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THE SHELL COMPANY OF AUSTRALIA LIMITED
METALS DIVISION

EXPLORATION LICENCE 7/74 - MOINA

Progress Report on Exploration during the Period

1/1/80 - 31/7/81

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SUMMARY

The Shell Company of Australia Limited entered into a joint venture agreement in 1980 with Comalco Limited to explore exploration licences 7/74 (Moina) and 36/79 (Loongana). Investigations by Shell on E.L. 7/74 since January, 1981 have consisted largely of diamond drilling at the Shepherd and Murphy area and by a regional aeromagnetic/radiometric survey and subsequent follow-up work.

The main areas investigated have been:

1) The Shepherd and Murphy area where a large fluorite-tin-tungsten-wrigglite skarn deposit had been outlined by Comalco.

2) The Tin Spur - Devonian area, where low grade tin-gold mineralization had been outlined by Comalco.

3) Major aeromagnetic anomalies indicated by the regional aeromagnetic/radiometric survey completed for Shell Co. of Australia Ltd. early in 1980.

In the Shepherd and Murphy area a total of 2,059.7 m of diamond drilling has now been completed, testing various styles of mineralization. Associated geophysical surveys have also been carried out over the main limestone basin. Drilling has outlined approximately 26 000 000 tonnes grading an average of about 18% CaF_2, 1000 ppm Sn, 1000 ppm W. (Askins, 1978, 1979). This mineralization is not economically viable due to severe metallurgical problems.

In the Tin Spur - Devonian area a possible 2 000 000 tonnes at 0.2% Sn, 1 ppm Au is inferred from Comalco drilling but is not thought to be economically viable.

Eight major aeromagnetic anomalies have been tested. Only one anomaly, the Lake Gairdner Anomaly, may have significant economic potential. Work is continuing on this anomaly.

No major targets, excepting the Lake Gairdner anomaly, remain to be tested. However, numerous secondary targets located by the regional aeromagnetic/radiometric survey and regional stream sediment surveys are being investigated further.

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1.0 INTRODUCTION

E.L. 7/74 was first granted to Comalco Limited on 18th July, 1974. The present E.L. boundaries were established on 18th July, 1979, and the Exploration Licence was trasnferred to the Commonwealth Aluminium Corporation Ltd., early in 1979.

The Shell Company of Australia Ltd. (SCOA), entered into a Joint Venture agreement with Comalco Limited in early 1980. Since then SCOA have been the operators of the Joint Venture. As part of the Joint Venture the adjacent Loongana Licence, E.L. 36/79 held by SCOA, was included in the agreements with a committment to spend $410,000 on exploration in the two licence areas over the initial two years of the Joint Venture. This expenditure committment has now been met.

This report covers all investigations in the licence area undertaken by SCOA from 1st January 1980 to 31st July 1981 and a brief summary of previous work.

2.0 LOCATION & ACCESS

The E.L. is located on the Burnie 1:250 000 map and the Sheffield and Middlesex 1 inch to 1 mile sheets. E.L. 7/74 comprises 405 sq. km. of rugged country 32 km south of Devonport. The area includes the townships of Liena, Lorinna and Moina. Access to the area is obtained by a variety of major and minor roads. However, once off these main roads, movement is very restricted due to steep terrain and thick vegetation.

3.0 PREVIOUS INVESTIGATIONS

Numerous early investigators have been attracted by the profusion of minor ore occurrences throughout the licence area. Several small mines have been worked in the past and these have been reported on in various publications.

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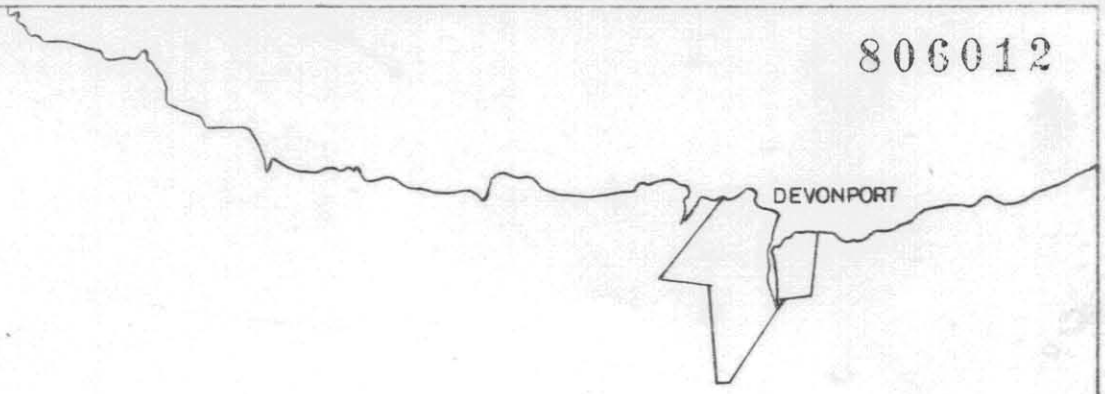

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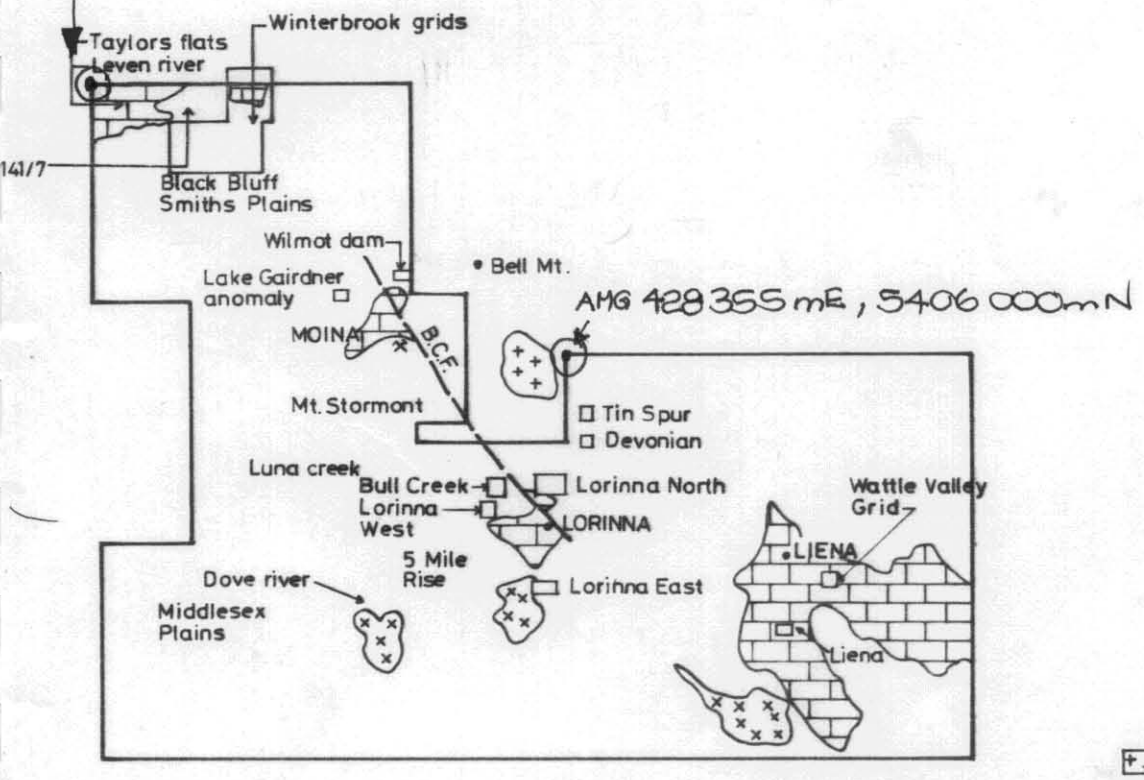

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA	
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FIG. No. 1	REPORT No.
ENCL. No.	DRG. No. D/MZ01/113
DATE 6 7 81	AUTHOR W.D.S.
DRAWN H.L.H.	OFFICE DEVONPORT

AMG REFERENCE POINTS ADDED

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Prior to Comalco obtaining the lease the Moina area had been investigated by BHP and the Mt. Lyell Mining and Railway Co. Ltd. These companies conducted regional aeromagnetic and stream sediment geochemical surveys over the whole area. The Mt. Lyell Mining and Railway Co. Ltd. drilled three diamond drill holes at the Shepherd and Murphy Mine area and two in the Devonian area.

Comalco undertook the most intensive search. Most attention was focused on the Shepherd and Murphy mine where 26 diamond drill holes were drilled. Other main areas of interest were the Tin Spur/ Devonian prospects with four diamond drill holes and the Mt. Jacob area with two diamond drill holes completed. Various regional stream sediment geochemical surveys were done with only a few of the resultant anomalies being followed up.

Two main target areas had been defined at the time of SCOA's entry into the Joint Venture. The main wrigglite/pyrrhotite/sphalerite skarns at the Shepherd and Murphy Mine Area and a possible low grade tin-gold zone in the Tin Spur area.

A comprehensive reference to previous reports and investigations is included as Appendix 1.

4.0 REGIONAL GEOLOGY

On the Sheffield and Middlesex sheet areas all the units from Pre-Cambrian to Devonian age change their geological trends from N-S in the west, to E-W and NW in the east. The licence is located over the E-W, NW trending areas. Superimposed on this is a strong north-west structural trend.

In the south of the licence PreCambrian rocks of the Tyennan Nucleus are exposed. These are unconformably overlain to the north by Cambrian volcanics and sediments, which are also overlain unconformably by the Ordovician sequence of the Roland Conglomerate, Moina Sandstone and Gordon Limestone. The Devonian Dolcoath and Dove Granites intrude all these units. Overlying these units with considerable unconformity are Tertiary basalts and some Jurassic Dolerites. (Refer plan D/MZ 01/148).

The PreCambrian rocks exposed south of the E.L. consist of quartzites and schists which have been severely deformed. Regionally they have been divided into three units based on lithological characters.

These are:

1) Howell Group - interbedded quartzite, quartz-mica and garnet-mica schists.

2) Fischer Group - thinly bedded massive and laminated quartzite with interbedded quartz-mica schists.

3) Dove Group - quartz-mica and garnet-mica schists with little or no quartzite.

Limestone/dolomitic units are known in the PreCambrian in the Granite Tor area and a possible outcrop near the Lone Pine Granite (Jennings, 1963).

The Cambrian rocks occur mainly in the north of the licence as part of a major E-W anticlinorium, and also as minor exposures throughout the rest of the area. Because of patchy outcrop, some uncertainty exists as to the geological succession. In the south two main units are recognised, the Lorinna Greywacke and the Bull Creek Porphyry. In the north, possible Lorinna Greywacke equivalent is exposed together with a large area of un-named volcanics near Black Bluff.

The Lorinna Greywacke consists of a mixed assemblage of greywacke, chert, porphyry, conglomerate and quartzite. The formation is tightly folded and has suffered considerable dynamic and hydrothermal alteration.

The Bull Creek Porphyry is a complex assemblage of quartz-feldspar porphyry and sediments. This formation also has suffered from dynamic and hydrothermal alteration.

The Cambrian unit in the Black Bluff area consists of rhyolitic lavas, intrusives, tuffs, dacitic andesitic lavas and tuffs and various volcanoclastic sediments (Weste, 1978).

The Ordovician rocks occur throughout the central portion of the licence. The Roland Conglomerate is a lenticular body of quartz conglomerate which varies in thickness from a few metres up to a maximum of about 300 m. The formation consists of thick beds of white, pink and purple quartz conglomerate interbedded with occasional thinner beds of white and pink quartzite. Except for the basal beds, the pebbles are almost exclusively siliceous, consisting of reef quartz, quartzite and quartz schist set in a dense, frequently recrystallized fine-grained siliceous matrix. The conglomerate is well sorted, sometimes showing a rough imbricate texture and rarely cross-bedded. The pebbles are almost always subrounded to rounded.

The basal beds near the unconformity sometimes reflect the composition of the underlying Cambrian rocks.

The Roland Conglomerate is overlain by a sequence of quartz sandstone and shale with minor grit and some conglomerate beds, called the Moina Sandstone. The formation is about 300 m thick, fine grained, dense and siliceous, It consists largely of quartzite and quartz sandstone with minor bands of shale, conglomerate and grit. Shaly bands are more common and thicker toward the top of the formation and conglomerate beds more common toward the base of the sequence.

Some beds in the Moina Sandstone contain abundant spherulitic pyrite. Characteristic also of the formation is the presence, in certain beds, of abundant worm burrows orientated at right angles to the bedding.

The Gordon Limestone conformably overlies the Moina Sandstone in preserved synclines throughout the area, at Moina, Taylors Flats, Lorinna and Liena.

The maximum thickness of the limestone in this region is about 1000 m at Gunns Plains. Generally, it consists of thick, massive beds of fairly pure blue-grey fine-grained limestone. Occassionally it is highly sheared and somewhat schistose and ranges in composition from 60 - 95% $CaCO_3$, with common impurities of Al_2O_3, SiO_2, MgO and iron oxides. Deep weathering in limestone areas is common and outcrop is rare.

Metasomatic and contact metamorphic alteration of the Gordon Limestone and the transition zone beds at its base has resulted in the formation of variable skarn assemblages in the Stormont, Ti-Tree Creek, Moina and Tin Spur Creek areas. (Refer plan D/MZ 01/148).

At several localities in the vicinity of Mole Creek and Gunns Plains, the Gordon Limestone is succeeded, apparently conformably, by a sequence of sandstone and quartzite. These rocks are considered to be of Silurian age and probably equivalent to the Crotty Sandstone of the Eldon Group. These rocks appear similar to some members of the Moina Sandstone and contain tubicolar organisms characteristic of that formation.

Cambrian?

The Devonian Dove Granite outcrops in three places along or near the Pre-Cambrian - Lower Palaeozoic unconformity.

In the Mersey Valley the granite is mostly weathered to depths exceeding 20 m. Near the contact with the Moina Sandstone the Dove Granite is a medium to coarse grained pinkish weathered rock containing pink feldspar, glassy quartz and a green micaceous mineral.

Aplite and basic dykes up to 2 feet wide occur and usually stand out well as fresher material against the completely weathered enclosing granite.

Dove Granite outcrops fairly widely around the junction of the Dove and Forth Rivers but it is deeply weathered and variable, in composition. Hematite and sulphide mineralization is associated with this granite.

Granite porphyry and marginal phases of the granite also occur in the vicinity of the Devon Mine higher up on the Dove River. The Devon Pb-Ag-Au mine is completely enclosed by the granite and several vein-type gold and gold-lead occurrences on 5 Mile Rise are probably associated with this phase of the Dove Granite.

The Devonian Dolcoath Granite outcrops as a small stock about 3 km in diameter centred near the Cethana Dam east of Moina.

The granite outcrops on the steep side of the Forth Valley typically as granite tors intersected by strong but widely spaced joint systems. Narrow aplite veins occur within the granite and intruded along joints in the surrounding Cambrian porphyry.

This granite is the source of numerous tin-tungsten deposits in the area. Narrow quartz veins, infilling joints within the granite, carry chiefly wolframite and molybdenite as well as minor quantities of cassiterite. Some wolframite and molybdenite is disseminated through the granite just below the road at the highest point of the granite on the east side of the Forth River.

In hand specimen the granite is a medium to coarse grained, flesh-coloured rock containing abundant glassy quartz crystals up to 5 mm across and altered feldspars 3 - 4 mm across and 10 mm long plus some biotite.

Although the outcrop area of the Dolcoath Granite is small, it is known from diamond drilling to extend $3\frac{1}{2}$ km to the west to below the Shepherd and Murphy Mine area. It is thought, from gravity data, to be part of a massive east west trending batholith with possible connections to Granite Tor which outcrops 40 km to the southwest.

Jurassic Dolerite occurs outside the licence to the south and east. The dolerite is generally in the form of discontinuous sills with one major sill intruded at about the top of a Triassic sandstone.

Tertiary basalt crops out over large areas throughout the region and within E.L. 7/74 they occupy approximately a third of the area. These rocks cap thin, freshwater clay, sand and conglomerate deposits of Tertiary age. The flows are mainly valley fill into eroded limestone synclinal areas and originated from numerous small volcanic centres. Two extensive basalt covered areas occur on the licence from Middlesex Plains to the Forth River and from Gads Hill/ Lorinna to Liena.

Structurally the region consists of east-west/north-west trending Palaeozoic units bordered to the north and south by Precambrian units. Over the area of E.L. 7/74 the major east-west fold direction has had superimposed a north-west fracture and fold pattern which was probably active from the Ordovician to the Tertiary.

Cambrian rocks in the area were folded and had developed a mild regional schistosity before the beginning of the Ordovician. The Jukesian movement in late Cambrian time which caused this, probably also caused uplift of the Precambrian nucleus leading to the deposition of the Roland Conglomerate and Moina Sandstone. Later Tabberaberan movement was associated with folding and the intrusion of granites. Normal and thrust faulting in a mainly NW system affect most of the area. Normal NW faulting trend has probably been active since the Ordovician and the thrust faulting was post Tabberaberan.

5.0 EXPLORATION TARGETS AND METHODS

The main area of interest on the E.L. was the Shepherd and Murphy skarn deposits at Moina. Possible cassiterite-rich magnetite or pyrrhotite skarns were the immediate drilling targets. Stockwork and greisen tin-tungsten associations were also to be investigated. Regionally the area was thought to be prospective for similar skarns, with the wrigglite of the Shepherd and Murphy area and Renison style sulphide mineralization as models. A regional airborne magnetic/ radiometric survey was flown to locate similar magnetic features over E.L. 7/74 and other adjacent licences. The helicopter-borne survey was carried out by Geometrics International Corp. using 250 m line

spacings and a 100 m detector clearance. Several promising anomalies were detected and these have now been investigated.

At Tin Spur a possible low grade tin-gold occurrence had been outlined by Comalco. Numerous other small gold shows are present throughout the licence, and some of these areas may have similar potential to the Tin Spur/Devonian area.

The Cambrian volcanics at Black Bluff are known to host volcanogenic Pb/Zn mineralization. The Black Bluff/Smiths Plains area and various other windows of Cambrian rocks require further investigation to determine their potential.

The areas of Gordon Limestone may be prospective for Irish style Pb, Zn deposits. Numerous small Pb, Zn, Ag vein-type deposits occur and significant Zn mineralization is present at the Shepherd and Murphy prospect. Major north-south and north-west structures through the area have been active since at least the beginning of the Ordovician and these may have controlled the upward flow of metal bearing fluids.

Regional and local stream sediment sampling has been carried out. Samples have been analysed for tin/tungsten as well as for copper/lead/zinc style mineralization. Comalco carried out two main regional surveys over the area; one using -20# stream sediments and a second more localized survey using -80# stream sediments. Other localized surveys were also carried out. Several anomalies detected during these surveys have not yet been investigated.

6.0 SHEPHERD & MURPHY AREA

6.1 General

An area of approximately 8 sq km around the old Shepherd and Murphy workings was gridded by Comalco. Soil geochemistry, ground magnetics and IP/MIP surveys and diamond drilling were carried out over the area. This work indicated a resource of 26×10^6 tonnes at 18% CaF_2, 0.1% Sn and 0.1% W. (P.W. Askins 1978 and 1979).

6.2 Geology

6.2.1 Lithology - An east-west trending syncline of Ordovician Moina Sandstone overlain by Gordon Limestone forms the core of the region. (Refer plan D/MZ 01/062). The Moina Sandstone sometimes including the Roland Conglomerate at its base, unconformibly overlies Cambrian Volcanics. These units have been intruded by the Devonian Dolcoath Granite, the apparent source of Sn, W and basemetal mineralization. Tertiary basalt covers most of the area and occassionally has Tertiary gravels and soils at its base.

The Gordon Limestone, is up to 200 m thick at Moina and appears well-bedded with thin, 5 - 10 cm possibly bio-turbated silty bands. Magnesium content is low, being less than 3%. The limestone is probably a tidal flat facies and is separated from the underlying Moina sandstone by a 10 m thick silty transition zone.

The Gordon Limestone and transition zone has been extensively metasomatized/replaced. The metasomatic fluids appear to have been introduced along numerous fine fractures throughout the Moina Sandstone/quartzite. These fractures were probably produced by the intrusion of the granite and/or fluid pressure from the granite. The fractures have various vein fillings consisting of (1) amphibole-biotite-muscovite (2) fluorite-sanidine-adularia-scheelite (3) sanidine-adularia-fluorite-biotite and (4) calcite-amphibole (5) greisen veinlets (6) quartz-wolframite. The fluorite rich veins generally have a magnetite-diopside selvedge. These veins show, in places, selective replacement of the limestone. Massive wrigglite zones can be separated by almost unreplaced beds (generally $<$ 10 cm thick) but joined by fracturing/veining. Replacement in some places obviously proceeds from the veining outwards.

A fairly regular stratigraphic succession is recognized through the main skarn development. From the top down this is relatively unaltered limestone, passing into garnet skarn,

wrigglite-magnetite skarn, garnet-magnetite skarn, garnet skarn, pyroxene (diopside) skarn (in the Transition zone) and quartzite in the Moina Sandstone. Thin section descriptions of the various rock types are included in Appendix 2.

The wrigglite (laminar skarn) consists generally of fine to ultra fine (<5 - 100 micron) granular to subhedral and locally fibrous magnetite, fluorite and vesuvianite with less common phlogopite, hedenbergite or garnet substituting for vesuvianite. These are present in near-equant proportions, with sub - to fine millimetric scale compositional banding. Magnetite stains the vesuvianite/phologopite bands and grades into semi-to near-massive laminae. Fluorite bands are relatively massive. Banding is of crudely crustiform to nodular in character. The wrigglite is often extensively retrogressively altered. The magnetite is martitised, ambhiboles are altered to chlorite and garnet to ankerite. The characteristic texture of the rocks is thought to be caused by F rich metasomatic fluids in a mechanism similar to that which produces Liesegang rings. However, at low fluorine values (<9% F) a granular magnetite-hedenbergite (phologopite)-fluorite rock is produced.

The pyroxene skarn consists mainly of fine grained diopside-hedenbergite with very minor amounts of fluorite and garnet. In the garnet(vesuvianite-fluorite) skarn, the garnet is andradite-gossularite. The pyroxene interstitial to and occurring as inclusions throughout garnet is diopside-hedenbergite with Fe-rich hornblendic amphibole and epidote. Interstitial fluorite and adularia also occur, occassionally with the epidote and calcite.

Another skarn type, of limited extent, is a wollastonite skarn which is useful in places as a local marker. This skarn is possibly a sandy facies of the limestone and it consists mainly of wollastonite with lesser amounts of garnet, pyroxene, vesuvianite and fluorite.

Other skarns of potential economic importance fringing the main skarn zone are a pyrrhotite-bearing skarn and a sphalerite-rich skarn.

The pyrrhotite skarn consists of medium to coarse grained pyrrhotite, magnetite, fine grained actinolite? and chlorite? and minor very fine grained fluorite. It has an irregular, wispy, banded texture.

The sphalerite skarn consists essentially of granular (mean diameter 500 micron) to massive grossular andradite with subordinate to minor included and intergranular diopside. Sphalerite is conspicuous in bands of closely spaced, semicontinuous lenses with subordinate, closely associated pyrite. The sphalerite forms spongy, intergranular aggregates interspersed with granular diopside, garnet and relatively abundant quartz, chlorite and carbonate. Retrogressive alteration has produced chlorite, clinozoisite and siderite.

The Moina Sandstone is a sequence of clean quartz sandstones, pyritic sandstones, conglomerates, shales and siltstones with an occassional interbedded limestone lense. Bedding is well developed in part but may be disrupted by burrowing organisms to form a tubicular sandstone. The Moina Sandstone is up to 300 m thick in the area and passes conformably up from Roland Conglomerate. It has been metamorphosed into a quartzite below the Moina skarn and is extensively fractured.

The Roland Conglomerate is a dense recrystallized quartz conglomerate composed of subrounded quartz, quartzite and quartz schist in a fine grained siliceous matrix. It has generally, though not always, a pink colouration due to finely divided haematite. The conglomerate unconformably overlies the Cambrian volcanics.

The Cambrian volcanics are only exposed in the southeast of the gridded area and they have been poorly investigated. They consist of a sequence of acid to intermediate lavas, tuffs and intrusives.

The Devonian Dolcoath Granite intrudes into the base of the Moina Sandstone. The granite is exposed three kilometers to the east of the Moina skarn area but has been intersected at approximately 150 m below the skarn in several drill holes. The unaltered granite has an average composition of K-feldspar 40%, quartz 35%, plagioclase 20%, biotite 5% with accessory fluorite and zircon. The granite in drill core from the old mine area consists of 60% quartz, 20% white mica, 1% brown biotite, 20% orthoclase, 8% digoclase and accessory fluorite, pyrite, rutile and heamatite.

Greisen, developed at the top of the granite beneath the skarn area, consists largely of quartz and mica, fluorite, pyrite and very minor amounts of sphalerite.

Tertiary basalt and soils constitute most of the outcrop at Moina covering the main limestone basin to depths of upto 90 m.

6.2.2 Structure - The major structure at Moina is the Bismuth Creek Fault (BCF) an NW trending, apparently dextral strike slip fault. East-west tension fractures, possibly associated with movement along the BCF, have been infilled with quartz-cassiterite-wolframite veins.

A thrust fault, Hugo's Fault, is recognized on the east side of the BCF and it has superimposed Moina Sandstone over Gordon Limestone. This fault has been displaced by several N-S trending normal(?) faults which form a conjugate set to the BCF. Neither Hugo's Fault nor the N-S set are recognized to the west of the BCF.

The Shepherd and Murphy area is a preserved section of Gordon Limestone in an east-west trending syncline. Superimposed on this east-west trend are a series of minor folds almost parallel to the BCF. These drag folds, known only from drilling results, appear to decrease in amplitude away from the immediate mine area and are not recognized 500 m to the northwest in the centre of the main syncline.

The intersection of the Bismuth Creek fault and the east west trending fracture system is a weakened zone up which a cupola from the Dolcoath Granite was able to intrude.

6.2.3 Mineralization - Skarn and vein type mineralization throughout the area appears to be related to the Dolcoath Granite intrusion.

The main ore production, both past and present, has been wolframite and cassiterite from quartz veins with east west strike, hosted mainly in the Moina Sandstone, but also in the Cambrian volcanics (Shepherd and Murphy, All Nations, Pig and Whistle, Iris Mines). This veining is of limited extent, and has not been a target of the present investigations.

The main mineralization of interest to Shell are the skarns around the Shepherd and Murphy Mine area and minor thin skarns at the Stormont Mine (Bi - Au), Fletcher's Adit (Bi) and the Iris River - Ti-Tree Creek area (pyrite). The skarns have been produced by the addition of significant quantities of Si, Al, Fe^{2+}, Fe^{3+}, Mg, Na, K, S, H_2O and F into reactive Gordon Limestone. Minor element additions have been Sn, W, Zn, Bi, Cu, Mo, Be, Au.

Sn and W show an apparent concentric zonation around the BCF and the Shepherd and Murphy Mine, with values decreasing away from the mine area.

Tin occurs in solid solution in garnet (upto 0.70 weight percent), in Sn-sphene and as cassiterite. The cassiterite is generally very fine grained (<15 microns) in the magnetite-rich layers in the laminar wrigglite skarn. Coarser grained (20 microns) cassiterite has been reported from chlorite rich areas. These chloritic zones are thought to be due to recrystallization associated with shearing close to the BCF.

Tungsten occurs mainly as wolframite in quartz veins, as coarse grained scheelite associated with feldspar veining, and as very finely disseminated scheelite/powellite in the wrigglite. Occassional replacement of wolframite by scheelite is observed in the various veins.

Zinc occurs as coarse grained sphalerite in a garnet/garnet-diopside skarn. Minor patchy occurrences of sphalerite of upto 5% Zn grade are also present in the wrigglite.

6.3 Exploration Targets

Three types of targets were originally sought:

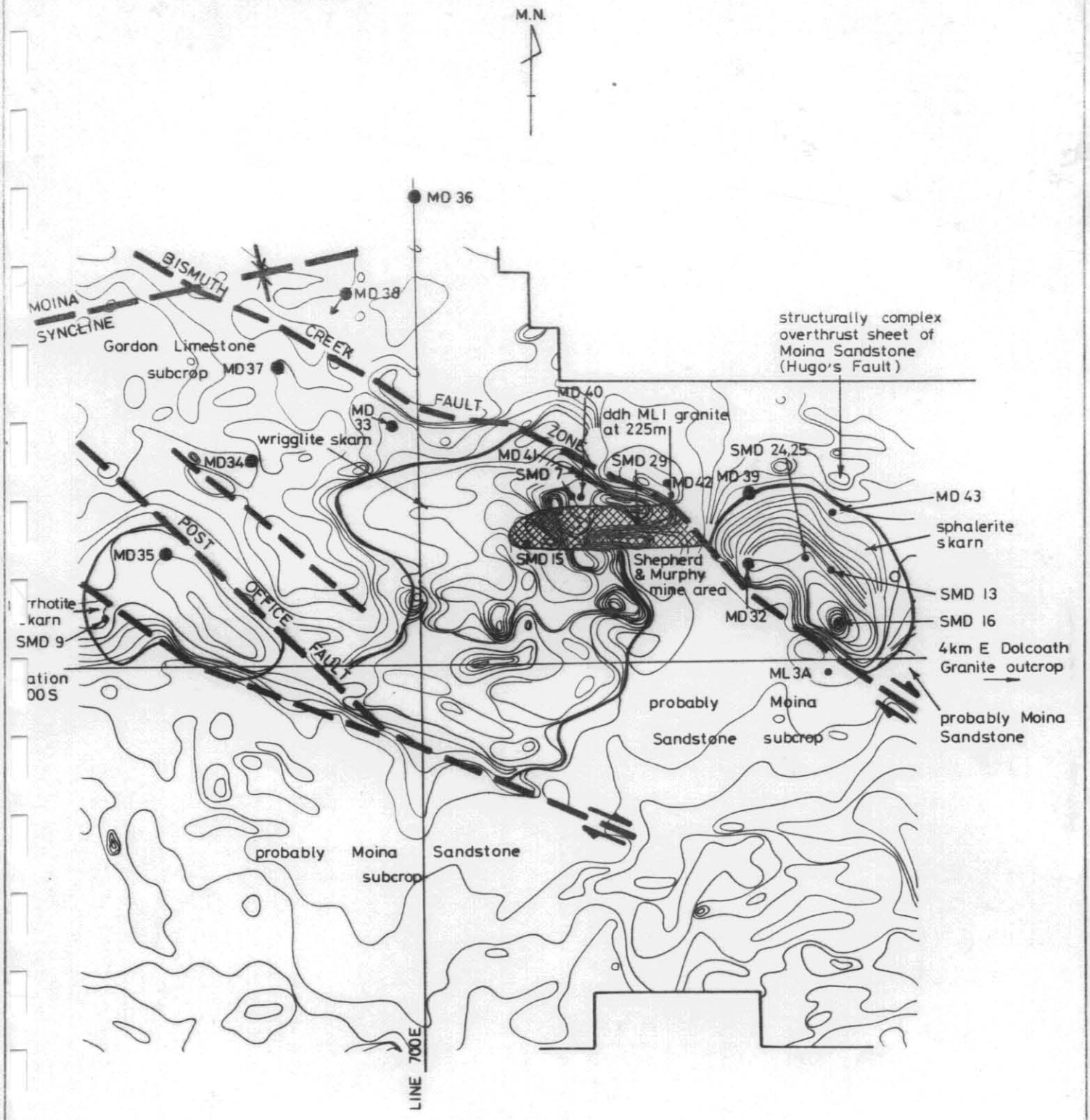
1) Skarn replacement of limestone with tin/tungsten enrichment - specifically a fringing pyrrhotite body (extensions of the pyrrhotite skarn intersection in hole SMD 9), higher grade wrigglite sections and extensions of the sphalerite skarn.

2) Stockwork or sheeted development of feldspar veins containing coarse scheelite mineralization along a preferred orientation. This was thought to be east-west similar to the main Shepherd and Murphy quartz veins.

3) Stockwork or greisen development at or near a granite contact.

A programme of 2050 m of diamond drilling was proposed to test these targets.

806026



5 cm

0 500m

Stockwork scheelite target

Gordon Limestone

Skarn (at base of limestone)

Moina Sandstone

○ Proposed Shell drill hole

● Completed Shell drill hole

The Shell Company of Australia Limited
METALS DIVISION

MOINA

GEOLOGY GROUND MAGNETICS AND DRILLING PROGRESS

Scale 1:10,000

FIG. No. 2	REPORT No
ENCL. No	DRG. No D/MZ01/032
DATE 22-7-80	AUTHOR I.J.B.
DRAWN O HEDDITCH	TRACE DEVONPORT

6.4 Investigations Completed

6.4.1 Gridding

Minor extensions were made to the previously established Comalco grid in the north east of the area. This was to cover the full extent of the major limestone-filled syncline, and also to cover possible extensions of magnetic skarn beneath Hugo's Fault. A total of approximately 7550 m was cut and pegged as additions (Refer plan D/MZ 01/062).

Two, three kilometre lines were cut at 41° (Mag.) across the central part of the syncline. Line 1 had as an origin at 1000 N at hole SMD 9 and Line 2 has as an origin at 1000 N at hole SMD 14. Work undertaken on these two lines is reported separately in Section 6.4.6 as Trial Line Geophysics.

6.4.2 Ground Magnetics

Ground magnetic surveys were redone over most of the eastern half of the grid, which includes the major skarn areas. An automatic base station magnetometer was used as a control. No significant changes were made to the magnetic contour plans produced by Comalco.

Readings were taken at 25 m intervals except in areas of high gradient, where spacings were cut down to better define contour intervals. Data is recorded on data sheets for computer processing and on plan D/MZ 01/110.

Ground magnetic surveys were done over extensions to the grid to the north and east of the mine area. No areas of anomalous magnetism were indicated. Readings were taken at 25 m spacings on lines 100 m and 50 m apart. All magnetic surveys were done with a Proton Precession Magnetometer on hire from Geometrics, using a 2.5 m sensor height.

The ground magnetic contour maps have been used in an attempt to indicate the possible trends of faults in the area. The Bismuth Creek Fault is well defined and a parallel set of faults (Post Office Fault, Brampton Creek Fault) are indicated to the west of the BCF. To the east of the BCF a possible series of north-south faults, also indicated by diamond drilling, are apparent.

6.4.3 Diamond Drilling

A total of 2059.70 m of drilling has been completed in 11 holes since 4/7/80. The holes were sited on those recommended in the original Joint Venture proposal and by subsequently located targets. (Refer plan D/MZ 01/062).

Drill holes were all vertical, except for holes MD 38, 40 and 41. A fence line of holes was drilled northeast from SMD 9 to test this area for fringing pyrrhotite skarns. These holes were MD 34, 35, 36, 37 and 38. Two holes, MD 32 and 42 were drilled to test the mineralization adjacent to and to the east of the BCF. Two angled holes MD 40 and 41, were drilled to test for the presence of a scheelite-rich sheeted vein system in the main wrigglite area. Another hole, MD 33, was drilled to test for fringing sulphide mineralization to the west of the BCF.

A brief summary of the results from the drilling is as follows:

MD 32 was collared at 1300E/035S to the east of the BCF to intersect possible high grade wrigglites beneath Hugo's Fault adjacent to the BCF. (Refer plans D/MZ 01/043 and 048.

FROM	TO	CORE LENGTH(m)	LITHOLOGY
0.0	11.1	11.10	Surface rubble (basalt and Moina Sandstone).
11.1	16.0	4.90	Garnet-diopside-chlorite skarn.
16.0	31.0	15.00	Strongly sheared and brecciated zone (Hugo's Fault).
31.0	100.7	69.70	Wrigglite and magnetite skarns, brecciated, altered and veined. Veining changes from biotite-fluorite at depth up through feldspar, pyritic-quartz, and talc near surface. This zonation probably reflects a temperature gradient - reactive host control on vein mineralogy.
100.7	115.0	14.30	Calc silicate rocks (Transition zone).
115.0	152.4	37.40	Moina Sandstone.

Summary assays from this hole are detailed below:

INTERVAL(m)	CORE LENGTH(m)	ASSAY	LITHOLOGY
61.44- 65.08	3.64	11.0 g/t Ag	Pyritic quartz vein breccia.
28.31- 95.67	67.36	0.21% Sn	Wrigglite & garnet wrigglite.
70.17-100.14	29.97	0.11% W	Garnet wrigglite, fractured with sanidine veining.
129.00-141.56	12.56	0.03% Mo	Molybdenite veining in quartzite.

Subsequent petrological work (C.M.S. Report 80/11/48; Report by T. Kwak) has shown that in the chlorite-rich zones, most of the tin values occur as discrete fine (< 20 micron) cassiterite crystals.

MD 33 was collared at 650 m E/222 m N to test for possible fringing sulphide zones between SMD 10 and the BCF. (Refer plan D/MZ 01/047, 118).

FROM	TO	CORE LENGTH(m)	LITHOLOGY
0.00	44.40	44.40	Tertiary Basalt.
44.40	50.86	6.46	Tertiary mudstone.
50.86	78.91	28.05	Limestone.
78.91	86.99	8.08	Limestone with minor patches of skarn.
86.99	89.56	2.57	Wrigglite.
89.56	93.55	3.99	Garnet-diopside skarn.
93.55	94.19	0.64	Wrigglite.
94.19	96.17	1.98	Garnet-diopside skarn.
96.17	100.11	3.94	Garnet-diopside/magnetite-biotite skarn.
100.11	103.24	3.13	Garnet skarn.
103.24	104.21	0.97	Magnetite-chlorite skarn.
104.21	132.60	28.39	Diopside $\pm$feldspar $\pm$biotite skarn.
132.60	139.80	7.20	Moina Sandstone quartzite.
139.80	141.15	1.35	Qtz-talc-chlorite skarn.
141.15	163.60	22.45	Moina Sandstone quartzite.

Summary assays from this hole are as follows:

INTERVAL(m)	CORE LENGTH(m)	ASSAYS	
		Sn ppm	W ppm
88.00 - 104.21	16.21	1185	350
139.80 - 141.15	1.35	55	6900

This hole indicated a slight thinning of the skarn sequence to the north from the main wrigglite zone, a decrease in grade and a thickening of the overall limestone unit. No significant sulphide skarn was found.

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MD 34 was collared at 400 m E/175 m N to test for fringing sulphides between SMD 9 and the BCF. (Refer plans D/MZ 01/045, 117, 130, 132).

FROM	TO	CORE LENGTH(m)	LITHOLOGY
0.00	23.95	23.95	Tertiary basalt and mudstone.
23.95	28.20	4.25	Extremely weathered limestone.
28.20	91.88	63.68	Limestone. Minor cave-fill. Pyritic between 59.70 - 61.50m.
91.88	93.55	1.67	Calcareous quartzite.
93.55	140.89	47.34	Limestone. Muddy 96.10 - 99.39. Minor sandy bands in places.
140.89	142.83	1.94	Quartz-actinolite-garnet (minor) skarn.
142.83	143.60	0.77	Garnet-rich skarn.
143.60	150.47	6.87	Limestone. Minor sandy bands.
150.47	154.07	3.6	Garnet-talc skarn.
154.07	160.05	5.98	Interbanded wrigglite and garnet-diopside skarn.
160.05	161.25	1.2	Wrigglite.
161.25	196.00	34.75	Diopside $\pm$quartz, biotite, chlorite skarns. Quartzite between 186.5 - 192.0m.

Summary assays for this hole are as follows:

INTERVAL(m)	CORE LENGTH(m)	ASSAYS	
		Sn ppm	W ppm
150.47 - 161.25	10.78	1065	480
170.00 - 172.00	2.00	22	1650

No significant sulphides were found and the skarn sequence thinned noticably from SMD 9.

MD 35 was collared at 240 m E/008 m N to investigate the extent of pyrrhotite skarn to the east of SMD 9. (Refer plans D/MZ 01/071, 114, 130, 132).

FROM	TO	CORE LENGTH(m)	LITHOLOGY
0.00	4.00		No recovery.
4.00	95.75	91.75	Limestone. Massive to banded.
95.75	100.65	4.90	Limestone with calc-silicate (garnet rich) skarn bands.
100.65	101.40	0.75	Interbanded garnet skarn & wrigglite.
101.40	107.00	5.60	Wrigglite with minor garnet $\pm$diopside $\pm$chlorite skarn. Contains trace to <10% pyrrhotite $\pm$pyrite.
107.00	109.34	2.34	Diopside $\pm$garnet $\pm$magnetite $\pm$chlorite skarn.
109.34	110.45	1.11	Garnet-magnetite-chlorite $\pm$fluorite skarn.
110.45	111.68	1.23	Wrigglite with trace to 10% pyrrhotite $\pm$pyrite.
111.68	118.79	7.11	Interbanded wrigglite and diopside $\pm$magnetite $\pm$chlorite $\pm$garnet skarn with 1-2% pyrite.
118.79	124.06	5.26	Interbanded wrigglite, magnetite-bearing skarn, calc-silicate skarn & diopside-rich skarn.
124.06	147.00	22.95	Diopside-rich skarns ("Metasiltstones"). ?Fault at 137.4 m.
147.00	158.00	11.0	Diopside skarn.
158.00	161.4	3.4	Moina Sandstone quartzite.

Summary assays from this hole are as follows:

INTERVAL(m)	CORE LENGTH(m)	ASSAYS	
		Sn ppm	W ppm
100.65 - 124.05	23.40	1180	1035
141.00 - 143.00	2.00	110	3000
153.75 - 154.70	0.95	95	1300

Only minor sulphides were encountered although Sn, W grades were better than in SMD 9. The massive pyrrhotite of SMD 9 does not appear to extend very far to the north east.

MD 36 was collared at 699 m E/648 m N on the east side of the BCF to obtain stratigraphic information on the east side of the BCF in an area which was thought to be an extension of the main limestone basin. (Refer plans D/MZ 01/094, 095).

FROM	TO	CORE LENGTH(m)	LITHOLOGY
0.00	60.00	60.00	Interbanded Basalt and variably lignitic mudstone (Tertiary).
60.00	101.70	41.70	Limestone; variably weathered with minor marl bands.
101.70	107.50	5.80	Limestone with garnet $\pm$diopside $\pm$calcite $\pm$?pyrite (relict) skarn bands.
107.50	116.50	9.00	Variably calcareous & carbonaceous mudstone with minor calc-silicate skarn. Largely cave-fill(?)
116.50	119.50	3.00	No recovery.
119.50	122.20	2.70	Variably carbonaceous mudstone. Cve-fill(?)
122.20	123.00	0.80	Limestone.
123.00	125.25	2.25	Variably calcareous/carbonaceous mudstone with minor garnet skarn. Largely cavefill(?)
125.25	144.10	18.85	Garnet skarn (mostly strongly weathered) with mudstone/siltstone sections (cavity filling).
144.10	153.20	9.10	Interbanded garnet skarn & diopside $\pm$quartz skarn ("Metasiltstone").
153.20	158.62	5.42	Diopside-quartz-feldspar $\pm$garnet $\pm$?vesuvianite skarn.
158.62	159.80	1.18	Limestone.
159.80	170.50	10.70	Impure Moina Sandstone quartzite.

Summary assays from this hole are as follows:

INTERVAL(m)	CORE LENGTH(m)	ASSAYS	
		Sn ppm	W ppm
122.20 - 153.20	31.00	<20	<50

MD 36 confirmed the presence of limestone underneath basalt to the east of the BCF in the north. There was however, no economic Sn or W values and little replacement of limestone. This area is probably too far from the source of mineralizing fluids.

MD 37 was collared at 450 m E/338 m N and was drilled to test an I.P. anomaly and investigate the replaced section of the limestone between MD 34 and the BCF. (Refer plans D/MZ 01/131, 133).

FROM	TO	CORE LENGTH(m)	LITHOLOGY
0.00	18.20	18.20	Basalt, variably weathered and minor Tertiary mudstone.
18.20	144.13	125.93	Limestone, massive to banded with extensive cavities, particularly in interval 68-93 m.
144.13	144.80	0.67	Calcareous quartzite.
144.80	147.05	2.25	Diopside-quart-tremolite skarn.
147.05	153.56	6.51	Limestone with minor diopside-garnet-calcite skarn bands.
153.56	156.58	3.02	Garnet-diopside-calcite skarn with 1-5% pyrite/pyrrhotite and minor ?sphalerite.
156.58	158.68	2.10	Chlorite-garnet skarn with 1-5% pyrite/ pyrrhotite.
158.68	160.90	2.22	Diopside $\pm$garnet skarn.
160.90	163.42	2.52	Chlorite-magnetite skarn and minor wrigglite; 1-2% pyrite/pyrrhotite.
163.42	164.68	1.26	Transition zone; diopside-rich skarns.
164.68	176.60	11.92	Diopside skarn; banded to massive "metasiltstones".

Summary assays from this hole are as follows:

INTERVAL(m)	CORE LENGTH(m)	ASSAYS	
		Sn ppm	W ppm
160.90 - 163.42	2.52	1140	315

MD 37 indicated a much reduced skarn section and lower Sn, W grades than MD 34. The adjacent I.P. anomaly may be due to the extensive cave fill between 68 - 93 m depth.

806035

MD 38 was collared at 575 m E/475 m N and angled at -70° towards 215°M on the east side of the BCF and was planned to drill south west to intersect the BCF. (Refer plans D/MZ 01/131, 133).

FROM	TO	CORE LENGTH(m)	LITHOLOGY
0.00	8.00	8.00	Basalt/Tertiary sediments.
8.00	178.80	170.80	Limestone.
178.80	180.60	1.80	Wollastonite skarn.
180.60	190.75	10.15	Limestone.
190.75	194.50	3.75	Garnet skarn/marble.
194.50	195.20	0.70	Shear/garnet-diopside skarn. BCF?
195.20	214.50	19.30	Garnet/garnet-diopside skarns.
214.50	222.20	7.70	Silty sandstone. Feldspar veining.
222.20	228.00	5.80	Diopside-garnet skarn.
228.00	243.20	15.20	Metasiltstone/quartzite.
243.20	243.90	0.70	Chlorite skarn.
243.90	250.00	6.10	Metasiltstone/diopside skarn.
250.00	260.60	10.60	Metasiltstone/quartzite.

Summary assays from this hole are as follows:

INTERVAL(m)	CORE LENGTH(m)	ASSAYS	
		Sn ppm	W ppm
195.20 - 197.30	2.10	240	10

This indicated a further thinning of skarn and Sn/W mineralization from MD 37. The BCF also proved to be non-mineralized (as in holes ML 1A and SMD 29).

806036

MD 39 was collared at 1301 m E/106 m N to test possible skarn (magnetite-zinc sulphide?) mineralization below Hugo's Fault to the north of previous intersections in MD 32, SMD 13, 16. (Refer plans D/MZ 01/043, 048).

FROM	TO	CORE LENGTH(m)	LITHOLOGY
0.00	95.90	95.9	Moina Sandstone.
95.90	145.50	49.6	Roland Conglomerate.
145.50	153.40	7.9	Brecciated zone. Hugo's Fault. Meta-siltstone/hornfels. Very minor powellite in fine fractures joint surfaces associated with fine translucent quartz veining and disseminated.
154.55	166.80	2.25	Chlorite-diopside-magnetite-pyrite (10%) skarn. Powellite disseminated and in fine veining.
166.80	168.65	1.85	Garnet-diopside skarn.
168.65	190.80	22.15	Garnet-diopside-magnetite skarn. The magnetite apparently replaces the garnet-diopside skarn adjacent to fractures.
190.80	194.65	3.85	Magnetite-chlorite skarn. Powellite more plentiful in this section.
194.65	202.00	7.35	Mixed, banded zone of garnet-diopside skarn/ magnetite-biotite skarn.
202.00	222.60	20.60	Garnet-diopside skarn.
222.60	232.40	9.80	Mixed zone of diopside-garnet/garnet diopside skarns.
232.40	241.00	8.60	Garnet-diopside skarn.
241.00	243.15	2.15	Magnetite-diopside skarn/wrigglite with upto 5% sulphide-pyrite.
243.15	260.40	17.25	Diopside/diopside-garnet skarns/metasiltstone.

Summary assays from this hole are as follows:

INTERVAL(m)	CORE LENGTH(m)	ASSAYS	
		Sn ppm	W ppm
176.00 - 193.00	17.00	1150	220
193.00 - 202.00	9.00	770	130

This hole suggested a large syncline of skarned limestone may occur to the north of previously recognized mineralization, below Hugo's Fault. This drill hole suggested the possibilities of major tonnages of skarn to the east of the BCF.

MD 40 was collared at 975 m E/100 m N angled at -45° towards 210° M to investigate the economic potential of a suspected sheeted EW system developed in the wrigglite zone. (Refer plans D/MZ 01/068,107).

FROM	TO	CORE LENGTH(m)	LITHOLOGY
0.00	13.90	13.90	Rubble. Wrigglite.
13.90	20.00	6.10	Wrigglite/magnetite-chlorite skarn.
20.00	21.00	1.00	Quartzite. Chlorite-magnetite fractures.
21.00	23.50	2.50	Wrigglite, magnetite-chlorite skarn
23.50	24.50	1.00	Garnet skarn/chlorite-magnetite skarn/quartzit
24.50	85.40	60.90	Wrigglite/magnetite-chlorite skarn.
85.40	91.10	5.70	Breccia-shear zone (epidote).
91.10	95.50	4.40	Diopside/diopside-garnet skarn.
95.50	97.30	1.80	Garnet skarn.
97.30	119.00	21.70	Magnetite-garnet skarn (epidote).
119.00	123.70	4.70	Interbedded garnet-diopside/diopside skarns.
123.70	125.10	1.60	Magnetite-chlorite skarn.
125.10	126.40	1.30	Garnet-diopside/diopside skarn.
126.40	143.80	17.40	Diopside skarn/metasiltstone.
143.80	157.00	13.20	Quartzite/metasiltstone/diopside skarn.

Feldspar/feldspar quartz veining is best developed in the wrigglite section, with the highest density of veins in the sections between 37 m - 47 m, 63 m - 67 m and 77 m - 82 m. The major occurrences of scheelite were from 37 m - 47 m and 77 m - 80 m.

Summary assays from this hole are as follows:

INTERVAL(m)	CORE LENGTH(m)	ASSAYS	
		Sn ppm	W ppm
10.00 - 88.80	78.80	1525	1120
18.70 - 49.40	30.70	1585	1330
56.10 - 56.60	0.50	2300	5400
81.60 - 81.90	0.30	1000	5850
86.50 - 88.80	2.30	550	3200
112.90 - 113.20	0.30	260	2750

No well developed sheeted or stockwork vein system was intersected. The scheelite is present in irregular feldspar veins, quartz veins, quartz-feldspar veins, along minor joints and fractures and as very finely disseminated powellite. The two best values are associated with coarse-grained wolframite/scheelite in feldspar veins.

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MD 41 was collared at 975 m E/153 m N and angled at -45° towards 210°M to investigate the presence of the scheelite-bearing veins at depth below MD 40. (Refer plans D/MZ 01/068,107).

FROM	TO	CORE LENGTH(m)	LITHOLOGY
0.00	9.80	9.80	Rubble, Wrigglite.
9.80	28.50	18.70	Wrigglite/magnetite-chlorite skarn.
28.50	29.50	1.00	Magnetite-garnet skarn.
29.50	70.50	41.00	Garnet/garnet-diopside (chlorite) skarn.
70.50	75.60	5.10	Garnet skarn with numerous mag-chl. veins.
75.60	84.00	8.40	Garnet/garnet-diopside skarn.
84.00	92.00	8.00	Garnet-magnetite-chlorite-epidote skarn.
92.00	93.00	1.00	Wrigglite.
93.00	111.00	18.00	Garnet-chlorite-magnetite skarn.
111.00	124.00	13.00	Diopside-garnet skarn/metasiltstone.
124.00	150.70	26.70	Quartzite with minor diopside skarn.

The feldspar/feldspar-quartz veining was again best developed in the wrigglite from 21 m to 27 m. Outside the main wrigglite zone, veins occur from one to several metres apart. There appears to be a vague succession of veins going down the hole from feldspar to feldspar-quartz (mainly in wrigglite) to quartz-magnetite-chlorite to quartz-mica -(magnetite)-(wolframite). The quartz-mica veins are best developed in the magnetite-chlorite-garnet skarn.

Summary assays from the hole are as follows:

INTERVAL(m)	CORE LENGTH(m)	ASSAYS		
		Sn ppm	W ppm	Mo ppm
0.00 - 28.50	28.50	1560	820	
21.00 - 23.00	2.00	1375	1775	
27.00 - 28.50	1.50	1585	1820	
48.00 - 49.10	1.10	460	2650	
57.70 - 59.20	1.50	340	4800	
97.60 - 98.60	1.00	490	3800	1500
101.00 - 103.30	2.30	195	9570	
113.60 - 116.20	2.60	125	5550	

Drill holes MD 40, 41 have changed the inferred structure of the main outcropping wrigglite. It now appears that the folds are more open than previously thought. There is no discrete, recognizable, intense zone of feldspar veining and the feldspar veins die out at depth below the main wrigglite/garnet-magnetite mineralization

MD 42 was collared at 1170 m E/97 m N just east of the BCF to intersect the wrigglite skarn below Hugo's Fault. It was hoped this zone would have higher grade mineralization than holes further away from the fault. (Refer plans D/MZ 01/109, 145).

FROM	TO	CORE LENGTH(m)	LITHOLOGY
0.00	137.00	137.00	Moina sandstone.
137.00	143.00	6.00	Hugo's Fault with mainly broken Moina Sandstone and quartz veining.
143.00	158.00	15.00	Hugo's Fault with mainly broken and brecciated wrigglite, garnet skarns etc.
158.00	164.60	6.60	Wrigglite/magnetite skarn with feldspar veining.
164.60	165.60	1.00	Fractured quartzite.
165.60	174.10	8.50	Wrigglite/magnetite-chlorite skarn with feldspar veining.
174.10	177.00	2.90	Garnet-magnetite skarn. Feldspar veins.
177.00	178.50	1.50	Quartzite.
178.50	192.60	14.10	Garnet/garnet-magnetite skarn.
192.60	195.20	2.60	Chlorite-garnet-pyrite (to 10%).
195.20	199.30	4.10	Chlorite Moina Sandstone.
199.30	208.00	8.70	Moina Sandstone.

Summary assays from this hole are as follows:

INTERVAL(m)	CORE LENGTH(m)	ASSAYS	
		Sn ppm	W ppm
158.00 - 177.00	19.00	1350	475

This hole has indicated either a rapid steepening of the dip of Hugo's Fault or the presence of an additional north-south fault (indicated by magnetics) between MD 39 and MD 42. The skarn intersected did not show any notable increase in Sn, W grade.

MD 43 was collared at 1400 m E/100 m N at 90° to investigate extensions of the sphalerite skarn to the north of SMD 13 and indicate the depth to granite. (Refer plans D/MZ 01/068, 107).

FROM	TO	CORE LENGTH(m)	LITHOLOGY
0.00	80.60	80.60	Moina Sandstone. Sandstone, quartzite, tubicular sandstone, siltstone.
80.60	134.30	53.70	Roland Conglomerate. Meta conglomerate and quartzites.
134.30	136.60	2.30	Mixed zone. Conglomerate and magnetite rich metaquartzite.
136.60	136.90	0.30	Mineralized quart breccia with muscovite, siderite, chalcopyrite magnetite masses.
136.90	138.90	2.00	Sericitised sedimentary quartz breccia.
138.90			Contact - fine fracture (5mm) at 20° - pyrite chlorite/sericite in fracture.
138.90	224.55	85.65	Cambrian volcanics. Mainly f. gn. quartz porphyritic lavas or intrusives. Minor crs. gn. fragmentals. Magnetite/pyrite is present as veins and patches.
224.55			Contact - fine fracture (5mm) at 30°. Sericitic.
224.55	325.00	100.45	Moina Sandstone. Metaquartzite, occassionally mineralized by very mild metasomatism. Magnetite, pyrite, chlorite, sphalerite, chalcopyrite and garnet have been introduced.
			Granitic dyke 1 cm wide at 291.90 m.

Summary assays from this hole are as follows:

INTERVAL(m)	CORE LENGTH(m)	ASSAYS		
		Sn ppm	W ppm	Cu %
136.60 - 136.90	0.30	670	770	12.0

The presence of the apparently fault bounded block of Cambrian volcanics in this hole complicates the structure of this area to the east of the Bismuth Creek Fault. Hugo's Fault is possibly represented by the quartz breccias with minor mineralization from 134.30 m to 138.90 m. Two high angle faults, probably post dating Hugo's Fault, bound the Cambrian volcanics. Metasomatism has affected the quartz breccias, Cambrian volcanics and Moina sandstone below the Cambrian volcanics. This ~~is~~ has not introduced significant amounts of metals as elsewhere in the area.

6.4.4 Diamond Drill Hole Geophysics - Magnetic Susceptibility data has been routinely measured on all SCOA diamond drill holes. Selected drill holes from Mt. Lyell drilling (ML 3A) and Comalco (SMD 4, 5, 9, 10, 11, 13, 16 and 24) have also been tested. These results have been used in interpretation and modelling of magnetic data from the Shepherd and Murphy area and other magnetic anomalies located in the regional aeromagnetic survey. Susceptibility ranges for the various rock types are:

Wrigglite - (15 000 - 40 000) x 10^{-6} cgs units.
Pyrrhotite skarns - (10 000 - 18 000) x 10^{-6} cgs units.
Sphalerite skarn - (80 - 500) x 10^{-6} cgs units.
Garnet skarns - (1 000 - 3 000) x 10^{-6} cgs units.
Diopside skarn - (10 - 1 000) x 10^{-6} cgs units.
Moina Sandstone - (0 - 30) x 10^{-6} cgs units.
Gordon Limestone - (10 - 60) x 10^{-6} cgs units.
Basalt 0 - 300 x 10^{-6} cgs units.

Three array down hole I.P. surveys were carried out on drill holes SMD 9, MD 35, MD 38 and MD 39. Reports by Scintrex are included in Appendix 3.

A summary of the downhole results are as follows:

DDH SMD 9 : A low resistivity zone of 2 ohm m to 50 ohm m was intersected from 95 m to 105 m. Chargeabilities were not measured across this zone. This interval coincides with a magnetite - actinolite - biotite skarn occassionally rich in pyrrhotite (to 100% over 10 cm).

Other high chargeability zones of 90 m volts/volt were measured at 52.5 m and 70 m in zones of massive limestone. Resistivities however, are high at upto 1200 ohm m.

DDH MD 35 : A less resistive zone of 10 ohm m at 105 m on the $2\frac{1}{2}$ m spacings shows up on the 10 m and 20 m spacings as an internal polarization source. A magnetite-fluorite $\pm$ garnet $\pm$ chlorite skarn containing 1 - 5% pyrrhotite was intersected from 101.4 m to 107.0 m. Assays from this interval average 1000 ppm Sn and approximately 900 ppm W.

DDH MD 38 : The most significant features observed were low resistivity zones of 10 ohm m at 67 m and 105 m. Massive limestone with minor black shale bands are recorded for the zone 56.90 m to 68.6 m. From 68.8 m to 69.8 m a brecciated zone healed by quartz-calcite cement is recorded. No obvious explanation for the low resistivity is apparent at 67 m. From 105.6 m to 107.3 m a black-brown muddy limestone with minor pyrite was intersected in a section of massive limestone. No cave fill was intersected in this section.

DDH MD 39 : The most significant feature observed was a zone of low resistivity (40 ohm m) and high conductivity (110 m volts/volt) at 167.5 m which coincides with a narrow zone of chlorite - diopside - magnetite - pyrite (to 10%) skarn. Another low resistivity zone (30 ohm m) with moderate chargeability (50 m volts/volt) is associated with magnetite - chlorite skarn at 197.5 m.

Mise a la Mass/Applied Potential surveys were carried out on SMD 9 and MD 39. Reports by Scintrex are included in Appendix 3.

DDH SMD 9 : The applied potential survey indicated that the pyrrhotite mineralization was not very continuous. It appears to dip to the north towards a possible NW trending fault. The mineralization appears to be restricted to the vicinity of the borehole, as is verified by drill holes SMD 21 and MD 35.

DDH MD 39 : The applied potential survey indicated that the wrigglite - minor sulphide mineralization was very localized. The survey was strongly affected by the presence of the nearby Bismuth Creek Fault.

6.4.5 Costeans - Two costeans were dug using a Poclain-type trench digger. These were intended to expose possible feldspar veining with associated scheelite mineralization in the main wrigglite area along lines 975 E and 1100 E from 00 m to 100 m N. Difficulties with the depth of overburden and hardness of the wrigglite limited the usefulness of these trenches. (Refer plan D/MZ01/142).

Trench 975 E from 10 m N to 90 m N. The trench was cut into wrigglite/magnetite-chlorite skarn over its total length. Feldspar veins were apparent throughout, although mostly as solitary veins. A zone of more intense feldspar veining was apparent from 50 m N to 70 m N. Because of the extreme toughness of the rocks in this zone only surface boulders were exposed and no cut could be made into the underlying rock. Feldspar veins appeared to be in two main sets, (1) approximately north-south dipping 45° W and (2) east-west to north-west dipping 60° N. Lamping with the ultraviolet light indicated that scheelite was associated mainly with the second vein set.

Trench 1100 E from 15 m N to 90 m N. From 15 m N to 50 m N the trench was cut in garnet/garnet-diopside skarn, and from 50 m N to 90 m N it was cut in the overlying wrigglite/magnetite-chlorite skarn. Feldspar veins are apparent throughout but are mostly developed in the wrigglite section. No zones of intense veining were noted. Feldspar veins were in two main sets (1) north-northwest dipping 60° W and (2) east-west dipping 20° - 30° N. Scheelite is present with vein set (1) from 31 m N to 55 m N.

The scheelite distribution appeared very patchy both within a single vein and among veins of similar orientation.

Veining consists mostly of weathered feldspar although some greisen and quartz veins were seen. Beryl was noted in one quartz vein in garnet skarn.

6.4.6 Geophysical Test Lines (by N. Hungerford, Senior Geophysicist). Two diagonal lines bearing 041° M were cut through the centre of the gridded area. The lines were to test various geohysical methods for the location of sulphides and faults, which are thought to be important as conduits for mineralizing fluids from the granite. (Refer plan D/MZ01/062).

Line one was centred on drill hole SMD 9 (drilled through pyrrhotite-magnetite skarn at 100 to 124 metres depth) at 1000 m N. The line extended 1000 m to the southwest and 2000 m to the northeast. This line also included SMD 23, MD 33, 34, 37, 38 and 36 and was therefore well understood geologically. (Refer plan D/MZ01/058).

Line two was centred on SMD 14 at 1000 m N and extended 1000 m southwest and 2000 m northeast. (Refer plan D/MZ01/059).

Ground magnetic, I.P., TURAM, MAX-MIN (HORIZONTAL LOOP) E.M., VLF-EM and MMR surveys were carried out over part or all of these lines.

Ground Magnetics - Both lines were fully surveyed with Line 1 at 20 m, spacings and Line 2 at 25 m spacings. The magnetic survey along Line 1 indicated the presence of near surface magnetite (?) skarn near SMD 23 and outlined the pyrrhotite/magnetite-pyrrhotite skarns adjacent to SMD 9 and MD 35 (800 n T anomaly). The Bismuth Creek Fault (BCF) was not positively identified. Along Line 2 no major anomalies were identified, the minor

patch of wrigglite outlined in SMD 20 was indicated by a 350 nT anomaly (background of 62 000 nT). The overlying basalt was expressed generally as high frequency, low amplitude (100 - 200 nT) anomalies. (Refer plans D/MZ01/033, 034, 035, 137).

I.P. - An I.P. survey (Dipole-Dipole 100 m spacing, n = 1 to 6, IPR-8 receiver) was carried out by Scintrex from 500 m N to 2600 m N on Line 1. The survey possibly indicated the pyrrhotite skarn intersected in SMD 9 and MD 35 by isolated and non-coincident low resistivity, high chargeability anomalies. A broad area of low resistivity and high chargeability was recorded between 1600 N and 1700 N. Bore holes MD 37 and MD 38 indicate that this anomaly may be due to clays in cave fill and clays in the Bismuth Creek Fault. An area of low resistivity and high chargeability at depth between 2300 N and 2600 N may be due to pyrite in Moina Sandstone. Survey quality was not very high with frequent isolated negative chargeability anomalies, and occassional erratic resistivity values, suggesting electrode grounding problems. (Refer plan D/MZ01/138).

MAX-MIN (Horizontal loop) EM - Geoterrex carried out surveys on both lines using coil separations of 100 and 200 metres, and frequencies of 222,888 and 3555 Hz. On Line 1 the BCF was indicated by positive in-phase and quadrature anomalies. This is not the expected response from a steeply dipping conductor such as the low-resistivity clay-filled BCF could be expected to represent. However, it is possible that the response has been affected by variable thickness of the overlying clay/basalt layer, although such a layer is not obvious from the IP/resistivity results. A somewhat similar anomaly occurs on Line 1 at 500 N but its source is unknown. It is also possible to speculate from the 200 metre results that a conductor some 40 metres thick and steeply dipping to the south exists at depth beneath 700 N but this is not supported by the IP/resistivity results, and would not conform to the

known local geology which shows shallow dips. A broad surficial (?) conductor may be present between 1300 N and 1600 N and north from 1800 N. This is supported by the n = 1 results of the IP/resistivity survey, and is probably due to clay/weathered basalt layers. Resistivity values here range from 100 to 80 ohm m. (Refer plans D/MZ01/052, 053, 054, 055, 056, 057).

On Line 2 no well defined anomalies are apparent, although conductive overburden is indicated between 1800 N and 2300 N and north from 2550 N. The cause of the isolated positive in-phase anomalies on the 100 m survey at 1150 N is not known. (Refer plan D/MZ01/1064).

VLF-EM - The survey was carried out using a Phoenix receiver hired from Geoex. Measurements of dip angle and field strength were made using the Japan transmitter (17.4 Khz). Line 1 was surveyed from 600 N to 2000 N (20 m station spacing), and Line 2 the whole length (25 m station spacing). On Line 1 the BCF was apparently detected on both inclination and magnitude. However, the polarity of the latter is reversed from that expected over a steeply dipping conductor (e.g. the BCF) and the anomaly may in fact result from a pocket of resistive rock (outcropping Gordon Limestone) adjacent to conductive clay/basalt overburden. A similar anomaly occurs at 920 N but the source is unknown. The postulated Post Office Fault may be indicated by a weak anomaly at 1150 N. On Line 2 the only well defined conductor was due to a power line at 2400 N with possible weak anomalies at 100 N, 325 N, 570 N and 710 N. The BCF was not detected at the geologically postulated position of 1620 N. (Refer plans D/MZ01/140, 141).

TURAM EM - The survey was carried out by Scintrex over Line 1 from 00 N to 2500 N and over Line 2 from 00 N to 2500 N. A frequency of 400 Hz was used with a grounded cable current source. This was used instead of an inductive loop source

due to logistical problems of laying the latter. Several anomalies are evident - specifically at 150 N and 400 N (coincident with magnetic and weak Max-Min 100 m anomalies) and at 1380 N and 1520 N (conductive overburden?). Neither the Bismuth Creek Fault nor the pyrrhotite skarn are conclusively evident, with coincident typical galvanic responses. (Refer plans D/MZ01/049, 139).

MMR - The survey was carried out by Scintrex over both lines. No anomaly was conclusively detected over the BCF. The data were inconclusive with no apparent correlation to the known geology. A possible negative anomaly is present around SMD 9 and MD 35 poorly correlating with the pyrrhotite-magnetite skarn. (Refer plans D/MZ01/ 050, 051).

CONCLUSIONS - The magnetics appears to be the only method for conclusively and directly detecting the pyrrhotite/ magnetite mineralization at a depth of about 100 metres on Line 1. It must be concluded that the total amount of sulphide present is small judging by its lack of response to surface electrical methods (downhole measurements in SMD 35 show maximum chargeabilities of 40 to 70 mv/v from 82 to 122 metres with a background of less than 20 mv/v. Resistivities are the order of 1000's with a narrow zone of 10 v at 105 metres).

The IP/Resistivity survey indicated the Bismuth Creek Fault convincingly. However, the other electrical methods appear to have been very affected by the apparently conductive near surface clays in weathered basalts, so that the anomalies in general appear to indicate variations in surficial conductivity rather than bedrock conductors. This is of importance when applying the results to the planning of geophysical surveys elsewhere over basalt.

Certain anomalies as a result of these surveys do however still require a geological explanation:

Line 1 - 175N - Max-Min EM and Mag anomalies. Possible pyrrhotite skarn (no IP survey present).

370N - As above. SMD 23 does not appear to explain the anomalies which are however of limited lateral extent.

2500N - Max-Min EM and low amplitude mag anomalies. Possible coincident chargeability anomaly may be due to Moina sandstone.

Line 2 2620N - Poor Max-Min EM conductor.

6.5 ECONOMIC POTENTIAL

6.5.1 General - Three main types of targets were initially sought in the area. These were:

1. Skarn mineralization which can be divided into:
   a) Pyrrhotite skarns with free milling cassiterite as at Renison Bell.
   b) High grade wrigglite skarns.
   c) Sphalerite-rich skarns.

2. Stockwork or sheeted development of feldspar veins containing coarse scheelite mineralization.

3. Stockwork or greisen development at or near the granite contact.

It was hoped that one or a combination of two or more types of mineralization would make the area economically viable.

6.5.2 Skarn Mineralization - Pyrrhotite skarn - The initial target at Moina was the possibility of a pyrrhotite - cassiterite replacement/skarn fringing the known wrigglite skarn. The known pyrrhotite mineralization intersected in SMD 9 was an encouraging discovery. It was thought that the pyrrhotite may represent a lower temperature facies of the magnetite skarns occurring at a greater distance

from the mineralizing granite cusp below the Shepherd and Murphy area. Recent information from Renison, Cleveland and Mt. Bischoff indicate that magnetite rich skarns occur below the sulphide mineralization, closer to the mineralizing source (various offshoots of the Meredith Granite).

Diamond drill hole MD 33 and a fence line of holes MD 35, 34, 37, 38 and 36 were drilled to test this possibility. The "fence-line" had as its origin SMD 9, was aligned NE and thoroughly tested a 1000 m width of the main Moina limestone basin. (Refer plans D/MZ01/058, 130, 131, 132, 133). Minor pyrrhotite was intersected in MD 35 and traces occur in MD 34, 37 and 38. Total mineralization decreased from MD 35 to MD 36, and Sn and W grades also decreased to the NE. MD 36 indicated a shallowing of the limestone basin to the east of the Bismuth Creek Fault. Previous drilling and geological mapping indicate the basin shallows to the SW of SMD 9.

Various geophysical techniques were tried along two lines through the centre of the limestone basin remaining available for exploration. The northern part of the basin is covered by Lake Gairdner. One line, Diagonal Line 1, was pegged along the line of drill holes, extending SW from SMD 9 for 1000 m and NE from SMD 9 for 2000 m. Diagonal Line 2 was pegged approximately parallel and 300 m to the NW, centred on SMD 14 and extending 1000 m SW and 2000 m NE from that point. The geophysics was originally done to find massive sulphides and faults, which may act as conduits for mineralizing solutions, such as the Bassett-Federal Fault at Renison.

Ground magnetics, IP, TUREM, MAX-MIN (Horizontal loop), EM, VLF-EM and MMR surveys were carried out (Refer section 6.4.6 this report). No anomalies were detected which need to be further drill tested. The few anomalies detected coincide with known mineralization.

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These surveys provided good coverage over the main limestone basin, and indicate that no major sulphide bodies remain to be tested in the limestone area.

Drill Hole MD 33 (Refer plans D/MZ01/047, 118) to the north of the main wrigglite body and to the east of the pyrrhotite intersection in SMD 9, contained no pyrrhotite mineralization. This hole indicated a progressive thinning of the skarned zone away from the main area tested by previous drilling.

There appears to be no major fringing or dislocated sulphide skarn near the Shepherd and Murphy area. Drilling results indicate a gradual thinning of wrigglite skarn and sulphide away from the Shepherd and Murphy Mine area (granite cusp at highest point) except around SMD 9 and MD 35 where apparent fracturing has allowed a slight increase in mineralization.

High grade wrigglite skarn. The possibilities of an enriched area of tin/tungsten mineralization adjacent to the BCF in the Shepherd and Murphy area was tested by drill holes MD 32 and MD 42. Both holes were drilled on the east side of the BCF and intersected mineralization below Hugo's Fault. Comalco drill holes SMD 16 and SMD 24 may also be included in this zone, approximately 50 m wide to the east and parallel to the BCF. (Refer longitudinal section - plan D/MZ01/099).

Free cassiterite (20 micron) was reported in petrological reports from chloritized sections of MD 32. Petrological reports on core from SMD 16 do not indicate free cassiterite. (Refer Appendix 2).

Hole MD 42 indicates that either Hugo's Fault dips steeply to the northwest, north of MD 32 or, more likely, a north-south striking fault is present between MD 32 and MD 42 as indicated by the ground magnetics. This gives a strike extent of near surface mineralization of approximately 400 m. An additional fault is interpreted from the magnetics, between MD 32 and SMD 24.

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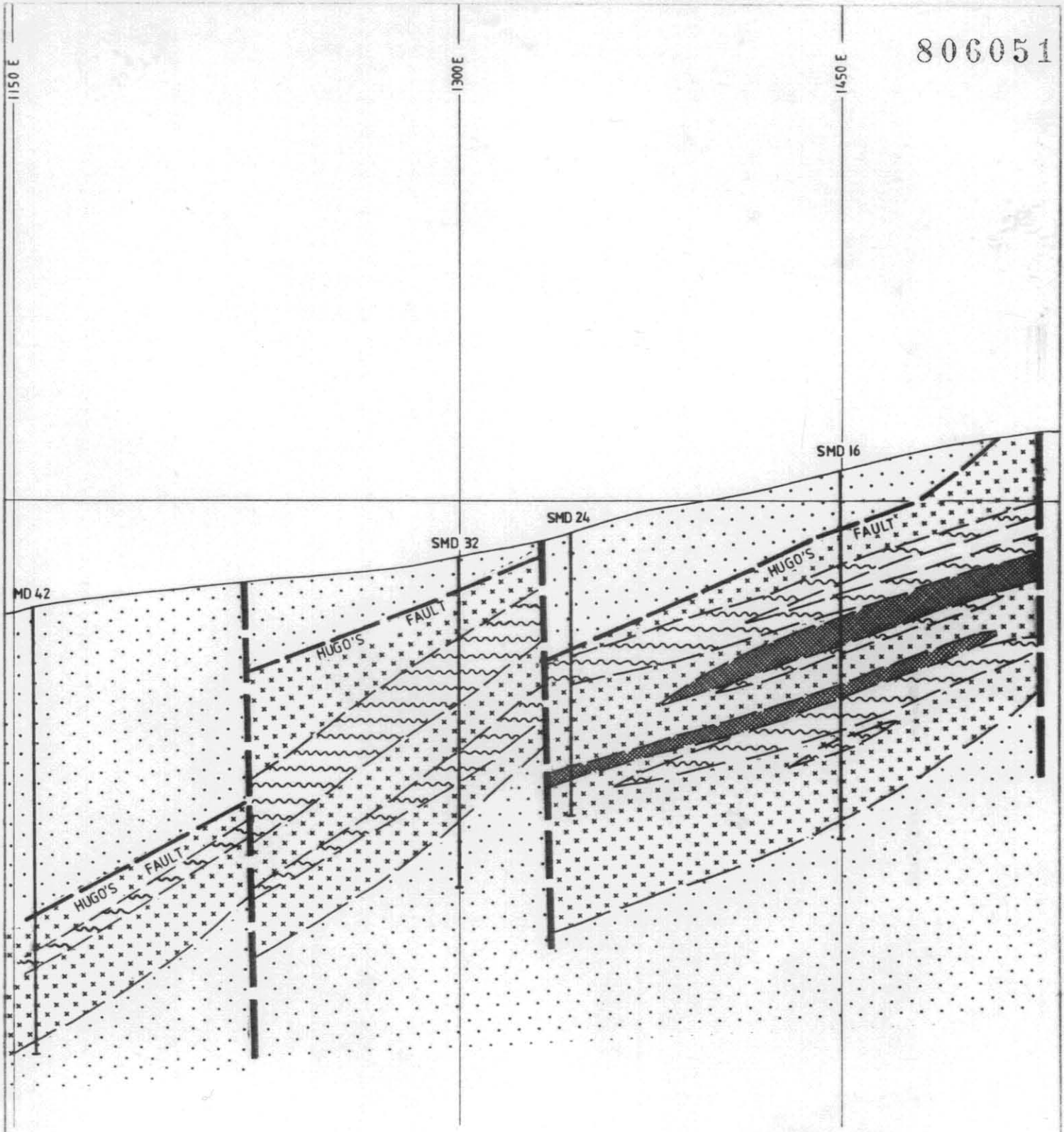

LEGEND

- Moina Sandstone
- Wrigglite
- Sphalerite skarn
- Calc-silicate

0 100 M

5 cm

The Shell Company of Australia Limited
METALS DIVISION

MOINA

NW-SE SECTION PARALLEL
BISMUTH CREEK FAULT
STRUCTURE

Scale 1:2,500

FIG. No.	3	REPORT No.	
ENCL. No.		DRG. No.	D/MZ 01/099
DATE	1-6-81	AUTHOR	W.D.S
DRAWN	O.H	OFFICE	DEVONPORT

Grades and mineralization thickness are indicated from drill hole assays:

SMD 16 - From 28.10 - 65.50 m (37.4m) at 1150 ppm Sn, 855 ppm W
SMD 24 - From 94.10 - 138.25 m (44.15m) at 1700 ppm Sn, 770 ppm W
MD 32 - From 28.31 - 95.67 m (67.36m) at 2100 ppm Sn, 515 ppm W
From 70.17 - 100.14 m (29.97m) at 1500 ppm Sn, 1100 ppm W
MD 42 - From 158.0 - 177.00 m (19.00m) at 1350 ppm Sn, 475 ppm W

A rough calculation of the tonnage potential of skarn material close to surface (excluding the deep MD 42 intersection) suggests about 2.8 million tonnes grading about 0.18% Sn, 0.07% W in a 50 m wide zone parallel and east of the BCF. (Refer sections D/MZ01/101 and 098).

The recoveries of tin and tungsten which could be expected from this block of mineralization are unknown. Some of the free cassiterite is upto 20 micron diameter but this possibly only occurs in localized sheared areas. Recovery of this grain size cassiterite would be difficult. The mineralization occurs below 50 m of Moina sandstone in the bottom of a topographic low. An open pit into the zone would have a waste to ore ratio of at least 6:1.

Overall, this block is not of economic interest due to expected poor recoveries and unfavourable location.

Sphalerite - rich skarn - Possible extensions to the sphalerite skarn fringing the wrigglite body under Hugo's Fault was tested by holes MD 39 and MD 43. Both holes failed to find significant sphalerite and this type of mineralization appears limited to SMD 13 and SMD 16 and possible minor eastward extensions.

Between SMD 16 and SMD 13 the sphalerite horizon has a dip extent of approximately 120 m and an average width of 10 m. To obtain a deposit of 5 000 000 tonnes at the same width the mineralization would need to extend over a strike length of approximately 1 400 m to the east. As the

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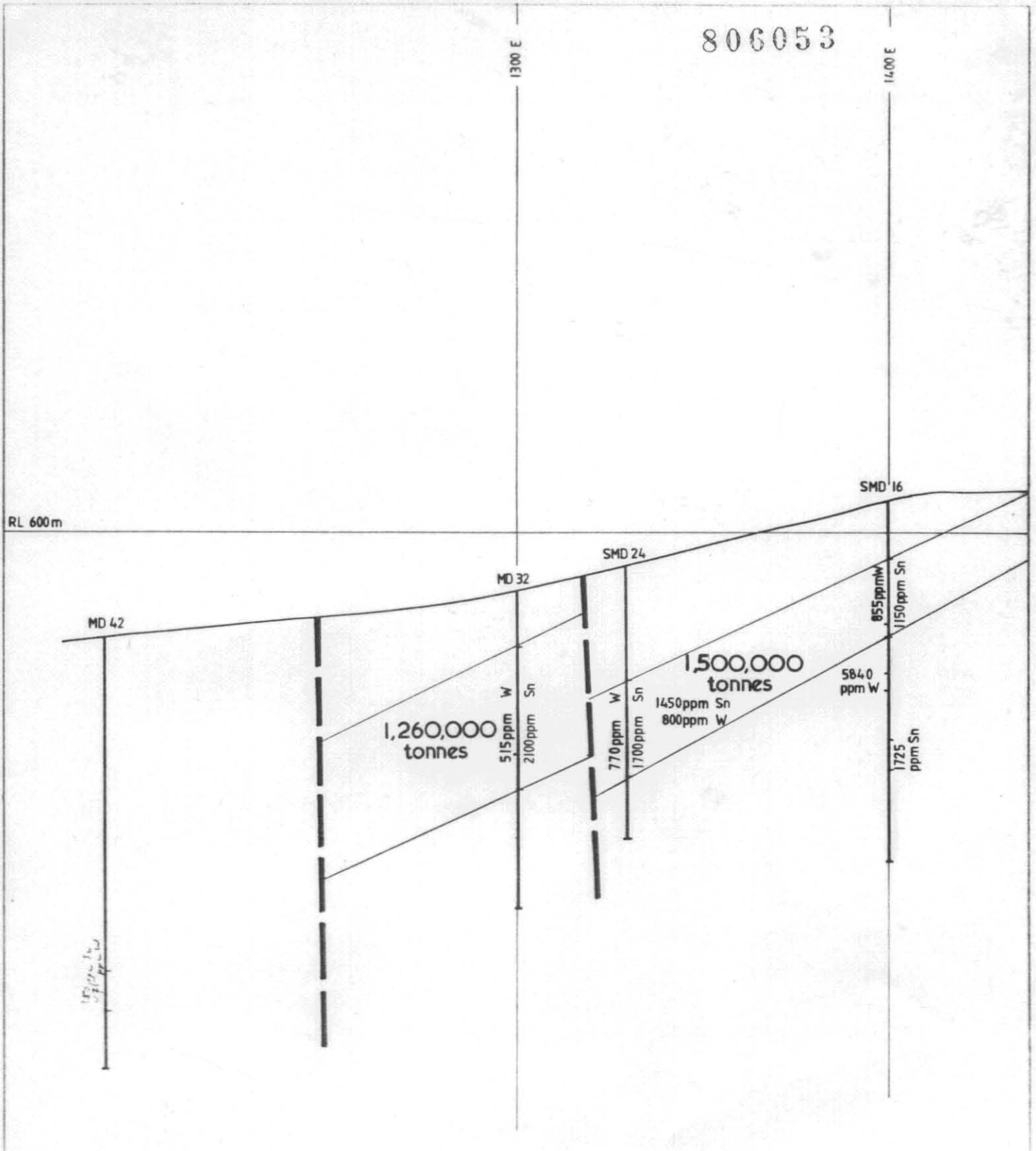

NOTE: 2,760,000 tonnes at 1750ppm Sn
670 ppm W

Tonnages assume 50m wide zone.
Tonnage factor : 3T/cu.m.

0 100m

5 cm

The Shell Company of Australia Limited
METALS DIVISION

MOINA

NW - SE SECTION PARALLEL
BISMUTH CREEK FAULT
POTENTIAL TONNAGES

Scale 1:2500

FIG N.	4	REPORT N.	
ENCL N.		DRG No.	D/MZ 01/101
DATE	2-6-81	AUTHOR	W.D.S
DRAWN	O.H.	OFFICE	DEVONPORT

pervasive skarn mineralization does not extend north more than 150 m from SMD 13 to MD 43, it is thought that sufficient extensions to the east are extremely unlikely.

6.5.3 Stockwork and/or sheeted vein development.

This target situated north of the old Shepherd and Murphy workings is a feldspar vein-scheelite association. The coarse grained nature of the scheelite in the feldspar veins should give an easily recoverable product, and the association with pink feldspar veinlets in a dark matrix may lend itself to ore sorting techniques similar to those used at Mt. Carbine in Queensland. The scheelite is, however, also associated with minor fractures and very fine, less than 1 mm quartz veins, and at least some of the assayed grade for W is due to very fine grained, disseminated, blue fluorescent, "powellite". Because of the east-west quartz vein system previously mined in the Shepherd and Murphy Mines, an east-west preferred direction was presumed.

This target was tested by two N/S costeans, one at 975 E (00 N - 100 N) and the other at 1100 E (00 N - 100 N). Neither costean showed particularly well developed vein systems. Two diamond drill holes, MD 40 and MD 41 were drilled beneath the costean on line 975 m E. These drill holes did not show a significant strongly developed vein system at depth.

Several other previous holes in the area have intersected vein-type scheelite mineralization. Assay results from these holes are shown below:

DRILL HOLE	FROM	TO	CORE LENGTH m	Sn ppm	W ppm
SMD 4	68.37	95.90	27.53	1320	840
	0.00	95.90	95.90	380	240
SMD 6	21.35	101.00	79.65	1100	960
	0.00	101.00	101.00	860	750
SMD 7	0.00	45.35	45.35	1630	740
SMD 10	38.75	76.00	37.25	1680	670
	0.00	76.00	76.00	820	330
SMD 11	31.00	74.00	43.00	1450	960
	0.00	74.00	74.00	840	560
SMD 15	33.00	103.00	70.00	1500	1270
	0.00	103.00	103.00	1020	860
SMD 28	17.70	90.60	72.90	1680	850
	0.00	90.60	90.60	1350	680
SMD 29	0.00	83.50	83.50	850	1760
MD 40	10.00	85.20	75.20	1360	950
MD 41	0.00	28.50	28.50	1560	820

These drill holes cover an area of approximately 500 m by 200 m across the thickest mineralized section. Part of this area is basalt covered, and beyond this area mineralization thins and basalt cover thickens. Drill hole sections along 1100 m E, 975 m E, 900 m E and 700 m E are plotted on plans D/MZ01/067, 116, 068, 107, 135, 136.

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Tonnage Calculations

Section 1100 E – Section Area of skarn: $60 \times \frac{80 + 30}{2}$ = 3300 m^2

Section Area of wrigglite: 70 x 15 = 1050 m^2

Applied over a width of 50mE + 62.5mW = 112.5 m

Tonnage Factor = 3.5

Tonnage allocated to section = 1,300,000 tonnes skarn
400,000 tonnes wrigglite

Grade = 850 ppm Sn, 1760 ppm W

Section 975 E – Section Area of wrigglite: 200 x 60 = 1200 m^2

Applied over a width of 62.5mE + 37.5W = 100 m

Tonnage Factor = 3.5

Tonnage allocated to section = 4,200,000 tonnes

Grade = 1480 ppm Sn, 860 ppm W

Section 900 E – Section Area of wrigglite: 50 x 200 = 10,000 m^2

Applied over a width of 100mW + 37.5mE = 137.5 m

Tonnage Factor = 3.5

Tonnage allocated to section = 4,800,000 tonnes

Grade = 1415 ppm Sn, 1020 ppm W

Overburden area 35m x 300m = 10,500 m^2

Tonnage Factor = 2.6

Overburden Tonnage = 3,700,000 tonnes

Section 700 E – Section Area of wrigglite: (40x200)+(100x30)= 11,000 m^2

Applied over a width of 50mW + 100mE = 150 m

Tonnage Factor = 3.5

Tonnage allocated to section = 5,800,000 tonnes

Grade = 1490 ppm Sn, 960 ppm W

Overburden area 35m x 400m = 12,000 m^2

Tonnage Factor = 2.6

Overburden Tonnage = 5,500,000 tonnes

Open pit tonnage potential in this area is estimated to total about 16 million tonnes averaging about 0.14% Sn, 0.10% W with possible 9.2 million tons of mainly basalt overburden. About 5.5 million tonnes of this material would be available free of overburden.

However, a complete review of all metallurgical testing at Moina by R.J. Purvis, Mineral Processing Engineer, Shell, gave the following conclusions:

1) Wrigglite mineralization located at Moina is not economic due to the low grade and extreme metallurgical problems which exist.

2) For further discoveries of mineralization to be economic grades of all components, but Sn and W in particular, would need to be considerably higher. At the same time reduced liberation problems would be a necessary condition to enable economic extraction of values.

3) If such mineralization was located techniques do exist for extraction values by either mineral processing or chemical techniques.

4) Tin and tungsten are considered to be the main target metals and fluorite could be a significant by product.

5) Previous test work by the Mines Dept. on the recovery of cassiterite and scheelite in wrigglite were unfortunately unsuccessful, as was test work by Amdel.

6) The work reported in the final Mines Dept. report (A782) confirms the difficulties previously indicated in treatment of this ore by conventional techniques. A marketable grade of fluorite (70% CaF_2) could not be achieved and recovery level is very low.

At the present time the Moina ore, including the stock feldspar - scheelite mineralization, is too low grade and metallurgically difficult to be of economic interest.

A treatment breakthrough will be required for the position to change. Some form of chemical or pyro-metallurgical technique would be required to overcome the physical treatment problems. The ore is too low grade to make such techniques viable at present.

6.5.4 Granite Associated Greisen or Stockwork Mineralization

Dolcoath granite crops out in the Forth River valley at an elevation of 400 m approximately 3 km to the east of the Shepherd and Murphy area and approximately one kilometer to the east of the E.L. 7/74 boundary. The granite is locally greisenised at the surface outcrop and also where it is intersected in diamond drilling at the Shepherd and Murphy area. Numerous tin/tungsten bearing veins are known throughout the adjacent areas.

Diamond drilling by the Department of Mines (D/MZ01/089) in the All Nations lease area to the east of the Shepherd and Murphy area has established that the granite does not come to within 200 m of the surface. The granite is intersected in the Shepherd and Murphy area at an elevation of approximately 400 m R.L., 150 m below the surface. This would appear to be a slightly elevated cusp, as other drill holes to the east which extend below 400 m R.L. do not intersect the granite. Analyses from the granite intersected in drill holes M.L. 1A and M.L. 2 are uniformly low. Tin values range up to 560 ppm but are generally less than 100 ppm. W values are upto 930 ppm with an average of approx-imately 100 ppm. Mo values are all less than 50 ppm.

Greisens are generally a low grade source of tin and at the depths to granite within the Moina area (greater than 150 m) they would probably not be economic. Exploration for such a deposit would have to rely entirely on drilling which at these depths would be prohibitively expensive.

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Several quartz vein type deposits have been and are being worked in the area east of Moina. Most of the veins are associated with east-west fracturing, similar to that in the Shepherd and Murphy Mine. Most of the known veins are very localized. The largest vein, the All Nations has been drilled recently by the Department of Mines for the leaseholders. Four diamond drill holes were completed and all intersected some wolframite-bearing vein material. The holes indicated a zone of low grade (0.1 - 0.2% W, but not all assays are available) tungsten in quartz veins. Some scheelite is also present. If the vein system extended for 1000 m along strike with a down dip extent of 100 m a reserve of approximately 5 million tonnes might be available. No indication of such a strike length is present. To open cut to a depth of 100m would require the removal of approximately 26 million tonnes of overburden giving a waste to ore ratio of approximately 5 to 1. Unless the grade was exceptionally high, which does not appear to be the case, such mineralization would be uneconomic.

6.6 RECOMMENDATIONS

No further drilling is recommended for the Shepherd and Murphy area. If the metallurgical process for beneficiation of the complex wrigglite ore are improved or a new technique invented an easily accessible resource is present. Further percussion drilling would then be needed to properly outline the full extent of the mineralization.

The zinc-bearing skarn NE of the Bismuth Creek Fault could require further evaluation and possibly one final drill hole to close off their SE boundary.

7.0 TIN SPUR

7.1 GENERAL

An area of approximately 0.6 sq. km. was gridded by Comalco. Work undertaken included geological mapping, soil sampling, rock sampling, trenching, ground magnetics survey, an E.I.P. survey and three diamond drill holes. This indicated a potential for approximately 2 million tonnes of 0.3% Sn, 0.1 ppm Au and a further 2 million tonnes of 1 ppm Au. (P.W. Askins, May, 1980).

7.2 GEOLOGY

A northwest trending syncline of Moina Sandstone conformably overlies a thin band of Roland Conglomerate which unconformably overlies Cambrian Volcanics. (Refer Comalco Plan TAS/80/334 - enclosed with this report).

Moina Sandstone in the area consists mainly of tublicular sandstones and quartzites with some siltstone/shale bands and a few limey beds.

The Dolcoath Granite crops out in the Forth River valley approximately one kilometer to the west. Quartz porphyry dykes are present in the area. Minor tin and some gold shows are located adjacent to Tin Spur and the Round Hill Pb, Ag, Zn mine is one kilometer to the north-northeast. Minor Pb, Zn, Ag values are reported from mineralized limey beds in the Comalco diamond drilling at Tin Spur.

The Moina Sandstone/Roland Conglomerate has been gently folded (dips 20° NE and SW) into north-west trending folds. A possible northwest trending shear zone cuts through the axis of the shallow syncline and is thought to be the conduit and host for mineralizing solutions in this area.

The tin mineralization occurs in leached, porous, sheared sandstones or in hard quartzite both with associated topaz. Cassiterite disseminated in the leached sandstone was found to be very fine grained, 10 to 30 micron in size. In the quartzite, cassiterite occurs in quartz veinlets or on fractures and is also fine, varying from 5 to 150 micron. No gold was seen in petrological samples.

The main area of interest was outlined by the 300 ppm Sn soil sampling contours. Costeans and diamond drilling was concentrated by Comalco in this zone.

7.3 INVESTIGATIONS COMPLETED

A total of 200 m of trenching was undertaken by Shell with a backhoe to make five costeans across the 300 ppm soil anomaly. Costeans were sampled at the bottom of the wall in narrow trench samples except for one extremely steep costean which caved in whilst being dug.

Assay results confirm the presence of low grade tin and gold values:

Trench on 800 m S	21 m @ 1 ppm Au
	17 m @ 1200 ppm Sn
Trench on 890 m S	7 m @ 2.1 ppm Au
Trench on 1100 m S	7 m @ 1.6 ppm Au
	16 m @ 2000 ppm Sn

Refer to plan D/MZ01/060 and 061. These results are significantly less than those recorded by Comalco.

Whether these results reflect actual grades at depth is in doubt as the costeans did not reach unweathered bedrock. Gold and tin values may be exaggerated because of concentration in surface fractures and cracks in the sandstone. Previous diamond drilling in the area recovered only one small section of tin mineralization (Drill hole T.S.D. 1, 11.9 m drill length, approximately 4 m true width at 1090 ppm Sn, 0.35 ppm Au) with occassional other values

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up to 500 ppm Sn but most less than 100 ppm Sn. It is thought that drilling fluids may have washed out the sheared/softer mineralized bands with their attendant tin/gold mineralization giving a low estimate of the actual grade. However, core recoveries in T.S.D. 1 from 3 m to 14 m and from 21 m to 56 m are close to 100%.

7.4 ECONOMIC POTENTIAL

The mineralized zone, using the 300 ppm Sn soil anomaly contours, has a strike length of approximately 800 m. Trenching appears to show patchy, narrow zones of mineralization upto 20 m wide. The tin grades, in well mineralized sections, are up to approximately 5000 ppm Sn, but would appear, in trenches to average out to 2000 ppm or less. Gold values would appear to be in the order of 1 ppm in the mineralized zones. These figures, with a depth of mineralization of 50 m, give a potential reserve of approximately 2 million tonnes of 0.2% Sn, 1 ppm Au. Because of the apparently irregular nature of the mineralization the tonnages may be smaller. This target is not of economic interest.

8.0 DEVONIAN

8.1 GENERAL

The area is covered by a small 900 m x 400 m grid cut by Comalco to cover a Pb, Ag rich gossan/laterite? and a small alluvial gold show at the Devonian. Geological mapping, rock sampling, soil geochemistry, panned soil concentrates, ground magnetics, I.P. survey (Mt. Lyell), gravity survey (Mines Dept.) and diamond drilling by the Mines Dept. (5 holes for a total of 309.4m), Mt. Lyell (two holes, 408.47m) and Comalco (one hole, 158m) were done over the area (P. Askins, May, 1980).

8.2 GEOLOGY

The area is covered almost entirely by Moina Sandstone, overlain to the northwest by massive Tertiary basalt. Gossan, consisting

of gritty, very exotic looking goethite, (Appendix 5, Petrology Report CMS 80/11/47) outcrops in two main zones. Quartz-feldspar porphyry dykes outcrop poorly in a northwest trend. The dykes are presumably of Devonian age and related to the Dolcoath granite which outcrops $1\frac{1}{2}$ km to the west and which probably extends under the Devonian area. (Refer to plan TAS/80/394).

The area is folded into a NW trending syncline with the gossanous material in the centre of the syncline. Major fractures in the area also trend NW with a few NE trending cross fractures.

The grid was planned to assess the potential for bulk low grade gold mineralization and to reassess the potential for strata-bound lead-zinc silver mineralization. Gold was known previously from the Devonian Mine. A possible Tin Spur situation with fine gold disseminated in sandstone was envisaged. The Pb-Zn-Ag gossan/laterite had numerous earlier investigators (Mines Dept. Jennings, I.B., 1963, Baker, 1971, Leaman, D.E., 1974, Mt. Lyell - Dandy, 1970, McKibben, 1972). The gossans/laterites are described (Appendix 5 - Petrology Report CMS 80/11/47) as thoroughly ferruginised sedimentary quartzites. Ferruginisation is pervasive in the matrix, which appears to have been largely argillic, with minor associated carbonate, and is a late secondary phenomenon possibly of lateritic affinities. The rocks may have been weakly hydrothermally mineralized in association with a quartz-mica $\pm$ magnetite phase, however present base metal assays evidently reflect the presence of metalliferous Mn oxides and probably absorption onto limonite. The paucity of recognisable sulphide-derived limonite suggests that the bulk of the anomalous values are exotic. The mineralized ironstone may be the result of the laterization of a limey bed in the Moina Sandstone (reported in drill holes at Tin Spur) and the scavening of associated Pb, Zn, Ag mineralization.

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8.3 INVESTIGATIONS COMPLETED

Previously unassayed core from Mt. Lyell holes OH 1 and OH 2 and Comalco hole DEV-D1 was logged, split or filleted, and assayed. Mt. Lyell hole OH 1 was assayed for Sn, Pb, Au and Ag. Comalco hole DEV-D1 was assayed for Sn, Au, Cu, Pb, Zn, Ag and As. Mt. Lyell hole OH 2 in the centre of the area of interest was assayed for Sn, Au, W, Cu, Pb, Zn, Ag, Ni, Co, Cd, Bi, Cr, Mn, Mo, Hg, As and Ta.

Mt. Lyell OH 1 was collared at approximately 200 m S, 60 m E and was designed to test an I.P. anomaly detected by a Mt. Lyell survey.

From	To	Core Length	Lithology
18.29	34.15	15.86m	Ironstone/laterite/gossan
34.15	40.55	6.40	F-med gn sandstone. Orange-yellow
40.55	44.82	4.27	Silicified, chloritised med gn sandstone
44.82	46.95	2.13	Silicified med gn silty sandstone
46.95	47.56	0.61	Well bedded siltstone/sandstone
47.56	50.91	3.35	Silicified sandstone
50.91	82.32	31.41	Tubicular sandstone
82.32	97.56	15.24	F-med gn quartzite
97.56	99.09	1.53	Orange red leached med gn sandstone
99.09	136.28	37.19	Silty sandstone
136.28	139.63	3.35	Massive f-med gn sandstone/quartzite
139.63	164.63	25.00	Siliceous & hematitic quartzite & conglomerate

Summary assays from this hole are as follows:

Interval	Width	Pb ppm	Zn ppm	Ag ppm	Sn ppm	Au ppm
18.29-34.15	15.86m	1.35%	2600	37	12	0.05

All gold assays were ‹0.05 ppm and all Sn assays were ‹40 ppm.

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Mt. Lyell OH 2 was collared at approximately 00 m N/10 m E and tested beneath the gossan zone in the centre of the outcrop area.

From	To	Core Length	Lithology
32'	79'	47'	Tubicular sandstone.
79'	101.5'	22.5'	Quartz-feldspar porphyry.
101.5'	167'	65.5'	Tubicular sandstone.
167'	220'	53'	F-med gn pyritic sandstone.
220'	268'	48'	F-med gn sandstone-fractured-leached.
268'	299'	31'	F-med gn sandstone-leached.
299'	325'	26'	Siltstone/sandstone interbeds.
325'	331'	6'	F-med gn sandstone-chloritized.
331'	354'	23'	F-med gn sandstone.
354'	430'	76'	Interbedded siltstone/sandstone.
430'	561'	131'	Conglomerate/quartzite.
561'	800'	239'	Quartz porphyritic lavas/tuffs.

Summary assays from this hole are as follows:

Interval	Width	Assay		
		Pb ppm	Zn ppm	Ag ppm
369' - 383'	14'	3400	370	14

All Sn was <60 ppm and all Au except one assay of 0.15 ppm was less than 0.05 ppm. Tungsten values from fillet samples were contaminated and two such samples were split and submitted for assay indicating much lower values than previously. All split samples were <30 ppm except one section of 6' at 390 ppm W, <4 ppm Sn.

Comalco DEV-D1 was collared at 100 N/275 W (045° at -60°) to test unweathered down dip extensions of the gossan and possible Au mineralization in sandstone in the Devonian mine area.

From	To (m)	Core Length (m)	Lithology
0.00	15.45	15.45	Massive f-med gn sandstone/quartzite.
15.45	33.75	18.30	Quartzite-quartz veined, brecciated.
33.75	35.00	1.25	Siltstone.
35.00	35.60	0.60	Massive f gn sandstone.
35.60	39.00	3.40	Quartz-porphyry dyke.
39.00	49.00	10.00	Tubicular sandstone.
49.00	52.00	3.00	Bleached porous sandstone.
52.00	74.00	22.00	Tubicular sandstone.
74.00	83.15	9.15	Bleached & Fe stained f-med gn sandstone.
83.15	118.60	35.45	Sandstone with minor siltstone beds.
118.60	129.50	10.90	Bedded siltstone/sandstone.
129.50	147.30	17.80	Massive quartzite.
147.30	157.80	10.50	Conglomerate.

All Sn are $\leq$50 ppm and all Au except two (0.15 ppm Au, 0.10 ppm Au) are $\leq$0.05 ppm. Only one Pb assay was greater than 1000 ppm (1650 ppm Pb, fillet sample, 71.00 - 74.00 m). The highest Ag value was 6 ppm Ag (fillet sample, 85.00 - 87.00 m).

From drill hole bedding data it appears that a small anticline exists between DEV-D1 and Mt. Lyell OH 2 (Refer plan D/MZ01/153). Data from Mines Department holes OH 2, 3 and 4 may also be interpreted in this manner. (Refer plan D/MZ01/162). Thus it would appear that the gossanous/lateritic material is restricted to a shallow syncline.

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8.4 ECONOMIC POTENTIAL

Mines Department holes assayed through the gossanous zones were similar to those in Mt. Lyell OH 1.

	Interval (m)	Width (m)	Assays				
			Pb%	Ag ppm	Sn ppm	Au ppm	W ppm
DOM OH 2	9.80-21.75	11.95	5.33	76	<300	Tr	<100
	36.64-40.62	3.98	2.96	26	<300	Tr	<100
	36.64-41.60	4.96	2.46	22	<300	Tr	<100
DOM OH 3	6.35-16.94	10.59	4.30	59	<300	Tr	<100
DOM OH 4	7.00-17.00	10.00	3.71	44	<70	0.1	<30
	7.00-24.30	17.30	2.85	30	<70	0.1	<30
DOM OH 5	0.00- 3.10	3.10	1.30	5	<36	0.05	<10

Average grades for all intersections are 3.1% Pb and 43 ppm Ag. Tin and gold values were low for all holes. The gossanous/ lateritic zone is the only material with high Pb Ag values. However due to the oxidized nature of the material, probably not much of the Pb or Ag would be recoverable. Gossanous material at the surface has an extent of approximately 550 m strike length, 100 m width and a thickness of 15 m. This would give a potential tonnage of approximately 2.25 million tonnes. A similar tonnage may be available under the basalt between the Devonian grid and the Tin Spur grid. However, overall this does not appear to be an economic target.

The diamond drilling which has intersected up to 150 m of the sandstone section below the laterite in each of three widely spaced holes has not intersected Pb-Ag mineralization of interest. There appears to be no need for further exploration of this prospect.

The Round Mountain ore deposits are the only similar style of mineralization in the area. One main mineralized zone and three much smaller zones were mined for the production of 4,700 tons Pb, 31.5 kg Au and 10,810 kg Ag. A total tonnage of approximately 58,000 tons of material was mined. This is a very small target (10 m x 40 m x 40 m) and would not be of economic interest.

An intensive stream geochemical survey would be necessary in the area of Moina Sandstone around the Devonian/Round Mountain area to locate further targets but this is not justified by the size of the known deposits.

9.0 BLACK BLUFF/SMITHS PLAINS AREA

9.1 GENERAL

An area of approximately 50 sq km of Cambrian volcanics was investigated by Comalco for volcanogenic copper-lead-zinc ore bodies. Regional geological mapping, regional stream sediment and rock chip surveys and regional geophysical (I.P., magnetics) and geochemical profile lines were carried out initially. This led to the choice of three areas to be more closely investigated by gridding. (Refer to plan TAS/78/154).

On the Mt. Jacob grid, soil geochemistry, rock chip sampling, ground magnetics, I.P., Pulse E.M. (trial only), two diamond drill holes, and bore hole I.P. surveys were carried out. Galena and sphalerite mineralization was intersected in one hole.

The Lower Winterbrook Grid had soil geochemical surveys Ao horizon and an I.P. survey carried out on it. Shale horizons with sphalerite, pyrite and galena are reported from the grid area.

The Upper Winterbrook has been soil sampled (Ao horizon).

The work to date has shown the presence of minor sulphide mineralization associated with volcanism. (G. Weste, Sept. 1978).

9.2 GEOLOGY

Erosion of a broad anticline with an axis trending E-W has exposed a 50 sq km window of Cambrian volcanics.

The Cambrian volcanics consist of acid tuffs, acid volcanoclastics, andesitic tuffs and andesitic and rhyolitic lavas and intrusives.

Sericite alteration is common in the acid rocks, some of it related to deformation. (The feldspars are most commonly sericitised). Chlorite-carbonate-epidote alteration is most prevalent in the intermediate rock types. The andesites very often show deuteric alteration of feldspar to chlorite and patches of chlorite-epidote-carbonate occur in the groundmass.

The volcanics are unconformably overlain to the north, south and west by the conformable Ordovician sequence of Roland Conglomerate, Moina Sandstone and minor Gordon Limestone. These form the limbs of the anticline which has been weathered down to expose the Cambrian volcanics.

Tertiary basalt covers the eastward extensions of the volcanics. Pleistocene glacials and recent talus obscure the contact between the Ordovician sandstones (resistant, topographic highs) and Cambrian volcanics (easily weathered, topographic low).

The volcanics trend east-north-east and dip and face to the south throughout the area. The Ordovician rocks trend east-west and form a west plunging anticline.

Faults, including the Bismuth Creek Fault, strike north northwest and also north-south. Two directions of cleavage are developed, 315° and 355°.

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9.3 INVESTIGATIONS COMPLETED

To date only one localized stream sediment and rock chip geochemical survey has been carried out in the area of a small rhyolitic stock.

Two minor Pb, Zn anomalies were located in one stream draining Moina Sandstone in an area of Tertiary basalt.

9.4 RECOMMENDATIONS

Mt. Jacob Grid - Extensions to the east of hole DDH J18 of a geochemical anomaly and chargeability anomaly need to be further tested. A geophysical method for searching through talus cover is required to locate possible drill targets. A Crone P.E.M. survey was not successful in this area.

Lower Winterbrook Grid - A C horizon soil sampling programme should be undertaken over most of the grid. The usefulness of Ao soil geochemical surveys in the Tasmanian environment is doubtful. Chargeability anomalies beneath Tertiary basalt should be further investigated.

Upper Winterbrook Grid - A C horizon soil sampling programme should be undertaken across most of the grid and geological mapping and rock chip sampling carried out. Geochemical anomalies should be followed up by an I.P. survey.

Stream sediment and soil geochemical anomalies previously located need to be followed up with further sampling and geological mapping.

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10.0 REGIONAL AEROMAGNETIC/RADIOMETRIC SURVEY

10.1 GENERAL

A regional airborne magnetic and radiometric survey was flown across E.L. 7/74 and several adjoining licences. Flight lines were run north-south at 250 m spacings with a terraine clearance of 100 m.

Maps of Residual Magnetic Contours and Total Count Contours were produced at 1:20 000 to overlay cadastral sheets at the same scale. These maps have proved useful as a mapping guide as well as for selection of numerous anomalies for further work.

The aeromagnetic data has been interpreted by consultant geophysicist, Dr. G. Dickson & Associates Pty. Ltd. Three reports refer to the Moina E.L. 7/74.

1) Tasmanian Aeromagnetic/Radiometric Surveys, Progress Report (December, 1980).

2) Tasmanian Aeromagnetic/Radiometric Surveys, Progress Report II - Block No. 1 (December, 1980).

3) Tasmanian Aeromagnetic/Radiometric Surveys, Progress Report IV - Block No. 3 (March, 1981).

These reports are included as Appendix 7.

Anomalies are numbered according to Cadastral Sheet Number with a sequential anomaly number i.e. (4240/3).

An initial group of the most obvious anomalies were selected for immediate follow-up. These included Liena South (4339/1), Liena (4339/2), Lorinna North (4240/3), Lorinna East (4239/1), Lorinna West (no number given) and Lake Gairdner (4240/1) aeromagnetic anomalies. These anomalies have been gridded and have had routine work done over the grid, including a ground magnetics survey, magnetic susceptibility measurements, soil sampling and geological mapping.

Ground magnetic surveys were done with a Proton Precession magnetometer with a 2.5 m sensor height. Soil samples were taken with an auger at the maximum depth possible (C horizon) and sieved to -80#. Stream sediment surveys are -80# fractions unless otherwise specified.

10.2 INVESTIGATIONS COMPLETED

Liena South (4339/1) Aeromagnetic Anomaly

The anomaly is located approximately 5.5 km south of Liena on the east side of the Mersey River.

One east-west line (1120 m long) and two north-south lines (600 m, 1000 m) were cut over the anomaly.

The geology of the area shows the Dove Granite intruding Precambrian quartzites and possibly Moina Sandstone.

Ground magnetic traverses along the grid lines indicate two roughly circular 1500 nT anomalies, both approximately 300 m in diameter. The western anomaly is located over hematite-magnetite bearing, weakly greisenized granite and the eastern anomaly is situated over hornfelsed, partly granitized and brecciated quartzite (hematitic). The source of the anomalies appears to be disseminated magnetite within a granite cupola and an adjacent quartzite (and sandstone) roof pendant. Hematitic breccias occur within the contact metamorphosed quartzites. Magnetic susceptibility readings of around 3000×10^{-5} S.I. units are recorded. (Refer to plans D/MZ01/125, 126). Susceptibility readings on weathered granite exposed in road cuttings indicated susceptibilities up to 8000×10^{-6} cgs units. These were generally associated with magnetite veining. Background readings of $200 - 400 \times 10^{-6}$ cgs units are common in the granite.

A suite of magnetite-bearing granites and breccias, in all 49 samples, were analyses by Amdel for Sn, W (XRF), Au (C3/3), U (J3/1) and Ba, Be, Ce, Co, Cr, La, Mn, Mo, Nb, Ni, Sc, Sr, Ta, Th, Ti, U, W, Y, Yb, Zn (Spec. 1) and Ag, As, Bi, Cd, Cu, Ca, Ce, In, Pb, Sb, Sn, Zn (Spec. 2).

Five samples had greater than 100 ppm Sn with the highest value 240 ppm Sn and seven samples had greater than 40 ppm W with the highest values 55 ppm. The other samples had generally less than 20 ppm Sn and 20 ppm W. One sample had 0.42 ppm Au with other samples less than 0.05 ppm Au and one sample had 16 ppm U compared with an average of 4 ppm for the other samples.

One sample had 20 ppm Ag, greater than 1% Pb and 6000 ppm Zn.

Results of soil sampling over the grid (Cu, Pb, Zn, Bi, Ag, Mo - AAS; Sn, W, U - XRF, Comlabs) indicated one slightly anomalous result at 1600 E/ 2460 N of 75 ppm Pb, 65 ppm Zn (Refer to plan D/MZ01/121, 122).

Stream sediment sampling in the immediately adjacent area (Au, Cu, Pb, Zn, Bi, Ag, Mo - AAS; Sn, W, U - XRF, Comlabs) did not give anomalous results (Refer to plans D/MZ01/108, 123, 124, 127, 128).

Liena (4339/2) Aeromagnetic Anomaly

The anomaly is located approximately 2.8 km south of Liena on the east side of the Mersey River.

Two grid lines at right angles, one north-south (880 m) and one east-west (1200 m) were cut over the anomaly. An additional east-west line was cut as a followup line on anomalous Pb soil samples.

The aeromagnetic anomaly is centred over a basalt covered hill surrounded by lower relief Gordon Limestone. Thin section description of the basalts (Appendix 5, Report No. Shell 23/80, A.G. Whittle & Associates) indicates they are breccias possibly

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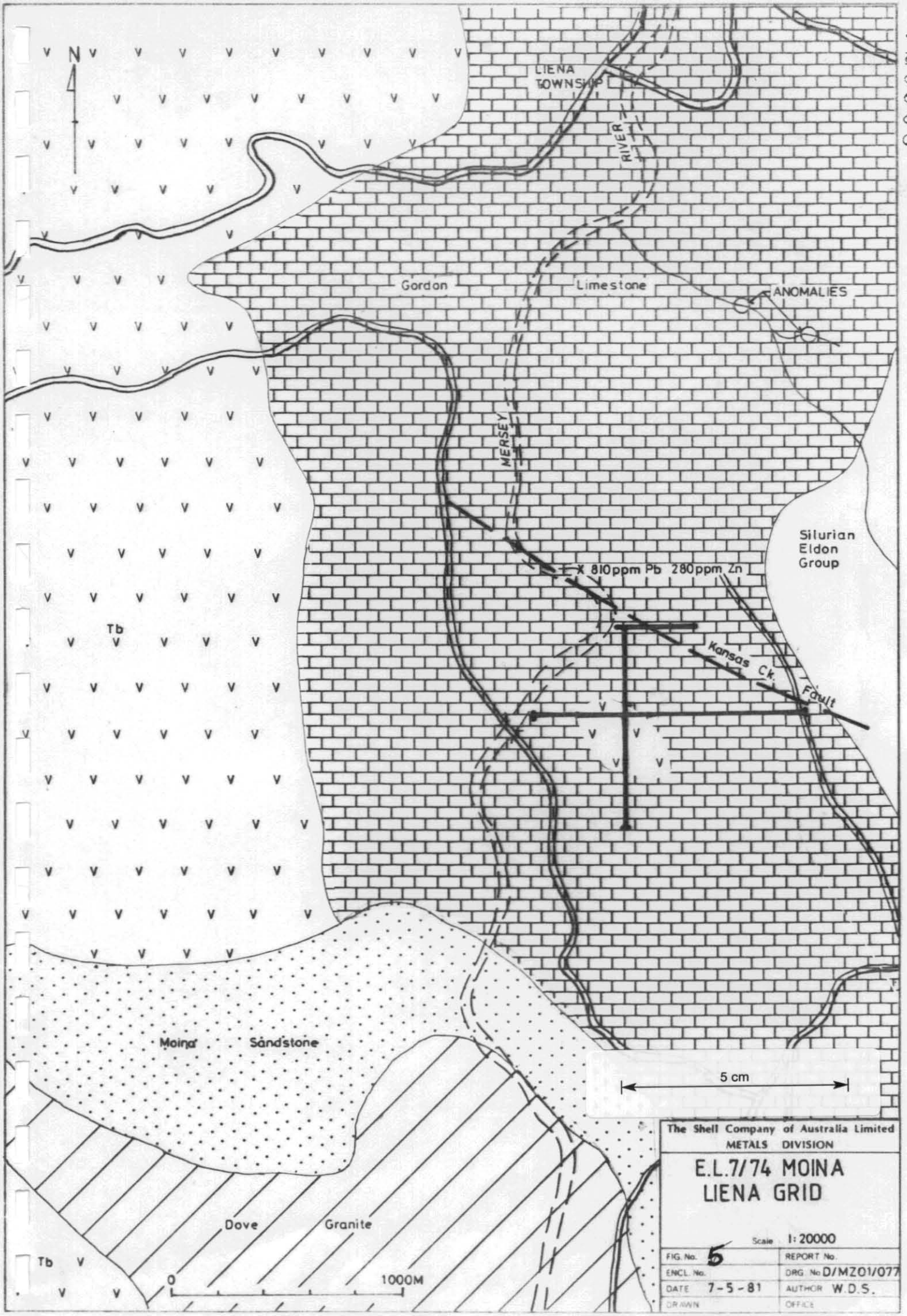

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E.L.7/74 MOINA
LIENA GRID

Scale 1:20000

FIG. No. 5	REPORT No.
ENCL. No.	DRG No D/MZ01/077
DATE 7-5-81	AUTHOR W.D.S.
DRAWN	OFFICE

formed by drag flow along the chilled contact zones of shallow intrusive porphyritic olivine basalts, with country rock. It is thought that the basalt in this area is an intrusive feeder to extensive basalt flows to the west (Refer to plan D/MZ01/104).

Ground magnetic traverses along the grid lines indicated an approximately circular anomaly, of 2500 nT with a diameter of approximately 200 m centred on 1400 m E/ 2000 m N. Magnetic susceptibilities of the basalts are of the order of (200 - 2000) x 10^{-6} cgs units. (Refer plan D/MZ01/091).

A VLF-EM survey was done over the lines without indicating any easily recognizable conductors. (Refer plan D/MZ01/085, 086).

Soil sampling over the original grid (Cu, Pb, Zn, Bi, Ni, Co, Cr, Fe, Mn, Ag, Mo - AAS; Sn, W - XRF, Comlabs) gave one anomalous Pb result. The grid was extended and three minor anomalous Pb results were indicated. One extremely anomalous Pb soil sample result was recorded from a traverse along the adjacent Mersey River. (Refer plans D/MZ01/088, 090).

Two rock chip samples from the grid area are anomalous in Pb, and one sample is anomalous in Ba.

The grid was found to be partly over the Croesus Cave State Reserve, so no further exploration was possible in the area.

Lorinna North (4240/3) Aeromagnetic Anomaly

This broad anomaly is located 1.5 km north of Lorinna on the east side of the Forth River.

This anomaly has been previously tested by Comalco and called the Lorinna East anomaly (Askins, P.W., March, 1980). Comalco gridded and mapped the area and conducted ground magnetic and soil sampling surveys.

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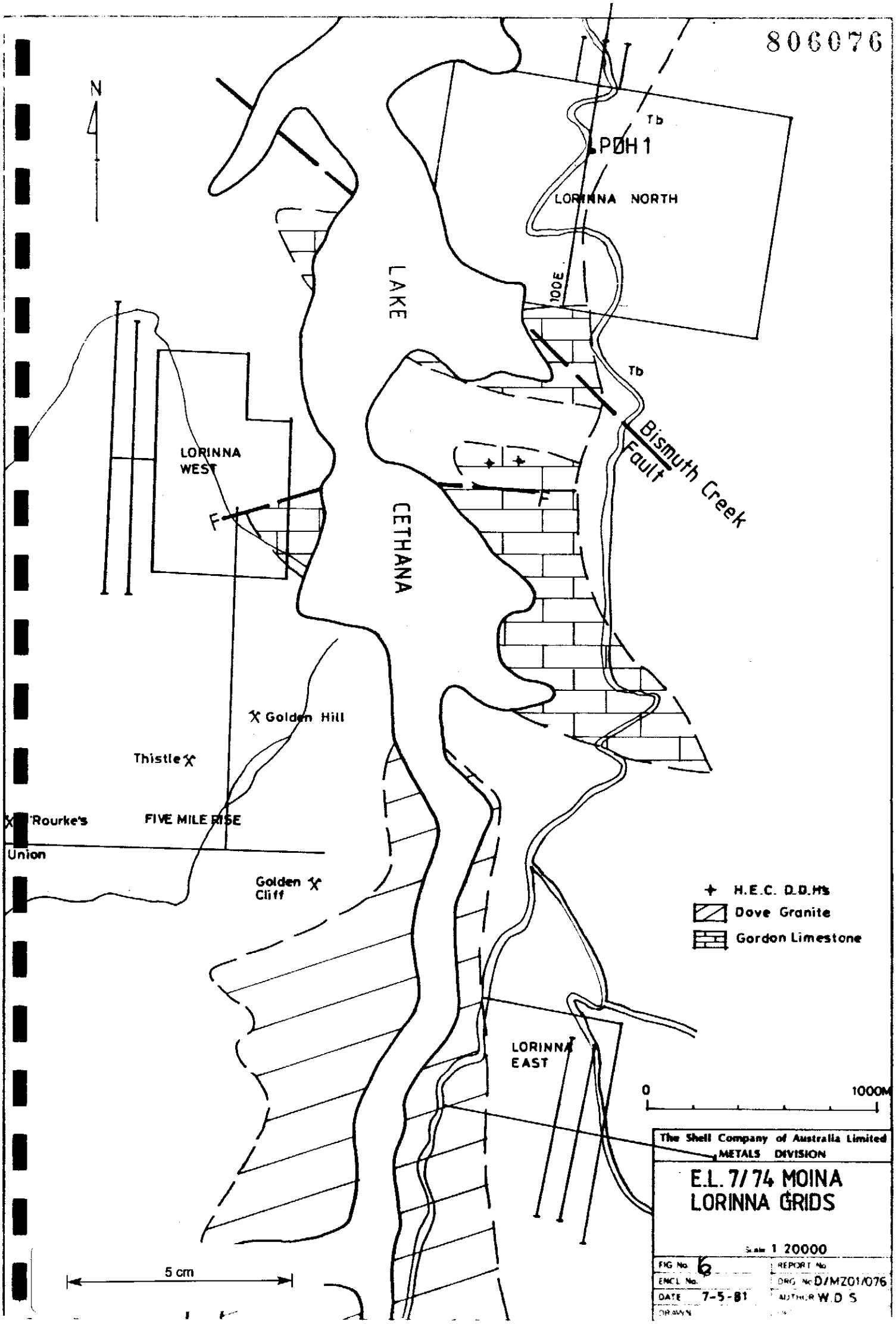
N
Tb
PDH 1
LORINNA NORTH
100E
LAKE
CETHANA
Tb
Bismuth Creek
Fault
LORINNA
WEST
F
F
Golden Hill
Thistle
'Rourke's
FIVE MILE RISE
Union
Golden
Cliff
LORINNA
EAST
H.E.C. D.D.H's
Dove Granite
Gordon Limestone
0
1000M
5 cm
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E.L. 7/74 MOINA
LORINNA GRIDS
Scale 1 20000
FIG No. 6
REPORT No.
ENCL No.
DRG No D/MZ01/076
DATE 7-5-81
AUTHOR W.D.S
DRAWN

Cambrian Acid tuffs/lavas are overlain by Moina Sandstone. Gordon Limestone crops out to the south of the grid. Tertiary basalt covers most of the south and eastern parts of the grid. (Refer plan TAS/77/67).

The ground magnetic survey indicated a broad magnetic high with two local anomalies of 67000 nT on top of the high background of 65 000 nT. The anomalies are associated with outcropping magnetite-rich porphyritic tuff. The tuffs have susceptibilities ranging up to 3000 x 10^{-6} cgs units with average values of 200 - 300 x 10^{-6} cgs units. It was thought that these susceptibilities do not explain the anomaly observed. (Refer plan TAS/77/68).

A percussion drill hole was drilled by Shell to 144 m at 115 E/ 460 N in the centre of the broad magnetic anomaly on the Comalco grid. (Refer Appendix 9).

From	To	Lithology
0.00	52.00m	Gravels. Alluvial - Glacial?
52.00	144.00m	Cambrian andesite.

Susceptibilities in the andesites ranged from (1000 - 7000) x 10^{-6} cgs units. This probably explains the broad magnetic anomaly over the area.

No mineralization was seen in the chips or indicated by assay.

The soil samples from the previous Comalco survey were reassayed for Cu, Pb, Zn. Minor Cu, Pb anomalies are associated with Cambrian volcanics. Two lines (100 W, 100 E) of Comalco soil samples were resubmitted for analysis for Au (AAS - Comlabs). Other lines (500 W, 400 W, 300 W, 200 W, 00, 50 E, 200 E, 300 E, 400 E, 500 E, 600 E, 700 E, 800 E, 900 E, 1000 E) were analysed for Sn, W, As, Bi (XRF Comlabs). (Refer plan D/MZ01/074).

Gold values were all less than 0.05 ppm Au. No anomalous Sn, As, Bi results were recorded. Anomalous W values were recorded at the northern edge of the area around 100 E. Extensions to three lines in this area failed to find extensions to this anomaly.

Rock chip sampling of volcanics indicated low gold values, all less than 0.05 ppm Au, Sn less than 10 ppm and W up to 120 ppm from a background of 10 ppm W.

Lorinna East (4239/1) Aeromagnetic Anomaly

This bullseye anomaly is located approximately 2 km south of Lorinna on the east side of the Forth River.

Three north-south lines (1000 m, 800 m, 600 m) and two east-west lines (780 m, 660 m) were cut over the anomaly.

Precambrian quartzitic shists are unconformably overlain by Ordovician Moina Sandstone and both(?) are intruded by the Dove Granite. No contacts are seen. Tertiary basalt covers these units and forms the top of a rounded hill. (Refer plan D/MZ01/070).

Ground magnetic traverses along the grid line indicates a roughly circular anomaly centred at 00 E/00 N over the top of the basalt hill. Magnetic susceptibilities range up to 1000 x 10^{-6} cgs units in the basalts, with an average in the order of (100 - 200) x 10^{-6} cgs units. It was thought the basalt did not explain the magnetic anomaly. (Refer plans D/MZ01/062, 106, 63, 64).

A percussion drill hole was drilled by Shell to 200 m at 00 N/ 00 E on the grid. (Refer Appendix 8).

From	To	Lithology
0.00m	58.00m	Tertiary basalt.
58.00	80.00	Tertiary clays.
80.00	200.00	Precambrian schists with minor granitic veining.

Susceptibilities in the basalt were low (500 x 10^{-6} cgs units). The magnetic anomaly is not explained by these results.

No mineralization was seen in the chips or indicated by assays. Soil sampling over the grid gave no anomalous results. (Refer plan D/MZ01/066).

Rock chip sampling of the Dove Granite (Cu, Pb, Zn, Ni, Bi, Ag, Mo, Au - AAS; Sn, W - XRF; Ba, Be, Ce, La, Mo, Nb, Ta, Zr, Th, Ti - Spec. Amdel) gave three high Sn - W values (210 ppm Sn, 130 ppm W; 390 ppm Sn, 250 ppm W; 370 ppm Sn, 150 ppm W). Gold values were all less than 0.1 ppm Au. (Refer plan D/MZ01/072).

Lake Gairdner (4240/1) Aeromagnetic Anomaly

This broad anomaly is located 1 km west of Lake Gairdner and adjacent to the existing Comalco Moina grid.

One east-west line (500 m) and three north-south lines (500 m, 800 m, 825 m) were cut over the anomaly. These lines are extensions of the Moina grid and named accordingly.

Moina Sandstone crops out thoughout the grid except where overlain by Tertiary basalt mainly in the south and east. A small, localized patch of magnetite-chlorite skarn was located in the sandstone. The grid ends at a cliff which indicates a thickness of at least 100 m of Moina Sandstone underlying the grid area. (Refer plan D/MZ01/080).

The ground magnetic survey indicated the centre of the broad anomaly was at 1800 W/450 N. Susceptibilities of the Moina Sandstone do not explain the anomaly. (Refer plan D/MZ01/079).

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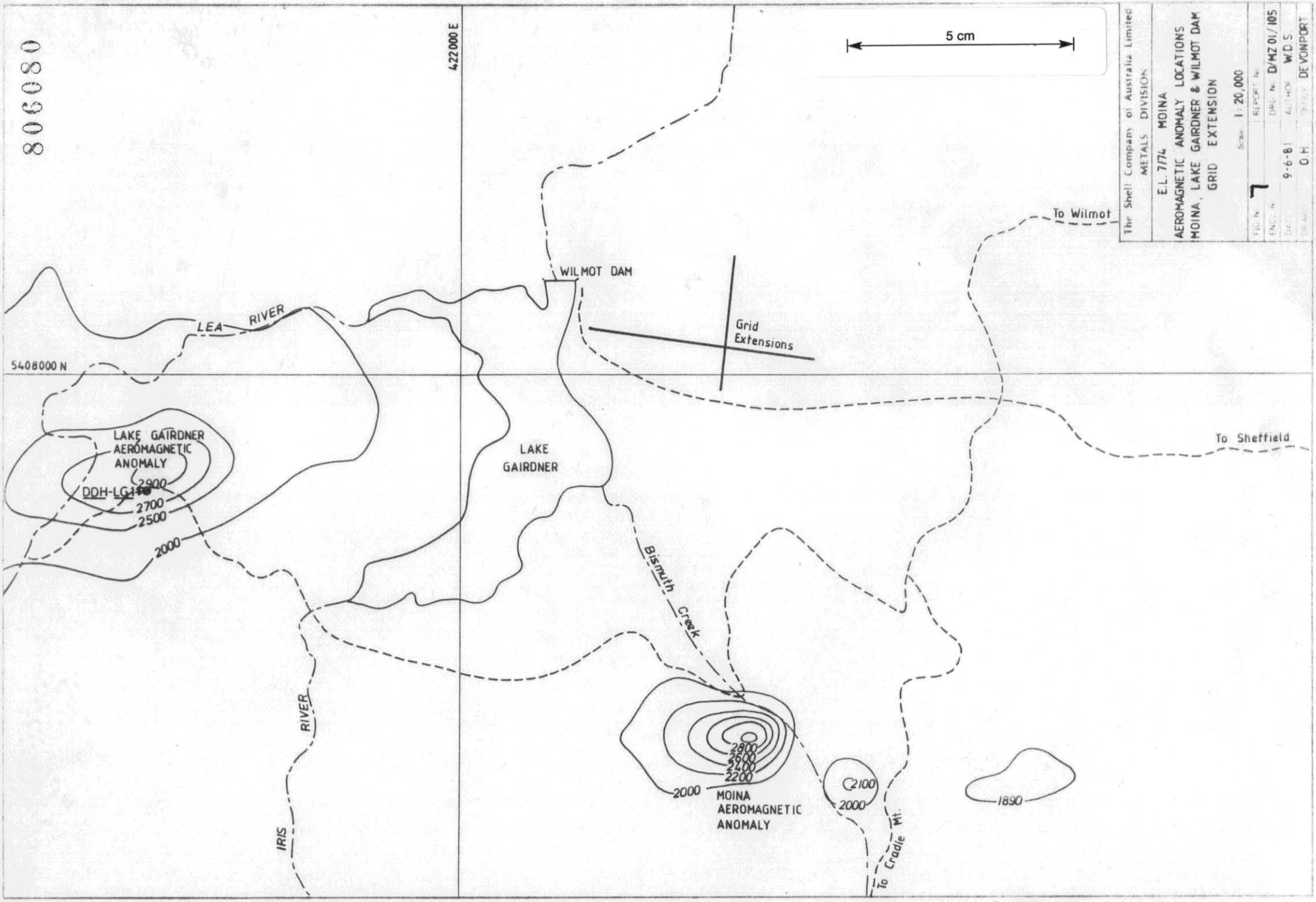

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E.L. 7/74 MOINA
AEROMAGNETIC ANOMALY LOCATIONS
MOINA, LAKE GAIRDNER & WILMOT DAM
GRID EXTENSION

Scale 1:20,000

FIG. No. 7
REPORT No.
ENCL. No. DRG. No. D/MZ 01/105
DATE 9-6-81 AUTHOR W.D.S.
DRAWN O.H. CHECKED DEVONPORT

A percussion drill hole (Appendix 8) was drilled to 71 m through Moina Sandstone at 1800 m W/445 m N. The hole was abandoned at 71 m (target 200 m) due to hard ground. No mineralization was seen in the hole and no anomalous assay results are reported. A diamond drill will be used to deepen the hole and test the anomaly.

A VLF survey was carried out over the central line through the anomaly. A possible conductor was indicated at 1800 m W/ 640 m N, over basalt. (Refer plans D/MZ01/078, 083, 087).

Three high tungsten values (230 ppm W, 240 ppm W and 55 ppm W) are reported in the soil sampling survey from basalt covered areas. (Cu, Pb, Zn, Ni, Bi, Fe, Mn - AAS; As, Sn, W - XRF Comlabs).

Rock chip sampling of Moina Sandstone and the small magnetite skarn showed all values <4 ppm Sn, <10 ppm W and <0.10 ppm Au. (W - XRF, Au - AAS, Sn, Ag, As, Bi, Cd, Cu, Ga, Pb, Sb, Zn - Spec. Amdel).

Lorinna West (4240/2) Aeromagnetic Anomaly

This broad anomaly is located 1 km west of Lorinna on the west side of the Forth River.

This anomaly has been previously investigated by Comalco and called the Lorinna West anomaly (Askins, P.W. March, 1980). A small grid was cut over the area and geological mapping, ground magnetics and one trial line of soil sampling carried out. (Refer plans TAS/77/62, 70).

The area is covered in alluvium and scree except for outcropping Cambrian Lorinna Greywacke in the northwest. The confused magnetics is probably due to the grid not covering sufficient area over a large magnetic high. A trial line for Cu, Pb, Zn, Bi showed nothing of interest and further sampling was abandoned.

The intertpretation of the SCOA aeromagnetic data (G. Dickson, March, 1981) downgraded this anomaly and no further work was done in the area.

Anomaly 4141/4

This anomaly appears to be on a broad high trending east-north-east in the Black Bluff - Smith's Plains area which is probably due to magnetic Cambrian volcanics. The area is adjacent to and to the south of the Lower Winterbrook Grid.

A reconnaissance ground magnetic survey was carried out over the area. No grid lines were cut. The ground magnetics indicate an east-west trending anomaly, roughly 200 m wide with a maximum amplitude of 2000 nT. Only the eastern edge of the main magnetic high (65,000 nT) was covered. (Refer plan D/MZ01/019).

Outcrop consisted of magnetite-bearing, green, andesitic lithic crystal tuff to agglomerate. Susceptibilities ranged from $1000 - 5000 \times 10^{-6}$ cgs units, which explains the aeromagnetic feature.

Soil geochemistry (34 samples) and stream geochemistry (Cu, Pb, Zn, Bi, Ni, Fe, Mn - AAS; Sn, W - XRF Comlabs) was done over the area, without recording significantly anomalous values. Stream sediment surveying done previously by Comalco detected no anomalies in this area.

Anomaly 4141/5

The anomaly appears to be off the edge of a broad high trending east-north-east, in the Black Bluff-Smiths Plains area. It is thought the magnetic high is due to magnetic Cambrian volcanics.

A reconnaissance ground magnetic survey was carried out over the area. No grid lines were cut. Two 800 m long lines on the ground located an east-west trending magnetic low of amplitude

600 - 1000 nT in a background of 62,000 nT. This anomaly appears to coincide with a boundary between Tertiary basalts and Cambrian acid tuff. The Cambrian tuff had susceptibilities of less than 100 x 10^{-6} cgs units. (Refer plan D/MZ01/020).

The anomaly is in a recently cleared area and location may have been out. The area does not however appear to be favourable for skarn mineralization.

Soil geochemistry (33 samples) and stream geochemistry (2 samples) (Cu, Pb, Zn, Ni, Bi, Fe, Mn - AAS; Sn, W - XRF Comlabs) failed to locate significantly anomalous values.

Anomaly 4141/6

This anomaly appears to be on the same broad east-north-east trending high as the previous two anomalies. The anomaly is in the centre of the Black Bluff - Smiths Plains area of Cambrian volcanics.

A reconnaissance ground magnetic survey was carried out over the area. No grid lines were cut. The broad anomaly peaked at 64,000 nT from a background of 62,500 nT. (Refer plan D/MZ01/021).

The same distinctive magnetite-bearing, green agglomeratic units as at anomaly 4141/1 with susceptibilities of 1000 - 5000 x 10^{-6} cgs units, was present, associated with Tertiary basalt.

The susceptibilities of the agglomerate explain this anomaly.

Soil geochemistry (25 samples) and stream geochemistry (2 samples) (Cu, Pb, Zn, Ni, Bi, Fe, Mn - AAS; Sn, W - XRF Comlabs) failed to locate significantly anomalous values.

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10.3 REGIONAL INTERPRETATION

The main features on the Residual Magnetic Contour map are the areas of basalt, generally areas of high relief but with rapid fluctuations. Other major features are the ENE trending Cambrian volcanics (andesites?) at Black Bluff and Lake Gairdner(?) and ESE trending volcanics between Moina and Lorinna North.

Numerous linear features are evident, mainly NW and NS features which are probably faults. The Bismuth Creek Fault, however, is not an easily identifiable feature.

On the Total Count Contours Map the area of Precambrian rocks in the south is highlighted as are the Cambrian volcanics and Devonian Granites.

A regional compilation of Aeromagnetics/Radiometrics, airphoto and satellite imagery interpretations is to be done.

10.4 RECOMMENDATIONS

A diamond drill will be used to deepen the hole into the Lake Gairdner Anomaly. Remnant magnetism studies will be carried out on Lorinna East Anomaly basalts. No further work is recommended for the other anomalies.

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11.0 REGIONAL STREAM SEDIMENT SURVEYS

11.1 GENERAL - COMALCO SURVEY

Comalco conducted stream sediment surveys over most of E.L. 7/74. Two main and separate surveys were completed. The most extensive was an early -20# stream sediment survey over Cadastral sheets 4139, 4140, 4141, 4239, 4240 and 4241, where samples were variously analysed for Cu, Pb, Zn, Bi, Ag, Sb, Au, W, Mo and F. Some rock chip samples were collected during this survey. A later -80# survey was carried out on selected areas on Cadastral sheets 4141 and 4140 where samples were assayed for Cu, Pb, Zn, Sn, W, Bi and F (Askins, P.W., March, 1980). Other localized surveys were undertaken along the Wilmot River area near Erriba, the Black Bluff/Smiths Plains area, and along the Campbell River, a southern tributary of the Dove River in the south of the area, (Askins, P.W., March, 1980; Weste, G., Sept. 1978). Another survey was done in the Liena area, however no detailed results or locations are available.

A large area of Precambrian schists in the south of the licence was not sampled. Data were treated statistically for both the main Comalco surveys.

Numerous anomalies were detected, most of which have had no followup done on them. Four main areas are indicated for followup:

(1) Bismuth Creek Fault Zone near Lorinna.
(2) Taylors Flats/Leven River limestone area.
(3) Luna Creek/Mt. Stormont Cambrian volcanics.
(4) Dove River Cambrian volcanics.

Bismuth Creek Fault Zone - Four fluorine anomalies are present (960 ppm, 1300 ppm, 1100 ppm, 1400 ppm F) mostly in areas of basalt (rubble?) overlying Moina Sandstone.

Four lead anomalies (max. 190 ppm) occur, possibly associated with Cambrian volcanics or the Dove Granite.

Anomalous Cu and Zn anomalies occur outside the licence area possibly due to basalt or Cambrian volcanics.

Taylors Flats/Leven River - Two tin anomalies (12 ppm, 14 ppm) are recorded from north of the Leven River near Mostyn Hardy Cave, one with associated anomalous zinc (150 ppm). To the south of the Leven River near Taylors Flats one stream has continuous high values for zinc (90 - 240 ppm) with the better values at the source of the stream in Moina Sandstone(?). Other high lead and zinc values are recorded in the area, over limestone subcrop. A prospector indicated that he had panned tin in the Taylor's Flat area in the 1930's.

Luna Creek/Mt. Stormont - Several samples along Luna Creek were anomalous for Pb (55, 55, 90 ppm) and in streams draining the southern slopes of Mt. Stormont high fluorine (1000 ppm, 1260 ppm) and lead (1950 ppm) were recorded from rock chips and one anomalous stream sediment lead value (65 ppm) was recorded. These values (fluorine?) are from Cambrian volcanic windows in the Moina Sandstone and a major Cambrian outcrop on Mt. Stormont.

Dove River Cambrian Volcanics - A zone of Pb anomalies (65 ppm to 245 ppm) are present adjacent to Cambrian volcanic outcrops to the south of the Five Mile Rise. Pb, Ag, Au mineralization is associated with the adjacent Dove Granite (1 km) in the Dove Mine, within the granite, and in the Silver Dove in the Pre-cambrian. Also gold occurrences on top of Five Mile Rise have associated galena at depth.

The anomalous Pb may be associated with minor veins related to the granite emplacement, rather than volcanogenic deposits.

A few individual anomalies also occur. Two tungsten anomalies are reported in the -80# survey, one near the junction of the Lea River and Devonport Creek and another in a tributary of the Lea River outside the western boundary of the E.L. These appear to be draining from Moina Sandstone.

A string of three Pb anomalies are recorded from the -20# survey for a tributary of Bull Creek near Daisy Dell. Most of the drainage zone is mapped as basalt.

11.2 INVESTIGATIONS COMPLETED

Taylors Flats/Leven River - A brief reconnaissance trip was made to the area. Basalt, not shown on maps available, is probably responsible for zinc anomalies in one of the streams. However, associated fluorine anomalies have not been explained. The tin anomalies appear to be in basalt-covered area and may be associated with greybilly. More work needs to be done on the area.

Liena - A localized stream sediment and rock chip survey was carried out around Liena from streams draining the Gordon Limestone. This survey covered an area of approximately 10 sq km, adjacent to the Mersey River. Thirty-one stream sediment sites, one sample was taken which was later divided into a -80# fraction and a -20# fraction. A lightly panned concentrate sample was taken at most sites (19) as a third sample. Following an orientation survey, carried out by M. Baker over a wide area (Moina, Borradaile Plains) the -80# samples were assayed for Sn, As, W, Sb, Mo, Ba - XRF, Comlabs and the panned concentrates assayed for Sn, W, Ta, Ba - XRF, Comlabs, Cu, Pb, Zn, Ni, Co, Bi, Ag, Mo, Au - AAS, Comlabs. (Refer plans D/MZ01/108, 123, 124, 127, 128).

Two anomalous Pb, Zn Ba anomalies were detected on one stream in the stream sediments analyses and accentuated in the panned concentrates analyses.

Several individual Pb, Zn and Ba and two Sn, W anomalies were detected in the associated rock chip sampling.

11.3 RECOMMENDATIONS

The anomalies detected in the Comalco surveys and the SCOA survey need to be check sampled and investigated geologically.

12.0 MISCELLANEOUS

Two areas were gridded and examined for possible low grade gold/tin deposits (Tin Spur-type). These were at Five Mile Rise and adjacent to the Wilmot Dam. Three main requirements appear to be necessary for the development of this type of deposit. These are a heat source, i.e. a granite intrusion to activate a hydrothermal system, a source rock, either the granite itself or possibly Cambrian volcanics (for the Au) and structures to allow the percolation of fluids and deposition of the ore minerals. The two areas chosen for initial investigation are adjacent to known gold producing areas.

Five Mile Rise - Several small shows were mined on the Five Mile Rise for gold. These were quartz veined fissure deposits associated with NW trending fractures. Gold, at approximately 15g/t, was payable due to secondary enrichment only above the water table. Below the water table the lodes consist of auriferous galena, sphalerite, arsenopyrite, pyrite and chalcopyrite in quartz veins. The lodes (approximately 25 cm wide) continued from Moina Sandstone into the underlying Cambrian volcanics.

A grid line, 00 E from the Comalco Lorinna West grid was extended south to 1500 S, near the crest of Five Mile Rise. A line was cut west for 1000 m and east for 400 m, at 1500 m S.

The lines were soil sampled at 50 m intervals and rock chip samples taken. Soil samples (-80#) were assayed for Cu, Pb, Zn, Bi (AAS - Comlabs) and Sn, W As (XRF - Comlabs). One anomalous result was recorded for Pb at 1500 S/450 W. Rock chip sampling at 1500 S/400 W and 1500 S/470 W gave values of less than 0.05 ppm Au.

Ground magnetics were done but gave a flat profile once off the basalt area of the Lorinna West grid. No further work was done on the grid.

Wilmot Dam/Moina Extended - The Bell Mountain alluvial gold field is located 500 m to the north of the Shepherd and Murphy grid area and near the E.L. boundary. Large flat nuggets (commonly 85 g) were found in the bottom of alluvium adjacent to Bell Creek. The source of the nuggets was not located.

Grid line 400 E of the Shepherd and Murphy grid was extended from 1300 m N to 1900 m N, which crossed Bell Creek, and a line cut east at 1500 m N to 800 m E and west at 1500 m N to 200 m W along a ridge of Moina Sandstone which sheds into Bell Creek.

The lines were soil sampled at 50 m spacings and rock chip samples taken. Soil samples (-80#) were assayed for As, Bi, Sn, W (XRF - Comlabs). Minor As anomalies were reported at 400 m E, 1150 m N; 400 m E, 1800 m N; and 1500 m N, 150 m E. Rock chip samples from 400 m E, 1150 m N recorded 0.10 ppm Au, 400 m E, 1800 m N less than 0.05 ppm Au and 1500 m E, 150 m E less than 0.05 ppm Au.

Ground magnetics was done across the grid giving a flat profile.

No further work was done on the area.

Recommendations - These areas have not been exhaustively tested. Further gridding and soil sampling/rock chip sampling could be carried out, if justified a target area can be delineated by a more regional approach.

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13.0. CONCLUSIONS & RECOMMENDATIONS

The area of main interest, the Shepherd and Murphy Area has been comprehensibly tested. A possible future tin, tungsten, fluorite resource has been outlined and a possible zinc resource partially delineated. The sphalerite skarn will require a further drill hole to outline possible extra mineralization.

Other known mineralization at Tin Spur and the Devonian grid was investigated. Both these areas appear to lack potential for a significant resource. However, Tin Spur, because of uncertainties in previous sampling, may warrant further testing.

The volcanics of the Black Bluff - Smiths Plains Area have been partially investigated. Further work on various geochemical and geophysical anomalies will need to be done before the area is fully tested.

Several aeromagnetic anomalies have been tested and most found to be due to remanent magnetism. The aeromagnetic method appears to be of limited use in basalt terrains. One aeromagnetic anomaly, Lake Gairdner, has yet to be fully tested. The Lorinna North anomaly proved to be related to Cambrian andesites.

Various geochemical stream sediment anomalies associated with possible volcanic related Pb, Zn mineralization and Sn, W mineralization have yet to be tested.

The Moina licence area still remains of prime interest, with several targets, although of a secondary nature, to be followed up.

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J of M	A.O.	C.G.	E.O.	D.S.M.E
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Received / Answered	- 3 MAY 1982			E & IL
DEPT. OF MINES REF. No.	3184/82			

THE SHELL COMPANY OF AUSTRALIA LIMITED
METALS DIVISION

APPENDICES TO ACCOMPANY

EXPLORATION LICENCE 7/74 - MOINA

Progress Report on Exploration during the Period

1/1/80 - 31/7/81

APPENDIX 1

REFERENCES

REFERENCES

Askins, P.W. (1978a). The Shepherd & Murphy Mine. Geology and Mineralization of north-west Tasmania. Green, D.C., Williams, P.R., eds. Geol. Soc. Aust. Publ.

Askins, P.W. (1978b). "Wrigglite" - a fluorite rich skarn at Moina, Tasmania. In Geology and Mineralization of north-west Tasmania. Green, D.C., Williams, P.R. eds. Geol. Soc. Aust. Publ.

Askins, P.W. (1978c). E.L. 7/74 Moina, Sheet 1, 2 and 3. All investigations to Sept. 1978. Comalco Ltd. Unpubl. Rep.

Askins, P.W. (1979). E.L. 7/74 Moina areas covered by Moina, Sheets 1, 2, 3, 1979 update and Moina sheet A. Report on all investigations to Aug. 1979. Comm. Alum. Corp. Unpubl. Rep.

Askins, P.W. (1979 Dec.) E.L. 7/74 Moina. General area, report on all investigations to December, 1979. Comm. Alum. Corp. Unpubl. Rep.

Askins, P.W. (1980 May) E.L. 7/74 Tasmania. Report on all investigations Tin Spur - Olivers Hill - Devonian Areas. Comm. Alum. Corp. Unpubl. Rep.

Austin, G., Serim, S. (1973). Exploration for porphyry copper, the Dove Granite area, Tasmania. Preliminary field report for Freeport of Aust. Inc. by Cundill Meyers & Ass. P/L. Tas. Dept. Mines Open File Rep. Q45/8.

Ayling, W.P., (1978). Preliminary investigations of the All Nations Mine Moina. Unpubl. Rep. by BRGM Aust.

Baker, W.E. (1971). Geochemical investigations in the vicinity of Oliver Hill, northwest Tasmania. Tech. Rep. Dept. Mines Tas. 14:158-183

Barton, C.M. et al (1966). Geological Atlas 1 mile series Zone 7, sheet 44, Mackintosh, Dept. Mines Tas.

Basnayake, S.B. (1975). Geochemistry and petrology of Ordovician Gordon Limestone, Mole Creek area. Unpubl. B.Sc. Hons Thesis Univ. Tas.

Blake, F. (1937). Lawkemlaw Mine, Moina. Tas. Dept. Mines Unpubl. Rep. (Typed Reports, 1937:92-94)

Blake, F. (1937). Higg's Gold Mine, Narrawa Creek. Tas. Dept. Mines Unpubl. Rep. (Typed Rep. 1937:88-91).

Blake, F. (1955). The Shepherd & Murphy Mine - Moina. Appendix Ann. Rep. Mines Dept. Tas. 1955:4-7.

Broadhurst, E. (1934). Extract from report on the Stormont & Black Bluff district. Unpubl. Rep. Tas. Dept. Mines.

Burns, K.L. (1958). No. 5 lode, No. 3 level Shepherd & Murphy Mine, Moina. Tas. Dept. Mines Tech. Rep. 2:70-72.

Burns, K.L. (1958). Preliminary report on white clay at Bell Mount. Tas. Dept. Mines Tech. Rep. 2:74-77.

Burns, K.L. (1959). The Stormont Bismuth Mine. Tech. Rep. Dept. Mines Tas. 3:36-42.

Burns, K.L. (1961). Cambrian Rocks of the Dolcoath Anticline. Tas. Dept. Mines Tech. Rep. 5:34-44.

Chesnut, W.S. (1967). Report on preliminary ground geological inspections of anomalous aeromagnetic features - Sheffield, Tasmania. E.L.15/65. BHP (Unpubl. Rep.) Tas. Dept. Mines Open File Rep. 29/8.

Cochrane, N. (1970). Final Report on Sheffield Area, Tasmania. E.L.15/65. BHP Unpubl. Rep. 934 Tas. Dept. Mines Open File Rep. Q29/10.

Cortima Mines Pty. Ltd. (1971). Sampling results E.L. 16/71, Liena and E.L. 17/71 Black Bluff. Open File Rep. Q36/17. Tas. Dept. Mines.

Collins, P.L.F. (1975). Exploratory diamond drilling in the Moina area. Tas. Dept. Mines Tech. Rep. 18:17-27.

Collins, P.L.F. (1975). The Devonport gold mine, Black Bluff. Tas. Dept. Mines Tech. Rep. 18:11-13.

Collins, P.L.F. (1975). Seismic Investigations, Moina. Tas. Dept. Mines Tech. Rep. 18:14-16.

Collins, P.L.F. (1975). A radioactive anomaly in central northern Tasmania (E.L.14/73). Tas. Dept. Mines Tech. Rep. 18:28-31.

Collins, P.L.F. (1978). All Nations Mine, Moina. Proposed diamond drilling program. Tas. Dept. Mines Unpubl. Rep. 1978/14.

Collins, P.L.F. (1981). Preliminary report on diamond drilling at All Nations Mine. Tas. Dept. Mines Unpubl. Rep.

Cummings, A.J. (1975). Tasmania Gold Project, Mole Creek area, E.L.13/74. Final report for Cygnatrex P/L. Tas. Dept. Mines Open File Rep.Q45/9.

Dandy, B.C. (1970). Annual Report Moina Area, E.L. 8/65. 1969-70. Mt. Lyell Mining & Railway Co. Ltd. Tas. Dept. Mines Open File Rep. 37/26.

Elliston, J. (1953). The Moina district. In Edwards A.B. (ed). "Geology of Australian Ore Deposits" 5th Empire Min Metall. Cong.

Everard, G. (1959). Lorinna area. Petrological notes. Tas. Dept. Mines Tech. Rep. 3:140-144.

Everard, G. (1960). Middlesex district, Forestry road, south of Liena. Petrological Notes. Tas. Dept. Mines Tech. Rep. 4:137-138.

Everard, G. (1971). Oliver Hill near Lorinna. (Notes on specimens collected at various localities). Tas. Dept. Mines Tech. Rep.14:135.

Foster, M.J. (1969). Progress Report on activities in E.L. 8/65 (Moina area) to March, 1969. Mt. Lyell Mining & Railway Co. Ltd. Tas. Dept. Mines Open File Rep. Q37/25.

Gee, C.E. (1966). The geology and mineral deposits of the Moina, Lorinna area. Unpubl. B.Sc. Hons. Thesis, Univ. of Tas.

Gove, C.J. (1974). Preliminary report on the Moina area, Tasmania. Comalco Expln. Dept. Rep.

Groves, D.I. (1965). The Shepherd & Murphy Mine, Moina. Tas. Dept. Mines Unpubl. Rep.

Hall, K.M., Taylor, C.P. (1968). Investigation of five aeromagnetic anomalies E.L. 15/65 Sheffield, Tasmania. BHP Co. Ltd. Unpubl. Rep. No. 670.

Hills, L. (1916). Tungsten and Molybdenum Part 1, North-eastern and eastern Tasmania. Part II. Middlesex & Mt. Claude Districts. Tas. Dept. Mines. Geol. Surv. Mineral Resources No.1.

Hitchcock, W.E., Pound, J.R. (1919). Notes on the Shepherd & Murphy Mine and on treatment of bismuth, tin and wolfram ores. Proc. Aust. Inst. Min. Met. No.35.

Hitchcock, W.E. (1942). Letter to Director of Mines re: Shepherd & Murphy mine, Moina. Tas. Dept. Mines Open File Rep. 37/31.

Howard, L.E. (1956). Airborne Scintollograph survey Tasmania 1955. Bur. Min. Resour. Aust. Rec. 1956 No.99.

Howland-Rose, A.W. (1975). A report on gradient electrical induced polarization surveys over the Shepherd & Murphy grid. E.L.7/74 Moina, northern Tasmania on behalf of Comalco Ltd. Unpubl. report to Comalco Ltd. by Scintrex Pty. Ltd.

Howland-Rose, A.W. (1977). A reconnaissance magnetic induced polarization survey over the Moina grid, E.L. 7/74 near Wilmot, Tasmania, on behalf of Comalco Ltd. Unpubl. Report to Comalco Ltd. by Scintrex Pty. Ltd.

Hughes, T.D. (1957). Limestones in Tasmania. Tas. Dept. Mines Geol. Surv. Min. Resources 10:149-154.

Jack, R. (1961). Gold mine, Narrawa Creek, Moina. Tech. Rep. Dept. Mines Tas. 5:102-104.

Jennings, I.B. (1958). The Round Mountain District. Geol. Surv. Tas. Bull. 45.

Jennings, I.B., et al (1959). Sheffield Map Sheet, one inch to one mile series. Geol. Surv. Tas.

Jennings, I.B. (1963). Middlesex, one mile geological map series, Explanatory Report. Tas. Dept. Mines, Geol. Surv. Explan. Rep.

Jennings, I.B. (1965). Middlesex Mineral District. In, McAndrew, J. (ed) "Geol. of Aust. Ore Deps" 8th Comm. Min. Met. Cong:512-514.

Jennings, I.B., Burns, K.L. (1958). Middlesex Map sheet, one inch to one mile series. Geol. Surv. Tas.

Keid, H.G.W. (1943). Report on the Moina mineral district. Tas. Dept. Mines Unpubl. Rep.

Kwak, T.A.P. (1978). The bearing of geochemical & spatial relationships on the genesis of the Moina W-Sn-F deposits in "Geology & Mineralization of NW Tasmania". Green, D.C., Williams, P.R., eds. Geol. Soc. Aust. Publ.

Kwak, T.A.P., Askins, P.W. (1981). Geology and genesis of the wrigglite F-Sn-W(-Be-Zn) skarn at Moina, Tasmania, Aust. Econ. Geol. 76.

Kwak, T.A.P., Askins, P.W. (1981). The nomenclature of carbonate replacement deposits, with emphasis on Sn-F(-Be-Zn) 'wrigglite' skarns. J. Geol. Soc. Aust. 28:123-136.

Lancaster, K. (1977). Exploring old mines of Tasmania's Dolcoath Granite region. Aust. Gems & Crafts Magazine Dec.76/Jan.77.

Leaman, D.E. (1974). Oliver Hill gravity survey. Tas. Dept. Mines Tech. Rep. 17:99-102.

Loftus-Hills, C. (1952). Preliminary report on the Moina tin-wolfram-bismuth project, embracing S & M and All Nations Mines. Tas. Dept. Mines Open File Rep. Q37/3.

Loftus-Hills, C. (1952). Report on the Moina tungsten-tin-bismuth project. Tas. Dept. Mines Open File Rep. Q37/4.

McDougall, I., Leggo, P.J. (1965). Isotopic age determinations on granitic rocks from Tasmania. J. Geol. Soc. Aust.12:295-332.

McKibben, J.P. (1971a). Annual report on Moina area E.L. 8/65, 1970-71. Mt. Lyell Mining & Railway Co. Ltd. Tas. Dept. Mines Open File Rep. 37/27.

McKibben, J.P. (1971b). Interim report on Moina E.L. 8/65. Tas. Dept. Mines Open File Rep. 37/28.

McKibben, J.P. (1972). Annual report on Moina area E.L. 8/65, 1971-72. The Mt. Lyell Mining & Railway Co. Ltd. Tas. Dept. Mines Open File Rep. 37/30.

McPheat, I.W., Rogers, W.G., Howard, K. (1976). Treatment of Moina fluorite. Progress report No. 2. Private report to Comalco Ltd. by the Aust. Mineral Development Lab.

McPheat, I.W., Rogers, W.G., Allen, R.J. (1977). Treatment of Moina fluorite. Amdel report No.1147. Private report to Comalco Ltd. by the Aust. Mineral Development Lab.

Mann, P.E. (1964). Wilmot Power Development Geophysical survey. Bur. Min. Resour. Aust. Rec. 1964/101.

Manson, W. St. C. (1957). R.290, R.300, R.301, R.302, R.303, R.304, R.305. Moina Tungsten-Tin Mining Co. N.L. Ore dressing investigations. Tas. Dept. Mines Tech. Rep. 1:71-82.

Manson, W. St. C. (1958). R.307, R.308, R.309, Moina Tingsten-Tin Mining Co. N.L. Ore dressing investigations. Tas. Dept. Mines Tech. Rep. 2:147-152.

Montgomery, A. (1894). Report on the mineral discoveries in the neighbourhood of Bell Mount. Ann. Rep. Sec. Min. Tas. for 1893-94.

Nixon, L.G. (1954). Geological Report on All Nations Mine and surrounding area. Rep. Dept. Mines Tas. (Unpubl.)

Nye, P.B. (1928). Report on Devon Mine. Tas. Dept. Mines Unpubl. Rep.

Omnes, G. (1970). Geophysical Survey in the Moina area, Tasmania. E.L. 8/65. Unpubl. Rep. by Compagnie Generale de Geophysique for the Mt. Lyell Mining & Railway Co. Ltd. Tas. Mines Dept. Open File Rep. Q37/29.

Paterson, S.J. (1960). Mersey Forth Wilmot Investigation. Geological Investigation Report 644-173-1 on the Lorinna Dam site. HEC Tasmania Unpubl. Rep.

Paterson, S.J. (1961, 1965). Drilling records for hole Nos. 4539, 4543, 4571, 4574. Wilmot diverson Inlet Portal & Wilmot Tunnel line (Unpubl.)

Paterson, S.J. (1967). Tertiary deep lead deposits in the Moina area. Pap. & Proc. Ry. Soc. Tas. 101:251-260.

Paterson, S.J. (1971). Engineering geology of the Lemonthyme Hydro-Electric scheme, Tasmania. Civil Eng. Trans. Apr.1971:17-24.

Paterson, S.J. (1972). Engineering geology of the Wilmot Hydro-Electric scheme, Tasmania. Aust. Geomech. Jour. G2, No.1:59-64.

Rawlings, G.E. (1967). Sub-basaltic sediments and metasediments of the Mersey/Forth area. Proc. Roy. Soc. Tas. 101:267-270.

Reid, A.M. (1919). The Mining Fields of Moina, Mt. Claude & Lorinna. Dept. Mines Tas. Geol. Surv. Bull. 29.

Reid, A.M. (1927). Stormont Bismuth prospect. Tas. Dept. Mines Unpubl. Rep.

Reid, K.O. (1967). Progress Report on activities in E.L.8/65 (Moina area) to June, 1967. Tas. Dept. Mines Open File Rep. Q37/20.

Robinson, R.G. (1957). Report on the Moina tungsten tin deposits. Tech. Rep. Dept. Mines Tas. 2:46-62.

Robinson, R.G. (1958). Moina tungsten tin deposits. Tas. Dept. Mines Tech. Rep. 2:46-62.

Rowe, S.M. (1962). Limestone deposits, Mole Creek area. Tas. Dept. Mines Tech. Rep. 7:59-63.

Scott, J.B. (1929). Mt. Stormont Mine, Moina. Tas. Dept. Mines Unpubl. Rep.

Seymour, D. (1975). Deformation studies of Gordon Limestone and Moina sandstone. Unpubl. B.Sc. Hons thesis Univ. Tas.

Sheehan, G.M. (1969). The gravity field in the Sheffield area. Unpubl. B.Sc. Hons. thesis, Univ. of Tas.

Smith, J.H. (1898). Report on the Shepherd & Murphy Mine, Bell Mount. Ann. Rep. Sec. Min. Tas. for 1896-97.

Smith, J.H. (1899). Report on the Bell Mount and Middlesex Mineral fields. Ann. Rep. Sec. Min. Tas. for 1898-99.

Stevenson, B.G. (1976). Treatment of Moina fluorite. Progress Report No.1. Private report to Comalco Ltd. by the Aust. Mineral Development Lab.

Smyth, W.D. (1979). Moina, Joint Venture proposal. Shell Co. Aust. Ltd., Metals Division. Unpubl. Rep. No. 79/08/343.

Tas. Dept. Mines (1954). Geological Report on the All Nations Mine and surrounding area. Unpubl. Rep. Tas. Dept. Mines.

Tas. Dept. Mines (1941, 1942). The Welcome Home Copper area. Vicinity of the Dove River. Typed reports for 1941, 1942. Unpubl. Rep. Tas. Dept. Mines.

Tas. Dept. Mines (1975). Diamond drill core records for holes OH 1, OH 2, OH 3, Olivers Hill. Unpubl.

Thureau, G. (1889). Special report on the geology of the route from Mt. Claude to the Five Mile Rise, west of the River Forth near Middlesex Plains, Country of Lincoln, North Tasmania. Tas. Parl. Pap. 125.

Twelvetrees, W.H. (1907). Report on the Bell Mount and Middlesex districts. Ann. Rep. Sec. Min. Tas. 1907.

Twelvetrees, W.H. (1913). The Middlesex and Mount Claude Mining Field. Tas. Dept. Mines Geol. Surv. Bull 14.

Waller, G.A. (1901). Report on Mineral Districts of Bell Mount Dove River, Five Mile Rise, Mt. Pelion and Barn Bluff. Ann. Rep. Sec. Min. Tas. for 1900-1901, 184-231.

Walsham, B.T. (1974). Report on Exploration Licence area 12/73 in the vicinity of Dove River by Freeport of Aust. Inc., between Sept. and Dec. 1973. Cundill Meyers & Ass. P/L. Tas. Dept. Mines Open File Rep. Q45/8.

Webb, J.E. (1968). Interpretation of Airborne Magnetic Survey, Staverton area, north central Tasmania for the Mt. Lyell Mining & Railway Co. Ltd. (Unpubl.)

Webb, J.E. (1968). First progress report on the ground follow-up of the Staverton airborne magnetic survey, Shepherd & Murphy Mine area. Unpubl. report by Austral Exploration Services to the Mt. Lyell Mining & Railway Co. Ltd. Tas. Dept. Mines Open File Rep. Q37/45 also Q37/23.

Webb, J.E. (1969). Second progress report Staverton geophysical results (Moina sheets 1 and 2). Unpubl. report by Austral Exploration Services to the Mt. Lyell Mining and Railway Co. Ltd. Tas. Mines Dept. Open File Rep. Q37/24 (also Q37/45).

Webb, P.N. (1974). The Dolcoath Granite Contact Aureole, Moina. Unpubl. B.Sc. Hons thesis, Univ. of Tas.

Weste, G. (1978). E.L. 7/74, Tasmania. Black Bluff - Smith's Plain area. Report on all investigations to Sept. 1978. Comalco Ltd. Unpubl. rep.

Williams, E. (1976). Tasman Fold Belt System in Tasmania. Tas. Dept. Mines.

Willimas, E. (1976). Structural map of pre-Carboniferous rocks of Tas.

Williams, K.L. (1957). Tin-tungsten ore from the Shepherd & Murphy Mine, Moina, Tasmania. CSIRO Miner. Invest. Rep. No. 681.

Williams, K.L. (1958). Tin-tungsten mineralization at Moina, Tasmania. Proc. Aus. I.M.M. No. 185:29-50.

Wood, F.W. (1955). Preliminary report on airborne reconnaissance scintillograph surveys in Tasmania. Jan. & March-April, 1955. Bur. Min. Resour. Aust. Rec. 1956, No.88.

Zarzavatjian, P.A. (1966a). Aeromagnetic survey, Staverton area, north central Tasmania for the Mt. Lyell Mining & Railway Co. Ltd. by Ameg. P/L (Unpubl.)

Zarzavatjian, P.A. (1966b). Aeromagnetic survey Sheffield area, north central Tasmania for BHP Co. Ltd. by Ameg. P/L (Unpubl.)

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APPENDIX 2

PETROLOGICAL REPORTS

SHEPHERD & MURPHY AREA - MOINA

MINERALOGICAL AND GEOLOGICAL SERVICES

806101

47 MANUKA ROAD, PANTON HILL, VIC. 3759 TEL. 478-3122 X 2649
A.H. 719-7479

Sample MD32-69.4 m

Minerals present -

fluorite
magnetite
chlorite
carbonate - siderite?
sphalerite
cassiterite
vesuvranite

Description

The main structure of the rock is that of a magnetite-wrigglite (see Askins, 1976-thesis). It has been fractured and extensive chlorite and fluorite alteration occurs only minor vesuvranite, common in such rocks, was observed. The degree of chlorite-fluorite alterations generally increases out from the factures. In many cases, it produces an "atoll" type structure consisting of magnetite rims and chlorite-fluorite centers.
Occasionally, ruby-red sphalerite occurs as small bladed crystals and masses along the peripheries of the magnetite. Fractures are often filled with fluorite but in some cases drusy cavities lined by colloform carbonate (siderite?) result. Minute amounts of cassiterite (to 3mμ long) were observed included in primary magnetite. This cassiterite tends to be very irregular in form. Cassiterite also occurs as minute (<1mm) crystals particularly noticeable in chlorite-rich areas. The cassiterite forms in loose aggregates and individual equant crystals differing in form to that observed included in magnetite.
The Sn contents in chlorite and magnetite were very low <0.02 weight percent SnO as done by election microprobo analyses.

Sample MD32-38.2 m

Mineralogy -

magnetite
chlorite
sphalerite
fine grained micaceous/chloritic alteration
vesuvranite
lemonite-carbonate alteration

Description

Like sample MD32-69.4, this sample is an altered magnetite wrigglite. A large degree of chlorite alteration occurs, especially around magnetite grains. Unlike MD32-69.4, a fine grained white micaceous (and chlorite?) alteration occurs comprising large areas between chlorite-rich areas. Cassiterite occurs rarely as small (to 21mμ crystals) in magnetite.

..2..

INERALOGICAL AND
GEOLOGICAL SERVICES

806102

47 MANUKA ROAD, PANTON HILL, VIC. 3759 TEL. 478-3122 X 2649
A.H. 719-7479

Outside magnetite, in chlorite, it often forms large (to 20mμ) grained aggregates of crystals. Some fine grained cassiterite also occurs. The coarse grained cassiterite often contains a dark core zone and an outer, pale rim. Late limonite-carbonate veins have cut all the assemblage. The amount of fluorite is much less than sample MD32-69.4m.

Conclusion

1. At least 95% of the tin values occur as cassiterite.

2. This cassiterite occurs as a primary precipitate included in magnetite (not as ex solution lamellae) and as crystals having different form (and thus, recrystallized) in chlorite.

3. Much of the latter type is very fine grained but in sample MD32-38.2m large (to 20mμ) grains are common. As such, they are of extractable size.

4. No amphibole alteration was observed so that Sn could not form in silicate structures (the Sn content of probed chlorite and magnetite was <0.02 weight percent).

5. Recrystallized fluorite also formed with chlorite. Sample MD32-38.2m is relatively low in fluorite while MD32-46.9 is very enriched. Whether there is a relation between cassiterite grain size and fine grained micaceous alterations and/or fluorite contents is possible but not determinable from only two samples.

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TECHNICAL NOTE

PM/81/03

Subject : Mineralogy of a 'sphalerite skarn' from Moina, Tasmania and its implications for beneficiation

Author : T. Finlow-Bates

Distribution :

SCOA, Melbourne (W.D. Smyth)	(3x)
BIM-MTE/2/21/214/215	(4x)
BIM-CF	(1x)
BRA-PM	(3x)
BRA-OD	(1x)
BRA-BR	(2x)
BRA-IC	(2x)

Date of issue : 11th March 1981

Report March 3

18/3/81

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1. INTRODUCTION

Two samples of material, rich in sphalerite, collected from a drill core through a skarn at Moina, Tasmania were submitted for investigation by BRA. A qualitative study of the mineralogy of the skarn was requested, with special reference to the mode of occurrence, distribution, composition and possible beneficiation of the zinc minerals (GSIF 30/1/80 from MTE/214).

Both samples were examined in transmitted and reflected light. X-ray powder diffraction patterns were made of each of the samples. One of the samples was also investigated qualitatively with the electron probe microanalyser using the energy dispersive system (EDS) attachment.

2. RESULTS

2.1 Sample 1628, TS 6264, PS 5485 SMD13 at 90m

This sample is a granular mixture of sphalerite, siderite, grossularite and subordinate quartz. Relict granules of the garnet mostly surrounded by thick rims of siderite, and 50 - 300 μm in size, are mixed with very variably sized patches of deep red sphalerite. The quartz is generally present as small (20 - 50 μm) optically strained grains mixed with the siderite. Occasionally the quartz is either enclosed by the sphalerite, or occurs as coarser-grained vein-like aggregates enclosing sphalerite. A small number of subhedral and anhedral grains of pyrite are also present (mostly 50 - 200 μm in size). The pyrite is almost always associated with the sphalerite. A grain of pyrrhotite was also observed.

2.2 Sample 1629, TS 6265, PS 5486 SMD13 at 90.5m

This sample is composed of masses of granular grossularite, patches of strongly zoned vesuvianite, abundant coarse-grained (mostly > 100 μm and up to several millimetres) deep red-brown sphalerite, minor amounts of green-blue pleochroic amphibole with marginal actinolite-tremolite, and minor amounts of quartz-sericite in patches. A little pyrite, chalcopyrite and pyrrhotite are present

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in the sphalerite mostly as small (< 20 μm) anhedral blebs. As vesuvianite is known to be able to take up to a few percent of zinc into its lattice, a qualitative examination of this phase was made with the electron probe microanalyser. In the sample studied, the vesuvianite contains less than 0.3 % (m/m) zinc (i.e. the lower level of detection of the EDS).

The grossularite is also poor in zinc. Except for a trace of manganese the only element significantly contaminating the sphalerite is iron. The colour of the sphalerite in this section and the EDS analysis suggest an iron content of around 10 %.

3. BENEFICIATION

If the samples are reasonably representative of the whole zinc bearing body at Moina, we may conclude that:

(a) Sphalerite is the only significant zinc bearing phase.

(b) The iron content of the sphalerite is such that a flotation concentrate will not contain more than about 55 % zinc.

(c) A high degree of liberation will be obtained at relatively coarse grinds.

(d) Although the silicates themselves are hard minerals, they (particularly garnet) will probably tend to fracture readily along grain boundaries, cf. the garnet sandstones at Broken Hill.

(e) No obvious trace element impurities were detected that may make concentrates of the Moina sphalerite unsaleable. If work progresses to bench-scale flotation tests, then a full spectrographic analysis of a concentrate should made at an early stage.

4. CONCLUSIONS

If the two samples submitted are representative there appears to be no sound reason why a simple 'grind and float' beneficiation circuit should not produce a saleable (if rather iron rich) zinc concentrate fron Moina 'sphalerite-skarn' with a very high recovery.

SHELL 1/81

Samples 1628, 1629 : Devenport.

W. D. Smyth, 15.1.81.

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Samples 1628, 1629.

The report provides from thin and polished sections descriptions of ore samples which were submitted by Mr W. D. Smyth.

Major sphalerite, dissociated pyrrhotite (now pyrite) and minor chalcopyrite, exist in an equilibrated recrystallised habit in an essentially calc-aluminous skarn assemblage. It seems probable that the sulphides were originally the syngenetic components of an aluminous shaley limestone which became involved with intrusive granite. The fluorine component of the vesuvianite in 1629; and the microcrystalline silica, and the hydrothermal alterations in 1628, emanated from the granite.

SMD 13 1990m.

1628 Sphalerite-pyrite in silicified-zoisitised-chloritised grossularite skarn.

In an average cross section through the core, sphalerite is more abundant than is pyrite; and much of it is in coarser masses. The sphalerite is both disseminated amongst the gangue at grain sizes of 0.01 - 0.2 mm; and is present in elongate (several cm x 2 - 3 mm) masses. In the former habit, pyrite anhedra of 0.1 mm average size occur with the sphalerite; and in the latter habit, the pyrite is either 0.5 mm in size, or enclosed within sphalerite as elongate masses of 4 - 8 mm x 2 - 4 mm.

In the finer disseminated habit the highly irregularly shaped single anhedra of sphalerite would, with moderately fine grinding, free readily from the gangue minerals and the pyrite. The individual sphalerites embody only sparse minute

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(5 - 10 [illegible]on) inclusions of pyrite, pyrrhotite and bournonite.

Sphalerite in the larger elongate masses is composite. These masses are made up of anhedral granular intergrowths of polysynthetically twinned sphalerite individuals of 1 - 2 mm grain size. The disseminated pyrite exists in the triple grain boundary junctions between groups of twinned sphalerites; with or without minor gangue components. Here too, good separation of the pyrite and gangue from the sphalerite would ensue during grinding, because of easy fracture along grain boundary junctions. However, sparse pyrrhotite, bournonite and occasional galena of a few microns grain size, are embodied as inclusions in the sphalerite.

All of the pyrite in this rock exhibits a lamellar texture which indicates that it formed from pre-existent pyrrhotite.

The gangue assemblage exhibits a significant degree of alteration, as well as extensive silicification by microcrystalline quartz. A few grossularite euhedra remain, but most of these appear to have been altered to aggregates of microcrystalline clinozoisite. What may originally have been diopside or an amphibole, is presently manifest in felted masses of very fine chlorite.

[redacted]

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The microcrystalline quartz extended as vein-like and elongate masses along the boundaries between the sulphides and the altered gangue minerals. Considerable amounts of the clinozoisite and chlorite were replaced by it.

SMD13 at 1005m

1629 Sphalerite-pyrite-minor chalcopyrite in grossularite-vesuvianite skarn.

The usual habit of the sphalerite is in roughly parallel-oriented elongate composite individuals of 2 - 8 mm x 0.5 - 3 mm. Only a small proportion is finer than 0.5 mm, and of equant or highly irregular shape.

The larger elongate sphalerites are composites of polysynthetically twinned anhedra of 0.5 - 2 mm sizes. Lamellar marcasitic pyrite (a derivative of pyrrhotite), chalcopyrite and binary hematite-marcasite grains of 0.08 - 0.3 mm sizes are sited in triple grain boundary junctions within the granular aggregates of sphalerite. There is about 3% chalcopyrite, 6% pyrite and 2% hematite amongst 50% of sphalerite. The remainder is the gangue.

Very fine chalcopyrite (5 - 30 microns), sparse fine pyrrhotite, marcasitic pyrite and hematite, are dispersed as inclusions through the individual twinned sphalerites. These minute inclusions will not be eliminated, even by the finest grinding.

However, the principal proportion of the sphalerite will free from gangue minerals, pyrite and chalcopyrite during

grinding to the average size of the twinned individuals of sphalerite which make up the composite sphalerite intergrowths. This will ensue because of the grain boundary locations of most of the pyrite, chalcopyrite and hematite.

The presence of hematite in the marcasitic pyrite is a manifestation of partial oxidation. This is further manifest in slight stainings by limonite in some of the silicate components.

The sulphides are dispersed through a moderately coarse grained subhedral-euhedral granular intergrowth of major grossularite and subordinate vesuvianite; which incorporates a small amount of very fine grained diopside, quartz and sodic hornblende. There are a few thin carbonate veinlets in the rock.

A.W.G. WHITTLE
13th February 1981.

806111

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16th January, 1981

REPORT CMS 80/11/48

YOUR REFERENCE:	Sample Despatch No. MZ01/1B/12
DATE RECEIVED:	20th November, 1980
SAMPLE NOS.:	475 - 484
SUBMITTED BY:	I. Buchhorn
WORK REQUESTED:	Petrology

H.W. Fander, M. Sc.

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Date	19/1/81	File
		MZ01 — 548
	WDS	

REPORT CMS 80/11/48

Notes:

This suite comprises variably veined and "retrogressively" altered, magnetite-rich skarns, ranging from medium-grained granular to intricately banded, finer-grained wrigglite types.

Primary skarn assemblages are typically garnet-magnetite ± tremolite-actinolite, diopside and Fe-Mg micas. Vesuvianite is of minor occurrence, and the skarns are weakly mineralised with Fe-sulphides, bismuth, cassiterite and chalcopyrite.

Secondary replacive assemblages are typically chlorite-carbonate with locally conspicuous talc. Associated phenomena include partial martitisation of magnetite and, locally, pyritisation of pyrrhotite. This retrogressive assemblage is generally related to a late phase of fracturing, reflected in veinlets, typically of chlorite and carbonate. Pink K-feldspar veins are locally significant and include disseminations of scheelite (after wolframite) and molybdenite.

Overall, there are close analogies with a previous suite described in report CMS 80/6/39. The main contrast lies in the relatively low-grade, retrogressive assemblageof chlorite-carbonate (as against biotite). This may be correlated with the similarly contrasting vein assemblage, particularly the paucity of K-spar veins.

Cassiterite was detected in trace amounts in one specimen only (478). In this particular specimen, there appearsto be a reasonable correlation between assay Sn and detectable cassiterite. However, as pointed out previously (CMS 80/6/39), non-cassiterite tin mineralogy is a common feature in high-grade skarns and their altered facies, and this aspect may warrant further examination.

D. Cowan, B. Sc.

Sections from MD 32.

REPORT CMS 80/11/48

Petrological Descriptions

475
24·35m.

(T.S. 34956)
This rock can be classified as a chlorite-carbonate-quartz rock and represents a retrogressively altered garnetiferous skarn.

Main constituents are fine-grained Fe-Mg chlorite and fine granular to anhedral, weakly poikilitic quartz. Spongy aggregates of ankeritic carbonate are common throughout and this phase also occurs in sparse crosscutting veins (to 500 μ). Accessories include patchy disseminated, more or less completely martitised, fine-grained magnetite and thinly disseminated cloudy microscopic sphene.

MD 32

Quartz is of relict primary character. In contrast, chlorite is pseudomorphous after random biotite (or phlogopite) flakes and fine-grained aggregates, and elsewhere is retrograde after an amphibole (?tremolite-actinolite). Sporadic patches of vug-like quartz aggregates, ranging up to a few millimetres diameter, are selvedged with thoroughly altered (carbonate-chlorite ± relict included quartz), sub- to euhedral garnets, recognisable as grossular-andradite from patchy, corroded relics. Carbonate elsewhere in the rock is similarly, partly, an alteration product of garnet.

This rock is thus recognisable as, primarily, a garnetiferous biotite-amphibole-quartz rock with accessory magnetite.

476
37·50m

(T.S. 34957)
This rock can be classified broadly as a "wrigglite" on the basis of its essential features, comprising an intricate contorted banding and abundant fine-grained magnetite.

Main components are fine to ultrafine (< 5-100 μ) granular to subhedral and locally fibrous magnetite, fluorite and pale to mid-green, extremely fine-grained phlogopitic biotite. These are present in near-equant proportions, with a sub- to fine millimetric scale compositional banding. Magnetite stains phlogopitic bands and grades into semi- to near-massive laminae. Fluorite bands are relatively massive. Banding is of crudely crustiform to nodular character but, as is typical in wrigglites, it is not clear whether this is a metasomatised relict sedimentary banding or a secondary feature.

Patchy, colour-variable, but typically blue-green pleochroic schorl is present with a micropoikilitic habit as anhedral to subhedral grains and crude lenses associated with the phlogopitic bands.

irregular, sub- to millimetric veins of cherty microcrystalline, weakly chlorite-stained quartz and albite occur sporadically, with associated displacements and disseminated angular intraclasts of the host rock locally impregnated with late sideritic carbonate. These fracture-healings are locally intersected by late-stage films of sericitic mica.

477

63·50

(T.S., P.S. 34958)
This rock can be broadly categorised as a chlorite-quartz rock with disseminated pyrite and conspicuous fine-grained magnetite. The rock represents a thoroughly altered "breccia", but finer details are obliterated to the extent that it is not clear whether the fabric is a primary (sedimentary) or secondary (i.e. tectonic) feature. Possibly, this will be resolved from field evidence.

The rock consists essentially of thoroughly altered (chloritised, silicified ± pyrite, magnetite), angular to subangular clasts (< 1 mm - 1.2 cm) with a weak dimensional preferred orientation, and a sparse, similarly altered matrix. Clasts are generally poorly resolved against the matrix, and the bulk are texturally featureless in terms of primary lithology. A few are recognisable as altered labile (?tuffaceous) psammopelites and others may represent impure chert. The gross fabric is consistent with a lithic (sandy, pebbly) grit, but, as noted above, a tectonic origin cannot be ruled out.

Apart from rare angular grains of clastic character and patchy relics of cherty microcrystalline silica, quartz is entirely secondary, preferentially replacing certain clasts, elsewhere subordinate to the replacive chlorite, and locally as interclast vug-like aggregates. The pervasive chlorite represents a late replacement of green phlogopitic biotite (± tremolite-actinolite) which persists locally as relics. Pale green hydromuscovite and patchy sideritic carbonate (yellowish in hand specimen) are accessory alteration phases. Opaques (magnetite, pyrite) preferentially impregnate the matrix or, locally, individual clasts.

Polished section examination reveals magnetite to be extensively martitised (i.e. replaced by secondary hematite). Pyrite occurs in two generations with sparse euhedra (mean 100 μ) of primary character and frequent fine-grained clots and irregular anhedra which appear secondary after pyrrhotite. The latter type may include magnetite. Rare chalcopyrite blebs (max. 60 μ, typically < 25 μ) and extremely rare arsenopyrite subhedra are present, but are not observed in contact with pyrite or magnetite, such that their paragenesis is not clear. There is no detectable cassiterite, wolframite, scheelite or bismuth-bismuthinite in the area sectioned.

478 (T.S., P.S. 34959)
67.1m This is a retrogressively altered, wrigglite-type, fine-grained skarn with affinities to 475 and 476.

The rock is intricately banded, largely with respect to the distribution of fine to ultrafine (max. about 50 μ, mean 10-15 μ), variably martitised magnetite. Interspersed are zones of semi- to near-massive, fine-grained Fe-Mg chlorite which is semi-pseudomorphous after amphibole, probably tremolite-actinolite. Fine-grained ankeritic carbonate is common throughout and has developed, at least in part, as a late replacement of granular to microgranular grossular-andradite which persists locally as corroded relics. Crudely lenticular patches of fluorite are disseminated throughout and enhance the banding. Fe-Mg mica was an accessory phase, now completely chloritised. In terms of general features, this rock is closely analogous to 476, but reflects a higher-grade, skarn-like silicate assemblage. Late veinlets of carbonate (+ chlorite) are common, often with small displacements of the opaque/silicate banding.

Close inspection of the areas sectioned reveals minor traces of cassiterite, characteristically as microscopic, sub- to euhedral, dark red-brown crystals (max. 30x60 μ, typically < 20 μ diameter), which are discrete to weakly clustered. These features tend to occur as inclusions in fluorite, but are locally enclosed in chlorite-carbonate aggregates. No intergrowths with magnetite were observed.

479 (T.S. 34960)
75.9m This is a very fine-grained talc-magnetite-fluorite rock or wrigglite with a characteristic intricate, sub- to fine millimetric scale banding comprising an alternation of semi- to near-massive magnetite and silicate-rich bands. Banding is reminiscent of that in, for example, a colloform to nodular limestone and may be a relict feature. Minor displacements are associated with sporadic talc-fluorite and later, crosscutting ankeritic carbonate veinlets.

Talc appears to represent a late retrogressive alteration phase and locally corrodes relict, extremely fine-grained lenses of phlogopite. Elsewhere, talc appears vaguely pseudomorphous after ?tremolite, but there are no relics to confirm this. Sparse microscopic corroded relics of garnet and pale green diopside-hedenbergite tend to confirmthe steatitised skarn interpretation.

Fluorite is semi-pervasive as microscopic patches of semi-banded distribution within the talcose bands. Magnetite is locally martitised adjacent to the late films and patchy impregnations of carbonate. The sectioned area includes a single 150 μ diameter anhedral grain of red-brown cassiterite, and extremely rare microscopic (< 15 μ diameter) cassiterite crystals similar to those in 478, but embedded in talc aggregates.

480 (T.S., P.S. 34961)
83·1m. This is a moderately altered wrigglite skarn with affinities to 476, 478 and 479. Main constituents are fine to ultrafine magnetite, extensively chloritised tremolite-actinolite, similarly-altered phlogopite-biotite and fine-grained fluorite. Patchy talc accompanies the late "retrogressive" chlorite. Sporadic granular to poikilitic patches of grossular-andradite are present. A relatively fine-scale crustiform-like banding largely reflects the distribution of magnetite and fluorite.

Apart from the near-pervasive development of chlorite, this rock is extensively veined. Intersecting veins of sanidine (pink in hand specimen) range up to 3 mm in width and include accessory fluorite, traces of quartz and apatite and sparse to frequent marginal disseminations (mean 75 μ) of cloudy scheelite. These features are mildly stressed and sericite-stained and are intersected by discontinuous veinlets of ankeritic carbonate, which are in turn mildly displaced by late films of talc and chlorite.

Polished section examination reveals scheelite to represent a late semi-pseudomorphous replacement of wolframite which persists, rarely, as corroded relics at the cores of scheelite clots.

The feldspathic veins, and adjacent areas of the host rock include locally conspicuous fine-grained (mean 15x35 μ) molybdenite. These are concentrated in marginal zones of the vein and particularly in weakly feldspathised selvedges ranging to 800 μ in width. Molybdenite is present, but is relatively rare in the core zones where it is locally accompanied by traces of pyrite and chalcopyrite.

481 (T.S. 34962)
89·0m. This is a brecciated and extensively altered wrigglite with an essential garnet-magnetite-phlogopite assemblage.

Breccia clasts of sub- to millimetric proportions are cemented and variably corroded/replaced by fine-grained chlorite aggregates. Individual clasts exhibit the characteristic wrigglite-type banding (magnetite/silicate) locally enhanced by a silicate banding with an alternation of more or less massive, fine to medium granular grossular-andradite and generally subordinate pale green phlogopite. Fine-grained fluorite is a semi-pervasive accessory component and is locally conspicuous in phlogopitic zones.

The chloritic matrix is veined by discontinuous films of ankeritic carbonate with minor associated secondary (or remobilised) fluorite. Marginal to these features, magnetite is weakly martitised. Close inspection of the area thin-sectioned revealed no optically detectable scheelite or cassiterite.

482 (T.S., P.S. 34963)
96.7m. This is a massive to finely banded (wriggite-like) garnetiferous skarn with the banding defined by the distribution of fine-to ultrafine-grained magnetite films and locally enhanced by lenses of fluorite and, elsewhere, pale phlogopite. Garnet is a grossular-andradite, generally granular and medium-grained, but relatively euhedral marginal to or where included in fluorite. This phase is locally replaced pseudomorphously by ankeritic carbonate. Similarly, phlogopite is extensively chloritised, and magnetite is variably martitised.

An early generation of fine-grained vesuvianite veining is evident in some zones. Areas of vesuvianite range up to several millimetres diameter and include marginally corroded/replaced garnet aggregates indicating vesuvianite to postdate the main pyrometasomatic phase. These zones locally parallel, but are generally discordant to, the wriggite-type banding.

Late displacive veinlets of chlorite postdate the vesuvianite veining and a weak intermediate phase of discontinuous fluorite veinlets. In detail, carbonate films tend to occur at the cores of chlorite veinlets and may intersect them, although the two phases appear essentially contemporaneous. Magnetite is weakly, but variably martitised adjacent to these displacive chloritic fracture-healings.

Polished section examination reveals extremely rare ultrafine blebs (mean 3-4 μ) of bismuth as inclusions in garnet and partly replaced by bismuthinite.

483 (T.S. 34964)
101.3m This is a relatively massive garnet skarn consisting essentially of granular, fine- to medium-grained grossular-andradite. Accessory fine-grained dolomite-ankerite and traces of quartz occur as inclusions and intergranular particles. Small intergranular patches of fluorite (with garnet micro-inclusions) are disseminated throughout. Minor chloritised ?phlogopite is present and the sectioned area includes sparse, crudely lenticular zones of partly martitised magnetite. Finer-grained magnetite occurs as microcrystalline discontinuous films selvedging sporadic microfilms of quartz and fluorite with accessory chloritised phlogopite.

This rock exhibits a weak, submillimetric-scale banding defined largely by the distribution of garnet-intergranular carbonate and quartz, and locally enhanced by subtle variations in (garnet) grain-sizing. This is an inherited feature which, together with an absence of tangible relict clastic features, is consistent with metasomatism of a banded impure carbonate facies.

484

147°3.

(T.S. 34965)
This rock is a weakly altered orthoquartzite, consisting largely of overgrown and incipiently recrystallized detrital quartz with fine-grained muscovite flakes along the grain boundaries representing a minor argillaceous matrix component.

The relict framework is moderately to well sorted in the fine to medium sand range. Apart from quartz, clastic components include rare chert fragments and fairly conspicuous detrital zircon (with subordinate opaques) distributed in contorted "placers", thus reflecting a phase of slumping. Muscovite is partly concentrated into thin lenses representing crude shaly partings.

This rock includes rare nebulous patches of apatite ranging up to a few millimetres diameter. These are poikilitic and appear to represent recrystallized primary (or diagenetic) colloform nodules. The phosphate is weakly fluorescent brown in both short and long wave UV light.

A 3.5 mm wide quartz vein transects the area sectioned. This feature includes accessory muscovite and traces of pale biotite (partly chloritised). In marginal zones of the host rock, the accessory matrix muscovite is replaced by biotite. Irregular clots of biotite, with rare associated pyrite subhedra have developed elsewhere and may represent a replacement of minor accessory carbonate cement.

D. Cowan, B. Sc.

T... P806119

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9th January, 1981

REPORT CMS 80/11/47

YOUR REFERENCE:	Sample Despatch No. MZ01/WDS/010
DATE RECEIVED:	20th November, 1980
SAMPLE NOS.:	1601, 1602, 1604, 1605, 1608
SUBMITTED BY:	W.D. Smyth
WORK REQUESTED:	Petrology

H.W. Fander, M. Sc.

806120

REPORT CMS 80/11/47

Notes:

This suite comprises mainly thoroughly ferruginised sedimentary quartzites (orthoquartzites) ranging from coarse, bimodally sorted to finer, relatively well-sorted types, and generally bedded on a millimetric scale. These rocks are of fluvial character and are unmetamorphosed. Ferruginisation is pervasive in the matrix, which appears to have been largely argillic, with minor associated carbonate, and is a late secondary phenomenon possibly of lateritic affinities.

The rocks are variably manganiferous. Generally, the Mn-oxide postdates the pervasive limonite, although the two may be more or less contemporaneous locally. The general nature of the steely to dark grey and black stainings was confirmed by chemical tests (HNO_3/sodium bismutate). Brief polished section examination of specimen 1604 confirms the assemblage to include pyrolusite, ?coronadite and degraded Mn-magnetite. Possibly, other Mn-oxide phases are present. There are no optically detectable metal salts.

Subordinate lithologies represented include ferruginised mica ?vein material (1604) and vein-quartz (1605, 1608).

Degraded sulphide is sparse and entirely restricted to rare grains of pyrite disseminated in the ferruginised psammites (1602, pyritohedral, possibly "syngenetic") and associated quartz veins (1605, 1608, cubic, hydrothermal). Quartz veins in 1608 appear to have included traces of base metal sulphide, but there are no boxworks, as may be expected in zones of pervasive late ferruginisation, such as reflected here, where boxworks, if formed, may be obliterated.

In summary, it appears the rocks may have been weakly hydrothermally mineralised in association with a quartz/mica + magnetite veining phase. Present base metal assays, however, evidently reflect the presence of metalliferous Mn-oxides and, probably, absorption onto limonite. The paucity of recognisable sulphide-derived limonite suggests the bulk of the anomalous values are exotic (i.e. introduced) rather than indigenous.

D. Cowan, B. Sc.

Sections from TIN SPUR area.

REPORT OMS 80/11/47

Petrological Descriptions

1601

TIN SPUR
12005 5BOW

(T.S. 34966) 14 Ag, 6:0 Pb, 1050 Zn, <1 Ag

This is a thoroughly ferruginised, weakly bedded, slightly gritty sandstone, essentially an orthoquartzite.

The framework is poorly sorted in the fine to coarse sand range and tends to be bimodal, with medium to coarse sand grains disseminated throughout a fine sand base. Grainshapes are similarly variable, with the coarser fractions subangular to rounded and the fine sand generally angular. These features are consistent with fluvial transport and deposition.

The main clastic component is quartz, typically as single grains, but with a subordinate component of composites (variably stressed vein-type, minor ortho- and metaquartzite). Accessories (total < 1 %) comprise sub- to rounded detrital zircons, rare ferruginised quartzose siltstone clasts, and rare degraded/leached ?feldspar grains.

The matrix is thoroughly ferruginised and consists virtually entirely of optically dense limonite. Locally, the Fe-oxide is clearly replacive after argillaceous matter (indeterminate), but typically the limonite is microcolloform to massive and featureless. Sporadic patches of Mn-oxide are present, but are not common.

The bulk of limonite, and possibly all, is of exotic (introduced) origin, rather than indigenous. This suggests that the rock was primarily cemented with a relatively soluble phase, [redacted]. Problematically, there are no relics or diagnostic boxworks to confirm this. Similarly, there are no tangible sulphide boxworks or detectable secondary metal salts.

1602

TIN SPUR
1200N 545W

(T.S. 34967) 16 Ag, 5750 Pb, 1350 Zn, 1 Ag

This is a thoroughly ferruginised, fine sandy quartzose siltstone, essentially a finer-grained facies variant of 1601.

The rock is faintly bedded on a sub- to millimetric scale and consists almost entirely of weakly marginally corroded clastic quartz grains and limonite in near-equant proportions. Microtextural features indicate the Fe-oxide replaces a primary argillaceous matrix. Sparse microscopic relict flakes of illite suggest this may have been sericitic.

Sporadic spongy patches of Mn-oxide are associated with the ferruginised matrix. Rare fine-scale "devil's dice" (max. 300 μ) with hexagonal outlines indicate the rock was weakly mineralised with pyritohedral pyrite, but there are no tangible base metal sulphide boxworks.

Minor accessory phases, recognisable in this rock, include thinly disseminated detrital tourmaline, rare zircons and rare, partly degraded clastic muscovite flakes.

1604

TIN SPUR 11505 550W

(T.S., P.S. 34968) 42 Cu, 1·10% Pb 7300 Zn <1 Ag.
This is a relatively massive limonite rock, locally colloform and weakly cavernous and elsewhere representing a thoroughly weathered and ferruginised, fine-grained mica rock. There are no definite sedimentary features and in contrast to 1601 and 1602, this rock appears representative of an altered facies, alternately a vein.

The rock is incipiently to distinctly magnetic. Polished section examination reveals this to reflect rare to locally conspicuous, discrete to clustered magnetite euhedra (mean 50 μ), extensively martitised and locally replaced by aggregates of Mn-oxide (pyrolusite in part) and martitic hematite. Sparse relics of magnetite persist and exhibit optical characteristics consistent with a low to intermediate Mn-content (trend jacobsite). Patchy late pyrolusite cavityfillings are disseminated throughout the rock. Rare columnar, cavity-filling Mn-oxide aggregates are locally mantled with fibrous outgrowths of ?coronadite (stereobinocular determination). Close inspection of the two sections and related offcuts reveals no tangible sulphide boxworks or optically detectable metal salts.

The association of magnetite and ferruginised mica suggests the mica was a ferromagnesian phase (biotite-phlogopite), although this cannot be confirmed from the patchy, degraded/ferruginised relics. The assemblage is reminiscent of a "basic" vein, alternately [redacted] metasomatic rock.

1605

(T.S. 34969) 14 Cu, 430 Pb 650 Zn <1 Ag
This rock is a thoroughly ferruginised sediment with close affinities to 1601 and particularly 1602.

The relict framework is weakly bedded on a sub- to millimetric scale and is relatively well sorted in the coarse silt/fine sand range. Apart from extremely rare detrital tourmaline, zircon, and (degraded) white mica flakes, quartz is the only clastic component. Grainshapes are angular to subangular and marginally corroded by the limonite matrix.

Limonite is massive to spongy, with semi-pervasive colloform microtextures. Vague pseudomorphs after fine-grained carbonate [illegible] are present locally, but are infrequent, and the primary nature of the bulk of matrix is obscure.

The rock includes occasional semi-conformable, weakly stressed [illegible] quartz veinlets with thinly disseminated oxidised, fine-grained pyrite and, possibly, minor traces of degraded ultrafine chalcopyrite. There are no detectable galena or sphalerite boxworks in the veinlets or the ferruginised host rock.

1608

TIN SPUR

11505 E50W.

(T.S. 34970) 32 Cu, 5600 Pb, 23000 Zn, 1 Ag.

This ferruginised and Mn-stained sediment is similar to 1601, 1602 and 1605. The framework is analogous to that of 1601 with distinct bimodal sorting reflected in subrounded, medium-sand-sized quartz grains of random to bedded distribution in a framework of relatively evenly-sized, coarse silt- to fine sand-sized quartz. Apart from extremely rare detrital tourmaline and zircon, quartz is the only recognisable clastic component.

Ferruginisation is marked to the extent that the original matrix which appears to have been argillaceous, is completely replaced by spongy to optically dense limonite. Late films, colloform veinlets, and irregular concretions of Mn-oxide are relatively common throughout. These are partly joint-controlled and postdate sporadic comb-structured to granular quartz veins ranging up to 1 cm in width and generally discordant to bedding.

[illegible] are incipiently stressed and include rare patches (to 1.5 mm, typically < 500 μ) of limonite, typically of quartz-intergranular habit. Pseudomorphs of an- to subhedral pyrite and ?magnetite are present, but are rare. There are no identifiable base metal sulphide boxworks.

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806124

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30th July, 1980

REPORT CMS 80/6/39

YOUR REFERENCE:	Letter dated 25.6.1980
DATE RECEIVED:	26th June, 1980
SAMPLE NOS.:	00001 - 00014
SUBMITTED BY:	S.D. Lee
WORK REQUESTED:	Petrology/Mineragraphy

H.W. Fander, M. Sc.

Copy to:
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REPORT CMS 80/6/39

Notes:

This is a texturally and compositionally complex suite of rocks, which may be categorised as veined and hydrothermally altered skarns.

Where relatively fresh, the typical skarnassemblage comprises diopside (+ tremolite) and grossular-andradite in varying proportions with accessory to abundant magnetite. These rocks are typically banded and may be intricately laminated. A few exhibit vague relict turbiditic features, and generally they are considered as representing skarnised labile clastic sediments, possibly with subordinate chemical sedimentary facies (?B.I.F.). The secondary phases are Ca-Mg-Fe silicates, and there is a marked paucity of Ca-silicates and carbonate which would be expected in orthodox pyrometasomatised carbonate facies. This interpretation tends to be confirmed by similarities with, for example, metasomatised tuffaceous greywackes of the Crimson Creek Formation.

Fluorite and vesuvianite are more or less ubiquitous in the skarns. Some of these rocks contain conspicuous sphalerite. Pyrite is not uncommon, but is generally secondary after pyrrhotite. Minor chalcopyrite is present and there are traces of bismuth, bismuthinite, wolframite and ?jamesonite.

Grain-sizings are widely variable, but generally fine. This pertains particularly to the silicates and is complicated by the generally marked alteration. Thus, quoted sizing ranges can be considered only as a guide.

The veins are complex. Discounting sparse Ca-Mg-Fe silicate veins related to the pyrometasomatic phase, the most conspicuous features is K-feldspar veining. These features are generally pink in hand specimen. The feldspar is generally sanidine, but elsewhere orthoclase predominates and adularia may be present. Zeolite veins are present locally, and the variation sanidine-orthoclase-adularia-zeolite can be interpreted as reflecting a range of temperatures of vein formation.

Accessory vein phases include wolframite, scheelite, fluorite, beryl, biotite-phlogopite and muscovite. Veins are typically devoid of sulphide, but may include extremely rare microscopic gold and thinly disseminated molybdenite. In general, these features have a pneumatolytic character.

Veined rocks are typically extensively altered. The main effect here is phlogopitisation (or biotitisation). Feldspathisation is developed to varying degrees and the rocks may be impregnated with a second generation of fluorite and fine magnetite.

No cassiterite was detected in the various thin- and polished sections. This aspect may warrant further examination on the basis of assay data. By analogy with other altered skarn situations, tin, if present, may be a "silicate" form.

The complex mineralogy of these rocks and their generally fine grainsizings render hand specimen interpretation difficult. Some advantages may be seen in sawn and semi-polished surfaces. As a general rule, diopsidic (and/or tremolitic) rocks are greenish to brownish grey. Strongly altered (biotitised) rocks are typically dark green to green-black, but this is complicated by patchy occurrences of dark hastingsitic amphibole. As noted, feldspathic veins are typically pink. Coarse wolframite is generally visible, but may be masked by scheelite replacements. Garnet-rich rocks tend to be brownish, but only rare coarse garnets are conspicuous.

D. Cowan, B. Sc.

REPORT CMS 80/6/39

Petrological/Mineragraphic Descriptions

00001
SMD 16
9m

(T.S. 32436) K-stain weakly positive.
This is a fine-grained diopside rock or skarn, consisting essentially of near-massive, microcrystalline (mean 10-15 μ) to finely granular (mean 50-75 μ) diopside with sporadic coarser granular aggregates and lenses. Minor ultrafine tremolite occurs intergranular to diopside and is locally concentrated into discontinuous lenses of millimetric proportions. Dark green biotite locally substitutes, texturally, for tremolite. Pyrite occurs in sporadic spongy, intergran-ular aggregates and crude lenses and appears late secondary after pyrrhotite. Accessory traces of microcrystalline sphene tend to be concentrated into thin lenses.

Sparsely disseminated aggregates of dark green Fe-chlorite (± quartz, adularia, pyrite) are sized to 1-2 mm with vaguely garnet- and ?vesuvianite-pseudomorphous shapes. Biotite is similarly partly chloritised. Overall, there is some evidence of a weak, late-stage retrogressive phase of alteration.

This rock exhibits a mildly deformed, millimetric-scale relict banding, which is enhanced by the distribution of accessories (e.g. tremolite, sphene, pyrite). Diopside may exhibit "graded" variations in sizing within individual poorly defined bands. Evidence is sketchy, but is consistent with contact-metasomatic alteration of a labile turbiditic sediment.

00002
SMD16
15m

(T.S. 32437) K-stain positive.
This rock is essentially similar to 00001, but is less altered. It grades from a microcrystalline feldspathic hornfels stained with microgranular diopside into a more or less massive microgranular Diopside skarn.

Where relatively unaltered, the rock consists of extremely fine-grained (mean 20 μ) aggregates of K-feldspar (?adularia) with subordinate to minor, closely intergrown, untwinned plagioclase, traces of quartz and minor, but semi-pervasive, degraded pale ?phlogopite. These zones are variably stained with microgranular diopside and include thinly disseminated chloritised garnet euhedra (mean 50 μ) and chloritic pseudomorphs of a poikilitic phase, possibly amphibole. Fine cloudy sphene is ubiquitous and appears to have replaced titaniferous clastic opaques. This interpretation tends to be confirmed by thinly disseminated grains of zircon and apatite of relict detrital character.

Elsewhere, as noted, the rock consists of more or less massive microgranular diopside aggregates, analogous to 00001, but relatively even-grained.

The relict banding is confused by two phases of veining, with highly discontinuous diopside veinlets locally transected and displaced by thin (max. 200 μ), straight-walled veinlets of quartz, adularia and pale brown phlogopite with accessory fluorite. These features have narrow replacement selvedges (to 750 μ wide), with diopside replaced by phlogopite and tremolite, and locally displace spongy clots and discontinuous films of pyritised pyrrhotite (sim. 00001).

Sn 14ppm; W 35ppm; Cu 139ppm.

00003 (T.S., P.S. 32438) K-stain positive.
SmD.6
362m

This banded skarn consists largely of coarse, granular grossular-andradite with accessory, closely intergrown vesuvianite and intergranular and included fine granulardiopside. Sub- to millimetric-scale banding is reflected in the distribution of diopside, sporadic lenses of diopside and chloritised biotite and, elsewhere, in the distribution of accessory magnetite. Grainsizings are widely variable and the banding is clearly a relict feature (i.e. bedding), essentially planar, but locally mildly deformed.

Magnetite is largely restricted to granular diopsidic lenses, where it is of intergranular habit and is accompanied by thinly disseminated grains (mean 50 μ) of pale (low Fe) sphalerite, partly as partial inclusions.

A second generation of finer (mean 20 μ), sub- to euhedral magnetite is evident in chloritic replacement selvedges, marginal to a semi-conformable 3 mm wide vein of K-feldspar (optically sanidine, with pervasive ultrafine Fe-pigmentation, pink in hand specimen), with accessory disseminations of fluorite and traces of chlorite, muscovite and sphene.

Adjacent to this feature, the Ca-Mg-Fe silicates are progressively chloritised. The fine magnetite is of banded distribution and appears to represent "exsolved" Fe from breakdown of the silicates. Similar, but finer, discontinuous, crosscutting veinlets occur elsewhere, but are generally devoid of alteration selvedges. These features grade into microscopic films of chlorite and carbonate. Veins are mildly stressed.

Polished section examination reveals the magnetite in this rock to be extensively martitised. There are no sulphides in the area sectioned and this confirms the sphalerite detected in thin-section as a very minor accessory phase.
Sn 740 ppm; W 310 ppm;

00004
SMD16
4lm

(T.S., P.S. 32439) K-stain negative.
This banded skarn is similar to 00003, but is slightly finer- and more even-grained. It consists essentially of granular (mean 500 μ) to massive grossular-andradite with subordinate to minor included and intergranular diopside. Accessories include poikilitic quartz, green Fe-Mg chlorite (?after biotite) and poikilitic calcite which locally develops by corroding/replacing relatively diopsidic lenses. In addition, this rock includes conspicuous sphalerite (moderate Fe, red in thin-section) in a 1 cm wide band of closely spaced, semi-continuous lenses with subordinate, closely associated pyrite. The sphalerite forms spongy, intergranular aggregates interspersed with granular diopside, garnet and relatively abundant quartz, chlorite and carbonate.

This rock has a weakly directed fabric parallelling the weak relict sub- to millimetric scale banding, and sulphide-rich zones are crudely schistose. Late discontinuous, intersecting microfractures are healed with films of quartz, calcite, chlorite and locally remobilised sphalerite. Later crosscutting, quartz-healed microfractures occur sporadically and are relatively continuous.

Polished section examination reveals sphalerite aggregates to be weakly stained throughout with exsolution chalcopyrite, typically as microscopic blebs, but with sporadic coarser blebs (to 100 μ) at sphalerite "triple points". Rare exsolution blebs of pyrrhotite are present. Pyrite occurs as subskeletal grains clustered into spongy aggregates (to 2.5 mm), and there is some evidence that these pseudomorph pyrrhotite. Rare blebs (max. 60 μ) and discontinuous films of a Pb-sulphosalt (?jamesonite) are randomly disseminated throughout.
Sn 640 ppm; W 210 ppm; Zn 7·6%; Au 0·38 ppm.

00005
SMD16
47·80

(T.S., P.S. 32440) K-stain negative.
This is a mineralogically and texturally complex rock reflecting two metasomatic phases with some common constituents. Essential features comprise a hastingsite-vesuvianite-magnetite skarn, veined and partly replaced by a phlogopite-albite-fluorite assemblage.

Where evident, the skarn exhibits a crude relict banding, defined mainly by the distribution of spongy, granular magnetite (mean 75 μ) which comprises up to 50 % of the rock. The remainder comprises random, semi-ragged hastingsitic amphibole with subordinate fluorite or, elsewhere, random to crudely banded aggregates with hastingsite, fluorite and vesuvianite in varying proportions. Grainsizings are widely variable, but generally fine, with the fluorite in granular aggregates ranging up to 2 mm diameter. Vesuvianite is granular to subhedral, occasionally radiating, and may be clouded with hastingsite inclusions. Accessories include sparse grains and small clusters of plagioclase (labradorite), rare poikilitic diopside, disseminated green-brown biotite flakes, and evenly disseminated to weakly clustered, granular to subhedral particles of scheelite (approx. 0.5 % of rock, mean 150-200 μ).

This skarn is extensively veined (to 2 mm) and marginally replaced by fine- to medium-grained aggregates of albite, fluorite and pale green phlogopite, with the mica largely restricted to selvedges (to 1 cm in width) where it replaces hastingsite and biotite. These aggregates also include disseminated grains and clusters of scheelite. Marginal areas of thehost-rock may be stained with ultrafine, secondary magnetite.

Polished section examination reveals minor traces of bismuth as 10-75 μ diameter particles, extensively corroded and replaced by bismuthinite. These phases are typically associated with clusters of magnetite and are of very spotty distribution, thus locally conspicuous in fields of view (to 2 mm diameter), but generally absent.

Extremely rare ultrafine (< 10 μ) particles of chalcopyrite are disseminated throughout the altered skarn. There are no other detectable sulphides.

Sn 1500 ppm ; W 1000 ppm ; ~~[illegible]~~

00006 (T.S., P.S. 32441) K-stain positive.
SMD16 This is a K-spar-veined and relatively strongly altered skarn with
69.4m conspicuous fine-grained sulphides.

The rock has a relict granular fabric (mean 75 μ) and, by analogy, with, for example, 00001, was originally a more or less massive granular diopside skarn. The diopside is now represented by pseudomorphous clots of pale tremolite-actinolite or, marginal to feldspathic veins, near-colourless phlogopite. These phases are locally corroded and replaced bylate secondary quartz. This rock includes sparse poikiloblasts (to 2 mm) of grossular-andradite, which are similarly partly replaced by tremolite-phlogopite-quartz aggregates.

Fine-grained magnetite is disseminated throughout the rock and may be loosely intergrown with sulphides (red sphalerite, subordinate pyrite), which are generally of silicate-intergranular habit.

The area sectioned is traversed by a 2-3.5 mm wide vein of Fe-pigmented sanidine. This feature includes sporadic discontinuous microscopic films of fluorite, accessory pale green phlogopite and spongy aggregates (to 750 μ x 4.5 mm) of scheelite. Scheelite is partly pseudomorphous after blades of wolframite and is stained with corroded microscopic relict wolfram inclusions. Phlogopitic replacement selvedges adjacent to the vein range up to 5 mm in width and are heavily impregnated with extremely fine-grained fluorite.

This rock includes sporadic lenses of semi-massive sulphide. Polished section examination of one of these zones reveals it to consist largely of coarse-grained sphalerite with a weakly directed polygonal mosaic fabric and a mean grainsize about 300 μ. Subordinate intergranular pyrite similarly occurs as polygonal to subpolygonal aggregates with an internal microstructure characteristic of pyritised pyrrhotite. Rare relics of pyrrhotite occur as microscopic (< 15 μ) inclusions in disseminated magnetite subhedra, as corroded relics in pyrite and as exsolution blebs in sphalerite. Exsolution chalcopyrite is conspicuously absent.

Very rare, highly skeletal grains of wolframite (to 200 μ) occur included in sphalerite. The sectioned area also includes a single 40 μ diameter blade of jamesonite, loosely intergrown with sphalerite and pyritised pyrrhotite.

Sn 130ppm; W 2650 ppm; Zn 740 ppm; Au 0.04 ppm

00007
SmD16
88.8m

(T.S., P.S. 32442) K-stain positive.
This rock can be classified as a feldspar-veined and altered skarn and is of similar paragenesis to 00006. On the basis of the relict fabric and sparse relics of the calc-silicates, it was originally a banded garnet-diopside skarn with accessory fluorite, ?tremolite-actinolite and possibly vesuvianite. Mineralogical banding is on a sub- to millimetric scale, with a finer, submillimetric ?relict bedding "ghosted" in the distribution of inclusions.

The calc-silicates arethoroughly altered to a secondary micaceous assemblage. This grades from green phlogopite to talc-minnesotaite. Secondary fluorite is semi-ubiquitous in fine-grained disseminations, crude lenses and discontinuous, crosscutting veinlets with accessory quartz. Fine to ultrafine secondary magnetite is associated with altered garnetiferous zones.

The sectioned area includes a 1.5 cm wide zone of feldspathic vein material (pinkish off-white in hand specimen). This consists largely of coarse (to 5 mm+), granular to subhedral orthoclase with patchy

Fe-pigmentation. Green biotite flakes are disseminated throughout marginal zones, with sporadic muscovite flakes, sub- to euhedral beryl crystals (to 1.2 mm), patches of fluorite (to 750 μ) and disseminations of scheelite developing as a semi-pseudomorphous replacement of euhedral wolframite (200 μ to 2.8 x 8 mm). Marginal to this vein, the altered host rock is relatively talcose, with a phlogopitic assemblage in distal areas. The vein has a distinct pneumatolytic character.

Polished section examination confirms the presence of thinly disseminated, single flakes (mean 50 μ) and clusters (to 200 μ) of molybdenite throughout marginal areas of the vein and adjacent micaceous altered host rock. Molybdenite may be spatially associated with wolframite and, here, is corroded by scheelite, which then trends towards powellite on the basis of fluorescence effects.

Sn 250 ppm; W 4650 ppm; Fe 10.3%; As 685 ppm

00008 (T.S., P.S. 32443) K-stain positive.

Sm 0.6
111.6m

This is a finely banded garnet-diopside skarn with accessory vesuvianite, fine intergranular and included magnetite and relatively conspicuous fluorite. As with the associated skarns, the rock is fine- to medium-grained, but with a rather wide variation in sizing, which makes sizing data rather meaningless.

Sub- to millimetric scale banding reflects an alternation of garnetiferous and granular diopsidic bands with abundant fluorite, and is enhanced by the distribution of magnetite which is typically associated with garnet. Banding is considered as (metasomatised) relict sedimentary, although the original facies is obscure (conceivably a B.I.F.).

Banding is intersected generally at a high angle by frequent veins ranging up to 4 mm in width. At least two generations of veining are evident, but relationships are complex and not easily resolved, since few vein intersections are seen.

Crosscutting veins of grossular-andradite, with subordinate diopside and fluorite, reflect the initial pyrometamorphic/metasomatic phase. These grade into, and may be mildly altered by, sparse veinlets with hastingsite-fluorite (+ magnetite, argillised ?tremolite) assemblages. These are, in turn, intersected by a typical, crudely comb-structured vein of sanidine, with disseminated clots and films of fluorite and extremely rare scheelite (to 100 μ). This feature shows thin marginal selvedges of poorly twinned albite and thin phlogopitic replacement selvedges with ultrafine secondary magnetite. There is minor development of later chloritic microfractures.

Polished section examination reveals minor traces of bismuth, as microscopic (max. 25 μ) particles and subordinate ultrafine films included in, and intergranular to, the calc-silicates. Bismuth is partly replaced by bismuthinite.

Sn 480ppm; W 470 ppm; Zn 550 ppm; Au 0.50.

00009 (T.S., P.S. 32444) K-stain positive.

SMD16 112.50m

This is a thoroughly altered skarn, essentially similar to, for example, 00006. Relict features are consistent with a banded microgranular diopside skarn with relatively abundant, very fine magnetite, accessory fluorite, garnet and vesuvianite. Garnet and vesuvianite persist locally as relics (mean 100 μ).

The bulk of the rock is more or less completely altered to extremely fine, green-brown biotite with closely intergrown fluorite. There is a semi-pervasive network of apple-green biotite veinlets and fluorite films, and ultrafine ?talc is a semi-pervasive accessory alteration phase.

Discontinuous veinlets of K-feldspar with conspicuous fluorite and accessory quartz postdate the mica veinlets. These features grade into coarser, continuous veins (3 mm - 1 cm) of crudely comb-structured, Fe-pigmented sanidine with patchy fluorite, disseminated scheelite (to 750 μ, pseudomorphing and including corroded relics of wolframite) and traces of quartzand ankeritic carbonate. These veins locally include discontinuous zones of adularia at the cores and, in common with the feldspathic veins in associated rocks, are mildly stressed and microfractured.

This rock contains extremely rare, ultrafine (< 10 μ) particles of bismuth of similar paragenesis to those in 00008.

Sn 1150ppm; W 1100ppm; Zn 1300ppm; Au 0.46ppm.

00010 (T.S., P.S. 32445) K-stain weakly positive.

SMD16 155.6m

This is a veined and altered garnet-diopside skarn, similar to the associated examples, but with a slightly different secondary alteration assemblage.

Where relatively unaltered, the rock consists of granular to more or less massive grossular-andradite with accessory intergranular and included diopside defining a sub- tomillimetric scale banding. Occasional discontinuous lenses of granular diopside enhance the banding. Minor traces of ankeritic carbonate and fluorite similarly show a banded distribution.

An irregular network of veinlets of varying continuity is present, with widths ranging up to 2.5 mm. These typically consist of weakly sericite-stained, poorly twinned albite with disseminated patches of fluorite, thin, semi-continuous films of magnetite, minor K-feldspar, disseminated aggregates of hastingsite, sparse, deep-green hedenbergite, and thinly disseminated grains (< 100 - 300 μ) of scheelite, which may be pseudomorphous after wolframite.

Coarser veins have irregular, but semi-continuous, replacement selvedges up to a few millimetres in width, with the original garnet-diopside assemblage altered to albite-hastingsite-hedenbergite aggregates with disseminations of fluorite and magnetite. There is minor late development of a sericite-calcite-chlorite assemblage in discontinuous veinlets and irregular to planar zones partly paralleling the banding.

Polished section examination confirms this rock to be devoid of sulphides. Sn 380 ppm; W 180ppm; Zn 600ppm.

00011 (T.S., P.S. 32446) K-stain positive.
SMD 15 This rock is best classified as a phlogopite-albite-fluorite rock and
52·4m is representative of an irregular vein or segregation with included angular, poorly sorted clasts of thoroughly altered host rock. These features (1-5 mm+) exhibit a faint relict microgranular fabric and generally consist of poikilitic fluorite clouded with included clots of extremely fine phlogopite (?after diopside). One clast includes a relict anhedral garnet (hand specimen only) and the altered host rock is reasonably interpreted as a diopside-garnet skarn with accessory fine-grained magnetite, locally finely banded and broadly mesofolded.

The enclosing vein material comprises mainly fluorite-albite aggregates of widely variable habit and sizing. Green to near-colourless phlogopite is disseminated throughout, and albite has clearly developed largely as a late replacement of mica aggregates (similarly some clasts are partly albitised). Fluorite is generally poikilitic with a few clear areas of millimetric proportions. Included phases are clusters of subacicular beryl, variably albitised mica (phlogopite) and sparse tourmaline (green, weakly pleochroic schorl, rare elbaite).

Accessories include traces of K-feldspar, phlogopite-stained ankeritic carbonate and Fe-Mg chlorite as a late replacement of the relict mica. Scheelite is randomly disseminated throughout the veins and, to a lesser extent, the altered host rock clasts as anhedral grains

(100 μ - 1 mm), loose clusters and vaguely wolframite-pseudomorphous aggregates (to 2 mm) weakly stained with corroded relics of wolframite.

Polished section examination reveals an adjacent zone of banded host rock to include rare microscopic particles of ?jamesonite.
Sn 850 ppm; W 590 ppm; Zn 300 ppm

00012
SMD15
75·25m

(T.S, P.S. 32447) K-stain positive.
This specimen can be classified as a feldspar-veined biotite-fluorite-magnetite rock.

The rock is fine-grained, banded on a sub- to millimetric scale and has a faint relict granular fabric suggestive of an altered skarn. Main constituents are very dark green biotite as random flakes clustered into small aggregates (mean 200 μ) and fluorite which is interstitial to these features and often poikilitic. Fluorite is accompanied by subordinate poikilitic quartz, minor untwinned albite and, locally, traces of sellaite (Mg fluoride). Fine magnetite is more or less pervasive, with a semi-banded distribution. Sporadic anhedral to skeletal grains (to 1 mm) of very dark blue schorl are associated with biotite-rich zones.

Feldspathic veins, varying in width from < 1-5 mm, transect the banding at a high angle. These consist largely of weakly stressed, granular to crudely comb-structured sanidine with pervasive Fe-pigmentation causing the pink colouration (hand specimen). Fluorite is disseminated throughout as single grains (mean 150 μ) and small clusters.

The polished section is representative of the host and associated feldspathic veins. In common with 00011, the host rock includes rare to thinly disseminated microscopic particles of jamesonite. Extremely rare microscopic particles of gold are present in the veins. These are discrete to weakly clustered and typically less than 15 μ diameter with a maximum observed of 5x15 μ.
Sn 1200 ppm; 350 ppm.

00013
SMD15
52·0m

(T.S., P.S. 32448) K-stain positive.
This is a fairly typical altered and veined skarn with the sectioned area including a 5 mm to 1 cm wide feldspathic vein and marginal zones of the altered host rock.

The skarn is largely replaced by extremely fine, green to brown-green biotite or, locally, by granular aggregates of fluorite and weakly sericite-stained albite. This rock exhibits a relict sub- to millimetric scale banding enhanced by the distribution of accessory fine-grained magnetite. In distal areas, relics of grossular-andradite persist and elsewhere, this phase is represented by biotite aggregates stained with

ultrafine secondary opaques. The remainder probably comprised finely granular diopside.

The vein consists largely of mildly stressed, granular to subhedral, Fe-pigmented K-feldspar (generally orthoclase, minor adularia) with frequent patches (to 4 mm x 1 cm) of colourless or locally massive fluorite and relatively conspicuous scheelite (to 2x4 mm with sparse corroded wolframite inclusions) in semi-continuous lenses. Accessories include very fine-grained clusters of subacicular beryl (sim. 00011, typically included in fluorite), sparse biotite flakes (partly albitised) and minor traces of calcite and sellaite.

The polished section reveals rare grains of pyritised pyrrhotite (to 120 μ) and very thinly disseminated, microscopic chalcopyrite particles (max. 20 μ) within the host rock. Magnetite is not infrequently skeletal and is locally extensively martitised.

The vein includes rare pyrite (particles to 40 μ, microscopic films) and microscopic chalcopyrite particles and extremely rare molybdenite flakes (to 50 μ). Sn 580 ppm; W 1650 ppm;

00014 (T.S., P.S. 32449) K-stain positive.
SMD 15 This is a biotite-fluorite rock with analogies to 00012, and clearly
43·7m represents an altered, banded skarn.

The rock consists essentially of spongy aggregates of extremely fine, random, dark green biotite, interspersed with fluorite. A broadly mesofolded, fine-scale banding is reflected in variations of the relative proportions of these two phases.

Degraded garnet subhedra are disseminated throughout. These features have a mean diameter of 600 μ and are pseudomorphed by aggregates of crypto- to microcrystalline K-feldspar (confirmed by staining) and ultrafine green biotite with accessory fluorite. Relict growth-zoning (and locally sector twinning), characteristic of grossular-andradite, is preserved. In some bands, the pseudomorphed garnets are stained with ultrafine secondary magnetite. These bands include accessory magnetite and it thus appears that the garnet was compositionally banded within the original skarn.

The sectioned area includes two semi-distinct types of vein. A 3 mm wide vein of Fe-pigmented K-feldspar (orthoclase with patchy, clear adularia) carries frequent thin films of fluorite and has sharp to gradational contacts with patchy marginal feldspathised zones in the host rock. This is locally intersected by microscopic films of zeolite,

albite and adularia. These can be related to sporadic, straight-walled veins (to 2 mm) of zeolite (stilbite, laumontite) with accessory calcite and chlorite. These include sporadic fluorite grains transected by zeolitic microveinlets and may, in part, represent zeolitised feldspar veins.

Polished section examination reveals the host rock to include extremely rare blebs of jamesonite (to 35 μ, typically < 15 μ), pyrite (max. 20 μ) and chalcopyrite (< 20 μ). The feldspathic veins include extremely rare particles of ?native silver (max. about 5 μ, too fine for positive optical determination).

Sn 860 ppm; W 660 ppm.

D. Cowan, B. Sc.

Analysis code B1/1 Report AC 6137/80 Page 1

NATA Certificate Results in ppm

Sample	Sn	W
00001	24	90
00002	14	35
00003	740	310
00004	640	<10*
00005	1500	1000
00006	130	2650*
00007	250	4650
00008	480	470
00009	1150	1100*
00010	380	180
00011	880	5900
00012	1200	350
00013	580	1650
00014	860	660
Detn limit	(4)	(10)

* Values for W have been redetermined by Code B2 because of serious interference.

806139

ANALYSIS
%

SAMPLE MARK	CALCIUM FLUORIDE CaF_2
00001	0.69
2	2.10
3	4.95
4	1.40
5	29.2
6	11.3
7	19.9
8	20.5
9	18.3
10	16.4
11	33.8
12	21.8
13	32.6
14	26.6

Method: E5

806140

AMDEL ANALYTICAL SERVICE

FORM 6 JOB 6134/80 *Results in ppm unless otherwise stated* BATCH NO. 1.

TT	Sample No.	Cu	Pb	Zn	Bi	As	Ag	Mo	Au
1	Diop sk 00001	270	15	50	<10		<1	1	<0.01
2	Diop sk 02	130	25	100	20		<1	2	<0.01
3	Gl. dk sk 03	10	15	120 ppm	<10 ppm		<1	10 ppm	0.02
4	Sp pk sk 04	320	20	7.6%	20 ppm		<1	1 ppm	0.38
5	Sno			4.1%					
6	wr 05	8	5	740	300		<1	22	0.04
7	Sp sk 06	590	25	10.3%	830		<1	160	0.65
8	c-s 07	38	20	580	340		<1	620	0.50
9	wr 08	10	15	1300	660		<1	9	0.46
10	mg sk 09	2	10	640	360		<1	13	0.04
11	c-s 10	8	15	300	10	1.0 ppm	<1	5	0.04
12	wr 11	8	15	180	650		<1	80	0.10
13	wr 12	2	5	230	300		<1	4	0.07
14	wr 13	210	10	140	320		<1	20	0.03
15	wr 00014	10	10	150	590		<1	5	0.04
16	no r								
17	Blank								
18									
19	CODE	C1	C1	C1	C1	C2	C2	C2	C3/3
20									

CuF2, Sn, W to follow also

THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

A

REPORT AN 6137/80

806141

x = not detected at the limits quoted.

Results in ppm unless otherwise stated. Detection limits in brackets.

Sample Mk	Ba (100)	Be (1)	Ce (100)	Co (5)	Cr (20)	La (50)	Mn (10)	Nb (20)	Ni (5)	Ta (100)
001	1600	18	x	40	1000	100	25000	20	50	
2	10000	16	x	40	1000	100	15000	20	50	
3	4000	16	x	5	50	x	25000	x	25	
4	x	210	x	80	50	100	40000	x	50	
5	8000	810	x	210	410	50	30000	x	20	
6	4000	15	x	1500	40	x	30000	x	50	
7	20000	1500	x	1210	80	500	10000	x	30	
8	1200	810	x	210	1500	x	21000	x	30	
9	2600	1000	x	215	1500	x	30000	x	30	
10	4100	500	x	15	810	x	40000	120	40	
11	x	14000	x	10	410	500	15000	x	25	
12	x	1400	x	10	1310	x	21000	x	25	
13	14000	12000	x	1310	1210	500	25000	x	25	
014	x	10000	x	10	1210	x	25000	x	10	

THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

REPORT AN 6137/80

806142 B

x = not detected at the limits quoted.

Results in ppm unless otherwise stated. Detection limits in brackets.

Sample Mark	Ti (100)	Y (10)	Zr (10)							
001	4100	1010	2510							
2	4000	1810	2010							
3	2000	1610	1510							
4	2000	1510	1510							
5	1000	1410	1510							
6	7000	1410	1010							
7	2500	1610	1510							
8	1500	1210	1510							
9	2600	1310	2010							
10	3000	1810	2000							
11	1000	1510	1010							
12	7000	1110	1810							
13	7000	1610	1010							
2014	5000	1210	1010							

Results are semi-quantitative. Elements apparently present in concentrations of econo

806143

APPENDIX 3

DIAMOND DRILL HOLE LOGS

SHEPHERD & MURPHY AREA - MOINA

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

Hole No : MD 43

PROJECT : MOINA

LOCATION CODE : MZ 01

COLLAR CO-ORDINATES : 1450E/100N

COLLAR R.L. :

LOCATION : SHEPHERD & MURPHY AREA

MAP/PHOTO REFERENCE :

DATE STARTED	21-5-81	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE	
DATE FINISHED	31-7-81	NON CORE					No OF TRAYS	
TOTAL DEPTH	325.00						SAMPLE STORAGE	
LOGGED BY	W.D. SMYTH	CORE	HQ	0	2m	2m	ASSAY LAB.	Comlabs
CONTRACTOR	A.D.D.		NQ	2	63.50	61.50	ASSAY REPORTS	
RIG	F30 RT		BQ	63.50	325.00	261.50		
DRILL CREW	G. Archer D. Goodwin	CASING	HQ	0	2m	2m	MIN. & PET. LAB.	C.M.S. P/L
			NQ	0	63.50	63.50	MIN. & PET. REPORTS	81/8/52
		CASING LEFT						

HOLE SURVEY DATA

INSTRUMENT : TROPARI

DEPTH	INSTRUMENT INCL.	INSTRUMENT AZ.	ACID ETCH INCL.	ACID ETCH AZ.	REMARKS
COLLAR	-90°	-			
100m	-85	162			
150	-84°				
250	-76				
320	-76	197°			

GRAPHIC / LETTER SYMBOL LOGGING KEY

STRUCTURE / ALTERATION CODE

B BEDDING
J JOINTING
C CLEAVAGE
F FOLIATION
sh SHEARING
q QUARTZ VEINS
O OXIDATION

DRILLING SUMMARY :

806144

PROJECT: MOINA

DIAMOND DRILL LOG - SAMPLING RECORD

HOLE NO: MD 43

From	To	Interl (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Mo	Au	Weighted Assays/Ratios	% Estimates	Core Angles	Alt	T.S P.S	Description
0·00	10·00				788 f		<4	80		60	16	75	<4							MOINA SANDSTONE. Orange-red Fe stained sandstone.
10·00	22·00				789 f		<4	85		55	24	50	<4							" " Grey.
22·00	23·00				790 f		12	20		32	28	100	<4							" " Finely bedded, shale horizon. Orange-yellow.
23·00	30·00				791 f		4	180		85	12	70	<4							" " Grey.
30·00	40·00				792 f		6	140		90	24	185	<4							" " Tubicular. Grey.
40·00	45·20				793 f		4	80		48	28	95	<4							" " Interbedded shale/sandstone. Orange-yellow.
45·20	50·00				794 f		10	40		65	28	120	<4							" " Shale with minor sandstone interbeds.
50·00	56·00				795 f		10	25		34	8	280	<4							" " " " " "
56·00	62·00				796 f		8	70		75	8	105	<4							" " Sandy/silty zone.
62·00	72·60				797 f		8	55		50	<4	32	<4							" " Quartzite/siliceous sandstone.
72·60	73·80				798 f		6	15		70	8	26	<4							" " Grey white kaolinitic shale zone.
73·80	80·00				799 f		125	140		95	16	55	<4							" " Grey white f. gn. siliceous sandstone.
80·00	90·00				800 f		28	95		60	16	46	<4							ROLAND CONGLOMERATE
90·00	100·00				801 f		14	135		85	24	65	<4							" "
100·00	110·00				802 f		18	270		145	16	115	<4							" "
110·00	120·00				803 f		50	160		120	4	80	<4							" "
120·00	130·00				804 f		40	150		95	40	160	<4							" "
130·00	134·30				805 f		30	150		140	50	70	12							" "
134·30	136·60				806 s		10	30		410	12	24	<4							" " /quartzite breccia
136·60	136·90				807 s		670	770		12.0%	8	1050	90							Qtz. pyrite, calcopyrite, magnetite, sphalerite veining.
136·90	138·90				808 s		14	40		310	<4	70	18							Siliceous skarn/brecciated quartzite.
138·90	139·60				809 s		8	35		65	<4	36	4							Cambrian volcanics. Prophyritic/fragmental? rock.
139·60	140·80				810 s		6	50		16	<4	16	6							" " " " " "
140·80	142·00				811 s		10	60		16	<4	14	4							" " Fragmental rock - breccia?
142·00	144·00				812 s		10	30		12	<4	18	70							" " " " " "
144·00	146·00				813 s		14	25		14	<4	14	4							" " " " " "
146·00	148·00				814 s		12	25		22	<4	90	<4							" " Feldspar porphyritic acid lava?
148·00	150·00				815 s		12	25		18	<4	22	4							" " " " " "
150·00	152·00				816 s		12	25		10	<4	8	<4							" " " " " "
152·00	154·00				817 s		20	25		14	<4	14	<4							" " " " " "
154·00	156·00				818 s		14	<10		10	<4	8	<4							" " " " " "
156·00	157·40				819 s		18	20		6	<4	4	<4							" " " " " "
157·40	161·60				820 s		14	25		18	<4	16	6							" " Qtz - porphyritic lava?
161·60	164·00				821 s		16	15		14	<4	20	<4							" " Qtz feldspar porphyritic lava?
164·00	167·40				822 s		26	20		16	<4	26	6							" " "
167·40	171·00				823 s		18	115		14	<4	22	44							" " "
171·00	175·00				824 s		8	15		14	<4	18	4							" " "
175·00	179·00				825 s		20	25		8	<4	12	6							" " "
179·00	183·00				826 s		26	45		8	<4	18	<4							" " "
183·00	187·00				827 s		65	55		6	<4	10	<4							" " "
187·00	191·00				828 s		12	35		10	<4	14	8							" " "
191·00	195·00				829 s		18	30		12	6	18	<4							" " "
195·00	199·00				830 s		<4	25		10	4	18	<4							" " "
199·00	203·00				831 s		24	50		8	<4	10	<4							" " "
203·00	206·60				832 s		46	55		10	<4	14	38							" " "
206·60	208·90				833 s		10	55		14	<4	22	4							" " "
208·90	213·00				834 s		18	40		16	<4	20	4							" " "
213·00	217·00				835 s		22	35		8	<4	18	<4							" " "
217·00	221·00				836 s		18	35		12	<4	14	4							" " "
221·00	224·80				837 s		6	50		14	<4	16	4							" " "
224·80	231·30				845 f		65	130		65	<4	50	8							MOINA SANDSTONE. Grey-white f-med gn quartzite.
231·30	233·20				846 s		16	30		350	14	105	12							" " Fractured zone. Qtz-pyrite-magnetite.
233·20	235·40				847 s		14	35		75	75	350	10							" " Grey quartzite. Brecciated?
235·40	236·70				848 s		20	25		105	8	2700	8							" " Quartzite - diopside - biotite?
236·70	241·80				849 f		26	105		195	24	210	125							" " Grey quartzite
241·80	243·60				850 s		30	105		180	16	185	230							" " Brown/orange-yellow shale-bedded.
243·60	245·40				851 s		14	25		95	20	90	240							" " Grey quartzite.
245·40	246·50				852 s		26	50		380	24	90	26							" " Patchy black/grey quartzite.
246·50	249·60				853 f		6	70		220	12	80	8							" " Grey quartzite.
249·60	252·10				854 s		8	25		145	16	46	28							" " Orange-yellow quartzite. Moly.
252·10	253·00				855 s		12	<10		85	8	34	36							" " Grey f.-med gn. sandstone.

PROJECT: MOINA

DIAMOND DRILL LOG - SAMPLING RECORD

HOLE NO:

From	To	Interl (m)	Core Rec'd	% Rec	Sample No.		Compos No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Mo	Au	Weighted Assays/Ratios	% Estimates	Core Angles	Alt	T.S P.S	Description
253·00	254·70				856	s		18	15		290	10	30	16							MOINA SANDSTONE. Grey f-med gn. sandstone.
254·70	255·90				857	f		85	150		120	<4	65	9500							" " " " "
255·90	256·20				858	s		80	15		70	<4	18	200							" " Quartzite with 1cm qtz.-moly vein.
256·20	260·00				859	s		30	15		105	10	30	28							" " Grey quartzite.
260·00	270·00				860	f		34	340		250	4	135	70							" " "
270·00	280·00				861	f		28	680		300	<4	260	55							" " "
280·00	283·00				862	f		36	220		200	<4	90	32							" " "
283·00	288·25				863	f		34	650		290	12	260	3200							" " Orange-yellow f. med gn. pyritic quartzite.
288·25	289·00				864	s		30	40		24	14	46	2100							" " Qtz. mica moly vein.
289·00	292·50				865	s		16	25		115	6	30	22							" " Orange-yellow quartzite.
292·50	295·30				866	s		20	<10		90	6	36	30							" " Orange-yellow siltstone/sandstone.
295·30	298·00				867	s		48	60		90	<4	70	14							" " Orange-yellow quartzite.
298·00	311·30				868	f		46	380		150	28	155	450							" " Grey quartzite.
311·30	311·80				869	s		56	35		20	30	26	175							" " Qtz moly vein.
311·80	314·60				870	f		36	1250		570	8	510	85							" " Grey quartzite.
314·60	320·15				871	f		55	520		390	<4	360	16							" " Grey/grey-green quartzite.
320·15	321·00				872	s		60	35		170	6	80	4							" " Grey white leached quartzite.
321·00	321·60				873	s		150	65		80	6	85	<4							" " Orange-yellow quartzite/shale
321·60	375·00				874	s		115	75		115	<4	70	60							" " Grey green quartzite (diopside?)

806146

PRO _M(

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Comments	Assays								Printed
							Ag	Bi	As	Cd	Fe%	Mn	Co	Be	
0.00	10.00				788		<1	<4	38	<1	0.85	130	20		
10.00	22.00				789		<1	<4	14	<1	1.75	400	22		
22.00	23.00				790		1	<4	10	<1	4.30	1400	18		
23.00	30.00				791		<1	<4	24	<1	1.30	30	32		
30.00	40.00				792		<1	<4	20	<1	1.60	440	34		
40.00	45.20				793		<1	<4	28	<1	1.40	470	20		
45.20	50.00				794		<1	<4	55	<1	4.20	1400	22		
50.00	56.00				795		1	<4	65	<1	1.45	530	16		
56.00	62.00				796		<1	24	18	<1	0.95	145	28		
62.00	72.60				797		<1	<4	16	<1	0.4	10	16		
72.60	73.80				798		<1	<4	5	<1	9.30	12	6		
73.80	80.00				799		<1	<4	4	<1	0.40	26	20		
80.00	90.00				800		<1	<4	4	<1	0.55	26	16		
90.00	100.00				801		<1	<4	<2	<1	0.50	65	20		
100.00	110.00				802		<1	4	3	<1	0.20	20	36		
110.00	120.00				803		<1	<4	6	<1	0.30	24	24		
120.00	130.00				804		<1	<4	8	1	8.30	36	22		
130.00	134.30				805		<1	<4	3	<1	0.60	30	16		
134.30	136.60				806		<1	<4	<2	<1	1.55	68	<4	252	
136.60	136.90				807		34	<4	20	3	17.5	570	50	640	
136.90	138.90				808		<1	<4	<2	<1	4.40	320	<4	336	
138.90	139.60				809		<1	<4	<2	<1	2.20	140	<4	296	
139.60	140.80				810		<1	<4	<2	<1	1.35	60	<4	115	
140.80	142.00				811		<1	<4	<2	<1	1.35	44	<4	270	
142.00	144.00				812		<1	<4	6	<1	1.60	95	<4	300	
144.00	146.00				813		<1	<4	<2	<1	1.50	190	<4	470	
146.00	148.00				814		<1	<4	4	<1	0.55	135	<4	870	
148.00	150.00				815		<1	<4	4	<1	0.48	65	<4	830	
150.00	152.00				816		<1	<4	3	<1	0.44	40	<4	670	
152.00	154.00				817		<1	<4	3	<1	1.00	180	<4	460	
154.00	156.00				818		<1	4	3	<1	1.05	155	<4	360	
156.00	157.40				819		<1	<4	<2	<1	0.95	55	<4	420	
157.40	161.60				820		<1	<4	<2	<1	1.85	190	<4	370	
161.60	164.00				821		<1	<4	3	<1	1.70	200	<4	560	
164.00	167.40				822		<1	<4	<2	<1	1.60	340	<4	370	
167.40	171.00				823		<1	<4	<2	<1	1.20	220	<4	330	
171.00	175.00				824		<1	<4	<2	<1	1.05	230	<4	370	
175.00	179.00				825		<1	<4	<2	<1	1.05	110	<4	480	
179.00	183.00				826		<1	<4	<2	<1	1.95	140	<4	700	
183.00	187.00				827		<1	<4	<2	<1	1.65	85	<4	630	
187.00	191.00				828		<1	<4	<2	<1	0.95	75	<4	500	
191.00	195.00				829		<1	<4	<2	<1	1.45	200	<4	420	
195.00	199.00				830		<1	<4	<2	<1	1.45	260	<4	330	
199.00	203.00				831		<1	<4	3	<1	1.25	44	<4	370	
203.00	206.60				832		<1	4	<2	<1	1.15	55	<4	610	
206.60	209.90				833		<1	<4	<2	<1	1.90	300	<4	580	
209.90	213.00				834		<1	<4	<2	<1	1.85	230	<4	480	
213.00	217.00				835		<1	<4	<2	<1	1.70	65	<4	430	
217.00	221.00				836		<1	<4	<2	<1	1.65	36	<4	500	
221.00	224.60				837		<1	6	<2	<1	2.10	165	<4	540	
224.60	231.30				838		<1	<4	4	<1	0.55	40		330	
231.30	233.20				839		<1	<4	18	<1	2.40	1830	40	850	
233.20	235.40				840		<1	<4	8	1	0.90	190	20	240	
235.40	236.70				841		<1	<4	28	10	2.20	6600	16	800	
236.70	241.80				842		<1	<4	14	<1	3.45	1250		240	
241.80	243.60				843		<1	<4	14	<1	5.70	1380	24	450	
243.60	245.40				844		<1	<4	18	<1	1.50	320	12	910	
245.40	246.50				845		<1	<4	14	<1	5.10	2160	60	1660	
246.50	249.00				846		<1	<4	16	<1	1.40	220		310	
249.00	250.10				847		<1	<4	28	<1	1.45	220	40	310	
250.10	253.00				848		<1	<4	5	<1	1.30	210	16	610	

80614

PRO M(

From	To	Interl (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays Ag	Bi	As	Cd	Fe %	Mn	Co	Ba	Weighted
253.00	254.70				856		<1	20	24	<1	1.60	105	85	140	
254.70	255.90				857		<1	<4	9	<1	1.45	360		50	
255.90	256.20				858		<1	4	10	<1	0.90	175	16	60	
256.20	260.00				859		<1	<4	32	<1	1.15	220	40	65	
260.00	270.00				860		<1	<4	12	<1	0.85	80		95	
270.00	280.00				861		<1	<4	12	<1	2.15	650		50	
280.00	283.00				862		<1	<4	14	<1	2.80	340		105	
283.00	288.25				863		1	<4	3	<1	2.50	680		30	
288.25	289.00				864		<1	<4	5	<1	2.60	810	<4	35	
289.00	292.50				865		<1	<4	16	<1	1.90	550	20	35	
292.50	295.30				866		<1	<4	6	<1	3.50	1090	16	440	
295.30	298.00				867		<1	<4	7	<1	3.00	540	32	85	
298.00	311.30				868		<1	<4	8	<1	1.55	280		15	
311.30	311.80				869		<1	16	3	<1	1.70	500	8	25	
311.80	314.60				870		<1	<4	4	<1	2.35	770		75	
314.60	320.15				871		<1	<4	18	<1	3.00	830		30	
320.15	321.00				872		<1	<4	30	<1	3.10	710	40	20	
321.00	321.60				873		<1	<4	6	<1	6.50	4500	20	380	
321.60	325.00				874		<1	<4	<2	<1	4.80	1580	24	560	

806148

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

Hole No : MD 42

PROJECT : MOINA

LOCATION CODE : MZ 01

COLLAR CO-ORDINATES : 1160mE/97mN

COLLAR R.L. : 550m

LOCATION : SHEPHERD AND MURPHY AREA

MAP/PHOTO REFERENCE :

DATE STARTED	30-2-81	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE	
DATE FINISHED	18-5-81	NON CORE					Nº OF TRAYS	
TOTAL DEPTH	208.0m						SAMPLE STORAGE	
LOGGED BY	W.D. Smyth	CORE	NQ	0	5	5m	ASSAY LAB.	COMLABS
CONTRACTOR	A.D.D.						ASSAY REPORTS	
RIG	F30 RT							
DRILL CREW	G. Archer D. Godwin	CASING	NQ	0	5	5m	MIN. & PET. LAB.	
							MIN. & PET. REPORTS	
		CASING LEFT	NQ	0	5	5m		

HOLE SURVEY DATA

INSTRUMENT :

DEPTH	INSTRUMENT INCL.	INSTRUMENT AZ.	ACID ETCH INCL.	ACID ETCH AZ.	REMARKS
COLLAR	-90°	-			
208m	-87°	210°			

GRAPHIC / LETTER SYMBOL LOGGING KEY

STRUCTURE / ALTERATION CODE

- B BEDDING
- J JOINTING
- C CLEAVAGE
- F FOLIATION
- sh SHEARING
- q QUARTZ VEINS
- O OXIDATION

DRILLING SUMMARY :

80G146

PROJECT: MOINA MD 42 CORE RECOVERY DIAMO

From	To	Core Length cm	Core Recovered cm	% Recovery	Sample No.	Core No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Ag	Au
0.00	2.00	200	40	20										
	3.00	100	50	50										
	4.80	180	100	56										
	8.60	380	160	42										
	9.00	40	80	100										
	12.00	300	320	100										
	15.00	300	300	100										
	18.00	300	300	100										
	21.00	300	300	100										
	24.00	300	300	100										
	27.00	300	300	100										
	30.00	300	300	100										
	31.20	120	120	100										
	33.00	180	180	100										
	36.00	300	300	100										
	39.00	300	300	100										
	42.00	300	300	100										
	45.00	300	300	100										
	48.00	300	300	100										
	49.00	100	90	90										
	51.00	200	200	100										
	54.00	300	300	100										
	57.00	300	300	100										
	58.50	150	150	100										
	60.00	150	100	67										
	63.00	300	200	67										
	64.50	150	120	80										
	65.30	130	150	100										
	66.00	20	20	100										
	69.00	300	70	23										
	71.00	200	100	50										
	72.00	100	80	80										
	73.00	100	80	80										
	75.80	200	160	80										
	78.00	300	300	100										
	81.00	300	300	100										
	84.00	300	250	83										
	87.00	300	290	97										
	90.00	300	300	100										
	93.00	300	300	100										
	96.00	300	300	100										
	99.00	300	300	100										
	102.00	300	300	100										
	105.00	300	300	100										
	108.00	300	300	100										
	111.00	300	300	100										
	114.00	300	300	100										
	117.00	300	300	100										
	120.00	300	300	100										
	126.00	600	300	50										
	129.00	300	300	100										
	132.00	300	300	100										
	135.00	300	300	100										
	138.00	300	300	100										
	142.00	400	300	75										
	145.00	300	300	100										
	148.00	300	280	93										
	151.00	300	250	83										
	154.00	300	100	33										
	157.00	300	260	87										
	160.00	300	290	97										
	162.50	250	250	100										

80 61 50

SUBJECT: MOINA MD 42 CORE RECOVERY

DJAMC

[illegible]	To	[illegible]	Core Rec'd	% Rec	Sample No.	Common No.	Assays							
							Sn	W	CaF_2	Cu	Pb	Zn	Mo	Au
162.50	163.20	70	65	93										
	165.75	255	200	78										
	171.40	565	530	94										
	174.50	340	280	82										
	178.00	320	320	100										
	181.00	300	300	100										
	184.00	300	230	77										
	187.00	300	300	100										
	189.70	270	270	100										
	192.80	310	310	100										
	195.40	260	260	100										
	199.00	360	360	100										
	202.00	300	280	93										
	208.00	600	600	100										

806151

PROJE MOIN 4 DIAMO DRILL

From	To	Interl (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays								Weighted Ass	
							Ag	Bi	As	Cd	Ta	Fe%	Co	Cr		
0.00	3.60	3.60			722 f		<1	<4	75	<1	<10	1.65	35	44		
3.60	4.80	1.20			723 s		<1	<4	55	<1	<10	6.5	8	90		
4.80	8.30	3.50			724 s		<1	<4	42	<1	<10	2.1	16	95		
8.30	15.60	7.30			725 f		<1	<4	8	<1	<10	2.95	22	24		
15.60	18.40	2.80		100	726 f		<1	<4	26	<1	<10	2.75	28	60		
18.40	21.00	2.60		100	727 f		<1	<4	20	<1	<10	1.30	24	40		
21.00	27.00	6.00		100	728 f		<1	<4	10	<1	<10	2.0	42	55		
27.00	28.60	1.60		100	729 s		<1	<4	10	<1	10	1.55	6	105		
28.60	34.00	5.40		100	730 f		<1	<4	48	<1	10	3.5	22	40		
34.00	36.00	2.00		100	731 s		<1	8	18	<1	<10	1.75	6	85		
36.00	43.80	7.80		100	732 f		<1	<4	16	<1	<10	2.8	26	50		
43.80	44.60	0.80		100	733 s		<1	6	8	<1	<10	3.4	14	90		
44.60	50.00	5.40			734 f		<1	<4	24	<1	<10	3.7	26	48		
50.00	57.00	7.00		100	735 f		<1	<4	32	<1	<10	3.2	20	32		
57.00	65.00	8.00			736 f		<1	<4	26	<1	10	2.0	16	40		
65.00	73.00	8.00			737 f		<1	<4	48	<1	<10	1.85	22	44		
73.00	75.00	2.00			738 s		<1	6	28	<1	<10	1.05	18	80		
75.00	81.00	6.00		100	739 f		<1	<4	46	<1	<10	1.85	28	32		
81.00	85.50	4.50			740 s		<1	<4	32	<1	<10	1.75	6	75		
85.50	90.00	4.50		100	741 f		<1	<4	40	<1	<10	2.2	24	50		
90.00	95.00	5.00		100	742 f		<1	<4	24	<1	10	1.85	22	36		
95.00	101.00	6.00		100	743 f		1	<4	32	<1	10	2.3	22	28		
101.00	103.00	2.00		100	744 s		<1	4	36	<1	<10	1.95	14	38		
103.00	110.00	7.00		100	745 f		<1	<4	44	<1	10	1.85	28	32		
110.00	120.00	10.00		100	746 f		1	<4	75	<1	<10	1.95	36	32		
120.00	127.00	7.00			747 f		1	<4	34	<1	<10	2.2	32	36		
127.00	129.00	2.00			748 s		<1	<4	26	2	<10	1.25	10	44		
129.00	135.00	6.00		100	749 f		1	<4	55	2	10	1.80	32	20		
135.00	137.00	2.00		100	750 s		<1	10	50	<1	<10	1.05	28	38		
137.00	140.00	3.00			751 s		<1	4	115	14	<10	4.6	16	65		
140.00	143.00	3.00			752 s		<1	12	140	20	<10	8.0	4	55		
143.00	145.00	2.00		100	753 s		<1	36	26	40	<10	22.5	10	42		
145.00	148.00	3.00			754 s		<1	24	65	75	15	16.0	12	42		
148.00	151.00	3.00			755 s		<1	12	20	16	15	19.0	6	30		
151.00	158.00	7.00			756 s		<1	90	55	30	<10	17.5	10	50		
158.00	160.00	2.00			757 s		<1	740	60	6	<10	22.5	6	20		
160.00	162.50	2.50		100	758 s		<1	490	265	4	<10	21.5	<4	22		
162.50	164.60	2.10			759 s		<1	550	240	4	<10	21.5	<4	14		
164.60	165.60	1.00			760 s		<1	430	365	4	<10	18.0	4	26		
165.60	167.80	2.20			761 s		<1	250	285	4	<10	23.0	4	28		
167.80	168.80	1.00			762 s		<1	165	325	10	<10	23.0	6	38		
168.80	171.10	2.30			763 s		<1	530	165	6	<10	20.5	<4	18		
171.10	174.10	3.00			764 s		<1	410	150	4	<10	19.5	4	26		
174.10	176.00	1.90		100	765 s		<1	530	135	4	<10	26.5	8	36		
176.00	177.00	1.00		100	766 s		<1	310	135	4	<10	17.5	6	34		
177.00	178.50	1.50		100	767 s		<1	26	12	2	<10	3.4	<4	25		
178.50	179.50	1.00		100	768 s		<1	24	18	2	<10	10.5	<4	90		
179.50	180.80	1.30		100	769 s		<1	26	25	6	<10	12.0	<4	30		
180.80	183.10	2.30			770 s		<1	65	14	6	<10	12.5	<4	34		
183.10	184.45	1.35			771 s		<1	230	36	36	<10	11.0	22	40		
184.45	184.95	0.50		100	772 s		<1	195	34	115	<10	16.0	48	28		
184.95	187.20	2.25		100	773 s		<1	20	10	24	<10	10.5	10	80		
187.20	188.20	1.00		100	774 s		<1	10	4	8	<10	10.0	6	38		
188.20	188.80	0.60		100	775 s		<1	12	6	6	<10	9.5	<4	38		
188.80	191.00	2.20		100	776 s		<1	10	5	6	<10	10.5	<4	55		
191.00	192.60	1.60		100	777 s		<1	<4	7	6	<10	12.5	<4	95		
192.60	195.20	2.60		100	778 s		<1	6	9	4	<10	23.5	40	60		
195.20	197.00	1.80		100	779 s		<1	<4	22	<1	<10	7.4	10	50		
197.00	199.30	2.30		100	780 s		<1	8	20	<1	<10	6.9	10	75		
199.30	208.00				781 f		<1	<4	14	<1	<10	3.1	12	32		

80 6152

THE SHELL COMPANY OF AUSTRALIA LTD. - METALS DIVISION

PROJECT: MOINA — DIAMOND DRILL LOG - SAMPLING RECORD — HOLE NO: MD42

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Mo	Au	Weighted Assays/Ratios			% Estimates	Core Angles	Alt	T.S P.S	Description
0.00	3.60	3.60			722	f	12	310		540	14	380	8									MOINA SANDSTONE. F med gn. sandstone
3.60	4.80	1.20			723	s	48	25		70	50	50	12									" " Leached, pyritic
4.80	8.30	3.50			724	s	12	90		60	30	115	10									" " " "
8.30	15.60	7.30			725	f	<4	80		100	4	110	<4									" " Dark brown/black silty sandstone
15.60	18.40	2.80		100	726	f	<4	100		110	26	95	<4									" " Grey f gn silicified, tubicular
18.40	21.00	2.60		100	727	f	8	110		115	40	110	<4									" " " " "
21.00	27.00	6.00		100	728	f	4	220		185	22	165	<4									" " " " "
27.00	28.60	1.60		100	729	s	14	<10		34	26	46	6									" " Chloritic, pyritic
28.60	34.00	5.40		100	730	f	14	90		110	38	135	<4									" " Grey med-f gn sandstone
34.00	36.00	2.00		100	731	s	10	35		26	12	22	<4									" " " "
36.00	43.80	7.80		100	732	f	12	85		115	24	95	<4									" " " " "
43.80	44.60	0.80		100	733	s	18	<10		170	24	95	<4									" " Orange-yellow leached sandstone
44.60	50.00	5.40			734	f	6	55		90	16	75	<4									" " Grey tubicular sandstone
50.00	57.00	7.00		100	735	f	6	70		70	16	130	<4									" " Dark brown f gn sandstone-siltstone
57.00	65.00	8.00			736	f	6	60		48	28	95	<4									" " Orange yellow badly broken.
65.00	73.00	8.00			737	f	<4	95		75	24	95	8									" " " " "
73.00	75.00	2.00			738	s	<4	10		110	14	40	<4									" " Silicified, chloritic, pyritic
75.00	81.00	6.00		100	739	f	6	80		120	14	55	8									" " Orange yellow badly broken.
81.00	85.50	4.50			740	s	<4	35		26	34	42	<4									" " " "
85.50	90.00	4.50		100	741	f	6	60		75	18	56	8									" " Grey f-med gn tubicular sandstone
90.00	95.00	5.00		100	742	f	4	35		85	20	32	4									" " " " "
95.00	101.00	6.00		100	743	f	<4	55		140	34	100	4									" " " " "
101.00	103.00	2.00		100	744	s	4	15		95	18	26	6									" " " " "
103.00	110.00	7.00		100	745	f	<4	70		110	20	75	8									" " " " "
110.00	120.00	10.00		100	746	f	8	60		125	80	260	12									" " " " "
120.00	127.00	7.00			747	f	8	60		115	180	480	4									" " " " "
127.00	129.00	2.00			748	s	<4	20	0.04	85	260	1000	6	<0.05								" " Qtz. veining, silicification
129.00	135.00	6.00		100	749	f	<4	85		90	290	1150	4									" " " "
135.00	137.00	2.00		100	750	s	C1 8	10	0.04	120	185	240	8	<0.05								" " " " brecciated, Hugo's Fault.
137.00	140.00	3.00			751	s	10	30		100	280	5300	<4									Hugo's Fault. Brecciated zone, wrigglite, calc silicate, pyrite.
140.00	143.00	3.00			752	s	8	45		34	280	1.10%	<4									" "
143.00	145.00	2.00		100	753	s	C2 55	95	0.15	32	360	2.55%	<4	<0.05			1.8% Zn					" "
145.00	148.00	3.00			754	s	60	90		70	1050	2.95%	<4									" "
148.00	151.00	3.00			755	s	16	90		12	80	1.85%	<4									" "
151.00	158.00	7.00			756	s	380	125	0.90	46	370	1.30%	<4	<0.05	380	125						Wrigglite, Weathered altered.
158.00	160.00	2.00			757	s	1500	100		6	24	730	<4									"
160.00	162.50	2.50		100	758	s	C3 1300	520	11.8	<2	16	310	<4	<0.05								" Two feldspar veins
162.50	164.60	2.10			759	s	1650	590		<2	14	300	<4									Fractured quartzite-mag-chlorite veins. scheelite.
164.60	165.60	1.00			760	s	1200	410	9.05	22	14	400	<4	<0.05								Wrigglite.
165.60	167.80	2.20			761	s	1250	200	9.25	4	16	220	<4	<0.05								Fault zone. Sheared material
167.80	168.80	1.00			762	s	660	140	4.00	60	460	1300	<4	<0.05	1350	475						Wrigglite. Feld. veining
168.80	171.10	2.30			763	s	C4 1150	690	12.5	14	48	230	12	<0.05								" "
171.10	174.10	3.00			764	s	1100	620		20	30	220	6									Garnet-magnetite skarn. Minor feld. veining. scheelite.
174.10	176.00	1.90		100	765	s	C5 2100	520	10.4	14	20	220	<4	<0.05								" " " " "
176.00	177.00	1.00		100	766	s	1350	800		<2	18	150	12									Quartzite. Fractured-mag-chl. scheelite.
177.00	178.50	1.50		100	767	s	240	190		4	20	100	6		240	190						Garnet/garnet-magnetite skarn. Few feld veins. scheelite.
178.50	179.50	1.00		100	768	s	C6 400	210	5.15	<2	34	85	<4	<0.05								" " "
179.50	180.80	1.30		100	769	s	580	160		<2	42	90	<4									" " "
180.80	183.10	2.30			770	s	530	470		<2	26	70	6		435	305						" " "
183.10	184.45	1.35			771	s	350	360		40	24	6700	14									" " "
184.45	184.95	0.50		100	772	s	C7 620	420	7.90	120	30	2.30%	<4	<0.05			0.7% Zn					" " "
184.95	187.20	2.25		100	773	s	240	210		22	38	3500	6									" " "
187.20	188.20	1.00		100	774	s	380	75		<2	60	300	<4									" "
188.20	188.80	0.60		100	775	s	C8 600	60	4.25	<2	50	145	<4	<0.05								" "
188.80	191.00	2.20		100	776	s	340	150		<2	34	95	<4		420	210						" " Qtz epidote vein.
191.00	192.60	1.60		100	777	s	500	420		<2	34	125	8									" "
192.60	195.20	2.60		100	778	s	490	135	0.40	180	12	250	55	<0.05	490	135						Chlorite-garnet-pyrite-magnetite skarn.
195.20	197.00	1.80		100	779	s	C9 210	80	0.50	<2	8	130	12	<0.05	180	80						MOINA SANDSTONE. Chloritic, leached.
197.00	199.30	2.30		100	780	s	155	80		<2	8	110	32									" "
199.30	208.00	8.70			781	f	65	85		36	24	125	36		65	65						" " Quartzite.

Sheet [redacted] of [redacted] Sheets

8 0 1 5 2 5

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

Hole No : MD 41

PROJECT : MOINA

LOCATION CODE : MD 01

COLLAR CO-ORDINATES : 975E 153N

COLLAR R.L. : 537m

LOCATION : SHEPHERD & MURPHY AREA

MAP/PHOTO REFERENCE :

HOLE SURVEY DATA

INSTRUMENT :

DEPTH	INSTRUMENT		ACID ETCH		REMARKS
	INCL.	AZ	INCL.	AZ.	
COLLAR	-45°	215°			
55	-44°				TROPARI
100	-43°	210°			
150	-43°				

DATE STARTED	1-3-81	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE	
DATE FINISHED	16-3-81	NON CORE					Nº OF TRAYS	
TOTAL DEPTH	150.70m						SAMPLE STORAGE	
LOGGED BY	W.D. Smyth	CORE	HW	0	9m	9m	ASSAY LAB	COMLABS
CONTRACTOR	A.D.D.		HQ	9	250.7m	141.7m	ASSAY REPORTS	
RIG	10L							
DRILL CREW	E. McRae E. Hornblow	CASING	HW	0	9m	9m	MIN. & PET. LAB	
							MIN. & PET. REPORTS	
		CASING LEFT	-	-	-	-		

GRAPHIC / LETTER SYMBOL LOGGING KEY

STRUCTURE / ALTERATION CODE

B BEDDING
J JOINTING
C CLEAVAGE
F FOLIATION
sh SHEARING
q QUARTZ VEINS
O OXIDATION

DRILLING SUMMARY :

80154

PROJECT: MOINA

DIAMOND DRILL

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Comments	Assays								Selected Assays	
							Ag	Bi	As	Cd	Te	Fe%	Co	Cr	Mo	
0.00	10.00	10.0			s 656		<1	490	190	<1	<10	21.0	12	30		
10.00	13.00	3.0	2.3	77	s 657		<1	390	175	<1	<10	17.5	6	20		
13.00	15.00	2.0	1.6	80	s 658		<1	490	100	<1	10	20.5	8	18		
15.00	15.20	0.2	0.16	80	s 659		<1	420	36	<1	<10	20.0	10	14		
15.20	16.00	1.0	0.8	80	s 660		<1	940	190	<1	<10	19.0	8	20		
16.00	16.80	0.8	0.7	87	s 661		<1	230	140	<1	<10	21.0	6	16		
16.80	18.00	1.2	1.04	87	s 662		<1	270	230	<1	<10	13.5	6	26		
18.00	19.00	1.0	0.87	87	s 663		<1	1200	105	<1	<10	15.5	8	28		
19.00	20.00	1.0	0.97	97	s 664		<1	4500	55	<1	<10	15.5	8	30		
20.00	21.00	1.0	0.97	97	s 665		<1	390	120	<1	10	16.0	8	16		
21.00	22.00	1.0	1.0	100	s 666		<1	490	230	<1	<10	17.0	6	8		
22.00	23.00	1.0	1.0	100	s 667		<1	330	120	<1	<10	18.0	8	10		
23.00	24.00	1.0	1.0	100	s 668		<1	460	175	<1	<10	19.5	6	14		
24.00	26.00	2.0	2.0	100	s 669		<1	430	90	<1	<10	19.0	6	14		
26.00	26.50	0.5	0.5	100	s 670		<1	590	200	<1	<10	22.5	10	16		
26.50	27.00	0.5	0.5	100	s 671		<1	580	170	<1	<10	16.5	8	16		
27.00	27.70	0.7	0.7	100	s 672		<1	1150	175	<1	10	15.5	10	18		
27.70	28.50	0.8	0.7	87	s 673		<1	310	135	<1	<10	15.0	8	30		
28.50	30.00	1.5	1.25	83	s 674		<1	450	145	<1	<10	11.5	6	34		
30.00	31.00	1.0	0.83	83	s 675		<1	1250	155	<1	<10	6.9	<4	36		
31.00	37.00	6.0	4.50	75	r 676		1	530	16	<1	10	13.5	26	36	900	
37.00	37.90	0.9	0.9	100	s 677		<1	840	12	<1	10	9.0	<4	32		
37.90	43.00	5.1	5.1	100	r 678		<1	390	9	<1	<10	11.2	12	42	950	
43.00	48.00	5.0	5.0	100	r 679		<1	65	24	<1	<10	11.5	12	40	920	
48.00	49.10	1.1	1.0	90	s 680		<1	30	22	<1	<10	6.9	<4	34		
49.10	52.60	3.5	3.44	98	r 681		<1	28	38	<1	<10	11.5	10	28	970	
52.60	53.30	0.7	0.63	90	s 682		<1	<4	4	<1	<10	6.1	<4	50		
53.30	55.00	1.7	1.53	90	r 683		<1	<4	12	<1	<10	11.5	10	44	760	
55.00	56.20	1.2	1.2	100	s 684		<1	<4	5	<1	15	8.3	<4	40		
56.20	57.70	1.5	1.5	100	r 685		<1	<4	4	<1	<10	10.2	8	42	840	
57.70	59.20	1.5	1.5	100	s 686		<1	<4	3	<1	<10	9.8	<4	34		
59.20	66.00	6.8	6.2	91	r 687		<1	20	18	<1	<10	12.5	4	26	380	
66.00	68.00	2.0	1.04	52	s 688		<1	<4	3	<1	<10	4.7	12	85		
68.00	70.30	2.3	1.16	47	s 689		<1	<4	6	<1	<10	6.9	14	90		
70.30	72.30	1.8	1.67	93	r 690		<1	<4	5	<1	<10	11.5	10	38	790	
72.30	76.20	3.9	3.35	86	s 691		<1	<4	5	<1	<10	18.3	12	44	1.2E	
76.20	80.80	4.6	4.6	100	r 692		<1	<4	5	<1	<10	11.5	4	55	860	
80.80	82.20	1.4	1.4	100	s 693		<1	20	7	<1	<10	8.3	4	60		
82.20	87.70	5.5	5.5	100	r 694		<1	60	22	<1	10	16.5	10	34	750	
87.70	89.90	2.2	2.2	100	r 695		1	160	220	140	<10	24.5	60	22	1.0E	
89.90	90.40	0.5	0.5	100	s 696		<1	38	44	<1	<10	7.9	4	55		
90.40	91.70	1.3	1.3	100	r 697		<1	85	75	<1	<10	13.5	12	24	890	
91.70	93.00	1.3	1.3	100	s 698		<1	690	26	<1	<10	14.5	20	18		
93.00	95.00	2.0	2.0	100	s 699		<1	125	55	<1	<10	13.5	10	36		
95.00	96.00	1.0	1.0	100	s 700		<1	50	36	<1	<10	14.5	6	36		
96.00	96.50	0.5	0.5	100	s 701		<1	60	145	<1	<10	9.5	6	34		
96.50	97.60	1.1	1.1	100	r 702		<1	<4	<2	<1	<10	16.5	8	32	800	
97.60	98.60	1.0	1.0	100	s 703		<1	16	16	<1	<10	15.0	8	44		
98.60	101.00	2.4	2.4	100	r 704		<1	410	10	<1	<10	19.0	12	34	460	
101.00	102.70	1.7	1.7	100	s 721		<1	26	4	<1	<10	6.8	8	55		
102.70	103.30	0.6	0.6	100	s 705		<1	<4	<2	<1	<10	6.7	<4	55		
103.30	103.90	0.6	0.6	100	s 706		<1	<4	6	<1	<10	9.5	<4	72		
103.90	109.50	5.6	5.6	100	r 707		<1	8	7	<1	<10	9.5	6	48	84	
109.50	111.80	2.3	2.3	100	s 708		<1	<4	5	<1	<10	7.4	6	55		
111.80	113.60	1.8	1.8	100	r 709		<1	8	5	<1	<10	7.2	26		180	
113.60	115.00	1.4	1.4	100	s 710		<1	<4	2	<1	<10	5.8	10	80		
115.00	116.20	1.2	1.2	100	s 711		<1	<4	5	<1	20	6.3	10	52		
116.20	118.00	1.8	1.8	100	r 712		<1	<4	10	<1	<10	7.4	20	52	3	
118.00	124.00	6.0	6.0	100	r 713		<1	<4	4	1	<10	3.3	12	65	13	
124.00	125.00	1.0	0.9	90	r 714		<1	<4	10	<1	<10	2.2	28	38	36	
125.00	128.00	3.0	2.8	93	s 715		<1	<4	10	<1	<10	1.8	10	60		

80615

THE SHELL COMPANY OF AUSTRALIA LTD. METALS DIVISION

PROJ. Mc... | MON... | ELL L | SAM... | G RE... | HOLE MD...

From	To	Interl (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Mo	Au	Weighted Assays/Ratios			% Estimates				Core Angles				T.S Alt	T.S P.S	Description
0.00	10.00	10.0			s 656		1250	680		46	8	290	12		1250	680												Rubble - highly weathered wrigglite skarns.
10.00	13.00	3.0	2.3	77	s 657		1200	580		42	8	180	24															Wrigglite/magnetite - chlorite skarn. K feld - qtz veins
13.00	15.00	2.0	1.6	80	s 658		1550	540		50	10	165	8															" " " "
15.00	15.20	0.2	0.16	80	s 659		1600	350		60	12	160	12		1340	570												" " " " K feld veining
15.20	16.00	1.0	0.8	80	s 660		1050	580		12	10	200	4															" " " "
16.00	16.80	0.8	0.7	87	s 661		1300	230		14	8	260	<4															" " " " K feld veining
16.80	18.00	1.2	1.04	87	s 662		1900	730		18	10	160	8															" " " " K feld veining. Scheelite
18.00	19.00	1.0	0.87	87	s 663		3300	760		14	12	120	8		2160	825												" " " " " " "
19.00	20.00	1.0	0.97	97	s 664		2200	970		16	8	105	4															" " " " " " "
20.00	21.00	1.0	0.97	97	s 665		1300	860		16	55	135	44															" " " " " " "
21.00	22.00	1.0	1.0	100	s 666		1400	1300		12	19	185	24		1375	1775												" " " " " " "
22.00	23.00	1.0	1.0	100	s 667		1350	2250		16	8	175	24															" " " " " " "
23.00	24.00	1.0	1.0	100	s 668		2350	690		14	4	170	4															" " " " " " "
24.00	26.00	2.0	2.0	100	s 669		2550	930		12	6	185	8		2170	800												" " " " " " "
26.00	26.50	0.5	0.5	100	s 670		1450	590		14	8	250	<4															" " " " " " "
26.50	27.00	0.5	0.5	100	s 671		1000	730		24	6	180	12															" " " " " " "
27.00	27.70	0.7	0.7	100	s 672		1400	1050		34	28	210	4		1588	1820												" " " " " " "
27.70	28.50	0.8	0.7	87	s 673		1750	2500		12	18	135	8				1560 ppm Sn 820 ppm W											" " " " " " "
28.50	30.00	1.5	1.25	83	s 674		1600	380		12	14	140	8		1600	380												Garnet/Garnet - diopside/garnet - magnetite - chlorite skarn. K feld veining. Scheelite
30.00	31.00	1.0	0.83	83	s 675		520	110		12	20	190	36		520	220												" " " " " "
31.00	37.00	6.0	4.50	75	r 676		520	240		290	20	300	4															Garnet/Garnet - diopside skarn. Minor quartz and feldspar veins.
37.00	37.90	0.9	0.9	100	s 677		430	2250		16	28	105	65		430	2250												" . Qtz - magnetite veining.
37.90	43.00	5.1	5.1	100	r 678		360	140		100	14	190	<4		420	210												Garnet/Garnet - diopside skarn. Minor quartz or feldspar veins.
43.00	48.00	5.0	5.0	100	r 679		490	260		130	24	185	6															" " "
48.00	49.10	1.1	1.0	90	s 680		460	2650		16	24	70	90		460	2650												" " " . Qtz - magnetite veining
49.10	52.60	3.5	3.44	98	r 681		440	190		100	12	170	75		440	190												" " "
52.60	53.30	0.7	0.63	90	s 682		230	1350		14	20	50	260		230	1350												" " " " " " "
53.30	55.00	1.7	1.53	90	r 683		410	75		60	12	130	<4		410	75												" " "
55.00	56.20	1.2	1.2	100	s 684		370	1650		12	20	55	28		370	1650												" " " . Qtz - magnetite - mica veins
56.20	57.70	1.5	1.5	100	r 685		370	100		85	18	210	<4		370	100												" " "
57.70	59.20	1.5	1.5	100	s 686		340	4800		12	65	55	240		340	4800												" " " " " " "
59.20	66.00	6.8	6.2	91	r 687		360	110		46	26	115	<4		360	110												" " "
66.00	68.00	2.0	1.04	52	s 688		110	550		16	6	115	530		225	840												Brecciated silicified zone. Badly broken.
68.00	70.30	2.3	1.16	47	s 689		320	970		16	6	160	650															" " " " "
70.30	72.30	1.8	1.67	93	r 690		610	130		42	12	175	<4															Garnet skarn. Numerous fine magnetite - chlorite veins.
72.30	76.20	3.9	3.35	86	r 691		670	400		36	10	310	70		650	330												Garnet skarn. Altered epidote ? Magnetite - chlorite veins.
76.20	80.80	4.6	4.6	100	r 692		630	350		38	12	130	8															Garnet/Garnet - diopside skarn.
80.80	82.20	1.4	1.4	100	s 693		390	700		14	24	105	460		390	700												" " " . Qtz - mica - magnetite veins.
82.20	87.70	5.5	5.5	100	r 694		940	100		48	14	160	6		910	120												Garnet - magnetite - chlorite skarn.
87.70	89.90	2.2	2.2	100	r 695		850	170		300	14	2.15%	<4															Garnet - magnetite - chlorite - epidote skarn.
89.90	90.40	0.5	0.5	100	s 696		450	1000		12	20	125	260		450	1000												Garnet - magnetite - chlorite - epidote skarn. Qtz - mica - Wolframite vein.
90.40	91.70	1.3	1.3	100	r 697		810	130		85	12	650	<4		810	130												Garnet - magnetite - chlorite - epidote skarn.
91.70	93.00	1.3	1.3	100	s 698		1150	240		125	16	155	55															Wrigglite.
93.00	95.00	2.0	2.0	100	s 699		830	150		60	12	135	8		900	190												Garnet - chlorite - magnetite skarn . K feld veining.
95.00	96.00	1.0	1.0	100	s 700		890	120		14	14	110	<4															" " " . Feld veining.
96.00	96.50	0.5	0.5	100	s 701		570	360		8	14	125	145															" " " . Qtz - mica - magnetite veining
96.50	97.60	1.1	1.1	100	r 702		610	110		20	10	180	28		610	110												Garnet - chlorite - magnetite skarn.
97.60	98.60	1.0	1.0	100	s 703		490	3800		10	18	130	1300		490	3800												Garnet - chlorite - magnetite skarn. Qtz - mica - Wolframite vein.
98.60	101.00	2.4	2.4	100	r 704		730	185		160	10	200	6		730	185												" " " . K feld veining.
101.00	102.70	1.7	1.7	100	s 721		165	7050		8	6	55	860		195	9570												Magnetite - chlorite garnet skarn. Qtz - mica - scheelite vein.
102.70	103.30	0.6	0.6	100	s 705		280	1.67%		6	24	65	195															" " " . Qtz - mica - Wolframite vein.
103.30	103.90	0.6	0.6	100	s 706		430	85		8	40	70	4															Garnet - chlorite - magnetite skarn. Qtz - feld vein - scheelite.
103.90	109.50	5.6	5.6	100	r 707		520	100		70	20	150	<4		440	209												Garnet - chlorite - magnetite skarn.
109.50	111.80	2.3	2.3	100	s 708		440	340		8	18	70	290															" " " " . Qtz - mica - Wolframite veins. Feldspar veins.
111.80	113.60	1.8	1.8	100	r 709		200	380		270	12	280	36															Diopside - garnet skarn.
113.60	115.00	1.4	1.4	100	s 710		120	2800		18	10	60	260		125	5950												" " " . Qtz - mica - Fluorite veins
115.00	116.20	1.2	1.2	100	s 711		135	8750		8	6	90	1600															" " " . Qtz - mica - Wolframite veins
116.20	118.00	1.8	1.8	100	r 712		150	135		65	18	220	<4															Diopside - garnet skarn.
118.00	124.00	6.0	6.0	100	r 713		100	120		60	12	90	6															" " "
124.00	125.00	1.0	0.9	90	r 714		46	165		130	14	110	<4															Quartzite, minor diopside skarn.
125.00	128.00	3.0	2.8	93	s 715		46	75		28	14	40	36		53	169												Quartzite. Qtz - veining. silicification.

80656

PROJECT Mc

COMMON

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays Ag	Bi	As	Cd	Tg	Fe%	Co	Cr
128.00	130.00	2.0	2.0	100	r 716		<1	<4	4	<1	<10	2.6	30	70
130.00	135.00	5.0	5.0	100	r 717		<1	<4	5	<1	<10	2.7	32	48
135.00	140.00	5.0	5.0	100	r 718		<1	<4	7	<1	<10	3.6	60	60
140.00	145.00	5.0	5.0	100	r 719		<1	<4	7	<1	<10	2.9	30	85
145.00	150.70	5.7	5.7	100	r 720		<1	<4	7	<1	<10	3.1	18	50

806157

PROJE Mol | MONI | LL L | SAMF | REC | HOLE NO MD41

From	To	Interl (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Mo	Au	Weighted Assays/Ratios	% Estimates	Core Angles	Alt	T.S P.S	Description
128.00	130.00	2.0	2.0	100	F 716		24	155		190	6	120	<4							Quartzite, minor diopside skarn and mica siltstone.
130.00	135.00	5.0	5.0	100	F 717		50	190		300	6	220	8							" " " " " "
135.00	140.00	5.0	5.0	100	F 718		44	370		470	12	350	<4							" " " " " "
140.00	145.00	5.0	5.0	100	F 719		30	195		175	10	170	6							" " " " " "
145.00	150.70	5.7	5.7	100	F 720		14	60		50	4	65	<4							" " " " " "

Sheet 2 of 2 Sheets

80635

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

PROJECT : MOINA

Hole No : MD 40

COLLAR CO-ORDINATES : 975E/100N

LOCATION CODE : MZ 01

COLLAR R.L. : 549.6m

LOCATION : SHEPHERD & MURPHY AREA

MAP/PHOTO REFERENCE :

DATE STARTED	12-2-81	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE	
DATE FINISHED		NON CORE					No OF TRAYS	
TOTAL DEPTH							SAMPLE STORAGE	
LOGGED BY	W.D. Smyth	CORE	HW	0	6m	6m	ASSAY LAB.	COMLABS
CONTRACTOR	A.D.D.		HQ	6m	157m	151m	ASSAY REPORTS	
RIG	10 L							
DRILL CREW	E. McRae E. Hornblow	CASING	HW	0m	11m	11m	MIN. & PET. LAB.	
							MIN. & PET. REPORTS	
		CASING LEFT	HW	0m	9m	9m		

HOLE SURVEY DATA

INSTRUMENT :

DEPTH	INSTRUMENT INCL.	INSTRUMENT AZ.	ACID ETCH INCL.	ACID ETCH AZ.	REMARKS
COLLAR	-45°	215°			
50m	-43°	215°			TROPARI
100m	-43°	215°			
156m	-43°	215°			

GRAPHIC/LETTER SYMBOL LOGGING KEY

STRUCTURE / ALTERATION CODE

B BEDDING
J JOINTING
C CLEAVAGE
F FOLIATION
sh SHEARING
q QUARTZ VEINS
O OXIDATION

DRILLING SUMMARY :

80C150

THE SHELL COM

PROJECT: MOINA MD40

DIAMO

From	To	Inter'l (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays							
							Ag	Bi	As	Cd	Ta	Fe%	Co	Cr
0	10.00													
10.00	11.70	1.7			550 s									
11.70	12.90	1.2			551 s	C1	<1	385		<1		15.0	15	100
12.90	14.20	1.3			552 s									
14.20	15.40	1.2			553 s	C2	<1	340		<1		13.0	15	100
15.40	15.90	0.5			554 s									
15.90	17.80	1.9			555 s		<1	925		<1		7.6	10	200
17.80	18.70	0.9			556 s	C3	<1	290		<1		16.0	20	80
18.70	20.00	1.3			557 s									
20.00	21.00	1.0			558 s		<1	20		<1		2.0	5	300
21.00	21.80	0.8			559 s									
21.80	22.80	1.0			560 s	C4	<1	465		<1		15.5	15	80
22.80	23.50	0.7			561 s									
23.50	24.50	1.0			562 s		<1	215		<1		5.7	5	300
24.50	24.70	0.2			563 s									
24.70	25.80	1.1			564 s									
25.80	26.20	0.4			565 s									
26.20	26.80	0.6			566 s	C5	<1	550		<1		18.0	30	80
26.80	27.90	1.1			567 s									
27.90	28.40	0.5			568 s									
28.40	29.90	1.5			569 s									
29.90	30.10	0.2			570 s									
30.10	31.20	1.1			571 s									
31.20	31.40	0.2			572 s									
31.40	32.60	1.2			573 s	C6	<1	515		<1		16.0	30	100
32.60	33.00	0.4			574 s									
33.00	34.20	1.2			575 s									
34.20	36.20	2.0			576 s									
36.20	37.10	0.9			577 s									
37.10	37.40	0.3			578 s									
37.40	38.40	1.0			579 s	C7	<1	570		23		18.5	40	80
38.40	39.40	1.0			580 s									
39.40	40.30	0.9			581 s									
40.30	41.30	1.0			582 s									
41.30	42.20	0.9			583 s	C8	<1	480		2		19.5	30	80
42.20	43.45	1.25			584 s									
43.45	45.60	2.15			585 s									
45.60	47.60	2.00			586 s	C9	<1	420		8		20.5	40	80
47.60	49.40	1.80			587 s									
49.40	51.00	1.60			588 s									
51.00	52.70	1.70			589 s									
52.70	53.20	0.50			590 s	C10	<1	800		14		17.5	40	80
53.20	53.70	0.50			591 s									
53.70	54.10	0.40			592 s									
54.10	54.30	0.20			593 s									
54.30	56.10	1.80			594 s									
56.10	56.60	0.50			595 s	C11	<1	455		3		16.5	40	10
56.60	57.50	0.90			596 s									
57.50	58.60	1.10			597 s									
58.60	59.80	1.20			598 s									
59.80	60.60	0.80			599 s									
60.60	61.50	0.90			600 s	C12	<1	950		<1		17.0	30	10
61.50	62.10	0.60			601 s									
62.10	62.90	0.80			602 s									
62.90	64.50	1.60			603 s									
64.50	65.80	1.30			604 s	C13	<1	545		<1		19.0	30	8
65.80	66.90	1.10			605 s									
66.90	68.20	1.30			606 s									
68.20	70.10	1.90			607 s									
70.10	71.10	1.00			608 s	C14	<1	450		<1		18.0	30	8
71.10	71.30	0.20			609 s									
71.30	72.90	1.60			610 s									

806160

[redacted] [redacted] [redacted] [

THE SHELL COMP

PROJECT: DI

From	To	Interl (m)	Core Rec'd	%	Sample No.		Compos No.	Assays							
								Ag	Bi	As	Cd	Ta	Fe%	Co	Cr
72·90	73·50	0·60			611	s									
73·50	74·40	0·90			612	s									
74·40	75·90	1·50			613	s	C15	<1	330		<1		12·5	30	100
75·90	77·40	1·50			614	s									
77·40	78·90	1·50			615	s									
78·90	80·00	1·10			616	s									
80·00	81·60	1·60			617	s									
81·60	81·90	0·30			618	s	C16	<1	410		<1		13·5	30	100
81·90	82·40	0·50			619	s									
82·40	84·00	1·60			620	s									
84·00	85·20	1·20			621	s									
85·20	86·50	1·30			622	s	C17	<1	110		<1		10·5	10	150
86·50	88·80	2·30			623	s									
88·80	90·00	1·20			624	s		<1	110		<1		4·8	15	150
90·00	91·10	1·10			625	s		<1	40		<1		5·9	20	300
91·10	93·00	1·90			626	s		<1	20		<1		2·8	15	200
93·00	94·20	1·20			627	f		<1	65		<1		4·1	40	300
94·20	94·50	0·30			628	s		<1	34		<1		3·7	15	300
94·50	97·40	2·90			629	f	C18	<1	760		<1		6·6	30	200
97·40	98·30	0·90			630	f									
98·30	98·60	0·30			631	s		<1	250		<1		4·9	10	100
98·60	100·80	2·20			632	f	C19	1	360		<1		7·7	30	200
100·80	103·60	2·80			633	f									
103·60	104·00	0·40			634	s		<1	80		<1		6·6	10	150
104·00	105·40	1·40			635	f	C20	<1	170		<1		6·3	20	200
105·40	106·80	1·40			636	f									
106·80	107·50	0·70			637	s		<1	145		<1		8·5	5	100
107·50	110·20	2·70			638	f		<1	260		<1		12·0	40	200
110·20	110·80	0·60			639	s		<1	400		<1		15·5	30	80
110·80	112·90	2·10			640	f		<1	260		<1		13·0	30	150
112·90	113·20	0·30			641	s		<1	60		<1		8·2	20	200
113·20	115·30	2·10			642	f		1	750		<1		12·0	40	200
115·30	115·90	0·60			643	s		<1	230		<1		9·9	40	100
115·90	116·40	0·50			644	s	C21	<1	420		<1		6·5	40	150
116·40	116·90	0·50			645	s									
116·90	120·70	3·80			646	f		7	665		9		7·7	40	200
120·70	121·40	0·70			647	s		<1	180		<1		5·2	20	200
121·40	123·60	2·20			648	f		2	400		<1		8·0	60	300
123·60	125·00	1·40			649	s		<1	485		<1		13·0	30	100
125·00	129·90	4·90			650	f		4	22		6		6·4	60	200
129·90	135·00	5·10			651	f		<1	4		<1		3·6	40	400
135·00	140·00	5·00			652	f	C22	<1	8		<1		1·65	80	400
140·00	145·00	5·00			653	f									
145·00	150·00	5·00			654	f	C23	<1	10		<1		1·85	80	300
150·00	158·00	8·00			655	f									

806162

THE SHELL COMPANY OF AUSTRALIA LTD

PROJ. [illegible] MON ILL L SAM G RE) HOLE MD 4

From	To	Interl (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Mo	Au	Weighted Assays/Ratios Sn	W	% Estimates	Core Angles	Alt	T.S P.S	Description
72.90	73.50	0.60			611 s		900	580							1020	586					Wrigglite. Feldspar vein. Trace scheelite in fractures & f.qtz feld. veins.
73.50	74.40	0.90			612 s		1100	590							↓	↓					" " " "
74.40	75.90	1.50			613 s	C15	900	1550		120	18	100	46	<0.05	900	1550					" " Minor scheelite in qtz. mica vein.
75.90	77.40	1.50			614 s		1400	650							↑	↑					" Two qtz feld. veins with scheelite.
77.40	78.90	1.50			615 s		1350	500							1460	695					" Feld./feld.-qtz veining. Major scheelite in veins.
78.90	80.00	1.10			616 s		1500	1150							↓	↓					" " " " "
80.00	81.60	1.60			617 s		1600	610							↓	↓					" Feld. veins, chlorite veining. Trace scheelite in fine qtz-feld. veins.
81.60	81.90	0.30			618 s	C16	1000	5850		170	16	110	24	<0.05	1000	5850					" Two feld/feld.-qtz veins. Wolframite and scheelite.
81.90	82.40	0.50			619 s		1750	590							↑	↑					" Feld/feld-qtz. veining. Trace scheelite.
82.40	84.00	1.60			620 s		1250	840							1365	570					" " " No scheelite in veins
84.00	85.20	1.20			621 s		1100	460							↓	↓					" Pyrite veins, qtz veins. Trace scheelite.
85.20	86.50	1.30			622 s	C17	1600	330		24	16	115	42	<0.05	↓	↓					Breccia zone. Minor calcite, chlorite-magnetite veining.
86.50	88.80	2.30			623 s		1550	3200							550	3200					" " Qtz/qtz-feld. veining. Scheelite.
88.80	90.00	1.20			624 s		850	350	4.8	4	16	105	8	0.05	↑	↑					Shear zone. Epidote. Trace scheelite in shears.
90.00	91.10	1.10			625 s		960	310	5.9	4	12	75	6	<0.05							" " "
91.10	93.00	1.90			626 s		300	85	2.8	10	24	105	32	<0.05							Diopside/diopside-garnet skarn. Minor qtz. veins. Trace scheelite in veins.
93.00	94.20	1.20			627 f		610	540	4.1	70	28	140	12	<0.05	720	340					" " " "
94.20	94.50	0.30			628 s		420	810	3.7	8	16	80	380	<0.05							" " " "
94.50	97.40	2.90			629 f	C18	930	250		50	44	525	32	1.15							Garnet/garnet-chlorite-ankerite skarn.
97.40	98.30	0.90			630 f		1250	430							↓	↓					Magnetite-garnet skarn.
98.30	98.60	0.30			631 s		880	1050	4.9	65	65	365	12	0.10	1030	1230					" " Breccia zone. Fe oxides-feld?
98.60	100.80	2.20			632 f	C19	1050	1400		70	26	245	125	0.10	↓	↓					" " One qtz-feld.-wolframite vein.
100.80	103.60	2.80			633 f		1200	540							1130	515					" "
103.60	104.00	0.40			634 s		660	330	6.6	6	12	130	200	<0.05	↓	↓					" " One qtz-feldspar vein.
104.00	105.40	1.40			635 f	C20	1350	1650		48	28	205	85	0.05	1350	1650					" "
105.40	106.80	1.40			636 f		1150	390							↑	↑					" "
106.80	107.50	0.70			637 s		680	470	8.5	22	12	140	2000	<0.05							" "
107.50	110.20	2.70			638 f		1100	510	12.0	95	18	230	32	<0.05	720	590					" " One feldspar vein.
110.20	110.80	0.60			639 s		1350	540	15.5	16	10	280	26	<0.05							" " Qtz-feldspar veining.
110.80	112.90	2.10			640 f		1200	490	13.0	44	16	255	22	<0.05	↓	↓					" "
112.90	113.20	0.30			641 s		260	2750	8.2	6	16	95	340	<0.05	260	2750					" " Two feldspar veins.
113.20	115.30	2.10			642 f		990	360	12.0	55	55	220	36	<0.05	↑	↑					" "
115.30	115.90	0.60			643 s		470	430	9.9	4	14	110	40	<0.05							" " Two feldspar veins.
115.90	116.40	0.50			644 s	C21	630	760		6	24	125	65	<0.05							" "
116.40	116.90	0.50			645 s		380	760							605	335					" " One feldspar vein
116.90	120.70	3.80			646 f		530	280	7.7	130	40	635	10	0.05							" " /garnet-diopside skarn.
0.70	121.40	0.70			647 s		140	45	5.2	14	110	95	55	0.10							Garnet-diopside skarn. Qtz Feldspar veining.
121.40	123.60	2.20			648 f		470	270	8.0	190	30	190	10	<0.05							" "
123.60	125.00	1.40			649 s		880	340	13.0	160	8	135	28	0.05	↓	↓					Chlorite-magnetite skarn.
125.00	129.90	4.90			650 f		200	1300	6.4	205	20	270	75	<0.05	200	1300					Diopside-quartz skarn. Qtz veining.
129.90	135.00	5.10			651 f		85	320	3.6	150	16	200	16	<0.05	85	320					" " quartzite, metasiltstone. Qtz veining
135.00	140.00	5.00			652 f	C22	42	610		200	22	215	50	<0.05	40	610					" " " " "
140.00	145.00	5.00			653 f		24	450							25	450					" " " " "
145.00	150.00	5.00			654 f	C23	22	210		150	28	160	24	<0.05	20	810					Quartzite, metasiltstone, diopside skarn.
150.00	158.00	8.00			655 f		20	390							20	390					" " "

Sheet 2 of 2 Sheets

80616

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

Hole No : MD 39

PROJECT : MOINA

LOCATION CODE : MZ 01

COLLAR CO-ORDINATES : 106mN/1301mE

COLLAR R.L. : 596m

LOCATION :

MAP/PHOTO REFERENCE :

DATE STARTED	22-10-80	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE
DATE FINISHED	17-11-80	NON CORE					No OF TRAYS
TOTAL DEPTH	260.40						SAMPLE STORAGE
LOGGED BY	W.D. Smyth	CORE					ASSAY LAB.
CONTRACTOR	A.D.D.	NQ		0	69m	69m	ASSAY REPORTS
RIG	MINDRILL F30	BQ		69m	260.40m	191.40m	
DRILL CREW	F. Ortner	CASING					MIN. & PET. LAB.
	M. Bligh	NQ		0	69m	69m	MIN. & PET. REPORTS
		CASING LEFT					

HOLE SURVEY DATA

INSTRUMENT : TROPARI

DEPTH	INSTRUMENT INCL.	INSTRUMENT AZ.	ACID ETCH INCL.	ACID ETCH AZ.	REMARKS
COLLAR	90°	-			
150m	90°	-			
260m	85°	320°			

GRAPHIC/LETTER SYMBOL LOGGING KEY

STRUCTURE / ALTERATION CODE

B BEDDING
J JOINTING
C CLEAVAGE
F FOLIATION
sh SHEARING
q QUARTZ VEINS
O OXIDATION

DRILLING SUMMARY :

80916

							Assays								Weighted Assays	
							Ag	Bi	As	Ba	Be	Ta	Zr	Ti	W XRF	Au Fire
0.00	10.00	10.00			521		5	<1	<50	200	<1	<100	150	6000	30	
10.00	18.00	7.80			522		10	<1	<50	200	<1	<100	100	4000	440	
18.00	28.00	10.00			523		6	<1	<50	<200	<1	<100	80	2500	160	
28.00	36.60	8.60			524		20	<1	<50	<200	<1	<100	100	3000	560	
36.60	41.40	4.80			525		25	<1	<50	<200	<1	<100	60	1000	1350	
41.40	50.00	8.60			526		15	<1	<50	<200	<1	<100	80	800	820	
50.00	60.00	10.00			527		3	<1	<50	<200	1	<100	100	2000	460	
60.00	70.00	10.00			528		25	<1	<50	400	1	<100	200	4000	620	
70.00	80.00	10.00			529		3	<1	<50	<200	<1	<100	80	3000	350	
80.00	90.00	10.00			530		0.2	<1	<50	<200	<1	<100	100	3000		
90.00	100.00	10.00	10.00	100	531		<0.1	<1	<50	200	<1	<100	100	2000		
100.00	110.00	10.00	10.00	100	532		0.1	<1	<50	200	<1	<100	80	400		
110.00	120.00	10.00	10.00	100	533		0.2	<1	<50	200	<1	<100	60	600		
120.00	130.00	10.00	10.00		534		0.1	<1	<50	<200	<1	<100	50	200		
130.00	140.00	10.00			535		0.8	<1	<50	600	<1	<100	60	200		
140.00	145.50	5.50			536		1	<1	<50	<200	<1	<100	40	300		
145.50	146.00	0.50			485		<1	<4	4			10				
146.00	148.00	2.00	2.00	100	486		<1	<4	12			10				
148.00	150.00	2.00	2.00	100	487		<1	<4	14			15				
150.00	152.00	2.00	2.00	100	488		<1	<4	22			10				
152.00	153.40	1.4	1.4	100	489		<1	<4	20			10				
153.40	155.40	2.00	2.00	100	490		<1	<4	10			25				
155.40	157.40	2.00	2.00	100	491		<1	<4	8			10				
157.40	159.40	2.00	2.00	100	492		<1	<4	8			25				
159.40	159.90	0.50	0.50	100	493		<1	6	12			<10				
159.90	161.50	1.6	1.6	100	494		<1	4	8			<10				
161.50	163.00	1.5	1.5	100	495		<1	4	6			<10				
163.00	164.55	1.55	1.55	100	496		<1	8	8			<10				
164.55	166.80	2.25	2.25	100	497		<1	65	22			20				
166.80	167.80	1.00	1.00	100	498		<1	14	16			30				
167.80	168.65	0.85	0.85	100	499		<1	6	6			<10				
168.65	170.00	1.35	1.35	100	500		<1	6	6			25				
170.00	171.50	1.50	1.50	100	501		<1	6	2			10				
171.50	173.00	1.50	1.50	100	502		<1	6	<2			<10				
173.00	174.40	1.40	1.40	100	503		<1	4	4			<10				
174.40	176.00	1.60	1.60	100	504		<1	4	10			10				
176.00	177.50	1.50	1.50	100	505		<1	6	8			10				
177.50	178.80	1.30	1.30	100	506		<1	6	2			<10				
178.80	180.00	1.20	1.20	100	507		1	710	28			10				
180.00	182.00	2.00	2.00	100	508		<1	450	20			25				
182.00	184.00	2.00	2.00	100	509		<1	34	10			<10				
184.00	186.00	2.00	2.00	100	510		<1	20	8			15				
186.00	188.00	2.00	2.00	100	511		<1	10	6			<10				
188.00	190.00	2.00	2.00	100	512		<1	32	6			<10				
190.00	190.80	0.80	0.80	100	513		<1	50	10			<10			<0.1	0.7
190.80	192.00	1.20	1.20	100	514		<1	175	8			<10				0.8
192.00	193.00	1.00	1.00	100	515		<1	115	12			<10				0.8
193.00	194.65	1.65	1.65	100	516		<1	330	<2			15				1.2
194.65	196.00	1.35	1.35	100	517		2	2400	65			<10				2.6
196.00	198.00	2.00	2.00	100	518		<1	140	75			<10				0.2
198.00	200.00	2.00	2.00	100	519		<1	24	26			20				(0.1
200.00	202.00	2.00	2.00	100	520		<1	410	22			<10				0.3
[illegible]	[illegible]	10.00	10.00	100	537		0.5	80	<50	<200	5	<100	100	3000		
[illegible]	[illegible]	10.60	10.60	100	538		0.2	40	<50	<200	5	<100	150	3000		
[illegible]	[illegible]	1.15	1.15	100	539		1	20	<20	800	1	<100	400	6000		
[illegible]	[illegible]	1.10	1.10	100	540		<1	50	30	<200	80	<100	80	3000		
[illegible]	[illegible]	3.15	3.15	100	541		0.2	15	<50	<200	10	<100	80	1500		
[illegible]	[illegible]	2.00	2.00	100	542		<1	20	<20	<200	1	<100	60	6000		
[illegible]	[illegible]	2.40	2.40	100	543		<1	10	<20	600	2	<100	400	8000		
[illegible]	[illegible]	9.20	9.20	100	544		0.2	30	<50	<200	10	<100	100	2500		
[illegible]	[illegible]	1.55	1.55	100	545		1	220	<20	<200	80	<100	250	1500		
[illegible]	[illegible]	7.85	7.85	100	546		0.5	<1	<50	<200	8	<100	100	2000		

806165

THE SHELL COMPANY OF AUSTRALIA LTD. - EXPLORATION

PROJECT: MD 39 — DIAMOND DRILL LOG - SAMPLING RECORD — HOLE NO: MD 39

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Composite No.	Assays Sn	W	CaF_2%	Cu	Pb	Zn	Ag	Au	Weighted Assays/Ratios Sn	W	% Estimates	Core Angles	Alt	T.C P.S	Description
0.00	10.20				521					200	40	180	10	<0·05							MOINA SANDSTONE. Weathered f.-med.gn sandstone.
10.20	18.00				522					540	15	510	33	<0·05							MOINA SANDSTONE. Minor shale banding. Trace pyrite.
18.00	28.00				523					260	25	260	15	0·05							MOINA SANDSTONE. Quartzite. Pyrite 5%.
28.00	36.60				524					830	10	790	32	<0·05							MOINA SANDSTONE. Quartzite. Pyrite 5%
36.60	41.40				525					2200	5	2000	170	<0·05							MOINA SANDSTONE. Tubicular sandstone. Pyrite.
41.40	50.00				526					1400	15	1300	42	<0·05							MOINA SANDSTONE. Quartzite. Pyrite.
50.00	60.00				527					1000	30	910	13	<0·05							MOINA SANDSTONE. Quartzite. Pyrite.
60.00	70.00				528					860	30	790	11	<0·05							MOINA SANDSTONE. Interbanded hornfels/sandstone/shale.
70.00	80.00				529					340	10	310	2	<0·05							MOINA SANDSTONE. Interbanded sandstone/siltstone.
80.00	90.00				530																MOINA SANDSTONE. Quartzite.
90.00	100.00				531		30	<50		80	8	20	<3								MOINA SANDSTONE.
100.00	110.00				532		6	<50		100	8	<20	6								ROLAND CONGLOMERATE.
110.00	120.00				533		2	<50		300	4	20	<3								ROLAND CONGLOMERATE.
120.00	130.00				534		8	50		60	2	20	<3								ROLAND CONGLOMERATE.
130.00	140.00				535		1	100		80	10	20	<3								ROLAND CONGLOMERATE.
140.00	145.50				536		1	<50		80	25	60	10								ROLAND CONGLOMERATE.
145.50	146.00				485	C1	8	50	0·03	8	14	90	90	<0·05							Sheared altered ground.
146.00	148.00				486		6	70		20	18	880	40	<0·05							Brecciated CONGLOMERATE/Quartz veining.
148.00	150.00				487		12	70		12	10	230	20	<0·05							Brecciated. Hornfels/Metasiltstone.
150.00	152.00				488	C2	10	45	0·10	18	12	95	8	<0·05							Brecciated. Hornfels/Metasiltstone.
152.00	153.40				489		<4	25		14	14	85	10	<0·05							Brecciated. Hornfels/Metasiltstone.
153.40	155.40				490		10	55		30	10	55	14	<0·05							HORNFELS. F. med. gn. trace Powellite.
155.40	157.40				491	C3	22	50	0·18	44	12	50	14	<0·05							HORNFELS. F. med. gn. trace Powellite.
157.40	159.40				492		8	60		40	12	34	16	<0·05							HORNFELS. F. med. gn. trace Powellite.
159.40	159.90				493	C4	40	60	0·71	580	8	44	36	<0·05							MAGNETITE-CHLORITE-PYRITE SKARN. Powellite.
159.90	161.50				494		20	120		50	12	38	26	<0·05							HORNFELS. F. gn. trace Powellite.
161.50	163.00				495	C5	16	140	0·32	20	8	38	42	<0·05							HORNFELS. F. gn. trace Powellite.
163.00	164.55				496		16	320		10	8	42	34	<0·05							HORNFELS. F. gn. trace Powellite.
164.55	166.80				497	C6	100	120	0·33	1650	8	70	46	0·15							CHLORITE-DIOPSIDE-MAGNETITE-PYRITE SKARN. Powellite.
166.80	167.80				498	C7	290	70	0·73	500	8	130	22	<0·05							GARNET-DIOPSIDE SKARN.
167.80	168.65				499		360	490		710	6	310	75	0·1							GARNET-DIOPSIDE SKARN. Chalcopyrite?
168.65	170.00				500		480	310		65	8	185	20	0·1	330	360					GARNET-DIOPSIDE/MAGNETITE-BIOTITE SKARN. Powellite.
170.00	171.50				501	C8	390	640	2·45	6	8	185	48	0·15							GARNET-DIOPSIDE/MAGNETITE-BIOTITE SKARN.
171.50	173.00				502		480	600		90	8	175	95	0·20							GARNET-DIOPSIDE/MAGNETITE-BIOTITE SKARN.
173.00	174.40				503		390	490		14	4	165	80	<0·05							GARNET-DIOPSIDE/MAGNETITE-BIOTITE SKARN.
174.40	176.00				504		480	240		46	6	190	155	0·15							MAGNETITE-CHLORITE SKARN. Sanidine veins. Powellite.
176.00	177.50				505	C9	910	110	2·20	105	4	530	20	0·15							MAGNETITE-CHLORITE SKARN.
177.50	178.80				506		1000	250		65	4	280	30	0·15							MAGNETITE-CHLORITE SKARN.
178.80	180.00				507		700	200		16	14	180	8	0·1							DIOPSIDE-GARNET/MAGNETITE-BIOTITE SKARN. Sanidine. Powellite.
180.00	182.00				508	C10	1150	230	2·10	14	10	200	24	0·15							DIOPSIDE-GARNET/MAGNETITE-BIOTITE SKARN. Sanidine. Powellite.
182.00	184.00				509		1300	170		14	4	155	14	0·1	1150	220					DIOPSIDE-GARNET/MAGNETITE-BIOTITE SKARN. Sanidine. Powellite.
184.00	186.00				510		880	150		10	6	140	10	0·15							DIOPSIDE-GARNET/MAGNETITE-BIOTITE SKARN. Sanidine. Powellite.
186.00	188.00				511		1200	140		14	4	160	8	0·2							DIOPSIDE-GARNET/MAGNETITE-BIOTITE SKARN. Sanidine. Powellite.
188.00	190.00				512	C11	220	160	2·75	125	4	200	60	0·2							DIOPSIDE-GARNET/MAGNETITE-BIOTITE SKARN. Sanidine. Powellite.
190.00	190.80				513		4000	190		8	6	155	22	0·6							DIOPSIDE-GARNET/MAGNETITE-BIOTITE SKARN. Sanidine. Powellite.
190.80	192.00				514		1100	570		16	4	185	34	1·1			2170	440			MAGNETITE/BIOTITE SKARN. Powellite.
192.00	193.00				515	C12	2000	480	1·30	4	4	185	20	0·35							MAGNETITE/BIOTITE SKARN. Powellite.
193.00	194.65				516		730	560		6	6	185	90	1·25							MAGNETITE/BIOTITE SKARN. Powellite.
194.65	196.00				517		870	120		16	135	115	<4	1·65							Mixed zone Garnet-magnetite-chlorite-diopside skarn.
196.00	198.00				518	C13	440	10	0·32	4	12	105	<4	0·15	770	130					Mixed zone Garnet-magnetite-chlorite-diopside skarn.
198.00	200.00				519		990	<10		4	4	75	<4	0·1							Mixed zone Garnet-magnetite-chlorite-diopside skarn.
200.00	202.00				520		860	30		4	16	90	<4	1·1							Mixed zone Garnet-magnetite-chlorite-diopside skarn.
202.00	212.00				537		200	<50		30	20	40	<3								GARNET-(DIOPSIDE) SKARN. Some biotite.
212.00	222.60				538		200	<50		100	30	80	<3								GARNET-(DIOPSIDE) SKARN. Some biotite.
222.60	223.75				539		32	<10		30	40	130	4	<0·01							GARNET-(DIOPSIDE) SKARN. Some biotite.
223.75	224.85				540		210	<10		14	30	2700	3	<0·01							DIOPSIDE (GARNET) SKARN. Large magnetite blebs.
224.85	228.00				541		80	<50		40	20	150	<3								DIOPSIDE/DIOPSIDE GARNET SKARN. Some shale bands.
228.00	230.00				542		24	<10		4	30	44	1	<0·01							DIOPSIDE/DIOPSIDE GARNET SKARN. Some shale bands.
230.00	232.40				543		70	<10		18	15	46	2	<0·01							DIOPSIDE/DIOPSIDE GARNET SKARN. Some shale bands.
232.40	241.60				544		200	<50		40	30	100	<3								GARNET-DIOPSIDE SKARN.
241.60	243.15				545		330	620		160	25	160	28	<0·01							MAGNETITE-DIOPSIDE SKARN/WRIGGLITE. Up to 5% sulphides.
243.15	251.00				546		80	100		80	15	100	<3								DIOPSIDE/DIOPSIDE-GARNET SKARN.

8061166

THE SELLER COMPANY OF AU

DIAMOND DRILL LO

PROJECT: MD 39

From	To	Interval (m)	Core Rec'd	%	Sample No.	Compos No.	Ag	Bi	As	Ba	Be	Ta	Zr	Ti	Weighted Assay		
250.00	256.00	5.00	5.00	100	547		<0.1	<1	<50	400	1	<100	100	4000			
256.00	258.00	2.00	2.00	100	548		<1	100	<20	600	1	<100	400	6000			
258.00	260.40	2.40	2.40	100	549		<1	10	<20	400	2	<100	250	6000			

806167

THE SHELL ... OF AUSTRALIA LTD. ... SION

PROJECT: MD 39

D... UND DRILL LOG - SAMPLING RECO

HOLE NO: MD 39

From	To	Inter'l (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Mo	Au	Weighted Assays Ratios	% Estimates	Core Angles	Alt	T.S P.S	Description
251.00	256.00				547		2	50		80	10	<20	6							SHALE/METASILTSTONE/DIOPSIDE SKARN.
256.00	258.00				548		26	50		46	15	36	11	<0.01						DIOPSIDE SKARN. Some magnetite-chlorite veinging. Sulphides.
258.00	260.40				549		46	100		22	25	40	4	0.04						DIOPSIDE SKARN. Some magnetite-chlorite veinging. Sulphides.

Sheet 2 of 2 sheets

806168

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

PROJECT: MOINA J.V.

Hole No : MD 38

COLLAR CO-ORDINATES: 475N/575E

LOCATION CODE: ...MZ.01.....

COLLAR R.L.: .....

LOCATION: .....

MAP/PHOTO REFERENCE: .....

DATE STARTED	3-10-80	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE
DATE FINISHED	21-10-80	NON CORE					No OF TRAYS
TOTAL DEPTH	263.1m						SAMPLE STORAGE
LOGGED BY	W.D. Smyth	CORE	NQ	0	21m	21m	ASSAY LAB.
CONTRACTOR	A.D.D.		BQ	21m			ASSAY REPORTS
RIG	MINDRILL F30						
DRILL CREW	F. Ortner	CASING	HQ	0	3.5m	3.5m	MIN. & PET. LAB.
	N. How		NQ	3.5m	21.0m	17.5m	MIN. & PET. REPORTS
		CASING LEFT					

HOLE SURVEY DATA

INSTRUMENT:

DEPTH	INSTRUMENT INCL.	INSTRUMENT AZ.	ACID ETCH INCL.	ACID ETCH AZ.	REMARKS
COLLAR	70°	215°			
90m	68°	226°			Topari
150m	61°	226°			Topari
230m	59°	234°			Topari

GRAPHIC/LETTER SYMBOL LOGGING KEY

STRUCTURE/ALTERATION CODE

- B BEDDING
- J JOINTING
- C CLEAVAGE
- F FOLIATION
- sh SHEARING
- q QUARTZ VEINS
- O OXIDATION

DRILLING SUMMARY:

806169

PROJECT: MOINA MD 38 DIAMOND DRILL LO

From	To	Interval	Core Recd	% Rec	Sample No.	Check No.	Assays								Weighted Assays		
							Ag	Bi	As	Ba	Be	Ta	Zr	Ti			
0.00	8.00	8.00	1.10														
8.00	10.00	2.00	1.50	60	435		0.1	<1	<50	<200	<1	<100	10	300			
10.00	20.00	10.00	9.22	92	436		0.8	<1	<50	<200	1	<100	30	1000			
20.00	30.00	10.00	9.30	94	437		0.1	<1	<50	<200	<1	<100	10	300			
30.00	40.00	10.00	10.00	100	438		0.1	<1	<50	<200	<1	<100	<10	300			
40.00	50.00	10.00	10.00	100	439		<0.1	<1	<50	<200	<1	<100	20	800			
50.00	60.00	10.00	10.00	100	440		<0.1	<1	<50	200	<1	<100	50	1000			
60.00	70.00	10.00	10.00	100	441		0.3	<1	<50	200	<1	<100	20	600			
70.00	80.00	10.00	10.00	100	442		0.1	<1	<50	<200	<1	<100	10	300			
80.00	90.00	10.00	10.00	100	443		<0.1	<1	<50	200	<1	<100	50	1000			
90.00	94.95	4.95	4.95	100	444		<0.1	<1	<50	200	<1	<100	50	800			
94.95	95.35	0.40	0.40	100	445		1	<10	<20								
95.35	100.00	4.65	4.65	100	445		<0.1	<1	<50	200	<1	<100	50	800			
100.00	110.00	10.00	10.00	100	447		<0.1	<1	<50	200	<1	<100	30	600			
110.00	120.00	10.00	10.00	100	448		<0.1	<1	<50	200	<1	<100	10	600			
120.00	130.00	10.00	10.00	100	449		<0.1	<1	<50	<200	<1	<100	20	600			
130.00	140.00	10.00	10.00	100	450		<0.1	<1	<50	<200	<1	<100	30	1000			
140.00	150.00	10.00	10.00	100	451		<0.1	<1	<50	200	<1	<100	20	300			
150.00	160.00	10.00	10.00	100	452		<0.1	<1	<50	<200	<1	<100	30	800			
160.00	170.00	10.00	10.00	100	453		0.1	<1	<50	200	<1	<100	30	600			
170.00	178.80	8.80	8.80	100	454		<0.1	<1	<50	<200	<1	<100	30	800			
178.80	180.60	1.80	1.80	100	455		<1	<10	<20	<200	<1	<100	250	6000			
180.60	188.80	8.20	8.20	100	456		<0.1	<1	<50	200	<1	<100	60	1500			
188.80	190.75	1.95	1.95	100	457		1	<10	<20	<200	<1	<100	30	4000			
190.75	194.50	3.75	3.00		458		1	<10	40	<200	1	<100	100	6000			
194.50	195.20	0.70	0.45		459		1	10	<20	<200	3	<100	60	3000			
195.20	197.30	2.10	2.10	100	460		1	30	340	200	3	<100	250	6000			
197.30	199.20	1.90	1.90	100	461		<1	<10	<20	400	<1	<100	500	3000			
199.20	201.50	2.30	2.30	100	462		<1	<10	<20	800	1	<100	1500	8000			
201.50	214.50	13.00	13.00	100	463		0.2	3	<50	<200	1	<100	100	4000			
214.50	217.25	2.75	2.75	100	464		<1	<10	<20	800	1	<100	800	10,000			
217.25	219.60	2.35	2.35	100	465		<1	<10	20	800	1	<100	300	10,000			
219.60	222.70	2.60	2.50		466		<1	<10	<20	400	2	<100	400	10,000			
222.20	228.00	5.80	5.80	100	467		<1	<1	<50	<200	<1	<100	150	4000			
228.00	232.25	4.25	4.25	100	468		<1	<1	<50	400	1	<100	100	6000			
232.25	243.20	10.95	10.90	99	469		40	<1	<50	<200	<1	<100	60	1500			
243.20	243.90	0.70	0.70	100	470		<1	10	<20	<200	<1	<100	400	4000			
243.90	250.00	6.10	6.10	100	471		5	<1	<50	<200	<1	<100	150	3000			
250.00	256.80	6.80	6.80	100	472		4	<1	<50	<200	<1	<100	100	2500			
256.80	260.60	3.80	3.80	100	473		5	<1	<50	<200	1	<100	80	1500			
260.60	263.10	2.50	2.50	100	474		0.8	<1	<50	<200	<1	<100	60	1000			

806170

THE SHELL COMPANY OF AUSTRALIA LTD. - METALS DIVISION

PROJECT: MOINA

DIAMOND DRILL LOG - SAMPLING RECORD

HOLE NO: MD 38

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Common No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Mo	Au	Weighted Assays/Ratios Sn	W	% Estimates	Core Angles	Alt	M.C P.S	Description
0.00	8.00	8.00	1.10																		Not sampled
8.00	10.00	2.00	1.50	60	435		<1	<50		25	6	<20	<3								LIMESTONE. Occassional shale horizon
10.00	20.00	10.00	9.23	92	436		<1	<50		25	150	40	<3								LIMESTONE. Occassional shale horizon
20.00	30.00	10.00	9.90	99	437		<1	<50		15	6	<20	<3								"
30.00	40.00	10.00	10.00	100	438		<1	<50		10	3	<20	<3		<1	<50					"
40.00	50.00	10.00	10.00	100	439		<1	<50		800	10	<20	<3								"
50.00	60.00	10.00	10.00	100	440		<1	<50		6	10	20	<3								"
60.00	70.00	10.00	10.00	100	441		<1	<50		8	6	<20	<3								"
70.00	80.00	10.00	10.00	100	442		<1	<50		20	15	<20	<3								"
80.00	90.00	10.00	10.00	100	443		<1	<50		30	10	<20	<3								"
90.00	94.95	4.95	4.95	100	444		<1	<50		1500	6	<20	<3								"
94.95	95.35	0.40	0.40	100	445		<4	10		32	30	10	6	<0.01	<4	10					BRECCIA ZONE.
95.35	100.00	4.65	4.65	100	446		1	<50		1000	10	<20	<3								LIMESTONE. Occassional shale horizon
100.00	110.00	10.00	10.00	100	447		3	<50		40	10	<20	<3								"
110.00	120.00	10.00	10.00	100	448		<1	<50		20	4	<20	<3								"
120.00	130.00	10.00	10.00	100	449		<1	<50		6	2	<20	<3								"
130.00	140.00	10.00	10.00	100	450		<1	<50		10	6	<20	<3		1	<50					"
140.00	150.00	10.00	10.00	100	451		<1	<50		25	3	20	<3								"
150.00	160.00	10.00	10.00	100	452		<1	<50		6	10	<20	<3								"
160.00	170.00	10.00	10.00	100	453		<1	<50		6	6	20	<3								"
170.00	178.80	8.80	8.80	100	454		<1	<50		8	15	40	<3								"
178.80	180.60	1.80	1.80	100	455		<4	<10		12	35	250	4	<0.01	<4	<10					WOLLASTONITE skarn.
180.60	188.80	8.20	8.20	100	456		<1	<50		10	25	<20	<3		<1	<50					LIMESTONE. Occassional shale horizon
188.80	190.75	1.95	1.95	100	457		<4	<10		90	20	440	8	<0.01							LIMESTONE. Occassional shale horizon
190.75	194.50	3.75	3.00		458		26	<10		100	15	2800	8	<0.01	17	<10					GARNET SKARN/MARBLE. Alternating layers.
194.50	195.20	0.70	0.45		459		16	<10		48	15	170	7	<0.01							SHEAR/GARNET DIOPSIDE SKARN.
195.20	197.30	2.10	2.10	100	460		240	<10		26	35	2100	7	<0.01	240	<10					GARNET DIOPSIDE SKARN.
197.30	199.20	1.90	1.90	100	461		4	<10		16	40	60	4	<0.01	<4	<10					DIOPSIDE SKARN.
199.20	201.50	2.30	2.30	100	462		<4	<10		32	40	1200	4	<0.01							GARNET/DIOPSIDE SKARNS. Mixed zone.
201.50	214.50	13.00	13.00	100	463		8	<50		40	25	80	<3		8	<50					GARNET/DIOPSIDE SKARN. Mixed zone.
214.50	217.25	2.75	2.75	100	464		4	15		14	5	38	4	<0.01							SILTY SANDSTONE. Pink feldspar veinlets.
217.25	219.60	2.35	2.35	100	465		12	<10		14	5	26	2	<0.01	8	13					SILTY SANDSTONE. Pink feldspar veinlets.
219.60	222.20	2.60	2.50		466		8	15		10	<5	26	4	<0.01							SILTY SANDSTONE. Pink feldspar veinlets.
222.20	228.00	5.80	5.80	100	467		1	50		30	10	40	<3								DIOPSIDE GARNET SKARN.
228.00	232.25	4.25	4.25	100	468		1	<50		30	6	<20	<3		1	<50					METASILTSTONE/QUARTZITE.
232.25	243.20	10.95	10.90	99	469		1	<50		100	30	150	<3								METASILTSTONE/QUARTZITE.
243.20	243.90	0.70	0.70	100	470		16	<10		34	35	80	1	0.06	16	<10					CHLORITE SKARN.
243.90	250.00	6.10	6.10	100	471		1	<50		60	25	40	<3								METASILTSTONE/DIOPSIDE SKARN.
250.00	256.80	6.80	6.80	100	472		1	<50		60	20	40	<3		2	<50					METASILTSTONE - QUARTZITE. Minor pyrite nodules.
256.80	260.60	3.80	3.80	100	473		6	50		150	10	60	<3								
260.60	263.10	2.50	2.50	100	474		1	<50		80	40	60	<3								METASILTSTONE.

Sheet 1 of 1 Sheets

8061-1-1

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

PROJECT : MOINA

Hole No : MD 37

COLLAR CO-ORDINATES : 450E/338N

LOCATION CODE : MZ.01

COLLAR R.L. : Approx. 515m (estimate)

LOCATION :

MAP/PHOTO REFERENCE :

DATE STARTED	22nd September 1980	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE	Spreyton
DATE FINISHED	2nd October 1980	NON CORE					No OF TRAYS	20
TOTAL DEPTH	176.60m						SAMPLE STORAGE	
LOGGED BY	S.D. Lee	CORE	HQ	0.00	12.00	12.00	ASSAY LAB.	AMDEL
CONTRACTOR	A.D.D.		NQ	12.00	42.00	30.00	ASSAY REPORTS	
RIG	MINDRILL F 30		BQ	42.00	176.60	134.60		
DRILL CREW	A. Butler	CASING					MIN. & PET. LAB.	
	D. Tope						MIN. & PET. REPORTS	
		CASING LEFT	PVC Electrode	0.00 would not	10.00(approx.) go past approx. 10m			

HOLE SURVEY DATA

INSTRUMENT : TROPARI

DEPTH	INSTRUMENT INCL.	INSTRUMENT AZ.	ACID ETCH INCL.	ACID ETCH AZ.	REMARKS
COLLAR	90°	-			
97m	89°	244°			
169m	86°	229°			

GRAPHIC/LETTER SYMBOL LOGGING KEY

STRUCTURE / ALTERATION CODE

- B BEDDING
- J JOINTING
- C CLEAVAGE
- F FOLIATION
- sh SHEARING
- q QUARTZ VEINS
- O OXIDATION

DRILLING SUMMARY :

21,1908

PROJECT: BOTNA MD 37

							Bi	Ag	As	Ba	Be	Ta	Zn		
0.00	18.20	18.20			No sample										
18.20	25.00	6.80			406		<1	<0.1	<50	<200	<1	<100	20		
25.00	30.00	5.00			407		<1	0.1	<50	<200	<1	<100	60		
30.00	40.00	10.00			408		<1	<0.1	<50	<200	<1	<100	40		
40.00	50.00	10.00			409		<1	<0.1	<50	<200	<1	<100	60		
50.00	60.00	10.00			410		<1	<0.1	<50	<200	<1	<100	60		
60.00	68.50	8.50			411		<1	0.1	<50	<200	<1	<100	20		
68.50	79.85	11.35			No sample										
79.85	83.60	3.75			412		<1	0.2	<50	<200	<1	<100	<10		
83.60	92.25	8.65			No sample										
92.25	100.00	7.75			413		<1	0.2	<50	<200	<1	<100	50		
100.00	110.00	10.00			414		<1	<0.1	<50	<200	<1	<100	30		
110.00	120.00	10.00			415		<1	<0.1	<50	<200	<1	<100	10		
120.00	130.00	10.00			416		<1	0.1	<50	<200	<1	<100	30		
130.00	140.00	10.00			417		<1	<0.1	<50	<200	<1	<100	20		
140.00	144.13	4.13			418		<1	<0.1	<50	<200	<1	<100	20		
144.13	144.80	0.67			419		<1	0.2	<50	<200	<1	<100	60		
144.80	147.05	2.25			420		<1	0.2	<50	200	<1	<100	100		
147.05	153.56	6.51			421		<1	0.1	<50	<200	<1	<100	30		
153.56	155.00	1.44			422	C1	10	<1	80	<200	10	<100	80		
155.00	156.58	1.58			423		50	<1	260						
156.58	158.68	2.10			424		130	<1	60						
										<200	30	<100	100		
158.68	160.90	2.22			425	C2	10	<1	<20						
160.90	162.00	1.10			426		230	<1	210						
162.00	163.42	1.42			427		470	<1	40						
163.42	164.68	1.26			428	C3	20	<1	<20	200	10	<100	100		
164.68	166.00	1.32			429		<1	0.2	<50	400	3	<100	150		
166.00	168.00	2.00			430		<1	0.2	<50	200	2	<100	150		
168.00	170.00	2.00			431		<1	0.2	<50	400	2	<100	150		
170.00	172.00	2.00			432		<1	<0.1	<50	200	2	<100	150		
172.70	174.00	2.00			433		<1	0.2	<50	200	1	<100	200		
174.00	176.60	2.60			434		<1	0.2	<50	200	1	<100	150		
	END OF HOLE														

80612

THE SUCI[illegible]ANY OF AUSTRALIA LTD. - MET[illegible]IVISION

PROJECT: MOINA

[illegible]OND DRILL LOG - SAMPLING RECO[illegible]

HOLE NO: MD 37

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Comments No.	Assays Sn	W	Cu	Pb	Zn	Mo	Au	Weighted Assays Ratios Sn	W	Sn	W	% Estimates	Core Angles	T.S / P.S	Description
0.00	18.20	18.20			No sample																BASALT; variably weathered with minor claystone at base
18.20	25.00	6.80			406		<1	<50	6	15	<20	<3									LIMESTONE; mostly fresh, massive
25.00	30.00	5.00			407		<1	<50	8	8	<20	<3									LIMESTONE; massive and well layered
30.00	40.00	10.00			408		<1	<50	10	6	<20	<3									LIMESTONE; mostly massive
40.00	50.00	10.00			409		<1	<50	8	6	<20	<3									LIMESTONE; massive, moderately fractured 44.5 to 47.0m
50.00	60.00	10.00			410		<1	<50	8	2	<20	<3									LIMESTONE; massive
60.00	68.50	8.50			411		<1	<50	8	10	<20	<3									LIMESTONE; massive
68.50	79.85	11.35			No sample																CAVITY. 60cm grey/orange-brown mud
79.85	83.60	3.75			412		<1	<50	15	6	<20	<3		<1	<50						LIMESTONE, massive to finely layered
83.60	92.25	8.65			No sample																CAVITY. 17cm brown-grey mud.
92.25	100.00	7.75			413		<1	<50	6	8	<20	<3									LIMESTONE, massive to layered
100.00	110.00	10.00			414		<1	<50	80	10	<20	<3									LIMESTONE, massive to layered
110.00	120.00	10.00			415		<1	<50	4	10	20	<3									LIMESTONE; mostly massive, moderately fractured and calcite veined 114.5 to 116.2m
120.00	130.00	10.00			416		<1	<50	2	10	<20	6									LIMESTONE, mostly massive
130.00	140.00	10.00			417		<1	<50	6	10	100	10									LIMESTONE, massive
140.00	144.13	4.13			418		<1	<50	4	20	<20	<3									LIMESTONE, massive
144.13	144.80	0.67			419		<1	<50	8	40	40	<3									Calcareous QUARTZITE (gradational lower contact)
144.80	147.05	2.25			420		<1	<50	20	15	20	<3									DIOPSIDE-QUART-IREMOLITE(?) SKARN
147.05	153.56	6.51			421		<1	<50	6	20	40	<3									LIMESTONE, massive to banded, with minor diopside-garnet-calcite skarn bands increasing down hole.
153.56	155.00	1.44			422	C1	120	10	14	<5	650	3	<0.01	350	10						GARNET-DIOPSIDE-CALCITE SKARN with up to 5% pyrite/pyrrhotite
155.00	156.58	1.58			423		550	10	55	5	1800	2									GARNET-DIOPSIDE-CALCITE SKARN with up to 5% pyrrhotite/pyrite and trace ?sphalerite.
156.58	158.68	2.10			424		260	45	180	5	70	12									CHLORITE (/BIOTITE) - GARNET SKARN with 1-5% pyrrhotite (pyrite), calcite cemented
158.68	160.90	2.22			425	C2	140	20	14	5	38	1	0.03	605	75						BRECCIA approx. 157.10 to 157.80m.
160.90	162.00	1.10			426		1250	240	200	5	130	11				1140	315				DIOPSIDE + QUARTZ + GARNET SKARN.
162.00	163.42	1.42			427		1050	370	190	15	80	12		600	210						CHLORITE - MAGNETITE SKARN typically with 1-2% pyrite/pyrrhotite & minor WRIGGLITE & DIOPSIDE SKARN.
163.42	164.68	1.26			428	C3	95	25	12	5	40	1	0.04								As above.
164.68	166.00	1.32			429		20	<50	15	10	<20	6									DIOPSIDE-RICH SKARN with minor & variable chlorite, calcite, garnet . TRANSITION ZONE.
166.00	168.00	2.00			430		6	50	60	25	<20	6									DIOPSIDE SKARN, well banded. "Metasiltstone".
168.00	170.00	2.00			431		10	<50	40	10	<20	<3									DIOPSIDE SKARN, well banded. "Metasiltstone".
170.00	172.00	2.00			432		3	<50	30	8	20	40		9	<50						DIOPSIDE SKARN ("Metasiltstone"), relatively massive and moderately fractured with irregular calcite/feldspar veinlets.
172.00	174.00	2.00			433		5	<50	80	10	20	6									As above.
174.00	176.60	2.60			434		2	<50	40	10	40	<3									DIOPSIDE SKARN ("Metasiltstone"), massive, weakly fractured.
	END OF HOLE																				END OF HOLE

80614

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

Hole No : MD 36

PROJECT : MOINA

LOCATION CODE : MZ 01

COLLAR CO-ORDINATES 699E/648N

COLLAR R.L. : ?

LOCATION :

MAP/PHOTO REFERENCE :

DATE STARTED	8th Sept. 1980	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE	Spreyton
DATE FINISHED	18th Sept. 1980	NON CORE					Nº OF TRAYS	21
TOTAL DEPTH	170.50m						SAMPLE STORAGE	
LOGGED BY	S.D. Lee	CORE	HQ	0.00	3.00		ASSAY LAB.	AMDEL
CONTRACTOR	A.D.D.		NQ	3.00	96.00		ASSAY REPORTS	
RIG	Mindrill F30		BQ	96.00	170.50			
DRILL CREW	A. Butler	CASING					MIN. & PET. LAB.	
	M. Blight						MIN. & PET. REPORTS	
		CASING LEFT	HQ PVC Agriflex	0.00 0.00 30m	- 3.00 ?			

HOLE SURVEY DATA

INSTRUMENT : TROPARI

DEPTH	INSTRUMENT INCL.	INSTRUMENT AZ.	ACID ETCH INCL.	ACID ETCH AZ.	REMARKS
COLLAR	90°	-			
169.5m	90°	(010°)			

GRAPHIC/LETTER SYMBOL LOGGING KEY

STRUCTURE / ALTERATION CODE

- B BEDDING
- J JOINTING
- C CLEAVAGE
- F FOLIATION
- sh SHEARING
- q QUARTZ VEINS
- O OXIDATION

DRILLING SUMMARY :

806175

PROJECT: MOINA MD 36

DIAMOND DRILL LO

From	To	Interval (m)	Core Recov	% Rec	Sample No.	Compos No.	Ag	Bi	As	Ba	Be	Ta	Zr		Weighted Assay		
0.00	60.00	60.00			No sample												
60.00	70.00	10.00			373		0.11	<1	<50	<200	1	<100	10				
70.00	77.50	7.50			374		0.10	<1	<50	<200	1	<100	20				
77.50	85.00	7.50			375		<0.11	<1	<50	<200	1	<100	60				
85.00	91.75	6.75			376		0.1	<1	<50	<200	1	<100	40				
91.75	92.15	0.40			377		<0.1	<1	<50	<200	1	<100	80				
92.15	95.14	2.99			378		0.1	<1	<50	<200	1	<100	30				
95.14	101.70	6.56			379		<0.1	<1	<50	<200	1	<100	60				
101.70	104.00	2.30			380		<0.1	<1	<50	<200	20	<100	40				
104.00	106.00	2.00			381		<0.1	<1	<50	<200	10	<100	40				
106.00	107.50	1.50			382		<0.1	<1	<50	<200	30	<100	60				
107.50	113.50	6.00			383		<0.1	<1	<50	<200	15	<100	40				
113.50	116.50	3.00			384		<0.1	<1	<50	<200	30	<100	100				
116.50	119.50	3.00			No sample												
119.50	122.20	2.70			385		<0.1	<1	<50	<200	20		80				
122.20	123.00	0.80			386		1	10	<20								
123.00	125.25	2.25			387		<1	<10	<20								
125.25	131.50	6.25			388		<1	10	<20								
131.50	134.50	3.00			389	C1	1	10	<20	<200	20	<100	150				
134.50	137.50	3.00			390		<1	<10	<20								
137.50	144.10	6.50			391		<1	10	<20								
144.10	146.00	1.90			392		<1	10	<20								
146.00	148.00	2.00			393		<1	<10	<20								
148.00	150.00	2.00			394	C2	<1	10	<20	200	4	<100	150				
150.00	152.00	2.00			395		<1	10	<20								
152.00	153.20	1.20			396		<1	20	270								
153.20	155.00	1.80			397					<200	<1	<100	80				
155.00	157.00	2.00			398					<200	<1	<100	100				
157.00	158.62	1.62			399					<200	<1	<100	80				
158.62	159.80	1.18			400					200	<1	<100	60				
159.80	162.00	2.20			401					<200	<1	<100	100				
162.00	164.00	2.00			402					400	<1	<100	100				
164.00	166.00	2.00			403					200	<1	<100	150				
166.00	168.00	2.00			404					<200	1	<100	100				
168.00	170.50	2.50			405					400	1	<100	150				

NO OF HOLE

806176

THE SHELL C[illegible]NY OF AUSTRALIA LTD. - METAL[illegible]STON

DIA[illegible]D DRILL LOG - SAMPLING RECORD

HOLE NO. MO 3[illegible]

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays Sn	As	Sb %	Cu	Pb	Zn	Ag	Au	Weighted Assay Ratios	% Estimates	Core Angles	-1t	1.5 P.S	Description
0.00	60.00	60.00			No sample															BASALT and tertiary MUDSTONE (variably calcareous and lignitic)
60.00	70.00	10.00			373			<50		4	60	<20	<3							LIMESTONE; mostly highly weathered and non-banded
70.00	77.50	7.50			374			<50		4	40	<20	<3							LIMESTONE; weakly to highly weathered
77.50	85.00	7.50			375			<50		8	20	<20	<3							LIMESTONE; strongly to moderately weathered, no certain bedding
85.00	91.25	6.25			376			<50		4	30	<20	<3							LIMESTONE; weakly to moderately weathered
91.25	91.65	0.40			377			<50		3	8	<20	<3							MARL; finely banded
91.65	94.64	2.99			378			<50		4	30	<20	<3							LIMESTONE; weakly weathered to fresh, massive, pelitial in places
94.64	101.20	6.56			379			<50		6	20	<20	<3							LIMESTONE; weakly to strongly weathered, strongly foliated, minor mud/silt - rich band.
101.20	103.50	2.30			380			<50		8	40	<20	<3							LIMESTONE with highly weathered GARNET - ?DIOPSIDE - CALCITE - RELICT ?PYRITE SKARN ZONES
103.50	105.50	2.00			381			<50		6	40	<20	<3							LIMESTONE with highly weathered GARNET - ?DIOPSIDE - CALCITE - RELICT ?PYRITE SKARN ZONES
105.50	107.50	1.50			382			<50		1	60	<20	<3							LIMESTONE with GARNET - DIOPSIDE rich SKARN zones as above
107.50	113.50	6.00			383			<50		8	20	<20	<3							Variably calcareous/carbonaceous MUDSTONE ?Cave-fill
113.50	116.50	3.00			384			<50		4	40	<20	<3							Weakly calcareous, carbonaceous MUDSTONE-SILTSTONE with minor GARNET - DIOPSIDE SKARN
																				Largely cave-fill ?
116.50	119.50	3.00			No sample															No recovery
119.50	122.20	2.70			385			<50		10	40	<20	<3							Carbonaceous MUDSTONE/SILTSTONE, Cave-fill(?)
122.20	123.00	0.80			386		6	<10		14	50	34	1	<0.01						LIMESTONE, massive.
123.00	125.25	2.25			387		<4	<10		26	55	260	4	<0.01						Weakly calcareous, carbonaceous SILTSTONE/MUDSTONE with minor (?) GARNET SKARN zones.
																				Largely cave-fill(?).
125.25	131.50	6.25			388		<4	45		32	25	60	4	<0.01						GARNET SKARN, mostly strongly weathered.
131.50	135.50	3.00			389	C1	<4	<10	0.21	12	15	70	3	<0.01						GARNET SKARN (highly weathered) with carbonaceous sediment (?cave-fill).
135.50	137.50	3.00			390		8	20		6	20	120	5	<0.01						Mostly GARNET SKARN (highly weathered) as above.
137.50	144.10	6.60			391		<4	15		14	40	34	1	<0.01						GARNET SKARN (moderately to highly weathered) & carbonaceous mud (cave-fill)(?)
144.10	146.00	1.90			392		<4	15		12	35	24	1	<0.01						Interbanded GARNET SKARN and DIOPSIDE - QUARTZ SKARN ("Metasiltstone")
146.00	148.00	2.00			393		<4	<10		14	45	27	<1	<0.01						As above. Garnet skarn weak, to highly weathered
148.00	150.00	2.00			394	C2	10	<10	0.25	48	45	230	<1	<0.01						As above
150.00	152.00	2.00			395		12	10		55	25	150	<1	0.02						As above
152.00	153.20	1.20			396		16	10		12	20	190	20	<0.01						Interbanded GARNET SKARN (weathered) and DIOPSIDE - QUARTZ SKARN as above
153.20	155.00	1.80			397				0.59					<0.01						DIOPSIDE-QUARTZ-FELDSPAR - GARNET - WOLLASTANITE SKARNS ("Metasiltstone" - impure quartzite)
155.00	157.00	2.00			398				0.39					<0.01						As above.
157.00	158.62	1.62			399				0.18					<0.01						Metasiltstone - impure quartzite as above.
158.62	159.80	1.18			400				0.10					<0.01						LIMESTONE and highly calcareous siltstone with very minor garnet-chlorite skarn bands (5mm
159.80	162.00	2.20			401				0.39					<0.01						Variable QUARTZ-DIOPSIDE SKARNS (impure quartzite).
162.00	164.00	2.00			402				0.16					<0.01						As above.
164.00	166.00	2.00			403				0.12					<0.01						As above.
166.00	168.00	2.00			404				0.16					<0.01						As above.
168.00	170.50	2.50			405				0.18					<0.01						Variable QUARTZ-DIOPSIDE SKARNS (impure quartzite) as above.
END OF HOLE																				END OF HOLE

80 1 19 7

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

Hole No : MD 35

PROJECT : MOINA

LOCATION CODE : MZ DJ

COLLAR CO-ORDINATES : 240E/008N

COLLAR R.L. : 500m

LOCATION :

MAP/PHOTO REFERENCE :

DATE STARTED	23rd August, 1980	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE	Spreyton
DATE FINISHED	2nd September 1980	NON CORE					NO OF TRAYS	22
TOTAL DEPTH	161.40m						SAMPLE STORAGE	
LOGGED BY	S.D. Lee	CORE	HQ	0.00	4.00	4.00	ASSAY LAB.	AMDEL
CONTRACTOR	A.D.D.		NQ	4.00	33.00	29.00	ASSAY REPORTS	
RIG	Mindrill F30		BQ	33.00	161.40	128.40		
DRILL CREW	F. Ortner	CASING					MIN. & PET. LAB.	
	A. Ortner	Note:	Lead electrode at 123m.				MIN. & PET. REPORTS	
		CASING LEFT	HW	0.0	4.0	4.0		
			PVC	0.0	6.0	6.0		
			Agriflex	0.0	33.00	33.00		

HOLE SURVEY DATA

INSTRUMENT : TROPARI

DEPTH	INSTRUMENT INCL.	INSTRUMENT AZ.	ACID ETCH INCL.	ACID ETCH AZ.	REMARKS
COLLAR	90°	-			
65.4m	86°	244°			
106.0m	86°	289.5°			
161.0m	85°	227.5°			

GRAPHIC / LETTER SYMBOL LOGGING KEY

STRUCTURE / ALTERATION CODE

B BEDDING
J JOINTING
C CLEAVAGE
F FOLIATION
sh SHEARING
q QUARTZ VEINS
O OXIDATION

DRILLING SUMMARY :

80178

THE SHELL CO... OF ...

PROJECT ... MOINA 35

DIAM ... DRILL CO

From	To	Interval (m)	Core Recvd	% Rec.	Sample No.	Composite No.	Assays Ag	Bi	As	Ba	Be	Ta	Zr		Weighted Assays		
0.00	4.00	4.00	NIL				1										
4.00	10.00	6.00			312		1	<10	<20								
10.00	15.00	5.00			313		1	<10	<20								
15.00	20.00	5.00			314	C1	1	<10	<20	<200	<1	<100	40				
20.00	25.00	5.00			315		1	<10	<20								
25.00	29.00	4.00			316		<1	10	<20								
29.00	31.35	2.35			317	C2	<1	<10	<20	<200	<1	<100	30				
31.35	35.00	3.65			318	C3	<1	<10	<20	<200	<1	<100	20				
35.00	38.93	3.93			319		<1	<10	<20								
38.93	42.55	3.62			320	C4	<1	<10	<20	<200	<1	<100	10				
42.55	50.00	7.45			321		<1	<10	<20								
50.00	55.00	5.00			322	C5	<1	<10	<20	<200	<1	<100	10				
55.00	60.00	5.00			323		<1	<10	<20								
60.00	65.00	5.00			324		<1	<10	<20								
65.00	70.00	5.00			325	C6	<1	<10	<20	<200	<1	<100	30				
70.00	75.00	5.00			326		<1	<10	<20								
75.00	80.00	5.00			327		<1	10	<20								
80.00	85.00	5.00			328	C7	<1	<10	<20	<200	<1	<100	10				
85.00	90.00	5.00			329		<1	10	<20								
90.00	95.75	5.75			330		<1	<10	<20								
95.75	98.00	2.25			331	C8	<1	20	140	<200	<1	<100	20				
98.00	100.65	2.65			332	C9	<1	140	160	<200	10	<100	20				
100.65	101.40	0.75			333	C10	1	600	230	<200	60	<100	100				
101.40	102.00	0.60			334		1	860	150								
102.00	103.00	1.00			335	C11	1	630	<20	<200	40	<100	80				
103.00	104.00	1.00			336		1	450	<20								
104.00	105.00	1.00			337		<1	510	90								
105.00	106.00	1.00			338	C12	<1	510	50	<200	40	<100	100				
106.00	107.00	1.00			339		<1	340	<20								
107.00	108.00	1.00			340		<1	40	<20								
						C13				<200	20	<100	100				
108.00	109.34	1.34			341		<1	70	<20								
109.34	110.45	1.11			342	C14	<1	260	<20	<200	20	<100	100				
110.45	111.68	1.23			343	C15	<1	560	<20	<200	60	<100	100				
111.68	113.00	1.32			344		<1	550	<20								
113.00	114.00	1.00			345		<1	510	<20								
114.00	115.00	1.00			346	C16	<1	610	<20	<200	60	<100	100				
115.00	116.00	1.00			347		<1	410	<20								
116.00	117.25	1.25			348		<1	690	<20								
117.25	118.79	1.54			349	C17	<1	320	<20	<200	40	<100	150				
118.79	120.00	1.21			350		<1	170	<20								
120.00	121.00	1.00			351		<1	180	<20								
						C18				<200	30	<100	150				
121.00	122.00	1.00			352		<1	20	<20								
122.00	123.00	1.00			353		<1	240	<20								
123.00	124.05	1.05			354		<1	250	<20								
124.05	125.00	0.95			355	C19	<1	30	<20	400	10	<100	150				
125.00	126.00	1.00			356		<1	10	<20								
						C20				<200	10	<100	100				
126.00	127.00	1.00			357		<1	10	<20								
127.00	129.00	2.00			358		<1	10	<20								
129.00	131.00	2.00			359		<1	<10	<20								
131.00	133.00	2.00			360	C21	<1	<10	<20	200	6	<100	150				
133.00	135.00	2.00			361		1	<10	<20								
135.00	137.00	2.00			362		1	10	<20								
137.00	139.00	2.00			363	C22	1	<10	<20	<200	8	<100	100				
139.00	141.00	2.00			364		<1	20	<20								
141.00	143.00	2.00			365	C23	<1	10	<20	400	2	<100	150				
143.00	145.05	2.05			366		<1	<10	<20								

80179

THE SHELL CO[illegible]Y OF AUSTRALIA LTD. - METALS [illegible]SION

PROJECT: MOINA

[illegible]AM DRILL LOG - SAMPLING RECORD

HOLE NO: MD 35

From	To	Interval (m)	Core Recvd	% Rec	Sample No.	Compos No.	Sn	W	CaF2 %	Cu	Pb	Zn	Mo	Au	Weighted Assays Ratios Sn	W	% Estimates Sn	W	Core Angles		Alt	P.S	Description
0.00	4.00	4.00	NIL																				No recovery
4.00	10.00	6.00			312		10	<10		10	5	34	1	<0.01									LIMESTONE: Massive, moderately weathered to fresh
10.00	15.00	5.00			313		6	<10		4	5	16	<1	<0.01									LIMESTONE: Massive to banded, variably bioturbated, fresh.
15.00	20.00	5.00			314	C1	<4	<10	0.06	<2	5	14	<1	<0.01									LIMESTONE: Massive to banded, variably bioturbated, fresh.
20.00	25.00	5.00			315		<4	<10		6	5	18	<1	<0.01									LIMESTONE: Massive to banded, variably bioturbated, fresh.
25.00	29.00	4.00			316		6	<10		4	5	26	<1	<0.01									LIMESTONE: Massive to banded, variably bioturbated, fresh.
29.00	31.35	2.35			317	C2	8	<10	0.04	4	10	48	<1	<0.01									LIMESTONE: Strongly fractured, moderately weathered.
31.35	35.00	3.65			318	C3	4	<10	0.08	6	10	40	<1	<0.01									LIMESTONE: Mostly massive, fresh.
35.00	38.93	3.93			319		4	10		4	5	18	<1	<0.01									LIMESTONE: Mostly massive fresh.
38.93	42.55	3.62			320	C4	<4	<10	0.04	14	5	22	<1	<0.01	5	<10							CALCITE (white) with minor feldspar veining.
42.55	50.00	7.45			321		<4	<10		6	5	20	1	<0.01									LIMESTONE: Massive to banded, fresh.
50.00	55.00	5.00			322	C5	6	<10	0.06	6	5	28	<1	<0.01									LIMESTONE: Massive to banded, fresh.
55.00	60.00	5.00			323		<4	<10		4	5	20	2	<0.01									LIMESTONE: Massive to banded, fresh, rare slightly sandy layers.
60.00	65.00	5.00			324		4	<10		4	5	22	1	<0.01									LIMESTONE: Mostly massive, fresh, minor bioturbation.
65.00	70.00	5.00			325	C6	<4	<10	0.10	4	10	16	<1	<0.01									LIMESTONE: Mostly massive, fresh, minor bioturbation.
70.00	75.00	5.00			326		6	<10		10	10	32	<1	<0.01									LIMESTONE: Mostly massive, fresh, minor bioturbation.
75.00	80.00	5.00			327		<4	<10		4	10	14	<1	<0.01									LIMESTONE: Fresh, massive to banded, variably bioturbated.
80.00	85.00	5.00			328	C7	<4	<10	0.08	4	5	18	<1	<0.01									LIMESTONE: Fresh, massive to banded, variably bioturbated.
85.00	90.00	5.00			329		4	<10		4	10	26	4	<0.01									LIMESTONE: Fresh, massive to banded, variably bioturbated.
90.00	95.75	5.75			330		8	<10		4	5	20	4	<0.01									LIMESTONE: Fresh, massive to banded, variably bioturbated.
95.75	98.00	2.25			331	C8	65	20	0.94	34	5	280	4	<0.01	170	65							LIMESTONE with GARNET ± mica, ?diopside, chlorite SKARN bands, increasing down hole.
98.00	100.65	2.65			332	C9	260	100	4.30	110	10	250	3	<0.01									LIMESTONE with GARNET RICH SKARN bands (40%) and rare WRIGGLITE patches.
100.65	101.40	0.75			333	C10	1050	640	13.5	140	10	110	10	0.42	1050	640							Interbanded WRIGGLITE and GARNET RICH SKARN
101.40	102.00	0.60			334		600	520		290	5	170	25	0.15									WRIGGLITE containing 1-5% pyrrhotite (± pyrite).
102.00	103.00	1.00			335	C11	1200	1400	16.5	530	5	80	44	<0.01	1040	920							WRIGGLITE containing 1-5% pyrrhotite (± pyrite).
103.00	104.00	1.00			336		1100	1000		330	5	120	41	0.03									WRIGGLITE containing 1-5% pyrrhotite (± pyrite).
104.00	105.00	1.00			337		1100	600		160	5	100	27	0.03									WRIGGLITE containing 1-5% pyrrhotite (± pyrite).
105.00	106.00	1.00			338	C12	1400	600	16.5	180	30	60	39	0.02	1450	800							WRIGGLITE with subordinate GARNET - DIOPSIDE - CHLORITE SKARN patches, Trace to 10% pyrrhotite.
106.00	107.00	1.00			339		1500	1000		110	10	65	37	<0.01									As above.
107.00	108.00	1.00			340		620	1200		22	5	42	41	<0.01									DIOPSIDE-RICH SKARN with variable GARNET, CHLORITE & increasing MAGNETITE down hole.
						C13			4.50						680	1070							Minor pyrite/pyrrhotite.
108.00	109.34	1.34			341		720	980		30	5	38	50	<0.01									As above.
109.34	110.45	1.11			342	C14	1300	1000	7.25	12	10	36	26	<0.01	1300	1000							GARNET-MAGNETITE-CHLORITE ± FLUORITE SKARN with magnetite increasing down hole.
110.45	111.68	1.23			343	C15	940	760	18.2	190	10	80	41	<0.01	940	760	1180	1035					WRIGGLITE contain trace to 5% pyrrhotite (± pyrite)
111.68	113.00	1.32			344		1450	1400		220	5	70	70	<0.01									Interbanded WRIGGLITE (60%) & DIOPSIDE-MAGNETITE-CHLORITE ± GARNET SKARN with 1-2% pyrite.
113.00	114.00	1.00			345		1050	800		170	5	55	39	0.04									As above (interbanded WRIGGLITE & SKARN)
114.00	115.00	1.00			346	C16	2250	1650	13.0	190	<5	55	70	0.03	1690	1440							As above (interbanded WRIGGLITE & SKARN).
115.00	116.00	1.00			347		1350	1350		190	5	65	65	0.01									As above (interbanded WRIGGLITE & SKARN).
116.00	117.25	1.25			348		1450	1900		150	10	60	85	<0.01									As above (interbanded WRIGGLITE & SKARN).
117.25	118.79	1.54			349	C17	1100	580	9.95	95	10	55	27	<0.01	1100	580							Interbanded WRIGGLITE & DIOPSIDE-GARNET ± MAGNETITE ± CHLORITE SKARNS with minor (<1%) pyrite
118.79	120.00	1.21			350		680	900		200	5	50	30	<0.01									Complex interbanded WRIGGLITE, MAGNETITE BEARING SKARN, GARNET & DIOPSIDE RICH SKARNS
120.00	121.00	1.00			351		1150	1400		140	5	55	75	<0.01									("Metasiltstone"). Minor pyrite in general.
						C18			12.2						950	1010							Complex interbanded WRIGGLITE & MAGNETITE BEARING SKARNS (minor pyrite), GARNET & DIOPSIDE RICH SKARNS ("Metasiltstone").
121.00	122.00	1.00			352		780	620		50	5	55	35	<0.01									As above.
122.00	123.00	1.00			353		1200	960		310	5	65	40	0.01									As above.
123.00	124.05	1.05			354		1000	1200		140	5	85	60	0.03									As above.
124.05	125.00	0.95			355	C19	320	520	5.15	60	5	38	17	<0.01	320	520							DIOPSIDE ± feldspar (?) SKARN with rapidly decreasing magnetite, garnet, chlorite & minor pyrite.
125.00	126.00	1.00			356		70	580		6	5	34	8	<0.01									DIOPSIDE RICH SKARN with minor variable feldspar, biotite, quartz, tremolite(?) & rare magnetite.
						C20			2.36														
126.00	127.00	1.00			357		120	70		34	5	100	55	<0.1									DIOPSIDE-RICH SKARN as above ("Metasiltstone").
127.00	129.00	2.00			358		170	190		100	25	100	16	<0.1									DIOPSIDE-RICH SKARN as above ("Metasiltstone").
129.00	131.00	2.00			359		110	95		75	5	70	22	<0.02	145	190							DIOPSIDE-RICH SKARN ("Metasiltstone").
131.00	133.00	2.00			360	C21	60	85	1.56	60	5	90	49	0.05									DIOPSIDE-RICH SKARN ("Metasiltstone").
133.00	135.00	2.00			361		70	90		90	5	100	19	<0.01									DIOPSIDE-RICH SKARN ("Metasiltstone").
135.00	137.00	2.00			362		70	100		65	25	90	4	<0.1									DIOPSIDE-RICH SKARN ("Metasiltstone").
137.00	139.00	2.00			363	C22	80	580	2.96	110	5	120	9	<0.1									DIOPSIDE-RICH SKARN("Metasiltstone"). Strongly foliated chlorite-calcite-pyrite FAULT ZONE 137.37 - 137.46m.
139.00	141.00	2.00			364		520	50		42	5	70	39	<0.1									DIOPSIDE-RICH SKARN ("Metasiltstone") Rare 1-2% pyrite.
141.00	143.00	2.00			365	C23	110	3000	1.11	60	<5	95	4	<0.1	110	3000							DIOPSIDE-RICH SKARN ("Metasiltstone") Rare 1-2% pyrite.
143.00	145.05	2.05			366		85	65		48	5	90	2	<0.01									DIOPSIDE-RICH SKARN ("Metasiltstone") Rare 1-2% pyrite.

Chlorite/biotite rich 144.70 - 145.05m.

80.6.180

HELL

PROJECT: MOINA MD 35 DIAM DRILL LO

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Comp. No.	Assays Ag	Bi	As	Ba	Be	Ta	Zr		Weighted Assays
145.05	147.00	1.95			367	C24	<1	10	<20	200	3	<100	100		
147.00	150.00	3.00			368	C25	<1	<10	<20	<200	6	<100	80		
150.00	153.75	3.75			369		<1	10	<20						
153.75	154.70	0.95			370	C26	<1	10	<20	200	2	<100	150		
154.70	158.00	3.30			371	C27	<1	<10	<20	400	1	<100	100		
158.00	161.40	3.40			372	C28	<1	<10	<20	<200	<2	<100	80		
	END OF HOLE														

806181

[redacted] THE S[redacted] CO [redacted] OF [redacted]TRAL[redacted]TD. - METALS [redacted]ION [redacted]

PROJECT: MOINA

TAM DRILL LOG - SAMPLING RECORD

HOLE NO: MD 35

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays Sn	Assays W	Assays CaF2 %	Assays Cu	Assays Pb	Assays Zn	Assays Mo	Assays Au	Weighted Assays Ratios Sn	Weighted Assays Ratios W	% Estimates	Core Angles	Alt	T.S P.S	Description
145.05	147.00	1.95			367	C24	75	70	0.78	55	<5	90	<1	<0.02							DIOPSIDE-RICH SKARN ("Metasiltstone").
147.00	150.00	3.00			368	C25	65	130	0.97	120	<5	130	7	<0.02	60	103					DIOPSIDE-QUARTZ ± biotite, feldspar, ?actinolite SKARN, tending to impure QUARTZITE down hole.
150.00	153.75	3.75			369		36	120		150	5	160	8	<0.01							Metasiltstone and quartzite (impure) as above.
153.75	154.70	0.95			370	C26	95	1300	1.19	130	25	270	270	<0.1	95	1300					FELDSPAR-CALCITE-QUARTZ-DIOPSIDE SKARN
154.70	158.00	3.30			371	C27	60	85	0.68	90	5	120	18	<0.1	43	107					DIOPSIDE-QUARTZ-RICH SKARN ("Metasiltstone") tending to impure QUARTZITE (down hole).
158.00	161.40	3.40			372	C28	28	130	0.86	120	<5	120	11	<0.02							QUARTZ-RICH (± diopside) METASEDIMENT (Impure QUARTZITE).
	END OF HOLE																				END OF HOLE

Sheet 2 of 2 Sheets

806182

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

Hole No : MD 34

PROJECT : MOINA

LOCATION CODE : MZ 01

COLLAR CO-ORDINATES : 400E/175N

COLLAR R.L. : 526m

LOCATION :

MAP/PHOTO REFERENCE :

DATE STARTED	10th August 1980	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE	Spreyton
DATE FINISHED	21st August 1980	NON CORE					Nº OF TRAYS	26
TOTAL DEPTH	196.00m						SAMPLE STORAGE	
LOGGED BY	S.D. Lee	CORE	HQ	0.00	6.00	6.00	ASSAY LAB.	AMDEL
CONTRACTOR	A.D.D.		NQ	6.00	52.80	46.80	ASSAY REPORTS	
RIG	Mindrill F30		BQ	52.80	196.00	143.20		
DRILL CREW	F. Ortner	CASING					MIN. & PET. LAB.	
	A. Ortner	Note:	Lead electrode lost down hole.				MIN. & PET. REPORTS	
		CASING LEFT	PVC Agriflex	0.0	6.0	6.0 54.0		

HOLE SURVEY DATA

INSTRUMENT : TROPARI

DEPTH	INSTRUMENT INCL.	INSTRUMENT AZ.	ACID ETCH INCL.	ACID ETCH AZ.	REMARKS
COLLAR	89°	225° appr.			
95.5m	88°	199°			
195.5m	87°	188°			

GRAPHIC/LETTER SYMBOL LOGGING KEY

STRUCTURE / ALTERATION CODE

- B BEDDING
- J JOINTING
- C CLEAVAGE
- F FOLIATION
- sh SHEARING
- q QUARTZ VEINS
- O OXIDATION

DRILLING SUMMARY :

80618

... MD 34

From	To	Interval m	Core Recd %	Sample No.	Tag No.	Assays Ag	Bi	As	Ba	Be	Ta	Zr	Weighted Assays
0.00	23.95	23.95		No sample									
23.95	28.20	4.25		258		1	<10	<20					
28.20	35.00	6.80		259	C1	1	<10	<20	200	<1	<100	80	
35.00	45.00	10.00		260		1	<10	<20					
45.00	50.00	5.00		261		1	<10	<20					
50.00	55.00	5.00		262	C2	1	<10	<20	<200	<1	<100	30	
55.00	59.70	4.70		263		<1	<10	<20					
59.70	61.50	1.80		264	C3	<1	<10	<20	<200	<1	<100	10	
61.50	65.00	3.50		265		<1	<10	<20					
65.00	70.00	5.00		266	C4	<1	<10	<20	<200	<1	<100	10	
70.00	75.00	5.00		267		<1	<10	<20					
75.00	80.00	5.00		268		<1	<10	<20					
80.00	85.00	5.00		269	C5	<1	<10	<20	<200	<1	<100	10	
85.00	91.88	6.88		270		<1	<10	<20					
91.88	93.55	1.67		271	C6	1	<10	<20	200	<1	<100	250	
93.55	96.10	2.55		272		1	<10	<20					
96.10	99.39	3.29		273	C7	1	<10	<20	200	<1	<100	60	
99.39	105.00	5.61		274		2	<10	<20					
105.00	110.00	5.00		275		1	<10	<20					
110.00	115.00	5.00		276		1	<10	<20					
115.00	120.00	5.00		277	C8	1	<10	<20	<200	<1	<100	30	
120.00	125.00	5.00		278		<1	<10	<20					
125.00	130.00	5.00		279		<1	<10	<20					
130.00	135.00	5.00		280	C9	<1	<10	<20	<200	<1	<100	30	
135.00	140.89	5.89		281		<1	<10	<20					
140.89	142.83	1.94		282	C10	<1	<10	<20	<200	1	<100	150	
142.83	143.60	0.77		283		<1	<10	40					
143.60	146.00	2.40		284		<1	<10	<20					
146.00	148.00	2.00		285	C11	<1	<10	<20	200	<1	<100	50	
148.00	150.47	2.47		286		1	<10	<20					
150.47	152.00	1.53		287	C12	1	60	200	<200	10	<100	200	
152.00	154.07	2.07		288		<1	190	250					
154.07	156.00	1.93		289		2	230	<20					
156.00	158.00	2.00		290	C13	2	150	<20	<200	60	<100	200	
158.00	160.05	2.05		291		<1	260	<20					
160.05	161.25	1.20		292	C14	2	680	<20	<200	60	<100	200	
161.25	162.50	1.25		293	C15	1	30	<20	800	20	<100	200	
162.50	164.00	1.50		294		1	10	<20					
164.00	166.00	2.00		295	C16	1	10	<20	<200	6	<100	100	
166.00	168.00	2.00		296		1	<10	<20					
168.00	170.00	2.00		297		1	<10	<20					
170.00	172.00	2.00		298		1	10	<20					
172.00	174.00	2.00		299	C17	1	10	<20	200	2	<100	100	
174.00	176.40	2.40		300		1	10	<20					
176.40	176.42	0.02		301		1	200	<20					
176.42	176.00	1.58		302		1	10	<20					
176.00	180.00	2.00		303	C18	1	<10	<20	600	2	<100	200	
180.00	182.00	2.00		304		<1	<10	<20					
184.00	184.00	2.00		305		<1	<10	<20					
184.00	186.50	2.50		306		<1	10	<20					
186.50	188.00	1.50		307		<1	<10	<20					
188.00	190.00	2.00		308	C19	<1	<10	<20	<200	<1	<100	80	
190.00	192.00	2.00		309		<1	<10	<20					
192.00	194.00	2.00		310	C20	<1	<10	<20	<200	2	<100	100	
194.00	196.00	2.00		311		<1	<10	<20					
END OF HOLE													

80 9184

THE SHELL CO' ... OF AUSTRALIA LTD. - METALS ... TION

PROJECT: MOINA ... DRILL LOG - SAMPLING RECORD ... HOLE NO: MD 34

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Comps No.	Assays Sn	W	CaF2 %	Cu	Pb	Zn	Ag	Au	Weighted Assays Ratios Sn	W	Sn	W	% Estimates	Core Angles	Alt	T.S P.S	Description
0.00	23.95	23.95			No sample																		BASALT and TERTIARY MUDSTONE
23.95	28.20	4.25			258		44	60		16	30	110	11	0.01									LIMESTONE: completely weathered (mostly unconsolidated)
28.20	35.00	6.80			259	C1	<4	35	0.12	44	15	60	5	<0.01									LIMESTONE: massive, moderately weathered to fresh.
35.00	45.00	10.00			260		<4	<10		55	5	65	3	<0.01									LIMESTONE with minor clay/mud (?cave-fill) 41.4 - 44.4m
45.00	50.00	5.00			261		<4	<10		24	10	36	2	<0.01									LIMESTONE: massive, fresh
50.00	55.00	5.00			262	C2	14	20	0.12	12	5	24	5	<0.01									LIMESTONE: variably weathered.
55.00	59.70	4.70			263		<4	<10		26	10	40	2	<0.02									LIMESTONE: mostly massive; fresh.
59.70	61.50	1.80			264	C3	8	<10	0.08	24	5	40	2	<0.02									LIMESTONE: variably weathered with minor (1%) relict pyrite.
61.50	65.00	3.50			265		<4	<10		22	10	30	3	<0.02									LIMESTONE: massive fresh.
65.00	70.00	5.00			266	C4	4	10	0.08	65	5	75	1	<0.01									LIMESTONE: massive, fresh.
70.00	75.00	5.00			267		<4	<10		14	10	28	3	<0.01									LIMESTONE: massive, fresh.
75.00	80.00	5.00			268		10	<10		14	10	26	2	<0.01									LIMESTONE: massive, fresh with minor slightly sandy layers
80.00	85.00	5.00			269	C5	8	15	0.08	36	90	70	<1	<0.01	7	15							LIMESTONE: massive, fresh with minor slightly sandy layers
85.00	91.88	6.88			270		<4	<10		34	15	44	1	<0.01									LIMESTONE: massive, fresh with minor slightly sandy layers
91.88	93.55	1.67			271	C6	8	30	0.12	140	20	120	<1	<0.1									QUARTZITE: weakly calcareous.
93.55	96.10	2.55			272		4	20		42	10	44	<1	<0.02									LIMESTONE: massive with minor sandy layers.
96.10	99.39	3.29			273	C7	<4	15	0.08	22	5	50	1	0.03									LIMESTONE: dark, relatively mud-rich(?)
99.39	105.00	5.61			274		<4	10		50	10	38	2	<0.01									LIMESTONE: massive with minor slightly sandy layers.
105.00	110.00	5.00			275		4	<10		8	5	30	<1	<0.01									LIMESTONE: massive with minor slightly sandy layers.
110.00	115.00	5.00			276		4	10		8	10	50	2	<0.01									LIMESTONE: minor sandy beds, variably bioturbated.
115.00	120.00	5.00			277	C8	8	<10	0.10	8	10	30	<1	<0.01									LIMESTONE: minor sandy beds, variably bioturbated.
120.00	125.00	5.00			278		12	<10		16	5	22	2	<0.01									LIMESTONE: minor sandy beds, variably bioturbated.
125.00	130.00	5.00			279		<4	<10		16	5	110	<1	<0.01									LIMESTONE: massive with minor sandy layers.
130.00	135.00	5.00			280	C9	10	<10	0.08	14	10	60	<1	<0.01									LIMESTONE: massive with minor sandy layers, bioturbated.
135.00	140.89	5.89			281		8	<10		8	10	30	1	<0.01									LIMESTONE: minor slightly sandy layers, variably bioturbated
140.89	142.83	1.94			282	C10	12	160	0.14	150	20	160	1	<0.02	12	160							QUARTZ-ACTINOLITE-GARNET SKARN.
142.83	143.60	0.77			283		120	10		8	5	75	4	<0.01	120	10							GARNET-RICH SKARN (minor and variable calcite, diopside, chlorite)
143.60	146.00	2.40			284		6	<10		20	10	50	1	0.01									LIMESTONE: massive with minor slightly sandy layers.
146.00	148.00	2.00			285	C11	6	<10	0.12	14	10	22	1	0.01	7	10							LIMESTONE: massive with minor slightly sandy layers.
148.00	150.47	2.47			286		8	10		24	10	28	<1	<0.01									LIMESTONE: massive with minor slightly sandy layers.
150.47	152.00	1.53			287	C12	580	<10	1.89	4	15	85	<1	<0.01	850	13							GARNET (-TALC) RICH SKARN with minor biotite/chlorite, calcite.
152.00	154.07	2.07			288		1050	15		4	10	75	<1	0.04									GARNET (-TALC) RICH SKARN with minor biotite/chlorite, calcite.
154.07	156.00	1.93			289		880	700		190	10	60	26	<0.01									Interbanded WRIGGLITE (30%) and GARNET DIOPSIDE SKARN (70%)
156.00	158.00	2.00			290	C13	1050	410	10.9	75	10	48	25	<0.01	1030	550	1065	480					Interbanded WRIGGLITE (30%) and GARNET DIOPSIDE SKARN (70%).
158.00	160.05	2.05			291		1150	540		90	10	55	20	0.03									Interbanded WRIGGLITE (30%) and GARNET DIOPSIDE SKARN (70%).
160.05	161.25	1.20			292	C14	1900	1550	19.9	170	10	180	50	0.12	1900	1550							WRIGGLITE
161.25	162.50	1.25			293	C15	190	860	6.40	44	5	46	30	<0.01									DIOPSIDE-RICH SKARN with lesser feldspar, quartz, biotite, ?tremolite. Magnetite decreases to approx. zero by 162.50m. Transition zone.
162.50	164.00	1.50			294		70	190		160	<5	160	22	<0.02									DIOPSIDE-RICH SKARN (minor feldspar, quartz, biotite, ?actinolite & trace magnetite)
															65	325							"Metasiltstone".
164.00	166.00	2.00			295	C16	40	140	1.95	170	35	170	4	<0.02									As above.
166.00	168.00	2.00			296		38	340		1100	5	960	8	<0.01									DIOPSIDE ± quartz, feldspar, biotite SKARN ("Metasiltstone").
168.00	170.00	2.00			297		28	270		690	5	630	15	0.02									DIOPSIDE ± quartz, feldspar, biotite SKARN ("Metasiltstone").
170.00	172.00	2.00			298		22	1650		270	<5	240	33	<0.02	22	1650							DIOPSIDE-RICH SKARN ("Metasiltstone") with minor? muddy bands
172.00	174.00	2.00			299	C17	18	100	0.64	250	<5	220	4	<0.01									DIOPSIDE-RICH SKARN ("Metasiltstone") with minor? muddy bands
174.00	176.40	2.40			300		22	70		180	5	150	3	<0.01									DIOPSIDE-RICH SKARN ("Metasiltstone") with minor? muddy bands
176.40	176.42	0.02			301		150	25		230	5	120	4	0.04									FAULT(?): Chlorite - pyrite, quartz, feldspar rubble.
176.42	178.00	1.58			302		20	560		180	5	160	27	<0.01									DIOPSIDE-RICH SKARN with variable biotite/chlorite, quartz, feldspar, ?actinolite.
																							"Metasiltstone".
178.00	180.00	2.00			303	C18	18	70	0.45	110	<5	120	8	<0.01									DIOPSIDE-RICH SKARN with variable biotite/chlorite, quartz, feldspar, ?actinolite.
															15	105							"Metasiltstone".
180.00	182.00	2.00			304		8	50		65	5	85	<1	<0.01									DIOPSIDE-RICH SKARN as above.
182.00	184.00	2.00			305		18	25		55	5	95	2	<0.02									DIOPSIDE-RICH SKARN as above.
184.00	186.50	2.50			306		20	60		100	<5	120	<1	<0.02									DIOPSIDE-RICH SKARN as above.
186.50	188.00	1.50			307		12	95		140	5	150	<1	0.3									DIOPSIDE-QUARTZ-BIOTITE SKARN. "Metasiltstone/metasandstone".
188.00	190.00	2.00			308	C19	6	110	0.16	260	5	250	4	<0.1									DIOPSIDE-QUARTZ BIOTITE SKARN. "Metasiltstone/metasandstone".
190.00	192.00	2.00			309		6	65		160	<5	150	1	<0.02									DIOPSIDE-QUARTZ-BIOTITE SKARN. "Metasiltstone/metasandstone".
192.00	194.00	2.00			310	C20	20	75	0.45	220	<5	190	1	<0.1									Interbanded DIOPSIDE-RICH SKARN and QUARTZITE: interbanded metasiltstone & impure quartzite.
194.00	196.00	2.00			311		14	100		230	<5	210	<1	<0.1									As above.
END OF HOLE																							END OF HOLE

Sheet 1 of 1 Sheets

8061837

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

Hole No : MD 33

PROJECT : MOINA

LOCATION CODE : MZ 01

COLLAR CO-ORDINATES : 650E/222N

COLLAR R.L. : 533m

LOCATION :

MAP/PHOTO REFERENCE :

DATE STARTED	25th July, 1980	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE	Spreyton
DATE FINISHED	8th August, 1980	NON CORE					Nº OF TRAYS	17
TOTAL DEPTH	163.60m						SAMPLE STORAGE	AMDEL
LOGGED BY	S.D. Lee	CORE	HQ	0.00	6.00	6.00	ASSAY LAB.	AMDEL
CONTRACTOR	A.D.D.		NQ	6.00	72.00	66.00	ASSAY REPORTS	
RIG	Mindrill F30		BQ	72.0	163.60	91.60		
DRILL CREW	F. Ortner	CASING					MIN. & PET. LAB.	
	A. Ortner	NOTE:	Lead electrode could not be put down hole.				MIN. & PET. REPORTS	
		CASING LEFT	PVC Agriflex	0.0 3.0	11.0 76.0	11.0 73.0		

HOLE SURVEY DATA

INSTRUMENT : TROPARI

DEPTH	INSTRUMENT INCL.	INSTRUMENT AZ.	ACID ETCH INCL.	ACID ETCH AZ.	REMARKS
COLLAR	89°	225°			
91.5m	87°	227°			
163.0m	86°	202°			

GRAPHIC/LETTER SYMBOL LOGGING KEY

STRUCTURE / ALTERATION CODE

B BEDDING
J JOINTING
C CLEAVAGE
F FOLIATION
sh SHEARING
q QUARTZ VEINS
O OXIDATION

DRILLING SUMMARY :

806186

PROJECT: MOINA MD 33

DIAMOND DRILL LOG

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Comp No.	Assays Ag	Bi	As	Ba	Be	Ta	Zr	Weighted Assays		
0.00	44.40	44.40			No sample				<20							
44.40	50.86	6.46			199		<1	<10	<20							
50.86	53.00	2.14			200		<1	<10	<20							
53.00	54.82	1.82			201	C1	<1	10	<20	400	3	<100	250			
54.82	56.92	2.10			202		<1	<10	<20							
56.92	58.10	1.18			203		<1	<10	<20							
58.10	62.10	4.00			204		<1	<10	<20							
62.10	65.50	4.40			205		<1	<10	<20							
66.50	70.00	3.50			206	C2	<1	<10	<20	<200	<1	<100	40			
70.00	74.00	4.00			207		1	<10	<20							
74.00	78.31	4.31			208		<1	<10	<20							
78.31	80.21	1.30			209		1	120	290							
80.21	81.99	1.78			210		1	120	480							
81.99	84.00	2.01			211	C3	1	190	390	1000	30	<100	80			
84.00	86.00	2.00			212		1	290	390							
86.00	86.99	0.99			213		1	180	470							
86.99	88.00	1.01			214	C4	1	460	580	<200	80	<100	200			
88.00	89.56	1.56			215		1	450	200							
89.56	90.00	0.44			216		1	300	440							
90.00	92.28	2.28			217	C5	<1	140	70							
92.28	92.64	0.36			218		2	170	<20	<200	30	<100	150			
92.64	93.55	0.31			219		<1	160	70							
93.55	94.19	0.64			220	C6	1	410	40	<200	40	<100	100			
94.19	95.00	0.81			221		1	100	<20							
95.00	96.17	1.17			222	C7	1	170	110	<200	40	<100	100			
96.17	98.00	1.83			223		1	310	240							
98.00	100.11	2.11			224	C8	1	190	90	800	40	<100	150			
100.11	102.00	1.89			225	C9	<1	40	90	<200	20	<100	250			
102.00	103.24	1.24			226		1	170	70							
103.24	104.21	0.97			227	C10	<1	50	<20	<200	30	<100	200			
104.21	106.00	1.79			228	C11	1	10	<20	200	8	<100	200			
106.00	108.00	2.00			229		1	10	<20							
						C12	<1	10	<20	200	6	<100	200			
108.00	110.00	2.00			230		<1	<10	<20							
0.00	112.00	2.00			231		<1	<10	<20							
112.00	114.00	2.00			232	C13	1	<10	<20	600	3	<100	200			
114.00	116.00	2.00			233		1	<10	<20							
116.00	118.00	2.00			234	C14	1	<10	<20	800	3	<100	200			
118.00	120.00	2.00			235		2	10	<20							
120.00	122.00	2.00			236		1	<10	<20							
122.00	124.00	2.00			237	C15	1	10	<20	600	30	<100	150			
124.00	126.00	2.00			238		<1	<10	<20							
126.00	128.00	2.00			239		1	10	<20							
128.00	130.00	2.00			240	C16	<1	<10	<20	200	10	<100	150			
130.00	132.60	2.60			241		1	<10	<20							
132.60	134.00	1.40			242		1	<10	<20							
134.00	136.00	2.00			243	C17	<1	<10	<20	<200	2	<100	150			
136.00	138.00	2.00			244		1	<10	<20							
138.00	139.80	1.80			245		1	<10	<20							
139.80	141.15	1.35			246	C18	<1	<10	<20	<200	20	<100	150			
141.15	143.80	2.65			247		<1	<10	<20							
143.80	144.81	2.48			248	C19	<1	<10	<20	200	6	<100	150			
144.81	147.00	2.19			249		<1	<10	<20							
147.00	149.00	2.00			250	C20	1	<10	<20	200	2	<100	150			
149.00	152.40	3.40			251		<1	<10	<20							
152.40	154.00	1.60			252	C21	1	<10	<20	<200	3	<100	150			
154.00	155.07	1.07			253		1	<10	<20							
155.07	155.91	0.84			254	C22	1	<10	<20	<200	6	<100	250			
155.91	158.00	2.09			255		<1	<10	<20							
158.00	160.00	2.00			256	C23	1	<10	<20	<200	2	<100	100			
0.00	161.60	1.60			257		2	<10	<20							

80313

[redacted] THE SU[redacted]PANY OF AUSTRALIA LTD. - MET[redacted]VISION

PROJECT: MOINA

[redacted]OND DRILL LOG - SAMPLING RECO

HOLE NO: [redacted] 31

From	To	Interval (m)	Core Recvd	% Rec	Sample No.	Stones No.	Assays Sn	W	Calc %	Cu	Pb	Zn	Mo	Au	Weighted Assays Ratios Sn	W	% Estimates Sn	W	Core Angles	Alt	P.S	Description
0.00	44.40	44.40			No sample																	BASALT: variably weathered with minor Tertiary mudstone.
44.40	50.86	6.46			199		14	≤10		26	25	130	2	0·03								MUDSTONE: Tertiary with minor basalt and siltstone.
50.86	53.00	2.14			200		8	15		44	5	50	<1	0·06								LIMESTONE: Variably weathered with minor basalt rubble.
53.00	54.82	1.82			201	C1	4	≤10	0·28	16	10	32	<1	<0·01								LIMESTONE: Mottled, weakly weathered.
54.82	56.92	2.10			202		4	35		80	10	75	<1	0·02								LIMESTONE: Massive.
56.92	58.10	1.18			203		4	10		14	10	26	2	<0·01	8	12						LIMESTONE: Mottled.
58.10	62.10	4.00			204		12	10		10	10	65	2	<0·01								MUDSTONE: Unconsolidated mud and silt. ?Cave-fill.
62.10	66.50	4.40			205		≤4	≤10		16	10	26	1	<0·01								LIMESTONE: Massive, weakly weathered to fresh.
66.50	70.00	3.50			206	C2	6	≤10	0·12	6	10	32	<1	<0·01								LIMESTONE: Mottled, mostly fresh.
70.00	74.00	4.00			207		≤4	≤10		8	10	65	2	<0·01								LIMESTONE: Mottled, mostly fresh.
74.00	78.91	4.91			208		8	≤10		8	10	40	1	<0·01								LIMESTONE: Mottled, mostly fresh.
78.91	80.21	1.30			209		190	35		40	10	210	4	0·03								LIMESTONE with thin MAGNETITE or GARNET SKARN bands.
80.21	81.99	1.78			210		660	35		20	15	490	<1	0·03								LIMESTONE with GARNET SKARN bands and minor WRIGGLITE.
81.99	84.00	2.01			211	C3	410	110	6·00	150	5	660	3	0·02	510	130						LIMESTONE with irregular WRIGGLITE patches.
84.00	86.00	2.00			212		470	190		90	5	810	6	0·03								LIMESTONE with irregular WRIGGLITE patches.
86.00	86.99	0.99			213		540	120		130	10	730	5	0·03								LIMESTONE with irregular WRIGGLITE patches.
86.99	88.00	1.01			214	C4	940	350	20·0	44	10	180	5	0·01								WRIGGLITE with minor GARNET-BIOTITE SKARN bands.
88.00	89.56	1.56			215		1350	520		34	5	140	8	0·04								WRIGGLITE with minor GARNET-BIOTITE SKARN bands.
89.56	90.00	0.44			216		2250	130		4	10	95	12	0·01	1255	260						GARNET-DIOPSIDE SKARN; with magnetite.
90.00	92.28	2.28			217	C5	1000	110	7·60	6	5	80	8	0·02								GARNET-DIOPSIDE SKARN.
92.28	92.64	0.36			218		430	40		110	130	180	14	<0·01	430	40						CALCITE VEIN with minor chlorite, partially brecciated.
92.64	93.55	0.91			219		1200	340		6	20	75	11	<0·01								DIOPSIDE-GARNET SKARN.
93.55	94.19	0.64			220	C6	1300	680	20·2	110	5	110	28	0·03			1185	350				WRIGGLITE with 1-5% pyrite.
94.19	95.00	0.81			221		1600	340		26	10	80	11	0·01	1380	475						GARNET-DIOPSIDE SKARN with minor BIOTITE-MAGNETITE SKARN zones.
95.00	96.17	1.17			222	C7	1000	290	11·9	22	10	100	10	0·01								As above.
96.17	98.00	1.83			223		1400	480		160	15	210	14	0·05								Interbanded GARNET-DIOPSIDE and MAGNETITE-BIOTITE SKARNS.
98.00	100.11	2.11			224	C8	1300	620	13·0	150	15	100	18	0·01								Interbanded GARNET-DIOPSIDE and MAGNETITE-BIOTITE SKARNS, tending to WRIGGLITE in places.
100.11	102.00	1.89			225	C9	760	290	4·70	40	10	160	10	<0·01	760	290						GARNET SKARN.
102.00	103.24	1.24			226		1250	200		10	10	90	7	0·04	1160	205						GARNET SKARN.
103.24	104.21	0.97			227	C10	1050	210	4·09	10	30	150	5	0·04								MAGNETITE-CHLORITE SKARN.
104.21	106.00	1.79			228	C11	110	210	2·63	22	5	46	3	0·03								DIOPSIDE SKARN with biotite and decreasing magnetite.
106.00	108.00	2.00			229		90	95		10	5	24	10	<0·01								DIOPSIDE-FELDSPAR SKARN of variable composition with minor biotite, rare magnetite.
						C12			1·91													("METASILTSTONE").
108.00	110.00	2.00			230		44	240		12	5	34	6	<0·01								As above, ("METASILTSTONE"). Strongly fractured.
110.00	112.00	2.00			231		38	75		14	5	24	5	<0·01	60	210						As above, ("METASILTSTONE").
112.00	114.00	2.00			232	C13	38	310	1·60	510	5	390	7	<0·1								As above ("METASILTSTONE").
114.00	116.00	2.00			233		55	210		280	5	230	10	<0·1								As above, ("METASILTSTONE").
116.00	118.00	2.00			234	C14	60	390	1·23	130	5	120	6	<0·1								DIOPSIDE -rich SKARN ("METASILTSTONE").
118.00	120.00	2.00			235		38	130		110	10	110	7	<0·1								DIOPSIDE -rich SKARN ("METASILTSTONE")
120.00	122.00	2.00			236		22	55		65	<5	100	4	<0·1								DIOPSIDE - feldspar - biotite SKARN. Minor magnetite.
122.00	124.00	2.00			237	C15	30	120	0·64	130	<5	130	8	<0·02	30	100						DIOPSIDE ± feldspar - biotite SKARN.
124.00	126.00	2.00			238		46	120		130	<5	150	12	<0·1								DIOPSIDE - feldspar - biotite SKARN.
126.00	128.00	2.00			239		60	230		320	5	280	10	<0·1								DIOPSIDE-QUARTZ-FELDSPAR-BIOTITE SKARN (Metasiltstone/sandstone)
128.00	130.00	2.00			240	C16	26	170	0·95	260	5	240	6	<0·1	40	170						As above (Meta-siltstone/sandstone).
130.00	132.60	2.60			241		40	170		160	5	160	6	<0·01								As above, (Meta-siltstone/sandstone).
132.60	134.00	1.40			242		46	110		130	5	120	3	<0·1								QUARTZITE containing variable feldspar-biotite and minor DIOPSIDE (± garnet, biotite) SKARN zones.
134.00	136.00	2.00			243	C17	18	190	0·58	350	5	330	1	<0·01	45	1245						QUARTZITE with minor feldspar, biotite and DIOPSIDE rich SKARN zones.
136.00	138.00	2.00			244		30	210		330	5	280	6	<0·01								As above.
138.00	139.80	1.80			245		80	220		340	5	300	7	0·02								As above.
139.80	141.15	1.35			246	C18	55	6900	3·35	22	5	40	1100	<0·02			55	6900				QUARTZ-TALC-CHLORITE SKARN.
141.15	143.80	2.65			247		22	150		150	5	150	4	<0·01								QUARTZITE with variable feldspar biotite, diopside.
143.80	146.81	2.48			248	C19	38	35	0·55	120	5	85	1	<0·1								QUARTZITE similar to above but very fine-grained with minor talc, epidote.
146.81	147.00	2.19			249		28	290		120	5	120	9	<0·02								QUARTZITE with minor feldspar, biotite/chlorite, diopside.
147.00	149.00	2.00			250	C20	20	75	0·55	110	5	120	3	<0·01								As above.
149.00	152.40	3.40			251		14	150		150	5	140	5	<0·01	35	220						As above.
152.40	154.00	1.60			252	C21	10	40	0·14	130	10	130	12	<0·01								SHEARED & BRECCIATED QUARTZITE with variable mica, chlorite, talc and pyrite.
154.00	155.07	1.07			253		47	130		180	15	180	4	<0·1								As above.
155.07	155.91	0.84			254	C22	32	35	0·10	42	10	140	2	<0·1								CHLORITE-TALC rich FRACTURED QUARTZITE (pyritic)
155.91	158.00	2.09			255		110	240		200	5	180	31	<0·02								QUARTZITE with minor feldspar, micas.
158.00	160.00	2.00			256	C23	50	470	0·35	450	<5	380	17	<0·02								As above.
160.00	161.60	1.60			257		16	400		330	5	290	5	<0·01								As above (QUARTZITE)

END OF HOLE

END OF HOLE

Sheet [redacted]

80618

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

PROJECT : MOINA

Hole No : MD 32

COLLAR CO-ORDINATES : 1300E/935S

LOCATION CODE : MZ 01

COLLAR R.L. : 573m

LOCATION : 5406300N/423600E AMG Zone 55

MAP/PHOTO REFERENCE :

DATE STARTED	9-7-80	HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE	Spreyton Shed
DATE FINISHED	25-7-80	NON CORE	-				No OF TRAYS	22
TOTAL DEPTH	152.40m						SAMPLE STORAGE	AMDEL
LOGGED BY	I. Buchhorn	CORE	HQ	0.00	2.00	2.00	ASSAY LAB.	AMDEL
CONTRACTOR	A.D.D.		NQ	2.00	36.00	34.00	ASSAY REPORTS	
RIG	Mindrill F30		BQ	36.00	152.40	116.40		
DRILL CREW	F. Ortner	CASING					MIN. & PET. LAB.	
	A. Ortner	Note:	Lead electrode placed at 60.0 metres.				MIN. & PET. REPORTS	
		CASING LEFT	PVC Agriflex	0.00 0.00	6.00 48.00			

HOLE SURVEY DATA

INSTRUMENT : TROPARI

DEPTH	INSTRUMENT INCL.	INSTRUMENT AZ.	ACID ETCH INCL.	ACID ETCH AZ.	REMARKS
COLLAR	-90°	-			
150.20	-89°	205°MN			

GRAPHIC / LETTER SYMBOL LOGGING KEY - See attached sheet

STRUCTURE / ALTERATION CODE

- B BEDDING
- J JOINTING
- C CLEAVAGE
- F FOLIATION
- h SHEARING
- q QUARTZ VEINS
- O OXIDATION

DRILLING SUMMARY : See separate "Diamond drill log - sampling record", attached following.

8015 93

PROJECT: MOINA — DIAMOND DRILL LOG - SAMPLING REC. — HOLE NO: MD 32

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Mo	Au	Weighted Assays/Ratios 2000ppm Sn cutoff	1000ppm Sn cutoff	1000ppm W cutoff	500ppm W cutoff	% Estimates	Core Angles	Alt	T.S P.S	Description
0.00	7.30	7.30	1.95	27	021	C1	40	20	0·14	12	70	75	2	<0·01									QUARTZITE AND SANDSTONE RUBBLE - overburden
7.30	11.10	3.80	2.20	60	022		20	30		12	65	370	<1	<0·01									BRECCIATED QUARTZITE RUBBLE - overburden
11.10	13.00	1.90	1.90	100	023		55	170		18	65	1100	36	<0·01									CLAYSTONE - weathered diopside - garnet skarn
13.00	14.40	1.40	1.40	100	024	C2	150	170	0·16	8	45	540	6	0·02									AMPH - GARN - CHLOR SKARN, 1 - 2% pyrite
14.40	15.96	1.56	1.56	100	025		200	210		2	65	610	3	0·03									AMPH - GARN - CHLOR SKARN, 1 - 2% pyrite
15.96	17.00	1.04	1.04	100	026		220	310		<2	65	780	2	0·11									CHLORITE SCHIST - Hugo Fault zone
17.00	19.10	2.10	1.30	62	027	C3	150	170	0·27	4	55	710	7	0·04									CHLORITE - GARN - AMPH - DIOP SKARN - Hugo Fault zone
19.10	21.80	2.70	1.20	44	028		390	110		85	410	980	1	0·05									CHLORITIZED GARN-DIOP SKARN - Hugo Fault zone
21.80	23.26	1.46	1.20	82	029	C4	580	160	0·14	6	60	520	1	<0·01									AMPH (-GARN - CHLOR) SKARN - base of Hugo Fault zone
23.26	24.40	1.14	1.14	100	030	C5	380	210	0·16	6	30	350	1	0·01									AMP (-GARN) SKARN, minor brecciated garnet and quartz
24.40	25.78	1.38	1.38	100	031		640	210		18	100	610	<1	0·04									AMPH (-GARN) SKARN, minor brecciated garnet and quartz
25.78	27.00	1.22	1.22	100	032		130	140		70	260	1300	6	0·02									GARN - AMPH - CHLOR SKARN BRECCIA, quartz fragments
27.00	28.31	1.31	1.31	100	033	C6	400	100	0·25	24	130	460	1	<0·01									GARN - AMPH - CHLOR SKARN BRECCIA, quartz fragments
28.31	29.00	0.69	0.69	100	034		3000	140		20	65	390	2	0·02									GARN - AMPH SKARN BRECCIA, 2% pyrite
29.00	30.00	1.00	1.00	100	035	C7	2500	140	0·18	10	40	250	1	<0·01									AMPH - GARN SKARN, strong alteration and brecciation
30.00	31.05	1.05	1.05	100	036		2150	150		8	35	240	<1	<0·01									AMPH - GARN SKARN, strong alteration and brecciation
31.05	31.88	0.83	0.83	100	037	C8	2850	100	0·33	16	45	530	7	0·08									MAGNETITE - AMPH SKARN, trace coarse pyrite blebs
31.88	33.50	1.62	1.62	100	038	C9	2100	130	0·25	32	25	360	16	0·12									MAG - AMPH SKARN, talc vein network, min pyrite
33.50	35.63	2.13	2.13	100	039		2000	200		110	25	250	26	0·08									MAG - AMPH SKARN, talc vein network, min pyrite
35.63	36.60	0.97	0.87	90	040	C10	2800	380	0·25	20	25	280	5	<0·01									GARN - AMPH - CHLOR SKARN
36.60	38.85	2.25	2.13	95	041		2400	190		4	20	230	33	0·04									WRIGGLITE, talc veined
38.85	39.92	1.07	1.07	100	042	C11	2150	100	5·20	8	20	320	7	0·05									MAGNETITE - AMPH SKARN
39.92	41.50	1.58	1.58	100	043		3100	330		12	40	260	13	0·13									WRIGGLITE, talc veined, min py, min fluor vein
41.50	43.08	1.58	1.58	100	044		2200	150		24	35	210	160	0·12									WRIGGLITE, talc veined, min py, min fluor vein
43.80	45.00	1.92	1.92	100	045	C12	2750	170	0·78	10	20	200	210	0·15									WRIGGLITE, magnetite and amph rich
45.00	46.98	1.98	1.98	100	046		3450	140		2	20	250	9	0·11									WRIGGLITE, common 1-5mm py blebs
46.98	48.60	1.62	1.62	100	047	C13	2150	190	1·95	28	30	250	7	0·19									WRIGGLITE, moderate talc veined
48.60	51.20	2.60	2.60	100	048		1850	200		16	25	280	9	0·11									WRIGGLITE
51.20	52.90	1.70	1.70	100	049	C14	2600	150	0·41	8	30	220	20	0·12	46.88m								WRIGGLITE, strong talc veined
52.90	55.23	2.33	2.33	100	050	C15	1950	230	1·35	8	15	330	130	0·09	@								WRIGGLITE, min zones of alteration, brecciation
55.23	57.55	2.32	2.32	100	051		2000	150		40	30	400	80	0·13	2389ppm		51.39m						WRIGGLITE, min zones of alteration, brecciation
57.55	58.76	1.21	1.21	100	052	C16	1950	130	0·25	36	45	280	12	0·05			@						QUARTZ VEIN BRECCIA siliceous "wrigglite" matrix, min py
58.76	60.21	1.45	1.45	100	053		400	80		4	10	230	2	0·04									QUARTZ VEIN BRECCIA, predm. rextal qtz
60.21	61.44	1.23	1.23	100	054	C17	2500	140	0·51	38	35	490	1	0·07			240ppm						WRIGGLITE, qtz. veined and fractured
61.44	62.40	0.96	0.96	100	055	C18	2700	120	0·10	55	120	420	1	0·04									QUARTZ VEIN (-PYRITE) BRECCIA, amph - mag skarn matrix
62.40	63.40	1.00	1.00	100	056		2850	160		100	180	470	7	0·02									QUARTZ VEIN (-PYRITE) BRECCIA, amph - mag skarn matrix
63.40	64.43	1.03	1.03	100	057	C19	2850	160	0·14	120	140	540	5	0·06									QUARTZ VEIN BRECCIA, amph (-mag) skarn matrix
64.43	65.08	0.65	0.65	100	058		1200	130		60	120	610	6	0·03									QUARTZ VEIN BRECCIA, amph (-mag) skarn matrix
65.08	65.90	0.82	0.82	100	059	C20	3200	120	0·14	30	65	410	5	0·07									WRIGGLITE, talc veined
65.90	67.54	1.64	1.64	100	060		4500	240		6	30	310	1	<0·01									WRIGGLITE & GARNET SKARN, interbanded, chlor. alt.
67.54	68.87	1.33	1.33	100	061	C21	3100	170	19·7	40	45	210	1	<0·01									WRIGGLITE & GARNET SKARN, interbanded, chlor. alt.
68.87	70.17	1.30	1.30	100	062		2000	160		110	20	200	9	0·05									CHLORITIC GARNET WRIGGLITE, 1-5% fluor. vein
70.17	71.95	1.78	1.78	100	063		2000	500		180	30	160	9	0·19									CHLORITIC GARNET WRIGGLITE, 1-5% fluor. vein
71.95	73.72	1.77	1.77	100	064	C22	2100	540	18·8	70	40	130	5	0·03									ALTERED GARNET WRIGGLITE, pk kspar vein, tr. sch.
73.72	75.19	1.47	1.47	100	065		2150	860		8	30	120	9	0·01									ALTERED GARNET WRIGGLITE, pk kspar vein, tr. sch.
75.19	76.54	1.35	1.35	100	066	C23	1200	380	18·7	75	30	200	10	0·05									WRIGGLITE, v.f. hairline yellow chlor. veining
76.54	77.79	1.25	1.25	100	067		1700	330		42	40	190	18	0·01									WRIGGLITE, v.f. hairline yellow chlor. veining
77.79	78.10	0.31	0.31	100	068		380	45		14	90	110	10	<0·01									QUARTZ VEIN, wrigglite inclusions
78.10	79.70	1.60	1.53	93	069	C24	1650	780	21·2	12	40	110	31	0·06									GARNET WRIGGLITE, yellow chlorite vein alt., tr. sch.
79.70	80.95	1.25	1.25	100	070		1750	1450		80	35	160	9	0·07									GARNET WRIGGLITE, yellow chlorite vein alt., tr. sch.
80.95	82.30	1.35	1.35	100	071	C25	1900	680	6·40	18	40	110	3	0·06									BRECCIATED WRIGGLITE & GARNET SKARN - fault zone
82.30	83.20	0.90	0.90	100	072		1050	1400		85	30	120	120	0·08									GARNET WRIGGLITE, strong sanidine veining, ~0.3% scheelite
83.20	84.11	0.91	0.91	100	073		1850	3950		2	15	110	31	0·05									GARNET WRIGGLITE, strong sanidine veining, ~0.3% scheelite
84.11	84.95	0.84	0.84	100	074	C26	1350	1500	21·2	14	40	70	85	0·07									GARNET SKARN, trace dissem. scheelite
84.95	85.75	0.80	0.80	100	075		3600	700		2	25	170	9	0·07									GARNET - MAGNETITE - WRIGGLITE, strong fract., yellow chlor. vein
85.75	86.14	0.39	0.39	100	076		520	250		24	60	130	10	0·02									QUARTZ - PYRITE VEIN, vuggy yellow-white fluorite
86.14	87.05	0.91	0.91	100	077		1150	260		28	50	210	16	0·10									GARNET - MAGNETITE WRIGGLITE, strong shear, & brecc.
87.05	88.27	1.22	1.22	100	078	C27	960	3000	24·5	16	25	160	110	0·08									MAG - AMPH - FLUOR SKARN, strong sanidine vein, 1% scheelite
88.27	89.20	0.93	0.93	100	079		1200	1500		8	20	170	31	0·07	67.36m								BRECCIATED MAG - BIOT - FLUOR - WRIGGLITE - fault zone
89.20	90.32	1.12	1.12	100	080		1500	960		18	35	230	15	0·05	@	17.64m	29.97m						BRECCIATED MAG - BIOT - FLUOR - WRIGGLITE, poss. vf dissem. powellite - fault zone
90.32	90.98	0.66	0.66	100	081	C28	1200	2100	20·5	2	35	210	15	0·04	2127ppm	@	@						BRECCIATED WRIGGLITE, sch. in wh feld vein - fault zone
90.98	92.47	1.49	1.49	100	082		1550	880		<2	35	310	10	0·04		1307ppm	1110ppm						BRECC. WRIGGLITE, vf white fluor. vein, dissem powell - fault zone

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THE SHELL COMPANY OF AUSTRALIA LTD. - MINERALS DIVISION

PROJECT: MOINA

DIAMOND DRILL LOG - SAMPLING RECORD

HOLE NO: MD 32

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Compos No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Mo	Au	Weighted Assays Ratios 2000ppm cutoff Sn	1000ppm cutoff Sn	1000ppm cutoff W	500ppm cutoff W	% Estimates	Core Angles	Alt	P.S	Description
92.47	93.20	0.73	0.73	100	083	C28	2200	290		2	30	510	5	0.05									BRECC. WRIGGLITE, dissem. powellite - fault zone
93.20	93.70	0.50	0.50	100	084		1500	1600		2	25	200	27	0.03									MAG - AMPH - GARN SKARN, poss fluorite bearing
93.70	95.67	1.97	1.97	100	085	C29	1050	620	19.7	6	45	120	21	0.12									BRECC GARN - MAG - DIOP - FLUOR SKARN , sch vein
95.67	97.34	1.67	1.67	100	086		800	1350		60	35	110	34	0.10									as above, intense vein & brecc, yellow chlor. & mag vn, sch.
97.34	99.00	1.66	1.66	100	087		660	520		28	30	110	25	0.07									GARN - MAG WRIGGLITE, yellow chlor vein on polyg fracture
99.00	100.14	1.14	1.14	100	088	C30	600	920	20.0	40	45	130	130	<0.01									WRIGGLITE, yellow garnet bands
100.14	100.70	0.56	0.28	50	089		660	270		180	830	990	70	0.01									QUARTZ - FLUOR - PYRITE VEIN
100.70	102.09	1.39	1.39	100	090		800	120		12	60	110	8	0.03									GARNET SKARN, granular vuggy alteration
102.90	103.12	1.03	1.03	100	091	C31	960	130	4.45	6	50	150	12	0.03									ALTERED GARNET SKARN, phlog - chlor alt along micro fracture
103.12	105.48	2.36	2.36	100	092		820	540		4	40	95	12	0.01									ALTERED GARNET SKARN, phlog - chlor alt along micro fracture
105.48	106.98	1.50	1.50	100	093		600	290		6	40	100	7	0.01									ALTERED GARNET SKARN, phlog - chlor alt along micro fracture
106.98	108.33	1.35	1.35	100	094	C32	580	310	4.70	4	40	95	14	<0.01									ALTERED GARNET SKARN, phlog - chlor alt along micro fracture
108.33	110.56	2.23	2.23	100	095		740	140		2	55	85	2	<0.01									ALTERED GARNET SKARN, phlog - chlor alt along micro fracture
110.56	111.86	1.30	1.28	98	096		920	390		12	80	130	130	<0.01									GARNET - DIOPSIDE SKARN, intense hairline magnetite veining
111.86	112.54	0.68	0.68	100	097		800	480		160	6300	1.00%	14	0.02									QUARTZ PYRITE VEIN with garn - amph - mag skarn
112.54	113.04	0.50	0.50	100	098	C33	980	85	7.40	8	90	190	1	<0.01									GARNET SKARN
113.04	114.20	1.16	1.16	100	099		560	320		8	40	140	6	<0.01									GANRET SKARN, intense chlorite and mag alt
114.20	114.70	0.50	0.45	90	100		310	1150		4	25	190	120	0.01									GARNET SKARN, 0.2% sch., intense alt
114.70	116.27	1.57	1.53	97	101		390	640		2	25	120	60	<0.01									DIOPSIDE (-GARN) SKARN, becoming qtzose, 0.3% sch.
116.27	116.77	0.50	0.50	100	102	C34	130	200	6.75	2	30	44	55	<0.01									QUARTZITE (-MAG - GARN SKARN)
116.77	118.70	1.93	1.04	54	103		240	700		2	30	220	55	<0.01									GARN - DIOP SKARN, strongly weathered
118.70	119.70	1.00	0.85	85	104	C35	150	60	14.2	2	15	70	17	<0.01									QUARTZITE, porous hydrotherm alt, dissem py, chlor.
119.70	121.50	1.80	1.50	83	105		60	680		6	10	22	110	<0.01									QUARTZITE, brecciated & greisen, tr sch,molyb
121.50	124.00	2.50	2.50	100	106		75	55		6	10	22	25	0.05									QUARTZITE, brecciated
124.00	124.40	0.40	0.40	100	107		150	110		2	10	55	21	<0.01									QUARTZITE with altered (phlog) garnet skarn
124.40	125.90	1.50	1.50	100	108	C36	100	70	2.95	30	20	75	36	<0.01									QUARTZITE, brecciated & qtz veined
125.90	127.55	1.65	1.65	100	109		130	260		22	20	70	170	<0.01									QUARTZITE, yellow alteration, magnetite vein in jnts
127.55	129.00	1.45	1.45	100	110		70	350		14	25	120	160	0.01									QUARTZITE, brecciated & qtz vein, tr molyb
129.00	129.94	0.94	0.94	100	111	C37	60	180	0.70	6	20	90	600	<0.01									QUARTZITE, tr molyb, sch
129.94	133.22	3.28	3.28	100	112		55	160		6	30	70	95	<0.01									QUARTZITE, mass, unaltered, non-brecc, tr molyb
133.22	134.93	1.71	1.71	100	113		55	130		6	15	30	240	<0.01									QUARTZITE, mod. qtz vn, tr mo, wf, fl
134.93	135.75	0.82	0.82	100	114	C38	65	50	1.55	8	15	26	90	<0.01									QUARTZITE, tr pyrite
135.75	136.55	0.80	0.80	100	115		50	370		24	10	100	200	<0.01									QUARTZITE, minor biot, mag, pyrite, tr sch, wf
136.55	137.81	1.26	1.26	100	116		65	1100		22	10	55	95	0.03									QUARTZITE, minor biot, pyrite, minor sch, wf in qtz vn
137.81	138.59	0.78	0.78	100	117		200	880		30	30	50	440	<0.01									QUARTZITE, mag, biot, pyrite, min sch, wf, molyb
138.59	139.73	1.14	1.14	100	118		46	110		16	30	60	820	<0.01									QUARTZITE, vuggy qtz - molyb veining
139.73	140.43	0.70	0.70	100	119	C39	60	60	1.20	8	20	60	180	0.03									QUARTZITE
140.43	141.03	0.60	0.60	100	120		60	50		14	25	38	170	<0.01									QUARTZITE, wf veins mag, tr sch
141.03	141.56	0.53	0.53	100	121		90	90		4	30	20	370	0.03									QUARTZITE, mod qtz - molyb vein
141.56	142.63	1.07	1.07	100	122		65	190		8	25	24	22	0.03									QUARTZITE
142.63	144.33	1.70	1.70	100	123		50	50		40	20	34	27	0.01									QUARTZITE, unaltered, non-veined
144.33	144.61	0.28	0.28	100	124	C40	65	45	0.70	16	25	46	1	<0.01									QUARTZITE, dissem magnetite
144.61	146.13	1.52	1.47	97	125		65	50		20	30	22	70	0.02									QUARTZITE, min vuggy qtz-muscov greisen vein
146.13	146.67	0.54	0.54	100	126		820	85		10	25	28	330	<0.01									QUARTZITE, min amph - mag, mod vuggy qtz-py vn
146.67	147.26	0.59	0.59	100	127		1400	75		44	25	30	190	0.03									QUARTZITE
147.26	147.80	0.54	0.46	85	128	C41	140	50	0.25	16	25	18	32	0.05									QUARTZITE, yellow fluores mineral, equant, poikilob, apatite?
147.80	148.44	0.64	0.64	100	129		170	580		4	20	16	5	0.01									QUARTZITE
148.44	149.20	0.76	0.30	39	130		130	95		2	25	46	4	<0.01									QUARTZITE, chloritic, greisen alteration, barren
149.20	149.64	0.44	0.44	100	131	C42	60	120	2.20	24	20	44	17	0.02									QUARTZITE, brecciated
149.64	150.84	1.20	1.20	100	132		100	160		24	25	110	5	<0.01									QUARTZITE, yellow weath, mod mag vein
150.84	152.14	1.30	1.30	100	133		55	110		32	30	70	8	<0.01									QUARTZITE
152.14	152.40	0.26	0.26	100	134		26	45		26	20	70	9	<0.01									QUARTZITE
																							END OF HOLE - Barren Quartzite

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APPENDIX 4

DIAMOND DRILL HOLE GEOPHYSICS

SHEPHERD & MURPHY AREA - MOINA

806193

SCINTREX

PRIVATE AND CONFIDENTIAL

BRIEF COMMENTS ON METHOD
DOWN-HOLE IP & APPLIED POTENTIAL
SURVEYS
CONDUCTED FOR SHELL METALS
AT MOINA & BUCKBY PROSPECTS
NORTH TASMANIA

BY

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GEOPHYSICIST

SYDNEY, N.S.W.

JULY, 1980
TAS - 078

SCINTREX

BRIEF COMMENTS ON METHOD
DOWN-HOLE IP & APPLIED POTENTIAL
SURVEYS
CONDUCTED FOR SHELL METALS
AT MOINA & BUCKBY PROSPECTS, NORTH TASMANIA

INTRODUCTION

At the request of Nigel Hungerford, Chief Geophysicist for Shell Metals, Scintrex Pty. Ltd., conducted a down-hole induced polarization survey and an around-hole applied potential survey on the Moina and Buckby prospects in Northern Tasmania.

The surveys were conducted under the supervision of Scintrex Geophysicist, Greg Street, MSc,DIC, assisted by Mr. R. Prydon and Shell Metals field assistants, over five and a quarter production days between 7th and 17th July, 1980.

EQUIPMENT

The energisation for down-hole induced polarization was affected by a Scintrex IPC [illegible] Watt time domain induced polarization transmitter, and for the applied potential, a Scintrex 2.5 Kw time domain induced polarization transmitter, powered by a Briggs and Stratton 3 HP motor generator. An 8 second cycle was used with 2 second pulse. The receiver used to monitor the primary (Vp/resistivity) and secondary (chargeability) field was a Scintrex IPR-8 induced polarization receiver.

Five slices under the decay curve were measured for the down-hole induced

polarization, whereas a one slice programme was used for the applied potential.

METHOD - MOINA

For the down-hole induced polarization a 2½ metre three array was employed, with an 'infinite' current electrode at 1 kilometre to the west of the hole. A moving current electrode was positioned at the bottom of the hole, with a 2½ metre potential dipole 2½ metres away. Measurements were made, starting from the bottom of drill-hole SMD-9 and going upwards.

On the first day of the survey, infinite electrodes were laid 1 kilometre to the east and west of the drill-hole at 150E/100S.

The applied potential survey was conducted on the second, third and fifth days of the survey. Two infinite electrodes were employed, positioned 1 kilometre to the east and west of the drill-hole along line 100S and a stationary potential was positioned at approximately 125E/50S. A current electrode of opposite sign to the two infinites was placed in a high chargeability/low resistivity zone located at approximately 97 metres down the hole.

Nine lines of between 200 and 400 metres in length were read at 25 metre intervals, using a mobile potential electrode.

METHOD - BUCKEY

Two infinite electodes were employed for the applied potential survey, positoned 2100 metres to the north and south of the drill-hole at 75S/1600W. A current electrode of opposite sign was employed, positioned at approximately 80 metres

down the drill-hole.

The applied potential survey was then read, using a stationary potential, positioned at 1625W/175S. A moving potential was employed and readings taken along lines 350S to 50N at 25 metre intervals.

An attempt was made to log the drill-hole once the applied potential survey was completed. On removing the electrode from the hole, a blockage occurred at around 50 metres. The down-hole survey was then abandoned.

HERCULES - *MOINA*

The down-hole three array is plotted at the mid-point of the two potentials. Resistivity scale used is a 5 centimetre log scale and chargeability at one centimetre equals 5 millivolt/volt.

The applied potential contours are plotted at a scale of 1:2500 for Vs/Vp.

Vp is in millivolts and chargeability in millivolts/volt.

[illegible] - *BUCKBY*

Results of applied potential survey are plotted at a scale of 1:1250 for Vs and Vp.

Vs is calculated from the Vp and chargeability data using the formula

$$M = \frac{Vs \quad 1000}{Vp} \quad \text{in mV/V}$$

where $Vs = \dfrac{\int_{t^1}^{t^2} Vs \; dt}{tr} + Vx$

t^1 = time at beginning of slice.

t^2 = time at end of slice.

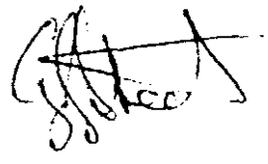
Vx = residual transient voltage at the end of the automatic self-potential correction.

$tr = t^2 - t^1$ i.e., the integrating period.

Therefore Vs is a direct measure of the secondary voltage in millivolts.

Respectfully submitted on behalf of

SCINTREX PTY. LTD.



F.J. STREET, MSC, DIC.

GEOPHYSICIST

806198

DH SMD-9

Moina

DOWNHOLE 3 ARRAY

a = 2½ metres

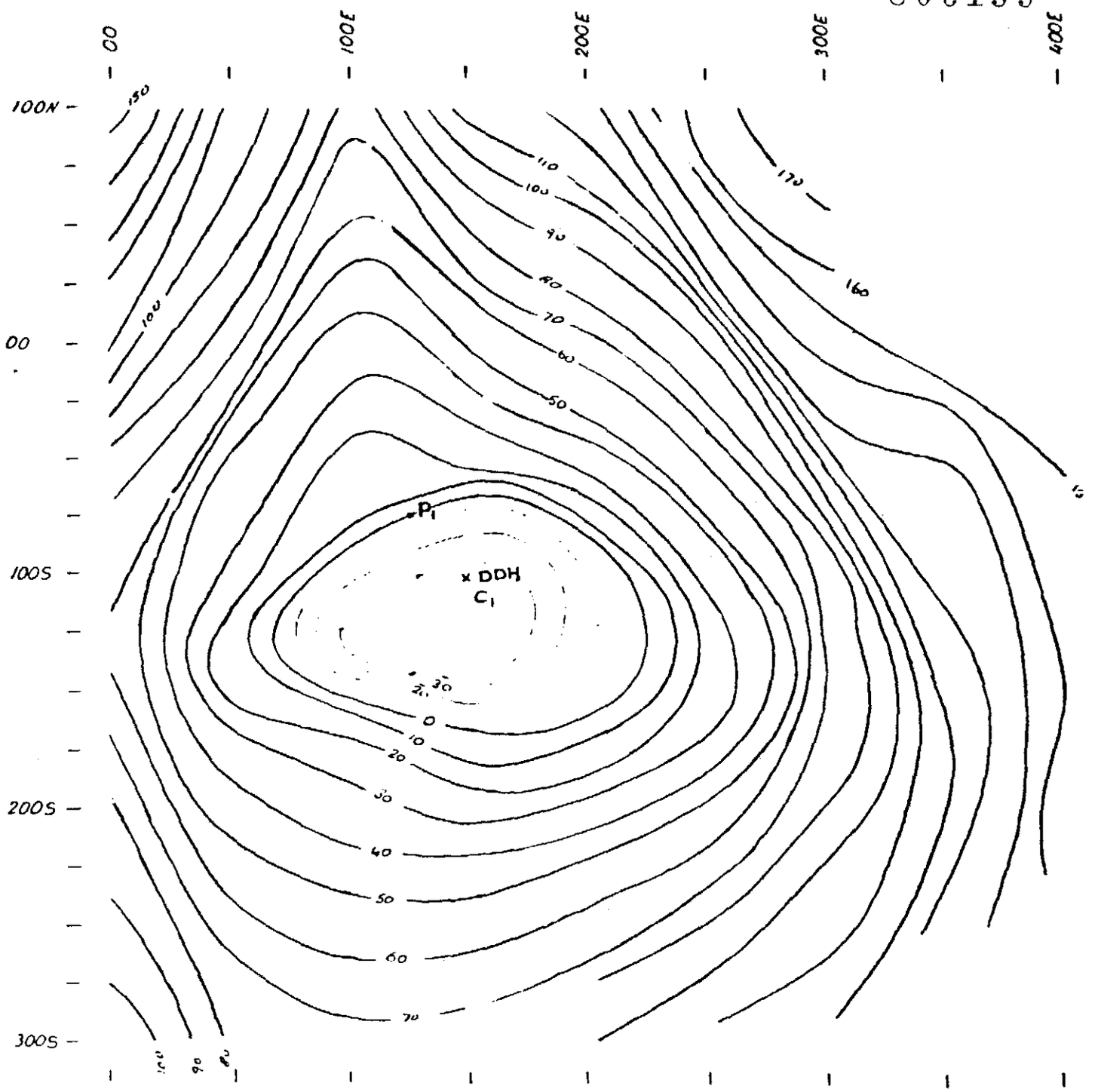
Chargeability in millivolts per volt

Resistivity in ohm-metres

depth in metres

10000
5000
2000
1000
500
200
100
50
100
20
10
5
2
80
60
40
20
0
30
40
50
60
70
80
90
100
110

806199



THE SHELL COMPANY OF AUSTRALIA
METALS DIVISION

MOINA
NTH TASMANIA

APPLIED POTENTIAL SU
Vp CONTOUR PLAI

SURVEYED & COMPILED BY
SCINTREX

JUNE 1980

SCALE 1:2500m

5 cm

Job Nº TAS-078

806200

SHELL AHO REPORT No. 08-682

SCINTREX

BRIEF COMMENTS ON DOWN-HOLE INDUCED POLARIZATION SURVEYS OVER THE MOINA PROSPECT, NORTHERN TASMANIA ON BEHALF OF SHELL COMPANY OF AUSTRALIA LTD. (METALS DIVISION)

DDH: MD-35 & MD-38

806201

SCINTREX

PRIVATE AND CONFIDENTIAL

BRIEF COMMENTS ON DOWN-HOLE INDUCED POLARIZATION SURVEYS OVER THE MOINA PROSPECT, NORTHERN TASMANIA ON BEHALF OF SHELL COMPANY OF AUSTRALIA LTD.(METALS DIVISION)

BY

G.J. STREET,M.SC.,D.I.C.
GEOPHYSICIST

SYDNEY, N.S.W.

NOVEMBER, 1980
TAS-078A

806202

SCINTREX

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DDH MD-38 Page 2

DDH MD-35 Page 5

Data Profiles

806203

SCINTREX PTY. LTD.

GEOPHYSICAL CONSULTANTS AND CONTRACTORS

SUMMARY

Two drill holes, MD-35 and MD-38, at the Moina prospect, were surveyed using three-array down-hole induced polarization. Low resistivity zones in each are associated with strong negative polarization effects. These are considered to be possibly due to conductive clays in caves within limestone.

WELLINGTON STREET, PERTH 6000, W.A. AUSTRALIA
TELEPHONE 321 6934
TELEX 92353
TELEGRAMS SCINTREX PERTH

6 TRAMORE PLACE, KILLARNEY HEIGHTS, 2087 N.S.W. AUSTRALIA
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TELEGRAMS SCINTREX SYDNEY

SCINTREX

BRIEF COMMENTS ON DOWN-HOLE INDUCED POLARIZATION SURVEYS OVER THE MOINA PROSPECT, NORTHERN TASMANIA ON BEHALF OF SHELL COMPANY OF AUSTRALIA LTD.(METALS DIVISION)

INTRODUCTION

At the request of Mr. N. Hungerford, Chief Geophysicist for Shell Company of Australia Ltd. (Metals Division), Scintrex Pty. Ltd. conducted a down-hole induced polarization survey on the Moina prospect in Northern Tasmania.

The surveys were conducted under the supervision of Scintrex crewleader Mr. R. Prydon assisted by Mr. S. Fletcher over 2.75 production days between 16th and 22nd October, 1980.

EQUIPMENT

The energisation for down-hole induced polarization was effected by a Scintrex IPC 7/25 watt time domain induced polarization transmitter. An 8 second cycle was used with 2 second pulse. The receiver used to monitor the primary (resistivity) and secondary (chargeability) field was a Scintrex IPR-8 induced polarization receiver. Three slices under the decay curve were measured for the down-hole induced polarization.

METHOD

A 2½ metre three array was employed, with an 'infinite' current electrode on the surface at some distance from the hole. A moving current electrode was positioned at the bottom of the hole, with a 2½ metres potential dipole 2½ metres away.

Measurements were made starting from the bottom of drill holes. This method was repeated using 10 metre and 20 metre three-array. Drill holes MD-35 and MD-38 were both logged in this fashion.

DATA PRESENTATION

The down-hole three array is plotted at the midpoint of the two potentials. All data is plotted on standard Shell geolphysical log sheets at a scale of 1 centimetre = 50 metres.

DISCUSSION OF RESULTS

The results of the drill holes are discussed from the top of the hole going down in order of smallest spacing to largest. Depth positions are all ±1 metre due to wire stretch and other possible measuring errors.

DDH MD-38 2½ metre three-array

37 metres..... A chargeable anomaly lies on the lower side of a resistivity low. A chargeability of 50 millivolts/volt plus is recorded over two spacings. The response comes from a source close to the hole.

62 metres ..... A small chargeable anomaly is associated with a resistivity low.

68 metres ..... A strong negative induced polarization effect is recorded associated with a resistivity low of 10 ohm-metres. This negative chargeability indicates an internal polarization effect meaning the potential electrodes are within a source of polarization. The positive peaks above and below the negative confirm this effect. The asymmetry is due to the nature of the array plus a

further chargeable source at 75 metres. This source is very close to the hole.

105 metres ..... A resistivity low of 12 ohm-metres is recorded with an associated chargeability high. The anomaly here is not completely defined as resistivities were too low at 107 metres for any measurement to be taken, i.e. less than 10 ohm-metres. The source is close to the hole.

157 metres to 185 metres ..... A zone of higher chargeability up to 40 millivolts/volt was recorded associated with a series of resistivity lows.

10 metre three-array

By enlarging the spacing, a larger volume of material is sampled by the array. Therefore material further away from the hole influences the results obtained.

43 metres ..... The chargeable source located on the 2½ metre array gives a 40 millivolts/volt response from a negative background. The high negative chargeability in this region is caused by conductive polarizable material within a few metres of the hole.

95 metres ..... A positive chargeability anomaly of 50 millivolts/volt occurs below the less resistive zone. The overall profile between 43 and 100 metres has a characteristic shape of a conductive polarizable zone surrounded by positive chargeability "shoulders". This can be due to the distribution of internal and external polarization currents around a conductor. However, the picture is obviously complicated by two chargeability sources detected on the 2½ metre array at 38 metres and 100 metres. These are probably the main contributors to the positive anomalies on the 10 metre array.

Notwithstanding these results the 10 metre array does identify a polarizable less resistive source which is within a few metres of the hole centred between 67 and 72 metres. The 2½ metre spacing showed this zone to be around 67 metres. Decay rates measured over this zone are fast, indicating a fine grain size.

105 metres ..... A low resistivity zone down to 30 ohm-metres. Resistivities on this section were too low for accurate chargeability readings.

172 metres ..... Resistivities decrease at depth, falling to less than 100 ohm-metres at 175 metres. This low resistivity is associated with a chargeability high of 80 millivolts/volt plus.

20 metre three-array

Results of the 20 metre three-array are disappointing. Apparently the low resistivities in the upper part of the hole prevented readings being obtained above 100 metres. This emphasises the significance of these less resistive zones. The current is being drawn preferentially into these areas. This is quite understandable.

SUMMARY

A number of chargeable sources are associated with zones of lower resistivity. Two of these zones appear to be conductive at 68 metres and 105 metres. For the most part resistivities in the hole are high, up to 90,000 ohm-metres. Strong external polarization responses are recorded at 38 metres, 100 and 172 metres associated with low resistivities. However, the most significant features are considered to be the very low resistivities encountered at 67 metres and 105 metres. The upper of these zones has strong negative polarization effects.

CONCLUSIONS

The most significant features observed in this drill hole are the low resistivity zones at 67 metres and 105 metres. The marked contrast of less than 100 ohm-metres to surrounding rocks close to 100,000 ohm-metres will mean that electrical current will be drawn into these zones. The whole area around these relative conductors will therefore be distorted when measured with surface arrays. The dipole-dipole results show a zone below 1700N which would correlate well with the results from the drill hole. Personal communications with A.W. Howland-Rose suggest that this anomalous region may be conductive clays located in caves within the limestone. Such features have been observed before in this area using magnetic induced polarization surveys. As such the anomalies should be treated with some caution.

DDH MD-35 2½ metre three-array

A less resistive zone was encountered at 105 metres. This is considered the most significant feature of the hole.

Below 70 metres, bulk chargeabilities are higher, up to a maximum of 80 millivolts/volt at 120 metres. Decay rates in this zone are slow, indicating fine grain size. Significant less resistive zones occur at 67 metres and 105 metres.

10 metre and 20 metre three-array

Bulk chargeabilities increase going down the hole to 120 metres. A strong negative polarization source occurs at 105 to 110 metres. This is coincident with the low resistivity feature detected by the 2½ metre array. Decay rates over this zone are slow to moderately fast. This implies that coarse grain size material is the source and electromagnetic coupling is not significant.

SCINTREX

SUMMARY

A less resistive zone at 105 metres on the 2½ metre spacing shows up on the 10 and 20 metre spacings as an internal polarization source. Decay rates are slow to moderately fast, which implies electromagnetic coupling is not significant. Overall background chargeability increases from 70 metres to 120 metres with a maximum of 80 millivolts/volt at 120 metres.

RECOMMENDATIONS

The low resistivity anomalies should be treated with some caution and geochemical and geological results should be correlated before proceeding. These low resistivities will distort the effects observed within the hole and do downgrade somewhat the positive chargeability anomalies observed within the hole and at surface. If any positive geochemical results suggest further work, then the conductive zones could be outlined using applied potential arrays on the surface.

Respectfully submitted on behalf of:

SCINTREX PTY. LTD.

R. Mathieson
for

G.J. STREET, M.Sc., D.I.C.

Geophysicist

SHELL COMPANY OF AUSTRALIA LTD.

Geophysical Log

DIAMOND DRILL HOLE N° : DDH-38

PROJECT : MOINA
STATE :
ANOMALY N° :
GRID COORDS :
INCLINATION :
AZIMUTH :
DATE DRILLED :
TOTAL DEPTH :
CASING :

GROUND GEOPHYSICAL ANOMALIES :

IP / RESISTIVITY LOGGING —
CONTRACTOR : SCINTREX TAS-078A
DATE LOGGED : 21-10-80
ARRAY : 3 ARRAY
ELECTRODE SPACINGS : 20m

SUSCEPTIBILITY LOGGING
BY :
DATE LOGGED :

DEPTH metres | LITHOLOGIC LOG | ASSAYS | GEOLOGICAL DESCRIPTION | DENSITY gms/cc | CHARGEABILITY ms | SUSCEPTIBILITY 10^{-6} cgs | RESISTIVITY Ohm m

0 20 40 60 80 40 100 1000 10000 10,0000

50m
100m
150m
200m
250m

N.R
N.R
N.R

806210

[redacted] CHELL COMPANY OF AUSTRALIA LTD.

Geophysical Log

DIAMOND DRILL HOLE N° : DDH 38

PROJECT : MOINA
STATE : TAS
ANOMALY N° :
GRID COORDS :
INCLINATION :
AZIMUTH :
DATE DRILLED :
TOTAL DEPTH :
CASING :

GROUND GEOPHYSICAL ANOMALIES :

IP / RESISTIVITY LOGGING —
CONTRACTOR : SCINTREX TAS-078A
DATE LOGGED : 21-10-80
ARRAY : 3 ARRAY
ELECTRODE SPACINGS : 10m

SUSCEPTIBILITY LOGGING
BY :
DATE LOGGED :

DEPTH metres	LITHO'GIC LOG	ASSAYS	GEOLOGICAL DESCRIPTION

DENSITY gms/cc
CHARGEABILITY ms 0 20 40 60 80 10
SUSCEPTIBILITY 10^{-6} cgs
RESISTIVITY Ohm m 100 1000 10000 10 9000

0m
100m
150m
200m

No Reading
N.R.
N.R.
N.R.
N.R.
N.R.
N.R.
N.R.

80521 11

SHELL COMPANY OF AUSTRALIA LTD.

Geophysical Log

DIAMOND DRILL HOLE N° : DDH-38

PROJECT : MOINA
STATE : TAS
ANOMALY N° :
GRID COORDS : Stn 1920N on 3120E
INCLINATION :
AZIMUTH :
DATE DRILLED :
TOTAL DEPTH : 263m
CASING :

GROUND GEOPHYSICAL ANOMALIES : 3?

IP / RESISTIVITY LOGGING —
CONTRACTOR : SCINTREX TAS-078A
DATE LOGGED : 20-10-80
ARRAY : 3 ARRAY
ELECTRODE SPACINGS : 2·5m

SUSCEPTIBILITY LOGGING
BY :
DATE LOGGED :

DEPTH metres	LITHOLOGIC LOG	ASSAYS	GEOLOGICAL DESCRIPTION

DENSITY gms/cc
CHARGEABILITY ms
0 20 40 60 80 10

SUSCEPTIBILITY 10^{-6} cgs
RESISTIVITY Ohm m
100 1000 10000 10·0001

50m
100m
150m
200m
250m

NR
NO READING
Jordan Limestone
Skarn
NO READING

8052219

[redacted] COMPANY OF AUSTRALIA LTD.

Geophysical Log

DIAMOND DRILL HOLE N° : DDH-35

PROJECT : MOINA
STATE :
ANOMALY N° :
GRID COORDS :
INCLINATION :
AZIMUTH :
DATE DRILLED :
TOTAL DEPTH :
CASING :

GROUND GEOPHYSICAL ANOMALIES :

IP / RESISTIVITY LOGGING —
CONTRACTOR : SCINTREX TAS-078A
DATE LOGGED : 21-10-80
ARRAY : 3 ARRAY
ELECTRODE SPACINGS : 10m

SUSCEPTIBILITY LOGGING
BY :
DATE LOGGED :

DEPTH metres	LITHOLOGIC LOG	ASSAYS	GEOLOGICAL DESCRIPTION

DENSITY gms/cc
CHARGEABILITY ms — 0 20 40 60 80 10
SUSCEPTIBILITY 10^{-6} cgs
RESISTIVITY Ohm m — 100 1000 10,000 10 0000

0m
100m
150m
200m
250m

NO READING

8062213

SHELL COMPANY OF AUSTRALIA LTD.

Geophysical Log

DIAMOND DRILL HOLE N° : 35

PROJECT : MOINA
STATE :
ANOMALY N° :
GRID COORDS : 1135E on 3 N Line
INCLINATION :
AZIMUTH :
DATE DRILLED :
TOTAL DEPTH :
CASING :

GROUND GEOPHYSICAL ANOMALIES :

IP / RESISTIVITY LOGGING —
CONTRACTOR : SCINTREX TAS-078A
DATE LOGGED : 21-10-80
ARRAY : 3 ARRAY
ELECTRODE SPACINGS : 20m

SUSCEPTIBILITY LOGGING
BY :
DATE LOGGED :

DEPTH metres	LITHOLOGIC LOG	ASSAYS	GEOLOGICAL DESCRIPTION	DENSITY gms/cc — · — CHARGEABILITY ms	SUSCEPTIBILITY 10^{-6} cgs · x RESISTIVITY Ohm m
				0 20 40 60 80 10	100 1000 10000 10 000
100m					
200m					
300m					

12608

TEL_ COMPANY OF AUSTRA IA L.TD.

Geophysical Log

DIAMOND DRILL HOLE N° : 35

PROJECT : MOINA
STATE : TAS
ANOMALY N° :
GRID COORDS : Stn 1135E on IP Line 1 2405/008N
INCLINATION :
AZIMUTH :
DATE DRILLED :
TOTAL DEPTH : 161.40m
CASING :

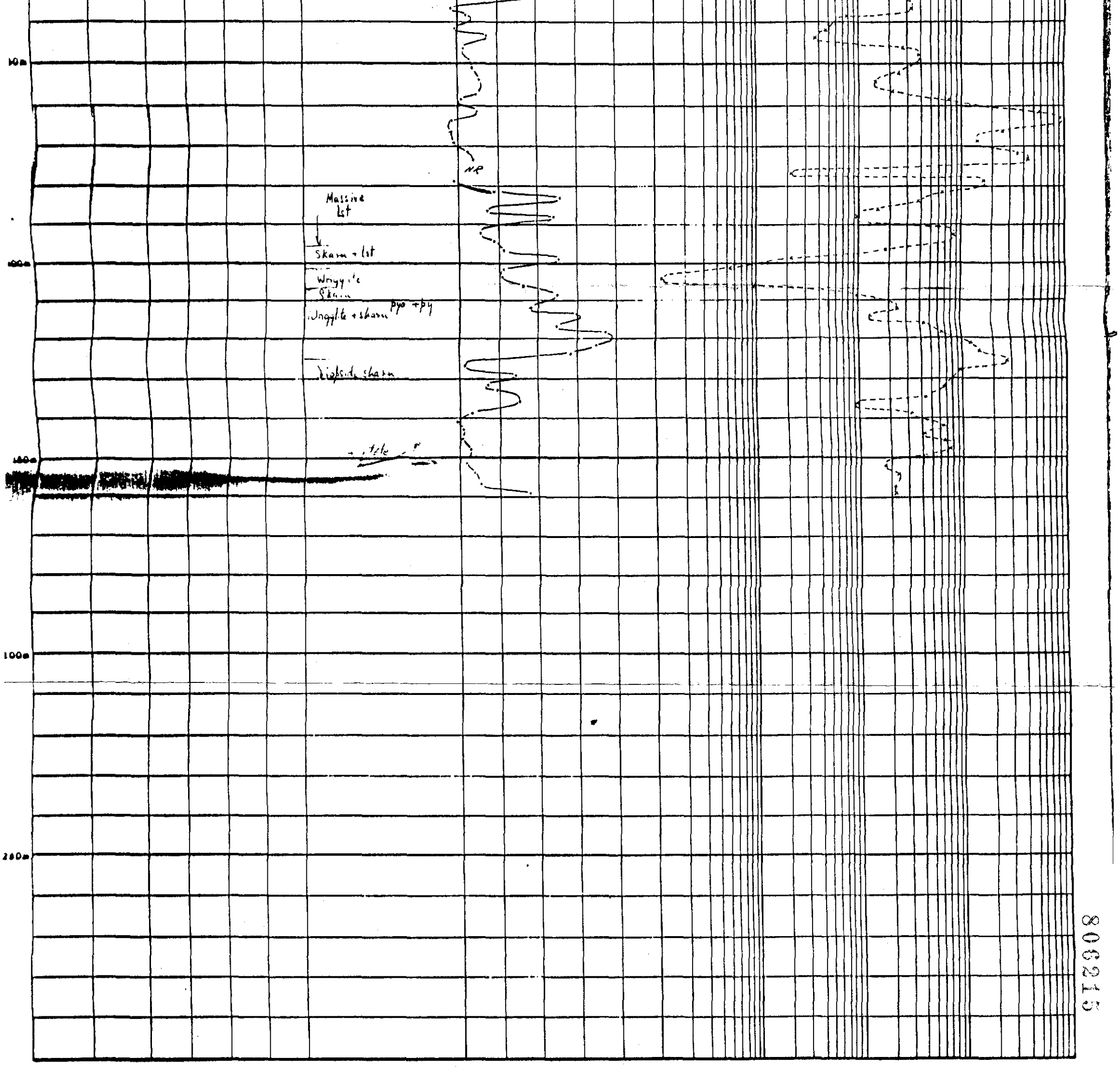
GROUND GEOPHYSICAL ANOMALIES : MAG

IP / RESISTIVITY LOGGING —
CONTRACTOR : SCINTREX TAS-078A
DATE LOGGED : 22-10-80
ARRAY : 3 ARRAY
ELECTRODE SPACINGS : 25m

SUSCEPTIBILITY LOGGING
BY :
DATE LOGGED :

DEPTH metres | LITHO'GIC LOG | ASSAYS | GEOLOGICAL DESCRIPTION | DENSITY gms/cc | CHARGEABILITY ms | SUSCEPTIBILITY 10^{-6} cgs | RESISTIVITY Ohm m

0 20 40 60 80 10 100 1000 10,000 10 0000



8063215

AHO REPORT NO. 08-684

806216

SCINTREX

A BRIEF REPORT ON DOWN-HOLE AND APPLIED POTENTIAL SURVEYS ON MD-39, AT MOINA, NORTHERN TASMANIA CARRIED OUT FOR SHELL COMPANY OF AUSTRALIA LTD. (METALS DIVISION)

Distribution: AHO
SHELL, DEVONPORT
COMALCO

806217

SCINTREX

PRIVATE AND CONFIDENTIAL

A BRIEF REPORT ON DOWN-HOLE AND APPLIED POTENTIAL SURVEYS ON MD-39, AT MOINA, NORTHERN TASMANIA CARRIED OUT FOR SHELL COMPANY OF AUSTRALIA LTD. (METALS DIVISION)

BY

G.J. STREET, MSC, DIC.
GEOPHYSICIST

SYDNEY, N.S.W.

NOVEMBER, 1980
TAS-079A

806218

SCINTREX

A BRIEF REPORT ON DOWN-HOLE AND APPLIED POTENTIAL SURVEYS ON MD-39, AT MOINA, NORTHERN TASMANIA CARRIED OUT FOR SHELL COMPANY OF AUSTRALIA LTD. (METALS DIVISION)

INTRODUCTION

At the request of Mr. R. Wright, Chief Geologist for Shell Metals, Scintrex Pty. Ltd. executed down-hole and around hole induced polarization and resistivity surveys on drill hole MD-39 in the Moina area, Northern Tasmania.

The surveys were conducted over 4½ production days between 11th and 16th November, 1980. The crew was under the immediate direction of Scintrex crew leader Mr. R. Prydon, assisted by Mr. P. Brown, BSc., and P. Dorney. Geological supervision was given by Mr. W. Smythe of Shell Metals.

EQUIPMENT

A Scintrex IPTAA 2.5Kw induced polarization transmitter was used for both the applied potential and down-hole surveys. Resistance in series with the down-hole electrode was used to decrease the output for the down-hole surveys.

A Scintrex IPR-10 induced polarization receiver was used to monitor

the primary (Vp) and secondary (Vs - chargeability) fields.

METHOD - Down-hole IP.

For the down-hole surveys a 2½ metre 3 array was employed with an infinite current electrode placed on the surface 270 metres away towards the north on line 1300E. A moving current electrode was positioned at the bottom of the hole, with a 2½ metre potential dipole 2½ metres away. Measurements were made starting at the bottom of MD-39 and going upwards. This method was repeated using a 20 metre 3 array. Three slices under the decay curve were measured for chargeability using a 2 second square wave pulse.

DATA PRESENTATION

The down-hole 3 array is plotted at the mid point of the two potentials. All data is plotted on standard Shell geophysical log sheets at a scale of 1 centimetre = 50 metres.

METHOD - Applied Potential.

A current electrode was emplaced at 200 metres down drill-hole MD-39. Two infinite electrodes of opposite sign were employed, placed in a grid north-east : south-west direction. The north-east electrode was at a distance of 1670 metres and the south-west at around 1450 metres.

ESULTS

ata is presented in contour-plan form. Parameters presented are:

Vp = the primary voltage potential about the down-hole electrode in millivolts.

M = chargeability in millivolts per volt.

Vs = the secondary voltage potential calculated from Vp and M using the formula:

$$M = \frac{Vs \quad 1000}{Vp} \text{ in mV/V}$$

here $$Vs = \frac{\int_{t_1}^{t_2} Vs\, dt}{tr} + Vx$$

t_1 = time at beginning of slice.

t_2 = time at end of slice.

Vx = residual transient voltage at the end of the automatic self-potential correction.

tr = $t_2 - t_1$ i.e., the integrating period.

herefore Vs is a direct measure of the secondary voltage in millivolts.

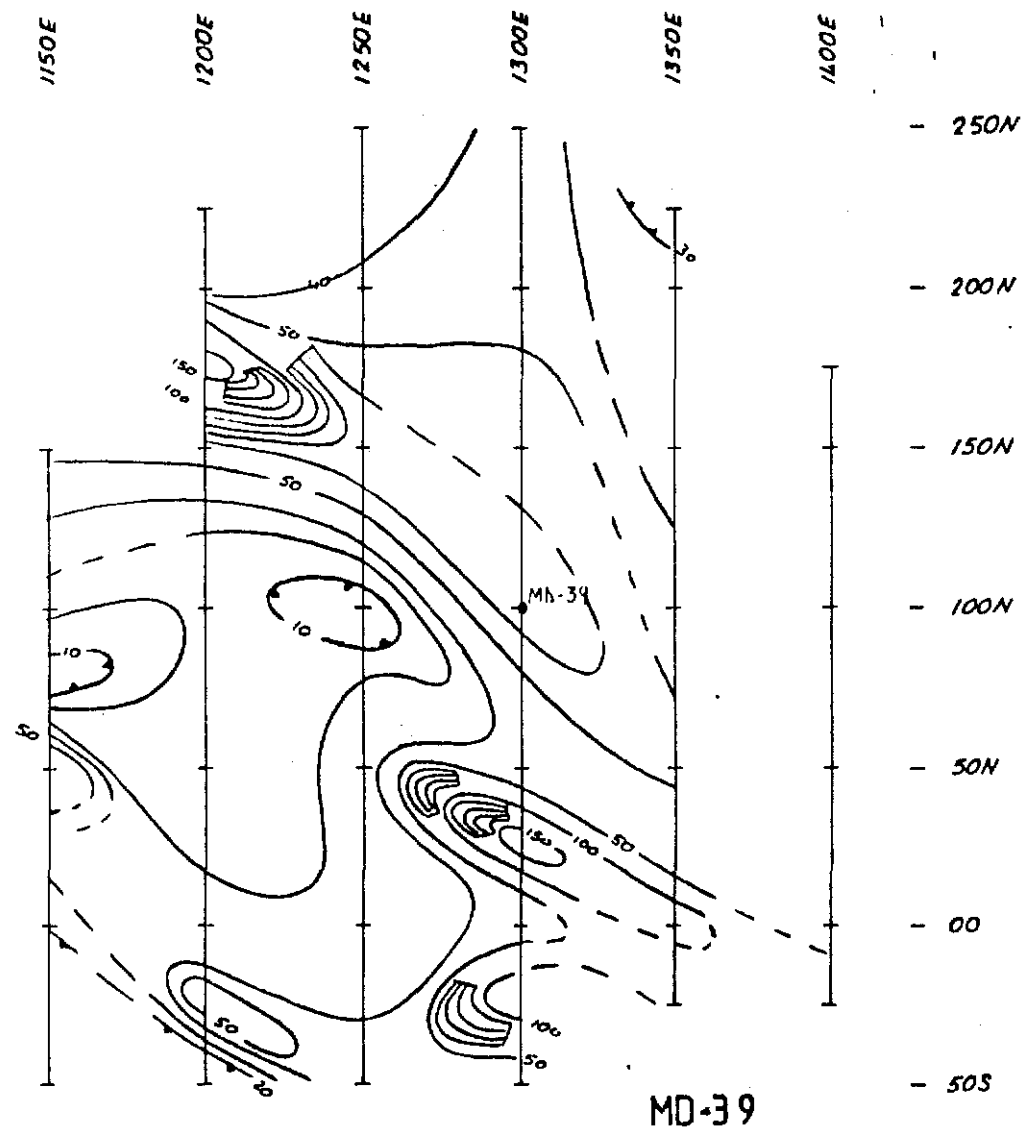
espectfully submitted on behalf of

CINTREX PTY. LTD.

G.J. STREET, MSc,DIC.

EOPHYSICIST.

806221



MD-39

Moina Tas.

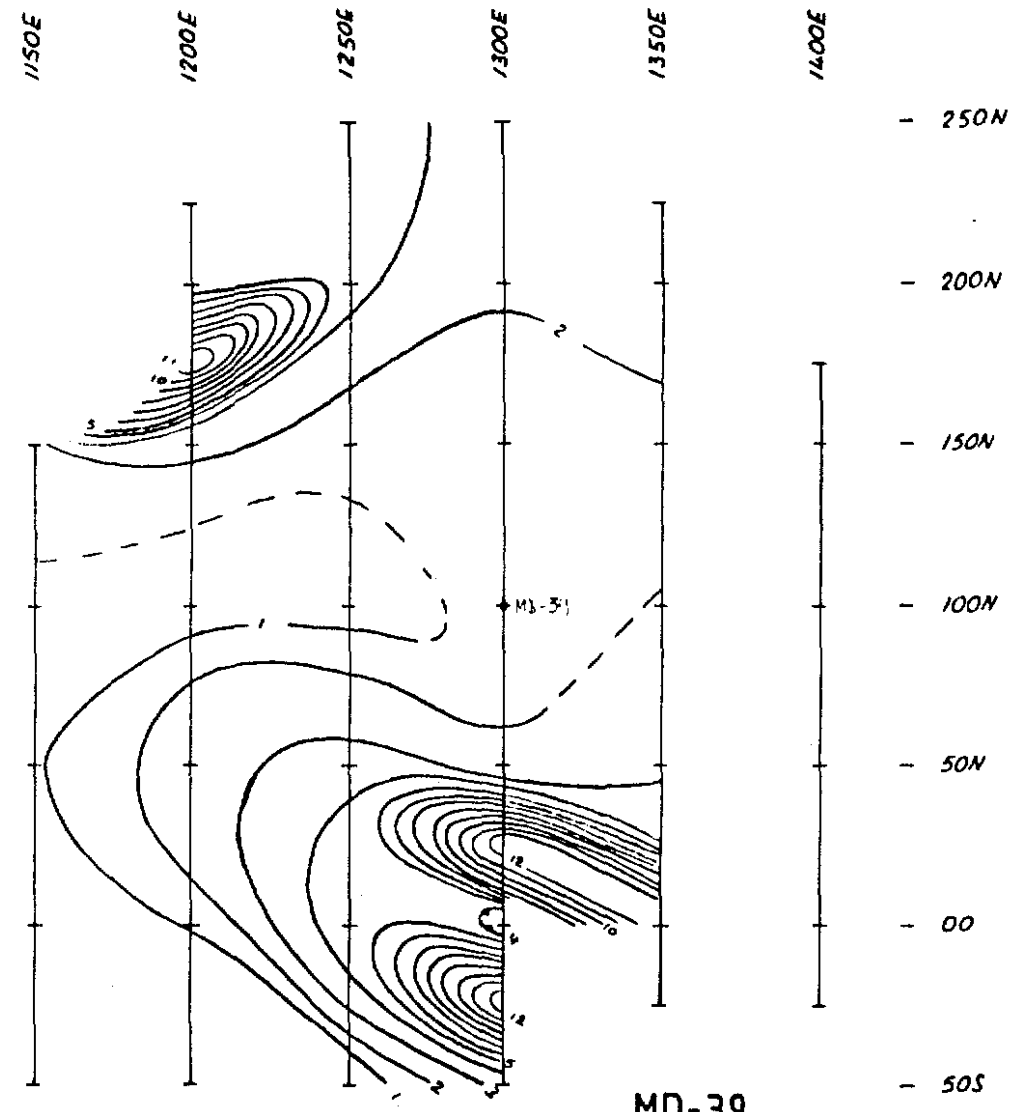
APPLIED POTENTIAL SURVEY

CHARGEABILITY CONTOURS

SCINTREX Job N° TAS-079A

Scale 1:2

806222



MD-39

Moina Tas. .

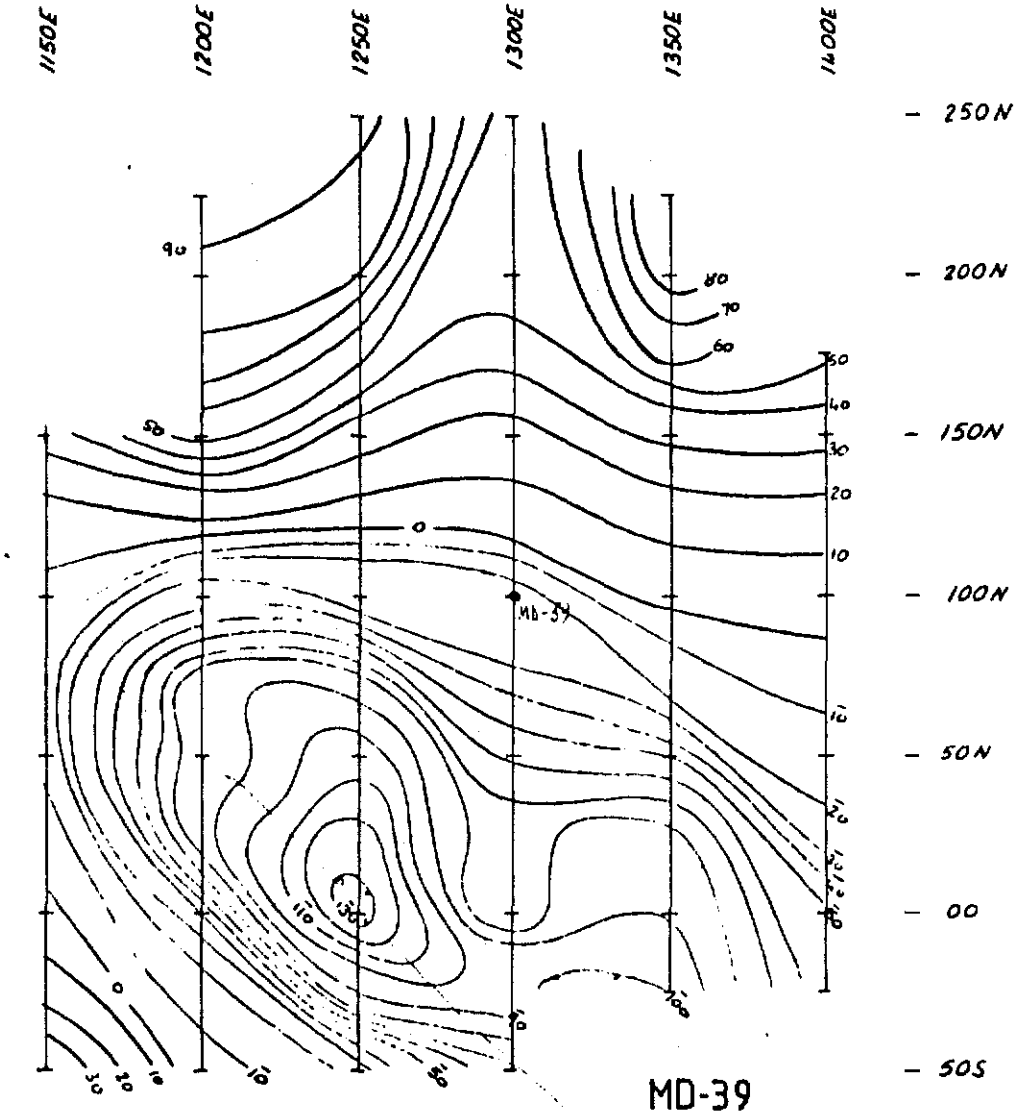
APPLIED POTENTIAL SURVEY

Vs CONTOURS

SCINTREX Job N° TAS 079A

[redacted]e 1[redacted]0m.

806223



MD-39

Moina Tas.

APPLIED POTENTIAL SURVEY

Vp CONTOURS

5 cm

SCINTREX Job N° TAS-079A

Scale 1:2500m

SHELL COMPANY OF AUSTRALIA LTD.

Geophysical Log

DIAMOND DRILL HOLE N° : MD-39

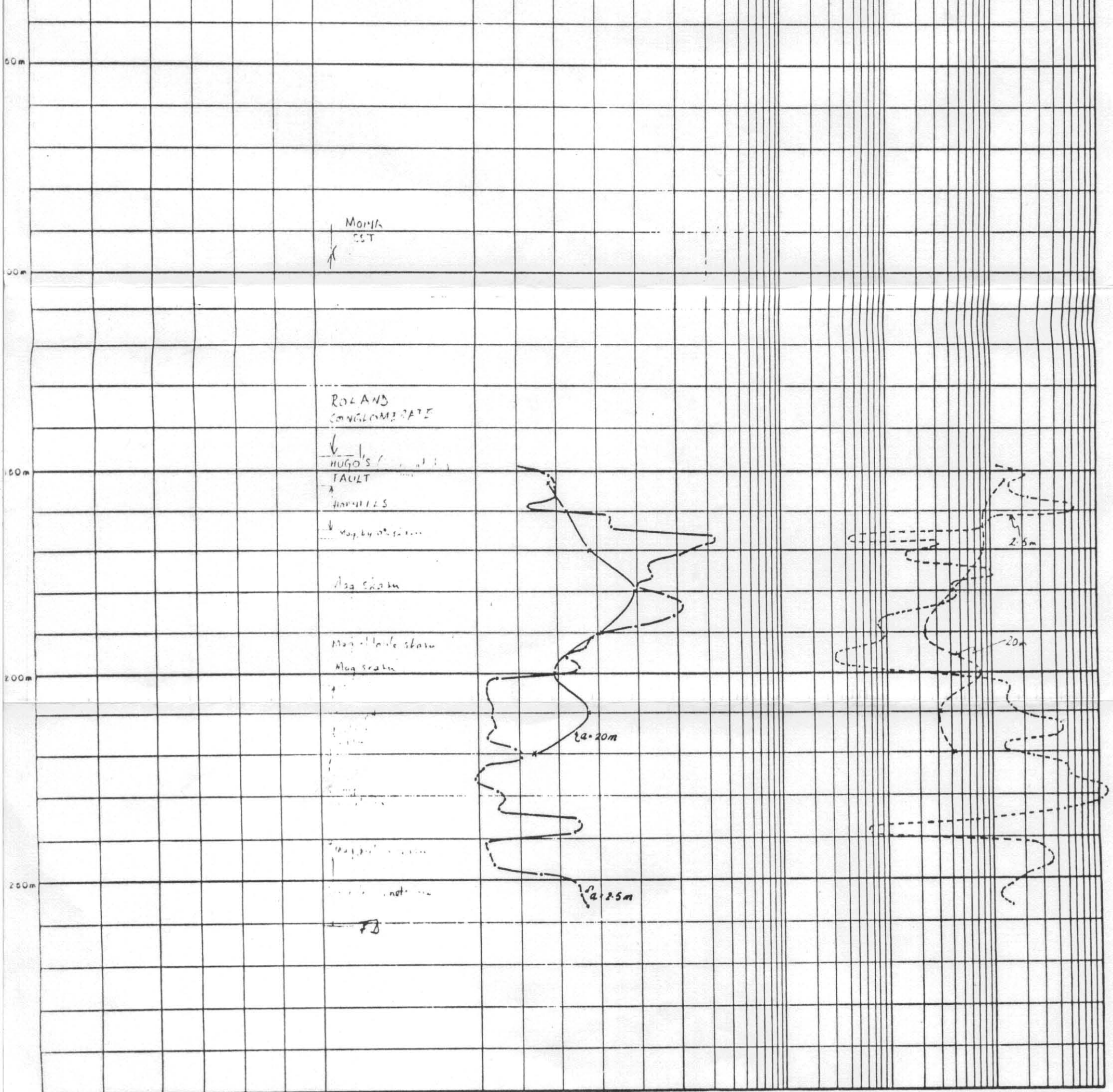
PROJECT : [illegible]
STATE : TAS
ANOMALY N° :
GRID COORDS :
INCLINATION : [illegible]
AZIMUTH :
DATE DRILLED : [illegible]
TOTAL DEPTH : 249.40
CASING :

GROUND GEOPHYSICAL ANOMALIES : NIL

IP / RESISTIVITY LOGGING —
CONTRACTOR : Scintrex (Tas-079A)
DATE LOGGED : 11/12-11-80
ARRAY : 3-Array
ELECTRODE SPACINGS : 2½ & 20 metres

SUSCEPTIBILITY LOGGING
BY :
DATE LOGGED :

DEPTH metres	LITHOLOGIC LOG	ASSAYS	GEOLOGICAL DESCRIPTION	DENSITY gms/cc / CHARGEABILITY ms	SUSCEPTIBILITY 10^{-6} cgs / RESISTIVITY Ohm m
				0 20 40 60 80	0 10 100 1000 10,000



8062241

APPENDIX 5

PETROLOGY REPORT - DEVONIAN PROSPECT

806226

Central Mineralogical Services

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

Mr. W.D. Smyth
Geologist
The Shell Co. of Aust. Ltd.
Metals Division
P.O. Box 860
DEVONPORT / TAS. 7310

9th January, 1981

REPORT CMS 80/11/47

YOUR REFERENCE:	Sample Despatch No. MZ01/WDS/010
DATE RECEIVED:	20th November, 1980
SAMPLE NOS.:	1601, 1602, 1604, 1605, 1608
SUBMITTED BY:	W.D. Smyth
WORK REQUESTED:	Petrology

H.W. Fander, M. Sc.

REPORT CMS 80/11/47

Notes:

This suite comprises mainly thoroughly ferruginised sedimentary quartzites (orthoquartzites) ranging from coarse, bimodally sorted to finer, relatively well-sorted types, and generally bedded on a millimetric scale. These rocks are of fluvial character and are unmetamorphosed. Ferruginisation is pervasive in the matrix, which appears to have been largely argillic, with minor associated carbonate, and is a late secondary phenomenon possibly of lateritic affinities.

The rocks are variably manganiferous. Generally, the Mn-oxide postdates the pervasive limonite, although the two may be more or less contemporaneous locally. The general nature of the steely to dark grey and black stainings was confirmed by chemical tests (HNO_3/sodium bismutate). Brief polished section examination of specimen 1604[3] confirms the assemblage to include pyrolusite, ?coronadite and degraded Mn-magnetite. Possibly, other Mn-oxide phases are present. There are no optically detectable metal salts.

Subordinate lithologies represented include ferruginised mica ?vein material (1604) and vein-quartz (1605, 1608).

Degraded sulphide is sparse and entirely restricted to rare grains of pyrite disseminated in the ferruginised psammites (1602, pyritohedral, possibly "syngenetic") and associated quartz veins (1605, 1608, cubic, hydrothermal). Quartz veins in 1608 appear to have included traces of base metal sulphide, but there are no boxworks, as may be expected in zones of pervasive late ferruginisation, such as reflected here, where boxworks, if formed, may be obliterated.

In summary, it appears the rocks may have been weakly hydrothermally mineralised in association with a quartz/mica + magnetite veining phase. Present base metal assays, however, evidently reflect the presence of metalliferous Mn-oxides and, probably, absorption onto limonite. The paucity of recognisable sulphide-derived limonite suggests the bulk of the anomalous values are exotic (i.e. introduced) rather than indigenous.

D. Cowan, B. Sc.

REPORT OMS 80/11/47

Petrological Descriptions

1601 (T.S. 34966)

This is a thoroughly ferruginised, weakly bedded, slightly gritty sandstone, essentially an orthoquartzite.

The framework is poorly sorted in the fine to coarse sand range and tends to be bimodal, with medium to coarse sand grains disseminated throughout a fine sand base. Grainshapes are similarly variable, with the coarser fractions subangular to rounded and the fine sand generally angular. These features are consistent with fluvial transport and deposition.

The main clastic component is quartz, typically as single grains, but with a subordinate component of composites (variably stressed vein-type, minor ortho- and metaquartzite). Accessories (total < 1 %) comprise sub- to rounded detrital zircons, rare ferruginised quartzose siltstone clasts, and rare degraded/leached ?feldspar grains.

The matrix is thoroughly ferruginised and consists virtually entirely of optically dense limonite. Locally, the Fe-oxide is clearly replacive after argillaceous matter (indeterminate), but typically the limonite is microcolloform to massive and featureless. Sporadic patches of Mn-oxide are present, but are not common.

The bulk of limonite, and possibly all, is of exotic (introduced) origin, rather than indigenous. This suggests that the rock was primarily cemented with a relatively soluble phase, probably carbonate. Problematically, there are no relics or diagnostic boxworks to confirm this. Similarly, there are no tangible sulphide boxworks or detectable secondary metal salts.

1602 (T.S. 34967)

This is a thoroughly ferruginised, fine sandy quartzose siltstone, essentially a finer-grained facies variant of 1601.

The rock is faintly bedded on a sub- to millimetric scale and consists almost entirely of weakly marginally corroded clastic quartz grains and limonite in near-equant proportions. Microtextural features indicate the Fe-oxide replaces a primary argillaceous matrix. Sparse microscopic relict flakes of illite suggest this may have been sericitic.

Sporadic spongy patches of Mn-oxide are associated with the ferruginised matrix. Rare fine-scale "devil's dice" (max. 300 μ) with hexagonal outlines indicate the rock was weakly mineralised with pyritohedral pyrite, but there are no tangible base metal sulphide boxworks.

Minor accessory phases, recognisable in this rock, include thinly disseminated detrital tourmaline, rare zircons and rare, partly degraded clastic muscovite flakes.

1604 (T.S., P.S. 34968)
This is a relatively massive limonite rock, locally colloform and weakly cavernous and elsewhere representing a thoroughly weathered and ferruginised, fine-grained mica rock. There are no definite sedimentary features and in contrast to 1601 and 1602, this rock appears representative of an altered facies, alternately a vein.

The rock is incipiently to distinctly magnetic. Polished section examination reveals this to reflect rare to locally conspicuous, discrete to clustered magnetite euhedra (mean 50 μ), extensively martitised and locally replaced by aggregates of Mn-oxide (pyrolusite in part) and martitic hematite. Sparse relics of magnetite persist and exhibit optical characteristics consistent with a low to intermediate Mn-content (trend jacobsite). Patchy late pyrolusite cavityfillings are disseminated throughout the rock. Rare columnar, cavity-filling Mn-oxide aggregates are locally mantled with fibrous outgrowths of ?coronadite (stereobinocular determination). Close inspection of the two sections and related offcuts reveals no tangible sulphide boxworks or optically detectable metal salts.

The association of magnetite and ferruginised mica suggests the mica was a ferromagnesian phase (biotite-phlogopite), although this cannot be confirmed from the patchy, degraded/ferruginised relics. The assemblage is reminiscent of a "basic" vein, alternately micaceous metasomatic rock.

1605 (T.S. 34969)
This rock is a thoroughly ferruginised sediment with close affinities to 1601 and particularly 1602.

The relict framework is weakly bedded on a sub- to millimetric scale and is relatively well sorted in the coarse silt/fine sand range. Apart from extremely rare detrital tourmaline, zircon, and (degraded) white mica flakes, quartz is the only clastic component. Grainshapes are angular to subangular and marginally corroded by the limonite matrix.

Limonite is massive to spongy, with semi-pervasive colloform microtextures. Vague pseudomorphs after fine-grained carbonate rhombs are evident locally, but are infrequent, and the primary nature of the bulk of matrix is obscure.

The rock includes occasional semi-conformable, weakly stressed veinlets of quartz with thinly disseminated oxidised, fine-grained pyrite and, possibly, minor traces of degraded ultrafine chalcopyrite. There are no detectable galena or sphalerite boxworks in the veinlets or the ferruginised host rock.

1608 (T.S. 34970)

This ferruginised and Mn-stained sediment is similar to 1601, 1602 and 1605. The framework is analogous to that of 1601 with distinct bimodal sorting reflected in subrounded, medium-sand-sized quartz grains of random to bedded distribution in a framework of relatively evenly-sized, coarse silt- to fine sand-sized quartz. Apart from extremely rare detrital tourmaline and zircon, quartz is the only recognisable clastic component.

Ferruginisation is marked to the extent that the original matrix which appears to have been argillaceous, is completely replaced by spongy to optically dense limonite. Late films, colloform veinlets, and irregular concretions of Mn-oxide are relatively common throughout. These are partly joint-controlled and postdate sporadic comb-structured to granular quartz veins ranging up to 1 cm in width and generally discordant to bedding.

Quartz veins are incipiently stressed and include rare patches (to 1.5 mm, typically < 500 μ) of limonite, typically of quartz-intergranular habit. Pseudomorphs of an- to subhedral pyrite and ?magnetite are present, but are rare. There are no identifiable base metal sulphide boxworks.

D. Cowan, B. Sc.

APPENDIX 6

DIAMOND DRILL HOLE LOGS - DEVONIAN PROSPECT

80232

The Shell Company of Australia Limited
METALS DIVISION

DRILL LOG SHEET

Hole No : .....DEV.-D1.....

PROJECT : .....MOINA (DEVONPORT).....

LOCATION CODE : MZ 01

COLLAR CO-ORDINATES : .....100N/275W.....

COLLAR R.L. : .....

LOCATION : .....COMALCO DEVONIAN GRID.....

MAP/PHOTO REFERENCE : .....

DATE STARTED		HOLE SIZE		FROM	TO	TOTAL	CORE STORAGE	
DATE FINISHED		NON CORE					No OF TRAYS	
TOTAL DEPTH	157.80						SAMPLE STORAGE	
LOGGED BY	W.D.S.	CORE	NQ	0	52.00		ASSAY LAB.	
CONTRACTOR	A.P.R. (Comalco)		BQ	52.00	157.80		ASSAY REPORTS	
RIG								
DRILL CREW		CASING					MIN. & PET. LAB.	
							MIN. & PET. REPORTS	
		CASING LEFT						

HOLE SURVEY DATA

INSTRUMENT :

DEPTH	INSTRUMENT INCL.	INSTRUMENT AZ.	ACID ETCH INCL.	ACID ETCH AZ.	REMARKS
COLLAR					

GRAPHIC / LETTER SYMBOL LOGGING KEY

STRUCTURE / ALTERATION CODE

B BEDDING
J JOINTING
C CLEAVAGE
F FOLIATION
sh SHEARING
q QUARTZ VEINS
O OXIDATION

DRILLING SUMMARY :

THE SHELL COMPANY OF AUSTRALIA LTD. - METALS DIVISION

PROJECT: DEVONIAN

DIAMOND DRILL LOG - SAMPLING RECORD

HOLE NO: DEV-D1

From	To	Interval m	Core Rec'd	% Rec.	Sample No.	Sample No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Ag	Au	Weighted Assays/Ratios	% Extractions	Core Angles	Alt.	P.S	Description
0	3.00	300	65	22																White-grey massive f - med. gn. sandstone/quartzite
3.00	9.00	600	535	89	1534	f	4			70	125	60	1	<0·05						White-grey massive f - med. gn. sandstone/quartzite
9.00	11.00	200	185	93	1535	s	4			4	155	6	<1	<0·05						White-grey massive f - med. gn. sandstone/quartzite
11.00	12.30	130	130	100	1536	s	<4			6	55	4	<1	<0·05						Fe stained - quartz veined quartzite
12.30	14.00	170	170	100	1537	s	12			2	28	6	<1	<0·05						White-grey massive f - med. gn. sandstone/quartzite
14.00	15.45	145	120	83	1538	s	12			4	36	8	<1	<0·05						White-grey massive f - med. gn. sandstone/quartzite
15.45	15.90	45	42	93	1539	s	14			14	48	6	1	<0·05						Quartz veining and Fe staining - minor brecciation
15.90	18.00	210	110	52	1540	s	10			6	85	6	<1	<0·05						Quartz veining and Fe staining - minor brecciation
18.00	24.00	600	420	70	1541	f	16			115	80	85	1	<0·05						Quartz veining and Fe staining - minor brecciation
24.00	26.00	200	190	95	1542	s	4			4	26	6	<1	<0·05						Quartz veining and Fe staining - minor brecciation
26.00	32.60	660	634	96	1543	f	6			<2	60	42	1	<0·05						Quartz veining and Fe staining - minor brecciation
32.60	33.75	115	117	100	1544	s	<4			16	420	30	1	<0·05						Quartz veined, Fe stained quartzite
33.75	35.00	125	110	88	1545	s	8			50	740	22	3	<0·05						Dark brown black siltstone
35.00	35.60	60	60	100	1546	s	22			6	720	14	<1	<0·05						Grey massive f. gn. sandstone
35.60	39.00	340	340	100	1547	s	16			4	330	14	1	<0·05						Quartz porphyry dyke
39.00	42.00	300	293	98	1548	f	10			28	240	32	<1	<0·05						Pale grey/grey-green f. gn. tubicular sandstone
42.00	44.00	200	200	100	1549	s	4			6	200	8	<1	<0·05						Pale grey/grey green f.gn. tubicular sandstone
44.00	44.90	90	80	89	1550	s	18			2	450	10	<1	<0·05						Pale grey/grey-green f.gn. tubicular sandstone
44.90	49.00	410	408	99	1551	f	6			105	175	195	1	<0·05						Dark brown tubicular silicified f-med. gn. sandstone
49.00	50.00	100	100	100	1552	s	10			12	265	40	1	<0·05						Bleached porous sandstone
50.00	52.00	200	200	100	1553	s	10			14	200	42	<1	<0·05						Bleached porous sandstone
52.00	52.50	550	510	93	1554	f	4			105	210	80	1	<0·05						Dark brown tubicular sandstone
52.50	63.10	560	520	93	1555	f	16			65	1000	125	3	<0·05						Red-brown siliceous f-med.gn. sandstone
63.10	63.80	70	64	91	1556	s	6			12	225	26	<1	<0·05						Orange leached-altered sandstone
63.80	65.00	120	117	98	1557	s	<4			12	95	6	<1	<0·05						Red-brown siliceous f-med.gn. sandstone
65.00	70.90	590	525	89	1558	f	4			80	900	380	2	<0·05						Red-brown siliceous f-med.gn. sandstone
70.90	71.80	90	90	100	1559	s	14			8	260	12	1	<0·05						Dark brown tubicular sandstone
71.80	74.00	220	116	53	1560	f				115	1650	190	3	<0·05						Dark brown tubicular sandstone
74.00	76.00	200	200	100	1561	s	8			2	350	90	<1	<0·05						Bleached and Fe stained f-med. gn. sandstone
76.00	82.00	600	600	100	1562	f	48			95	700	175	1	<0·05						*Bleached and Fe stained f-med. gn. sandstone*
82.00	83.15	115	115	100	1563	s	42			90	770	480	3	<0·05						Bleached and Fe stained f-med.gn. sandstone
83.15	85.00	185	190	100	1564	s	20			26	500	550	2	<0·05						Dull grey-green sandstone with minor siltstone
85.00	87.00	200	200	100	1565	f	20			390	195	270	6	0·15						Dull grey-green sandstone with minor siltstone
87.00	88.50	150	150	100	1566	s	8			12	165	310	<1	<0·05						Dull grey-green sandstone with minor siltstone
88.50	91.90	340	330	97	1567	f	14			190	440	620	1	<0·05						Dull grey-green sandstone with minor siltstone
91.90	93.00	110	110	100	1568	s	6			14	115	165	<1	<0·05						Grey white bleached, pitted, sandstone
93.00	94.60	160	160	100	1569	s	24			6	130	190	<1	<0·05						Dull grey-green interbedded siltstone/sandstone
94.60	96.00	140	140	100	1570	s	8			10	135	180	<1	<0·05						Grey white bleached pitted sandstone
96.00	98.80	280	250	89	1571	f	16			190	48	210	<1	<0·05						Quartz veining - silicification
98.80	100.60	180	180	100	1572	f	10			85	18	180	<1	<0·05						Well bedded siltstone/sandstone
100.60	108.30	770	760	99	1573	f	<4			165	34	200	<1	<0·05						Massive dull grey med.-crs. gn. silicified sandstone
108.30	116.00	770	780	100	1574	f	14			100	290	320	<1	<0·05						Massive sandstone with siltstone/sandstone interbeds
116.00	118.60	260	260	100	1575	f	<4			490	250	620	<1	<0·05						Grey massive med.-f. gn. quartzite
118.60	124.00	540	540	100	1576	f	16			30	160	450	<1	<0·05						Bedded siltstone/sandstone
124.00	129.50	550	550	100	1577	f	18			28	70	430	<1	<0·05						Bedded siltstone/sandstone
129.50	135.00	550	550	100	1578	f	10			70	14	140	<1	<0·05						Massive grey silicified quartzite
135.00	140.00	500	500	100	1579	f	50			185	710	195	1	0·1						Massive grey silicified quartzite
140.00	145.00	500	480	96	1580	f	18			75	110	130	<1	<0·05						Massive grey silicified quartzite
145.00	147.30	230	230	100	1581	s	22			14	20	15	<1	<0·05						Massive grey silicified quartzite
147.30	152.00	470	470	100	1582	f	18			135	44	250	<1	0·05						Conglomerate
152.00	157.80	580	580	100	1583	f	34			130	50	240	<1	0·05						Conglomerate

Page ... of ... Sheets

8062233

THE SHELL COMPANY OF AUSTRALIA LTD. - METALS DIVISION

PROSPECT: MOINA (DEVONIAN)

DIAMOND DRILL LOG - SAMPLING RECORD

HOLE NO: DH 1

From	To	Interval Feet	Core Recd	% Rec	Sample No.	Compos No.	Assays Sn	As	WO3	Cu	Pb	Zn	Ag	Sb	Weighted Assays Ratios	% Estimates	Core Angles	Alt	W.S P.S	Description
18.29	22.56	427	167	39	S 1501	C1	10				1.35%	2600	37	0.05						Laterite? gossan? ironstone rubble.
28.05	34.15	610	40	7	S 1502		14							0.05						Laterite? gossan? ironstone rubble.
34.15	36.89	274	63	23	S 1503	C2	6				2350	450	3	<0.05						Orange-yellow leached f-med. gn. sandstone.
36.89	40.55	366	175	48	S 1504		8							<0.05						Orange-yellow leached f-med. gn. sandstone.
40.55	41.77	122	70	57	S 1505		24				840	370	2	<0.05						Green-grey silicified (chloritised?) sandstone.
41.77	43.90	213	470	100	S 1506	C3	< 4							<0.05						Green-grey silicified (chloritised?) sandstone.
43.90	44.82	92	95	100	S 1507		8							<0.05						Green-grey silicified (chloritised?) sandstone.
44.82	46.95	213	200	94	S 1508		8				1250	24	2	<0.05						Grey-brown silicified med. gn. silty sandstone.
46.95	47.56	61	80	100	S 1509		< 4				590	680	1	<0.05						Dark brown-black foliated-bedded siltstone/sandstone.
47.56	50.91	335	210	63	S 1510		10				1850	410	3	<0.05						Grey/orange-grey silicified sandstone.
50.91	53.05	214	170	79	S 1511	C4	40				550	1200	2	<0.05						Grey-brown tubicular silty sandstone.
53.05	59.15	610	545	89	S 1512		4							<0.05						Grey-brown tubicular silty sandstone.
59.15	64.94	579	585	100	S 1513	C5	12				830	680	3	<0.05						Grey-brown tubicular silty sandstone.
64.94	70.12	518	520	100	S 1514		4							<0.05						Grey-brown tubicular silty sandstone.
70.12	77.44	732	720	98	S 1515	C6	4				680	260	4	<0.05						Grey-brown tubicular silty sandstone.
77.44	82.32	488	500	100	S 1516		8							<0.05						Grey-brown tubicular silty sandstone.
82.32	85.37	305	250	82	S 1517		10				1050	340	6	<0.05						Grey siliceous f. med. gn. sandstone.
85.37	88.41	304	230	76	S 1518		10				290	230	3	<0.05						Grey-green f. med. gn. quartzite.
88.41	91.46	305	280	92	S 1519	C7	< 4							<0.05						Grey-green f. med. gn. quartzite.
91.46	97.56	610	440	72	S 1520		4							<0.05						Grey-green f. med. gn. quartzite.
97.56	99.09	153	190	100	S 1521		8				200	70	1	<0.05						Orange-red leached med. gn. sandstone.
99.09	104.88	579	580	100	S 1522	C8	4				55	290	1	<0.05						Grey-brown silty sandstone.
104.88	110.67	579	580	100	S 1523		< 4							<0.05						Grey-brown silty sandstone.
110.67	117.38	671	675	100	S 1524	C9	4				75	270	<1	<0.05						Grey-brown silty sandstone.
117.38	123.48	610	610	100	S 1525		6							<0.05						Grey-brown silty sandstone.
123.48	129.27	579	640	110	S 1526		6				32	210	<1	<0.05						Grey-brown silty sandstone.
129.27	136.28	701	425	61	S 1527		4				95	410	<1	<0.05						Green-grey f. gn. silty-sandstone/sandy siltstone.
136.28	139.63	335	465	100	S 1528		4				60	185	<1	<0.05						Grey-white massive f. med. gn. sandstone/quartzite.
139.63	143.90	427	415	97	S 1529	C10	< 4				55	180	<1	<0.05						Siliceous and haematitic quartzite and conglomerate.
143.90	150.00	610	605	99	S 1530		8							<0.05						Siliceous and haematitic quartzite and conglomerate
150.00	156.10	610	605	99	S 1531	C11	4				24	90	<1	<0.05						Siliceous and haematitic quartzite and conglomerate.
156.10	162.20	610	605	99	S 1532		4							<0.05						Siliceous and haematitic quartzite and conglomerate.
162.20	164.63	243	215	88	S 1533		< 4				20	70		<0.05						Siliceous and haematitic quartzite and conglomerate.

C Check Assays

80634

THE SHELL COMPANY OF AUSTRALIA LTD. - METALS DIVISION

PROJECT: OH 2

DIAMOND DRILL LOG - SAMPLING RECORD

HOLE NO: OH2 (mine)

From	To	Interval (m)	Core Rec'd	% Rec	Sample No.	Comps No.	Assays Sn	W	Mn	Cu	Pb	Zn	Ag	Au	Weighted Assays Ratios	% Estimates	Core Angles	Alt	T.S P.S	Description
30	52'	6.61	7.50	100	1584	f	<4	35	22	60	450	75	2	<0.05						Tubicular sandstone - some pyrite nodules.
52	79'	8.25	6.50	79	1585	f	4	40	16	12	330	130	4	<0.05						Tubicular sandstone.
79	91'	3.60	3.25	90	1586	s	6	15	20	8	95	20	4	<0.05						Quartz-feldspar porphyry.
91	101.5'	3.25	3.10	95	1587	f	<4	20	30	14	80	55	1	<0.05						Quartz-feldspar porphyry.
101.5	115'	4.10	3.65	89	1588	s	<4	<10	14	16	200	200	3	<0.05						Tubicular sandstone - quartz veined.
115'	124'	2.75	3.00	100	1589	s	6	<10	22	2	34	<2	1	<0.05						Fine - Med. grn. sandstone - Fe stained fractures.
124	131'	2.10	2.10	100	1590	s	<4	<10	16	4	40	<2	2	<0.05						Tubicular sandstone.
131	167	1.00	1100	100	1591	f	<4	290	32	380	230	300	4	<0.05						Tubicular sandstone.
167	178'	3.35	2.90	87	1592	s	4	10	16	12	85	2	2	<0.05						F - med. grn. sandstone - x pyrite nodules?
178	184'	1.83	1.85	100	1593	s	<4	<10	18	12	250	22	1	<0.05						F - med. grn. sandstone - some Fe staining.
184	190'	1.83	1.78	97	1594	f	<4	55	32	120	95	60	4	<0.05						F - med. grn. sandstone - some Fe staining - x pyrite?
190	200'	3.05	2.75	90	1595	s	<4	<10	14	8	90	<2	3	<0.05						F - med. grn. sandstone - some Fe staining - x pyrite?
200	205'	1.52	1.20	79	1596	s	<4	10	14	2	270	2	2	<0.05						F - med. grn. sandstone - silicified.
205	220'	4.58	4.50	98	1597	f	<4	20	26	1200	140	940	1	<0.05						F - med. grn. silty sandstone - pyrite on joints - fractured.
220	231'	3.35	1.80	54	1598	s	4	15	24	60	360	130	2	<0.05						F - med. grn. sandstone - leached - fractured.
231	239'	2.44	2.00	82	1599	f	<4	540	26	440	330	380	1	<0.05						F - med. grn. sandstone - leached - fractured.
239	249'	3.05	2.40	79	1600	f	10	<10	6	2	330	12	2	<0.05						F - med. grn. sandstone - leached - fractured.
249	256'	2.13	1.95	92	1701	s	4	20	16	<2	120	<2	2	<0.05						F - med. grn. sandstone - leached - fractured.
256	268'	3.66	2.25	61	1702	s	6	<10	<4	4	55	2	2	<0.05						F - med. grn. sandstone - leached - fractured.
268	273'	1.52	1.30	85	1703	s	<4	15	16	10	170	95	1	<0.05						Shale zone - fractured.
273	281'	2.44	1.80	74	1704	s	4	15	18	10	110	2	2	<0.05						F - med. grn. sandstone - leached.
281	289'	2.44	2.35	96	1705	s	<4	<10	14	4	48	<2	1	<0.05						F - med. grn. sandstone - leached.
289	299'	3.07	2.80	91	1706	s	<4	<10	16	2	36	<2	1	<0.05						F - med. grn. sandstone - leached.
299	325'	7.91	8.00	100	1707	f	4	880	105	700	125	850	1	<0.05						Silty sandstone/sandy siltstone - mixed zone.
325	331'	1.83	2.00	100	1727	s	<4	<10	155	12	60	195	1	<0.05						F - med. grn. sandstone - leached - chloritized? pyrite.
331	350'	5.79	6.50	100	1708	f	<4	640	<4	28	20	<2	2	<0.05						F - med. grn. sandstone - some siltstone interbeds.
350	354'	1.22	1.40	100	1709	s	4	<10	85	480	220	520	3	<0.05						F - med. grn. sandstone - silicified.
354	359'	1.52	1.65	100	1710	f	<4	310	230	200	70	140	1	<0.05						Interbedded sandstone - siltstone.
359	369'	3.05	2.10	69	1711	s	<4	<10	130	12	30	100	1	<0.05						F - med. grn. sandstone - silicified.
369	383'	4.27	4.00	94	1728	s	4	30	160	34	3400	370	14	<0.05						Interbedded siltstone-sandstone - some silicification - chloritization
383	401'	5.48	5.60	100	1712	f	<4	160	160	90	90	330	1	<0.05						Interbedded siltstone - sandstone.
401	424'	7.02	7.15	100	1713	f	<4	280	240	185	55	360	1	<0.05						Interbedded siltstone - sandstone.
424	430	1.82	0.70	38	1714	s	<4	390	46	240	10	230	1	<0.05						Interbedded siltstone - sandstone.
430	463'	10.06	9.90	98	1715	f	<4	230	26	155	28	145	1	<0.05						Conglomerate/quartzite.
463	490'	8.23	8.75	100	1716	f	<4	390	24	230	20	195	1	<0.05						Conglomerate/quartzite.
490	528'	11.58	10.80	93	1717	f	4	480	18	300	10	260	1	1.4						Conglomerate/quartzite.
528	561'	10.06	10.00	99	1718	f	8	600	18	280	8	270	1	<0.05						Conglomerate/quartzite.
561	581'	6.10	6.80	100	1719	f	8	120	260	48	26	165	1	<0.05						Quartz porphyritic lavas/tuffs.
581	614'	10.06	9.47	94	1720	f	14	50	1600	32	110	230	1	<0.05						Quartz porphyritic lavas/tuffs.
614	644'	9.14	9.22	100	1721	f	60	75	3100	34	60	200	1	<0.05						Quartz porphyritic lavas/tuffs.
644	674'	9.15	9.15	100	1722	f	18	40	4000	30	20	150	2	0.15						Quartz porphyritic lavas/tuffs.
674	704'	9.14	8.17	89	1723	f	16	55	4200	50	430	330	8	<0.05						Quartz porphyritic lavas/tuffs.
704	733'	8.84	8.62	98	1724	f	<4	20	3800	22	130	195	1	<0.05						Quartz porphyritic lavas/tuffs.
733	763'	9.14	9.31	100	1725	f	10	40	2800	24	280	570	14	<0.05						Quartz porphyritic lavas/tuffs.
763	800'	11.28	11.63	100	1726	f	10	45	1700	44	115	105	4	<0.05						Quartz porphyritic lavas/tuffs.
	Check Assays																			
490	496				1853									<0.05						COMLABS AAS SA special - Au
	502				1854									<0.05						
	508				1855									<0.05						
	516				1856									<0.05						
	523				1857									<0.05						
	528				1858									<0.05						
205	220				1860			20					1							COMLABS XRF1 - W AAS3 - Ag
299	316				1861			10					1							
	325				1862			<10					1							

80623

APPENDIX 7

REGIONAL AEROMAGNETIC/RADIOMETRIC SURVEY

G.O. DICKSON & ASSOCIATES

806237

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18 ELMIE STREET,
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Telephone: 818 1782

December 3, 1980.

TASMANIAN AEROMAGNETICS - RADIOMAGNETIC SURVEYS

PROGRESS REPORT

1.0 Comments on Programme to date.

1.1 We have, at this date, a copy of all twenty-six sheets of the aeromagnetic data contoured at a scale of 1:20,000. However, of these only nine are of an acceptable quality, and of these, two need to be re-contoured in final form. The major error in the data is one of navigation or transposition of photographic "picks" to base plan. The result is, the contour plans are "torn" in many places. A less important, but uncorrectible source of error lies in variation of altitude over magnetic basalt. This results in a "noisy" map.

At this stage, following talks with Rod Gardener of Geometrics, we believe the problems are in hand and we should receive a good deal of the data in final form before Christmas.

The outstanding sheets are:

Sheet	Priority for Completion
4340	7
4242	-
4241	5
4240	4
4239	6
4143	-
4142	2

../2

December 3, 1980

Sheet	Priority for Completion
4141	2
4140	-
4139	-
4044	9
4042	1
4041	3
3943	8
3940	-
3840	-
4339	-

1.2 Splicing in of earlier data, and the production of a smaller scale map cannot proceed until the final maps are available. At this stage, I believe mid-January is the earliest date for this.

1.3 The regional work cannot proceed until 1.2 is completed.

1.4 We have examined the airborne data relating to the twenty anomalies selected by the Devonport staff. A discussion of the results of our examination follows in another section

2.0 Ground Follow-up.

Ground follow up should consist of:

a) A surface examination, and it is vital that susceptibility measurements be taken whenever possible. Our rating of the anomalies is heavily dependent on knowing the susceptibility of the surface rocks.

../3

b) Magnetometer survey to:

i) verify ground location;
ii) further evaluate the target.*

c) Ground EM examination of target. To this end, we have contacted Wolf Tschaikowsky of Geoterrex to arrange field tests using the lightweight Max-min EM System. Tests can be planned for mid-December and suitable test sites over known mineralisation should be considered. Cost for the Max-min System will be about $200/day for one man and equipment. A two-man crew is normally required, three may be required in rough terrain. The system should be capable of seeing reasonably good conductors to a depth of 70-80 metres; perhaps more in reasonable terrain. Careful line preparation is required, as this is a frequency system, and the pegs need to be chained.

3.0 Method of Rating the Aeromagnetic Anomalies.

We have given anomalies a higher rating where the interpreted parameters begin to approach those observed over Moina and Mt. Bischoff. In evaluating the effect of the basaltic topography, we have used a value of 1500 x 10**-6 cgs. units. If this is in error at any particular location, our rating will be seriously effected. In particular, anomaly site 4, Cuprona, is probably related to topography,

* Generally, the width of a magnetic body cannot be resolved when it is buried to a depth greater than its width. We tend, therefore, to overstate the widths of airborne anomalies. Thin targets, whether they be horizontal or vertical, are more likely to represent mineralisation than wide targets.

but this cannot be a basaltic source. Susceptibility measurements are highly desirable here.

At Moina an anomaly of 1300 gammas is observed, accompanied by a small but noticeable K channel high. Instead of interpreting for the susceptibility, K, we use a parameter K', which is proportional to susceptibility, and we note a value of 900. At Mt. Bischoff, the amplitude is 700 gammas and K' is approximately 600. We therefore consider any anomaly, which is not obviously formational, with a K' value of, say, 400-500, to be significant, and more particularly so if the potassium channel is elevated.

Our two-dimensional models of reasonable basaltic topography (again we stress using 1500 cgs. units) cannot yield a K' value of 500. 50-100 would be a more likely value.

A copy of the results over Moina and Mt. Bischoff, along with some of the models are included.

December 3, 1980.

NOTES ON SELECTED ANOMALIES.

Anomaly Number	Name	Comments
1	Upper Stowport	East side of Emu River. K' is not high @ 200. Anomaly looks formational and the trend cuts the Emu River. Source is close to surface - may represent a buried channel. No immediate K channel response.
2	Natone	If associated with a [illegible] then not a strongly magnetic one. K' 400-500. No topo effects. Faulted to the south and probably to the north. Slight increase in K channel probably sediments.
3	Camena	Source is strongly magnetic with K'- 600-900. Depth of burial 600-800 m. Suggests an ultramafic source. Uncertain exploration potential.
4	Cuprona	Although an obvious topographic association, it cannot be basalt with susceptibility of 1500 cgs. The anomaly requires about 15,000 to be topographic. It does fit ultramafic range. Solutions suggest near-surface source. K channel slightly elevated - perhaps due to sediments. Could source be the same as Camena.

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December 3, 1980.

Anomaly Number	Name	Comments
5	Highclere	Not positioned.
6	Buckby	Not positioned. Ground data available and report noted.
7.	Redwater*	In valley and no obvious topographic relationship. K'-850 and therefore high. Magnetite skarn. At a granite contact. Suggest near surface.
8.	Peak Hill*	Source buried about 60 m. Looks like wide source - needs ground mag check. K' is moderate @ 400. Cannot be basalt hill @ 1500 cgs. Needs susceptibility check. Cambrian volcanics to the south. Perhaps source is in volcanics.
9	Laurel Creek*	Fairly high amplitude for depth. 3D body and depths incorrect. Suggest K' is high. Anomaly in a valley on NE fault zone. K channel locally low but anomaly occurs in granitic environment.
10	Laurel Creek*	Anomaly source close to surface on local hill. K' is high 700-800. On granite contact and NE fault zone. Looks good.

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December 3, 1980.

Anomaly Number	Name	Comments
11	Laurel Creek	Looks to be formational. K' is low. Occurs in granite, some structure apparent. Could be topographic over slightly magnetic granite. —
12	Alps Road	Low amplitude @ 80 gammas over topographic feature in basalt. 140 m. clearance over 300 m. wide hill. No follow up.
13	Taylor Flat	Looks like topographic effect over basaltic cover. K', 60-70. Source at surface. Geology certainly basalt.
14	Wilmot River	Located on Flt. 60. Helicopter low @ 80 m. Shape fits the hill, but amplitude too high for 1500 cgs. material. K' = 300; looks a little low. Need susceptibility information. Needs another model. Slight deviation in K channel.
15	Nietta River	Helicopter low @ 75-80 m. clearance. Anomaly not placed correctly for hill effect and amplitude @ 750 too high for K - 1500 cgs. K'=400-500 is moderate. Need susceptibility information. No K channel elevation in area.

December 3, 1980.

Anomaly Number	Name	Comments
16	Lorinna ~~East~~ West 4240/10	Anomaly looks formational - suspect Acid volcanics - note loss of altimeter trace - moderate K channel increase. K' is low.
	Lorinna ~~South~~ East* 4239/3	Bullseye anomaly. Adjacent to granite with very slight K channel high K' fairly high and source could be narrow. Cannot be formational.
	Lorinna North 4240/6	Suspect a formational anomaly; probably ultramafics, but at the contact with a granite. No obvious topographic correlation.
17	Liena 4339/1	Although there is obvious topographic relief, this mag response does not appear to be directly related to it. Granites or sediments occur immediately to the south - I suspect Cambrian or Ordivician sediments. K' is high @ 900 - low susceptibility basalts will not satisfy the response.
18	Liena South 4339/2	Left for the time being - depending results with Liena.

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December 3, 1980.

Anomaly Number	Name	Comments
19	Mt. Pearce East	Low amplitude anomaly - suspect buried, basalt-filled valley. Needs additional modelling.
20	Mt. Pearce West	One line anomaly. Not sure that the anomaly is real. If so, then of low amplitude.

G.O. DICKSON

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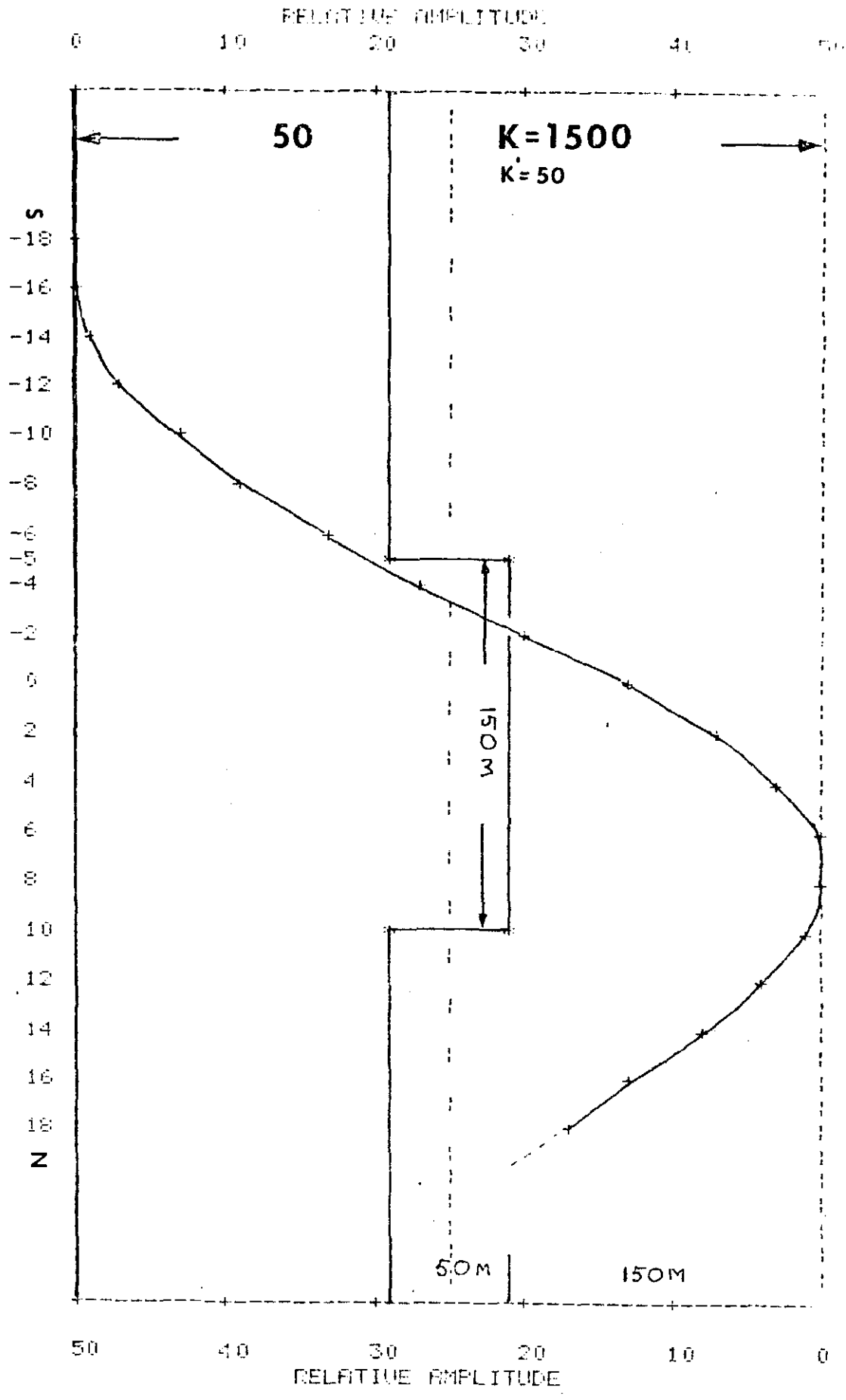
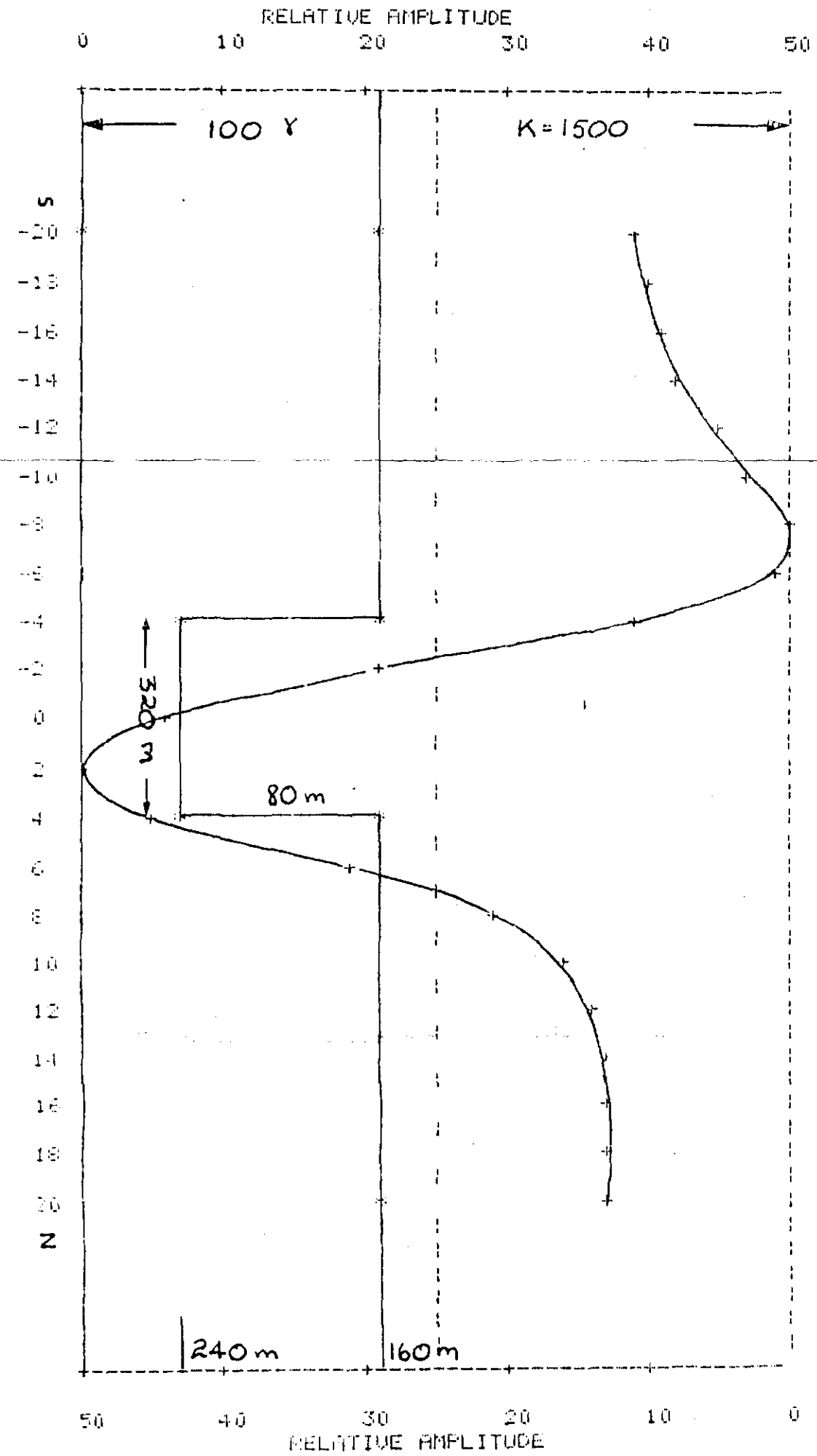


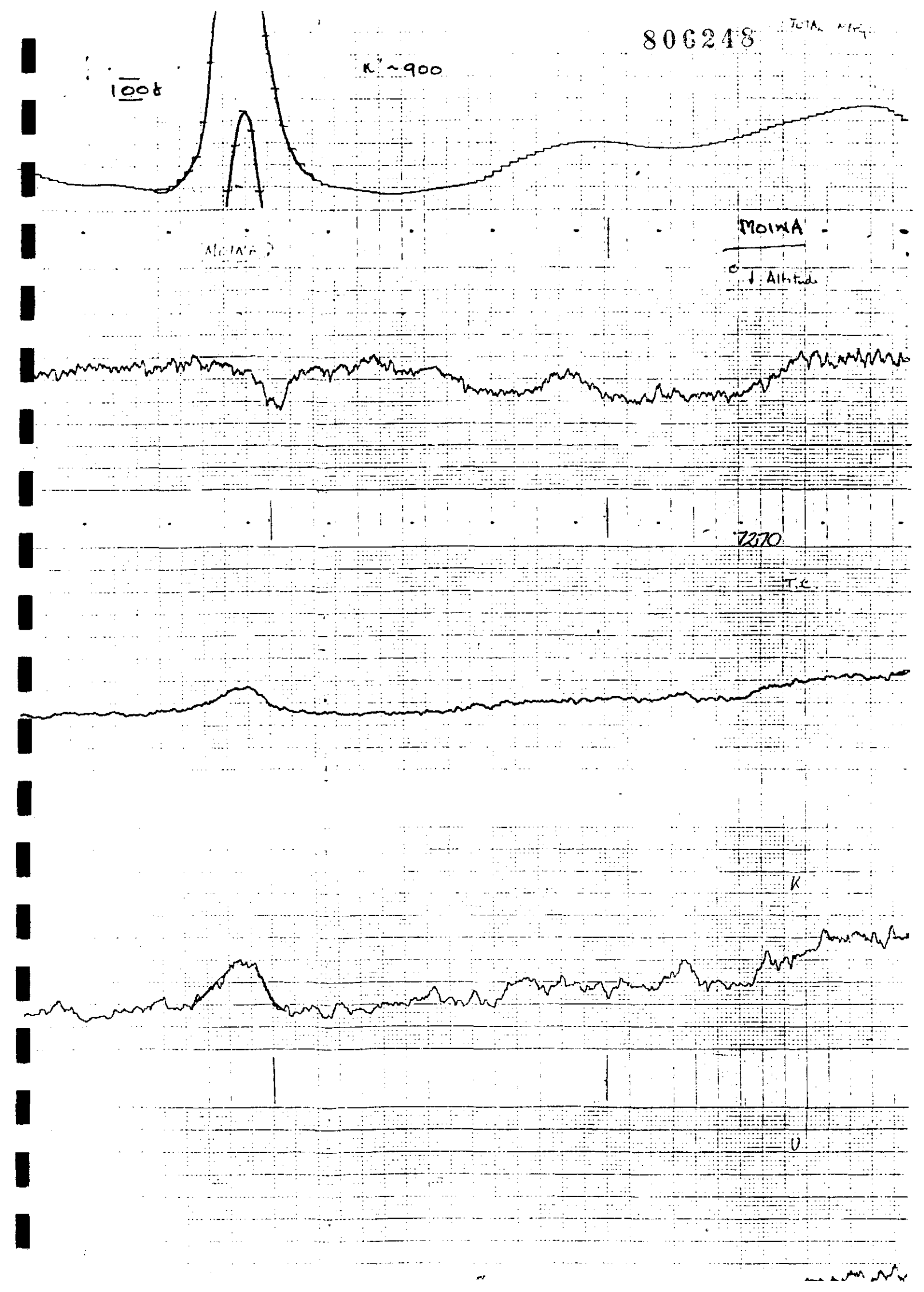
MODEL SCALE + = 669.058 GAMMAS/UNIT
FIELD SCALE F = 0 GAMMAS/UNIT
DEPTH SCALE * = .7 METRES/UNIT
SUSCEPTIBILITY = 1 CGS UNITS

80C247



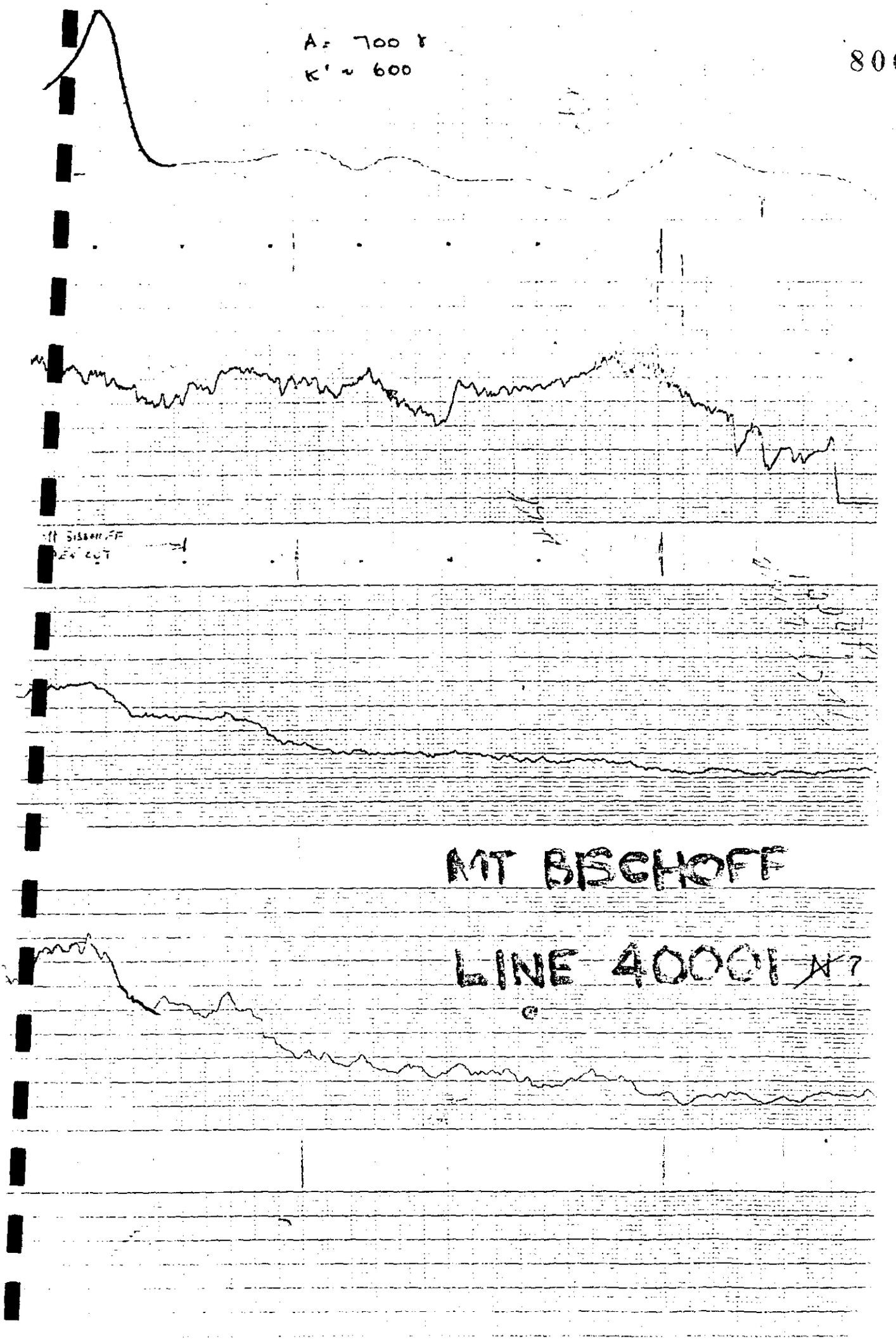
MODEL SCALE + = 1332.95 GAMMAS/UNIT
FIELD SCALE F = 0 GAMMAS/UNIT
DEPTH SCALE = = .14 METRES/UNIT
SUSCEPTIBILITY = 1 CGS UNITS

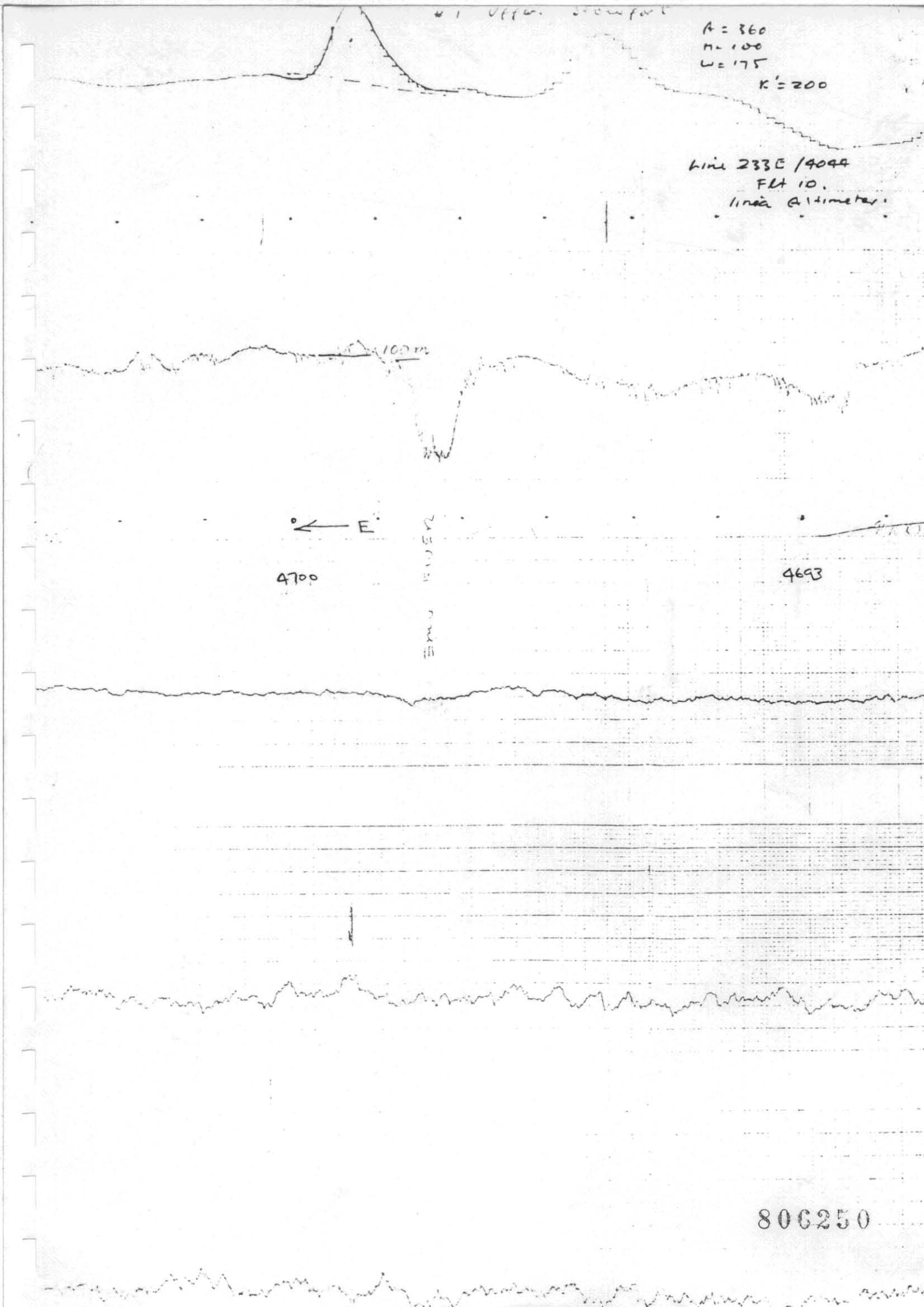
806248



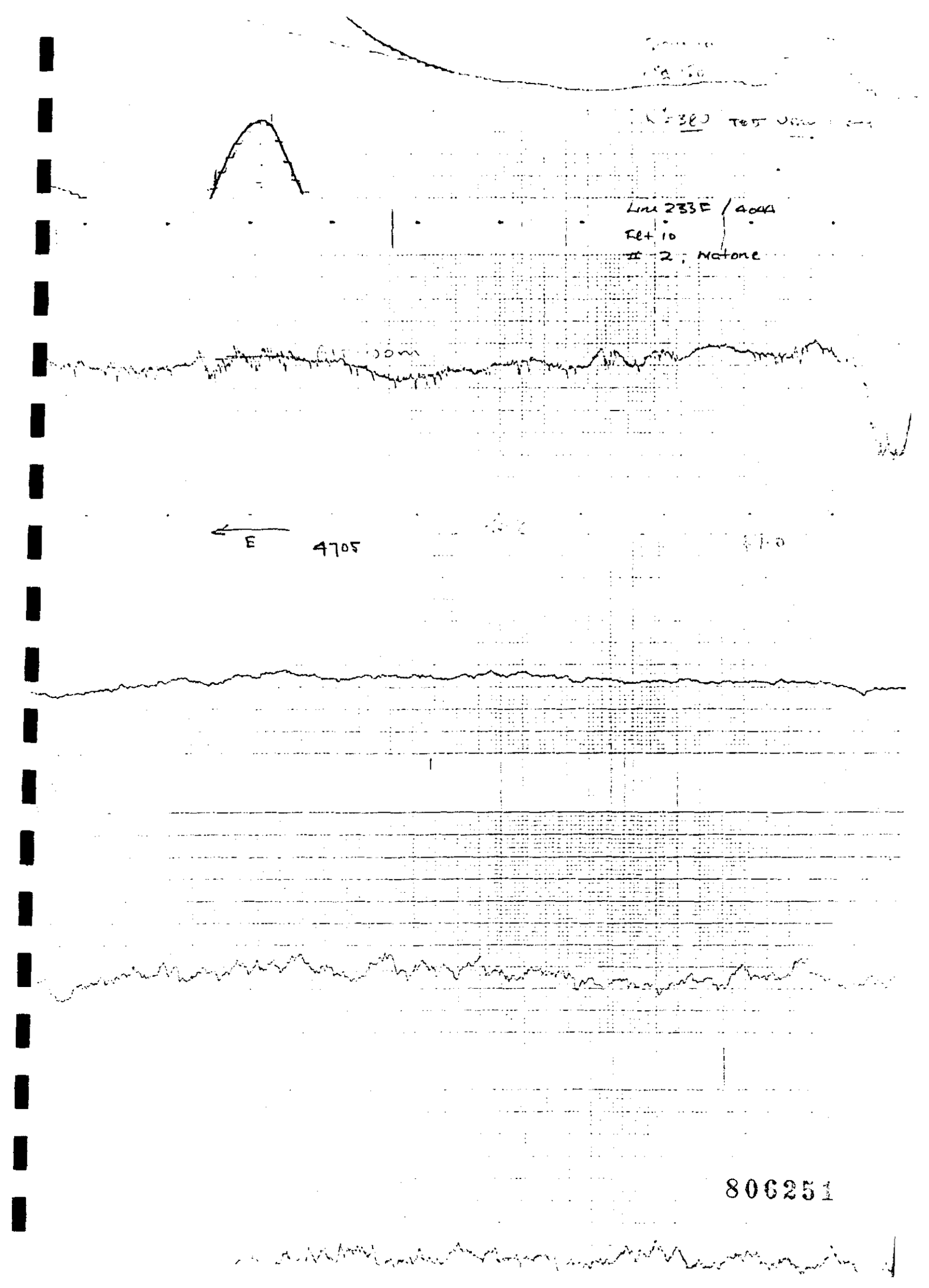
A: 700 ft
K' ~ 600

806249

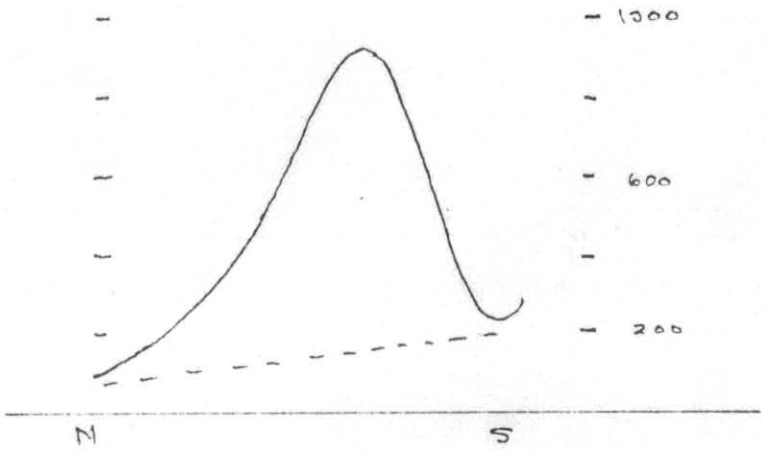



A = 360
M = 100
W = 175
K' = 200
Line 233E /4044
Flt 10.
Linear Altimeter
100 m
E
4700
4693

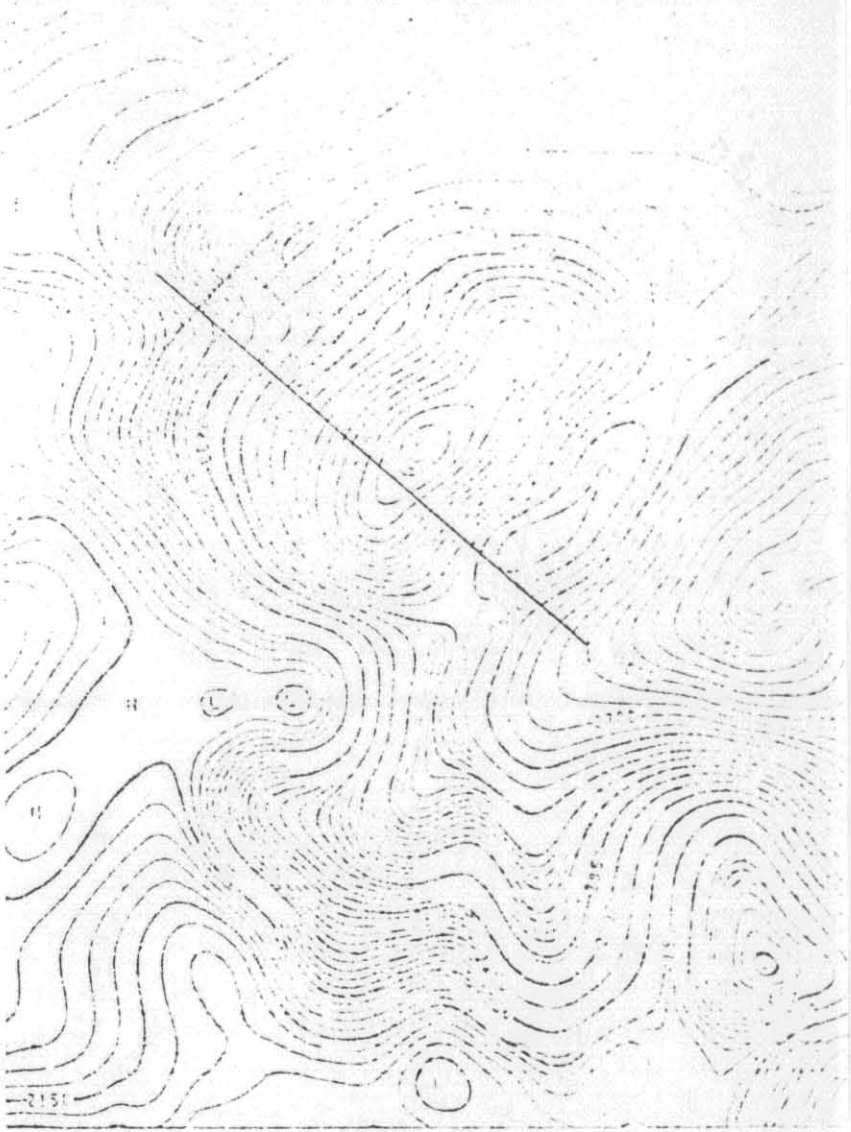
806250



806251

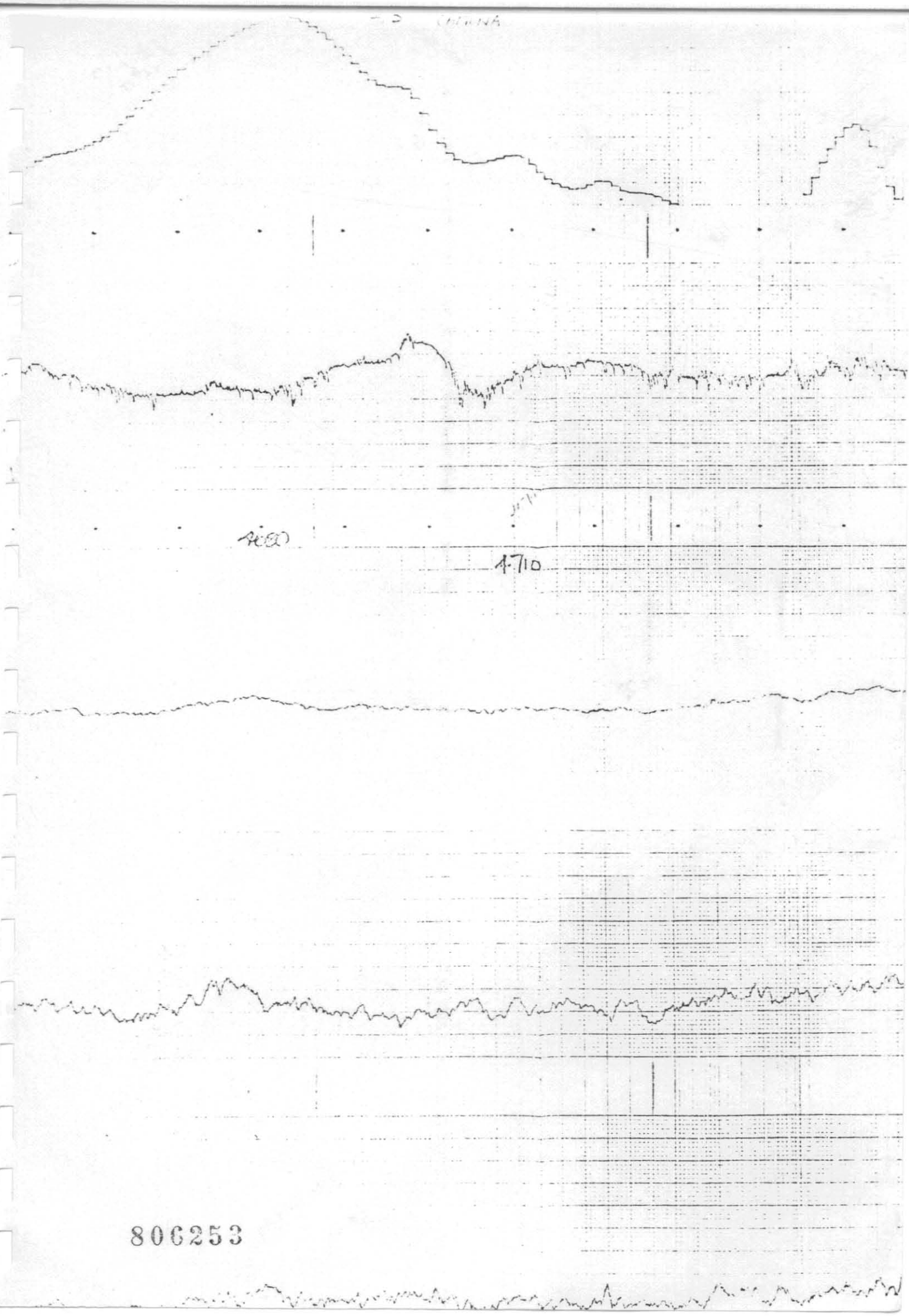


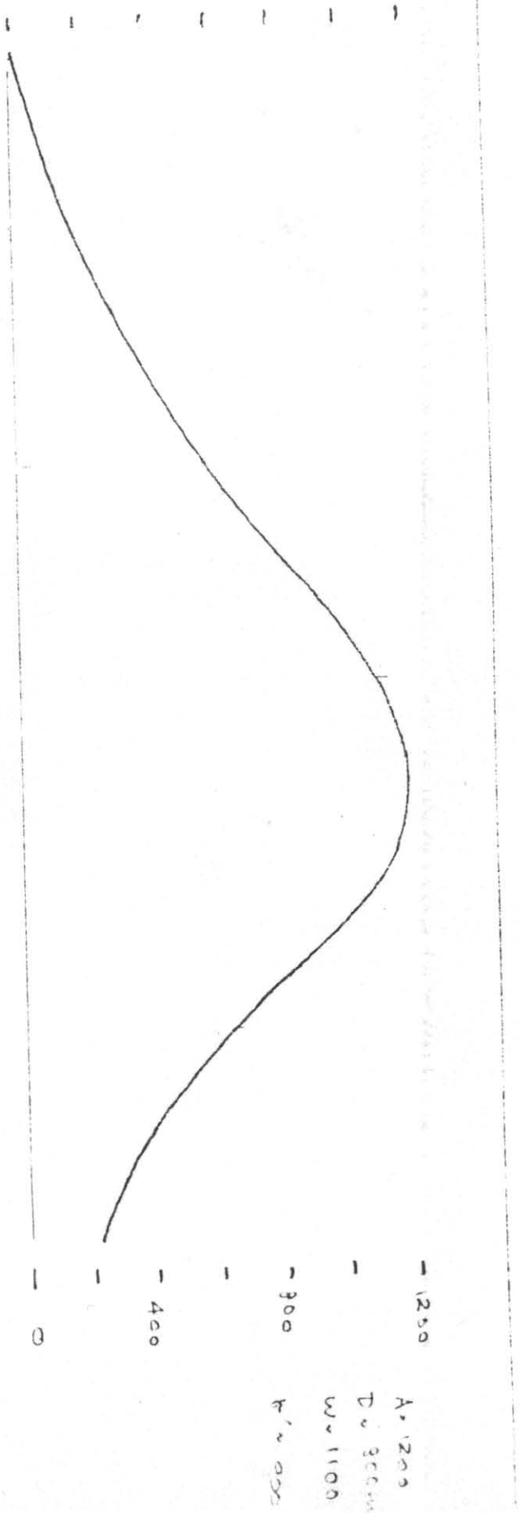
A ~ 800
D ~ 180m
W ~ 260
K' ~ 550

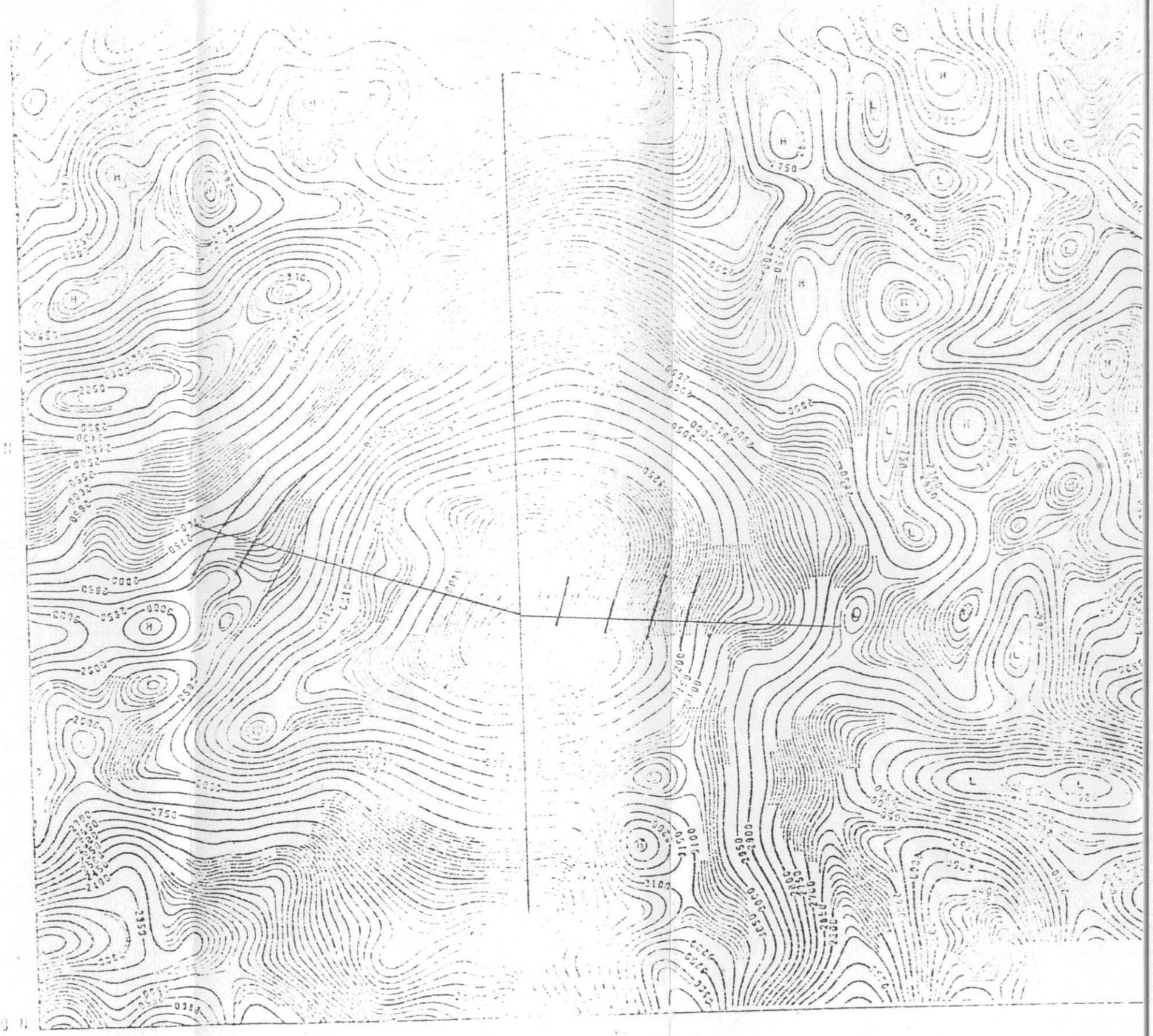


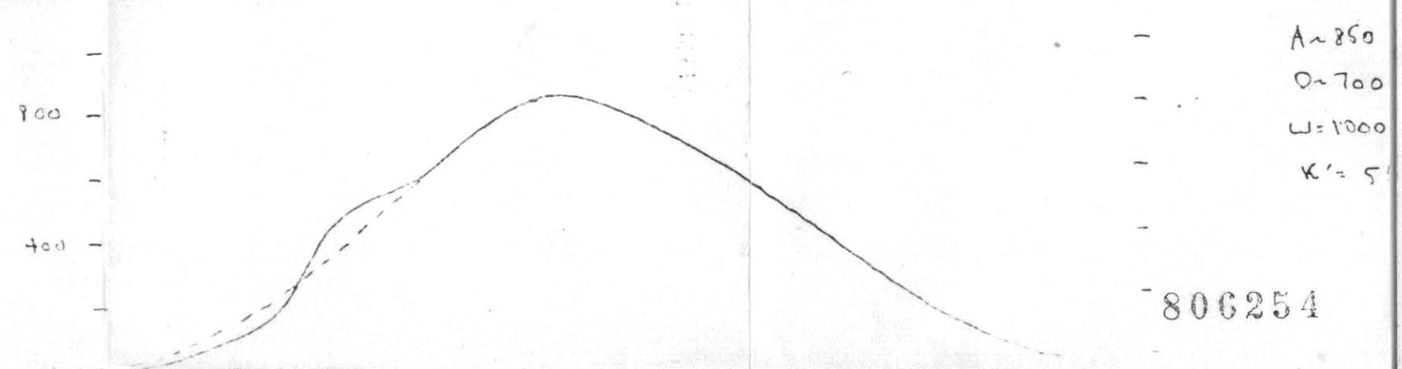
#2, MATONE

8055252

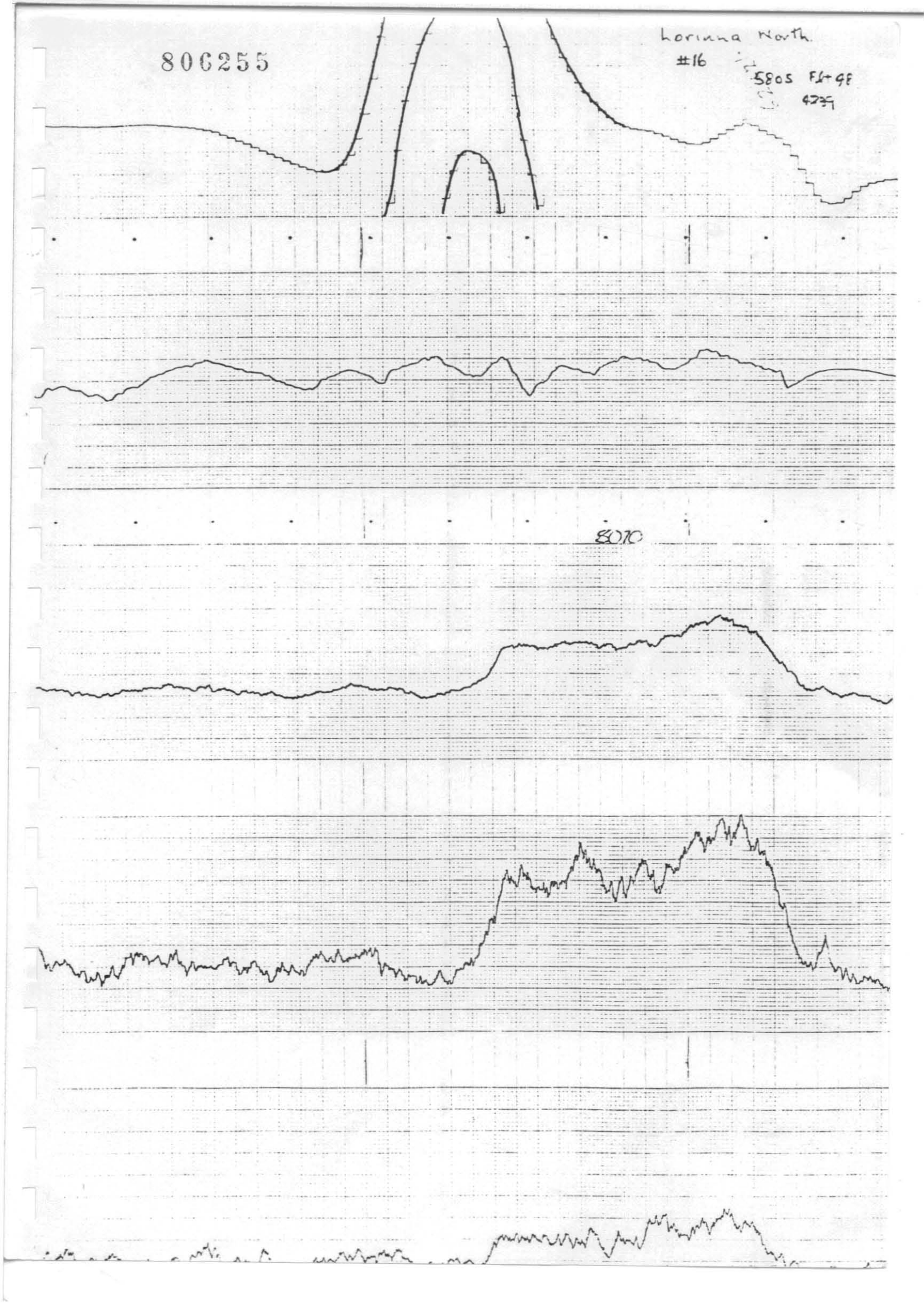

4710
806253


0
400
800
1200
A = 1200
D = 800
W = 1100
K' = 900

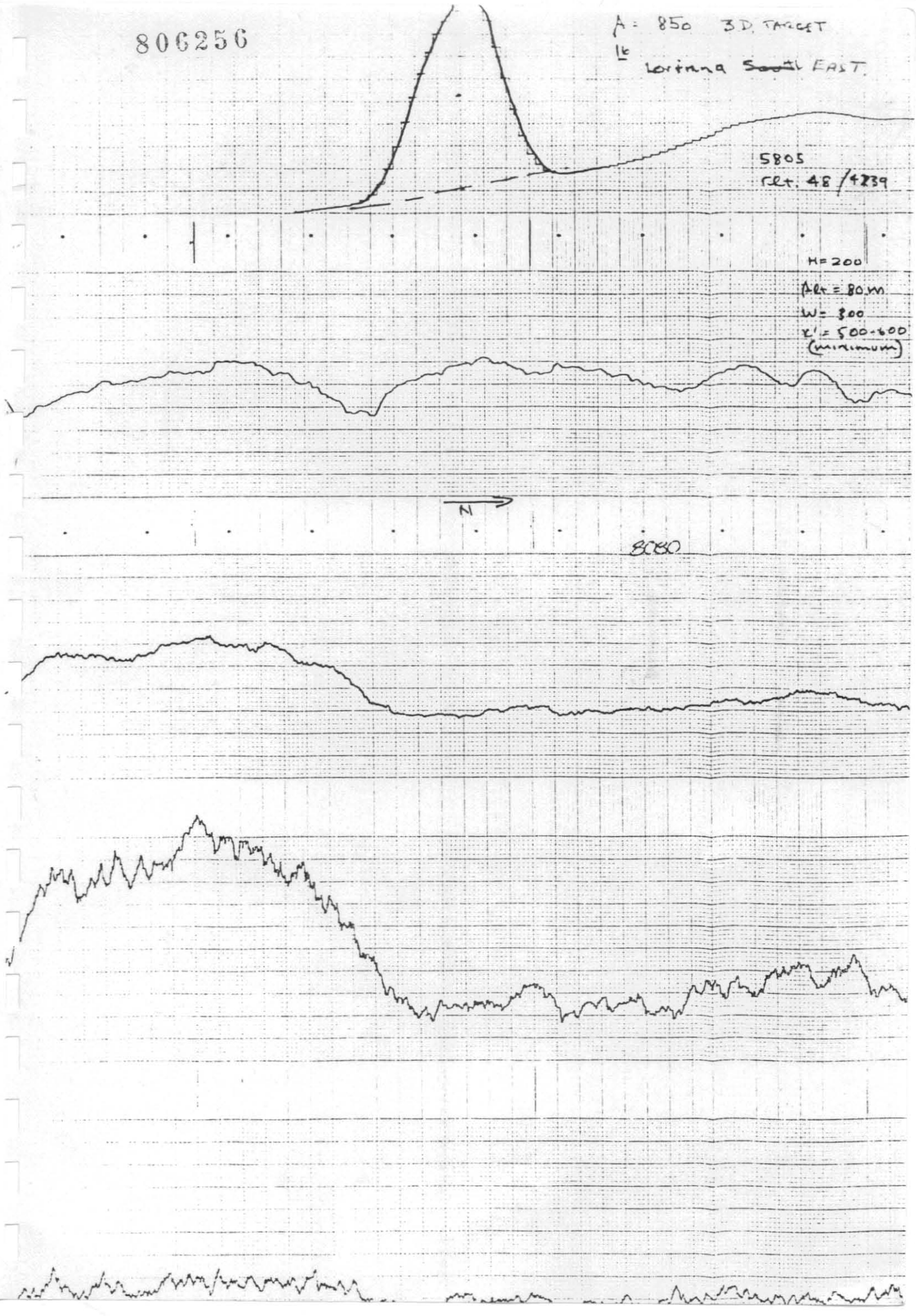



800
400
A ~ 850
D ~ 700
W = 1000
K' = 5

806254


806255
Lorinna North
#16
5805 Flt 98
4735
8010

806256


A = 850 3D TARGET
Lorinna ~~South~~ EAST
5805
rlt. 48/4239
H=200
Alt = 80 m
W = 300
x' = 500-600
(minimum)
N
8080

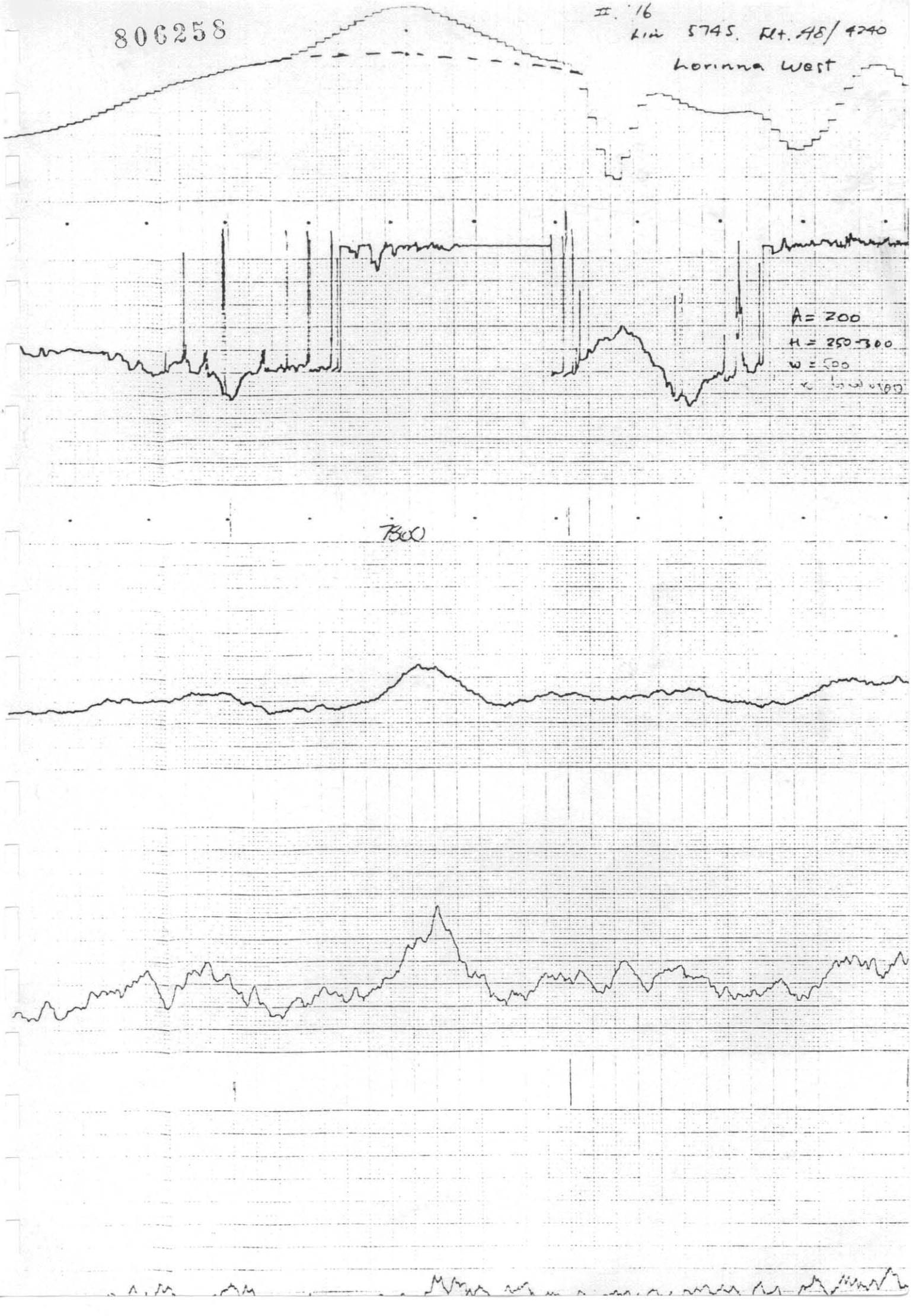
Lorinna North

Lorinna West

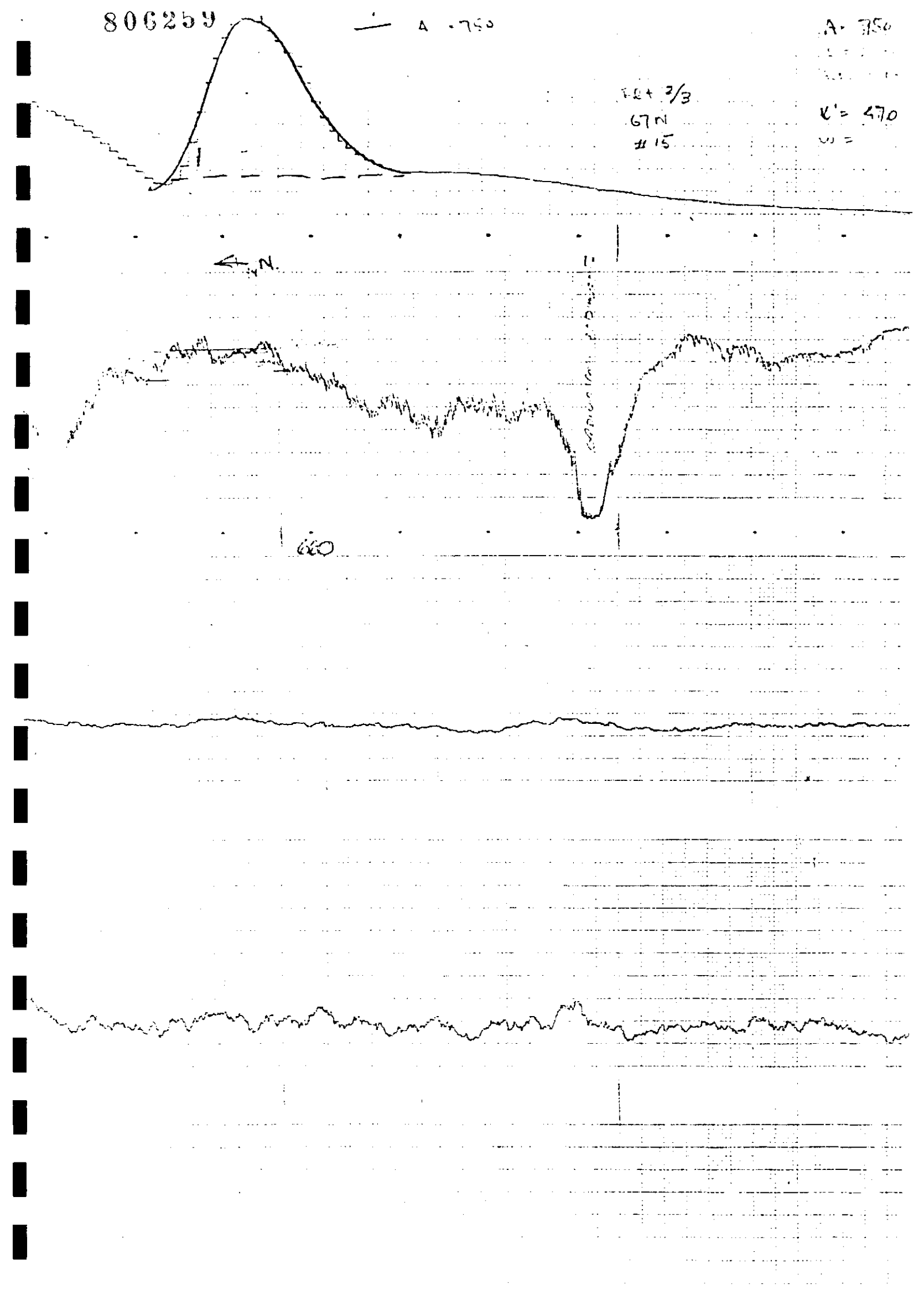
Lorinna South

80625

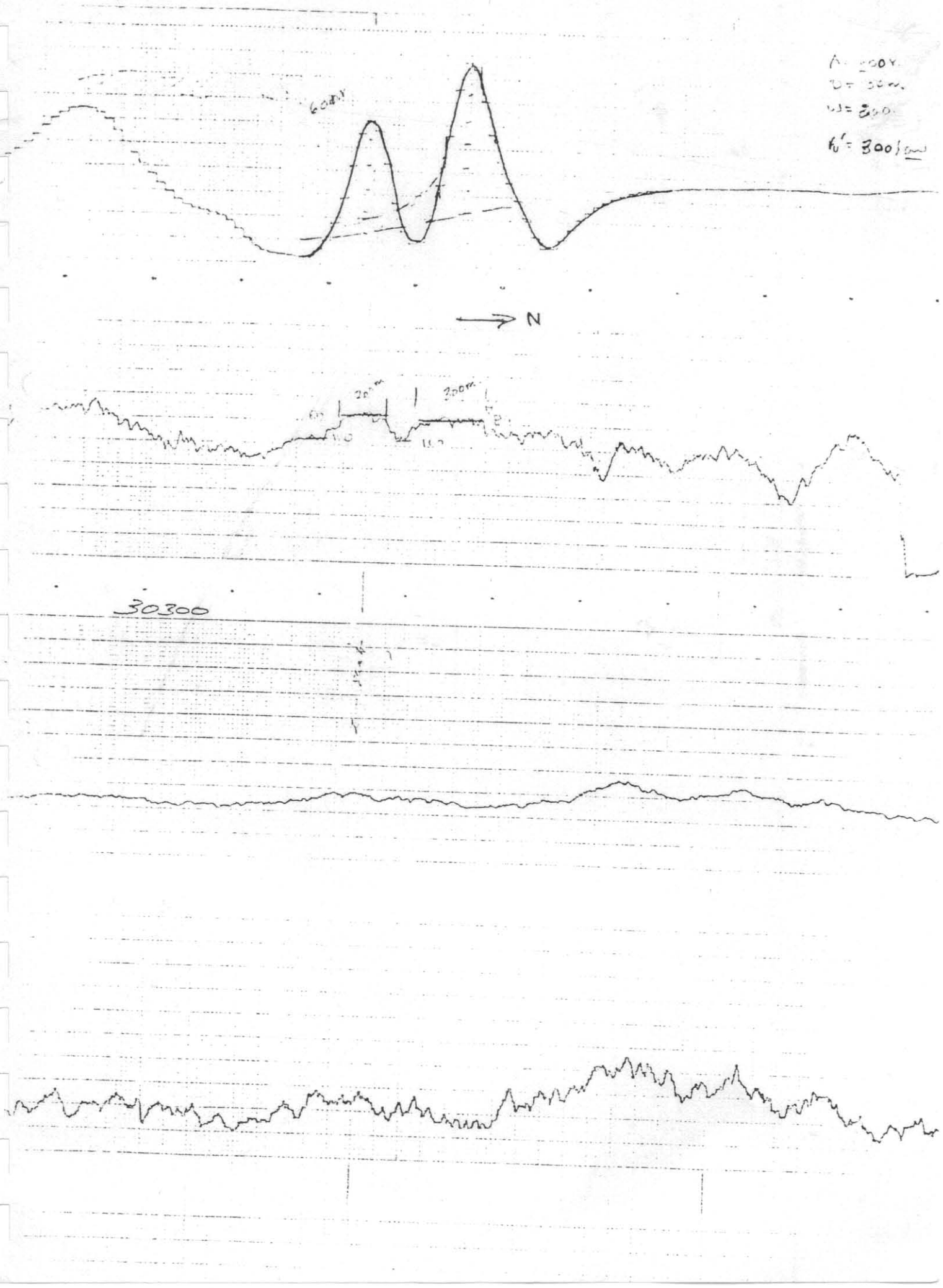
806258


II. '16
Lin 5745. Flt. 48/4240
Lorinna West
A= 200
H = 250-300
W = 500
7800

806259

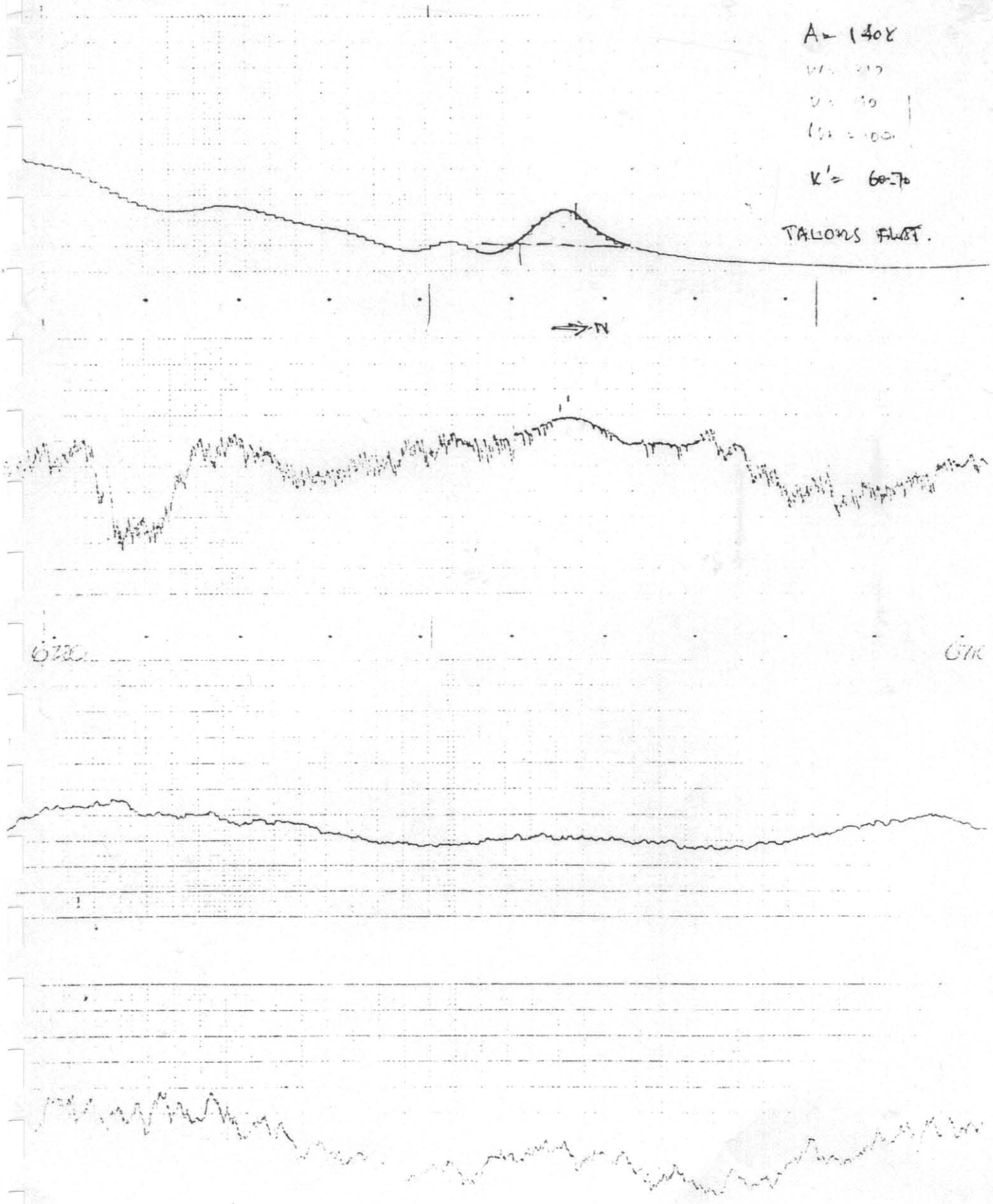


806260



806261

Plt 15
375 # 13

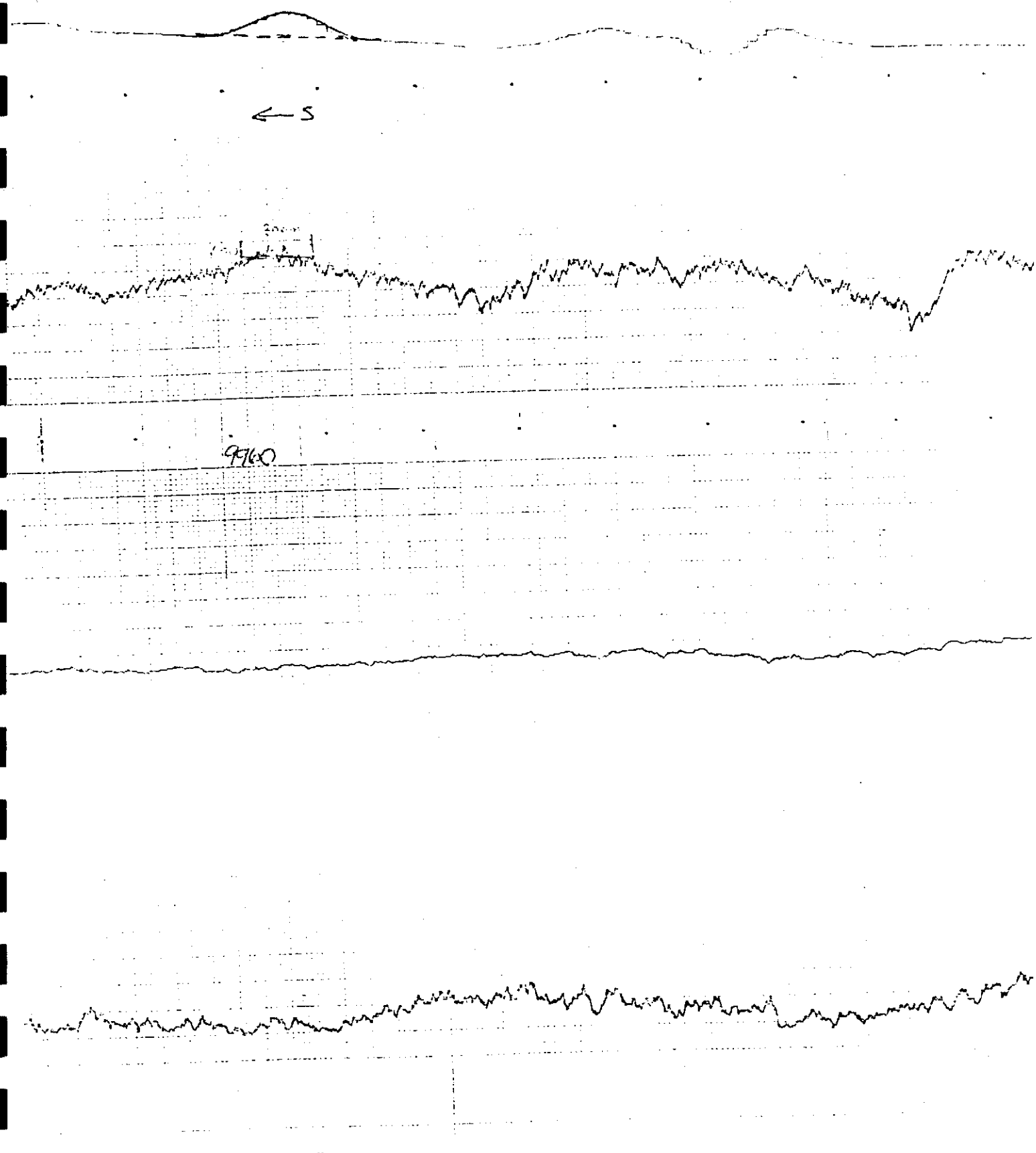


806262

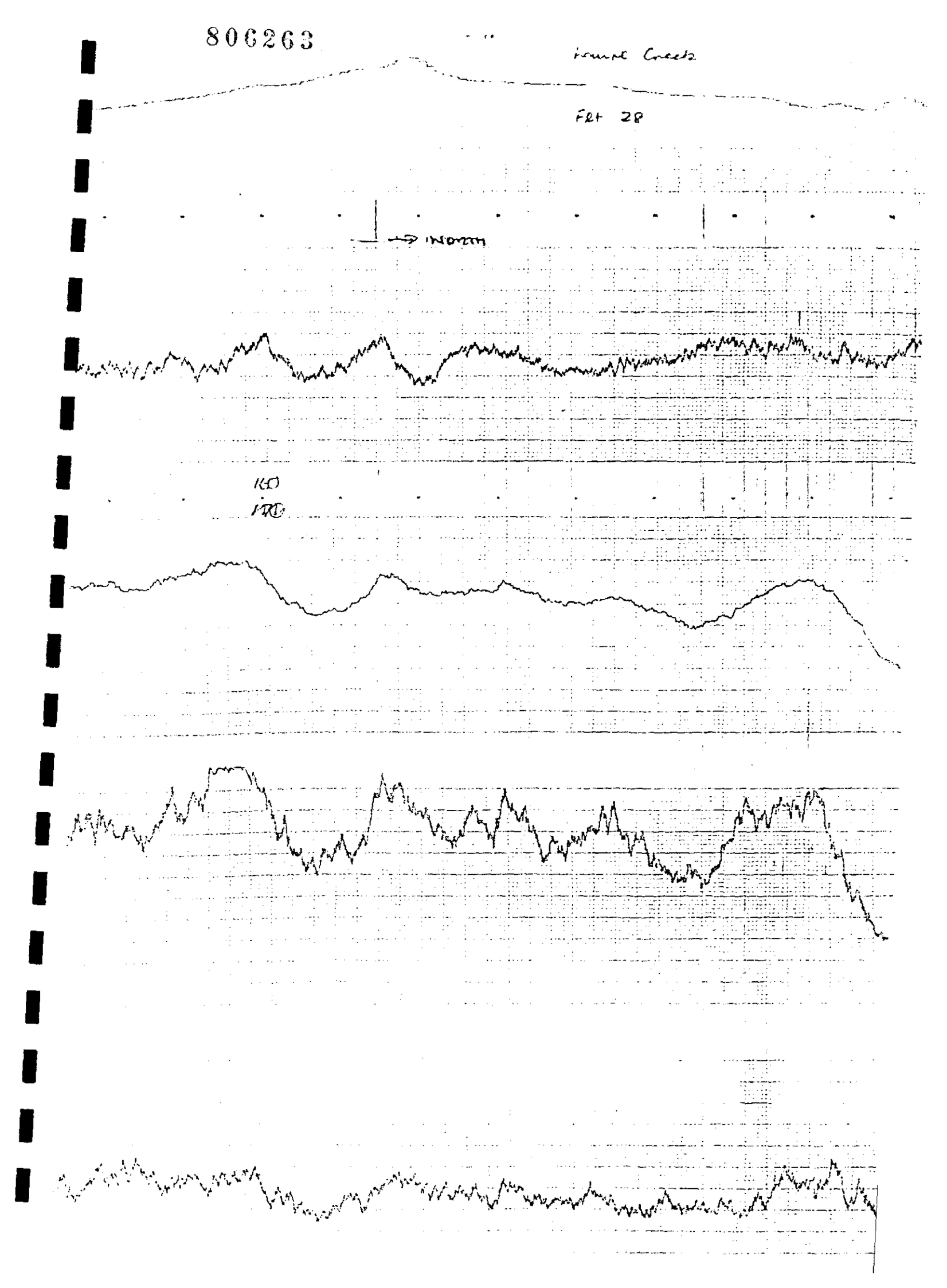
Flt. 27-28

Line 115 4141

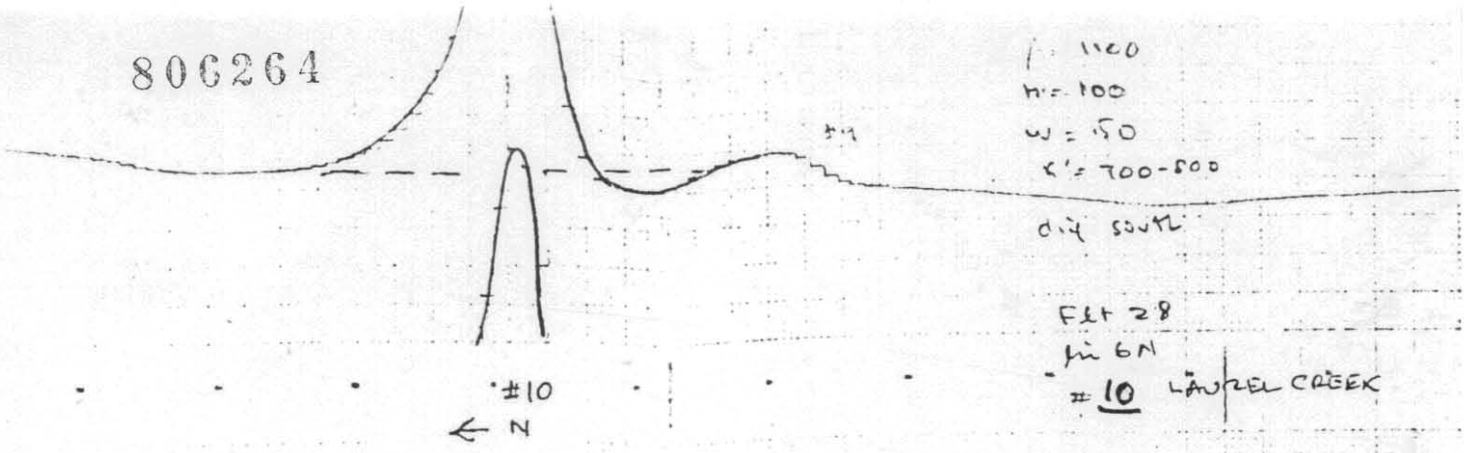
ALPS ROAD



806263



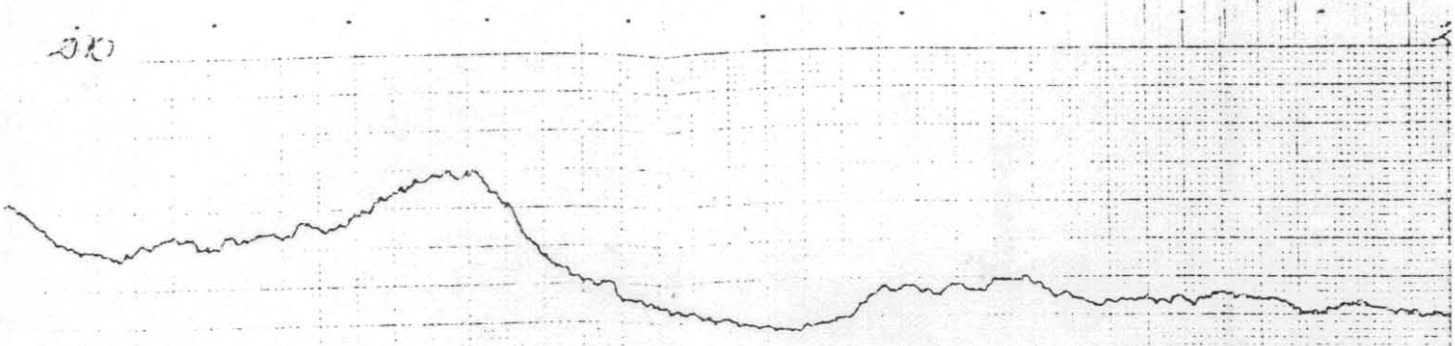
806264

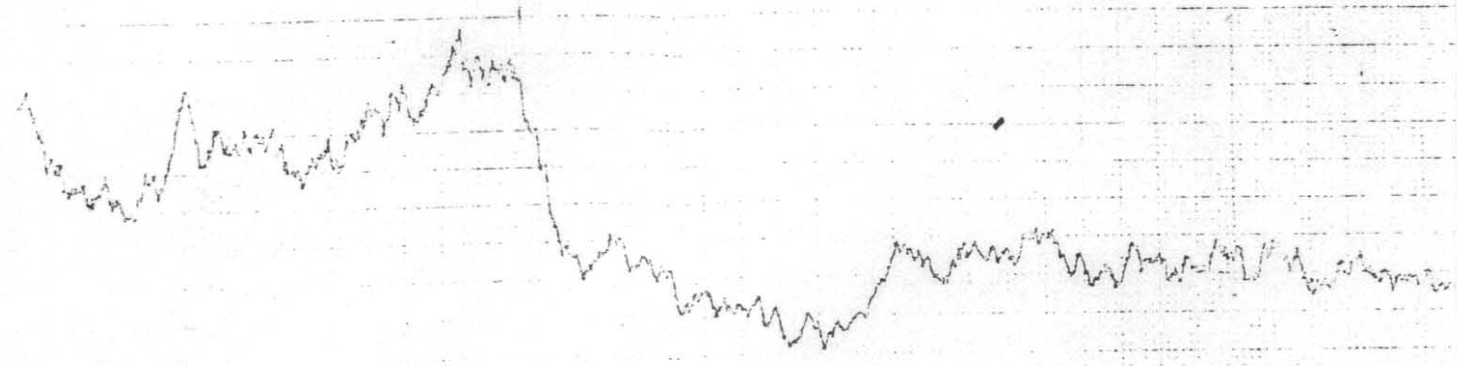


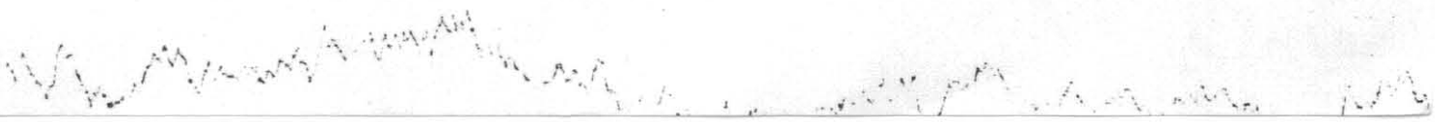
f = 1100
h = 100
w = 50
x' = 700-800
dip south
Flt 28
fin 6N
#10 LAUREL CREEK
#10
← N

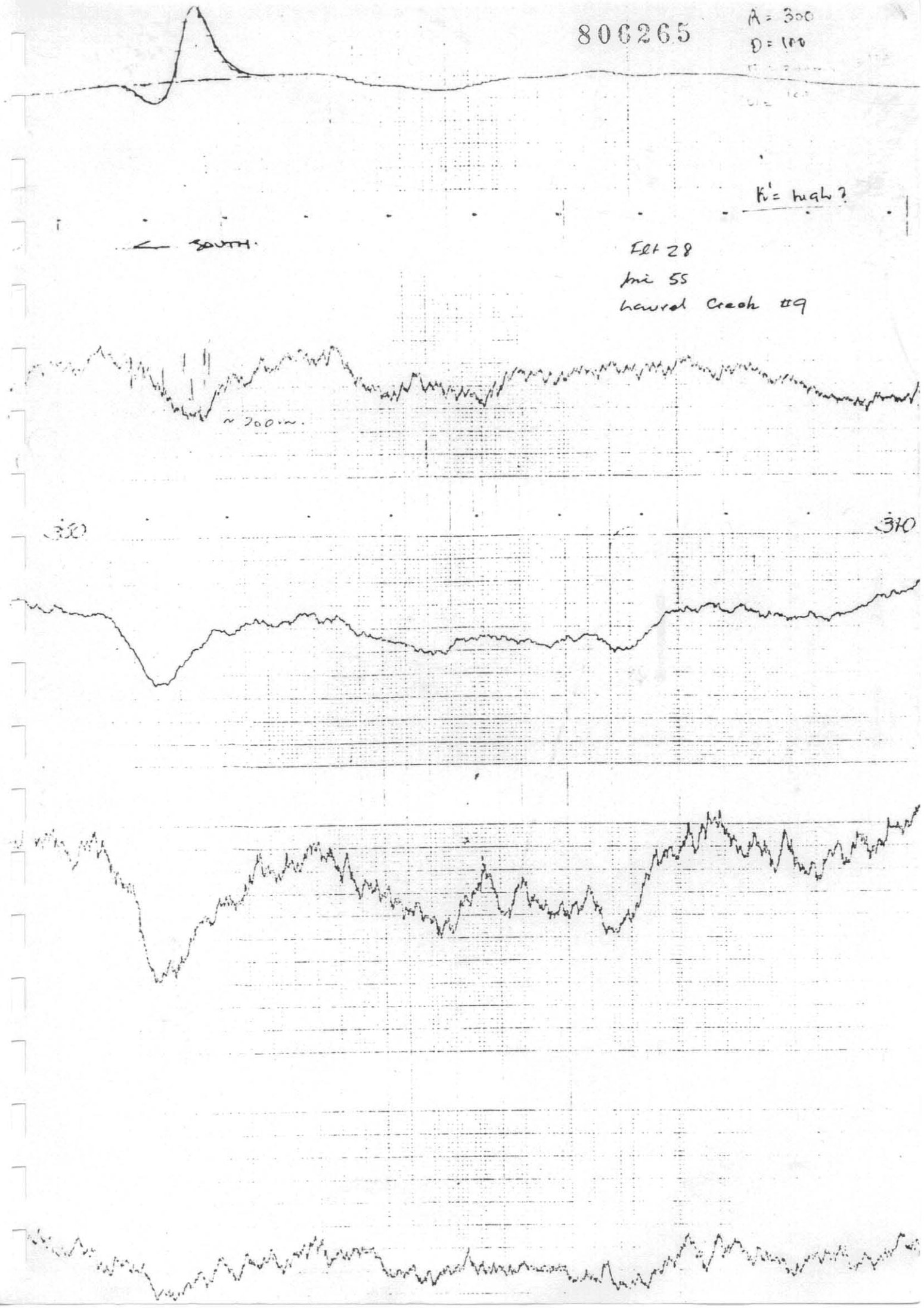


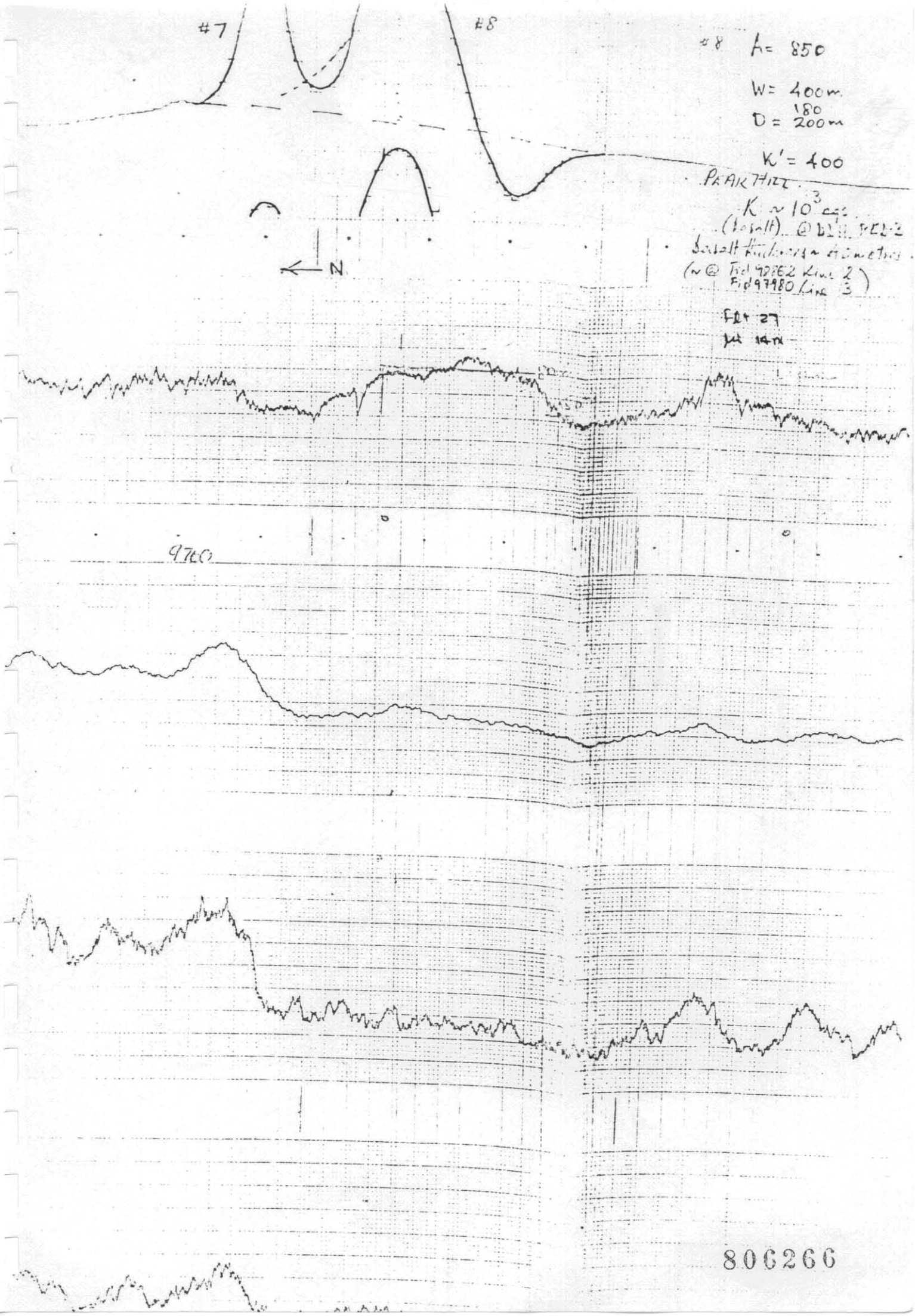
150m





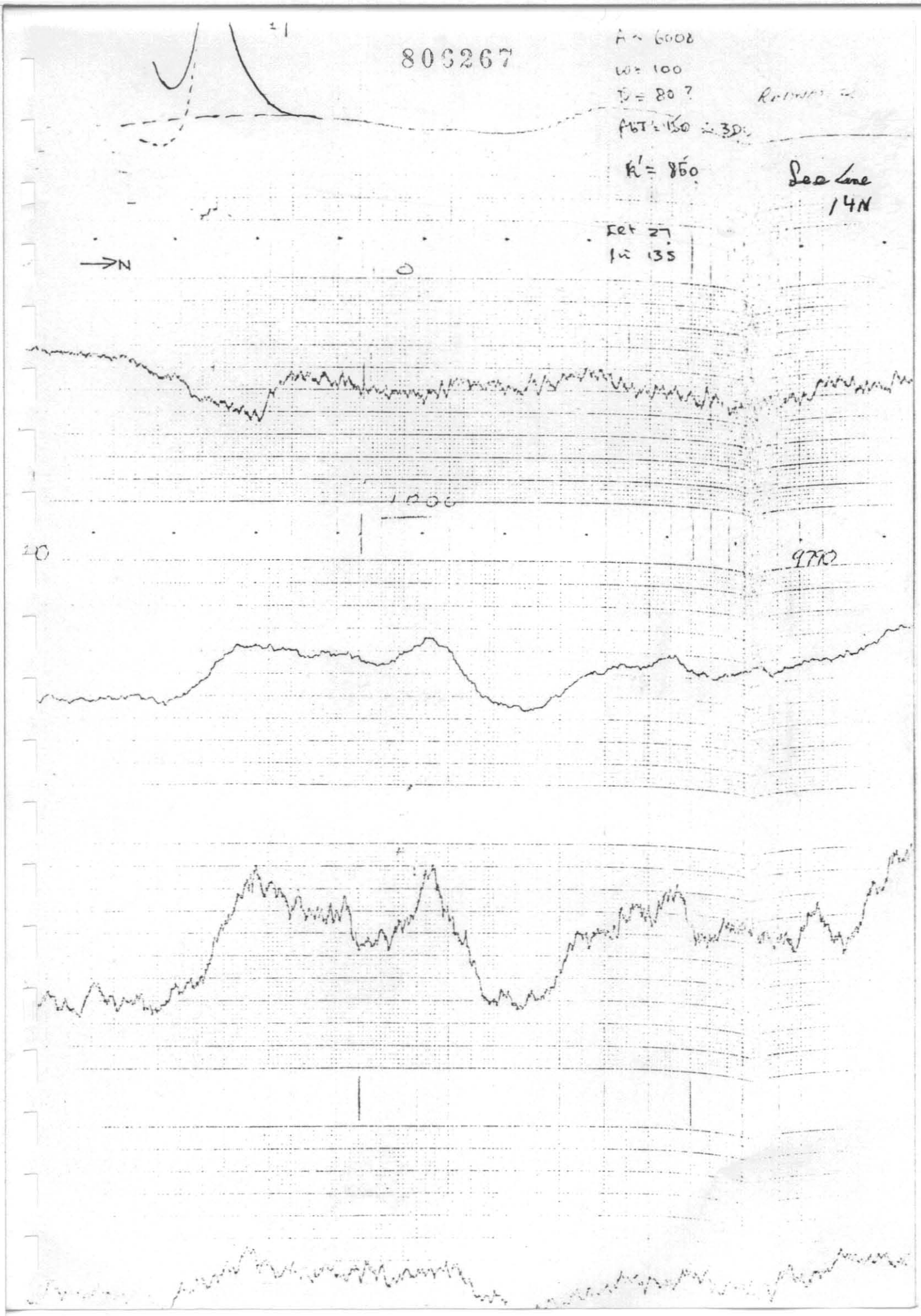



806265
A = 300
D = 100
K' = high?
SOUTH
Elt 28
Inc 55
Laural Creek #9
~ 200 m.
300
310


#7
#8
#8 h= 850
W= 400m
180
D= 200m
K'= 400
PEAK HILL
K ~ 10^3 cgs
(basalt) @ DDH PED-2
basalt thickness ~ 40 metres
(~@ Fid 98862 Line 2
Fid 97980 Line 3)
Flt 27
N
9760

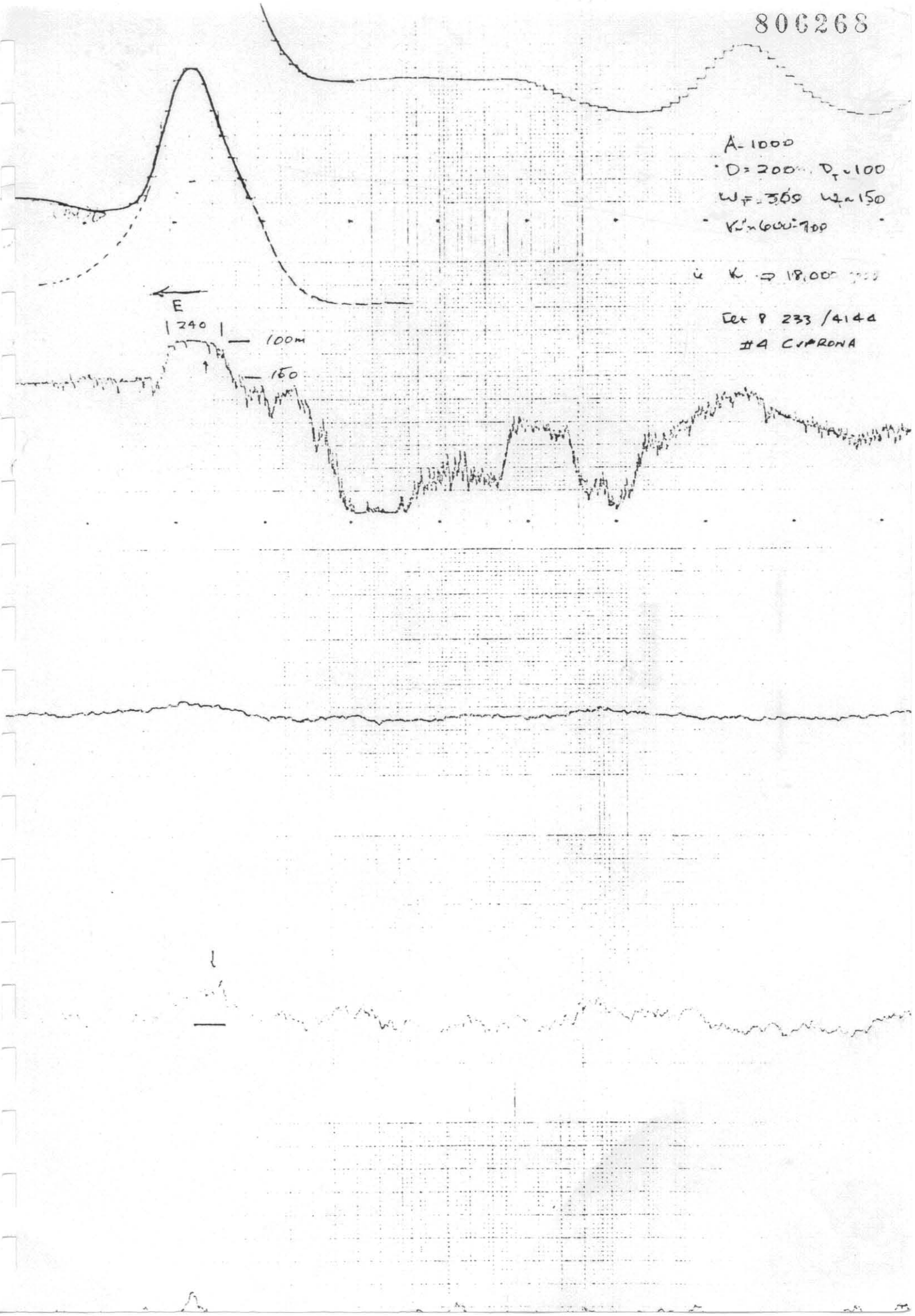
806266

806267

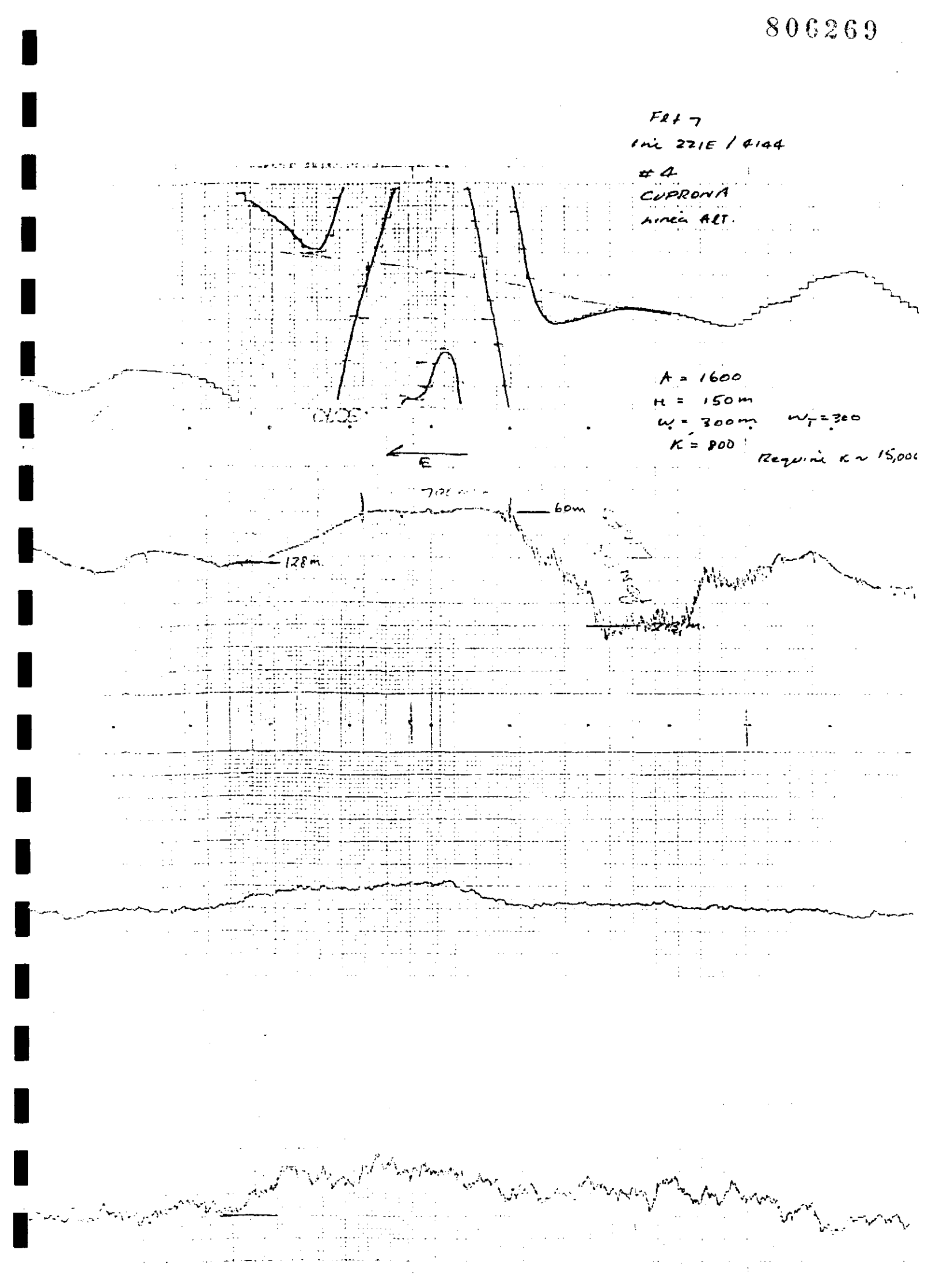


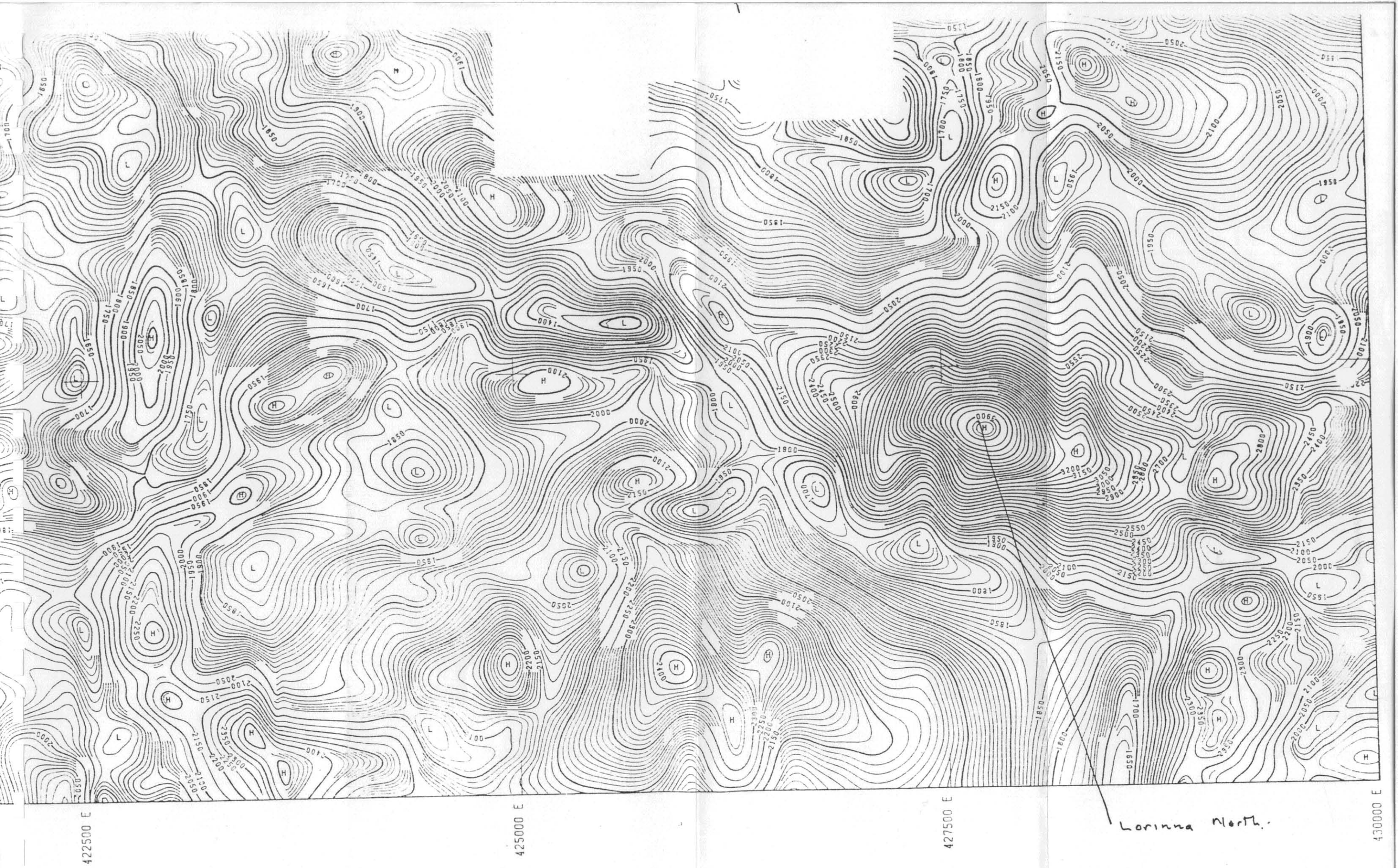
A ~ 6008
W = 100
D = 80 ?
ABT = 150 ± 300
K' = 850
See Line 14N
Let 27
In 135
→N
0
1000
9790

806268

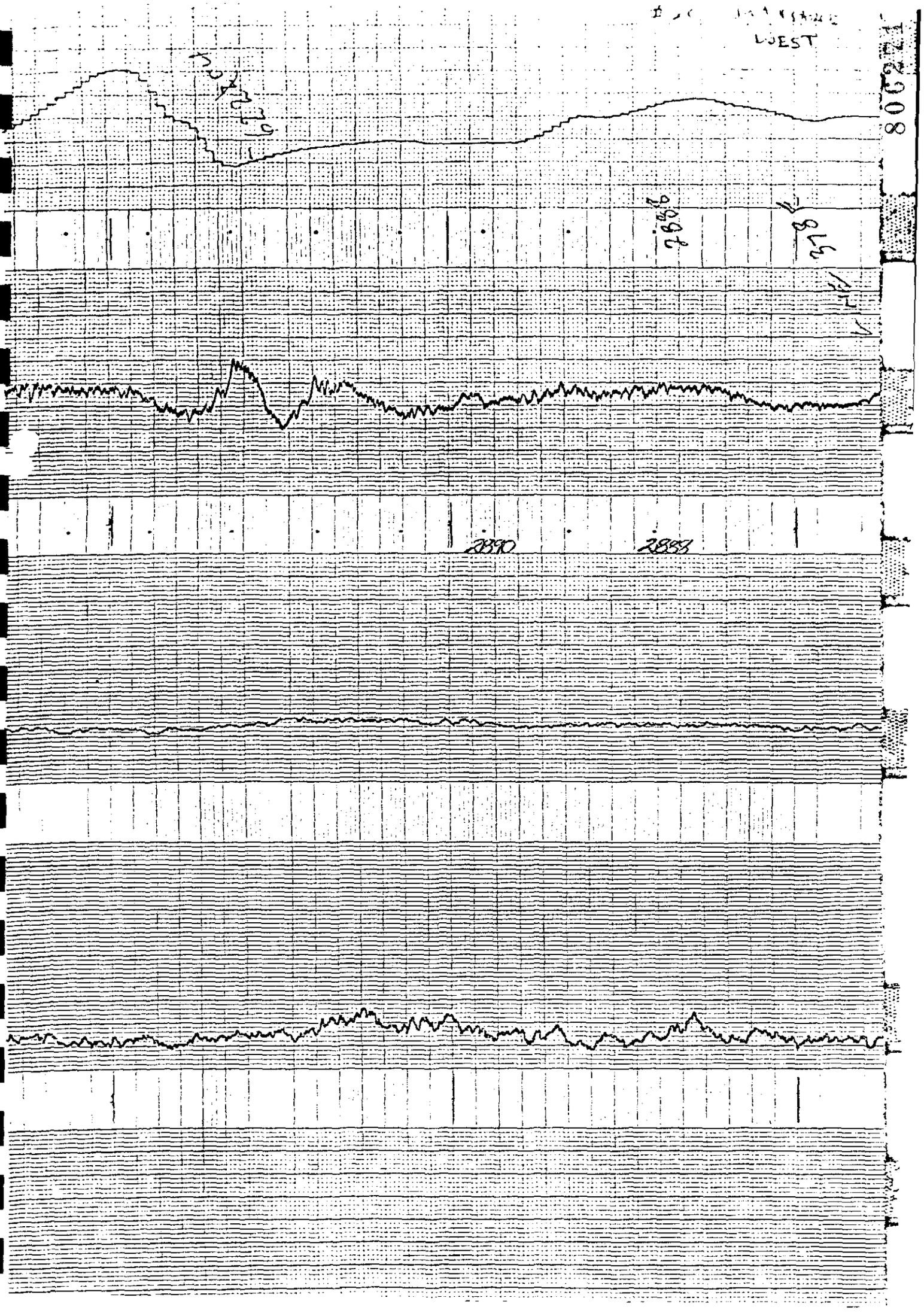

A-1000
D=200 D_T~100
W_F=300 W_T~150
K~600-700
ie K ⇒ 18,000
Tet 8 233/4144
#4 CUPRONA
E
240
100m
150

806269


Flt 7
Ini 221E / 4144
#4
CUPRONA
mine Alt.
A = 1600
H = 150m
W = 300m
W_T = 300
K = 800
Require K ~ 15,000
E
60m
128m



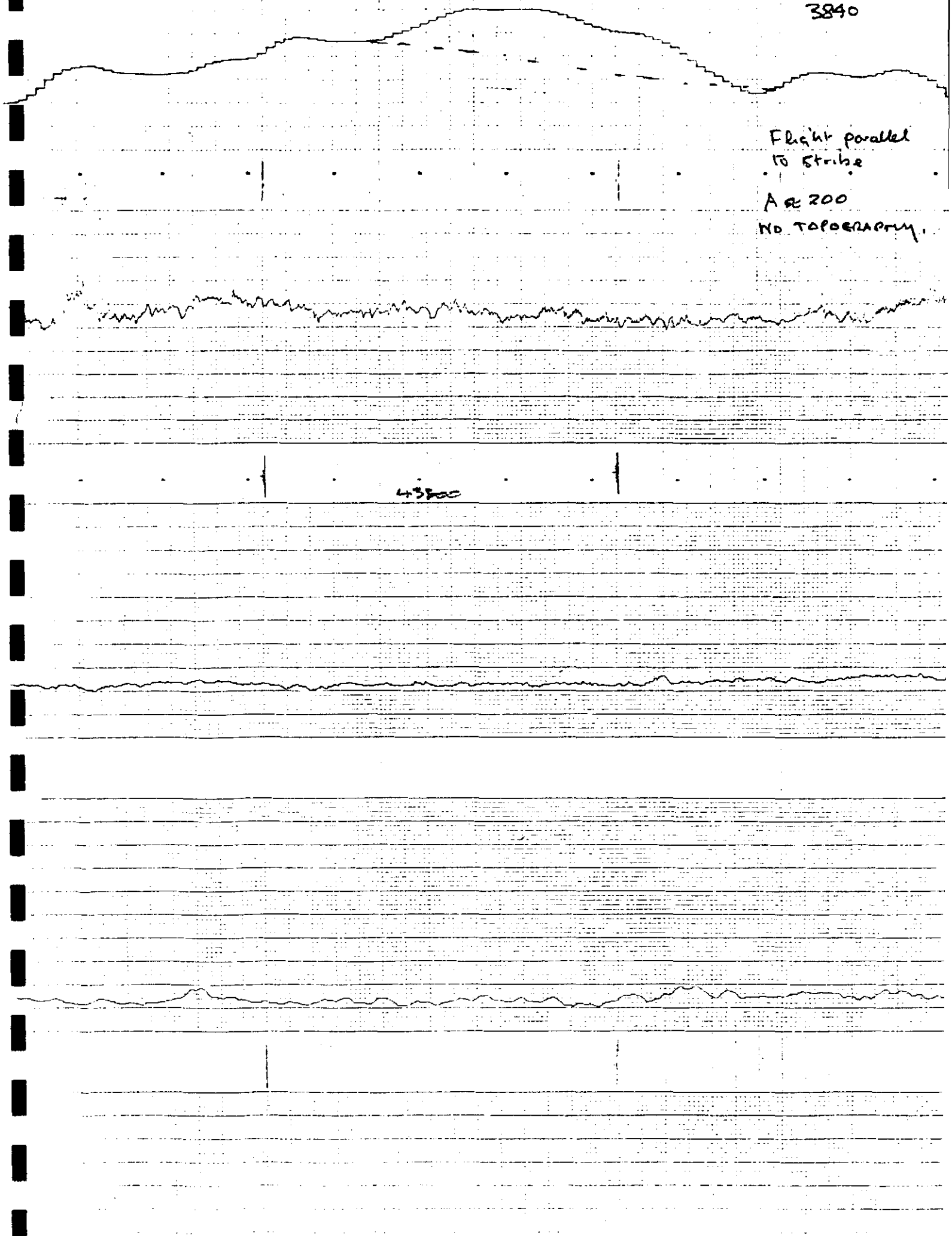
806270

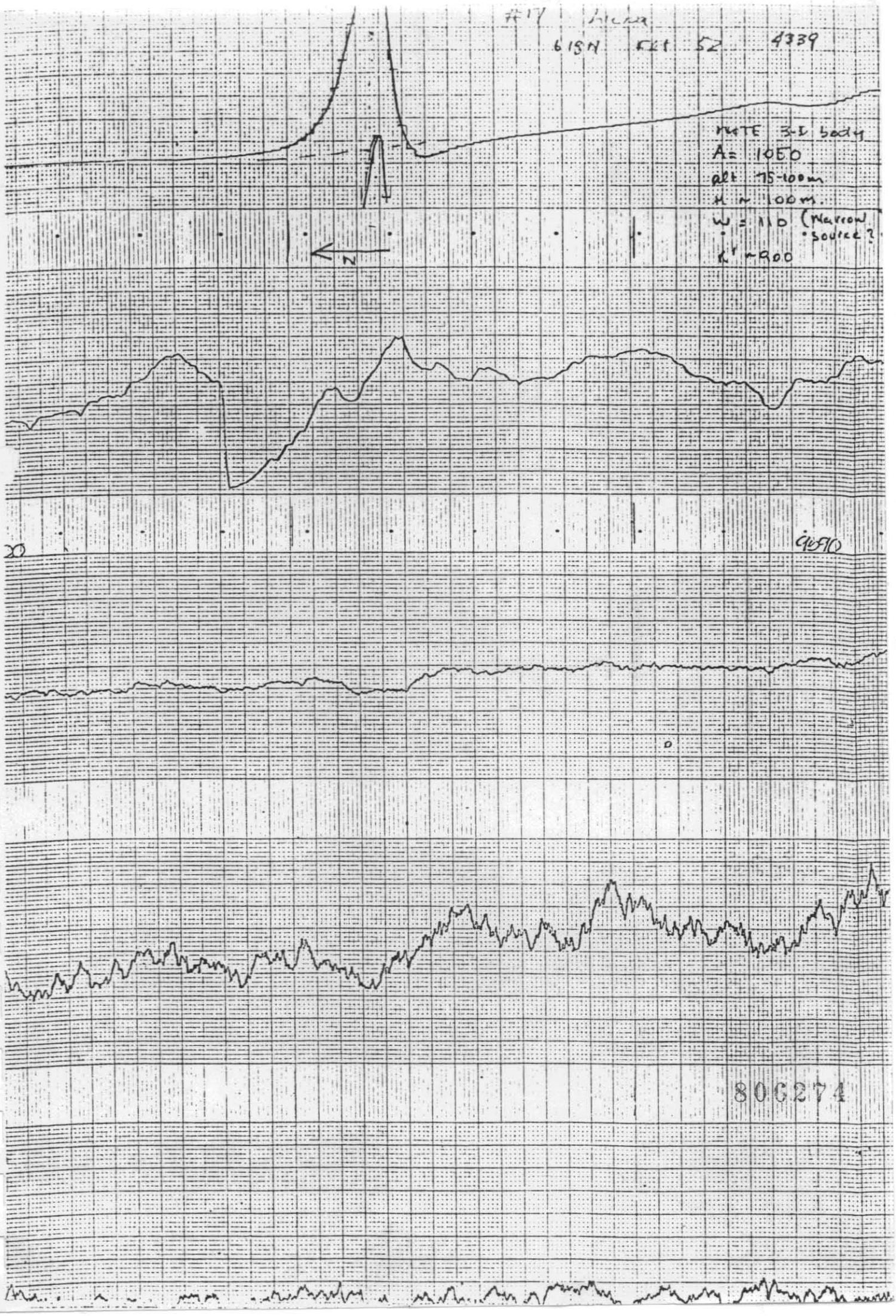

OUEST
2830
2833

806272

806273

#19 M Vance East
380 W (reflight)
3840




#17 Lima
6 ISN Flt 52 4339
MATE 3-I body
A= 1050
alt 75-100m
H ~ 100m.
W = 110 (Narrow source?
R' ~900
N
806274

806275

G.O. DICKSON & ASSOCIATES PTY. LTD.
18 ELMIE STREET,
HAWTHORN. 3122
Telephone: 818 1782

March 31, 1981.

TASMANIAN AEROMAGNETIC & RADIOMETRIC SURVEY
PROGRESS REPORT IV - BLOCK NO. 3

1.0 Introduction. We have examined the analogue records for the flights covering Block 3, as set out on the one-inch to one-mile aeromagnetic transparency. The report has been set out on a sheet-by-sheet basis similar to the previous reports.

In the course of examining this block we have examined the records of sheets 4340, 4339, 4239, 4240.

The anomaly numbering system has been altered, however, to give a simple sequential number to the anomalies within the sheet in question. The anomaly number which now appears is as follows:

I, JJJ, KKKK.

I = sequential number for sheet XXXX.
JJJ = line number.
KKKK = fiducial number.

Anomalies can be referred to as anomaly I on sheet XXXX. JJJ, KKKK is retained in text so that there can be no confusion with an anomaly on another sheet.

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G.O. DICKSON & ASSOCIATES PTY. LTD.
18 ELMIE STREET,
HAWTHORN. 3122
Telephone: 818 1782

December 23, 1980.

TASMANIAN AEROMAGNETIC & RADIOMETRIC SURVEYS

PROGRESS REPORT II - BLOCK NO. 1

1.0 Introduction. We have examined the inflight analogue records for the profiles covering Block No. 1, specified on the 1 inch to 1 mile aeromagnetic transparency. The report is set out on a sheet-by-sheet basis. The anomalies have been numbered as:

(LINE NUMBER) . (NEAREST FIDUCIAL)

for anomalies within the sheet boundaries.

2.0 Summary for Block 1. The results for this block are a little disappointing in that no really strong anomalies, or anomalies clearly unrelated to helicopter clearance variations, have been found. A list of the more intriguing anomalies follows, and reference can be made to the description and records which follow.

SHEET	ANOMALY LIST
4041	333.2982
4141	32.6977, 44.2695, 475
4241	55.2073, 60.1109, 61.1012

../2

806277

3.2 Sheet No. 4141

Anomaly No.	Comments
13.9817	Low amplitude anomaly near basalt, sediment contact. Helicopter high at 150 m. K' only low at 166. Not obviously formational. Not a strong target.
21.9284	Moderate anomaly and moderate K' at 230. Helicopter high = 160 m. Looks formational. No obvious topography.
32.6977*	500 gamma anomaly. Moderate K' = 300. Occurs in basalts with sediments to the north. Cannot be topographic unless very high susceptibility.
44.2695* E.L. 7/74. 4141/4	Occurs right against granite contact - granite to the north. If topographic, then high susceptibility. Needs susceptibility check. K' in moderate range at 240.
475* E.L. 7/74. 4141/5	Unusually high magnetitic response over sediments or granites. Requires geological comments.

3.3 Sheet No. 4241.

52.2228	Possibility of anomaly near basalt sediment contact. Sediments to the south.
52.2219	Anomaly near basalt sediment contact. Sediments to the south. Multiple anomaly and difficult to resolve.
55.2073 ?	400 gamma anomaly with weak topographic relief. Clearly over basalts. K' - 350 is

../4

806278

2.0 Summary for Block 3. Generally, the block is more interesting than block 2 and there are some anomalies which clearly warrant follow-up.

The anomalies of sheet 4340 are generally weak, but are associated with elevated potassium levels; in this respect, they are similar to some of the anomalies of block 2.

Follow-up of anomaly 2 on 4339 is definitely required. Perhaps it is a dolerite plug; however, the susceptibility must be very high. A ground magnetic survey is required. Several plugs have been identified on this sheet.

On sheet 4340 several strong anomalies occur over cambrian sediment or over areas mapped as moina sandstone. We feel that these will have to be resolved by ground follow-up.

A list of the more interesting anomalies follows:

Sheet	Anomaly
4340	1
4339	1, 2
4239	3
4340	1, 3, 6, 7.

3.0 Anomaly Description.

3.1 Sheet No. 4340.

Anomaly No.	Comments
1, 617.9908 2, 615.9790 3, 613.9710	All three anomalies occur over cambrian sediments with a very high potassium count. The magnetic response is weak in each case. The sediments are faulted by a north-south fault. Anomaly 2 appears to be associated with this fault. Follow-up required.

806279

3.2 Sheet No. 4339.

Anomaly No.	Comments
1, 613.9687 LIBYA SOUTH.	This magnetic anomaly, although fairly weak, is difficult to explain in the geological setting. An explanation is required.
2, 613.9695 LIBYA.	We understand ground follow-up suggests only weakly magnetic material, dolerite. We suggest a highly magnetic source and, very likely, narrow. Follow-up is definitely required.
3, 605.9280	Possibly a deeper source, no obvious topography. The anomaly has some linearity. Moderate susceptibility, but too high for 1500 cgs. basalt.
4, 605.9276	See plans. Almost certainly a plug of magnetic rock. Perhaps related to anomaly 2?
5, 591.8610	We believe this could also be a mafic plug.

../4

806280

3.3 Sheet No. 4239.

Anomaly No.	Comments
1, 589.852	This is the western end of the plug noted on sheet 4339.
2, 584.824	On north side of hill. Susceptibility looks too high for basalt. May be related to anomaly 3.
LORNA EAST. 3, 580.8082	Shape is unusual and requires the southern wall to be dipping south. Susceptibility is moderately high. May be small plug. Seems to occur very close to pre-cambrian basement.

../5

806281

3.4 Sheet No. 4240.

Anomaly No.	Comments
1, 553.1045 GAIRDNER DAM.	Very high susceptibility material buried 100 plus metres. Could be ultramafic intrusive, but occurs in area of Cambrian sediment and near limestone.
2,	Moina.
3, 562.7231	Perhaps only valley fill.
4, 571.7754	Reversely magnetised dyke, 9, the same.
5, 575.7925	Cuts across topography, only weakly magnetic, but may be related to 6.
6, 581.8124 LORINNA NORTH	Very strong anomaly mapped as Moina sandstone. Could be 300-400 metres deep. Susceptibility very high. Another ultramafic intrusive?
7, 583.8207	Weak magnetic anomaly, but coincident with elevated potassium channel.
8, 587.8450	Probably the same material as 6.
9. 594 7857	Low mag. dyke.

G.O. DICKSON for

G.O. DICKSON & ASSOCIATED PTY. LTD.

806282

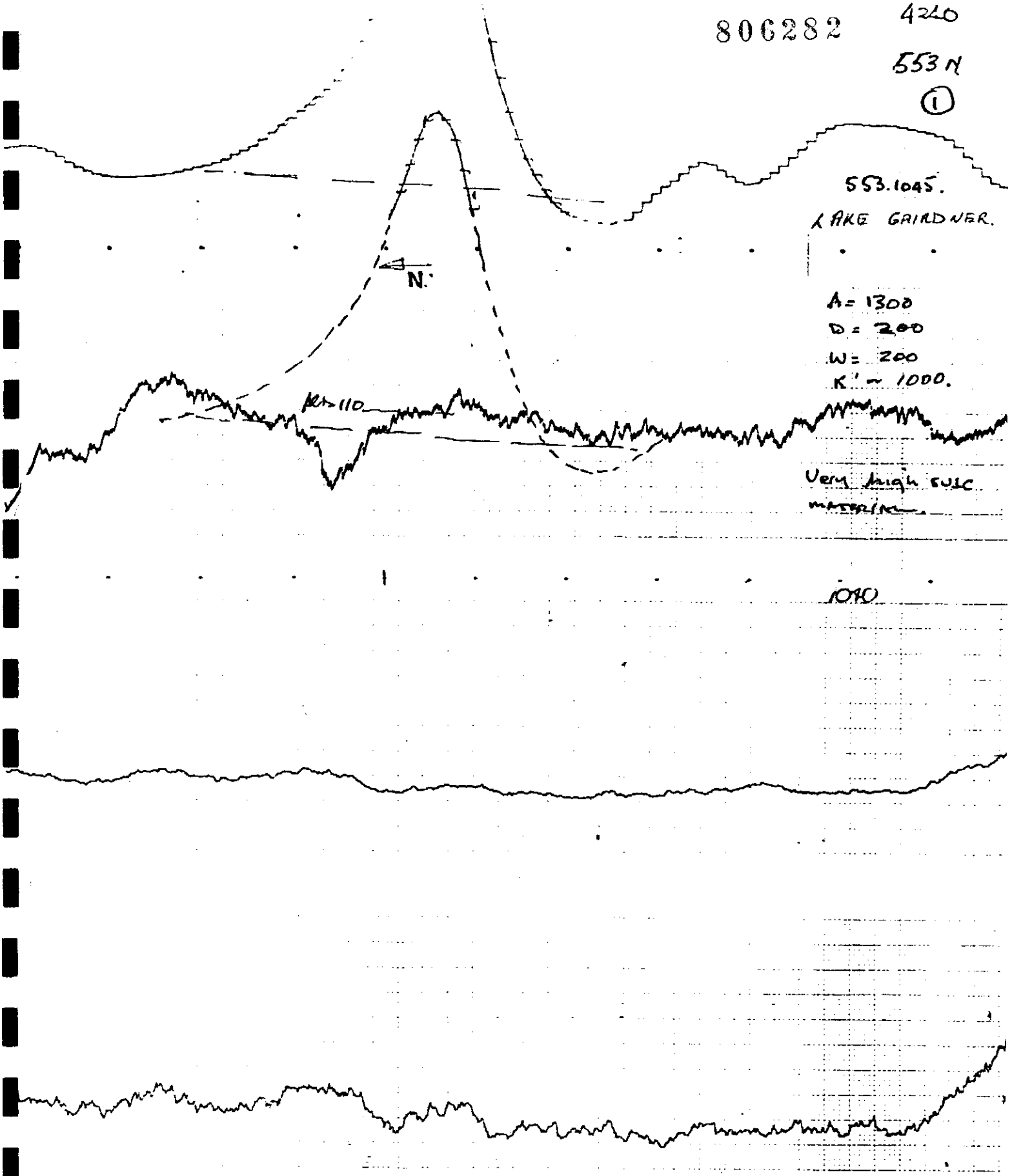
420

553 N

(1)

553.1045.

LAKE GAIRDNER.



APPENDIX 8

PERCUSSION DRILL HOLES

FOLLOW UP OF AEROMAGNETIC ANOMALIES

THE SHELL COMPANY OF AUSTRALIA LTD. - METALS DIVISION

PROJECT: MOINA - LAKE GAIRDNER 4240/1 — PERCUSSION DRILL LOG - SAMPLING RECORD — 1800m W 445m N — HOLE NO: PDH 1

From	To	Interl (m)	Mag Suscept. (JH8)	Sample No.	Compos No.	Assays Sn	W	CaF_2	Cu	Pb	Zn	Mo	Au	Weighted Assays/Ratios	% Estimates	Core Angles	Alt	T.S P.S	Description
2.00	4.00	2.00	20	5001		3	<50		40	20	<20								Orange - yellow. f-med. gn. sandstone.
4.00	6.00	2.00	15	5002		<1	<50		40	30	<20								Orange - yellow f-med. gn. sandstone/shale
6.00	8.00	2.00	15	5003		1	<50		15	30	<20								Orange - yellow + pink f-med gn. sandstone.
8.00	10.00	2.00	15	5004		2	<50		30	30	<20								Orange - yellow and brown f-med. gn sandstone.
10.00	12.00	2.00	15	5005		<1	<50		15	20	<20								Pale yellow orange f. gn. sandstone.
12.00	14.00	2.00	15	5006		1	<50		10	15	40								Grey/orange-yellow f. gn. sandstone.
14.00	16.00	2.00	15	5007		1	<50		15	10	40								Brown and grey f. gn. sandstone.
16.00	18.00	2.00	15	5008		<1	<50		10	6	<20								Grey and orange yellow f. gn. sandstone.
18.00	20.00	2.00	15	5009		<1	<50		15	6	<20								Grey f. gn. sandstone.
20.00	22.00	2.00	15	5010		<1	<50		30	10	<20								"
22.00	24.00	2.00	15	5011		<1	<50		20	8	<20								"
24.00	26.00	2.00	20-25	5012		<1	<50		30	20	<20								"
26.00	28.00	2.00	15	5013		1	<50		6	20	<20								"
28.00	30.00	2.00	10	5014		1	<50		10	15	20								"
30.00	32.00	2.00	25	5015		1	<50		3	15	<20								"
32.00	34.00	2.00	20	5016		1	<50		3	8	<20								"
34.00	36.00	2.00	25	5017		1	<50		6	4	<20								"
36.00	38.00	2.00	10	5018		<1	<50		4	3	<20								"
38.00	40.00	2.00	10	5019		<1	<50		10	30	40								"
40.00	42.00	2.00	15	5020		2	<50		20	15	<20								"
42.00	44.00	2.00	20	5021		1	<50		30	10	20								"
44.00	46.00	2.00	40	5022		5	<50		30	25	<20								"
46.00	48.00	2.00	40	5023		1	<50		30	15	<20								Grey/grey brown f.gn. qtz vein, silicification.
48.00	50.00	2.00	65	5024		5	<50		40	15	<20								Grey f. gn. sandstone.
50.00	52.00	2.00	40	5025		1	<50		20	10	<20								"
52.00	54.00	2.00	75	5026		1	<50		20	10	<20								"
54.00	56.00	2.00	90	5027		1	<50		30	8	<20								"
56.00	58.00	2.00	200	5028		<1	250		20	20	<20								"
58.00	60.00	2.00	150	5029		<1	50		15	15	<20								"
60.00	62.00	2.00	30	5030		1	50		60	60	<20								"
62.00	64.00	2.00	55	5031		10	300		40	40	<20								"
64.00	66.00	2.00	65	5032		1	<50		60	60	<20								"
66.00	68.00	2.00	25	5033		1	<50		40	40	<20								"
68.00	70.00	2.00	15	5034		2	<50		30	30	<20								"
70.00	71.00		15	5035		2	<50		80	80	<20								Grey f. gn. sandstone/pyrite.

Sheet of Sheets

8062284

MOINA - LORINNA NORTH 4240/3 PERCUSSION DRILL LOG - SAMPLING RECORD 115mE 460mN HOLE NO: PD 1

From	To	Interval	Mag. Suscept. (JH8)	Sample No.	Dup. No.	Assays Sn	W	Ni	Cu	Pb	Zn	Mo	Au	Anomalous Assay Ratios	% Estimates	Core Angles	Alt.	P.S.	Description
0.00	2.00	2.00	65	5036		10	20	<4	10	12	8	8							Orange-yellow/yellow-brown quartzite, quartz veining. Glacials.
2.00	4.00	2.00	10	5037		6	15	4	16	12	10	8							"
4.00	6.00	2.00	5	5038		4	25	<4	10	8	6	8							"
6.00	8.00	2.00	10	5039		10	20	<4	4	<4	4	8							"
8.00	10.00	2.00	5	5040		<4	10	<4	6	<4	4	8							"
10.00	12.00	2.00	5	5041		8	10	<4	4	4	4	4							Orange-yellow/grey quartzite, quartz veining. Glacials
12.00	14.00	2.00	20	5042		10	10	<4	4	4	4	4							
14.00	16.00	2.00	20	5043		10	30	<4	10	4	6	8							
16.00	18.00	2.00	70	5044		4	15	<4	12	8	4	4							
18.00	20.00	2.00	50	5045		4	15	4	18	8	6	8							
20.00	22.00	2.00	40	5046		4	25	4	18	<4	8	4							
22.00	24.00	2.00	35	5047		6	15	4	40	8	16	4							
24.00	26.00	2.00	200	5048		<4	40	40	36	4	170	4							
26.00	28.00	2.00	50	5049		<4	25	44	16	4	135	4							
28.00	30.00	2.00	25	5050		<4	20	44	8	4	55	4							Orange-yellow/grey-black quartzite, quartz vein, Tertiary basalt. Glacials.
30.00	32.00	2.00	35	5051		<4	15	36	38	<4	65	4							Tertiary basalt/quartzite. Grey/black same weathering. Tb dominates.
32.00	34.00	2.00	30	5052		6	10	36	75	110	55	4							Tertiary basalt/quartzite. Grey/black same weathering. Tb dominates.
34.00	36.00	2.00	30	5053		<4	15	24	32	12	40	4							Grey/black. Quartzite/Tb.
36.00	38.00	2.00	25	5054		10	10	24	44	28	36	4							Grey quartzite, quartz veining/siliceous sandstone. No Tb.
38.00	40.00	2.00	20	5055		10	10	12	32	8	16	4							"
40.00	42.00	2.00	20	5056		4	20	32	60	28	50	4							"
42.00	44.00	2.00	25	5057		<4	25	16	60	210	26	4							"
44.00	46.00	2.00	20	5058		<4	15	24	60	28	50	4							"
46.00	48.00	2.00	80	5059		<4	15	12	110	36	26	4							"
48.00	50.00	2.00	250	5060		<4	20	8	24	16	18	4							Quartzite/quartz veins/siliceous sandstone - chlorite.
50.00	52.00	2.00	3000	5061															Pale grey siliceous sandstone, quartz.
52.00	54.00	2.00	5000	5062															Black f. gn. rock - pyritic - tertiary basalt + qtz. contamination.
54.00	56.00	2.00	2000	5063	1	8	65	20	16	12	26	38							Cambrian andesite + some contamination.
56.00	58.00	2.00	1000	5064															"
58.00	60.00	2.00	1500	5065															"
60.00	62.00	2.00	3000	5066															"
62.00	64.00	2.00	2500	5067															"
64.00	66.00	2.00	3500	5068	2	10	20	32	80	8	75	8							"
66.00	68.00	2.00	4500	5069															"
68.00	70.00	2.00	7000	5070															"
70.00	72.00	2.00	1500	5071															"
72.00	74.00	2.00	2500	5072															"
74.00	76.00	2.00	1300	5073	3	<4	20	30	85	8	230	6							"
76.00	78.00	2.00	2000	5074															"
78.00	80.00	2.00	2000	5075															"
80.00	82.00	2.00	1500	5076															"
82.00	84.00	2.00	3500	5077															"
84.00	86.00	2.00	1000	5078	4	6	30	32	48	8	210	6							"
86.00	88.00	2.00	2000	5079															"
88.00	90.00	2.00	2500	5080															"
90.00	92.00	2.00	1250	5081															"
92.00	94.00	2.00	1500	5082															"
94.00	96.00	2.00	85-150	5083	5	<4	20	34	26	4	180	4							"
96.00	98.00	2.00	400-800	5084															"
98.00	100.00	2.00	200-400	5085		4	20	28	44	8	175	4							"
100.00	102.00	2.00	600-800	5086		4	15	28	26	12	150	4							Large water flow.
102.00	104.00	2.00	2500	5087															Cambrian andesite + some contamination
104.00	106.00	2.00	2000	5088	6	4	30	40	90	8	190	6							"
106.00	108.00	2.00	850	5089															"
108.00	110.00	2.00	2500	5090															"
110.00	112.00	2.00	2500	5091															"
112.00	114.00	2.00	3000	5092															"
114.00	116.00	2.00	4500	5093	7	<4	15	38	105	8	230	6							"
116.00	118.00	2.00	4250	5094															"
118.00	120.00	2.00	4500	5095															"
120.00	122.00	2.00	5000	5096															"

Page 1 of 2 Sheets

8062285

THE SHELL COMPANY OF AUSTRALIA LTD. - METALS DIVISION

PROJECT: MOINA - LORINNA NORTH

PERCUSSION DRILL LOG - SAMPLING RECORD

HOLE NO: _____

From	To	Inter'l (m)		Sample No.	Compos No.	Assays								Weighted Assays/Ratios				% Estimates				Core Angles				Alt	T.S P.S	Description
						Sn	W	Ni	Cu	Pb	Zn	Mo	Au															
122.00	124.00	2.00	2500	5097																								Cambrain andesite + some contamination
124.00	126.00	2.00	2000	5098	8	<4	30	36	38	4	165	4																" "
126.00	128.00	2.00	2000	5099																								" "
128.00	130.00	2.00	1800	5100																								" "
130.00	132.00	2.00	1800	5101																								" "
132.00	134.80	2.00	2000	5102																								" "
134.00	136.00	2.00	2250	5103	9	<4	35	34	24	4	110	4																" "
136.00	138.00	2.00	2000	5104																								" "
138.00	140.00	2.00	2500	5105																								" "
140.00	142.00	2.00	2500	5106	10	14	45	55	280	8	170	16																" "
142.00	144.00	2.00	2500	5107																								" "

Sheet 2 of 2 Sheets

806286

THE SHELL COMPANY OF AUSTRALIA LTD. - METALS DIVISION

PROJECT: LORINNA EAST 4239/1 PERCUSSION DRILL LOG - SAMPLING RECORD 00mE/00mN HOLE PD 1

From	To	Interval (m)		Sample No.	Composite No.	Assays Sn	W	Cal$_2$	Cu	Pb	Zn	Mo	Au	Weighted Assays/Ratios	% Estimates	Core Angles	Alt	I.S P.S	Description
0.00	2.00	2.00	300	5101															Tertiary basalt - f. gn. black/green-black
2.00	4.00	2.00	300	5102															" "
4.00	6.00	2.00	400	5103															" "
6.00	8.00	2.00	400	5104															" "
8.00	10.00	2.00	400	5105															" "
10.00	12.00	2.00	500	5106															" "
12.00	14.00	2.00	800	5107															" "
14.00	16.00	2.00	500	5108															" "
16.00	18.00	2.00	400	5109															" "
18.00	20.00	2.00	300	5110															" "
20.00	22.00	2.00	400	5111															" "
22.00	24.00	2.00	700	5112															" "
24.00	26.00	2.00	700	5113															" "
26.00	28.00	2.00	400	5114															" "
28.00	30.00	2.00	200	5115															" "
30.00	32.00	2.00	400	5116															" "
32.00	34.00	2.00	400	5117															" "
34.00	36.00	2.00	400	5118															" "
6.00	38.00	2.00	300	5119															" "
38.00	40.00	2.00	300	5120															" "
40.00	42.00	2.00	350	5121															" "
42.00	44.00	2.00	250	5122															" "
44.00	46.00	2.00	500	5123															" "
46.00	48.00	2.00	450	5124															" "
48.00	50.00	2.00	350	5125															" "
50.00	52.00	2.00	450	5126															" "
52.00	54.00	2.00	400	5127															Tertiary basalt - med - crs. gr. - dark-grey/black
54.00	56.00	2.00	350	5128															" "
56.00	58.00	2.00	450	5129															" "
58.00	60.00	2.00	600	5130															Tertiary sediments - clays, shale - grey black
60.00	62.00	2.00	50	5131															" "
62.00	64.00	2.00	65	5132															" "
64.00	66.00	2.00	50	5133															" "
66.00	68.00	2.00	50	5134															" "
68.00	70.00	2.00	65	5135															" "
70.00	72.00	2.00	95	5136															" "
72.00	74.00	2.00	50	5137															" "
74.00	76.00	2.00	50	5138															" "
76.00	78.00	2.00	45	5139															" "
78.00	80.00	2.00	50	5140															" "
80.00	82.00	2.00	55	5141		10	<50		100	40	40	10							PE? sericitic schists - pink-grey/red-grey
82.00	84.00	2.00	10	5142		1	<50		6	6	<20	<3							" "
84.00	86.00	2.00	15	5143		1	<50		15	15	<20	<3							" "
86.00	88.00	2.00	10	5144		2	<50		15	10	<20	<3							PE? sericitic-chloritic schist
88.00	90.00	2.00	10	5145		2	<50		150	6	<20	<3							" "
90.00	92.00	2.00	15	5146		1	<50		60	3	<20	<3							" "
92.00	94.00	2.00	15	5147		<1	<50		80	1	<20	<3							" "
94.00	96.00	2.00	20	5148		3	<50		150	10	<20	<3							" "
96.00	98.00	2.00	35	5149		<1	<50		100	3	<20	<3							" "
98.00	100.00	2.00	20	5150		3	<50		60	6	<20	<3							" "
100.00	102.00	2.00	20	5151		2	<50		200	3	<20	<3							" "
102.00	104.00	2.00	20	5152		<1	<50		200	15	<20	<3							" "
104.00	106.00	2.00	25	5153		<1	<50		200	6	<20	<3							" "
106.00	108.00	2.00	20	5154		<1	<50		200	10	<20	<3							" " + minor granite
108.00	110.00	2.00	20	5155		3	<50		100	10	<20	<3							" " + granite
110.00	112.00	2.00	25	5156		2	<50		200	10	<20	<3							" " + very small amount granite
112.00	114.00	2.00	20	5157		<1	<50		80	6	<20	<3							" "
114.00	116.00	2.00	25	5158		1	<50		100	6	<20	10							" "
116.00	118.00	2.00	20	5159		<1	<50		150	15	<20	<3							" " + granite, med-crs. gr.
118.00	120.00	2.00	20	5160		<1	<50		150	15	<20	<3							" " + minor granite
120.00	122.00	2.00	25	5161		1	<50		80	10	<20	<3							" "

8063071

THE [illegible] COMPANY OF AUSTRALIA LTD. - METALS DIVISION

PERCUSSION DRILLING - SAMPLING RECORD

00mE/00mN

From (ft)	To	Depth (ft)		Sample No.	Type No.	Assays								Weighted Assay Ratios				% Estimates				Bore Angles				Tr. Alt.	Tr. Ch.	Description
						Sn	*	Cu	Pb	Zn	Mo	Au																
122.00	124.00	2.00	25	5162		1	<50	100	25	<20	3																	PE? sericitic - chloritic schist + minor granite
124.00	126.00	2.00	25	5163		1	<50	60	60	<20	<3																	" "
126.00	128.00	2.00	20	5164		<1	<50	20	40	<20	<3																	" "
128.00	130.00	2.00	30	5165		1	<50	10	80	<20	<3																	" "
130.00	132.00	2.00	20	5166		1	<50	15	40	<20	<3																	" "
132.00	134.00	2.00	25	5167		<1	<50	15	15	<20	<3																	" "
134.00	136.00	2.00	30	5168		<1	<50	6	40	<20	<3																	" "
136.00	138.00	2.00	25	5169		1	<50	8	20	<20	<3																	" "
138.00	140.00	2.00	35	5170		5	<50	60	30	<20	<3																	" "
140.00	142.00	2.00	35	5171		<1	<50	25	60	60	3																	" "
142.00	144.00	2.00	25	5172		<1	<50	100	60	40	10																	" "
144.00	146.00	2.00	45	5173		<1	<50	80	60	40	30																	" "
146.00	148.00	2.00	25	5174		<1	<50	20	100	<20	3																	" "
148.00	150.00	2.00	50	5175		<1	<50	40	40	<10	6																	" " + minor f-med gn granite
150.00	152.00	2.00	30	5176		<1	<50	100	60	<20	<3																	" "
152.00	154.00	2.00	30	5177		<1	<50	100	80	80	3																	" "
154.00	156.00	2.00	30	5178		<1	<50	100	40	<20	<3																	" "
156.00	158.00	2.00	30	5179		1	<50	100	60	<20	<3																	" "
158.00	160.00	2.00	30	5180		3	<50	60	15	<20	<3																	" "
160.00	162.00	2.00	25	5181		<1	<50	60	20	<20	25																	" " + v.f. gn pale green cherty quartzite
162.00	164.00	2.00	50	5182		1	<50	80	20	<20	<3																	" "
164.00	166.00	2.00	40	5183		1	<50	80	30	<20	<3																	" "
166.00	168.00	2.00	40	5184		<1	<50	60	30	<20	<3																	" "
168.00	170.00	2.00	40	5185		<1	<50	60	15	<20	<3																	" "
170.00	172.00	2.00	25	5186		1	<50	150	10	<20	10																	" "
172.00	174.00	2.00	20	5187		1	<50	150	10	<20	<3																	" "
174.00	176.00	2.00	30	5188		<1	<50	100	6	<20	<3																	" "
176.00	178.00	2.00	50	5189		1	<50	300	15	<20	<3																	" "
178.00	180.00	2.00	45	5190		1	<50	100	10	<20	<3																	" "
180.00	182.00	2.00	30	5191		<1	<50	80	8	<20	<3																	" "
182.00	184.00	2.00	65	5192		<1	<50	40	8	<20	<3																	" "
184.00	186.00	2.00	80	5193		1	<50	40	6	<20	<3																	" "
				5194		1	<50	150	15	<20	3																	
				5195		<1	<50	150	3	<20	<3																	
				5196		<1	<50	60	3	<20	<3																	
				5197		2	<50	40	4	<20	<3																	
				5198		2	<50	40	8	<20	<3																	
				5199		2	<50	40	8	<20	<3																	
			-	5200	-	1	<50	60	8	<20	3																	

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PROJECT LORINNA EAST 4239

PERCUSSION DRILL LOG

From	To	Interval (m)		Sample No.	Composite No.	Assays								Weighted Assays/M		
						Ag	As	Ba	Bi	Co	Zn					
0.00	2.00	2.00	300	5101												
2.00	4.00	2.00	300	5102												
4.00	6.00	2.00	400	5103												
6.00	8.00	2.00	400	5104												
8.00	10.00	2.00	400	5105												
10.00	12.00	2.00	500	5106												
12.00	14.00	2.00	800	5107												
14.00	16.00	2.00	500	5108												
16.00	18.00	2.00	400	5109												
18.00	20.00	2.00	300	5110												
20.00	22.00	2.00	400	5111												
22.00	24.00	2.00	700	5112												
24.00	26.00	2.00	700	5113												
26.00	28.00	2.00	400	5114												
28.00	30.00	2.00	200	5115												
30.00	32.00	2.00	400	5116												
32.00	34.00	2.00	400	5117												
34.00	36.00	2.00	400	5118												
6.00	38.00	2.00	300	5119												
38.00	40.00	2.00	300	5120												
40.00	42.00	2.00	350	5121												
42.00	44.00	2.00	250	5122												
44.00	46.00	2.00	500	5123												
46.00	48.00	2.00	450	5124												
48.00	50.00	2.00	350	5125												
50.00	52.00	2.00	450	5126												
52.00	54.00	2.00	400	5127												
54.00	56.00	2.00	350	5128												
56.00	58.00	2.00	450	5129												
58.00	60.00	2.00	600	5130												
60.00	62.00	2.00	90	5131												
62.00	64.00	2.00	65	5132												
64.00	66.00	2.00	50	5133												
66.00	68.00	2.00	50	5134												
68.00	70.00	2.00	65	5135												
70.00	72.00	2.00	95	5136												
72.00	74.00	2.00	50	5137												
74.00	76.00	2.00	50	5138												
.00	78.00	2.00	45	5139												
78.00	80.00	2.00	50	5140												
80.00	82.00	2.00	55	5141		0.3	<50	800	<1	40	250					
82.00	84.00	2.00	10	5142		<0.1	<50	1500	<1	10	200					
84.00	86.00	2.00	15	5143		0.1	<50	1500	<1	10	200					
86.00	88.00	2.00	10	5144		0.1	<50	1500	<1	10	200					
88.00	90.00	2.00	10	5145		0.2	<50	1500	<1	10	200					
90.00	92.00	2.00	15	5146		0.1	<50	1500	<1	10	200					
92.00	94.00	2.00	15	5147		0.1	<50	1500	<1	15	200					
94.00	96.00	2.00	20	5148		0.2	50	1500	<1	15	300					
96.00	98.00	2.00	35	5149		<0.1	<50	1000	<1	15	150					
98.00	100.00	2.00	20	5150		<0.1	<50	1500	<1	15	200					
100.00	102.00	2.00	20	5151		0.1	<50	2000	<1	15	200					
102.00	104.00	2.00	20	5152		0.3	<50	1500	<1	15	200					
104.00	106.00	2.00	25	5153		<0.1	<50	1500	<1	10	400					
106.00	108.00	2.00	20	5154		<0.1	<50	2000	<1	10	200					
108.00	110.00	2.00	20	5155		<0.1	<50	2000	<1	5	300					
110.00	112.00	2.00	25	5156		<0.1	<50	2000	1	10	300					
112.00	114.00	2.00	20	5157		<0.1	<50	600	<1	5	100					
114.00	116.00	2.00	25	5158		<0.1	<50	1000	<1	10	250					
116.00	118.00	2.00	20	5159		<0.1	<50	1000	1	15	200					
118.00	120.00	2.00	20	5160		1.0	<50	1000	.5	15	200					
120.00	122.00	2.00	25	5161		<0.1	<50	800	<1	30	200					

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PERCUSSION [illegible]

From	To	Interl (m)		Sample No.	Gpos No.	Assays Ag	As	Ba	Bi	Co	Zn			Weighted As
122.00	124.00	2.00	25	5162		<0.1	<50	800	15	60	200			
124.00	126.00	2.00	25	5163		0.3	<50	1000	6	5	150			
126.00	128.00	2.00	20	5164		0.3	<50	1000	2	10	300			
128.00	130.00	2.00	30	5165		0.3	<50	1000	3	15	300			
130.00	132.00	2.00	20	5166		0.1	<50	1000	<1	10	150			
132.00	134.00	2.00	25	5167		<0.1	<50	1000	<1	15	300			
134.00	136.00	2.00	30	5168		<0.1	<50	1000	<1	5	250			
136.00	138.00	2.00	25	5169		<0.1	<50	1500	<1	10	300			
138.00	140.00	2.00	35	5170		0.1	<50	1500	<1	10	300			
140.00	142.00	2.00	35	5171		0.2	<50	2000	<1	30	200			
142.00	144.00	2.00	25	5172		0.1	150	2000	<1	20	200			
144.00	146.00	2.00	45	5173		<0.1	50	1500	<1	40	200			
146.00	148.00	2.00	25	5174		0.2	50	2000	<1	20	200			
148.00	150.00	2.00	50	5175		0.1	50	2000	<1	20	250			
150.00	152.00	2.00	30	5176		0.2	<50	2000	<1	20	200			
152.00	154.00	2.00	30	5177		0.6	<50	2000	6	10	200			
154.00	156.00	2.00	30	5178		0.8	<50	1500	<1	10	200			
156.00	158.00	2.00	30	5179		1.0	<50	2000	6	15	200			
158.00	160.00	2.00	30	5180		0.2	50	1500	<1	15	200			
160.00	162.00	2.00	25	5181		0.1	<50	1500	<1	15	250			
162.00	164.00	2.00	50	5182		0.2	<50	1500	<1	40	200			
164.00	166.00	2.00	40	5183		0.8	<50	1000	<1	40	200			
166.00	168.00	2.00	40	5184		0.5	<50	1500	<1	20	250			
168.00	170.00	2.00	40	5185		0.5	<50	1500	<1	20	300			
170.00	172.00	2.00	25	5186		0.1	<50	1500	<1	20	300			
172.00	174.00	2.00	20	5187		0.1	<50	1500	<1	20	250			
174.00	176.00	2.00	30	5188		<0.1	<50	800	<1	5	200			
176.00	178.00	2.00	50	5189		0.3	<50	800	6	10	150			
178.00	180.00	2.00	45	5190		0.2	<50	1000	3	10	150			
180.00	182.00	2.00	30	5191		0.2	<50	1000	3	15	100			
182.00	184.00	2.00	65	5192		<0.1	<50	800	2	15	100			
184.00	186.00	2.00	80	5193		0.1	<50	1500	<1	30	250			
				5194		0.1	<50	1500	6	30	250			
				5195		0.1	<50	800	<1	20	200			
				5196		<0.1	<50	1000	<1	15	200			
				5197		0.1	<50	1500	<1	10	100			
				5198		0.3	<50	1000	<1	15	250			
				5199		0.5	<50	1000	<1	30	250			
				5200		0.1	<50	800	<1	30	200			

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APPENDIX 9

PETROLOGY REPORT - LIENA ANOMALY

CONSULTING MINERALOGISTS
ALAN M. G. WHITTLE, M.Sc., Ph.D.
P.O. BOX 102
STANSBURY, S.A. 5582
PHONE (088) 52 4281

M I N E R A L O G I C A L R E P O R T

SHELL 23/80

Samples 5201 - 5206, Tasmania.

R.G. Wright,
25.9.80 : letter.

DISTRIBUTION

Copy 1 — Mr R.G. Wright
Supervising Geologist
Shell Metals
P.O. Box 860 DEVONPORT 7310.

Copy 2 — Mr J. Langenberg
Exploration Manager
Shell Metals
G.P.O. Box 872K MELBOURNE 3001.

Samples 5201 - 5206, Tasmania.

The report was prepared from observations on the thin and polished sections of rocks which were submitted by Mr R.G. Wright.

The breccias were possibly formed by flow drag along the chilled contact zones of shallow intrusive porphyritic olivine basalts, with country rock. This postulation is based upon the abundance of devitrified vitric basalt (or tachylite) within the breccias.

The magnetic susceptibilities in the three porphyritic basalt samples is due to the presence of slightly martitised titanomagnetite amongst the principal accessory ilmenite.

The basalts are highly unsaturated; but of low potash content since they contain no mica. There is therefore, no affinity with kimberlite.

* * * *

5201 Flow-structured olivine basalt.

The basalt has a simple composition; and it is a very undersaturated species. The principal components are roughly parallel-oriented labradorite; and olivine, which exists as small phenocrysts, and as finer interstitial material amongst the plagioclase.

Pyroxenes are not present. About 7% evenly dispersed ilmenite, several % titano-magnetite, and traces of fine pyrite are complexed with the fine grained interstitial olivine. The titanomagnetite induces the magnetic susceptibility.

806293

A small proportion of the olivine is either serpentinised, or altered to iddingsite.

5202 Decomposed basaltic volcanic breccia.

The assemblage of non-size-classified fragmentary material includes a major proportion of completely decomposed basic volcanic rock, some 7% highly angular quartz, minor calcite, olivine and pyroxene. There are no opaque mineral components.

The fragments of volcanic material appear to have been from both tachylite and vesicular basalts; some of which had flow structure. Sparse olivine and pyroxene are preserved in some fragments; but most fragments now consist of limonite-stained microcrystalline montmorillonite and serpentinous minerals. In the fragments the pseudomorphs of olivine are clearly visible.

The fragmentary quartz is irregularly dispersed as single individuals. The quartz was either vein material, or was present as vesicle fillings in the volcanics.

5204 Devitrified vitric breccia.

This assemblage of volcanic fragments is less altered than is the case with 5202. The fragments are highly angular; and they range in size from 01. - 4.0 mm.

806294

[redacted]

All of the fragments are from devitrified vitric basalt; probably tachylite which formed at the contacts of the basalt with the country rock. Rapid chilling occurred; a few small vesicles were formed; and most fragments contain minute 0.1 mm crystals of olivine, sparse fine pyrite and pyroxene. Calcite or quartz is present in some of the vesicles.

There are in the fragments, no opaque mineral components, other than sparse fine pyrite.

5205 Serpentinised porphyritic olivine basalt.

This basalt has much the same composition as 5201; but there are slight differences. It is more distinctly porphyritic, since it contains a few olivines and plagioclase of several mm size, as well as occasional clusters of pyroxenes.

The main components are plagioclase and olivine. The finest olivine coexists with 7% ilmenite, 1 - 2% weakly martitised titano-magnetite, 0.2% pyrite and a trace of fine chalcopyrite. These minerals, together with 5% brown isotropic silicate glass, constitute the mesostasis amongst the randomly-oriented plagioclase and coarser olivine grains.

More extensive serpentinisation was incident in this rock. In addition, despite the presence of larger phenocrysts than in 5201, this basalt underwent a late stage of rapid chilling. This was the cause of the formation of silicate glass in the fine grained mesostasis.

A small magnetic susceptibility can be expected because of the content of titano-magnetite.

806295

[redacted]

5206 Porphyritic olivine basalt.

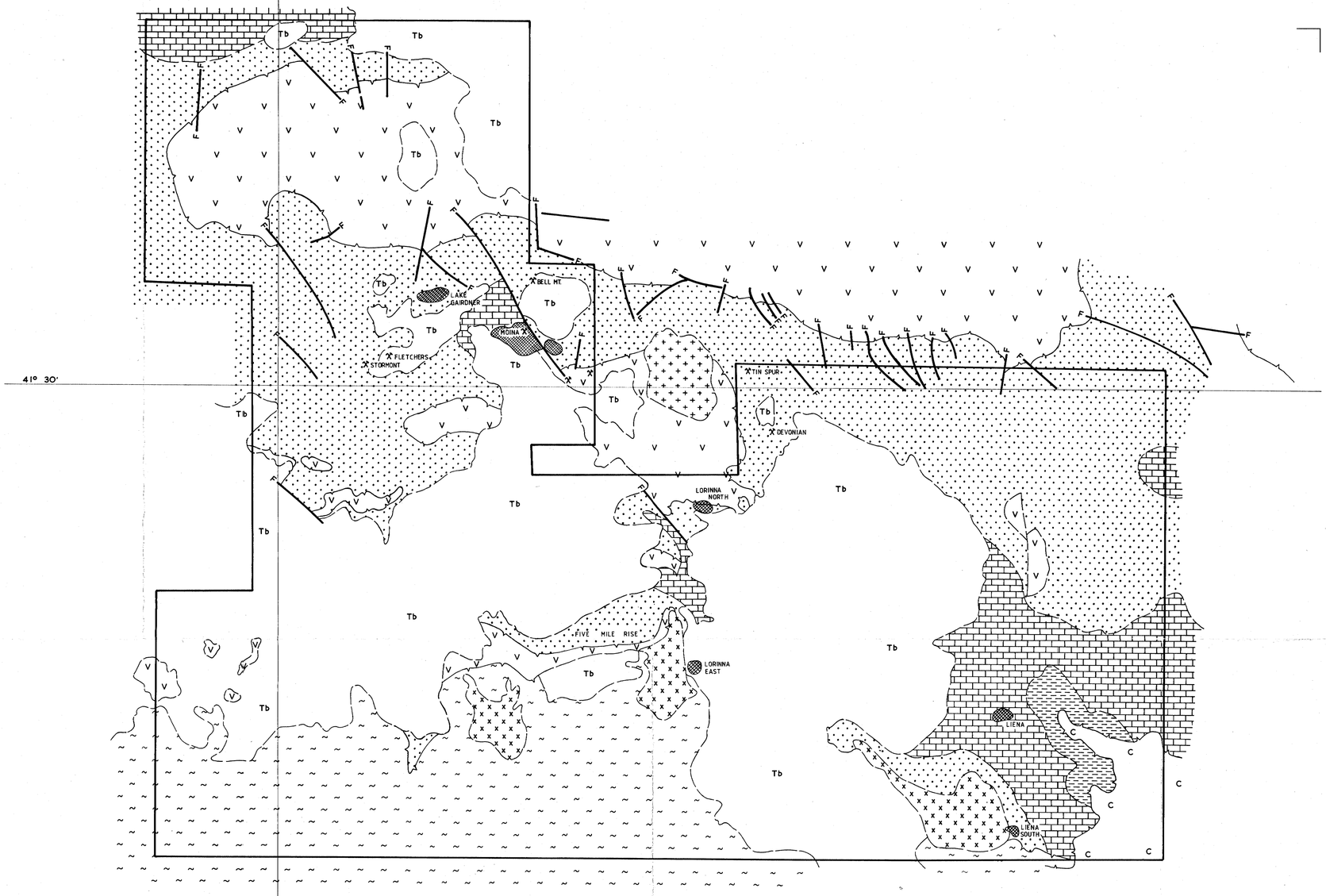
The general similarity with 5201 and 5205 is apparent from the thin section. In this rock, proportions of both the labradorite and olivine are phenocrysts of 1 - 3 mm size.

The bulk of the smaller labradorite crystals, and the very fine olivine, constitute with 7% ilmenite, 2 - 3% titanomagnetite, and minor fine sulphides, the groundmass of the basalt. There are sparse orthopyroxene crystals.

Incipient alteration of the olivine to either serpentine or to iddingsite, is evident from the section.

A.W.G. WHITTLE
24th October 1980.

806296



LEGEND

TERTIARY	Tb — Basalt	Ordovician	Gordon Limestone	DEVONIAN	Dolcoath Granite
CARBONIFEROUS	C — Sediments		Moina Sandstone / Roland Conglomerate		Dove Granite
	Unconformity		Unconformity		F——F Fault
SILURIAN	Eldon Group	CAMBRIAN	V V Volcanics		Aeromagnetic Anomaly
			Unconformity		
		PreCambrian	Quartzite		

5 cm

0 1 2 Mile

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA	
REGIONAL GEOLOGY	
82-1728 Vol 3\5	
Scale 1:63,360	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/148
DATE 27-8-81	AUTHOR W.D. SMYTH
DRAWN O. HEDDITCH	OFFICE DEVONPORT

806297

1538

LEGEND

- Sediments / Basalt — TERTIARY
- Dolcoath Granite — DEVONIAN
- Gordon Limestone (LS) — ORDOVICIAN
- Moina Sandstone — ORDOVICIAN
- Roland Conglomerate — ORDOVICIAN
- Volcanics — CAMBRIAN

NOTE:
DOM - Dept. of Mines diamond drill holes.
DH - H.E.C. diamond drill holes.
SMD - Comalco diamond drill holes.
MD - S.C.O.A. diamond drill holes.

Mineralized quartz veins

Fault

LEA RIVER

WILMOT RIVER

LIMIT OF GRIDDING

GAIRDNER DAM

D.H. 4548

DH 4546

DH 4543

DH 4539

DIAG. LINE 2
3000 mN

DH 4558

DH 4542

DH 4554

DH 4514

DH 4577

DIAG. LINE 1
3000 mN

DH 4580

MD 36

MD 38

MD 37

MD 34

MD 33

MD 35

SMD 12

SMD 10

SMD 5

SMD 11

SMD 4

SMD 14
1000 mN

DOM 1

SMD 17

SMD 21

SMD 9
1000 mN

SMD 20

SMD 22

SMD 8

SMD 23

DOM 2

DOM 3

00 mN

1000 W

IRIS RIVER

BISMUTH CREEK

SMD 7
MD 40

SMD 15
SMD 28

SMD 6

SMD 29

MD 42

ML 1

MD 39

MD 43

MD 32

SMD 24
SMD 25

SMD 13

ML 2

SMD 30
SHEPHERD & MURPHY
MINE AREA

SMD 16

ML 3

FAULT

SMD 27

1000 E

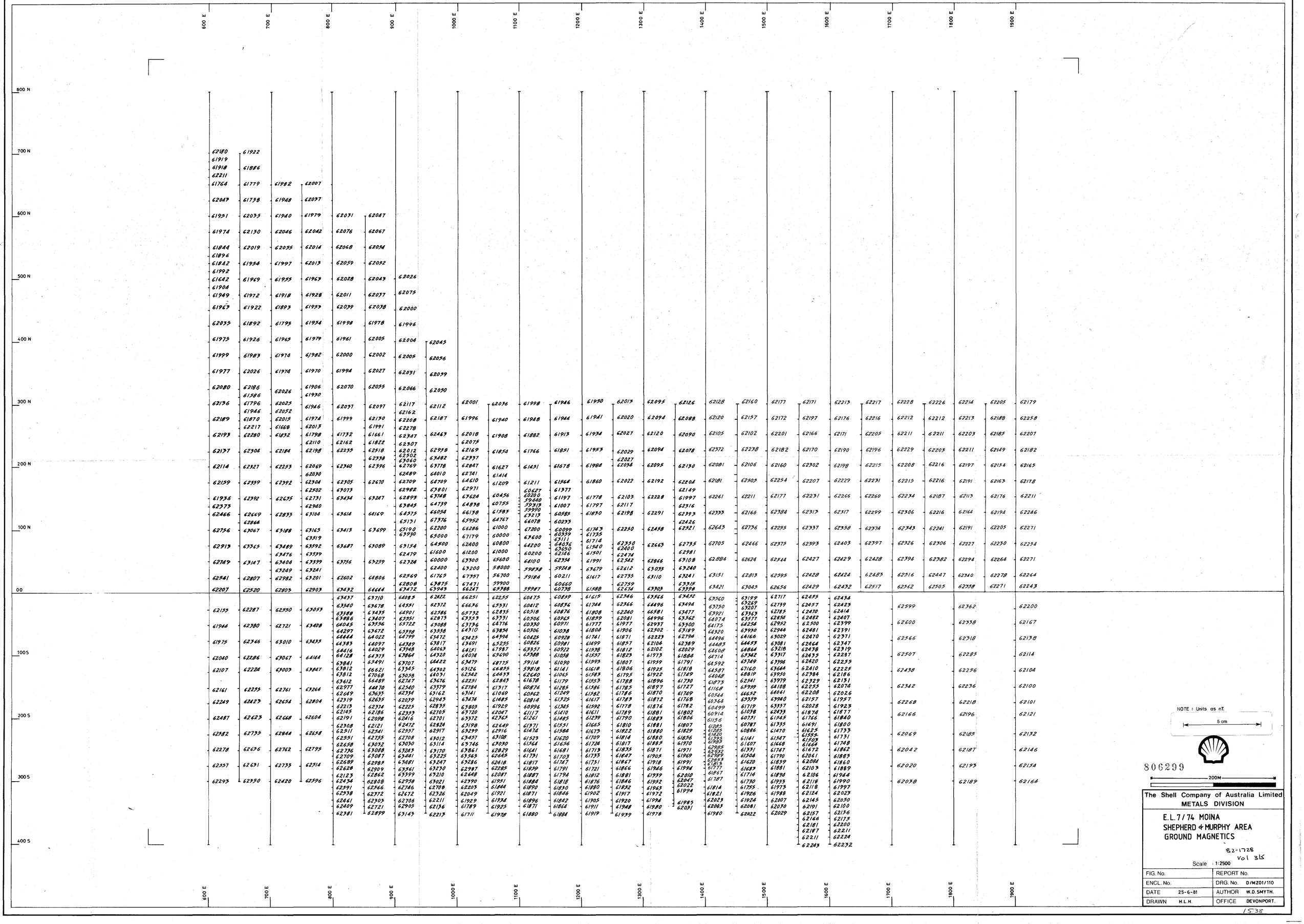
806298

5 cm

0 100 200M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SHEPHERD & MURPHY AREA GEOLOGY & DIAMOND DRILL HOLE LOCATION GRID EXTENT 82-1728 Scale 1:5000 Vol 3/5	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/062
DATE 14 - 4 - 81	AUTHOR W.D. SMYTH
DRAWN O. HEDDITCH	OFFICE DEVONPORT

1538



NOTE : Units as nT.

5 cm

806299

200M

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA SHEPHERD & MURPHY AREA GROUND MAGNETICS	
82-1728 Vol 315	
Scale : 1:2500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/110
DATE 25-6-81	AUTHOR W.D.SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT.

15 38

200N 150N 100N 050N 000 050S 100S 150S 200S

610 600 590 580 570

MD 39

MD 32

quartzite scree

intense shearing
Hugos Fault
c/a 10 -40°

strong
brecciation

quartz vein brecc.
amph mag sk mat

pink sanidine veining
accessory coarse
scheelite
steep dipping
sheets

wrigglite breccia

brecciated

brecciated

Hornfels
Py.
Hornfels
Py.
Py. Sph.
Py.

46·88m @ 0·24% Sn (0·2% cut off)

67·36m @ 0·21% Sn (0·1% cut off)

17·64m @ 0·13% W
(0·1 % cut off)

29·97m @ 0·11% W
(0·05 % cut off)

806300

5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SHEPHERD & MURPHY AREA SECTION 1300 E LITHOLOGICAL 82-1728 Vol 315 Scale : 1:500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/043
DATE 11-12-80	AUTHOR W.D. SMYTH
DRAWN O. HEDDITCH	OFFICE DEVONPORT

1538

610 200N 150N 100N 050N 000 050S 100S 150S 200S 610

600 600

MD 39 MD 32

590 590

580 580

570 570

<1	300	
<1	200	
<1	50	
<1	300	
3	1500	4000 Cu 2000 Zn
1	300	
<1	250	
<1	600	
<1	100	
<1	<50	
30	<50	
6	<50	
2	<50	
8	50	
1	100	
1	<50	
8	50	
6	70	
12	70	
10	45	
<4	25	
10	55	
22	50	
8	60	
40	60	
20	120	
16	140	
16	320	
100	120	1650 Cu
280	70	
360	490	
480	310	
350	640	
490	600	
380	480	
480	140	155 Mo
510	110	
1800	250	
700	200	
1150	330	
1300	170	
850	150	
1200	140	
220	160	
4000	190	
1100	220	
2000	480	
730	360	
870	120	
440	10	
990	<10	
860	30	
200	<50	
200	<50	
32	<10	
270	<10	2700 Zn
80	<50	
24	<10	
70	<10	
200	<50	
330	620	
80	100	
2	50	
26	50	
46	100	

20	30
55	170
150	170
200	210
220	310
150	170
390	110
580	160
380	220
640	170
130	140
400	100
3000	340
2300	165
2630	180
2460	130
2900	200
2800	380
2400	130
2150	100
3100	330
2100	150
2750	170
3450	140
2150	190
1850	200
2600	150
1950	330
2000	150
1850	130
400	80
2500	140
3400	120
2650	160
1200	150
3200	110
4000	240
3490	170
2890	160
2690	590
2100	540
2150	840
1700	380
1700	330
380	45
1650	1180
1750	1450
1900	690
1610	1400
1810	1280
1698	780
1785	835
1673	2000
1200	2000
1500	840
1055	2160
1620	880
1188	1180
1059	630
800	1150
660	530
600	330
820	370
890	130
980	180
838	540
600	280
580	310
740	140
520	350
860	480
380	85
280	330
310	180
730	540
240	700
160	60
60	680
75	55
150	110
100	70
130	260
70	350
60	180
55	160
55	130
65	60
65	370
67	1190
320	880
46	110
60	90
50	80
50	50
44	45
65	60
820	90
1400	80
1120	530
42	70
160	140
52	46

5 cm

NOTE : Analyses in ppm

Sn W

0 10 20 30M

806301

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SHEPHERD & MURPHY AREA SECTION 1300 E ASSAYS 82-1728 vol 315 Scale : 1 500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D / MZ 01/048
DATE 23-1-81	AUTHOR W.D.SMYTH
DRAWN O. HEDDITCH	OFFICE DEVONPORT

1538

N 400 350 300 250 200 150 100 050 000 S

R.L. 550

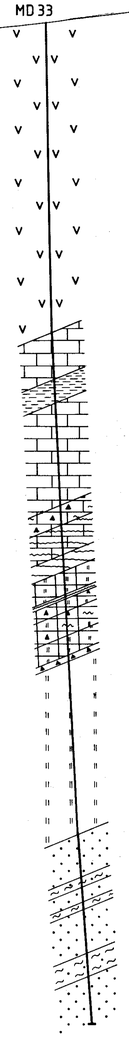
500

450

400

350

MD 33



806302

Bearing of section line 000° M.

5 cm

The Shell Company of Australia Limited METALS DIVISION	
MOINA E.L. 7/74 SHEPHERD & MURPHY AREA SECTION 650 E LITHOLOGY 82-1728 Scale : 1:500 W01315	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/047
DATE OCTOBER 1980	AUTHOR S.D. LEE
DRAWN O. HEDDITCH	OFFICE DEVONPORT

400 N | 350 N | 300 N | 250 N | 200 N | 150 N | 100 N | 50 N | 00 S

R.L. 550

500

450

400

350

MD 33

8	12
510	130
1255	260
430	40
1300	475
760	290
1160	205
60	210
30	100
40	170
45	1245
55	6900
35	220

NOTE : Analyses in ppm.

Sn | W

5 cm

0 10 20 30 M

806303

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
SHEPHERD & MURPHY AREA
SECTION 650 E
ASSAYS

82-1728
vol 315

Scale : 1:500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/118
DATE 24-7-81	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT

1539

200N 150N 100N 50N 00 50S 100S 150S 200S

MD 34

SMD 12 (52M.E.)

SMD 5 (33M. W)

R.L. 500m

Actinolite

Actinolite

Po, Py.

LEGEND

- Tertiary basalt
- Sand clay
- Gordon limestone
- Siltstone
- Moina sandstone
- Wrigglite
- Garnet skarn
- Diopside skarn
- Quartzite

5 cm

0 10 20 30M

806304

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SHEPHERD & MURPHY AREA SECTION 400 E LITHOLOGICAL 82-1728 Vol 3&5 1539 Scale 1:500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/045
DATE 24-7-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

200N | 150N | 100N | 50N | 00 | 50S | 100S | 150S | 200S

MD 34

SMD 12

SMD 5

R.L. 500 m

7	15
12	160
120	10
7	10
850	13
1030	550
1900	1550
65	325
22	1650
15	105

16	15
280	80
80	10
660	190
605	60
1010	120
325	230
780	260
130	55
38	75

80	<10
1010	510
1345	1080
400	355
1030	520
840	590
535	985
1880	780
390	470
75	170

NOTE : Analyses in ppm.

Sn | W

5 cm

0 10 20 30 M

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
SHEPHERD & MURPHY AREA
SECTION 400E
ASSAYS

82-1728
Vol 8(5.

Scale 1:500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/117
DATE 19-1-81	AUTHOR W.D. SMYTH.
DRAWN O. HEDDITCH	OFFICE DEVONPORT

806305

1537

1000 N | 1050 N | 1100 N | 1150 N | 1200 N | 1250 N | 1300 N | 1350 N | 1400 N

SMD 9 | MD 35 | MD 34

R.L. 500

Po

Po

Actinolite

129.70M

L.S

161.40M

Actinolite

196.00M

LEGEND

- Tertiary basalt
- Sand clay
- Gordon limestone
- Siltstone
- Wrigglite
- Garnet skarn
- Diopside skarn
- Chlorite skarn
- Magnetite skarn
- Quartzite
- Breccia
- Shearing

0 10 20 30 M

5 cm

806306

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
SHEPHERD 4 MURPHY AREA
1000 – 1400 N LINE 1
LITHOLOGY

82-1728
Vol 315

Scale 1:500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/130
DATE 17-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

1539

1000 N | 1050 N | 1100 N | 1150 N | 1200 N | 1250 N | 1300 N | 1350 N | 1400 N

SMD 9 — MD 35 — MD 34 — R.L. 500

SMD 9		MD 35		MD 34	
		5	<10	7	15
880	240				
1000	182				
183	318				
460	345				
113	280				
1433	433				
389	72				
890	20				
610	205				
120	60				
320	100				
105	150				
129.70M		170	65	12	160
		1050	640	120	10
		1040	920	7	10
		1450	800	850	13
		680	1070	1030	550
		1300	1000	1900	1550
		940	760	65	325
		1690	1440	22	1650
		1100	580	15	105
		950	1010	196.00M	
		320	520		
		145	190		
		110	3000		
		60	103		
		95	1300		
		43	107		
		161.40M			

NOTE : Analyses in ppm.

Sn | W

0 10 20 30 M

5 cm

806307

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
SHEPHERD 4 MURPHY AREA
1000 — 1450 N LINE 1
ASSAYS

82-1728 vol 3/5

Scale 1:500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/132
DATE 18-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

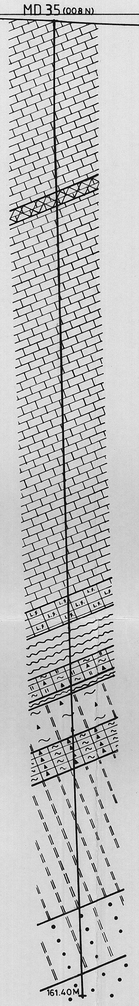
1539

200 N | 150 N | 100 N | 50 N | 00 | 50 S | 100 S | 150 S | 200 S

500 R.L.

MD 35 (00 8 N)

500 R.L.



5 cm

0 10 20 30M

The Shell Company of Australia Limited METALS DIVISION	
MOINA E.L. 7/74 SHEPHERD & MURPHY AREA SECTION 250 E LITHOLOGY 82-1728 Vol 3/5 Scale 1:500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/071
DATE 28-4-81	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT.

806308

1539.

200 N | 150 N | 100 N | 50 N | 00 | 50 S | 100 S | 150 S | 200 S

R.L. 500 — R.L. 500

MD 35 (008 N)

5	<10
170	65
1050	640
1040	920
1450	800
680	1070
1300	1000
940	760
1500	1440
1100	580
950	1010
320	520
145	190
110	3000
60	103
95	1300
43	107
161.40M	

NOTE: Analyses in ppm.

Sn W

0 10 20 30M

The Shell Company of Australia Limited
METALS DIVISION

E.L.7/74 MOINA
SHEPHERD & MURPHY AREA
SECTION 250 E
ASSAYS

82-1728 Vol 3|5

Scale 1:500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/114
DATE 15-7-81	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT.

806309

5 cm

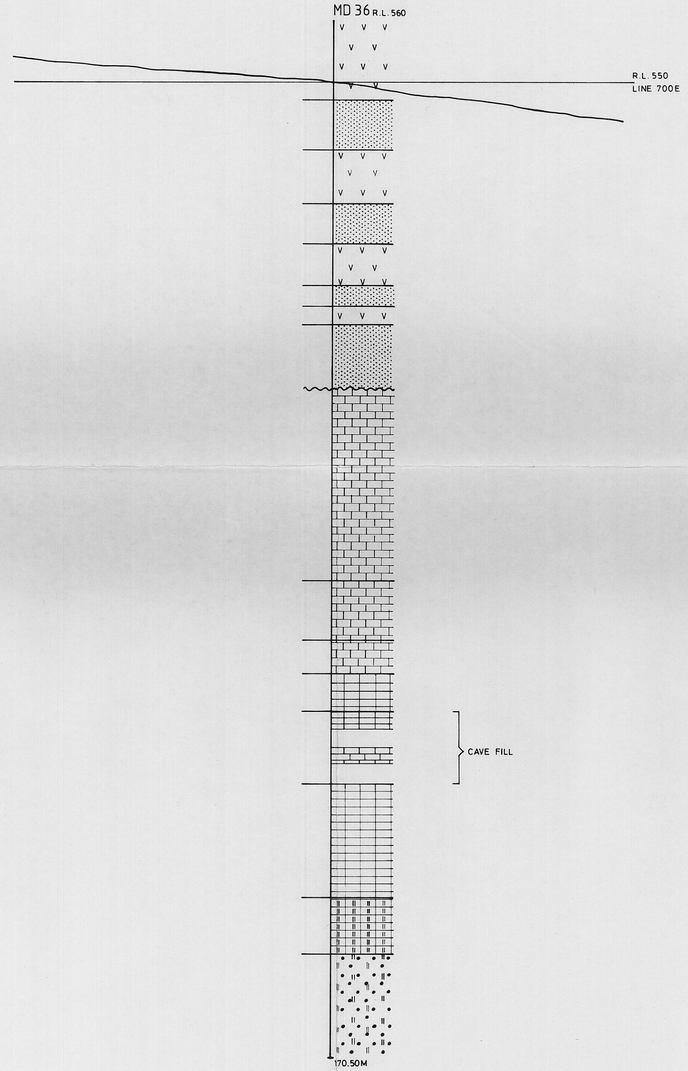
1540

700N

650N

648 N

600N



0 10 20 30M

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA SHEPHERD & MURPHY AREA SECTION 700E, 600-700N LITHOLOGY 82-1728 Vol 3i5	
Scale 1:500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/094
DATE 29-5-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

806310

5 cm

1540

700 N

650 N

648 N

600 N

MD 36 R.L. 560

No samples taken

<50

<10

45

<10

20

15

<10

10

6

<4

8

<4

10

12

16

170.50M

NOTE: Analyses in ppm.

W | Sn

5 cm

0 10 20 30M

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA SHEPHERD & MURPHY AREA SECTION 700E, 600N-700N ASSAYS 82-1228 Vol 3\5	
Scale 1:500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/095
DATE 29-5-81	AUTHOR W.D.SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

806311

1540

1400 N
1450 N
1500 N
1550 N
1600 N
1650 N
1700 N
1750 N

MD 34

MD 37

MD 38

R.L. 500

CAVE

CAVE

Actinolite

Po.Py-Tremolite

176.60M

196.00M

B.C.F.?

Actinolite

Hornfels

2631.0M

LEGEND

- Tertiary basalt
- Sand clay
- Gordon limestone
- Siltstone
- Wrigglite
- Garnet skarn
- Diopside skarn
- Chlorite skarn
- Magnetite skarn
- Quartzite
- Breccia
- Shearing

5 cm

0 10 20 30 M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SHEPHERD & MURPHY AREA 1400—1750 N LINE 1 LITHOLOGY 82-1728 Vol 3\5	
Scale : 1:500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/131
DATE 13-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

806312

1540

1400 N | 1450 N | 1500 N | 1550 N | 1600 N | 1650 N | 1700 N | 1750 N

R.L. 500

MD 34

MD 37

MD 38

7 15

<1 <50

12 160
120 10
7 10
850 13
1030 550
1900 1550
65 325
22 1650
15 105
196.00M

350 10
605 75
600 210
9 <50
176.60M

<1 <50
<4 10
1 <50
<4 <10
<1 <50
17 <10
240 <10
<4 <10
8 <50
8 13
1 <50
16 <10
2 <50
263.10M

NOTE : Analyses in ppm.

Sn W

5 cm

0 10 20 30 M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SHEPHERD & MURPHY AREA 1400 – 1750 N LINE 1 ASSAYS 82-1728 Vol 315 Scale : 1:500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/133
DATE 13-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

806313

1546

200 N | 150 N | 100 N | 50 N | 00 | 50 S | 100 S | 150 S | 200S

550m RL

BISMUTH CREEK FAULT

MD 41

MD 7

150.70m
53mW

157.00m
54mW

MD 40

LEGEND

- Tertiary basalt
- Siltstone
- Moina sandstone
- Wrigglite
- Garnet skarn
- Garnet diopside skarn
- Magnetite skarn
- Shearing

0 10 20 30M

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
Shepherd & Murphy Area
Section 975E
LITHOLOGY

82-1728
Vol 315

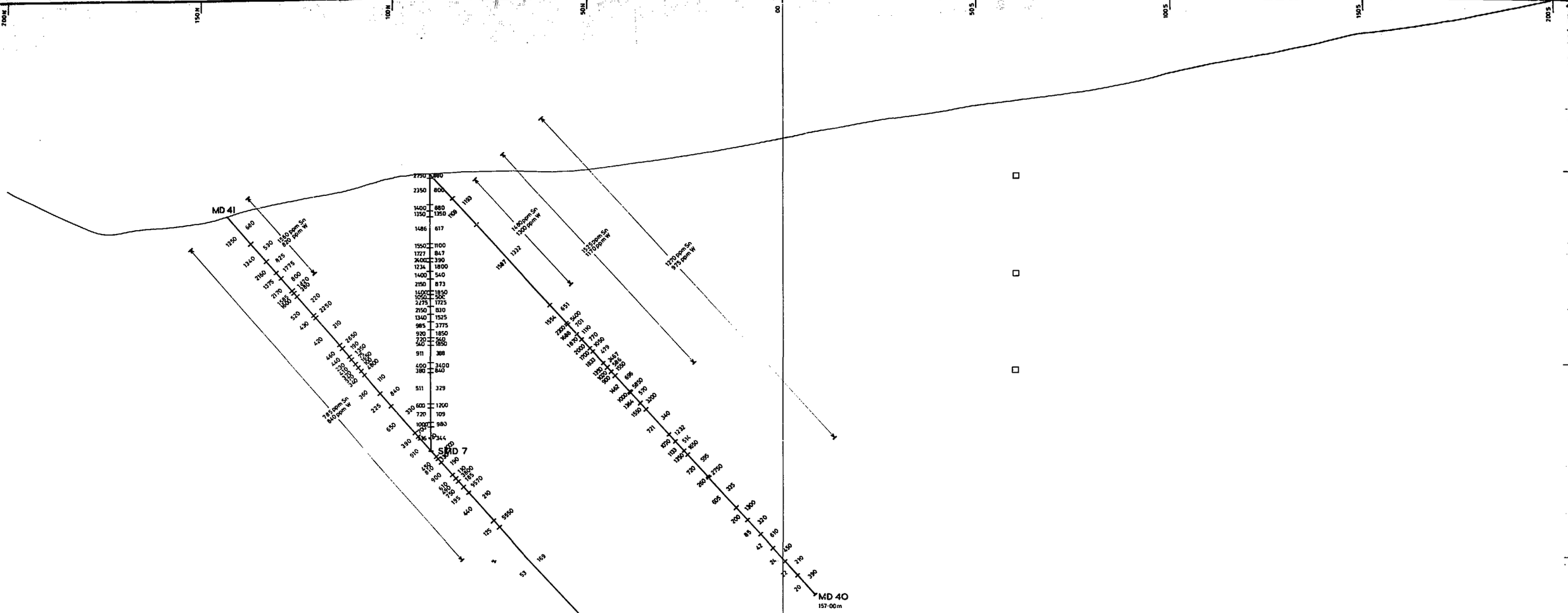
Scale 1:500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/068
DATE 23-4-81	AUTHOR W.D.S.
DRAWN H.L.H.	OFFICE DEVONPORT.

806314

5 cm

1540



The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SECTION 975E SHEPHERD & MURPHY AREA ASSAYS Scale : 1:500 1541	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/107
DATE 16-6-81	AUTHOR W.D. SMYTH
DRAWN Q. HEDDITCH	OFFICE DEVONPORT

200 W

100 W

00N

100 S

200 S

No. 6 LODE

No. 5 LODE

ML 1 (20% CY)

MD 42 (15% CY)

550M R.L.

Py

BISMUTH CREEK FAULT

0 10 20 30M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SHEPHERD & MURPHY AREA SECTION 1150 E LITHOLOGY	
Scale 1:500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/M2011/109
DATE	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT

1541

200 N | 100 N | 000 | 100 S | 200 S

No. 6 LODE

No. 5 LODE

ML 1 (220M E)

MD 42 (15M E)

550M R.L.

15	310
20	75
5	135
10	65
380	125
1350	475
240	190
435	305
420	210
490	135
180	80
65	85

BISMUTH CREEK FAULT

NOTE : Analyses in ppm.

Sn W

0 10 20 30M

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
SHEPHERD + MURPHY AREA
SECTION 1150 E
ASSAYS

Scale 1:500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/M201/145
DATE 26-8-81	AUTHOR W.D.SMYTH.
DRAWN H.L.N.	OFFICE DEVONPORT

15441

200N 150N 100N 50N 00 50S 100S 150S 200S

MD 43

SMD 13

SMD 16

R.L. 600m

HUGO'S FAULT

ML 3A

TD 325.00 Metres

LEGEND

SEDIMENTS / VOLCANICS

RECENT
- Slope talus soil

TERTIARY
- Basalt
- Sand clay

ORDOVICIAN
- Limestone
- Siltstone
- Sandstone
- Conglomerate

CAMBRIAN
- Acid - intermediate volcanics

INTRUSIVES

DEVONIAN
- Dalcoath Granite

SKARNS

- Wrigglite
- Garnet skarn
- Diopside skarn
- Chlorite skarn
- Amphibole skarn
- Magnetite skarn
- Sulphide skarn
- Recrystalized quartzite

ALTERATION / STRUCTURAL

- Breccia
- Veining/stockworks
- Layering core angle
- Shearing core angle

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
SHEPHERD & MURPHY AREA
SECTION 1450E
LITHOLOGY

Scale : 1 500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/042
DATE 19-1-84	AUTHOR
DRAWN O. HEDDITCH	OFFICE DEVONPORT

200N | 150N | 100N | 50N | 00 | 50S | 100S | 150S | 200S

RL 600m

MD 43

SMD 13

SMD 16

ML 3A

Cu 12%

Mo 9500

Zn up to 640 ppm Generally 4100 ppm

Zn <100 ppm

NOTE : Analyses in ppm

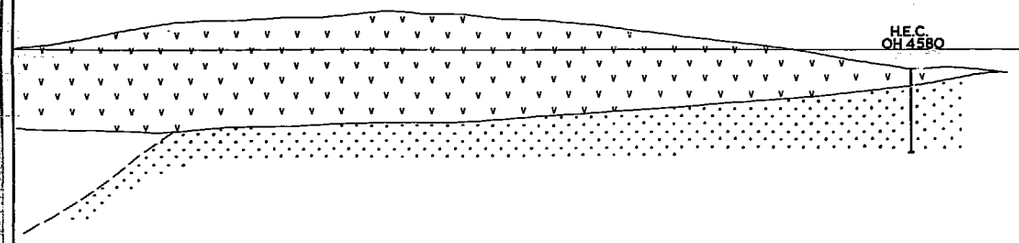
W Sn

0 10 20 30 M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SHEPHERD & MURPHY AREA SECTION 1450 E ASSAYS	
Scale : 1·500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/044
DATE 19-1-81	AUTHOR W. D. SMYTH
DRAWN Q. HEDDITCH	OFFICE DEVONPORT

15441

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N



2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

The Shell Company of Australia Limited
METALS DIVISION

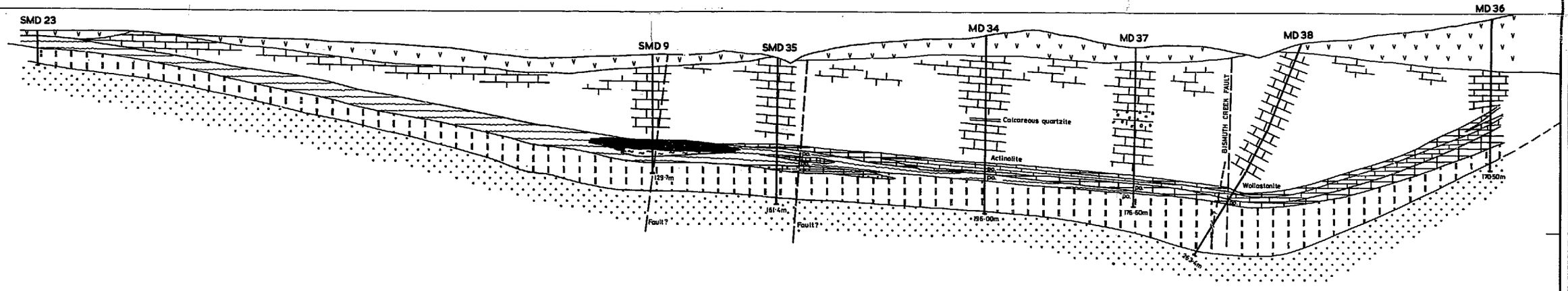
E.L.1174 MOINA
SHEPHERD & MURPHY AREA
SW - NE DRILL SECTION LINE 1
GEOLOGY

1544

Scale 1 2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/058
DATE 18 - 3 - 81	AUTHOR W D SMYTH
DRAWN O HEDDITCH	OFFICE DEVONPORT

100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N 1800N 1900N 2000N



LEGEND

- Tertiary basalt mudstone
- Limestone
- Magnetite - chlorite - pyrrhotite skarn.
- Garnet skarn.
- Chlorite - actinolite - garnet skarn.
- Magnetite garnet diopside / Wrigglite skarns.
- Diopxide - garnet skarn.
- Interbedded Wrigglite / diopside skarn / Metasiltstone
- Diopside skarn / metasiltstone / TRANSITION ZONE
- Quartzite / Moina Sandstone

100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

The Shell Company of Australia Limited
METALS DIVISION

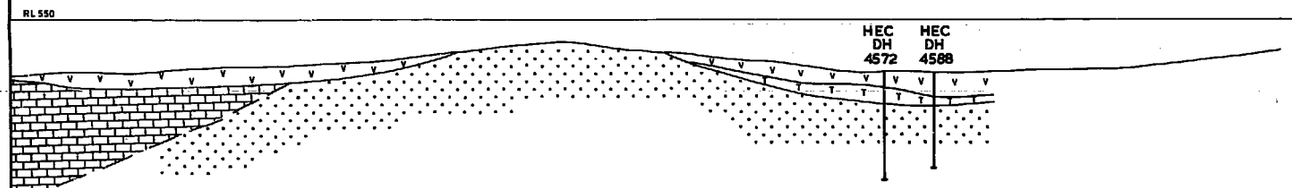
E.L.7/74 MOINA
SHEPHERD & MURPHY AREA
SW - NE DRILL SECTION LINE 1
GEOLOGY
1542

Scale : 1:2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/058
DATE 18 - 3 - 81	AUTHOR W. D. SMYTH
DRAWN D. HEDDITCH	OFFICE DEVONPORT

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

RL 550



2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

LEGEND

- Tertiary basalt
- Tertiary sediments
- Moina sandstone
- Gordon limestone

200M

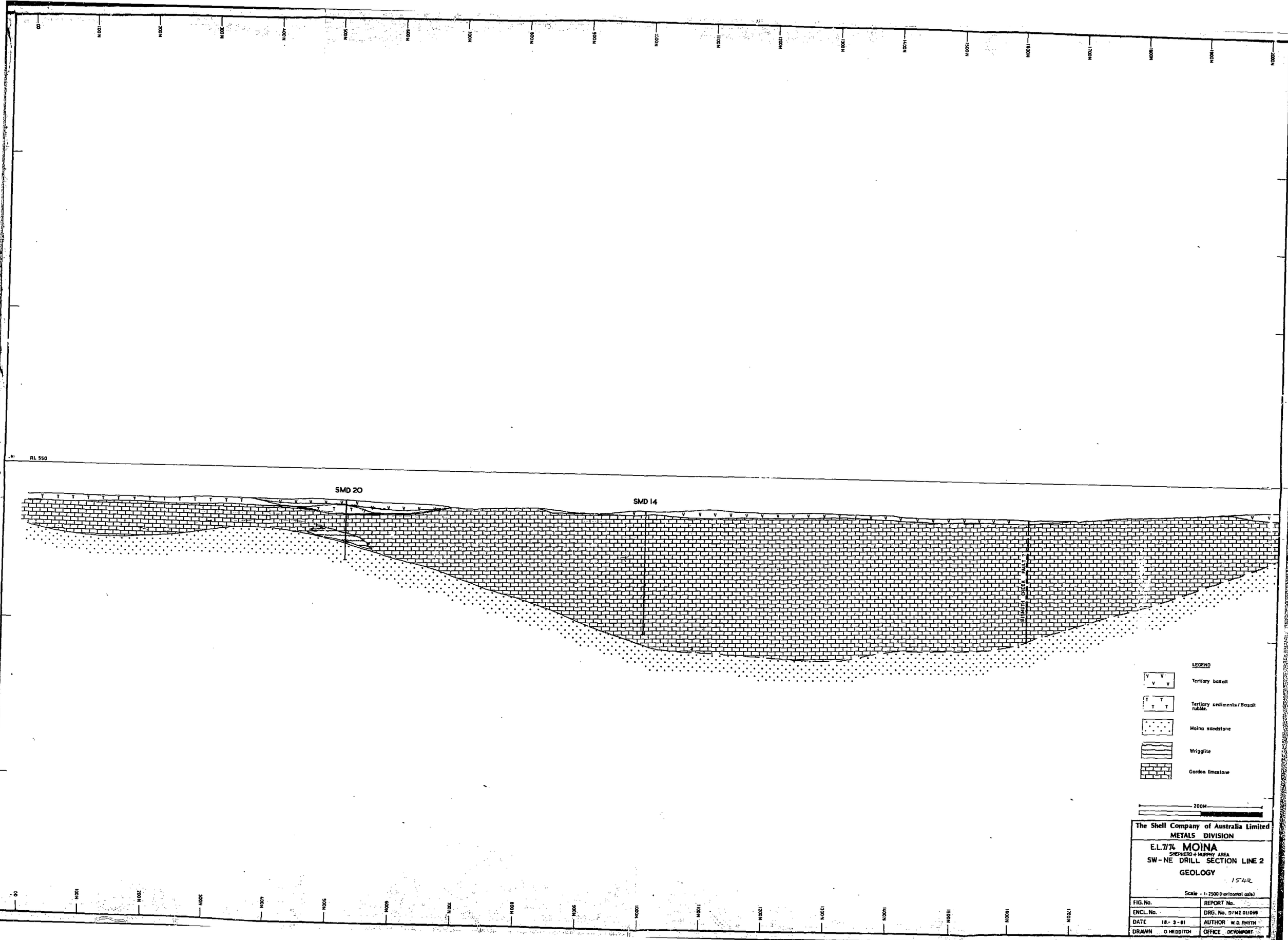
The Shell Company of Australia Limited
METALS DIVISION

E.L.7/74 MOINA
SHEPHERD + MURPHY AREA
SW - NE DRILL SECTION LINE 2
GEOLOGY

1542

Scale : 1:2500 (horizontal axis)

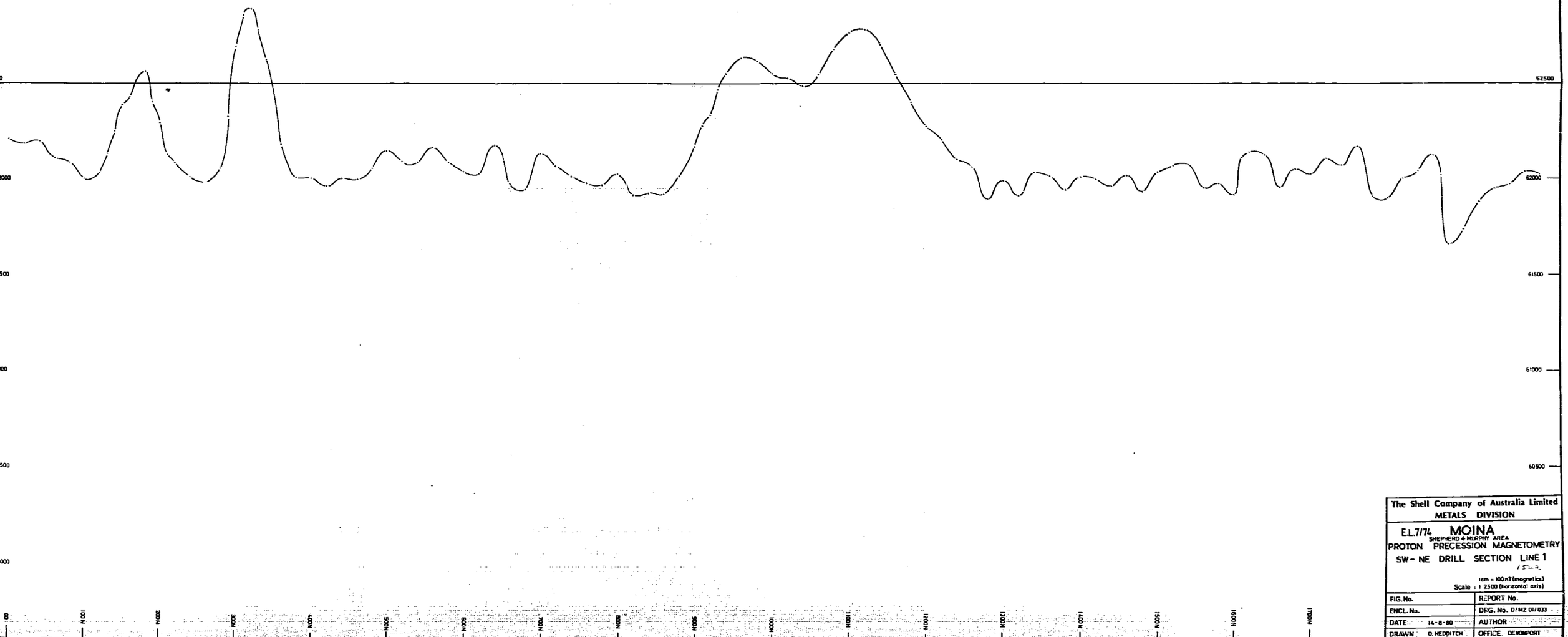
FIG. No.	REPORT No.
ENCL. No. -	DRG. No. D/MZ 01/059
DATE 18 - 3 - 81	AUTHOR W.D. SMYTH
DRAWN O. HEDDITCH	OFFICE DEVONPORT



RL 550
SMD 20
SMD 14
BISMUTH CREEK FAULT ?
LEGEND
Tertiary basalt
Tertiary sediments/Basalt rubble.
Moina sandstone
Wrigglite
Gordon limestone
200M
The Shell Company of Australia Limited
METALS DIVISION
E.L.7/74 MOINA
SHEPHERD + MURPHY AREA
SW-NE DRILL SECTION LINE 2
GEOLOGY
1542
Scale : 1:2500 (horizontal axis)
FIG. No.
REPORT No.
ENCL. No.
DRG. No. D/MZ 01/058
DATE 18-3-81
AUTHOR W.D. SMYTH
DRAWN O. HEDDITCH
OFFICE DEVONPORT

0 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

65000
64500
64000
63500
63000
62500
62000
61500
61000
60500
60000



0 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

The Shell Company of Australia Limited
METALS DIVISION

E.L.7174 MOINA
SHEPHERD & MURPHY AREA
PROTON PRECESSION MAGNETOMETRY
SW - NE DRILL SECTION LINE 1

1cm = 100nT (magnetics)
Scale : 1 2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. DMZ 01/033
DATE 14-8-80	AUTHOR
DRAWN D. HEDDITCH	OFFICE DEVONPORT

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

65000
64500
64000
63500
63000
62500

culture

62000
61500
61000
60500
60000

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

The Shell Company of Australia Limited
METALS DIVISION

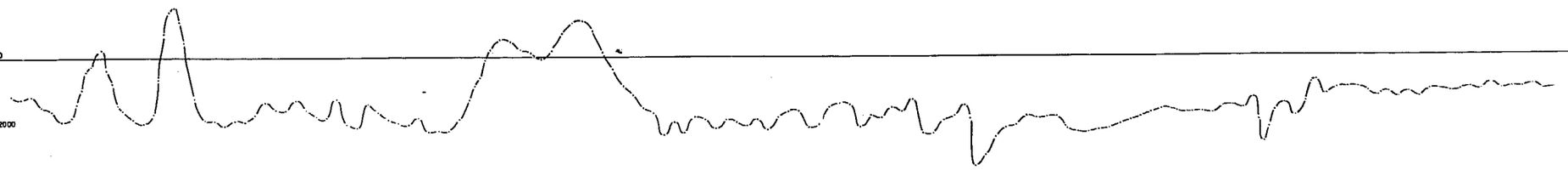
E.L.7/74 MOINA
SHEPHERD & MURPHY AREA
PROTON PRECESSION MAGNETOMETRY
SW - NE DRILL SECTION LINE 1
1542

1cm = 100nT (magnetics)
Scale : 1:2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/034
DATE 14 - 8 - 80	AUTHOR
DRAWN O. NEDDITCH	OFFICE DEVONPORT

00 500N 1000N 1500N 2000N 2500N 3000N

64000
63500
63000
62500
62000
61500
61000



00 500N 1000N 1500N 2000N 2500N 3000N

The Shell Company of Australia Limited
METALS DIVISION

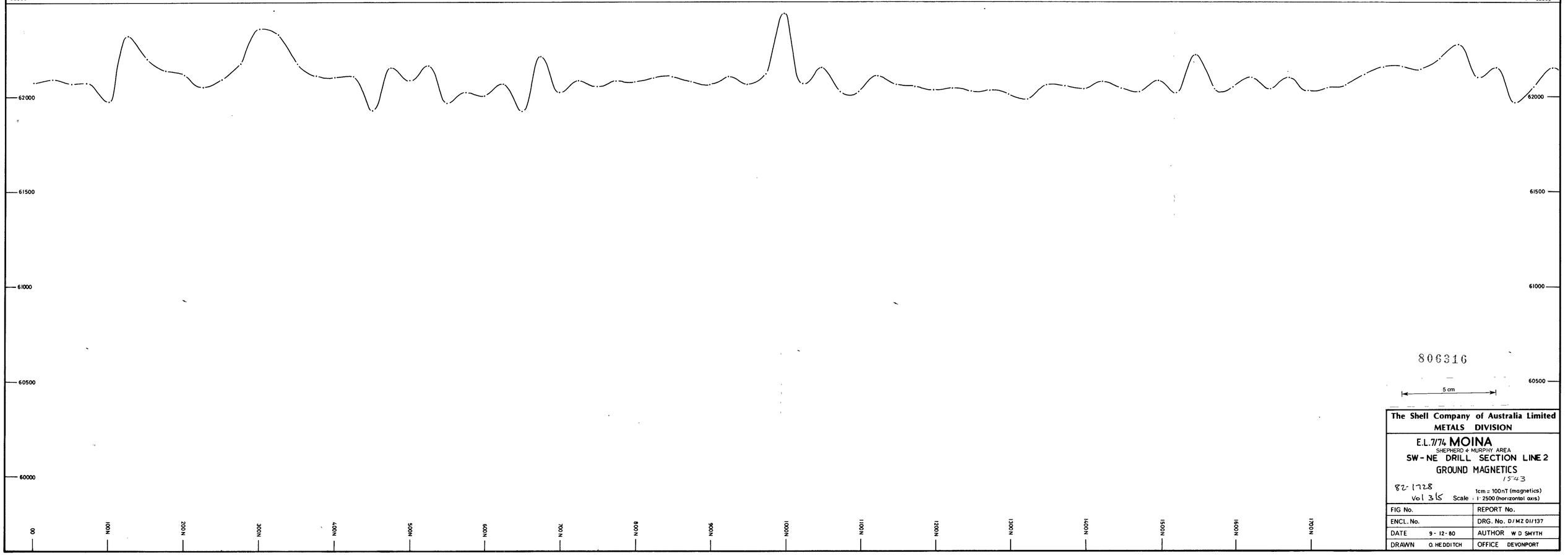
E.L 7/74 MOINA
SHEPHERD & MURPHY AREA
PROTON PRECESSION MAGNETOMETRY
SW - NE DRILL SECTION LINE 1

1cm = 200nT (magnetics)
Scale 1:5000 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/03
DATE 15-8-80	AUTHOR
DRAWN G HEDDITCH	OFFICE DEVONPORT

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N 1800N 1900N 2000N

65000
64500
64000
63500
63000
62500



62000
61500
61000
60500
60000

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

806316

5 cm

The Shell Company of Australia Limited
METALS DIVISION

E.L.7/74 **MOINA**
SHEPHERD & MURPHY AREA
SW-NE DRILL SECTION LINE 2
GROUND MAGNETICS

1543

82-1728
Vol 315

1cm = 100nT (magnetics)
Scale : 1:2500 (horizontal axis)

FIG No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/137
DATE 9-12-80	AUTHOR W D SMYTH
DRAWN O. HEDDITCH	OFFICE DEVONPORT

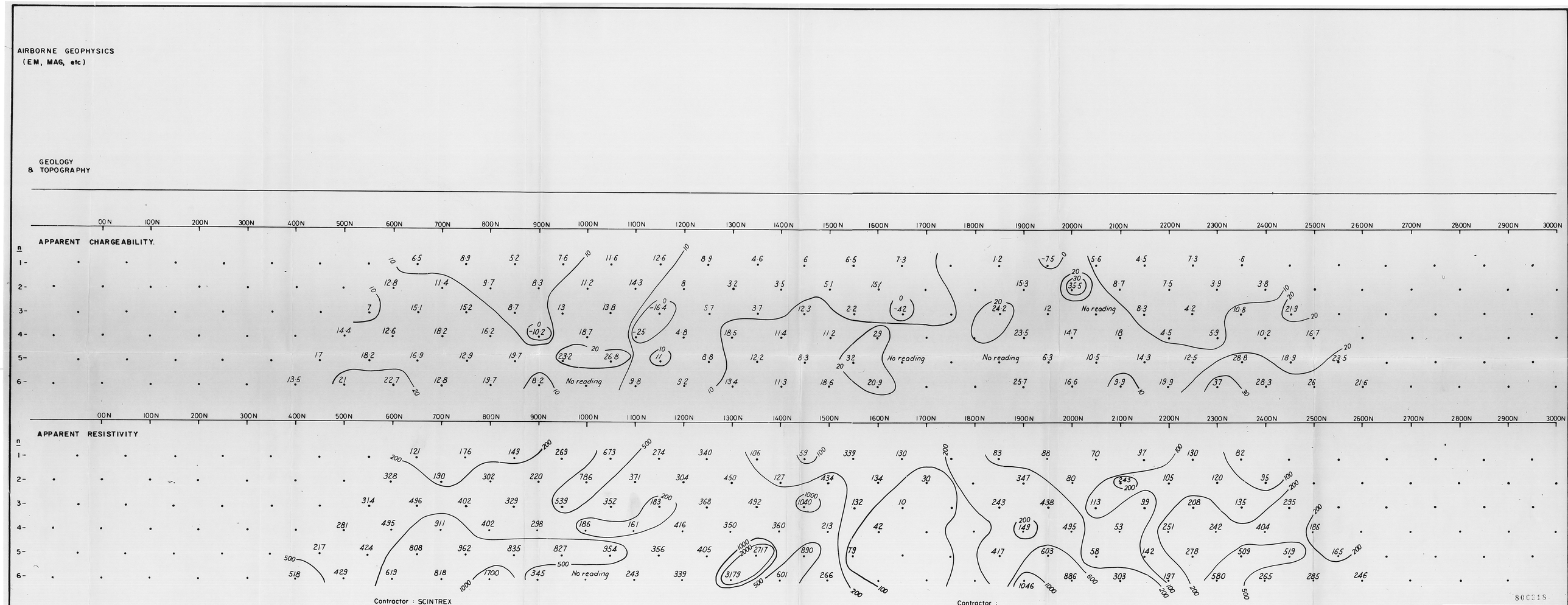
2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

65000
64500
64000
63500
63000
62500
62000
61500
61000
60500
60000

806317

5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 **MOINA** SHEPHERD & MURPHY AREA SW - NE DRILL SECTION LINE 2 GROUND MAGNETICS 82-1728 Vol 3\5 1543 Scale 1.2500 (horizontal axis)	
FIG. No	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/137
DATE 9 - 12 - 80	AUTHOR W D SMYTH
DRAWN O HEDDITCH	OFFICE DEVONPORT



Contractor : SCINTREX
Date : 3-8-80
Timing : 2 SEC.
Transmitter : IPC 2·5KW
Receiver : IPR 8
Integration time :
Array : DIPOLE - DIPOLE
Dipole length : 100 m

Contractor :
Date :
Timing :
Transmitter :
Receiver :
Integration time :
Array :
Dipole length :

80C318

The Shell Company of Australia Limited
METALS DIVISION

IP / RESISTIVITY SURVEY
MOINA E.L. 7 74
LINE 1
82-1728 Vol 315 1523
SCALE 1:2500

CALC. No.	REPORT No.
ENG. No.	DRG. No. D/MZ01/138
DATE 24 10 80	AUTHOR
DRAWN O.H.	DESIGN D'PORT

2000 N 2100N 2200 N 2300 N 2400N 2500N 2600N 2700N 2800N 2900N 3000 N

FSR Phase

150
140
130
120 +8
110 +4
100 0
90 -4
80 -8
70

FENCE ROAD

LOW SIGNAL

(CURRENT CABLE)

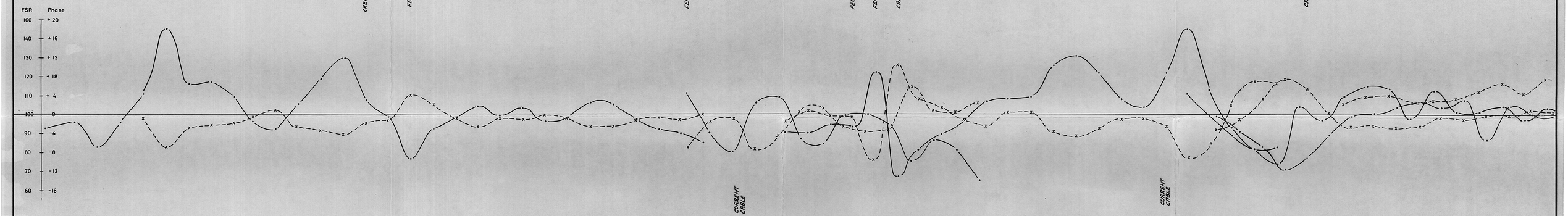
2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

806319

5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA SHEPHERD & MURPHY AREA SW-NE DRILL SECTION LINE 1 TURAM EM	
82-1728 Vol 3/5 1543	
Scale 1 2500 (horizontal axis)	
FIG No.	REPORT No
ENCL No	DRG. No. D/MZ 01/049
DATE JAN 1981	AUTHOR SCINTREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

00 N 100 N 200 N 300 N 400 N 500 N 600 N 700 N 800 N 900 N 1000 N 1100 N 1200 N 1300 N 1400 N 1500 N 1600 N 1700 N 1800 N 1900 N 2000 N



SMD 8 offset

SMD 22 Skarn 93-110

SMD 9 Skarn 95-105

MD 35 Skarn 96-124

PYO SKARN

'POST OFFICE' FAULT

MD 34 Skarn 161-196

MD 37

BCF ?? (mag.)

MD 38

MD 36 Skarn 161-170

5 cm

NOTE: -x-----x- Phase difference.
Field strength ratio.
SOURCE: Grounded cable 1400m long.
Frequency >400 H

806320

The Shell Company of Australia Limited
METALS DIVISION

E.L.7/74 **MOINA**
SHEPHERD-MURPHY AREA
SW-NE DRILL SECTION LINE 1
TURAM E.M.

82-1728 Vol 3 1543

Scale : 1:2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/049
DATE JAN. 1981	AUTHOR SCINTREX
DRAWN O. HEDDITCH	OFFICE DEVONPORT

00 N 100 N 200 N 300 N 400 N 500 N 600 N 700 N 800 N 900 N 1000 N 1100 N 1200 N 1300 N 1400 N 1500 N 1600 N 1700 N

2000 N | 2100N | 2200 N | 2300 N | 2400 N | 2500N | 2600N | 2700 N | 2800 N | 2920 N | 3000 N

POWERLINE 100 HOST

x Phase
FSR

CURRENT CABLE

2000N | 2100N | 2200 N | 2300N | 2400 N | 2500N | 2600N | 2700N | 2800N | 2920N | 3000N

806321

5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA. SHEPHERD + MURPHY AREA SW - NE DRILL SECTION LINE 2 TURAM EM 1544 82-1728 Vol 315 Scale 1 2500 (horizontal axis)	
FIG No	REPORT No.
ENCL No.	DRG No. D/MZ 01/139
DATE JAN 1981	AUTHOR SCINTREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

00 | 100N | 200N | 300N | 400N | 500N | 600N | 700N | 800N | 900N | 1000N | 1100N | 1200N | 1300N | 1400N | 1500N | 1600N | 1700N | 1800N | 1900N | 2000N

FSR | Phase

170 | 160 | 150 | 140 (+16) | 130 (+12) | 120 (+8) | 110 (+4) | 100 (0) | 90 (-4) | 80 (-8) | 70 (-12) | 60 (-16) | 50 | 40

FENCE

FENCES ROAD

FENCE CREEK

FENCE

FENCE CREEK

FENCE

CREEK

CURRENT CABLE

CURRENT CABLE

CURRENT CABLE

00 | 100N | 200N | 300N | 400N | 500N | 600N | 700N | 800N | 900N | 1000N | 1100N | 1200N | 1300N | 1400N | 1500N | 1600N | 1700N | 1800N | 1900N | 2000N

806322

NOTE: —x—x— Phase difference
—•—•— Field strength ratio
Source: Grounded cable 1400 m long
Freq. = 4.00 HZ

5 cm

The Shell Company of Australia Limited
METALS DIVISION

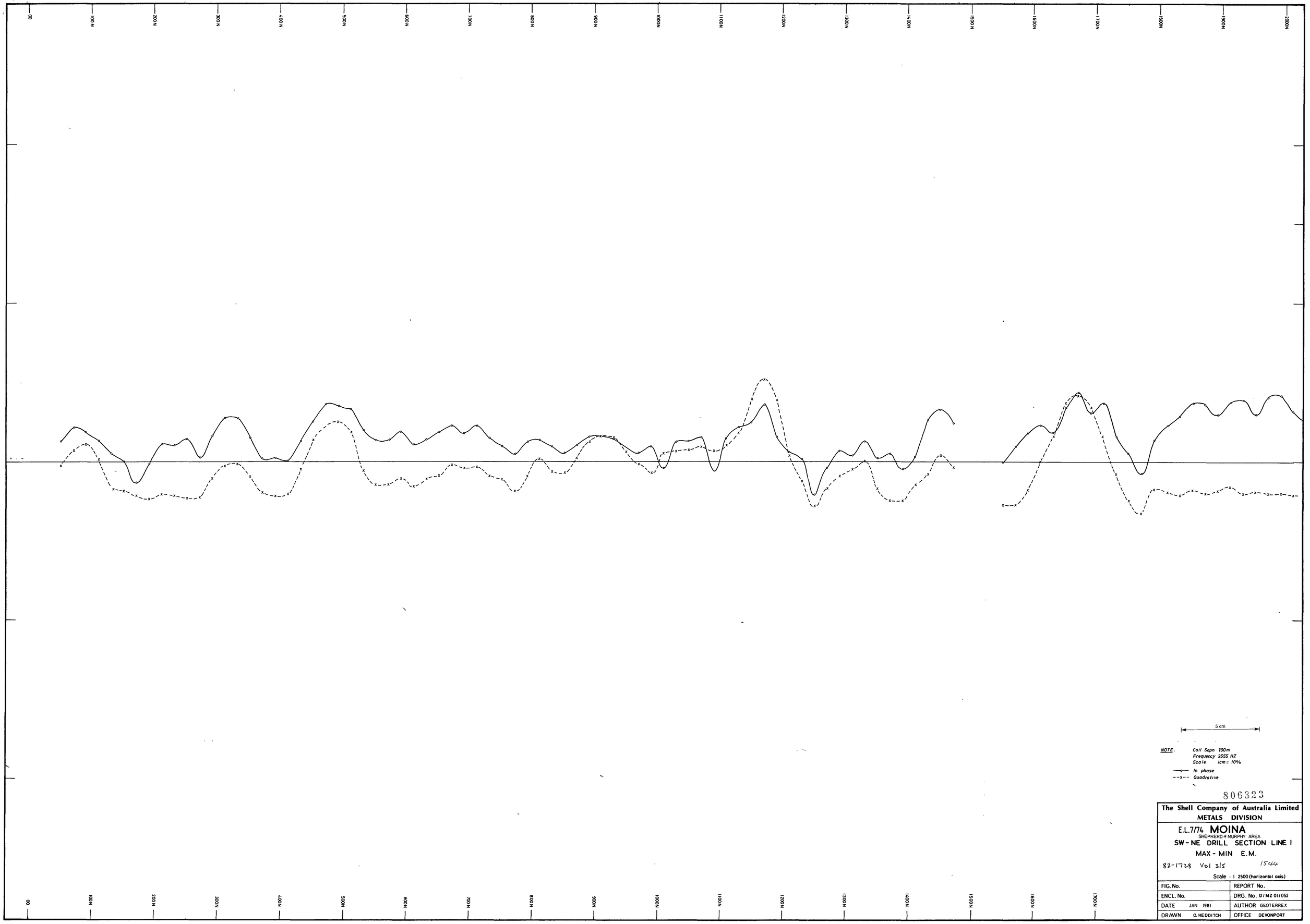
E.L. 7/74 **MOINA**
SHEPHERD & MURPHY AREA
SW - NE DRILL SECTION LINE 2
TURAM EM

82-1728
Vol 315

1544

Scale : 1: 2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/139
DATE JAN. 1981	AUTHOR SCINTREX
DRAWN Q. HEDDITCH	OFFICE DEVONPORT



5 cm

NOTE. Coil Sepn 100m
Frequency 3555 HZ
Scale 1cm = 10%
In phase
Quadrative

806323

The Shell Company of Australia Limited
METALS DIVISION

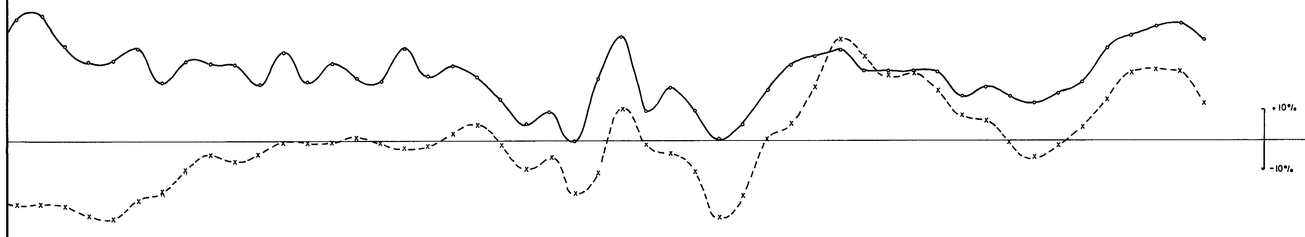
E.L.7/74 **MOINA**
SHEPHERD & MURPHY AREA
SW - NE DRILL SECTION LINE 1
MAX - MIN E.M.

82-1728 Vol 3/5 15444

Scale : 1 2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 011/052
DATE JAN 1981	AUTHOR GEOTERREX
DRAWN O. HEDDITCH	OFFICE DEVONPORT

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N



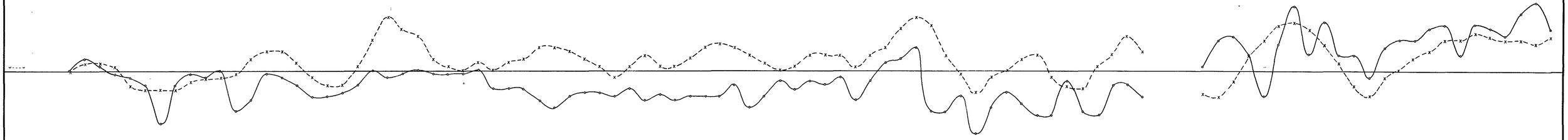
2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

806324

5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA SHEPHERD & MURPHY AREA SW - NE DRILL SECTION LINE 1 MAX - MIN E.M. 82-1728 Vol 315 1544 Scale 1 2500 (horizontal axis)	
FIG. No	REPORT No.
ENCL No	DRG No. D/MZ 01/052
DATE JAN. 1981	AUTHOR GEOTERREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N 1800N 1900N 2000N



00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

NOTE : *Coil separation 100m*
Frequency 888 HZ.
Scale 1cm = 5%
—x— In phase
—o— Quadrative

806325

5 cm

The Shell Company of Australia Limited
METALS DIVISION

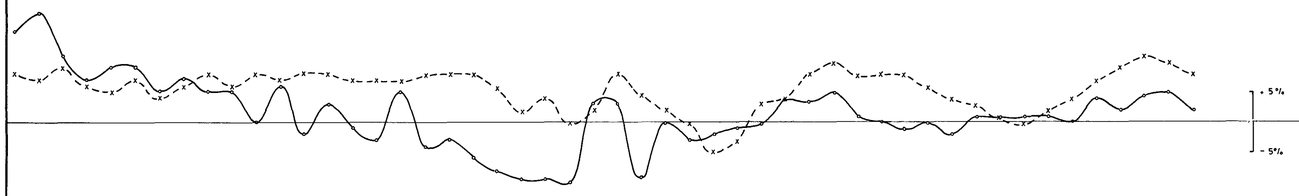
E.L.7/74 **MOINA**
SHEPHERD & MURPHY AREA
SW - NE DRILL SECTION LINE 1
MAX - MIN E.M.

82-1728 Vol 315 1544

Scale : 1: 2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/053
DATE JAN. 1981	AUTHOR GEOTERREX
DRAWN O. HEDDITCH	OFFICE DEVONPORT

2000 N
2100 N
2200 N
2300 N
2400 N
2500 N
2600 N
2700 N
2800 N
2900 N
3000 N



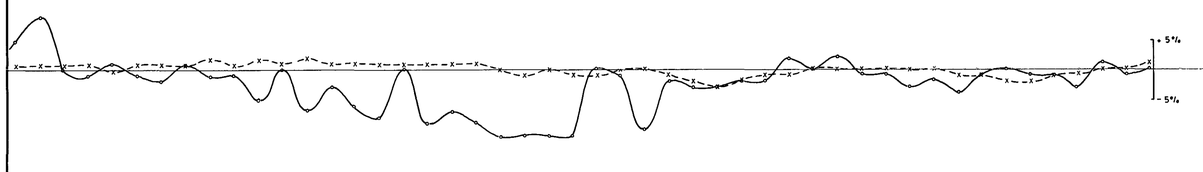
2000 N
2100 N
2200 N
2300 N
2400 N
2500 N
2600 N
2700 N
2800 N
2900 N
3000 N

806326

5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 **MOINA** SHEPHERD ◂ MURPHY AREA SW - NE DRILL SECTION LINE 1 MAX - MIN E.M. 82-1728 vol 315 15544 Scale 1 2500 (horizontal axis)	
FIG No.	REPORT No.
ENCL No	DRG. No. D/MZ 01/053
DATE JAN 1981	AUTHOR GEOTERREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N



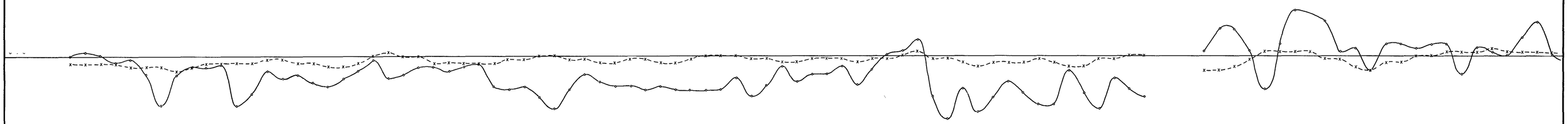
2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

806327

5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L.1174 MOINA SHEPHERD & MURPHY AREA SW - NE DRILL SECTION LINE 1 MAX - MIN E.M. 82-1728 Vol 3/5 1545 Scale 1 2500 (horizontal axis)	
FIG No	REPORT No.
ENCL No	DRG No. D/MZ 01/054
DATE JAN. 1981	AUTHOR GEOTERREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N 1800N 1900N 2000N



00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

5 cm

NOTE : Coil separation 100m.
Frequency 222 HZ
Scale 1cm = 5%
—o— In phase
--x-- Quadrative

806328

The Shell Company of Australia Limited
METALS DIVISION

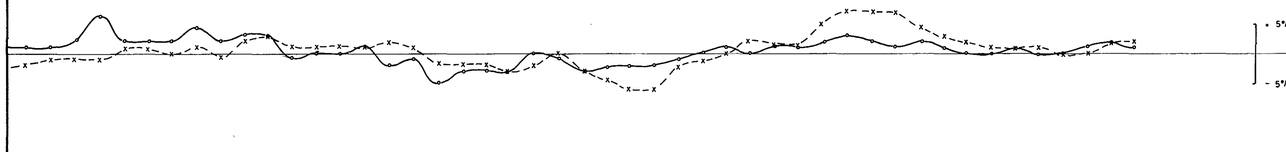
E.L.7/74 **MOINA**
SHEPHERD & MURPHY AREA
SW - NE DRILL SECTION LINE 1
MAX - MIN E.M.

82-1728 Vol 3/5 15-45

Scale . 1·2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/054
DATE JAN 1981	AUTHOR GEOTERREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N



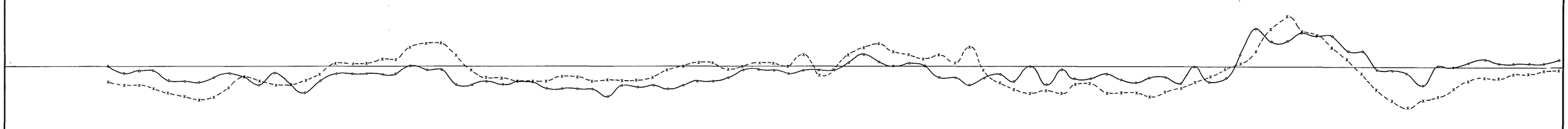
2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

806329

5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA SHEPHERD + MURPHY AREA SW - NE DRILL SECTION LINE I MAX - MIN E.M. 82/1728 Vol 3/5 1545 Scale 1 2500 (horizontal axis)	
FIG No	REPORT No.
ENCL No.	DRG No D/MZ 01/055
DATE JAN. 1981	AUTHOR GEOTERREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N 1800N 1900N 2000N



00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

5 cm

NOTE. Coil separation 200m
Frequency 222HZ
Scale 1cm = 5%
—o— In Phase
--x-- Quadrative.

806330

The Shell Company of Australia Limited
METALS DIVISION

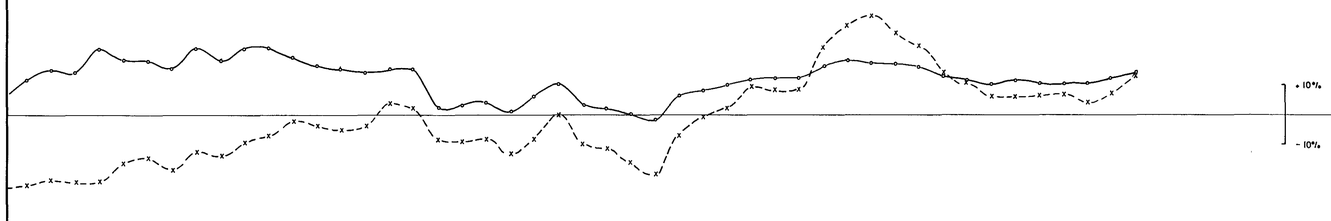
E.L. 7174 **MOINA**
SHEPHERD + MURPHY AREA
SW - NE DRILL SECTION LINE 1
MAX - MIN E.M.

82-1728 Vol 3/5 1545

Scale : 1 2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/055
DATE JAN 1981	AUTHOR GEOTERREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N



2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

806331

5 cm

The Shell Company of Australia Limited
METALS DIVISION

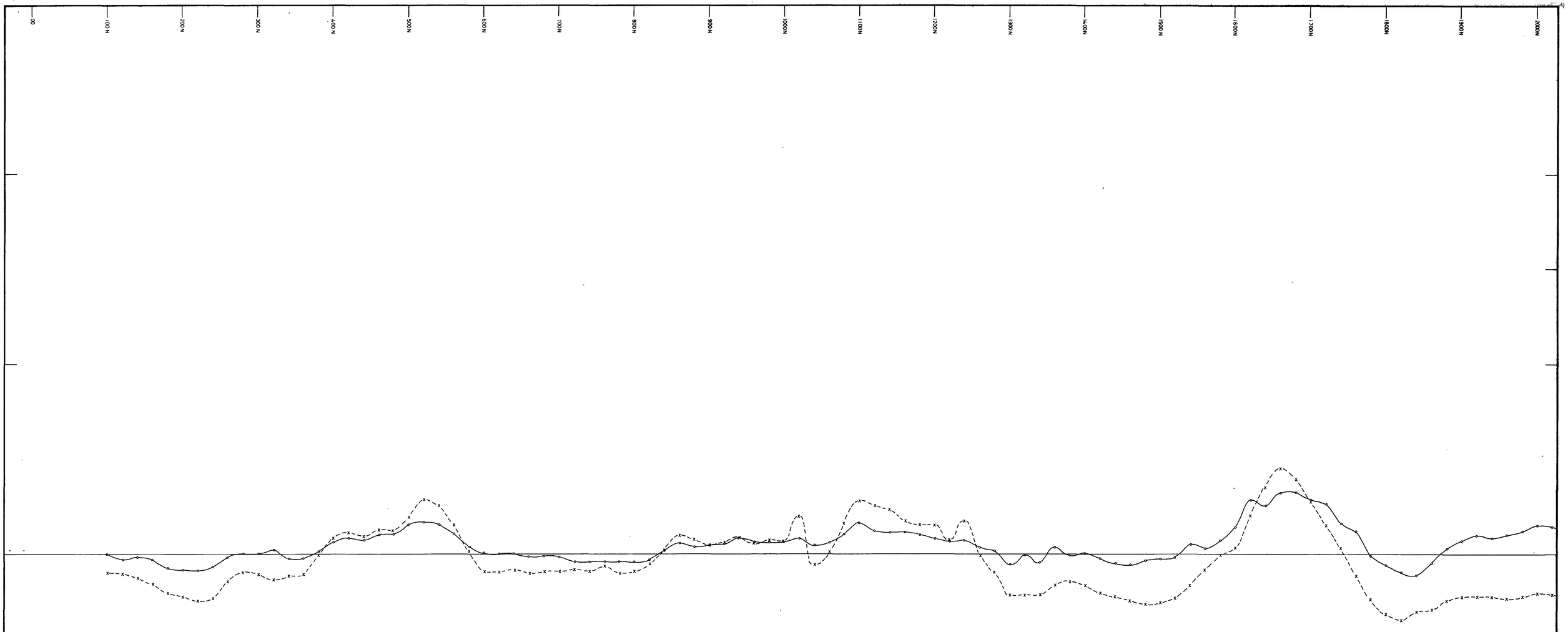
E.L.7/74 **MOINA**
SHEPHERD & MURPHY AREA
SW - NE DRILL SECTION LINE I
MAX - MIN E.M.

82-1728
Vol 3.5
1545

Scale - 1 2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL No	DRG No D/MZ 01/056
DATE JAN. 1981	AUTHOR GEOTERREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N 1800N 1900N 2000N



00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

NOTE: Coil separation 200m
Frequency 888 HZ.
Scale: 1cm = 10%
—o— In phase.
--x-- Quadrature.

5 cm

806332

The Shell Company of Australia Limited
METALS DIVISION

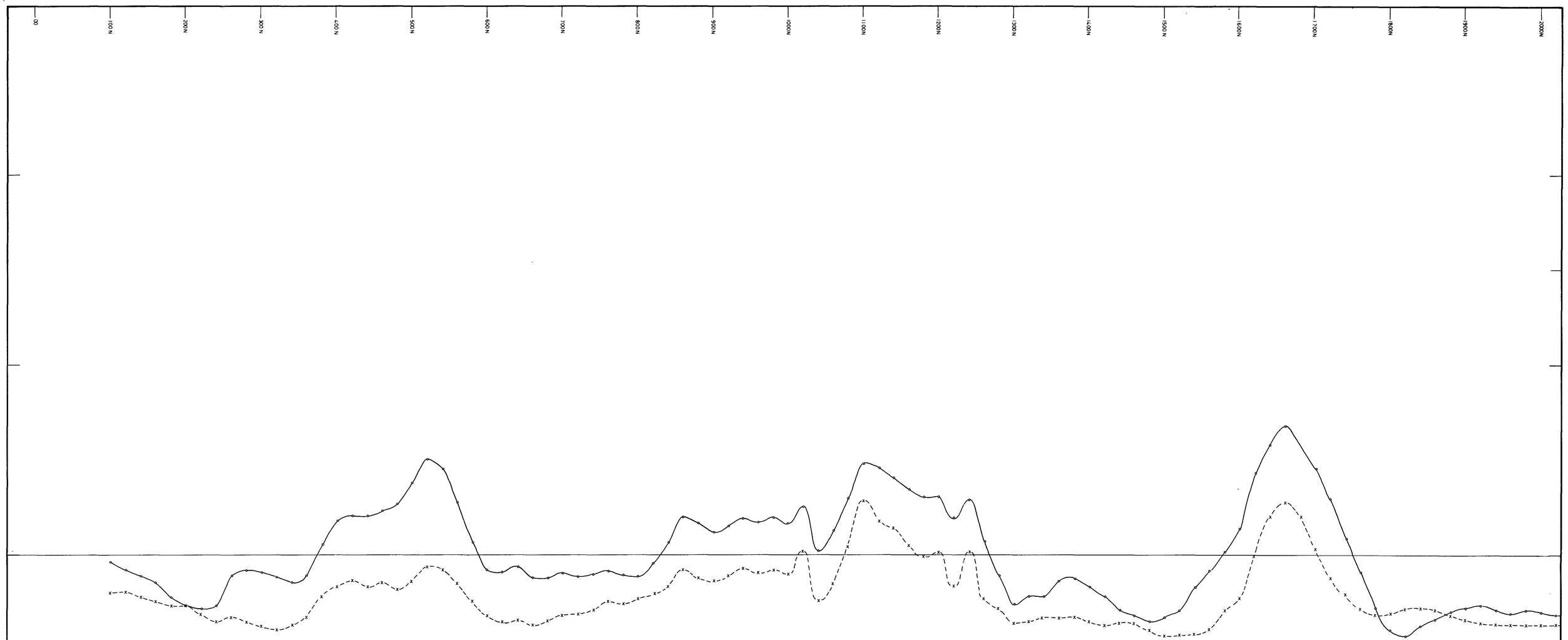
E.L.7/74 **MOINA**
SHEPHERD & MURPHY AREA
SW - NE DRILL SECTION LINE 1
MAX - MIN E.M.

82-1728
Vol 3/5
1545

Scale : 1 2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/056
DATE JAN 1981	AUTHOR GEOTERREX
DRAWN O. HEDDITCH	OFFICE DEVONPORT

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N 1800N 1900N 2000N



00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

5 cm

NOTE: Coil separation 200m
Frequency 3555 HZ.
Scale 1cm = 20%
—o— In phase.
--x-- Quadrative

806333

The Shell Company of Australia Limited
METALS DIVISION

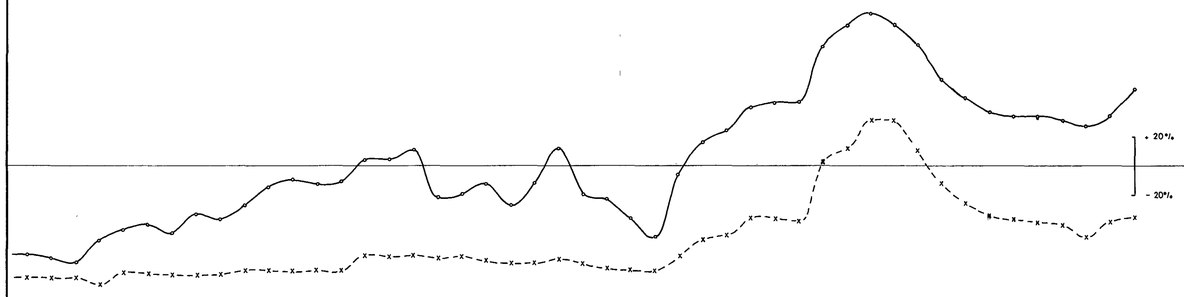
E.L.7/74 **MOINA**
SHEPHERD & MURPHY AREA
SW - NE DRILL SECTION LINE 1
MAX - MIN E.M.

82-1728
Vol 315
1546

Scale 1 2500 (horizontal axis)

FIG. No	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/057
DATE JAN 1981	AUTHOR GEOTERREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N



2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

806334

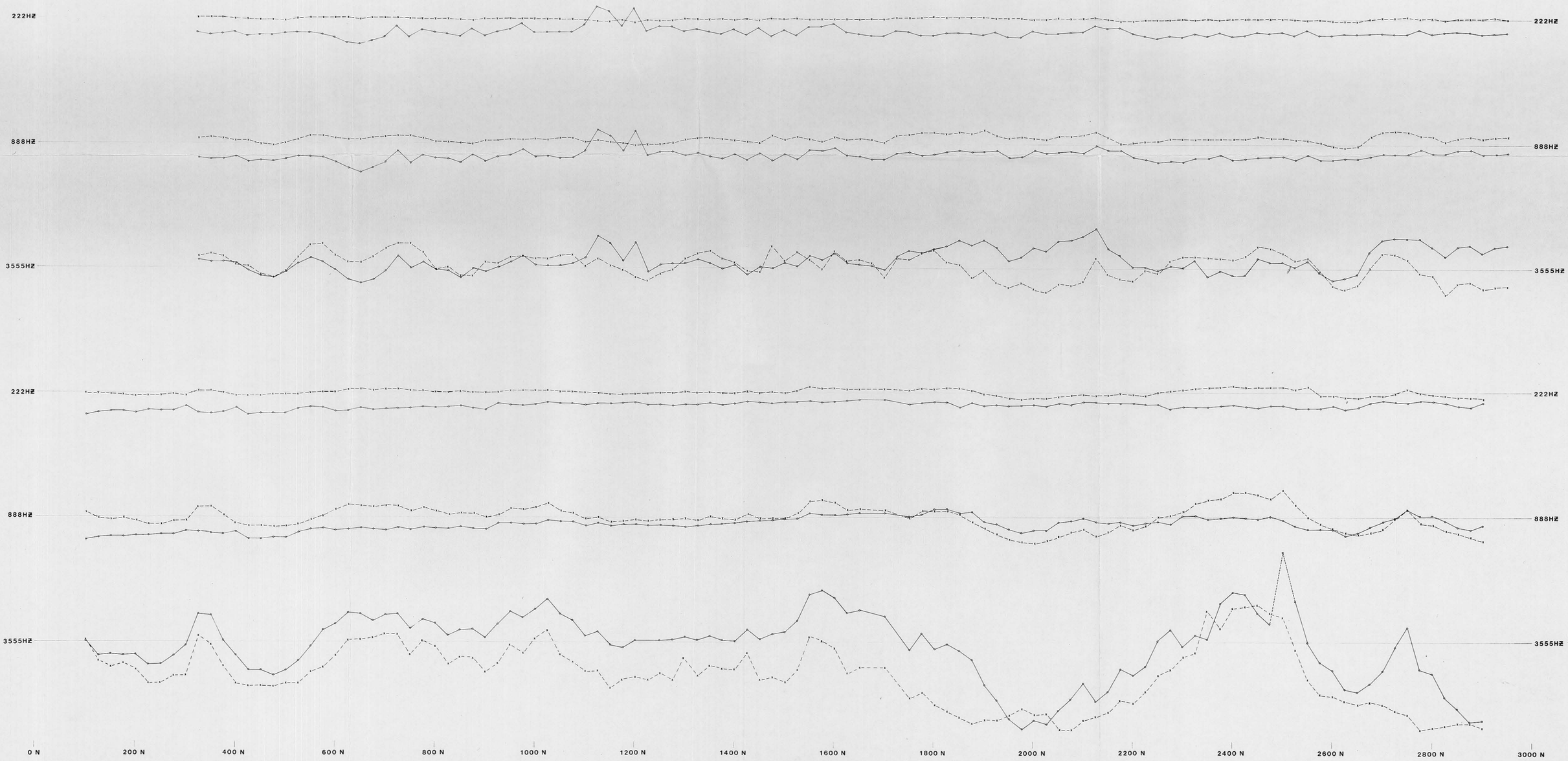
5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA SHEPHERD-MURPHY AREA SW-NE DRILL SECTION LINE 1 MAX-MIN E.M.	
82-1728 Vol 315 1546	
Scale 1 2500 (horizontal axis)	
FIG No.	REPORT No.
ENCL No	DRG No. D/MZ 01/057
DATE JAN. 1981	AUTHOR GEOTERREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

MOINA MAX-MIN SURVEY

JOB#85-1277-FOR SHELL

LINE 2, 25/1/81



LEGEND

In-phase Scale 1cm=10%

Quadrature

5 cm

806335

82-1728
Vol 315

The Shell Company of Australia Limited
METALS DIVISION

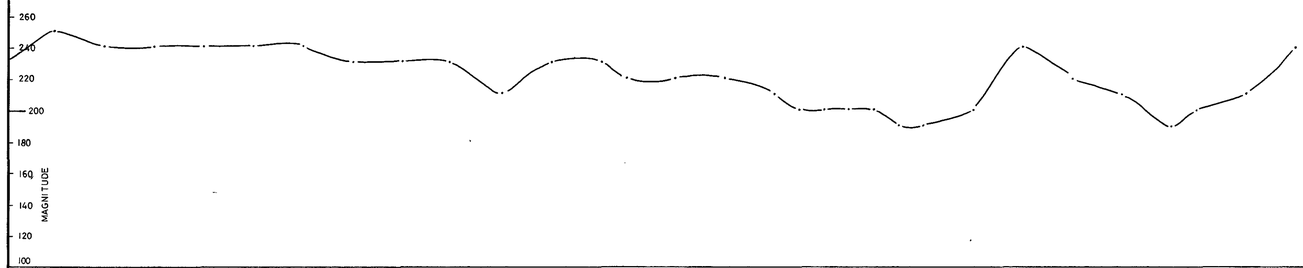
E.L.7/74 MOINA
Shepherd-Murphy area.
SW-NE DRILL SECTION LINE 2
MAX-MIN EM 1546

Scale 1:5000 (horiz)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. MZ017/1064
DATE JAN '81	AUTHOR GEOTERREX
DRAWN V.Caton	OFFICE AHO-MELB

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

260
240
220
200
180
160
140
120
100
MAGNITUDE



40
0
-10
INCLINATION



2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

806330

5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 **MOINA** SHEPHERD & MURPHY AREA SW-NE DRILL SECTION LINE 1 V.L.F. TEST	
82-1728 Vol 3/5	1546
Scale : 1:2500 (horizontal axis)	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/140
DATE 9-12-80	AUTHOR W D SMYTH
DRAWN O HEDDITCH	OFFICE DEVONPORT

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N 1800N 1900N 2000N

MAGNITUDE
260
240
220
200
180
160
140
120
100

INCLINATION
+10
0
-10

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

806337

5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 **MOINA** SHEPHERD & MURPHY AREA SW-NE DRILL SECTION LINE 1 V.L.F. TEST 82-1728 Vol 315 1546 Scale : 1 2500 (horizontal axis)	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/140
DATE 9-12-80	AUTHOR W. D. SMYTH
DRAWN O HEDDITCH	OFFICE DEVONPORT

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

MAGNITUDE
300
280
260
240
200
200
180
160
140
120
100

INCLINATION
+10
0
-10

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

806338

5 cm

The Shell Company of Australia Limited
METALS DIVISION

E.L.7/74 **MOINA**
SHEPHERD & MURPHY AREA
SW - NE DRILL SECTION LINE 2
V.L.F. TEST

82-1728 Vol 3/5 1546

Scale 1:2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/141
DATE 9-12-80	AUTHOR W.D. SMYTH
DRAWN O.HEDDITCH	OFFICE DEVONPORT

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N 1800N 1900N 2000N

MAGNATUDE
300
280
260
240
220
200
180
160
140
120
100

INCLINATION
+10
0
-10

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

806339

5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SHEPHERD + MURPHY AREA SW - NE DRILL SECTION LINE 2 V.L.F. TEST 82-1728 Vol 315 1547 Scale : 1:2500 (horizontal axis)	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/141
DATE 9-12-80	AUTHOR W D. SMYTH
DRAWN O. HEDDITCH	OFFICE DEVONPORT

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N 1800N 1900N 2000N

%

50 40 30 20 10 0 -10 -20 -30 -40 -50 -60

ELECTRODE WIRE

ELECTRODE WIRE

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

806340

5 cm

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 **MOINA** SHEPHERD & MURPHY AREA SW-NE DRILL SECTION LINE 1 MMR SURVEY 82-1728 Vol 3/5 1547 Scale 1:2500 (horizontal axis)	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/050
DATE 8-1-81	AUTHOR SCINTREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

ELECTRODE WIRE

806341

5 cm

The Shell Company of Australia Limited METALS DIVISION	
EL 7174 **MOINA** SHEPHERD + MURPHY AREA SW - NE DRILL SECTION LINE 1 MMR SURVEY 15447 82-1728 Vol 315 Scale : 1-2500 (horizontal axis)	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/050
DATE 8-1-81	AUTHOR SCINTREX
DRAWN O HEDDITCH	OFFICE DEVONPORT

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N 1800N 1900N 2000N

%

50 40 30 20 10 0 -10 -20 -30 -40 -50 -60

ELECTRODE WIRE

ELECTRODE WIRE

00 100N 200N 300N 400N 500N 600N 700N 800N 900N 1000N 1100N 1200N 1300N 1400N 1500N 1600N 1700N

806342

5 cm

The Shell Company of Australia Limited
METALS DIVISION

EL 7/74 **MOINA**
SHEPHERD-MURPHY AREA
SW-NE DRILL SECTION LINE 2
MMR SURVEY
82-1728
Vol 3|5
1547

Scale 1:2500 (horizontal axis)

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/051
DATE JAN 1981	AUTHOR SCINTREX
DRAWN O. HEDDITCH	OFFICE DEVONPORT

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

ELECTRODE WIRE

2000N 2100N 2200N 2300N 2400N 2500N 2600N 2700N 2800N 2900N 3000N

806343

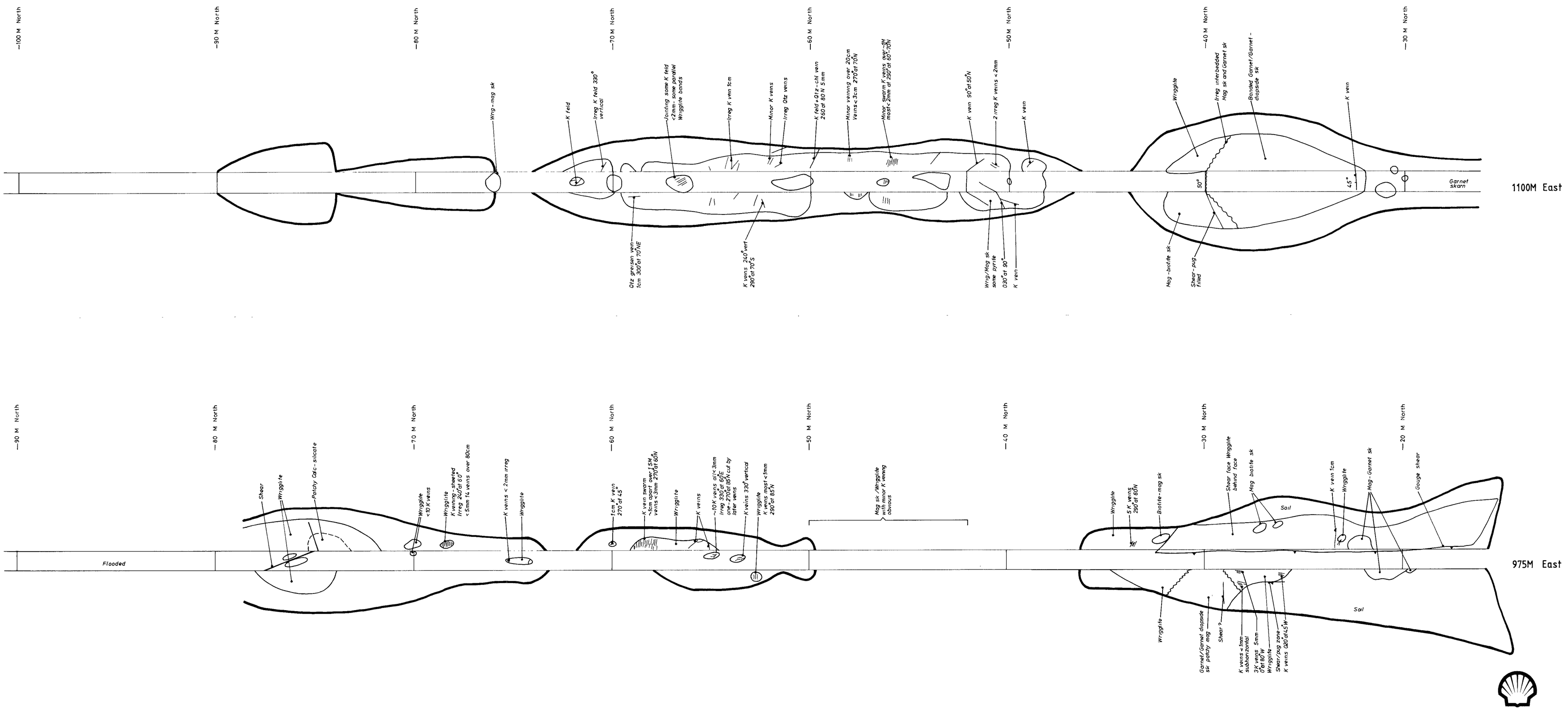
5 cm

The Shell Company of Australia Limited
METALS DIVISION

E.L.7/74 **MOINA**
SHEPHERD & MURPHY AREA
SW - NE DRILL SECTION LINE 2
MMR SURVEY
82-1728 Vol 215 1547

Scale 1 2500 (horizontal axis)

FIG No.	REPORT No.
ENCL No.	DRG. No. D/MZ 01/051
DATE JAN 1981	AUTHOR SCINTREX
DRAWN O HEDDITCH	OFFICE DEVONPORT



The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SHEPHERD & MURPHY AREA COSTEANS — GEOLOGY 82-1728 Vol 5/5 1547	
Scale 1 100	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/142
DATE 1-9-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

806344

100N

00

100S

200S

SMD 29

SMD 30

No 6 LODE

No 5 LODE

No 4 LODE

1 LEVEL.

3 LEVEL.

500M R.L.

500M R.L.

?

?

?

BISMUTH CREEK FAULT

LEGEND

- Tertiary basalt
- Sand clay
- Moina sandstone
- Wrigglite
- Garnet skarn
- Diopside skarn
- Chlorite skarn
- Shearing

5 cm

806345

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA Shepherd & Murphy Area Section 1100E LITHOLOGY 82-1728 Vol 4/5 Scale 1:2500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/067
DATE 22-4-81	AUTHOR W.D.S.
DRAWN H.L.H.	OFFICE DEVONPORT

1548

100 N

00

100 S

200 S

SMD 29

SMD 30

550M R.L.

BISMUTH CREEK FAULT

NOTE : Analyses in ppm.
X = below limit of detection.

Sn | W

5 cm

806346

0 10 20 30M

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA Shepherd & Murphy Area Section 1100E ASSAYS 82-1728 Vol 415 Scale 1: 500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/116
DATE 22-4-81	AUTHOR W.D.S.
DRAWN H.L.H.	OFFICE DEVONPORT

1548

150 N | 100 N | 50 N | 000 | 50 S | 100 S | 150 S | 200 S | 250 S

SMD15

SMD 6

M L 2

WOLLASTONITE

WOLLASTONITE

R.L. 500

R.L. 500

116.12M

102.0M

LEGEND

- Tertiary basalt
- Siltstone
- Moina Sandstone
- Wrigglite
- Garnet skarn

5 cm

0 10 20 30M

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
SHEPHERD & MURPHY AREA
SECTION 900 E
LITHOLOGY

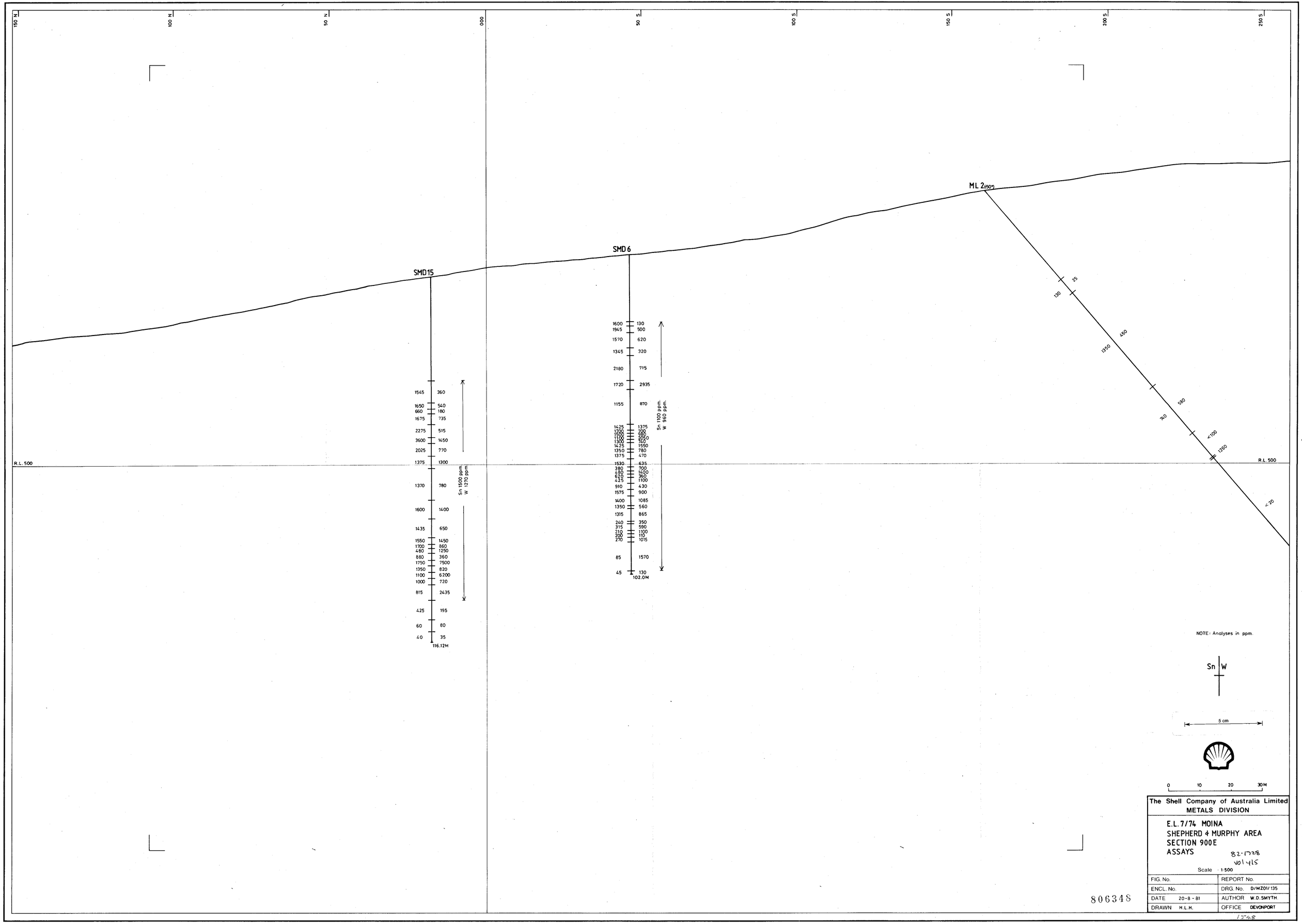
82-1728
Vol 415

Scale 1:500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/143
DATE 21-8-81	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT

806347

1548



The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
SHEPHERD & MURPHY AREA
SECTION 900E
ASSAYS

82-1728
vol 415

Scale 1:500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/135
DATE 20-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

806348

1548

150 N | 100 N | 50 N | 000 | 50 S | 100 S | 150 S | 200 S | 250 S

SMD10

SMD11

SMD4

R.L. 500

R.L. 500

Quartz veins

117.50M

120.00M

107.50M

LEGEND

- Tertiary basalt
- Sand clay
- Siltstone
- Moina Sandstone
- Wrigglite
- Garnet skarn
- Shearing

5 cm

0 10 20 30 M

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
SHEPHERD & MURPHY AREA
SECTION 700 E
LITHOLOGY

82-1728
Vol 415

Scale 1:500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/144
DATE 24-8-81	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT

806349

1 of 5

150 N | 100 N | 50 N | 000 | 50 S | 100 S | 150 S | 200 S | 250 S

SMD10

1830	70
1365	190
770	185
265	265
870	160
1550	220
800	1115
940	455
900	2250
2320	470
1450	1150
1400	760
1200	1450
4.10¾	1.31¾
1865	840
630	150
1050	375
2150	3200
1200	640
460	180
3080	295
525	300
165	300

Sn 1680 ppm.
W 670 ppm.

117.50M

SMD11

2150	260
2040	510
2165	590
1950	1450
1450	580
2000	1585
1100	750
1040	1200
1080	655
1250	1500
1360	655
1200	1150
1300	6500
600	1000
1600	640
980	1305
1535	525
755	1100
2950	2300
1150	900

Sn 1450 ppm.
W 1960 ppm.

120.00M

SMD4

1605	485
1685	1500
1575	840
220	600
1000	460
1345	1750
1040	780
1145	525
180	335
310	740
40	300

Sn 1320 ppm.
W 840 ppm.

107.50M

R.L. 500

NOTE : Analyses in ppm.

Sn | W

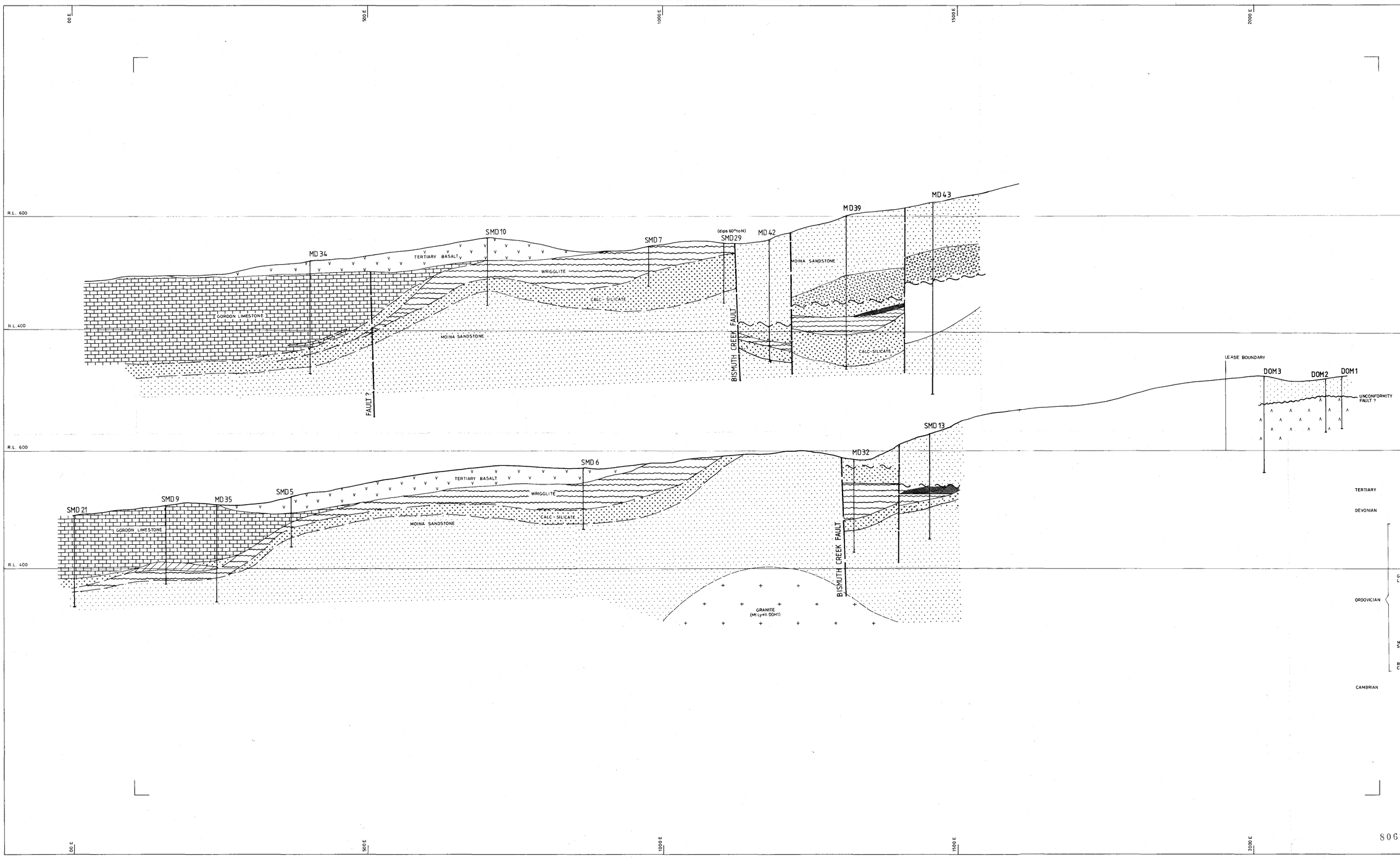
5 cm

0 10 20 30 M

806350

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SHEPHERD & MURPHY AREA SECTION 700 E ASSAYS 82-1728 vol 415	
Scale 1:500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/136
DATE 21-8-81	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT

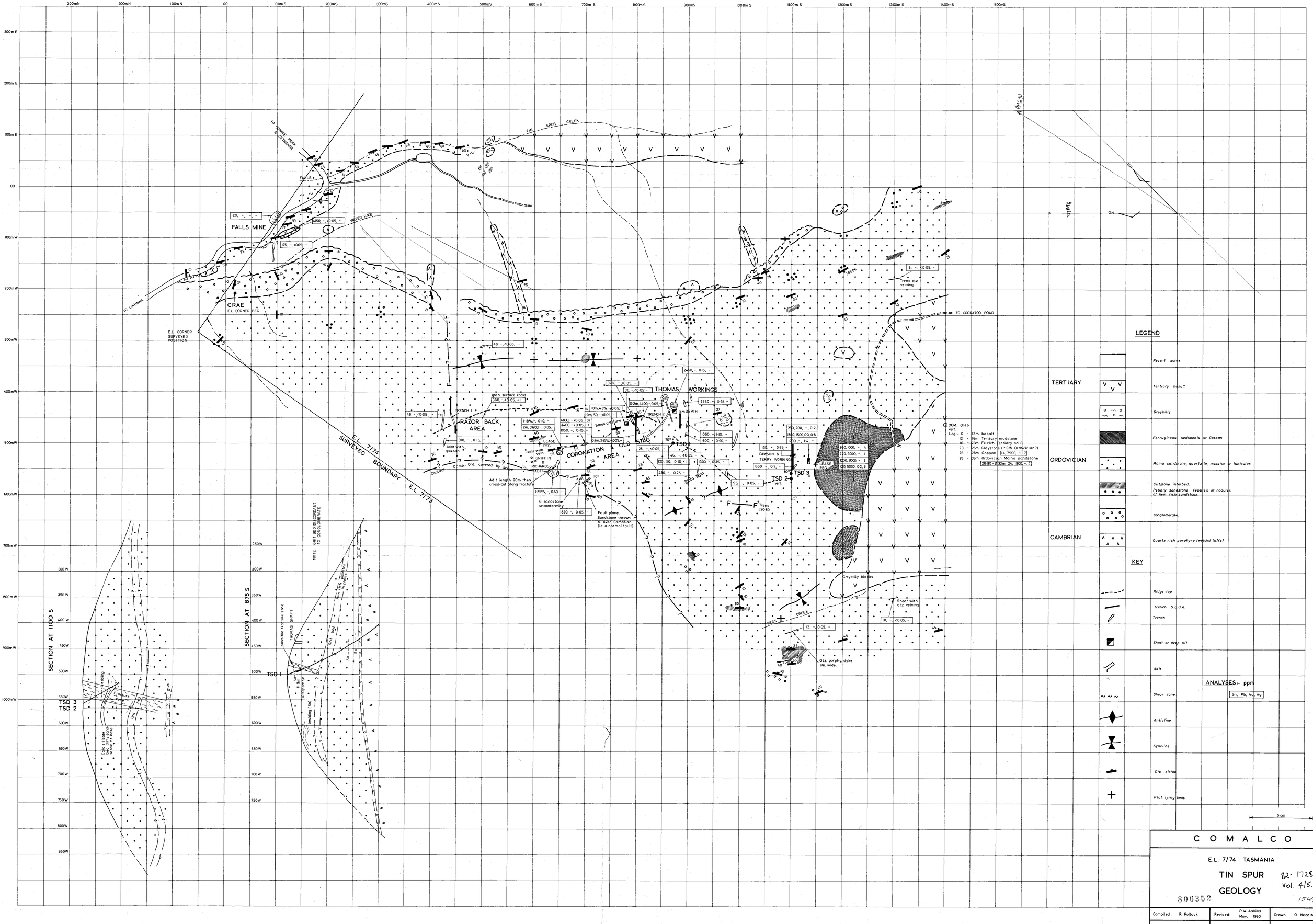
1548



806351

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA SHEPHERD & MURPHY AREA SECTIONS 50S & 100N	
82-1728 vol 415	
Scale 1:2500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/089
DATE 27-5-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

1514.9



DOM OH6 vert.
Log - 0 - 12m basalt
12 - 16m Tertiary mudstone
16 - 23m Fe rich Tertiary soil?
23 - 26m Claystone (? CW Ordovician?)
26 - 28m Gossan 14, 7500, - 3
28 - 36m Ordovician Moina sandstone
28.90 - 36.33m 24, 1900, - 4

C O M A L C O

E.L. 7/74 TASMANIA

TIN SPUR GEOLOGY

82-1728
Vol. 4/5.
1549

806352

Compiled: R. Poltock	Revised: P.W. Askins May, 1980	Drawn O. Hedditch	
Date: Feb. 1980	Scale: 1:2500	Drg. No.: TAS-80-334	

800 S

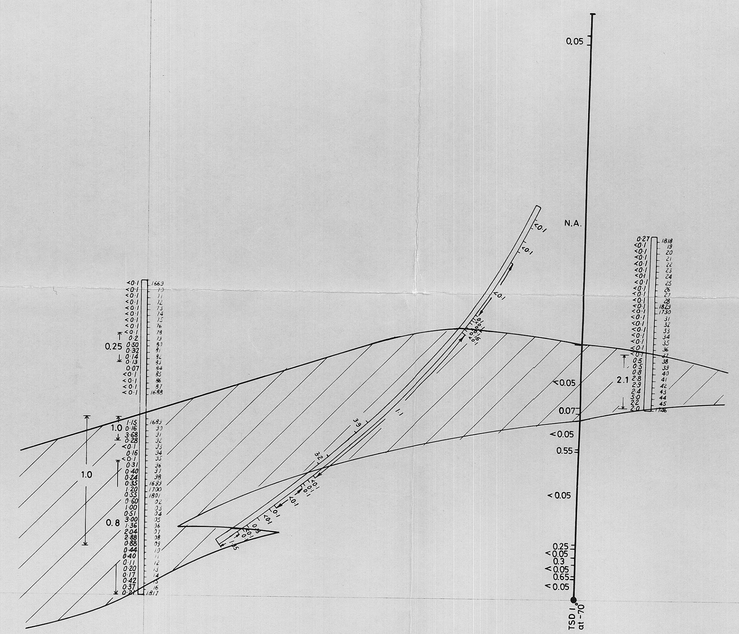
900 S

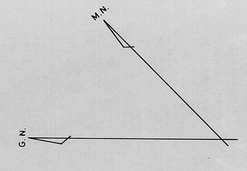
1000 S

1100 S

400 W

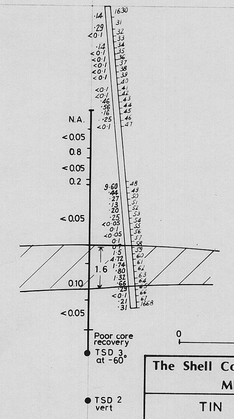
500 W





MINERALISED ZONE

Au-ppm. | Sample No.



0 10 20 30M

5 cm

806353

The Shell Company of Australia Limited METALS DIVISION	
TIN SPUR E.L. 7/74 TRENCH SAMPLING Au 82-1728 Vol #5 Scale : 1 500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/060
DATE	AUTHOR W.D. SMYTH
DRAWN O. HEDDITCH	OFFICE DEVONPORT

1549

800 S

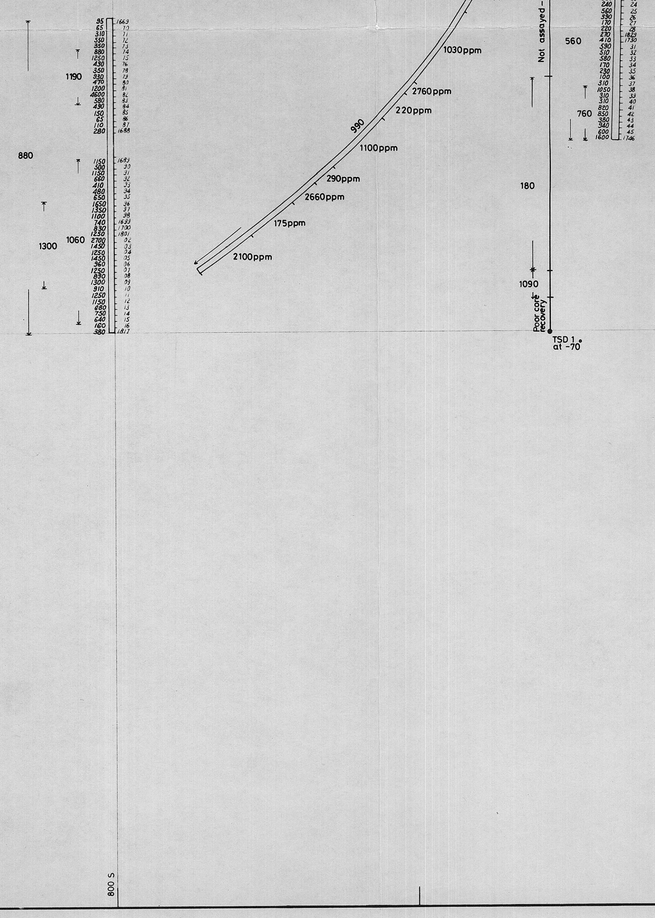
900 S

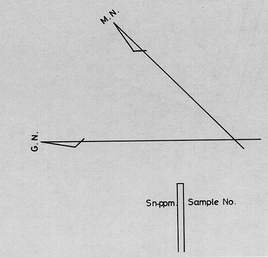
1000 S

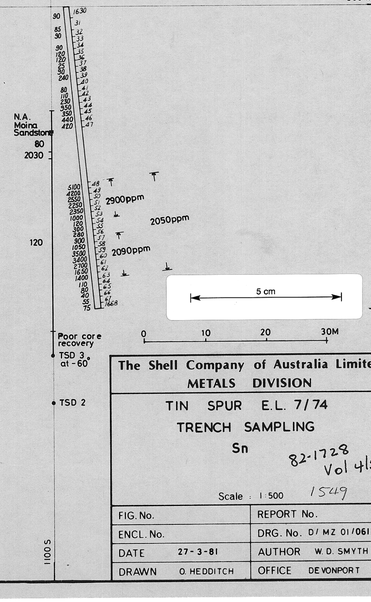
1100 S

400 W

500 W







806354

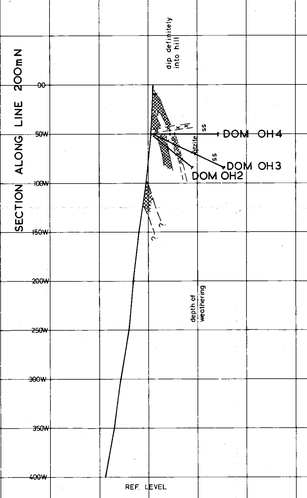
The Shell Company of Australia Limited
METALS DIVISION

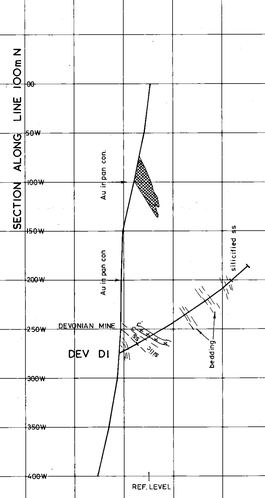
TIN SPUR E.L. 7/74
TRENCH SAMPLING
Sn

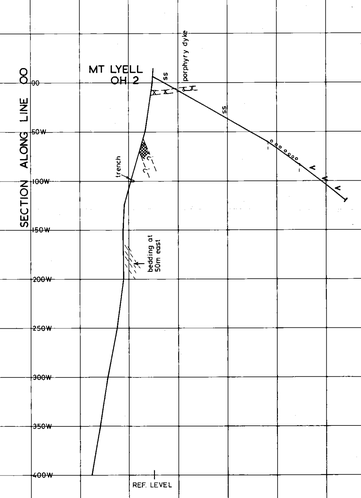
82-1728
Vol 415

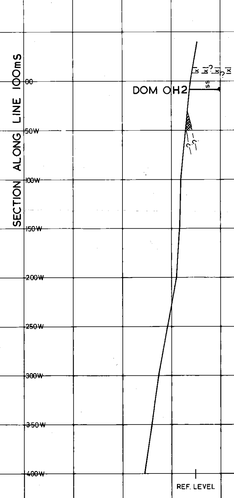
Scale : 1:500 1549

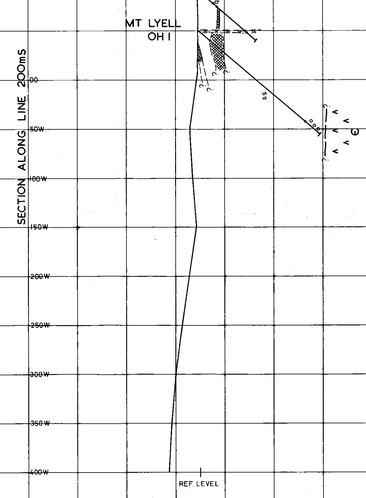
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/061
DATE 27-3-81	AUTHOR W.D. SMYTH
DRAWN O. HEDDITCH	OFFICE DEVONPORT













COMALCO

806355 E.L. 7/74 TASMANIA

DEVONIAN GRID GEOLOGY AND DRILL SECTIONS

82/1728 Vol 4-5 1550

Compiled: P.W. Askins	Revised:	Drawn: O. Hedditch
Date: May, 1980	Scale: 1:2500	Drg. No.: TAS - 80 - 394

COMALCO
DEV-D1 (50M. North)

157.80M

Mt. LYELL
OH 2 (50M. South)

243.84

R.L. 0
R.L. -50
R.L. -100
R.L. -150

LEGEND

- Quartz Feldspar Porphry
- Sandstone
- Siltstone
- MOINA SANDSTONE
- Tubicular Sandstone
- Quartzite
- ROLAND CONGLOMERATE
- Unconformity
- CAMBRIAN VOLCANICS

275 W 250 W 200 W 150 W 100 W 50 W 00 W

5 cm

0 10 20 30M

806356

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
DEVONIAN
SECTION 50 N
LITHOLOGY

82-1728
Vol 415

Scale 1:500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/153
DATE 31-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT.

1550

COMALCO
DEV-D1 (50M. North)

4 <4 12 10 82 12 8 10 4 16 6 <4 14 39 16 0.15 16 82 16 10 <4 14 <4 17 25 0.1 <0.05 27 0.05 <0.05

157.80M

Mt. LYELL
OH2 (50M. South)

<0.05 4 4 4



300 W 250 W 200 W 150 W 100 W 50 W 00 W

LEGEND

- Quartz Feldspar Porphry
- Moina Sandstone
- Gossan/Laterite
- Tubicular Sandstone
- Shearing

DOM = Department of Mines Diamond Drill Hole

5 cm

0 10 20 30M

806358

The Shell Company of Australia Limited
METALS DIVISION

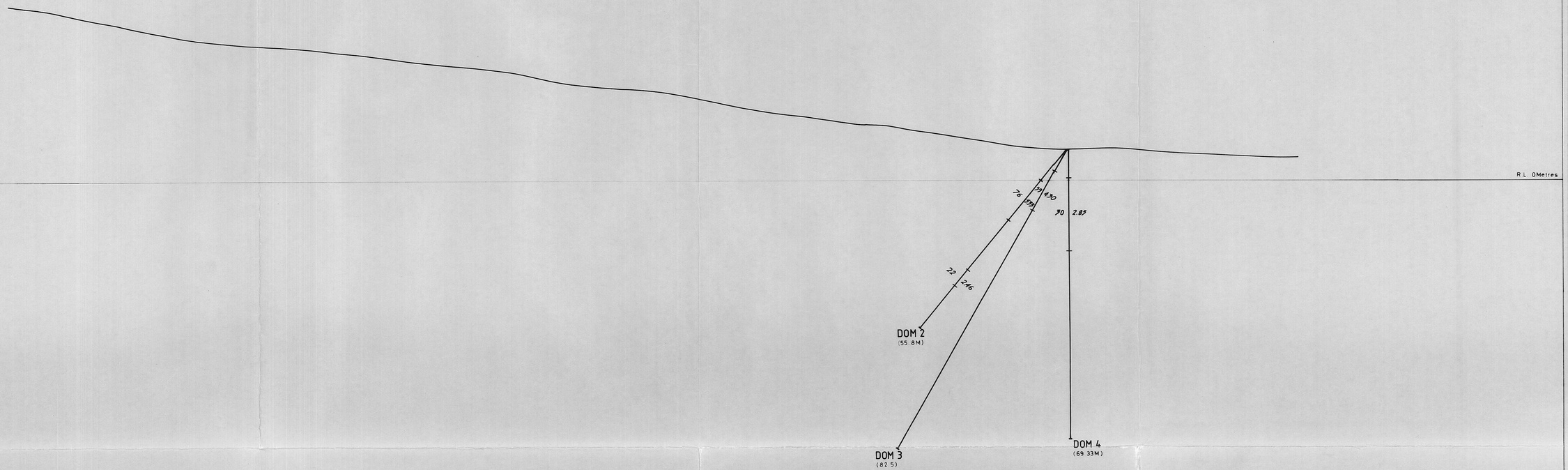
E L.7/74 MOINA
DEVONIAN
SECTION 200N
LITHOLOGY

82-1728
Vol 4/5

Scale 1 500

FIG No	REPORT No
ENCL No	DRG No D/MZ01/162
DATE 3-9-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1550





Ag ppm. | Pb %

5 cm

DOM = Department of Mines
Diamond Drill Hole

0 10 20 30M

806359

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA DEVONIAN SECTION 200N ASSAYS 82-1728 Vol 4-5	
Scale 1:500 1550	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/163
DATE 4-9-81	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT

GEOLOGY OF THE BLACK BLUFF – SMITHS PLAIN AREA

COMALCO LIMITED

EL 7/74 TASMANIA

82.1728
Vol 415
1551

Compiled G. Weste	Revised G.W. 1978
Date: July, 1978	Scale: 1:10,000
Drawn M. Attwell	Drg No TAS-78-154

806360

NB: Mapped by R. Pollock, G. Weste, A.H. White 1976–78

NOTE: For detailed geology of :

1. Mt Jacob Grid / see Drg TAS-78-103
2. Lower Winter Brook Grid / see Drg TAS-78-
3. Upper Winter Brook Grid / see Drg TAS-
4. Profile Lines A, B, D / see Drg TAS-

Scale (Approx.) 0 1000 metres

TRUE MTH MAGNETIC MTH

L E G E N D

RECENT — Alluvium, talus

PLEISTOCENE — Moraine

TERTIARY — Basalt

ORDOVICIAN
- Limestone
- Sandstone
- Intermediate vesicular lava flow?
- Conglomerate.
- Unconformity
- Strongly cleaved sericitised hematite altered volcanics.

CAMBRIAN

sediments
- Limestone
- Siltstone, tuff-shale
- Volcaniclastic conglomerate reworked tuffs, minor tuff-shale, sandstone, minor lithic + crystal tuffs.

acid volcanics
- Undifferentiated acid tuffs.
- Lithic tuff, airfall agglomerate
- Lithic vitric tuff.
- Lithic crystal tuff.
- Crystal tuff
- Crystal lithic tuff
- Crystal vitric tuff.
- Vitric crystal tuff.
- Vitric lithic tuff.
- Vitric crystal welded ash flow.
- Rhyolite lava, minor rhyodacite, minor dacite.

intermediate volcanics
- Undifferentiated intermediate tuffs.
- Lithic tuff, airfall agglomerate
- Lithic crystal tuff.
- Crystal tuff
- Crystal lithic tuff.
- Andesite lava

Geological Boundaries

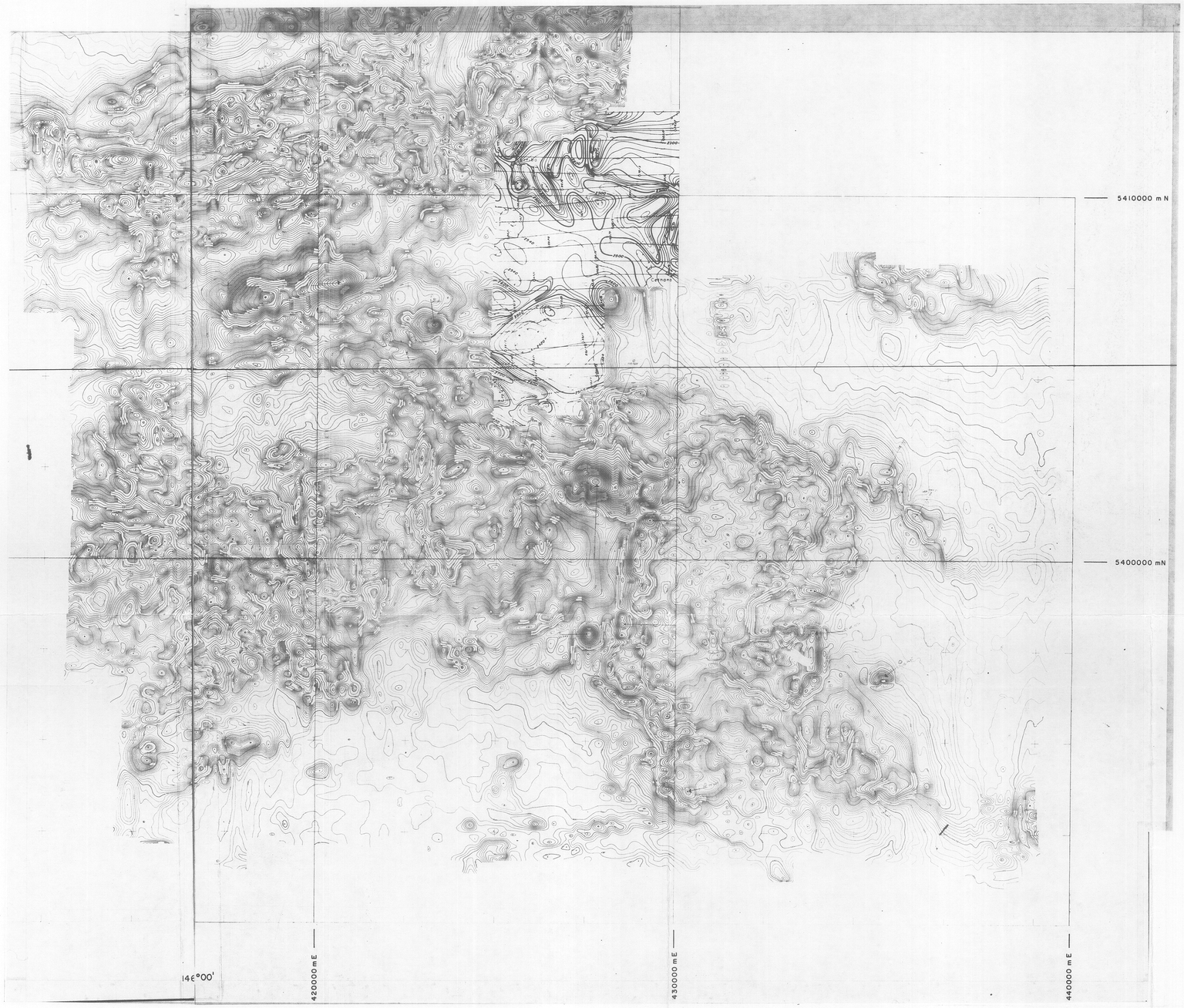
Faults
- F——F Position accurate
- F——F Position approximate
- F——?——F Position inferred

Dip and strike, measured, facing observed.
Dip and strike, measured, facing unknown.
Dip and strike inferred from air photos.
Strongly sheared in direction of symbol.
sericite — Strongly sericitised
chlorite — Strongly chloritised
Galena, sphalerite
MTJ DIB — Comalco diamond drill hole.
A2220m — Reconnaissance profile line and distance in metres from point of origin.
Road
Jeep Track
Cliff
Quarry
+ 3/45 — Centre position of 1:10,000 air photograph (run/photo number)

5 cm

Key features

UPPER WINTER BROOK GRID
LOWER WINTER BROOK GRID
MOUNT JACOB GRID
Mt J.D.19
Mt J.D.18
Mt Jacob
Smiths Plain
Lake Gairdner
Wilmot R.
Winter Brook
Jakes Brook
To Loongana
To Upper Castra
To South Nietta
TE Davenport Gold mine
Block Shaft 13.5 m
Paddy's Pipe
Abundant quartz on float
sericite chlorite
Lake Road
5408000m N
412000m E
422000m E
12
14
16
18
20
22
10
A
B
D
U
F
VX
XV
VA
AV
XL
AX
XA
AT
A2220m
A2100m
A1900m
A1800m
A1700m
A1600m
A1500m
A1400m
A1300m
A1200m
A1100m
A1000m
A900m
A800m
A700m
A600m
A500m
A400m
A300m
A200m
A100m
A0m
MTJ DIB
A2220m
Gm Jacob
Wilmot
Dam
Lake Road
Lake Gairdner



Contractor : Geometrics International Corporation
Instrument : Geometrics Model G803 Airborne Proton Magnetometer

Flight line spacing: 250m
Detector height : 100m

5 cm

1 0 1 2 Mile

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
REGIONAL
RESIDUAL MAGNETIC CONTOURS

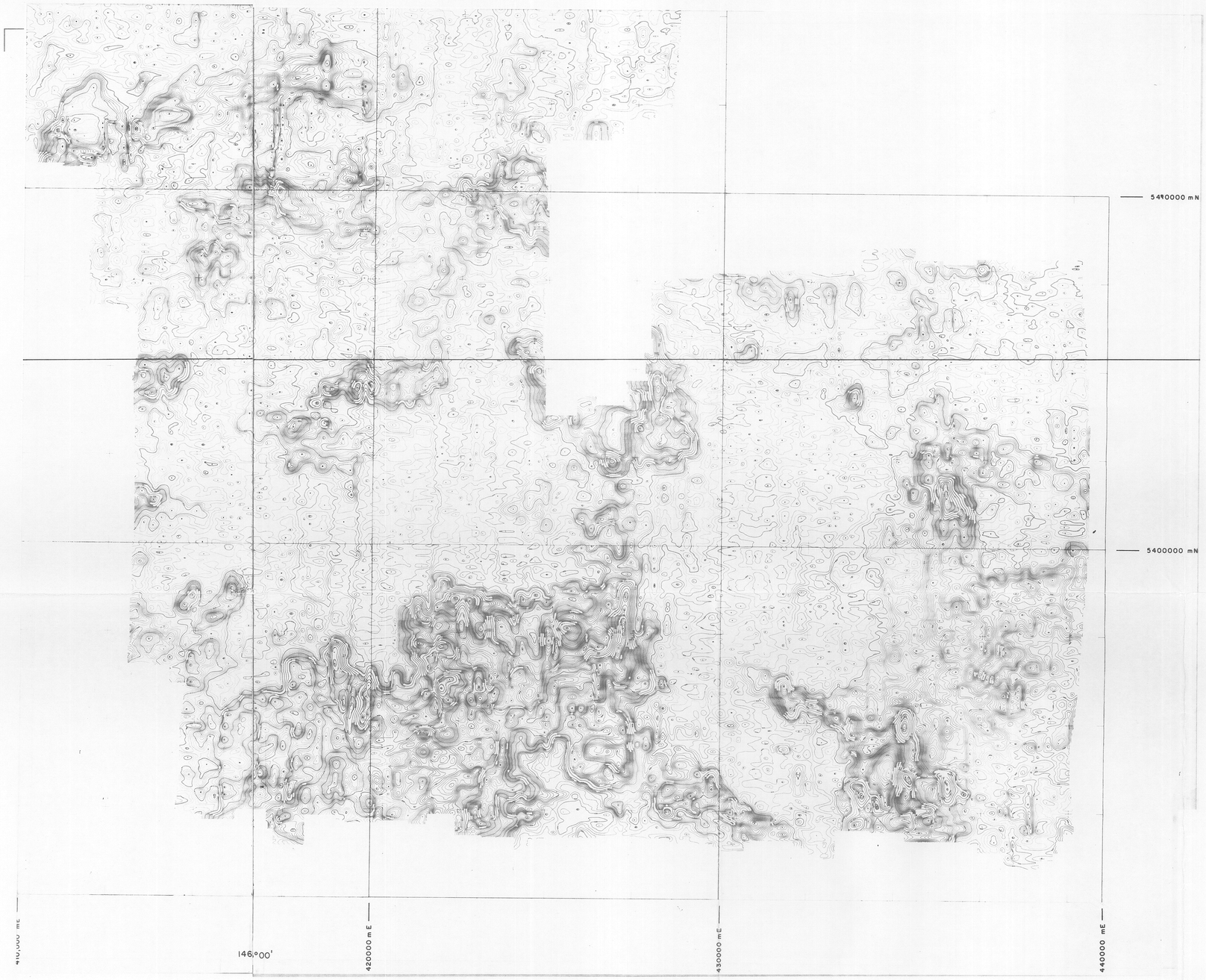
82-1728
Vol 415

Scale 1:63,360

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/149
DATE 25-8-81	AUTHOR
DRAWN	OFFICE DEVONPORT

806361

151



Contractor : Geometrics International Corporation
Instrument : Exploranium DGRS-1002, Four (4) Channel Gamma Ray Spectrometer.

Flight line spacing : 250m
Detector height : 100m

5 cm

1 0 1 2 Mile

806362

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA REGIONAL TOTAL COUNT CONTOURS 82-1728 Vol 415	
Scale : 1:63,360	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ 01/150
DATE 25-8-81	AUTHOR
DRAWN	OFFICE DEVONPORT

1557

TO LIENA

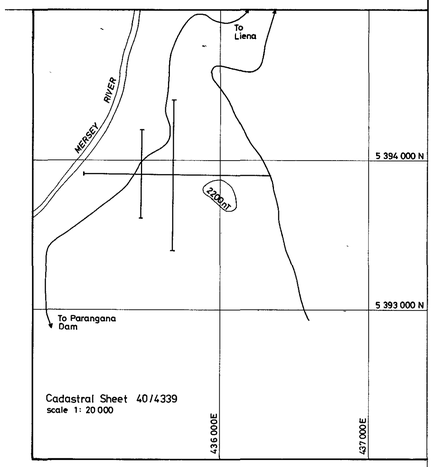
TO LIENA

Haematitic

pЄ

2 500 N
2 400 N
2 300 N
2 200 N
2 100 N
2 000 N
1900 N
1800 N
1700 N
1600 N
1500 N

1000 E
1100 E
1200 E
1300 E
1400 E
1500 E
1600 E
1700 E
1800 E
1900 E
2000 E
2100 E



Cadastral Sheet 40/4339
scale 1: 20 000

TN
MN

LEGEND

DEVONIAN — Dove Granite
ORDOVICIAN — Moina Sandstone
PRECAMBRIAN — pЄ Quartzites
Road
Geological boundary

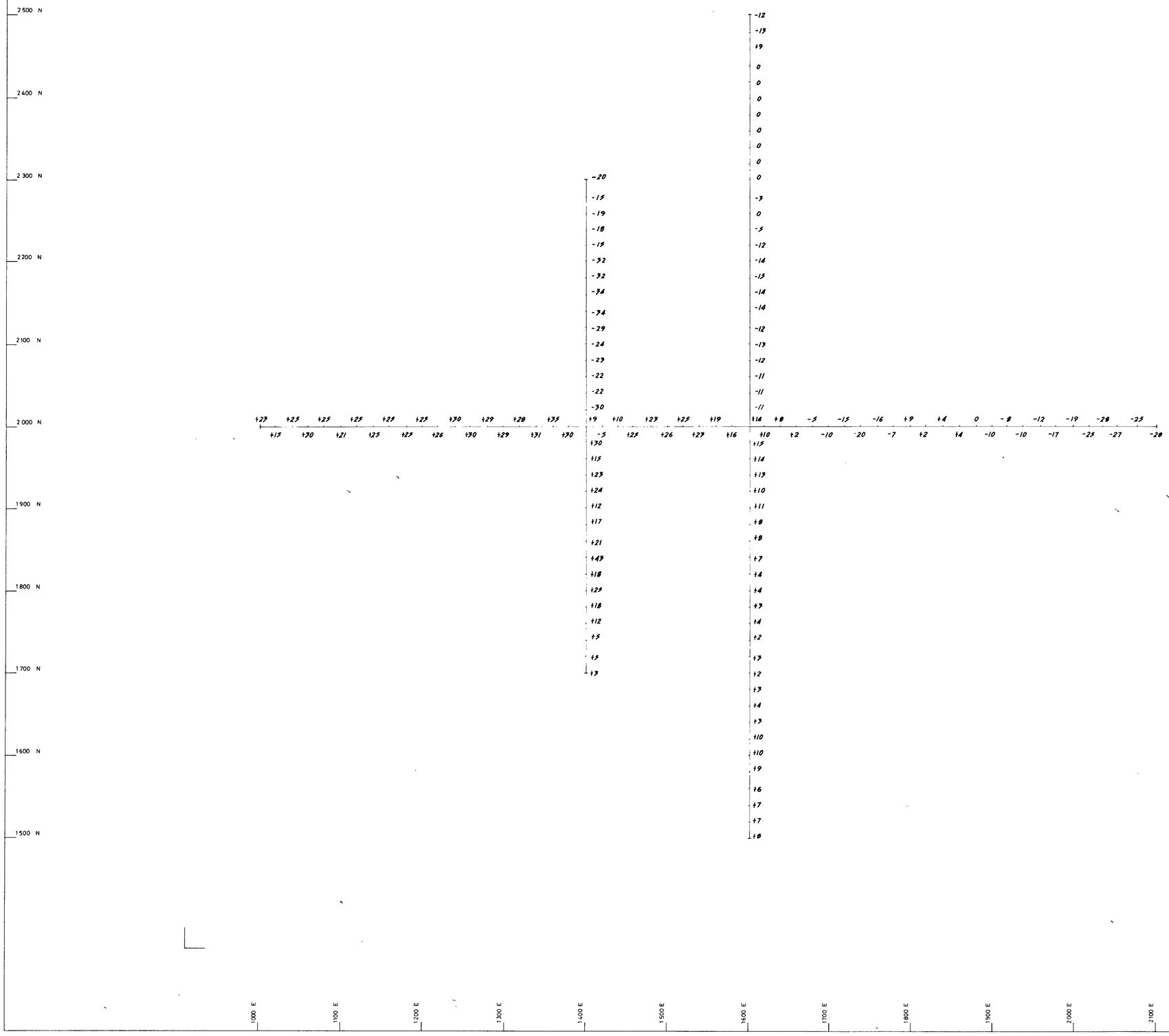
5 cm

0 100 200 M

806363

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA LIENA SOUTH 4339/1 GEOLOGY 82-1728 Vol 4/5 Scale 1 2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/147
DATE 27-8-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1551



N
MN

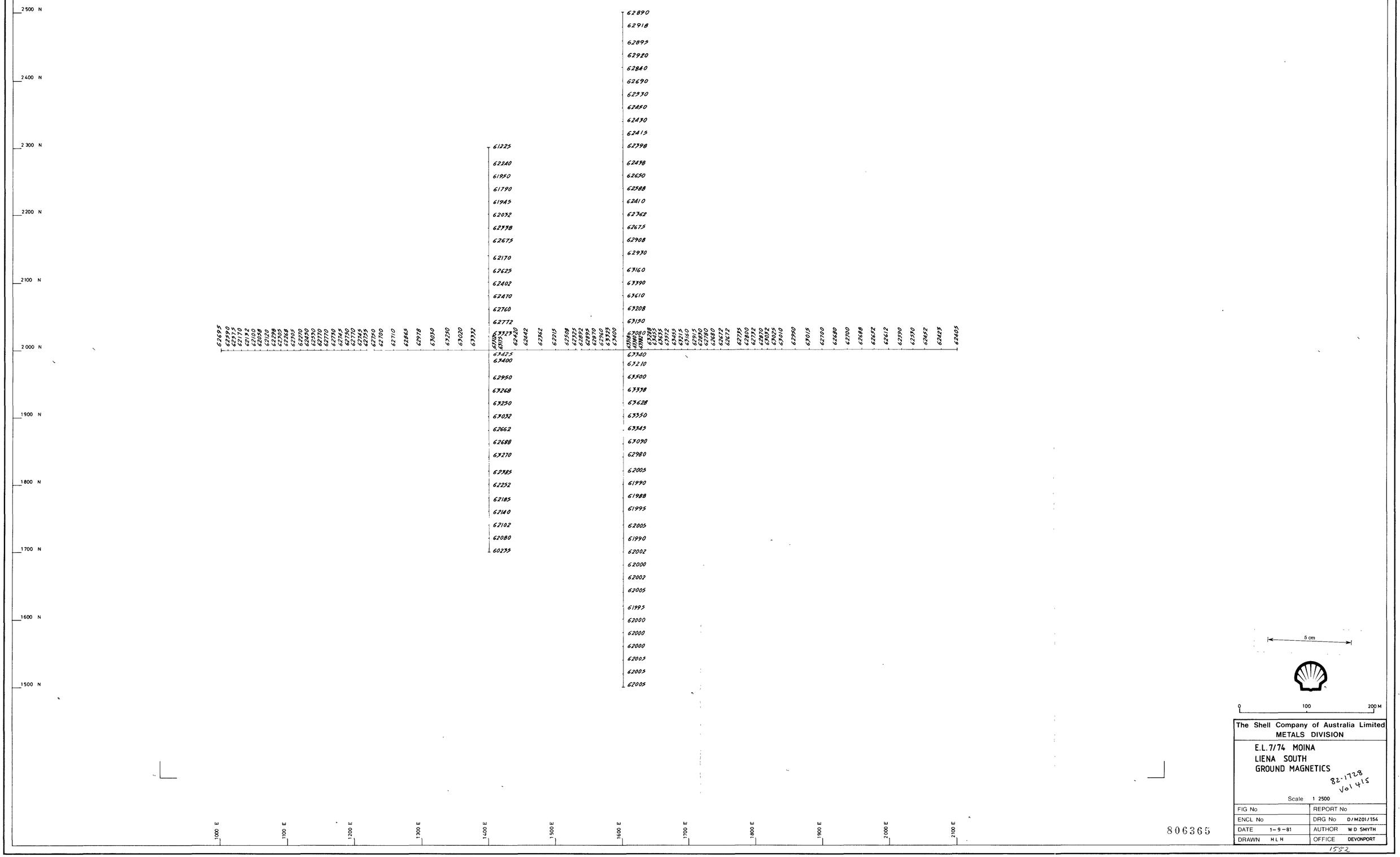
5 cm

0 100 200 M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA LIENA SOUTH SLOPE CORRECTIONS 82-1728 Vol 4/5	
Scale 1 2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/120
DATE 4-8-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

806364

1551



The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
LIENA SOUTH
GROUND MAGNETICS

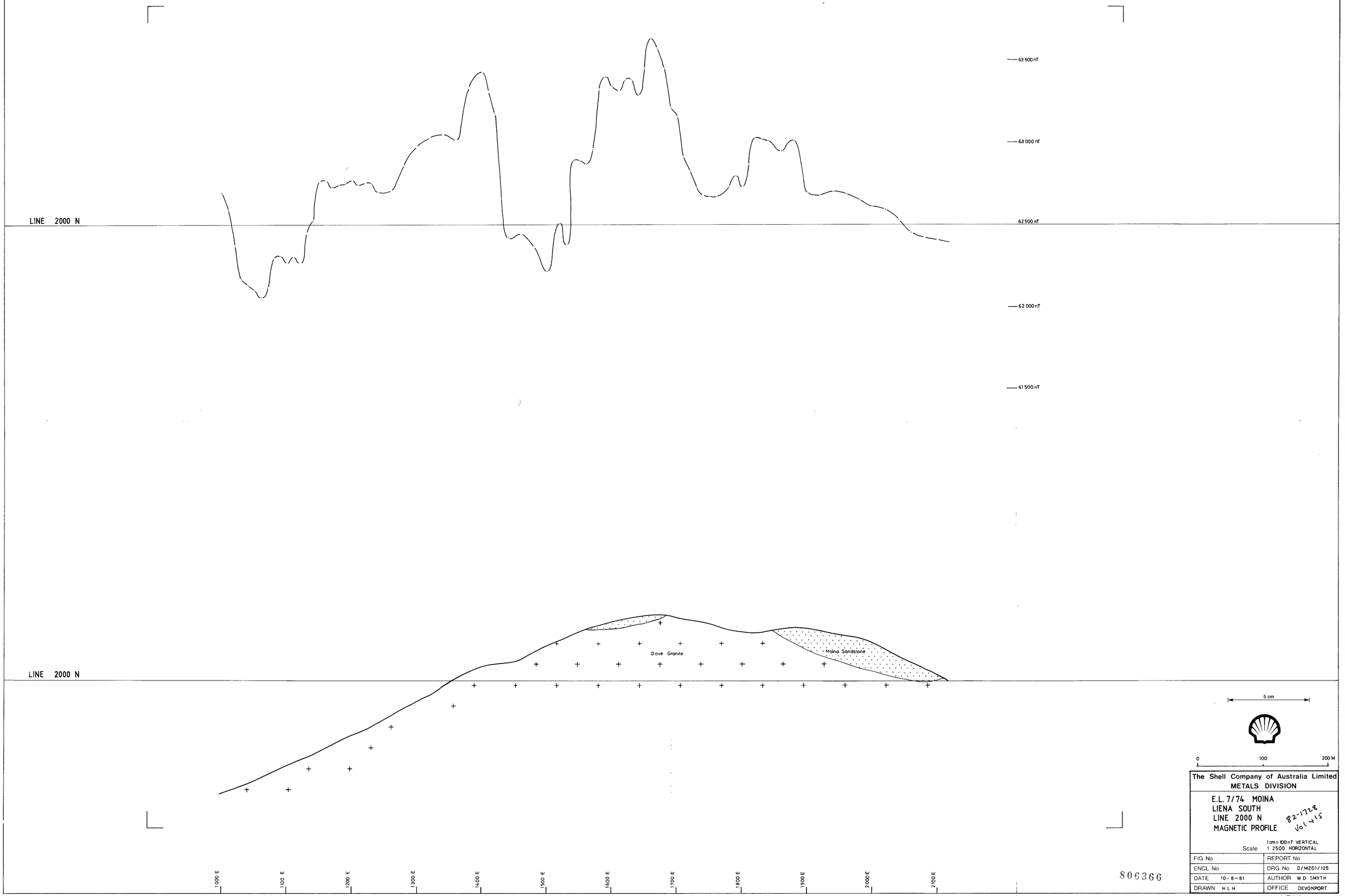
82-1728
Vol 415

Scale 1 2500

FIG No	REPORT No
ENCL No	DRG No D/MZ01/154
DATE 1-9-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

806365

1552



806366

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
LIENA SOUTH
LINE 2000 N
MAGNETIC PROFILE

82-1728
Vol 415

Scale 1cm = 100nT VERTICAL
1 2500 HORIZONTAL

FIG No	REPORT No
ENCL No	DRG No D/MZ01/125
DATE 10-8-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1552

LINE 1600 E

LINE 1600 E

LINE 1400 E

LINE 1400 E

2 500 N

2 400 N

2 300 N

2 200 N

2 100 N

2 000 N

1 900 N

1 800 N

1 700 N

1 600 N

1 500 N

61225?

60235?

62000 nT

62500 nT

63000 nT

63500 nT

61500 nT

62000 nT

62500 nT

63000 nT

5 cm

0 100 200 M

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
LIENA SOUTH
LINES 1400 & 1600 E
MAGNETIC PROFILES

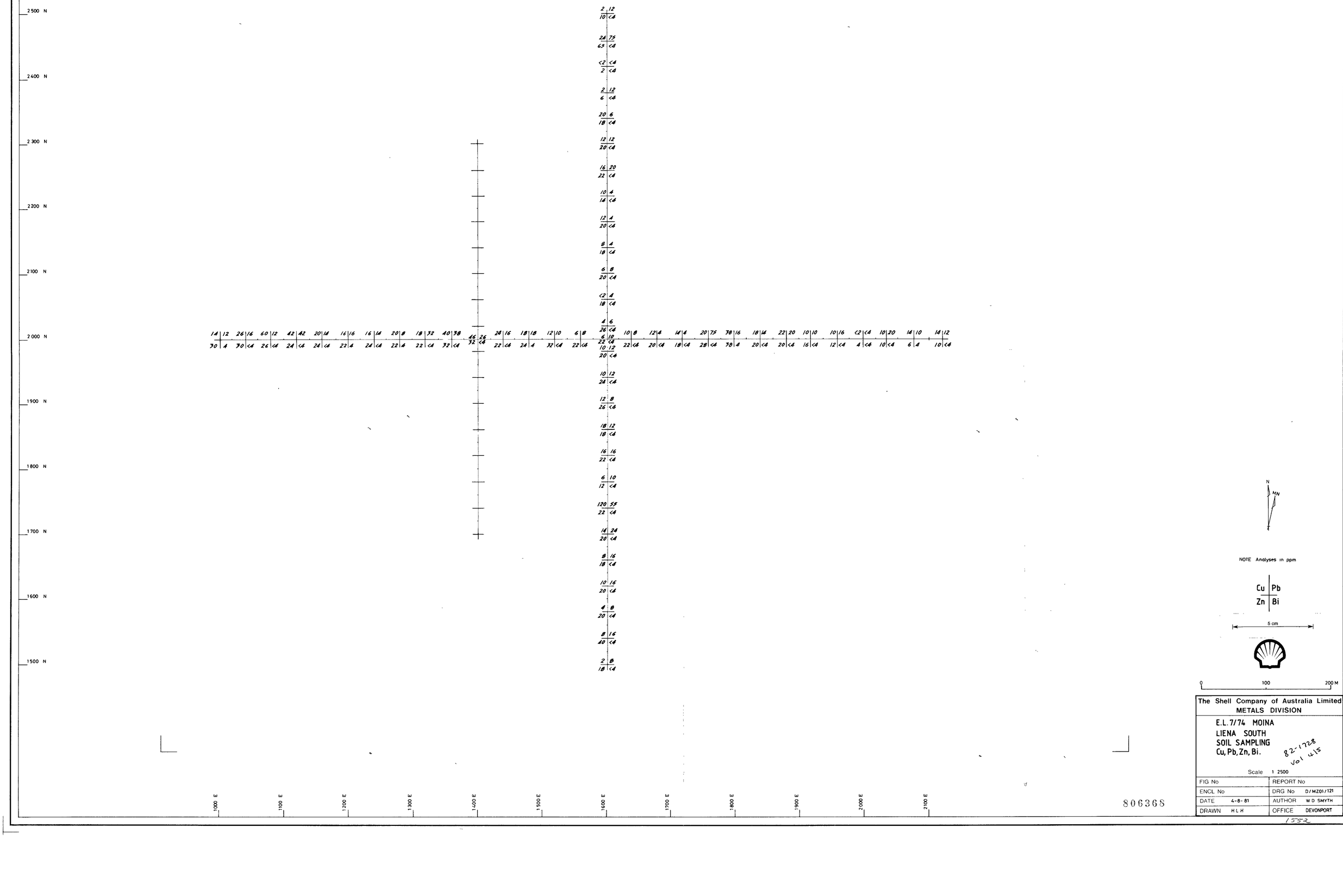
82/1728
401 415

Scale 1cm = 100 nT VERTICAL
1 2500 HORIZONTAL

FIG No	REPORT No
ENCL No	DRG No D/MZ01/126
DATE 10-8-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

806367

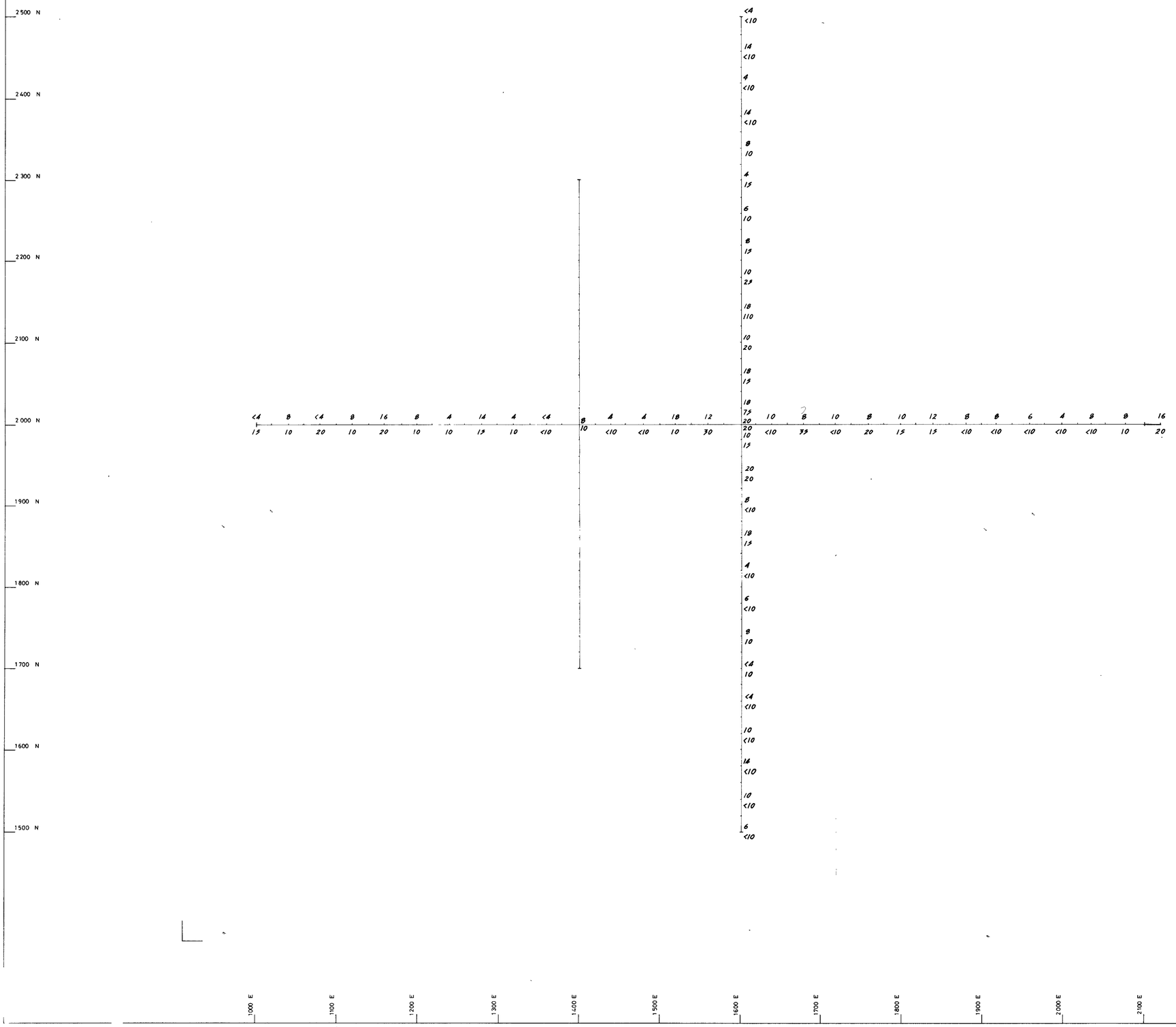
1552



806368

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA LIENA SOUTH SOIL SAMPLING Cu, Pb, Zn, Bi.	82-1728 Vol 415
Scale 1 2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/121
DATE 4-8-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1552



N

MN

5 cm

NOTE : Analyses in ppm

Sn
W

0 100 200 M

806369

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 MOINA
LIENA SOUTH
SOIL SAMPLING
Sn, W.

82-1728
Vol 4 15

Scale 1 2500

FIG No	REPORT No
ENCL No	DRG No D/MZ01/122
DATE 4-8-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1552

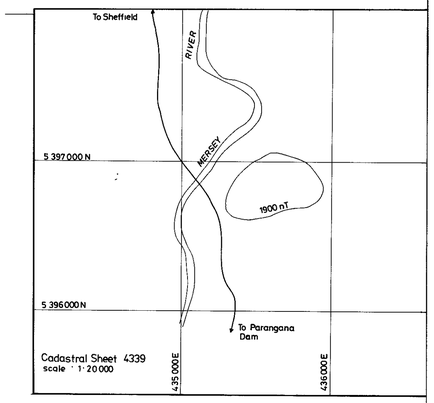
1000 E

1380 E

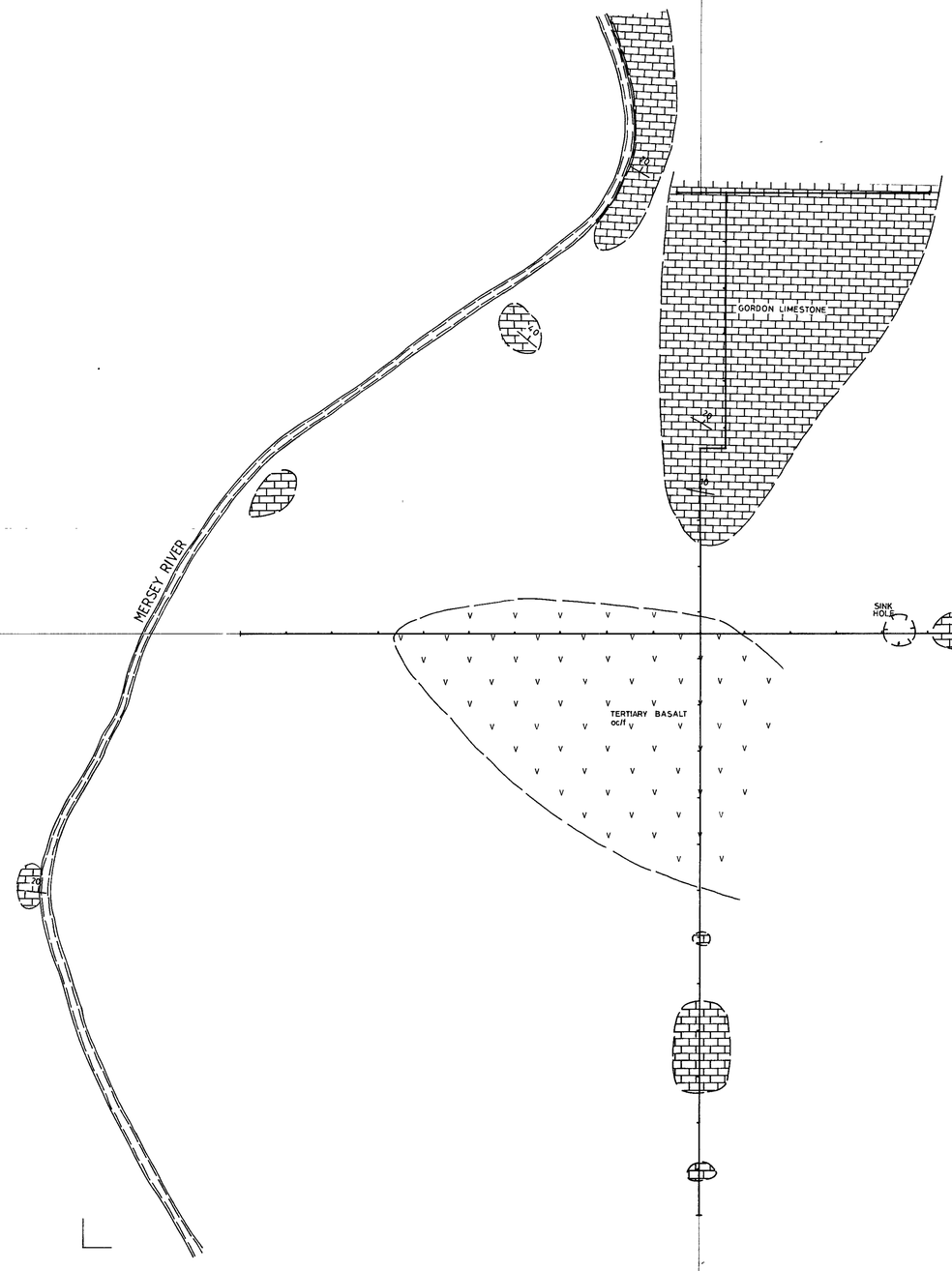
1400 E

1600 E

2200 E



2380 N



1500 N

LEGEND

TERTIARY BASALT

GORDON LIMESTONE

5 cm

N MN

oc/f = outcrop float

0 100 200M

The Shell Company of Australia Limited METALS DIVISION	
MOINA E.L. 7/74 LIENA ANOMALY (4339/2) GEOLOGY 82.1728 Vol 415	
Scale 1 2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/104
DATE 5-6-81	AUTHOR W D SMYTH.
DRAWN H L.H.	OFFICE DEVONPORT.

806370

155-2

1000 E

1380 E

1400 E

1600 E

2700 E

2380 N

MERSEY RIVER

+7 -3 -12 -18 -15 -20 -17 -18 -15 -10 +3

0 +3 +13 +10 +3 -14 -17 -25

+7 -1 -2 +1 -1 -3 0 +5 +12 +22 +29 +22 +15 +14 +17 +18 +25 +21 +21 +16

+9 +2 0 -4 -5 -4 +8 +10 -5,-25 +24 +20 +17 +12 +7 -8 -9 +2 +8 +1 -5 -1 -2 -2 -2 0 -2 +5 +8 +10 +1 +10 +6 +11 +9 +11 +12 +11 +13 +12 +14 +13 +15

2000 N

+18 +15 +15 +18 +18 +18 +22 +23 +25/-8 -14 -17 -13 -14 -16 -14 +10 +14 +3 -4 -10 -14 -13 +5 +8 +10

1500 N

N

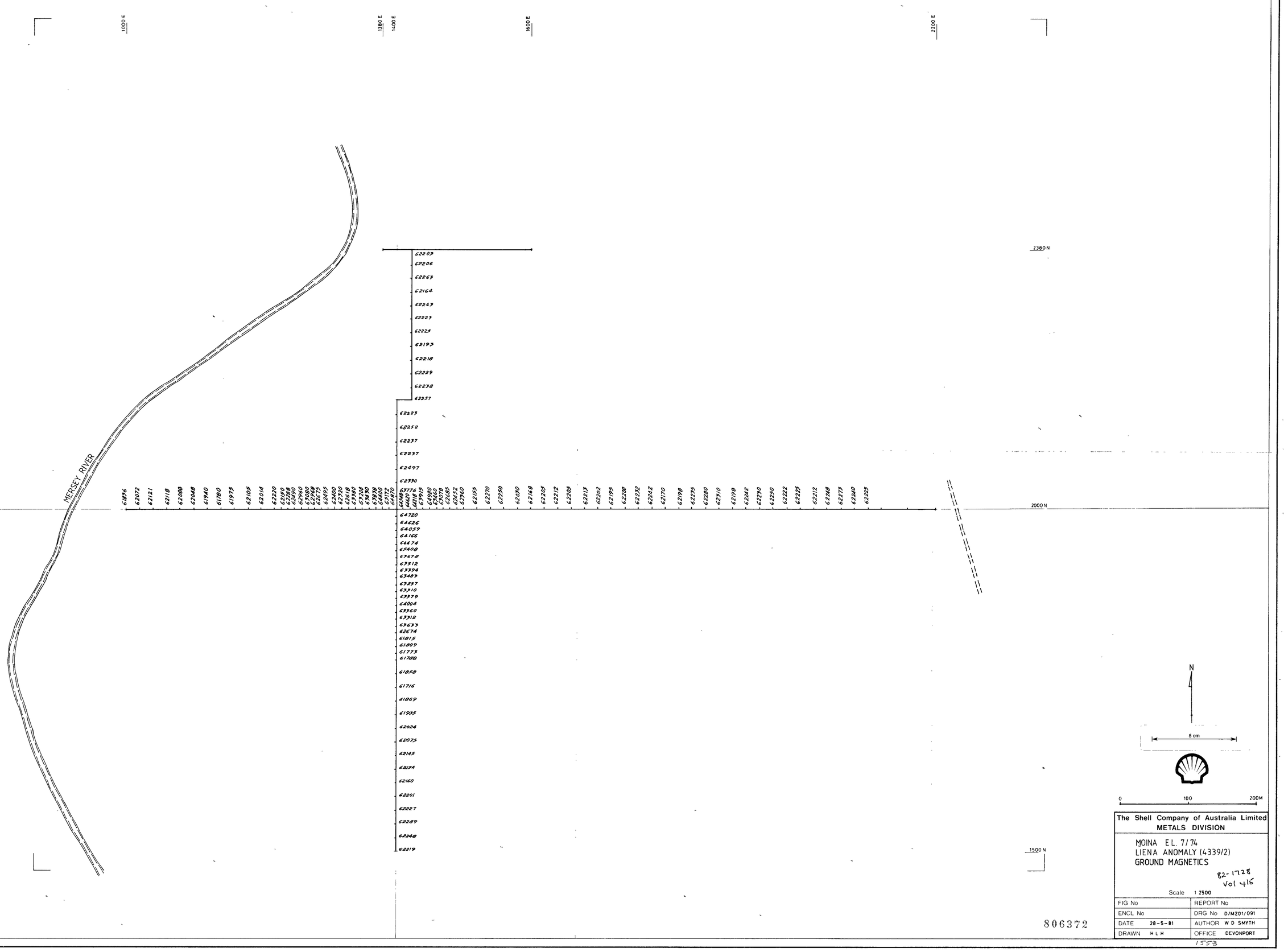
5 cm

0 100 200M

806371

The Shell Company of Australia Limited METALS DIVISION	
MOINA E.L. 7/74 LIENA ANOMALY (4339/2) **SLOPE CORRECTIONS** 82-1728 Vol 415 Scale 1:2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/152
DATE 28-8-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1553



806372

The Shell Company of Australia Limited
METALS DIVISION

MOINA E.L. 7/74
LIENA ANOMALY (4339/2)
GROUND MAGNETICS

82-1728
Vol 415

Scale 1:2500

FIG No	REPORT No
ENCL No	DRG No D/MZ01/091
DATE 28-5-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1553

1000 E | 1400 E | 1500 E | 2000 E | 2100 E | 2240 E

64 000 nT
63 000 nT
62 000 nT

61 000 nT

300γ
200γ
100γ

V L F

+20°
+ 10°
0
-10°
-20°

oc/f
oc/f
oc/f

GORDON LIMESTONE

TERTIARY BASALT

GORDON LIMESTONE

1000 E | 1500 E | 2000 E | 2240 E

5 cm

25nT = 1cm vert

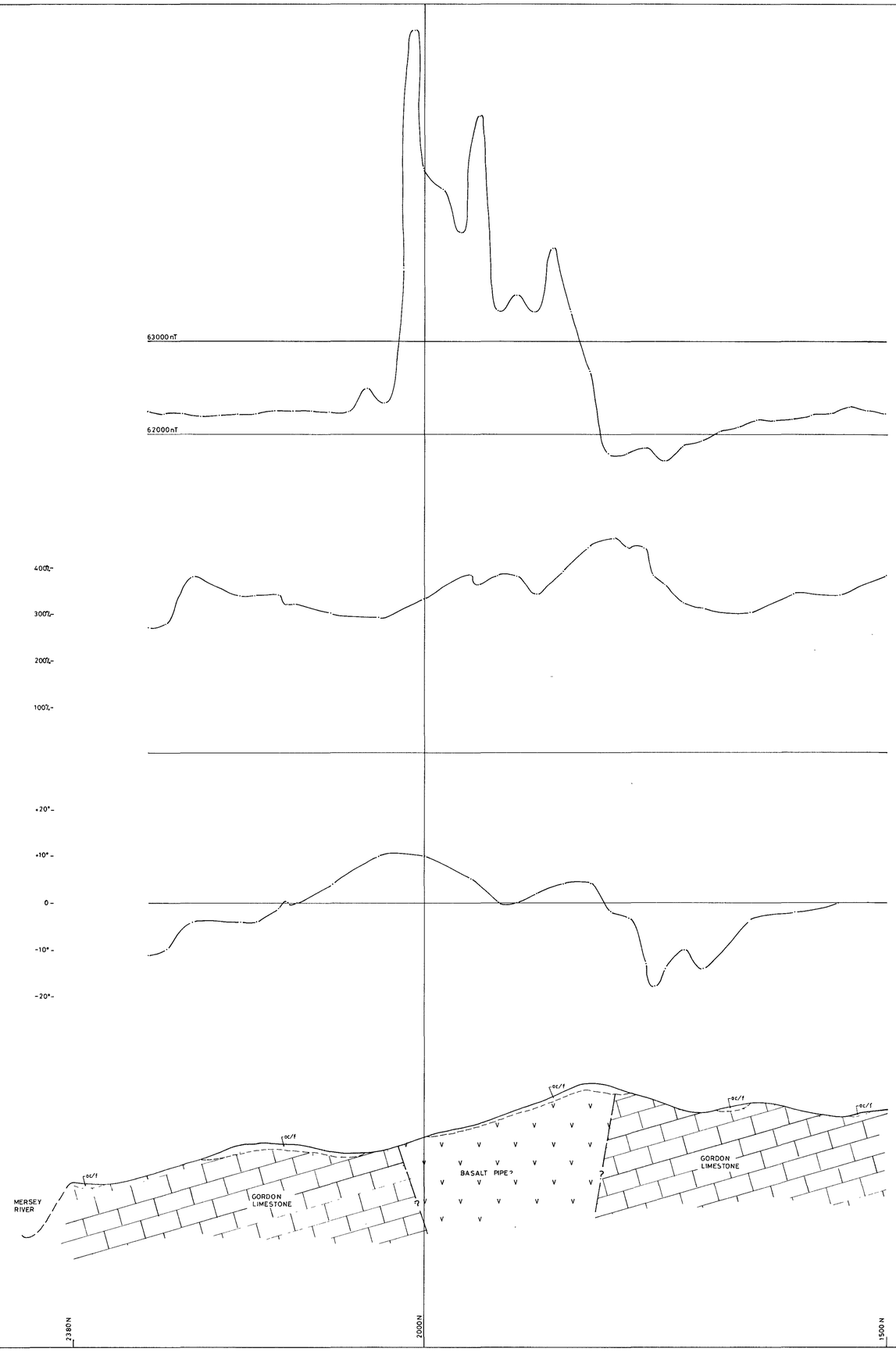
oc/f = outcrop float

0 100 200M

The Shell Company of Australia Limited METALS DIVISION	
E.L 7/74 MOINA LIENA ANOMALY 4339/2 LINE 2000N GEOLOGY, V.L F, MAGNETICS	
Scale 1 2500	82-1728 Vol 4/5
FIG No	REPORT No
ENCL No	DRG No D/MZ01/085
DATE 19-5-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

806373

1553



5 cm

oc/f = outcrop float

0 100 200M

The Shell Company of Australia Limited METALS DIVISION	
E L 7/74 MOINA LIENA ANOMALY 4339/2 LINE 1400 E GEOLOGY, VLF, MAGNETICS 82-1728 vol 415 Scale 1 2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/086
DATE 20-5-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

806374

1553

1000 E

1380 E

1400 E

1600 E

2200 E

2380 N

MERSEY RIVER

2000 N

1500 N

NOTE Analyses in ppm.

ROCK CHIP SAMPLING Sn | W

SOIL SAMPLING Sn | W

N

5 cm

0 100 200M

806375

The Shell Company of Australia Limited METALS DIVISION	
MOINA E.L. 7/74 LIENA ANOMALY (4339/2) **SOIL & ROCK CHIP SAMPLING** 82-1728 Vol 415 Scale 1:2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/088
DATE 26-5-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1553

1000 E

1380 E

1400 E

1600 E

2700 E

2380 N

MERSEY RIVER

2000 N

1500 N

ROCK CHIP SAMPLES Cu | Pb / Zn | Ba

NOTE - Analyses in ppm

SOIL SAMPLES Cu | Zn / Pb | Ni

N

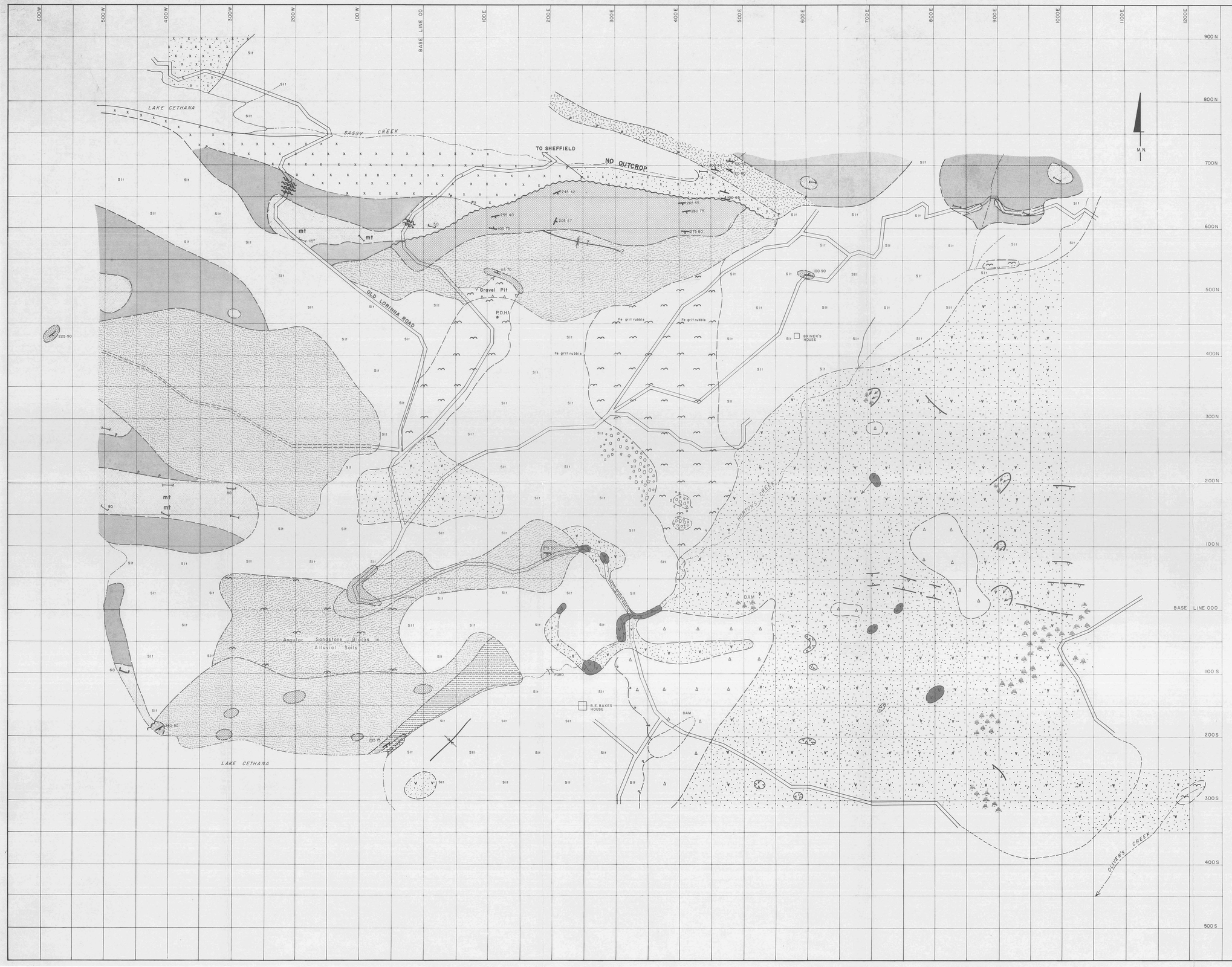
5 cm

0 100 200M

806376

The Shell Company of Australia Limited METALS DIVISION	
MOINA E.L. 7/74 LIENA ANOMALY (4339/2) SOIL & ROCK CHIP SAMPLING 82-1728 Vol 415 Scale 1:2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/090
DATE 28-5-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1553



LEGEND

- Syncline
- Shear Zone
- Springs
- Topographic depressions (Usually water filled - not sink holes)
- Swamps
- mt — Magnetite
- Creeks
- Geological boundaries
- Road
- 4 wheel drive track.
- Walking track
- 240-30 — Bedding - strike and dip.
- 80 — Cleavage with dip.
- Cleavage, vertical.

RECENT
- Alluvial Soils
- Alluvial - Cobbles and gravels

TERTIARY
- Basalt - Massive
- Basalt - Agglomerate
- Soil derived from basalt.
- Sediments - Scree
- Slt — Sediments - silts

ORDOVICIAN
- Limestone
- Siltstone, Sandstone
- Soils derived from siltstone - sandstone
- Sandstone - Conglomerate
- Soil and scree derived from sandstone

CAMBRIAN
- Greywacke - greywacke tuffs
- Soils derived from greywackes
- Quartz crystal tuff ("porphyry")
- Soils derived from "porphyry"
- Fine grained tuff - coarse siltstone

5 cm

COMALCO LIMITED

TASMANIA
(E.L. 7/74)

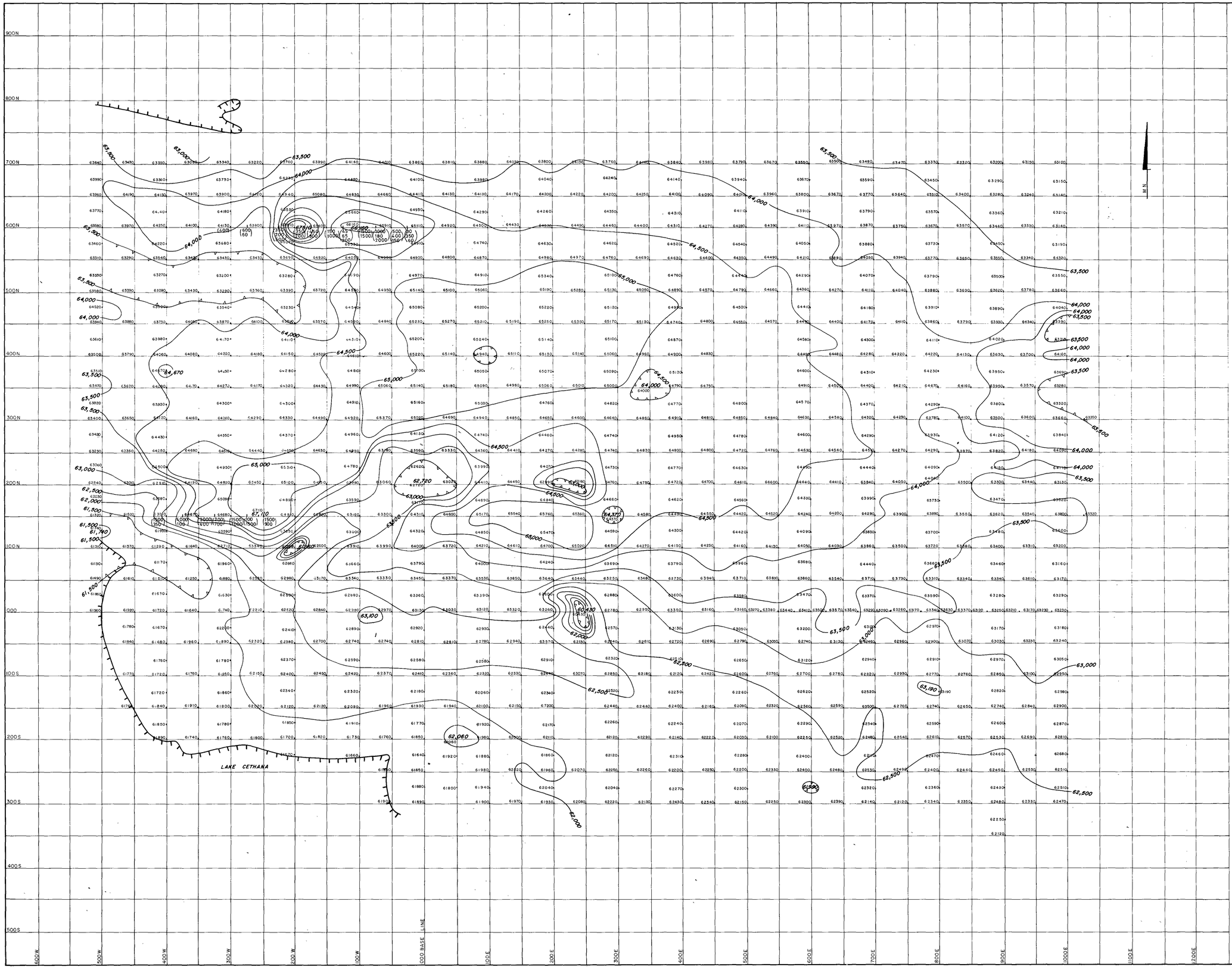
LORINNA NORTH ANOMALY (4240/3)
GEOLOGY

Vol 515
82-1728

Compiled: R. Poltock.	Revised:	Drawn: M. Attwell.
Date: July, 1977	Scale: 1:2,500	Drg. N° TAS-77-63

806377

1554



NOTE

- Instrument used - Geometrics G-856 "Unimag" portable proton precession magnetometer
- Contour interval 500γ (Magnetic Susceptibility $\times 10^{-6}$ cgs units)

5 cm

0 100m

Scale

NOTE: Overlay for Geology Map TAS-77-63

COMALCO LIMITED

TASMANIA (E.L. 7/74) 82-1728 Vol 5(5

LORRINA NORTH ANOMALY (4240/3)

GROUND MAGNETICS (PROTON PRECESSION)

Compiled- R Pollock	Revised	Drawn M Attwell
Date August, 1977	Scale 1 2,500	Drg N° TAS-77-68

806378

1554

	600 W	500 W	400 W	300 W	200 W	100 W	00 E	100 E	200 E	300 E	400 E	500 E	600 E	700 E	800 E	900 E	1000 E	1100 E	
1000 N								6 5 <10 6 8 10											1000 N
900 N			8 <2 <10 <4 30 4	14 6 10 4 16 4	10 3 15 <4 32 5		12 7 15 8 6	4 10 10 4 8	6 9 10 4 5										900 N
800 N			20 10 12 8	<10 10 10 6 12 4	20 4 30 3 15 12 20 3		10 8 12 25 14 12	10 8 10 <10 8 8	10 6 7 10 6 6										800 N
700 N		8 4 30 4 6 3	15 4 14 12 25 6 14 8	15 6 12 6 15 <4 8 6	13 26 22 7 45 6 14 8	12 8 10 16 8	20 16 12 12 8 15 4 40 6 20 8 16 8	13 10 8 110 12 3	10 6 10 100 <4 8 3	4 12 75 <4 6 8	10 8 20 <4 10 8	6 8 15 <4 12 4	8 6 <10 <4 <4 8	6 9 <10 <4 8 6	10 6 <10 <4 6 8	4 2 <10 <4 8 3	6 2 <10 <4 <4 4		700 N
600 N		15 <4 10 5	10 <4 4 6	10 <4 6 12	35 60 8 6	25 18 10	35 6 50 16 6 10	130 12 2	50 <4 6 <2	20 <4 6 4	15 6 <4 4	35 4 6 4	10 <4 4 5	<10 <4 6 8	15 <4 6 8	<10 <4 12 4	<10 <4 6 5		600 N
500 N		<10 <4 14 10 35 4 12 8	20 <4 12 10 20 4 10 4	15 <4 6 10 15 <4 10 6	15 10 8 4 15 <4 6 6	35 10 10 35 6 5	30 28 8 8 20 4 10 12	45 16 12 70 10 4	20 <4 8 6 20 <4 <4 2	10 <4 6 4 <10 <4 8 6	10 4 4 2 <10 <4 10 6	25 <4 10 8 <10 <4 4 2	<10 <4 10 6 <10 <4 6 8	<10 4 <4 7 <10 <4 6 8	15 <4 <4 2 <10 <4 <4 4	10 <4 8 10 <10 <4	<10 <4 <4 <2 <10 <4		500 N
400 N		<10 <4 4 3 20 <4 6 <2	15 <4 14 8 <10 <4 6 3	15 <4 12 10 15 <4 14 6	<10 <4 6 12 20 <4 10 5	40 8 8 <10 8 8	40 4 8 6 <10 <4 6 6	25 5 <4 <10 <4 8	15 <4 6 5 <10 6 3	<10 <4 8 14 <10 <4 8 16	<10 <4 <10 <4	<10 <4 <10 <4	<10 <4 <10 <4	<10 <4 8 6 <10 <4	<10 <4 6 5 <10 <4				400 N
300 N		10 <4 12 2 25 <4 10 4	15 <4 10 2 15 4 24 3	10 <4 8 <2 <10 <4 4 <2	25 <4 12 14 40 <4 4 4	<10 12 14 25 <4 3	<10 <4 8 6 <10 <4 8 14	<10 8 6 <10 <4 14	<10 6 8 4 <10 <4 12 8	<10 <4 6 6 <10 16 16									300 N
200 N		65 <4 12 6 15 4 10 6	25 <4 8 2 20 <4 10 <2	<10 <4 4 <2 20 <4 10 <2	15 <4 6 <2 35 <4 10 3	15 10 14 20 6 4	<10 <4 <4 4 <10 <4 <4 2	<10 <4 12 <10 8 6	<10 <4 8 8 10 <4 8 8	<10 <4 10 <2 <10 <4 12 4									200 N
100 N		25 6 12 8 25 <4 6 4	30 <4 8 6 25 <4 4 10	25 <4 6 4 25 <4 8 2	30 <4 6 8 15 <4 12 8	<10 <4 8 15 4 6	<10 4 <4 <2 <10 <4 4 6	20 6 6 <10 8 8	<10 <4 10 10 <10 <4 6 2	10 <4 12 10 <10 <4 <4 4									100 N
00 N		15 4 4 4 10 <4 6 4	<10 <4 4 6 <10 <4 8 6	15 <4 8 10 15 <4 4 <2	15 <4 4 16 15 <4 6 44	15 <4 10 15 4 14	25 <4 4 12 10 4	20 14 6 <10 <4 12	15 <4 6 8 15 <4 4 5	<10 <4 4 4 <10 <4 6 4									00 N
100 S		15 <4 <4 4 <10 <4 12 16	25 <4 8 20 23 <4 6 16	<10 4 4 7 25 <4 10 <4	15 <4 <4 12 <10 <4 6 16	10 <4 12 15 4 18	8 16 10 <4 8 14	10 <4 8 <10 8 44	<10 <4 <4 3 10 <4 12 4	<10 <4 <4 3									100 S
200 S		<10 <4 8 30 25 <4 10 7	<10 <4 8 9 25 4 10 26	25 <4 6 12 <10 <4 8 24	10 <4 6 10 <10 <4 16 8	<10 6 10 <10 15 <4	10 6 8 28 10 32 6 5	10 14 2 <10 6 10	<10 <4 8 4 <10 <4 4 8	<10 <4 <4 3									200 S
300 S		25 <4 12 6	15 <4 8 2	15 <4 4 <2	<10 <4 6 <2	<10 10 14	15 <4 8 5 <10 4	<10 6 4 10	<10 <4 6 3 <10 <4	<10 <4 <4 3									300 S

N

NOTE: Analyses in ppm

Sn As
W Bi

5 cm

200M

The Shell Company of Australia Limited
METALS DIVISION

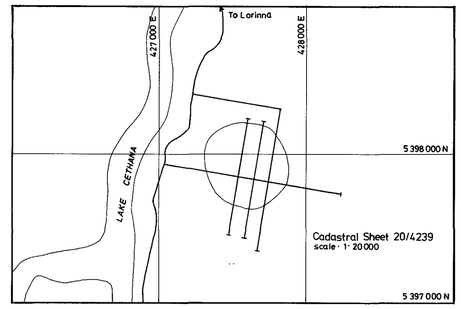
E.L. 7/74 MOINA
LORINNA NORTH GRID
SOIL SAMPLING

82-1728
Vol 515
1554

806379

Scale 1:2500

FIG. No. -	REPORT No.
ENCL. No.	DRG. No. D/MZ01/074
DATE 5-5-81	AUTHOR W D SMYTH.
DRAWN H L H.	OFFICE DEVONPORT



To Lorinna

30°

MOINA SANDSTONE

TERTIARY BASALT

DOVE GRANITE

TERTIARY BASALT

P.D.H 1

TERTIARY BASALT

DOVE GROUP QUARTZITE

POWERFUL MINE
Haem, Au

T.N MN

5 cm

200 M

The Shell Company of Australia Limited
METALS DIVISION

LORINNA EAST GRID
GEOLOGY
MOINA E.L. 7/74
4239/3

82-1728
Vol 5|5

Scale . 1·2500

FIG. No.	REPORT No
ENCL No	DRG. No D/MZ01/070
DATE 27-4-81	AUTHOR W.D.S.
DRAWN H.L.H.	OFFICE DEVONPORT

806380

1554

-7
-10
-16
-19
-13
-4
-2
-1

-17
-11
-12
-16
-13
-8
-2
-2

+5
+2
+1
-7
-21
-27
-21
-26

+3
+1
0
-4
-4
-17
-20
-3

500 N
400 N
300 N
200 N
100 N
00
100 S
200 S
300 S
400 S
500 S

800 W
500 W
200 W
100 W
00
500 E

M.N.
T.N

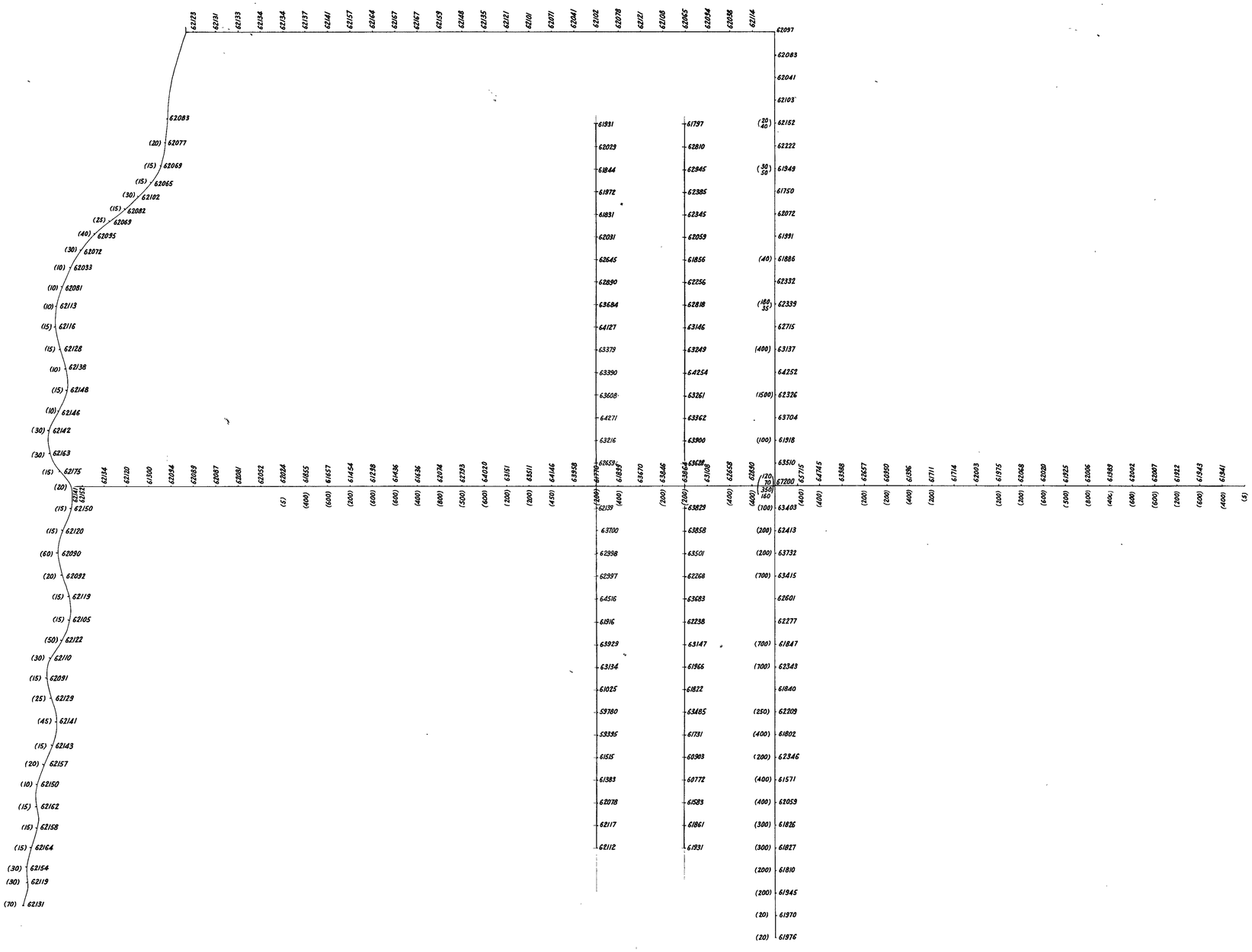
5 cm

0 100 200M

806381

The Shell Company of Australia Limited METALS DIVISION	
LORINNA EAST GRID MOINA E.L 7/74 4239/3 SLOPE CORRECTIONS 82-1728 Vol 515 Scale 1 2500	
FIG No.	REPORT No.
ENCL No	DRG. No D/MZ01/155
DATE 1-9-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1554



NOTE : (x) = magnetic susceptibility : 10^{-6} cgs. UNITS
Magnetic intensity . nT

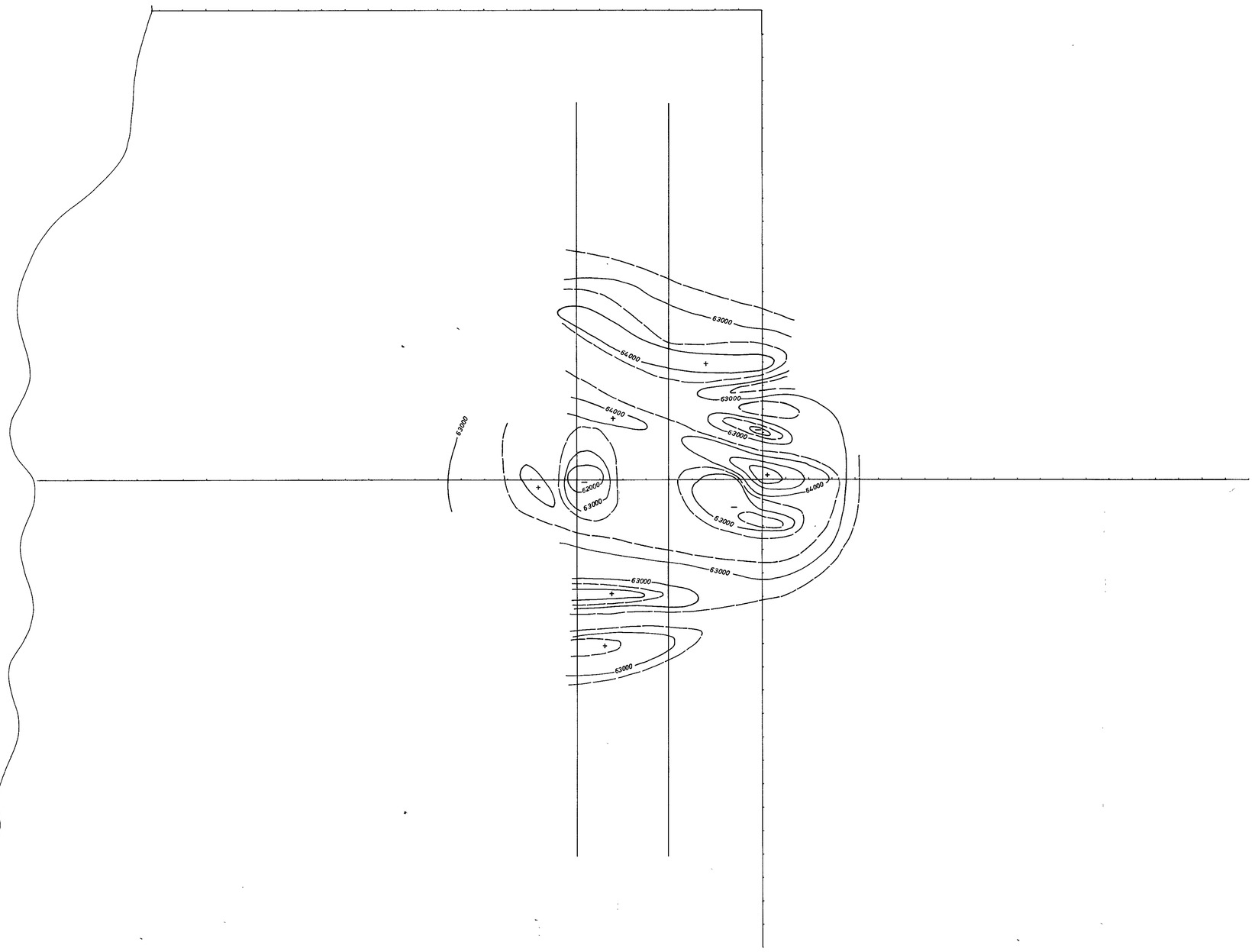
806382

The Shell Company of Australia Limited
METALS DIVISION

LORINNA EAST GRID
TOTAL MAGNETIC INTENSITY
AND SUSCEPTIBILITIES
MOINA E.L. 7/74
4239/3 82-1728
Scale . 1:2500 Vol 515

FIG. No.	REPORT No.
ENCL. No.	DRG No D/MZ 01/062
DATE 27-3-81	AUTHOR W D. SMYTH
DRAWN O HEDDITCH	OFFICE DEVONPORT

1554



500 N
400 N
300 N
200N
100 N
00
100S
200 S
300 S
400S
500S

800W 700W 600W 500W 400W 300W 200W 100W 00 100 E 200 E 300 E 400 E 500 E

806383

The Shell Company of Australia Limited
METALS DIVISION

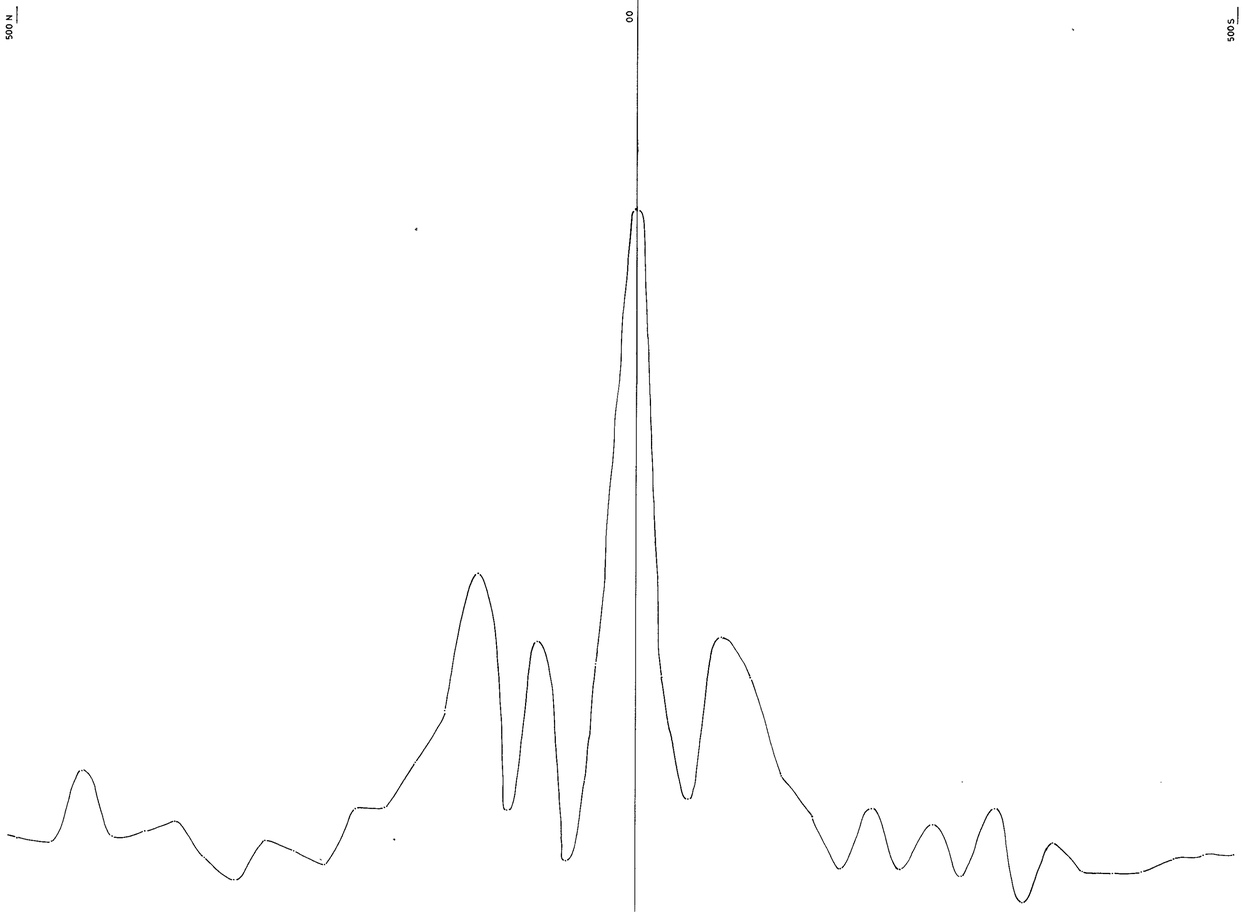
LORINNA EAST GRID
MOINA E.L. 7/74
4239/3
MAGNETIC CONTOURS

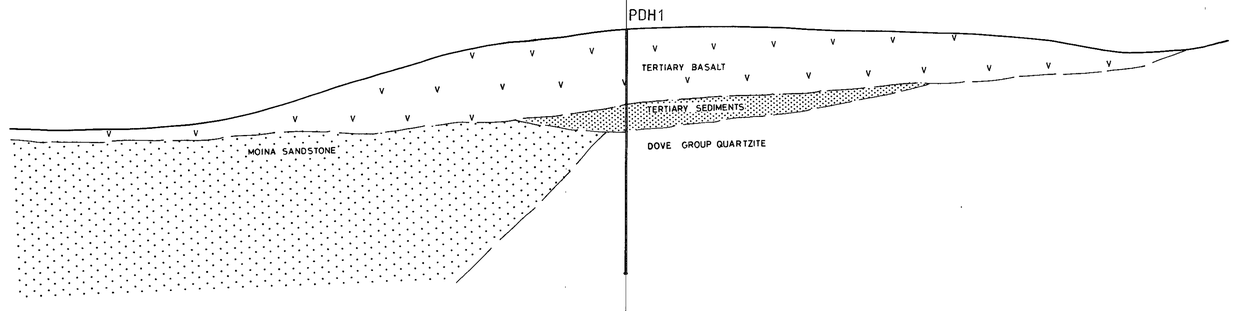
827728 VOL 515

Scale . 1 2500

FIG. No.	REPORT. No.
ENCL. No	DRG. No D/MZ01/106
DATE 12-6-81	AUTHOR W.D. SMYTH / N.H
DRAWN H L H.	OFFICE DEVONPORT

1555





5 cm

200 M

The Shell Company of Australia Limited METALS DIVISION	
LORINNA EAST GRID MOINA E.L. 7/74-4239/3 00E 500N-500S 82-1728 Vol 5/5 **GROUND MAGNETIC PROFILE** 1cm = 250nT VERTICAL Scale 1 2500 HORIZONTAL	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/063
DATE 12-6-81	AUTHOR W D SMYTH
DRAWN H.L H.	OFFICE DEVONPORT

806384

1555

790 E

0.0

500 W

60 000 nT

PDH 1

60 000 nT

TERTIARY BASALT

TERTIARY SEDIMENTS

DOVE GROUP QUARTZITE

DOVE GRANITE

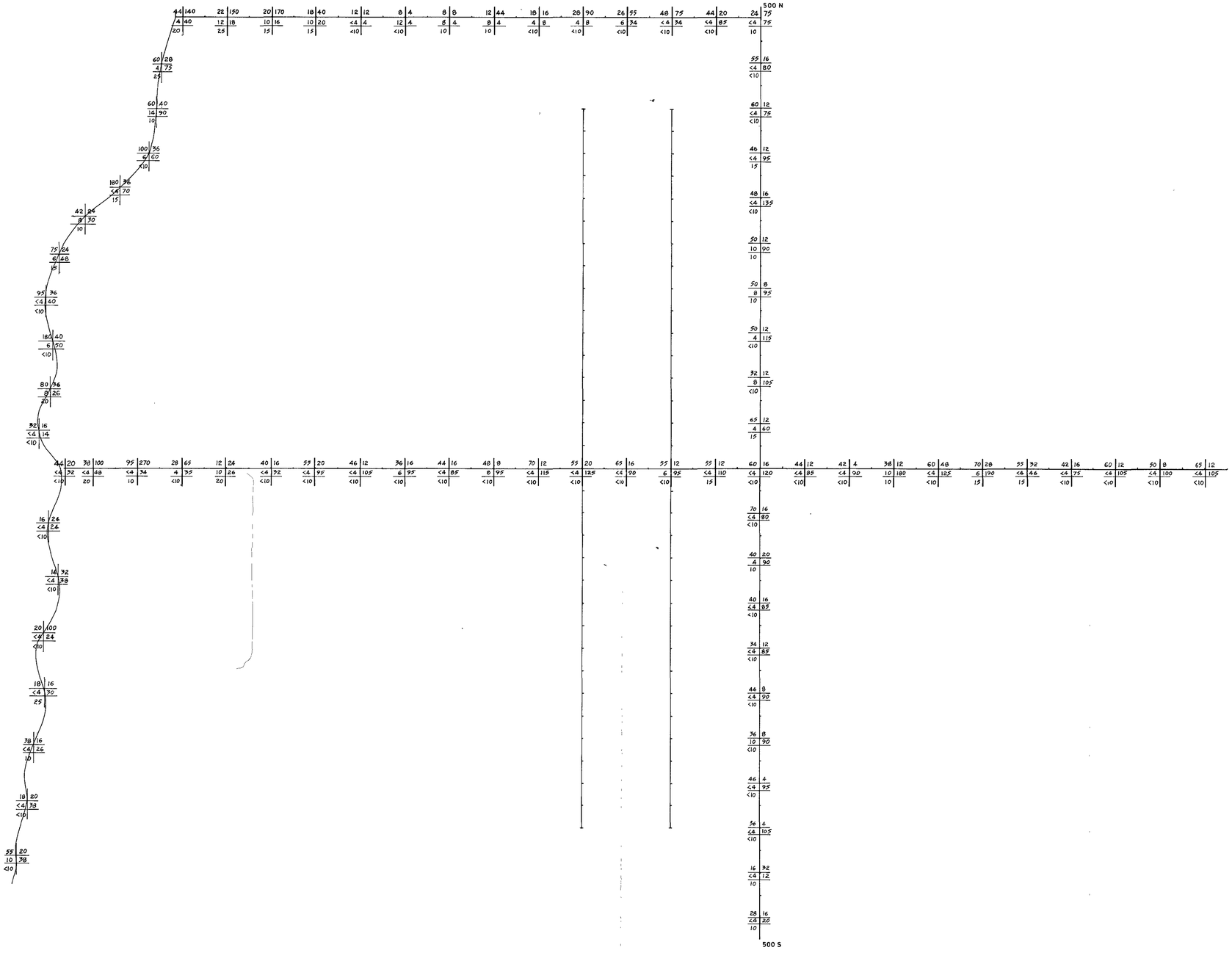
5 cm

200 M

The Shell Company of Australia Limited METALS DIVISION	
LORINNA EAST GRID OON 790 E – 500 W MOINA E.L.7/74 - 4239/3 GROUND MAGNETIC PROFILE 82-1728 Vol 5/6 1cm = 250 nT VERTICAL Scale 1 2500 HORIZONTAL	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/064
DATE 12-6-81	AUTHOR W.D. SMYTH
DRAWN H L H	OFFICE DEVONPORT

806385

1555



500 N
400 N
300 N
200 N
100 N
00
100 S
200 S
300 S
400 S
500 S

TN MN

NOTE- Analyses in ppm.

Cu Pb
Sn Zn
W

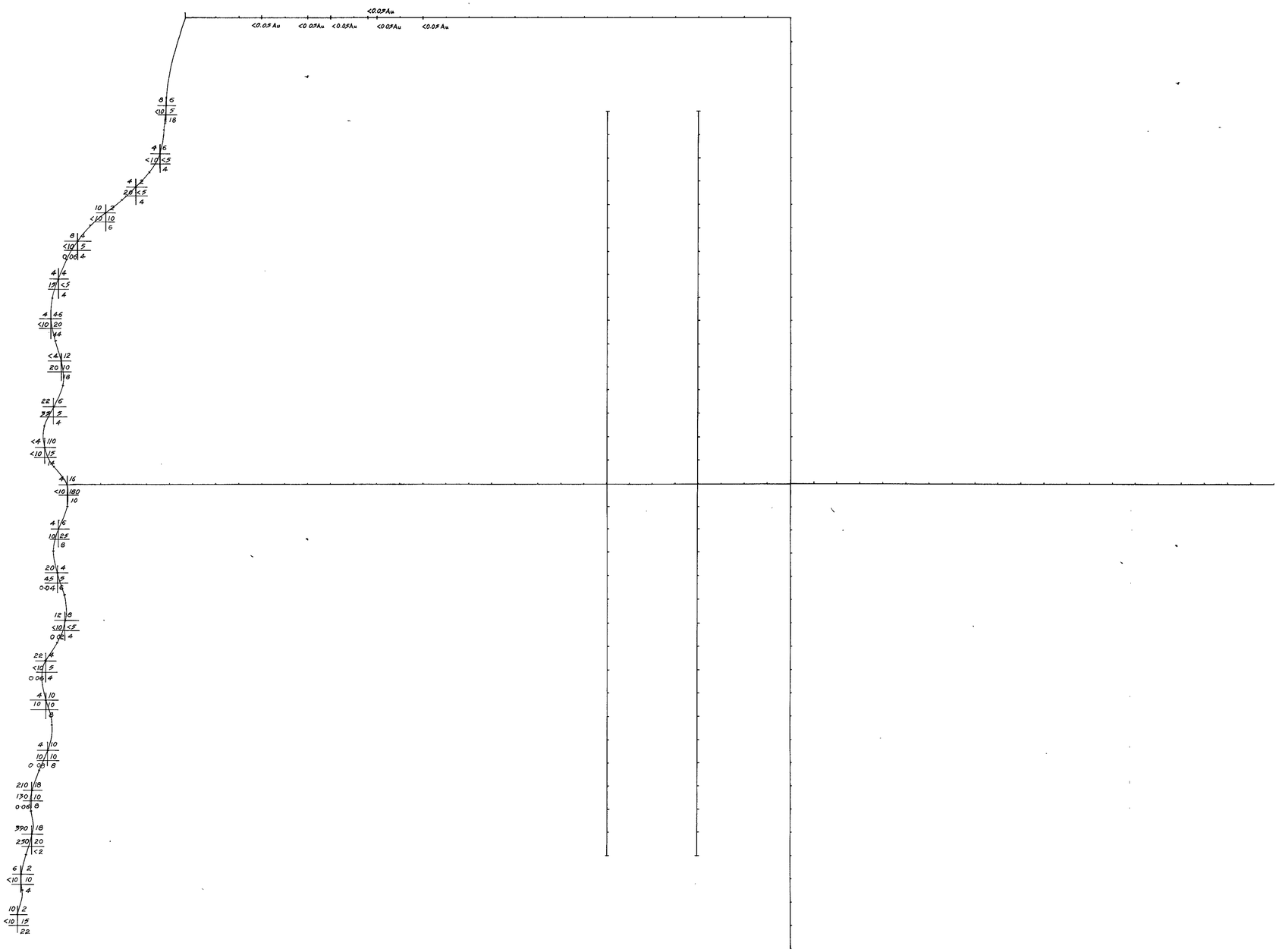
5 cm

1Km

806386

The Shell Company of Australia Limited METALS DIVISION	
LORINNA EAST GRID SOIL SAMPLING MOINA E.L. 7/74 4239/3 82-1728 vol 515 Scale 1 2500	
FIG. No.	REPORT No.
ENCL No.	DRG. No. D/MZ01/066
DATE 22-4-81	AUTHOR W D.S.
DRAWN H L H.	OFFICE DEVONPORT

1555



The Shell Company of Australia Limited METALS DIVISION	
LORINNA EAST GRID MOINA E.L. 7/74 4239/3 ROCK CHIP SAMPLING 82-1728 Vol 5\5 Scale : 1 2500	
FIG. No.	REPORT No.
ENCL No.	DRG. No. D/MZ01/073
DATE 4-5-81	AUTHOR W.D. SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT

80638?

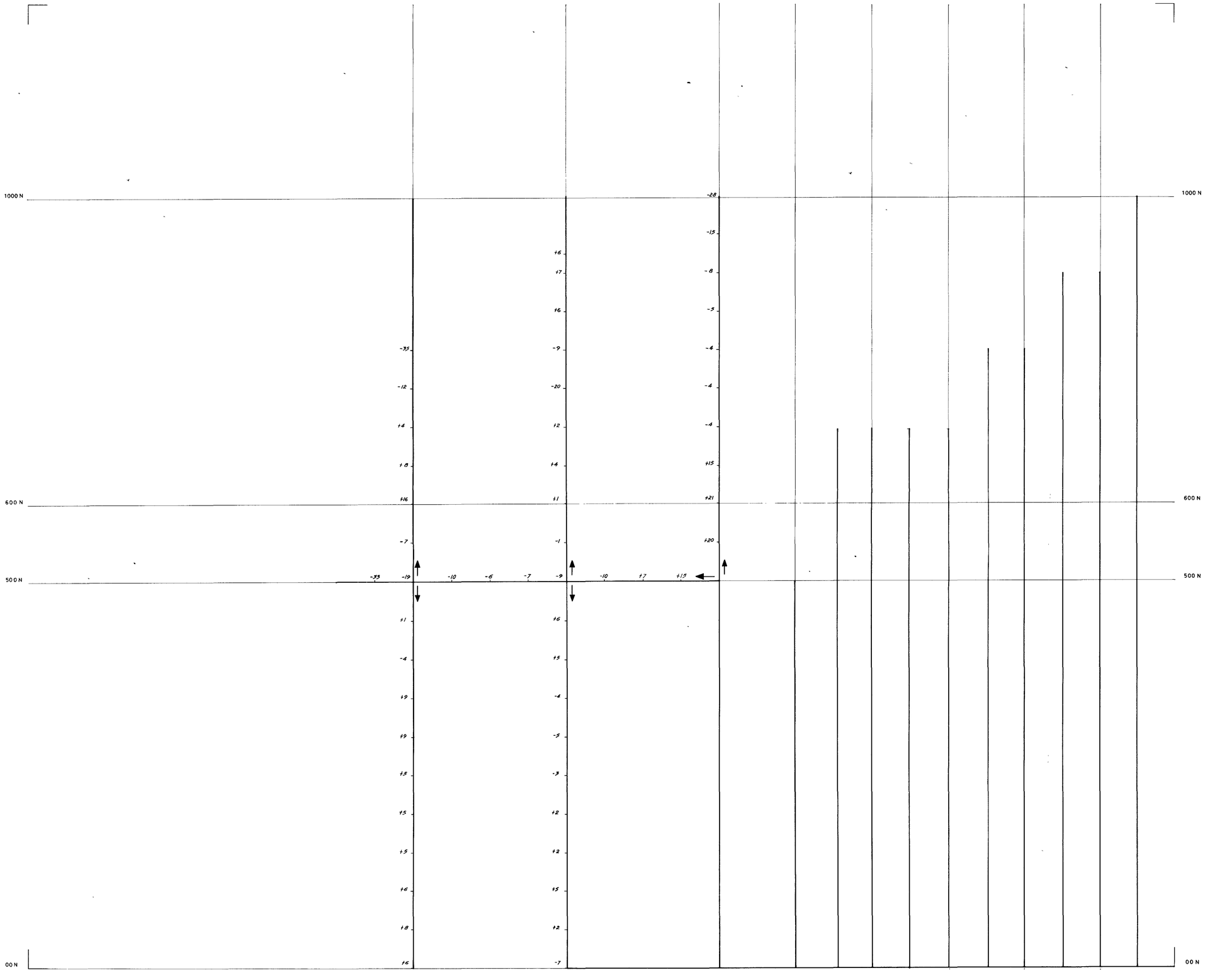
1555



806388

The Shell Company of Australia Limited METALS DIVISION	
E.L 7/74 MOINA LAKE GAIRDNER ANOMALY (4240/1) MOINA GRID & EXTENSIONS GEOLOGY Vol 5/5 Scale 1 2500 82-1728	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/080
DATE 24-4-81	AUTHOR W D S
DRAWN H L H	OFFICE DEVONPORT

1555



806389

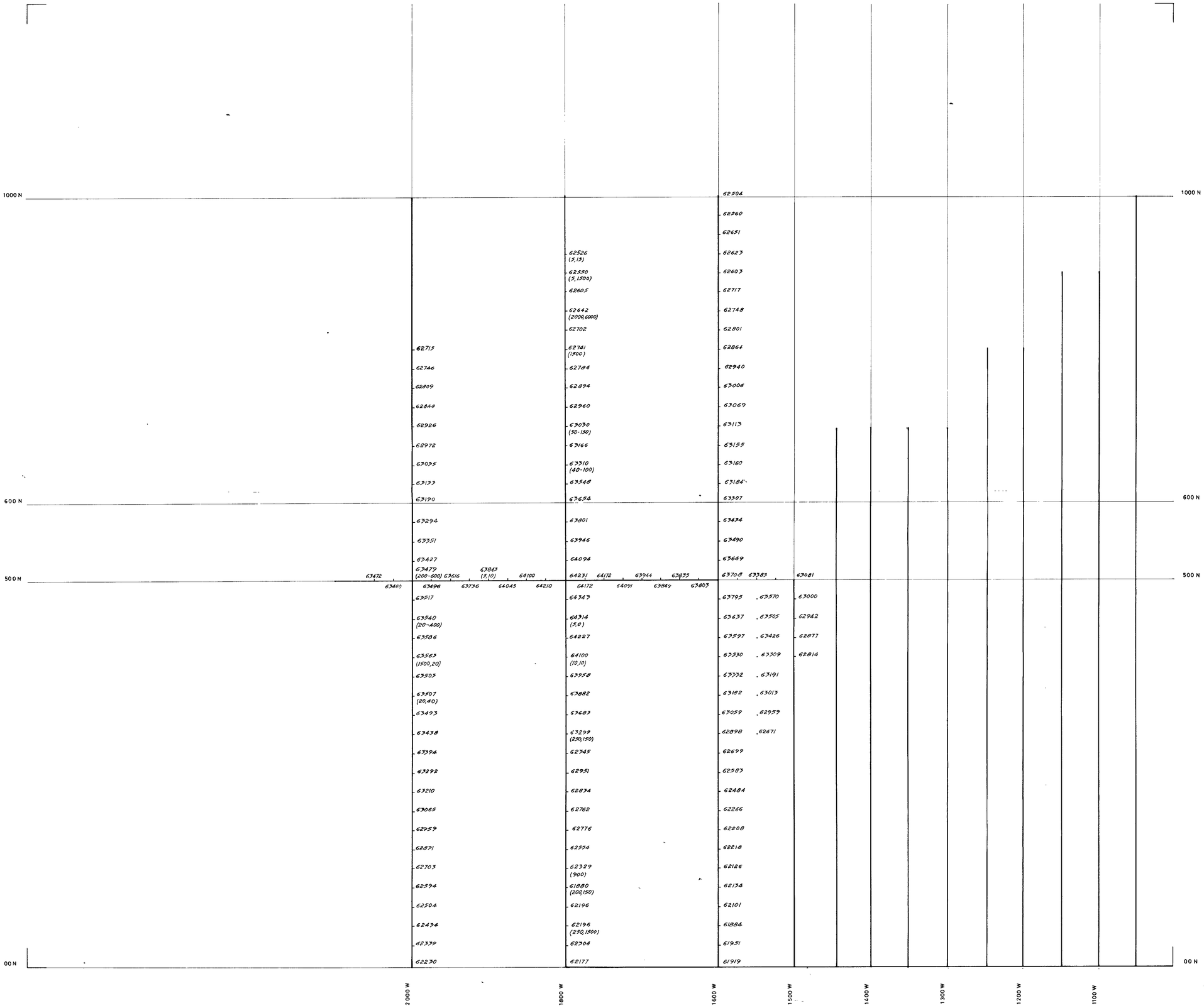
MN
TN

5 cm

200 M

The Shell Company of Australia Limited METALS DIVISION	
EL. 7/74 MOINA LAKE GAIRDNER ANOMALY (4240/1) MOINA GRID & EXTENSIONS Slope Corrections Scale 1 2500	82-1728 Vol 515
FIG No	REPORT No
ENCL No	DRG No D/MZ01/081
DATE 24-4-81	AUTHOR W D S
DRAWN H L H	OFFICE DEVONPORT

1556



MN
TN

(Magnetic Susceptibility in 10^{-6} Units)

5 cm

200 M

806390

The Shell Company of Australia Limited METALS DIVISION	
E L. 7/74 MOINA LAKE GAIRDNER ANOMALY (4240/1) MOINA GRID & EXTENSIONS GROUND MAGNETICS Vol 515 Scale 1 2500 82-1728	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/079
DATE 24-4-81	AUTHOR W D S
DRAWN H L H	OFFICE DEVONPORT

1556

GROUND MAGNETICS

64000nT

62000nT

V.L.F

200%

100%

+20°

+10°

0

-10°

-20°

PDH 1 (71 M)
DDH 1

MAGNETITE SKARN

MOINA SANDSTONE

LEA RIVER

CAMBRIAN VOLCANICS

253.52M

1000 N 900 N 800 N 700 N 600 N 500 N 400 N 300 N 200 N 100 N 00

5 cm

0 200M

806391

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA LAKE GAIRDNER ANOMALY (4240/1) SECTION 1800 W GEOLOGY, V.L.F, MAGNETICS. 82-1728 Scale 1:2500 Vol 515	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/078
DATE 20-5-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1556

1000 N

500 N

00 N

62000nT

1600 W

TERTIARY BASALT

MOINA SANDSTONE

62000nT

1600 W

62000 nT

2000 W

TERTIARY BASALT

TERTIARY BASALT

MOINA SANDSTONE

62000 nT

2000 W

1000 N

500 N

00 N

1000nT

5 cm

0 100 200M

The Shell Company of Australia Limited
METALS DIVISION

MOINA EL 7/74
LAKE GAIRDNER ANOMALY
SECTION 1600W & 2000W
GEOLOGY, GROUND MAGNETICS

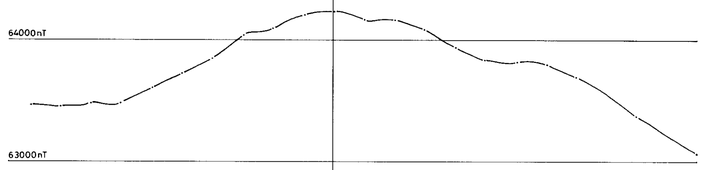
vol 5/5

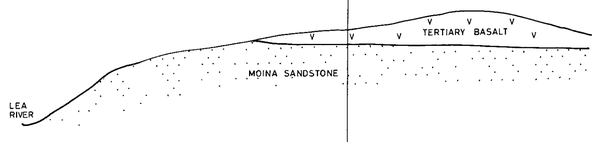
Scale 1:2500 82-1728

FIG No	REPORT No
ENCL No	DRG No D/MZ01/083
DATE 18-5-81	AUTHOR W D SMYTH
DRAWN H L.H	OFFICE DEVONPORT.

806392

1556





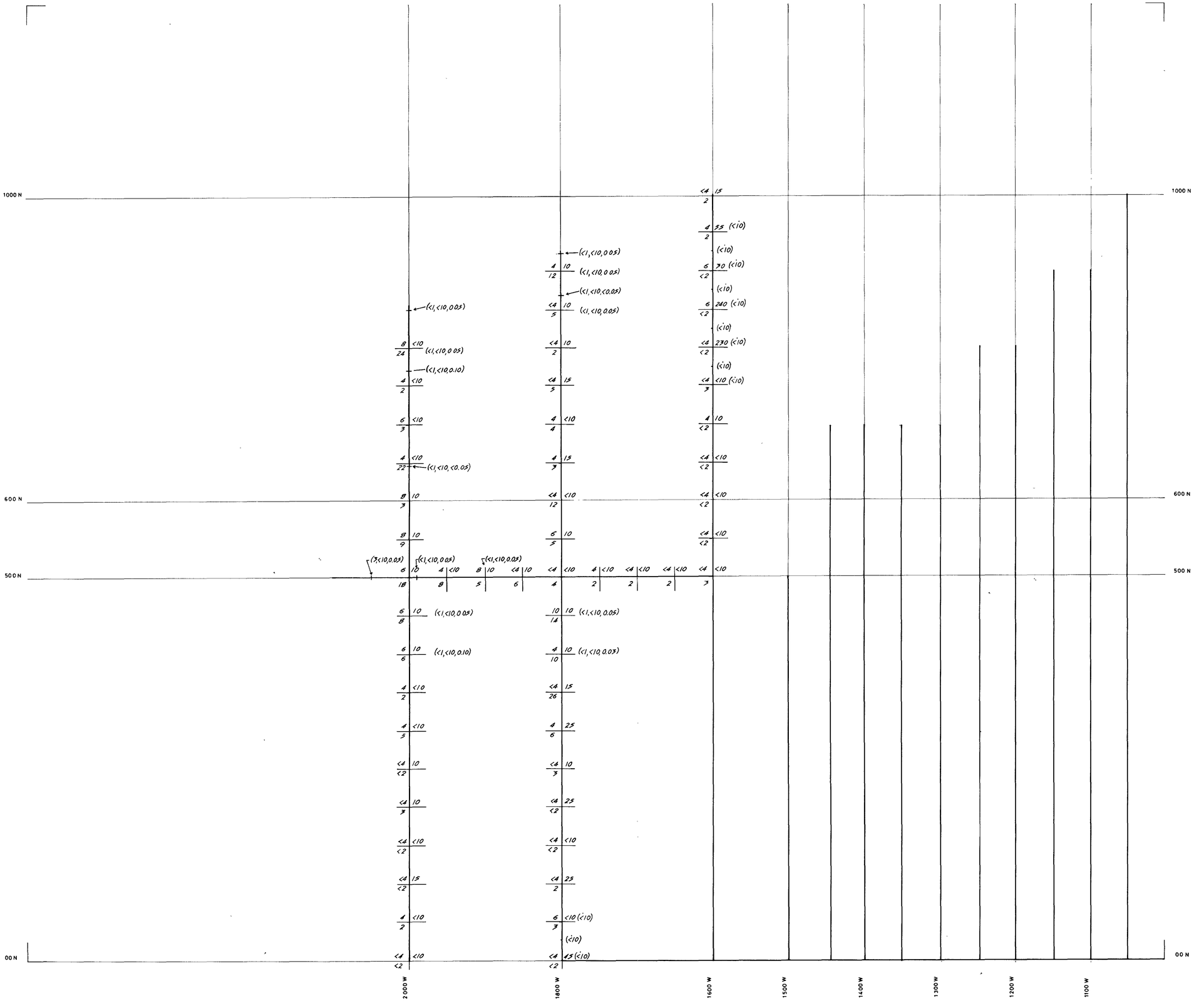
1800W

5 cm

806393

The Shell Company of Australia Limited METALS DIVISION	
EL 7/74 MOINA LAKE GAIRDNER ANOMALY (4240/1) MOINA GRID & EXTENSIONS LINE 500N 82-1728 Vol 5/5 Scale 1:2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/087
DATE 20-5-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1556



806394

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA LAKE GAIRDNER ANOMALY (4240/1) MOINA GRID & EXTENSIONS Soil & Rock Chip Geochemistry Scale 1 2500 82-1728 Vol 5/5	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/146
DATE 24-4-81	AUTHOR W D S
DRAWN H L H	OFFICE DEVONPORT

1556

1000 N

600 N

500 N

00 N

2000 W

1800 W

1600 W

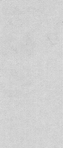
1500 W

1400 W

1300 W

1200 W

1100 W



5 cm

200 M

806395

The Shell Company of Australia Limited METALS DIVISION	
82-1728 Vol 5/5	
E.L. 7/74 MOINA LAKE GAIRDNER ANOMALY (4240/1) MOINA GRID & EXTENSIONS Soil Sample Depths Scale 1:2500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/082
DATE 24-4-81	AUTHOR W.D.S.
DRAWN H.L.H.	OFFICE DEVONPORT.

1557

700N
600N
500N
400N
300N
200N
100N
BASE LINE 000
100S
200S
300S
400S
500S
600S
700S
800S
900W
800W
700W
600W
500W
400W
300W
200W
100W
000 BASE LINE
100E
200E
300E
400E
500E

To Cradle Mt Road

MAGNETIC NORTH

BUSH / CREEK TRACK

065-50

Angular sandstone blocks

Thin Alluvium on Basalt soils

Vesicular

Alluvium Terrace

Cemented angular qtz grit

Vesicular

Vesicular

F

U

D

F

FLOODED RD TO LORINNA

115-30

095-15

SANDSTONE — BASALT CONTACT FROM PHOTO

185-10

Sandy Creek

120-15

LEGEND

- Recent Alluvium
- (Agglomeratic.) Tertiary Basalt (Massive)
- Ordovician – Moina sandstone – Tubicular siltstone, sandstone.
- Cambrian – Lorinna Greywacke.
- Land Slip
- Swamp
- Creek
- Geological boundary
- Track
- Dip of bedding

5 cm

806396

COMALCO LIMITED

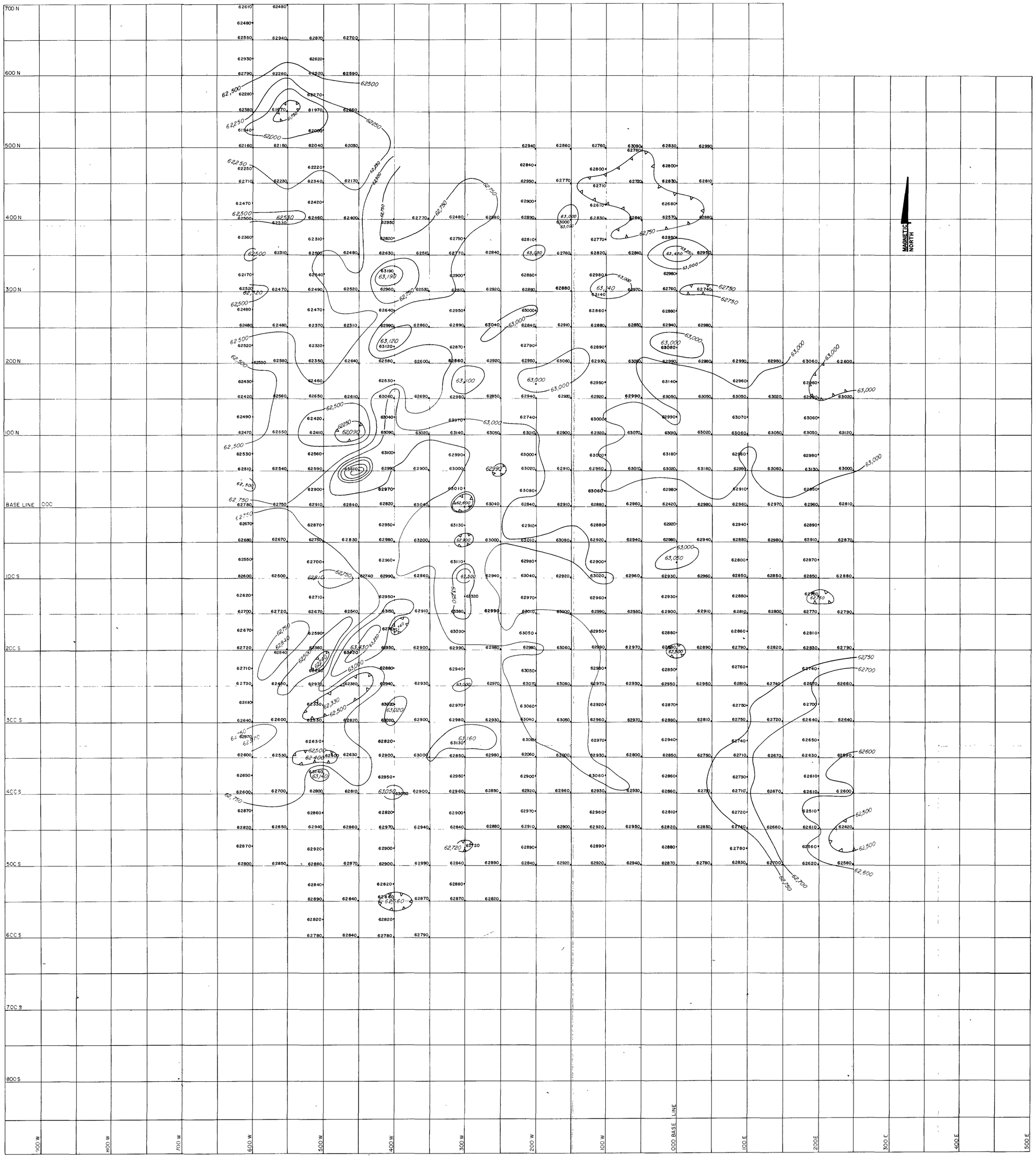
TASMANIA
(E.L.7/74)

LORINNA WEST GRID GEOLOGY

82-1728
Vol 5/5

Compiled: R. Poltock.	Revised:	Drawn: M. Attwell
Date July, 1977	Scale 1:2,500	Drg N° TAS-77-62

1557



NOTE:

- Instrument used Geometrics G-836 "Unimag" portable proton precession magnetometer
- Contour interval 250γ

5 cm

0 100m

Scale

NOTE: Overlay for Geology Map TAS-77-62

COMALCO LIMITED

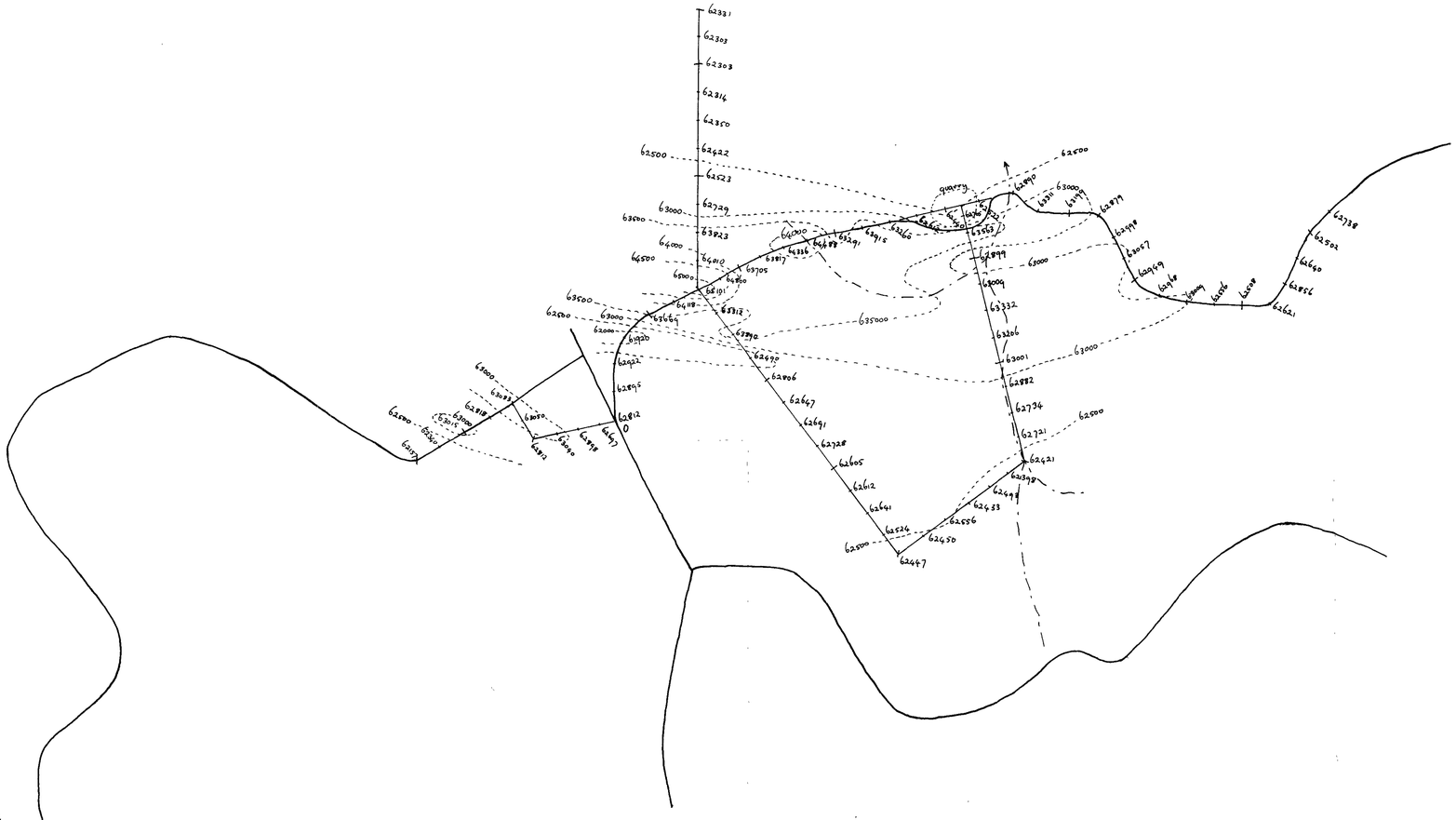
TASMANIA
(E.L.7/74)
82-1728
Vol 515

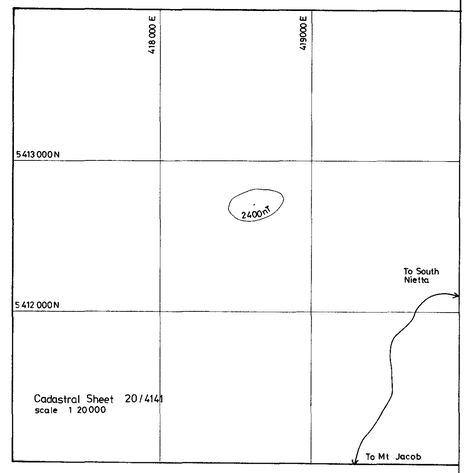
LORINNA WEST GRID
GROUND MAGNETICS
(PROTON PRECESSION)

Compiled: R. Poltock.	Revised	Drawn: M. Attwell
Date July, 1977	Scale 1:2,500	Drg N° TAS-77-70

806397

1557



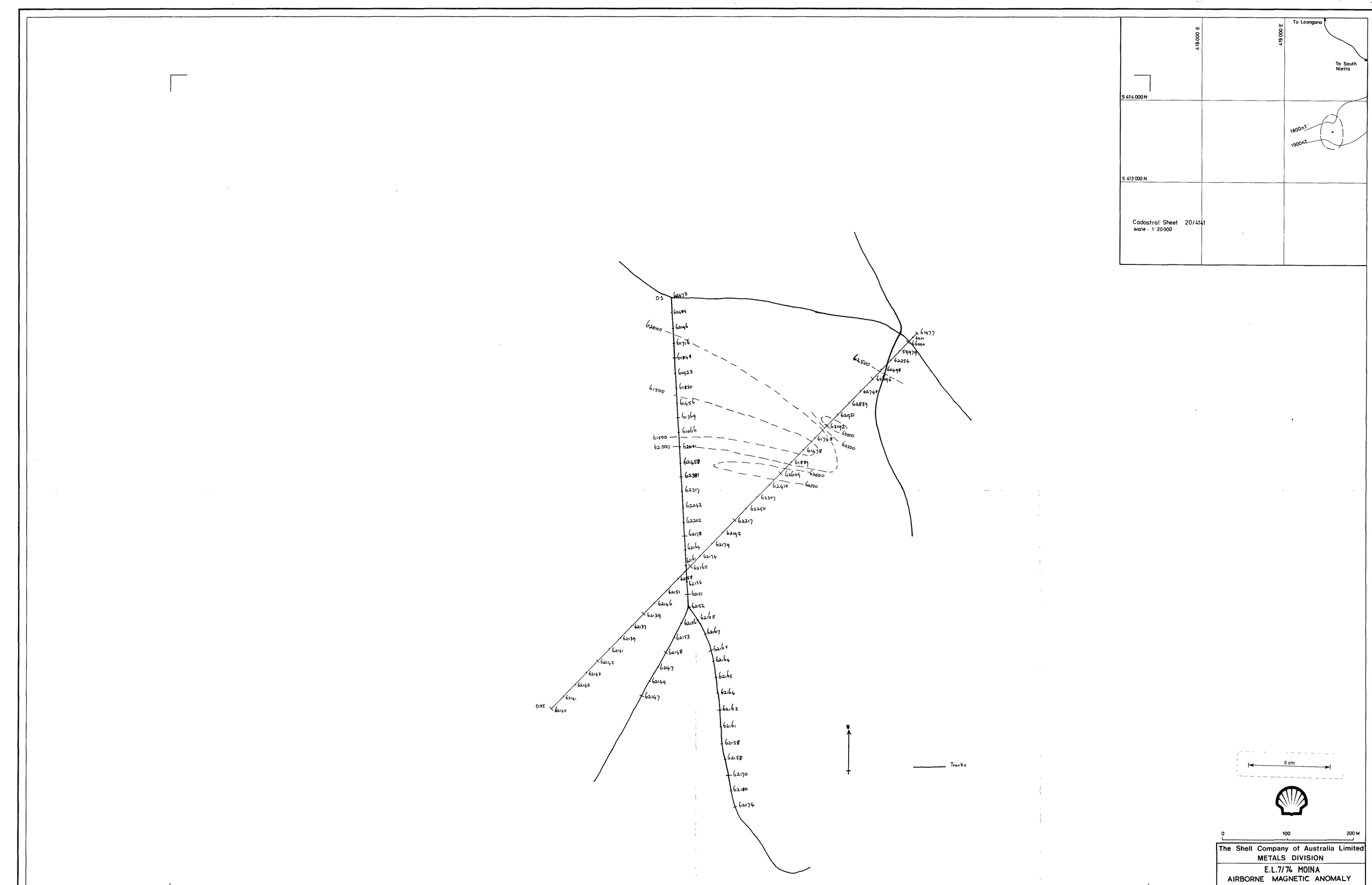


5 cm

0 100 200 M

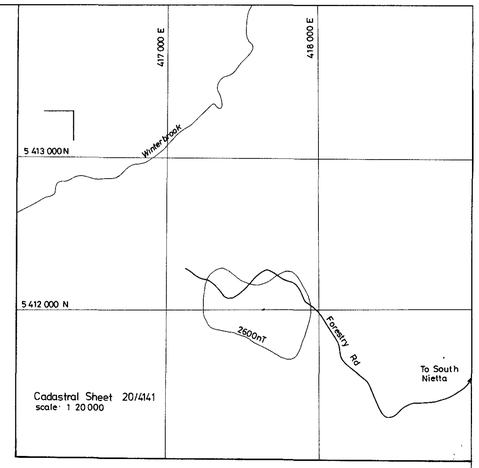
The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA AIRBORNE MAGNETIC ANOMALY 4141/4 RECONNAISSANCE GROUND MAGNETICS 82-1728 Vol 5\5 Scale 1 2500	
FIG No	REPORT No
ENCL No.	DRG. No D/MZ 02/019
DATE 30 · 3 · 81	AUTHOR G OAKES
DRAWN G OAKES	OFFICE DEVONPORT

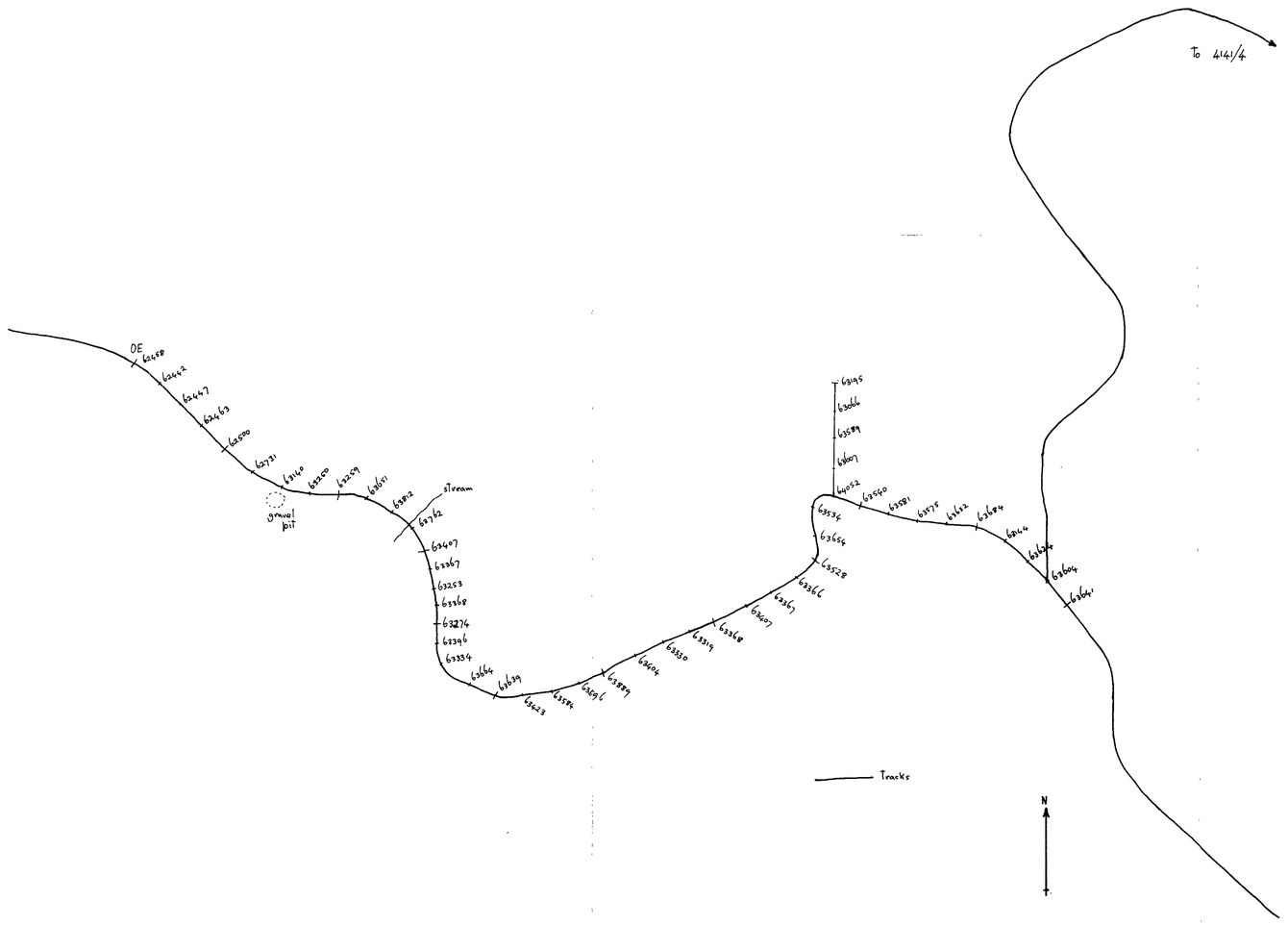
806398



The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA AIRBORNE MAGNETIC ANOMALY 4141/5 RECONNAISSANCE GROUND MAGNETICS 82-1728 Vol 5\5	
Scale 1 2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ 02/020
DATE 30 3 81	AUTHOR G OAKES
DRAWN G OAKES	OFFICE DEVONPORT

806399





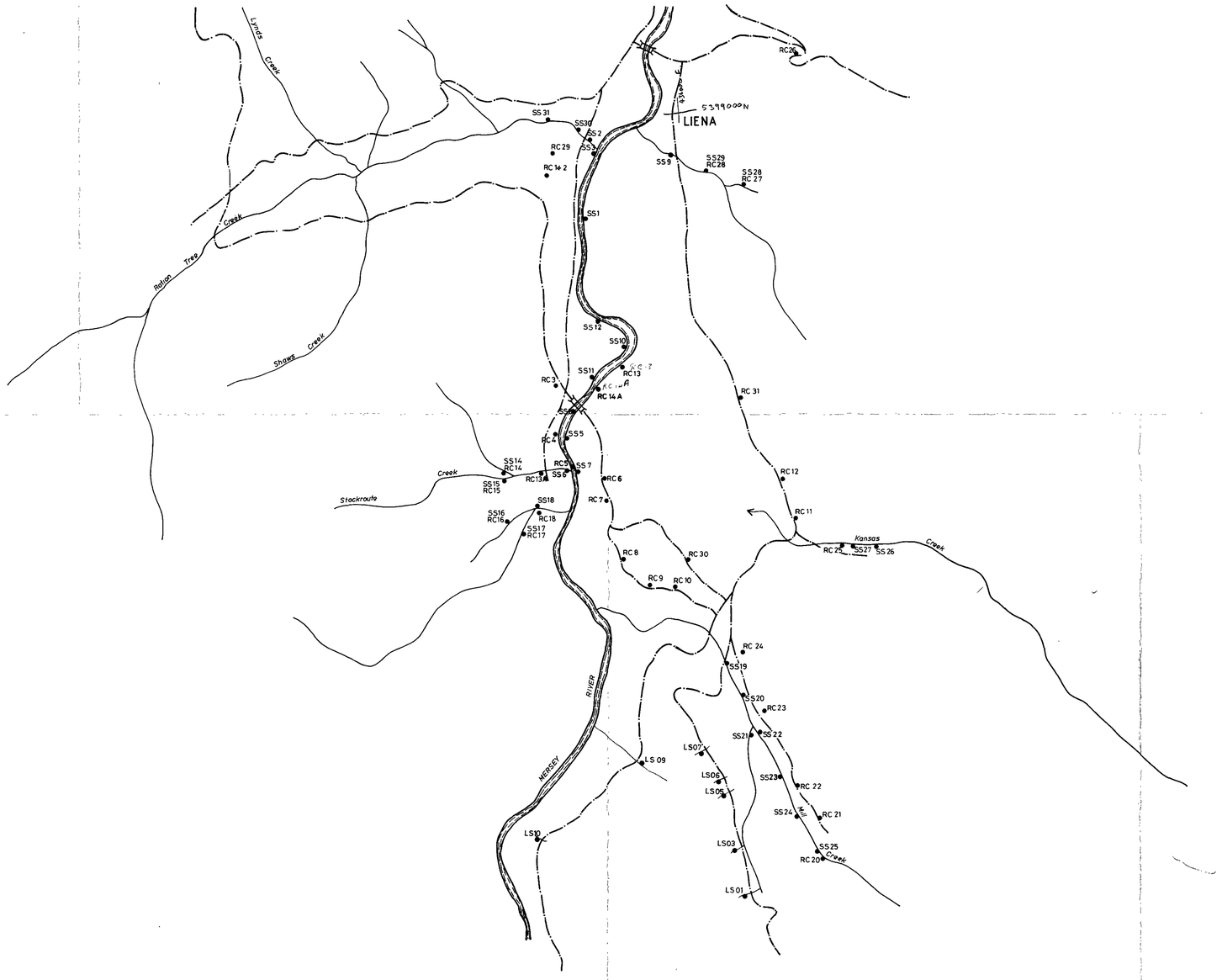
5 cm

0 100 200M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA	
AIRBORNE MAGNETIC ANOMALY 4141 / 6	
RECONNAISSANCE GROUND MAGNETICS 82-1726 Vol 5\5	
Scale 1 : 2500	
FIG. No	REPORT No
ENCL No.	DRG. No D / MZ02 / 021
DATE 30 - 3 - 81	AUTHOR G OAKES
DRAWN G. OAKES	OFFICE DEVONPORT

806400

1557



T.N

5 cm

LEGEND

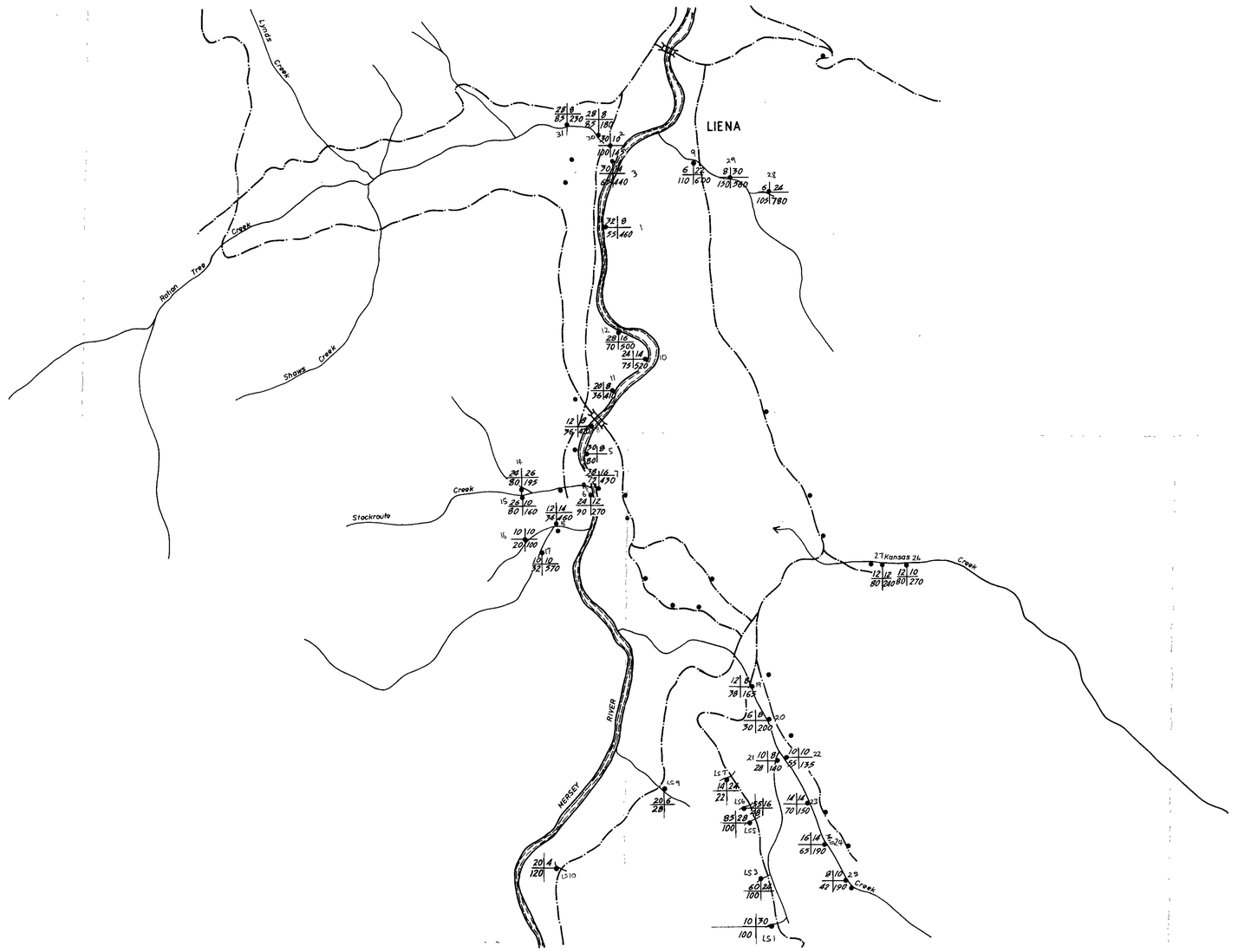
- CREEK
- RIVER
- ROADS
- ●RC 1 — Location of rock chip sample No
- ●SS1 — Location of stream sediment sample No
- ●LS — Location of Liena South stream sediment sample No

1Km

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA LIENA AREA 82-1728 Vol 5/5 STREAM SEDIMENT & ROCK CHIP SAMPLE LOCATIONS Scale 1:20,000	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/108
DATE 4-8-81	AUTHOR W.D. SMYTH
DRAWN H.L.H	OFFICE DEVONPORT

806401

1558



Cu | Pb
Zn | Ba

LEGEND

CREEK

RIVER

ROADS

NOTE : Analyses in ppm.
-80 #

6 cm

1Km

The Shell Company of Australia Limited
METALS DIVISION

E.L.7/74 MOINA
LIENA AREA
Stream sediment sample assay results - Cu, Pb, Zn, Ba.

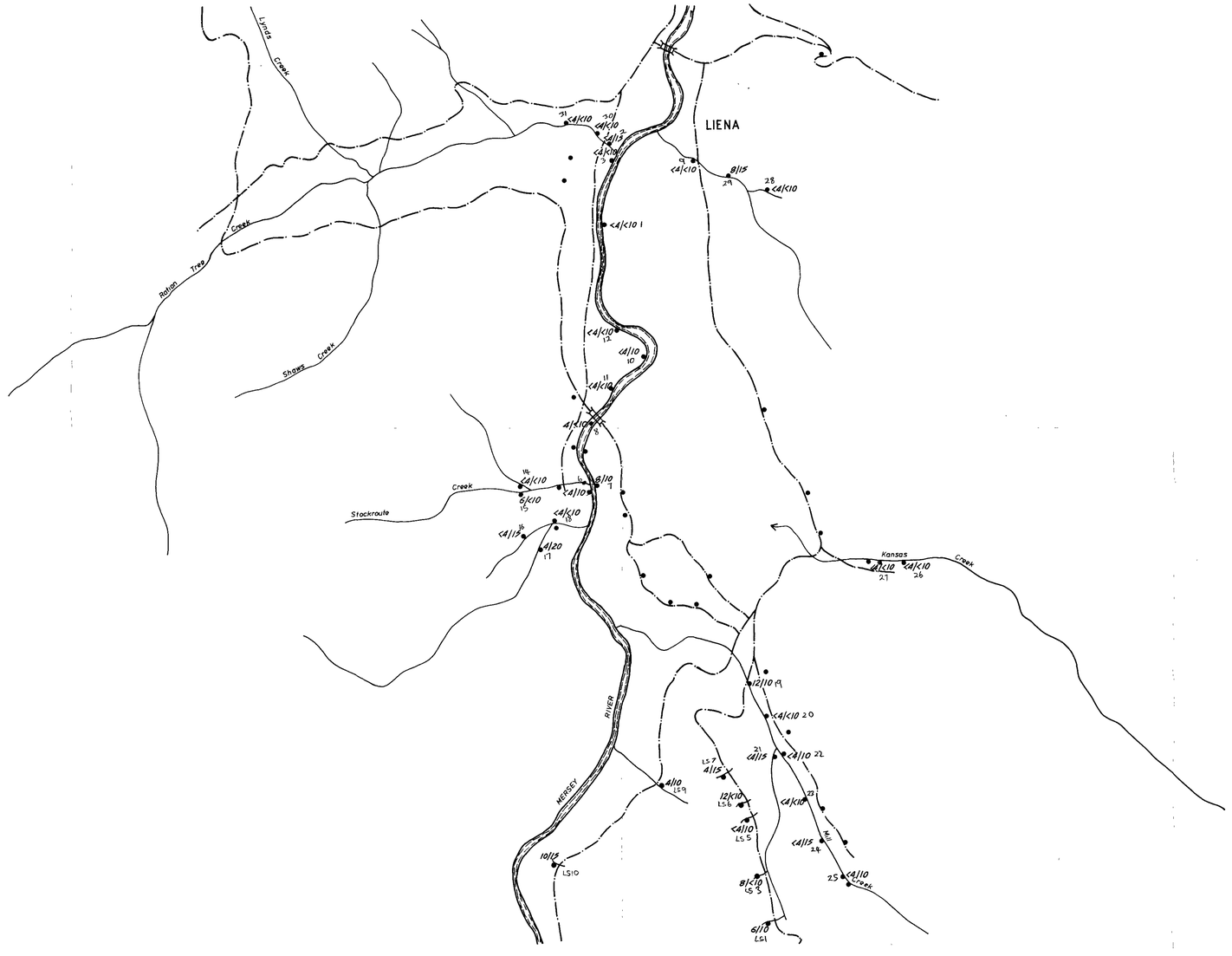
82-1728 Vol 5/5

Scale 1 20000

FIG No	REPORT No
ENCL No	DRG No D/MZ01/123
DATE 5-8-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

806402

1558



TN

MN

Sn/W

LEGEND

CREEK

RIVER

ROADS

NOTE Analyses in ppm
-80 #

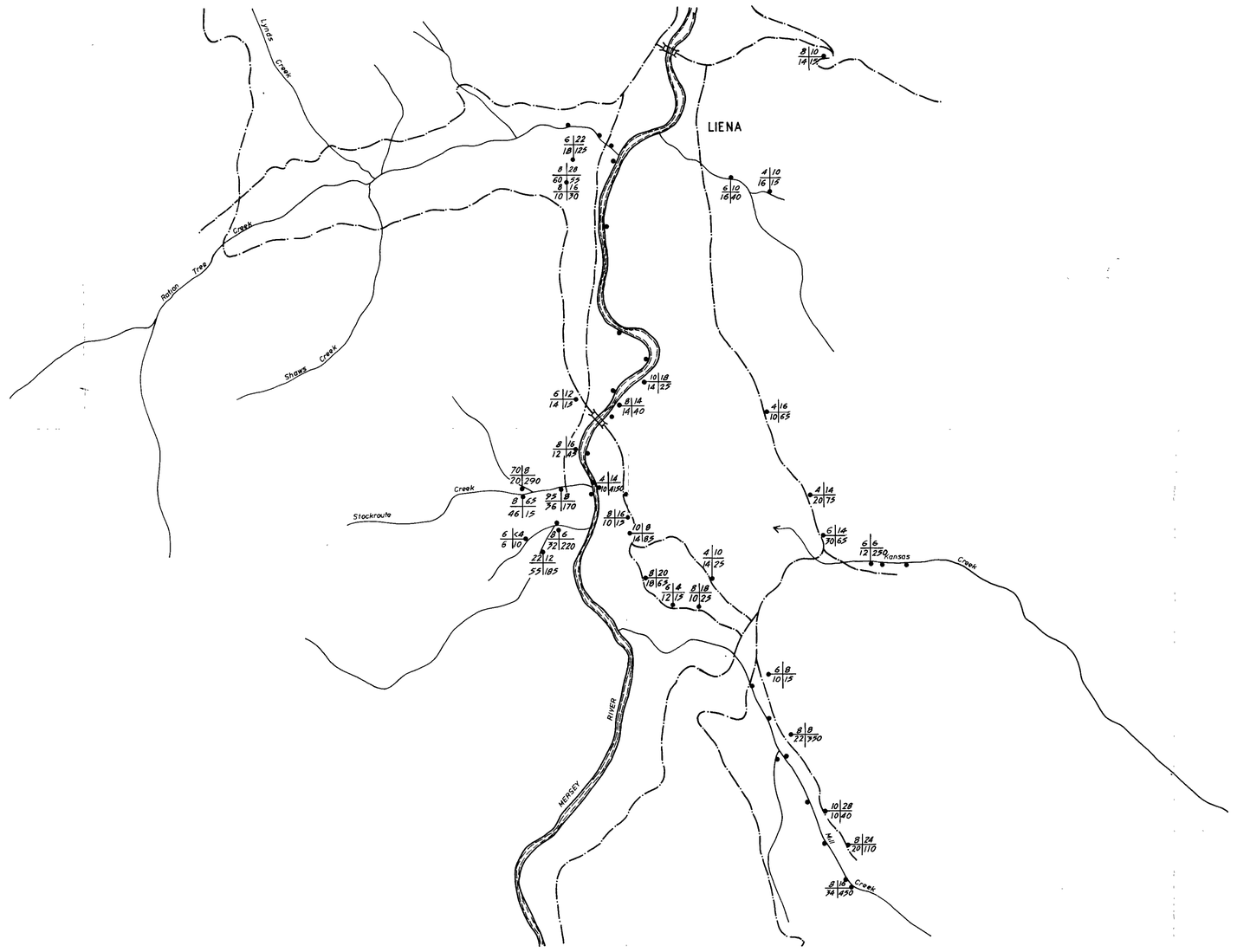
5 cm

1Km

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA LIENA AREA Stream sediment sample assay results - Sn,W. 82-1728 Vol 5\5 Scale 1 20000	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/124
DATE 6-8-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

806403

1558



Cu | Pb
Zn | Ba

TN
MN

LEGEND

CREEK

RIVER

ROADS

NOTE · Analyses in ppm.

5 cm

1Km

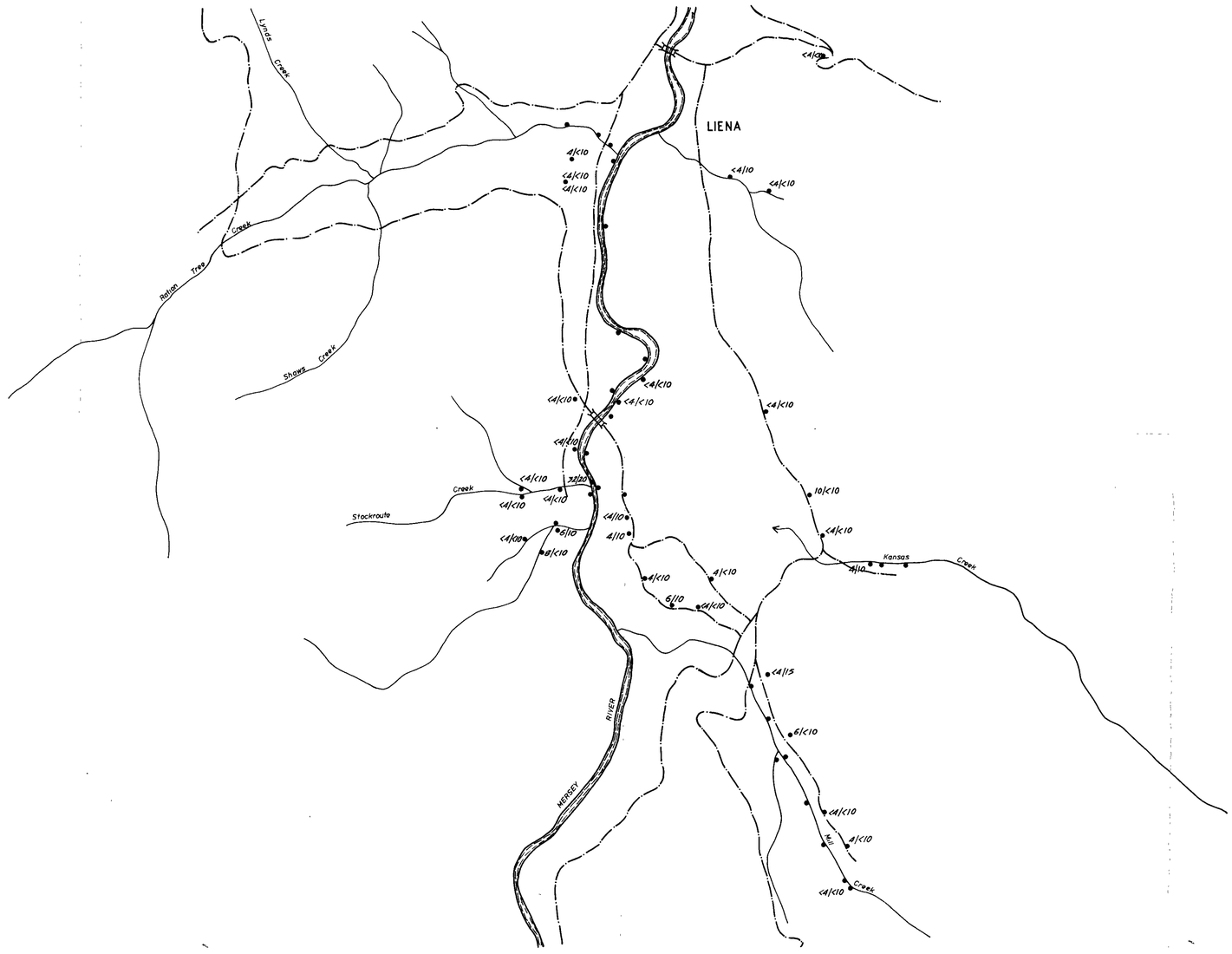
RC 19
12|4
8|20

RC 32
22|65
14|55

806404

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 MOINA LIENA AREA Rock chip assay results - Cu, Pb, Zn, Ba. 82-1728 Vol 5|5 Scale 1 20000	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/127
DATE 11-8-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

1558

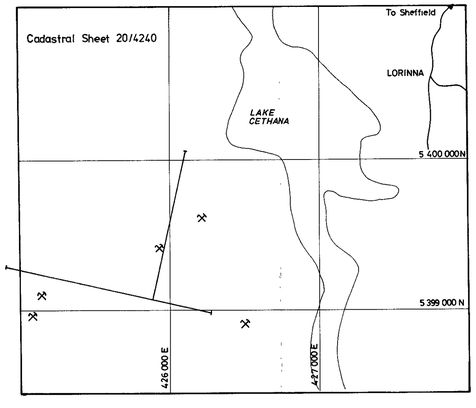

Lyons Creek
Ration Tree Creek
Shows Creek
LIENA
<4/10
4/<10
<4/<10
<4/<10
<4/10
<4/<10
<4/<10
<4/

400 E | 300 E | 200 E | 100 E | 00 E | 100 W | 200 W | 300 W | 400 W | 500 W | 600 W | 700 W | 800 W | 900 W | 1000 W

1500 S
1400 S
1300 S
1200 S
1100 S
1000 S
900 S
800 S
700 S
600 S
500 S

MOINA SANDSTONE

MOINA SANDSTONE



T.N.
M.N

5 cm

0 100 200 M

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA 5 MILE RISE LORINNA WEST GRID EXTENSION GEOLOGY 82-1728 Vol 515 Scale 1 2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/156
DATE 1-9-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

806406

1558

400 E | 300 E | 200 E | 100 E | 00 E | 100 W | 200 W | 300 W | 400 W | 500 W | 600 W | 700 W | 800 W | 900 W | 1000 W

| | | |

400 E 300 E 200 E 100 E 00 E 100 W 200 W 300 W 400 W 500 W 600 W 700 W 800 W 900 W 1000 W

1500 S

62239 62246 62265 62295 62339 62390 62439 62484 62506 62518 62528 62533 62520 62496 62490 62493 62513 62557 62573 62585 62583 62590 62587 62571 62574 62575 62563 62552

62236 62242 62252 62278 62316 62356 62410 62462 62502 62514 62522 62551 62526 62512 62491 62489 62495 62535 62569 62578 62575 62586 62580 62581 62573 62577 62571 62561

62305

62312

62329

1400 S

62338

62350

62356

62366

1300 S

62377

62380

62388

62398

1200 S

62609

62624

62646

62666

1100 S

62681

62695

62710

62741

1000 S

62755

62750

62729

62674

900 S

62655

62684

62687

62705

800 S

62710

62713

62704

62899

700 S

62680

62739

62707

62765

600 S

62796

62805

62838

62834

500 S

62830

T.N.
M.N.

5 cm

0 100 200 M

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA 5 MILE RISE LORINNA WEST GRID EXTENSION GROUND MAGNETICS 82-1728 Vol 5\5 Scale 1 2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/159
DATE 2-9-81	AUTHOR W.D SMYTH
DRAWN H.L.H	OFFICE DEVONPORT

806408

1559

400 E | 300 E | 200 E | 100 E | 00 E | 100 W | 200 W | 300 W | 400 W | 500 W | 600 W | 700 W | 800 W | 900 W | 1000 W

0.4M 0.5M 0.3M 0.2M 0.4M 0.6M 0.2M 0.3M 0.2M 0.3M 0.5M 0.2M 0.3M 0.6M 0.3M 0.2M 1.0M 0.2M 0.4M 0.7M 0.3M 0.4M 0.6M 0.3M 0.3M 0.6M 0.7M 0.5M 0.2M

1500 S
1400 S
1300 S
1200 S
1100 S
1000 S
900 S
800 S
700 S
600 S
500 S

0.4M
0.4M
0.2M
0.4M
0.3M
0.2M
0.2M
0.5M
0.2M
0.5M
0.6M
0.8M
0.2M
0.3M
0.3M
0.6M
0.9M
0.1M

T.N.
M.N.

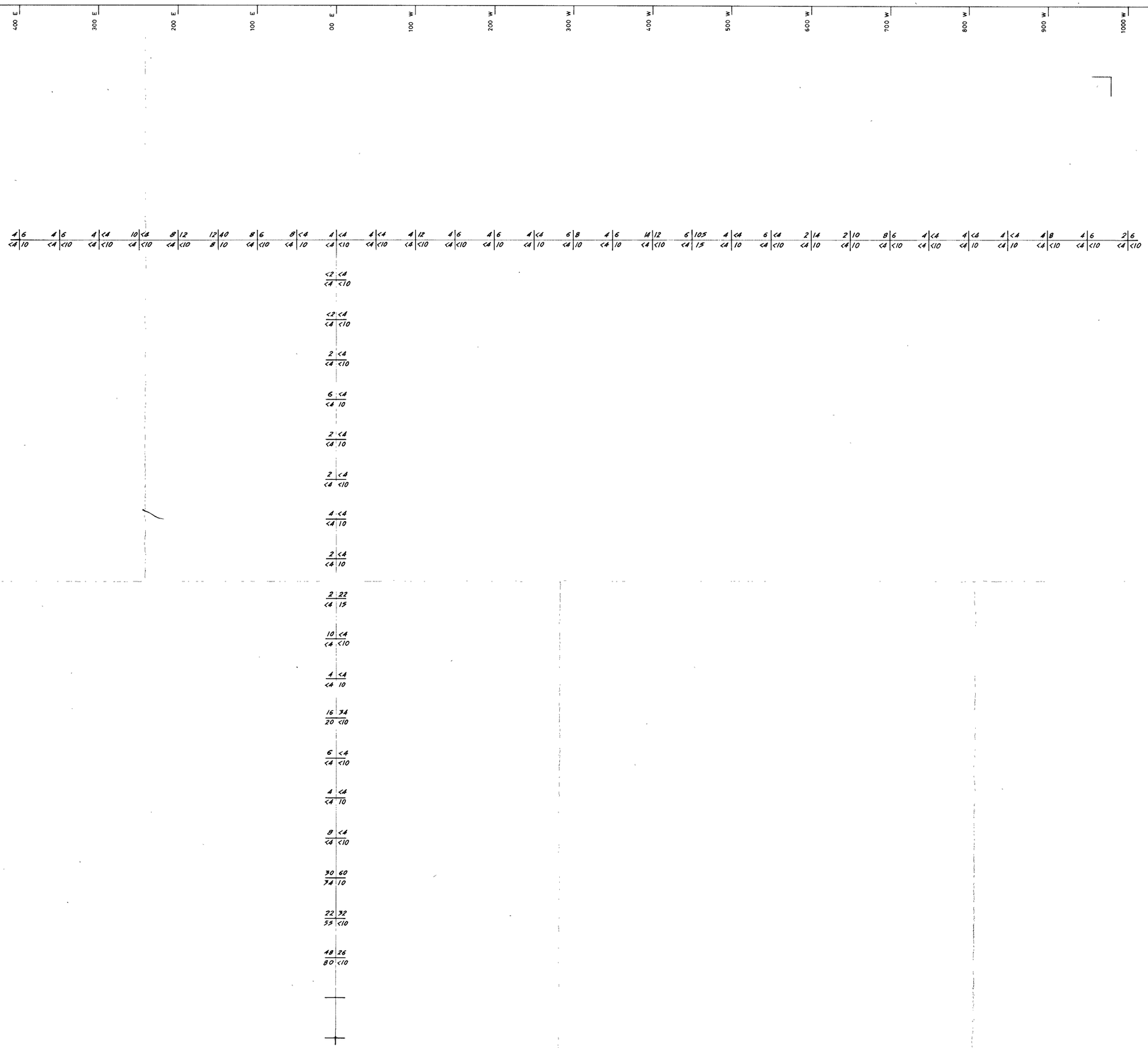
5 cm

0 100 200 M

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA 5 MILE RISE LORINNA WEST GRID EXTENSION SOIL SAMPLE DEPTHS 82-1728 Vol 5 IS Scale 1:2500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/161
DATE 2-9-81	AUTHOR W.D.SMYTH
DRAWN H.L.H.	OFFICE DEVONPORT

806409

1558



NOTE Analyses in ppm

Cu | Pb
Zn | W

T.N
M.N.

5 cm

ORIGIN FROM 00E, 500S, COMALCO
LORINNA WEST GRID

0 100 200 M

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA 5 MILE RISE LORINNA WEST GRID EXTENSION SOIL GEOCHEMISTRY 82-1728 Vol 5/5 Scale 1 2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/157
DATE 2-9-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

806410

1559

400 E | 300 E | 200 E | 100 E | 00 E | 100 W | 200 W | 300 W | 400 W | 500 W | 600 W | 700 W | 800 W | 900 W | 1000 W

1500 S
<4 | 2 | 4 | 4 | <4 | 4 | 4 | 2 | <4 | 3 | 4 | 4 | 6 | 3 | 4 | 4 | <4 | 2 | <4 | 2 | 10 | 4 | 6 | 2 | 6 | 5 | 6 | 3 | 10 | 2 | 8 | 3 | 6 | 4 | 6 | <2 | (<0.05) 6 | 3 | 6 | 3 | 8 | 3 | 6 | 4 | 4 | 3 | 6 | <2 | <4 | 3 | <4 | 4 | 4 | 3 | <4 | <2 | 6 | 2
<4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | (<0.05) <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4 | <4

1400 S
6 | <2
<4

1300 S
6 | 2
<4

1200 S
4 | 3
<4

1100 S
8 | 3
<4

1000 S
6 | 2
<4

900 S
8 | 2
<4

800 S
6 | 2
<4

700 S
6 | 2
<4

600 S
10 | 2
<4

500 S
4 | 4 (<0.05)
<4

6 | 4 (<0.05)
<4

6 | 14
<4

6 | 2
<4

4 | <2
<4

6 | 2
<4

4 | 24
<4

14 | 12
<4

8 | 6
<4

NOTE : Analyses in ppm

Sn | As
Bi

(Au) ROCK CHIP SAMPLE

T.N.
M.N

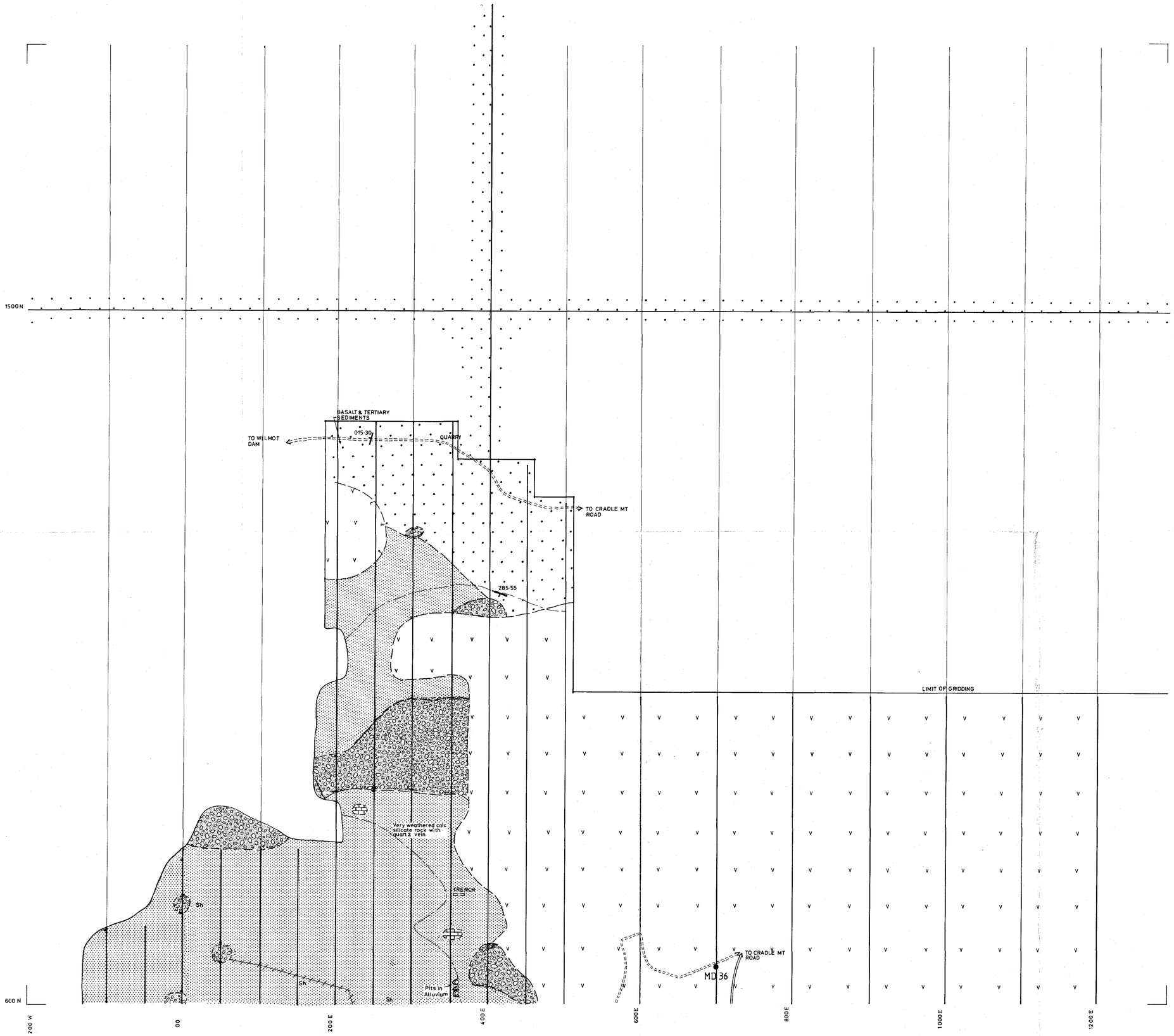
5 cm

0 100 200 M

The Shell Company of Australia Limited METALS DIVISION	
E.L.7/74 MOINA 5 MILE RISE LORINNA WEST GRID EXTENSION SOIL GEOCHEMISTRY 82-1728 Vol 5 | 5 Scale 1 2500	
FIG No	REPORT No
ENCL No	DRG No D/MZ01/160
DATE 2-9-81	AUTHOR W D SMYTH
DRAWN H L H	OFFICE DEVONPORT

806411

1559



5 cm

N

200M

The Shell Company of Australia Limited
METALS DIVISION

E.L. 7/74 TASMANIA
WILMOT DAM EXTENSION
SHEPHERD & MURPHY AREA
GEOLOGY

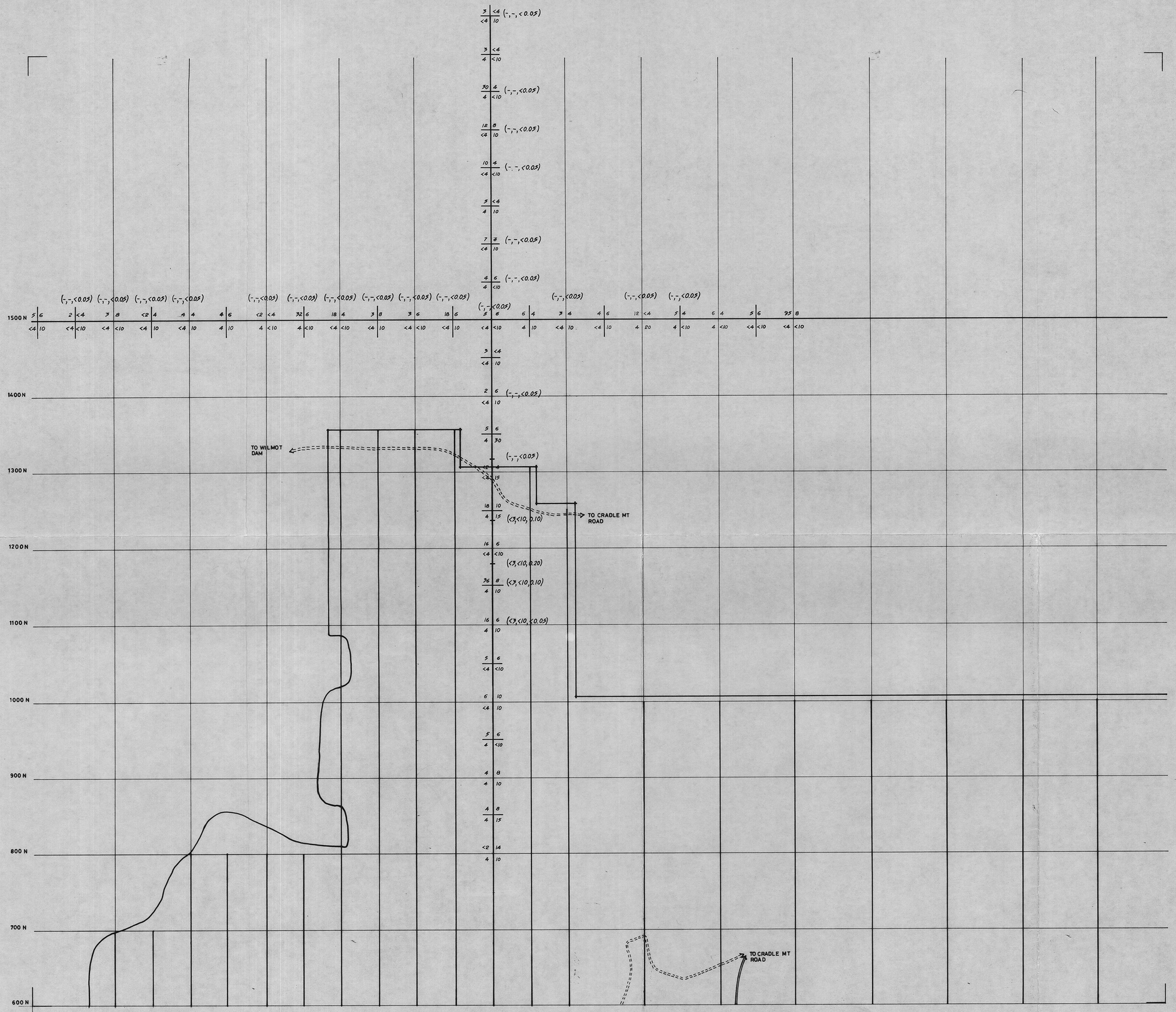
82-1728
Vol 5/5

Scale 1 : 2500

FIG. No.	REPORT No.
ENCL. No.	DRG. No. D/MZ01/069
DATE 23-4-81	AUTHOR W.D.SMYTH.
DRAWN H.L.H.	OFFICE DEVONPORT.

806412

1559



MN
TN

5 cm

NOTE: Analyses in ppm.

As | Sn — SOIL SAMPLING
Bi | W

(Sn,W,Au) ROCK CHIP SAMPLING

200M

The Shell Company of Australia Limited METALS DIVISION	
E.L. 7/74 TASMANIA WILMOT DAM EXTENSION SHEPHERD & MURPHY AREA SOIL / ROCK CHIP SAMPLING 821728 vol 5 | 5 Scale 1:2500	
FIG. No.	REPORT No.
ENCL. No.	DRG. No. · D/MZ01/072
DATE 24-4-81	AUTHOR W.D.S.
DRAWN H.L.H.	OFFICE DEVONPORT

806413