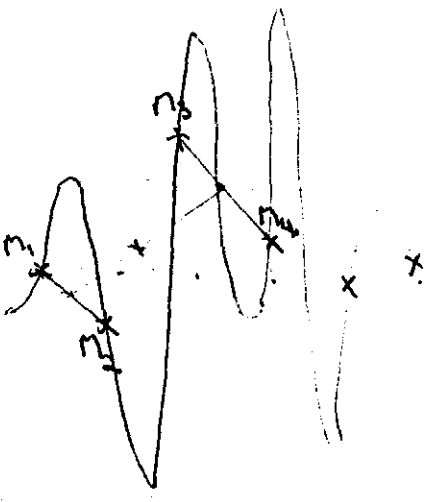
To adequately sample a wavelength the significant sampling interval must be at least 1/2 the shortest wavelength component.

On the cuni grid (for VLF) the wavelength in most cases is less than fifty meters. When this occurs, digital filtering can't be carried out as aliasing occurs.

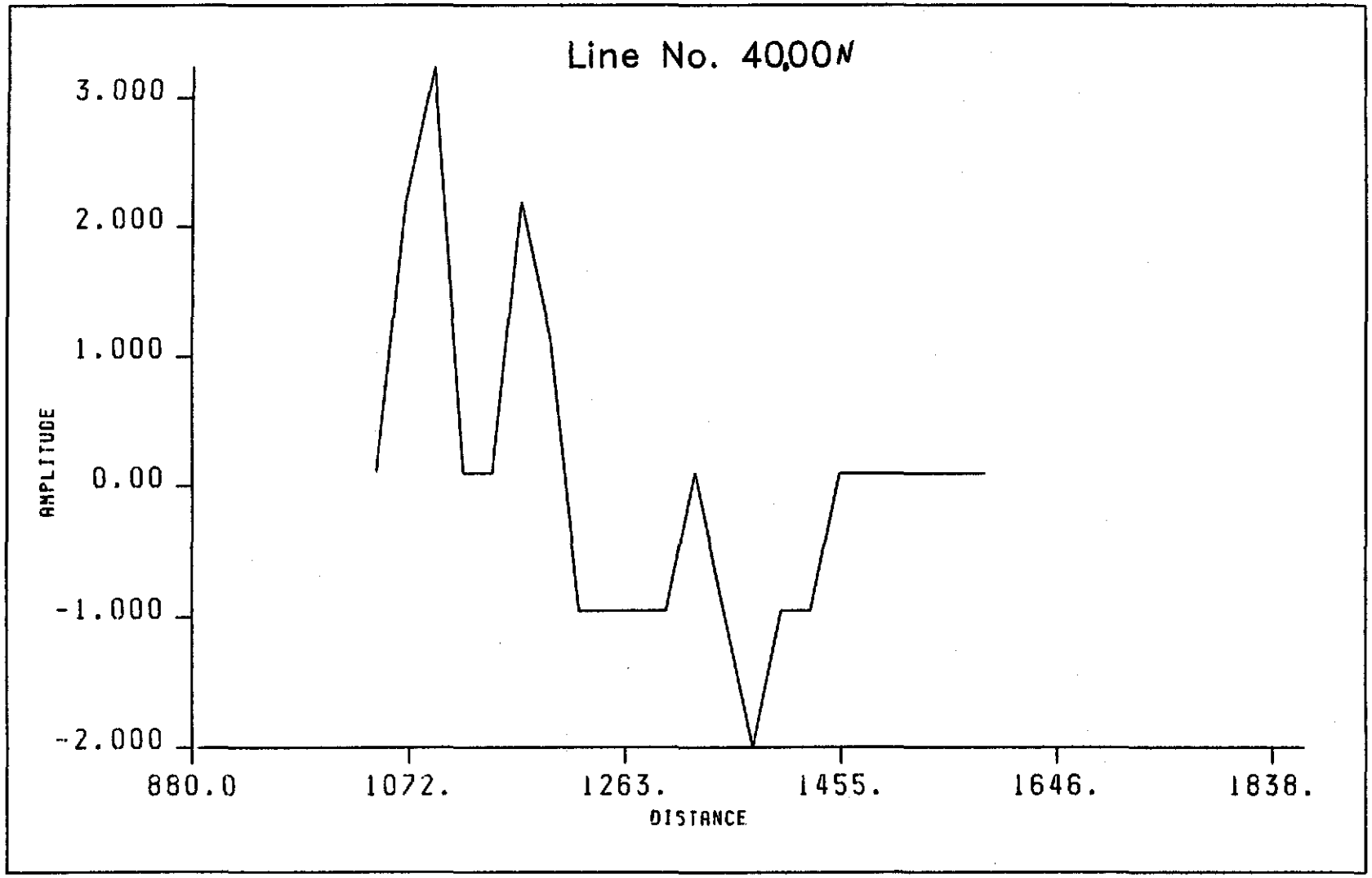
When aliasing occurs, (due to too-coarse a sampling) the undersampled short wavelength components become added to the long wavelength components giving false results.



adequate sampling
gives a true result



inadequate sampling
gives a false result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2.000
1.000
0.00
-1.000
-2.000
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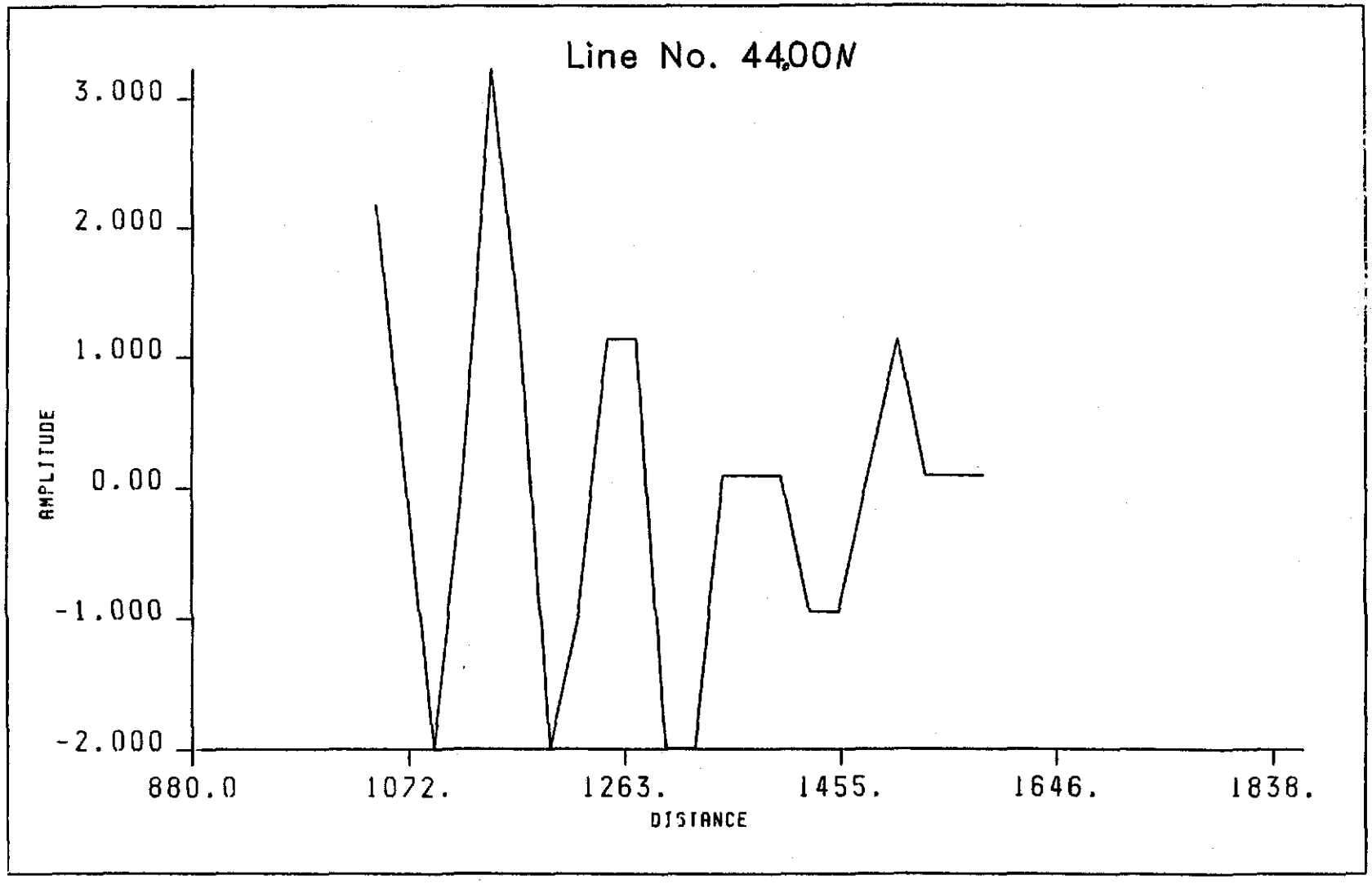
880.0
1072.
1263.
1455.
1646.
1838.
DISTANCE

9951191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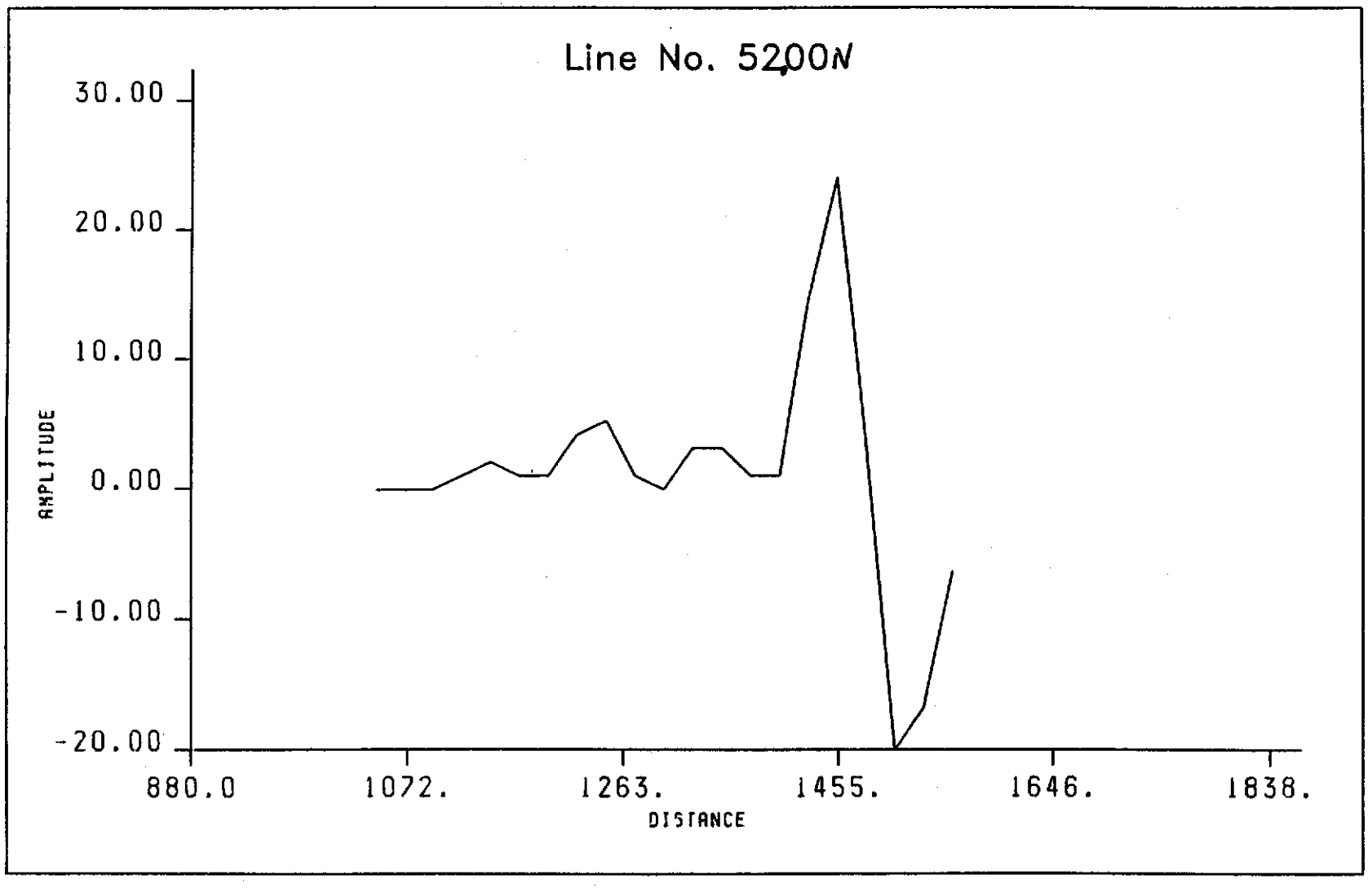
1263.
1455.
1646.
1838.
DISTANCE

0051192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10.00
0.00
-10.00
-20.00
AMPLITUDE
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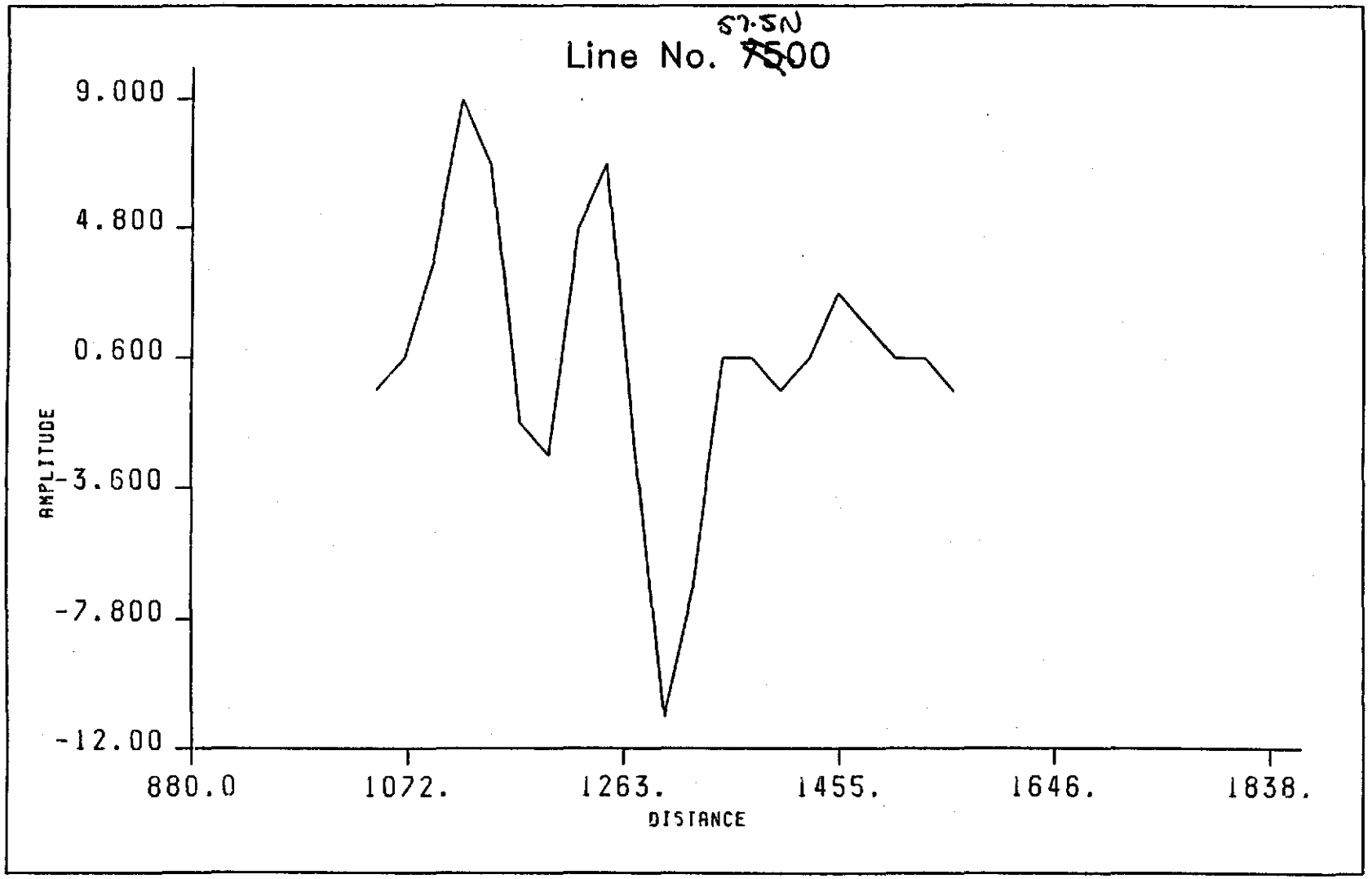
1263.
1455.
1646.
1838.
DISTANCE

9951193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0.600
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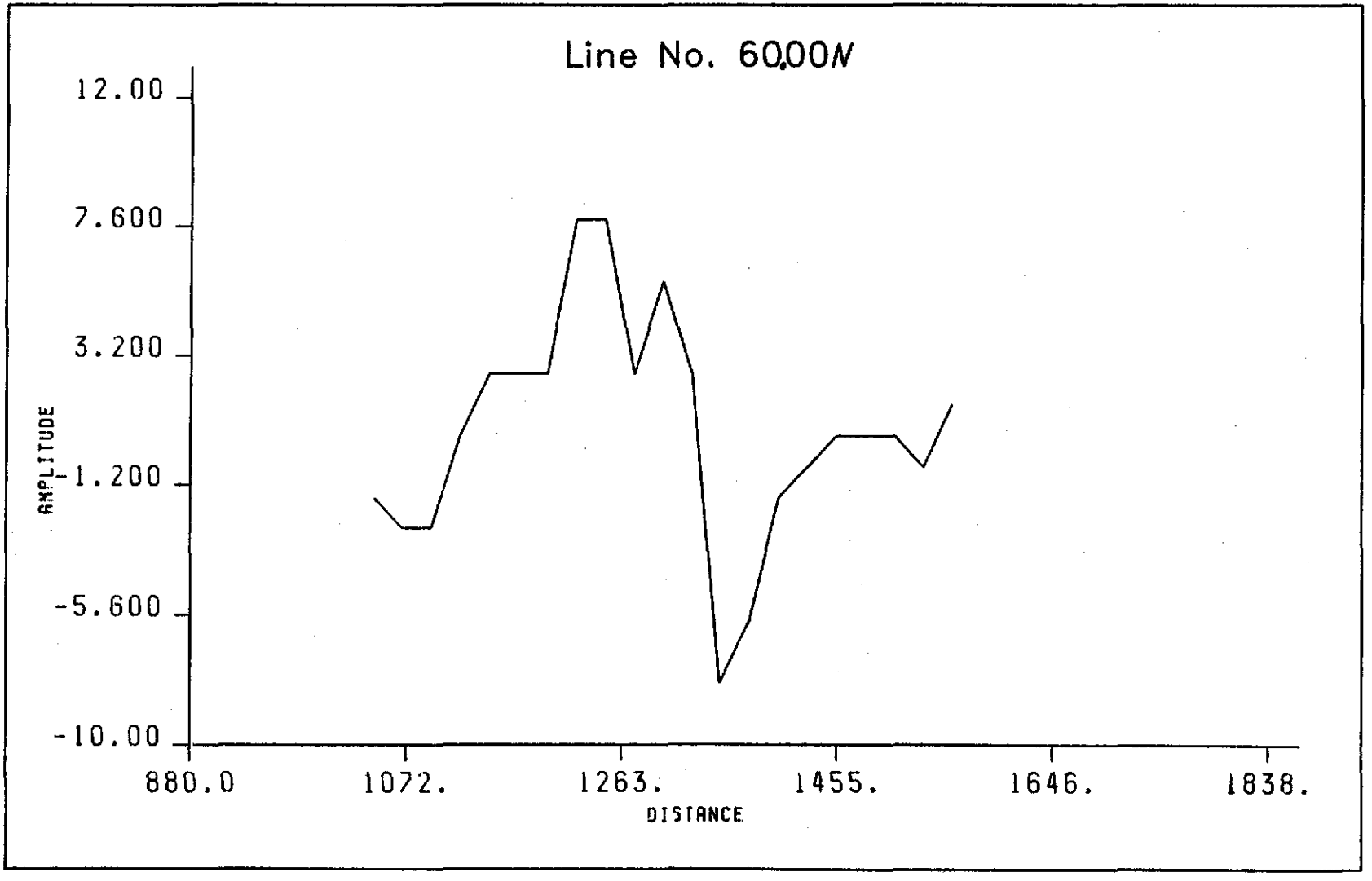
1072.
1263.
1455.
1646.
1838.
DISTANCE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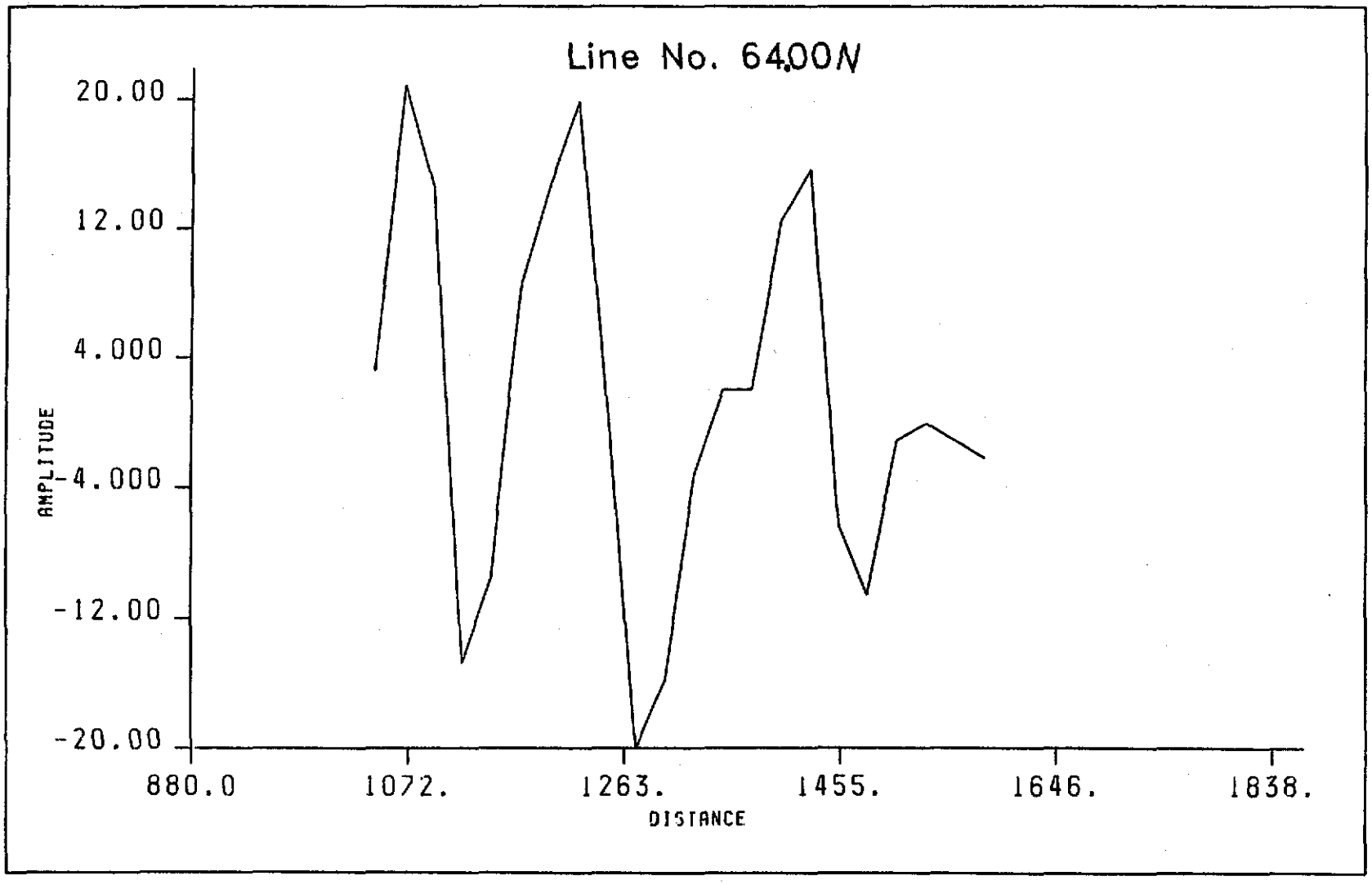
1263.
1455.
1646.
1838.
DISTANCE

0995193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4.000
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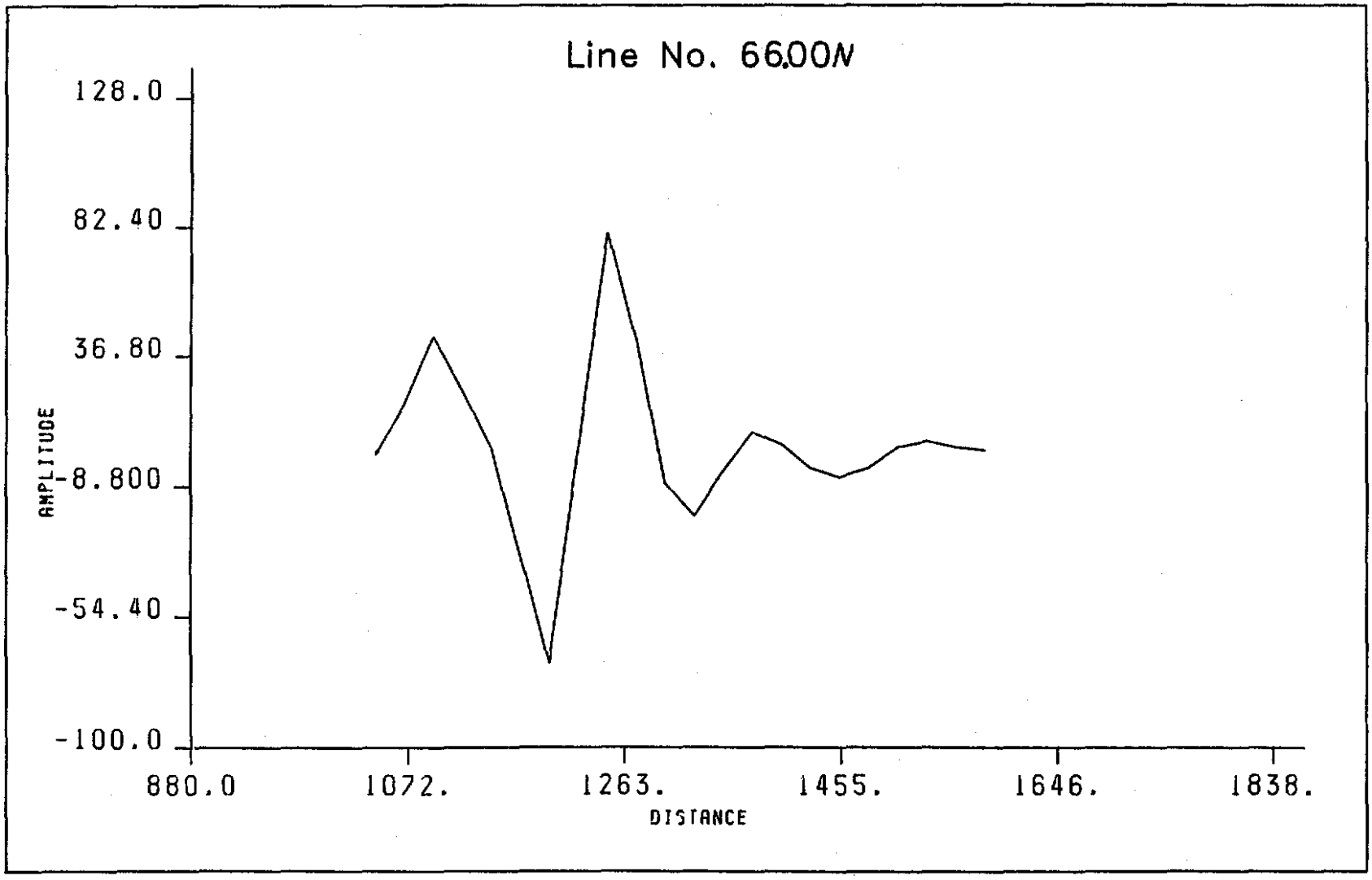
1263.
1455.
1646.
1838.
DISTANCE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36.80
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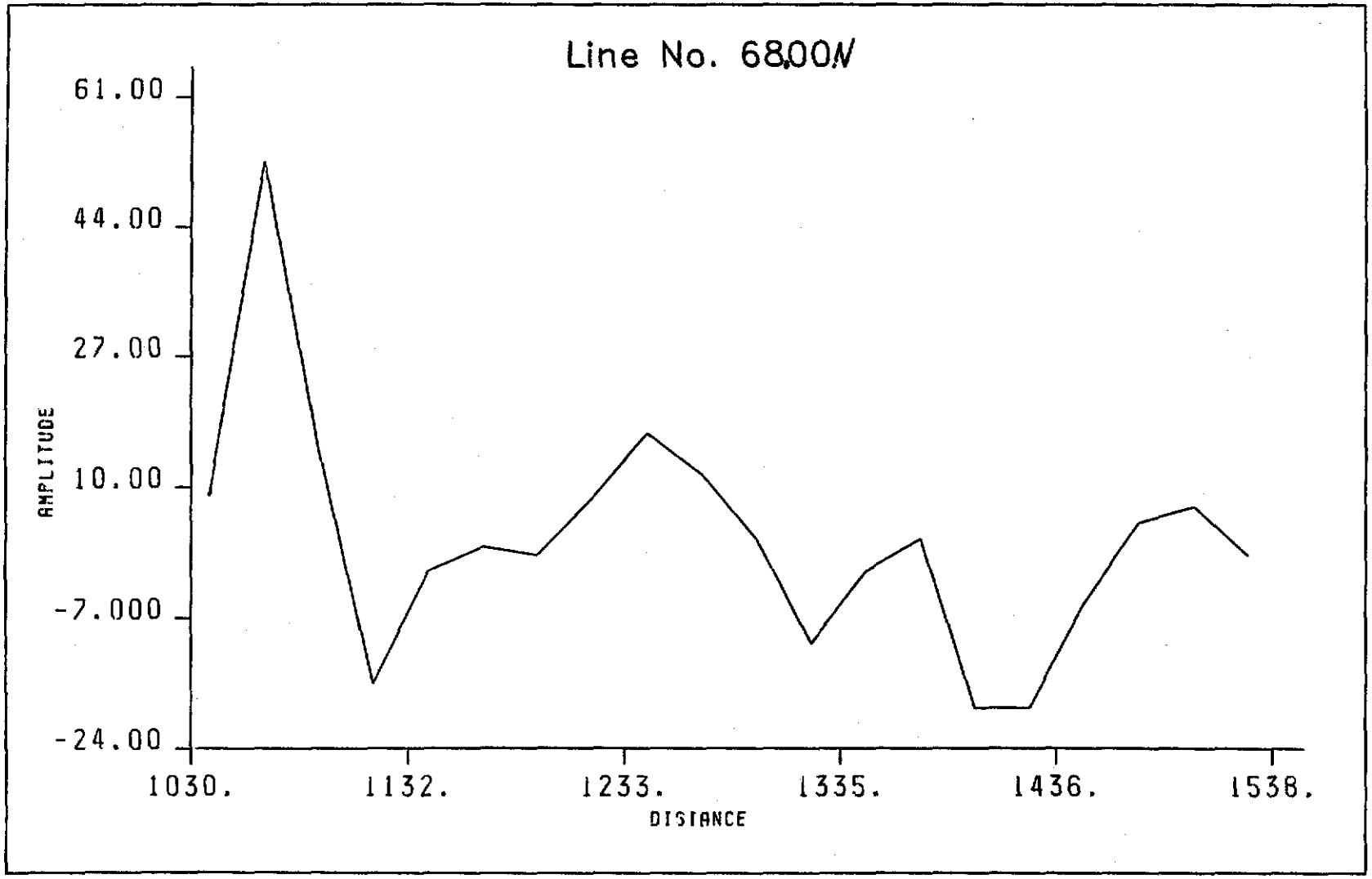
1455.
1646.
1838.
DISTANCE

99519?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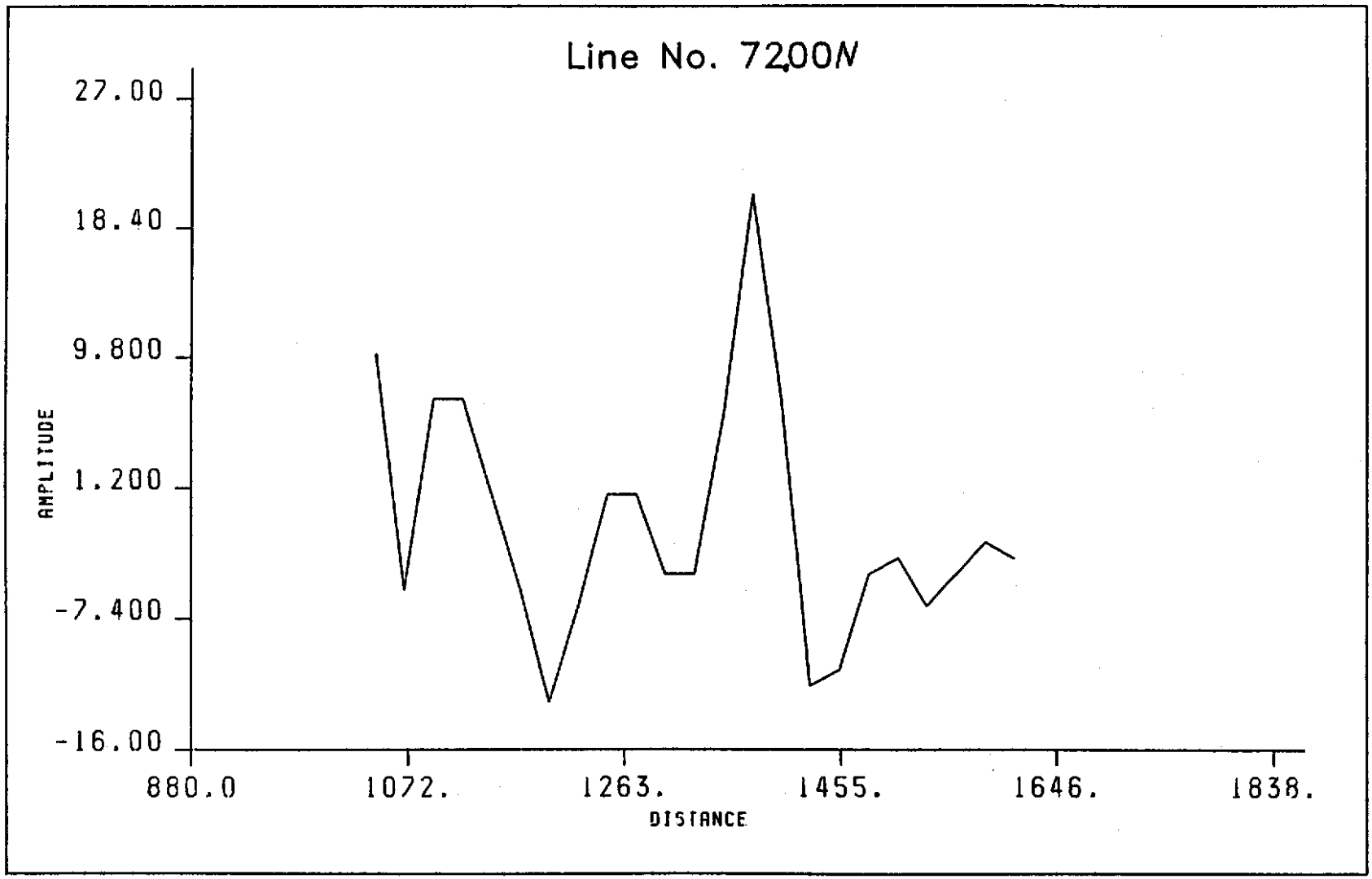
1538.
DISTANCE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AMPLITUDE
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1072.
1263.
1455.
1646.
1838.
DISTANCE

9951199



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1088.	4400.	-21.
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1138.	4400.	38.
1163.	4400.	14.
1188.	4400.	-23.
1213.	4400.	-18.
1238.	4400.	16.
1263.	4400.	16.
1288.	4400.	-25.
1313.	4400.	-28.
1338.	4400.	-3.
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1388.	4400.	0.
1413.	4400.	-12.
1438.	4400.	-18.
1463.	4400.	5.
1488.	4400.	19.
1513.	4400.	6.
1538.	4400.	-3.
1563.	4400.	-4.
1038.	4000.	5.
1063.	4000.	26.
1088.	4000.	35.
1113.	4000.	6.
1138.	4000.	5.
1163.	4000.	29.
1188.	4000.	19.
1213.	4000.	-11.
1238.	4000.	-14.
1263.	4000.	-13.
1288.	4000.	-11.
1313.	4000.	4.
1338.	4000.	-12.
1363.	4000.	-29.
1388.	4000.	-18.
1413.	4000.	-10.
1438.	4000.	-3.
1463.	4000.	6.
1488.	4000.	1.
1513.	4000.	-4.
1538.	4000.	1.
1563.	4000.	3.
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1063.	5200.	-13.
1088.	5200.	-12.
1113.	5200.	7.
1138.	5200.	15.
1163.	5200.	9.
1188.	5200.	7.
1213.	5200.	34.
1238.	5200.	47.
1263.	5200.	-9.
1288.	5200.	-13.
1313.	5200.	29.
1338.	5200.	26.
1363.	5200.	1.
1388.	5200.	6.
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1438.	5200.	225.

200

1443.	5200.	24.
1488.	5200.	-201.
1513.	5200.	-175.
1538.	5200.	-70.
1038.	4800.	-47.
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1288.	4800.	76.
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1438.	4800.	5.
1463.	4800.	140.
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1388.	7200.	68.
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1388.	6800.	-193.
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1238.	6000.	77.
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1438.	6000.	6.
1463.	6000.	9.
1488.	6000.	-2.
1513.	6000.	-11.
1538.	6000.	13.
1038.	5750.	-13.
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1088.	5750.	31.
1113.	5750.	84.
1138.	5750.	60.
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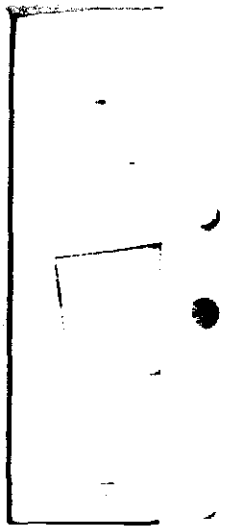

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1463.	5750.	14.
1488.	5750.	-6.
1513.	5750.	-9.
1538.	5750.	-11.
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1188.	6600.	-720.
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1238.	6600.	720.
1263.	6600.	360.
1288.	6600.	-127.
1313.	6600.	-235.
1338.	6600.	-83.
1363.	6600.	53.
1388.	6600.	13.
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1438.	6600.	-104.
1463.	6600.	-76.
1488.	6600.	-9.
1513.	6600.	28.
1538.	6600.	4.
1563.	6600.	-16.

995204

APPENDIX XII

CARBINE GRID

SOIL GEOCHEMISTRY

CSR Limited
Minerals Division

995265

Correspondence to: THE CHIEF GEOLOGIST BOX 483 GPO SYDNEY NSW 2001. TELEPHONE (02) 237 5111

CSR

FIELD SAMPLE DESPATCH SHEET

13085

State TASMANIA Project DUNDAS Prospect No. 7602 Locality CARBINE

CSR Order No. 41619 Date Sampled JULY 85 Sampler RW/BD

Date Despatched 12/8/85 Despatcher PDE Despatched per ANSETT

Type of Sample SOIL

Lab. Name COMLABS

Sample Number Co-ordinates	From E/W	To N/S	Cu	Pb	Zn	Bi	Ag	Sn	As	Remarks
AD12851	575E	72N	16	32	24	6	x	6	14	
852	550E	"	28	70	68	12	2	4	24	
853	625E	"	70	120	420	12	2	14	36	
854	525E	"	18	55	50	14	2	10	24	
855	600E	"	18	60	55	8	x	6	22	
856	500E	"	44	55	110	6	x	4	24	
857	450E	"	28	185	160	6	x	8	44	
858	425E	"	28	160	140	6	2	8	34	
859	475E	"	50	100	230	2	x	8	42	
860	BLANK		4	4	9	4	x	12	2	
861	400E	72N	42	500	240	4	x	6	75	
862	375E	"	28	640	525	8	x	x	130	
863	360E	"	9	210	50	2	2	8	36	
864	325E	"	14	810	180	12	x	12	50	
865	300E	"	36	380	520	6	2	10	75	
866	275E	"	28	105	530	6	x	10	140	
867	250E	"	22	85	250	6	x	4	70	
868	225E	"	22	175	140	4	x	14	28	
869	175E	"	2	70	200	2	x	6	42	
870	150E	"	32	200	390	2	2	10	38	
871	275E	"	30	90	530	4	x	x	145	
872	75E	"	2	220	940	8	1	x	170	
873	125E	"	115	320	370	x	x	10	80	
874	200E	"	80	69	440	2	x	6	44	
875	STD	5	75	14	110	20	x	8	12	
876	50E	72N	65	55	130	6	x	6	26	
877	100E	"	44	230	340	x	x	x	55	
878	STD	12	4	8	2	2	21	55	4	
879	25E	72N	18	60	60	4	x	4	16	
880	0	"	9	29	24	4	x	x	7	
881	30SW	"	18	42	70	x	x	6	7	
882	325W	"	16	36	75	6	x	6	6	
883	350W	"	44	44	55	4	x	10	10	
884	BLANK		5	2	6	2	2	4	2	
885	375W	72N	28	12	75	x	x	x	6	
886	400W	"	28	36	76	4	x	4	10	
887	425W	"	20	16	70	2	x	10	9	
888	450W	"	20	16	85	2	x	x	2	
889	475W	"	28	30	60	2	x	x	4	
AD12890	500W	"	18	36	60	8	2	8	5	

Instructions to Analyst: Dry 4 Samples in plastic bag. PULVERIZE ALL SAMPLES ANALYSE 4 dry samples + 19 loose samples + -2mm samples for Sn, As by XRF-1. ANALYSE 1 dry samples + 19 loose samples + -80# samples for Cu, Pb, Zn, Bi by AAS-1 and Ag by AAS3

Results + Invoice to: CSR Ltd Minerals 60 GPO BOX 483 Sydney NSW 2001

Results to: + Burns to CSR Ltd 35 East Derwent H'way LAUNCESTON TAS 7015

DISBURSEMENT Pink — To Chief Geologist Sydney White — To Assay Lab with Order Green — Despatch with Samples
Yellow — Field Copy

205 CSR Limited
Minerals Division

995206

Correspondence to: THE CHIEF GEOLOGIST BOX 483 GPO
SYDNEY NSW 2001. TELEPHONE (02) 237 5111

FIELD SAMPLE DESPATCH SHEET

13086

State TAS Project DUNDAS Prospect No. 7602 Locality CARBINE

CSR Order No. 4116 NG Date Sampled JULY 85 Sampler BD/RW

Date Despatched 12 AUG 85 Despatcher PE Despatched per ANSETT

Type of Sample SOIL

Lab. Name COMLABS

Sample Number Co-ordinates	From E/W	To N/S	Chemical Analyses (ppm or %) Cu	Pb	Zn	Bi	Ag	Sn	As	Remarks
A212891	525W	72N	44	180	65	x	x	12	14	
892	550W	"	15	45	15	15	15	4	7	
893	STD	11	5	x	2	x	x	180	x	
894	575W	72N	36	44	70	4	x	x	6	
895	575W	"	38	46	75	4	2	4	6	
896	600W	"	48	20	70	x	x	x	5	
897	0	39N	16	26	10	8	2	4	14	
898	25E	"	7	32	12	4	x	8	6	
899	50E	"	2	105	x	4	x	4	x	
900	75E	"	4	16	3	x	x	8	x	
A212951	100E	"	12	18	10	x	x	4	22	
952	125E	"	16	12	32	x	x	8	16	
953	150E	"	4	x	4	x	x	6	2	
954	STD	12A	6	18	12	x	x	280	x	
955	175E	39N	14	360	110	6	x	10	30	
956	200E	"	4	6	x	4	x	6	2	
957	225E	"	28	32	50	4	x	x	24	
958	250E	"	14	60	18	x	x	14	10	
959	275E	"	5	12	6	x	x	8	3	
960	300E	"	12	12	8	x	x	8	24	
961	300E	"	12	4	6	4	x	8	x	
962	325E	"	8	8	x	x	x	4	2	
963	350E	"	7	8	x	4	x	4	3	
964	375E	"	5	4	x	x	x	12	x	
965	STD	17	5	x	x	x	1	6800	x	
966	400E	39N	8	x	x	x	x	14	2	
967	425E	"	6	8	x	x	x	6	4	
968	450E	"	5	x	3	6	x	6	x	
969	475E	"	5	4	x	x	x	14	x	
970	500E	"	8	4	x	x	x	8	x	
971	525E	"	6	6	x	x	x	10	x	
972	550E	"	6	4	x	4	x	8	3	
973	STD	14	4	x	x	6	x	950	x	
974	575E	39N	5	6	x	x	x	8	x	
975	596E	"	3	x	x	6	x	6	2	
976	250W	52N	24	32	44	6	x	x	7	
977	575N	"	14	48	22	6	x	x	8	
978	325W	"	12	75	26	x	x	8	46	
979	225N	"	40	6	90	6	x	6	5	
A212980	525N	"	32	34	75	x	x	6	120	

Instructions to Analyst:

See Field Sample Despatch Sheet 13085

Results to:

DISBURSEMENT Pink — To Chief Geologist Sydney White — To Assay Lab with Order Green — Despatch with Samples
Yellow — Field Copy

CSR Limited
Minerals Division

99520

Correspondence to: THE CHIEF GEOLOGIST BOX 483 GPO SYDNEY NSW 2001. TELEPHONE (02) 237 5111

FIELD SAMPLE DESPATCH SHEET

13087

State TAS Project WUDAS Prospect No. 7602 Locality CARBINE

CSR Order No. 41619 Date Sampled JULY 85 Sampler RWJRD

Date Despatched 12/8/85 Despatcher PDE Despatched per BNLETT

Type of Sample SOIL

Lab. Name COMLABS

Sample Number Co-ordinates	From E/W	To N/S	Cu	Pb	Zn	Bi	Ag	Sn	As	Remarks
A212981	600W	52N	9	x	9	4	x	8	8	
982	550W	"	60	28	80	x	x	x	10	
983	500W	"	16	70	95	4	x	4	38	
984	475W	"	14	85	360	x	x	8	10	
985	450W	"	95	105	135	4	x	12	22	
986	HOB 2		1000	34	105	150	8	990	790	
987	425W	52N	36	95	100	4	x	6	24	
988	400W	"	14	22	55	6	x	6	6	
989	375W	"	5	14	16	x	x	x	9	
990	300W	"	28	34	100	9	x	4	12	
991	275W	"	34	70	90	x	x	12	18	
992	450W	"	16	110	140	x	x	12	22	
993	200W	"	28	32	50	x	x	10	12	
994	175W	"	26	70	75	10	x	4	10	
995	HOB 2		1050	38	105	170	7	1050	770	
996	150W	52N	22	190	120	x	x	8	18	
997	125W	"	18	140	95	4	x	4	10	
998	100W	"	68	1050	300	x	x	24	42	
999	75W	"	34	1200	140	8	1	16	20	
A213000	50W	"	18	670	60	x	1	6	12	
001	25W	"	20	1100	75	x	x	8	16	
002	0	"	4	310	16	x	x	10	4	
003	HOB 1		10	10	14	8	x	95	36	
004	275W	72N	18	65	80	x	x	x	12	
005	250W	"	24	65	80	x	x	8	16	
006	225W	"	18	50	40	x	x	8	20	
007	200W	"	44	60	95	x	x	14	22	
008	175W	"	24	22	130	x	x	x	18	
009	150W	"	9	16	14	x	x	9	9	
010	125W	"	10	20	12	x	x	10	3	
011	100W	"	20	260	155	x	x	10	46	
012	HOB 1		9	10	16	4	x	95	34	
013	75W	72N	14	150	100	6	x	4	34	
014	50W	"	12	46	28	x	x	8	12	
015	25W	"	20	38	75	4	x	8	12	
016	0	"	9	26	20	6	x	4	3	
017	25W	40N	10	16	14	x	x	4	18	
018	50W	"	4	x	x	24	x	10	5	
019	75W	"	2	12	x	x	x	8	3	
A213020	100W	"	4	x	x	6	x	8	3	

Instructions to Analyst:

See Field Sample Despatch Sheet 13085

Results to:

DISBURSEMENT Pink — To Chief Geologist Sydney White — To Assay Lab with Order Green — Despatch with Samples
Yellow — Field Copy

CSR Limited
Minerals Division
207 995208
Correspondence to: THE CHIEF GEOLOGIST BOX 483 GPO SYDNEY NSW 2001. TELEPHONE (02) 237 5111

FIELD SAMPLE DESPATCH SHEET

13088

State TAS Project DUNDAS Prospect No. 7602 Locality CARBINE
CSR Order No. 4/16kg Date Sampled JULY 85 Sampler BD/RW
Date Despatched 12/8/85 Despatcher PDE Despatched per ANSETT
Type of Sample SOIL
Lab. Name COMLABS

Sample Number Co-ordinates	From E/W	To N/S	Chemical Analyses (ppm or %) Cu	Pb	Zn	Bi	Ag	Sb	As		Remarks
A213021											
022	125W	40N	20	140	220	x	x	10	55		
023	150W	"	7	68	16	4	x	12	9		
024	175W	"	6	26	5	x	x	4	x		
025	200W	"	22	20	340	6	x	6	2		
026	225W	"	4	4	14	4	x	x	2		
027	250W	"	370	2180	670	20	x	x	440		
028	275W	"	18	70	24	2	x	4	7		
029	BLANK		3	x	10	4	x	x	2		
030	300W	40N	44	46	68	x	x	6	16		
031	325W	"	24	55	55	2	x	8	14		
032	200W	72N	50	65	110	2	x	12	18		
033	350W	40N	38	20	185	2	x	8	7		
034	375W	"	145	18	32	2	x	10	6		
035	400W	"	14	90	22	x	2	8	14		
036	425W	"	18	210	12	4	2	8	18		
037	450W	"	75	230	55	6	x	8	46		
038	475W	"	40	400	70	2	x	12	24		
039	175W	72N	22	20	116	x	x	6	18		
040	STD	16	5	x	2	4	2	1.38%	2		
041	500W	40N	30	450	180	6	x	14	95		
042	525W	"	14	430	100	2	x	6	24		
043	550W	"	16	1600	35	x	2	22	42		
044	575W	"	18	165	75	4	x	6	10		
045	600W	"	12	120	85	8	2	6	34		
046	625W	"	12	320	115	6	x	4	165		
047	650W	"	5	24	220	6	x	14	310		
048	675W	"	4	68	120	x	2	10	65		
049	700W	"	7	26	26	8	1	6	16		
050	0	16N	8	x	2	4	2	x	5		
051	25E	"	12	12	x	x	x	4	2		
052	50E	"	6	12	4	x	x	x	2		
053	75E	"	4	2	5	x	x	6	4		
054	100E	"	7	14	6	x	x	10	3		
055	STD	18	11	x	2	x	x	450	x		
056	125E	16N	6	55	3	x	2	16	4		
057	150E	"	4	80	3	x	1	8	12		
058	175E	"	6	2	2	x	x	12	x		
059	200E	"	6	16	3	x	x	12	3		
A213060	225E	"	24	160	85	4	1	4	14		

Instructions to Analyst: See Field Sample Despatch Sheet 13085

Results to:

DISBURSEMENT Pink — To Chief Geologist Sydney White — To Assay Lab with Order Green — Despatch with Samples
Yellow — Field Copy

208 Minerals Division 995209 SYDNEY NSW 2001. TELEPHON (02) 237 5111

FIELD SAMPLE DESPATCH SHEET 13089

State TAS Project DUNDAS Prospect No. 7602 Locality CARBINE

CSR Order No. 41619 Date Sampled JULY 85 Sampler BD/RW

Date Despatched 12/8/85 Despatcher PDE Despatched per ANSETT

Type of Sample SOIL

Lab. Name COMLABS

Sample Number Co-ordinates	From E/W	To N/S	Chemical Analyses (ppm or %) Cu	Pb	Zn	Bi	Ag	Sn	As	Remarks
A213061	125E	16N	6	50	4	2	x	4	x	
062	250E	"	12	70	32	x	x	10	17	
063	275E	"	28	95	65	x	x	8	22	
064	300E	"	16	60	65	x	x	12	5	
065	25E	52N	280	200	42	x	x	8	90	
066	50E	"	16	4	65	x	x	x	32	
067	100E	16N	8	44	4	x	x	10	3	
068	75E	52N	85	510	230	x	x	6	34	
069	100E	"	14	22	10	x	x	4	10	
070	125E	"	55	95	300	x	x	6	16	
071	STD	Q	6	x	2	x	x	32	x	
072	150E	52N	10	48	90	x	x	4	5	
073	175E	"	22	12	8	x	x	4	12	
074	200E	"	7	x	5	x	x	4	x	
075	225E	"	5	x	3	x	x	x	x	
076	250E	"	7	8	5	4	x	8	4	
077	275E	"	7	4	14	x	x	x	7	
078	300E	"	7	26	10	x	x	10	8	
079	325E	"	14	55	22	x	1	6	x	
080	350E	"	9	42	34	x	x	4	8	
081	375E	"	14	28	38	x	x	6	12	
082	400E	"	7	34	22	x	x	10	8	
083	STD	10	6	x	2	x	x	38	x	
084	425E	52N	7	70	18	x	x	4	7	
085	450E	"	4	16	5	x	x	12	2	
086	475E	"	8	50	14	x	x	4	8	
087	500E	"	105	165	160	x	1	6	68	
088	525E	"	155	460	65	x	x	4	60	
089	550E	"	12	10	6	x	x	6	10	
090	575E	"	7	4	x	x	x	6	x	
091	600E	"	5	x	2	x	x	8	2	
092	350W	"	9	26	24	x	x	4	18	
093	STD	15	5	2	2	x	x	200	x	
094	BLANK		3	x	9	x	x	x	x	

Instructions to Analyst: See Field Sample Despatch Sheet 13085

Results to:

DISBURSEMENT Pink — To Chief Geologist Sydney White — To Assay Lab with Order Green — Despatch with Samples
Yellow — Field Copy

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COMLABS Pty. Ltd.

COMPUTERISED ANALYTICAL LABORATORIES

Head Office and Central Laboratory
305 South Road,
Mile End South,
Sth. Aust. 5031.
Tel: (08) 43 5722
Telex: AA89323

NATA REGISTERED No. 1526

OUR REF.: COM851429

YOUR REF.: 13085-13089

Mr. Peter Ellis
CSR Minerals Limited
35 East Derwent Highway
LIDISFARNE

TAS 7015

August 22, 1985

Dear Peter

RE: JOB COM851429

Enclosed are the assays for the samples delivered to our laboratory on August 13, 1985

Yours Sincerely,
COMLABS PTY LTD

per :

c.c.: CSR - Sydney No. of copies : 1

Report Length 16 pages

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

	SAMPLE	Sn	As
	A212851 -20#+80#	6	14
	A212852 -20#+80#	4	24
	A212853 -20#+80#	14	36
	A212854 -20#+80#	10	24
	A212855 -20#+80#	6	22
	A212856 -20#+80#	4	24
	A212857 -20#+80#	8	44
	A212858 -20#+80#	8	34
	A212859 -20#+80#	8	42
	A212860	12	2
	A212861 -20#+80#	6	75
	A212862 -20#+80#	<4	130
	A212863 -20#+80#	8	36
	A212864 -20#+80#	12	50
	A212865 -20#+80#	10	75
	A212866 -20#+80#	10	140
	A212867 -20#+80#	4	70
	A212868 -20#+80#	14	28
	A212869 -20#+80#	6	42
	A212870 -20#+80#	10	38
	A212871 -20#+80#	<4	145
	A212872 -20#+80#	<4	170
	A212873 -20#+80#	10	80
	A212874 -20#+80#	6	44
	A212875	8	12
	UNITS	ppm	ppm
	SCHEME	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

	SAMPLE	Sn	As
	A212876 -20#+80#	6	26
	A212877 -20#+80#	<4	55
	A212878	55	4
	A212879 -20#+80#	4	16
	A212880 -20#+80#	<4	7
	A212881 -20#+80#	6	7
	A212882 -20#+80#	6	6
	A212883 -20#+80#	10	10
	A212884	4	<2
	A212885 -20#+80#	<4	6
	A212886 -20#+80#	4	10
	A212887 -20#+80#	10	8
	A212888 -20#+80#	<4	2
	A212889 -20#+80#	<4	4
	A212890 -20#+80#	8	5
	A212891 -20#+80#	12	14
	A212892 -20#+80#	4	7
	A212893	130	<2
	A212894 -20#+80#	<4	6
	A212895 -20#+80#	4	6
	A212896 -20#+80#	<4	5
	A212897 -20#+80#	4	14
	A212898 -20#+80#	8	6
	A212899 -20#+80#	4	<2
	A212900 -20#+80#	8	<2
	UNITS	ppm	ppm
	SCHEME	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

SAMPLE		Sn	As
A212951	-20#+80#	14	22
A212952	-20#+80#	8	16
A212953	-20#+80#	6	2
A212954		280	<2
A212955	-20#+80#	10	30
A212956	-20#+80#	6	<2
A212957	-20#+80#	<4	24
A212958	-20#+80#	14	10
A212959	-20#+80#	8	3
A212960	-20#+80#	8	24
A212961	-20#+80#	8	<2
A212962	-20#+80#	4	2
A212963	-20#+80#	4	3
A212964	-20#+80#	12	<2
A212965		6800	<2
A212966	-20#+80#	14	2
A212967	-20#+80#	6	4
A212968	-20#+80#	6	<2
A212969	-20#+80#	14	<2
A212970	-20#+80#	8	<2
A212971	-20#+80#	10	<2
A212972	-20#+80#	8	3
A212973		950	<2
A212974	-20#+80#	8	<2
A212975	-20#+80#	6	2
UNITS		ppm	ppm
SCHEME		XRF1	XRF1

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COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

	SAMPLE	Sn	As
	A212976 -20#+80#	<4	7
	A212977 -20#+80#	<4	8
	A212978 -20#+80#	8	46
	A212979 -20#+80#	6	5
	A212980 -20#+80#	6	120
	A212981 -20#+80#	8	8
	A212982 -20#+80#	<4	10
	A212983 -20#+80#	4	38
	A212984 -20#+80#	8	10
	A212985 -20#+80#	12	22
	A212986	980	790
	A212987 -20#+80#	6	24
	A212988 -20#+80#	6	6
	A212989 -20#+80#	<4	8
	A212990 -20#+80#	4	12
	A212991 -20#+80#	12	18
	A212992 -20#+80#	12	22
	A212993 -20#+80#	10	12
	A212994 -20#+80#	4	10
	A212995	1050	770
	A212996 -20#+80#	8	18
	A212997 -20#+80#	14	10
	A212998 -20#+80#	24	42
	A212999 -20#+80#	16	20
	A213000 -20#+80#	6	12
	UNITS	ppm	ppm
	SCHEME	XRF1	XRF1

COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

	SAMPLE	Sn	As
	A213001 -20#+80#	8	16
	A213002 -20#+80#	10	9
	A213003	95	36
	A213004 -20#+80#	<4	12
	A213005 -20#+80#	8	16
	A213006 -20#+80#	8	20
	A213007 -20#+80#	14	22
	A213008 -20#+80#	<4	18
	A213009 -20#+80#	8	8
	A213010 -20#+80#	10	3
	A213011 -20#+80#	10	46
	A213012	95	34
	A213013 -20#+80#	4	34
	A213014 -20#+80#	8	12
	A213015 -20#+80#	8	12
	A213016 -20#+80#	4	3
	A213017 -20#+80#	4	18
	A213018 -20#+80#	10	5
	A213019 -20#+80#	8	3
	A213020 -20#+80#	8	3
	A213021 -20#+80#	LNR	LNR
	A213022 -20#+80#	10	55
	A213023 -20#+80#	12	9
	A213024 -20#+80#	4	<2
	A213025 -20#+80#	6	2
	UNITS	ppm	ppm
	SCHEME	XRF1	XRF1

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O/N : 13085-13089

	SAMPLE	Sn	As
	A213026 -20#+80#	<4	<2
	A213027 -20#+80#	<4	440
	A213028 -20#+80#	4	7
	A213029	<4	<2
	A213030 -20#+80#	6	16
	A213031 -20#+80#	8	14
	A213032 -20#+80#	12	18
	A213033 -20#+80#	8	7
	A213034 -20#+80#	10	6
	A213035 -20#+80#	8	14
	A213036 -20#+80#	8	18
	A213037 -20#+80#	8	46
	A213038 -20#+80#	12	24
	A213039 -20#+80#	6	18
	A213040	1.38%	<2
	A213041 -20#+80#	14	55
	A213042 -20#+80#	6	24
	A213043 -20#+80#	22	42
	A213044 -20#+80#	6	10
	A213045 -20#+80#	6	34
	A213046 -20#+80#	4	165
	A213047 -20#+80#	14	310
	A213048 -20#+80#	10	65
	A213049 -20#+80#	6	16
	A213050 -20#+80#	<4	5
	UNITS	ppm	ppm
	SCHEME	XRF1 XRF2	XRF1

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

SAMPLE	Sn	As
A213051 -20#+80#	4	2
A213052 -20#+80#	<4	<2
A213053 -20#+80#	6	4
A213054 -20#+80#	10	3
A213055	450	<2
A213056 -20#+80#	16	4
A213057 -20#+80#	8	12
A213058 -20#+80#	12	<2
A213059 -20#+80#	12	3
A213060 -20#+80#	4	18
A213061 -20#+80#	4	<2
A213062 -20#+80#	10	12
A213063 -20#+80#	8	22
A213064 -20#+80#	12	5
A213065 -20#+80#	8	90
A213066 -20#+80#	<4	32
A213067 -20#+80#	10	3
A213068 -20#+80#	6	34
A213069 -20#+80#	4	10
A213070 -20#+80#	6	16
213071	32	<2
A213072 -20#+80#	4	5
A213073 -20#+80#	4	12
A213074 -20#+80#	4	<2
A213075 -20#+80#	<4	<2
UNITS	ppm	ppm
SCHEME	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

SAMPLE		Sn	As
A213076	-20#+80#	8	4
A213077	-20#+80#	<4	7
A213078	-20#+80#	10	8
A213079	-20#+80#	6	<2
A213080	-20#+80#	4	8
A213081	-20#+80#	6	12
A213082	-20#+80#	10	8
A213083		38	<2
A213084	-20#+80#	4	7
A213085	-20#+80#	12	2
A213086	-20#+80#	4	8
A213087	-20#+80#	6	48
A213088	-20#+80#	4	60
A213089	-20#+80#	6	10
A213090	-20#+80#	6	2
A213091	-20#+80#	8	2
A213092	-20#+80#	4	18
A213093		2700	<2
A213094		<4	<2
UNITS		ppm	ppm
SCHEME		XRF1	XRF1

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

	SAMPLE	Cu	Pb	Zn	Bi	Ag
7ZN 575	A212851 -80#	16	32	24	6	<1
550	A212852 -80#	28	70	48	12	<1
625	A212853 -80#	30	120	120	12	<1
525	A212854 -80#	18	55	50	14	<1
600	A212855 -80#	18	60	55	8	<1
[illegible]	A212856 -80#	44	55	110	6	<1
[illegible]	A212857 -80#	28	155	160	6	<1
[illegible]	A212858 -80#	28	160	140	6	<1
[illegible]	A212859 -80#	50	100	230	<4	<1
	A212860	4	4	9	4	<1
[illegible]	A212861 -80#	42	500	240	4	<1
[illegible]	A212862 -80#	28	610	520	8	<1
[illegible]	A212863 -80#	9	210	50	<4	<1
325	A212864 -80#	14	810	180	12	<1
[illegible]	A212865 -80#	36	380	520	6	<1
[illegible]	A212866 -80#	28	105	530	6	<1
[illegible]	A212867 -80#	22	85	280	6	<1
775	A212868 -80#	22	175	140	4	<1
175	A212869 -80#	36	70	200	<4	<1
150	A212870 -80#	32	200	270	<4	<1
[illegible]	A212871 -80#	30	90	530	4	<1
[illegible]	A212872 -80#	36	220	940	8	1
[illegible]	A212873 -80#	115	300	370	<4	<1
[illegible]	A212874 -80#	80	48	440	<4	<1
	A212875	75	14	110	20	<1
	UNITS	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS1	AAS3

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

SAMPLE	Cu	Pb	Zn	Bi	Ag
A212876 -80#	65	55	130	4	<1
A212877 -80#	44	230	340	<4	<1
A212878	4	8	<2	<4	<1
A212879 -80#	18	60	60	4	<1
A212880 -80#	9	28	24	4	<1
A212881 -80#	18	42	70	<4	<1
A212882 -80#	16	36	75	6	<1
A212883 -80#	14	44	55	4	<1
A212884	5	<4	6	<4	<1
A212885 -80#	28	12	75	<4	<1
A212886 -80#	28	36	75	4	<1
A212887 -80#	20	16	70	<4	<1
A212888 -80#	20	14	85	<4	<1
A212889 -80#	22	30	60	<4	<1
A212890 -80#	18	34	60	8	<1
A212891 -80#	44	100	65	<4	<1
A212892 -80#	I.S.	I.S.	I.S.	I.S.	I.S.
A212893	5	<4	2	<4	<1
A212894 -80#	36	46	70	4	<1
A212895 -80#	38	46	75	4	<1
A212896 -80#	48	20	70	<4	<1
A212897 -80#	16	26	10	8	<1
A212898 -80#	7	32	12	4	<1
A212899 -80#	2	105	<2	4	<1
A212900 -80#	4	16	3	<4	<1
UNITS	ppm	ppm	ppm	ppm	ppm
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS3

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

	SAMPLE	Cu	Pb	Zn	Bi	Ag
100	A212951 -80#	12	18	10	<4	<1
125	A212952 -80#	16	12	32	<4	<1
50	A212953 -80#	4	<4	4	<4	<1
	A212954	6	18	12	<4	<1
175	A212955 -80#	16	360	110	6	<1
200	A212956 -80#	4	6	<2	4	<1
225	A212957 -80#	28	32	50	4	<1
250	A212958 -80#	14	60	18	<4	<1
275	A212959 -80#	5	12	6	<4	<1
100	A212960 -80#	12	12	8	<4	<1
300	A212961 -80#	12	4	6	4	<1
325	A212962 -80#	8	8	<2	<4	<1
350	A212963 -80#	7	8	<2	4	<1
375	A212964 -80#	5	4	<2	<4	<1
	A212965	5	<4	<2	<4	1
400	A212966 -80#	8	<4	<2	<4	<1
425	A212967 -80#	6	8	<2	<4	<1
450	A212968 -80#	5	<4	3	6	<1
475	A212969 -80#	5	4	<2	<4	<1
500	A212970 -80#	8	4	<2	<4	<1
525	A212971 -80#	6	6	<2	<4	<1
550	A212972 -80#	6	4	<2	4	<1
	A212973	4	<4	<2	6	<1
575	A212974 -80#	5	6	<2	<4	<1
600	A212975 -80#	3	<4	<2	6	<1
	UNITS	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS1	AAS3

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

SAMPLE	Cu	Pb	Zn	Bi	Ag
A212976 -80#	24	32	44	6	<1
A212977 -80#	14	48	22	6	<1
A212978 -80#	12	75	26	<4	<1
A212979 -80#	40	6	90	6	<1
A212980 -80#	32	34	75	<4	<1
A212981 -80#	9	<4	9	4	<1
A212982 -80#	60	28	80	<4	<1
A212983 -80#	16	70	95	4	<1
A212984 -80#	14	85	360	<4	<1
A212985 -80#	95	105	135	4	<1
A212986	1000	34	105	150	8
A212987 -80#	30	95	100	4	<1
A212988 -80#	14	22	55	6	<1
A212989 -80#	5	14	16	<4	<1
A212990 -80#	28	34	100	8	<1
A212991 -80#	34	70	90	<4	<1
A212992 -80#	16	110	140	<4	<1
A212993 -80#	28	32	50	<4	<1
A212994 -80#	26	70	75	10	<1
A212995	1050	38	105	170	7
A212996 -80#	22	190	120	<4	<1
A212997 -80#	18	190	85	4	<1
A212998 -80#	48	1050	300	<4	<1
A212999 -80#	34	1200	140	8	1
A213000 -80#	18	670	60	<4	1
UNITS	ppm	ppm	ppm	ppm	ppm
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS3

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

		SAMPLE	Cu	Pb	Zn	Bi	Ag
	25W	A213001 -80#	20	1100	75	<4	<1
	0	A213002 -80#	9	310	16	<4	<1
		A213003	10	10	14	8	<1
72N	275N	A213004 -80#	18	65	80	<4	<1
	[illegible]	A213005 -80#	24	65	80	<4	<1
	[illegible]	A213006 -80#	18	50	40	<4	<1
	[illegible]	A213007 -80#	44	60	95	<4	<1
	175	A213008 -80#	24	22	130	<4	<1
	150	A213009 -80#	8	16	14	<4	<1
	[illegible]	A213010 -80#	10	20	12	<4	<1
	100	A213011 -80#	20	260	155	<4	<1
		A213012	9	10	16	4	<1
	75	A213013 -80#	14	150	100	6	<1
	50	A213014 -80#	12	44	28	<4	<1
	25	A213015 -80#	20	38	75	4	<1
	0	A213016 -80#	9	26	20	6	<1
48N	25W	A213017 -80#	10	14	14	<4	<1
	50W	A213018 -80#	4	<4	<2	<4	<1
	75	A213019 -80#	2	14	<2	<4	<1
	100	A213020 -80#	4	<4	<2	6	<1
		A213021 -80#	LNR	LNR	LNR	LNR	LNR
	[illegible]	A213022 -80#	20	140	220	<4	<1
	[illegible]	A213023 -80#	7	48	16	4	<1
	175	A213024 -80#	6	26	5	<4	<1
	[illegible]	A213025 -80#	22	20	340	6	<1
		UNITS	ppm	ppm	ppm	ppm	ppm
		SCHEME	AAS1	AAS1	AAS1	AAS1	AAS3

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

		SAMPLE	Cu	Pb	Zn	Bi	Ag
	225	A213026 -80#	4	4	14	4	<1
	250	A213027 -80#	370	**2450**	670	20	<1
	275	A213028 -80#	18	70	24	<4	<1
		A213029	3	<4	10	4	<1
	300	A213030 -80#	44	46	48	<4	<1
40N	325W	A213031 -80#	24	55	55	<4	<1
72N	200W	A213032 -80#	50	65	110	<4	<1
40N	350W	A213033 -80#	38	20	135	<4	<1
	375	A213034 -80#	195	18	32	<4	<1
	400	A213035 -80#	14	90	22	<4	<1
	425	A213036 -80#	18	**210**	12	4	<1
	450	A213037 -80#	75	**230**	55	6	<1
40N	475	A213038 -80#	40	**400**	70	<4	<1
72N	175	A213039 -80#	22	20	120	<4	<1
		A213040	5	<4	<2	4	<1
40N	500	A213041 -80#	30	**4350**	180	6	<1
	525	A213042 -80#	14	**430**	100	<4	<1
	550	A213043 -80#	16	**1600**	55	<4	<1
	575	A213044 -80#	18	145	75	4	<1
	600	A213045 -80#	12	120	65	8	<1
	625	A213046 -80#	12	**320**	115	6	<1
	650	A213047 -80#	5	24	220	6	<1
	675	A213048 -80#	4	48	120	<4	<1
	700	A213049 -80#	7	26	26	8	1
16N	7	A213050 -80#	8	<4	2	4	<1
		UNITS	ppm	ppm	ppm	ppm	ppm
		SCHEME	AAS1	AAS1	AAS1	AAS1	AAS3

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

		SAMPLE	Cu	Pb	Zn	Bi	Ag
16N	25E	A213051 -80#	12	12	<2	<4	<1
	50	A213052 -80#	6	12	6	<4	<1
	75	A213053 -80#	6	<4	5	<4	<1
	100	A213054 -80#	7	14	6	<4	<1
		A213055	12	<4	2	<4	<1
	125	A213056 -80#	6	55	3	<4	<1
	150	A213057 -80#	14	80	3	<4	1
	175	A213058 -80#	6	<4	2	<4	<1
	200	A213059 -80#	6	16	3	<4	<1
	225	A213060 -80#	24	160	85	4	1
	125	A213061 -80#	6	50	4	<4	<1
	250	A213062 -80#	12	70	32	<4	<1
	275	A213063 -80#	28	85	65	<4	<1
	300	A213064 -80#	16	60	65	<4	<1
52N	25E	A213065 -80#	280	200	42	<4	<1
	50E	A213066 -80#	16	4	65	<4	<1
16N	100E	A213067 -80#	8	14	4	<4	<1
32N	75E	A213068 -80#	85	510	230	<4	<1
	100	A213069 -80#	14	22	10	<4	<1
	125	A213070 -80#	55	95	300	<4	<1
		A213071	6	<4	2	<4	<1
	150	A213072 -80#	10	48	90	<4	<1
	175	A213073 -80#	22	12	8	<4	<1
	200	A213074 -80#	7	<4	5	<4	<1
	225	A213075 -80#	5	<4	3	<4	<1
		UNITS	ppm	ppm	ppm	ppm	ppm
		SCHEME	AAS1	AAS1	AAS1	AAS1	AAS3

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ANALYTICAL REPORT

JOB COM851429
O/N : 13085-13089

	SAMPLE	Cu	Pb	Zn	Bi	Ag
SLN 250E	A213076 -80#	7	8	5	4	<1
275	A213077 -80#	7	4	14	<4	<1
300	A213078 -80#	7	26	10	<4	<1
325	A213079 -80#	14	55	22	<4	1
350	A213080 -80#	9	42	34	<4	<1
375	A213081 -80#	14	28	38	<4	<1
400	A213082 -80#	7	34	22	<4	<1
	A213083	6	<4	<2	<4	<1
425	A213084 -80#	7	70	18	<4	<1
450	A213085 -80#	4	16	5	<4	<1
475	A213086 -80#	8	50	14	<4	<1
500	A213087 -80#	105	165	140	<4	1
525	A213088 -80#	155	460	65	<4	<1
550	A213089 -80#	12	10	6	<4	<1
575	A213090 -80#	7	4	<2	<4	<1
600	A213091 -80#	5	<4	<2	<4	<1
350	A213092 -80#	9	26	24	<4	<1
	A213093	5	<4	<2	<4	<1
	A213094	3	<4	9	<4	<1
	UNITS	ppm	ppm	ppm	ppm	ppm
	SCHEME	AAS1	AAS1	AAS1	AAS1	AAS3

APPENDIX XIII

CARBINE GRID

GRADIENT IP SURVEY DATA

PRG/JM 34A:63

DUNDAS EL 15/76 - CARBINE PROSPECT

GRADIENT ARRAY TIME DOMAIN I.P. SURVEY

A gradient array induced polarisation survey was undertaken on the Carbine Grid during December 1985 - January 1986 to determine the presence of sulphide mineralisation in a geochemically anomalous area. Additional to geochemistry, airborne EM (DIGHEM), ground VLF and some magnetics, (see Ellis, 1983) suggested the area as having potential for mineralisation.

The Survey

The survey contractor approved for the work was Solo Geophysics of Adelaide. Steep topography and limited vehicular access dictated the decision being made that the work would use a gradient array geometry. Initially, four current electrode sites were determined for the work but in practice it was found these sites were unsuitable due to low current transfer and so alternate sites were selected. The sites eventually chosen were:

Current Electrodes	Northing	Easting
1	52.00	-1500.00
2	52.00	600.00
3	52.00	-650.00
4	52.00	1250.00

Electrodes 1 and 2 were used to measure data along east-west traverses on the western half of the grid. Electrodes 3 and 4 were used for measurements on the eastern half. Along traverse lines data were collected using 100m dipoles with 25 metre station intervals.

Equipment used for the survey was a Huntec Mark IV induced polarisation time domain/frequency domain microprocessor controlled receiver. A Huntec Mark IV 7.5 kw IP time domain transmitter unit was used and was supplied with current by a 10 kw motor generator. A cycle time of 2 seconds ON, 2 seconds OFF was used with currents ranging from 1.5 to 4.0 Amps dependent on variable ground conditions.

Data recording was obtained after a delay time of 50 msec using channels 0-9 (50 to 1550 msec). Each channel width was 150 msec. The data coverage is shown in stack profiles on Drawing No 7602-195 using logarithmic plotting. Additionally, recorded data values are contained in accompanying data sheets.

Results

Only resistivity data are presented in Drawing No 7602-195 It was not possible, due to extremely low resistivities to reliably and repeatably record chargeabilities. Self potential too, although measured did not result in meaningful trends and is not believed helpful in interpreting the geology. It is probable that the SP effects measured were due to spurious surficial noise due to the uncharacteristically low resistivities.

The presented resistivities indicate a primary low zone trending north-northeast from 300W (on line 1) to 100W (on line 15). Typically resistivities within this zone are 1-2 ohm metres amid a background of 200-400 ohm metres. This highly conductive and continuous unit reflects conductivities typical of very massive sulphide ores, or uniform graphitic units.

Some other sporadic low restivity zones exist but these, in most instances appear as isolated, one-line anomalies and are likely due to lenses or pockets of more conductive rock not warranting further interest.

No correlation appears to exist between observed magnetic response and that determined by the IP survey. Reasonable correlation is defined between the IP and VLF data.

Processed for : CSR LIMITED - AMCD [redacted] SOLO GEOPHYSICS & Co

Location : TASMANIA

Grid : (JOB NO.610)

xx Line ID 1 xx

230

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	CURRENT (ampere)	SELF POTENTIAL
40	-750	21.10	22.50	202.00	4.00	287
40	-725	15.10	16.20	148.00	4.00	508
40	-700	12.60	10.50	126.00	4.00	598
40	-675	8.50	6.20	86.00	4.00	171
40	-650	5.70	4.30	59.00	4.00	154
40	-625	4.12	0.00	43.00	4.00	899
40	-600	3.22	0.00	34.00	4.00	709
40	-575	2.44	0.00	26.00	4.00	723
40	-550	1.99	0.00	21.00	4.00	217
40	-525	.26	0.00	3.00	4.00	626
40	-500	.24	0.00	3.00	4.00	-82
40	-475	1.40	0.00	15.00	4.00	118
40	-450	.57	0.00	6.00	4.00	947
40	-425	.14	0.00	2.00	4.00	792
40	-400	.57	0.00	6.00	4.00	376
40	-375	.07	0.00	1.00	4.00	-182
40	-350	.13	0.00	1.00	4.00	-60
40	-325	.23	0.00	2.00	4.00	-169
40	-300	1.37	0.00	14.00	4.00	-153
40	-275	1.90	0.00	20.00	4.00	-140
40	-250	1.06	0.00	11.00	4.00	73.9
40	-225	2.95	0.00	30.00	4.00	-82
40	-200	4.70	31.20	47.00	4.00	-1.8
40	-175	8.25	37.30	81.00	4.00	-123
40	-150	15.00	24.80	144.00	4.00	-62
40	-125	25.30	26.20	238.00	4.00	-109
40	-100	37.30	23.90	343.00	4.00	104
40	-75	50.50	33.40	453.00	4.00	421
40	-50	53.80	21.80	471.00	4.00	-73
40	-25	24.30	20.20	207.00	4.00	237
40	0	17.50	28.80	146.00	4.00	144
40	25	13.90	32.80	113.00	4.00	87.9
40	50	8.50	54.30	67.00	4.00	42
40	75	35.00	26.40	269.00	4.00	180.7

PARAMETERS :

LINE COVERAGE : LINE 40N FROM 750W TO 200E
FIELD OPERATOR : B.BROWN
SURVEY DATE : 311285
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -1500.00
ELECTRODE 2 EASTING : 600.00

INSTRUMENTATION :

T1 TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL: 50 - 1550 msec

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34 points printed Computed on 1:37 PM MON., 17 FEB., 1986

99231

Processed for : CSR LIMITED - AMCD

Location : TASMANIA

Grid : (JOB NO.610)

xx Line ID 2 xx

231

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	CURRENT (ampere)	[illegible]
40	0	.17	0.00	3.00	1.25	250
40	25	.20	0.00	4.00	1.25	223
40	50	4.05	0.00	80.00	1.25	206
40	75	1.17	0.00	24.00	1.25	94
40	100	2.33	0.00	48.00	1.25	125
40	125	.47	0.00	10.00	1.25	-30
40	150	.21	0.00	4.00	1.25	22
40	175	.41	0.00	9.00	1.25	-1.8
40	200	.63	0.00	14.00	1.25	162

PARAMETERS :

LINE COVERAGE : LINE 40N FROM 00E TO 200E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 020186
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -650.00
ELECTRODE 2 EASTING : 1250.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL : 50 - 1550 msec

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9 points printed Computed on 1:37 PM MON., 17 FEB., 1986

9952232

Location : TASMANIA

Grid : (JOB NO.610)

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	CURRENT (ampere)	SELF POTENTIAL
44	-750	18.80	20.10	154.00	4.00	-13.
44	-725	15.90	8.80	134.00	4.00	306
44	-700	15.70	7.60	136.00	4.00	264
44	-675	13.80	9.60	122.00	4.00	73
44	-650	12.30	7.30	111.00	4.00	66
44	-625	10.15	6.80	94.00	4.00	-236
44	-600	7.06	3.25	66.00	4.00	-237
44	-575	5.56	5.03	52.00	4.00	-161
44	-550	3.41	0.00	33.00	4.00	-28.7
44	-525	1.30	0.00	13.00	4.00	22
44	-500	.27	0.00	3.00	4.00	74
44	-475	.06	0.00	1.00	4.00	35
44	-450	.14	0.00	1.00	4.00	-17
44	-425	.09	0.00	1.00	4.00	208
44	-400	.57	0.00	6.00	4.00	-30
44	-375	.41	0.00	4.00	4.00	-60
44	-350	.21	0.00	2.00	4.00	460
44	-325	.28	0.00	3.00	4.00	153
44	-300	.81	0.00	8.00	4.00	6.7
44	-275	2.30	38.00	21.00	4.00	728
44	-250	3.18	0.00	29.00	4.00	303
44	-225	3.90	19.25	35.00	4.00	123
44	-200	4.46	28.90	39.00	4.00	111
44	-175	4.80	36.90	40.00	4.00	130
44	-150	8.10	36.10	66.00	4.00	152
44	-125	21.50	13.70	171.00	4.00	18.6
44	-100	41.30	22.60	318.00	4.00	65
44	-75	52.90	28.30	394.00	4.00	417
44	-50	70.50	24.70	506.00	4.00	398
44	-25	95.10	18.60	656.00	4.00	327
44	0	101.50	22.40	673.00	4.00	322
44	25	87.70	23.40	557.00	4.00	64
44	50	61.40	30.50	373.00	4.00	311
44	75	13.00	21.40	76.00	4.00	512

PARAMETERS :

LINE COVERAGE : LINE 44N FROM 750W TO 75E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 311285
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -1500.00
ELECTRODE 2 EASTING : 600.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL : 50 - 1550 msec

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34 points printed Computed on 1:37 PM MON., 17 FEB., 1986

Processed for : USK LIMITED - HNCP

Location : TASMANIA

Grid : (JOB NO.610)

** Line ID 4 **

233

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	CURRENT (amperes)	[illegible]
44	0	1.18	16.70	[illegible]	[illegible]	[illegible]
44	25	.95	0.00	[illegible]	[illegible]	4.3
44	50	.61	0.00	10.00	1.75	-4.2
44	75	.13	0.00	2.00	1.75	-47.6
44	100	.08	0.00	1.00	1.75	-45
44	125	.09	0.00	2.00	1.75	-22.5
44	150	.12	0.00	2.00	1.75	39
44	175	.41	0.00	7.00	1.75	179
44	200	.56	0.00	10.00	1.75	205
44	225	.46	0.00	9.00	1.75	129
44	250	.48	0.00	9.00	1.75	34
44	275	.22	0.00	4.00	1.75	-98
44	300	.40	0.00	8.00	1.75	-60

PARAMETERS :

LINE COVERAGE : LINE 44N FROM 00E TO 300E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 020186
ELECTRODES NORTHING : 550.00
ELECTRODE 1 EASTING : -650.00
ELECTRODE 2 EASTING : 1250.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL : 50 - 1550 msec

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13 points printed Computed on 1:37 PM MON., 17 FEB., 1986

995234

Processed for : [illegible]

Location : TASMANIA

Grid : (JOB NO.610)

** Line ID [illegible] 5 **

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	CURRENT (ampere)	SELF POTENTIAL
48	-700	13.60	9.40	102.00	4.00	[illegible]
48	-675	10.50	9.30	81.00	4.00	-66
48	-650	8.80	9.02	70.00	4.00	-58
48	-625	8.24	10.90	67.00	4.00	-59
48	-600	8.16	10.76	68.00	4.00	-134
48	-575	9.70	9.80	82.00	4.00	-224
48	-550	12.37	13.60	107.00	4.00	-370
48	-525	11.50	16.10	100.00	4.00	-232
48	-500	10.00	8.90	88.00	4.00	-219
48	-475	5.40	11.50	48.00	4.00	-300
48	-450	1.10	0.00	10.00	4.00	-56
48	-425	.66	0.00	6.00	4.00	500
48	-400	.50	0.00	4.00	4.00	275
48	-375	.42	0.00	4.00	4.00	365
48	-350	.40	0.00	3.00	4.00	425
48	-325	.21	0.00	2.00	4.00	450
48	-300	.61	0.00	5.00	4.00	281
48	-275	1.12	0.00	9.00	4.00	113
48	-250	.96	0.00	8.00	4.00	47.6
48	-225	2.50	0.00	19.00	4.00	487
48	-200	2.76	26.50	21.00	4.00	6.1
48	-175	3.04	25.20	22.00	4.00	-22.6
48	-150	4.10	20.80	29.00	4.00	-34
48	-125	6.73	17.30	45.00	4.00	-14
48	-100	8.98	21.60	58.00	4.00	-43.3
48	-75	12.50	25.70	76.00	4.00	-51.9
48	-50	24.30	31.30	141.00	4.00	-35
48	-25	51.90	30.10	284.00	4.00	-5
48	0	75.80	29.70	391.00	4.00	8
48	25	97.50	25.40	471.00	4.00	58.6
48	50	128.20	23.10	597.00	4.00	122
48	75	139.40	23.50	585.00	4.00	85.4

PARAMETERS :

LINE COVERAGE : LINE 48N FROM 700W TO 75E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 221285
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -1500.00
ELECTRODE 2 EASTING : 600.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL : 50 - 1550 msec

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32 points printed Computed on 1:37 PM MON., 17 FEB., 1986

995235

[redacted] : TASMANIA

Grid : (JOB NO.610)

[redacted] ID [redacted]6

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	CURRENT (ampere)	SELF POTENTIAL
48	0	1.06	0.00	18.00	1.25	[illegible]
48	25	1.07	0.00	19.00	1.25	-45
48	50	.97	0.00	18.00	1.25	-68
48	75	.78	0.00	15.00	1.25	-75
48	100	.66	0.00	13.00	1.25	-43
48	125	.71	0.00	15.00	1.25	-29
48	150	.41	0.00	9.00	1.25	-1.2
48	175	.26	0.00	6.00	1.25	50
48	200	.30	0.00	7.00	1.25	-49
48	225	.55	0.00	13.00	1.25	-136
48	250	1.28	0.00	30.00	1.25	-12
48	275	1.45	0.00	34.00	1.25	-146
48	300	1.80	12.20	43.00	1.25	-161
48	325	1.68	13.90	40.00	1.25	-188
48	350	1.30	0.00	31.00	1.25	51
48	375	1.09	0.00	26.00	1.25	82
48	400	.83	0.00	20.00	1.25	100
48	425	.97	0.00	23.00	1.25	52
48	450	1.20	0.00	28.00	1.25	19
48	475	1.43	12.10	33.00	1.25	87
48	500	1.40	7.30	31.00	1.25	133
48	525	1.28	13.44	28.00	1.25	1077

PARAMETERS :

LINE COVERAGE : LINE 48N FROM 00E TO 525E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 090186
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -650.00
ELECTRODE 2 EASTING : 1250.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL : 50 - 1550 msec

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22 points printed Computed on 1:37 PM MON., 17 FEB., 1986

995236

Location : TASMANIA

Grid : (JOB NO.610)

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	CURRENT (ampere)	SELF POTENTIAL
52	-650	10.50	42.90	81.00	4.00	-35
52	-625	8.20	41.90	5.00	4.00	-18
52	-600	8.76	13.70	71.00	4.00	-55
52	-575	11.60	21.70	76.00	4.00	158.7
52	-550	12.90	15.30	108.00	4.00	-409
52	-525	11.60	14.30	99.00	4.00	-428
52	-500	11.10	10.30	95.00	4.00	-557
52	-475	4.48	9.50	39.00	4.00	-444
52	-450	2.70	11.60	23.00	4.00	-278
52	-425	1.64	0.00	13.00	4.00	261
52	-400	.46	0.00	4.00	4.00	604
52	-375	.47	0.00	4.00	4.00	959
52	-350	.59	0.00	5.00	4.00	556
52	-325	1.70	0.00	14.00	4.00	554
52	-300	1.36	0.00	11.00	4.00	118
52	-275	1.80	0.00	14.00	4.00	276
52	-250	1.40	0.00	11.00	4.00	-10.9
52	-225	1.95	0.00	15.00	4.00	172
52	-200	3.10	0.00	23.00	4.00	253
52	-175	3.10	0.00	22.00	4.00	614
52	-150	2.27	0.00	15.00	4.00	536
52	-125	3.92	14.90	25.00	4.00	-29.9
52	-100	4.25	18.50	26.00	4.00	-57
52	-75	5.23	18.97	30.00	4.00	-112
52	-50	8.80	24.10	48.00	4.00	-189
52	-25	14.90	18.40	77.00	4.00	-88
52	0	25.70	33.90	125.00	4.00	-5.5
52	25	37.00	49.00	167.00	4.00	264
52	50	90.00	22.90	377.00	4.00	145
52	75	144.60	38.80	559.00	4.00	651

PARAMETERS :

LINE COVERAGE : LINE 52N FROM 650W TO 75E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 231285
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -1500.00
ELECTRODE 2 EASTING : 600.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL : 50 - 1550 msec

30 points printed Computed on 1:37 PM MON., 17 FEB., 1986

995237

Processed for : CSR LIMITED - AMCD

Location : TASMANIA

Grid : (JOB NO.610)

** Line ID 8 **

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	CURRENT (ampere)	SELF POTENTIAL
52	0	3.50	10.20	46.00	1.50	-54
52	25	1.96	14.20	27.00	1.50	56
52	50	1.50	13.30	22.00	1.50	232
52	75	13.80	6.60	21.00	1.50	81
52	100	1.90	41.30	30.00	1.50	124
52	125	2.10	8.10	33.00	1.50	91
52	150	1.67	18.30	29.00	1.50	56
52	175	1.52	8.60	27.00	1.50	6
52	200	.86	0.00	16.00	1.50	-46
52	225	.97	7.40	18.00	1.50	-197
52	250	1.80	15.60	34.00	1.50	-151
52	275	1.88	22.60	36.00	1.50	-107
52	300	2.10	26.40	41.00	1.50	111
52	325	2.15	13.40	42.00	1.50	201
52	350	1.80	7.82	35.00	1.50	212
52	375	1.94	28.30	38.00	1.50	171
52	400	1.86	7.30	36.00	1.50	196
52	425	1.85	11.10	35.00	1.50	-101
52	450	1.77	15.70	33.00	1.50	-187
52	475	2.12	14.10	39.00	1.50	-14
52	500	3.41	23.60	61.00	1.50	-22
52	525	4.16	16.90	73.00	1.50	104
52	550	4.44	10.80	75.00	1.50	101

PARAMETERS :

LINE COVERAGE : LINE 52N FROM 00E TO 550E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 030186
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -650.00
ELECTRODE 2 EASTING : 1250.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUN EL MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL: 50 - 1550 msec

****

23 points printed Computed on 1:37 PM MON., 17 FEB., 1986

237

995238

Processed for : CSR LIMITED - AMCD

Location : TASMANIA

Grid : (JOB NO.610)

xxx [redacted] xxxx [redacted] xxx
xx Line ID 9 xx
xxxxxxxxxxxxxxxxxxx

238

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	[illegible] (amperes)	[illegible]
58	-600	10.29	8.10	84.00	4.00	[illegible]
58	-575	10.03	6.70	83.00	4.00	41.5
58	-550	11.06	7.40	93.00	4.00	40.3
58	-525	12.80	5.20	108.00	4.00	113
58	-500	10.53	11.10	90.00	4.00	126
58	-475	8.30	9.96	71.00	4.00	122
58	-450	4.46	0.00	38.00	4.00	127
58	-425	2.28	0.00	19.00	4.00	144
58	-400	.45	0.00	4.00	4.00	238
58	-375	.56	0.00	5.00	4.00	337
58	-350	.52	0.00	4.00	4.00	323
58	-325	.46	0.00	4.00	4.00	287
58	-300	.48	0.00	4.00	4.00	192
58	-275	.54	0.00	4.00	4.00	34
58	-250	.44	0.00	3.00	4.00	-22.6
58	-225	.63	0.00	5.00	4.00	-126
58	-200	.94	0.00	7.00	4.00	-110
58	-175	1.40	0.00	10.00	4.00	-50
58	-150	2.05	0.00	13.00	4.00	43
58	-125	3.22	0.00	20.00	4.00	88
58	-100	4.32	15.10	26.00	4.00	78
58	-75	4.56	12.06	26.00	4.00	206
58	-50	8.37	6.89	45.00	4.00	14
58	-25	13.30	5.20	67.00	4.00	297
58	0	15.10	6.55	71.00	4.00	85
58	25	16.40	5.42	72.00	4.00	-63
58	50	15.10	8.50	62.00	4.00	205
58	75	9.50	9.70	36.00	4.00	-28

PARAMETERS :

LINE COVERAGE : LINE 57.5N FROM 600W TO 75E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 231285
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -1500.00
ELECTRODE 2 EASTING : 600.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL: 50 - 1550 msec

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28 points printed Computed on 1:37 PM MON., 17 FEB., 1986

99239

Location : TA[redacted]NI[redacted]

Grid : (JOB NO.610)

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	[illegible] (ohm m)	[illegible]	[illegible]
58	0	8.80	18.60	[illegible]		
58	25	7.60	16.60	[illegible]	[illegible]	
58	50	4.30	15.30	71.00	1.25	12.2
58	75	1.59	8.80	30.00	1.25	-8
58	100	1.40	12.80	27.00	1.25	217
58	125	1.50	6.70	30.00	1.25	286
58	150	1.70	0.00	36.00	1.25	52
58	175	1.50	0.00	32.00	1.25	397
58	200	1.89	10.70	42.00	1.25	6
58	225	1.46	10.00	33.00	1.25	-83
58	250	1.33	13.20	31.00	1.25	328
58	275	.74	0.00	17.00	1.25	-92
58	300	.16	0.00	4.00	1.25	-53
58	325	.16	0.00	4.00	1.25	6
58	350	.02	0.00	1.00	1.25	-34
58	375	.22	0.00	5.00	1.25	-131
58	400	1.06	0.00	25.00	1.25	-229
58	425	2.04	0.00	47.00	1.25	-132
58	450	3.49	16.20	80.00	1.25	-145
58	475	7.02	13.50	158.00	1.25	73
58	500	7.08	14.30	155.00	1.25	-5
58	525	5.50	12.60	118.00	1.25	-236

PARAMETERS :

LINE COVERAGE : LINE 57.5N FROM 00E TO 525E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 090186
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -650.00
ELECTRODE 2 EASTING : 1250.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL : 50 - 1550 msec

****

22 points printed Computed on 1:37 PM MON., 17 FEB., 1986

239

995240

[redacted]

Grid : (JOB NO.610)

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	CURRENT (ampere)	SELF POTENTIAL
60	-550	8.24	19.90	21.00	4.00	[illegible]
60	-525	10.90	14.60	[illegible]	4.00	[illegible]
60	-500	10.30	7.71	92.00	4.00	-299
60	-475	10.59	8.60	95.00	4.00	153
60	-450	8.80	12.20	79.00	4.00	285
60	-425	2.98	0.00	27.00	4.00	403
60	-400	3.08	0.00	28.00	4.00	750
60	-375	1.70	0.00	15.00	4.00	576
60	-350	1.21	0.00	11.00	4.00	500
60	-325	1.69	0.00	17.00	4.00	413
60	-300	8.51	0.00	7.00	4.00	288
60	-275	.71	0.00	6.00	4.00	75.1
60	-250	2.05	0.00	17.00	4.00	-40.3
60	-225	1.68	0.00	13.00	4.00	-25.6
60	-200	.62	0.00	5.00	4.00	-47.6
60	-175	1.30	0.00	10.00	4.00	-73.2
60	-150	.20	0.00	1.00	4.00	569
60	-125	.60	0.00	4.00	4.00	151
60	-100	1.00	0.00	7.00	4.00	157.5
60	-75	1.57	0.00	10.00	4.00	167.8
60	-50	2.15	0.00	13.00	4.00	163.6
60	-25	5.64	8.40	32.00	4.00	355
60	0	8.69	16.89	47.00	4.00	159.3
60	25	16.88	8.03	87.00	4.00	141
60	50	19.44	9.82	94.00	4.00	164
60	75	20.10	14.35	91.00	4.00	600

PARAMETERS :

LINE COVERAGE : LINE 60N FROM 550W TO 75E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 241285
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -1250.00
ELECTRODE 2 EASTING : 600.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL: 50 - 1550 msec

****

26 points printed Computed on 1:37 PM MON., 17 FEB., 1986

240

995241

Location : TASMANIA

Grid : (JOB NO.610)

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	CURRENT (ampere)	SELF POTENTIAL
60	0	2.27	10.10	33.00	1.50	[illegible]
60	25	4.43	8.9[illegible]	48.00	[illegible]	-386
60	50	4.75	16.20	76.00	1.50	-226
60	75	4.70	11.80	78.00	1.50	-41
60	100	4.50	13.20	78.00	1.50	1.8
60	125	1.96	6.09	35.00	1.50	182
60	150	1.63	0.00	30.00	1.50	422
60	175	1.49	0.00	28.00	0.00	452
60	200	1.56	16.50	30.00	1.50	-26
60	225	1.40	0.00	28.00	1.50	88
60	250	1.31	0.00	26.00	1.50	-75
60	275	1.37	0.00	28.00	1.50	75
60	300	.93	0.00	19.00	1.50	220
60	325	1.10	0.00	23.00	1.50	87
60	350	1.09	0.00	22.00	1.50	154
60	375	1.50	0.00	31.00	1.50	-85
60	400	2.20	6.80	45.00	1.50	1.8
60	425	3.91	3.16	79.00	1.50	303
60	450	2.26	6.50	45.00	1.50	-125
60	475	7.43	7.00	145.00	1.50	-124
60	500	9.25	8.80	177.00	1.50	309
60	525	8.30	13.10	155.00	1.50	446

PARAMETERS :

LINE COVERAGE : LINE 60N FROM 00E TO 525E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 030186
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -650.00
ELECTRODE 2 EASTING : 1250.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL : 50 - 1550 msec

****

22 points printed Computed on 1:47 PM MON., 17 FEB., 1986

241

995242

Location : TASMANIA

Grid : (JOB NO.610)

****
** [redacted] ID [redacted] 3 ** [redacted]
****

242

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	CURRENT (ampere)	SELF POTENTIAL
64	-500	11.70	11.50	114.00	4.00	51
64	-475	10.55	14.10	103.00	4.00	35
64	-450	8.60	8.80	84.00	4.00	35.4
64	-425	5.40	9.30	55.00	4.00	42.1
64	-400	5.04	0.00	49.00	4.00	36
64	-375	4.64	0.00	45.00	4.00	61.6
64	-350	3.48	0.00	33.00	4.00	44.6
64	-325	3.03	0.00	29.00	4.00	59.2
64	-300	1.46	0.00	14.00	4.00	42.1
64	-275	1.70	0.00	16.00	4.00	24.4
64	-250	1.23	0.00	11.00	4.00	44.6
64	-225	1.09	0.00	10.00	4.00	160.5
64	-200	.76	0.00	7.00	4.00	-39
64	-175	.74	0.00	6.00	4.00	57.4
64	-150	.43	0.00	4.00	4.00	135
64	-125	.33	0.00	3.00	4.00	146
64	-100	.70	0.00	5.00	4.00	163
64	-75	.61	0.00	5.00	4.00	603
64	-50	.60	0.00	4.00	4.00	370
64	-25	.58	0.00	4.00	4.00	56
64	0	.44	0.00	3.00	4.00	173
64	25	.50	0.00	3.00	4.00	-142
64	50	2.76	13.90	17.00	4.00	-339
64	75	9.90	6.04	58.00	4.00	-149.5

PARAMETERS :

LINE COVERAGE : LINE 64N FROM 500W TO 75E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 291285
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -1500.00
ELECTRODE 2 EASTING : 600.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL : 50 - 1550 msec

****

24 points printed Computed on 1:37 PM MON., 17 FEB., 1986

995243

Location : TASMANIA

Grid : (JOB NO.610)

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	COMPENT (milliamps)	[illegible]
64	0	1.50	7.60	25.00	[illegible]	
64	25	.85	14.10	15.00	[illegible]	[illegible]
64	50	1.02	30.10	18.00	1.50	-358
64	75	1.90	14.10	35.00	1.50	-170
64	100	3.30	12.60	63.00	1.50	208
64	125	3.47	10.25	68.00	1.50	-268
64	150	3.05	14.90	62.00	1.50	549
64	175	1.72	0.00	35.00	1.50	-101
64	200	.02	0.00	.50	1.50	-97.7
64	225	.88	0.00	19.00	1.50	368
64	250	.37	0.00	8.00	1.50	131
64	275	.27	0.00	6.00	1.50	119
64	300	.24	0.00	5.00	1.50	-90
64	325	.53	0.00	12.00	1.50	63
64	350	1.69	0.00	37.00	1.50	353
64	375	2.10	0.00	46.00	1.50	316
64	400	1.90	0.00	42.00	1.50	546
64	425	1.65	0.00	36.00	1.50	410
64	450	1.70	0.00	37.00	1.50	565
64	475	.37	0.00	8.00	1.50	735
64	500	1.22	0.00	25.00	1.50	-239
64	525	2.95	19.16	60.00	1.50	-390
64	550	2.48	21.00	50.00	1.50	-359
64	575	6.11	26.50	119.00	1.50	-45
64	600	5.53	17.30	105.00	1.50	215

PARAMETERS :

LINE COVERAGE : LINE 64N FROM 00E TO 600E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 070186
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -650.00
ELECTRODE 2 EASTING : 1250.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL : 50 - 1550 msec

****

25 points printed Computed on 1:37 PM MON., 17 FEB., 1986

243

995244

Location : TASMANIA

Grid : (JOB NO.610)

** Line ID 15 **

GRID NORTH	GRID EAST	PRIMARY VOLTAGE	TOTAL CHARGEABILITY	RESISTIVITY (ohm m)	CURRENT (ampere)	SELF POTENTIAL
68	-450	6.46	2.88	70.00	4.00	53
68	-425	5.14	8.30	56.00	4.00	-19
68	-400	8.30	0.00	91.00	4.00	5
68	-375	6.02	0.00	66.00	4.00	-35
68	-350	4.30	0.00	47.00	4.00	-31.7
68	-325	4.08	0.00	44.00	4.00	-22.6
68	-300	3.67	0.00	39.00	4.00	-39
68	-275	3.03	0.00	32.00	4.00	-54
68	-250	2.69	0.00	28.00	4.00	-40
68	-225	1.50	0.00	16.00	4.00	-6.7
68	-200	.86	0.00	9.00	4.00	65.3
68	-175	1.30	0.00	13.00	4.00	366
68	-150	.56	0.00	6.00	4.00	-53.7
68	-125	.38	0.00	4.00	4.00	-133.7
68	-100	.09	0.00	1.00	4.00	-78
68	-75	.09	0.00	1.00	4.00	-34.8
68	-50	.59	0.00	5.00	4.00	-142
68	-25	.03	0.00	.03	4.00	-185
68	0	.43	0.00	4.00	4.00	-655
68	25	1.70	5.52	14.00	4.00	-169
68	50	8.53	2.90	70.00	4.00	361
68	75	9.90	4.10	79.00	4.00	863

PARAMETERS :

LINE COVERAGE : LINE 68N FROM 450W TO 75E
FIELD OPERATOR : P.BROWN
SURVEY DATE : 291285
ELECTRODES NORTHING : 52.00
ELECTRODE 1 EASTING : -1500.00
ELECTRODE 2 EASTING : 600.00

INSTRUMENTATION :

TRANSMITTER : HUNTEC MK IV 7.5kW
RECEIVER : HUNTEC MK IV
TIMING : 2 sec ON 2 sec OFF
DELAY TIME : 50 msec
CHANNELS : 0-9 150 msec
CHARG. TOTAL : 50 - 1550 msec

****

22 points printed Computed on 1:37 PM MON., 17 FEB., 1986

244

995245

[redacted] at[redacted] [redacted] T[redacted]ANI[redacted] [redacted] [redacted] [

995247

APPENDIX XIV

CARBINE AREA

GEOPHOTO DRILLING - DDH-CW1, DDH-CW2

GEOCHEMISTRY

CARBINE AREA

GEOPHOTO DRILL CORE ANALYSES

Sample No.	Hole	Depth	Cu	Pb	Zn	Ni	Bi	Sn	W	As	Sb	Ba	Ag	Au	Rock
A161929	CW1	170'-174'	60	44	100	145	x	6	x	20	6	240	x	x	slst/sh
930	CW1	174'-181'	105	90	340	470	x	8	x	85	12	85	x	x	metadolerite
931	CW1	181'-187'	36	22	110	420	x	x	x	7	x	15	x	x	metadolerite
932	CW1	187'195'6"	32	8	75	870	x	x	x	2	6	160	x	x	metadolerite
933	CW1	195'6-202'6"	125	450	2350	240	x	18	x	32	20	175	1	x	graphitic sh
934	CW1	202'6"-210'	60	420	2050	190	x	10	x	24	4	210	x	x	graphitic sh
938	CW2	310'-321'	30	14	200	120	x	6	x	7	8	80	x	x	metadolerite
939	CW2	321'-333'	30	12	200	100	x	x	x	5	x	95	x	x	metadolerite
940	CW2	333'-345'	55	6	135	75	x	x	x	8	10	260	x	x	metadolerite
941	CW2	345'-354'	34	42	610	240	x	10	x	8	10	40	x	x	metadolerite
942	CW2	354'-378'	18	940	3950	180	x	24	10	x	10	85	1	x	metadolerite + sh
943	CW2	404'-402'	12	270	620	210	x	10	x	6	8	50	x	x	metadolerite
944	CW2	420'-430'	55	10	145	90	x	x	x	6	4	80	x	x	metadolerite

Analyses by Comlabs using:

Cu Pb Zn Ni Bi by AAS 1

Sn W As Sb Ba by XRF 1

Ag by AAS 3

Au by FAS 1

995245

995219

APPENDIX XV

CARBINE GRID

GEOPHOTO DRILLING - DDH-CW1, DDH-CW2

PETROLOGY

995200

SAMPLE LOCATIONS

Sample No.	Drill Hole No.	Depth
A161935	CW-1	479'6"
A161936	CW-2	314'0"
A161937	CW-2	394'0"
A161945	CW-2	427'0"
A161946	CW-1	114'0"
A161948	CW-1	305'0"
A161949	CW-1	191'6"

250

995251

MINPET SERVICES
659 Botany Road
ROSEBERY, N.S.W.

REPORT NO. 19/86

'DUNDAS' GROUP SEDIMENTS AND INTRUSIVES FOR PETROGRAPHIC DESCRIPTION

(prepared for Mr. P. Ellis,
CSR Limited, Tasmania)

March 1986

995252

CONTENTS

		PAGE NO.
1.	INTRODUCTION	1
2.	SUMMARY	2
3.	PETROGRAPHIC DESCRIPTIONS	5
4.	REFERENCES	21

APPENDICES

I	CSR LIMITED, MINERALS DIVISION ORDER NO. 44472 DATED 18TH FEBRUARY 1986
II	CSR LIMITED FIELD SAMPLE DESPATCH SHEET 10160 DATED 19TH FEBRUARY 1986
III	FURTHER DISCUSSION ON STRATIGRAPHIC POSITION OF SPECIMENS.

995253

1. INTRODUCTION

Eight drill-core specimens A161935 to A161948, were submitted for petrographic description. Structure, relationship, origin, genesis and mineralisation were required.

One specimen only was polished for identification of sulphides and possible gold - A161947.

2. SUMMARY

A161935 Carbonaceous mudstone or shale, thinly bedded, brecciated and sheared. Fissures were filled by chlorite from compacted chloritised sediment. Later cut by quartz and carbonate veins; the former were sheared.

A161936 Porphyritic metadolerite with brown hornblende and plagioclase phenocrysts. Hornblende altered to actinolite through regional metamorphism; a more calcic plagioclase was altered to oligoclase. Traces of allanite with pleochroic halos occur in hornblende (ex-pyroxene).

A161937 Mudstone (tuffaceous?) show microturbidites as rhythmic sedimentary sequences of graded silt to fine sand. Abundant illite and chlorite are present. Minor pyrite occurs.

A161945 Coarse metadolerite or metagabbro. Metamorphosed gabbro resulted in a less calcic plagioclase and an amphibolitised pyroxene. Strongly sericitised, chloritised and carbonatised, via veins.

A161946 Tuffaceous(?) mudstone with calcareous silt bands, rhythmic graded silt:carbonate beds.

A161947 Carbonaceous mudstone, strongly sheared, graded clay and silt bands. Strongly graphitic and with about 5 vol.% pyrite as scattered syngenetic framboids and vein pyrite. The latter contains a pinkish isotropic mineral as inclusions - Cubanite II, Ramdohr. No gold is seen.

A161948 Porphyritic quartz microdiorite of hornblende and plagioclase. Chloritised and sericitised. Pyrite has partly replaced leucoxene after ilmenite. Biotite is largely fresh.

A161949 Quartz:sericite:carbonate breccia with ribbon-type mylonite; pyrite:sphalerite in sheared veins and 'stylolites'. Brecciated metasediment?

/....

Specimens are members of the Cambrian, Dundas series. Mainly mudstones with graded siltstone beds. Strongly dynamometamorphosed. Intrusives are unreported in the Dundas Group except for plugs of microdiorite and microgranite at Macquarie Harbour (thomson, in the 'Economic Geology of Australia and P.N.G.' 1. Metals, edited by Knight (1975)].

1) Structural Similarities

A161935 Strongly sheared, brecciated, quartz then carbonate veined.+ pyrite

A161936 Brecciated; quartz then carbonate veined.

A161937 Brecciated; cherty quartz vein, carbonate:chlorite.

A161945 Brecciated; quartz ± feldspar vein → chlorite vein → carbonate vein.

A161946 Shear → moderate brecciation.
i) Vein, quartz:pyrite.
ii) Vein, chlorite:carbonate.
iii) Vein, carbonate.

A161947 Shear → weak cross brecciation.
Vein 1, Quartz.
Vein 2, Carbonate.
Further shear.

A161949 Brecciation → i) Quartz vein.
ii) Chlorite vein (sheared).
a) Cataclasis.
b) Mylonitisation.

A161949 Brecciation.
i) Quartz vein - weak.
ii) Carbonate - strong veining.

(a)	Mudstones	A161935, 46 and 47 - similarly sheared, brecciated.
(b)	Intrusives	A161936, 45 and 48 - show similar cross brecciation and shear.
(c)	Metasediment?	A161949 - very strongly brecciated and carbonatised - identity unconfirmed.

2) Relationships

(a) Similarities between A161935 and 47 as similar carbonaceous mudstones.

/

(b) Tuffaceous mudstones - A161946 and A161937. Compositionally and structurally similar but A161937 contains sandy bands; and A161946 where 'coarse' fraction is quartz silt.

3) Origin

Mudstones vary from anoxic carbonaceous sediments to shallower water undisturbed microturbidites. Deposited in the Dundas Trough with a hinterland of low tectonic activity. The intrusives identified were introduced (as plugs?) after consolidation and lithification of sediments.

4) Gold

No identifiable gold in the only specimen where a polished section was prepared - A161947. The pink very fine inclusions in intrusive pyrite are of unknown identity. These inclusions would have to be microprobed for definite identification. Could be Cubanite II.

3. PETROGRAPHIC DESCRIPTIONS

.. Sample No. A161935/MPS 4032

Petrographic Summary: A thinly bedded mudstone of chlorite, illite and graphite or a shale metasediment. The carbonaceous mudstone was brecciated, veined and sheared into coarse and fine fragments. Chlorite derived from sediment moved into fissures after compaction. Cross-cut by later quartz then by carbonate veins. Veins of quartz present are sheared.

Mineralogy:	Vol.%
Graphite	7
Illite	21
Chlorite	40
Quartz (vein)	20
Carbonate (vein)	12

Veins: (1) Quartz; (2) Carbonate + pyrite

Texture: Finely bedded chlorite:illite sediment with thin carbonaceous rich bands and lenticles (0.05 mm wide) alternate with clear, fine illite:chlorite intermixtures. After compaction and consolidation the metasediment was brecciated into coarse (to 20 x 10 mm) to fine (1.5 mm) fragments. The cross fractures (from 0.03 to 3 mm wide and variable) were filled with pure fibrous chlorite that was subsequently cut across by quartz vein. The quartz in broad fissures is of medium sand size. Grains show brecciation and complex sutured contacts due to stress. Quartz vein was cut by veins of later carbonate of large plates that commonly fill the width of the vein.

In parts of the section, quartz is seen to have been strongly brecciated and sheared to form gneissic patterns normal to the vein axis. Rolling of consolidated bedded chlorite:illite fragments has resulted in circular encapsulation by narrow carbonate and chlorite fissure-fill. Thin stringers of cherty quartz fill numerous fine cross-fractures to the metasediment.

Alteration:

a) Thin cherty silicification emanated along beds of chlorite:illite from cross-cutting quartz indicate some replacement of chlorite:illite.

b) Similar emanations from carbonate vein - more certain replacement.

Metamorphism: Compaction, strongly sheared, then strongly brecciated, veined.

.. Sample No. A161936/MPS 4033

Petrographic Summary: Porphyritic metadolerite of subophitic growths of brown hornblende and plagioclase phenocrysts with interstitial finer hornblende and plagioclase intergrowths now altered to actinolite and oligoclase, respectively. Strongly brecciated with introduction of carbonate and with less chlorite along fractures.

Mineralogy:	Vol.%
Plagioclase (oligoclase)	62
Actinolite	7
Chlorite	3
Carbonate	12
Hydromuscovite	4
Iron oxides	6
Quartz	3
Leucoxene	2
Allanite	1
Zircon	<1

Veins: 1) Quartz; 2) Carbonate.

Texture: A porphyritic metadolerite that shows abundant iron oxide precipitation, consists of randomly disposed, stressed twinned plagioclase laths (~ 0.3 x 0.1 mm) often marginally embedded in large plagioclase phenocrysts (to 2.4 x 1.0 mm) due to metamorphic growth. Plagioclase shows a subophitic relationship with subhedral, stressed actinolite of a pale green to bluish-green hue, consisting of fine laths and porphyritic size grains (1.6 x 0.6 mm) similar to plagioclase. Actinolite laths commonly have relict brownish hornblende centres surrounded by actinolite margins. Otherwise, hornblende contains grains of rectangular allanite (~ 0.06 x 0.03 mm) with dense brownish halos. Carbonate alteration of plagioclase follows the perimeters of carbonate vein system of breccia-fill and appear to be strongly associated with fine black wad-like metallic oxides that stain the feldspars patchily and hornblende laths densely along cleavage planes. Minor chlorite is associated with carbonation of feldspars.

/....

Alteration: Pyroxene(?) → brown hornblende → actinolite + iron oxides ± chlorite or carbonate.

More calcic plagioclase → oligoclase + carbonate.

Metamorphism: Strong dislocation brecciation and introduction of carbonate with less chlorite.

Sample No. 161937/MPS 4034

Petrographic Summary: Mudstone (tuffaceous?) microturbidite sequences of silt to fine sand quartz with illite and leucoxene. Presence of chlorite and exsolved leucoxene suggest former presence of biotite and in silty bands a little plagioclase breccia is present. Apparent tuffaceous turbiditic beds in mudstones of quiescent deposition with fine syngenetic pyrite growth. Shallow trough (lagoonal?) deposition of fine sediments.

Mineralogy (vol.%):	Clay Bands	Sandy Bands
Quartz	1	20*
Illite	51	22
Muscovite	-	2
Leucoxene	10	15
Carbonate	-	5
Chlorite	30	30
Plagioclase	-	2
Pyrite	4	4

Veins (1) Cherty quartz; (2) Carbonate:chlorite.

* Includes fine chert.

Texture: Broad bands of very fine illite:leucoxene:chlorite as a homogeneous intermixture of mineral intergrowths, contain appreciable framboidal forms of fine pyrite. Occasionally the pyrite as groups have segregated into bands or into transbedded narrow fissures containing illite, possibly ex mudcracks(?). Sharply transgressive dilating narrow veins contain carbonate, or carbonate with selvages of chlorite; chlorite or exceptionally chert follow approximate trigonal patterns of intersection.

Apart from the finely bedded sediment described above are interbands (0.7 to 2.5 mm) of quartz breccia (to 0.3 mm) embedded in abundant fine clay, intermixtures of chert, chlorite and illite and fine intergranular carbonate; all grains are of clay to silt size. Also present are rare subrounded clear

cherts (0.4 x 0.16 mm). In some finer sandy bands, a clear graded bedding upwards into clay beds is portrayed. Elsewhere, the graded bedded sequence is disturbed by brecciation and contains fine fissile quartz and wedges of clear clay (chlorite and illite). Microfaulting of silt:sand beds is noted. Occasional large (0.4 mm) quartz erratics occur in clay beds.

Alteration: Biotite → chlorite of tuffaceous beds.

Metamorphism: Moderate to strong dislocation and breccia fill. Gash fractures with sweated (chlorite?) and carbonate.

Sample No. A161945/MPS 4035

Petrographic Summary: Metadolerite (or metagabbro), regionally metamorphosed with resulting decrease in calcic component of plagioclase; amphibolitisation of pyroxene minerals(?). Strong sericitisation, chloritisation and carbonatisation (with pyrite) followed brecciation. Cross-cutting veins are quartz, carbonate and chlorite.

Mineralogy:	Vol.%
Plagioclase (original plagioclase ~60 vol.%)	32
Leucoxene	8
Chlorite	19
Actinolite	2
Illite	15
Kaolinite	2
Carbonate (calcite)	20
Pyrite	2

Vein sequence and alteration: (1) Quartz ± feldspar → sericite; (2) Carbonate + pyrite; (3) Chlorite.

Texture: A coarse grained random texture of partly albitised and otherwise altered plagioclase laths (0.16 x 0.4 to 3 x 0.6 mm, median 1.2 x 0.5 mm) as intergrowths where only fine albite plagioclase twinning remains that indicate an oligoclase composition (confirmed by mineral stain technique). Elsewhere, plagioclase is massively altered to fine platelets of illite in mosaics of the mineral or feldspar is totally carbonatised except for patchy chlorite distribution. Also carbonatised, since a relict fibrous amphibole texture remains, are radiate growths of actinolite; elsewhere occur unaffected blue-green actinolite, and later fine fibrous green chlorite with carbonate. This shows replacement of an earlier ferromagnesian mineral (pseudomorphed crystal shapes are not distinct) and locally replaced plagioclase is seen.

Large altered ilmenite rhombs are scattered through the section as skeletal forms of leucoxene following the lattice

planes of ilmenite grains. Coarse pyrite replacement of ilmenite/leucoxene followed the carbonate:chlorite alteration phase. Pyrite occurs in all silicate phases as replacement but to a less extent than with ilmenite.

Coarse carbonate in gash veins (0.2 to 0.6 mm width) has partly followed rare narrow quartz veins (0.12 mm wide) which was in turn followed by chlorite. Sericitisation flanks narrow quartz vein (± feldspar now altered).

Alteration:
Sericitisation, strong in places.
Carbonatisation + chlorite - very strong.

Metamorphism: Hornblende (after pyroxene?) → actinolite (regional).

Dislocation with subsequent veining → alteration.

.. Sample No. A161946/MPS 4036

Petrographic Summary: Tuffaceous(?) mudstone microturbidite with calcareous silt bands. Brecciated, veined by quartz: pyrite, chlorite:carbonate and carbonate veins.

Mineralogy (vol.%):	(a)*	(b)*
Quartz	2	15
Illite	46	40
Muscovite	-	-
Leucoxene	15	10
Carbonate	15	varies 15 to 30
Chlorite	20	20 to 5
Pyrite	2	-

Veins: (1) Quartz:pyrite; (2) Chlorite:carbonate with chlorite selvage; (c) Carbonate.

* (a) Clay bands; (b) Silt bands.

Texture: Similar to A161937 but with a fine and better sorted silty quartz in coarser grained bands.

Bands of (a) and (b) sediment are sharply differentiated; they alternate and vary in thickness (0.08 to 4.8 mm) and are displaced only in places of post-consolidation microfaulting.

In the clay bands, fine blebby chlorite and illite ($\sim$0.006 mm wide) and more irregular carbonate blebs make up most of the beds and all minerals are intermixed with dispersed fine microcrystalline leucoxene or leucoxene aggregates.

Chlorite:illite ratios vary along bands to give an appearance of lighter and darker alternate thin bands.

In horizons of (a), thin silty bands as fine microturbidites grade into clay beds. The clays of beds (a) show a substitution of fine carbonate for much of the chlorite in A161937 clay beds which also contain scattered quartz silt forms.

Otherwise in grain size variations and texture the clay beds of both sections are identical. Irregular fractures (to 0.5 mm wide) contain an abundance of coarser (than in beds) flakey chlorite, silt quartz and tiny rotund carbonate grains. Narrow carbonate veins with inclusions of silt quartz cut across the chlorite:carbonate:quartz vein. Earlier fine quartz veins contain minute spheres of pyrite and pyrite aggregates. Towards the top of beds (a), size of clay and chlorite bleb-like flocculates increase somewhat, more silt quartz is included and there is an increase in carbonate at the expense of chlorite. The top of (b) bed to upper next (a) bed is sharp. Sediment shows a sequence of microturbidite successions.

Microfaulting of beds and attentuation of chlorite:carbonate fractures may indicate the latter to be sweated gash veins of mineral material squeezed from the beds. Tension fractures contain quartz and irregular fine fracture networks contain thin chlorite.

Alteration: Chlorite → carbonate replacement.

Metamorphism: Compaction → shear → dislocation and sweating into tension fractures of chlorite and carbonate.

Note: Abundance of leucoxene suggests former presence of biotite (now illite and leucoxene); probably tuffaceous.

Sample No. A161947/MPS 4037

Petrographic Summary: Strongly sheared mudstone, strongly graphitic and chloritic contains an abundance of fine cherty quartz, particularly in augen forms and also dispersed fine acicular illite. Veining includes vein breccia of pyrite and quartz and carbonate gash type veins that dilated and attenuated through overall stress. Pyrite is mainly framboidal, and is syngenetic with sediment.

Mineralogy:	Vol.%
Quartz	20
Carbonate	3
Graphite	12
Chloritic clay	40
Illite	20
Pyrite	5
Magnetite	<1

Texture: Carbonaceous mudstone of fine grain. Consists of sheared clay-rich lenticles associated with an abundance of fine cherty quartz and quartz aggregates. Quartz occurs as ovoid augen and fragmental forms, varies in grain size, 0.04 to 0.2 x 0.15 mm, as irregular quartz mosaics, ex-vein augen forms. The fine sediment shows flow patterns due to shear where quartz is either scarce or fine grained; and brecciation along quartz-rich bands shows subparallel augen to 0.6 x 0.16 mm, that contain minimal clay and graphite and are separated by thin laminae of graphitic clay. Graphite also appears as networks of fine blebs and lenticles intermingled with clays separating augen breccia forms. Quartz-rich augen contain quartz fragments, fine sheared clays and graphite matrix and alternatively consist of fine cherty quartz or occur as coarse irregular quartz in mosaics, as fragmented quartz vein. Rotation of some sheared fragments is indicated by perpendicular orientation of bedding/shear planes. Sulphides retain crystal shapes; illite is present as acicular moderately birefringent flakes, as stellate growths and flakes mostly

oriented parallel to shear, though many are almost perpendicular to shear planes. Chloritic clay is very fine in fibrous aggregates, green where coarse chlorite in augen but mostly associated with graphite and forms the main matrix mineral.

Alteration: Carbonate veins do not penetrate into sediment. Quartz veins show brecciation and incorporation into rock 'bedding'.

Metamorphism: Strong shear, cross brecciation and veining; veins (1) quartz; (2) carbonate, followed by further shear.

Incident Light Examination: Sulphides present are largely pyrite (up to 0.15 x 0.10 mm), euhedral, subhedral and fragmentary. Larger pyrite grains contain lobate forms (0.016 x 0.006 mm, 0.0012 mm) of isotropic orange-yellow particles*, softer than surrounding pyrite.

Pyrite is scattered throughout the sediment as fine framboidal forms (0.001 to 0.02 mm) but only vein pyrite as quartz:pyrite breccia contain the minute orange-yellow inclusions.

Framboids formed early before consolidation and later diagenetic fill by later pyrite, appear rarely as raspberry-like aggregates.

Occasional pyrite nucleation has occurred around magnetite grains. Coarse pyrite other than that from veins occurs as massive diagenetic growths of framboidal pyrite.

* Possibly cubanite (Ref. 3).

.. Sample No. A161948/MPS 4038

Petrographic Summary: Porphyritic quartz microdiorite of hornblende and plagioclase, now altered to chlorite and to andesine and sericite respectively. Texture between minerals is very strongly interlocking. Other minerals of porphyritic dimensions are quartz and biotite. Pyrite replacement of ilmenite and leucoxene is apparent.

Mineralogy:	Vol.%
Primary	
Plagioclase (andesine)	39
Biotite	4
Quartz	4
Hornblende	50
Magnetite/ilmenite	3
Secondary	
Oligoclase	15
Sericite	20
Chlorite	57
Quartz	4
Leucoxene	4
Quartz veinlets	

Texture: An interlocking texture of medium size grains. Primary texture is difficult to confirm because of strong alteration. However large flakes of biotite (0.08, 0.16 x 0.32 mm, etc.), including residual grains, are altered to a brown-green ragged chlorite. Hornblende shapes (0.23 x 0.28, 0.23 x 0.16 mm etc.) are easy to spot in plain subdued light, and in the interstices, occur finer hornblende laths. All are totally chloritised. Plagioclase (0.5 x 0.15 mm, 0.16 x 0.10 mm, etc.) and smaller interstitial laths show strong interlocking intergrowths which may be easily seen between plagioclase and quartz where quartz intergrowth forms are well preserved; also growths between hornblende and plagioclase have a tendency to be 'granophyric'. One exceptionally large plagioclase crystal form (4.4 x 3 mm) is totally

sericitised. Ilmenite as rhomb-shaped crystals (0.04 to 0.5 mm) occur now as skeletal forms of iron oxide and leucoxene residua along crystal lattice planes and filling the smaller ilmenite forms. Where structures are filled with biotite or chlorite, and rubbly iron oxides, forms are amphibole shaped and are probably pseudomorphed hornblende laths.

Small amounts of pyrite have replaced leucoxene in 'ilmenite' structures.

Alteration:

Plagioclase → sericite ± chlorite.
Hornblende → chlorite ± iron oxides/leucoxene.
Ilmenite → leucoxene → pyrite.
Biotite → chlorite.

) Hydrothermal propylitic - strong.

Metamorphism: Dislocation, narrow fractures are filled with quartz. Strongly sheared chlorite flakes. Dynamometamorphic changes are overprinted by some hydrothermal activity.

.. Sample No. A161949/MPS 4039

Petrographic Summary: Quartz:sericite:carbonate breccia with a ribbon mylonite texture in both carbonate and quartz component. Veins of quartz:pyrite:sphalerite are strongly sheared and dismembered.

Mineralogy:	Vol.%
Sericite	7
Carbonate*	65
Quartz	18
Chlorite	5
Sphalerite	3
Pyrite	2

Sphalerite, pyrite and quartz - 'stylolitic' forms but the result of strong compaction:solution prior to shear?

* Ferroan calcite (Dickson).

Texture: A strongly brecciated and sheared carbonate:quartz metasediment. The quartz occurs as intergrowths of embedded fibrous sericite in quartz breccia. Quartz in carbonate often shows mylonitic ribbon texture, due to crushing and intense plastic deformation. Distribution of the quartz in mylonitised sediment is erratic. Where quartz occurs with sheared iron oxides it could be present as deformed vein forms. Between the 'mosaics' of quartz with sericite growth are clear granular carbonate mosaics in networks. Veins of sphalerite and pyrite that transected specimen have been brecciated, finely sheared and dismembered.

Using reduced polarised light, the strong brecciation and abundant ribbon texture are seen to occur consistently over much of the section.

Thin chlorite occupies fractures (to 0.16 mm wide) containing sphalerite and pyrite breccia. The chlorite is very finely sheared along fractures.

/....

Alteration:

a) Carbonatisation of quartz structures - moderate.

b) Chloritisation - weak.

Metamorphism: Dynamometamorphic with brecciation - cataclasis and mylonitisation - weak.

4. REFERENCES

DICKSON, J.A.D.

"A Modified Staining Technique for Carbonates in Thin Section". 'Nature', 6th February 1965.

THOMSON, B.P.

"Tasman Geosyncline in South Australia, Kanmantoo Trough - Regional Geology". Economic Geology of Australia and P.N.G. 1 Metals.
The Aus. Inst. of Mining & Metallurgy - 1975.

RAMDOHR, P.

"The Ore Minerals and their Intergrowths", 2nd Edition. Volume 2. Pergamon Press, 1980.

APPENDIX I

274

995275

1 O'CONNELL STREET
SYDNEY AUSTRALIA
BOX 483 GPO
SYDNEY AUSTRALIA 2001
TELEPHONE (02) 237 5111
TELEX AA20285
CABLE 'CSRMINDIV' SYDNEY

PURCHASE ORDER

44472

MINPET SERVICES
659 BOTANY ROAD
ROSEBERY NSW 2018

PLEASE SUPPLY TO AND ADDRESS ANY COMMUNICATION OR INVOICE TO:

CSR Limited, Minerals Division

Date 18/2/86
R.A./Pros. No. 7602
Project Code
Account No.
CEA

No.	Quantity	Description	Unit Price	Total Price
	9	PREPARE THIN SECTION OF ENCLOSED DRILL CORE SAMPLES (NOTE: SOME MAY CONTAIN GRAPHITE)	$12-$17.50	$108-$157.50
	9	DESCRIBE THE THIN SECTIONS Note (1) any structural similarities between the rocks (2) relationship of rocks (3) origin of rocks (4) any Au or sulphides in graphitic rock See Field Sample Despatch Sheet 10160 for sample No's	$38.00	$342

DELIVERY INSTRUCTIONS INVOICE & RESULTS TO: CSR LTD M.E.D. GROUP 10 O'CONNELL ST, SYDNEY $ MAX $500-00

RETURN THIN SECTIONS & FRAGMENTS TO CSR LTD 35 EAST DERWENT H'WAY, LINDISFARNE TAS 7015

CONDITIONS

1. Please show Purchase Order Number on all invoices, packages, packing slips.
2. Please note that liability is accepted only for goods purchased on our official purchase orders.
3. The supplier or contractor by his acceptance of this order also accepts the conditions on the back. These conditions shall prevail over and cancel any conditions specified by the supplier or contractor, there shall be no exception to these provisions except by mutual agreement between the parties, evidenced in writing.

WHITE COPY – SUPPLIERS COPY
YELLOW COPY – ATTACH TO INVOICE
PINK COPY – TO SYDNEY OFFICE
BLUE COPY – PURCHASING OFFICER COPY
BUFF COPY – PROSPECT LEADER COPY

SALES TAX (EXEMPTIONS AND CLASSIFICATIONS) ACT.

I hereby certify that the above goods are for use in the mining industry in carrying out mining operations and in the treatment of the products of those operations and exemption is claimed under Item 14 in the First Schedule.

For and on behalf of
CSR LIMITED
INCORPORATED IN N.S.W.

APPENDIX II

276 Division

995217

FIELD SAMPLE DESPATCH SHEET

10160

State TASMANIA Project DUNDAS Prospect No. 760Z Locality

CSR Order No. 64472 Date Sampled FEB 86 Sampler PDE/REW

Date Despatched 19/2/96 Despatcher PDE Despatched per SKYROADS

Type of Sample DRILL CORE FOR THIN SECTION

Lab. Name MIN PET SERVICES

Sample Number Co-ordinates	From E/W	To N/S	Chemical Analyses (ppm or %)					Remarks
A161935								
936								
937								
A161945								
946								
947								
948								
949								

Instructions to Analyst: Prepare 4 thin sections of each (NOTE - GRAPHITE IN SOME)

Describe the thin sections with structure, relationships, origin, genesis, mineralisation.

RESULTS & INVOICE TO : CSR LTD M.E. & D. Group 1 O'CONNELL ST SYDNEY NSW 2001

RESULTS & THIN SECTIONS etc TO CSR LTD 35 EAST DERWENT H'WAY LINDISFARNE TAS 7015

Results to

DISBURSEMENT Pink – To Chief Geologist Sydney White – To Assay Lab with Order Green – Despatch with Samples

APPENDIX III

APPENDIX TO REPORT 19/86

Following a telephone conversation with Mr. R. Williams on the afternoon of Friday, 4th April 1986, concerning :-

1) nature of carbon associated with sediments of Specimen A161935, and
2) the exact stratigraphic position of the specimen suite submitted for determination;

further work was done on the prepared thin sections.

There appear to be no further cleavages after the first (i.e. there are no crenulation cleavages), and following brecciation where present was apparently quite random and fractures were ultimately filled with vein material or sweated groundmass minerals (e.g. chlorite).

With Specimen A161935, fine fragments of carbonaceous matter (largely graphite? but including unmetamorphosed kerogen) have formed thin regularly spaced carbon-rich and carbon-poor bands of illite, chlorite and silty quartz. No framboidal pyrite is detectable in the thin section, though there is a little pyrite with carbonate in a vein.

Therefore it would appear that the graphitic sediments are just typical black shale sediments as seen in the base metal belts (Mt. Isa, McArthur River, Sullivan, B.C. are the extent of my experience). In some specimens such as A161935 there has been a higher level of metamorphism than seen at Mt. Isa and particularly at McArthur River, but not too different from that at Sullivan.

In point of fact framboidal pyrite is common in Specimen A161947 where a polished section was prepared and pyrite framboids are seen to be very fine along the bedding.

The intrusives present in the suite of specimens were (in order):-

Metadolerite	A161931
Metagrabbro (or coarse metadolerite)	A161945
Quartz microdiorite	A161948

/....

The metasediments:-

Black shale or carbonaceous mudstone(±) syngenetic pyrite, tuffaceous, microturbiditic	A161937
Tuffaceous mudstone - silt, clays, carbonate beds	A161946
Black shale or tuffaceous carbonaceous mudstone, graded beds, framboidal pyrite.	A161947
Quartz:sericite:carbonate breccia (metasediment?) cataclased, mylonitised.	A161945

According to Brown, Campbell and Crook (p.60), "The lowermost part of the Dundas Group consists of argillaceous - slates, mudstones and shales with important chert and pyroclastic units". They then state that the latter pass upwards into greywacke, conglomerate and with argillite above. There is no reference there to Oonah Formation below the Dundas Group.

Thomson (Ore Deposits of Australia & P.N.G., Metals I) indicated gabbro intrusives into Crimson Creek Argillite below the Dundas Group, and (p.568) states that the quartzites of the Success Creek Group merge upwards into shale with possible pyroclastic bands (c.f. current specimen suite) of the Crimson Creek Group (note, if characteristic reds and greens of sediments in the drill core?). Other lithologies not present in the submitted suite are lithic wacke and basalt.

Comparison with the Dundas Group is made very briefly in the main report (MPS 19/86) and there is also a broad correlation between the described lithologies and those discussed by Thomson though this appears to be weaker than with the Crimson Creek Argillites.

This discussion was produced in a hurry without much in the way of detailed stratigraphic reference to do a good job of correlation. My Tasmanian reference library is pretty well non-existent.

Quite frankly it appears to me that you don't have Oonah Formation represented by the suite of specimens submitted for petrography. There is insufficient deformation except possibly in bottom most specimen A161945 where sequence of deformation is not clear.

/....

REFERENCES

THOMSON, B.P.

'Kanmantoo Trough - Regional Geology and Comments on Mineralisation'. Economic Geology of Australia and P.N.G., 1 Metals. Pub. The Australian Institute of Mining & Metallurgy.

BROWN, D.A., CAMPBELL, K.S.W. & CROOK, K.A.W.

'The Geological Evolution of Australia and N.Z.'
Pergamon Press, 1969

APPENDIX XVI

EWARTS CREEK GRID

"WACKER" BEDROCK GEOCHEMISTRY

282 CSR Limited
Minerals Division

995283

Correspondence to: THE CHIEF GEOLOGIST BOX 483 GPO
SYDNEY NSW 2001. TELEPHONE (02) 237 5111

FIELD SAMPLE DESPATCH SHEET

13095

State TASMANIA Project DUNDAS Prospect No. 7607 Locality EWARTS CREEK GRID

CSR Order No. 44466 Date Sampled DEC 85/JAN 86 Sampler PDE/NP

Date Despatched 22/1/86 Despatcher PDE Despatched per SKYROADS

Type of Sample WEATHERED BEDROCK WACKER

Lab. Name CEMLABS

Sample Number Co-ordinates	From	To	Chemical Analyses (ppm or %)									Remarks
			Cu	Pb	Zn	Bi	Ag	Sn	As	Sb	Ba	
A213251	LINE 1	14250E	36	12	70	x	x	x	10	x	340	3·8m
252		14250E	36	20	50	4	x	6	6	4	380	14·8m
253		14500E	16	14	55	4	x	2	5	4	320	6·3.
254		14750E	14	8	55	4	x	6	8	4	320	5·2.
255		15000E	16	8	75	4	x	8	7	6	190	21·6
256		15250E	12	14	20	6	x	x	12	x	75	19·6m
257		15500E	32	16	75	x	x	6	4	6	370	5·0.
258		15750E	34	16	65	x	x	4	10	x	420	6·8.
259		16000E	36	18	85	x	x	8	9	x	320	14·2
260		16250E	30	28	55	4	x	4	14	8	470	5·5.
261		16500E	36	14	60	4	x	x	14	6	420	4·8m
262		16750E	24	10	60	6	x	6	4	x	360	3·2.
263		17000E	36	34	70	4	x	10	8	x	370	3·6m
264		17250E	44	22	70	4	x	12	12	10	300	2·5.
265		17500E	14	14	38	4	x	8	10	4	250	1·8m
266		17750E	34	18	60	x	x	x	18	4	450	0·8.
267		18000E	38	18	80	x	x	8	14	8	470	7·3m
268		15250E	16	12	65	4	x	6	6	4	320	4·6m
269	LINE 2	14750E	2	12	36	12	x	x	4	x	60	10·0
270		15000E	7	14	95	8	x	8	5	6	180	2·6
271		15250E	4	8	60	8	x	8	14	6	30	1·8.
272		15500E	9	14	12	12	x	10	6	4	165	0·1.
273		15750E	5	4	12	6	x	8	7	4	95	0·3
274		16000E	8	12	48	8	x	x	12	10	60	12·5
275		16250E	46	240	115	2	1	14	26	8	310	9·6
276		16500E	60	75	18	4	x	6	8	x	220	0
277	LINE 3	15750E	10	24	44	8	x	4	16	x	90	9·7.
278	[illegible]	16000E	5	22	55	6	x	4	2	x	80	11·2
279		16250E	6	16	16	10	x	2	6	8	95	13·1m
280		16500E	34	24	75	4	x	12	14	x	360	16·5.
281		16750E	8	32	140	6	x	x	14	x	85	24·0m
282		17000E	6	x	10	10	x	x	6	x	60	15·5m
283		17250E	4	65	140	6	x	x	20	x	90	6·6m
284	STD	16	3	x	2	x	x	137	x	x	10	
285	STD	6	170	8	125	26	x	12	10	6	37	
286	LINE 3	17500E	32	16	26	4	x	14	22	6	300	10·6m
287		15500E	10	14	60	6	x	6	10	4	185	9·6m
288	LINE 4	16000E	24	350	600	6	x	x	16	8	380	20·3m
289		16250E	12	32	40	10	x	x	20	6	940	10·3.
290		16500E	10	22	68	8	x	4	10	4	120	6·7m

Instructions to Analyst: PULVERIZE ALL SAMPLES, ANALYSE for Cu, Pb, Zn, Bi by AAS 1, Ag by AAS-3 and Sn, As, Sb, Ba by XRF-1

RESULTS + INVOICE TO CSR LTD MET DEPT GPO BOX 483 SYDNEY NSW 2001

RESULTS TO CSR LTD 35 EAST DERWENT HWAY, LINDISFARNE, TAS, 7015

Results to:

DISBURSEMENT Pink — To Chief Geologist Sydney White — To Assay Lab with Order Green — Despatch with Samples

CSR Limited
Minerals Division

995284

Correspondence to: THE CHIEF GEOLOGIST BOX 483 GPO
SYDNEY NSW 2001. TELEPHONE (02) 237 5111

FIELD SAMPLE DESPATCH SHEET

13096

State TASMANIA Project DONAS Prospect No. 7602 Locality QUARTZ CREEK GRID

CSR Order No. 4446C Date Sampled DEC 85/JAN 86 Sampler PDE/HP

Date Despatched 22/1/86 Despatcher PDE Despatched per SKYROADS

Type of Sample WEATHERED BEDROCK WALKER

Lab. Name LEACHLABS

Sample Number Co-ordinates	From	To	Chemical Analyses (ppm or %)					Remarks				
			Cu	Pb	Zn	Bi	Ag	Sn	As	Sb	Ba	
A213291	LINE 4	1675E	6	14	18	12	x	6	5	4	65	23.2m
292		1700E	10	28	95	8	x	6	9	6	140	13.6m
293		1725E	5	4	7	4	x	10	4	6	40	15.4m
294		1725E	2	4	2	x	x	6	2	x	15	16.0m
295		1750E	34	55	85	6	x	x	6	x	270	25.8m
296		1775E	50	50	95	6	x	24	5	6	250	25.4m
297		1800E	50	220	350	6	x	6	14	8	200	27m
298		1825E	48	50	85	4	x	6	16	4	240	21.7m
299	STD	5	95	12	110	24	x	10	16	10	360	
A213300	STD	8	12	6	30	6	1	4	75	x	290	
A761851	LINE 4	1850E	60	32	44	6	x	6	9	8	330	24.3m
852		1875E	28	12	80	4	x	8	4	x	350	11.4m
853		1900E	85	24	85	4	x	4	6	6	310	7.1m
854		1925E	22	16	44	x	x	4	12	x	320	10.1m
855		1950E	60	28	110	4	x	x	7	x	490	11.0
856	LINE 3	1900E	10	22	135	10	x	8	9	x	470	11.0m
857	LINE 5	1550E	6	8	38	12	x	x	5	4	55	7.8m
858		1575E	7	10	20	10	x	4	6	x	95	9.0m
859		1600E	22	60	70	6	x	x	20	8	180	14.3m
860		1625E	4	6	40	12	x	x	4	x	30	17.1m
861		1650E	18	14	28	8	x	6	8	x	165	19.5
862		1675E	55	36	110	x	x	x	10	4	195	16.3
863		1700E	55	40	100	4	x	x	14	6	270	18.7
864	LINE 6	1625E	26	60	175	x	x	x	10	x	252	14.3
865		1650E	9	30	20	x	x	6	4	x	260	14.3
866		1675E	24	36	75	x	x	8	30	x	170	18.4m
867		1700E	26	30	44	4	x	4	9	6	220	22.5m
868	LINE 7	1500E	18	18	50	4	x	6	4	4	250	12.8m
869	STD	19	30	6	24	4	x	x	50	20	330	
870	LINE 7	1525E	14	30	170	4	x	4	30	4	155	15.5m
871		1550E	20	70	440	4	x	x	22	4	400	24.0m
872	LINE 8	1450E	20	16	115	x	x	6	7	6	280	15.7m
873		1475E	18	14	150	4	x	12	7	x	320	11.0m
874		1500E	40	38	170	x	x	10	30	6	220	12.2m
875		1525E	40	38	155	4	x	4	28	4	190	12.8m
876	LINE 9	1425E	16	22	300	x	x	8	10	6	270	11.2
877		1450E	32	6	26	x	x	14	6	6	80	2.2m
878		1450E	10	18	85	x	x	4	3	x	270	14.8m
879		1475E	6	12	6	x	x	6	9	8	75	13.2m
880		1500E	12	16	24	x	x	6	60	6	35	9.4m

Instructions to Analyst: See FIELD SAMPLE DESPATCH SHEET 13095

Results to:

DISBURSEMENT Pink — To Chief Geologist Sydney White — To Assay Lab with Order Green — Despatch with Samples

CSR Limited
Minerals Division

995285

Correspondence to: THE CHIEF GEOLOGIST BOX 483 GPO
SYDNEY NSW 2001. TELEPHONE (02) 237 5111

FIELD SAMPLE DESPATCH SHEET

13097

State TASMANIA Project DUNDAS Prospect No. 7602 Locality QUARTZ CREEK GRID

CSR Order No. 44660 Date Sampled DEC 85/JAN 86 Sampler PDE/NP

Date Despatched 22/1/86 Despatcher PDE Despatched per SKYROADS

Type of Sample WEATHERED BEDROCK WACKER

Lab. Name CAMLABS

Sample Number Co-ordinates	From E/W	To N/S	Chemical Analyses (ppm or %) Cu	Pb	Zn	Bi	Ag	Sn	As	Sb	Remarks Ba	
A16/881	LINE 9	1525E	16	22	34	x	x	6	65	6	60	8·2n
882		1550E	40	46	175	4	x	6	30	8	240	11·8n
883	LINE 10	1325E	16	36	200	x	x	8	14	4	260	14·3n
884		1350E	6	16	7	4	x	x	10	4	95	8·9n
885		1375E	6	18	6	x	x	10	7	4	185	10·7n
886	[illegible]	1400E	30	18	32	x	x	12	6	x	210	14·5n
887		1425E	55	28	60	6	x	9	9	6	250	9·7n
888	LINE 11	1175E	60	18	46	x	x	x	7	4	240	7·7n
889			-	-	-	-	-	-	-	-	-	
890	LINE 13	975E	60	24	70	x	x	4	14	8	300	4·7n
891		950E	55	8	80	6	x	6	10	4	350	5·9n
892		925E	42	22	46	4	x	6	7	4	135	9·8n
893		900E	65	22	80	8	x	8	9	8	230	5·0n
894		775E	65	26	85	4	x	8	12	8	220	5·8n
895		750E	55	28	120	4	x	6	20	12	270	9·8n
896		725E	18	46	65	6	x	8	9	x	110	13·3n
897		700E	16	14	26	10	x	x	9	x	120	12·0n
898		675E	8	14	10	10	x	x	12	16	75	7·3n
899		650E	38	46	160	4	x	x	14	x	230	8·4n
900		625E	14	22	55	8	x	4	12	6	120	6·2n
901		600E	12	12	30	8	x	x	5	x	135	6·0n
902	LINE 7	1575E	32	50	175	4	x	x	24	16	380	18·3n
903		1600E	16	16	22	4	x	4	9	x	100	17·4n
904		1625E	70	38	100	x	x	4	5	x	300	23·7n
905		1650E	55	36	105	6	x	x	10	4	270	22·2n
906		1675E	65	30	90	4	x	x	8	6	360	22·5n
907		1700E	65	28	100	4	x	x	9	x	340	23·4n
908		1725E	70	42	115	6	x	14	12	x	250	21·6n
909		1750E	36	18	55	6	x	12	3	8	240	21·5n
910		1775E	55	50	195	4	x	8	22	8	260	18·9n
911		1800E	70	28	80	6	x	x	12	10	220	21·0n
912		1825E	80	60	170	6	x	6	12	x	320	19·0n
913		1850E	70	60	165	4	x	x	5	4	260	18·6n
914		1875E	70	50	160	6	x	12	12	x	250	20·6n
915		1900E	70	44	145	4	x	x	10	x	320	21·0n
916		1925E	70	40	145	4	x	8	6	4	250	18·8n
917		1950E	65	32	115	4	x	4	10	x	240	19·0n
918		1975E	65	48	140	4	x	6	14	4	230	18·6n
919		2000E	30	105	140	8	x	4	32	8	145	15·7n
920	ROAD 145	INTERSECTION	60	16	70	x	x	8	13	4	260	17·0n

Instructions to Analyst: See FIELD SAMPLE DISPATCH SHEET 13095

Results to:

DISBURSEMENT Pink – To Chief Geologist Sydney White – To Assay Lab with Order Green – Despatch with Samples

285 ..ision 995286

Correspondence to: THE CHIEF GEOLOGIST BOX 483 GPO SYDNEY NSW 2001. TELEPHONE (02) 237 5111

CSR

FIELD SAMPLE DESPATCH SHEET

13098

State TASMANIA Project DUNDAS Prospect No. 76C2 Locality EVANS CREEK GRID

CSR Order No. 44466 Date Sampled DEC 85/JAN 86 Sampler PDE/NP

Date Despatched 22/1/86 Despatcher PDE Despatched per SKYROADS

Type of Sample WEATHERED BEDROCK WACKE

Lab. Name COMLABS

Sample Number Co-ordinates	From E/W	To N/S	Chemical Analyses (ppm or %) Cu	Pb	Zn	Bi	Ag	Sn	As	Sb	Ba	Remarks
A161921	ROAD 12.5	30m E.	70	20	75	4	x	10	6	x	270	21.5A
922	· STD	5	100	10	95	24	x	10	14	x	400	
923	· STD	6	165	8	120	26	x	6	10	6	310	
924	· STD	14	5	x	x	4	x	970	x	8	10	
925	· STD	6	170	10	125	24	x	14	12	8	320	
926	· STD	13	5	x	2	4	x	470	x	x	x	
927	· STD	6	170	12	125	30	x	6	10	8	320	
REMAINDER												
A213278 A	STD	5	100	14	115	26	1	8	14	x	340	
A161886A	STD	5	100	12	120	26	x	4	14	10	410	

Instructions to Analyst: See FIELD SAMPLE DESPATCH SHEET 13095

Results to:

DISBURSEMENT Pink – To Chief Geologist Sydney White – To Assay Lab with Order Green – Despatch with Samples

APPENDIX XVII

RAZORBACK WEST GRID

"WACKER" BEDROCK GEOCHEMISTRY

CSR Limited
Minerals Exploration and Development Group

995288

Correspondence to: THE CHIEF GEOLOGIST
Box 483, G.P.O.
Sydney, N.S.W. 2001
Telephone: (02) 235 8333

FIELD SAMPLE DESPATCH SHEET

17038

Project No. 7602 Project Name DUNDAS - RAZORBACK WEST Date Required 30/6/86

Date Despatched 12/6/86 Despatcher P.D. ELLIS Despatched per ANSETT

CSR Order No. 44487 Consignment No. E759234

Lab Name COMLABS

Preparation Method PULVERISE TOTAL SAMPLE (PREP 4)

Element(s)/Method Cu, Pb, Zn, Mi, Bi: AAS1 As, Ba, Sn, W: XRF1. Ag: AA S3

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A1843777		BR		536480ON366225E		
3778		"		STD 14 200E		
3779		"		175E		
3780		"		150E		
A1621810		"		536440ON366850E		
1811		"		825E		
1812		"		800E		
1813		"		775E		
1814		"		750E		
1815		"		725E		
1816		"		700E		
1817		"		STD 11 675E		
1818		"		650E		
1819		"		625E		
1820		"		600E		
1821		"		575E		
1822		"		550E		
1823		"		525E		
1824		"		500E		
1825		"		475E		
1826		"		STD 12 450E		
1827		"		536400ON366625E		
1828		"		600E		
1829		"		575E		
2010		CL	ST	STD GX6 [illegible]		
A1622251		BR		536400ON366550E		
2252		"		525E		
2253		"		500E		
2254		"		475E		
2255		"		450E		
2256		"		425E		
2257		"		650E		
2258		"		STD 16 675E		
2259		"		700E		
2260		"		725E		
2261		"		750E		
2262		"		775E		
2263		"		800E		
2264		"		825E		
2265		CL	ST	STD GX14		

DISBURSEMENT: WHITE to Assay Laboratory with order PINK

CSR Limited
Minerals Exploration and Development Group

995289

Correspondence to: THE CHIEF GEOLOGIST
Box 483, G.P.O.
Sydney, N.S.W. 2001
Telephone: (02) 235 8333

FIELD SAMPLE DESPATCH SHEET

17039

Project No. 7602 Project Name _____ Date Required / /

Date Despatched / / Despatcher _____ Despatched per _____

CSR Order No. 44487 Consignment No. _____

Lab Name _____

Preparation Method _____

Element(s)/Method SEE FIELD SAMPLE DESPATCH SHEET 17038

CSR SAMPLE NUMBER	FIELD NUMBER	SAMPLE TYPE	CONTROL TYPE	SAMPLE DESCRIPTION	ORIGINAL NUMBER	SAMPLE WEIGHT SUBMITTED
A16226		CL	ST	STD GX16		
A16293		CL	BL	SAND		
2946		CL	BL	SAND		
2945		BR		536490ON366875E		
2946		"		850E		
2947		"		825E		
2948		"		800E		
2949		"		775E		
3010		"		750E		
A18423 0		"		725E		
2311		"		700E		
2312		"		675E		
2313		"		650E		
2314		"		625E		
2315		"		600E		
2316		"		575E		
2317		"		550E		
2318		"		525E		
2319		"		500E		
2410		"		475E		
2411		"		450E		
2412		"		425E		
2413		"		400E		
2414		"		375E		
2415		"		350E		
2416		"		325E		
2417		"		300E		
2418		"		275E		
2419		"		250E		
2510		CL	ST	STD GX16		

DISBURSEMENT: WHITE — to Assay Laboratory with order. PINK — to Computer Services YELLOW — to Head Office filing

289

995290

COMLABS SERVICES PTY. LTD.

305 South Road, Mile End South, South Australia 5031 Telephone (08) 43 5722 Telex LABCOM AA89323

COM860895

44487

Mr. Peter Ellis
CSR Minerals Limited
35 East Derwent Highway
LIDISFARNE

TAS 7015

June 27, 1986

Dear Peter

RE: JOB COM860895

Enclosed are the assays for the samples delivered to our laboratory on June 13, 1986

Yours Sincerely,
COMLABS PTY LTD

per :

P R Shaw

c.c.: CSR - Sydney No. of copies : 1

Report Length 28 pages

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995291

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ANALYTICAL REPORT

JOB COM860895
O/N : 44487

SAMPLE	Cu	Pb	Zn	Ni	Bi	Ag	
							Regolith List 5364800N
A 184377	12	24	290	140	22	<1	225
A 184378	65	26	125	100	22	<1	200
A 184379	75	30	250	140	30	<1	175
A 184380	70	22	140	100	22	<1	150
A 162180	34	26	95	100	22	<1	5364400 N 850E
A 162181	46	24	125	80	16	<1	825E
A 162182	26	18	70	55	20	<1	800
A 162183	40	10	650	185	6	<1	
A 162184	38	360	1950	70	26	<1	
A 162185	12	220	910	42	12	<1	
A 162186	7	75	280	10	120	<1	
A 162187	7	44	90	12	110	<1	[illegible]
A 162188	8	30	24	8	105	<1	
A 162189	10	145	520	20	80	<1	
A 162190	9	28	70	12	75	<1	
A 162191	7	44	130	10	85	<1	
A 162192	7	50	34	12	75	<1	
A 162193	7	24	14	6	120	<1	
A 162194	6	26	32	10	95	<1	
A 162195	30	85	150	65	12	<1	
A 162196	5	10	14	10	<4	<1	[illegible]
A 162197	18	85	185	38	12	<1	
A 162198	24	140	600	26	14	<1	
A 162199	6	85	195	10	130	<1	
A 162200	145	20	125	42	32	<1	STD 6
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1	AAS3	

995292

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ANALYTICAL REPORT

JOB COM860895
O/N : 44487

SAMPLE	Cu	Pb	Zn	Ni	Bi	Ag	
A 162251	9	26	5	10	75	<1	5364000N 550E
A 162252	4	24	4	8	110	<1	525E
A 162253	12	36	80	32	12	<1	
A 162254	8	36	60	20	55	<1	
A 162255	10	190	2050	30	50	<1	
A 162256	5	155	980	8	85	<1	
A 162257	20	100	610	40	<4	<1	
A 162258	5	38	55	16	85	<1	
A 162259	14	470	3150	190	8	2	
A 162260	18	210	950	34	22	1	
A 162261	28	540	5350	310	10	<1	
A 162262	75	22	330	100	10	<1	
A 162263	44	12	140	50	10	<1	
A 162264	46	36	150	50	<4	<1	
A 162265	2	4	6	<4	<4	<1	STD 14
A 162266	3	6	<2	<4	<4	<1	STD 16
A 162293	2	6	16	<4	<4	<1	BLANK
A 162294	2	6	22	<4	<4	<1	BLANK
A 162295	65	48	115	36	<4	<1	5364800N 875E
A 162296	48	20	175	85	8	<1	850
A 162297	40	16	150	75	4	<1	
A 162298	26	20	170	110	16	<1	
A 162299	65	14	75	42	8	<1	
A 162300	22	18	175	110	12	4	
A 184230	80	24	140	80	8	<1	
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	
SCHEME	AAS1	AAS1	AAS1	AAS1	AAS1	AAS3	

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ANALYTICAL REPORT

JOB COM860895
O/N : 44487

SAMPLE	Cu	Pb	Zn	Ni	Bi	Ag	
A 184231	38	22	135	75	<4	<1	
A 184232	150	20	165	115	10	<1	
A 184233	65	16	200	85	12	<1	
A 184234	34	18	135	75	6	<1	
A 184235	48	14	85	50	<4	<1	
A 184236	170	14	105	90	10	<1	
A 184237	26	18	200	130	10	<1	
A 184238	65	20	145	50	14	<1	
A 184239	24	135	430	46	18	<1	
A 184240	8	260	1900	85	40	3	
A 184241	14	150	820	160	32	2	
A 184242	7	42	210	65	60	1	
A 184243	7	44	200	14	85	<1	
A 184244	5	36	160	10	100	<1	
A 184245	16	370	1850	90	55	4	
A 184246	7	48	260	16	65	<1	
A 184247	90	390	810	190	10	<1	
A 184248	7	50	160	10	60	<1	
A 184249	20	140	530	60	30	<1	
A 184250	3	4	14	<4	<4	<1	STD 16.

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ANALYTICAL REPORT

JOB COM860895
O/N : 44487

SAMPLE	As	Ba	Sn	W
A 184377	22	270	6	15
A 184378	6	230	4	25
A 184379	3	155	<4	<10
A 184380	7	220	<4	15
A 162180	7	220	<4	15
A 162181	5	155	8	30
A 162182	2	80	6	25
A 162183	28	35	4	20
A 162184	3	230	4	25
A 162185	42	105	<4	10
A 162186	5	30	4	15
A 162187	8	65	10	25
A 162188	5	70	<4	15
A 162189	18	80	<4	15
A 162190	4	100	6	10
A 162191	4	80	<4	10
A 162192	8	70	<4	15
A 162193	2	35	<4	<10
A 162194	6	65	12	15
A 162195	30	580	6	30
A 162196	6	55	6	10
A 162197	20	260	6	25
A 162198	10	300	8	25
A 162199	8	45	8	10
A 162200	10	450	12	115
UNITS	ppm	ppm	ppm	ppm
SCHEME	XRF1	XRF1	XRF1	XRF1

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ANALYTICAL REPORT

JOB COM860895
O/N : 44487

SAMPLE	As	Ba	Sn	W
A 162251	8	85	4	<10
A 162252	<2	40	<4	<10
A 162253	18	380	10	20
A 162254	16	170	<4	10
A 162255	20	115	<4	20
A 162256	<2	40	<4	<10
A 162257	32	230	<4	30
A 162258	12	25	<4	20
A 162259	<2	160	6	25
A 162260	26	195	<4	20
A 162261	40	240	<4	35
A 162262	16	250	4	25
A 162263	12	260	<4	15
A 162264	9	260	<4	15
A 162265	2	20	990	20
A 162266	6	15	1.49%	65
A 162293	4	45	<4	25
A 162294	4	40	4	25
A 162295	4	80	4	20
A 162296	7	175	6	25
A 162297	7	170	6	10
A 162298	8	130	4	20
A 162299	10	120	<4	25
A 162300	10	180	<4	10
A 184230	7	180	<4	15
UNITS	ppm	ppm	ppm	ppm
SCHEME	XRF1	XRF1	XRF1 XRF2	XRF1

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ANALYTICAL REPORT

JOB COM860895
O/N : 44487

SAMPLE	As	Ba	Sn	W
A 184231	4	190	<4	10
A 184232	7	175	10	25
A 184233	4	115	6	35
A 184234	8	130	4	10
A 184235	6	170	<4	15
A 184236	3	95	<4	15
A 184237	2	145	6	25
A 184238	4	175	<4	15
A 184239	10	290	8	20
A 184240	18	180	<4	30
A 184241	16	145	8	45
A 184242	4	75	8	15
A 184243	3	65	4	20
A 184244	2	80	4	15
A 184245	48	165	6	15
A 184246	<2	135	<4	25
A 184247	20	330	12	10
A 184248	9	155	14	10
A 184249	10	260	6	15
A 184250	5	15	1.45%	70

995297

APPENDIX XVIII

EL 15/76 - DUNDAS

REGIONAL SAMPLES - THIN SECTION PETROLOGY

995298

THIN SECTIONS

CSR No.	P. Kitto No.	Sheet Location	Comments
A213179	RB2	RAZORBACK	Razorback Mine Dump
A213180	A101	MISERY	
A213181	A156	RAZORBACK	
A213182	CH145	CARBINE	
A213183	B90	MISERY	
A213184	A76	RAZORBACK	
A213185	D130	DUNDAS	
A213186	D170	DUNDAS	
A213187	D324	DUNDAS	
A213188	D182	DUNDAS	
A213189	CH26	CARBINE	
A213190	B141	MISERY	
A213191	B220	MISERY	
A213192	B154	MISERY	
A213193	D265	DUNDAS	
A213194	SCM2	DUNDAS	South Comet Mine Dump
A213195	MDC	CARBINE	Montezuma Road outcrop of Maestries Dolomitic Conglomerate
A213196	A122	MISERY	
A213197	D403		
A213198	A64	MISERY	
A213199	CH15	CARBINE	
A213200	CH36	CARBINE	
A213231	D378	DUNDAS	
A213232	CH27	CARBINE	
A213233	A163	CARBINE	
A213234	D332	DUNDAS	
A213235	CH204A	CARBINE	
A213236	D11	DUNDAS	

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MINERALOGICAL REPORT NO. 4720
by A.C. Purvis PhD

12th March, 1986

TO:	Mr. Peter Ellis, CSR Limited, Minerals Division, 35 East Derwent Highway, LINDISFARNE, TASMANIA 7015
YOUR REFERENCE:	Field Sample Despatch Sheet 13100 CSR Order No. 44462 (part)
MATERIAL:	Thin sections provided
IDENTIFICATION:	A213174 to A213200 A213231 to A213236
WORK REQUESTED:	Descriptions, summary comments
THIN SECTIONS:	Returned to you with this report

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INTRODUCTION

The 28 thin sections submitted were divided into a number of lithological groups as listed below, and the individual descriptions are presented in this order, as shown.

GROUP 1 : POLYMICT SMALL PEBBLE CONGLOMERATES (angular to subrounded clasts)

RB1 : A213179
A101 : A213180
D130 : A213185
B141 : A213190
D265 : A213193
B200 : A213191

GROUP 2 : LESS POLYMICT CONGLOMERATES WITH PREDOMINANT CHERT OR CARBONATE CLASTS

SCM2 : A213194
MDC : A213195
D403 : A213197
CH36 : A213200

GROUP 3 : CLEAN QUARTZ SANDSTONE-QUARTZITE-DOMINATED LITHOLOGY

B90 : A213183
D324 : A213187
D182 : A213188

GROUP 4 : GREYWACKES - ARGILLITE SUITE

CH145 : A213182
A76 : A213184
CH26 : A213189
B154 : A213192
A122 : A213196

GROUP 5 : SILTSTONE-GRAPHITIC SHALE FACIES

A64 : A213198
CH15 : A213199
D378 : A213231
CH27 : A213232
A163 : A213233
D322 : A213234

GROUP 6 : MISCELLANEOUS ROCK TYPES

D170 : A213186 pyrite in massive, patchy (?hydrothermal) quartz-sericite

A156 : A213181 acid, crystal vitric tuff

CH204A: A213235 glassy tholeiitic basalt

D11 : A213236 schistose, ultramafic serpentinite

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INTRODUCTION (continued)

It is understood that these samples of sedimentary, and rare crystalline rocks are from the Dundas Trough area of Tasmania.

The following summary on the petrography includes comments in that context. However, no details of stratigraphic , or any other field representation were given to the author, therefore the interpretations given in the summary are based entirely on the petrographic evidence; with any extensions suggested being highly speculative.

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SUMMARY COMMENTS

As noted in the introduction, the 28 rocks described in this report are grouped into six different facies, although transitional characteristics occur in some of the rocks, and characteristics linking samples in different facies together are obscured.

The conglomerates are of two main types -

polymict, mostly clastic sediment-(siltstone, claystone)- derived conglomerates (Group 1);

oligomict, with mostly chert-derived clasts (Group 2), but this group includes a dolomite-clast conglomerate (A213195).

A quartz-sandstone-clast-dominated conglomerate (A213191) also has minor claystone and basalt clasts and may be transitional towards the Group 1 polymict conglomerates, which includes basalt-dolerite clasts in A213180 and 213185.

The polymict conglomerates include matrix-poor samples (A213179. and 80) as well as matrix-rich samples (A213185, 90, 93), with a lithic sandstone (A213185, 90), or carbonate-cemented quartz sandstone matrix in A213193.

Part of A213193 is a carbonate-cemented quartz sandstone, similar to the matrix in the conglomerate in this sample, and may relate this sample to Group 3 quartz sandstones. The matrix in A213191 is a lithic quartz sandstone similar to that in A213180, 85, and the contained clasts of quartzite are the same as the whole rocks A213183, 88.

The chert-dominated conglomerates (A213194, 97, A213200) have a matrix of carbonate (A213194), or sandstone (A213197, 213200). The sandstones are argillaceous and similar to those in the matrix-rich polymict conglomerates (A213180, 85).

SUMMARY COMMENTS (continued);

Textures in the chert clasts suggest that they are possibly silicified carbonates, and for this reason the carbonate clast conglomerate (A213195) is included in this Group 3. One of these samples in Group 3 (A213194), has detrital chromite and this suggests an ultramafic provinance, possibly from a serpentinite similar to A213236, although the chromite in the conglomerate is a more yellow-brown colour, than the more reddish chromite in the serpentinite A213236. Leucoxene in this conglomerate A213194 may be of basaltic origin.

Quartzites, and relatively well sorted lithic quartz sandstone are designated as Group 3 (A213183, 87, 88). A 213187 may be transitional towards samples A213199 (silty to sandy graphitic slate) and A213233 (graphitic slate) as it contains a graphitic siltstone alyer, but is better sorted, and apparently a more mature sediment than those in Group 4 (greywacke-argillite group). The most appropriate grouping in this rock (A213187) is not clear, and reflects the numerous transitional characteristics seen in rocks in the suite.

Group 4 includes quartz-lithic sandstones (A213184, 89, 92, 96) interbedded with clay-rich siltstones, and with common chloritic-fragments which are not present in the sandstone components of the other groups. Soft-sediment deformation (e.g. ball and pillow structures, sedimentary dykes, pullaparts) are seen along some sandstone-siltstone contacts.

Sample A213182 is a laminated quartz siltstone-claystone, possibly more closely related to the clean quartz sandstones in Group 3. On the other hand A213198, placed in Group 5 (siltstone facies), appears to be part of a continuum from A213192 (most prooximal, turbidite sandstone-dominated graded sequence), through to A213196 (relatively distal siltstone-dominated graded unit).

The siltstone facies (Group 5) also includes graphitic pelitic units (A213199, A213233) as well as sandy siltstones, and silty sandstones (A213231, 32), possibly related to or overlapping with Group 4 sediments. A dolomitic siltstone (A213234) may be related to the chert and dolomite clast conglomerates of Group 2.

SUMMARY COMMENTS (continued) :

The sediments may be related to one or more depositional fans; proximal or within-channel conglomerates, and the sandstones may be partly of mass-flow origin with interchannel or distal siltstones and claystones. Basin plainsd sediments may be represented by graphitic pelitic sediments and possibly also the dolomitic siltstone; although the dolomite sediments and the clean quasrtz sandstones may be a shallow-shelf facies. Some exposure and erosion of mafic and ultramafic rocks is indicated by the pressure of chromite grains in the chert-clast-conglomerate (A213194), and by the basic igneous clasts in some of the conglomerates (A213180, 85, 91). The basalt-dolerite clasts are probably derived from within the Dundas Trough (?Cambrian), but the sectioned basalt whole-rock (A213235) is probably much younger (?Jurassic).

It appears that uplift of a complex older sediment-basalt-ultrabasic portion of the Trough sequence, resulted in reworking these rocks into one or more depositional fan, together with possible shelf-type sediments (dolomites, quartz sands) and basin floor sediments (graphitic shales and silty to sandy shales).

It is not clear from the samples whether they are coeval, or represent different time stratigraphic units however, and the various facies recognised are not necessarily part of a coherent time-stratigraphic entity.

**

INDIVIDUAL DESCRIPTIONS

GROUP 1 : polymict small pebble conglomerates (angular to subrounded clasts)

RB1 : A213179 : polymict small pebble conglomerate, with a variety of sedimentary clasts and very sparse matrix

This is a poorly sorted polymict small pebble conglomerate with angular to subrounded clasts of sedimentary rock 1 - 15 mm in size, in a very sparse matrix (2 - 3%) of sandy clay.

The smaller clasts include graphitic slate; micaceous silty fine sandstone, and granular carbonate rock. The coarser clasts include a variety of carbonate- rocks containing variously, quartz or chloritic-clays. Some apparently oolitic limestone is present.

Carbonate-cemented coarse to very coarse lithic sandstone which incorporates clasts 0.3 to 4 mm in size, possibly represents clasts in this conglomerate, or areas of cement within it. Large clasts of quartz-sericite are possibly of volcanic origin, but their textures are not well preserved.

Minor detritus of sandstone, claystone and cherty pyritic carbonate is also present. The sandstones are clay and/or carbonate-rich, with detrital quartz and cherty grains, and minor leucoxene. Trace detrital mica occurs in some of the rocks.

The presence of a matrix is not clear in view of the sedimentary nature of the fragments, bvut some areas of detrital quartz in chloritic-clays appears to be matrix.

Pyrite crystals up to 0.3 mm occur in a partly silicified carbonate clast. They comprise about 20% of that clast.

A101 : A213180 : polymict small-pebble conglomerate with clasts of sediment, vein-quartz, dolerite-basalt, and some volcanic; weathered and limonite stained

The clasts in this rock are more rounded than those in A213179, and are more varied, including dolerite-basalt clasts, as well as sediments and vein-quartz. They have a similar size range, but tghe smaller fragments are heavily limonitised. Although these smaller fragments were claystones and silty claystones there is no evidence that they were graphitic. Sandstone fragments are common and are clay-rich with detrital quartz and/or felspar, minor leucoxene and various amounts of limonite. Some are clearly of volcanic origin. Carbonate fragments are rare and are rimmed by chlorite.

The basic igneous clasts are dominated by albitised or sericitised felspar laths from 0.1 to 1 mm in length. Interstitial ferromagnesian minerals are replaced by chloritic and/or sericitic clays, or by carbonate; partly leucoxenised opaque oxides are common. The finer grained varieties are commonly weakly porphyritic basalts whereas the coarser varieties are mostly equigranular dolerites.

Vein quasrtz and layered chert are also present as clasts. The chert contains fine limonitised opaque grains, and very minor carbonate as rhombs and may represent a silicified carbonate. It is highly inequigranular (grain size 0.02 to 0.3 mm), with different grain sizes in different layers.

D130 : A213185 : polymict, small-pebble, sandy conglomerate, with sedimentary and volcanic (mostly basaltic) clasts subrounded to rounded; an abundant lithic sandy matrix

A lithic quartz sandstone matrix in this rock seems to differentiate it from the two previously-described conglomerates. The clasts are also more rounded and mostly smaller than 10 mm, which are other differences suggesting a more distal or lower energy environment for this sample. The clasts are relatively well rounded, and have bleached (limonite-poor) rims and limonite-rich cores.

Claystone, siliceous claystone, micaceous chert, and cherts possibly derived from carbonate rocks, and cherts possibly derived from carbonate rocks, are the dominant sediment types in the clasts. These last-mentioned cherts are inequigranular with irregular clay patches, whereas the micaceous (?primary) clasts are equigranular and homogeneous.

The basalt clasts have albitised felspar laths to 0.4 mm in length, with interstitial clays and leucoxenised (and, locally, less oxidised) opaque oxide grains. A 'phyllitic-altered' volcanic rock has felspar laths in a sericitic matrix with a principle schistosity and two conjugate minor schistosities at 45° to the dominant schistosity.

The abundant matrix is a subangular lithic-quartz sandstone, with grains to 0.5 mm, of quartz and clay-rich sedimentary fragments and very minor detrital white mica. The sand-sized grains are cemented by limonite.

B141 : A213190 : polymict sandy conglomerate;
rounded clasts mostly sedimentary,
extensive sandstone matrix, limonitised

This sample is similar to A213815, in having rounded clasts generally smaller than 10 mm, in an abundant sandstone matrix, and in being heavily limonitised.

Densely limonitised claystone and silty claystone clasts are larger and more abundant than in A213185 and may have been graphitic or pyritic. Limonite-free claystone, silty claystone and chert, are also common, the chert being homogeneous apart from a few thin quartz veins. Quartzites with grains to 0.8 mm are common in this sample, but rare in the previous samples.. Limonite cemented quartz sandstones are also present. There are no volcanic clasts in this rock, however.

The matrix is a lithic-quartz sandstone with grains 0.1 - 0.5 mm in size. The lithic grains include sericitic and limonite-rich types, with accessory detrital muscovite.

Some of the claystone clasts have detrital quartz grains pressed into their surface; these clasts may have been soft during sedimentation, indeed may be regarded as being similar to armoured mud balls.

D265 : A213193 : polymict very small-pebble conglomerate (grit), of sedimentary clasts, with calcareous-quartz sandstone matrix;
in contact with calcareous quartz sandstone

Part of this rock is a fine conglomerate with angular to subangular sedimentary fragments up to 5mm long, in a calcareous lithic quartz sandstone matrix. The other part is a sandstone similar to that forming the matrix in the conglomerate.

The conglomerate has clasts ranging from weakly graphitic claystone, to clay-rich, very fine sandstone with quartz and leucoxene detritus. Angular quartz grains to 2mm long are scattered and there are fine grained carbonate clasts veined by sericite.

The matrix is a lithic quartz sandstone with grains about 0.3 mm long including clay, carbonate and leucoxene, as well as single crystal quartz grains. Minor detrital white mica is present and interstitial areas contain variously sericite and clouded carbonate.

The sandstone is simialr to the matrix in the conglomerate but has more abundant opaque-rich fragments, including ?graphitic grains, and a more extensive carbonate cement.

B220 : A213191 : quartz sandstone-hosted conglomerate with rounded sedimentary and volcanic pebbles

About two-thirds of this sample is a chert, over 30mm in size, of quartz sandstone, composed of subrounded grains 0.1 - 0.5mm in size and minor iinterstitial sericite. Small clasts (to 25 x 15mm) consist of claystone, chert, sandy claystone and highly altered basalt.

The claystones are moderately foliated and the cherts are fine grained and homogeneous. The sandy claystone has detrital quartz grains scattered through a clay and sericite-rich matrix. This fragment and the large quartz sandstone fragment are both cut by quartz veins.

The basalt clast is altered to orange clays (after felspar laths) with colourless clays and leucoxene replacing the intersticies.

The matrix is a lithic quartz sandstone with grains up to 0.6mm in size. Sericitic, cherty, opaque-rich (?graphitic) and orange clay-altered (?volcanic) grains comprise the lithic component of this rock. the matrix contrasts with the lithic-free nature of the sandstone fragments.

The prominent large clast of quartzite compares with whole-rock samples A213183 and S213188.

GROUP 2 : less polymist conglomerates, with clasts predominantly of chert or carboante

SCM2 : A213194 : conglomerate of well-rounded predominantly chert clasts in a carbonate matrix; minor chromite, sphalerite, galena, leucoxene and pyrite; accessory detrital chromite (from an ultramafic source)

This is a rather unusual rock as it has indicastions of an ultramafic component in the form of detgrital fractured chromite grains to 1mm long. It is dominated however, by a chert clast up to 15mm long, in a dolomite matrix.

The chert is homogeneous and extremely fine grained, and may be silicified carbonate rock; it lacks chromite and thus appears not to be silcified ultramafic rock. A single clast of argillaceous-dolomite, with grains of carbonate set in a sericitic-clay matrix, is present, and there is also an area of ?diagenetic chert with lenses of clay.

The dolomite matrix is granular and contains columnar veins which also cut across the clasts. A variety of minor to accessory minerals include detrital chromite, and leucoxene after magnetite, as well as authigenic sulphides.

The sulphides are irregularly distributed in the dolomite matrix, also in chert fragments, and in and adjacent to veins. Pyrite is common especially in localised areas partly associated with veins and with rare coarse quartz crystals. Sphalerite is more widespread, and is only locally intergrown with pyrite or with galena. It is pale (iron-poor) and locally decorates thin carbonate veins.

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MPC : A213195 : conglomerate of silty dolomite clasts in a sandy dolomitic matrix; rare pyrite

The clasts in this sample are up to 10mm in length, and are essentially fine grained dolomite with, in most cases, minor to moderately abundant silt to very fine sand-sized quartz grains. The dolomites are mostly massive and structureless but some are laminated and some have veins, including stylolites.

Rare quartz-dominated clasts include cherts, and possible vein quartz with minor sericite, as well as laminated weakly sericitic siltstones.

The matrix is granular to rhombohedral carbonate with grains 0.1 to 1.5mm in size; minor grains and aggregates of quartz to 0.5mm in size are also scattered.

Very minor pyrite occurs in the clasts and matrix, and the rock is cut by lenticular planar stylolites.

D403 : A213197 : chert-small pebble conglomerate; extensive argilalceous sandstone matrix

The matrix of this rockl is similar to that in the sandstone-hosted polymict conglomerates (A213185, 90), but the clasts are essentially microcrystgalline to spherulitic-textured cherts, possibly formed by the silicification of pre-existing carbonate rocks. These microcrystalline cherts are in part, weakly sericitic and may be derived from argillaceous carbonates, or may be primary argillaceous cherts.

A single clast of highly argillaceous quartz sandstone is strongly distorted, and has marginaylly embedded chert fragments. It was probably deposited as a soft-sediment intraclast (mud flake). Rare small deformed claystone fragments may also be intraclasts.

The matrix is a quartz sandstone, with angular grains 0.1 - 0.5mmm in size, set in a heterogeneous matrix of clays, limonite and leucoxene. Traces of detrital zircon are present.

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CH36 : A213200 : chert-dominated conglomerate with a sparse argillaceous matrix

Clasts in this rock are mostly cryptocrystalline to microcrystalline, commonly weakly argilllaceous (sericitic) chert as in sample A213197, but there is very little matrix in this rock, and there are also a number of claystone to sandstone clasts.

These clasts are mostly 3 - 10mm in size, and moderately rounded. with some angular deformed claystone fragments to 6mm long, including small fragments of ?graphitic slate. Argillaceous quartz sandstone fragments have detrital grains to 0.3mm in a sparse clay matrix.

Some of the clasts hve irregularly dispersed fine opaques, (?graphtie) and grade into graphitic argillaceous cherts. Spherulitic textures are rare and one fragment is cut by a fibrous chalcedony vein. There is also a gradation from fine cherts to coarser grained quartzites although large single crystal quartz grains about 0.5mm in size, are uncommon. Rare to accessory brown tourmaline and magnetite are p;resent, and there is a very sparse clay matrix.

GROUP 3 : clean quartz-sandstone-quartzite-dominated lithologies

B90 : A213183 : weakly felspathic and micaceous quartzite

This is a fairly homogeneous massive rock, composed of a compact, apparently very low-grade metamorphosed aggregate of quartz grains, about 0.2mm size; incorporating minor sericitised ?felspar grains (5 - 10%), and minor detrital white mica.

Accessory tourmaline and rare zircon occur locally; minor ?secondary porosity is present, and there appear to be several leached out veins.

D324 : A213187 : contact between a sericitised lithic quartz sandstone, and weakly graphitic (cleaved) siltstone

This sample contains a contact between sandstone and siltstone, in which the sand grains are locally set into the top of the siltstone; and there are micro-scale flame structures extending from the siltstone into the sandstone. These textures suggest that the sandstone has been deposited on top of the siltstone.

The sandstone is quartz-rich with angular to subrounded single crystal and minor polycrystalline quartz grains to 5mm in size. Lithic grains are subordinate and are sericitic to cherty in character. Accessory detrital white mica and chlorite pseudomorphs after biotite are present. Rare accessories include tourmaline and zircon, the zircon is commonly enclosed in quartz.

The siltstone layer has some very fine to fine sand-sized quartz grains (to 0.1 mm) in a clay-rich matrix with minor graphite. Minor detrital white mica and altered biotite are scattered. Accessory tourmaline and zircon are rare.

A weak cleavage is developed in the siltstone at 90° to the contact with the sandstone. A thin (1 mm thick) sandstone layer in the siltstone contains quartz grains about 0.1 - 0.5 mm in size, with minor white mica and biotite, and accessory zircon and magnetite.

D182 : A213188 : weakly sericitic quartz sandstone
(c.f. A213183)

This rock is virtually identical to A213183 composed of a quartzitic aggregate of grains 0.05 to 0.2mm, including minor sericitised grains and minor white mica.

Partly leached veins to 2 mm wide, contain grains and crystals of quartz and may have contained clays or carbonate. A weak secondary porosity is present.

GROUP 4 : **greywacke-argillite suite**

CH145 : A213182 : schistose, laminated siltstone-sericitic claystone, accessory heavy mineral grains more or less in layers;
trace oxidised pyrite

Lenses and laminae rich in sericite, 0.1 - 0.2mm thick, alternate with layers of extremely fine grained quartz 0.5 - 1 mm thick. there is a large parallel schistosity, and a weak schistosity at 40° to the layering. Several thin layers contain weak concentrations of acicular crystals of rutile and tourmaline of apparent metamorphic origin, but possibly ultimately detrital.

Concordant chlorite stringers with small euhedral quartz crystals are locally offset by shear veins containing chlorite and only rare quartz. The shears also contain leached out cavities.

Limonite-lined fractures are present and partly weathered pyrite grains are scattered (1 - 2%).

A76 : A213184 : clay-rich, very fine grained immature sandstone-siltstone unit, with soft sediment deformation textures (load casts, sandstone dykes etc.)

This sample has a sequence of layers between 1 and 10mm thick of siltstone and sandstone. A weak graded bedding occurs in some of the units, and basal-sandstone structures (ball and pillow structures) occur in one of the silty layers, immediately below a sandstone layer.

The sandstones are very fine grained to fine grained, with quartz, felspar and altered lithic grains, now composed variously of sericite, chlorite, limonite, leucoxene and magnetite. The siltstones are mostly clay, limonite and leucoxene-rich, with scattered fine grained detritus, similar to that in the sandstones, including fresh to oxidised opaque oxides.

One of the sandstone-siltstone contacts shows irregularities up to 5 mm wide and 1 - 2mm deep (?load casts or flute casts) and bodies of sandstone over 1 mm in diameter occur in the siltstone. One of the other siltstone layers is cut by a sandstone dyke 0.2 - 0.5mm wide. This indicates that soft sediment deformation has occurred.

CH26 : A213189 : contact between claystone and poorly-sorted immature medium grained sandstone (or greywacke); carbonate-chlorite veins heal tension partings

Part of this rock is a weakly foliated claystone with fine sandy lenses; the remainder is a poorly-sorted quartz-lithic sandstone, possibly a greywacke, with carbonate-chlorite tension-gash veins.

The claystone is sericitic with a well developed preferred orientation of clays. It has thin well developed lenses containing fractured quartz grains, and lenses of carbonate to 1mm in length. These lenses occur in areas where the foliation shows complex deformation, and they may be deformed earlier veins; later tension gashes are filled by carbonate cores and thin lenticular chlorite rims but are simpler in form (planar lenses) than those in the sandstone.

The sandstone is poorly sorted with grains up to 0.4mm in size, ranging down to silt-sized grains (<0.05mm). Quartz and altered lithic fragments (with chlorite, quartz carbonate or sericite variously developed) are the main detrital components, but leucoxene is also common. Siltstone lenses or fragments 1 - 3mm long are scattered.

The fabric of the sandstone is interrupted along narrow shear zones containing crushed sandstone, and the rock is cut by thin veins containing various combinations of quartz, carbonate and chlorite but mostly quartz-dominated. A trace of pyrite occurs in some of these veins.

Large irregular tension gashes uip to 10 x 1-2mm have cores of carbonate and rims of fine platy chlorite crystals.

B154 : A213192 : interbedded and weakly graded, quartz-lithic sandstone and siltstone; probable turbidite facies

Sandstone-dominated weakly graded beds from 10mm upwards in thickness, indicate a probable, relatively proximal turbidite facies.

The sandstone is poorly sorted with a weak overall size grading; the largest clast size decreases from 1mm (base) to 0.3mm (top), but with a complete range to silt-sized grains throughout. Quartz grains and altered lithic detritus, with sericite, quarts and chlorite, variously developed, dominates the sediment. Chloritised rock fragments (?volcanic glass) are unusually common, as well as quartz-sericite rocks and rare interlayered chlorite-white mica flakes. Oxidised opaque grains and leucoxene are scattered.

Clay-rich siltstones occur at the top of each graded unit, and have more abundant sericite $\pm$ chlorite flakes, as well as quartz and altered biotite. Lenses of fine sandstone (detrital grains up to 0.2mm) occur in the siltstone, and lenses or fragments of siltstone are present in the sandstone. Opaque oxides and minor leucoxene are scattered.

A122 : A213196 : siltstone with minor, thin interbedded, fine sandstone layers, some ball and pillow sedimentary structures

Sioltstone is dominant in this thin section, with only minor laminae of fine sandstone (5%), suggesting a relatively distal or inter-channel facies, compared to A213192, which is sandstone dominated.

The sandstone layer is about 2mm thick, it is fine grained with poorly sorted grains to 0.2mm in size, to less than 0.05mm. Quartz, lithic grains and opaque oxides are the main detrital components with secondary chlorite and sericite as in A213192. Some chlorite flakes, possibly after biotite, are also present.

The siltstone has quartz, white mica ($\pm$ chlorite), and fine opaque oxides, dispersed through a sericite-chlorite-clay matrix with limonite staining. The quartz is almost all about 0.05mm in size and no grading is evident in the siltstone.

The base of the sandstone has small (about 1mm in size) ball and pillow structures and a pullapart in the sandstone is filled by siltstone.

GROUP 5 : 'black shale' facies

A64 : A213198 : graded, laminated and weakly cleaved siltstone-claystone;
minor laminae of very fine sandstone

Graded bedding in this rock is shown by thin (distal) siltstone-claystone cycles about 5mm thick. This may be related to A213196 (but even more distal in nature). A thin layer of fine sandstone overlies the graded units, with a basal oxide-rich layer about 0.5mm thick.

The siltstone is rich in quartz and white mica with minor opaque oxides, but little or no chlorite. A clay matrix (sericite + limonite) persists into the claystone layers, where it makes up the bulk of the rock apart from minor detrital white-mica.

Suggestions of soft sediment deformation are seen at the base of one of the siltstones but are absent from the basal sandstone contact.

The sandstone is dominated by quartz grains about 0.1mm in size, with sericitic and/or limonitic lithic grains, leucoxene and opaque oxides. A limonitic-clay cement or matrix shows a weak cleavage at a high angle to bedding. Fine opaque oxides are concentrated at the inferred base of the sandstone where they make up as much as 40% of the sediment.

Thin en-echelon fractures contain limonite in most of the claystone-siltstone, but expand into quartz-chlorite veins in the sandstone; their extent is uncertain, since much of the sandstone has been lost by (your) thin section-making.

CH15 : A213199 : sandy to silty graphitic (black) shale

This is a graphitic shale (or slate) with laminae 0.5 - 1mm thick alternately containing very fine sand and silt-sized detrital grains. The sand-sized grains are mostly about 0.1mm in size with rare grains to 0.2mm; they aare dominantly quartz, with minor leucoxene and sericitised lithic grains. Silt is generally less abundant in a given layer (10%), than the sand-sized grains are in the sandy layers (50% or more).

The matrix is sericitic-clays with laminae and dispersed, extremely fine graphite. Some of the graphite is layer-parallel and some is in an inclined schistosity at 25 - 45° to the layering.

D378 : A213231 : poorly sorted, sandy, limonitic siltstone and laminated siltstone; minor small intraclasts of siltstone

Much of this rock is a poorly sorted sandy siltstone, with angular grains of quartz and/or sericite to 0.3mm, (with rare grains to 0.5mm) in a clay-limonite matrix.

Detrital white mica is common, and oxidised opaque oxide grains are scattered. A large lens of layered siltstone with rather more abundant opaque oxide grains (5 - 10%) is 2 mm wide by over 10 mm long, and is offset by a small fault. More definite fragments of limonite-rich siltstone to 4 x 1mm, are scattered through the sandy siltstone unit.

A complex network of veinlets contains decussate small sericite flakes and minor chlorite, and locally these veinlets have limonitised cores which may have been carbonate. One of these veins lines the microfault mentioned above. Planar veins with cross-fibre sericite and minor quartz are much less abundant.

CH27 : A213232 : poorly sorted silty sandstone,
with quartz-carbonate-chlorite tension gash-veins
minor pyrite hematite and chalcopyrite

Grains of quartz, quartz-sericite, limonitic and rare possible graphite, are the detrital components in this rock, which is a poorly sorted silty sandstone. The grain size is 0.03 - 0.2mm with mostly angular grains, and rare larger limonitised fragments to 1mm long. Many of the grains are elongate and define a bedding orientation.

Irregular tension-gash -fill veins are like those in A213189 but with a more complex mineralogy. A zone of quartz is commonly present between the carbonate core and the chlorite rim, and some veins contain minor to abundant pyrite, with or without very small hematite blades, and/or massive anhedral chalcopyrite. The sulphide-bearing lenses are up to 10 x 2mm.

A163 : A213233 : laminated graphitic shale (or slate); with remnants of a quartz vein

This is a weakly graphitic metapelite, with 40% quartz and white mica detritus as grains to 0.2mm in size, dispersed through a finely laminated clay-graphite matrix. This detritus is locally concentrated into thin laminae, and there are rare, play, more graphitic intraclasts to 2mm long.

One edge of the sample is cut by a vein of fine granular quartz with minor sericite and limonite. This vein was largely plucked out during section-making.

D332 : A213234 : very weakly schistose, layered dolomitic-siltstone, with scattered fine sand grains

This sample is layered on millimetre and centimetre scales, with thin layers of extremely fine sericite-dolomite, and darker layers with fine opaques and small amounts of detrital white mica and quartz, as well as sericite and dolomite.

Wispy lenses of probably very fine graphite about 0.3mm long are also scattered through the darker layers. Minor grains and lenses of very fine quartz sand (grain size 0.1mm) are scattered, and some layers are unusually rich in graphitic lenses.

A thin vein cutting this rock contains dolomite and flakes of possible graphite.

GROUP 6 : Miscellaneous rock types

D170 : A213186 : pyrite in massive, platchy quartz-sericite rock; of ?hydrothermal alteration (?altered greisen)

The thin section provided was of extremely poor quality, thus a new one was made from the offcut.

Basically the rock consists of pyrite crystals (15%) to 0.4mm in size, set in a heterogeneous quartz-sericite matrix. The quartz is partly 'cherty' (grain size 0.03mm) and partly granular (grain size 0.1mm) and occurs as grains and diffuse lenses mixed with equally diffuse irregular patches of sericite.

The quartz and sericite both appear to largely represent hydrothermal alteration/replacement, but there are no relict textures to indicate an original rock type. The assemblage may represent a greisen, however.

A156 : A213181 : altered, crystal-vitric tuff or ignimbrite (acid volcanic facies)

Crystals of albitised plagioclase and minor quartz to 1.5mm long are scattered as small "phenocrysts", forming 10 - 20% of the rock. The rest of the rock has a well preserved vitroclastic texture, composed very largely of albitised shards to 1 mm long.

Rare fragments of claystone to 2mm in diameter, are scattered and locally graphitic, and there are rare patches of chlorite. Much of the matrix is unresolvably, extremely fine clays, with minor possible quartz and leucoxene.

Rare large patches are altered to fine sericitic-clays.

CH204A : A213235 : partly glassy tholeiitic basalt

This largely fresh basalt has rare partly to completely altered orthopyroxene phenocrysts 1 - 2mm long, locally rimmed by clinopyroxene. Separate augite phenocrysts, and microphenocrysts of plagioclase showing complex zoning and some alteration to sericite along zones, are also scattered.

The groundmass consists largely of felspar laths about 0.3mm long, and intergrown with subophitic clinopyroxene laths to 0.4mm long. Interstitial glass (30%) appears to have an emulsion-texture, with dark (?iron-rich) droplets of micron-size in a pale (?silica-rich) matrix. The glass locally contains crystallised dendritic iron-oxides. Similar liquid-immiscibility textures are seen in the Jurassic "Kingscote Basalt" (which is also orthopyroxene-bearing) in Kangaroo Island, S.A., and this basalt described may also be of Jurassic age (Tasmanian dolerite province).

D11 : A213236 : schistose serpentinite;
accessory chromite and magnetite

Schistose serpentine forms at least 80% of this rock, and this contains accessory scattered grains of magnetite (5 - 7%) and chromite (2 - 3%).
The chromite grains are fractured but were up to 2 mm in size. and are rimmed by magnetite. They are a reddish translucent colour, redder in colour than those in the chert-pebble conglomerate (A213194).

Magnetite is scattered through the serpentine as small (0.1 - 0.3mm) ragged grains, which are mostly of secondary origin.

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SELECTED PHOTOMICROGRAPHS OF THIN SECTIONS TO ACCOMPANY MINERALOGICAL REPORT No. 4720 FOR CSR MINERALS : DATED 12/3/86.

(Arranged in order of descriptions, i.e. Rock Groups to Miscellaneous)

GROUP 1

Fig. 1 **A213179** length of photo 9 mm

Ordinary light : relatively low magnification (X16):

polymict small-pebble conglomerate;
clasts of various sedimentary rock types;
negligible matrix

Fig. 2 **A213180** length of photo 9 mm

Ordinary light (X16) :

polymict small-pebble conglomeratem
clasts of basalt/dolerite (notably top right);
negligible matrix

Fig 3 **A213185** length of photo 9 mm

Ordinary light (X16) :

polymict small-pebble conglomerate,
clasts of vein-quartz and sedimentary rock;
abundant (lithic) sandy matrix

Fig 4 **A213190** length of photo 9 mm

Ordinary light (X16) caption as for figure 3 :

including abundant sandstone matrix

Fig. 5 **A213193** length of photo 9 mm

Ordinary light (X16) :

layer of polymict small-pebble conglomerate with extensive calcareous quartz sandstone matrix (which continues to form an adjacent bed, without the clasts)

GROUP 2

Fig. 6 **A213191** length of photo 9 mm

Crossed nicols (X16) :

chert clasts (some fractured) inc arbonate matrix;
small black-isotropic grains fractured in circle (1) are chromite;
blackish-isotropic grains in circle (2) are sphalerite

Fig. 7 **A213195** length of photo 9 mm

Crossed nicols (X16) :

clasts of micritic dolomite, in sandy-dolomitic matrix

Fig. 8 **A213197** length of photo 9 mm

Crossed nicols (X16) :

small subrounded to rounded clasts of chert
in abundant argillaceous sandstone matrix

Fig. 9 **A213197** length of photo 4.4 mm

Crossed nicols (X45) : higher magnification of figure 8 :

showing detail of chert clasts, and sandy matrix
with scattered sericitic and brownish-oxidised clays

Fig. 10 **A213200** length of photo 9 mm

Crossed nicols (X16) :

conglomerate of essentially chert clasts,
sparse argillaceous matrix

GROUP 3

Fig. 11 **A213187** length ofphoto 4.4 mm

Ordinary light (X45) :

lithic quartz sandstone, overlying a
carbonaceous weakly cleaved siltstone,
with flame-like protruberances into the sandstone

Fig. 12 **A213188** length of jphoto 4. 4 mm

Crossed nicols (X45) :

weakly sericitic, fairly cean, but sericitised-
felspatghic, quartz-sandstone (or quartzite);
massive and well sorted;
same as 213183

GROUP 4

Fig. 13 **A213182** length of photo 4.4 mm

Crossed nicols (X45) :

laminated siltstone, cleaved sericitic-claystone (shale)

Fig. 14 **A213184** length of photo 4.4 mm

Crossed nicols (X45) :

fine, clay-altered felspathic and lithic sandstone;
overlyiung carbonaceous pelitic-siltstone
with irregular flames caught up in the fine sand

Fig. 15 **A213184** length of photo 4.4 mm

Crossed nicols (X45) :

alternating laminae in same sample as figure 14;
of the 'dirty', fine, sand;
and the carbonaceous silt.
Very weak oblique cleavage

Fig. 16 **A213189** length of photo 4.4 mm

Ordinary light (X45) :

texturally heterogneous, dirty felspathic, lithic,
weakly chloritic sandstone (fine greywacke);
veining in lower-left corner of chlorite and carbonate

Fig. 17 **A213192** length of photo 9 mm

Ordinary light (X16) :

graded-laminated 'turbidite faciesd'
of fine-medium lithic sandstone and siltstone

Fig. 18 **A213192** length of photo 4.4 mm

Ordinary light (X45) :

shows detail of sandstone shown in figure 17;
highlighting lithic and minor chloritic components

GROUP 5

Fig. 19 A213199 length of photo 4.4 mm

Ordinary light (X45) :

laminated siltstone/claystone or shale;
with clear quartz silt;
turbid carbonaceous, clay-rich material

Fig. 20 A213231 length of photo 9 mm

Ordinary light (X16) :

poorly sorted, fine sandy siltstone,
with scattered intraclasts of similar composition

Fig. 21 A213234 length of photo 4. 4mm

crossed nicols (X45) :

weakly fine layered silty dolomite

MISCELLANEOUS

Fig. 22 A213186 length of photo 4.4 mm

crossed nicols (X45) :

pyrite scattered through diffuse patches of fine,
hydrothermal sericite and quartz

Fig. 23 A213181 length of photo 4.4 mm

ordinary light (X45) :

altered crystal vitric tuff or ignimbrite,
showing mass of welded altered glass shards,
incorporating rare small scattered crystals

Fig. 24 A213235 length of photo 4.4 mm

crossed nciols (X45) :

tholeiitic basalt;
phenocrysts of altered plagioclase (white),
and smaller pyroxene (coloured);
in groundmass of minute plagioclase laths,
minute grains of pyroxene, and interstitial
black patches of glass

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Fig. 1

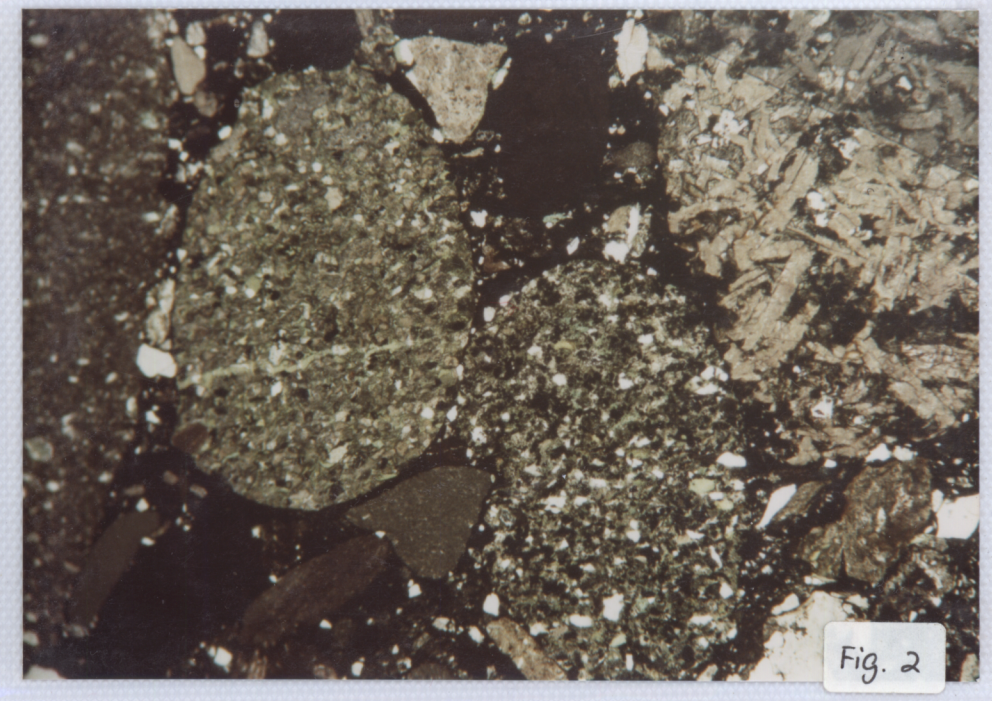

Fig. 2

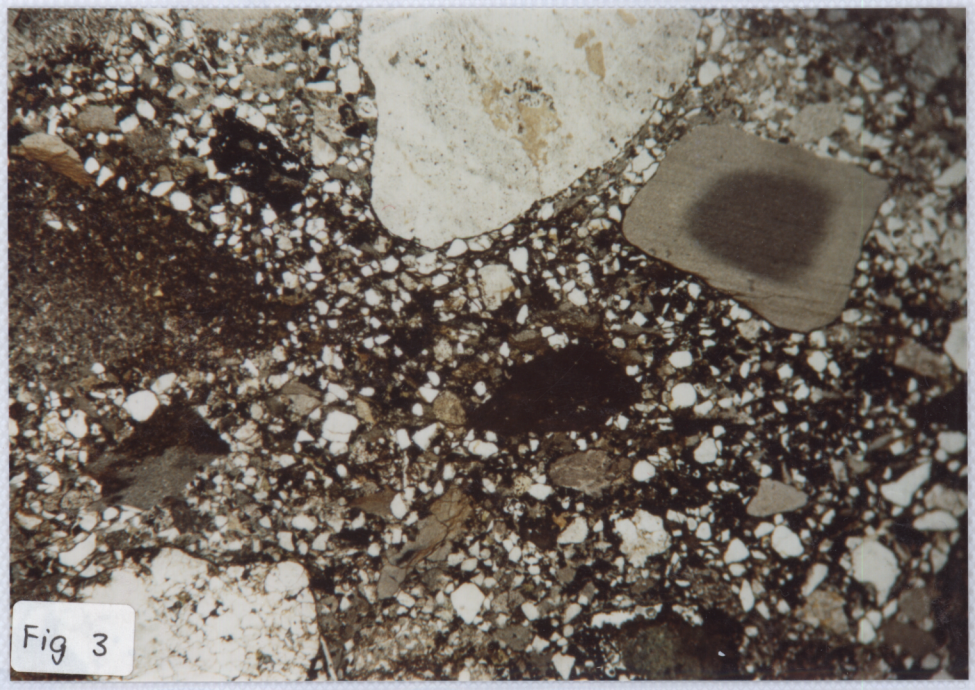

Fig 3

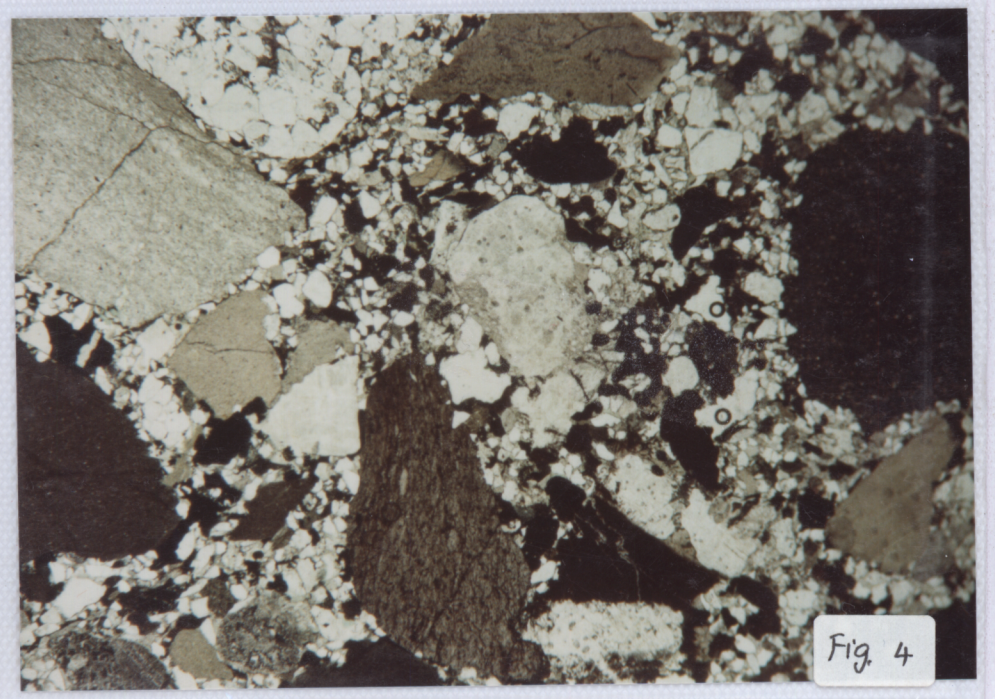

Fig 4



Fig 5

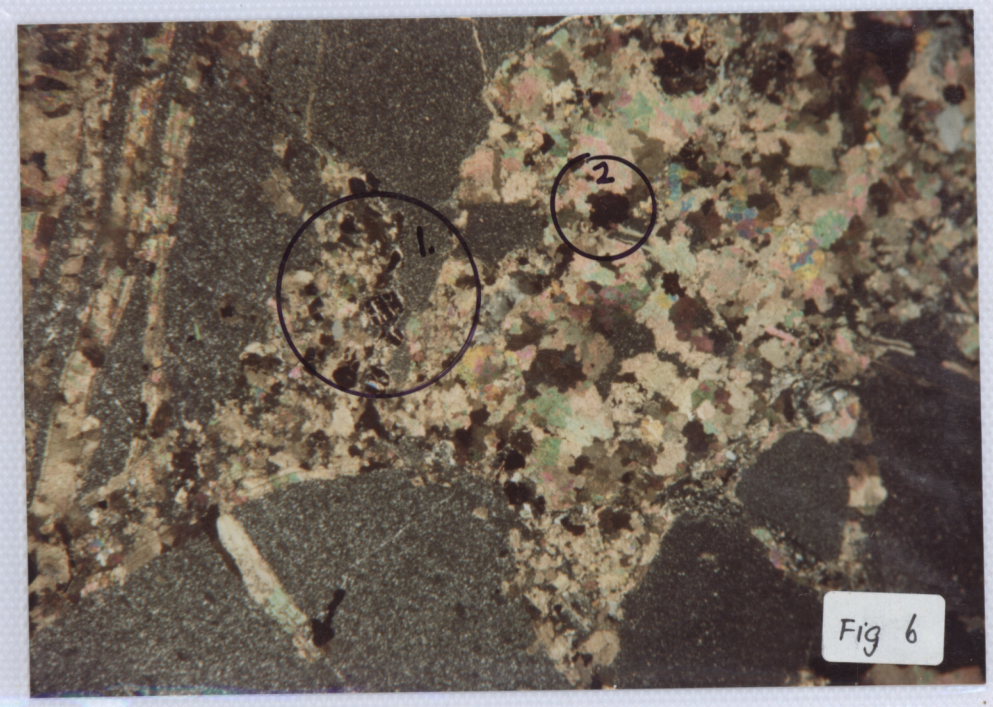

Fig 6

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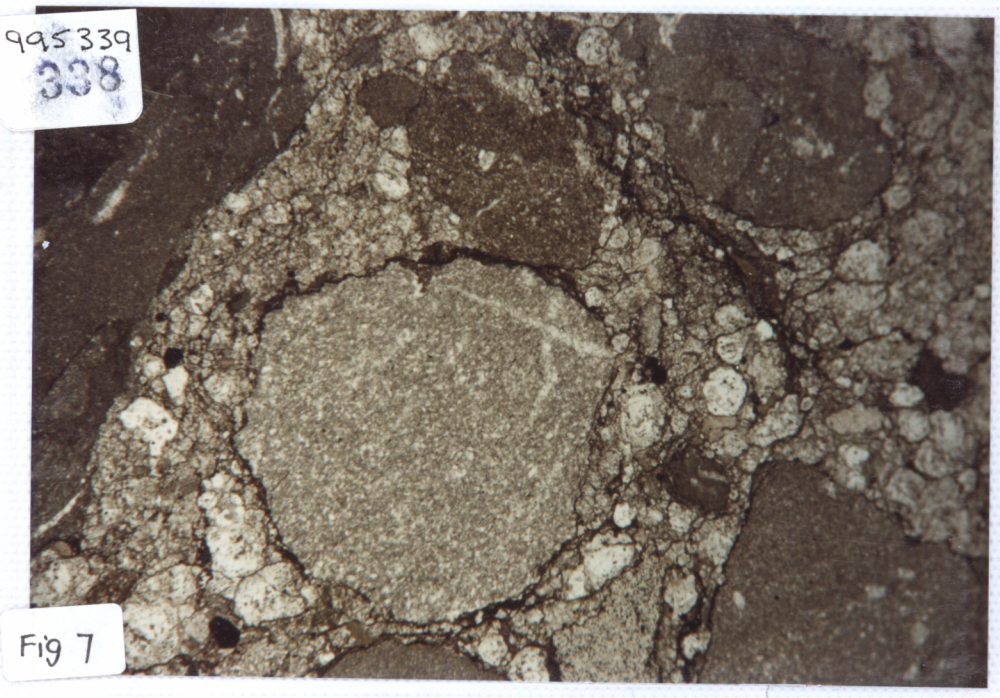


Fig 7

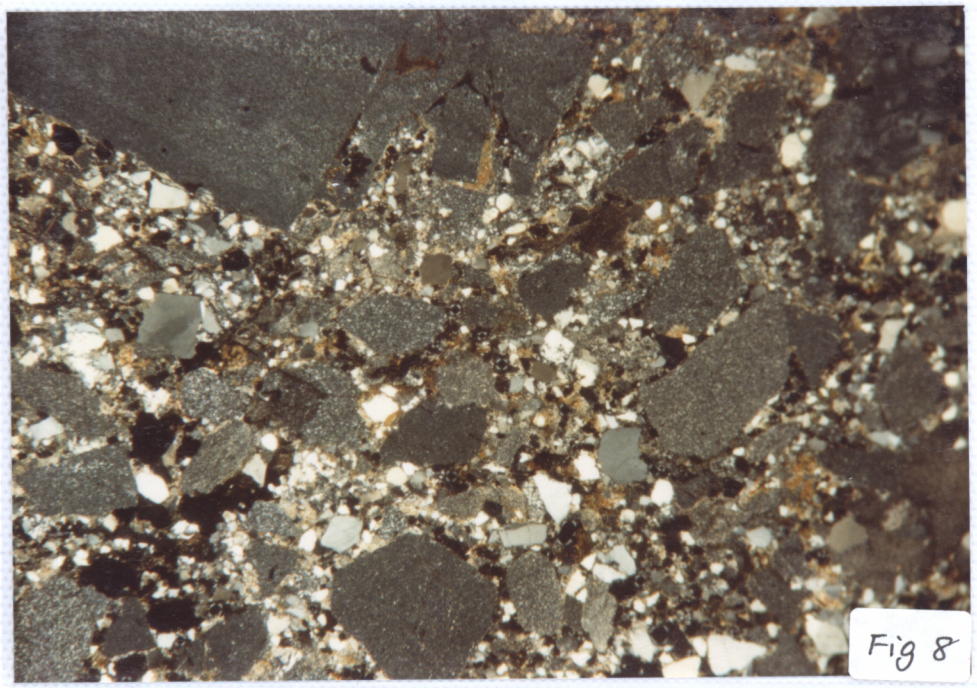
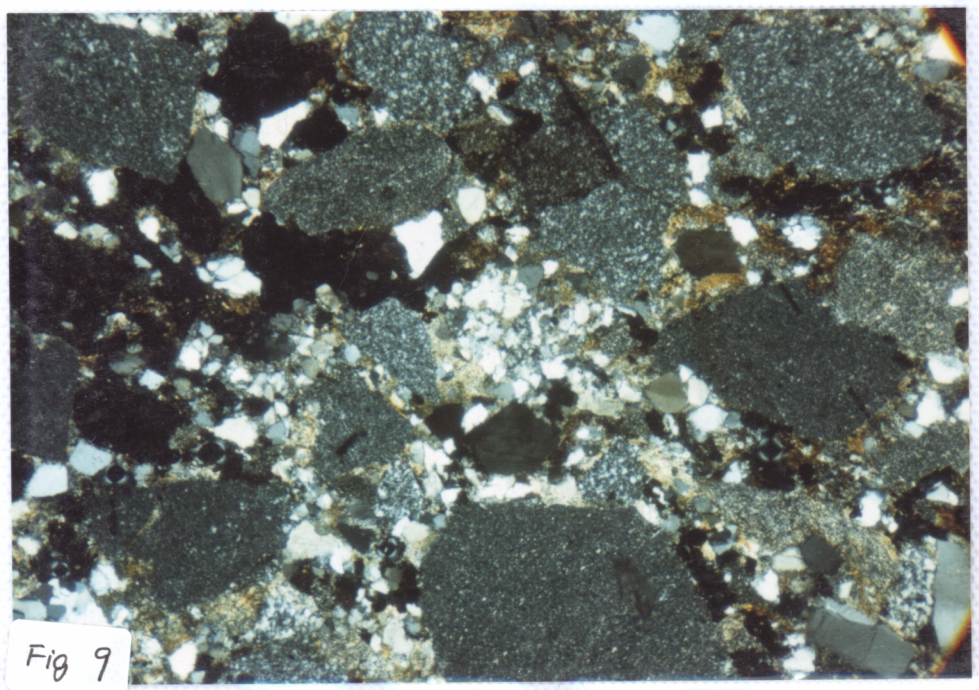


Fig 8



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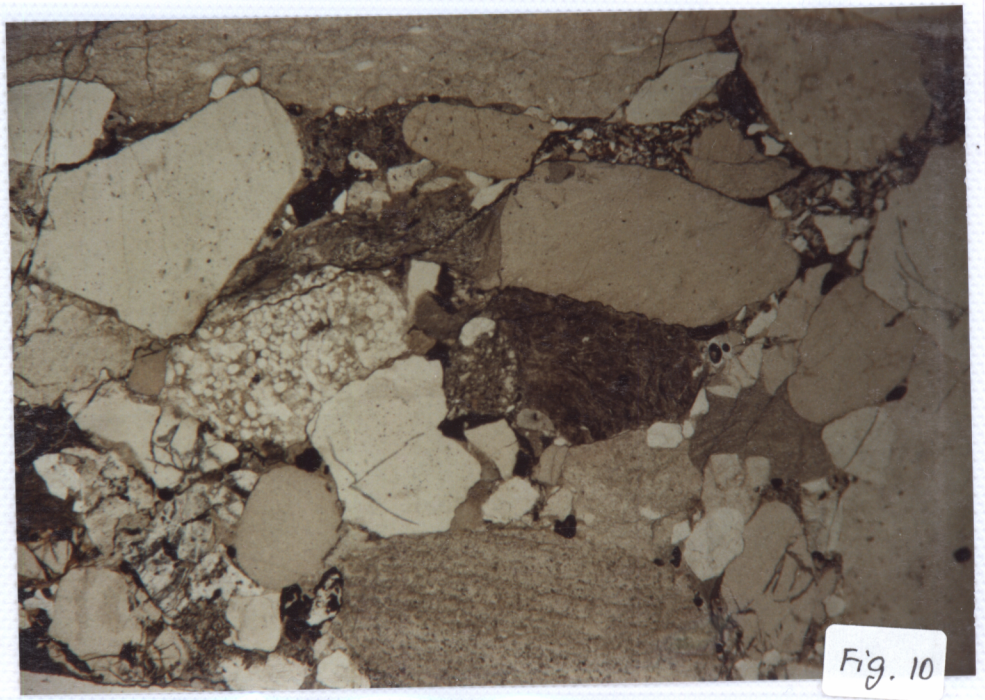

Fig. 10

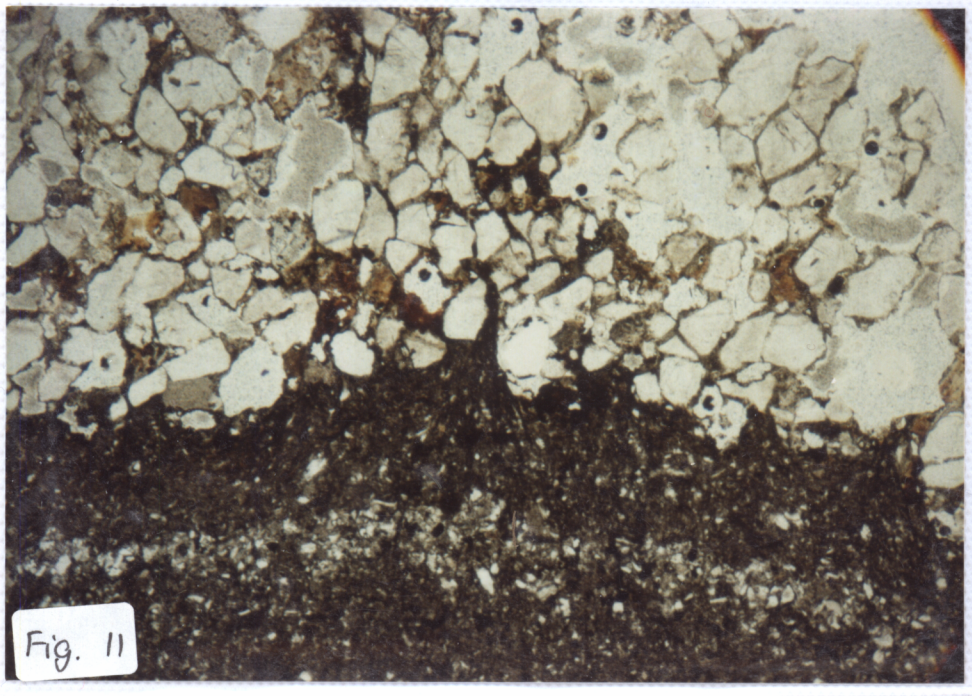

Fig. 11

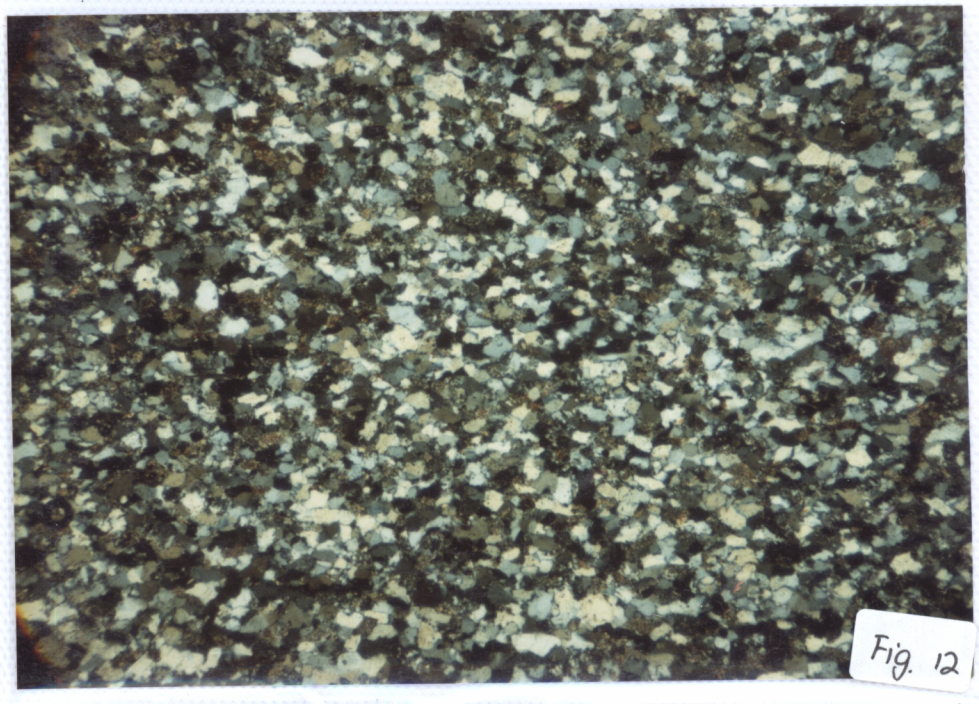

Fig. 12

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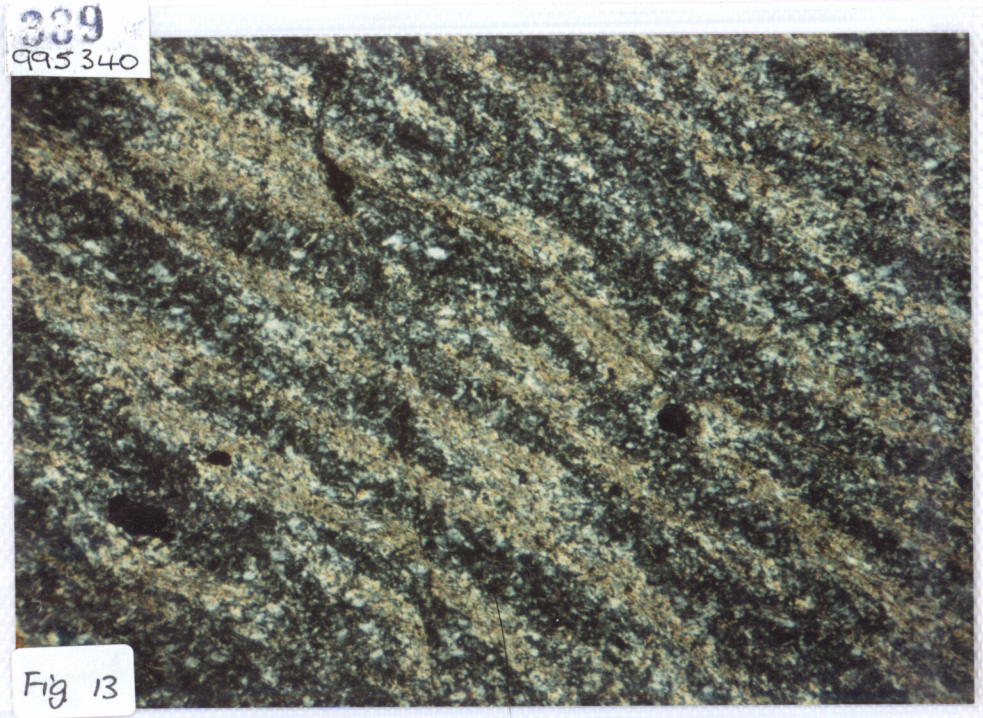

Fig 13

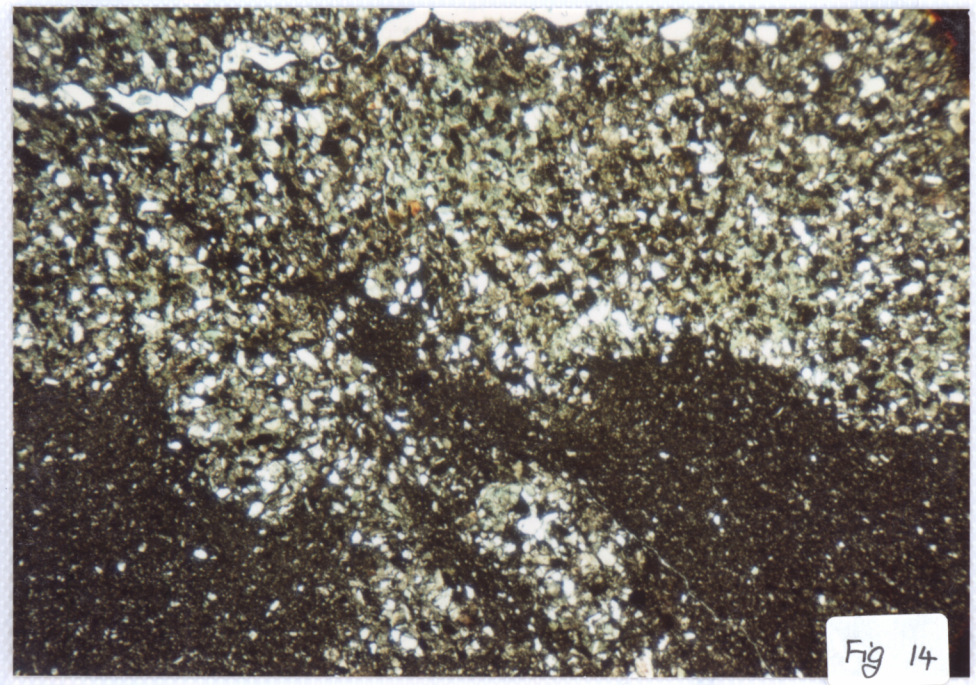

Fig 14

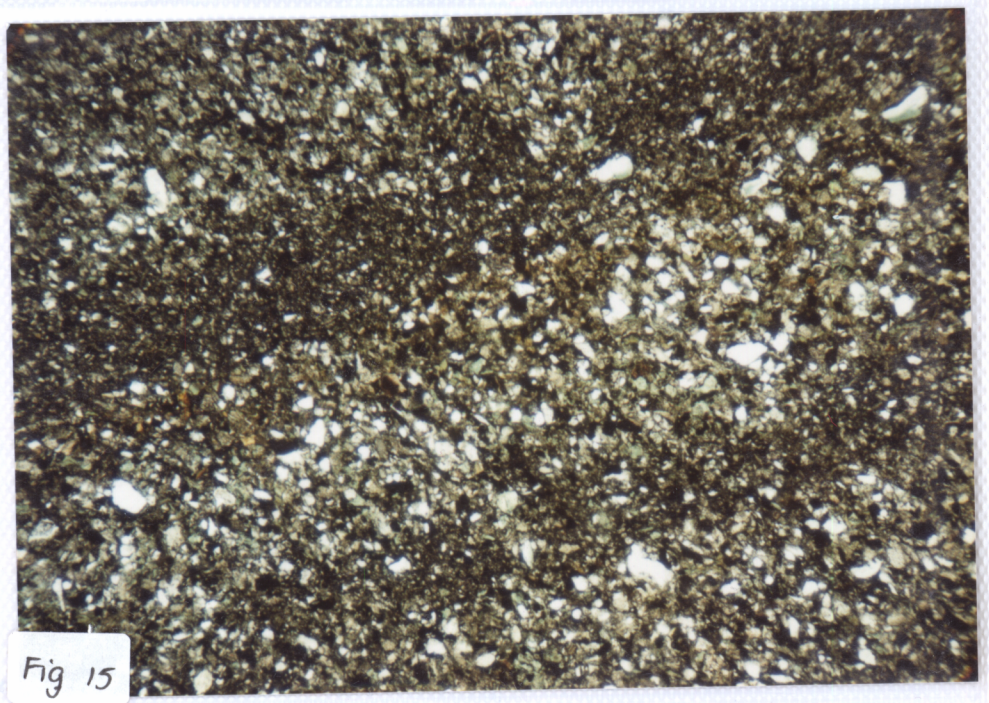

Fig 15

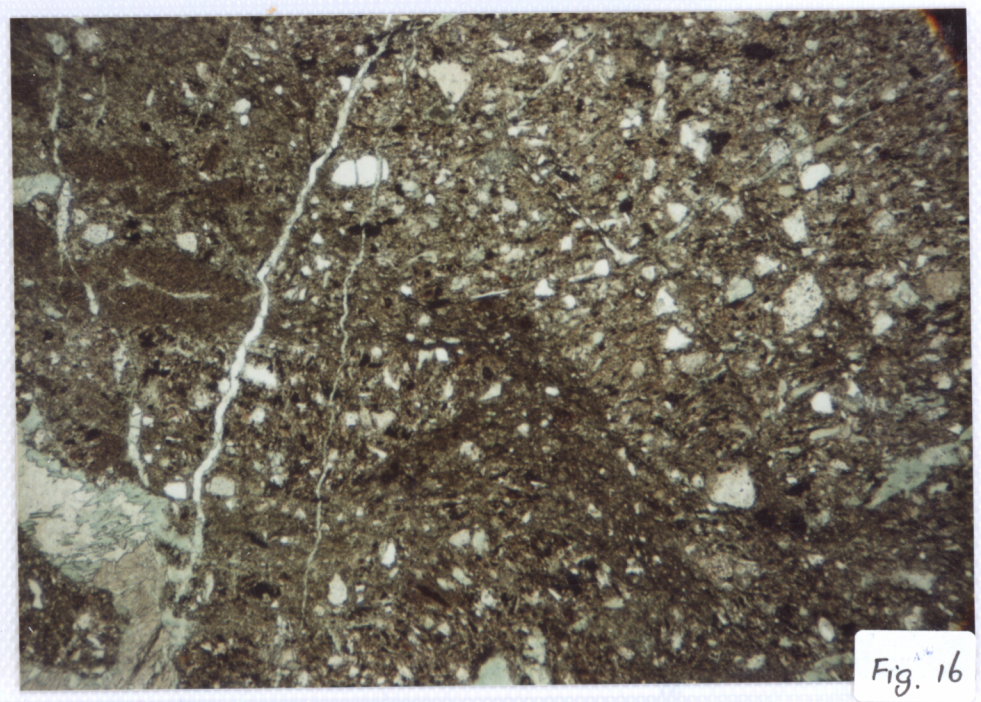

Fig. 16

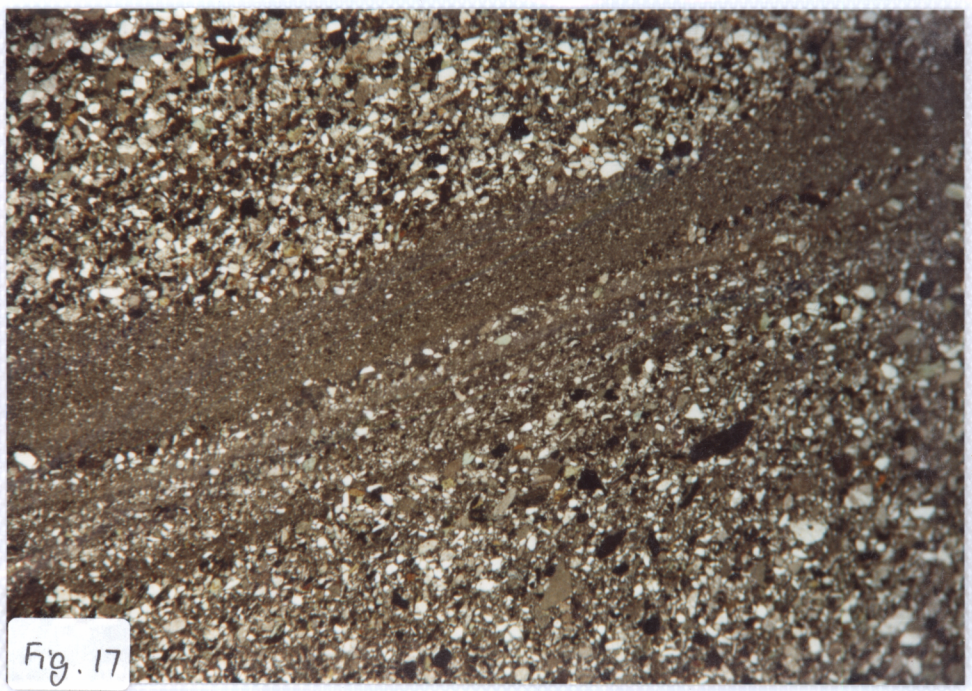

Fig. 17

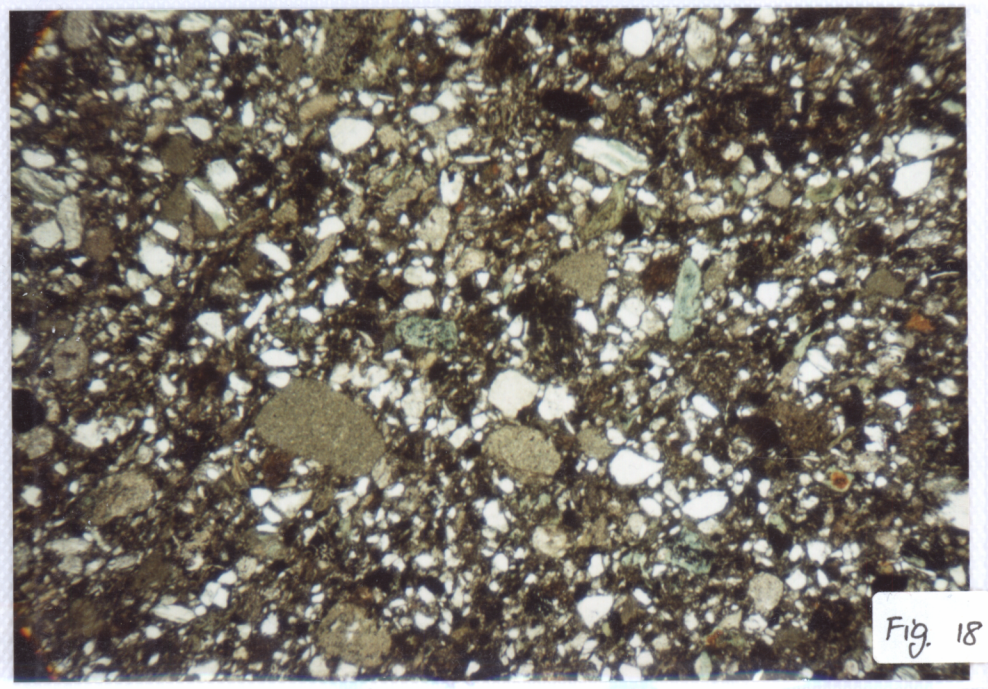

Fig. 18

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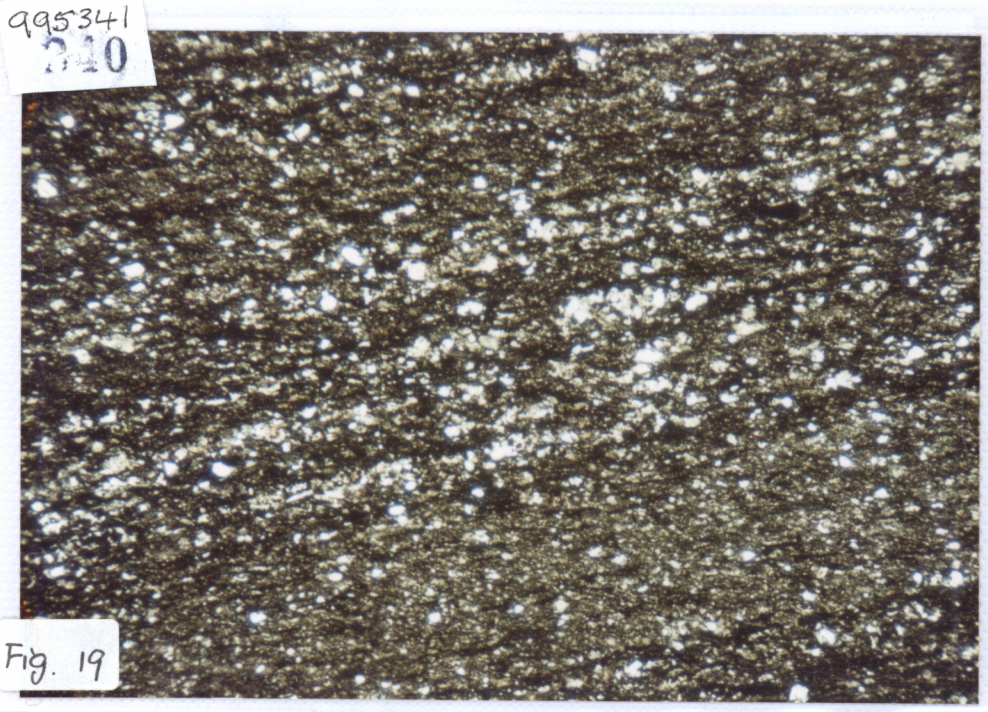

Fig. 19

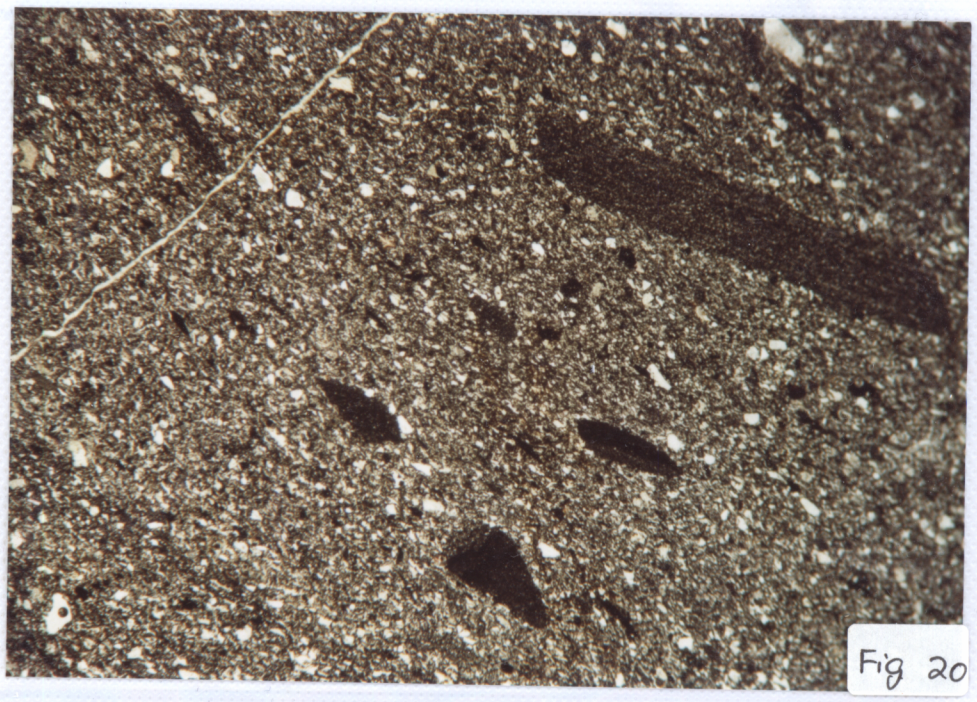

Fig 20



Fig 21

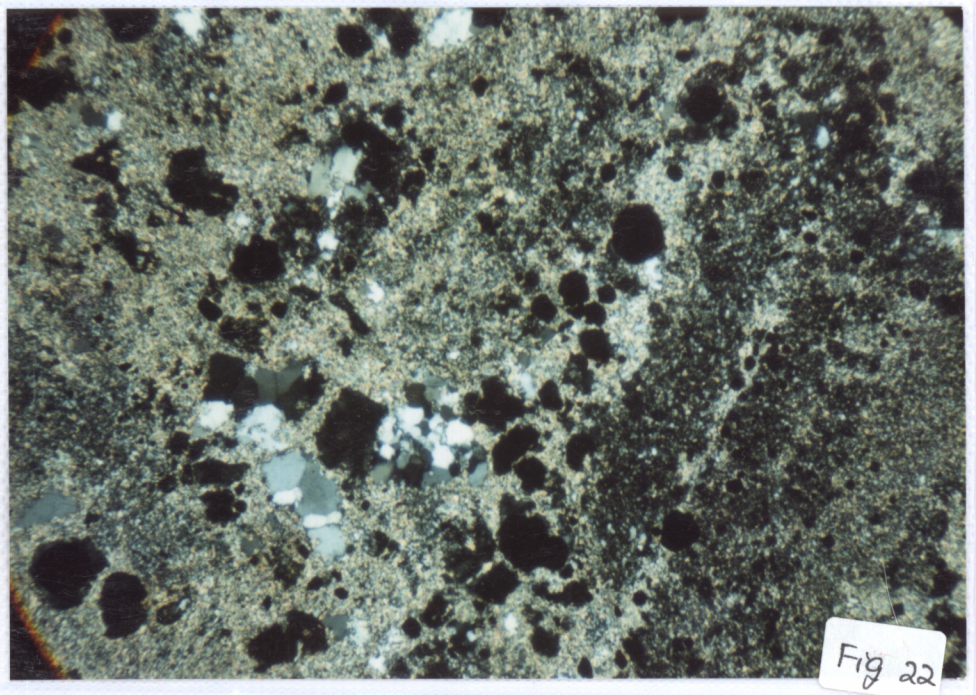

Fig 22

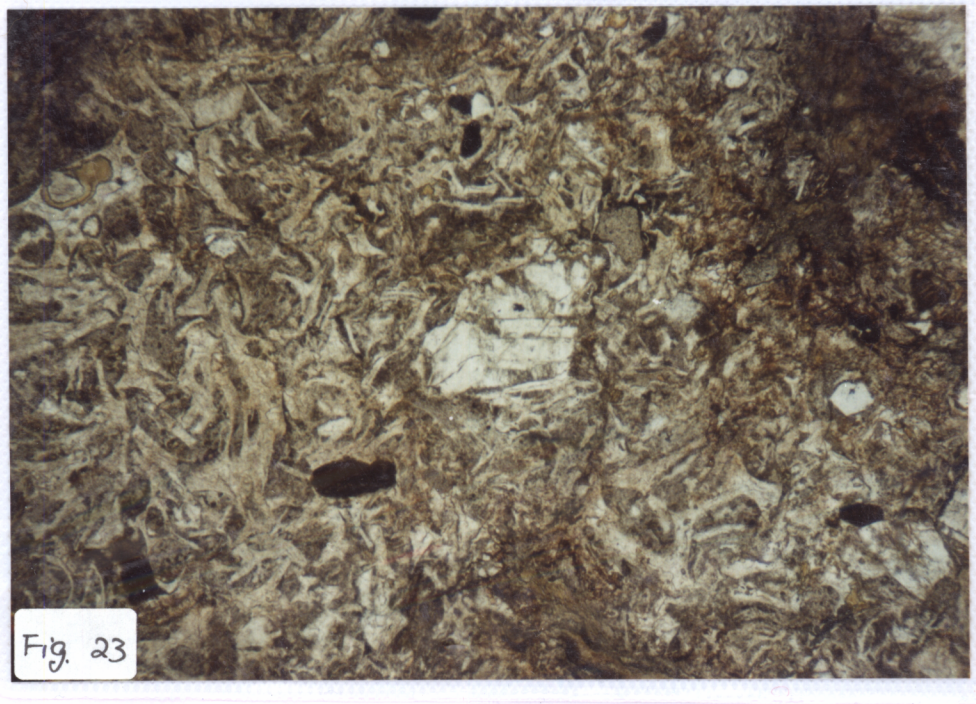

Fig. 23

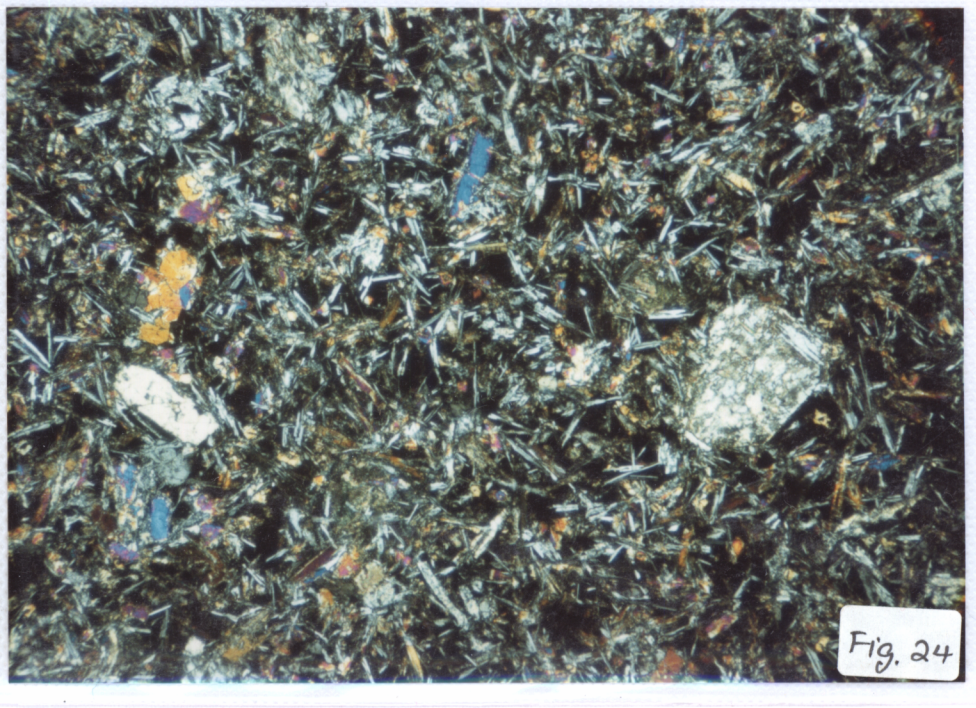

Fig. 24

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PROSPECT 7602

CSR LIMITED

MINERALS EXPLORATION AND DEVELOPMENT GROUP

RENEWAL REPORT - 1986

EXPLORATION LICENCE 15/76

DUNDAS, TASMANIA

EMR 108/86

VOLUME 2

4 SEP 1986
DEPT. OF MINES
No. 8907/86

OPEN FILE

HOBART

JUNE 1986

P.D. ELLIS

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APPENDIX XIX

EL 15/76 - DUNDAS

REGIONAL SAMPLES - ORE PETROLOGY

POLISHED SLABS

CSR NO.	P. KITTO'S NO.	SHEET LOCATION	COMMENTS
A161830	KHW3 (945')	DUNDAS	Geophoto Drill Core
A161831	CH3556	CARBINE	
A161832	D261	DUNDAS	
A161833	CH204A	CARBINE	
A161834	SCM3	DUNDAS	South Comet Mine Dump
A161835	D424a		
A161836	D264	DUNDAS	
A161837	SCM1	DUNDAS	South Comet Mine Dump
A161838	CH277	CARBINE	
A161839	KHW5 (763')	DUNDAS	Geophoto Drill Core
A161840	CH223	CARBINE	
A161841	SCM1	DUNDAS	South Comet Mine Dump
A161842	D79	DUNDAS	
A161843	CH305	CARBINE	
A161844	D116	DUNDAS	
A161845	MM	CARBINE	Maestries Mine Dump
A161846	KHW1A (277')	DUNDAS	Geophoto Drill Core
A161847	KH2 (76')	DUNDAS	Geophoto Drill Core
A161848	KHW3 (1374')	DUNDAS	Geophoto Drill Core
A161849	CH37	CARBINE	
A161850	CH355b	CARBINE	
A213093	SC4 (717')	DUNDAS	Geophoto Drill Core
A213094	SC Gos	DUNDAS	South Comet Mine gossan
A213095	D404	CARBINE	
A213096	GP	RAZORBACK	Grand Prize Mine Dump
A213097	CM	CARBINE	Comet Mine Dump
A213098	D380	DUNDAS	
A213099	AM	DUNDAS	Adelaide Mine Dump
A213100	RBM2	RAZORBACK	Razorback Mine Dump
A213172	D424		
A213173	D424b		
A213174	D274	DUNDAS	
A213175	CH279	CARBINE	
A213176	CH279b	CARBINE	
A213177	CH355a	CARBINE	
A213178	B331	RAZORBACK	

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MINERALOGICAL REPORT NO. 4734

23rd April, 1986

TO:	Mr. Peter Ellis CSR Limited, Minerals Division 35 East Derwent Highway LINDISFARNE, TAS 7015
YOUR REFERENCE:	Field Sample Despatch Sheet 13099 CSR Order No. 44462 (part)
MATERIAL:	Ore samples with large polished face provided.
IDENTIFICATION:	A161830 to 850 A213093 to 100 A213172 to 178
WORK REQUESTED:	Descriptions, summary comments
thin sections;	Returned to you with this report.

PONTIFEX & ASSOCIATES PTY. LTD.

INTRODUCTION

The thirty six ore samples submitted, each had a large polished surface, average size about 35mmx70mm, and a description was requested of each.

For such large samples it was decided to firstly describe each as seen under binocular microscope, whereby comments are made on the broader scale textures/structures, also on the sulphides where identifiable, and the gangue/rock type as appropriate. This information is given under the heading of **'macro'** in each description.

(Note that no thin section work was undertaken on these samples, therefore the information given on the non-opaque minerals should not be regarded as conclusive).

The information given under **'micro'** in each description is an assessment of the ore-minerals present and their associations/relationships as seen under the mineragraphic microscope. Estimates of mineral abundances are generally given, but comprehensive assay data, when considered together with the microscopy, will provide a more accurate measure of the abundance of the various ore minerals.

Indeed such assay data would have been an invaluable aid to the identification of some of the accessory and minor phases, which occur for example as fine inclusions in the more common sulphides and/or in gangue. There is a variety of minor-phase sulphides which may be expected to accompany the dominant Fe, Pb, Zn, and lesser As and Cu sulphides throughout this suite. Many such likely minerals however, such as Pb, Sb, As $\pm$ Ag sulphosalts, have similar and overlapping optical properties and in routine investigation of this type, on large polished surfaces, minor extremely fine phases in this category may remain undetected. Many occurrences of these minerals however, where described, are circled in black ink on the polished surface of the samples.

Introduction continued:

In this regard, two XRD analyses were undertaken to identify two of the less common sulphides, but which occurred locally in moderate abundance, these were:

* in sample Al61848, major boulangerite, with minor associated jamesonite.

* in sample Al61850, minor, very small, but widespread acicular crystals also identified as boulangerite, but with a distinctly different mode of occurrence than the relatively coarser more 'massive' boulangerite in Al61848.

Selected photomicrographs are appended to illustrate various textures on a microscale, also to show the microscopic mode of occurrence, mostly of the minor phases, within the relatively more major ore-forming minerals.

With regard to your request to note similarities between samples, and relationships between them, it seemed most appropriate to address this by providing the table (below) of the mineral assemblages in each sample. In the absence of knowledge of sample groupings based on location or geological controls, it is difficult to comment further on correlations or trends within the province represented by the whole suite.

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SUMMARY OF MINERALS IN THE 36 ORE SAMPLES DESCRIBED HERE-IN

Major	Subordinate/minor	Rare
sphalerite (sp)	chalcopyrite (cp)	pyrargyrite (pg)
galena (gl)	arsenopyrite (ap)	graphite (gr)
pyrite (py)	tetrahedrite (th	jamesonite (j)
	boulangerite (bg)	**hematite (hm)
	*pyrrhotite (po)	?heazlewoodite
		or ?niccolite (hz)

* pyrrhotite locally abundant alters to secondary pyrite,

** hematite, partly replaced by magnetite dominates one sample. tetrahedrite and boulangerite, rarely, locally abundant and associated with jamesonite in 161848, also possibly with bournonite.

A gangue of carbonate, almost certainly, very predominantly siderite, is virtually ubiquitous, however, minor vein-quartz occurs in some samples.

The distribution of these samples through the suite is as follows:

	sp	gl	py	cp	ap	th	bg	po	pg	gr	j	hm	?hz
161830	x	x	x	x									
161831	x	x	x	x	x								
161832	x	x			x								
161833												x	
161834	x	x	x										
161835			x	x	x					x			
161836	x	x	x										
161837	x	x	x										
161838	x	x	x										
161839			x	x									x
161840	x	x		x		x			x				
161841	x	x	x	x									
161842	x	x	x			x							x
161843	x	x	x	x		x							
161844	x	x	x						?				
161845	x	x	x			x	x						
161846	x	x											
161847	x	x											
161848		x	x	x	x	x	x				x		
161849	x	x		x	x	x							
161850	x	x					x						
213093	x	x	x		x		x						
213094	x	x	x										
213095	x	x	x	x	x								
213096				x	x			x					
213097	x	x											
213098	x	x											
213099	x	x	x										
213100				x				x					
213172	x	x	x		x					x			
213173	x	x		x		x		x					
213174	x	x	x										
213175	x	x	x	x	x	x	x						
213176	x	x	x	x	x	x	x						
213177	x	x	x	x	x	x	x						
213178	x		x	x	——	(gossan)	——						

A161830 : shear and/or breccia zone, including highly fine-pyritic country rock; extensive veining by carbonate, lesser quartz, carrying minor galena, pyrite, lesser sphalerite, chalcopyrite.

Macro : Core sample with apparent shearing with associated parting and brecciation, more or less along core axis. This has been followed by extensive introduction of veining; mostly of quite coarse, rhombohedral carbonate, subordinate sulphides, minor quartz. Total sulphide content is about 5% of the whole rock.

Micro : Most sulphides tend to occur along the margins of the thicker (10mm) vein of coarse carbonate, but more or less in carbonate, and between quartz crystals. Galena as irregular anhedral individually to 1mm grains are strung along a relatively internal part of the vein. Smaller (0.2mm) less abundant grains of sphalerite and/or chalcopyrite occur as inclusions in galena or are aggregated with galena, rarely they occur independently.

Pyrite occurs as individual subhedral crystals about 0.2mm in size, locally aggregated and strung out in carbonate along an outer part of the main vein, also partly in a breccia matrix between carbonate. Much finer (0.02mm) grains of an apparently earlier generation pyrite/marcasite are aggregated into elongate lenses, and in stringers possibly of highly pyritic host rock, enclosed in vein-carbonate. Small elongate crystals of rutile occur in slivers of 'country-rock' incorporated in the main veining.

A161831 : *fine breccia of 'fine-grained-sandstone'; very extensive* matrix of heterogeneous fine crystalline sulphide aggregate and prismatic quartz crystals; pyrite, arsenopyrite, sphalerite, lesser galena, trace chalcopyrite.

Macro : This is a breccia, with angular and fractured frgments of 'country rock' (40%) ranging in size up to l0mm maximum dimension, widely spaced and vaguely layered through a matrix of massive fine grained sulphide. Under binocular microscope the rock fragments are identified as a fine grained sandstone; abundant, random, very small (<lmm) clear prisms, presumably of quartz, are also seen scattered through the sulphide-dominated matrix which forms about 60% of the rock.

Micro : In reflected light the sulphide matrix is seen to consist of texturally heterogeneous masses, loose aggregates and individual crystals about 0.2mm size of pyrite and arsenopyrite, with abundant, highly irregular patches of sphalerite. The sphalerite commonly incorporates *numerous small crystals of arsenopyrite and pyrite.*

Galena occurs locally as crystals and clusters to 0.8mm, and as much smaller (0.0lmm) inclusions in sphalerite.

In fact most sphalerite is quite crowded with minute inclusions of arsenopyrite and pyrite as well as galena, with rare minute blebs of chalcopyrite. Some of these arsenopyrite inclusions enclose finer inclusions of galena.

A161832 : mass of fine granular pyrite, with probable reconstituted colloform textures, incorporating minor sphalerite, rare galena, trace arsenopyrite; ubiquitous carbonate 'matrix'

Macro : About 45% of this rock consists of massive microcrystalline pyrite, including localised scalloped, irregularly colloform patches and branches. A gangue of medium crystalline carbonate 35% in widespread between the pyrite. Irregular patches of reddish brown sphalerite (20%), generally about 3mm but up to 10mm are scattered.

Micro: The abundant pyrite occurs in clusters and aggregates of individual subhedral crystals about 0.2mm size. Commonly these occur in curved (?recrystallised colloform) rims, commonly surrounding the sphalerite grains which occur as anhedral cores. A relict lamellar-form texture is common within much of the pyrite, possibly after an earlier generation of marcasite, or possibly replacing a silicate mineral.

Accessory small (0.2mm) grains of galena occur in some sphalerite, adjacent to the pyrite rim. Rarer small blades of arsenopyrite also occur in some sphalerite grains.

A161833 : massive fine bladed hematite, partly replaced by magnetite; in a matrix of extensively oxidised carbonate; minor patches of vein quartz.

Macro: A mass of randomly interlocking, small blades of hematite, with a completely oxidised matrix incorporating minor small clusters and single prismatic crystals of vein quartz.

Micro: The hematite blades vary in size up to 0.5 x 5mm long form about 50% of the rock, randomly interlocked in a loose aggregate.

Areas between blades, essentially as a matrix consist of micro-porous to almost earthy secondary iron oxides, and poorly preserved relict textures suggest that this derived mainly from carbonate but possibly with minor calc-silicates, including garnet? Fresh magnetite is locally enclosed in the hematite blades, and appears to be partly replacing them. This magnetite is probably the variety 'mushketovite' formed by changes in oxygen pressures during metamorphism (of hematite).

A161834 : massive sphalerite, incorporating chaotic networks of pyrite and minor galena; cut by zoned veins of sphalerite + galena, and outer margins of carbonate.

Macro: Mostly a massive ore of fine granular sphalerite cut by a sub-equal abundance of fine pyrite in chaotic networks and veinlets. At one end of the large slab however, there is an irregular vein of at least 20mm wide, of coarse crystalline sphalerite + galena in the core, an outer rim of carbonate with scattered pyrite. Some of the patches of pyrite in the massive ore are subrounded, and fractured. Accessory galena is scattered.

Micro : The massive ore consists of an aggregate of a medium crystalline aggregate of sphalerite, with abundant random veins and granular aggregates of pyrite, variably continuous throughout. Galena forms up to possibly 5% of the ore, as scattered grains commonly about 0.8mm size but up to 2.5mm, and as veins commonly 'intergranular' to pyrite, variably continuous for distances up to 20 mm. Cleavages in the galena are commonly distorted, particularly in the galena in the coarse vein of sphalerite.

A161835 : layered massive crystalline carbonate (?siderite) rock, rare, disseminated, fine arsenopyrite; composite layer of pyrite + rare pyrite and trace graphite, rare single grains of chalcopyrite.

Macro : Most of this sample consists of a medium to quite coarse aggregate of carbonate crystals, probably siderite, including several voids protruded into by calcite crystals. This is cut by, or indeed is interlayered with a layer-vein of pyrite, incorporating lenses of carbonate and an adjacent layer-vein of very fine grey sulphide crystals.

Micro : Under the mineragraphic microscope, the siderite aggregate is seen to contain minor (2%) very fine (0.08mm), crystals of arsenopyrite, rarer pyrite and even rarer chalcopyrite.

Grains of pyrite and arsenopyrite increase in size and abundance in a layer about 5mm wide, adjacent to the layer-vein of concentrated pyrite. Patches and internal veinlets in the main pyrite layer are distorted. Accessory arsenopyrite occurs in the pyrite in this composite layer.

The fine crystals of grey sulphide, in a less well-defined layer, noted macroscopically are arsenopyrite, in loose clusters and stringers, with rare pyrite and trace graphite.

A161836 : *massive carbonate (?siderite), which appears to replace a former breccia; veins and patches of quite coarse, Fe-deficient sphalerite, minor galena and rarer localised fine pyrite.*

Macro : This sample is dominated by a massive aggregate of medium crystalline carbonate, probably siderite. This carbonate incorporates several patches about 10mm across, with diffuse margins, which appear to be relicts of a pre-existing breccia clasts (of fine grained sediment or volcanic?). Thus the breccia seems to have been invaded and extensively replaced by introduced carboante.

Patches, simple and composite veins of amber sphalerite are widespread to form about 20% of the rock. Minor galena locally accompanies the sphalerite.

Micro: The mineragraphic study confirms the identity of the iron-deficient sphalerite, with rare small (0.1mm) inclusions of galena. Minor coarser galena (5mm size) is locally loosely clustered in sphalerite. *Galena grains also rarely occur independently in the siderite.* Small crystals of prite occur in one area about 3mm X 10mm along the margins of some sphalerite and partly in the siderite.

A161837 : massive sphalerite, abundant pyrite locally in clusters of poorly-defined lamellae; rare very fine galena; minor carbonate matrix.

Macro : About 50% of this rock consists of a fine to medium grained massive aggregate of sphalerite. Pyrite (about 30%) has an overall vaguely layered distribution, but within the poorly defined layers about 20mm thick the pyrite occurs in random 'sprays'. A carbonate gangue is widespread, intergranular to the sulphides.

Micro : The micro-scale study comfirms massive and quite coarse sphalerite, which is Fe-deficient, incorporating pyrite. The pyrite occurs as subhedral to euhedral crystals in aggregates, which on a broader scale are commonly in groups of lamellae, and this texture at least, suggests that the pyrite may replace pre-existing bladed hematite.

Rare grains of galena, 0.01 to 0.5mm are very sparse in some sphalerite grains.

A161838 : breccia of shale or fine tuff; permeated by clays (± carbonate?); minor small generally isolated grains of pyrite, galena, sphalerite, and lamellar marcasite in several clusters.

Macro: This rock has a broad scale breccia structure, developed within a reasonably homogeneous mid-grey 'shale' or possible fine tuff. This permeated by an irregular network of pale brownish clays (±carbonate?), locally with minor generally small sulphide grains. Total sulphide content is 7-10% of the whole rock.

Micro : in polished section the sulphides are identified as mostly fine granular pyrite; minor clusters of filaments of marcasite; granular sphalerite and galena generally accompanying the granular pyrite. Galena occurs between lamellae in some clusters of marcasite.

Trace minute exsolution inclusions of chalcopyrite occur in sphalerite.

A161839 : massive calcite and subordinate siderite, rimmed by bands of pyrite with rare chalcopyrite and ??niccolite, also thinner rims of sphalerite; minor ?breccia clasts of pelite or fine tuff as in 161838

Macro: Core sample. Small areas (?breccia clasts) on this core consist of mid grey pelitic sediment (or fine tuff), probably the same as the rock in 161838.

Areas between, forming 2/3 of the sample consist of white crystalline carbonate (?calcite or dolomite) with domains of pale brownish probable siderite. Rims to 5mm wide around the carbonate are of coarse pyrite, and more locally of thinner rims of fine grained sphalerite.

Micro: The band-like rims of pyrite consist of an aggregate of medium grained pyrite, without any particular characteristics. This pyrite does however contain sparse chalcopyrite as inclusionsand in rare intergranular areas; also minor, irregularly granular sphalerite $\pm$ chalcopyrite occurs around the outer margins of pyrite.

Locally, very small (0.1mm) grains with an optically, pale yellow-cream colour, and very strongly anisotropic blue to yellow, accompany chalcopyrite + sphalerite, in pyrite. The identity of this is not certain, but objectively the optical properties suggest possible heazlewoodite (Ni_3S_2) - although the associations make this unlikely, or possible niccolite NiAs. At X600 magnification it is very locally seen to have an intimate zonal intergrowth with pyrite.

This thin rims of fine granular sphalerite mentioned above, contain numerous inclusions of fine pyrite, and of rarer pyrrhotite. Rare very small grains of pyrite, and the ?niccolite mentioned above, are scattered through the calcite aggregate.

A161840 : fractured/brecciated shale, weakly pyritic; veined by thick calcite vein with sparse Pb-Zn sulphide, also by more extensive chaotic veins of quartz, sphalerite, galena, accessory inclusions of tetrahedrite and pyrargyrite in galena, chalcopyrite in sphalerite.

Macro : One half of this rock consists of a band of iron-stained, medium-crystalline carbonate (calcite), probably a vein, containing several slivers of fractured grey shale. The other half consists of a brecciated grey shale, extensively permeated by a network of veins and stringers, of quartz and stringers.

Micro : In polished section the shale is seen to contain sparse, disseminated, extremely fine grains of pyrite. Rare (<1%), small (0.1mm), grains of pyrite, galena and sphalerite are scattered through the calcite vein, and indeed commonly occur in quartz veinlets, within the calcite.

Quite coarse anhedral grains and small aggregates of galena and sphalerite are widespread through the veining in the brecciated shale, mostly within a gangue of small sparry quartz crystals, and each of these sulphides forms about 15% of this mineralised breccia.

Accessory small (0.05 to 0.3mm) inclusions of tetrahedrite and of rarer pyrargyrite occur in some galena grains. More numerous, but minute (0.005mm) exsolution inclusions of chalcopyrite occur in some sphalerite grains. Stringers and threads of galena are also common in sphalerite.

019

A161841 : massive sphalerite, locally with abundant inclusions of galena, rare minute blebs of chalcopyrite; incorporating minor aggregates of pyrite; carbonate gangue.

Macro: A massive aggregate of fairly coarse crystalline sphalerite, incorporating minor irregular areas of pyrite (20%) with a vaguely layered distribution; also with a widespread, intergranular gangue of carbonate (15-20%).

Micro: The extensive sphalerite is seen under the mineragraphic microscope to be Fe-deficient, (consistent with sphalerite in all samples in this suite). Inclusions are locally abundant in this sphalerite, they include minute 0.005mm) exsolved blebs of chalcopyrite, and more abundant grains of galena ranging in size up to 0.1mm. Minor coarser grains of galena and pyrite (1mm) are also locally abundant in sphalerite.

The pyrite domains consist of irregular aggregates of subhedral to euhedral pyrite crystals.

A161842 : *massive crystalline carbonate rock; minor scattered pyrite with lesser associated sphalerite, galena; one composite grain of galena, sphalerite, tetrahedrite (rare ?heazlewoodite as in 161839)*

Macro: fine to medium grained, crystalline mass of carbonate (?ankerite or siderite); minor (10%) scattered grains, clusters and threads of sulphide.

Micro: Microscopically, the scattered sulphides are seen to consist of subhedral to euhedral pyrite crystals, average size about 0.5mm, in small clusters up to 5mm across, and smaller crystals in rare veins and stringers. *Minor crystals of pyrite* are also scattered as individuals.

Fine grained (0.05mm) galena is commonly intergranular to many of the pyrite clusters, but form <1% of the whole rock.

Several anhedral crystals of sphalerite (1-2% of the whole rock), up to 3mm across locally accompany pyrite.

One composite sulphide grain in the carbonate, 1mm in size, consists of galena, sphalerite, tetrahedrite and the bright pale yellow-cream coloured anisotropic mineral, tentatively identified as *niccolite* in 161839,(or possible heazlewoodite).

A161843 : massive vein-carbonate, incorporating zoned domains with outer rims of sphalerite enclosing carbonate; minor small inclusions of pyrite, galena, tetrahedrite and rarer chalcopyrite, all in sphalerite.

Macro : This sample appears to represent an irregularly zoned vein. The polished surface is dominated by a wavy lens 20mm x 40mm, with an outer rim of sphalerite 6mm wide, surrounding a zoned core of crystalline carbonate. Similar rims of sphalerite within, and enclosing carbonate aggregate are adjacent to and locally join the central lenticular enclosure.

Numerous small drusy voids are surrounded by inwardly protruding sparry carbonate crystals. The carbonate aggregate is locally extensively oxidised.

Micro : The 'ore-mineralisation' is restricted to the bands or zones of coarse grained sphalerite, i.e. there are no disseminations through the carbonate aggregate. This sphalerite contains accessory inclusions up to 0.8mm size, of galena tetrahedrite, pyrite, and rarer fine chalcopyrite, (including minute exsolution blebs of chalcopyrite). Tetrahedrite locally accompanies chalcopyrite and pyrite and it is partly oxidised.

A161844 : breccia of vein-carbonate, and rock replaced by carbonate; more or less cemented by coarse galena, lesser sphalerite, rare pyrite; trace minute blebs of ?Ag-sulphosalt in some galena.

Macro: This rock has a breccia fabric, with breccia-clast-like domains about 10mm across, more or less cemented by, and rimmed by sphalerite. Some of these domains consist entirely of crystalline carbonate of possible vein origin, but some have a relict fine granular to fine fibro lamellar texture, with minor disseminated pyrite and appears to be a former rock, pervasively replaced by carbonate.

Micro: Under the mineragraphic microscope, areas between the clasts are seen to consist of coarse galena (15% of the whole rock) and minor, closely associated sphalerite (3-5%). Inclusions of sphalerite to 0.8mm are fairly common in galena. Trace, very small (0.03mm) bleb-like inclusions of a probable Ag sulphosalt occur in some galena grains.

Stringers and inclusions of galena occur in most sphalerite. Small clusters of pyrite crysals occur locally, and closely spaced trains of pyrite occur along a shear at the edge of the sample.

A161845 : gangue of carbonate incorporating scattered quite coarse pyrite, sphalerite with galena which encloses abundant tetrahedrite, rarer associated ?boulangerite.

Macro : About 50% of this rock consists of fine to medium grained, crystalline carbonate. Irregular grains of pyrite (30%) are evenly scattered; and sphalerite (20%) is also scattered but less widespread.

Micro: At a microscopic scale the scattered coarse pyrite crystals are fairly straight forward, although the sphalerite and galena moulding around these grains creates some quite complex embayment intergranular contacts.

The sphalerite is more complexly intergrown, with more galena, mostly around its margins, and this sphalerite is crowded with more minute exsolution blebs of chalcopyrite, than in the other samples described above. The galena, which forms about 5% of the rock is also more complex than in the other samples because it is intricately intergrown with a subequal abundance of tetrahedrite (3-5% of the whole samples). At least one other mineral, but possibly two are very closely locally associated with tetrahedrite-galena intergrowths. One is pale grey-blue to white and weakly but distinctly anisotropic (but without internal reflection which may have suggested a ruby-silver phase). This mineral is possibly boulangerite $5PbS.2Sb_2S_3$. The other is more definitely white (like galena), but distinctly anisotropic, and is tentatively regarded as jamesonite ($4PbS.FeS.Sb_2S_3$). These identifications are made largely on the basis of XRD determination of the same minerals, with essentially the same optical properties from sample A161848.

A161846 : angular block of fine sandstone with small shale clasts, bounded by vein-carbonate with coarse galena and sphalerite in one vein.

Macro : About 60% of this small piece of core consists of a pale grey, fine sandy sediment, with numeros, small tabular clasts of darker grey shale. A band either size of this rock fragment consists of vein-carbonate; and one of these carbonate veins carries coarse sphalerite and galena.

Micro : The rock (and rarely the shale clasts in it), contain sparse fine pyrite grains. The coarse sphalerite in the one carbonate vein contains rare minute exsolution blebs of chalcopyrite and apparent pyrrhotite.

The sphalerite has a simple contact with equally coarse galena which continues on in the vein. This galena is free of inclusions.

A161847 : coarse galena, enclosing several small grains of sphalerite, cut by a carbonate vein.

Macro: At least 75% of this small piece of core consists of massive, coarse crystalline galena. A thin irregular vein of carbonate cuts through it, and accessory grains of sphalerite (5-7% of the rock) are scattered.

Micro: At a *micro* scale the galena is confirmed as homogeneous coarse crystalline mass, with *no* inclusions, except for several grains of sphalerite, the largest of which is 3 x 8mm. Minor threads and small inclusions of galena occur in the sphalerite, and in the carbonate vein noted above.

A161848 : massive crystalline carbonate gangue; subordinate patches of boulangerite intergrown with ?bournonite, incorporating chalcopyrite also rare small arsenopyrite and tetrahedrite; also patches-veins of loose-packed pyrite with intergranular boulangerite and/or chalcopyrite rarer galena and tetrahedrite; (rare jamesonite also detected by XRD).

Macro: several irregular patches, veins and networks of a grey sulphide enclosing yellow chalcopyrite, also networks of fine pyrite veinlets, are widespread through a gangue of quite coarse crystalline carbonate. The sulphides form about 30% of this core sample, the carbonate about 70%.

Micro: The grey sulphide (20% of the sample) forms quite extensive masses of fine grains and intergrown micro sheaf-like bundles of crystals. It is seen in reflected light to be a pale bluish grey, but as mottled-intergrowths and to be strongly anisotropic. These optical properties and the association suggests possible lautite (CuAsS) intricately intergrown with ?bournonite $2PbS.Cu_2S.Sb_2S_3$.

The identity of this mineral was resolved by XRD however, as boulangerite ($5PbS.2Sb_2S_3$) with minor jamesonite, although the pattern was not particularly good.

This boulangerite incorporates abundant small irregular patches of chalcopyrite, and much smaller, much less abundant grains of tetrahedrite. Minute crystals of arsenopyrite also occur as sparse inclusions, but locally clustered around the margins of some lautite.

Accessory minute rhombs of arsenopyrite are also scattered through carbonate.

Pyrite occurs as loose clusters of euhedral crystals in patches and veins, commonly partly surrounded by, and filled between by the lautite and/or chalcopyrite; rarer galena and/or tetrahedrite.

A161849 : texturally heterogeneous, massive carbonate gangue, veins and scattered aggregates of variably intergrown galena, lesser sphalerite, arsenopyrite; rarer chalcopyrite and tetrahedrite as inclusions in galena.

Macro: About 65% of this rock consists of massive, fine crystalline carbonate. Highly irregular veins, loose-aggregates and some vague fine porous layers of sulphide have a heterogeneous distribution, and some sulphide surrounding relatively barren carbonate domains, suggests that those domains may be large breccia clasts within a mineralised matrix.

Micro: The main coarse crystalline sulphide in the most prominant veins and patches is galena, but this contains accessory to numerous inclusions ranging in size from 0.03 to 1mm of chalcopyrite, sphalerite and rarer tetrahedrite.

Arsenopyrite occurs as small rhombs, locally loosely clustered, and/or concentrated to form criss-crossing lamellae. Tetrahedrite is locally very abundant in galena as clusters of minute (0.03mm), probable exsolution inclusions.

Sphalerite locally occurs in coarse anhedral grains with rare minute exsolved chalcopyrite. Accessory subhedral crystals of pyrite are scattered, more or less independently of the other sulphides.

A161850 : mass of carbonate crowded with abundant randomly scattered small crystals of galena and/or boulangerite; coarser galena and sphalerite in veins and patches; abundant boulangerite admixed with galena.

Macro: Most of this sample consists of a massive crystalline aggregate of carbonate, crowded with fine dark grey sulphide. A vein about 10mm wide cuts this aggregate, it has a core of carbonate bounded by variably continuous coarse galena, and with an outermost rim on one side of coarse sphalerite.

Micro: In microscopic detail it is confirmed that galena and the outer band of coarse sphalerite are the main sulphides in the coarse crystalline vein. Finer galena is the dominant sulphide scattered through the carbonate gangue.

At least 10% of the galena is crowded with extremely fine inclusions of boulangerite (± jamesonite), as needle-shaped crystals and aggregates of these. These minerals are also widely scattered as individual minute prisms and 'slinters' ± galena, mainly around the outer margins of the galena-boulangerite intergrowths.

The identity of this boulangerite was established by XRD.

Minor anhedral grains of sphalerite, 0.2mm size, are scattered through coarse galena, and through the carbonate gangue, (as well as the zone in the coarse vein). Rare small crystals of pyrite are scattered.

029

A213093 : vein of carbonate (?siderite) with altered clasts, crowded with pyrite and arsenopyrite; adjacent to altered rock with veins of carbonate quartz and clay; scattered patches of pyrite ± arsenopyrite, with local rare interstitial ?bournonite or boulangerite; also patches of sphalerite + minor galena.

Macro: A vein of siderite 10mm wide across this core carries small completely altered clasts of rock, crowded with fine sulphides. Adjacent to this is a zone of altered rock veined by quartz, carbonate and clays with scattered sulphides. (The composition of the altered rock would need to be determined in thin section).

Micro: Sulphides in the clasts in the carbonate vein are subhedral to euhedral pyrite and subordinate arsenopyrite. Sulphides in scattered patches in the altered rock also consist of pyrite, commonly as zoned crystls, and minor more localised arsenopyrite.

Very locally, rare amounts of a very fine granular (to 0.1mm), optically bright yellowish-pale-blue grey and strongly anisotropic mineral are intimately intergrown with the pyrite-arsenopyrite aggregates. This seems most likely to be bournonite or the boulangerite as identified in several other samples above.

Several irregular patches of sphalerite, up to 10mm across are also scattered, and these enclose minor small to extremely small inclusions of galena, and rarer minute chalcopyrite blebs.

A213094 : galena and sphalerite in a carbonate gangue; locally in weakly zoned domains with a core of carbonate, bordered by sphalerite/galena; trace pyrite.

Macro: The central pat of this polished slab consists of thin highly irregular (and possibly relict colloform) zonal layers of sulphide enclosing a medium to coarse crystalline aggregate of carbonate (siderite); total wide about 30mm. Fine grained ore either side of this is relatively massive, with an extensive carbonate gangue.

Micro: The zoned layers noted above consist of sphalerite and galena, these may be intergrown as irregular grains or bands of mostly coarse sphalerite, may be rimmed by finer crystalline galena. These sulphides are also scattered through the central carbonate core zone.

Areas both sides of the zoned domain consist of equally irregular, but generally smaller grains of sphalerite and galena, randomly scattered through carbonate gangue as individuals or composite grains.

Rare small crystals of pyrite are present.

A213095 : massive to vaguely, broadly layered sphalerite-galena ore, *minor scattered pyrite; thin vein of quartz* contains crystals and clusters of arsenopyrite, rare chalcopyrite, as well as Pb-Zn sulphides.

Macro: Most of this sample is of massive Pb-Zn ore, albeit with very vaguely defined layer 20mm thick almost entirely of galena, grading into another vaguely defined layer of sphalerite, but which incorporates irregular grains of galena and pyrite. A vein of quartz to 10mm wide is confirmable to the layering, gradational into galena/ sphalerite aggregate.

Micro: Under the mineragraphic microscope the coarse massive galena is seen to carry accessory grains of sphalerite, rare single crystals of pyrite, also several very small aggregates of euhedral pyrite crystals, and rare very small grains of tetrahedrite. Sphalerite contains more abundant inclusions of galena.

Small (0.15mm) arsenopyrite crystals occur locally in the quartz vein, and in several small clusters, within sphalerite/galena/pyrite adjacent to the quartz vein. Rare small grains of chalcopyrite occur in the quartz vein.

A213096 : massive very coarse pyrrhotite; incorporating vein minor arsenopyrite, lesser carbonate and chalcopyrite.

Macro: Probably the most homogeneous, massive, finest grained sulphide sample in the suite, and distinctive in that it consists almost entirely of iron sulphide.

Micro: The iron sulphide is pyrrhotite. Accessory, small grains and rare veinlets of carbonate are scattered through it. Rare small (0.2mm) grains of chalcopyrite are also present.

Several subhedral to euhedral crystals of arsenopyrite constitute a discontinuous veinlet, several arsenopyrite crystals occur independently.

A213097 : massive fairly coarse crystalline aggregate of carbonate (?siderite): discontinuous vein of coarse galena + rare sphalerite, rare extremely fine grains and threads of galena.

Macro: At least 75% of this sample consists of a medium grained crystalline mass of carbonate, probably siderite. An irregular discontinuous vein of mostly coarse anhedral crystals of galena cut through this aggregate.

Micro: In microscopic detail the coarse galena noted above is confirmed to be essentially monomineralic. In the vicinity of the galena vein, there are abundant extremely small (0.01 to 0.1mm) grains and short irregular stringers, intricately intergrown within the gangue. Similarly very small grains and stringers are extremely rare in the gangue, away from the vein.

Rare sphalerite locally accompanies the galena.

A213098 : vaguely layered to massive carbonate aggregate, incorporating a composite and locally zoned vein of sphalerite-galena; rarer scattered Pb-Zn sulphides.

Macro: About 60% of this sample consists of fairly coarse crystalline carbonate gangue, probably siderite. This is cut through by a complex vein of sphalerite and galena, overall width about 25mm, but with several internal zones, some of which are contorted, or form zoned-ovoidal sub-domains.

Macro: It is confirmed in reflected light that the composite veins consist mostly of sphalerite, but with outer rims of galena, locally up to 5mm wide; also thin stringers, veins or zones of galena, within, but conformable with the sphalerite vein margins.

Rarely the contorted areas of sphalerite enclose a drusy void partly occupied by sparry carbonate crystals.

Minor grains of sphalerite about 3mm size; and minor grains of galena, separately and composite with sphalerite are sparsely scattered through the carbonate gangue outside of the main composite vein.

A213099 : massive aggregate of fine pyrite with local curvi-layer structure; smaller, vaguely layered gradational zones of galena/pyrite, into sphalerite/pyrite.

Macro: This is one of the more massive ore samples in the suite, with at least 66% of it composed of an aggregate of pyrite, with minor interstitial carbonate gangue. Grey sulphide is aggregated with pyrite in the other 33%.

Micro: In microscopic detail the pyrite (very poorly polished) is seen to be basically a fine granular aggregate, but locally with a broader, vague, curvi-layered structure. In the pyrite aggregate, carbonate fills highly irregular intergranular areas and veinlets, with rare isolated grains of galena, and of sphalerite.

In the one third area noted above, irregular grains and patches of sphalerite and pyrite form a massive aggregate; but with one band of galena/pyrite, 10mm wide, between the massive pyrite aggregate and the pyrite/sphalerite zone.

A213100 : massive lamellar-form pyrrhotite aggregate, very extensively converted to secondary pyrite, incorporating a clay-rich gangue; rare chalcopyrite and magnetite.

Macro: This sample consists of massive fine grained aggregate largely of iron sulphide. Superficially it is rather like 213096, but in fact the sulphide is aggregated with a subordinate amount of gangue (40% of the rock), which is partly carbonate, but appears to include abundant clays.

Micro: At a micro scale the rock is seen as a massive, random, very fine scale network of micro porous pyrite, with optical properties gradational to marcasite, to suggest that it is secondary pyrite. The network incorporates the largely clay-rich gangue.

Small local areas, which take a better polish, are of quite coarse lamellar-form and more massive pyrrhotite (like 213096). The secondary pyrite grades into the pyrrhotite. Indicating that it probably formed by conversion of the original pyrrhotite.

Rare small grains of chalcopyrite and of separate magnetite occur in the secondary pyrite aggregate.

A213172 : brecciated, altered rock, with graphite in micro-breccia areas; veins of sphalerite, some with outer zone of very fine arsenopyrite ± rarer pyrite and galena; veins of siderite carrying sparse small grains of pyrite and arsenopyrite.

Macro: About 80% of this sample consists of a massive aggregate of altered and apparently microbrecciated rock, including numerous scattered quartz grains which may be part of the original rock, or disrupted quartz veins. This mass is extensively permeated by network veinlets of clays; thicker veins of siderite and separate veins of sphalerite.

Micro: In reflected light the sphalerite veins, which form up to 10% of the whole rock are seen to carry accessory small grains of galena and trace pyrite, and locally to have thin marginal zones of micro-crystalline arsenopyrite, with minor pyrite, and rarer galena which in turn forms a margin along adjacent siderite veins.

The siderite veins selectively carry accessory, small euhedral crystals of pyrite and arsenopyrite.

Numerous clusters and trains of fine graphite are fairly abundant through micro-brecciated areas within the fractured host rock, also rarely graphite is incorporated in siderite veins.

A213173 : massive, crystalline carbonate gangue; minor scattered small composite grains of chalcopyrite, galena, sphalerite, tetrahedrite ± boulangerite, with very fine inclusions of probable boulangerite also in sphalerite.

Macro: At least 90% of this rock consists of a massive crystalline aggregate of siderite crystals, rather heterogeneous due to internal disrupted veining. Yellow and grey sulphide grains up to a maximum size of 5mm are scattered to form about 5% of the rock.

Micro: The sulphide grains mentioned all have a composite composition mostly of chalcopyrite, galena and sphalerite, in variable but commonly subequal abundance. The size of individual phases in these poly-sulphide grains commonly varies between 0.1mm and 2mm.

Irregularly anhedral grains of tetrahedrite, also ranging in size from 0.1 to 2mm occur in many of the composite grains, randomly associated with the other phases. The same mineral with the same mode of occurrence as in 161850, and identified as boulangerite, occurs in (and indeed may be dominant in) some composite grains, where it is intricately intergrown with tetrahedrite, and/or galena, also with minor chalcopyrite. Where this assemblage is composite with sphalerite, minute lath to splinter and acicular inclusions of this same boulangerite also occur in the sphalerite together with abundant, minute, exsolved blebs of chalcopyrite.

Outside of the macroscopically visible sulphide grains, there are accessory (3-5% of the whole rock), much smaller 0.01 to 0.5mm grains of galena ± tetrahedrite ± ?boulangerite dispersed through the siderite aggregate.

A213174 : massive aggregate of galena, incorporating minor scattered sphalerite, and accessory pyrite including some spheroidal/framboidal pyrite.

Macro: This is a massive aggregate of dark grey sulphide, mostly galena, studded with minor (20%) grains and small patches of sphalerite, and rarer pyrite; all with a vaguely layered distribution.

Micro: The bulk of the rock is confirmed as coarse massive galena, enclosing the scattered anhedral grains and small patchy aggregates (0.05mm to 15mm) of sphalerite noted above. Some cleavages in galena are locally curved.

Small (0.1mm) crystals of pyrite (2-3%) are scattered through the galena, and some of these pyrite grains have a spheroidal/framboidal form. Rare small aggregates of subhedral pyrite crystals are veined by galena.

There is no exsolved chalcopyrite in the sphalerite in contrast to this association in most sphalerite in other samples in this suite.

A213175 : massive crystalline siderite gangue; areas of sphalerite veining incorporating galena pyrite, rarer chalcopyrite, tetrahedrite rarer ?boulangerite rather separate aras of quite coarse pyrite and arsenopyrite aggregate.

Macro: About 70% of this sample consists of a gangue of massive crystalline siderite. Irregular patches to 20mm across, and contorted 'veins' or layers 3mm wide, variably of pyrite (15-20%) and of sphalerite + galena (10-12%) have a random distribution within the carbonate.

Micro: The sphalerite incorporates numerous galena and pyrite crystals up to 5mm maximum dimension; also numerous, much smaller (0.05mm) euhedral crystals of arsenopyrite locally in small clusters enclosed withn the galena. Rare very small inclusions of tetrahedrite occur in rare galena crystals. Rare very fine scale (0.1mm) skeletal networks of distinctly anisotropic boulangerite occurs locally in sphalerite. Minute blebs of chalcopyrite occur in sphalerite, covellite/ chalcocite rims surround some galena grains. Small grains of chalcopyrite occur in some galena.

Most of the pyrite seen macroscopically is localised in patches somewhat away from the base-metal sulphide areas, where it is closely accompanied by a subequal amount of quite coarse crystals of arsenopyrite. Minr sphalerite and galena may be present, more or less cementing pyrite.

A213176 : irregular patchy aggregates of pyrite/arsenopyrite and of pyrite alone, with localised intergranular patches of sphalerite, tetrahedrite, chalcopyrite, rarer galena, trace boulangerite; all in gangue of massive carbonate.

Macro: About 50% consists of crystalline carbonate aggregate mixed with irregular aggregates of sulphide, mostly pyrite and arsenopyrite. Subhedral to euhedral, more distinctly recognisable crystals of pyrite are loosely aggregated along a zone 15mm wide adjacent to a compact aggregate of coarse sparry siderite crystals, as part of a thick vein.

Micro: At a micro scale, minor sphalerite and tetrahedrite, generally with associated galena and chalcopyrite in generally less abundance are seen to locally fill some areas between the rather loose aggregate of pyrite/arsenopyrite, and between the crystals of pyrite in the 15mm wide layer noted above.

Rare trace, minute, acicular laths, and skeletal networks of boulangerite occur in some grains of sphalerite and even less commonly in tetrahedrite. Locally, chalcopyrite is the dominant mineral in some of these complex mineral aggregates in patches up to 8mm across.

A213177 : massive sulphide, with apparent relict breccia structure; heterogeneous aggregates of arsenopyrite, lesser pyrite, filled between by chalcopyrite, galena, sphalerite; lesser tetrahedrite and rarer boulangerite

Macro: In hand specimen this is seen as a heterogeneous, massive, fine grained aggregate of sulphides, with patchy concentration suggesting a relict breccia texture; including indeed one apparent clast of "sandstone" 8mm x 20mm containing scattered fine pyrite, and rimmed by concentrated ?arsenopyrite.

Micro: The patches of sulphide consist of texturally very complex intergrowths of extensive, loose aggregate of subhedral to euhedral and brecciated arsenopyrite crystals, and subordinate pyrite crystals; flooded between and more or less cemented/healed by anhedral grains of chalcopyrite crowded by smaller irregular grains of galena, and rarer sphalerite.

Accessory tetrahedrite accompanies mostly the galena. Minor boulangerite as acicular and ragged blade-like crystals, about 0.1mm size, occur as inclusions in galena, in sphalerite, and out into adjacent carboante gangue, all the same as numerous fine crystals of boulangerite in sphalerite, gangue and chalcopyrite in A213173.

Rims of covellite/chalcocite occur around, or replace some galena grains.

A213178 : gossan mostly of limonite boxwork after carbonate (with some fresh carbonate), minor boxwork/replica after pyrite; probable arsenopyrite, and fine boxwork after possible sphalerite.

Macro: This rock consists of cellular limonite (boxwork), with an irregular network of branches of colloform limonite; i.e. it is essentially a gossan. Minor manganese oxides are scattered.

Micro: much of the boxwork is seen to be after carbonate, and several patches of carbonate gangue. This merges with less clearly defined, fine boxwork, (10-15% of the rock) with abundant acute and vaguely rhombic angles, which may be also after carbonate, but is conceivably after sphalerite.

Minor limonite replica after several clusters of small crystals have the shape of probable original arsenopyrite; and minor boxwork/ replica after small pyrite crystals are scattered.

Accessory fine, fibrous/spherulitic manganese oxides occur inside some limonite cells.

Irregular colloform goethitic branches probably follow boundaries between original domains, (possibly between breccia clasts), or follow fractures.

Geochemical analysis is recommended to highlight the possible presence of original sulphide species, which could not be interpreted from this isolated, objective assessment of textural characteristics.

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Figure 1 A161830 **length of photo 1.4mm**

X120, typical association of galena (gl), enclosing small grains of sphalerite (sp) and rare chalcopyrite (cp); all in carbonate gangue.

Figure 2 A161831 **length of photo 1.4mm**

X120, massive sphalerite (sp), extensively micro-pitted due to poor polish, incorporating prisms of arsenopyrite (ap), crystals of pyrite (py), and larger prisms of quartz.

Figure 3 A161831 **length of photo 1.4mm**

X120, loose aggregate of abundant very small prisms of arsenopyrite (white-acicular), and euhedral pyrite (white-cubic); all in carbonate gangue.

Figure 4 A161831 **length of photo 0.28mm**

X600, oil immersion; abundant minute inclusions of white arsenopyrite crystals in sphalerite.

Figure 5 A161832 **length of photo 2.8mm**
X60, 'ring' of white pyrite crystals, possibly a recrystallised colloform zone, surrounding sphalerite cores. Very dark carboante gangue between pyrite zones.

Figure 6 A161832 **length of photo 1.4mm**
X120, aggregate of pyrite with an inherent sheaf-like to lamellar fabric, (possibly replacing bladed hematite). Irregular mid-grey grains are sphalerite.

Figure 7 A161833 **length of photo 2.8mm**
X60, low magnification of bladed hematite.

Figure 8 A161833 **length of photo 0.28mm**
X600, oil immersion; detail of magnetite (mg) pinkish-brown, replacing bluish-white hematite blades (hm); large microporous areas between blades are oxidised carboante.

Figure 9 A161834 **length of photo 2.8mm**
X60, coarse galena (gl), with distorted cleavage traces, in sphalerite (sp), and loosely aggregated with pyrite (py). Extensive micropitting producing pseudo-porosity due to poor polish.

Figure 10 A161835 **length of photo 2.8mm**
X60, coarse cubic crystal of pyrite, smaller white prisms of arsenopyrite, more or less withn a layer-vein of carbonate.

Figure 11 A161837 **length of photo 2.8mm**
X60, fairly coarse granular and lamellar pyrite, in sphalerite (?replacing bladed hematite).

Figure 12 A161838 **length of photo 2.8mm**
X60, groups of sprays of white lamellar marcasite. Difficult to distinguish, but rare fine galena (example circled) locally occurs between marcasite; all in a ?tuff clast. Lower right corner is carboante gangue between ?clasts.

Figure 13 A161839 **length of photo 1.4mm**
X120, massive pyrite (py), sphalerite (sp), with yellowish-cream, strongly anisotropic mineral ?niccolite, ?heazlewoodite circled.

Figure 14 A161839 **length of photo 0.28mm**
X600, oil immersion; shows pyrite (py) as a greyish colour, intricately intergrown with yellowish mineral with optical properties (particularly anisotropism) of niccolite or heazlewoodite; (but associations suggest that these phases unlikely.)

Figure 15 A161830 **length of photo 1.4mm**
X120, irregular bluish grain of pyrargyrite (circled) in galena. Its size is about 0.15 x 0.3mm.

Figure 16 A161840 **length of photo 1.4mm**
X120, small irregular patchy inclusions of tetrahedrite in galena; example circled.

Figure 17 A161843 **length of photo 1.4mm**

X120, mid-olive-grey tetrahedrite (th), in sphalerite (sp). Small grains pyrite (white), chalcopyrite (yellow) in tetrahedrite.

Figure 18 A161845 **length of photo 1.4mm**

X120, abundant tetrahedrite (th), in galena (gl), all within sphalerite host (sp).

Figure 19 A161845 **length of photo 1.4mm**

X120, also tetrahedrite (th), galena (gl), in sphalerite (sp); but area circled also includes a small grain of ?boulangerite (see figure 20).

Figure 20 A161845 **length of photo 0.28mm**

X600, oil immersion; enlargement of area circled in figure 19 showing ?boulangerite (?), in tetrahedrite (th) in contact with galena (gl).

Figure 21 A161848 **length of photo 1.4mm**

X120, grey mineral is boulangerite, yellow is chalcopyrite; with scattered small white euhedral crystals of arsenopyrite; all in carbonate gangue. Colour mottling in boulangarite may be due to intimately mixed tetrahedrite, or possible jamesonite.

Figure 22 A161849 **length of photo 1.4mm**

X120, example of complex inclusios of one or more sulsphides in another; host is galena with composite inclusion of dark grey sphalerite carrying minute chalcopyrite blebs, with associated mid-grey tetrahedrite.

Figure 23 A161849 **length of photo 1.4mm**
X120, randomly itnerlocking lamellae or blades of euhedral arsenopyrite crystals; pale blue-grey galena between some lamellae.

Figure 24 A161849 **length of photo 1.4mm**
X120, poorly defined micromottling in circled area appears to be exsolved minute grains and micro networks of tetrahedrite (darker) in a host coarse crystal of galena (whiter). Small blades arsenopyrite in gangue around galena.

Figure 25 A161850 **length of photo 1.4mm**
X120, coarse galena (gl), in contact with a rim of vaguely micro-mottled boulangerite (bg), several minute crystals of arsenopyrite.

Figure 26 A161850 **length of photo 1.4mm**
X120, one mode of occurrence of boulangerite (bg) as very irregular small flame-like grains grading to acicular crystals e.g. in circle, in carboante gangue; in and around generally coarser galena (gl), white with triangular pits along cleavage.

Figure 27 & 28 A161850 **length of photo 1.4mm**
X600, oil immersion; detail of intimate intergrowth of boulangerite (bg) (mottled, darker-grey), within and around galena (gl).

Figure 29 A213093 **length of photo 1.4mm**
X600, oil immersion, intricate, extremely fine scale intergrowths of yellowish pyrite (py), whitish galena or arsenopyrite (gl), and ? boulangerite (bg) which in this photo is relatively brownish.

Figure 30 **A213098** **length of photo 2.8mm**
X60, broad zonal arrangement, (possibly recrystallised colloform) of white galena, in mid grey sphalerite; against much darker grey carbonate gangue.

Figure 31 **A213100** **length of photo 0.28mm**
X600; lamellar pyrrhotite, pinkish-brown, altering in-situ to secondary, microporous pyrite (whitish).

Figure 32 **A213172** **length of photo 1.4mm**
X120, graphite flakes, example circled, and small bright white arsenopyrite crystals, in matrix of breccia.

Figure 33 **A213173** **length of photo 1.4mm**
X120, typical complex inclusions in sphalerite (sp), yellow chalcopyrite white galena, mid grey tetrahedrite (th).

Figure 34 **A213173** **length of photo 1.4mm**
X120, texturally complex association of white galena (gl), mid-grey tetrahedrite (th), boulangerite (bg); all within darker grey sphalerite. Abundant minute acicular crystals of ?boulangarite also crowded within the sphalerite.

Figure 35 **A213173** **length of photo 0.28mm**
X600, oil imemrsion, detail of part of figure 34, showing galena (gl), boulangerite (bg) as patches in galena and as minute acicular crystals scattered through dark grey sphalerite (also with minute yellow chalcopyrite blebs.)

Figure 36 A213173 **length of photo 0.28mm**

X600, oil immersion, again to emphasise complex intergrowths (and difficulty to resolve the identity of all phases optically), with galena(gl), tetrahedrite (th), boulangerite (bg), yellow chalcopyrite.

Figure 37 A213174 **length of photo 1.4mm**

X120, small rounded framboidal pyrites (circled); rarer cubic euhedral crystals of pyrite, in galena; adjacent to irregular dark grey grains of sphalerite.

Figure 38 A213175 **length of photo 1.4mm**

X120, dark background to photo is all sphalerite; thin incorporates elongate patch of galena (gl), with minute inclusions of arsenopyrite. The ghost-like skeleton circled in sphalerite is ?boulangerite.

Figure 39 A213177 **length of photo 1.4mm**

X120, further example of complex intergrowth of minerals. The 'white' mineral is variably galena intergrown with boulangerite, galena however is relatively granular, boulangerite is bladed, fibrous and acicular. These phases and yellow chalcopyrite, and minute bright white crystals of arsenopyrite, are all enclosed within sphalerite.

Figure 40 A213177 **length of photo 1.4mm**

X120, abundant acicular crystals of white boulangerite through dark grey sphalerite.

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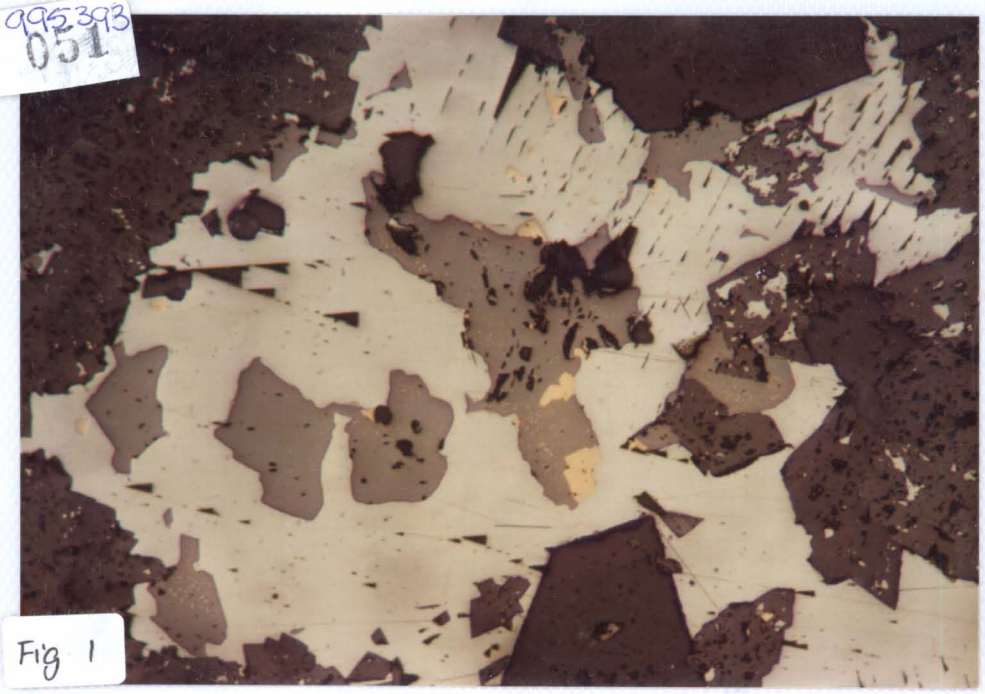

Fig 1

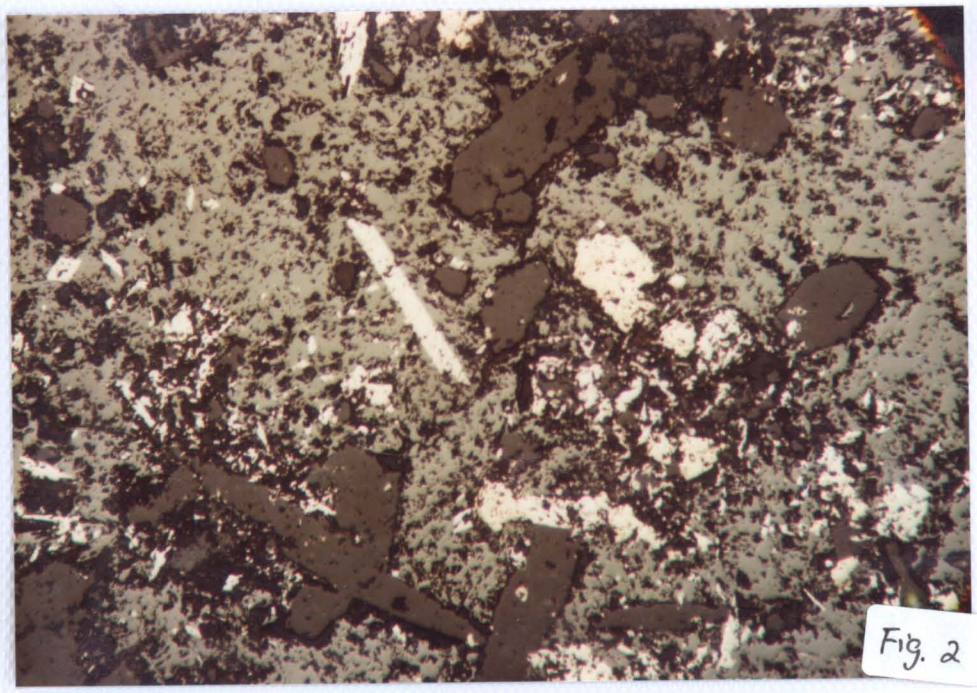

Fig. 2

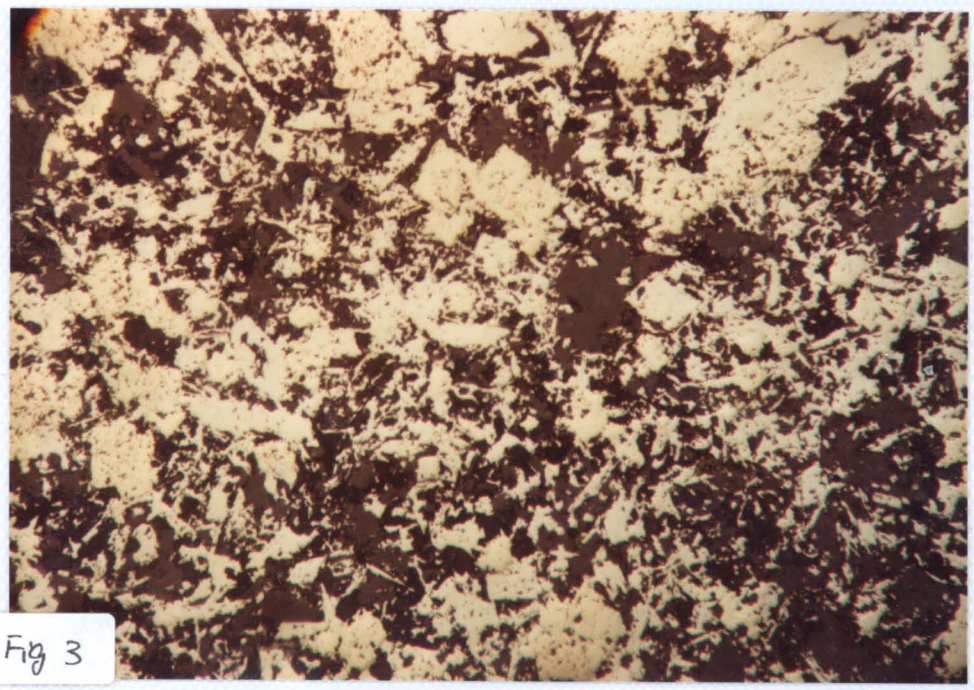

Fig 3

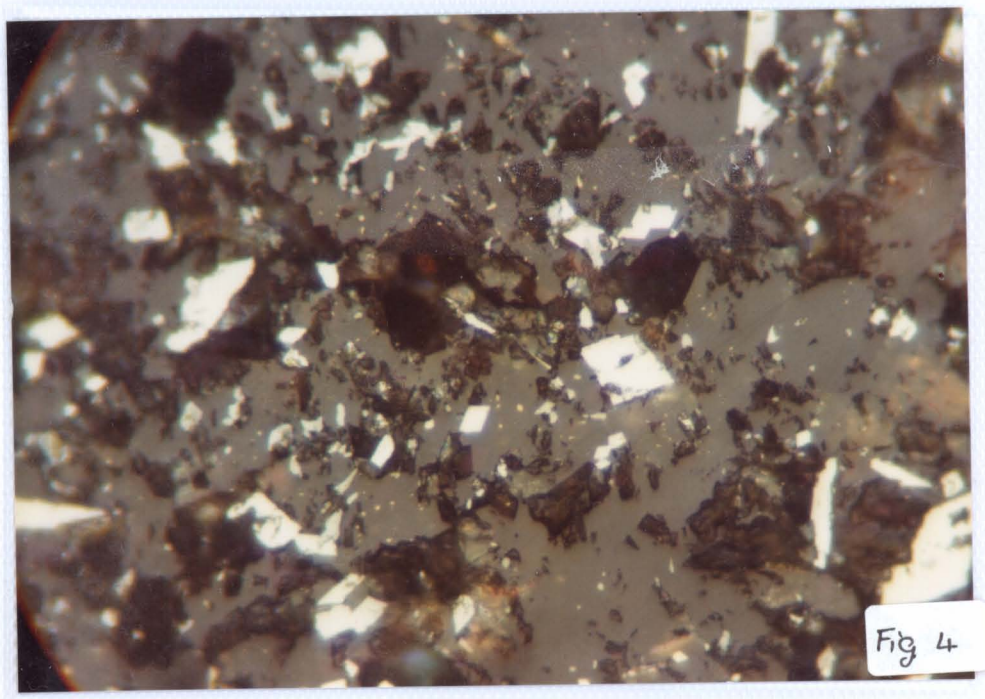

Fig 4

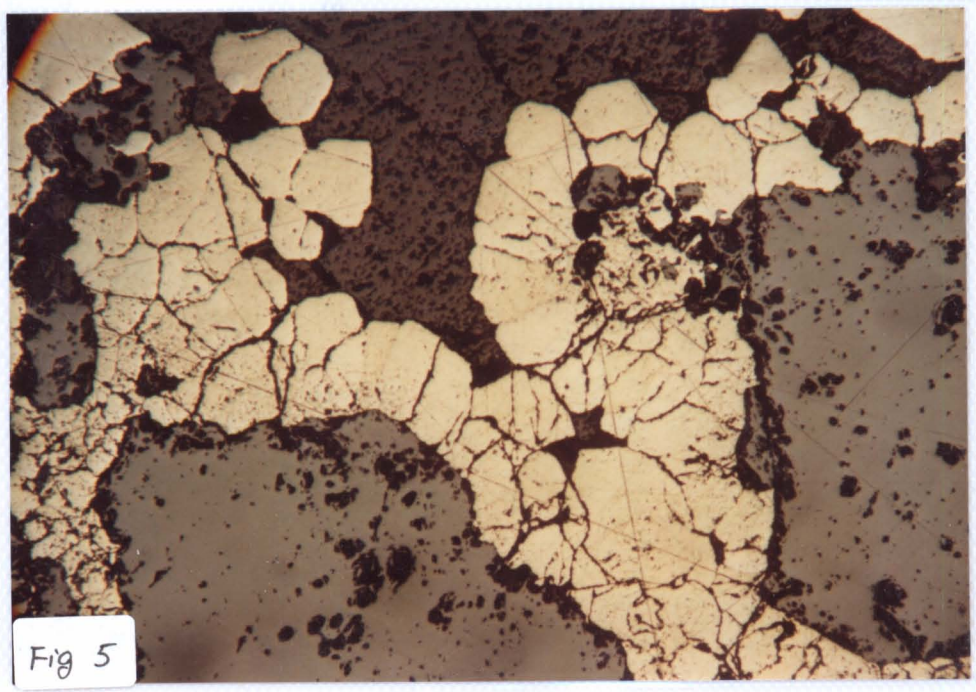

Fig 5

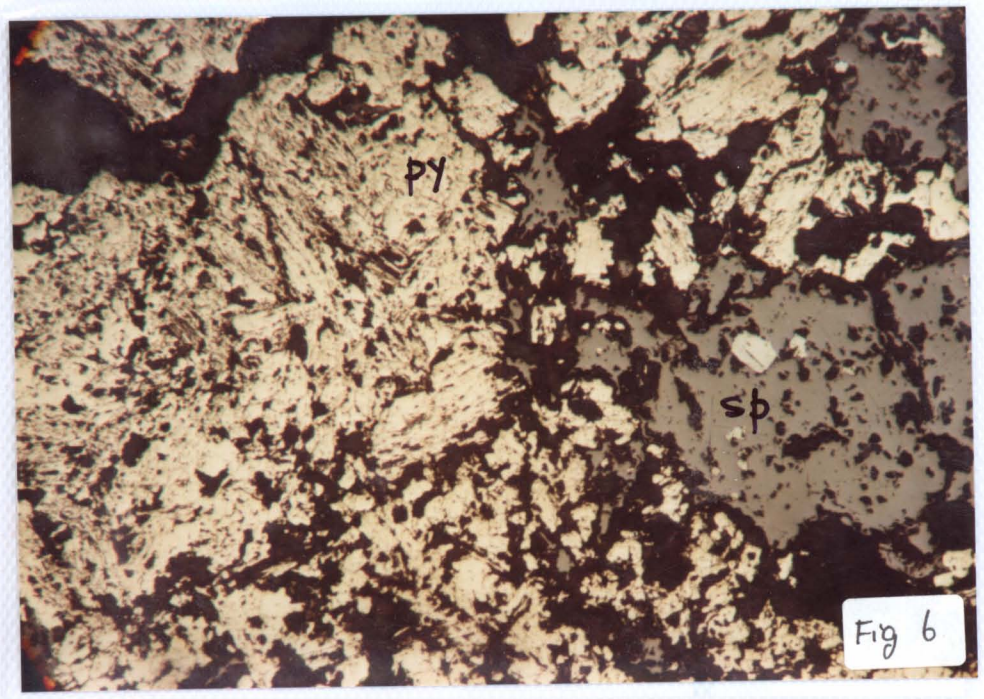

Fig 6

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Fig 7

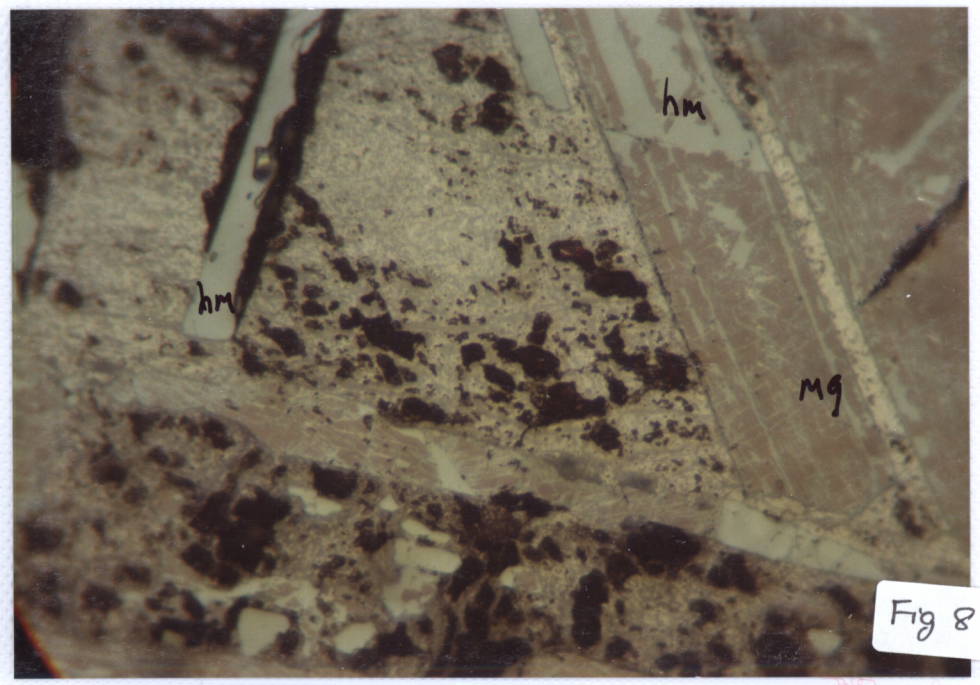
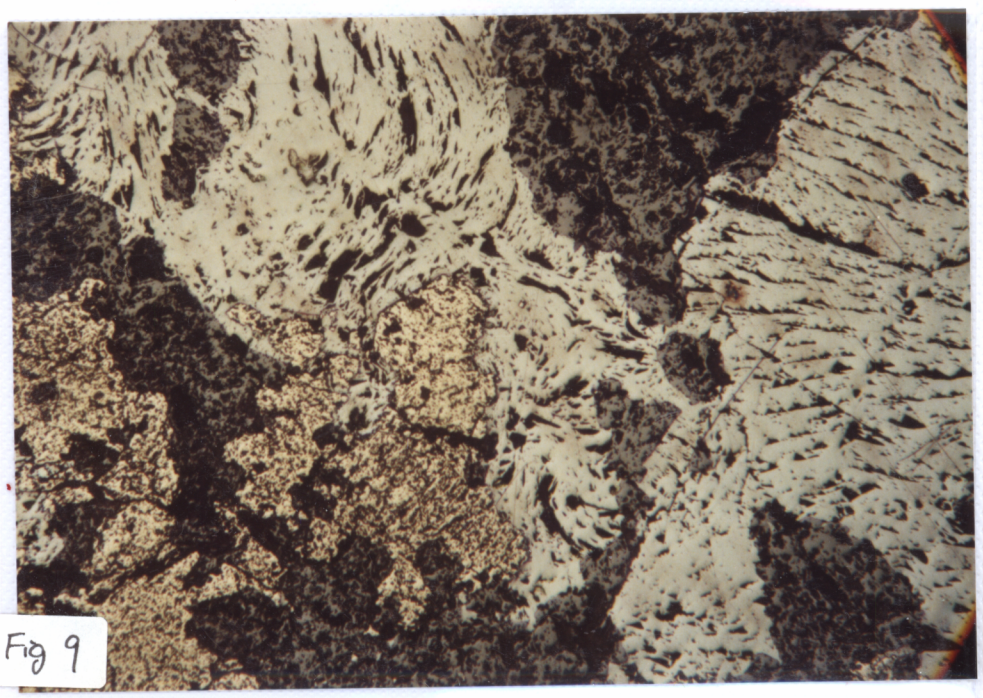


Fig 8



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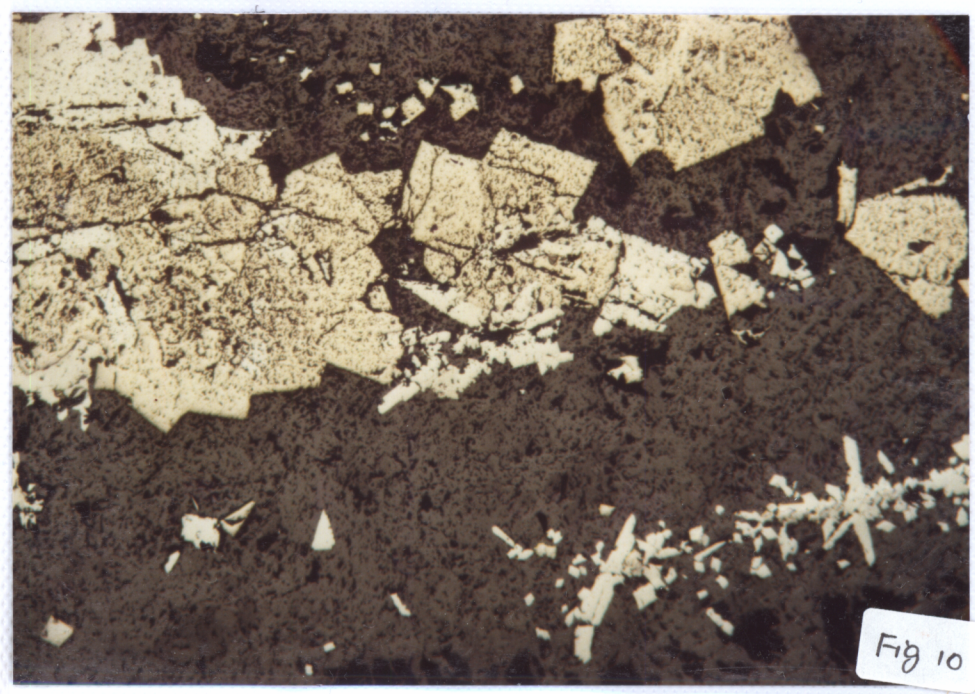
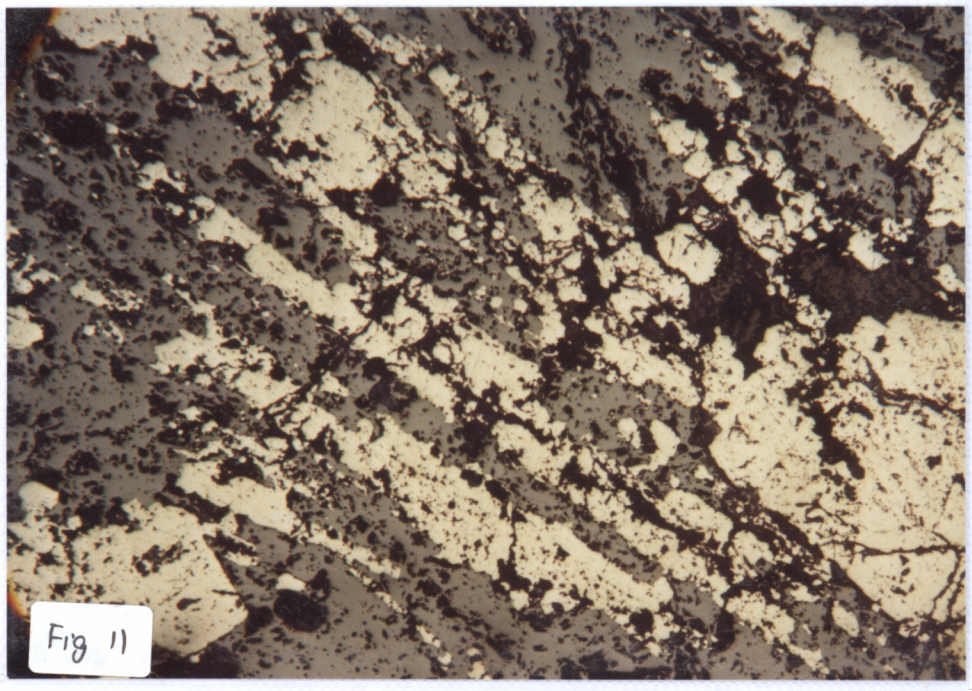


Fig 10



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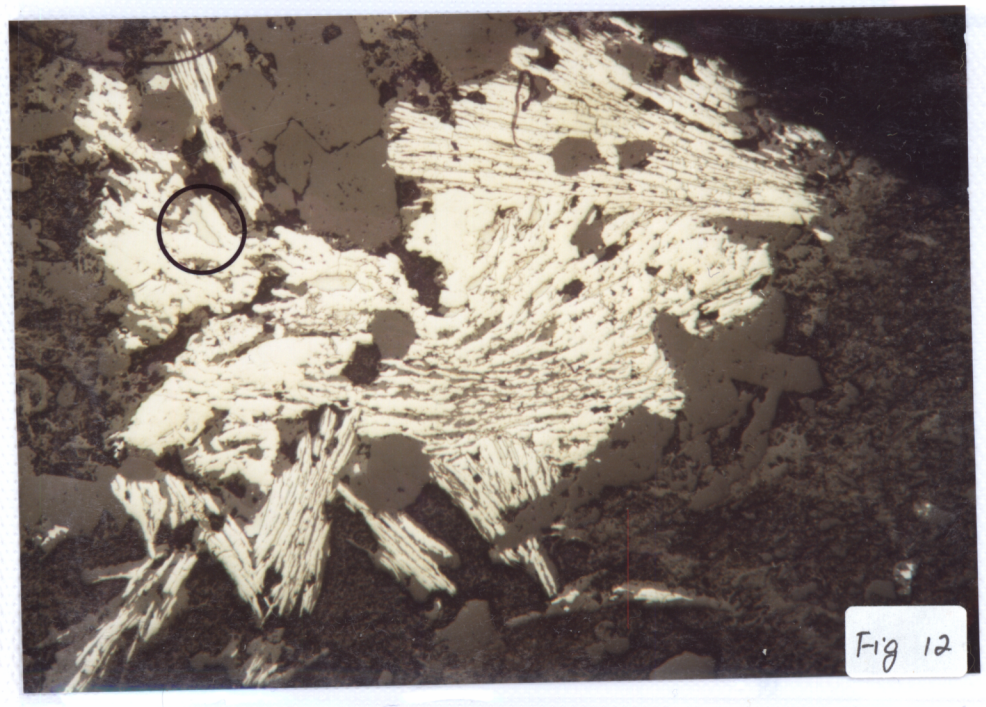

Fig 12

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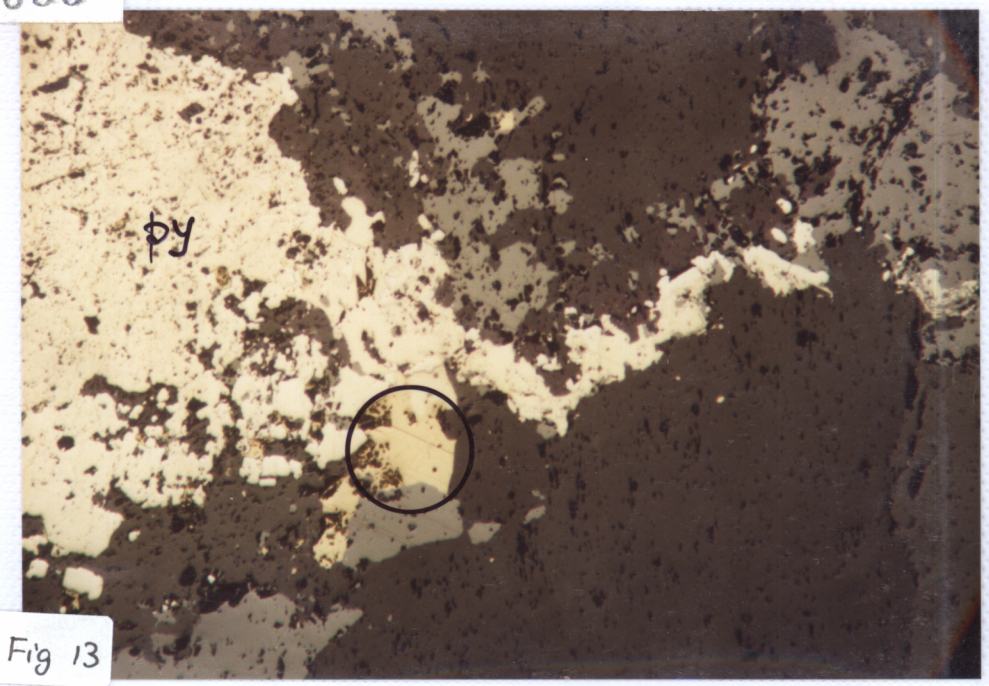


Fig 13

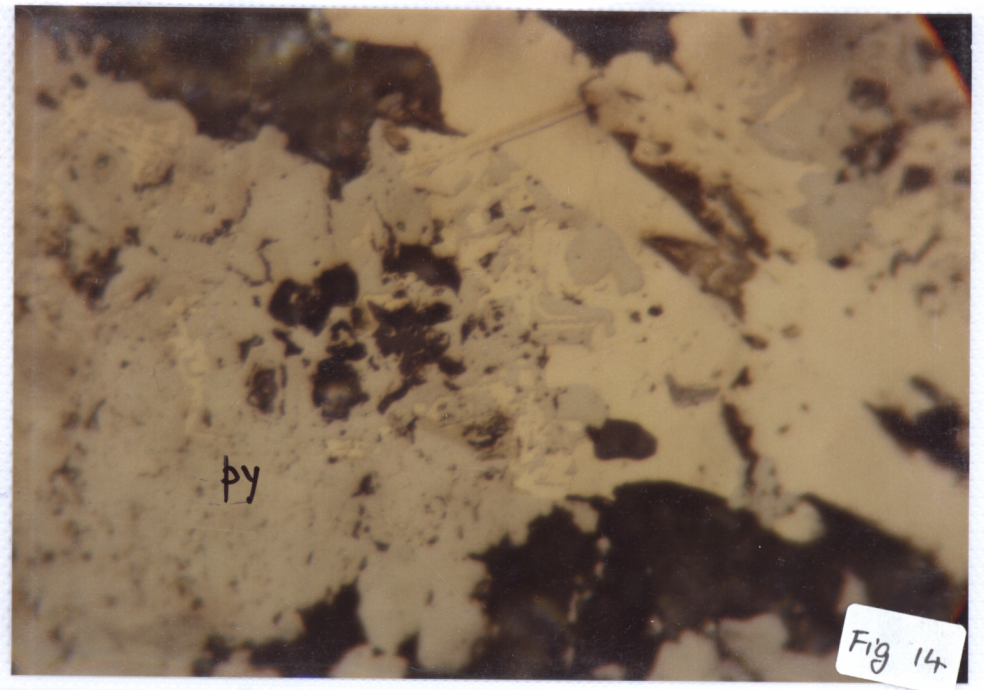
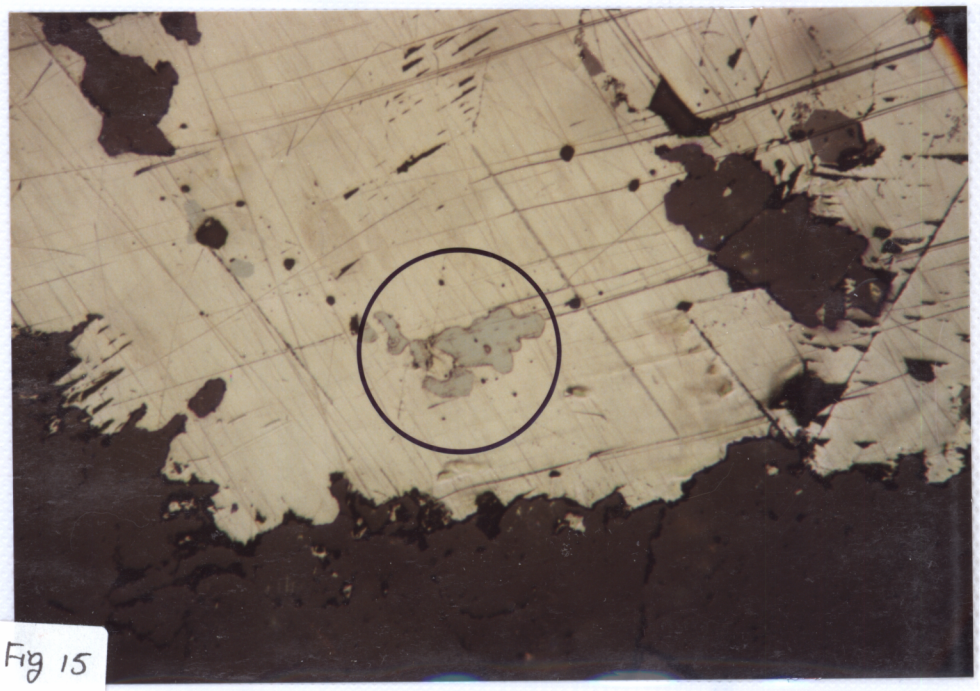


Fig 14



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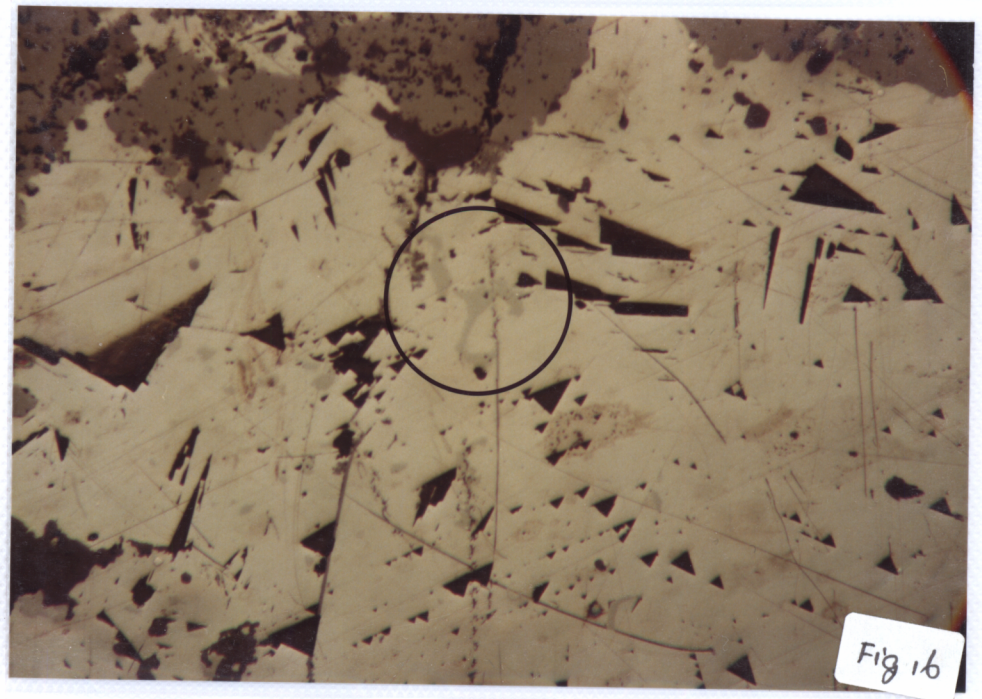

Fig 16

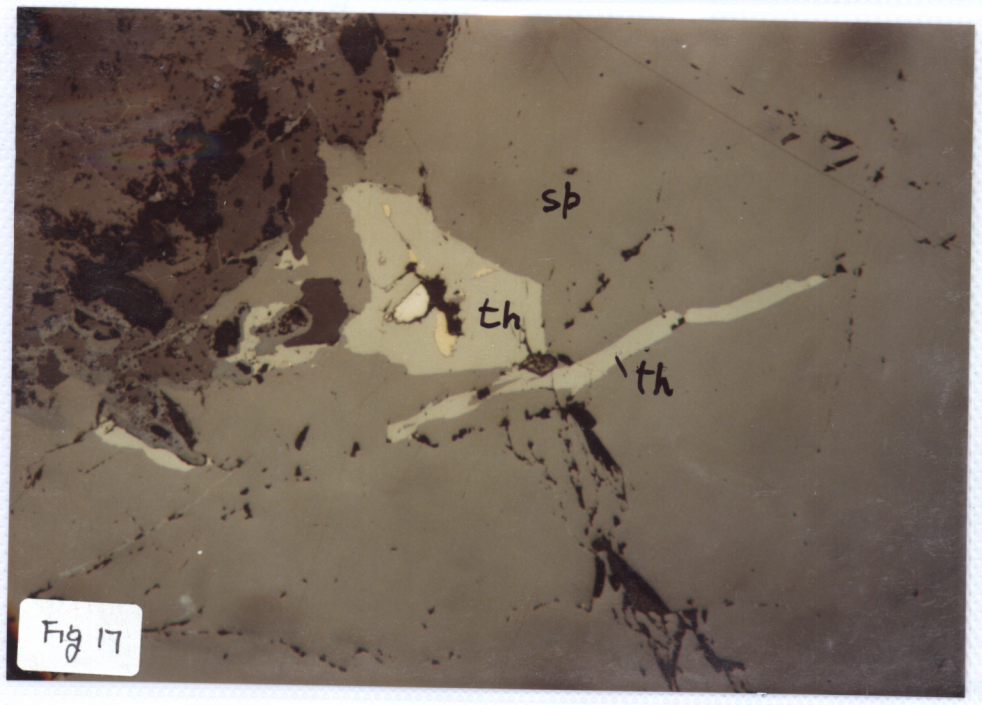

Fig 17

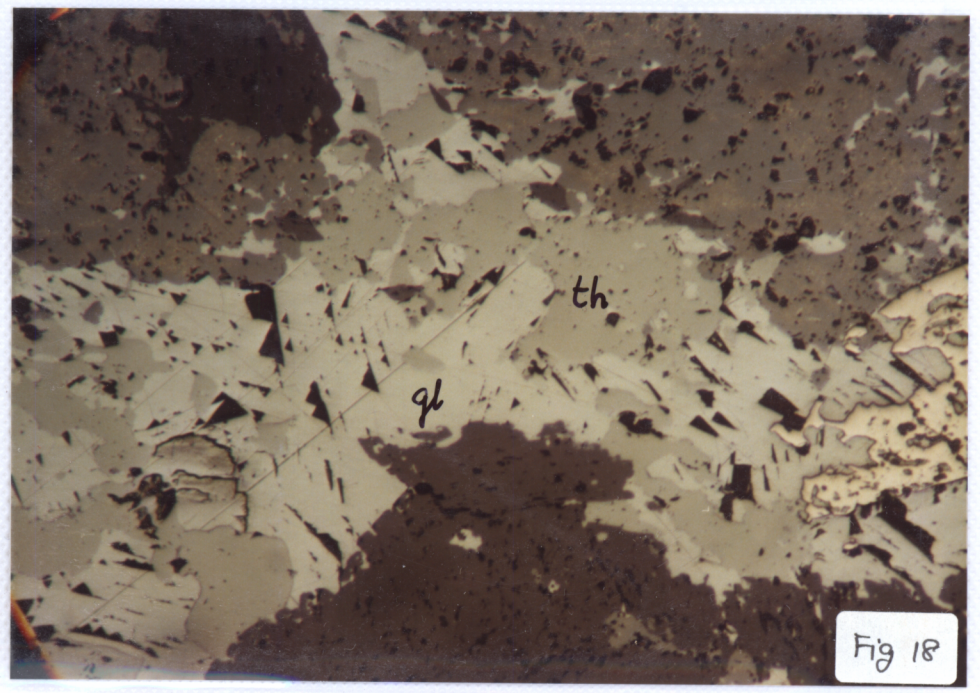

Fig 18

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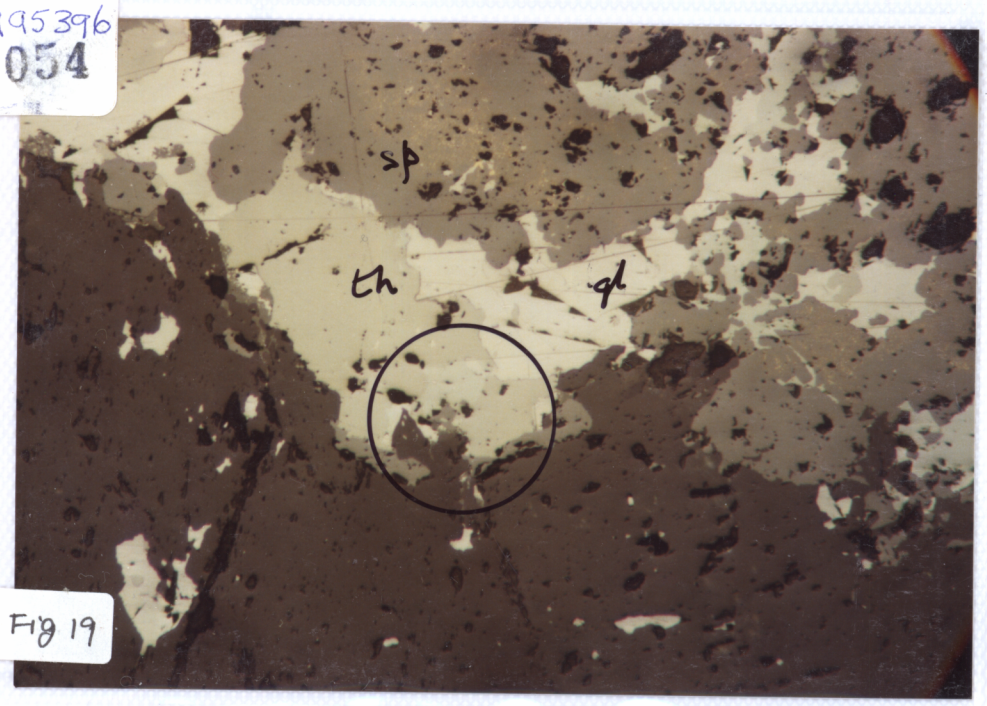

Fig 19

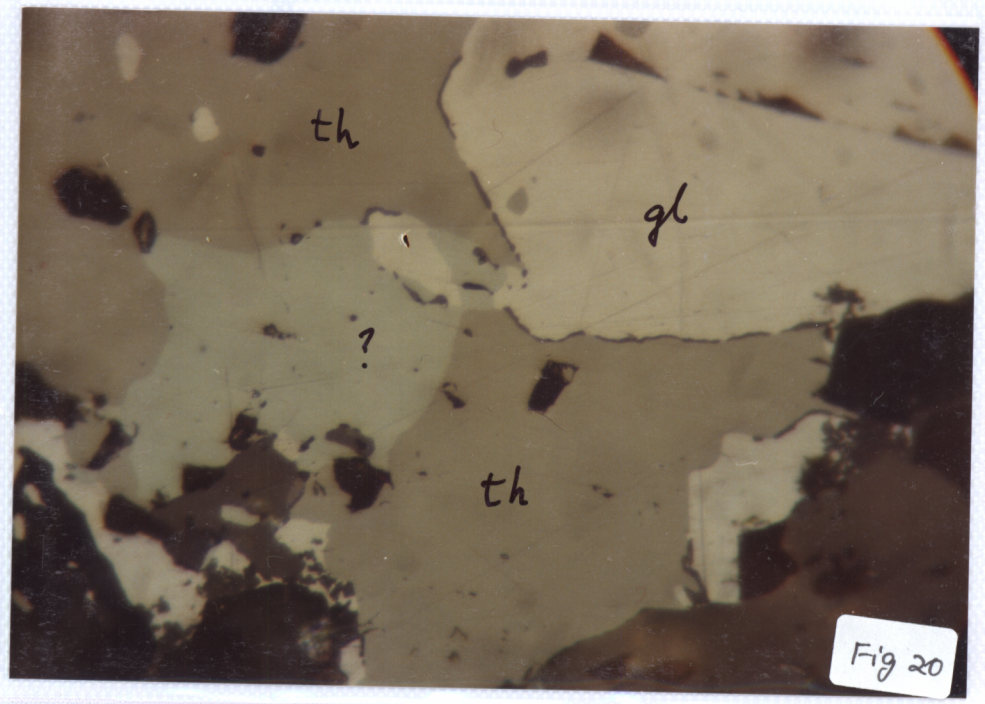

Fig 20

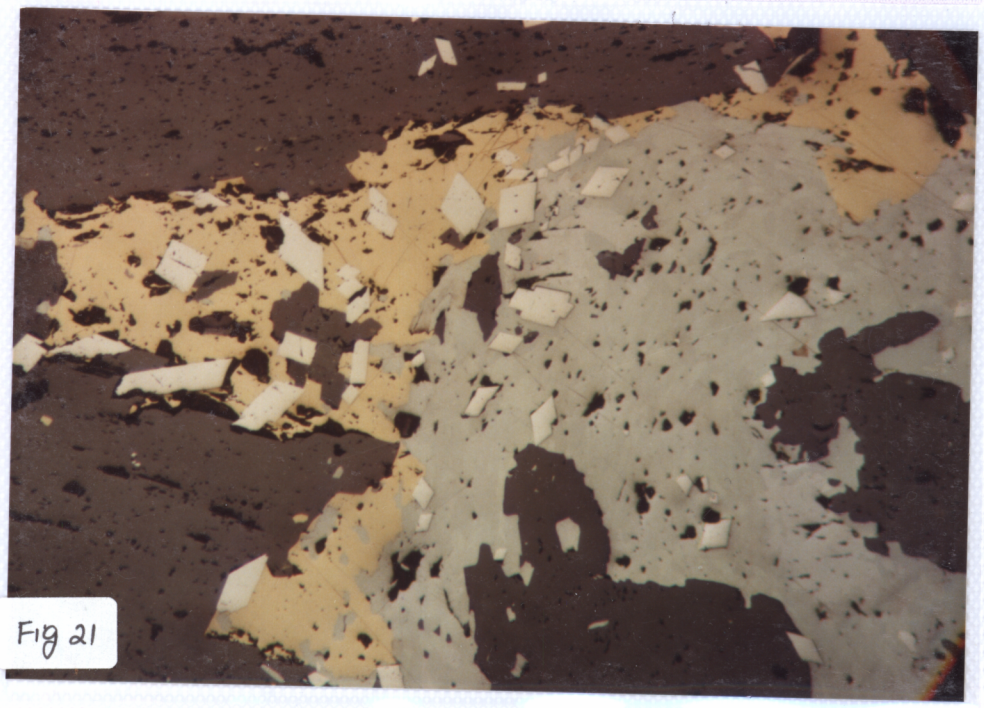

Fig 21

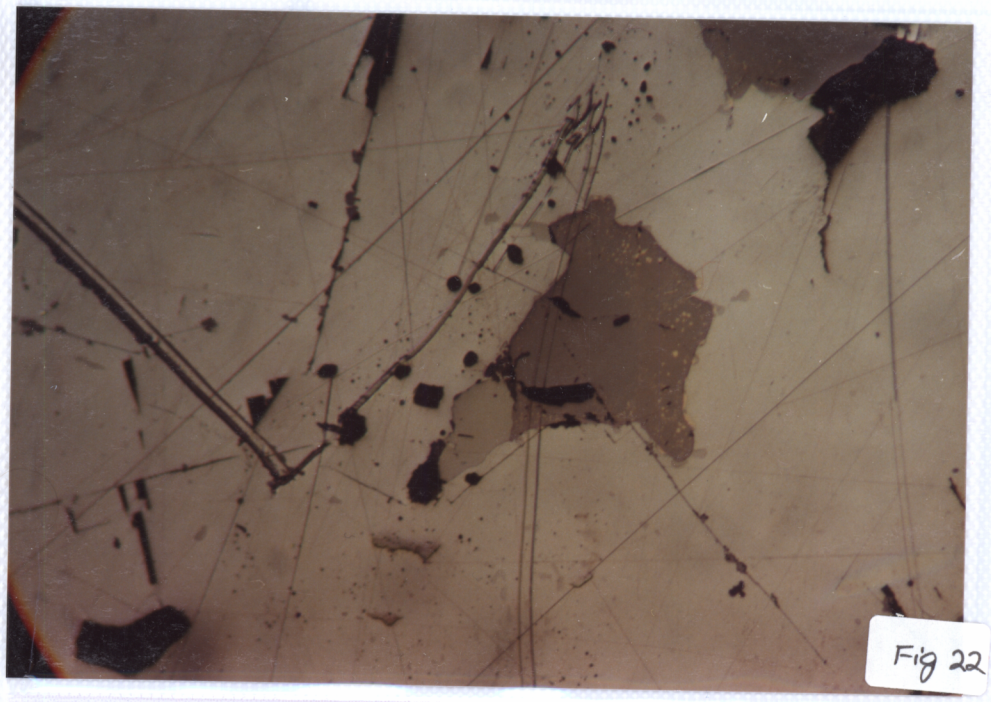

Fig 22

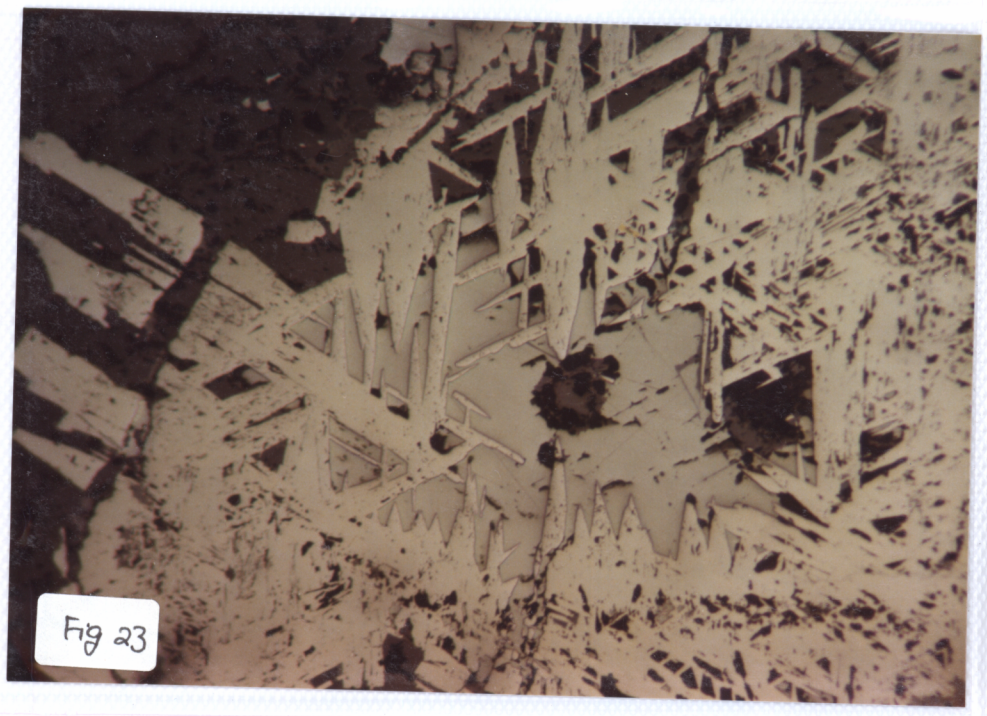

Fig 23

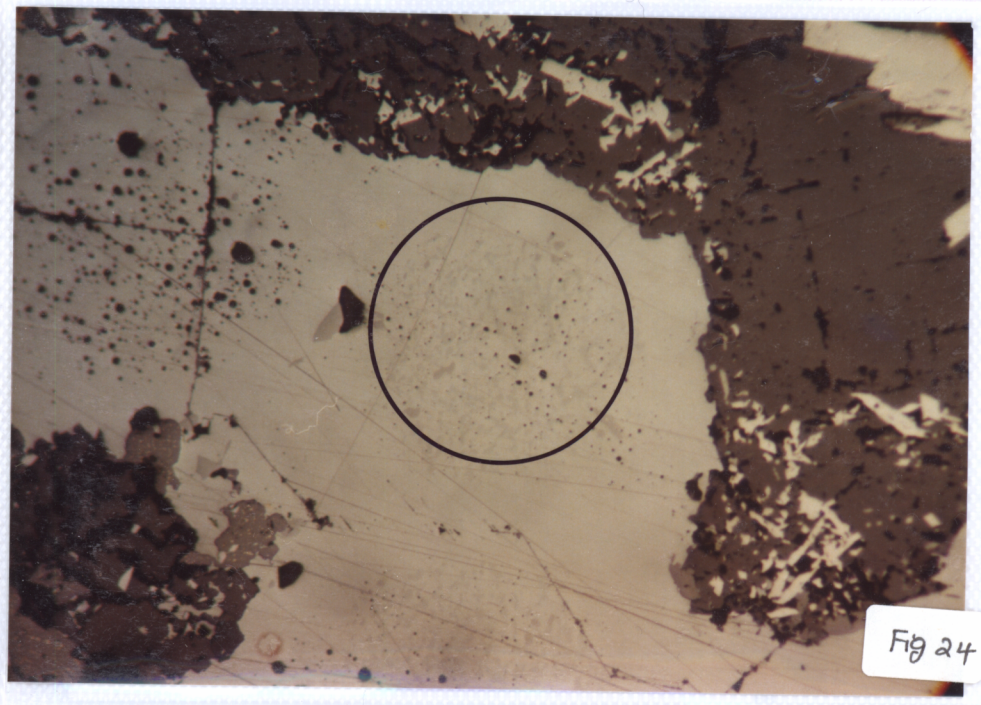

Fig 24

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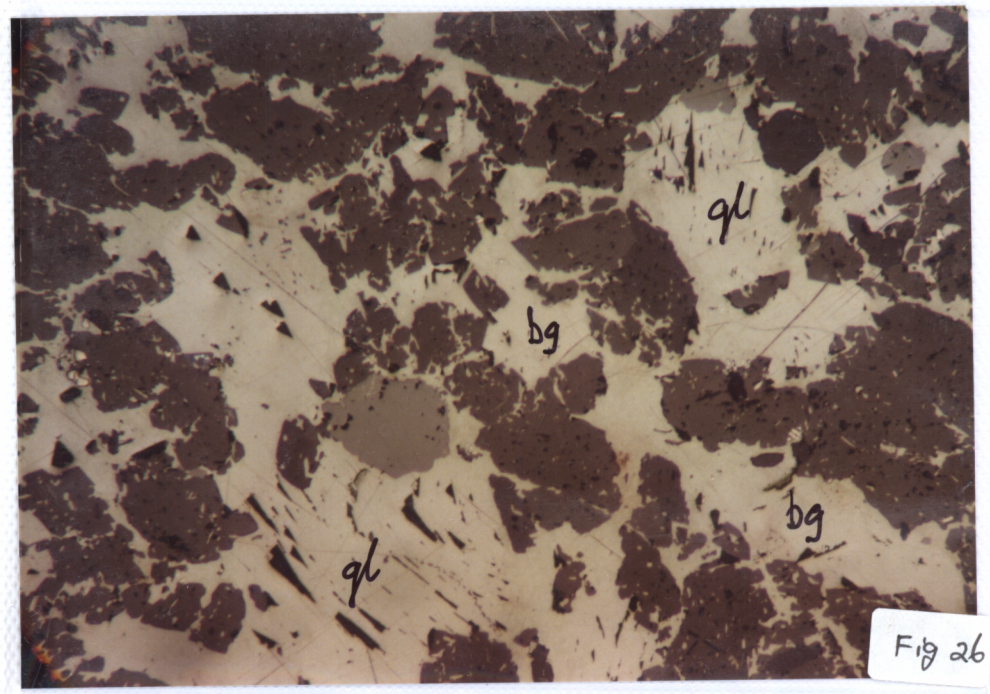
Fig 25



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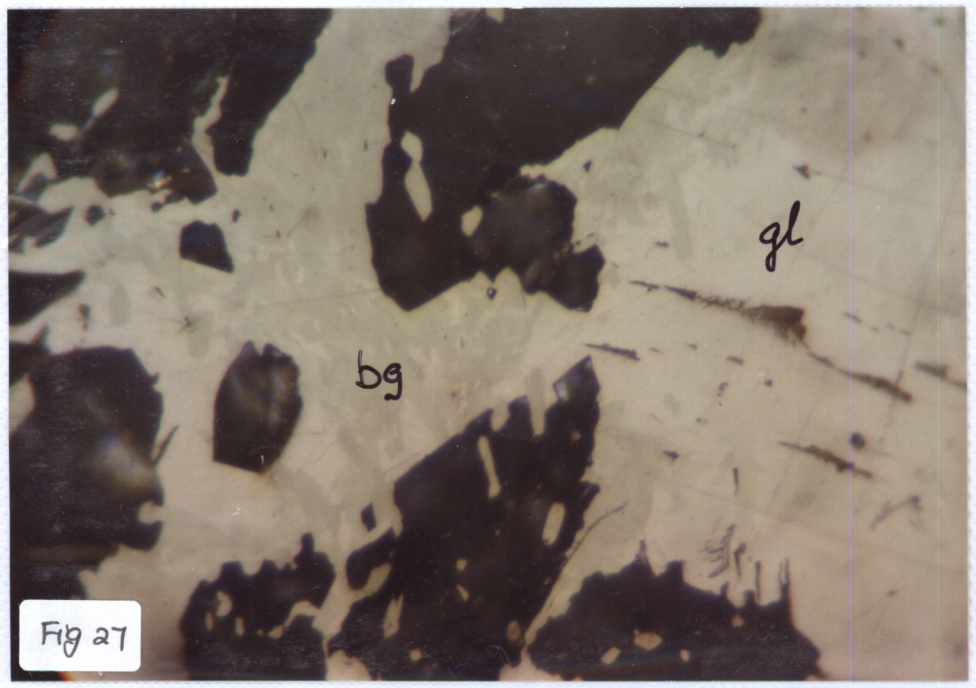

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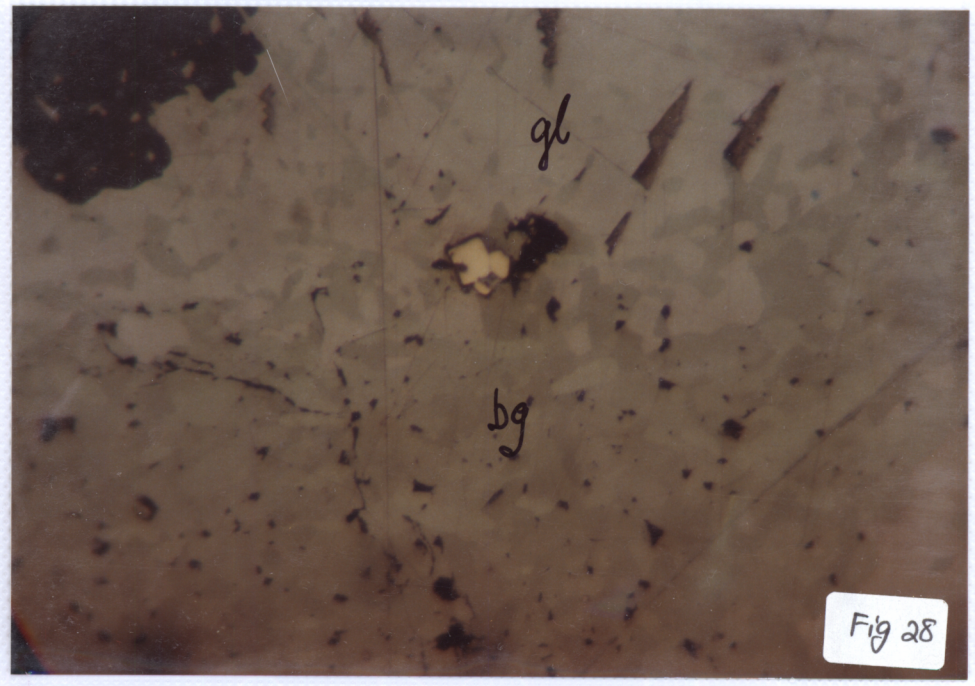

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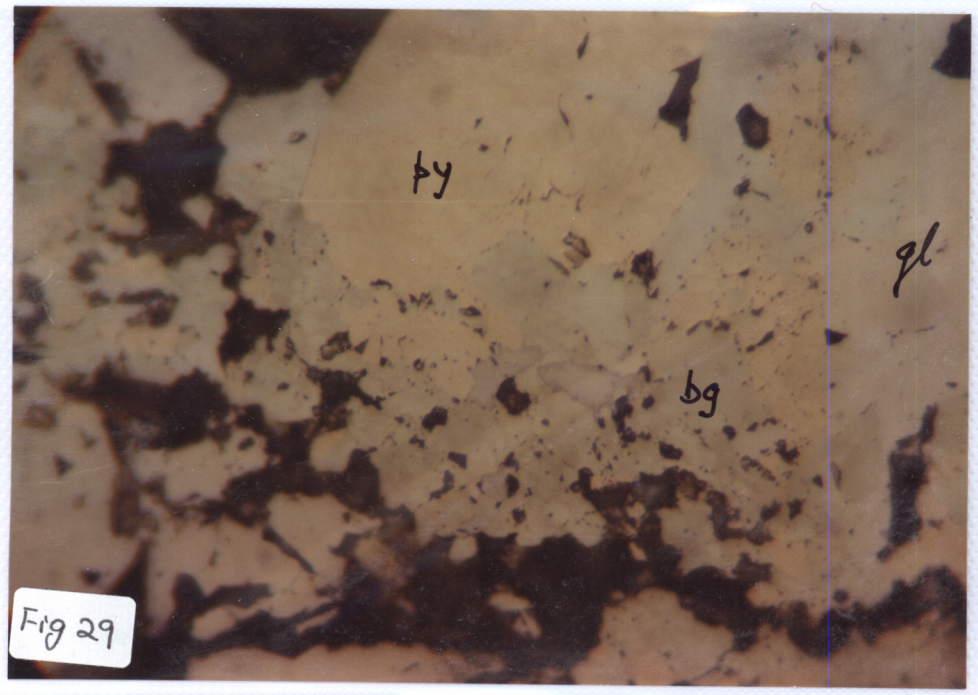

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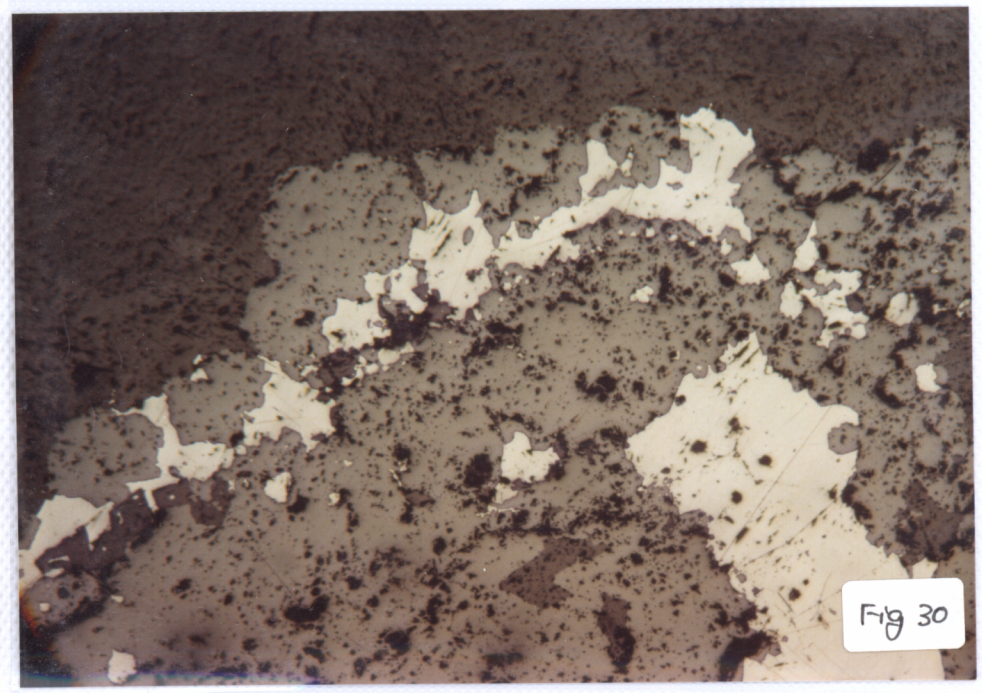

Fig 30

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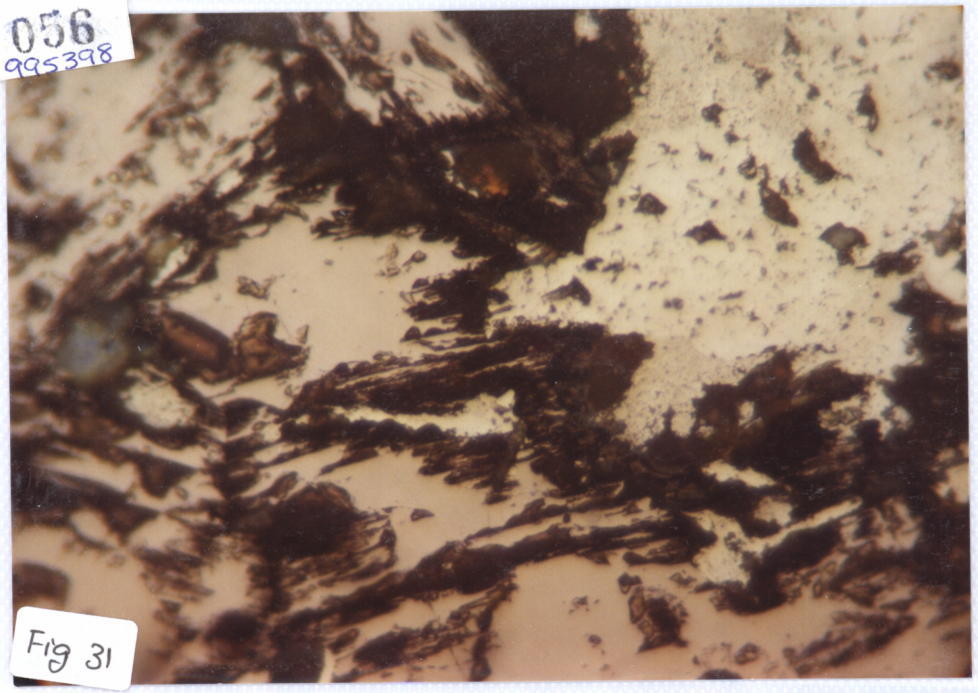

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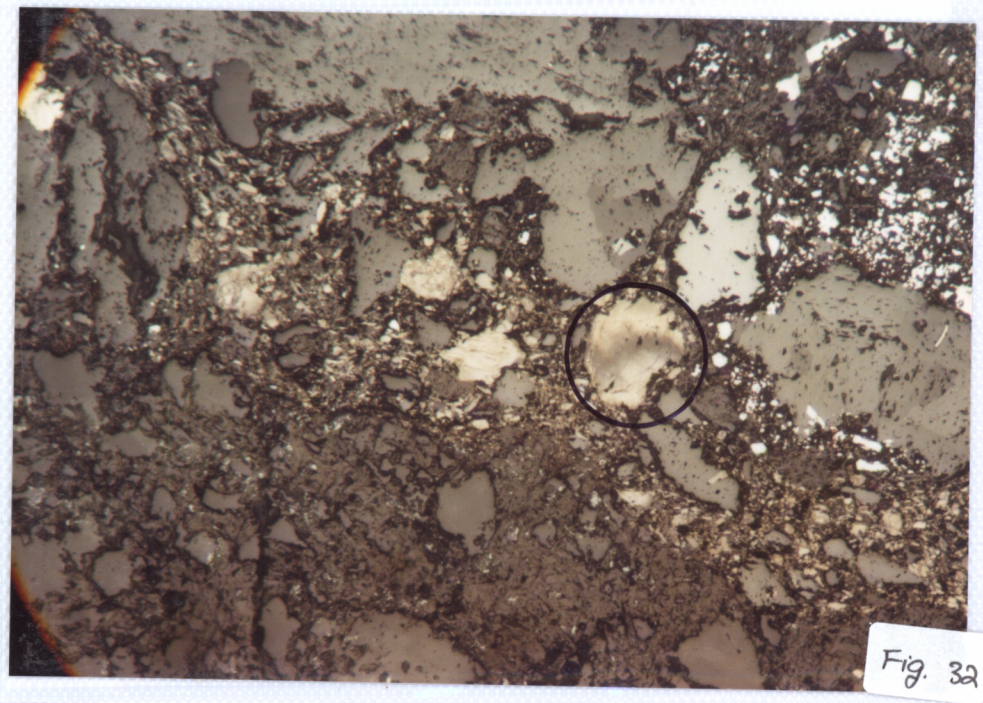

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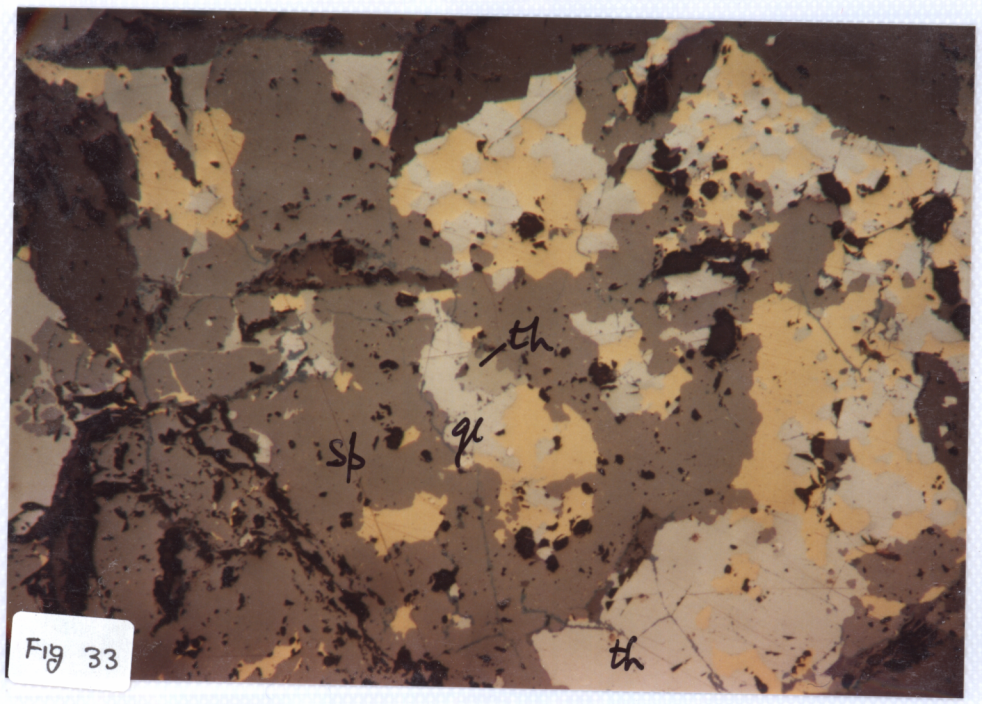
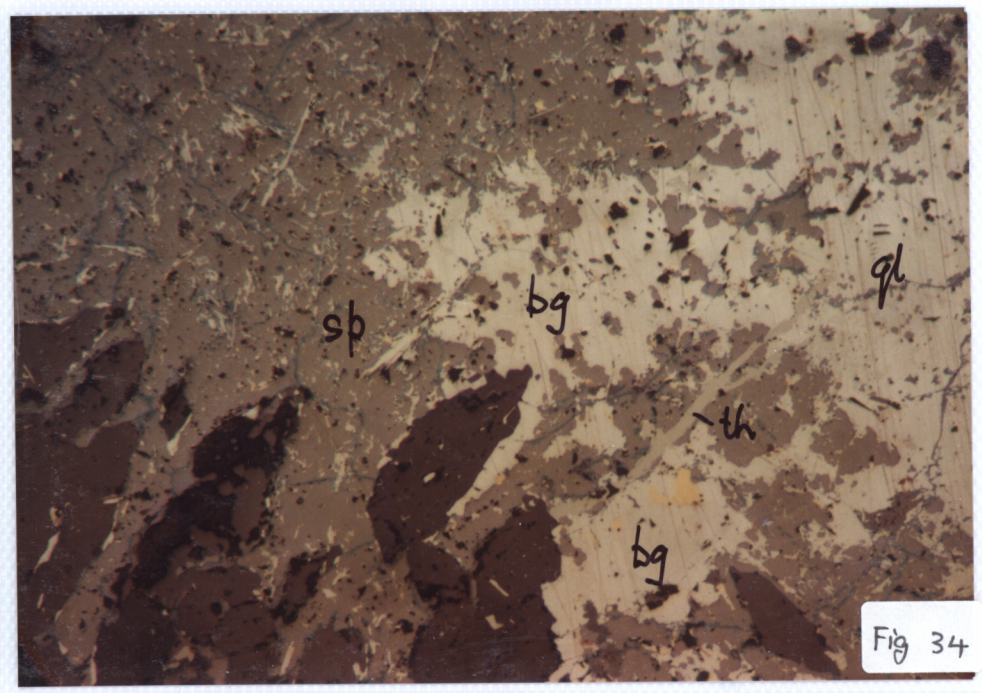


Fig 33



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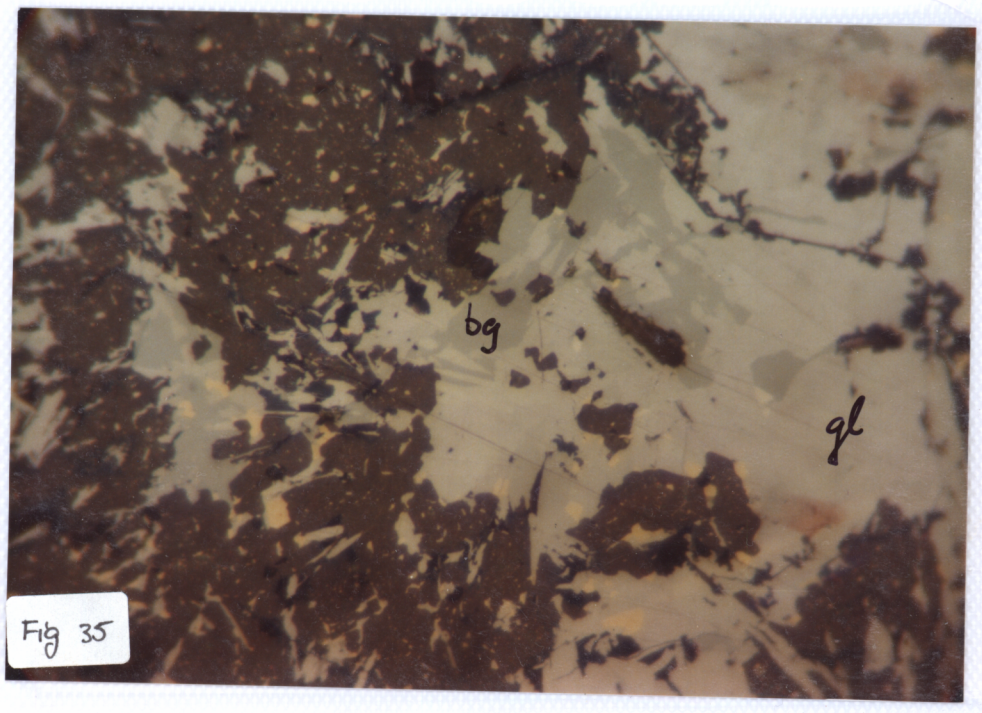

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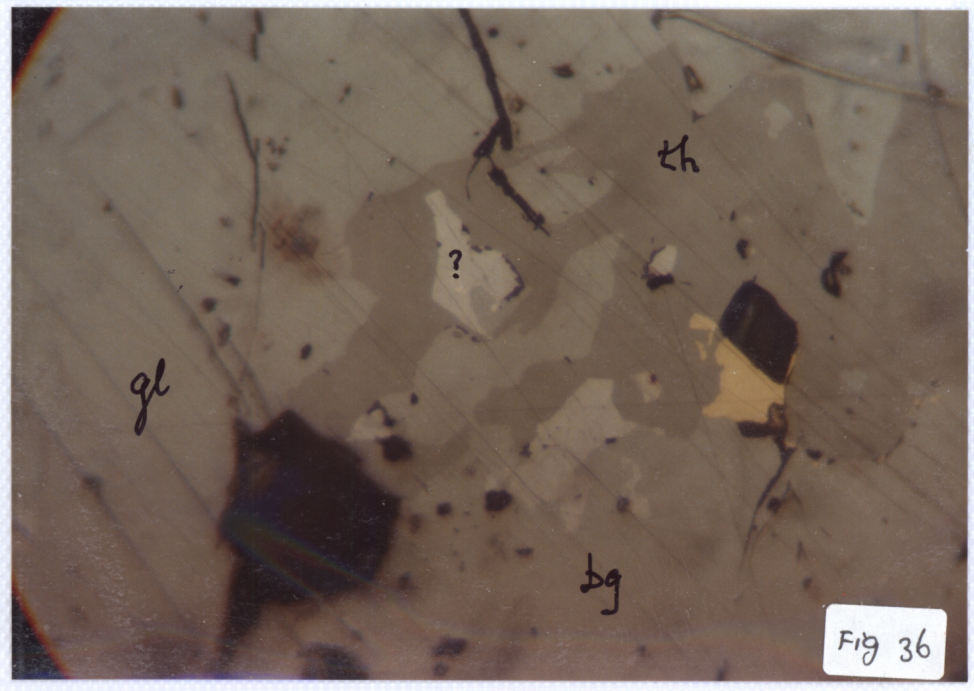

Fig 36

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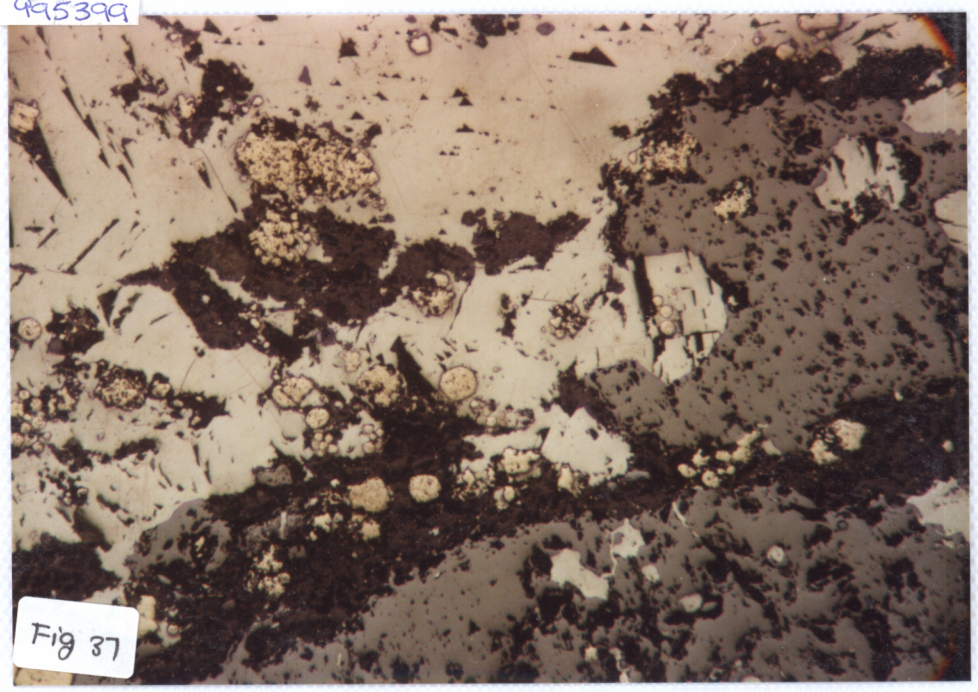

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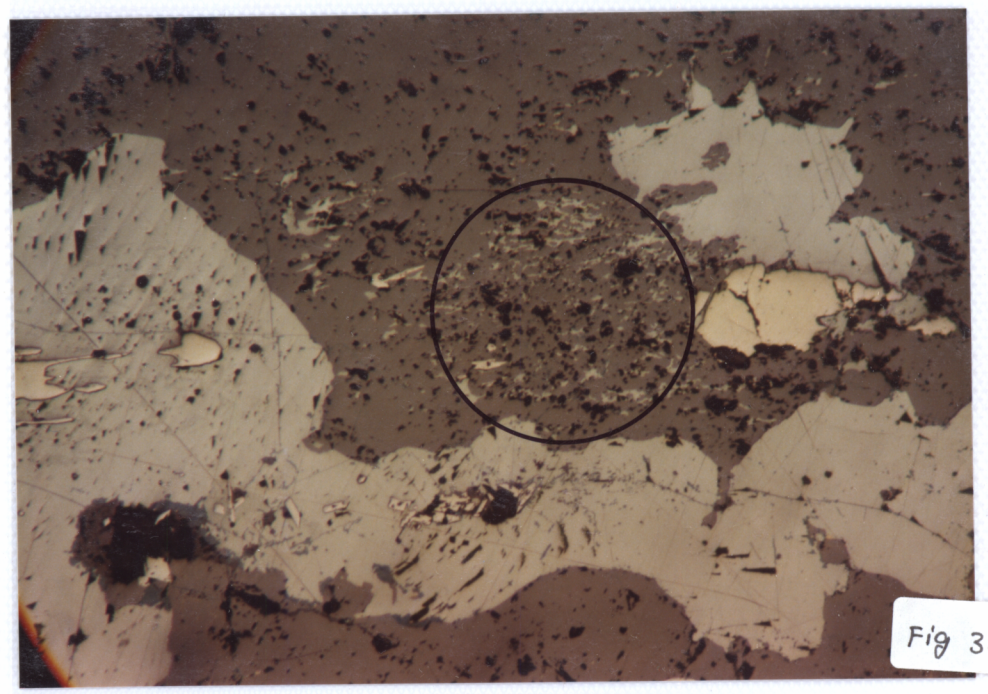

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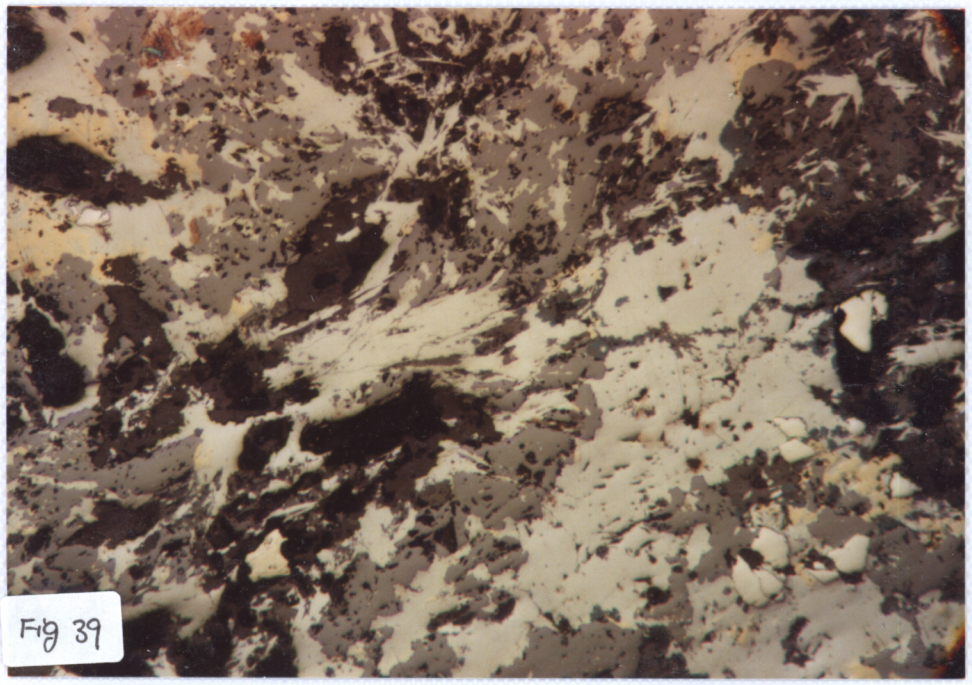

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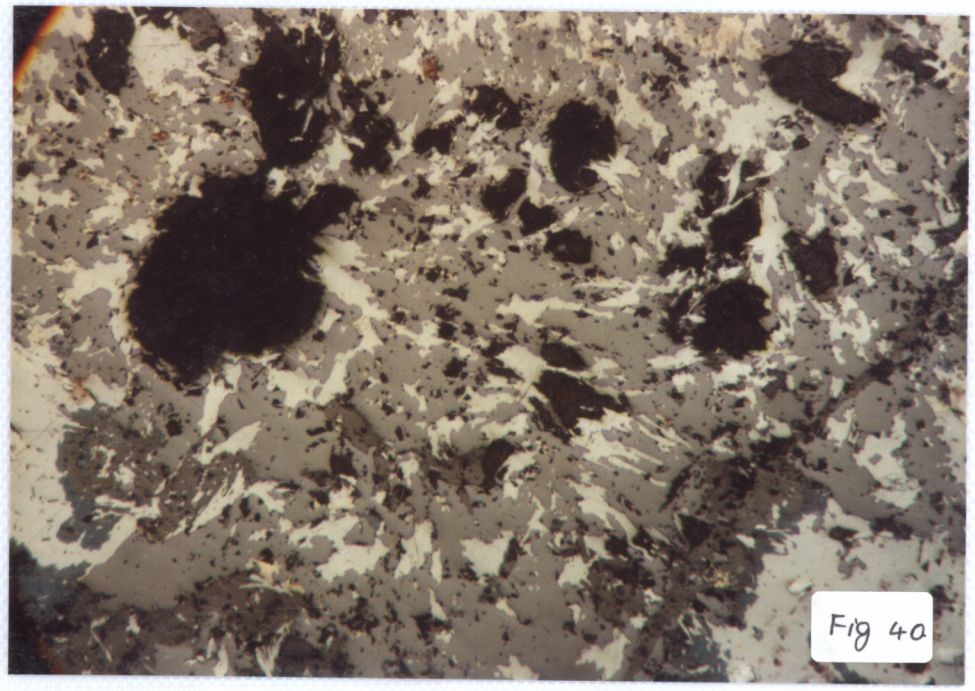

Fig 40

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Cyprus Minerals Australia Company

PROJECT A-84-109

D. DIR. | A.O. | E.O. | Registry | E & IL
- 4 AUG 1986
DEPT. OF MINES
REF. No. 7604/86

PROGRESS REPORT

JULY 1985 TO JUNE 1986

CYPRUS/CSR JOINT VENTURE

PART EXPLORATION LICENCE 15/76

DUNDAS TASMANIA

P A JONES
CONSULTANT GEOLOGIST

JUNE 1986

REPORT 490

CYPRUS

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by Thermasearch Pty Ltd

5 QUERY OF THERMASEARCH REPORT 19.86

6 STRUCTURAL CONSIDERATIONS IN FURTHER EXPLORATION OF EL15/76
by D Ransom

ENCLOSURES

			Scale
1	Whacker Sampling - AMBER CREEK	• LINES 52200N, 53100N	1:5000
2		• LINE 53250N	1:5000
	- LEATHERWOOD	• LINES 53200N,	
3		53600N	1:5000
4		• LINES 54000N, 54400N	1:5000
5	- PYRAMID	• LINES 55300N, 55900N	1:5000

6		- BERRY CREEK • LINE 56350N	1:5000
7	Part EL 15/76	• EXPLORATION AREAS REQUIRING REHABILITATION	1:25000



Project Location

5 cm

SUMMARY AND CONCLUSIONS

Exploration Licence 15/76 was granted to CSR for a period of six months from August 1976 with further twelve-month renewals subject to Mines Department approval until its expiry date in August 1987. Cyprus negotiated a joint venture with CSR to farm into a 58 square kilometer portion of EL 15/76 embracing the prospective Gordon Limestone sequence to the east of Cyprus adjoining Zeehan EL 4/78. EL 15/76 was reduced from 145 square kilometers to 125 square kilometers in August 1984.

The primary exploration target for the area is a large tonnage Irish-style carbonate hosted lead-zinc-silver orebody, however the area covers sequences with potential for either shale or carbonate hosted base metal prospects.

Work during the period included infill gridding on ten lines totalling 7.25 kilometers was completed on the Leatherwood, Amber Creek, Pyramid and Berry Creek prospects. These lines were whacker sampled producing a number of moderately anomalous geochemical zones worthy of follow-up.

Trial AO sampling surveys were conducted as were trial hydrocarbon analyses on both rockchip and drill core samples. Results from the hydrocarbon assays remain inconclusive and a further evaluation is awaited.

A structural analysis was also completed during the period the results of which supported the theory of lead-zinc mineralization being pre-Devonian age but the author also states that structural upgrading of the mineralization has been important.

Future exploration programs will be directed to infill to approximate 400 meter spacings, exploration activity on the southern limestone areas where recent work by EZ and the Mines Department has uncovered primary zinc carbonates and dolomites over wide intervals in diamond drilling.

INTRODUCTION

This report details work conducted under a joint venture between CSR Pty Limited and Cyprus Minerals Australia Company on part EL 15/76. Cyprus negotiated a joint venture with CSR to farm-in to a 58 square kilometer portion of EL 15/76 earning a 50% interest in the property over a period of three years. The tenement is considered to have excellent potential for hosting an Irish style or carbonate/shale hosted base metal deposit.

Details of all work conducted prior to January 1985 were submitted previously by CSR in their October 1981 to February 1982, January to June 1982, July to December 1982, January to June 1983, July to December 1983 and January to July 1984 six monthly reports and July 1984 to June 1985 annual report to the Mines Department.

LOCATION AND ACCESS

Exploration Licence 15/76 abuts Cyprus' tenement EL 4/78 (Figure 1) three kilometers east of the town of Zeehan (population approximately 5000). The Emu Bay Railway and a sealed road connect Zeehan with the port of Burnie located 140 kilometers to the north. Access within the tenement is relatively good for Western Tasmania as a number of logging tracks and a sealed highway traverse the prospective dolomite-limestone horizons which form topographic lows. Bombadier access is necessary on some grids to conduct the exploration programs.

Zeehan is the service town for the Renison tin mine and no difficulties would be anticipated with respect to power, water, labor and transport should a mine be developed. The area has an annual rainfall of 250 centimeters.

DESCRIPTION OF THE PROPERTY AND OWNERSHIP

Cyprus Minerals Australia Company negotiated a joint venture with CSR Pty Ltd to farm in to a 58 square kilomter portion of EL 15/76 embracing of the prospective Gordon Limestone sequence to the east and southeast of Cyprus EL 4/78 (Figure 1). Exploration Licence 15/76 was granted to CSR for the period of six months from August 1976. Renewal of the tenement for further periods of twelve months is subject to Mines Department approval of previous exploration and proposed programs.

Exploration Licence 15/76 was reduced from 145 square kilometers to 124 square kilometers in August 1984. The 21 square kilometers relinquished from the licence were not within the joint venture area and did not include any Gordon Limestone.

The licence is due to expire in August 1987.

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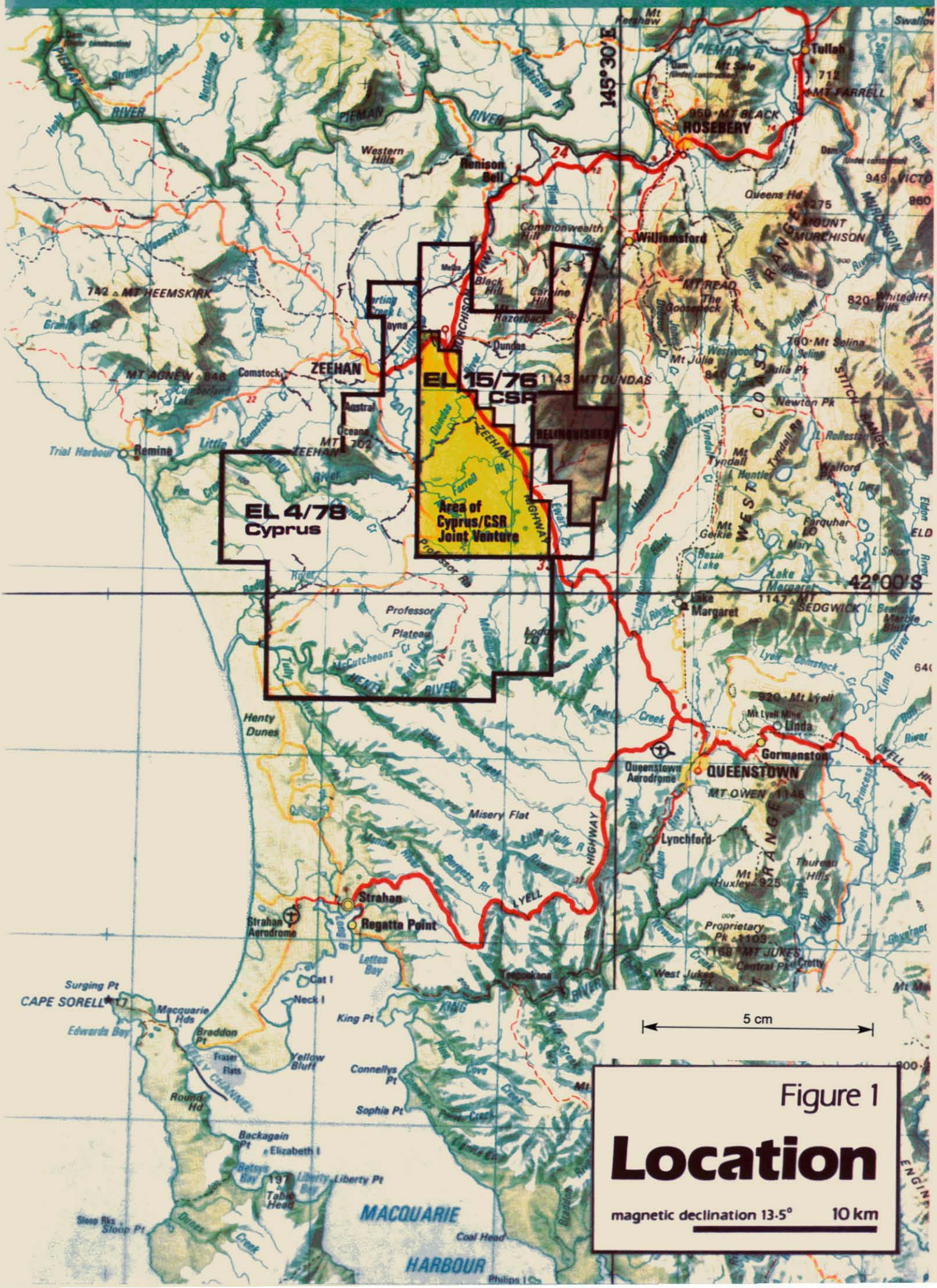

EL 15/76
CSR
RELINQUISHED
EL 4/78
Cyprus
Area of
Cyprus/CSR
Joint Venture
ZEEHAN
Renison Bell
Williamsford
ROSEBERY
Tullah
Queenstown
QUEENSTOWN
Gormanston
Linda
Lake Margaret
Strahan
Regatta Point
Strahan Aerodrome
Queenstown Aerodrome
Lynchford
Remine
Trial Harbour
Henty Dunes
CAPE SORELL
MACQUARIE HARBOUR
Sophia Pt
Connellys Pt
King Pt
Macquarie Hds
Surging Pt
Edwards Bay
Betsys Bay
Liberty Bay
Sloop Pt
Coal Head
Philips I
Mt Julia
Mt Dundas
Mt Read
Mt Owen
Mt Huxley
Mt Sedgwick
Mt Lyell
Mt Jukes
Mt Agnew
Mt Heemskirk
Mt Zeehan
Mt Tyndall
Mt Geikie
Mt Farquhar
Mt Darwin
Mt Sorell
Mt Victoria
Mt Murchison
Mt Black
Mt Jarrell
Mt Sale
Mt Selina
Mt Lyell Mine
Western Hills
Black Hill
Razorback
Caroline Hill
Commonwealth Hill
Queens Hd
Newton Pk
Proprietary Pk
Central Pk
West Jukes Pk
Table Head
Round Hd
Backagain Pt
Elizabeth I
Neck I
Cat I
Braddon Pt
Yellow Bluff
Fraser Flats
Lettes Bay
Comstock
Dundas
Zeehan
Farrell
Henty River
Tully River
Linda River
Queen River
Murchison River
Pieman River
Franklin River
Gordon River
Denison Range
Western Range
Stitch Range
Murchison Highway
Lyell Highway
145°30'E
42°00'S
5 cm
Figure 1
Location
magnetic declination 13·5°
10 km

012

HISTORY AND EXPLORATION TO DATE

A detailed description of the mining history and exploration carried out within the joint venture area has been summarized in five previous Cyprus (formerly Amoco) progress reports on the CSR Joint Venture, Dundas Tasmania:

October 1981 to February 1982	Amoco Report 287
January 1982 to June 1982	Amoco Report 311
July 1982 to December 1982	Amoco Report 339
January 1983 to June 1983	Amoco Report 358
July 1983 to December 1983	Amoco Report 376
January 1984 to July 1984	Amoco Report 396
July 1984 to June 1985	Amoco Report 450

REGIONAL GEOLOGY

Large blocks of Precambrian sediments form the basement complexes of both northwest and central Tasmania. These are overlain by Cambrian volcanics and marine sediments which host the Rosebery-Hercules, Mt Lyell and MacIntosh (Que River) orebodies.

Overlying these rocks is a sequence of Cambrian to Devonian basinal sediments. This sequence hosts the Renison and Cleveland tin orebodies.

The above units were intruded by granites during the Devonian and Carboniferous times which introduced tin mineralization. During the Jurassic and Tertiary periods the sequence was blanketed by basic volcanics. Recent fluviatile and Pleistocene glacial erosion have produced the present topography.

Major folding and block faulting are particularly evident in the Zeehan region. Uplift and folding accompanied accumulation of thick piles of sediment and volcanic material in various troughs during the Cambrian period. The Ordovician was marked by the onset of terrestrial and shallow marine sedimentation (the Owen Conglomerate, Moina Sandstone and Gordon Limestone). The major deformation accompanied the Paleozoic Tabberaberan orogeny and large northwest trending fold structures were formed.

LOCAL GEOLOGY

Minor Precambrian Oonah Formation basement rocks comprised of schists, quartzites, siltstones, shales, spillitic lavas and pyroclastics form an infaulted block within the Cambrian Dundas Group in the central eastern portion of the project area.

Cambrian sedimentation appears confined to fault bounded blocks or graben structures abutting the Precambrian Tyennan Block to the east. The rocks are predominantly rapidly deposited, shallow water sediments including argillites, grits, conglomerates, greywackes and shales with minor cyclical volcanic sedimentation (agglomerates, tuffs and tuffaceous cherts and shales).

The Ordovician to Devonian strata of the Zeehan Basin occur within a series of synclinal structures with northwest axial trends. Mount Zeehan Conglomerate at Mt Misery was deposited within a graben structure during the upper Cambrian to Lower

Ordovician period and is transgressively overlain by micaceous sandstones, siltstones, minor grits, quartzites and shales. These transgressive units are time equivalents of the Moina Sandstone. On a number of the mapped grids the Moina Sandstone underlies the Ordovician Gordon Limestone with a marked angular unconformity. This is in stark contrast to that observed in detailed mapping of the sequence occurring on the western limit of the basin. The Gordon Limestone is comprised of interbedded limestones and dolomites with numerous debris flow breccia horizons and zones of clastic sedimentation including fossiliferous calc-arenites, siltstones and shales. Siluro-Devonian sediments within the basin are rythmically interbedded fossiliferous shallow marine quartzites (minor siltstones and shales) and dolomitic to pyritic shales and siltstones.

The Zeehan area has been intensely disturbed by the Paleozoic Tabberaberan orogeny which caused major northwest folding and faulting. Some east and northwest trending fault systems are considered growth faults. These give rise to rapid increases in thickness of the carbonate lithologies on the downthrown side of the fault zones and may also act as conduits for mineralizing fluids. North, northeast striking faults are thought to have developed in post Permian times.

MINERALIZATION

Model

Exploration within the prospective Gordon Limestone has been modelled on the Irish type carbonate hosted sedimentary exhalative lead-zinc-silver deposits. Mineralization, lithological and structurally controlled, occurs as both epigenetic and stratiform bodies within carbonate hostrocks. The deposits are found in close proximity to the locus of major basement sutures (growth faults) and similar intersecting extension faults or dilation faults which act as feeder zones for the mineralizing fluids. Coarse and fine grained galena and sphalerite occur with a carbonate matrix.

The stratiform deposits occur as lenses associated with sedimentary shake breccias which have slumped into sub-basinal depressions formed on the down thrown side of the extension

faults and major growth faults. The epigenitic mineralization however is generally found in close proximity to major structures and occurs as veins, veinlets, coarse grained disseminations and small massive sulfide bodies.

Joint Venture Area

Details of the type and extent of mineralization within the joint venture area indicate the major parameters (lithologic, structural and mineralization) fit the Irish model.

At the Mariposa prospect, a distinct horizon containing galena and spalerite with minor pyrite in a sideritic matrix occurs concordant to bedding (a cerussite-anglesite-ironstone in the oxidized zone). This western zone (drilling results of up to seven meters of 4.5% lead, 1.2% zinc and 86.3 g/t silver) occurs within a down faulted block of limestone and shake breccias which appears to be connected through high angle extension faults to the major northwest trending structure, the Balstrup Fault. The Balstrup Fault cuts the Zeehan basin to the north of the Oceana mine and is thought to have been an active feeder zone for mineralizing fluids. An eastern mineralized zone (drill results of up to 12 meters of 2.0% lead, 1.5% zinc and 48.4 g/t silver) appears to be structurally related to the faulted contact between the Ordovician Limestone and Cambrian sediments.

Shake breccias and minor clastic units within the Gordon Limestone have been observed during the trenching program on the Bannockburn prospect. Two separate zones of mineralization occur in a similar stratigraphic level as the western zone on the Mariposa prospect. Costean values for the southern most zone returned moderate values assaying to 16 meters of 2.4% lead, 1.2% zinc and 13 g/t silver, however the northwestern zone returned highly anomalous values with 22 meters assaying 3.1% lead, 3.9% zinc and 34 g/t silver. Within this anomaly six meters assayed 5.4% lead, 9.7% zinc and 74 g/t silver from a zone of fine grained galena sphalerite interbedded with fissile shaley dolomites and minor breccias. Both zones of mineralization lie in

close proximity to major structures which may have acted as conduits for mineralizing fluids.

Breccias have also been observed on the Black Jacks prospect associated with predominantly zinc rich (costean results of up to four meters of 0.4% lead, 5.0% zinc and 8 g/t silver) mineralization which occurs within a structurally bound block of limestone. A number of major east-west and northwest trending structures cut the prospect with limestone thicknesses invariably thickening on the down thrown side indicating possible growth faulting. Dolomites in the zinc rich area contain laminar syngenetic pyrite interbeds averaging approximately 10% but varying up to 40% over narrow widths.

Costean results from the Professor prospect have defined a zone of anomalous geochemistry (assaying up to four meters of 1.3% lead, 2.2% zinc and 11 g/t silver) over a strike length of 400 meters. This zone occurs at a similar stratigraphic position to the defined mineralization at both Mariposa and Bannockburn prospects. A major northwest trending fault which cuts through the grid has lead-zinc-barium mineralization associated with it on the adjoining EL 4/78. This fault may represent a major mineralizing conduit for the region.

Although drilling to date has not intersected economic mineralization the similarities in geological setting and observed mineralization between the joint venture area and the Irish deposits indicate the potential for discovering a large tonnage syngenetic sedimentary lead-zinc-silver orebody or alternatively a number of moderate tonnage orebodies.

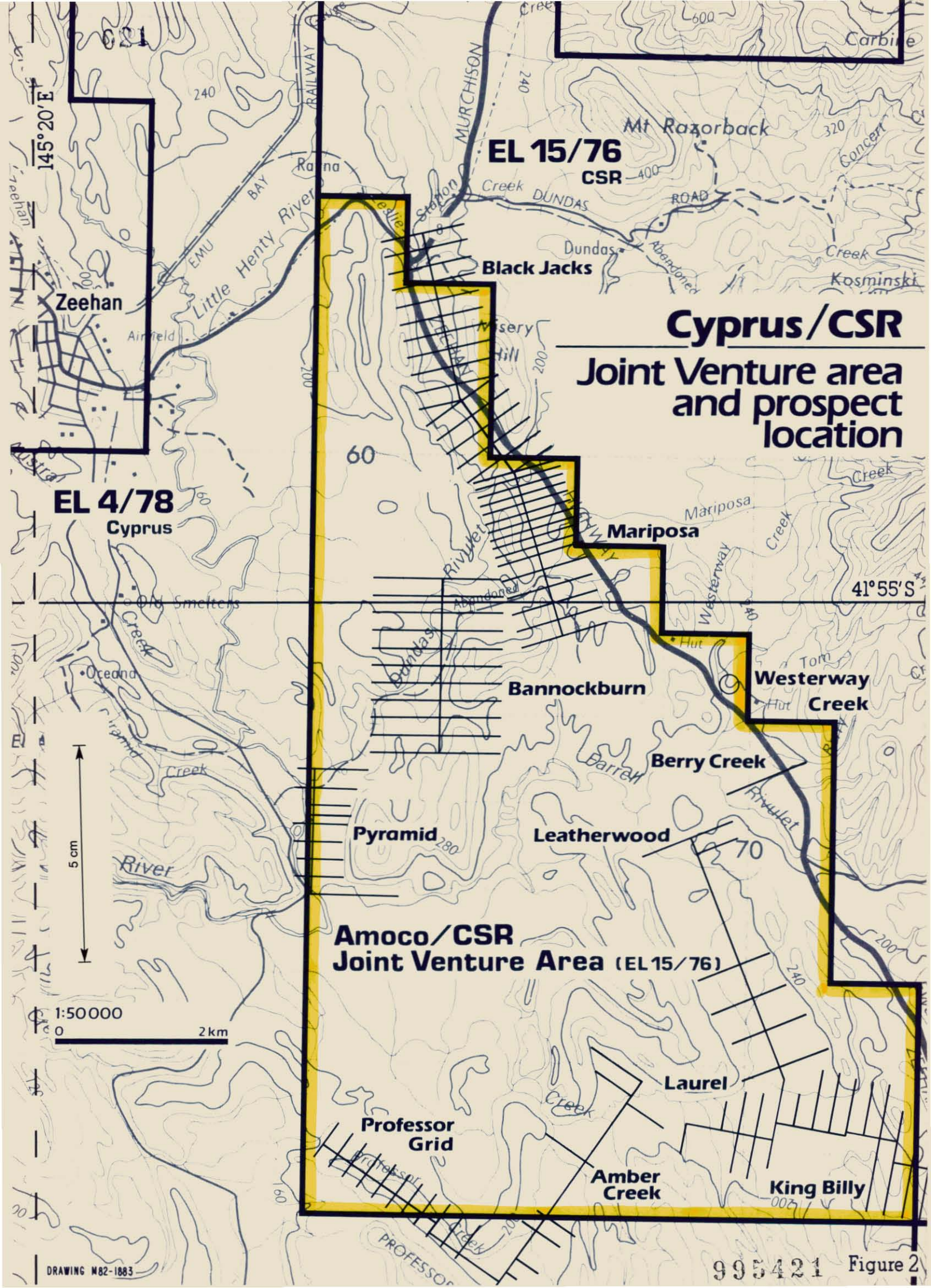
WORK CONDUCTED BY CYPRUS

Work during the period included gridding, whacker bedrock sampling, rockchip sampling (for hydrocarbon analysis) and A0 sampling surveys. A consultant geologist completed a structural analysis of the joint venture area. Figure 2 shows the location of recent gridding and sampling surveys.

Gridding

Minor gridding was completed over Leatherwood, Amber Creek Pyramid and Berry Creek prospects totalling 7.25 kilometers. The ten lines were established to enable reconnaissance whacker sampling surveys to be conducted.

Leatherwood Grid - four lines totalling 3650 meters
54400N, 54000N, 53600N and 53200N


Cyprus/CSR
Joint Venture area and prospect location
EL 15/76
CSR
EL 4/78
Cyprus
Amoco/CSR
Joint Venture Area (EL 15/76)
Black Jacks
Mariposa
Bannockburn
Westerway Creek
Berry Creek
Pyramid
Leatherwood
Laurel
Professor Grid
Amber Creek
King Billy
Zeehan
Mt Razorback
Dundas
Oceana
Old Smeltcks
145°20'E
41°55'S
1:50000
0
2km
5 cm
DRAWING M82-1883
995421
Figure 2

Amber Creek Grid - three lines totalling 1800 meters 53250N, 53100N and 52200N

Pyramid Grid - two lines totalling 800 meters 55900N and 55300N

Berry Creek Prospect - one line totalling 1000 meters 56350N

The two lines gridded over the Pyramid prospect replaced ones burnt out by bushfire on what was previously called the Farrel grid.

Geochemistry

Subsequent to Mines Department A0 geochemical sampling surveys at the Oceana deposit where the technique accurately outlined the mineralization between fluvioglacial gravels Cyprus completed two one kilometer traverses over the Leatherwood grid. The two lines chosen, Lines 18 and 22N (Figure 3) were lines previously sampled by Geopeko using their cobra drill sampling technique. Samples were taken approximately below root level at 15.8 meter intervals along lines and dispatched to the Mines Department for analysis.

At this juncture and after further discussions with W Baker of the Mines Department CSR recommended the technique not be used on a routine basis for covering the as yet unexplored limestone sequence. Possible problems were thought to exist with ground-water movements under thick fluvioglacial and glacial deposits (Appendix 1) negating effective humic acid transport of metal ions.

On this basis deep bedrock sampling surveys were commenced utilizing the proven whacker sampling tool. Ten lines were gridded at intervals varying from 400 to 800 meters distant and sampled at 50 meter intervals along lines. Whacker sampling depths ranged from <1 meter to 39.6 meters with average depths to bedrock of from five to ten meters. All samples were boxed and

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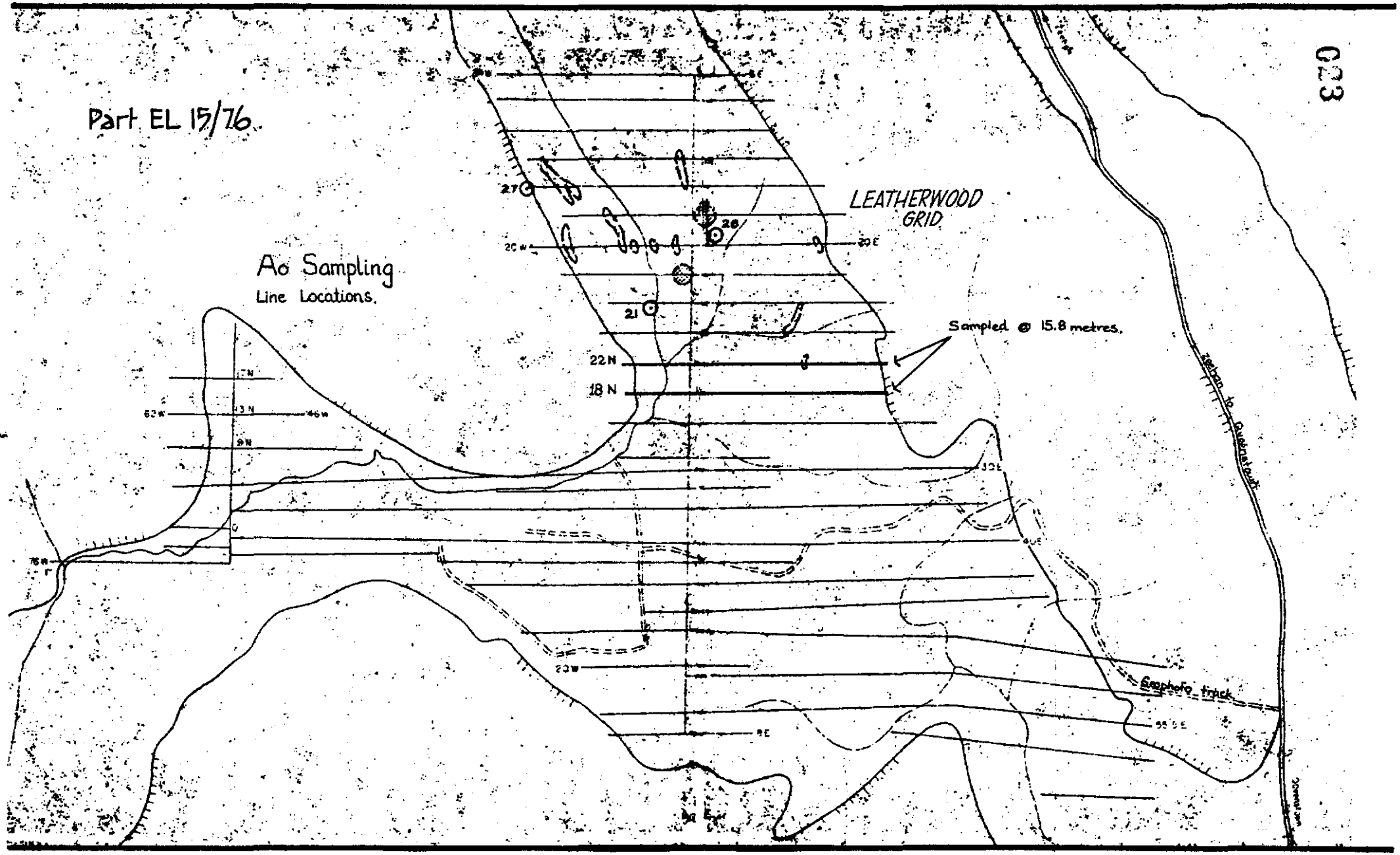

FIGURE 3

dispatched to Amdel in Burnie for preparation. Splits are then dispatched to Amdel in Adelaide with the samples being assayed for lead, zinc and silver by AAS.

Results for lead and zinc along with sample depths have been plotted on sections at a scale of 1:5000 (Enclosures 1 to 6) Analytical result sheets are appended (Appendix 2).

Results for the four areas are as follows:

Leatherwood

Line 54400N - two zones approximately 150 meters wide range up to 1440 and 1800 ppm zinc, 215 and 1540 ppm lead
Line 54000N - as above, much lower tenor
Line 53600N - spot high to 3820 ppm zinc
Line 53200N - spot high to 1380 ppm zinc

Amber Creek

Line 53100N - 150 meter wide zone assaying to 2120 ppm lead and 730 ppm zinc
Line 53250N - possibly same zone, low tenor, assaying to 200 ppm zinc
Line 52200N - spot high on east to 470 ppm zinc of line otherwise very flat

Pyramid

Line 55300N - 150 meter wide zone assaying to 1140 ppm lead and 1040 ppm zinc
Line 55900N - similar zone, less distinct assaying to 630 ppm lead and 1140 ppm zinc

Berry Creek

Line 56350N - spiky zinc values of 1520 ppm, 2200 ppm and 1600 ppm generally associated with increased depth to bedrock, lead values generaly flat - best to 500 ppm

A number of the anomalies especially those at the extremities of the lines appear to be related to contact effects especially that at the Crotty Quartzite Limestone hiatus.

One rockchip sample was taken from a small dump near the eastern end of Line 55300N on the Pyramid grid. The calcite minor siderite veined limestone pit is thought to have been mined as flux for the nearby Argenton smelters. Base metal values for the composite sample were quite low.

Hydrocarbon Analyses

CSR and Cyprus were approached by Thermasearch Limited of Ireland to conduct reconnaissance rockchip sampling surveys for hydrocarbon analysis. Thermasearch has carried out extensive orientation surveys involving the analysis of several thousand rock samples primarily from the Lower Carboniferous of central Ireland and claim to have succeeded in defining a valuable pathfinder to Irish style mineralization (Appendix 3). Compared with conventional lithogeochemistry the analysis of hydrocarbons offers three main advantages.

1 The size of anomalies - the anomalies cover large areas extending many kilometers (perhaps as much as ten kilometers in the case of Navan) away from major mineral deposits. It should therefore be possible to detect mineralization using a lower density of samples than one would use for conventional geochemistry (perhaps one to two per square kilometer).

2 The vertical extent of anomalies - the available data suggests the anomalies extend large distances (several hundred meters) above mineralization. It may therefore be possible to use hydrocarbon gases to locate deeply buried deposits.

3 Extent of anomaly versus size of deposit - there seems to be a general relationship between the size of a deposit and the extent of the associated anomaly with large anomalies around major deposits and only localized changes around minor mineral showings. The hydrocarbon gas data might therefore be used to assess the relative importance of various targets and perhaps to give a rough estimate of the amounts of sulfide likely to be present.

To be balanced against these advantages the method does have some limitations which could restrict its practical application.

1 Use of rock samples - the technique requires samples of fresh, unweathered rock and it may not be possible to use it in some areas of very poor exposure or deep weathering unless one was prepared to drill shallow boreholes.

2 Contamination - contamination by vegetation or grease can seriously effect the results. Normally this can be avoided by ensuring the sample is clean when collected but it may still cause the occasional spurious result, for example where roots have grown into porous or highly fractured rocks. Careful checking of the data and perhaps some re-sampling of dubious sites may therefore be needed.

3 Background noise - the combination of analytical errors, lithological effects and small scale fluctuations in the gas content of the rock introduces considerable background noise into the data which can hinder the detection of underlying trends. Some additional sampling may therefore be needed to check that changes based on just a few results are real.

4 Complex form of anomalies - the form of the anomalies is much more complex than the simple increase close to mineralization which would be expected with conventional geochemistry and interpretation of the results is correspondingly more difficult. A regional survey would show the general location of anomalies but would need to be followed up by more detailed sampling to properly interpret the patterns.

5 Spurious anomalies - there is a close association between gas anomalies and mineral deposits but depending on the origin of the hydrocarbons there may be situations where one will find anomalies without associated mineralization. Similarly it is possible that some deposits may not be surrounded by anomalies either because of a difference in their origin or because the hydrocarbons have been lost during later geological events.

The new technique was thought to be applicable in exploring the wide spaced sampled portion of limestone from Leatherwood to the Professor Valley. In light of this 29 rock samples were collected from around the basin in the Crotty Quartzite which directly overlies the Gordon Limestone. Ten core samples from a section through the limestone and mineralization at the Oceania deposit (Cyprus EL 4/78) were also sampled. The samples were boxed and dispatched to Thermasearch Limited in Dublin, Ireland.

The results from the hydrocarbon geochemistry analyses proved totally inconclusive with statements in the accompanying report (Appendix 4) not being substantiated by the data printout. Subsequently Thermasearch was requested to re-evaluate the data utilizing maps showing sample locations and information on mineralization encountered at the Oceana deposit (Appendix 5).

Structural Analysis

CSR proposed the joint venture should undertake some structural geological studies to determine:

a) the geometric relationship between bedding, cleavage, small scale folding etc and the mineralization

b) to determine the relationship of mineralization at Black Jacks, Mariposa and the fault immediately to the east

c) to determine the relationship of the mineralization to the deformational strain and thus the significance of remobilization of the mineralization

D Ransom, a consultant structural geologist, was contracted to undertake the survey during December 1985. Four days were spent in the field examining outcrops and core in the company of the author. His work indicates the lead-zinc mineralization predates the Tabberaberan orogeny and an original stratabound mineralized zone of probable post-diagenetic origin was upgraded prior to the Devonian folding. He further states the soft sediment deformational features and sedimentalogical structures may well be accounted for by large scale dissolution of the limestone. However he fails to mention petrographic studies conducted by G Green (Mines Department) in which sulfide clasts were identified in some of the classic chaotic slump breccias. There are also numerous examples where breccias show pressure solution features indicative of dissolution, however the primary sedimentalogical features remain. A full report is included as Appendix 6.

Costean Rehabilitation

Drill tracks and a few costeans remain to be infilled and restored to a state capable of regeneration. One or two costeans in particular have been recommended to be left as backfilling as they will only compound environmental problems associated with them. The restoration of drill tracks will be completed once it is known that their existence is not needed (Enclosure 7).

EXPLORATION POTENTIAL

The tenement is still considered to have excellent potential for the location of Irish style carbonate hosted lead-zinc orebodies.

Exploration to date has concentrated on the northern sedimentary basin which contains approximately one-third of the total limestone in the tenement.

The larger southern basin has received only wide spaced coverage and future work should be concentrated in this area.

Work by EZ on the adjoining EL 4/78 in this same basin has defined syngenetic lead and zinc mineralization indicating potential for this area. EZ's work has shown the southern basin to be more zinc rich. This has been confirmed by recent stratigraphic drilling by the Mines Department in which primary zinc

carbonates and dolomites with minor lead values being intersected (18.7 meters assaying 3.5% zinc and 0.25% lead).

The proposed exploration program would concentrate on this southern area of the tenement.

PROPOSED PROGRAM

The proposed program involves the infilling of existing reconnaissance lines on the southern limestone sequence to approximate spacings of 400 meters. These are to be whacker sampled and assayed for lead, zinc and silver. Reconnaissance geological surveys will be conducted over zones of questionable structural character in order to identify possible 'growth faults'.

FOR

P A Jones of Phil Jones and Associates
for Cyprus Minerals

CYPRUS MINERALS AUSTRALIA COMPANY

EXPENDITURE FOR THE PERIOD JULY 1, 1985 TO JUNE 30, 1986

DUNDAS - PART EXPLORATION LICENCE 15/76

Salaries and Wages	9,247.29
Drafting	(1,613.04)
Cookery	1,477.49
Field Office Rent	114.18
Field Supplies - General	(71.53)
Field Supplies - Diesel	-
Freight	424.66
Aircraft Charter	-
Travel	-
Communications	1,104.93
Geophysics	1,275.00
Consultants/Contractors	11,650.34
Drilling	-
Assays	2,663.96
Legal Fees	-
Equipment Rental	-
Equipment Operation & Maintenance	1,267.77
Property Payments	-
	27,541.05
Overhead	2,754.10
	$ 30,295.15

T.J. CONQUEST
ACCOUNTANT
Disc 317

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APPENDICES

APPENDIX 1

PROPOSED AO GEOCHEMICAL SOIL SAMPLING (LETTER)
by CSR

995435

035

RECEIVED

6 NOV 1985

APPENDIX 1

Minerals Exploration and Development Group

CSR LIMITED
1 O'CONNELL STREET
SYDNEY AUSTRALIA
GPO BOX 483
SYDNEY 2001 AUSTRALIA
TELEPHONE (02) 235 8333
TELEX AA20285
CABLE CSRMINDIV SYDNEY

REW/sgl/7607

October 29, 1985

Mr. B. Roxburgh
Cyprus Minerals Australia Company
P.O. Box 493
NORTH SYDNEY N.S.W. 2060

Dear Bryce,

DUNDAS JOINT VENTURE

PROPOSED AO GEOCHEMICAL SOIL SAMPLING

Subsequent to our discussions on October 9 we have discussed the subject further with Mr. B. Baker of the Department of Mines. Bill Baker was not confident of the applicability of the technique when overburden depth was greater than the depth of penetration of the plant root systems. Bill Baker also pointed out that groundwater movement would be prevented or severely reduced by clay layers within the fluvioglacials.

My own opinion of the applicability of AO soil sampling is based on the following basic aspects.

(a) Metal transport, other than direct uptake by root systems, relies on the metals being transported in the groundwater.

(b) Variations in the water table could induce upward movement of metals, but this situation is not applicable to the areas of Gordon Limestone which form topographic lows with infilling of fluvioglacials and a high rainfall and thus probable lateral water flow through the overburden.

(c) The accepted explanation for metal transport is movement of metals, as cations, in the groundwater

by S.P. effects. However, the groundwater in the base of the fluvioglacials is not likely to be oxidising and thus is unlikely to generate S.P. effects even if a sulphide body is present. Impervious clay horizons expected in the fluvioglacials will distort the flow of groundwater.

Consequently, although the method should be considered as a possible tool, we see no justification for a routine sampling programme using the method.

Yours sincerely

R.E. Williams
Supervising Geologist
- S.E. Australia

APPENDIX 2

ANALYTICAL RESULT SHEETS

995438

038

The Australian Mineral Development Laboratories

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SA 5063
In reply quote:

APPENDIX 2
3/397/0 - AC 2802/86
SPT 45/86

20 December 1985

amdel

NATA CERTIFICATE

Mr. P. Jones,
Cyprus Minerals,
"Ocean View",
Saddle Road,
KETTERING TASMANIA 7155

REPORT AC 2802/86

YOUR REFERENCE:	Application of 9 December 1985
REPORT COMPRISING:	Cover Sheet Pages G1 - G3
DATE RECEIVED:	13 December 1985

D. Patterson
Chief Chemist
Analytical Chemistry Division

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Townsville
Queensland 4814
Telephone (077) 75 1377

NATA

Analysis code A1/1,2 Report AC 2802/86 Page G1

NATA Certificate Results in ppm

Sample	Pb	Zn	Ag
A113648	370	1380	<1
A113649	12	8	<1
A113650	14	23	<1
A113675	16	26	<1
A113676	16	115	<1
A113677	215	540	<1
A113678	14	11	<1
A113679	16	32	<1
A113680	12	12	<1
A113681	16	23	<1
A113682	10	5	<1
A113683	14	13	<1
A113684	20	28	<1
A113685	12	7	<1
A113686	82	62	<1
A113687	14	21	<1
A113688	12	8	<1
A113689	26	40	<1
A113690	62	58	<1
A113691	26	15	<1
A113692	18	10	<1
A113693	12	8	<1
A113694	18	10	<1
A113695	42	215	<1
A113696	12	14	<1
A113697	12	16	<1
A113698	12	13	<1
A113699	10	10	<1
A113700	10	5	<1
A113913	22	26	<1
A113914	16	86	<1
A113915	60	2240	<1
A113916	115	415	<1
A113917	24	52	<1
A113918	10	9	<1
A113919	16	21	<1
A113920	22	6	<1
A113921	14	18	<1
A113922	12	5	<1
A113923	24	50	<1
Detn limit	(5)	(2)	(1)

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Analysis code A1/1.2 Report AC 2802/86 Page G2

NATA Certificate Results in ppm

Sample	Pb	Zn	Ag	
A113924	12	16	<1	
A113925	12	8	<1	
A113926	8	7	<1	
A113927	10	8	<1	
A113928	20	230	<1	
A113929	8	6	<1	
A113930	30	30	<1	
A113931	16	205	<1	
A113932	18	35	<1	
A113933	12	9	<1	
A113934	20	39	<1	
A113935	1540	1760	1	
A113936	44	135	<1	
A113937	56	1800	<1	
A113938	38	8	<1	
A113939	26	49	<1	
A113940	10	13	<1	
A113941	10	10	<1	
A113942	42	22	<1	
A113943	215	1440	<1	
A113944	195	660	<1	
A113945	205	310	<1	
A113946	30	4	<1	
A113947	20	130	<1	
A113948	14	38	<1	
A113949	20	6	<1	
A113950	14	34	<1	
A113965	14	9	<1	
A113966	305	3820	1	
A113967	24	47	<1	
A113968	16	12	<1	
A113969	14	20	<1	
A113970	50	120	<1	
A113971	18	80	<1	
A113972	24	6	<1	
A113973	54	23	<1	
A113974	12	19	<1	
A113975	12	9	<1	
A113976	18	9	<1	
A113977	58	470	<1	
Detn limit	(5)	(2)	(1)	

Analysis code A1/1,2 Report AC 2802/86 Page G3

NATA Certificate Results in ppm

Sample	Pb	Zn	Ag
A113978	12	7	<1
A113979	10	9	<1
A113980	10	8	<1
A113981	<5	2	<1
A113982	<5	3	<1
A113983	10	5	<1
A113984	8	5	<1
A113985	10	20	<1
A113986	30	13	<1
A113987	18	11	<1
A113988	<5	3	<1
A113989	10	11	<1
A113990	14	21	<1
A113991	8	6	<1
A113992	10	7	<1
A113993	8	9	<1
A113994	14	3	<1
A113995	10	5	<1
A113996	100	730	1
A113997	510	365	1
A113998	2120	185	1
A113999	24	5	<1
A114000	140	18	<1
E161201	22	27	<1
E161202	16	21	<1
E161203	12	8	<1
E161204	34	40	<1
E161205	10	6	<1
E161206	12	26	<1
E161207	18	17	<1
E161208	22	66	<1
E161209	24	72	<1
E161210	22	7	<1
E161211	42	185	<1
E161212	16	27	<1
E161213	<5	2	<1
E161214	18	2	<1
E161215	78	3	<1
E161216	6	3	<1
E161217	18	4	<1
E161218	18	22	<1
E161219	12	7	<1
Detn limit	(5)	(2)	(1)

C42

The Australian Mineral Development Laboratories

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Phone Adelaide (08) 79 1662
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In reply quote:

995442

3/397/0 - AC 3277/86
SPT 77/86

4 February 1986

amdel

NATA CERTIFICATE

Mr. B. Roxburgh,
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NORTH SYDNEY N.S.W. 2060

REPORT AC 3277/86

YOUR REFERENCE:	Order Number E16951 Despatch 2328
REPORT COMPRISING:	Cover Sheet Page 1 Page G1
DATE RECEIVED:	31 January 1986

D. Patterson
Manager, Quality Control
& Methods Development
Applied Sciences Group

cc Mr. P. Jones,
Cyprus Minerals Australia Company,
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ij

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ANALYSIS

ppm

SAMPLE MARK	BARIUM Ba	LEAD Pb	ZINC Zn	SILVER Ag	COPPER Cu	MANGANESE Mn
150132	15	28	18	<1	10	180

Method: X3, A1/1,2

044

995444

Analysis code A1/1,2 Report AC 3277/86 Page G1

NATA Certificate Order No. 2328 Results in ppm

Sample		Pb	Zn	Ag
150122	Pyramid. 5530oN/6490oE	26	58	<1
150123	6485oE	28	37	<1
150124	6500oE	16	17	<1
150125	6505oE	16	11	<1
150126	6510oE	16	16	<1
150127	6515oE	30	170	<1
150128	6520oE	32	195	<1
150129	6525oE	115	465	<1
150130	6530oE	1140	1040	<1
150131	6535oE	24	62	<1
150133	5590oN / 6500oE	155	230	<1
150134	6505oE	170	445	<1
150135	6510oE	360	260	<1
150136	6515oE	465	435	<1
150137	6520oE	20	60	<1
150138	6525oE	630	1140	1
150139	6530oE	160	30	<1
150140	6535oE	86	90	<1
161251	Berry Creek. 5635oN 7175oE	28	48	<1
161252	7180oE	20	38	<1
161253	7185oE	120	530	<1
161254	7190oE	135	110	<1
161255	7195oE	24	88	<1
161256	7200oE	80	365	<1
161257	7205oE	66	400	<1
161258	7210oE	500	1520	<1
161259	7190oE	130	500	<1
161260	7185oE	28	125	<1
161261	7180oE	220	2200	<1
161262	7175oE	18	82	<1
161263	7165oE	28	155	<1
161264	7145oE	18	24	<1
161265	7140oE	28	1600	<1
161266	7135oE	54	275	<1
161267	7130oE	22	78	<1
161268	7125oE	54	285	<1
161269	7120oE	88	300	<1
161270	7115oE	46	70	<1
161271	7110oE	82	540	<1
Detn limit		(5)	(2)	(1)

045

995445

APPENDIX 3

HYDROCARBON GAS ANOMALIES IN THE LOWER CARBONIFEROUS OF IRELAND

by Thermasearch Pty Ltd

/ 046

APPENDIX 3

THERMASEARCH LTD
Trinity House, The Triangle,
Ranelagh, Dublin 6,
Republic of Ireland.

Tel: (01) 976101/9767688
Telex: 91346 CSA EI

HYDROCARBON GAS ANOMALIES IN THE LOWER CARBONIFEROUS OF IRELAND

Mercury Hydrocarbon's research into the use of hydrocarbon gases as pathfinders for mineral exploration has concentrated on the Lower Carboniferous limestones of central Ireland. These rocks form a major metalogenic province which includes Europe's largest zinc mine, at Navan, and a number of other large carbonate-hosted lead-zinc deposits, for example at Silvermines and Tynagh.

Orientation surveys, involving the analysis of several thousand rocks samples, have been carried out around most of known sulphide deposits and over a number of background areas where no mineralization is known. The results can be summarized as follows:

a) Samples from background areas tended to release relatively small amounts of all the hydrocarbons.

b) In contrast, samples from near to mineralization show a greater variation, many releasing much larger amounts of gas.

This can be seen by comparing the scatter plots in figure 1 which plot the amounts of methane (C1) vs cyclopropane (C3=A), released by samples of limestones from a background area in Co. Limerick and from around two sulphide deposits at Silvermines and Mallow.

The levels of both components tend to be much higher in the samples from near the mineralization at Silvermines and Mallow than in similar rocks from the Limerick area.

c) The variations in the amounts of hydrocarbon form distinct anomalies which seem to be closely associated with mineralization.

At Silvermines and Mallow the clearest anomalies are shown by the C3=A component which is strongly enriched within a few hundred metres of the mineralization (figures 2 and 3). The higher levels of methane occur over a much larger area (several kilometres across at Silvermines) around these centres. Similar patterns, with a central concentration of heavier hydrocarbons passing out into broad zones of methane enrichment, have been found around all the deposits studied.

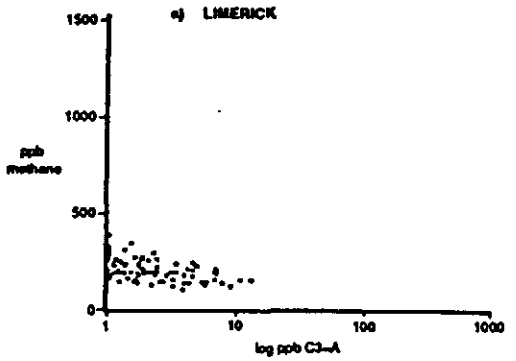
Directors: R. W. A. Crowe, P. C. D. Cazalet (U.K.), G. Ll. Jones (U.K.), D. J. Hough, C. Schaffalitzky.

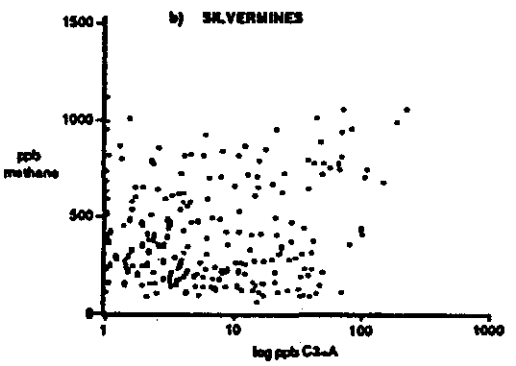
d) On a regional scale there are differences in the form of anomalies.

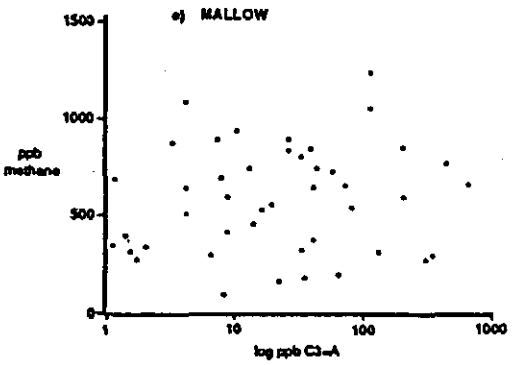
In particular some deposits show an enrichement in the gasoline-range hydrocarbons, such as ethane, propane, butane or pentane, close to mineralization rather than a change in C3-A. This is especiallymarked at Navan where there is a strong enrichment in the heaviest C4 and C5+ components.

These differences seem to reflect a regional trend across Ireland, the higher levels of the heavier hydrocarbon being found in the north-east while methane and C3-A anomalies occur in the south-west. This may reflect some fundemental change in conditions, for example in the temperature of the rocks or the source of the mineralizing brines.

Dr Jonathan Carter,
Mercury Hydrocarbons Ltd.,
November, 1985.







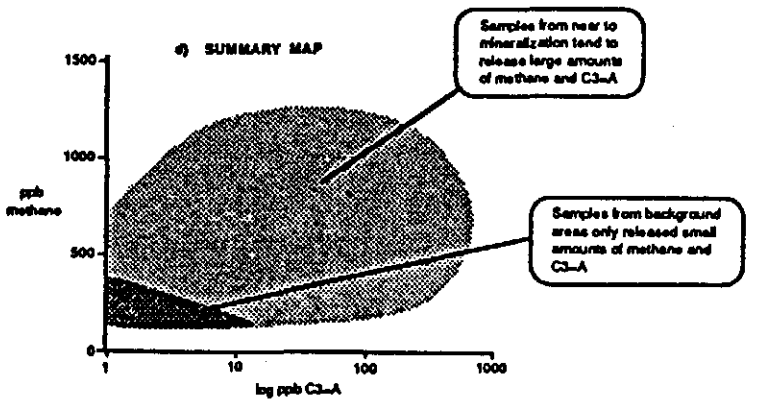
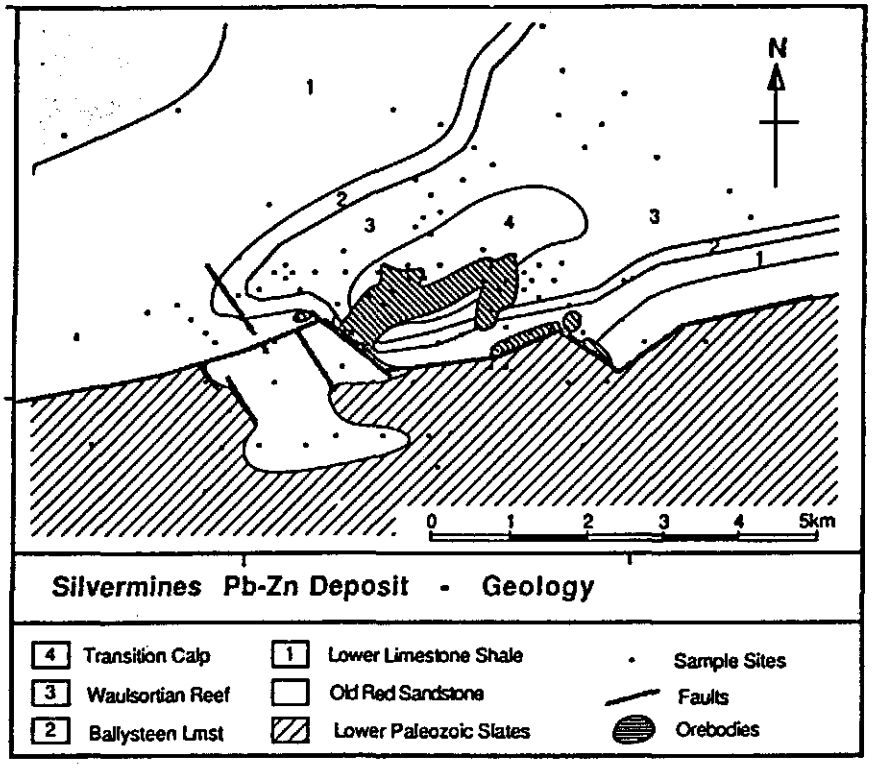
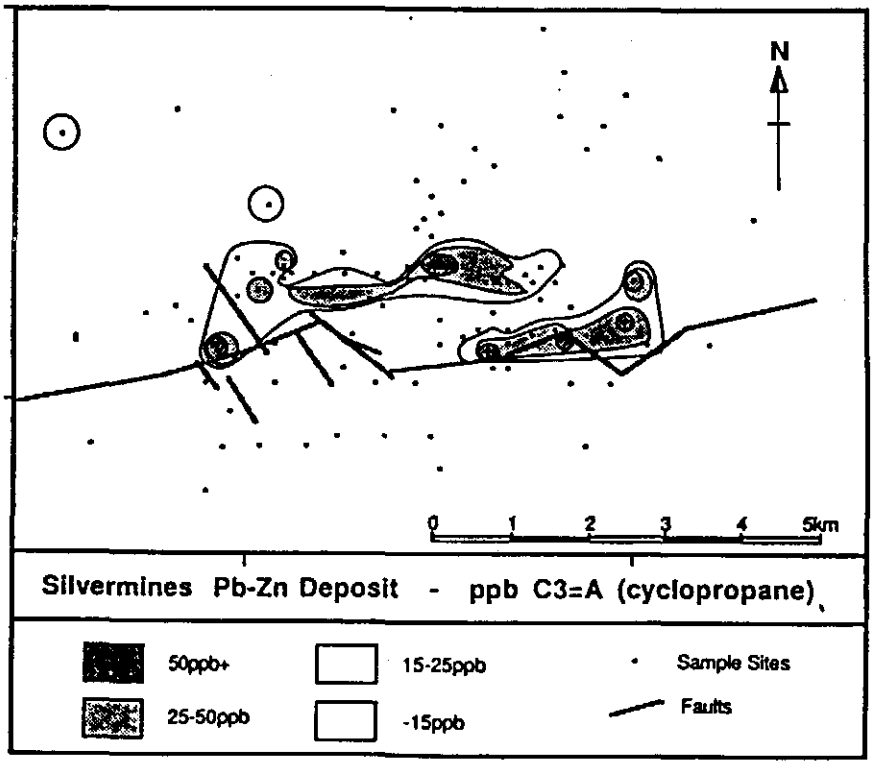
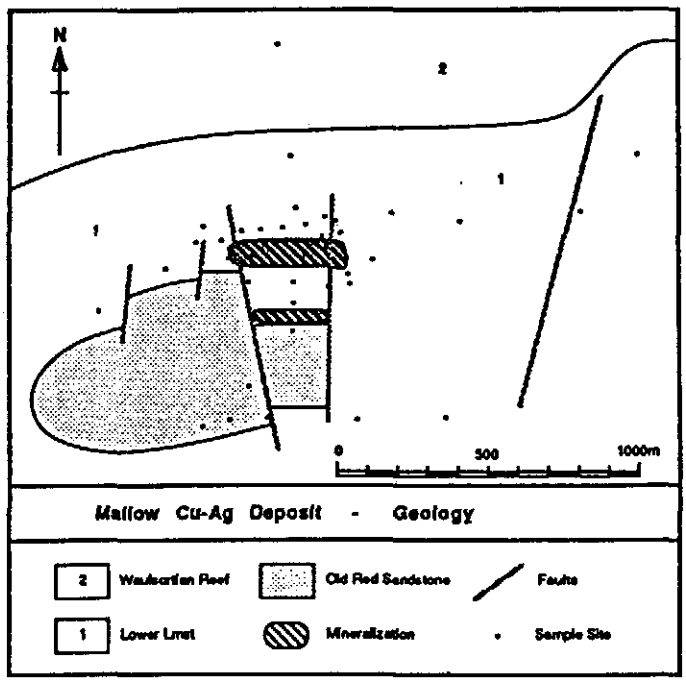


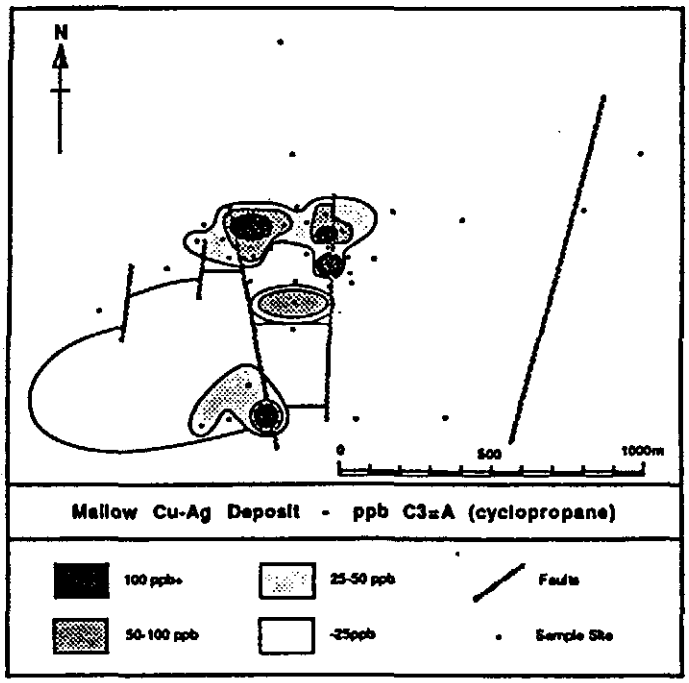
Figure 1 - Scatter plots showing the variations in the amounts of methane (C1) versus C3=A (cyclopropene) released by samples of Carboniferous limestones from three areas in western Ireland:
a) Limerick - a background area (about13km x 12km) where no mineralization is known.
b) Silvermines - an area of about 25km x 15km around a major Pb-Zn sulphide deposit.
c) Mallow - an area of about 10km x 6km around a small Cu-Ag prospect.
There is a clear contrast between the results from Limerick, where all the samples released relatively small amounts of methane and C3=A, and the two mineralized areas where the rocks are strongly enriched in both components.


N
1
2
3
4
3
3
2
1
0 1 2 3 4 5km
Silvermines Pb-Zn Deposit - Geology
4 Transition Calp
3 Waulsortian Reef
2 Ballysteen Lmst
1 Lower Limestone Shale
Old Red Sandstone
Lower Paleozoic Slates
Sample Sites
Faults
Orebodies

5 cm


N
0 1 2 3 4 5km
Silvermines Pb-Zn Deposit - ppb C3=A (cyclopropane)
50ppb+
25-50ppb
15-25ppb
-15ppb
Sample Sites
Faults





J.S. Carter, Nov, 1985.

5 cm

APPENDIX 4

LIGHT HYDROCARBON GAS ANALYSIS OF CYPRUS MINERALS SAMPLES
by Thermasearch Pty Ltd

995452

052

THERMASEARCH LTD
Trinity House, The Triangle,
Ranelagh, Dublin 6,
Republic of Ireland.

Tel: (01) 976101/9767688
Telex: 91346 CSA EI

Mr P.Dave Timms
Cyprus Minerals Australia Company
PO Box 493
North Sydney,
New South Wales 2060

Ref: 19.86
Date: 21/5/86

Attention: Mr P.A.Jones

Re: Tasmanian hydrocarbon analyses

Dear Dave,

I enclose, at last, the results of the hydrocarbon geochemistry results from your Zeehan property together with a short report by J.Carter on the nature of the results. We apologise for the delays in getting these to you. They were caused in part by problems with clearing customs in Dublin and also by having to re-run many of the samples several times to overcome problems with vegetation contamination of the samples. I have already sent full instructions to Mr Jones so the same problems should not arise again.

As you can see from the report, the results seem to be fairly good despite not knowing the locations. By analogy with Ireland, the technique would therefore appear to be useful in the Zeehan area. If this conclusion is borne out when you plot the results you should consider doing further collecting to detail anomalies or write off unprospective ground. In Ireland we have even found it worthwhile using a short-hole rig to take hydrocarbon samples in order to track down anomalies.

I also enclose a some recent results of scout sampling done in the Carlin area which you might be interested in

Directors R. W. A. Crowe, P. C. D. Cazalet (U.K.), G. Ll. Jones (U.K.), D. J. Hough, C. Schaffalitzky

I look forward to hearing from you if we can be of further assistance and take the opportunity of enclosing our invoice.

Yours Sincerely

Rupert Crowe

Rupert Crowe

C54

LIGHT HYDROCARBON GAS ANALYSIS OF CYPRUS MINERALS SAMPLES - May 1986.

by Dr J.Carter

Thirty-nine rock samples (29 from surface exposures and 10 from boreholes), collected by Cyprus Minerals Ltd., were analysed for light (C1-C5) hydrocarbons using Mercury Hydrocarbons Ltd's standard heating technique.

The accompanying computer print-out list the amounts of the 12 main hydrocarbons measured, as approximate ppb (10^{-9}g of gas/ g of rock). For convenience simple names have been assigned to each component. These are as follows:

C1	-	Methane
C2=	-	Ethene
C2	-	Ethane
C3A	-	Propene
C3B	-	Propane
C3=A	-	Cyclopropane ??
C3=B	-	Formaldehyde/methanol ?
170	-	Acedaldehyde ?
IC4	-	i-butane
C4=	-	Butene
NC4	-	n-butane
C5+	-	Pentanes and heavier hydrocarbons

RESULTS

From examination of the data, a number of general comments can be made, even though the locations of the samples are unknown. Much better interpretation and evaluation of the technique will be possible with the data plotted on a geological base map.

1) All the samples released significant amounts of hydrocarbon and

there are clearly large variations between samples.

2) About half of the outcrop samples released high levels of acedaldehyde (170) and of the other heavier hydrocarbons. This is a worry as large levels of 170 are often (but not invariably) a sign of contamination by vegetation.

The samples were all examined when they arrived and although a few did still have traces of moss and litchen on the surface, this was removed before crushing. It is therefore suprising that so many samples should be affected.

Possibly the samples have been contaminated by humic acids which have permeated into the rock. We have also had difficulties with rootlets growing down the cleavage of slates. Alternatively the high levels of 170 may reflect a real change in the rock, perhaps being produced by the decomposition of heavier petroleum hydrocarbons during the extraction procedure.

I would therefore treat the results for all the samples with greater than 100ppb 170 with caution, though the measurements for methane (C1) could still be used (methane is not normally released by vegetation) and some of the changes in the heavier hydrocarbons may be real.

3) The most striking variation in the remaining samples is in the amounts of methane which ranges from about 10ppb to over 1000ppb.

From our experience in Ireland and Europe, we would normally expect the background levels of methane to range between about 150ppb and 300ppb.

Higher amounts (>500ppb) are anomalous and are usually only found within methane halos surrounding mineralization. The high levels of methane in the Cyprus Minerals samples is therefore encouraging and suggests that there may be a methane anomaly in this area.

The low levels of methane (<50ppb) are very unusual and we have not

found so many samples like this in any previous study. It suggests that there has been an extreme loss of gas from the rocks, though there is no obvious sign in the rocks of extreme weathering or hydrothermal activity which might have caused such a loss.

4) There are also interesting variations in the other hydrocarbons.

   The changes in C3=A (cyclopropane) seem especially promising as high levels of this component has been found to be closely associated with mineralization in other areas. Anything over 5ppb of C3=A can be considered interesting and the higher levels (>10ppb) in samples 169007, 169014, 169022, 169024 and 15014 are certainly anomalous.

   Other interesting changes include the higher levels of C4= and NC4 in sample 160910; higher levels of C3= in 169010, 169011 and 169029; and the slightly higher levels of C5+ and NC4 in 169029. All these may be an indication of an enrichment of heavier hydrocarbons towards the centre of a gas anomaly.

5) The lithology of the samples was briefly recorded before crushing, but on this basis there does not seem to be any correlation between the hydrocarbon gas content and lithology.

CONCLUSIONS

Overall these results are encouraging though final evaluation will have to await plotting. They show evidence for changes in the amounts of methane and components such as C3=A, which is similar to those found around mineralization in other areas.

Plotting the data on a map should show if there is any correlation with the mineralization here. Ideally one would expect to see a broad area of methane enrichment, with a centre containing less methane but with higher concentrations of cyclopropane and the other heavier hydrocarbons. In practice the pattern is usually more complex than this reflecting the control of the local geology on the migration of the gases.

When interpreting the data one would also need to take into account the possible contamination of some of the outcrop samples and also the possibility that the very low amouts of methane in some samples reflects a loss of gas after the mineralizing event (e.g. during weathering).

CSR OUTCROP SAMPLES MAY 86

05-20-1986

Sample	C1	C2=	C2	C3A	C3B	C3=A	C3=B	170	IC4	C4=	NC4	C5+	LCode	Grd Ref	Comment
AM/001	9.8	0.6	8.9	19.7	0.0	5.7	5.2	33.4	0.0	0.0	11.0	10.7			169001 1 PROFESSOR
AM/002	11.6	7.8	1.9	16.8	0.0	19.8	0.0	166.7	0.0	64.2	3.8	144.9			169002 2 PROFESSOR
AM/002	7.5	4.0	6.6	9.4	0.0	23.3	47.8	102.4	0.0	61.0	0.0	202.8			169002 2 PROFESSOR
AM/003	16.6	1.1	3.4	24.0	0.0	2.0	0.0	28.7	0.0	0.0	0.0	20.3			169003 3 PROFESSOR
AM/004	7.3	1.5	9.1	15.1	0.0	14.8	17.2	101.9	0.0	22.8	24.6	52.6			169004 4 OCEANA
AM/005	15.3	0.7	1.9	0.0	7.4	35.6	0.0	41.6	0.0	0.0	0.0	17.3			169005 5 OCEANA
AM/006	6.8	1.9	1.9	10.3	0.0	23.4	0.0	127.2	0.0	41.3	1.9	64.5			169006
AM/006	8.3	2.6	1.0	11.0	0.0	38.7	41.1	166.0	0.0	53.0	0.0	123.8			169006
AM/007	11.8	0.8	1.6	25.5	0.0	36.1	0.0	46.3	0.0	3.9	17.2	38.0			169007 7 BLACK JACK
AM/008	11.0	0.0	6.3	14.9	0.0	2.1	0.0	14.3	0.0	0.0	7.9	0.0			169008 8 BLACK JACK
AM/009	13.5	0.6	1.5	13.2	0.0	3.7	0.0	12.3	6.7	0.0	5.7	10.3			169009 9 BLACK JACK
AM/010	14.4	0.4	3.6	67.5	0.0	8.2	9.4	40.6	0.0	24.3	145.5	28.0			169010 10 MARIPOSA
AM/011	16.2	2.2	3.2	46.9	0.0	2.7	12.5	36.4	0.0	0.0	12.4	32.5			169011 11 MARIPOSA
AM/012	7.1	1.0	5.0	8.8	0.0	33.9	89.1	154.0	0.0	52.8	0.0	148.2			169012
AM/012	30.9	2.0	1.1	30.7	0.0	49.2	238.2	434.3	0.0	95.7	0.0	315.0			169012
AM/013	9.0	1.7	3.5	10.2	0.0	13.5	30.3	94.9	0.0	20.5	0.0	94.2			169013 13 LEATHERWO
AM/013	3.6	0.1	7.8	5.3	0.0	9.6	31.0	62.9	0.0	56.4	0.0	166.4			169013 13 LEATHERWOO
AM/014	8.2	0.5	1.7	10.5	0.0	21.1	36.6	152.8	0.0	26.0	0.0	79.0			169014 14 LEATHERWO
AM/014	3.3	0.2	11.2	5.2	0.0	20.9	21.7	53.9	0.0	17.6	0.0	47.3			169014 14 LEATHERWOO
AM/015	5.4	0.2	2.4	19.0	0.0	2.2	0.0	28.2	0.0	0.0	6.5	11.0			169015
AM/016	14.5	1.6	1.0	35.3	0.0	12.1	0.0	178.2	0.0	0.0	6.5	95.6			169016
AM/017	10.4	2.3	9.4	41.8	0.0	10.4	18.6	112.5	21.4	0.0	76.7	94.2			169017
AM/018	13.3	1.9	5.6	11.3	0.0	100.5	55.3	189.0	0.0	12.2	0.0	99.2			169018
AM/018	15.1	1.8	4.4	11.5	0.0	98.6	36.7	141.5	0.0	10.9	0.0	63.9			169018
AM/019	13.8	0.4	0.8	35.3	0.0	18.1	0.0	141.9	0.0	0.0	8.8	55.6			169019
AM/019	17.0	1.3	6.3	38.0	0.0	22.7	26.4	131.3	0.0	0.0	9.9	42.4			169019
AM/020	17.0	2.7	5.4	27.1	0.0	116.2	50.8	172.4	0.0	39.3	6.4	172.3			169020
AM/020	19.5	2.6	1.7	30.5	0.0	62.8	35.9	180.2	0.0	56.4	0.0	141.8			169020
AM/021	1.6	0.3	0.0	0.0	0.0	2.9	2.1	15.0	0.0	9.4	0.0	0.0			169021
AM/021	3.2	0.5	0.0	1.5	0.0	2.6	8.0	43.9	0.0	13.1	0.0	26.0			169021
AM/022	12.3	0.7	2.3	17.7	0.0	11.2	4.7	22.3	6.1	0.0	17.6	0.0			169022
AM/023	1.9	0.3	0.0	1.4	0.0	1.6	2.0	28.4	16.5	0.0	0.0	10.7			169023
AM/023	3.0	0.0	7.3	1.6	0.0	2.7	5.0	25.8	18.9	0.0	0.0	19.1			169023
AM/024	3.5	0.7	2.7	7.7	0.0	23.9	6.4	35.9	37.2	0.0	0.0	0.0			169024
AM/025	6.5	0.0	0.0	0.0	0.0	0.0	0.0	52.9	0.0	17.1	4.9	0.0			169025
AM/026	7.1	0.5	7.7	13.9	0.0	2.8	13.7	95.5	12.1	0.0	31.9	56.2			169026
AM/027	23.9	0.0	1.4	41.9	0.0	49.6	46.2	362.3	0.0	19.0	12.1	261.3			169027
AM/027	20.0	0.4	5.3	38.3	0.0	120.5	45.4	367.4	6.0	0.0	23.0	295.7			169027
AM/028	18.5	7.3	6.5	34.7	0.0	41.6	28.6	238.1	10.1	0.0	26.8	71.6			169028
AM/028	25.3	8.9	4.3	50.8	0.0	52.8	26.1	266.4	10.5	0.0	36.1	81.2			169028
AM/029	17.0	1.2	2.8	38.9	0.0	7.6	12.6	76.2	0.0	0.0	27.2	18.9			169029

CSR CORE SAMPLES MAY 86 05-20-1986

Sample	C1	C2=	C2	C3A	C3B	C3=A	C3=B	170	IC4	C4=	NC4	C5+	LCode	Grd Ref	Comment
CA/001	17.4	1.0	6.9	22.9	0.0	1.1	9.0	8.2	0.0	0.0	0.0	9.4			150142 2T-80-5 15M
CA/001	22.3	1.9	6.2	27.3	0.0	2.7	9.0	9.8	6.3	0.0	6.1	0.0			150142 2T-80-5 15M
CA/002	21.9	1.8	2.1	24.8	2.5	0.0	0.0	4.7	0.0	0.0	0.0	0.0			150143 2T-80-5 124M
CA/003	10.6	1.5	0.0	22.3	0.0	1.8	16.1	7.9	4.2	0.0	12.1	0.0		150144	2T-80-5 230M
CA/003	11.1	1.6	2.8	21.6	0.0	1.8	13.9	5.0	0.0	8.6	14.7	0.0			150144 2T-80-5 230M
BA/004	6.9	0.9	0.0	11.1	4.5	0.0	3.4	4.8	11.2	0.0	0.0	0.0			150145 2T-80-5 327.5
CA/005	12.4	1.1	5.5	22.4	0.0	0.0	19.3	13.4	20.0	0.0	9.4	17.3			150146 2T-80-5 410M
CA/006	21.6	4.3	2.6	37.3	0.0	0.0	4.3	10.4	16.8	0.0	24.3	10.6			150147 2T-80-4 275M
CA/007	17.1	2.6	0.0	41.9	0.8	0.0	4.6	5.3	0.0	0.0	0.0	0.0			150148 2T-80-4 325M
CA/008	18.7	3.4	7.3	55.8	4.3	15.0	0.0	58.3	59.8	0.0	1.3	70.7			150149 2T-80-7 50M
CA/008	22.6	2.6	1.1	43.3	0.0	9.7	34.7	85.9	49.0	0.0	5.0	73.1			150149 2T-80-7 50M
BA/009	6.9	0.6	2.4	12.1	1.1	0.0	0.0	3.0	2.5	0.0	0.0	0.0			150150 2T-80-7 16.
BA/010	9.6	0.8	1.9	11.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0			152799 2T-80-12 36.6
CA/010	10.8	0.9	2.0	15.7	0.0	2.8	0.0	3.1	0.0	0.0	0.0	0.0			152799 2T-80-12 36.6

APPENDIX 5

QUERY OF THERMASEARCH REPORT 19.86

061 *Phil Jones and Associates Pty. Ltd.* 995461

Geotechnical Personnel

APPENDIX 5

SEND TO:

IRISH EXPORT BOARD,

ATTENTION:

MR. DON BRIGGS.

TO BE COLLECTED BY:

MR. R. CROWE.
ACTING FOR THERMASEARCH LTD.

SUBJECT:

QUERY OF THERMASEARCH REPORT 19.86.

N° OF PAGES:

TEXT: 2

FIGURES: 2

APPENDICES: 8

9A WAIMEA AVENUE, SANDY BAY, TASMANIA, 7005.

PHONE: (002) 28 2256

TO RUPERT CROWE,

C62

995462

RE: Tasmanian Hydrocarbon Analyses 19.86

A number of inconsistencies have arisen from Carters' summary report. These are outlined as follows:

Results.

Section 3.

i) He states methane values ranged from 10ppb to over 1000ppb, however the print out of data shows results of rock chips vary from 1.6 to 30.9 ppb and the core from 6.9 to 22.6 ppb. Therefore his statement that high levels in Cyprus' samples are encouraging, is erroneous.

ii) Consequently his statement that low levels of 50 ppb is unusual, is itself unusual as all the values are less than 50 ppb.

Section 4.

Keeping in mind the 170 gas levels then:

I i) Carter stated the levels of C3=A in samples 169007, 169014, 169022, 169024 and 15014 are considered interesting. Surely 169014 (repeat) is borderline due to the high 170 levels: a) C3=A 21.1 170 152.8
b) C3=A 20.0 170 53.9

ii) Also I presume 15014 should read 150149 in which C3 values are anomalous (15.0 and 9.7) however, are associated with higher 170 values of 58.3 and 85.9 ppb.

iii) Surely possible additional anomalous samples are:
169005 C3=A 35.6 170 41.6
169013 (rpt) a) C3=A 13.5 170 94.9
b) C3=A 9.6 170 62.9

and 169004 is possibly a borderline anomaly due to high 170 levels?

II Anomalous levels of C4 = and NC4 were outlined:

i) Sample N° 160910 I presume should read 169010?

ii) However, numbers 169011 and 169029 are reportedly showing high levels of C4= (in the report incorrectly typed as C3=?) but as seen in the data sheets have levels of 0.0 ppb.

iii) Should sample number 169013 (repeat) also be considered anomalous with gas levels of
a) 170 94.9 C4=20.5 C5+ 94.2
b) 170 62.9 C4=56.4 C5+ 166.4.

iv) Are samples 169002, 169004, 169014 again possible borderline results with high C4 =, NC4 associated with high 170 gas levels.

v) Do sample numbers 169021 and 169025 show weak anomalism?

The comment on vegetable matter contamination is possibly relevant as the area in question is comprised of boggy acid peat lands with humic acids being quite prominent.

Locatious for the rock chip samples are shown on Fig. 1. The samples were taken at 500 to 750 metre spaced intervals within the hanging wall Crotty Quartzite unit overlying the Gordon Limestone within the Zeehan Basin.

Drill core samples 150142 to 152799 were taken at approximate 50 metres intervals accross strike (H.W to F.W.) of the Ordorician Gordon Limestone sequence in which two mineralized (Pb-Zn) zones occur. (Fig 2).

Mineralized intervals occur as follows:

ZT-80-4 (lens 1) 247-258 11m @ 12%Pb 4%Zn 89g/t Ag.
(lens 2) 302-307 5m @ 22.3% Pb 2%Zn 323g/t Ag.

ZT-80-7 (len 2) 167-169 2m @ 12% Pb, 11%Zn 70g/t Ag.

On this basis sample N° 150146 lies proximal to the mineralized target zone, however, the mineralization has been faulted out.
Sample N° 150147 lies 20 metres below lens 1 mineralization and 27 metres above lens 2. Sample N° 150148 lies 20m below lens 2 mineralization Sample N° 150149 lies 115 metres below lens 2 mineralization.

I hope this further information may aid a check and reevaluation of the original data.

Regards,

Phil Jones.
Consultant to Cyprus Minerals
and CSR.

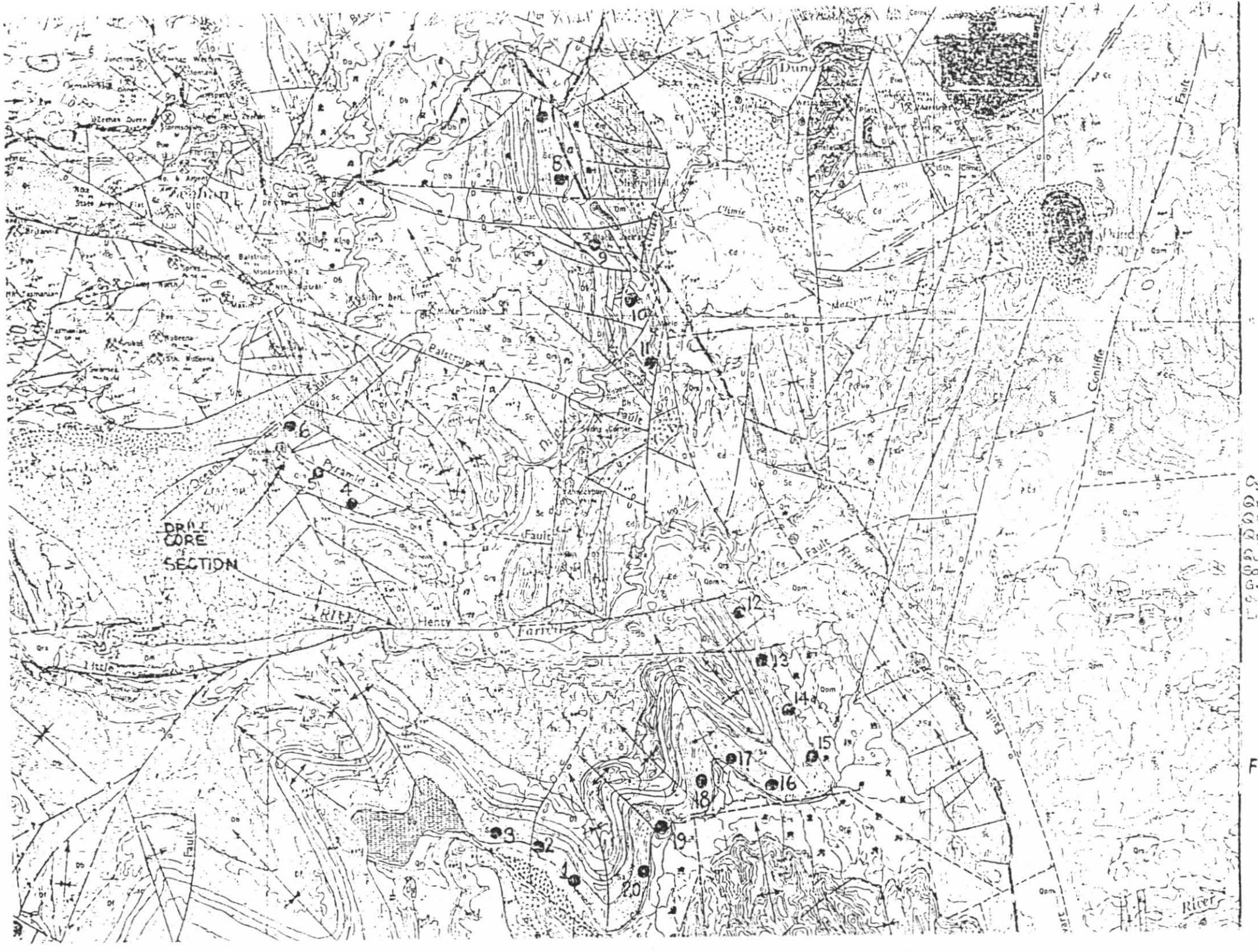


FIG 1

064
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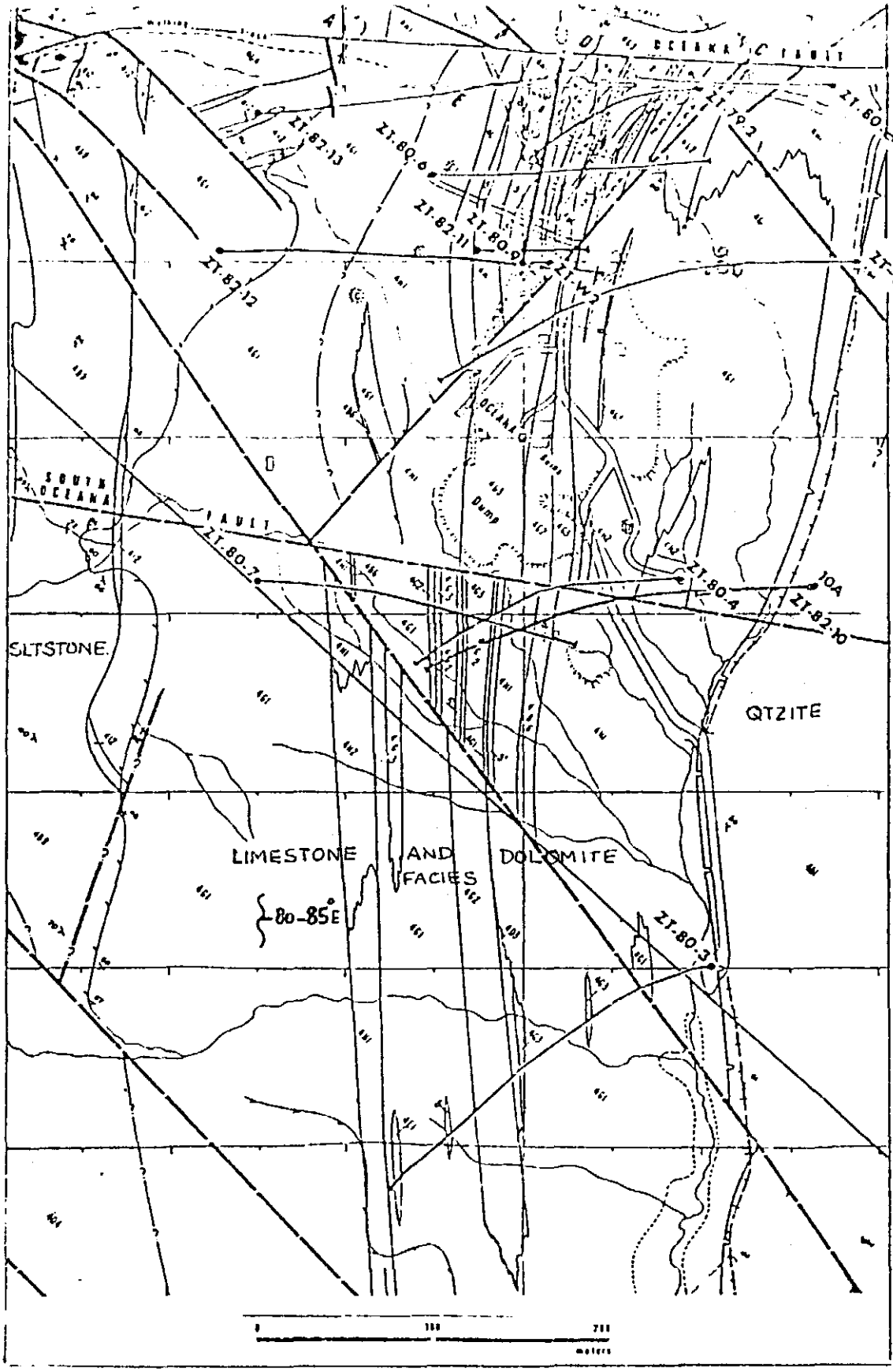

SILURIAN	-	Crotty Quartzite	
ORDOVICIAN	-	Gordon Limestone	
"	-	Moina Sandstone	

FIGURE 2. Geological plan of Oceana Valley, showing distribution of Gordon Limestone, major faults and Amoco boreholes. Scale 1:2500

5 cm

066

995466

LIGHT HYDROCARBON GAS ANALYSIS OF CYPRUS MINERALS SAMPLES - May 1986.

by Dr J.Carter

Thirty-nine rock samples (29 from surface exposures and 10 from boreholes), collected by Cyprus Minerals Ltd., were analysed for light (C1-C5) hydrocarbons using Mercury Hydrocarbons Ltd's standard heating technique.

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C3B	-	Propane
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170	-	Acedaldehyde ?
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C4=	-	Butene
NC4	-	n-butane
C5+	-	Pentanes and heavier hydrocarbons

RESULTS

From examination of the data, a number of general comments can be made, even though the locations of the samples are unknown. Much better interpretation and evaluation of the technique will be possible with the data plotted on a geological base map.

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wrong 1.6 – 30.9

3) The most striking variation in the remaining samples is in the amounts of methane which ranges from about 10ppb to over 1000ppb.

From our experience in Ireland and Europe, we would normally expect the background levels of methane to range between about 150ppb and 300ppb.

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C70

CSR OUTCROP SAMPLES MAY 86

Sample	C1	C2=	C2	C3A	C3B	C3=A	C3=B
AM/001	9.8	0.6	8.9	19.7	0.0	5.7	5.2
AM/002	11.6	7.8	1.9	16.8	0.0	19.8	0.0
AM/002	7.5	4.0	6.6	9.4	0.0	23.3?	47.8
AM/003	16.6	1.1	3.4	24.0	0.0	2.0	0.0
AM/004	7.3	1.5	9.1	15.1	0.0	14.8?	17.2
AM/005	15.3	0.7	1.9	0.0	7.4	35.6	0.0
AM/006	6.8	1.9	1.9	10.3	0.0	23.4	0.0
AM/006	8.3	2.6	1.0	11.0	0.0	38.7	41.1
AM/007	11.8	0.8	1.6	25.5	0.0	36.1 ✓	0.0
AM/008	11.0	0.0	6.3	14.9	0.0	2.1	0.0
AM/009	13.5	0.6	1.5	13.2	0.0	3.7	0.0
AM/010	14.4	0.4	3.6	67.5	0.0	8.2	9.4
AM/011	16.2	2.2	3.2	46.9	0.0	2.7	12.5
AM/012	7.1	1.0	5.0	8.8	0.0	33.9	89.1
AM/012	30.9	2.0	1.1	30.7	0.0	49.2	238.2
AM/013	9.0	1.7	3.5	10.2	0.0	13.5?	30.3
AM/013	3.6	0.1	7.8	5.3	0.0	9.6?	31.0
AM/014	8.2	0.5	1.7	10.5	0.0	21.1 ✓	36.6
AM/014	3.3	0.2	11.2	5.2	0.0	20.9 ✓	21.7
AM/015	5.4	0.2	2.4	19.0	0.0	2.2	0.0
AM/016	14.5	1.6	1.0	35.3	0.0	12.1	0.0
AM/017	10.4	2.3	9.4	41.8	0.0	10.4	18.6
AM/018	13.3	1.9	5.6	11.3	0.0	100.5	55.3
AM/018	15.1	1.8	4.4	11.5	0.0	98.6	36.7
AM/019	13.8	0.4	0.8	35.3	0.0	18.1	0.0
AM/019	17.0	1.3	6.3	38.0	0.0	22.7	26.4
AM/020	17.0	2.7	5.4	27.1	0.0	116.2	50.8
AM/020	19.5	2.6	1.7	30.5	0.0	62.8	35.9
AM/021	1.6	0.3	0.0	0.0	0.0	2.9	2.1
AM/021	3.2	0.5	0.0	1.5	0.0	2.6	8.0
AM/022	12.3	0.7	2.3	17.7	0.0	11.2 ✓	4.7
AM/023	1.9	0.3	0.0	1.4	0.0	1.6	2.0
AM/023	3.0	0.0	7.3	1.6	0.0	2.7	5.0
AM/024	3.5	0.7	2.7	7.7	0.0	23.9 ✓	6.4
AM/025	6.5	0.0	0.0	0.0	0.0	0.0	0.0
AM/026	7.1	0.5	7.7	13.9	0.0	2.8	13.7
AM/027	23.9	0.0	1.4	41.9	0.0	49.6	46.2
AM/027	20.0	0.4	5.3	38.3	0.0	120.5	45.4
AM/028	18.5	7.3	6.5	34.7	0.0	41.6	28.6
AM/028	25.3	8.9	4.3	50.8	0.0	52.8	26.1
AM/029	17.0	1.2	2.8	38.9	0.0	7.6	12.6

995471

C71

05-20-1986

I70	IC4	C4=	NC4	C5+	LCode	Grd Ref	Comment
33.4	0.0	0.0	11.0	10.7			169001 1 PROFESSOR
166.7	0.0	64.2	3.8	144.9			169002 2 PROFESSOR
102.4	0.0	61.0?	0.0	202.8			169002 2 PROFESSOR
28.7	0.0	0.0	0.0	20.3			169003 3 PROFESSOR
101.9	0.0	22.8?	24.6?	52.6✓?			169004 4 OCEANA
41.6	0.0	0.0	0.0	17.3			169005 5 OCEANA
127.2	0.0	41.3	1.9	64.5			169006 OCEANA
166.0	0.0	53.0	0.0	123.8			169006 OCEANA
46.3	0.0	3.9	17.2	38.0✓			169007 7 BLACK JACK
14.3	0.0	0.0	7.9	0.0			169008 8 BLACK JACK
12.3	6.7	0.0	5.7	10.3			169009 9 BLACK JACK
40.6	0.0	24.3✓	145.5✓	28.0✓			169010 10 MARIPOSA
36.4	0.0	(0.0)?	12.4	32.5✓			169011 11 MARIPOSA
154.0	0.0	52.8	0.0	148.2			169012 Leatherwood
434.3	0.0	95.7	0.0	315.0			169012
94.9	0.0	20.5?	0.0	94.2✓?			169013 13 LEATHERWO
62.9	0.0	56.4✓	0.0	166.4✓			169013 13 LEATHERWOO
152.8	0.0	26.0??	0.0	79.0			169014 14 LEATHERRWO
53.9	0.0	17.6✓?	0.0	47.3✓			169014 14 LEATHERWOO
28.2	0.0	0.0	6.5	11.0			169015 Leatherwood
178.2	0.0	0.0	6.5	95.6			169016 King Billy
112.5	21.4	0.0	76.7	94.2			169017 " "
189.0	0.0	12.2	0.0	99.2			169018 " "
141.5	0.0	10.9	0.0	63.9			169018 " "
141.9	0.0	0.0	8.8	55.6			169019 " "
131.3	0.0	0.0	9.9	42.4			169019
172.4	0.0	39.3	6.4	172.3			169020 " "
180.2	0.0	56.4	0.0	141.8			169020
15.0	0.0	9.4	0.0	0.0			169021 CSR 006
43.9	0.0	13.1✓	0.0	26.0✓			169021
22.3	6.1	0.0	17.6	0.0			169022 CSR 007
28.4	16.5	0.0	0.0	10.7			169023 CSR 008
25.8	18.9	0.0	0.0	19.1✓			169023
35.9	37.2	0.0	0.0	0.0			169024 CSR 009
52.9	0.0	17.1✓	4.9	0.0			169025 CSR 010
95.5	12.1	0.0	31.9	56.2			169026 CSR 011
362.3	0.0	19.0	12.1	261.3			169027 CSR 012
367.4	6.0	0.0	23.0	295.7			169027
238.1	10.1	0.0	26.8	71.6			169028 CSR 013
266.4	10.5	0.0	36.1	81.2			169028
76.2	0.0	(0.0)?	27.2✓	18.9✓			169029 CSR 014

CSR CORE SAMPLES MAY 86

Sample	C1	C2=	C2	C3A	C3B	C3=A
CA/001	17.4	1.0	6.9	22.9	0.0	1.1
CA/001	22.3	1.9	6.2	27.3	0.0	2.7
CA/002	21.9	1.8	2.1	24.8	2.5	0.0
CA/003	10.6	1.5	0.0	22.3	0.0	1.8
CA/003	11.1	1.6	2.8	21.6	0.0	1.8
CA/004	6.9	0.9	0.0	11.1	4.5	0.0
CA/005	12.4	1.1	5.5	22.4	0.0	0.0
CA/006	21.6	4.3	2.6	37.3	0.0	0.0
CA/007	17.1	2.6	0.0	41.9	0.8	0.0
CA/008	18.7	3.4	7.3	55.8	4.3	15.0
CA/008	22.6	2.6	1.1	43.3	0.0	9.7
CA/009	6.9	0.6	2.4	12.1	1.1	0.0
CA/010	9.6	0.8	1.9	11.9	0.5	0.0
CA/010	10.8	0.9	2.0	15.7	0.0	2.8

05-20-1986

170	IC4	C4=	NC4	C5+	LCode	Grd Ref	Comment
8.2	0.0	0.0	0.0	9.4			150142 2T-80-5 15M
9.8	6.3	0.0	6.1	0.0			150142 2T-80-5 15M
4.7	0.0	0.0	0.0	0.0			150143 2T-80-5 124M
7.9	4.2	0.0	12.1	0.0		150144	2T-80-5 230M
5.0	0.0	8.6	14.7	0.0			150144 2T-80-5 230M
4.8	11.2	0.0	0.0	0.0			150145 2T-80-5 327.
13.4	20.0	0.0	9.4	17.3			150146 2T-80-5 410M
10.4	16.8	0.0	24.3	10.6			150147 2T-80-4 275M
5.3	0.0	0.0	0.0	0.0			150148 2T-80-4 325M
58.3	59.8	0.0	1.3	70.7			150149 2T-80-7 50M
85.9	49.0	0.0	5.0	73.1			150149 2T-80-7 50M
3.0	2.5	0.0	0.0	0.0			150150 2T-80-7 16.5
0.0	0.0	0.0	0.0	0.0			152799 2T-80-12 36.
3.1	0.0	0.0	0.0	0.0			152799 2T-80-12 36.

APPENDIX 6

STRUCTURAL CONSIDERATIONS IN FURTHER EXPLORATION OF EL 15/76

by D Ransom

995475

APPENDIX 6

D. M. RANSOM & PARTNERS

DR. D. M. RANSOM B.Sc.(Hons.)(Syd.), PhD.(A.N.U.)
CONSULTANT GEOLOGIST

14 KINCARDINE AVE.,
ST. GEORGES, S.A. 5064
PHONE: (08) 79 4201

23 December, 1985

To: R. Williams

From: D. M. Ransom

Re: Structural Considerations in Further Exploration of EL 15/76 (Dundas), Tasmania.

INTRODUCTION

EL 15/76 (Dundas) located near Zeehan, western Tasmania, is being jointly explored for base metals by Cyprus Minerals Aust Co and CSR Minerals. It comprises an area of 124 square km. The programme to date has essentially involved gridding, soil geochemistry and drilling of the Gordon Limestone, and has been based on the Irish lead-zinc-silver deposit model. The present investigation has aimed to establish the likelihood of structural controls of the base metal deposits which may influence the course of future exploration. To this end four days were spent in Zeehan in early December 1985 inspecting outcrops and examining core in the company of Phil Jones. The inspection included examination of core from the Oceana area which lies outside the CSR/Cyprus EL.

STRUCTURAL GEOLOGY

1. Folding

Unweathered outcrops of the Gordon Limestone, which is host to the mineralization are rare. Little useful structural information can be directly observed. However, it is evident from the exposures observed in the Dundas River and the Austral Valley that dips are steep and consistent in orientation and a reasonably well developed cleavage, which is axial planar to the regional folds, is present. Bedding is disturbed by dissolution which predates folding. The cleavage is also a dissolution structure, as described elsewhere. In the east of the basin cleavage dips east, and in the west cleavage dips west, consistent with the recognized synclinorial regional structure.

The overlying Crotty Quartzite and underlying Moina Formation are well exposed by comparison with the Gordon Limestone. They exhibit a variety of small fold, kink and fracture cleavage structures all of which derive from flexural-slip folding. Folds are irregular in profile and plunge to some extent, exhibiting a variety of tensional vein structures. In the Mariposa area the irregularity in dip and overturning of bedding is attributable to the flexural-slip folding and similarly the ambiguous stratigraphic relationships between the Crotty Quartzite and Gordon Limestone in the Mariposa area.

2. Faulting

Examination of the Oceana Fault and parallel structures shows that a well developed slaty cleavage is developed in pelitic rocks close to the fault planes. This suggests the faults are related to cross-folding or kinking, i.e. the

faults are disrupted folds. They do not exhibit the geometry of shear zones. Axial plane schistosity is indistinguishable from fault-associated schistosity. Most of the fault structures of the region including the Oceana Fault are obviously Devonian in age, accompanying or post-dating Tabberabberan folding. Basin-controlling growth faults which are fundamental to the Irish mineralization model should be curved or recognizable as facies changes. None are identifiable on the published maps of the region. Pre-Tabberabberan shears are also evident in the Oceana Mine.

3. Dissolution Textures in the Gordon Limestone

Nodular and pseudobreccia textures with associated stylolites are ubiquitous in the Gordon Limestone. These structures formed during diagenesis and predate the axial plane stylolites/dissolution cleavage associated with folding described above. Dissolution has produced the gross irregularity observed in bedding in all cores. Continuity of bedding on a small scale is disrupted by this process giving rise to textures which are interpreted as products of slumping and penecontemporaneous deformation.

There is no evidence of any significant internal strain of these textures by deformation after their formation. Movement during folding was probably concentrated mainly at lithological contacts and along bedding parallel faults.

The dissolution textures may, however, imply a considerable volume loss during diagenesis of the Gordon Limestone contributing to the variations in thickness observed in outcrop.

MINERALIZATION

The Mariposa core shows that the blotchy solution textures are overprinted by the galena-sphalerite-siderite assemblage of the base metal mineralization, and by a footwall and hanging wall dolomitic stockwork also containing some siderite, galena and sphalerite. The latter also involves partial dissolution of the so-formed breccia. The stockwork is more densely developed in the hanging wall (western side) of the mineralization. Mineralization occupies open spaces and partially replaces the pseudobrecciated carbonate rock precursor. It is also overprinted by the stylolitic axial plane cleavage. Space-filling textures predominate in polished thin-section.

Mineralization in the southern mineralized zone at Oceana is similar to Mariposa, cutting across diagenetic stylolites but also including irregularly layered galena-sphalerite intervals which compose the high grade intersections. The galena in these intervals is "steely" in character and may be annealed after deformation. By contrast, in the northern mineralization galena is coarse grained and kinked. Net-vein breccia or stockworking similar to the Mariposa core occurs on the hanging wall of the southern mineralized zone.

DISCUSSION, IMPLICATIONS

Exploration in EL 15/76 has been based on a reinterpretation of the Oceana Mine as an Irish style carbonate-hosted sedimentary exhalative deposit. Previously the Oceana had been considered a magmatic hydrothermal deposit related to the intrusion of the Heemskirk Granite.

The basis of this interpretation is as follows:

* lead isotope data from Oceana resemble the Rosebery model, generally accepted as being of Cambro-Ordovician age. It contrasts with lead isotope data from Mt Farrell, generally considered to be of Upper Devonian age;

* the expectation that a structurally controlled zone of fissure breccia would show a symmetrical zonation to the included mineralization.

* interpretation of the breccia textures as chaotic slumped masses based on their heterogeneous character, subrounded shape, lack of clast support and carbonaceous matrix.

* evidence for synsedimentary sulphide away from the ore zone.

While acknowledging the experience of the proponents of the Irish-style model, the writer is not convinced that the Zeehan deposits are synsedimentary in origin. It is acknowledged, however, that the lead isotope data is convincing evidence that the Oceana deposit probably predates the intrusion of the Heemskirk Granite and that the structural evidence also suggests the mineralization predates the Tabberabberan folding. The evidence is open to other interpretation as follows:

* Asymmetry of net-vein brecciation can be interpreted as representing contrasts in the physical character of the enclosing rocks. Shear zones and faults commonly exhibit one sharp, one ragged contact in such circumstances. Alternatively, the hanging wall networks could be collapse and dissolution structures;

* The interpretation of the breccia structures as slumps ignores the evidence for large-scale dissolution of Gordon Limestone. The perceived difference between slump and fault breccias in any event will be blurred by dissolution of carbonate fragments. The ubiquitous evidence of dissolution and generation thereby of pseudobreccia textured rocks suggests that the evidence for slumping on a large scale is questionable;

* The evidence of minor synsedimentary sulphides is equally well interpreted as predating the base metal mineralization;

* The structural and stratigraphic evidence of basement highs, major facies changes or interpretable basement/cover relationships are absent or at least obscure on the conventional maps of the Zeehan District.

The "steely", layered character of the galena and associated sulphides in the southern mineralized zone at Oceana compared with the kinked coarse grained galenas of the northern mineralized zone implies a deformational origin for the layering. The fine textured galena is interpreted as a product of annealing of the coarse deformed galena such as that cored in the northern mineralized zone. The change in texture of the Oceana sulphides may be a product of late deformation and recrystallization of the sulphides along minor faults or shears perhaps related to the Mine Fault, predating the Tabberabberan folding, and certainly predating the Oceana Fault. This implies that the higher lead grades of the Oceana compared with the Mariposa may be upgraded by deformation. Moreover, the regular stope outlines of the old mine represent shoot-like grade boundaries and probably structural control of grade distribution.

The writer favours a model wherein a zone of stratiform mineralization of obscure but post-depositional origin (Mariposa) is upgraded by mobilization of galena and dissolution of carbonate along shears prior to Tabberabberan folding (Oceana).

FURTHER EXPLORATION

Reinterpretation of the Gordon Limestone base metal deposits as having a grade enhancing deformational overprint will not particularly assist further exploration in EL 15/76. This is because the major control of the mineralization

remains the sedimentological factors which define the site of initial deposition. Whether the Zeehan base metal deposits are Irish-style or say Mississippi Valley-type they will almost certainly relate to basin-controlling tectonic features. As noted above, none of these structures can be identified confidently within the confines of the basin since all of the faults usually depicted on the maps of the district are straight line features which post-date the Tabberabberan folding. However, the radical CSR photo-interpretation does in fact define a number of curved fault structures, which is how early basin-controlling faults should be manifested. While the writer sees little particular merit in the "decollement" model, the photo-interpretation has been effectively dismissed without any serious attempt to test it in the field. In the absence of a coherent regional structure which defines the basin-forming tectonics, the present rather unimaginative programme of systematically sampling the Gordon Limestone subcrop is the best programme to pursue. However, it is suggested that at least some attempt to test the essentials of the CSR interpretation should be undertaken concurrent with this programme, in order to focus the prospecting effort.

CONCLUSION

A model of in situ structural upgrading by deformation (Oceana) of open space filling post-diagenesis mineralization (Mariposa) prior to Tabberabberan deformation is favoured. The location of the original mineralization is determined most likely by so far undefined sedimentological and tectonic factors. In the absence of a tectonic and sedimentological model for the basin, the pragmatic approach to exploration of systematic geochemical sampling of the Gordon Limestone subcrop is favoured. However an attempt to test the CSR photo-interpretation, which possibly includes some of the elements which may define prospective sedimentary environments, should be undertaken concurrently.

D M Ransom

D. M. Ransom,
Consultant Geologist

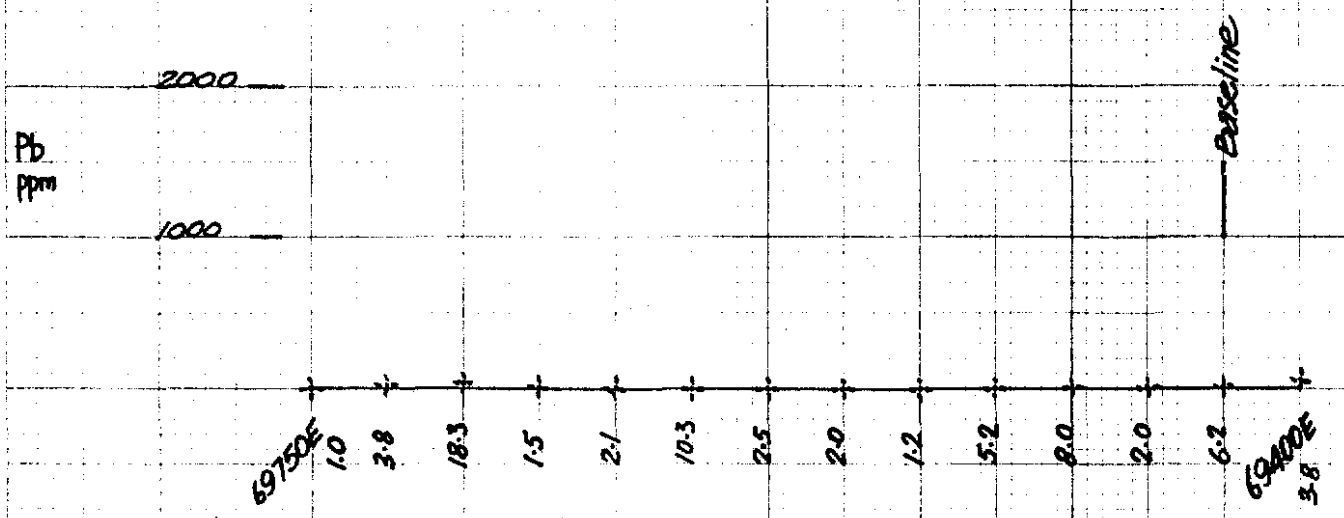
* * *

ENCLOSURES

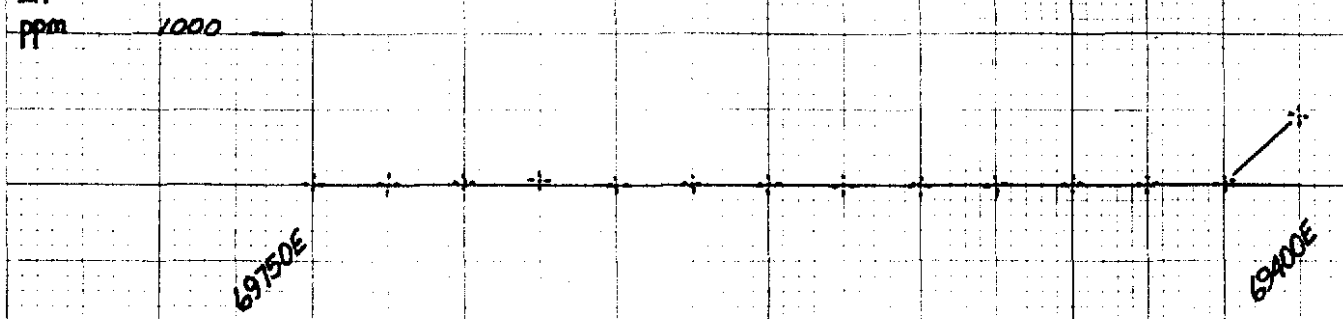
C30

AMBER CREEK
LN 52200N.

LEAD.

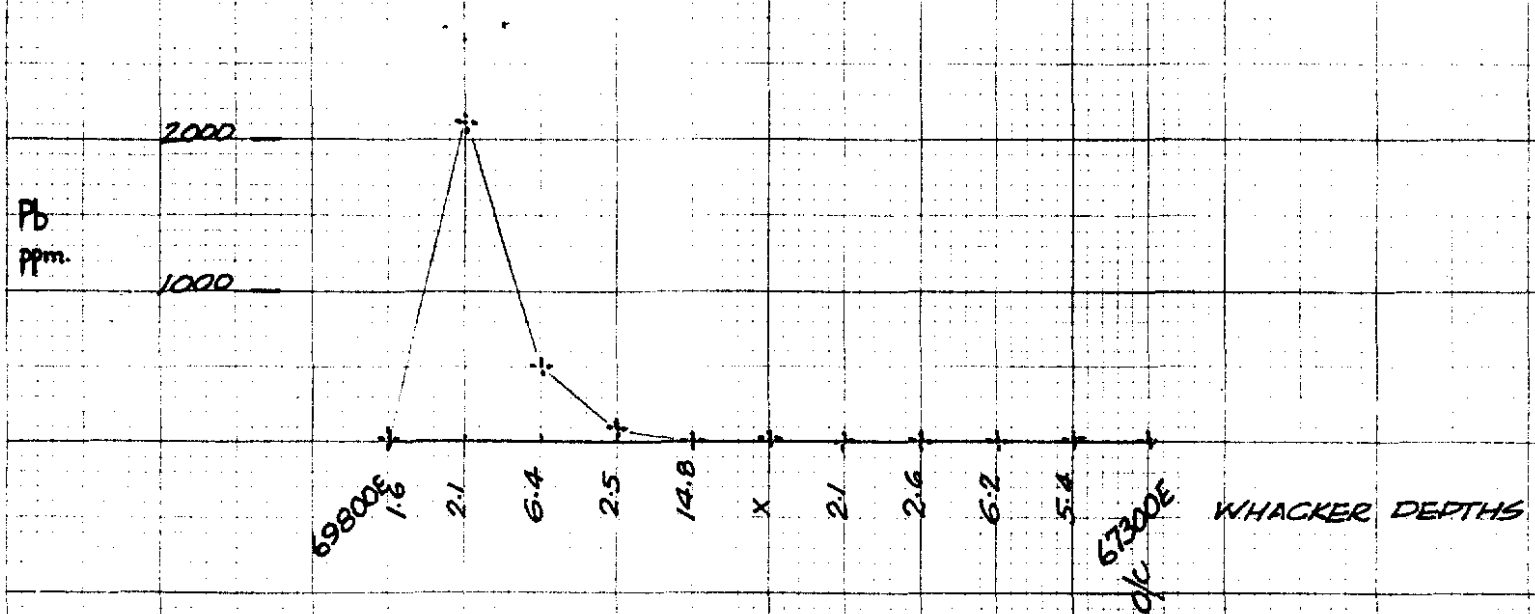


ZINC



AMBER CREEK
LN 53100 N

LEAD.



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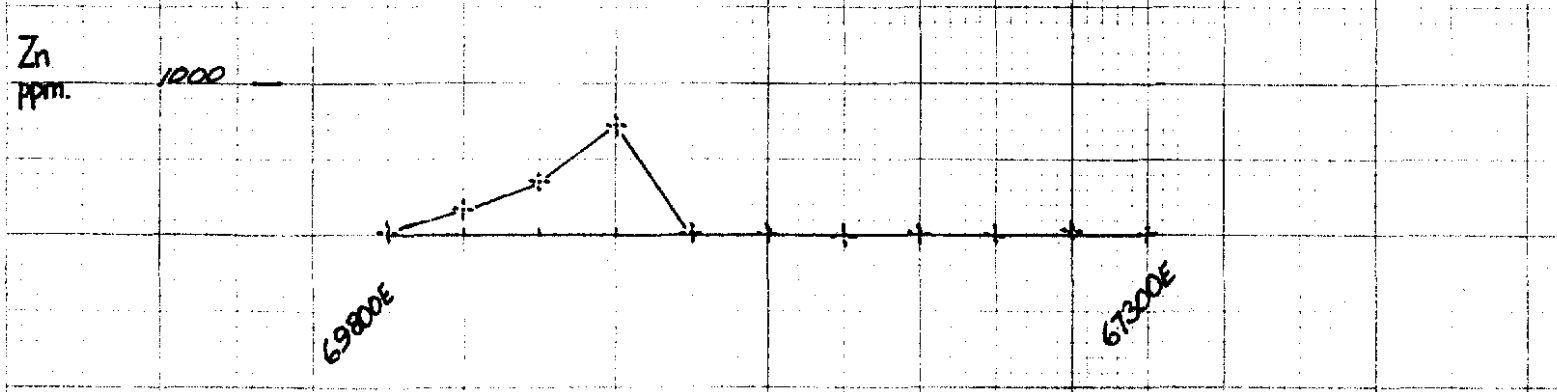
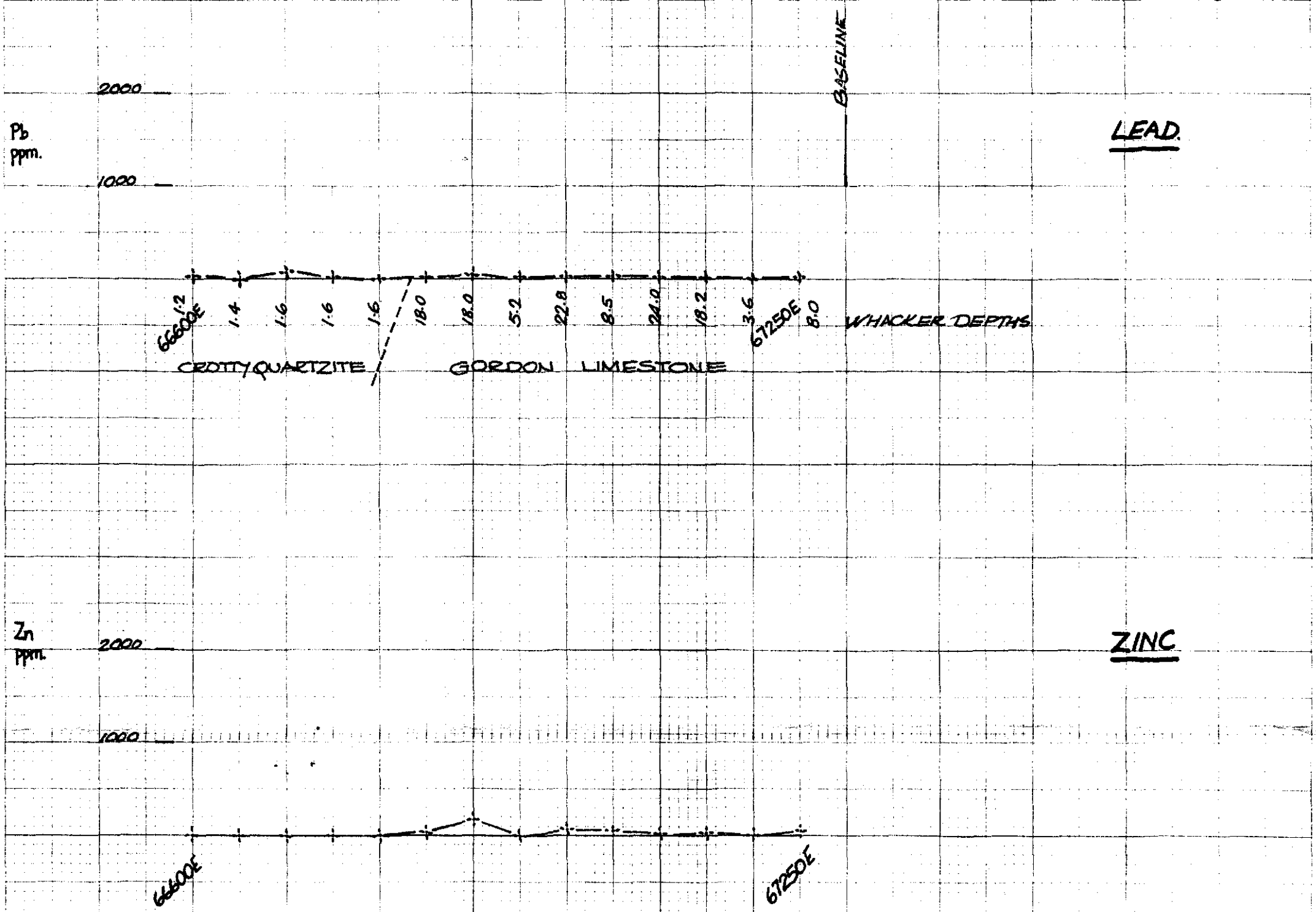


0804993

ENCLOSURE 1

AMBER CREEK
LN 53250 N



ENCLOSURE 2

99548 1

LEATHERWOOD
LN 53200 N

Pb (ppm)

LEAD

2000
1000

70400E B.L.

700E 1.4 9.2 6.7 1.2 5.7 12.6 1.0 4.7 8.2 1.6 18.6 22.1 2.0 1.4 1.5 39.6 20.4 1.2 2.8 12.7 710E 11.6

WHACKER DEPTHS

Zn ppm

ZINC

1000

700E 710E

LEATHERWOOD
LN. 53600 N

Pb ppm

2000
1000

LEAD

700E 4.6 7.4 22.4 10.3 2.0 1.4 2.1 1.0 0.8 1.0 3.4 22.6 9.0 7.8 10.8 20.0 22.3 2.7 709E 2.1

WHACKER DEPTHS

Zn ppm.

2000
1000

ZINC

700E 705E 709E

ENCLOSURE 3

LEATHERWOOD

LN. 54000N

LEAD

Pb ppm

2000

1000

70400E - B.L.

69900E 10.4 2.2 23.4 8.8 1.0 4.1 1.5 1.3 11.5 13.0 7.2 1.1 1.0 1.3 15.4 18.5 34.2 1.8 70800E 3.4

WHACKER DEPTHS

Zn ppm.

2000

1000

69900E 70800E

LEATHERWOOD

LN 54400 N

LEAD

Pb ppm.

2000

1000

69900E 57 16.4 18.5 6.8 18.5 12.6 6.3 6.0 7.6 24.5 12.6 14.0 14.0 11.0 3.5 7.3 35.4 70750E 11.8

WHACKER DEPTHS

ZINC

Zn ppm

3000

2000

1000

69900E 70750E

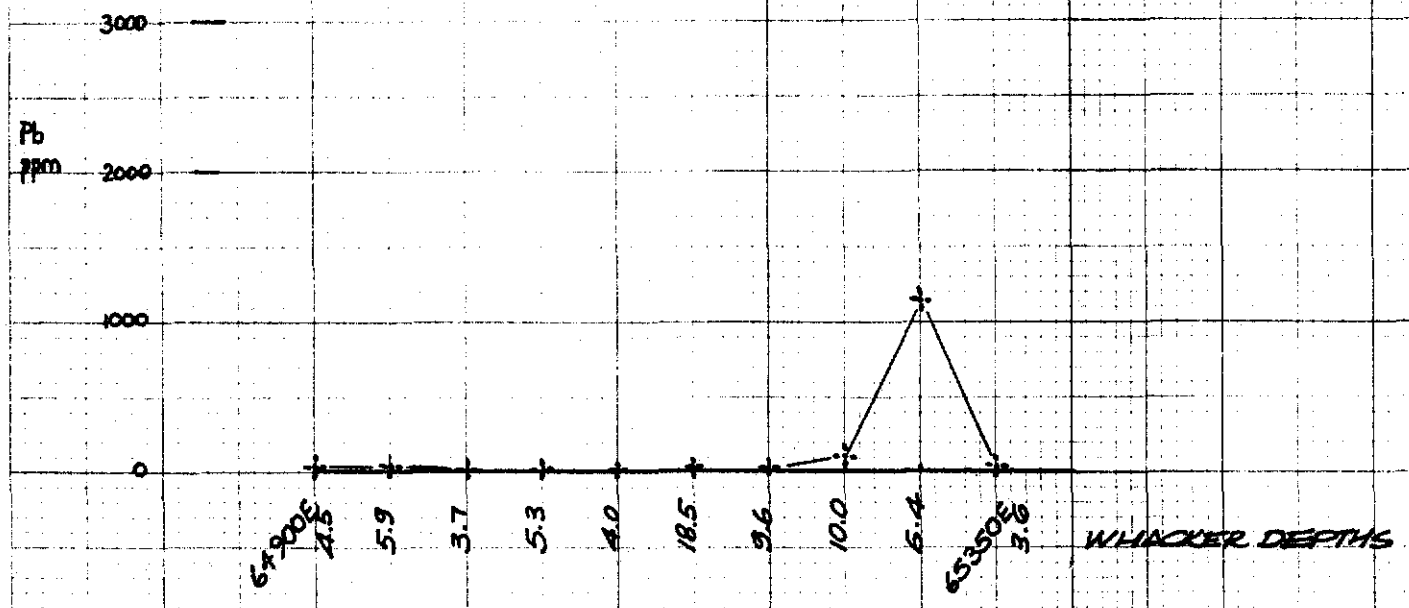
ENCLOSURE 4

995483

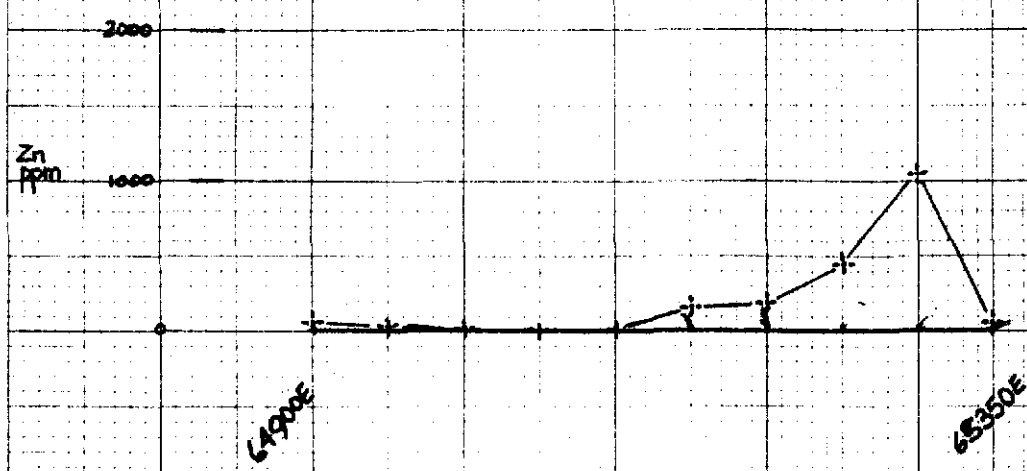
PYRAMID

LN 55300N

LEAD

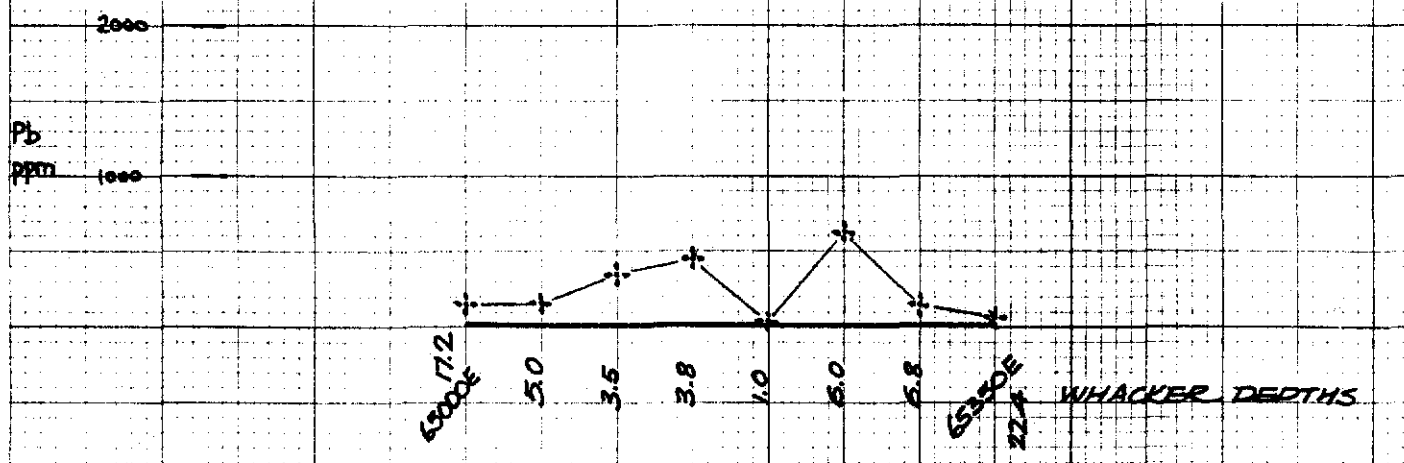


ZINC

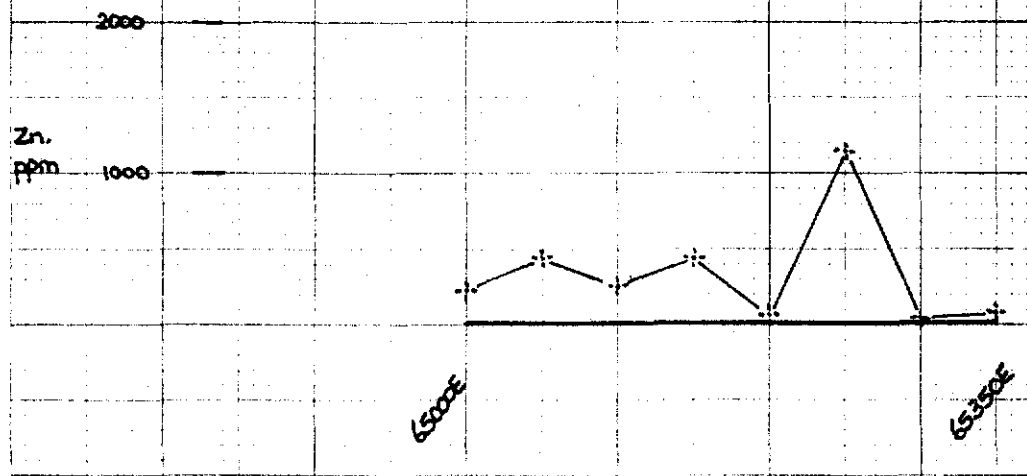


LN 55900N

LEAD



ZINC



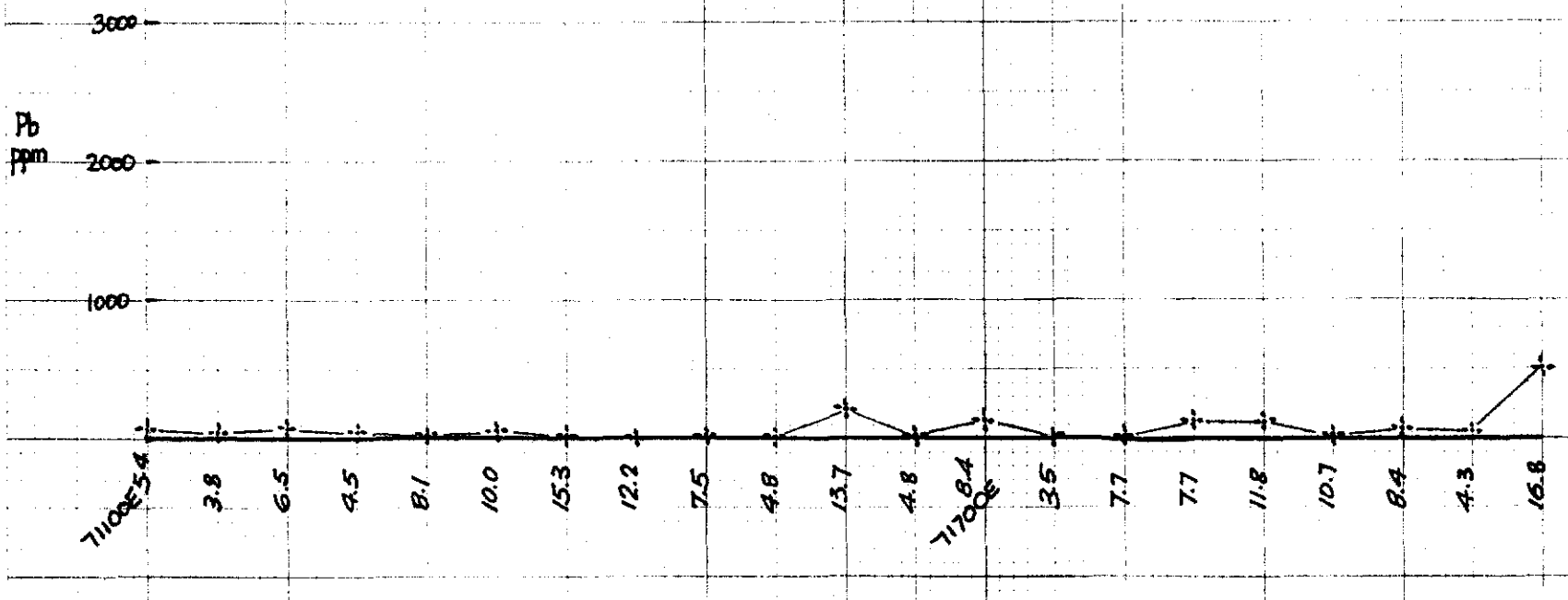
ENCLOSURE 5

533

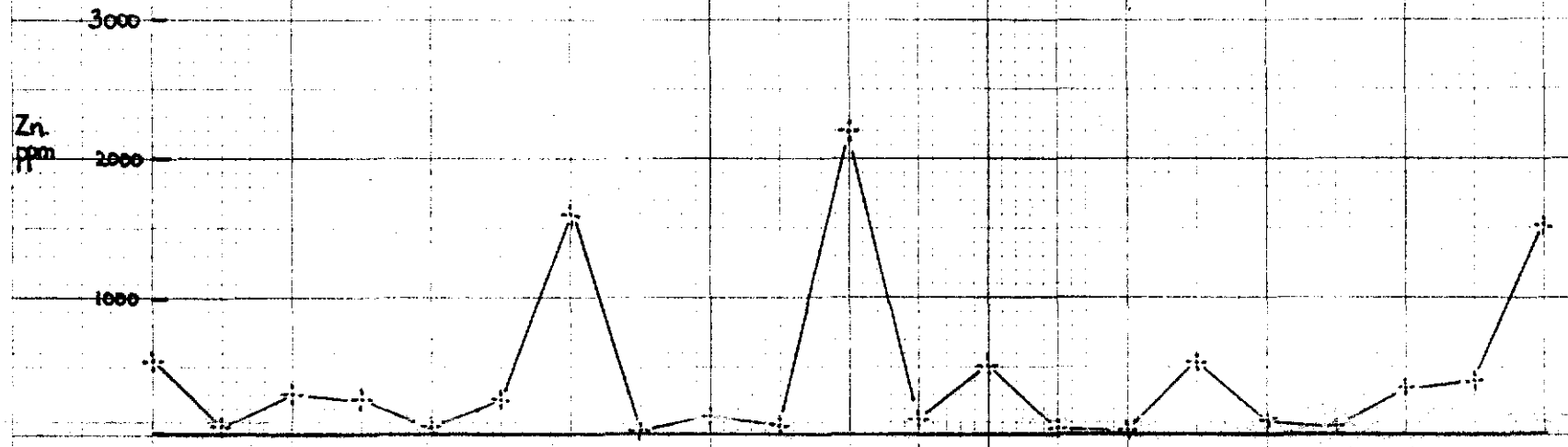
BERRY CREEK

LN 56350 N

LEAD

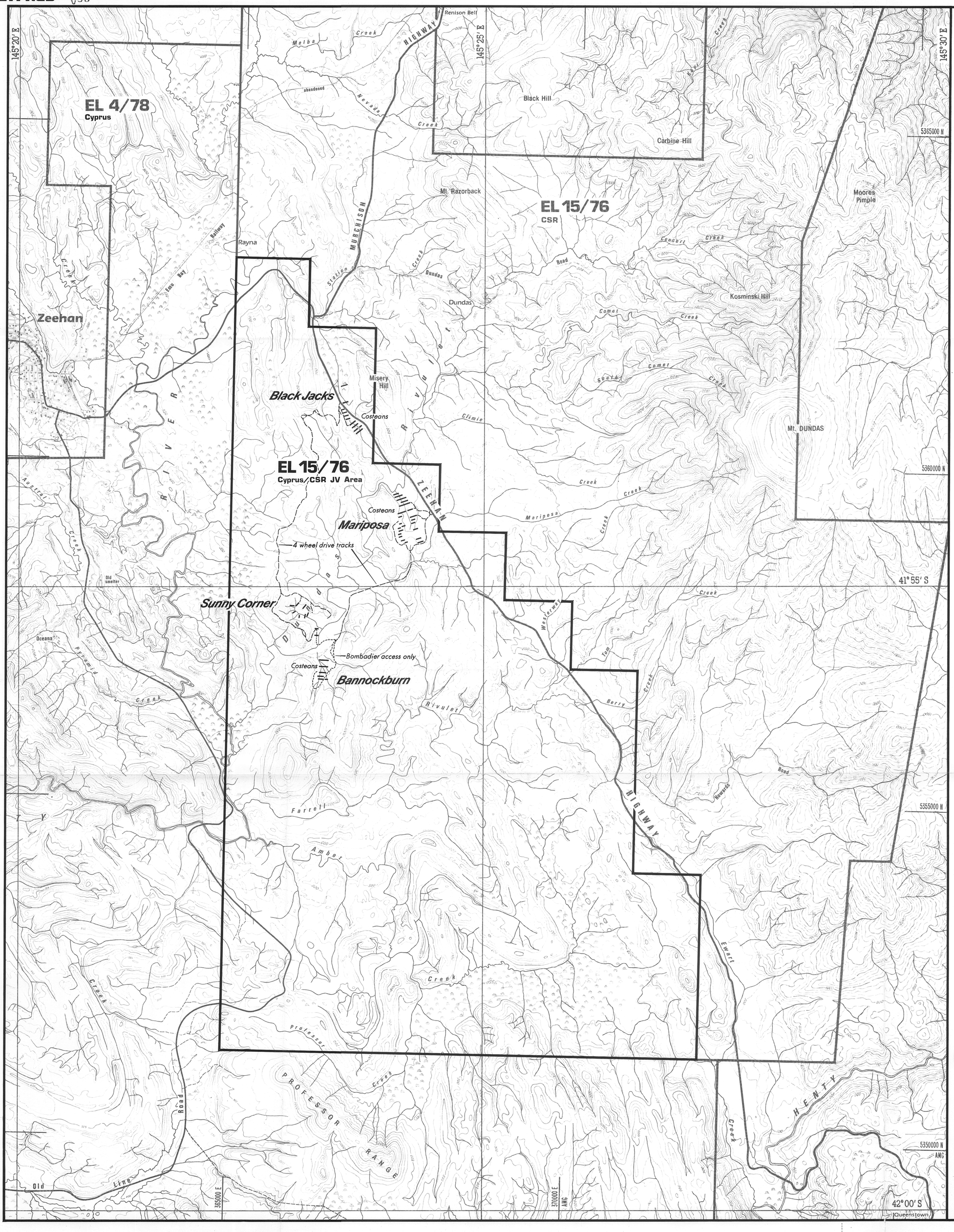


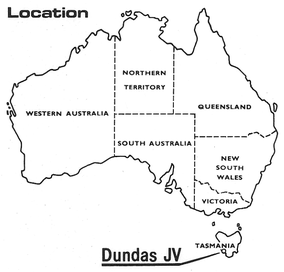
ZINC



ENCLOSURE 6

99548





TN
11°
MN

1:25000

0 1 2 kilometers

Base compiled from 1:15840 scale Pieman Project mapping series

Topographic contours in feet

5 cm

Cyprus Minerals Australia Company

Project	GORDON RIVER			Nº A-80-82	
Project Partner				CSR	
Dundas JV				995486	
EXPLORATION AREAS REQUIRING **REHABILITATION**					
Map Ref. ANG	K-55-5	Latitude	42°00'S	Longitude	145°30'E
Surveyed		Date		Scale	1:25000
Drawn	S.F.	Date	July 1986	Drawing Nº M86-2416	

Report 490

Enclosure 7

371 000mE

0

72 N

68

64

60

57·5

52

48

44

40 N

5 364 000mN

DOL/CON

DOL/CON

DOL/CON

DOL CON

DOL/PY

DOL

DIGHEM ANOMALY TRACE

DOLERITE DYKE

PY/DOL

DOL/SER

DDH CW1

DDH CW2

DOL

DOL/PY

CARBINE TRACK

Creek

Concert

500 W

500 E

0

371 000mE

EZ / LITTLE RIVER GOLDFIELDS
J. V.

N

REFERENCE

DOL	DOLOMITE / LIMESTONE
PY	PYRITE
SER	SERICITE
CON	CONGLOMERATE
M	MAGNETIC ANOMALY
•	VLF RESPONSE
←◉	DIAMOND DRILL HOLE

995487

5 cm

CSR LIMITED - MEDG

LOCATION OF GRID
CARBINE AREA

E.L. 15/76 DUNDAS TASMANIA

SCALE	1 : 5000
DRAWN	PDE./ C.J.L.
DATE	JULY 1985
REVISED	JULY 1986

7602 - 3

86-2584 2/4 7147


CUNI GRID
RAZORBACK WEST GRID
PINE PLANTATION
DUNDAS ROAD
SOUTH NEVADA
See Drg. No 7602-1 for details
See Drg. No. 7602-3 for details
E.L. 42/71
E.L. 15/76
CSR CYPRUS MINERALS J.V.
EZ LITTLE RIVER GOLDFIELDS J.V.
MINOPS P/L
GREEN & WILLIAMS
GODKIN RIDGE
BLACK HILL
CARBINE HILL
Serpentine Hill
Mt. Razorback
Razorback
Mt. Dundas
Qra
Qrs
Qt
Qrg
Qpf
Qpm
Pt
Db
Df
Sac
Sk
Sa
Sc
Es
Eg
Eh
Er
Ed
Ec
Em
Ecl
Ef
Eco
Efe
Eb
Era
Euo
Pc
Jdl
Ck
Ch
Ce
Ew
Ed
Ee
Ez
Ey
Ex
Ev
Ep
Eq
Et
Eu
Ei
Ej
Ek

REFERENCE

QUATERNARY	Q	Qra	Alluvium
		Qrg	Gravels
		Qt	Conglomerate talus
		Qe	Dolerite talus
		Qrs	Older alluvium marsh deposits, downwash etc.
		Qpf	Fluvioglacial & lacustrine deposits
		Qpm	Moraine
PERMIAN	P	Pt	Zeehan Glacial Formation
DEVONIAN	D	Db	Bell Shale
		Df	Florence Quartzite
SILURIAN	S	Sac	Austral Creek Siltstone
		Sk	Keel Quartzite
		Sa	Amber Slate
		Sc	Crotty Quartzite
		S	Unassigned
ORDOVICIAN	O	Og	Gordon Limestone
		Om	Moina Sandstone
		Oz	Mt. Zeehan Conglomerate
CAMBRIAN	€	€m	Misery Conglomerate
		€cl	Climie Formation
		€f	Fernflow Formation
		€co	Comet Formation
		€fe	Fernfields Formation
		€b	Brewery Junction Formation
		€ra	Razorback Conglomerate
		€h	Hodge Slate
		€r	Red Lead Conglomerate
		€d	Dundas Group unassigned
		€c	Crimson Creek Formation
		€	Cambrian unassigned
PROTEROZOIC	P	Puo	Oonah Quartzite & Slate
		Pc	Concert Schist
		Pw	Whyte Schist
IGNEOUS ROCKS		Jdl	JURASSIC Dolerite
CAMBRIAN	D	q,p	Quartz porphyry
	€	€g	Gabbro, norite and dolerite
		€s	Serpentinite and pyroxenite

- Stream sediment (M)
- Panned concentrate (P)
- Rock chip, Float (R, F)
- Limonite (L)

181 — 182 GEOTERREX BARRENGER SYSTEM AIRBORNE TEST E.M. LINE 1.5E (1978)

MH 208·20 MAGNETIC HIGH AT FIDUCIAL 208·20 ON FLIGHT LINE

EM 206·45 E.M. ANOMALY AT FIDUCIAL 206·45 ON FLIGHT LINE

DDH CG4 DIAMOND DRILL HOLE

169029 SAMPLES WITH CYPRUS NUMBERS SENT FOR HYDROCARBON ANALYSIS

995488

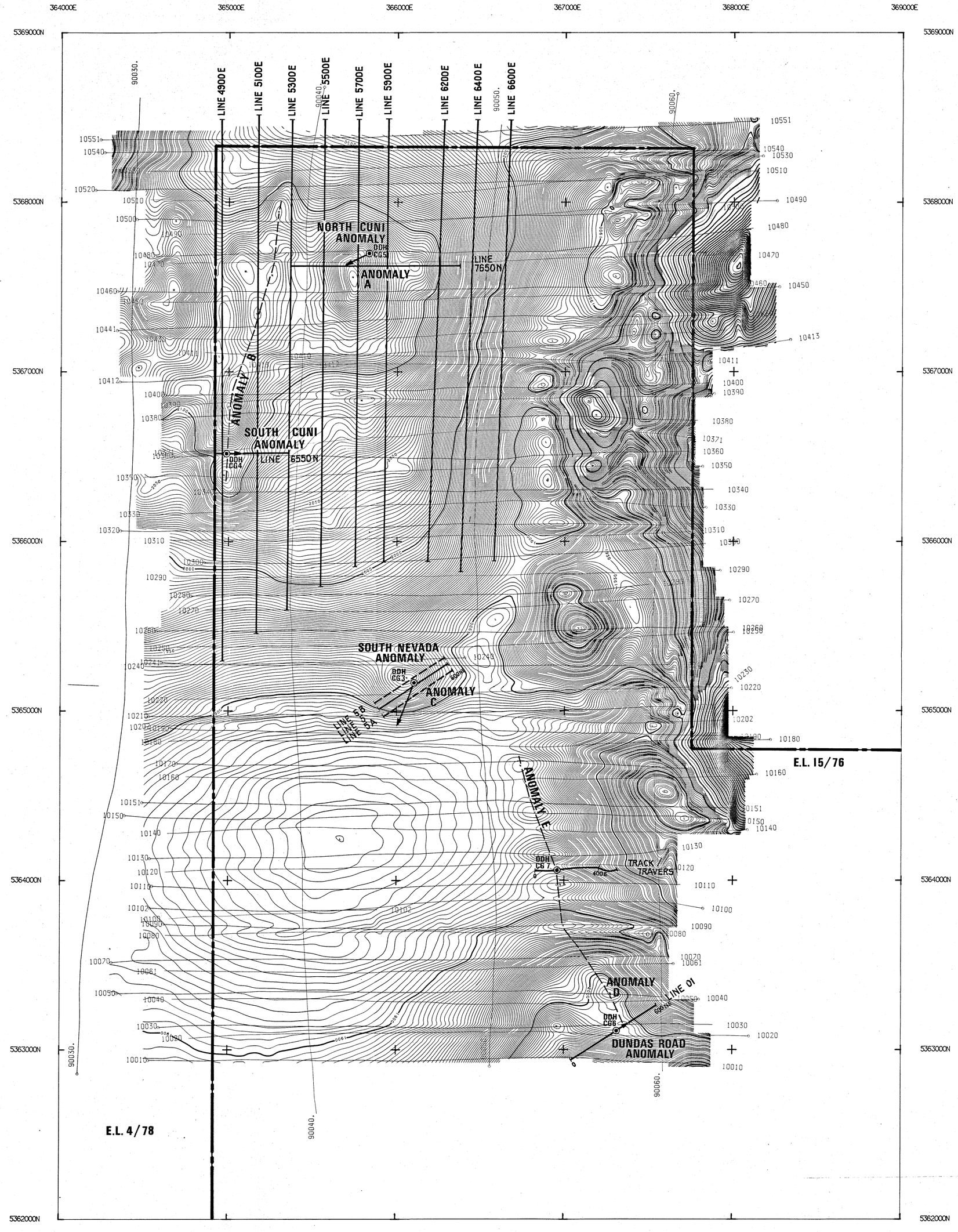
5 cm

CSR LIMITED-MEDG

GEOTERREX E.M. TEST LINES AND DRAINAGE SAMPLE NUMBERS GRID LOCATIONS

E. L. 15/76 – North Sheet

DUNDAS, WEST TASMANIA



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER	:	3 x G-813 proton precession magnetometers in tail stinger and wing tips. Sensitivity of 0.2 nT.
RECORDING INTERVAL	:	35 metres sampling
SPECTROMETER	:	GR-800 Gamma ray spectrometer Volume of NaI crystal : 16.8 litres
TOTAL COUNT WINDOW	:	0.8 - 3.00 MeV
POTASSIUM WINDOW	:	1.36 - 1.56 MeV
URANIUM WINDOW	:	1.66 - 1.86 MeV
THORIUM WINDOW	:	2.42 - 2.82 MeV
RECORDING INTERVAL	:	70 metre sampling
DATA RECORDING	:	GeoMetrics 714 acquisition system Digital to magnetic tape.
TERRAIN CLEARANCE	:	All detectors in aircraft at 70 metres
LINE SPACING	:	Traverse lines at 100 metres Tie lines at 1.0 km.
FLIGHT PATH RECORD	:	Continuous tracking colour video
FLIGHT RECOVERY	:	Visually to 1:80000 enlarged Black and white photographs.

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 55
Digitised from 1:80000 Black and white photographs.

MAGNETICS	:	Tie line levelled and diurnal removed. Datum of 2000 nT added.
IGRF (1980)	:	Updated to February 1986.
GRID MESH	:	25 x 25 metres.
GRID FILTER	:	Not Applied.
CONTOUR INTERVAL	:	2 nT

GROUND MAGNETICS

- GRID LINE TRAVERSE
- DIAMOND DRILL HOLE
- ANOMALY A REFER REPORT
- E.L. BOUNDARY

0.0 0.5 1.0km

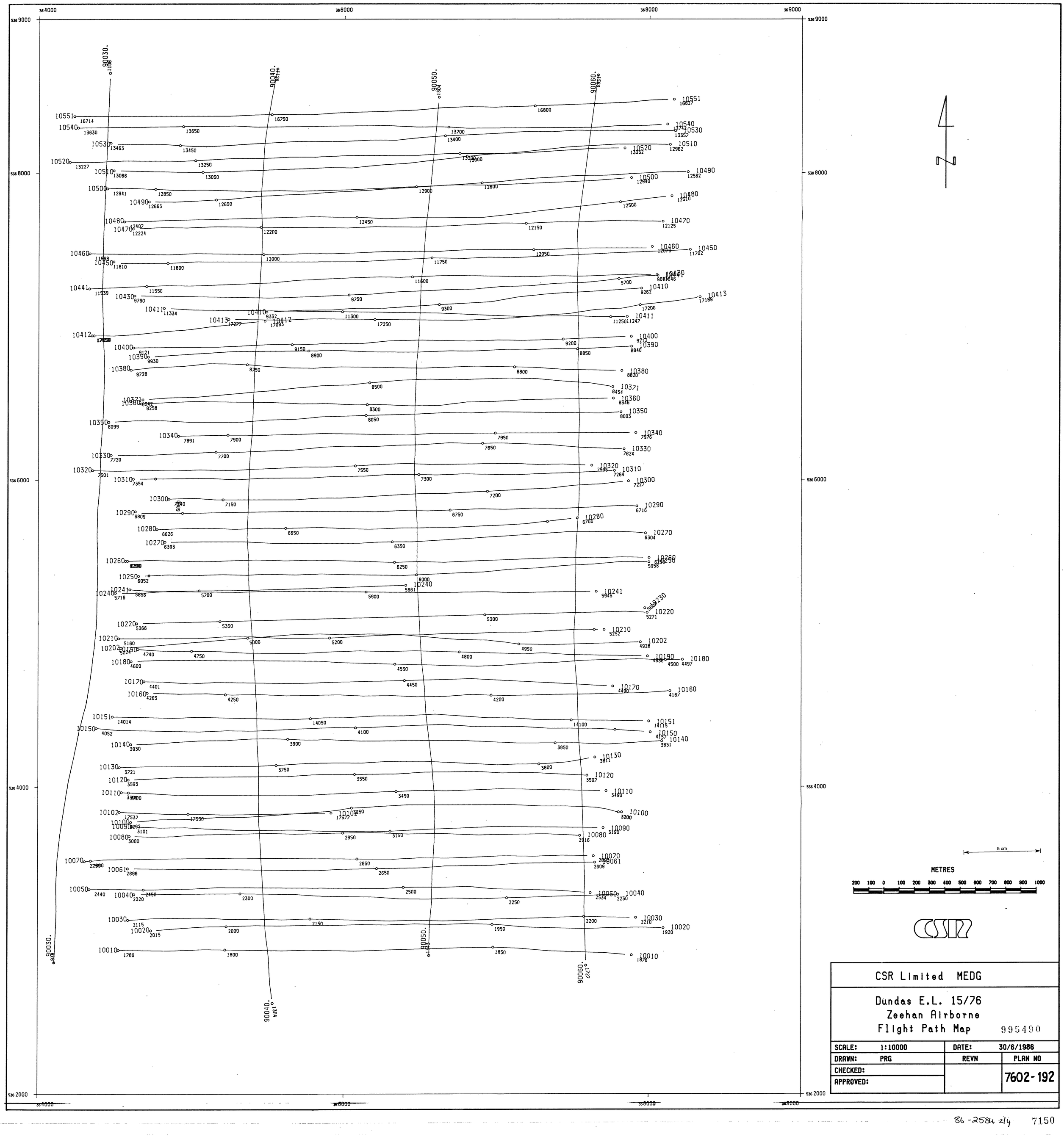
SCALE 1:10000

995489

5 cm

CSR LIMITED - MEDG	
DUNDAS E.L. 15/76 TAS.	
AIRBORNE RESIDUAL MAGNETIC DATA CONTOUR INTERVAL = 2 nT	
SCALE : 1: 10000	DRG No. 7602 - 191
AUTHOR : P.R.G.	
DATE : 1-JUL-86	
REVISED :	

86-2584 2/4 7149

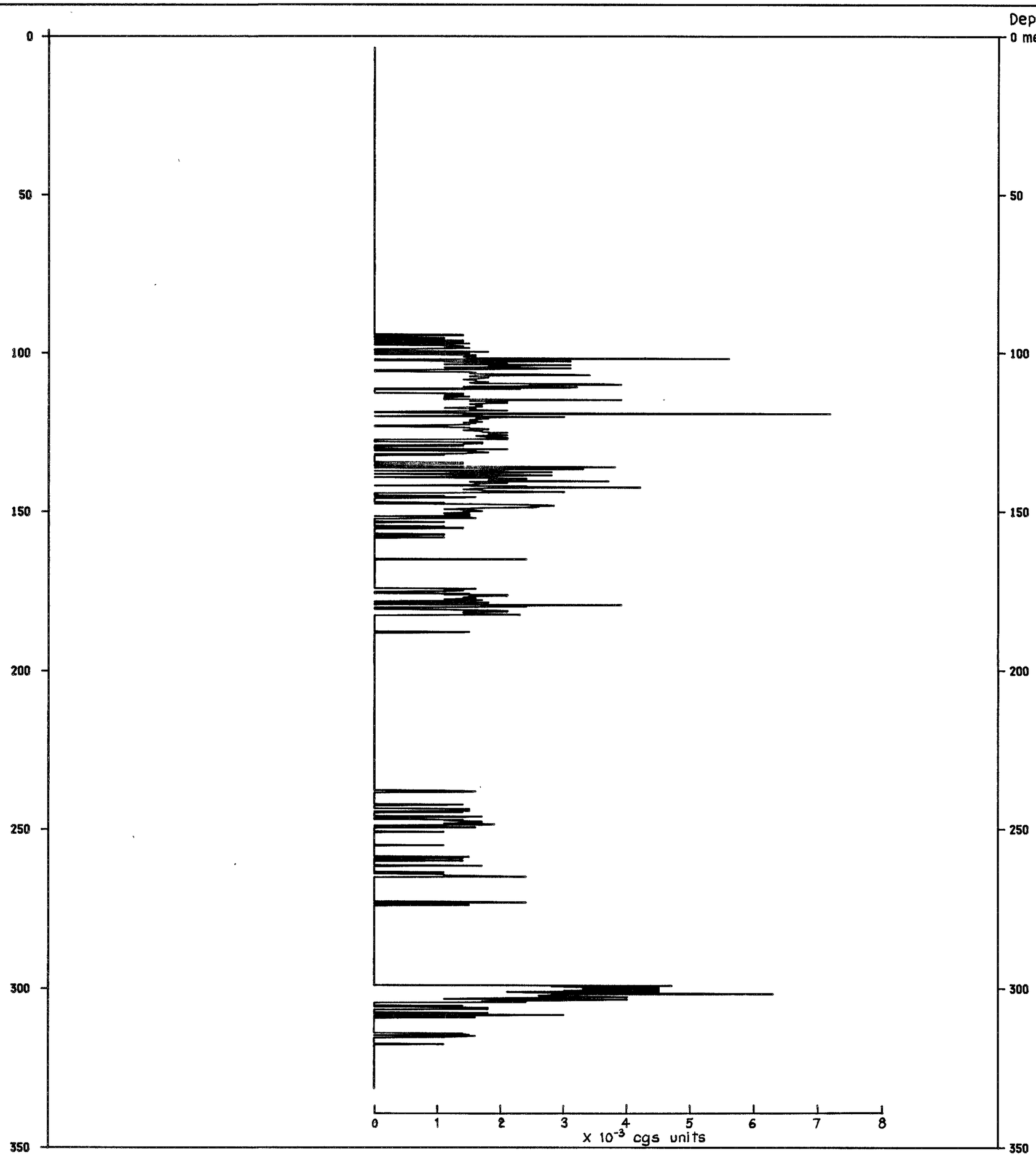


CSR Limited MEDG

Dundas E.L. 15/76
Zeehan Airborne
Flight Path Map 995490

SCALE:	1:10000	DATE:	30/6/1986
DRAWN:	PRG	REVN	PLAN NO
CHECKED:			7602-192
APPROVED:			

86-2584 2/4 7150



5 cm

995491

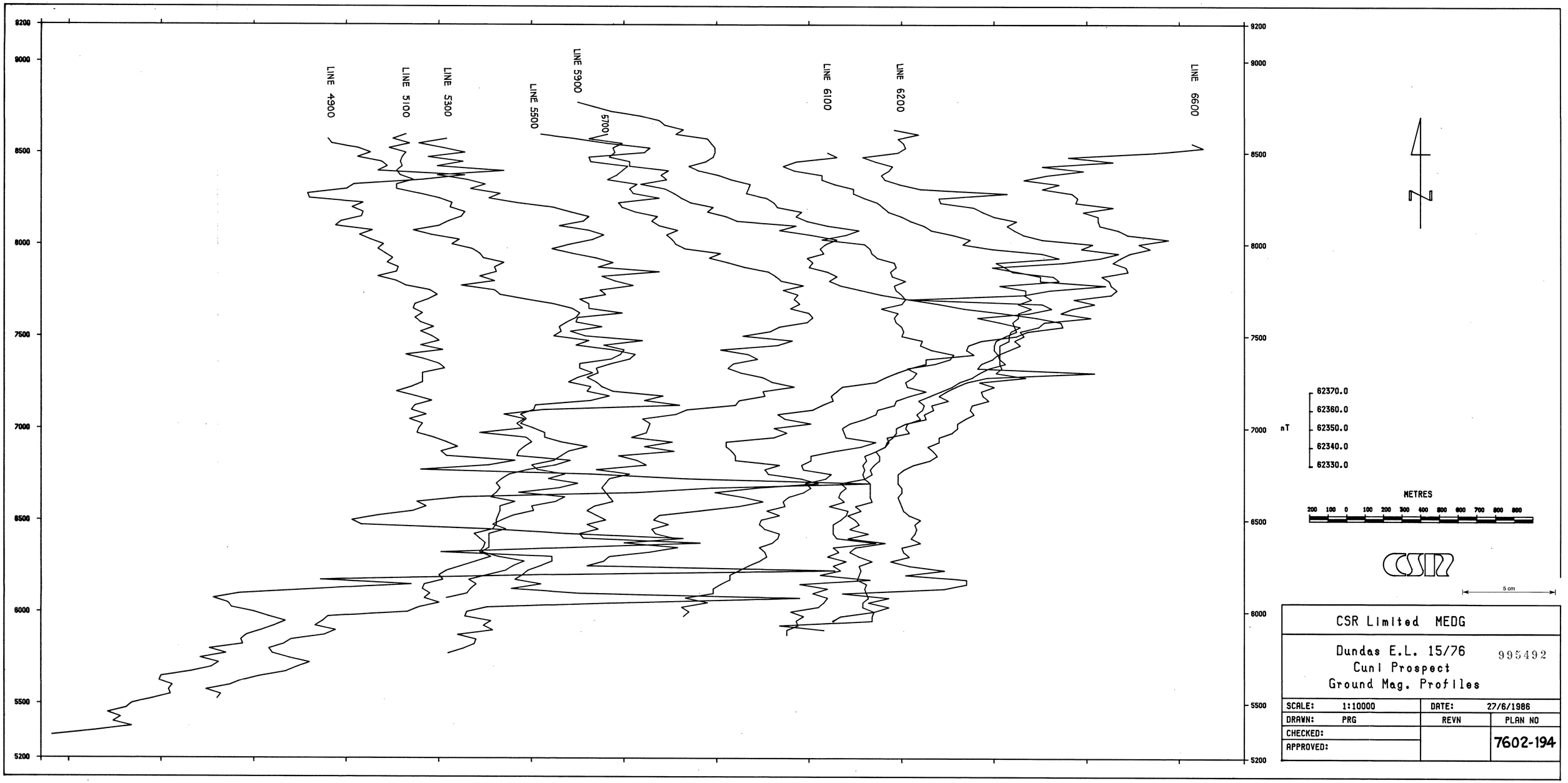
CSR Limited AM & C Division

Dundas E.L. 15/76
Cuni DDH - CG3
Magnetic Susceptibility Log

SCALE:	1:1000	DATE:	27/6/1986
DRAWN:	PRG	REVN	PLAN NO
CHECKED:			7602-193
APPROVED:			

86 -2584 2/4

7151

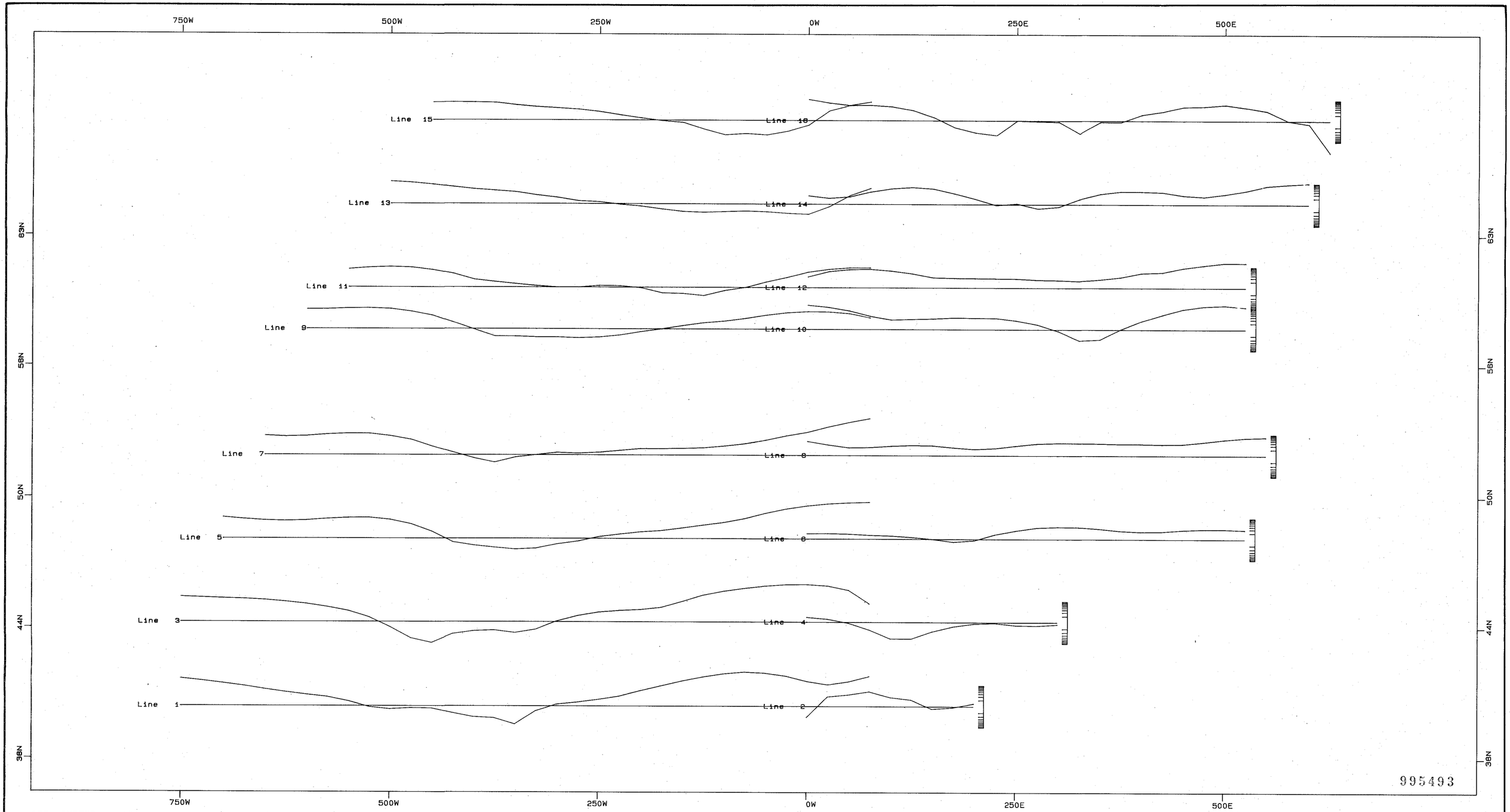


CSR Limited MEDG

Dundas E.L. 15/76 995492
Cuni Prospect
Ground Mag. Profiles

SCALE: 1:10000		DATE: 27/6/1986	
DRAWN: PRG		REVN	PLAN NO
CHECKED:			7602-194
APPROVED:			

86-2584 24 7152



CSR LIMITED - AMCD
TASMANIA
(JOB NO.810)
SOUTH-NORTH scale is 1: 100.
WEST - EAST scale is 1: 2500.
Scale : 1.00 cm= 1 logarithmic decade Resistivity base value 10 ohm m
Plotted on 5:59 PM MON., 17 FEB., 1986 by Solo Geophysics
Surveyed by Solo Geophysics & Co : From 221285 to 090186

APPARENT RESISTIVITY STACK PROFILE
(Three point averaging)

5 cm

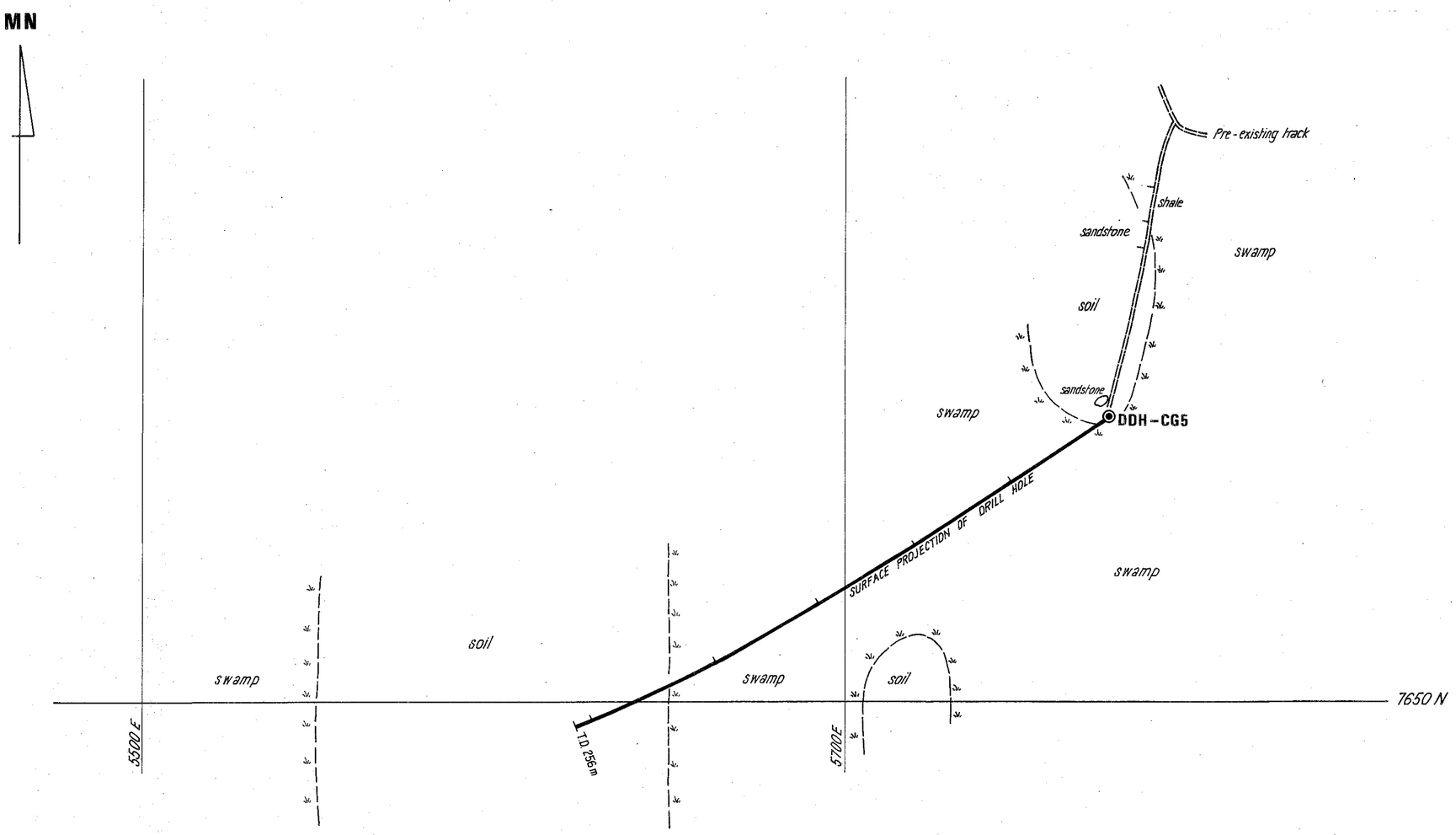
25 50 100

Scale : 1cm= 25m

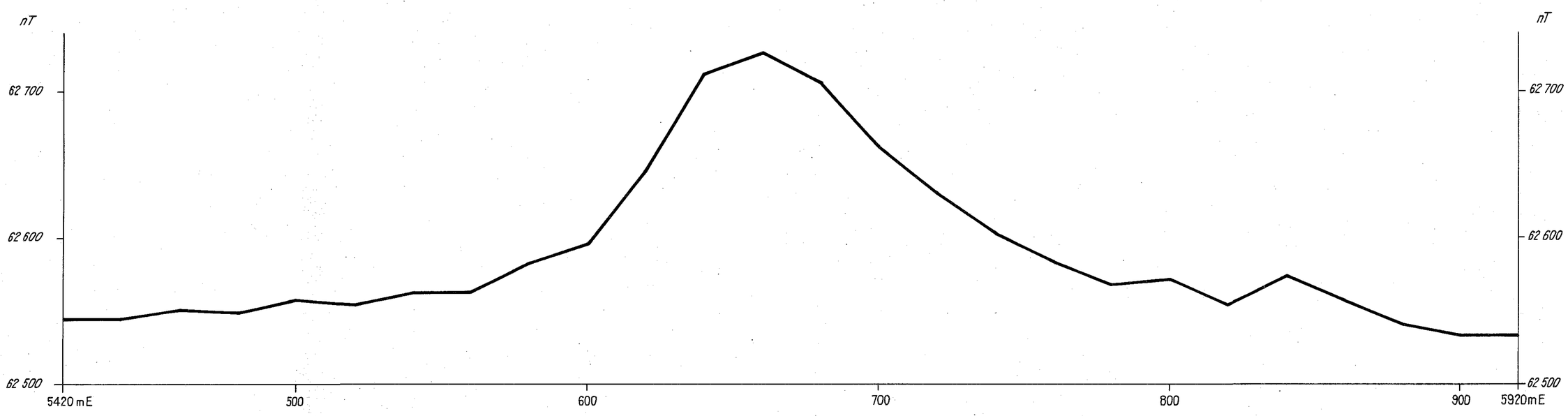
CSR LIMITED	MEDG
I.P. RESISTIVITY PROFILES CARBINE GRID E.L. 15/76 DUNDAS TAS.	
DATE JUN '86	7602- 195
DRAWN	
SCALE 1 CM = 25 m	

86-2584-2/4 7153

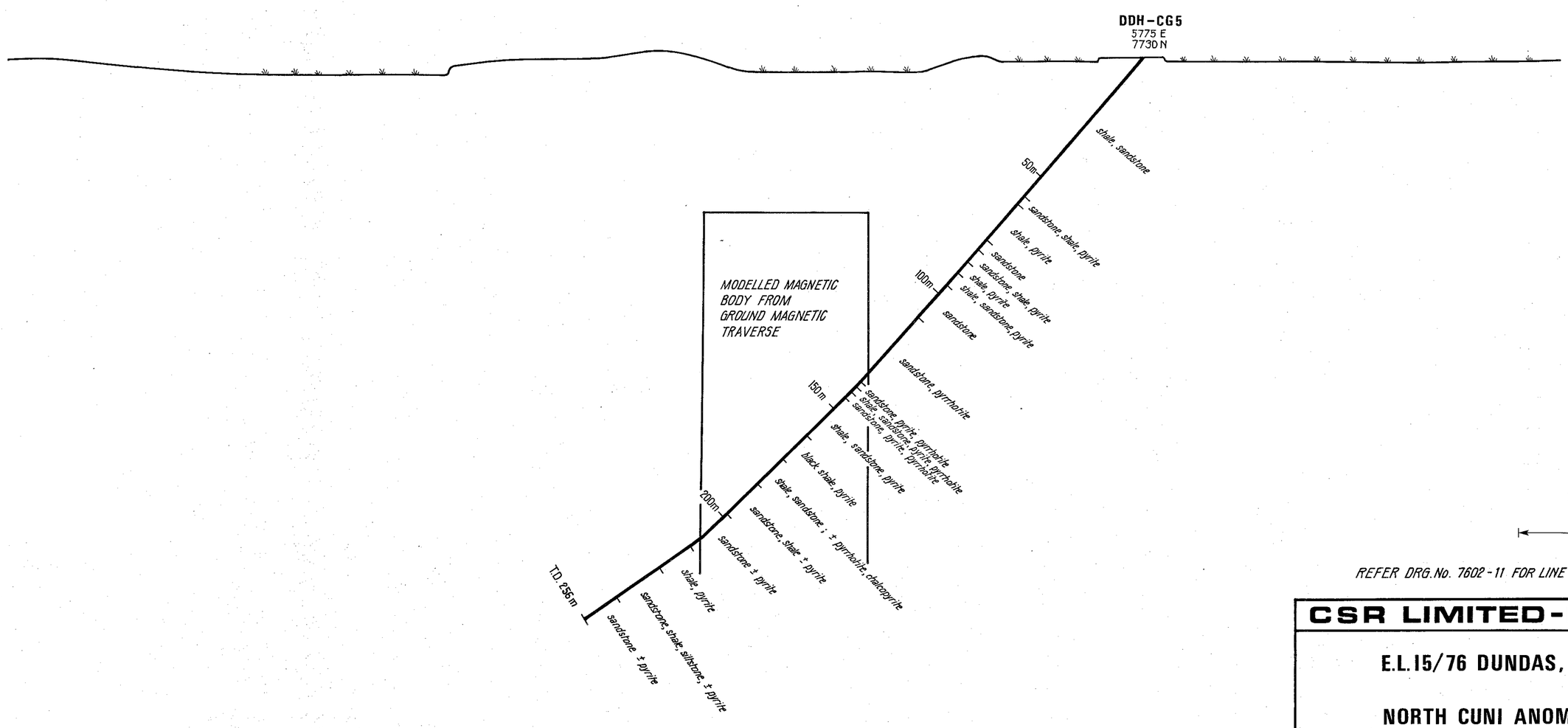
DDH – CG 5 PLAN



LINE 7650N GROUND MAGNETICS



DDH – CG 5 SECTION



995494

5 cm

REFER DRG. No. 7602-11 FOR LINE LOCATION

CSR LIMITED-MEDG

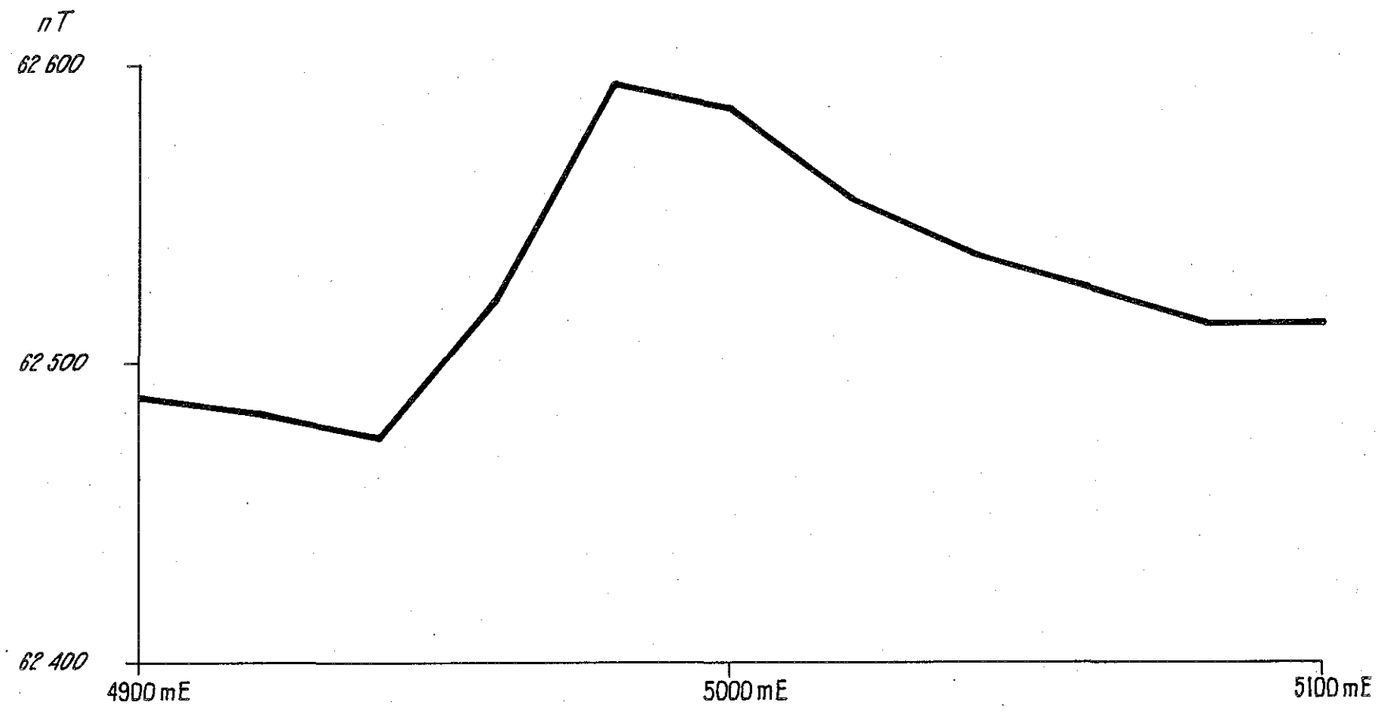
E.L. 15/76 DUNDAS, TAS.

NORTH CUNI ANOMALY
DDH-CG 5 DATA

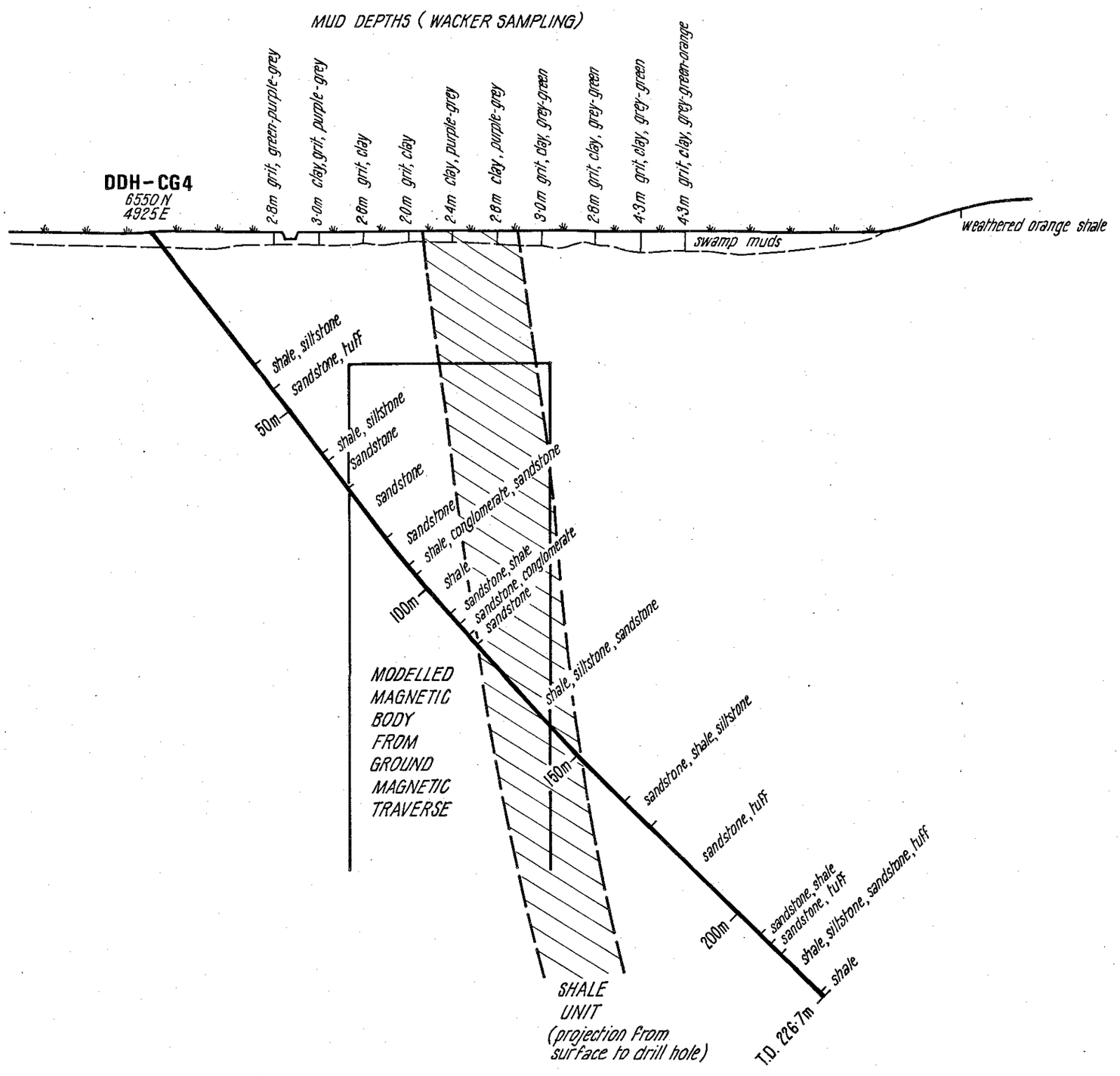
SCALE	: 1 : 1000	DRG. No. 7602-196
DRAWN	: P.D.E.	
DATE	: July '86	
REVISED	:	

86-2584 2/4 7154

LINE 6550N GROUND MAGNETICS



DDH-CG 4 SECTION



995495

5 cm

REFER DRG. No. 7602-11 FOR LINE LOCATION

CSR LIMITED-MEDG

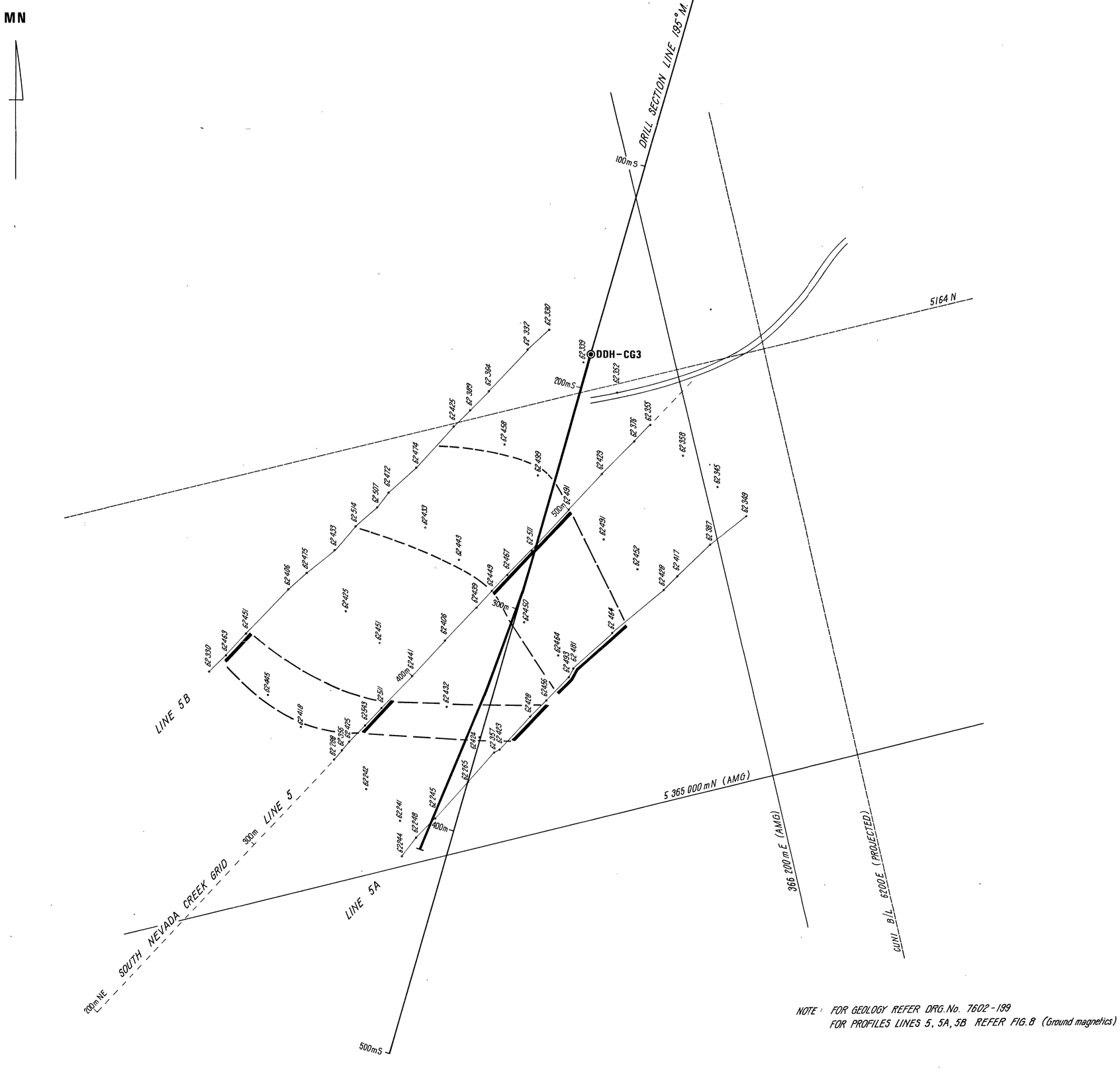
E.L. 15/76 DUNDAS, TAS.

SOUTH CUNI ANOMALY
DDH-CG4 DATA

SCALE : 1: 1000	DRG. No.
DRAWN : P.D.E.	**7602-197**
DATE : July '86	
REVISED :	

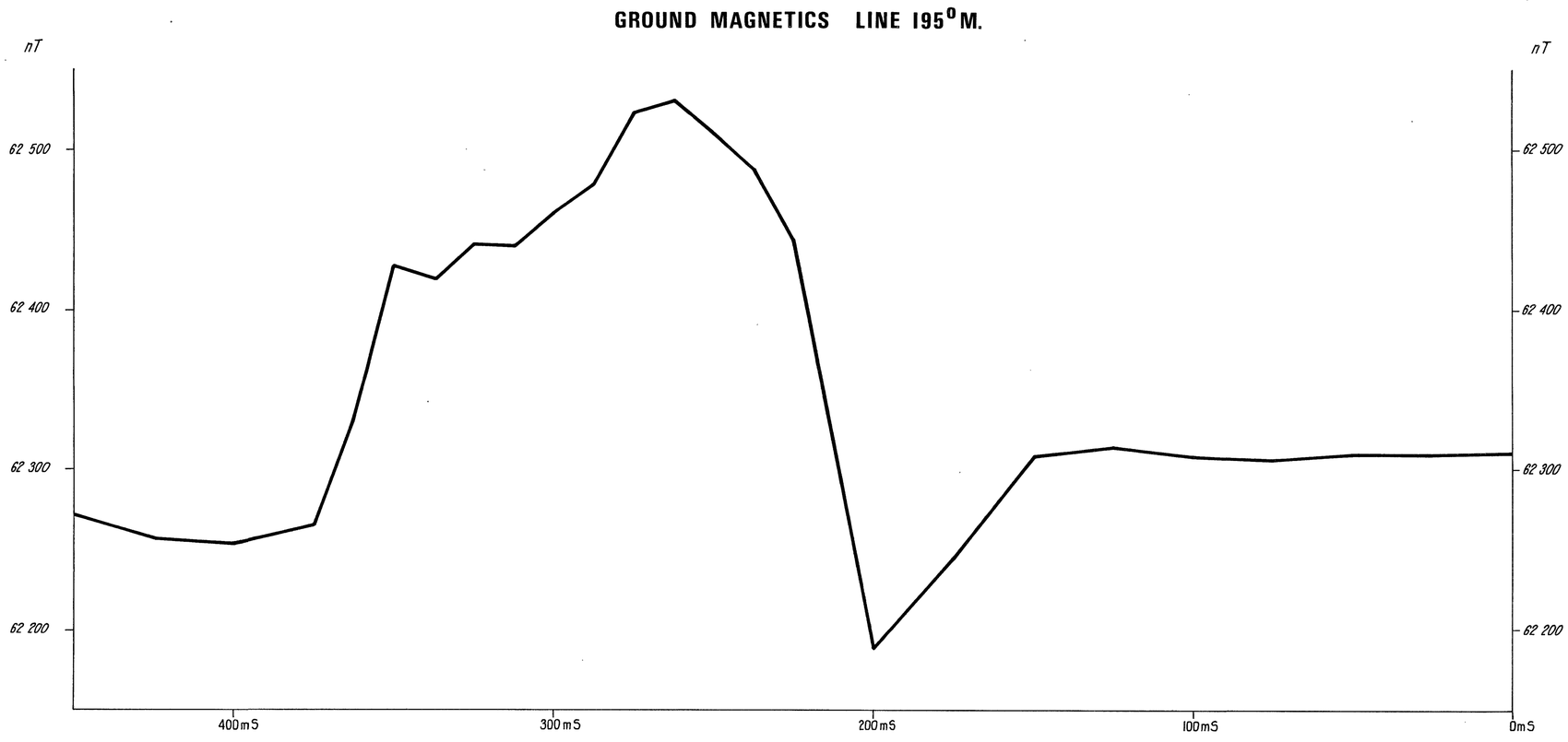
86-2584 44 7155

DDH – CG 3 PLAN



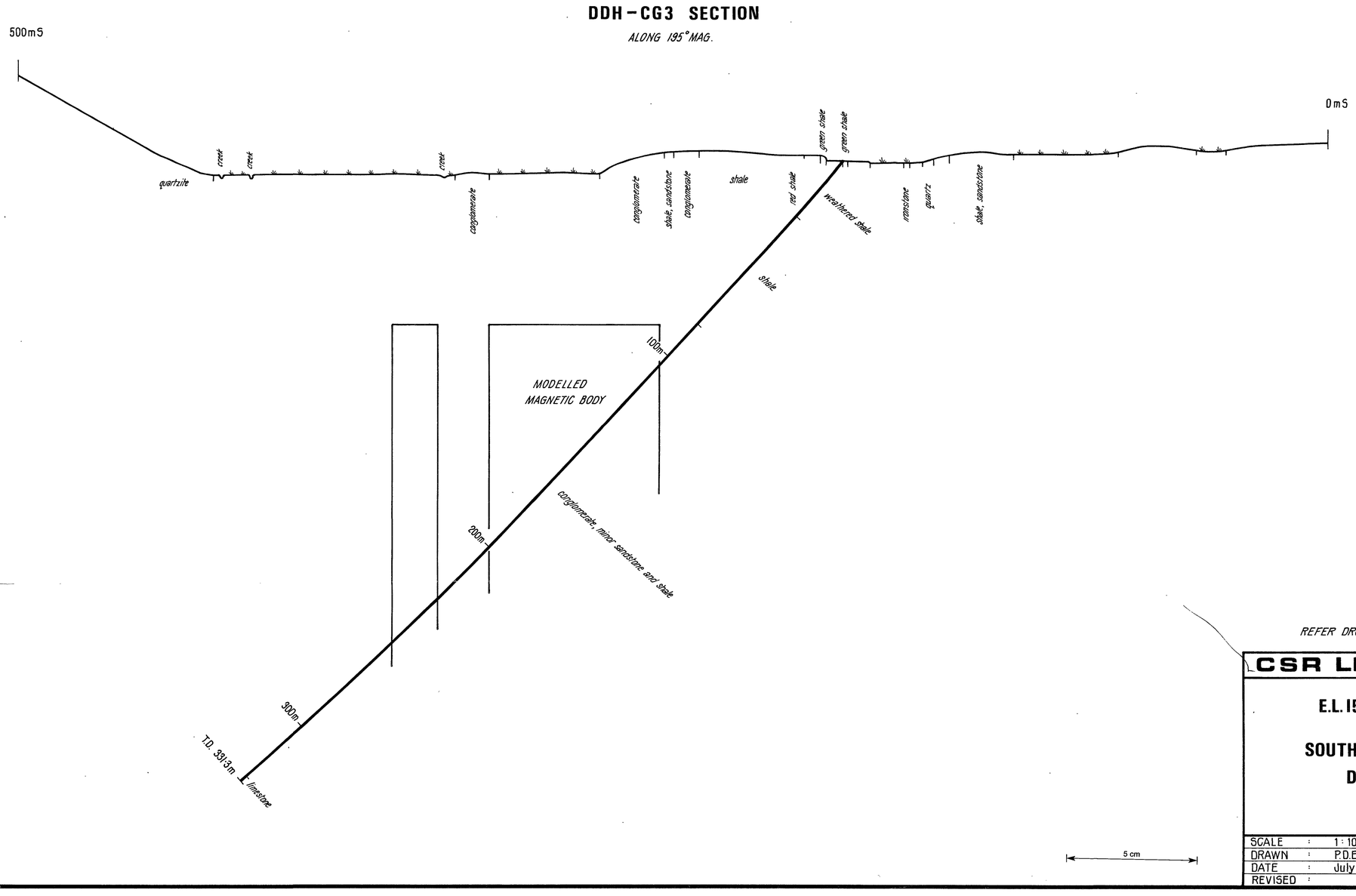
NOTE : FOR GEOLOGY REFER DRG.No. 7602 - 199
FOR PROFILES LINES 5, 5A, 5B REFER FIG.8 (Ground magnetics)

GROUND MAGNETICS LINE 195° M.



DDH – CG3 SECTION

ALONG 195° MAG.



5 cm

995496

REFER DRG.No. 7602-11 FOR LINE LOCATION

CSR LIMITED-MEDG

E.L. 15/76 DUNDAS, TAS.

SOUTH NEVADA ANOMALY
DDH – CG3 DATA

SCALE	: 1 : 1000	DRG. No. 7602 – 198
DRAWN	: P.D.E.	
DATE	: July '86	
REVISED	:	

86-2584 2/4

7156

SAMPLES 119M, 120P

RAILWAY

CUNI LINE 5487 N

5487 N 5600 E

6000 E

5900 E

6000 E

6100 E

6200 E

6260 E

6340 E

6420 E

6500 E

7000 E

7500 E

8000 E

8500 E

NEV 3

NEV 4

CREEK

NEVADA

SEE REPORT EMR 467/81

GEOTERREX AIRBORNE EM ANOMALY 183-15

PITS IN LIMONITE

RED CHERT HILL

HIGHWAY 58

MURCHISON

RAZORBACK BASELINE 8000 E

CUNI B/L PROJECTED 6200 E

GEOTERREX FLIGHT LINE 1 SE

SAMPLES 121M, 122P 669M, 670P

SAMPLES 602123M, 124P 667M, 668P 812M, 813P 810M, 811P

A202M 755M 809P

A201M 539M 161M 162P

A203M 736M 818M 819P

A204M 671M 672P 753M

A205P

A206

A207M 157M 158P 159M 160P

A208M 821P 735M 820M

116M 125M 126P

Qrs Qrg Qra Era Es Ec Eb Eh Efe Sa Sc Sb

Eg (dolerite) Es (Ec?)

Scree of (1) Mn veined (?) qss (2) Brn & grey stm banded Eg or S

Limonite (laterite)

Limonitic chert (ultrabasic rock capping?)

QS scree with blk (?) chromite xals

QS & blk. xtals, possible bedding

Si with dk grey & blk. bedding bands Strike/dip uncertain

Cb rubble on ridge top (in situ)

Mn rich clay

Limonite cemented scree

Clay (S1)

Limonitic SS

Yellow Clay

Yellow Clay Zone

Qrs

Qrg

Era

Ec

Eb

Eh

Efe

Sa

Sc

Sb

T1

T2

T3

T2/3

Ts

Ts/3

Qra

Qrg

Qrs

L

Eb

Era

Eh

Ec

Eg

Es

Efe

Sa

Sb

Sc

T1

T2

T3

T2/3

Ts

Ts/3

Δ

Δ QS

Δ cb

Δ Eg

Δ Eg (Rcg)

Δ Rcg

Δ Rch

Δ Rcs

Δ Rcw

Δ Rqs

Δ Rqsh

Δ Rqss

Δ Rqw

Δ Rsh

Δ Rss

Δ Rsw

Δ Rtg

Δ Rtq

Δ Rtqs

Δ Rtqss

Δ Rtqsh

Δ Rtqw

Δ Rtsh

Δ Rtss

Δ Rtsw

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Δ Rwwwwwwwwwqsh

Δ Rwwwwwwwwwqw

Δ Rwwwwwwwwwsh

Δ Rwwwwwwwwwss

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Δ Rwwwwwwwwwwq

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Δ Rwwwwwwwwwwqss

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Δ Rwwwwwwwwwwsh

Δ Rwwwwwwwwwwss

Δ Rwwwwwwwwwwsw

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Δ Rwwwwwwwwwwwg

Δ Rwwwwwwwwwwwq

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Δ Rwwwwwwwwwwwsh

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Δ Rwwwwwwwwwwwwwwsh

Δ Rwwwwwwwwwwwwwwss

Δ Rwwwwwwwwwwwwwwsw

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Δ Rwwwwwwwwwwwwwwwg

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Δ Rwwwwwwwwwwwwwwwqs

Δ Rwwwwwwwwwwwwwwwqss

Δ Rwwwwwwwwwwwwwwwqsh

Δ Rwwwwwwwwwwwwwwwqw

Δ Rwwwwwwwwwwwwwwwsh

Δ Rwwwwwwwwwwwwwwwss

Δ Rwwwwwwwwwwwwwwwsw

Δ Rwwwwwwwwwwwwwwww

Δ Rwwwwwwwwwwwwwwwwg

Δ Rwwwwwwwwwwwwwwwwq

Δ Rwwwwwwwwwwwwwwwwqs

Δ Rwwwwwwwwwwwwwwwwqss

Δ Rwwwwwwwwwwwwwwwwqsh

Δ Rwwwwwwwwwwwwwwwwqw

Δ Rwwwwwwwwwwwwwwwwsh

Δ Rwwwwwwwwwwwwwwwwss

Δ Rwwwwwwwwwwwwwwwwsw

Δ Rwwwwwwwwwwwwwwwww

Δ Rwwwwwwwwwwwwwwwwwg

Δ Rwwwwwwwwwwwwwwwwwq

Δ Rwwwwwwwwwwwwwwwwwqs

Δ Rwwwwwwwwwwwwwwwwwqss

Δ Rwwwwwwwwwwwwwwwwwqsh

Δ Rwwwwwwwwwwwwwwwwwqw

Δ Rwwwwwwwwwwwwwwwwwsh

Δ Rwwwwwwwwwwwwwwwwwss

Δ Rwwwwwwwwwwwwwwwwwsw

Δ Rwwwwwwwwwwwwwwwwww

Δ Rwwwwwwwwwwwwwwwwwwg

Δ Rwwwwwwwwwwwwwwwwwwq

Δ Rwwwwwwwwwwwwwwwwwwqs

Δ Rwwwwwwwwwwwwwwwwwwqss

Δ Rwwwwwwwwwwwwwwwwwwqsh

Δ Rwwwwwwwwwwwwwwwwwwqw

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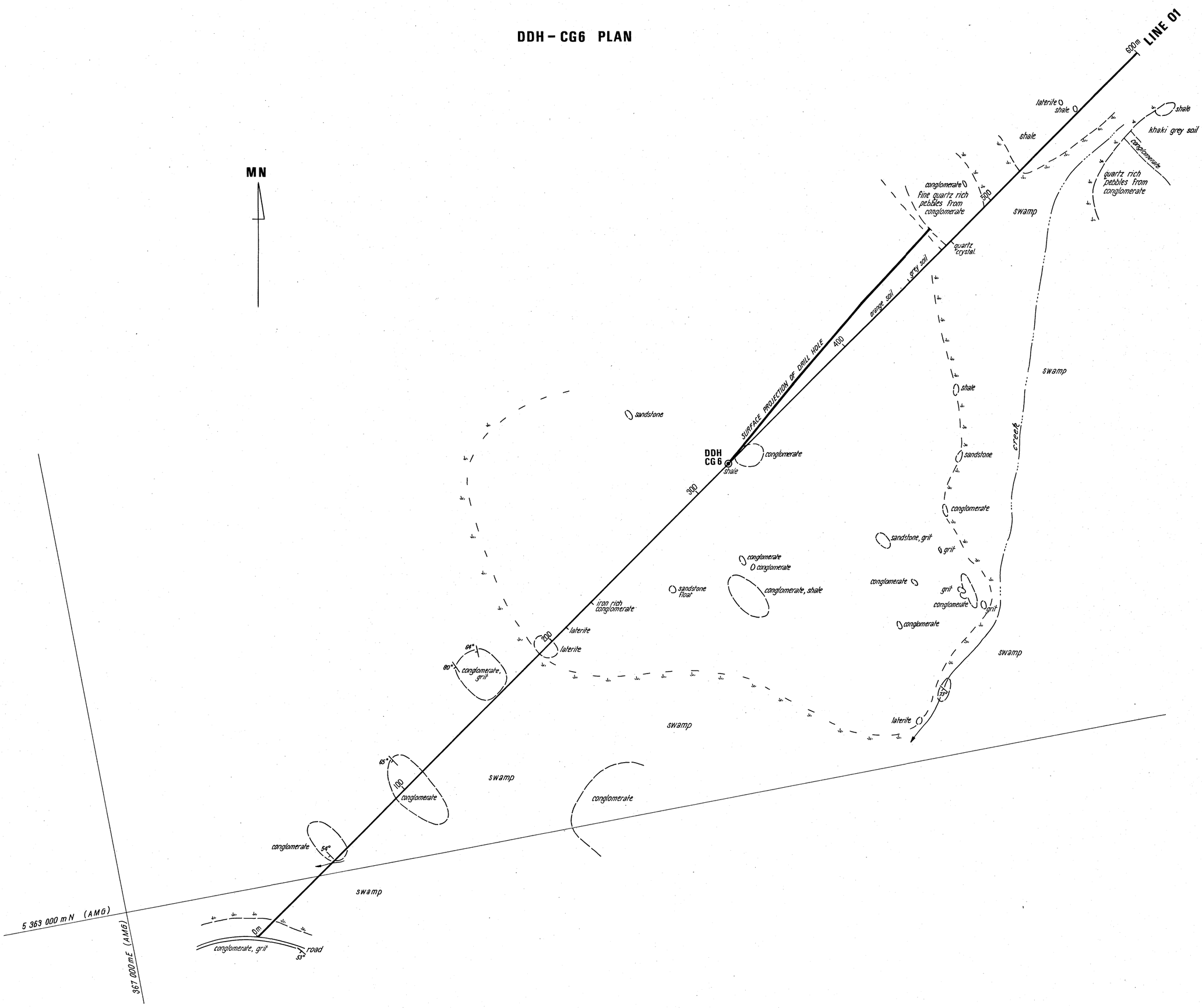
DDH – CG6 PLAN



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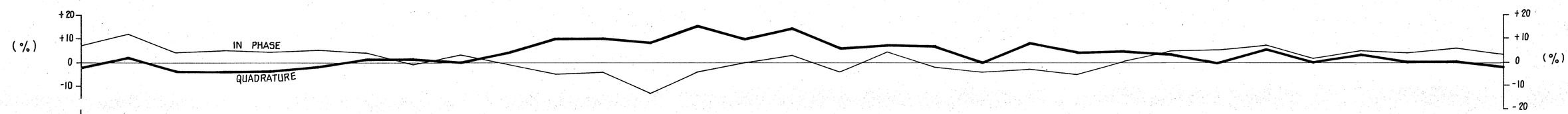
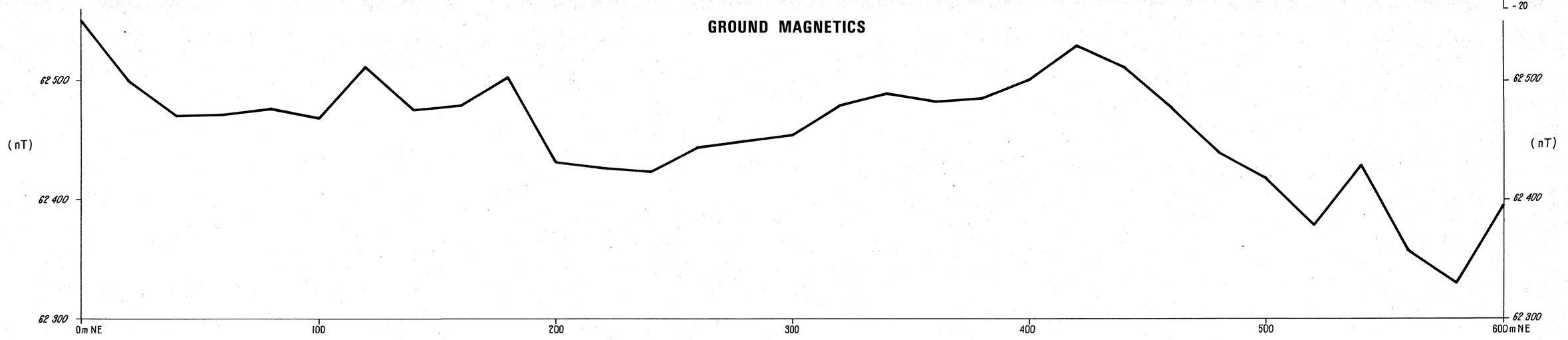
VLF – EM



GROUND MAGNETICS



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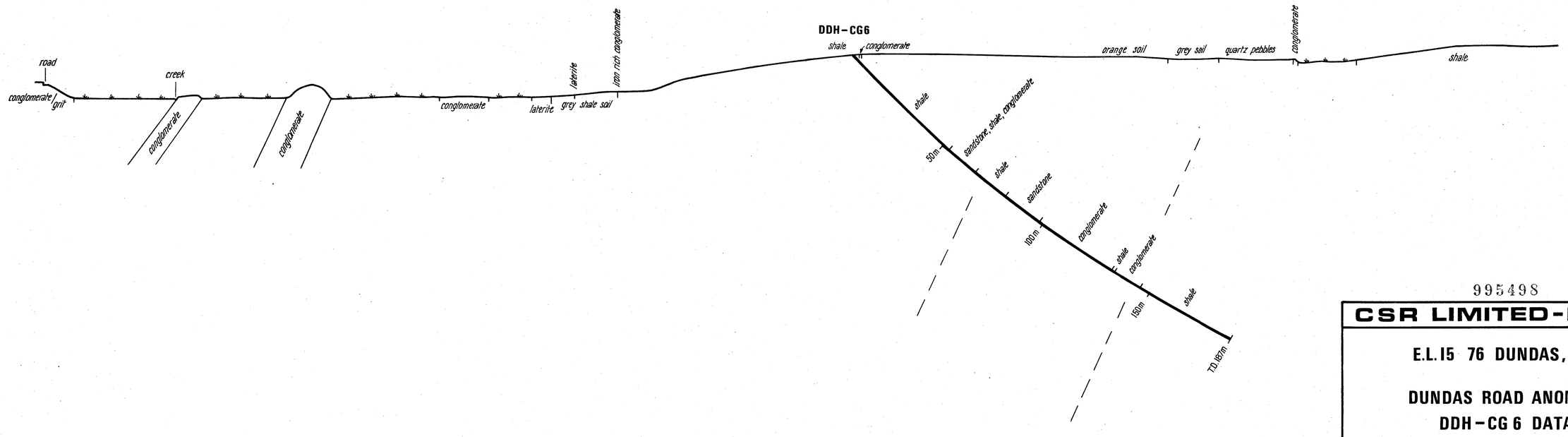


995498

CSR LIMITED – MEDG

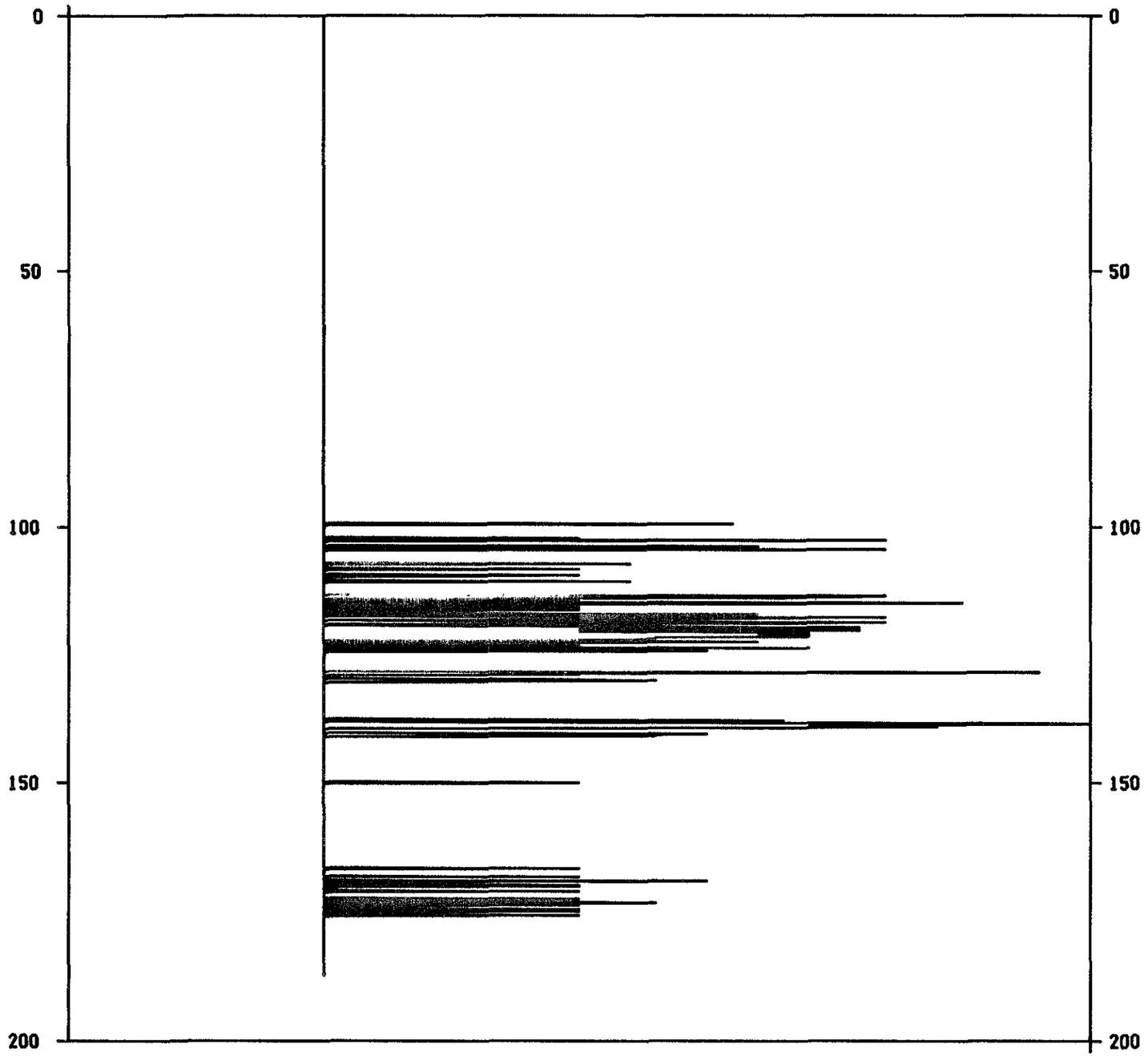
E.L. 15 76 DUNDAS, TAS.

DUNDAS ROAD ANOMALY
DDH – CG 6 DATA

5 cm

SCALE	: 1 : 1000	DRG. No. 7602 – 200
DRAWN	: P.D.E.	
DATE	: July '86	
REVISED	:	

86-2584 2/4 7158



MAGNETIC SUSCEPTIBILITY
1cm = 0·2cgs x 10^{-3}

995499

5 cm

CSR LIMITED-MEDG

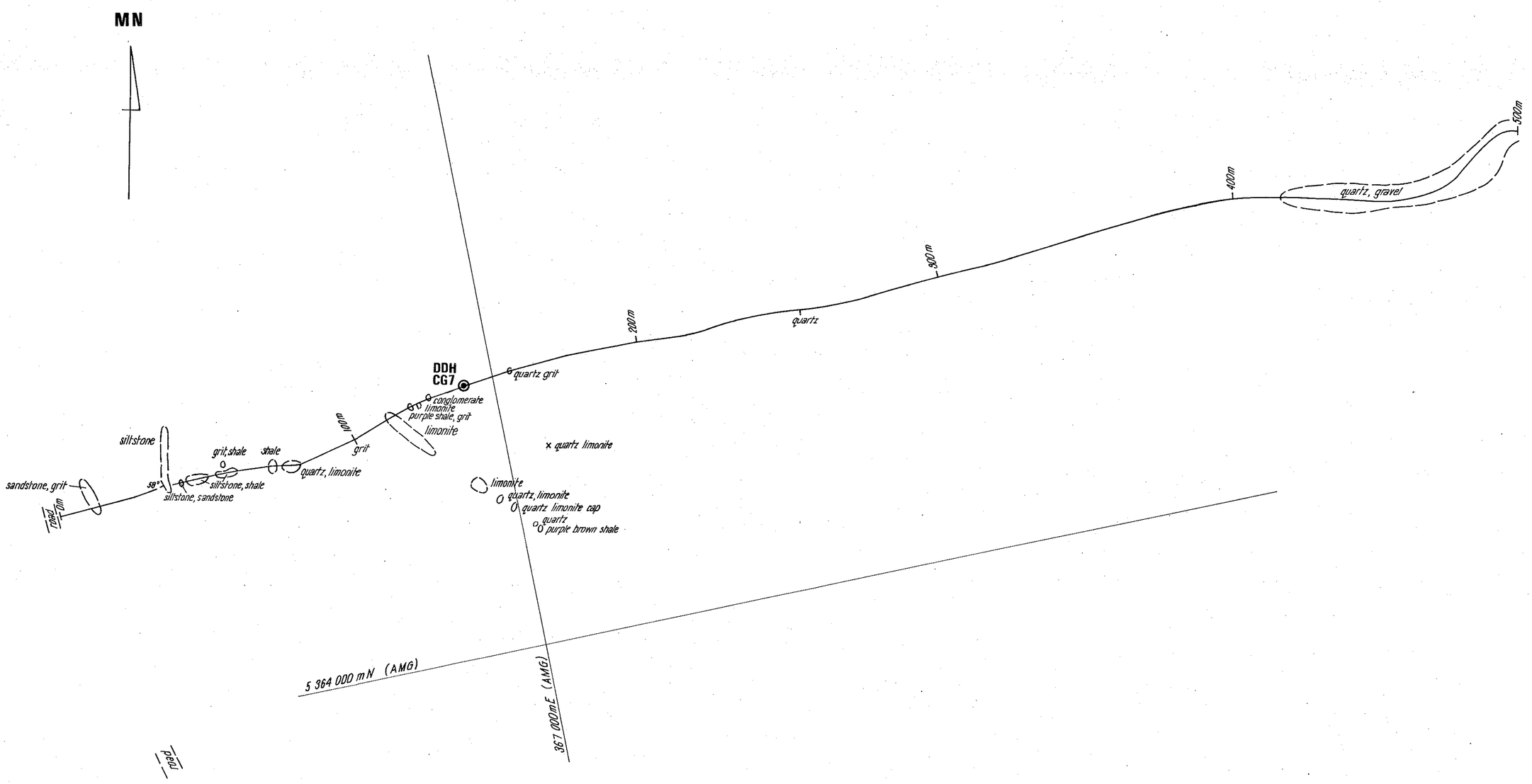
Dundas EL 15/76
Drill Hole CG-6
Magnetic Susceptibility Log

SCALE:	1:1000	DATE:	8/8/1986
DRAWN:	PRG	REVN	PLAN NO
CHECKED:			7602-201
APPROVED:			

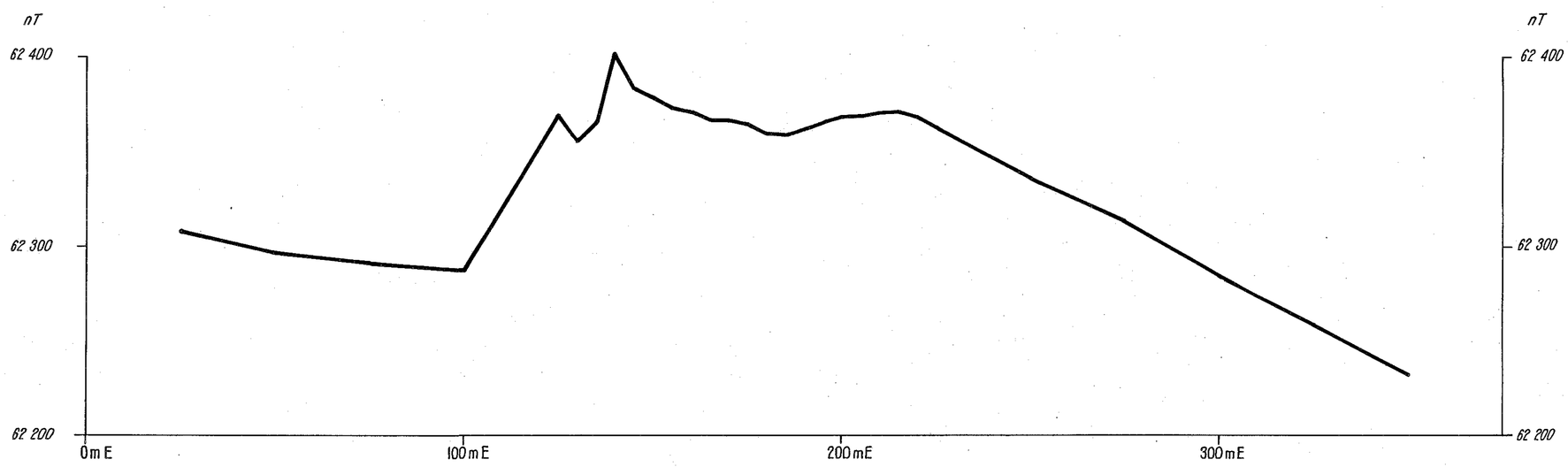
86-2584 2/4

7159

DDH – CG 7 PLAN



GROUND MAGNETICS



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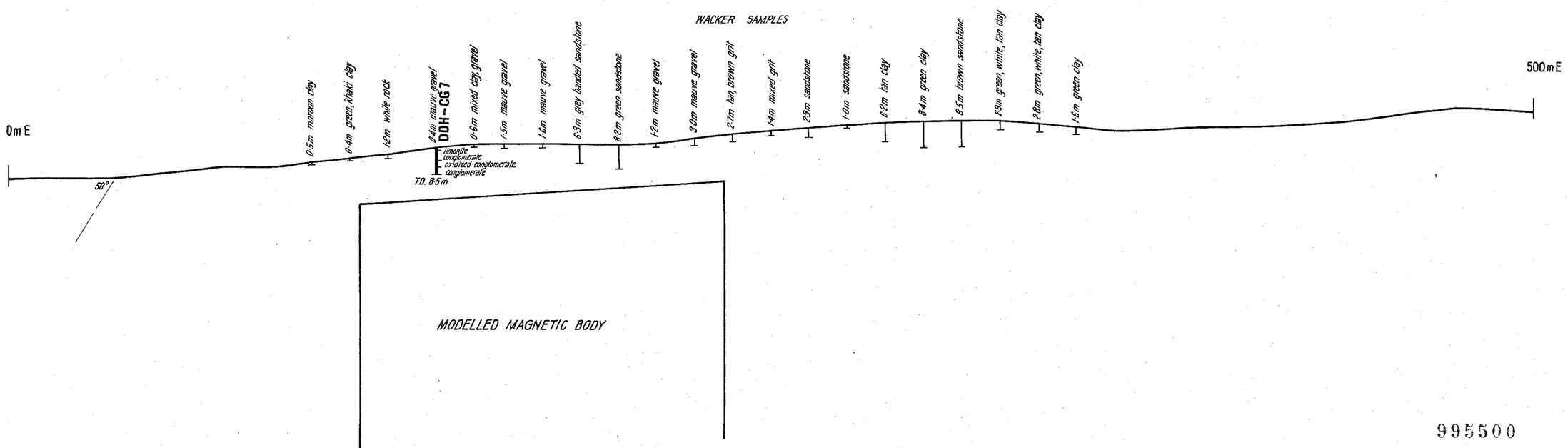


995500

5 cm

REFER DRG.No. 7602-11 FOR LINE LOCATION

CSR LIMITED-MEDG

E.L. 15/76 DUNDAS, TAS.

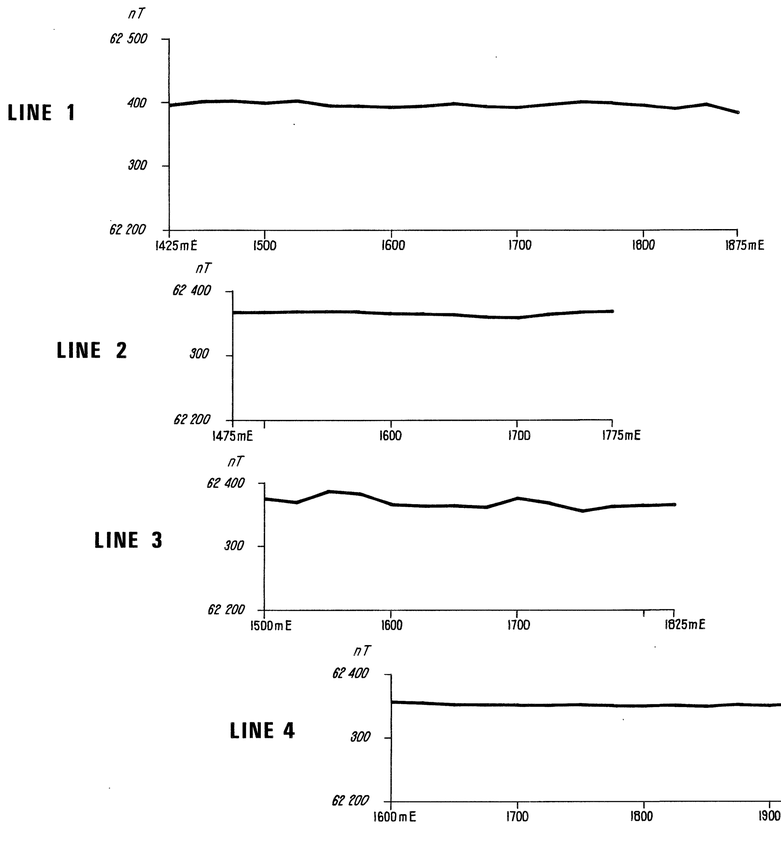
PINE PLANTATION ANOMALY
DDH – CG 7 DATA

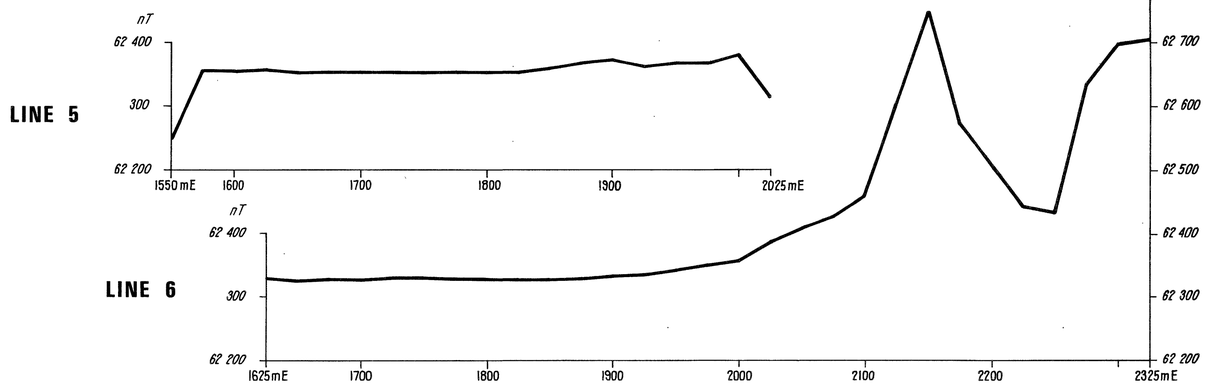
SCALE	: 1 : 1000	DRG. No.
DRAWN	: P.D.E.	7602 – 202
DATE	: July '86	
REVISED	:	

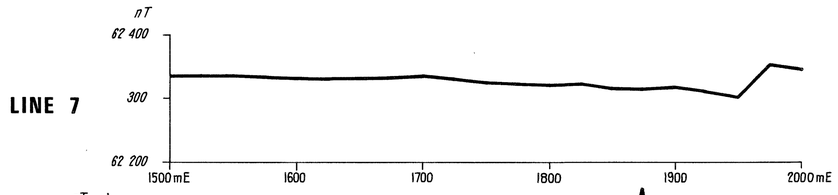
86-2584 4A

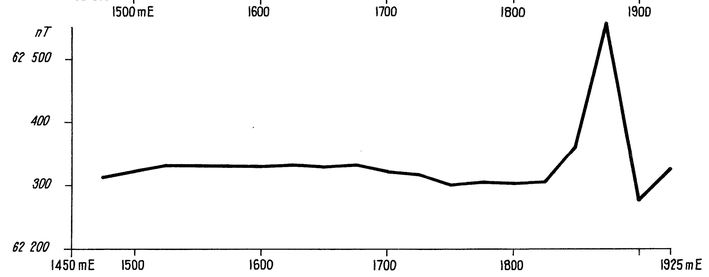
7160

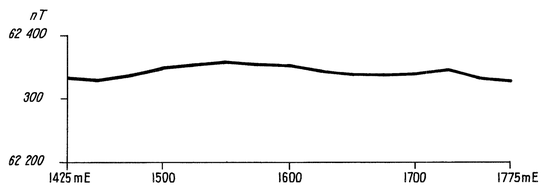

RELINQUISHED AREA
CSR / CYPRUS MINERALS
J.V.
GEOTERREX EM LINE 2E
AIRBORNE EM LINE 3 SW
EM LINE 4 NE
BALSTRUP FAULT
HENTY FAULT
FARRELL RIVER
Mariposa Creek
Westerway Ck
Tom Creek
Berry Creek
Amber Creek
Professor Creek
Sunny Corner
Bannockburn
DDH-HR1 (Mines Dept)
LINE 1
LINE 2
LINE 3
LINE 4
LINE 5
LINE 6
LINE 7
LINE 8
LINE 9
LINE 10
LINE 11
LINE 12
LINE 13
FOR REFERENCE SEE DRG No. 7602-11
CSR LIMITED-MEDG
GEOTERREX EM TEST LINES AND
DRAINAGE SAMPLE NUMBERS
GRID LOCATIONS
E.L. 15/76 - South Sheet
DUNDAS, WEST TASMANIA
SCALE 1:10000
DRAWN P.M.M. / P.H.
DATE December 1977
REVISED Jan '79, May '81, Oct '81, July '86
K555-7
DRG. No. 7602-203
995501
7161
86-2584 2/4

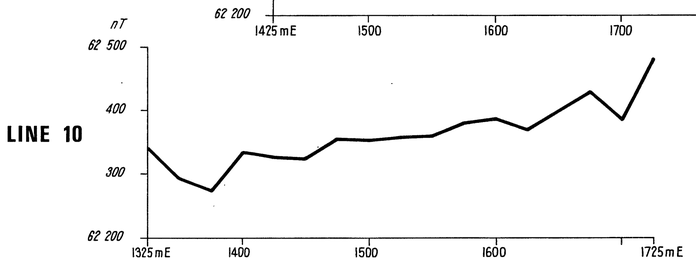
















995502

5 cm

REFER DRG. No. 7602-203 FOR LINE LOCATIONS

CSR LIMITED-MEDG

E.L. 15/76 DUNDAS, TAS.

EWARTS CREEK GRID
GROUND MAGNETIC PROFILES

HORIZONTAL SCALE	1 : 2500
VERTICAL SCALE	1cm = 50nT
DRAWN	P.D.E.
DATE	July '86

DRG. No. **7602-204**

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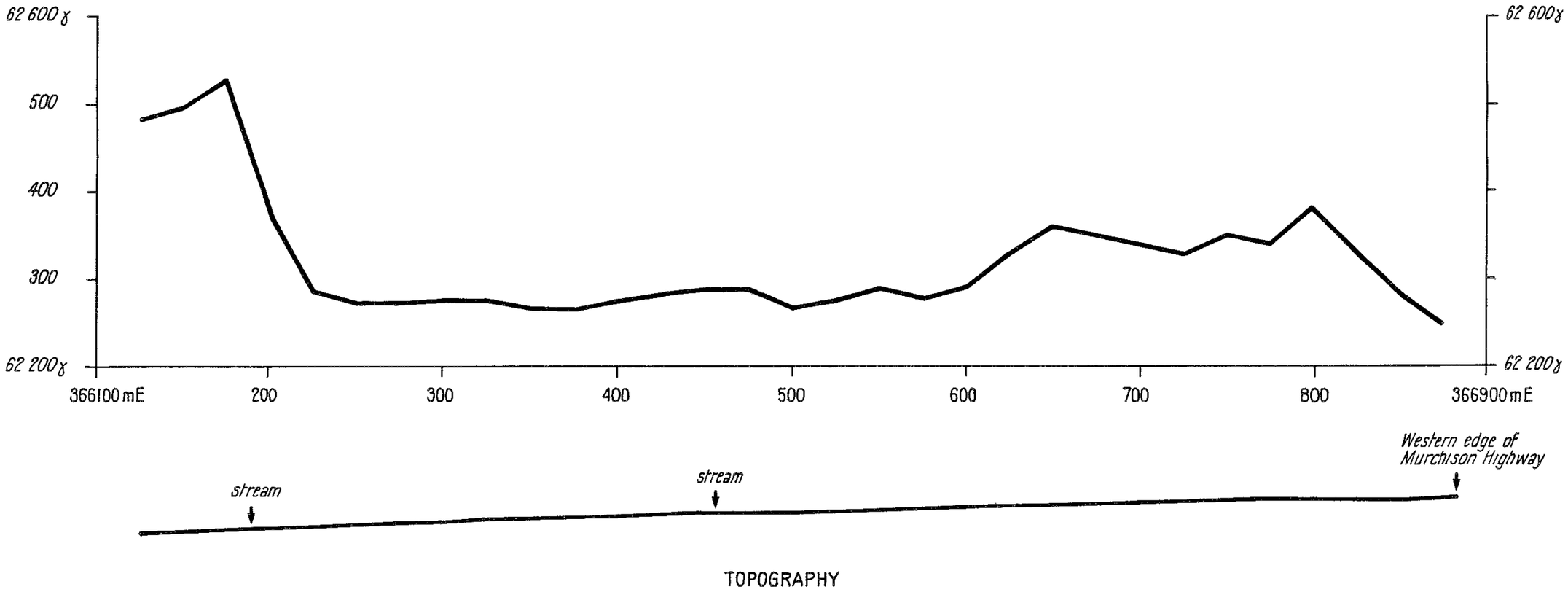
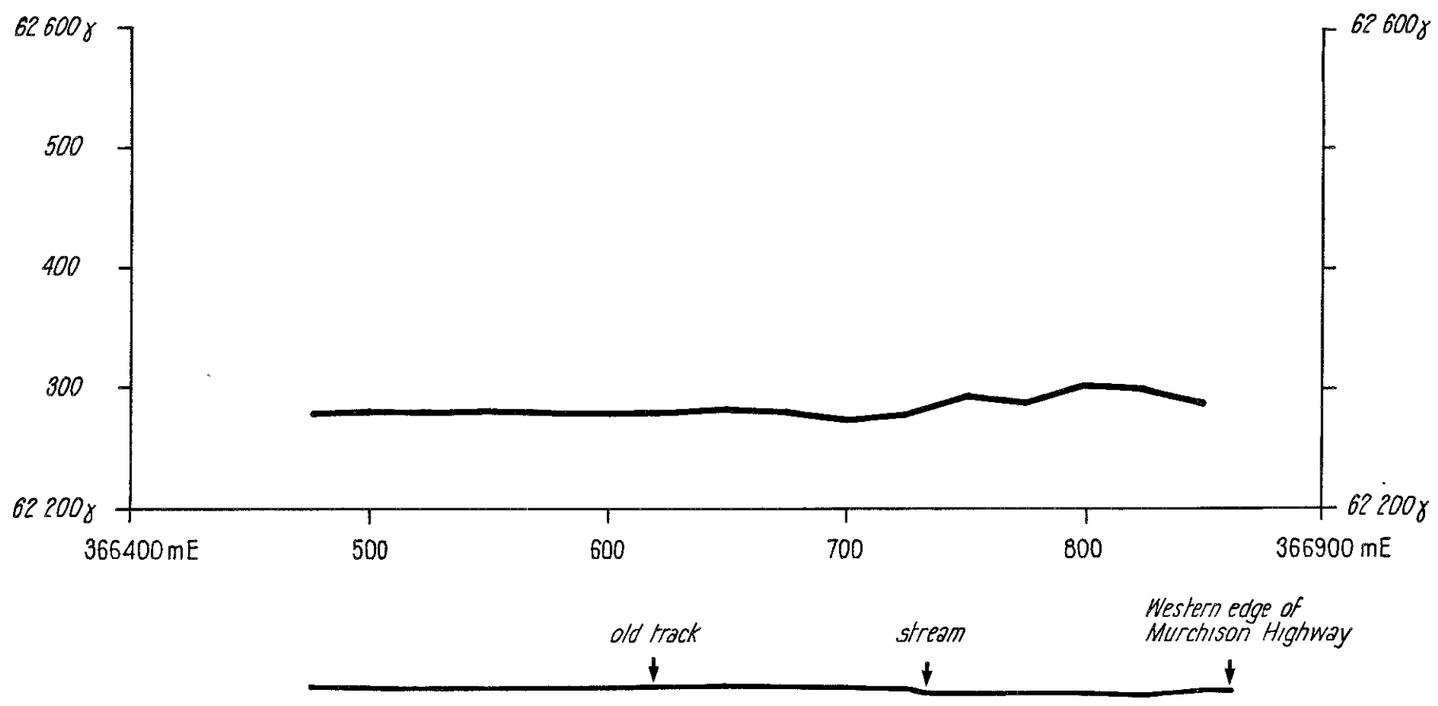
7162

LINE 5 364 800 mN



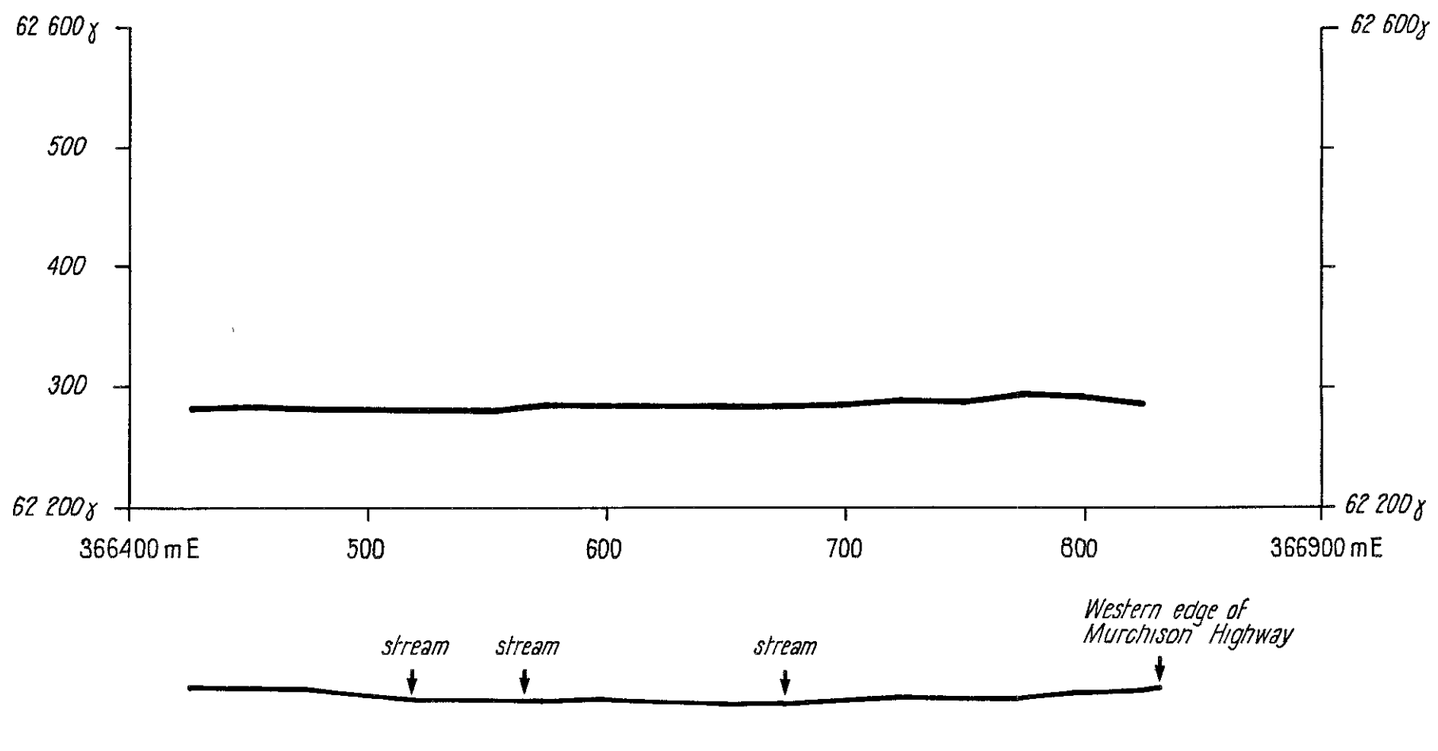
TOPOGRAPHY

LINE 5 364 400 m N



TOPOGRAPHY

LINE 5 364 000 m N



TOPOGRAPHY

5 cm

M.N.

995503

REFER : DRG No. 7602-11 FOR LINE LOCATIONS

CSR LIMITED-MEDG

E.L. 15/76 DUNDAS, TAS.

RAZORBACK WEST GRID
GROUND MAGNETIC PROFILES

HORIZONTAL SCALE 1:2500	DRG. No.
VERTICAL SCALE 1:2500 topo ; 1cm = 50nT mag.	**7602-205**
DRAWN : P.D.E	
DATE : July '86	

86-2584 4/4

7163

E.L. 15/76

APPENDIX IV

CONI AIR MAGNETIC DATA.

(includes magnetic computer tape titled

CSR LTD. ZEEHAN AREA

LOCATED AIRBORNE TAPE)

Report No 86-2584.

Resubmit ≈ 2 years.

check out mag tape

DATA TAPE HELD IN LIBARY

PRG/JM 34A:62

SPECIFICATIONS OF AIRBORNE GEOPHYSICAL SURVEY

1. SURVEY AREA

The area flown in the Zeehan region, and covering the Cuni prospect is indicated on Figure Approximately 355 line kilometres of east-west traverses were flown.

2. SURVEY SPECIFICATIONS

Flight line direction - 090-270 degrees
Flight line spacing - 100 metres
Tie line direction - 000-180 degrees
Tie line spacing - 1000 metres
Sensor terrain clearance - 70 metres
Sampling interval - Approximately 35 metres

The usage of close line spacings and high data density was adopted for this survey due to difficult vehicular and grid-based access. High quality data recovery meant minimal ground based grid preparation and expensive line cutting. To this purpose, the survey was very successful.

Navigation was controlled by three means:

a) electronic (Doppler)
b) visual means, from 1:10000 recently acquired photography
c) in-flight colour video recording of along track position

The overall navigation accuracy is believed better than ±5 metres.

EQUIPMENT

A Piper PA-31 Chieftain (VH-WJK) was used for the survey. Three GeoMetrics airborne proton magnetometers (G-813) were fitted, one in each wing tip and the third mounted in a tail stinger. This configuration permits calculation of horizontal gradients and so provides accurate anomaly placement.

A radar altimeter, and all digital output were recorded by a GeoMetrics Model G-714 geophysical data formatting/recording unit.

Additional to the magnetic field recording, the aircraft was fitted with a GeoMetrics Model GR-800 Differential Gamma Ray Spectrometer measuring the standard energy windows for gamma radiation of Tl-208, Bi-214, K-40, Total Count and Cosmic. The spectrometer was interfaced to a NaI (Ti) crystal detector with a volume of 16.8 litres (1,024 cubic inches).

CSR LTD ARCHIVE TAPE

AREA : ZEEHAN, WESTERN TASMANIA

TYPE : 9 track, 1600 bpi, Blocksize = 4968 Recordsize = 216

1. No Special symbols used.

2. No expansion of file header information.

3. Residual magnetic data tie line levelled and IGRF 2000nt datum removed.

4. Magnetic grid obtained from raw stinger magnetic data and the corrected transverse gradient using a bi-cubic spline method.

5. Test lines are pre flight 70000 series; post are 80000 series traverses are 10000 series; tie lines are 190000 series.

6. Channel description: Data is stored on a record size of 216 chars.

COLUMNS	DESCRIPTION
1 to 6	Date in DDMMYY
7	BLANK
8 to 10	Flight number
11 to 16	Time in seconds after midnight
17	BLANK
18 to 22	Line number
23	BLANK
24 to 29	Fiducial
30	Asterisk if a recovered point
31 to 37	AMG easting co-ordinate in metres
38	BLANK
39 to 45	AMG northing co-ordinate in metres
46	BLANK
47 to 53	Residual magnetic value
54	BLANK
55 to 61	Raw stinger magnetic value
62	BLANK
63 to 69	Raw left wing magnetic value
70	BLANK
71 to 77	Raw right wing magnetic value
78	BLANK
79 to 85	Corrected stinger magnetic value
86	BLANK
87 to 93	Corrected left wing magnetic vlaue
94	
95 to 101	Corrected right wing magnetic value

102 to 109	Raw transverse gradient value	
110 to 117	Raw longitudinal gradient	
118 to 125	Corrected transverse gradient	
126 to 133	Corrected longitudinal gradient	
134 to 140	Radar altimeter value	
141 to 147	Barometric altimeter value	
148 to 154	Raw total field radiometric	
155	BLANK	
156 to 161	Raw potassium value counts	
162	BLANK	
163 to 169	Raw uranium value counts	
170 to 176	Raw thorium value counts	
177 to 183	Corrected total count	CPS
184 to 190	Corrected potassium count	CPS
191 to 197	Corrected uranium count	CPS
198 to 204	Corrected thorium count	CPS
205 to 211	Raw Cosmic counts	
212 to 216	Live time micro-seconds	