Open File Envelope No. 4230

EL 756 AND EL 980

COOTRA

PROGRESS AND FINAL REPORTS TO LICENCE SURRENDER FOR THE PERIOD 25/11/80 TO 28/3/84

Submitted by
North Broken Hill Ltd and CRA Exploration Pty Ltd
1984

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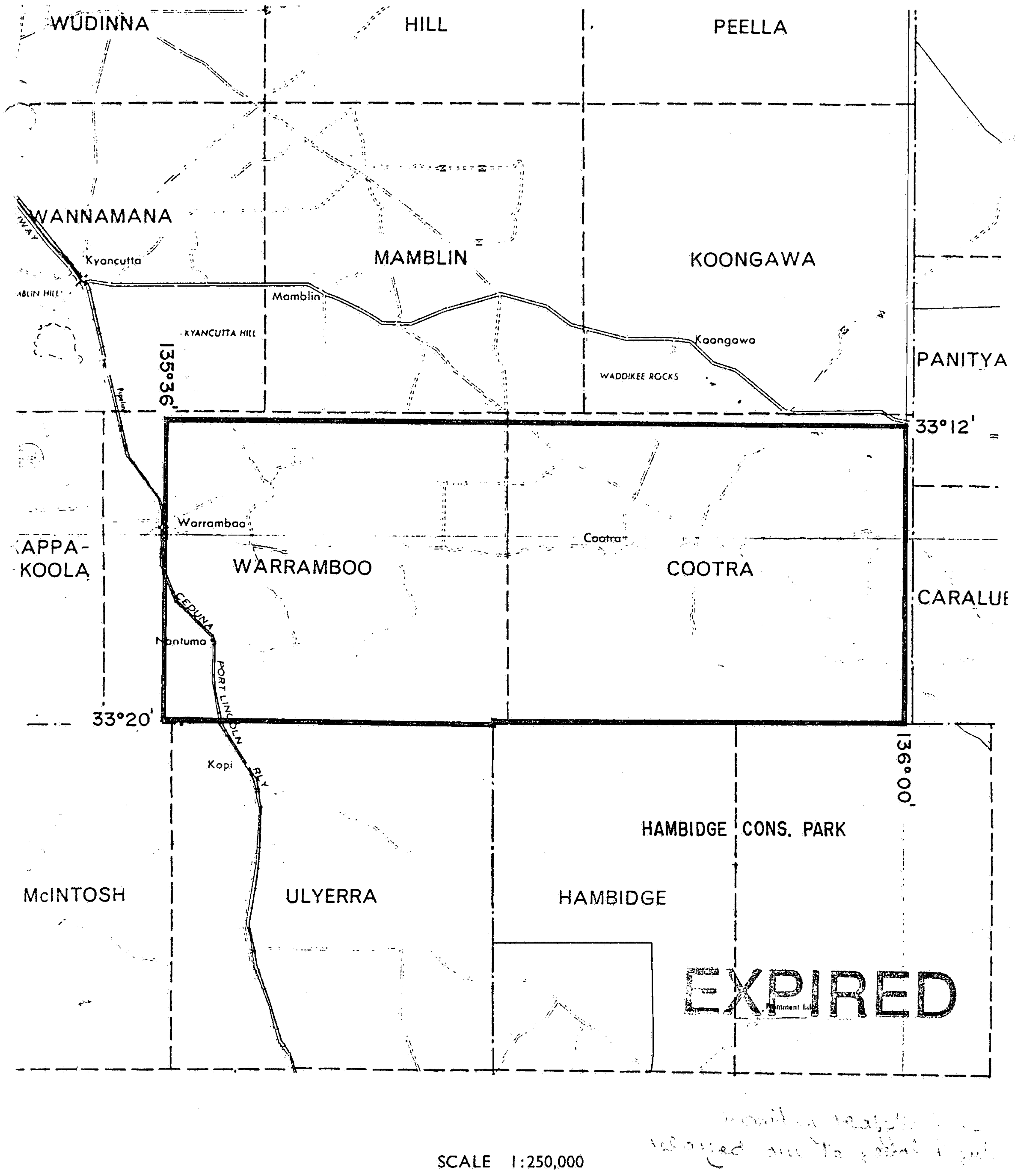
PRIMARY INDUSTRIES AND RESOURCES SA

SCHEDULE A



APPLICANT: NORTH BROKEN HILL LTD

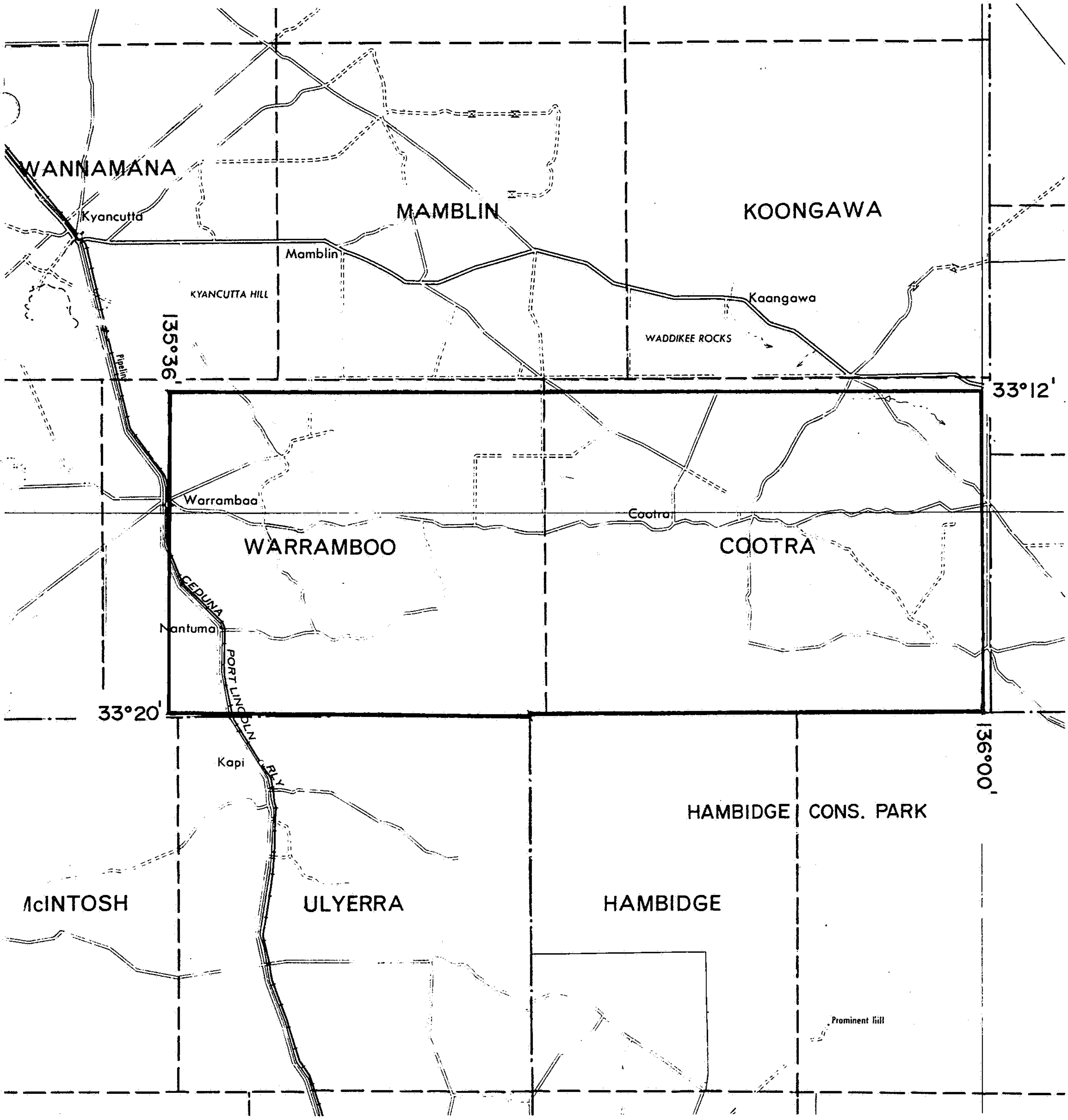
DM: 483/80 AREA: 551 square kilometres

1:250000 PLANS: KIMBA

LOCALITY: COOTRA AREA — Central Eyre Peninsula

DATE GRANTED: 25-11-80 DATE EXPIRED: 24-11-81 EL No: 756

SCHEDULE A ✓



SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

APPLICANT: NORTH BROKEN HILL LTD

DM: 685/81 AREA: 551 square kilometres approximately

1:250 000 PLANS: KIMBA

LOCALITY: COOTRA AREA – Central Eyre Peninsula

DATE GRANTED: 29·3·82 DATE EXPIRED: 28·3·~~83~~ 84

EXPIRED

EL No: 980

CONTENTS ENVELOPE 4230

Transparencies In Cylinder 4230/1

TENEMENT: E.L. 756 - Cootra - Central Eyre Peninsula.

TENEMENT HOLDER: North Broken Hill Limited.

PLANS:	Flight Path Plot.	4230(IV)-7
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	Contours Of Residual Total Magnetic Intensity.	4230(IV)-11
	Contours Of Residual Total Magnetic Intensity.	4230(IV)-12

I

EXPLORATION LICENCE NO. 756

COOTRA, S.A.

REPORT FOR QUARTER ENDED 25TH FEBRUARY 1981

(FIRST QUARTERLY REPORT)

7th July 1981

This area was selected because of :-

a) an outstanding gravity high located in the area,

b) the presence of iron formations, suggesting possible base or precious metal accumulation in particular facies changes,

c) possible lineaments crossing the area.

Application was made on 17th July 1980, and the licence (No. 756) covering 551 square kilometres was granted on 25th November 1980.

Initial work consisted of reconnaissance visits, contacting landowners, checking on information from old water bores, and sampling of outcrops.

In December 1980, barometer-levelled gravity surveys were commenced in the central part of the area, with the object of defining the high shown on the Departmental gravity map of the State in more detail.

One hundred and three readings were taken, which confirmed the anomaly, but still did not give sufficient detail. Unfortunately, at this stage, the Company's own gravity meter developed a fault requiring shipment overseas for repair, hence arrangements were made for the continuation of the survey by contractor Geoterrex Pty. Ltd.

Details of work carried out are given in the attached copies of the Company's internal monthly reports for November and December 1980 and January 1981.

NORTH BROKEN HILL LTD.

RHannigan

for P.S. FORWOOD,
Exploration Manager.
PSF:df

ATTACHMENTS :

1. Statement of Expenditure.

2. Internal Month Reports for November and December 1980 and January 1981.

EXPLORATION LICENCE NO. 756

EXPENDITURE TO 25TH FEBRUARY 1981

ELEMENTS OF EXPENSE

Salaries	6093
Wages	442
Fuel, Repairs, Stores	860
Travel	861
Camp Rations	116
Title Fees	729
General Charges	168
Administration, Accounting	1102
	$10371

ACTIVITIES

Geology	3098
Sampling and Analysis	114
Gravity	3157
Land Tenure	2260
Vehicles (General)	640
Administration, Accounting	1102
	$10371

DARKE PEAKE AREA

EXPLORATION LICENCE APPLICATION

SOUTH AUSTRALIA

NOVEMBER 1980

GENERAL

N. Kuzub and W. Cowley visited the Darke Peake area on 26th and 27th November to visit towns which could be used as a base for field activities and to assess the possibilities of auger drilling.

Wudinna and Lock are the closest sizeable towns each approximately 25km from the exploration area.

The topography of the area appears to be similar to the Lincolnfields - Port Broughton region, with longitudinal sand ridges superimposed on clayey and sandy overburden. Higher ground, with a soil development rather than sand dunes, appears to be formed on bedrock highs, and it is on these areas that outcrop or sub-outcrop tends to be found.

Available information indicates that depth to bedrock can reach 60m (200') in places, but auger drilling will be feasible in many areas.

Samples were collected from outcrop and sub-outcrop and have been sent in for analysis.

Preparations were made for P. Davis and C. Hatcher to travel to the area early in December to carry out a reconnaissance gravity survey.

COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

DECEMBER 1980

GENERAL

Two weeks were spent in the area by P. Davis and C. Hatcher for the purpose of starting a regional gravity survey along roads and determining land ownership.

Further information was obtained from the S.A. Department of Mines and Energy pertaining to the area. It appears that there are more outcrops and areas of float than was first thought, as Peter Davis and Chris Hatcher came across some previously unrecorded outcrops during their work.

GEOPHYSICS

Gravity readings were taken on roads at a spacing of approximately 500-1000m, with an emphasis on the centre of the E.L., which is near the centre of a broad gravity high. A total of 103 readings were taken, over a distance of 14.26km.

The work was drawn up on 22nd December. It revealed a high zone apparently running west from the homestead "Nosredna".

COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

JANUARY 1981

GENERAL

A reconnaissance gravity survey conducted in December 1980, revealed the existence of a broad high zone near the centre of the area.

Preparations have been made to further delineate this anomaly with a more detailed survey. Stations will be pegged and levelled before the gravity readings are taken by a contractor.

I

EXPLORATION LICENCE NO. 756

COOTRA, S.A.

REPORT FOR QUARTER ENDED 25TH MAY 1981

7th July 1981

SUMMARY & ASSESSMENT

This was a busy quarter, with completion of detailed low level aeromagnetics, extension of the gravity survey, and trial auger drilling.

Gravity over the central part of the area is now in sufficient detail to show specific anomalies and trends. Some of these coincide with magnetic trends while others do not. It is planned to extend the gravity coverage.

Auger drilling was attempted on a trial basis. Only about 20% of holes reached bedrock, and it was decided that augering is not a suitable method for the area.

One auger sample was assayed at 17ppm Ag, and this value was checked in the laboratory. However, follow-up augering failed to reveal any anomaly, and it is concluded that the initial value was spurious.

So far no sign of metal has been obtained, but this is not surprising considering the minimal sampling of bedrock carried out so far.

Plans showing various parameters — aeromagnetics gravity, geology, bores, etc. were compiled. Petrology on outcrop samples was conducted by Dr. R.N. England.

Details of work carried out are described in the attached copies of the Company's internal month reports for February, March, April and May 1981.

NORTH BROKEN HILL LTD.

for P.S. FORWOOD,
Exploration Manager.
PSF:df

ATTACHMENTS :

1. Statement of Expenditure
2. List of Plans
3. Internal Month Reports for February, March, April and May 1981.
4. Petrology report by R.N. England.

EXPLORATION LICENCE NO. 756

EXPENDITURE

1ST MARCH - 31ST MAY 1981

ELEMENTS OF EXPENSE

Salaries	5088
Wages	1689
Contractors	20394
Fuel, Repairs, Stores	2257
Travel	393
Camp Rations	75
Title Fees	180
General Charges	1041
Administration, Accounting	2635
	$33752

ACTIVITIES

Geology	4292
Sampling and Analysis	811
Magnetics	18020
Gravity	4561
Land Tenure	577
Vehicles (General)	1019
Auger Drilling	1546
Vehicles (Drilling)	291
Administration, Accounting	2635
	$33752

Total expenditure to date $44123

LIST OF PLANS

COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

FEBRUARY 1981

GENERAL

Pegging and levelling has commenced for a detailed gravity survey over the high zone revealed in the reconnaissance survey.

Base maps have been prepared by the drafting office, and transfer of geological information will commence soon.

LEASING

Fourteen Cessers of Exemption have been obtained from landowners in the area.

COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

MARCH 1981

GENERAL

Pegging of the detailed gravity was completed. Bill Amann from Geoterrex, Chris Hatcher and Michael MacLennan left for Cootra on 16th March, returning on 22nd March.

GRAVITY

Preliminary gravity contours and topography contours have been prepared for slab densities of 2.67, 2.4 and 2.2 g/cm^3. The plans have revealed that the large high has split into several high zones, some of which appear to be aligned on a NNE-SSW trend. 179 stations were read and the entire survey to date was tied in to the Mines Department regional work.

LEASING

Nine Cessers of Exemption have been obtained from landowners.

COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

APRIL 1981

GENERAL

Auger drilling will be attempted in the Cootra area in the near future, with interest concentrating on the positive gravity anomalies, areas of nearby outcrop and an interpreted linear alignment of gravity highs.

Field investigation of known and reported bedrock outcrops will be conducted at the same time.

The detailed low-level aeromagnetic anomaly over the central part of the area was flown by Geoex between 24th and 26th April. Preliminary contours are awaited.

COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

MAY 1981

GENERAL

Seventeen auger holes were drilled along roadsides near the centre of the Exploration Licence where there is a broad positive gravity anomaly.

Following the discovery of 17ppm Ag and 207ppm Co in the first hole, it was decided to redrill this site and fill in between the existing holes nearby at 100m spacing. This work is expected to be carried out in early June. Note that this silver value occurs in material which is difficult to identify, but is probably overburden, hence the value remains suspect until confirmed.

An aeromagnetic survey has been flown over the eastern two thirds of the Exploration Licence and results are awaited.

A base will be established in a rented transportable house belonging to Mr. R.W. Sampson, near his home situated 11 kilometres south-east of Warramboo.

0017

ORDER No. 3893 AN. 5 high grade metamorphic rocks from Cootra, Eyre Peninsular, S.A..

WMC81/12. Garnet-ferrohypersthene-plagioclase-quartz rock.

Garnet(10%) forms evenly distributed 150µ subhedra and anhedra. Hypersthene(=0.016, $2V=50^{o}$, giving it an mg number of around 0.4) occurs as 0.1-1mm anhedra occupying about 25% of the rock. The smaller hypersthene grains form an interlocking texture with quartz(40%) and plagioclase (20%,An_{68}). The grain size of quartz and plagioclase is around 300µ. Ilmenite(5%) and magnetite(tr) occur as 150µ anhedra, generally associated with hypersthene. Cummingtonite, a retograde phase forms in a few places as 100µ subhedral prisms on early-formed hypersthene grains. There is a weakly-developed gneissic layering of mafic/felsic bands.

This rock combines peraluminous chemistry with high Ca, and was probably a metasediment in a mafic/intermediate volcanic terrain. The mineral assemblage belongs to the granulite (or much less likely, uppermost amphibolite) facies.

WMC81/13. Hornblende-grunerite-plagiocase-quartz amphibolite.

Very pale olive green hornblende (40%) and colourless grunerite ($2V=90^{o}$, 10%) form 0.5 x0.2mm subhedral prisms with a slight preferred orientation. Exsolution lamellae of grunerite are common in hornblende, and hornbende and grunerite in some places grow in structural continuity. Grunerite commonly shows multiple twinning. Plagioclase(An_{65}, 32%) forms interstitial 0.3mm anhedra, and quartz(15%) occurs similarly. Ilmenite(2%) forms subequant, and magnetite equant 200µ anhedra.

This rock is of a strongly hypersthene-normative basaltic composition, and crystallised in the amphibolite facies.

WMC 81/15. Mylonite.

Subrounded 1mm fragments of albite(4%) and orthoclase partly inverted to microcline(4%) lie in a groundmass of 10-100µ anhedral quartz(76%), white mica(3%), biotite(10%), and ilmenite(1%). There may be some fine feldspar and less quartz in this aggregate. Patches, several mm across, contain more fine biotite and a few veins of 200µ quartz and biotite. It is possible that the mylonite has been remobilised and early-formed fragments have been rewelded into later mylonitic material. No foliation is evident.

WMC81/17. Diopside-actinolite-chlorite-plagioclase-prehnite-zoisite rock(Retrogressed high grade mafic rock).

This rock could well be a retrogressed version of WMC81/18. Clinopyroxene remains as large(c. 1mm) anhedra generally surrounded by actinolite. Exsolution lamellae of amphibole within clinopyroxene grains are evident but rarer than in WMC/81/18. These clinopyroxenes may be igneous relics predating even the high grade metamorphism. Plagioclase(30%), granoblastic aggregates(grain size c. 100μ) and isolated anhedra are relics of the high grade metamorphism and retain their calcic composition (An_{70}). Other relics are foxy red biotite, corroded anhedra and flakes mantled with fine-grained secondary ilmenite and primary 50-300μ anhedra of ilmenite and magnetite.

The rock is dominated by 300μ patches of fine fibbrous actinolite replacing high grade ferromagnesian minerals. Pale blue-green high-RI, low-δ chlorite forms 10-20μ rims on all the actinolite aggregates and plagioclase grains. 20x150μ flakes of prehnite are an alteration product of plagioclase. Zoisite forms 50x150μ subhedral prisms.

An approximate mode of this rock is: plagioclase, 30%; clinopyroxene, 5%; quartz, tr.; biotite, 1%; ilmenite, 3%; magnetite, 1%; actinolite, 45%; chlorite, 10%; zoisite, 2%; prehnite, 2%.

The retrograde assemblage suggests conditions in the low greenschist facies.

WMC81/18. 2-Pyroxene granulite.

Clinopyroxene occurs as large(0.5-1mm) anhedra mantled with pale brown hornblende. Common exsolution lamellae of hornblende in clinopyroxene suggest a higher temperature origin than the present assemblage, and these grains are very probably igneous relics. Hornblende anhedra range in grain size from 60μ to 2mm. Plagioclase (An_{80}) forms granoblastic anhedra 100-200μ across. These contain abundant 20-50μ bleb-shaped inclusions of hypersthene($2V=-60^{o}$, $\delta=0.014$, suggesting a composition of about En_{50}. 10-20μ blebs of quartz form clusters of inclusions, also within plagioclase. Larger (up to 200μ) grains of hypersthene have crystallised between hornblende-rich and plagioclase-hypersthene rich areas. Ilmenite occurs typically as clusters of blebs included in hornblende.

This texture, not typical of mafic granulites, is undoubtedly the result of partial hornblende breakdown. The apparent absence of clinopyroxene from the aggregates of breakdown products(cpx occurs only as large igneous relics) suggests that only the tschermakitic component of hornblende has broken down-- by such a reaction as:

$$Ca_2(Fe,Mg)_3Al_4Si_6O_{22}(OH)_2 + SiO_2 \rightleftharpoons 2CaAl_2Si_2O_8 + 3(Mg,Fe)SiO_3 + H_2O$$

tschermakite + qtz. ⇌ anorthite + hypersth. + water

There is a problem here, that this reaction uses up quartz, but the quartz bleb inclusions in plagioclase are almost certainly a reaction product. It therefore seems most probable that, in addition to losing tschermakite component, the hornblende is becoming more sodic by a reaction such as:

$$Ca_2(Fe,Mg)_4Al_2Si_7O_{22}(OH)_2 + NaAlSi_3O_8 \rightleftharpoons NaCa_2(Fe,Mg)_4Al_3Si_6O_{22}(OH)_2 + 4SiO_2$$

actinolite-tschermakite + albite ⇌ pargasite + quartz

A suitable combination of these reactions could give the combination of hornblende breakdown products and quartz observed.

Another important textural feature is the separation of clinopyroxene from the orthopyroxene-bearing domains by mantles of hornblende, with the implication that two pyroxenes are not yet in equilibrium, and P-T conditions were only on the threshhold of the granulite facies. This is in accordance with the evidence that only the tschermakite component of the hornblende has begun to break down.

In a few places hypersthene grains have been replaced by chlorite-mantled patches of fibrous actinolite, evidence of incipient retrogression like WMC81/17.

An approximate modal analysis is: clinopyroxene, 5%; hornblende, 25%; plagioclase, 50%; hypersthene, 18%; ilmenite, 2%.

It is possible that all the rocks in this suite except WMC81/13 were subject to similar metamorphic conditions close to the amphibolite-granulite facies boundary. WMC81/13 is definitely a lower grade rock because grunerite is stable. It is just possible that even this rock was a granulite now retrogressed under middle to high amphibolite facies conditions.

R.N.England

KYANCUTTA
EYRE HIGHWAY
"Morana"
"Mambrae"
"Mamblin"
"Tullamore"
Kyancutta Hill
"Rocky Pines"
"Pinegrange"
KOONGAWA
"Jungle Ranch"
Lake Warramboo
"Glen Roy"
"Lake Side"
"Omaroo"
"Bens Hill"
E.L.756
SEE INSET
"Pine Row"
WARRAMBOO
"Lea-Brae"
"Pineslope"
"Arunta"
"Nosredna"
COOTRA
"White Gates"
"Lincoln Dale"
"Yattarna"
"Delmore"
"Hilltop"
"Central"
NANTUMA
"Gunya"
"Karinda"
"Broadview"
"Waroona"
"Karinga"
"Roadview"
"Panorama"
"Fairview"
KOPI
"Peak View"
"Kiauna"
"Woodcombe"
"McLaghlan Station"
INSET
LOCATION
WHYALLA
Port Pirie
AREA SHOWN
Wallaroo
Spencer Gulf
Vincent Gulf
Port Lincoln
Abbreviations
LEGEND
Main road
Road
Track
Railway
Building
Lake
Land subject to inundation
Tank or dam
Quarry
DEPT. OF MINES DRILLHOLES
Diamond Drill Hole
Percussion
KR holes drilled to 11 only
NORTH BROKEN HILL LTD. DRILLHOLES
Percussion drillhole, with name, depth to bedrock & total depth shown.
"All depths in metres"
DRILLHOLE LOCATIONS
COOTRA AREA E.L. 756 S.A.
Scale 1:50000
NORTH BROKEN HILL LTD / EXPLORATION DIVISION
Date Aug.1981
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23 SEP 1981
DEPT. OF MINES AND ENERGY

4230(I)-1

KYANCUTTA
EYRE HIGHWAY
"Tullamore"
Kyancutta Hill
"Mamblin"
"Morana"
"Mambrae"
KOONGAWA
"Jungle Ranch"
"Rocky Plains"
"Pinegrange"
Lake Warramboo
(salt)
"Glen Roy"
"Lake Side"
"Omaroo"
"Bens Hill"
"Piltainga"
"Pine Row"
WARRAMBOO
"Lea-Brae"
"Pineslope"
"Arunta"
"Nosredna"
COOTRA
"White Gates"
"Lincoln Dale"
"Yattarna"
"Gunya"
"Delmore"
"Hilltop"
"Central"
NANTUMA
"Broadview"
"Waroona"
"Karanda"
"Karinga"
"Roadview"
E.L.756
"Panorama"
"Fairview"
KOPI
"Peak-View"
"Kiauna"
"Woodcombe"
"McLaghlan Station"
HAMBIDGE CONSERVATION PARK
135° 35'
135° 40'
135° 45'
135° 50'
135° 55'
33° 10'
33° 15'
33° 20'
33° 25'
LOCATION
Kyancutta
AREA SHOWN
WHYALLA
Port Pirie
Lock
Wallaroo
Moonta
Maitland
Spencer Gulf
Port Lincoln
Vincent Gulf
Scale 1:2,000,000
LEGEND
Main road
Road
Track
Railway
Building
Lake
Land subject to inundation
Tank or dam
Quarry
BORE HOLE EXPLANATIONS
S.A.D.M. drilling Warramboo-Kopi
Water bore
Mines Administration Pty.Ltd. (SML 645)
RECEIVED
10 JUL 1981
DEPT. OF MINES AND ENERGY
SECURITY
4230
GEOLOGY &
DEPTH TO BEDROCK
COOTRA AREA E.L. 756 S.A.
Scale 1:50000
NORTH BROKEN HILL LTD / EXPLORATION DIVISION
Date 11/6/'81
Map No.S.A. Co 1d

4230(I)-2

AUGER DRILLING
COOTRA AREA E.L. 756 S.A.
Scale 1:50000
NORTH BROKEN HILL LTD / EXPLORATION DIVISION
Date 10/6/81
Map No.S.A./Coff
LEGEND
Main road
Road
Track
Railway
Building
Lake
Land subject to inundation
Tank or dam
Quarry
AUGER DRILLING
Effective
Doubtful
Ineffective
LOCATION
AREA SHOWN
Kyancutta
WHYALLA
Port Pirie
Lock
Wallaroo
Moonta
Maitland
Spencer Gulf
Vincent Gulf
Pt Lincoln
Scale 1:2,000,000
N
KYANCUTTA
EYRE HIGHWAY
KOONGAWA
WARRAMBOO
NANTUMA
KOPI
COOTRA
E.L.756
HAMBIDGE CONSERVATION PARK
PORT LINCOLN - CEDUNA RAILWAY
Lake Warramboo
(salt)
"Tullamore"
Kyancutta Hill
"Rocky Pines"
"Pinegrange"
"Glen Roy"
"Lake Side"
"Omaroo"
"Pine Row"
"Pineslope"
"Lea-Brae"
"Central"
"Delmore"
"Hilltop"
"Broadview"
"Waroona"
"Karinga"
"Roadview"
"Panorama"
"Fairview"
"Peak-View"
"Kiauna"
"Woodcombe"
"McLaghlan Station"
"Mamblin"
"Morana"
"Mambrae"
"Jungle Ranch"
"Bens Hill"
"Arunta"
"Nosredna"
"Piltainga"
"Lincoln Dale"
"White Gates"
"Gunya"
"Karanda"
"attarna"
Co/1
Co/2
Co/3
Co/4
Co/5
Co/6
Co/7
Co/8
Co/9
Co/10
Co/11
Co/12
Co/13
Co/14
Co/15
Co/16
Co/17
135° 35'
135° 40'
135° 45'
135° 50'
135° 55'
33° 15'
33° 20'
33° 25'
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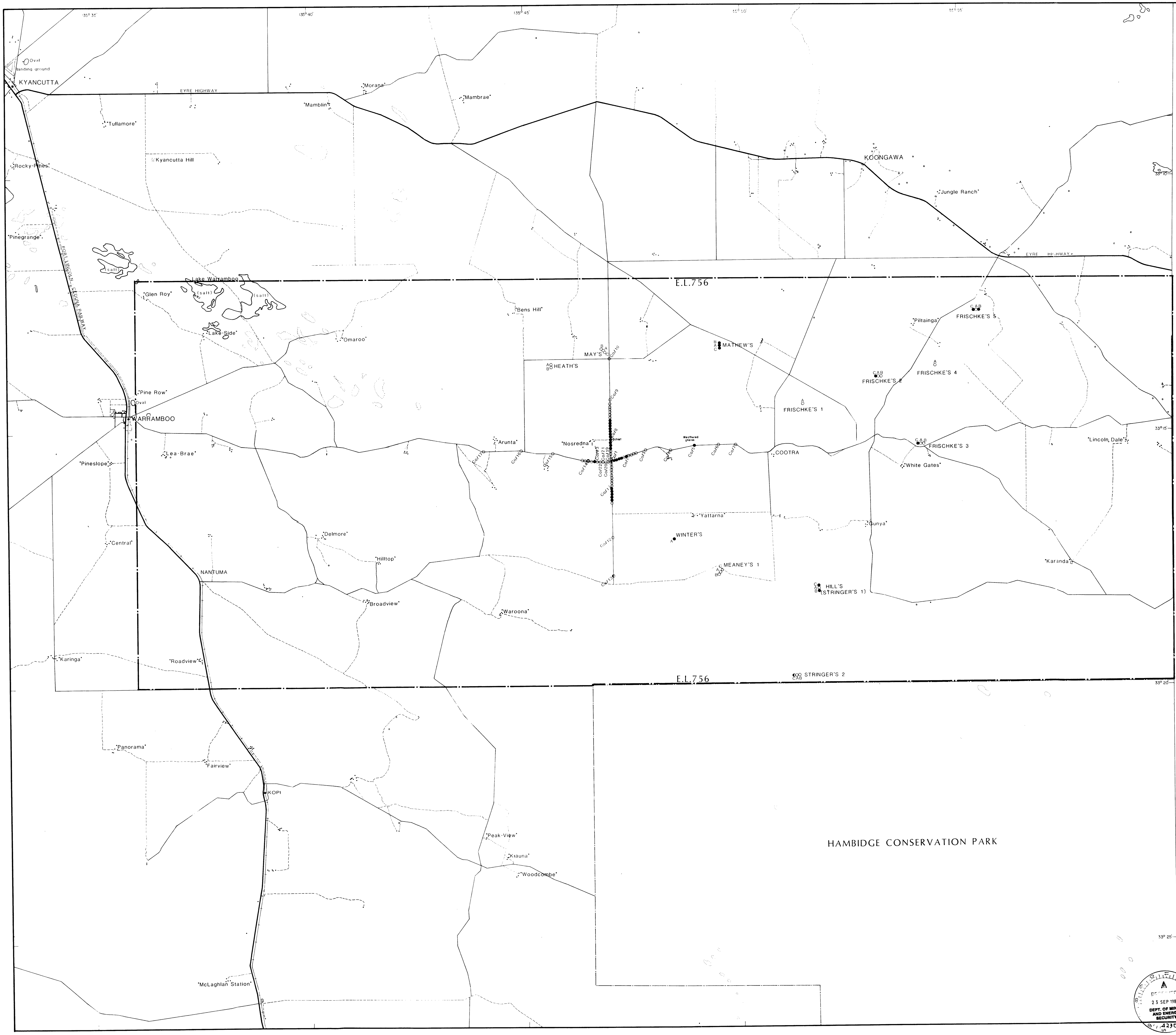
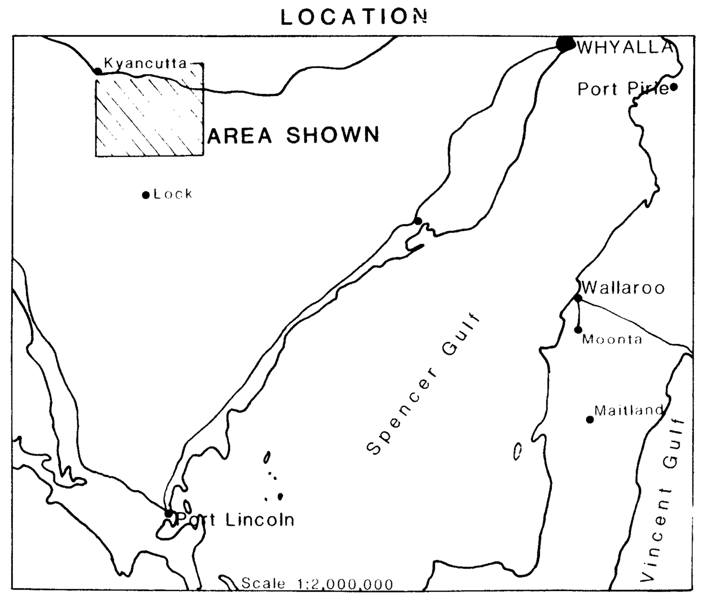
10 JUL 1981
DEPT. OF MINES AND ENERGY SECURITY

4230(I)-3





LEGEND

- Main road
- Road
- Track
- Railway
- Building
- Lake
- Land subject to inundation
- Tank or dam
- Quarry

AUGER DRILLING

- Effective
- Doubtful
- Ineffective

N.B.- Auger drilling was mainly ineffective. See air drilling map for moredata.

AUGER DRILLING

COOTRA AREA E.L. 756 S.A.

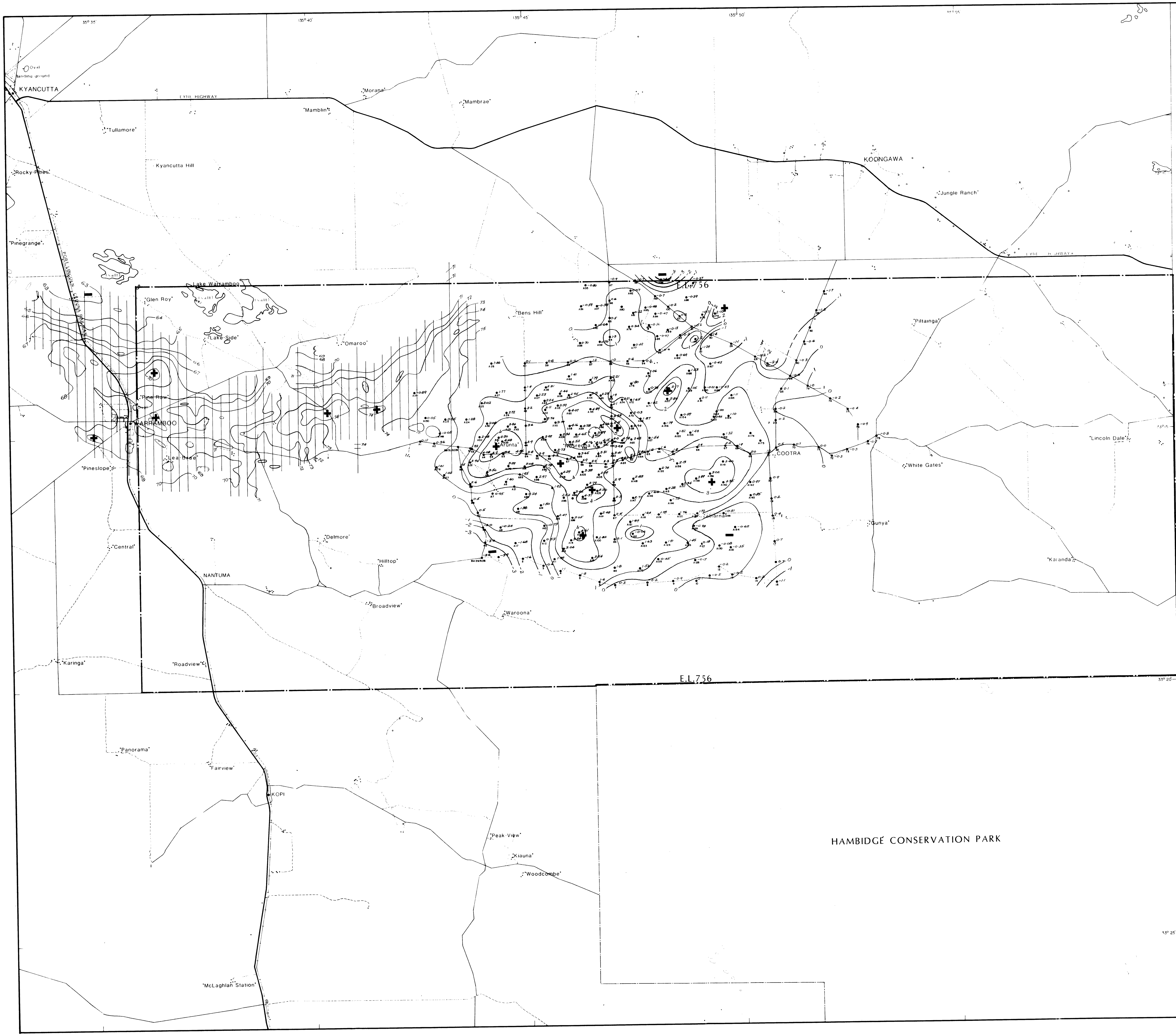
Scale 1:50000

NORTH BROKEN HILL LTD / EXPLORATION DIVISION

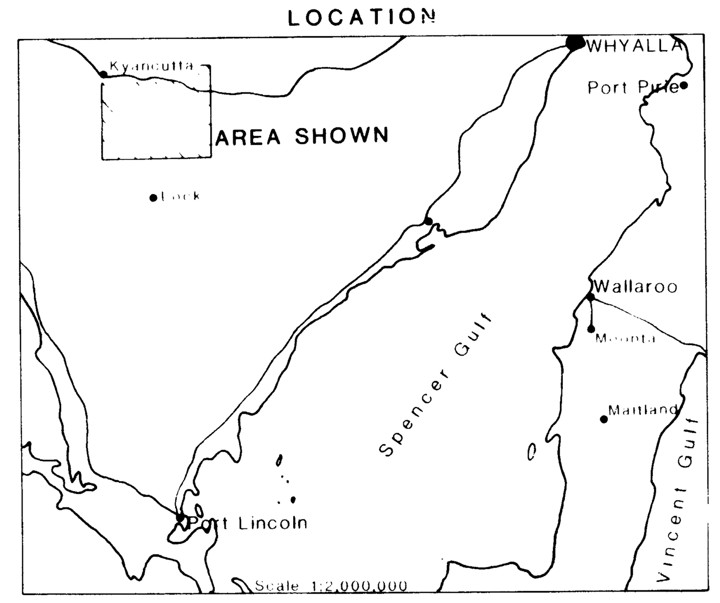
Date 10/6/81

Map No.S.A./Cof

4230 (I) - 36



LOCATION



LEGEND

- Main road
- Road
- Track
- Railway
- Building
- Lake
- Land subject to inundation
- Tank or dam
- Quarry

GRAVITY SURVEY DETAILS

Gravity station by N.B.H.L. showing bouguer gravity value & in milligals & station No. (density 2.4g/cc)

Gravity traverse by S.A.D.M. stations every 200ft (density 2.67g/cc)

BOUGUER GRAVITY

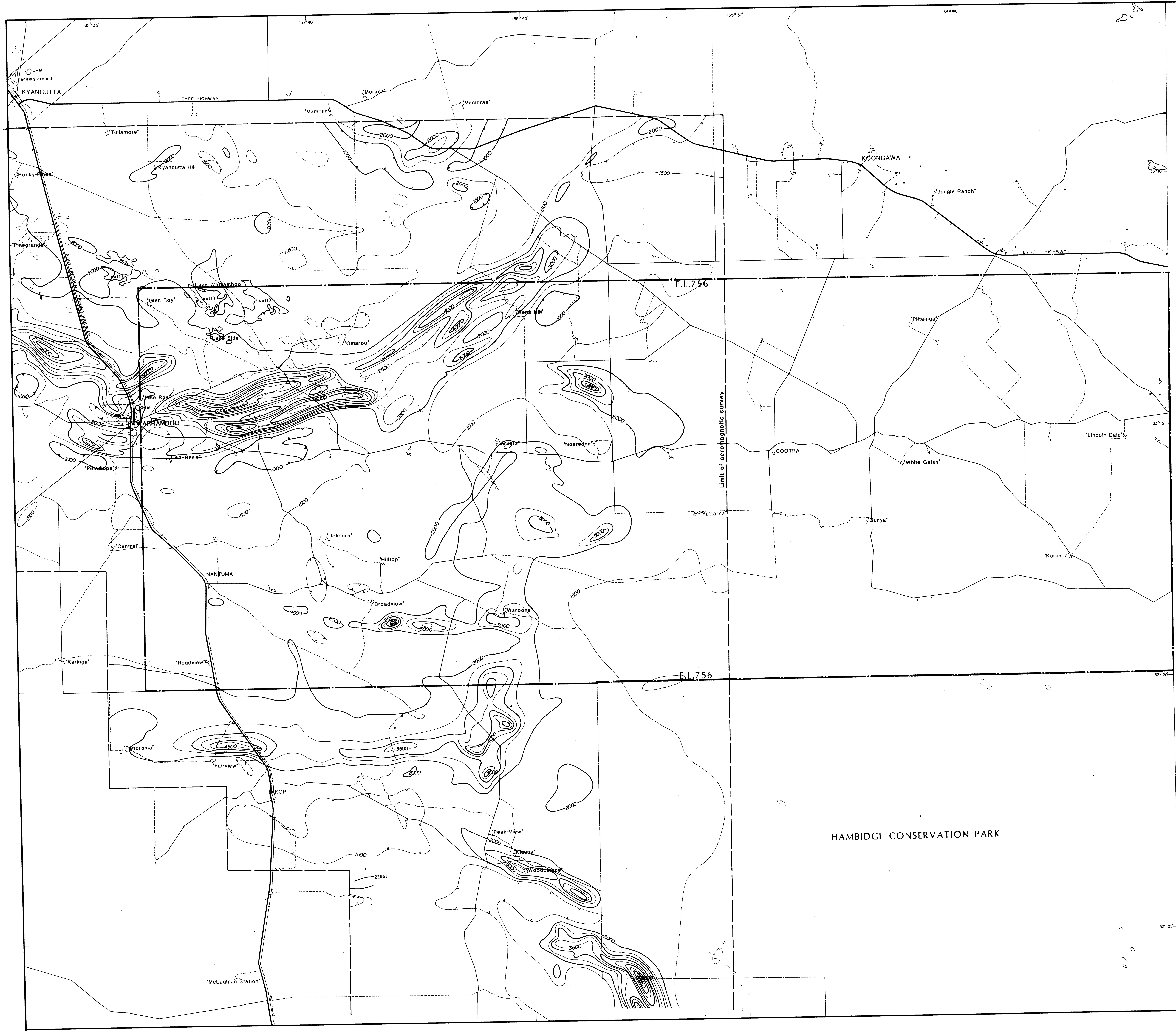
COOTRA AREA E.L. 756 S.A.

Scale 1:50000

NORTH BROKEN HILL LTD / EXPLORATION DIVISION

Date 10/4/1981 Map No.S.A. Co/1b

4230(I)-4



T M
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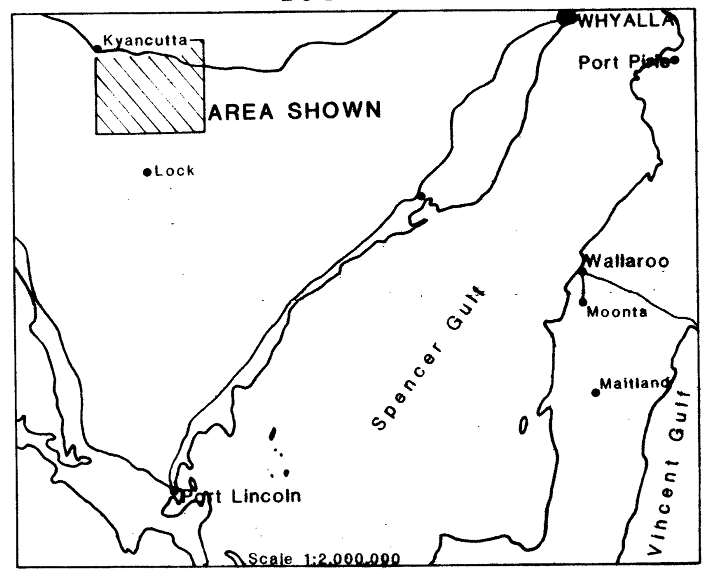
LOCATION



LEGEND

- Main road
- Road
- Track
- Railway
- Building
- Lake
- Land subject to inundation
- Tank or dam
- Quarry

AEROMAGNETIC SURVEY DETAILS

Operator : Adastra Hunting Geophysics Ltd. for S.A.D.M.
Date : March 1960
Heigh : 91m
Line spacing : 400m north-south, tie lines at 1600m spacing
Contour interval : 500 gammas

TOTAL MAGNETIC INTENSITY
COOTRA AREA E.L. 756 S.A.

Scale 1:50000

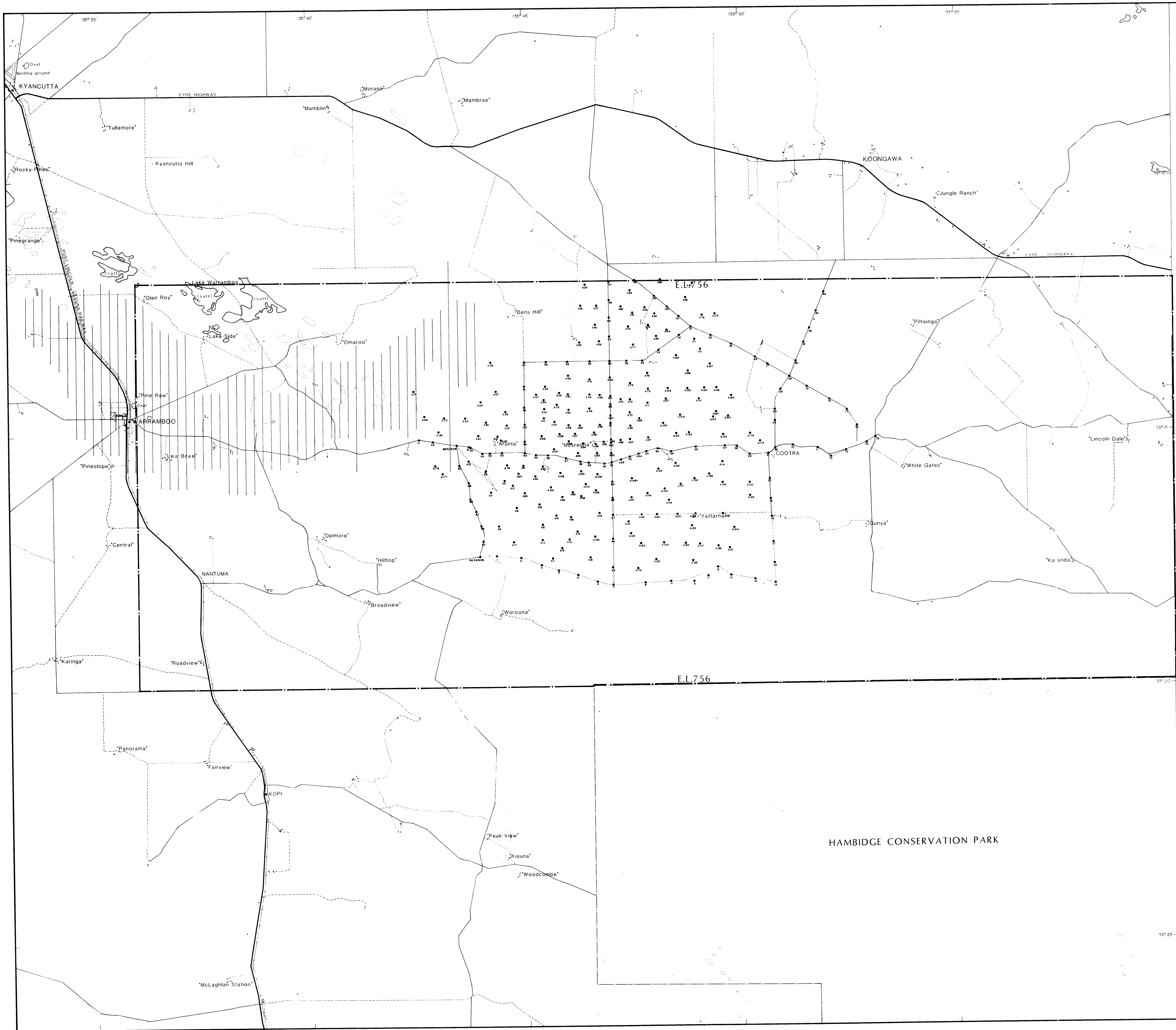
1 0 1 2 3 4 5 km

NORTH BROKEN HILL LTD / EXPLORATION DIVISION

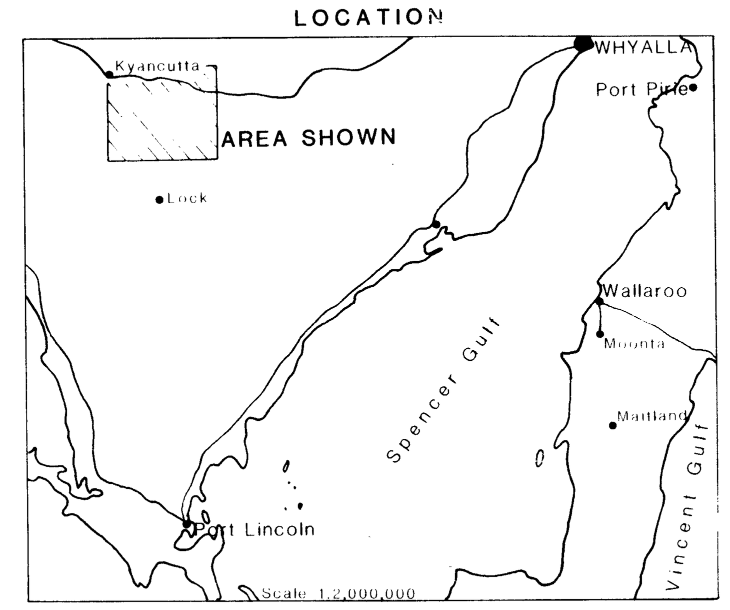
Date Feb 1981

Map No.S.A. Co/ 1a

4230 (I)-5



LOCATION



LEGEND

- Main road
- Road
- Track
- Railway
- Building
- Lake
- Land subject to inundation
- Tank or dam
- Quarry

10 JUL 1981
DEPT. OF MINES AND ENERGY

GRAVITY STATION LOCATIONS

COOTRA AREA E.L. 756 S.A.

Scale 1:50000

NORTH BROKEN HILL LTD / EXPLORATION DIVISION

Date JUNE 1981

Map No.S.A. Co/1i

423R(I)-6

I

0020

EXPLORATION LICENCE NO. 756

COOTRA - SOUTH AUSTRALIA

REPORT FOR QUARTER ENDED 25TH AUGUST 1981

GENERAL SUMMARY AND ASSESSMENT

Since last reporting, the major activity has been bedrock airblast drilling. ? Four holes were drilled through overburden and deeply weathered rocks into 43 holes total bedrock, using the Rotamec drill borrowed from the North Mine at Broken Hill. This was operationally a very successful program. However, no true gossans were found, and geochemical encouragement was weak.

One area of interest shows minor pyrite and weak geochemical copper values. This "Meaneys" prospect is scheduled to be tested by means of I.P. geophysics. However, graphite encountered in a number of localities promises to make the interpretation of results difficult.

Thick white aluminium-rich clays were encountered in some holes, but no bauxite is present.

Testing for radioactive and fluorescent minerals proved negative.

Minor petrology and some local ground magnetic traversing were done.

Details of work carried out are given in the attached copies of the company's internal month reports for June, July and August 1981.

NORTH BROKEN HILL LTD

R.P. Hannigan

P.S. FORWOOD,
Exploration Manager.

16th September 1981

EXPLORATION LICENCE NO. 756

EXPENDITURE

1ST JUNE - 31ST AUGUST 1981

ELEMENTS OF EXPENSE

Salaries	12248
Wages	3403
Contractors	342
Fuel, Repairs, Stores	9789
Travel	1786
Camp Rations	1363
Title Fees	300
General Charges	11316
Administration, Accounting	3856
	$ 44403

ACTIVITIES

Geology	9254
Sampling and Analysis	9973
Grid Preparation	107
Magnetics	220
Gravity	1160
I.P.	61
Land Tenure	853
Vehicles (General)	2099
Auger Drilling	6854
Air Drilling	8614
Vehicles (Drilling)	1352
Administration, Accounting	3856
	$ 44403

Total expenditure to date $88526

ATTACHMENTS

1. Statement of Expenditure.
2. Internal Reports for June, July, August 1981.
3. Drill Hole Locations   Map No. SA/Co-1h   Scale 1:50000
4. Auger Drilling   Map No. SA/Co-f   Scale 1:50000
5. Percussion Drilling Summary.
6. Analytical Results - Percussion Drilling.
7. Ground Magnetics.
8. Auger Drilling Profiles.

0023

COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

JUNE 1981

GENERAL

Auger drilling and gathering of Cessers were conducted during June. The results of the aeromagnetic survey flown by Geoex Pty. Ltd. over the eastern part of the exploration licence arrived early this month.

AUGER DRILLING

A further fifty-nine auger holes were drilled at 100m spacing in four lines extending from the intersection at 72920E, 19650N, where the anomalous silver and cobalt values were reported in CO-1 auger hole in May.

After perusal of the aeromagnetics plan, fifteen anomalies were selected for testing, of which twelve were drilled, with up to three holes on each. Twenty-nine holes were drilled.

Bedrock penetration has been poor, with the holes often being stopped by Pleistocene red, orange or brown clayey sands, haematite-limonite impregnated grey sandy siliceous clays or massive cemented sandy haematite-limonite. This massive ironstone is not clearly bedrock or overburden, but it appears to occur near holes which reached weathered rock.

In a few cases, granite, schist, gneiss or amphibolite have been clearly identified, but weathered bedrock is usually represented by variably haematitic or limonitic whitish kaolin with irregular embedded quartz grains. This probably represents decomposed granite or granitic gneiss.

It is planned to redrill many of the aeromagnetic anomalies and several other locations in July with the Rotamec percussion drill (on loan from the North Mine, Broken Hill).

Eighty-eight holes were drilled, totalling 1063m.

GEOCHEMISTRY

No significantly anomalous values have resulted from the auger drilling at Cootra. Apart from CO-1 (17ppm Ag, 207ppm Co), the highest values obtained for each element were: 131ppm Cu, 57ppm Pb, 60ppm Zn, 46ppm Ni, 47ppm Co, 18ppm Mo. No Sn, W, Ag or Au was detected.

COOTRA AREA (Cont'd)

It now seems likely that the anomalous silver and ~~tungsten~~ Cobalt. in auger hole CO-1 was spurious, as no anomaly was found in close-spaced follow up.

Twenty-four rock chip samples collected to date from Mines Department core and from outcrop and float yielded no anomalous values.

LEASING

Fourteen Cessers of Exemption were obtained from landowners. This virtually completes coverage of the licence area.

COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

JULY 1981

GENERAL

Because of the difficulty in reaching bedrock with auger drilling, it was decided to redrill these areas and investigate others using the Rotamec rotary-percussion drill from North Mine.

AIR DRILLING

Magnetic anomalies selected from the aeromagnetics plan and gravity highs from the work done in March were tested by drilling; one hole was sited on each.

Forty holes were drilled, totalling 1407m. Five holes could not be drilled due to access problems in the wet weather.

All but four of the holes reached bedrock and most of the bedrock holes yielded material which could be described in detail.

Most of the bedrock recovered was yellowish to white quartzofeldspathic gneiss, granite or green to brown mica schist. Biotite is commonly seen but garnet is rare. In many cases fresh rock is overlain by weathered material comprising variably limonitic whitish kaolin with embedded relict angular quartz. Less commonly encountered were blue-grey plagioclase-bearing granitic rocks (adamellite or granodiorite), various multicoloured kaolinized rocks and weathered bedrock clays sometimes with black graphite, brown or greenish grey silty clay with fine angular quartz, amphibolite, green chloritic rocks (schist), coarse red granite.

Sulphide (pyrite) was recognised in only two holes, but no geochemical values of interest were received.

The majority of holes intersected several metres of whitish kaolin with or without embedded quartz (weathered granite or gneiss) and some intersected over twenty metres of this material. Al_2O_3 analyses will be performed on selected samples as a guide to their purity.

Drilling commenced on 11th July 1981 and was completed on 23rd July 1981.

COOTRA AREA (CONT'D) 0026

GEOCHEMISTRY

Results have continued to be low. Anomalous results received to date are tabulated below :-

84680E,	*22950N*	*(580ppm Zn, 265ppm Ni)*
84000E,	*19350N*	*(130ppm Ni)*
90650E,	*25620N*	*(181ppm Zn)*
82320E,	*25780N*	*(153ppm Zn, 102ppm Cu)*
74850E,	*25900N*	*(104ppm Zn)*
76020E,	*24100N*	*(107ppm Cu)*
79900E,	*21600N*	*(5ppm Ag - checked, in overburden)*
86280E,	*24900N*	*(132ppm Zn, 120ppm Ni)*
76920E,	*15620N*	*(170ppm Cu)*
70880E,	*23225N*	*(400ppm Zn, 135ppm Pb, 125ppm Cu)*

No Sn, W or Au was detected. Assaying is continuing.

GEOPHYSICS

Short ground magnetometer traverses were performed on seven sites prior to pegging the holes. After anomalous geochemistry was received in hole 84680E, 22950N, five east-west lines of ground magnetics were run to the south east to locate the peak of the anomaly for testing with a second hole.

A total of 232 readings were taken over 5.17 line kilometres.

0027

COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

AUGUST 1981

GENERAL

After geochemical data from the first forty Rotamec air holes were plotted up, it was decided to drill a further three holes near Meaney's 1 and one to the northwest. Only weakly anomalous results were received.

AIR DRILLING

Weakly anomalous geochemical values had been obtained in Meaney's 1 (repeat) and Meaney's 5 and it was decided to test the intervening area with three holes, each sited on a magnetic high.

These holes resulted in similar geochemical values to those already received.

The fourth hole was drilled to test a magnetic high which is located on an interpreted lineament extending south-east to the area between Meaney's 1 and 5. No anomalous values resulted.

A total of 138m was drilled.

GEOCHEMISTRY

Anomalous results received during the month are listed below:-

Air hole co-ordinates		Geochemistry
71730E,	17200N	(100ppm Pb)
76820E,	15520N	(270ppm Cu)
74500E,	15100N	(335ppm Zn, 180ppm Co. 153ppm Cu, 115ppm Ni)
84100E,	24880N	297ppm Zn, 132ppm Cu)
Holes drilled in August:		
75980E,	15000N	(380ppm Cu, 160ppm Zn, 115ppm Ni, 105ppm Co)
75500E,	15700N	(175ppm Cu)

GEOCHEMISTRY (CONT)

All samples were assayed for Sn. Deeps and samples near the bedrock-overburden contact were assayed for W and Au. (No Sn, W or Au was detected in any of the holes).

Samples of the white kaolin from four holes were analysed for Al_2O_3*, with averages ranging from 20.8% to 31.4%. X-ray diffraction work preformed on some of the samples showed that they are largely kaolinite and no aluminous minerals typical of bauxite were detected.*

GEOPHYSICS

Short ground magnetometer traverses were run over the four proposed air-drilling sites prior to pegging the holes. A total of 100 readings were taken over 2.4 line kilometres.

COOTRA PERCUSSION DRILLING

0029

COLLOQUIAL NAME	CO-ORDINATES	T.D. (m)	BEDROCK DEPTH (m)	GEOLOGY OF DEEPS
Frischke's 4	84680E, 22950N	43	16	blue-grey granodiorite or adamellite.
" 3	84020E, 20120N	35	13	white-yellow fine grained biotite granite.
Cummings' 1	84000E, 19350N	35	3	grey fine grained biotite granodiorite or adamellite-magnetic.
" 2	83620E, 17250N	26	15	coarse grained red granite-magnetic.
Cant's	82920E, 14120N	25	12	yellow-white quartz-feldspar-biotite gneiss.
Andrew's	90250E, 15250N	48	13	yellow brown clay and quartz-magnetic.
Schmucker's	90250E, 21250N	42	2	limonitic quartz-feldspar-biotite schist.
Beinke's 1	90650E, 25620N	54	16	grey granodiorite or adamellite.
Hier's	82320E, 25780N	55	13	multicoloured graphitic ?calc-silicate clay.
Haines'	80750E, 26020N	37	7	white-brown kaolin/green chloritic rock/quartz-feldspar.
A175	76680E, 25000N	48	21	brown clay/quartz-feldspar-biotite/green chloritic rock.
Matthews'	76950E, 23620N	49	12	green-white kaolin-quartz-mica/orange fine grained granite or gneiss.
Stubing's	74850E, 25900N	60	30	green clay/quartz-feldspar-chlorite rock.
A171	76020E, 24100N	18	10	fine grained quartz-feldspar-mica schist and gneiss/?dolerite.
A158	75020E, 22300N	5	5	haematitic basic rock/graphitic feldspar-quartz-amphibole.
Frischke's 1	79900E, 21600N	59	26	mica clay/quartz-feldspar/limonite-kaolin-martite-magnetic.

COOTRA PERCUSSION DRILLING

0050

COLLOQUIAL NAME		CO-ORDINATES	T.D. (m)	BEDROCK DEPTH (m)	GEOLOGY OF DEEPS
Frischke's	5	86280E, 24900N	34	10	yellow-white quartz-feldspar-biotite fine grained granite or gneiss.
Hill's		80380E, 14920N	64	24	grey feldspar and quartz/green chloritic rock/pyrite.
Meaney's	1	76920E, 15620N	60	22	kaolinized ?sericite-quartz/pyrite.
Winter's	1	75200E, 16800N	18	10	white ferruginous kaolinized rock/ amphibolite.
Co-1		72990E, 19630N	34	8	fine grained white-orange-biotite granite.
A138		75950E, 19000N	11	3	grey-buff quartz-feldspar-biotite-garnet gneiss and schist.
May's	1	72700E, 23650N	43	20	green amphibolite/ quartz feldspar rock.
Heath's		70880E, 23225N	60	20	green chlorite schist.
May's	2	71380E, 19780N	48	24	green-grey kaolin and quartz.
"	3	77750E, 20580N	13	13	white-grey quartz-feldspar-biotite-garnet gneiss.
V/Bosch's	2	69600E, 18350N	21	-	N/BR - brown sand.
"	1	70580E, 16980N	13	-	N/BR - red and white sand.
A15		71730E, 17200N	29	12	grey-brown kaolin and quartz.
Meaney's	2	71245E, 13200N	13	-	N/BR - buff and red sand.
"	4	71470E, 14600N	30	22	brown clay and quartz.
"	1 (rpt.)	76820E, 15520N	48	24	green-white bedrock clay with graphite.
"	5	74500E, 15100N	35	12	buff-green-grey clay and quartz.

COOTRA PERCUSSION DRILLING

COLLOQUIAL NAME		CO-ORDINATES	T.D.(m)	BEDROCK DEPTH (m)	GEOLOGY OF DEEPS
A98-105		72120E, 18520N	35	6	fine grained buff-pink granite.
Murphy's		64650E, 19680N	10	-	N/BR - orange sandy clay.
May's	4	74050E, 18350N	30	20	brown kaolin and quartz.
Winter's	2	78750E, 16300N	9	5	coarse grained pale granite/microgranite or schist.
Beinke's	2	88500E, 20480N	34	14	quartz and feldspar (granite or gneiss).
Frischke's	6	84100E, 24800N	48	10	white fine grained quartz-feldspar-biotite-garnet gneiss.
"	4(rpt.)	84830E, 22550N	28	14	grey-white quartz-feldspar-biotite granodiorite or adamellite-magnetic.
Meaney's	6	75980E, 15000N	36	18	buff, grey, black bedrock clay.
"	7	76400E, 14750N	30	17	bright green-white weathered rock with graphite, limonite.
Winter's	3	75500E, 15700N	30	17	dark green-buff chloritic bedrock clay/quartz.
May's	5	71900E, 22250N	46	20	green chloritic rock/ quartz (chlorite schist).

Attachment 1.

ANALYTICAL RESULTS -

PERCUSSION DRILLING

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION**

0033

FIELD ENTRY

Date ....
Sampler / Driller BOLAND / CHETCUTTI
Area CCOTRA
Machine ....
Grid ....
Priority (urgency) ....
For location see Map No. ....
or Air Photo No. ....

LABORATORY

Order No. ....
Sheet No. ....
Project ....
Cost Code 543/2
Date Desp. 21-8-81
Notes ....

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn
–	–	–	MEANEYS – 6 75980E, 15000N		BLANK	–	–	–	–	–	–	–	–
2m	3m	1m	yellow clayey sand		224216	5	4	10	<1	4	2	<5	<20
3	4	"	"		7	3	1	3	"	1	2	"	"
4	5	"	"		8	1	2	3	"	1	1	"	"
5	6	"	buff calc. sand		9	2	1	3	"	2	1	"	"
6	7	"	"		20	1	1	2	"	1	1	"	"
7	8	"	"		1	3	4	4	"	2	5	"	"
8	9	"	orange clayey sand		2	4	2	4	"	1	2	"	"
9	10	"	"		3	4	1	4	"	1	2	"	"
10	11	"	"		4	2	1	3	"	1	1	"	"
1	2	"	pale brown siliceous clay		5	2	1	5	"	1	1	"	"
2	3	"	pale grey to red sandy clay		6	5	2	4	"	1	1	"	"
3	4	"	"		7	3	2	4	"	1	1	"	"
4	5	"	"		8	4	1	3	"	1	1	"	"
5	6	"	buff to red sandy kaolin WB?		9	3	1	2	"	1	1	"	"
6	7	"	"		30	2	1	2	"	1	1	"	"
7	8	"	" plus limonite		1	2	1	2	"	1	1	"	"
8	9	"	buff finely sandy kaolin WB		2	1	3	1	"	2	1	"	"
9	20	"	"		3	1	2	1	"	1	1	"	"
20	1	"	"		4	1	1	1	"	1	1	"	"
1	2	"	"		5	1	1	1	"	1	1	"	"
2	3	"	buff + brown finely sandy kaolin		6	1	2	1	"	1	1	"	"
3	4	"	"		7	1	2	1	"	1	1	"	"
24	25	"	white, brown, red flaky kaolin with graphite		8	1	2	2	"	1	1	"	"
SAMPLE TYPE / HOLE No: AIR HAMMER SPLS.				Check Sample		10	5	9	<1	5	4	<5	115

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — EXPLORATION DIVISION

—UNIVERSAL—

0034

FIELD ENTRY

Date .... Sampler / Driller BOLAND / CHETCUTTI
Area COOTRA Machine ....
Grid .... Priority (urgency) ....
For location see Map No. .... or Air Photo No. ....

LABORATORY

Order No. .... Sheet No. ....
Project ....
Cost Code 543/2 Date Desp. 27-8-81
Notes. ....

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
25m	26m	1m	MEANEYS 6 75980E, 15000N			224239	1	13	3	<1	1	1	<5	<20	
26	7	"				40	1	11	3	"	2	1	"	"	
27	8	"	pale brown flaky bedrock clay with quartz			1	1	7	4	"	2	1	"	"	
28	9	"				2	8	2	3	"	1	1	"	"	
29	30	"				3	27	3	4	"	4	1	"	"	
30	1	"				4	23	45	2	"	9	12	"	"	
31	2	"	buff to greenish grey clay with graphite			5	30	8	5	"	3	1	"	"	
32	3	"				6	80	17	5	"	19	17	"	"	
33	4	"	brown, buff and black bedrock clay			7	95	13	19	"	20	18	"	"	
34	5	"	" with pyrite			8	380	15	115	"	115	105	"	"	
35	36	"	buff, grey & black bedrock clay. WB	<0.1		9	185	5	160	"	66	58	"	"	<10
1m	2m	1m	MEANEYS 7 yellow sand 76400E, 14750N			50	1	1	8	"	2	1	"	"	
2	3	"				1	2	2	5	"	4	3	"	"	
3	4	"	" plus kunkar			2	4	1	5	4	2	3	"	"	
4	5	"	sandy kunkar			3	1	1	3	2	6	1	"	"	
5	6	"	buff loose sand			4	1	1	3	<1	2	1	"	"	
6	7	"				5	1	1	3	"	2	1	"	"	
7	8	"	orange clayey sand			6	6	4	5	"	2	1	"	"	
8	9	"				7	5	2	6	"	2	1	"	"	
9	10	"				8	5	1	5	"	1	1	"	"	
10	1	"				9	3	1	4	"	1	1	"	"	
1	2	"				60	5	1	5	"	1	1	"	"	
2	3	"	brown to red clay + limonite			1	9	2	4		5	1	"	"	
13	14	"				62	8	2	4	"	7	1	"	"	
						Check Sample	73	105	68	2	72	76	140	520	

SAMPLE TYPE / HOLE No: AIR HAMMER. MEANEYS 6 + 7

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION

0035

FIELD ENTRY

Date ....
Sampler / Driller BOLAND/ CHETCUTTI
Area COOTRA
Machine ....
Grid ....
Priority (urgency) ....
For location see Map No. ....
or Air Photo No. ....

LABORATORY

Order No. ....
Sheet No. ....
Project ....
Cost Code 543/2
Date Desp. 21-8-81
Notes ....

Co-ordinates/or From	To	Interval/ Depth	Geological description of sample 76400E 14750N	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
14m	15m	1m	MEANEYS 7 yellow, brown, red limonite; hard grey siliceous clay			224263	7	1	4	<1	4	1	<5	<20	
15	16	"	hard white clay + limonite with angular qtz WB?			4	2	1	4	"	3	1	"	"	
16	17	"				5	4	1	4	2	3	1	"	"	
17	18	"	yellow-red iron stained kaolin-qtz WB			6	4	1	3	<1	4	1	"	"	
18	19	"				7	6	1	4	"	3	1	"	"	
19	20	"	white, brown, pale green bedrock clays			8	16	1	7	"	1	1	"	"	
20	21	"	red brown + green soapy clay; white kaolin	<0.1		9	10	1	8	"	1	1	"	"	<10
1	2	"				70	5	1	9	"	2	1	"	"	
2	3	"				1	6	1	9	"	1	1	"	"	
3	4	"				2	7	1	10	"	1	1	"	"	
4	5	"	bright green + brown soapy clay with graphite			3	13	1	17	"	1	1	"	"	
5	6	"				4	15	1	15	"	1	1	"	"	
6	7	"				5	3	1	10	"	1	1	"	"	
7	8	"				6	5	1	13	"	1	1	"	"	
8	9	"	bright green + white clay			7	10	1	19	"	1	1	"	"	
29	30m	"	bright green + white weathered rock with graphite? limonite stained co[...] WB			8	11	1	16	"	1	1	"	"	<10

Check Sample

SAMPLE TYPE / HOLE No: AIR HAMMER

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** EXPLORATION DIVISION

— UNIVERSAL —

0036

FIELD ENTRY

Date .... ~~Sampler~~ / Driller BOLAND/CHETCUTTI

Area COOTRA Machine ....

Grid .... Priority (urgency) ....

For location see Map No. .... or Air Photo No. ....

LABORATORY

Order No. .... Sheet No. ....

Project ....

Cost Code 543 Date Desp. 27-8-81

Notes ....

Co-ordinates/or From	To	Interval/ Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	
2m	3m	1m	WINTERS 3 orange clayey sand 75500E 15700N		224279	4	19	8	<1	6	29	<5	<20	
3	4	"			80	5	6	8	"	3	4	"	"	
4	5	"			1	3	2	6	"	1	2	"	"	
5	6	"	yellow clayey sand		2	3	1	5	"	1	2	"	"	
6	7	"			3	2	1	4	"	1	1	"	"	
7	8	"			4	2	1	4	"	1	1	"	"	
8	9	"			5	3	1	5	"	1	1	"	"	
9	10	"	pale grey to red siliceous clay		6	5	1	5	"	1	1	"	"	
10	1	"			7	5	1	5	"	1	1	"	"	
1	2	"			8	3	1	5	"	1	1	"	"	
2	3	"	grey-white kaolin WB?		9	2	2	6	"	1	1	"	"	
3	4	"	" " " ; limonite		90	1	1	4	"	1	1	"	"	
4	5	"			1	2	1	4	"	1	1	"	"	
5	6	"	buff sandy kaolin; clayey haematite		2	2	1	4	"	1	1	"	"	
6	7	"			3	1	1	4	"	1	1	"	"	
7	8	"	buff kaolin WB		4	1	1	3	"	1	1	"	"	
8	9	"	" " : limonite, haematite-speckled		5	1	1	5	"	1	1	"	"	
9	20	"			6	1	4	4	"	1	1	"	"	
20	1	"	white, haem-stained clay with coarse altered mica		7	1	4	4	"	1	1	"	"	
1	2	"	streaky pale brown + buff clay		8	26	16	4	"	1	1	"	"	
2	3	"	grey-brown kaolin		9	245	40	5	"	15	12	"	"	
3	4	"			300	37	21	5	"	15	5	"	"	
4	5	"	buff, brown & blue grey graphitic clay		1	97	26	8	"	49	24	"	"	
25	26	"			2	77	21	6	"	33	13	"	"	
				Check Sample		140	210	135	6	145	150	230	790	

All results in parts per million unless otherwise indicated

SAMPLE TYPE / HOLE No: WINTERS-3 - AIR HAMMER

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION

0037

FIELD ENTRY

Date 21-8-81 Sampler / Driller BOLAND/ CHETCUTTI
Area COOTRA Machine
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project
Cost Code 543 Date Desp. 27 · 8 · 81
Notes

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
26m	27m	1m	75500E, 15700N			224303	98	6	7	<1	32	17	<5	<20	
27	28	"	pale brown to brown clay; pyrite			4	145	6	6	"	41	17	"	"	
28	29	"	green-grey pyritic clay with angular qtz.			5	175	2	9	"	57	34	"	"	
29	30	"	dark green to buff chloritic bedrock clay with quartz.	<0.1 WB		5A~~B~~	110	1	8	"	84	55	"	"	<10

SAMPLE TYPE / HOLE No: AIR HAMMER - WINTERS 3

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION

FIELD ENTRY

Date .... Sampler / Driller BOLAND / CHETCUTTI
Area COOTRA Machine ....
Grid .... Priority (urgency) ....
For location see Map No. .... or Air Photo No. ....

LABORATORY

Order No. .... Sheet No. ....
Project ....
Cost Code 543/2 Date Desp. 27-8-81
Notes ....

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn
1m	2m	1m	MAY-5 orange sandy clay 71900E, 22250N		224306	7	8	12	<1	11	6	<5	<20
2	3	"	" " " & kunkar		7	2	7	7	"	5	5	"	"
3	4	"			8	1	3	6	"	3	2	"	"
4	5	"	calc clayey sand		9	1	2	4	"	3	1	"	"
5	6	"	" " " & kunkar		10	5	5	6	"	5	8	"	"
6	7	"	orange clayey sand		1	2	7	5	"	3	6	"	"
7	8	"			2	1	2	4	"	1	1	"	"
8	9	"			3	1	1	3	"	1	1	"	"
9	10	"	yellow clayey sand		4	1	1	5	"	2	1	"	"
10	1	"			5	1	1	4	"	2	1	"	"
11	2	"			6	2	2	6	"	1	1	"	"
12	13	"	yellow, brown, red haematite-limonite		7	3	3	4	"	1	1	"	"
13	14	"			8	1	2	5	"	1	1	"	"
14	15	"			9	6	1	7	1	1	1	"	"
15	16	"			20	10	2	10	1	1	1	"	"
16	7	"	red+brown haematite-limonite; haematitic micaceous kaolinitic weathered rock WB?		1	3	1	5	<1	1	1	"	"
17	8	"			2	1	1	6	"	1	1	"	"
18	9	"	magnetic red-brown hematite; grey-red kaolin		3	3	8	7	"	1	1	"	"
19	20	"			4	4	2	8	"	3	1	"	"
20	1	"	magnetite-haematite; limonitic-haematitic, cavernous weathered rock + kaolin WB		5	9	2	7	"	3	1	"	"
21	2	"			6	10	5	6	"	4	1	"	"
22	3	"			7	6	2	6	"	2	1	"	"
23	4	"			8	12	1	10	"	3	1	"	"
24	25	"			29	18	2	13	"	1	1	"	"
					Check Sample	205	310	195	6	210	210	340	1080

SAMPLE TYPE / HOLE No: AIR HAMMER - MAY - 5

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION

FIELD ENTRY

Date .... Sampler / Driller BOLAND / CHETCUTTI
Area COOTRA .... Machine ....
Grid .... Priority (urgency) ....
For location see Map No. .... or Air Photo No. ....

LABORATORY

Order No. .... Sheet No. ....
Project ....
Cost Code 543 .... Date Desp. 27·8·81
Notes ....

Co-ordinates/or From	To	Interval / Depth	Geological description of sample 71900E, 22250N	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
25m	26m	1m	MAY - 5 brown, yellow, white limonitic kaolinized rock			224 330	29	6	10	<1	1	1	<5	<20	
26	27	"				1	34	6	14	"	1	1	"	"	
27	8	"	pale grey-white kaolinized rock with siliceous kaolin.			2	5	1	4	"	1	1	"	"	
28	9	"	yellow-brown " " with limonite			3	30	2	16	"	6	1	"	"	
29	30	"				4	21	9	14	"	5	1	"	"	
30	1	"				5	54	5	39	"	20	8	"	"	
31	2	"	" plus pale grey white kaolin-qtz rock			6	48	4	30	"	7	3	"	"	
2	3	"				7	35	2	15	"	2	1	"	"	
3	4	"	pale brown + white kaolin & qtz			8	18	3	9	"	2	1	"	"	
4	5	"	brown clay & qtz			9	31	9	21	"	10	2	"	"	
5	6	"				40	24	20	16	"	8	1	"	"	
6	7	"				1	33	21	31	"	20	7	"	"	
7	8	"	buff-brown kaolin-qtz			2	12	14	16	"	11	3	"	"	
8	9	"	white-yellow kaolin-qtz with green-white mica flakes			3	18	14	35	"	17	5	"	"	
9	40	"	green chloritic rock; fine quartz			4	36	15	54	"	24	12	"	"	
40	1	"				5	19	9	67	"	27	11	"	"	
1	2	"	" " " ; fine & coarse quartz (chlorite schist?) WB601			6	24	11	70	"	29	9	"	"	<10
~~2~~	~~3~~	~~"~~				~~7~~									
~~3~~	~~4~~	~~"~~				~~8~~									
~~4~~	~~5~~	~~"~~				~~9~~									
~~45~~	~~46~~	~~"~~				~~50~~									

SAMPLE TYPE / HOLE No: AIR HAMMER - MAY - 5

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET

— UNIVERSAL —

EXPLORATION DIVISION

0049

FIELD ENTRY

Date 10-7-81 Sampler / Driller

Area FRISCHKE'S #4 Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 543 Date Desp. 17-7-81

Notes FRISCHKE'S 4

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
BLANK	——				1	BLANK	—	—	—	—	—	—	—	—	
84680 E	22950 N	2 m	kunkar + clay		2	223579	6	20	68	<1	6	3	<5	<20	
		3			3	80	8	22	31	"	9	20	"	"	
		4	orange brown sandy clay		4	1	13	33	215	"	3	7	"	"	
		5			5	2	7	10	43	"	2	2	"	"	
		6	loose yellow sand; orange clay; limonite		6	3	6	4	18	"	2	2	"	"	
		7	yellow clayey loose sand		7	4	6	1	13	"	3	3	"	"	
		8	red-brown clayey sand; haematite		8	5	6	2	9	"	1	2	"	"	
		9			9	6	7	6	13	"	1	2	"	"	
		10			10	7	6	4	10	"	1	1	"	"	
		11	red brown + buff clay (kaolin)		1	8	2	3	6	"	1	1	"	"	
		12			2	9	6	1	7	"	1	1	"	"	
		13	orange-brown + buff sandy kaolin; limonite		3	90	7	1	7	"	1	1	"	"	
		14			4	1	7	1	8	"	1	1	"	"	
		15	orange-brown + buff clayey sand; limonite + haematite	<0·1	5	2	7	1	9	"	1	1	"	"	<10
		16	mottled buff-red-mauve-yellow kaolin-sandy WB?	<0·1	6	3	8	1	4	"	1	1	"	"	<10
		17	coarse angular sand, red-white kaolin		7	4	10	1	13	"	2	1	"	"	
		18	buff kaolin; coarse angular quartz		8	5	5	1	9	"	4	1	"	"	
		19	~~off white to yellow flaky kaolin WB~~		9	6	2	2	8	"	4	1	"	"	
		20			20	7	4	4	11	"	2	1	"	"	
		21			1	8	3	3	5	"	1	1	"	"	
		22	off white to yellow flaky kaolin WB		2	9	2	2	6	"	1	1	"	"	
		23			3	600	2	4	6	"	1	1	"	"	
		24			4	1	4	19	9	"	1	1	"	"	
SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.				Check Sample	5	No1 Sn100	10	6	9	<1	4	3	<5	100	

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION

0041

FIELD ENTRY

Date 10-7-81 Sampler / Driller
Area FRISCHKE'S #4 Machine ROTAMEC.
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project COOTRA
Cost Code 543 Date Desp. 17-7-81
Notes FRISCHKE'S 4

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
8468O E	2295O N	25 m	buff-yellow flaky kaolin; angular qtz		26	223602	3	5	6	<1	1	1	<5	<20	
		26			7	3	2	4	4	"	1	1	"	"	
		27	buff-yellow-brown kaolin; angular qtz		8	4	5	7	6	"	1	1	"	"	
		28			9	5	5	12	6	"	2	1	"	"	
		29			30	6	4	3	3	"	2	1	"	"	
		30	mottled grey-red-green smooth clay; buff kaolin		1	6A	7	6	6	"	1	1	"	"	
		31	pale green-white mottled soapy clay		2	7	6	13	7	"	2	1	"	"	
		32	mottled & streaky white-green-yellow clay		3	8	4	5	5	"	1	1	"	"	
		33			4	9	6	7	7	"	1	1	"	"	
		34			5	10	7	18	13	"	4	1	"	"	
		35			6	1	14	29	20	"	3	1	"	"	
		36			7	2	3	10	10	"	5	1	"	"	
		37	green to brown streaky clay; micac. haematite		8	3	11	7	12	"	4	1	"	"	
		38	dark bluegreen clay & clayey weathered rock		9	4	14	9	30	"	5	1	"	"	
		39			40	5	13	78	510	"	88	53	"	"	
		40	(contaminated)		1	6	16	61	580	"	89	34	"	"	
		41	weathered f.g. mafic rock: black mica & feldspar visible		2	7	17	46	460	"	205	91	"	"	
		42	pale blue grey granodiorite / diorite BR.		3	8	24	34	440	"	265	96	"	"	
		43	" " " BR.	<0.1	4	9	23	60	210	"	115	50	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION

FIELD ENTRY

Date 10-7-81 Sampler / Driller

Area FRISCHKE'S #3 Machine ROTAMEC.

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No

Project COOTRA

Cost Code 543 Date Desp. 17-7-81

Notes FRISCHKE'S 3

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/ Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
84020 E	20120 N	2m.	calc sandy clay		45	223620	11	13	100	<1	51	21	<5	<20	
		3			6	1	6	5	13	"	7	3	"	"	
		4			7	2	6	2	7	"	8	1	"	"	
		5	" " " + kunkar		8	3	4	1	8	"	5	1	"	"	
		6			9	4	5	1	6	"	2	1	"	"	
CHECK	SAMPLES.				50	No 2 Sn500	73	105	67	2	73	72	140	495	
		7	orange sl. clayey sand		1	5	2	2	4	<1	3	7	<5	<20	
		8	red-orange clayey sand		2	6	4	12	30	"	21	8	"	"	
		9			3	7	4	2	4	"	2	2	"	"	
		10	red-brown to buff sandy silty clay; haematite		4	8	7	1	5	"	1	1	"	"	
		11		<0.1	5	9	5	1	4	"	1	1	"	"	<10
		12	hard buff siliceous sandy clay	"	6	30	2	2	2	"	1	1	"	"	"
		13	buff silt; corse qtz sand	"	7	1	2	1	3	"	3	1	"	"	"
		14		"	8	2	1	1	3	"	4	1	"	"	"
		15	white kaolin; angular sand	"	9	3	1	1	3	"	5	1	"	"	"
		16			60	4	3	2	5	"	3	1	"	"	
		17	whitish silty kaolin		1	5	1	1	2	"	2	1	"	"	
		18	buff to red silty kaolin		2	6	1	1	2	"	3	1	"	"	
		19	white kaolin		3	7	1	1	2	"	1	1	"	"	
		20			4	8	1	1	1	"	1	1	"	"	
		21			5	9	1	1	1	"	1	1	"	"	
		22	white kaolin - angular qtz		6	40	30	1	1	"	2	1	"	"	
		23	yellow " " "		7	1	2	1	1	"	1	1	"	"	
		24	buff clay-qtz weathered rock WBR		8	2	3	1	2	"	2	1	"	"	
					9										

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

~~Check Sample~~

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** EXPLORATION DIVISION

— UNIVERSAL —

0043

FIELD ENTRY

Date 10-7-81 Sampler / Driller

Area FRISCHKE'S #3 Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No

Project COOTRA

Cost Code 543 Date Desp. 17-7-81

Notes FRISCHKE'S 3

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
84020 E	20120 N	25 m	buff clay-qtz-biotite weathered rock		69	223643	3	2	3	<1	4	1	<5	<20	
		26			70	4	4	1	3	"	4	1	"	"	
		27			1	5	3	1	4	"	1	1	"	"	
		28			2	6	3	3	4	"	3	1	"	"	
		29	pale red-brown silty clay with angular qtz sand		3	7	6	9	16	"	4	1	"	"	
		30	pale brown " " " " "		4	8	7	4	19	"	7	1	"	"	
CHECK	SAMPLES.				5	No 3 Sn 800	140	210	130	4	145	140	220	820	
		31	pink f.g. granite; yellow feldspar rich rock (diorite?) BR.		6	9	10	6	35	<1	8	1	<5	<20	
		32			7	50	16	5	46	"	19	4	"	"	
		33	buff-yellow biotite granite f.g.		8	1	17	6	45	"	17	5	"	"	
		34			9	2	13	1	46	"	17	5	"	"	
		35	white to yellow f.g sugary biotite granite	<0.1	80	3	13	5	38	"	28	6	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION**

FIELD ENTRY

Date: 10-7-81
Sampler / Driller:
Area: CUMMING'S #1
Machine: ROTAMEC.
Grid:
Priority (urgency):
For location see Map No.
or Air Photo No.

LABORATORY

Order No.
Sheet No. 0044
Project: COOTRA
Cost Code: 543
Date Desp.: 17-7-81
Notes: CUMMINGS 1

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
84000 E	19350 N	2 m	orange to brown sandy clay	<0.1	81	223654	6	12	39	<1	8	1	<5	<20	<10
		3	white to yellow f.g. granite or gneiss BR.	"	2	5	15	1	23	"	11	4	"	"	"
		4			3	6	10	3	21	"	11	5	"	"	
		5	pink-white-yellow f.g. biotite granite/gneiss		4	7	9	3	50	"	11	5	"	"	
		6	pale grey to brown f.g. sugary biotite granite		5	8	6	7	75	"	15	3	"	"	
		7			6	9	1	1	81	"	13	2	"	"	
		8			7	60	2	1	24	"	12	5	"	"	
		9			8	1	4	1	18	"	11	5	"	"	
		10			9	2	2	1	20	"	10	3	"	"	
		11			90	3	5	1	46	"	17	8	"	"	
		12			1	4	8	1	43	"	19	6	"	"	
		13			2	5	9	1	43	"	24	5	"	"	
		14			3	6	8	1	27	"	15	4	"	"	
		15	grey f.g. biotite granite		4	7	6	1	23	"	11	4	"	"	
		16			5	8	7	1	20	"	10	3	"	"	
		17			6	9	14	1	40	"	28	6	"	"	
		18			7	70	12	1	39	"	39	6	"	"	
		19			8	1	22	1	38	"	28	6	"	"	
		20			9	2	12	1	31	"	14	5	"	"	
CHECK	SAMPLE.				100	No 4 Sn1100	215	300	195	4	220	215	340	1080	

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION

0045

FIELD ENTRY

Date 10-7-81 Sampler / Driller
Area CUMMING'S #1 Machine ROTAMEC.
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No
Project COOTRA
Cost Code Date Desp. 17-7-81
Notes CUMMINGS 1

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
BLANK	—	—			1	BLANK.	—	—	—	—	—	—	—	—	
84000E	19350N	21	grey f.g. biotite granite		2	223673.	10	1	41	<1	29	11	<5	<20	
		22	" " " " ; biotite rich ~~schist~~		3	4	38	1	68	"	105	36	"	"	
		23			4	5	11	1	31	"	19	9	"	"	
		24	" " " "		5	6	2	1	22	"	8	7	"	"	
		25			6	7	48	1	49	"	130	20	"	"	
		26			7	8	11	9	40	"	22	11	"	"	
		27			8	9	6	1	23	"	11	7	"	"	
		28			9	80	4	1	29	"	7	7	"	"	
		29			10	1	4	1	23	"	8	6	"	"	
		30			1	2	4	1	24	"	9	6	"	"	
		31			2	3	3	1	30	"	8	8	"	"	
		32			3	4	3	1	27	"	7	6	"	"	
		33			4	5	2	1	23	"	6	12	"	"	
		34			5	6	6	1	33	"	9	7	"	"	
		35	grey f.g. biotite granite / granodiorite BR.	<0.1	6	7	5	1	24	"	2	7	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION 0046

FIELD ENTRY

Date 10-7-81 Sampler / Driller
Area CUMMING'S #2 Machine ROTAMEC.
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project COOTRA
Cost Code 543. Date Desp. 17-7-81
Notes

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
CUMMINGS	2	2 m.	Sandy kunkar		17	223688	4	4	35	<1	1	1	<5	<20	
		3			8	9	3	1	10	"	3	1	"	"	
		4	calc. sand		9	90	3	1	6	"	2	1	"	"	
		5	calc. clayey sand		20	1	4	2	6	"	3	1	4	"	
		6			1	2	4	2	6	"	1	3	"	"	
		7	orange brown & buff clayey sand		2	3	3	1	7	"	1	2	"	"	
		8	" " " " " " ; limonite ; siliceous grey clay		3	4	4	1	10	"	1	2	"	"	
		9	buff sand ; orange sandy limonitic clay		4	5	5	1	10	"	1	1	"	"	
CHECK	SAMPLES.				5	No5 Sn 100	275	400	280	8	275	290	460	110	
		10	buff siliceous clay; brown-red clay + limonite		6	6	8	1	3	<1	1	1	<5	<20	
		11			7	7	6	1	2	"	1	1	"	"	
		12			8	8	6	1	2	"	1	1	"	"	
		13		<0·1	9	9	7	1	1	"	1	1	"	"	<10
		14	white kaolin-qtz; mottled red-yellow-brown clayey rock	"	30	700	7	1	2	"	1	1	"	"	"
		15	white kaolin-qtz (granite?) WB	"	1	1	1	1	2	"	1	2	"	"	"
		16			2	2	1	2	2	"	1	1	"	"	
		17			3	3	1	1	1	"	1	1	"	"	
		18			4	4	1	2	2	"	1	1	"	"	
		19			5	5	1	1	1	"	1	1	"	"	
		20			6	6	1	1	1	"	1	1	"	"	
		21			7	7	1	1	1	"	1	1	"	"	
		22			8	8	1	3	2	"	1	1	"	"	
		23			9	9	3	6	10	"	1	1	"	"	
		24	greyish-yellow kaolin-qtz ; granite B.R.		40	10	10	2	32	"	1	3	"	"	

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION 0047

FIELD ENTRY

Date 10-7-81 Sampler / Driller

Area CUMMING'S #2 Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No

Project COOTRA

Cost Code 543. Date Desp. 17-7-81

Notes.

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
Cummings 2		25 m	coarse-medium red granite C.R.		41	223711	14	2	30	<1	4	3	<5	<20	
		26	" " " " B.R.	<0·1	2	2	14	5	35	"	3	4	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION** 0046

FIELD ENTRY

Date 10-7-81 Sampler / Driller

Area CANT'S #1 Machine ROTAMEC.

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 543 Date Desp. 17-7-81

Notes

Co-ordinates/or From	To	Interval/Depth	Geological description of sample		Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
CANT	1	2m	calcrete + clay		43	223713	12	6	27	<1	11	8	<5	<20	
		3			4	4	13	5	33	"	16	10	"	"	
		4	orange clayey sand		5	5	12	7	13	"	9	5	"	"	
		5			6	6	6	1	7	"	1	2	"	"	
		6	yellow " "		7	7	7	7	9	"	1	4	"	"	
		7			8	8	7	1	5	"	4	3	"	"	
		8	orange-brown sandy clay		9	9	15	1	7	"	2	5	"	"	
CHECK	SAMPLES				50	No 6 Sn500	10	6	10	<1	4	3	<5	510	
		9	" " " " ; haematite-limonite		1	20	12	1	5	"	2	1	<5	<20	
		10	pale grey to red clay ; " "	<0·1	2	1	9	1	6	"	1	1	"	"	<10
		11	white siliceous kaolin-qtz ; yellow-brown limonitic silcrete	"	3	2	11	1	4	"	1	1	"	"	"
		12	white kaolin-qtz	"	4	3	7	2	7	"	1	1	"	"	"
		13			5	4	8	1	3	"	1	1	"	"	
		14			6	5	1	1	2	"	1	1	"	"	
		15	black-speckled (graphite?) white-orange kaolin		7	6	2	1	3	"	2	1	"	"	
		16	white kaolin		8	7	1	8	2	"	2	1	"	"	
		17	" " - black-speckled		9	8	2	9	2	"	1	1	"	"	
		18			60	9	1	2	2	"	1	1	"	"	
		19			1	30	1	1	3	"	1	1	"	"	
		20	greenish white kaolin		2	1	12	5	10	"	3	1	"	"	
		21			3	2	11	1	9	"	5	2	"	"	
		22	greenish-yellow silt, qtz + feldspar chips WBR		4	3	31	1	22	"	5	4	"	"	
		23	buff gritty silt with qtz + mica		5	4	29	1	[illegible]	"	6	4	"	"	
		24			6	5	21	1	20	"	8	3	"	"	

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION 0049

FIELD ENTRY

Date 10-7-81
Sampler / Driller
Area CANT'S #1
Machine Rotamec
Grid
Priority (urgency)
For location see Map No.
or Air Photo No

LABORATORY

Order No.
Sheet No
Project Cootra
Cost Code 5M3
Date Desp. 17-7-81
Notes.

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
CANT	1	25m.	yellow to whitish qtz-feldspar-bio gneiss B.R.	<0·1	67	223736	37	1	55	<1	16	7	<5	<20	<10

All results in parts per million unless otherwise indicated

SAMPLE TYPE / HOLE No:

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION 0050

FIELD ENTRY

Date 10-7-81 Sampler / Driller
Area ANDREW'S Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No
Project COOTRA
Cost Code 543 Date Desp. 17-7-81
Notes ANDREW'S

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
90250E	15250N	9m	buff-brown sand; red-brown limonitic-haematitic grey clay		68	223737	15	2	13	<1	2	1	<5	<20	
		10			9	8	12	1	6	"	1	1	"	"	
		11		<0·1	70	9	12	1	4	"	1	1	"	"	<10
		12	whitish siliceous kaolin; haematite-limonite rock	"	1	40	16	1	4	"	1	1	"	"	"
		13	white-red ironstained kaolin-qtz WB	"	2	1	10	2	5	"	1	1	"	"	"
		14			3	2	7	1	2	"	1	1	"	"	
		15			4	3	5	1	2	"	1	1	"	"	
CHECK	SAMPLE				5	No 1 Sn800	78	105	73	2	70	78	120	795	
		16			6	4	2	1	2	<1	1	1	<5	<20	
		17			7	5	1	1	3	"	1	1	"	"	
		18	brown-red-yellow ferruginous, whitish kaolinized rock		8	6	6	1	5	"	1	1	"	"	
		19			9	7	7	1	3	"	1	1	"	"	
		20			80	8	6	1	3	"	1	1	"	"	
		21			1	9	10	1	3	"	1	1	"	"	
		22	grey-white-brown kaolin - flaky; limonite-haematite		2	50	25	1	3	"	1	1	"	"	
		23			3	1	17	1	4	"	1	1	"	"	
		24	red haematitic kaolin		4	2	30	1	5	"	1	1	"	"	
		25	brown micaceous clay; limonite		5	3	35	1	18	"	1	1	"	"	
		26	" " " " ; qtz.		6	4	60	1	15	"	1	1	"	"	
		27			7	5	56	1	15	"	1	1	"	"	
		28	" " "		8	6	42	1	12	"	1	1	"	"	
		29	" " " " "		9	7	52	1	15	"	1	1	"	"	
		30			90	8	44	1	21	"	1	1	"	"	
		31	pale brown clay; angular qtz		1	9	34	5	21	"	4	1	"	"	

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION 0051

FIELD ENTRY

Date 10-7-81 Sampler / Driller

Area ANDREWS Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No

Project COOTRA

Cost Code 543 Date Desp. 17-7-81

Notes ANDREW'S

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
90250E	15250N	32 m.	pale brown clay; angular qtz		92	223 760	39	1	19	<1	6	1	<5	<20	[illegible]
		33			3	1	30	3	20	"	3	1	"	"	
		34			4	2	43	12	32	"	13	7	"	"	
		35			5	3	25	6	17	"	3	1	"	"	
		36			6	4	18	7	18	"	1	1	"	"	
		37			7	5	21	4	16	"	1	1	"	"	
		38			8	6	20	9	18	"	1	1	"	"	
		39			9	7	32	19	34	"	11	3	"	"	
		40	pale brown clay; angular qtz sand WB?		100	8	26	13	32	"	11	3	"	"	

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
—UNIVERSAL—

EXPLORATION DIVISION

0052

FIELD ENTRY

Date 10 - 7 - 81 Sampler / Driller

Area ANDREW'S Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No

Project COOTRA

Cost Code 543 Date Desp. 17 - 7 - 81

Notes ANDREW'S

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au
BLANK				
90250 E	15250 N	41 m	brown clay; angular qtz sand	
		42		
		43		
		44		
		45		
		46		
		47		
		48	yellow-brown clay; angular qtz WB?	<0·1

All results in parts per million unless otherwise indicated

Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
1	BLANK.	—	—	—	—	—	—	—	—	
2	223769	18	1	22	<1	6	2	<5	<20	
3	70	17	1	25	"	7	1	"	"	
4	1	20	3	18	"	6	2	"	"	
5	2	31	1	29	"	11	4	"	"	
6	3	31	1	18	"	6	2	"	"	
7	4	38	1	24	"	10	4	"	"	
8	5	34	1	29	"	11	4	"	"	
9	6	29	1	30	"	12	3	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET

— UNIVERSAL —

EXPLORATION DIVISION

0053

FIELD ENTRY

Date 10 - 7 - 81 Sampler / Driller
Area SCHMUCKER'S Machine ROTAMEC
Grid Priority (urgency)
For location see Map No or Air Photo No

LABORATORY

Order No Sheet No
Project COOTRA
Cost Code 543. Date Desp. 17 - 7 - 81
Notes SCHMUCKERS

Co-ordinates /or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
90250 E	21250 N	2 m	white siliceous clay-qtz (granite) WB	<0·1	10	223 777	1	1	3	<1	2	1	<5	<20	<10
		3			1	8	1	1	2	"	1	1	"	"	
		4			2	9	1	1	2	"	1	1	"	"	
		5	" " " " " ; red-yellow ferrug kaolin		3	80	1	1	1	"	1	1	"	"	
		6			4	1	1	2	1	"	1	1	"	"	
		7	white kaolin-qtz. (granite or gneiss)		5	2	1	2	2	"	1	1	"	"	
		8	" " "		6	3	1	1	1	"	1	1	"	"	
		9			7	4	1	6	1	"	1	1	"	"	
		10			8	5	1	4	1	"	1	1	"	"	
		11			9	6	1	5	1	"	1	1	"	"	
		12			20	7	1	5	1	"	1	1	"	"	
		13	white kaolin-qtz; angular qtz		1	8	1	7	1	"	1	1	"	"	
		14			2	9	1	4	2	"	1	1	"	"	
		15			3	90	1	7	1	"	1	1	"	"	
		16			4	1	1	6	1	"	1	1	"	"	
CHECK	SAMPLES.				5	No 8 Sn 1100	140	230	130	4	151	175	180	1090	
		17			6	2	1	12	2	<1	1	1	<5	<20	
		18			7	3	1	9	1	"	1	1	"	"	
		19			8	4	1	11	3	"	1	1	"	"	
		20	buff kaolin-qtz; coarse angular qtz		9	5	1	18	3	"	2	1	"	"	
		21	" " " ; kaolinized yellow-green ?gneiss		30	6	1	14	5	"	2	1	"	"	
		22	yellowbrown " " ; " " " "		1	7	6	7	7	"	4	1	"	"	
		23	brown micaceous clay & weathered rock		2	8	11	7	23	"	9	5	"	"	
		24	" " " ; limonite		3	9	13	1	38	"	17	12	"	"	

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION 0054

FIELD ENTRY

Date 10 - 7 - 81 Sampler / Driller

Area SCHMUCKER'S Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No

Project COOTRA

Cost Code 543 Date Desp. 17 - 7 - 81

Notes. SCHMUCKER'S

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
90250 E	21250 N	25 m	brown micaceous clay; limonite		34	223 800	13	1	49	<1	31	24	<5	<20	
		26			5	1	18	1	56	"	32	25	"	"	
		27			6	2	10	1	33	"	19	13	"	"	
		28			7	3	10	1	33	"	16	13	"	"	
		29			8	4	15	1	35	"	18	11	"	"	
		30			9	5	11	1	27	"	14	10	"	"	
		31			40	6	27	3	59	"	32	19	"	"	
		32			1	7	13	1	27	"	14	8	"	"	
		33	brown sandy micaceous clay; weathered schist		2	8	30	2	72	"	38	19	"	"	
		34			3	9	29	6	70	"	47	19	"	"	
		35			4	10	29	2	69	"	41	16	"	"	
		36			5	1	40	3	84	"	58	22	"	"	
		37			6	2	32	1	66	"	45	19	"	"	
		38			7	3	21	1	42	"	25	10	"	"	
		39			8	4	32	1	75	"	48	18	"	"	
		40			9	5	39	1	84	"	59	20	"	"	
		41			50	6	29	1	61	"	38	14	"	"	
		42	qtz-feldspar-biotite schist with limonitic cavities	<0·1	1	7	25	1	63	"	37	17	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

0055

NORTH BROKEN HILL LIMITED — ANALYTICAL REPORT SHEET — EXPLORATION DIVISION

—UNIVERSAL—

FIELD ENTRY

Date 16-7-81 Sampler / Driller

Area BEINKE'S #1 Machine ROTAMEC.

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 543. Date Desp. 22-7-81

Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
BLANK	——		BEINK'S #1		1	BLANK.	–	–	–	–	–	–	—	—	
90650E	25620N	2m	orange clayey sand.		2	223818	10	8	12	<1	8	5	<5	<20	
		3			3	9	7	8	18	"	7	8	"	"	
		4			4	20	6	5	9	"	5	4	"	"	
		5			5	1	7	5	7	"	6	4	"	"	
		6	yellow clayey sand; limonite, qtz; siliceous grey clay.		6	2	8	3	5	"	5	4	"	"	
		7			7	3	10	4	9	"	4	3	"	"	
		8	brown-red haematite limonite with qtz grit.		8	4	7	5	8	"	2	2	"	"	
		9			9	5	6	2	9	"	2	1	"	"	
		10	buff silty Kaolin.		10	6	4	2	3	"	1	1	"	"	
		11	red-yellow + brown finely mottled limonite.		1	7	4	1	5	"	2	3	"	"	
		12	limonite stained grey buff clay.		2	8	3	1	5	"	1	1	"	"	
		13			3	9	5	1	6	"	1	2	"	"	
		14		<0.1	4	30	5	3	4		3	3	"	"	<10
		15		"	5	1	3	1	5	"	2	3	"	"	"
		16	limonite stained creamy Kaolin WB?	"	6	2	3	3	3	"	2	2	"	"	"
		17			7	3	3	1	4	"	2	1	"	"	
		18			8	4	6	1	8	"	8	1	"	"	
		19	yellow-brown limonitic Kaolin.		9	5	7	1	3	"	10	1	"	"	
		20			20	6	41	2	10	"	13	2	"	"	
		21			1	7	3	1	7	"	5	1	"	"	
		22	limonitic white to yellow Kaolin.		2	8	4	1	7	"	6	1	"	"	
		23			3	9	4	1	11	"	7	2	"	"	
		24			4	40	21	1	8	"	9	2	"	"	
Check Sample					5	No1 Sn 100	10	5	9	<1	6	3	<5	105	

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION 0056

FIELD ENTRY

Date 16-7-81 Sampler / Driller
Area BEINKE'S #1 Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project COOTRA
Cost Code 543 Date Desp. 22-7-81
Notes BEINKE'S #1 cont.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
90650 E	25620 N	25m.			26	223841	15	2	13	<1	10	2	<5	<20	
		26			7	2	9	3	15	"	10	2	"	"	
		27			8	3	7	2	11	"	8	2	"	"	
		28			9	4	1	6	6	"	5	1	"	"	
		29	buff yellow Kaolin; angular qtz.		30	5	1	4	9	"	8	2	"	"	
		30			1	6	1	3	5	"	8	1	"	"	
		31			2	7	1	7	11	"	11	3	"	"	
		32			3	8	1	7	12	"	12	2	"	"	
		33			4	9	1	7	11	"	11	2	"	"	
		34			5	50	1	10	14	"	18	3	"	"	
		35			6	1	3	9	15	"	18	2	"	"	
		36			7	2	4	14	14	"	17	3	"	"	
		37			8	3	2	7	15	"	17	3	"	"	
		38	greenish clay; angular qtz + weathered rock WB.		9	4	2	6	19	"	20	4	"	"	
		39			40	5	4	4	15	"	14	3	"	"	
		40			1	6	2	5	14	"	17	3	"	"	
		41	buff clay; qtz; green-grey ~~grey~~ weathered rock		2	7	1	11	8	"	9	2	"	"	
		42			3	8	1	9	22	"	8	2	"	"	
		43			4	9	5	8	14	"	13	3	"	"	
		44			5	60	16	8	44	"	29	10	"	"	
		45	green - buff clay + qtz; green weathered rock (H_2S smell)		6	1	25	11	78	"	41	14	"	"	
		46	pale grey clay with mica + angular qtz.		7	2	29	11	142	"	53	23	"	"	
		47			8	3	33	13	181	"	62	28	"	"	
		48			9	4	36	10	165	"	63	30	"	"	
Check Sample					50	No2 Sn 500	73	101	64	2	68	73	140	510	

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION** 0057

FIELD ENTRY

Date 16-7-81 Sampler / Driller

Area BEINKE'S #1 Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No

Project COOTRA

Cost Code 543 Date Desp. 22-7-81

Notes BEINKE'S #1

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
90660 E	25620 N	49	pale grey clay; qtz + feldspar grit; red-brown mica.		51	223865	28	7	130	<1	59	26	<5	<20	
		50			2	6	20	6	79	"	47	25	"	"	
		51	grey-buff micaceous clay; grey qtz + feldspar chips WB.		3	7	30	9	117	"	64	33	"	"	
		52			4	8	32	10	138	"	70	36	"	"	
		53.	pale grey gritty clay with mica, qtz + feldspar chips (granite?).	<0·1	5	9	30	13	128	"	79	44	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION** 0058

FIELD ENTRY

Date 16-7-81 Sampler / Driller
Area HIER'S Machine ROTAMEC
Grid Priority (urgency)
For location see Map No or Air Photo No

LABORATORY

Order No. Sheet No.
Project COOTRA
Cost Code 543 Date Desp. 22-7-81
Notes.

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Al_2O_3 %	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
								All results in parts per million unless otherwise indicated								
	HIERS	2m	sandy kunkar			56	223872	7	1	20	<1	9	2	<5	<20	
		3				7	3	2	1	9	"	2	4	"	"	
		4	calc clay			8	4	11	1	10	"	6	6	"	"	
		5	concretionary haematite - limonite			9	5	6	2	15	"	3	4	"	"	
		6				60	6	5	1	11	"	1	1	"	"	
		7				1	7	3	1	14	"	1	2	"	"	
		8				2	8	5	1	8	"	1	1	"	"	
		9	red, haem-stained pale grey clay			3	9	5	1	5	"	1	1	"	"	
		10			<0.1	4	80	7	1	6	"	1	1	"	"	<10
		11			"	5	1	8	1	5	"	1	1	"	"	"
		12			"	6	2	4	1	4	"	1	1	"	"	"
		13	mottled, red-mauve to white kaolin		"	7	3	3	1	6	"	1	1	"	"	"
		14				8	4	3	1	2	"	1	1	"	"	
		15				9	5	4	1	4	"	1	1	"	"	
		16				70	6	6	1	3	"	1	1	"	"	
		17				1	7	5	1	3	"	1	1	"	"	
		18	red, brown limonite, vitreous goethite ; red silty clay	27.80		2	8	32	1	14	"	1	2	"	"	
		19	red to white haem-stained kaolin	28.0		3	9	20	1	7	"	1	2	"	"	
		20		30.20		4	90	25	3	6	"	1	2	"	"	
		21		26.10		5	1	38	3	8	"	1	4	"	"	
		22		21.40		6	2	12	1	5	"	1	1	"	"	
		23		20.80		7	3	50	1	15	"	8	1	"	"	
		24	brown & yellow limonite, mottled white kaolin	21.80		8	4	51	1	9	"	6	4	"	"	
		25		20.70		9	5	49	1	12	"	5	3	"	"	
				Check Sample		80	No 3 Sn 800	126	179	113	4	128	121	240	790	

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION

0059

FIELD ENTRY

Date 16-7-81 Sampler / Driller
Area HIER'S Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project COOTRA
Cost Code 543 Date Desp. 22-7-81
Notes

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Al_2O_3%	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
	HIERS	26m		24.70		81	223896	46	1	13	<1	4	3	<5	<20	
		27		24.0		2	7	60	1	14	"	7	3	"	"	
		28		21.60		3	8	60	1	14	"	5	3	"	"	
		29	yellow-white limonite-kaolin rock with graphite	22.3 WBR		4	9	75	1	13	"	9	4	"	"	
		30				5	900	76	1	22	"	9	4	"	"	
		31	" " " " " with white weathered feld grains?			6	1	43	1	34	"	7	3	"	"	
		32				7	2	69	2	29	"	13	3	"	"	
		33				8	3	54	3	26	"	11	3	"	"	
		34				9	4	81	2	59	"	22	7	"	"	
		35				90	5	73	4	51	"	16	6	"	"	
		36				1	6	52	3	60	"	15	8	"	"	
		37				2	7	58	6	61	"	17	8	"	"	
		38				3	8	131	4	77	"	19	10	"	"	
		39	buff-white kaolinized rock with graphite			4	9	45	4	34	"	9	5	"	"	
		40	" " " " " " ; limonite			5	10	79	3	78	"	29	13	"	"	
		41				6	1	96	6	96	"	45	14	"	"	
		42				7	2	76	7	95	"	39	12	"	"	
		43				8	3	84	6	99	"	46	12	"	"	
		44				9	4	75	2	93	"	39	12	"	"	
CHECK	SAMPLES					100	No 4 Sn 1100	206	299	220	5	220	210	330	1070	

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET

— UNIVERSAL —

EXPLORATION DIVISION

0060

FIELD ENTRY

Date 16-7-81 Sampler / Driller
Area HIER'S Machine ROTAMEC
Grid Priority (urgency)
For location see Map No or Air Photo No

LABORATORY

Order No Sheet No
Project COOTAR
Cost Code 543 Date Desp. 22-7-81
Notes

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
BLANK		—			1	BLANK	—	—	—	—	—	—	—	—	
	HIERS	45			2	223915	70	6	97	<1	41	13	<5	<20	
		46			3	6	64	5	96	"	42	13	"	"	
		47			4	7	42	4	73	"	23	9	"	"	
		48			5	8	59	3	85	"	36	11	"	"	
		49			6	9	79	2	68	"	44	15	"	"	
		50	red haematite stained graphite bearing white kaolinized rock		7	20	60	5	51	"	34	12	"	"	
		51	grey, white micaceous kaolinized rock - graphitic		8	1	102	33	153	"	40	30	"	"	
		52			9	2	72	14	88	"	38	21	"	"	
		53	white, dark & light green, brown, grey abundant silvery graphite micaceous kaold rock		10	3	78	8	117	"	37	24	"	"	
		54			1	4	64	4	91	"	43	30	"	"	
		55	white, green, grey, brown kaolinized rock with graphite (calc silicate?)	<0.1	2	5	57	3	68	"	44	28	"	"	<10

SAMPLE TYPE / HOLE No:

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION** 0061

FIELD ENTRY

Date 16-7-81 Sampler / Driller
Area HAINE'S Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project Cuotra
Cost Code 543 Date Desp. 22-7-81
Notes. HAINE'S

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
80750E ~~[illegible]-E~~	26020N ~~[illegible]N~~	2 m	orange clayey sand		13	223926	13	7	22	<1	8	4	<5	<20	
		3			4	7	9	2	15	"	4	4	"	"	
		4	" " " ; limonite		5	8	12	1	23	"	9	4	"	"	
		5			6	9	5	1	7	"	3	2	"	"	
		6	siliceous sandy pale grey hard clay; limonite	<0.1	7	30	7	1	7	"	3	3	"	"	<10
		7	white kaolin - qtz WB	"	8	1	8	1	9	"	2	3	"	"	"
		8			9	2	3	1	7	"	2	1	"	"	
		9			20	3	4	1	4	"	1	1	"	"	
		10			1	4	1	1	5	"	1	1	"	"	
		11			2	5	1	2	2	"	1	1	"	"	
		12			3	6	1	2	3	"	1	1	"	"	
		13			4	7	1	1	4	"	1	1	"	"	
CHECK	SAMPLE.				5	No 5 Sn 100	274	386	264	6	281	279	460	100	
		14			6	8	1	5	4	<1	1	1	<5	<20	
		15	N.B. No change in geology or geochemistry		7	9	1	9	2	"	1	1	"	"	
		16	between these two samples despite change		8	40	1	3	4	"	1	1	"	"	
		17	in hole number on paper packets.		9	1	1	1	2	"	1	1	"	"	
80750E	26020N	18			30	2	1	1	4	"	1	1	"	"	
		19			1	3	2	3	4	"	1	1	"	"	
		20			2	4	6	1	3	"	1	1	"	"	
		21			3	5	1	1	2	"	1	1	"	"	
		22	white kaolin - black (graphite?) speckled		4	6	2	1	4	"	1	1	"	"	
		23			5	7	2	1	4	"	1	1	"	"	
		24			6	8	4	1	3	"	1	1	"	"	

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION

FIELD ENTRY

Date 16-1-81 Sampler / Driller
Area HAINE'S Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project COOTRA
Cost Code 543 Date Desp. 22-1-81
Notes. HAINE'S

Co-ordinates/or From	To	Interval/ Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
80750E	26020N	25m			37	223949	6	2	7	<1	1	1	<5	<20	
		26			8	50	7	3	6	"	1	1	"	"	
		27			9	1	8	6	8	"	2	1	"	"	
		28			40	2	30	5	19	"	5	2	"	"	
		29	red-white clay; haematitic qtz-feldspar fragments WB		1	3	13	10	34	"	3	4	"	"	
		30			2	4	7	7	26	"	1	3	"	"	
		31			3	5	19	10	35	"	8	4	"	"	
		32	weathered green/white chlorite-kaolin-limonite rock		4	6	9	4	14	"	4	1	"	"	
		33			5	7	24	4	24	"	8	3	"	"	
		34	white, graphite-speckled kaolinized rock + kaolin		6	8	22	7	22	"	6	4	"	"	
		35	~~white-brown kaolin; green chloritic rock; qtz-feldspar rock~~		7	9	31	2	30	"	6	5	"	"	
		36			8	60	44	3	41	"	13	6	"	"	
		37	white-brown kaolin; green chloritic rock; qtz-feldspar rock WB	<0·1	9	1	41	4	46	"	15	7	"	"	<10
CHECK	SAMPLE.				50	No6 Sn500	11	5	11	<1	6	4	<5	515	

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — EXPLORATION DIVISION

— UNIVERSAL —

0063

FIELD ENTRY

Date 16-7-81 Sampler / Driller

Area "A 175" Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 543 Date Desp. 22-7-81

Notes A

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	As	Ni	Co	Mo	Sn	W
76680E	25000N	2 m	kunkar		51	223962	1	1	7	<1	6	3	<5	<20	
		3			2	3	1	1	6	"	6	4	"	"	
		4	calc sand		3	4	1	1	5	"	3	4	"	"	
		5			4	5	1	1	6	"	3	4	"	"	
		6			5	6	1	1	6	"	3	4	"	"	
		7	orange clayey sand		6	7	9	17	17	"	11	26	"	"	
		8			7	8	8	6	12	"	6	7	"	"	
		9			8	9	4	6	11	"	4	6	"	"	
		10			9	70	4	5	11	"	5	4	"	"	
		11			60	1	1	2	6	"	3	3	"	"	
		12			1	2	2	1	6	"	2	3	"	"	
		13			2	3	1	1	4	"	1	2	"	"	
		14			3	4	2	1	5	"	2	5	"	"	
		15	buff-brown clay; limonite		4	5	8	3	6	"	3	5	"	"	
		16	ironstained pale grey clay; limonite-haematite		5	6	7	4	5	"	2	4	"	"	
		17	" " " " "		6	7	5	3	5	"	1	4	"	"	
		18	buff angular gritty sand, some siliceous-cemented		7	8	2	1	4	"	1	2	"	"	
		19		<0.1	8	9	1	1	3	"	1	1	"	"	<10
		20	pale grey-white silty sand	"	9	80	2	2	5	"	1	1	"	"	
		21	buff-white kaolin WB?		70	1	3	11	3	"	1	1	"	"	
		22			1	2	1	6	1	"	1	1	"	"	
		23			2	3	3	5	1	"	1	2	"	"	
		24			3	4	2	4	1	"	1	2	"	"	
		25			4	5	2	4	1	"	1	2	"	"	
				Check Sample	5	No7 Sn800	74	105	65	2	80	79	135	820	

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION 0064

FIELD ENTRY

Date 16-7-81 Sampler / Driller

Area "A 175" Machine ROTAMEC.

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No

Project COOTRA

Cost Code 543 Date Desp. 22-7-81

Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
76680E	25000N	26m			76	223986	1	5	1		1	1	<5	<20	
		27			7	7	1	7	1	<1	1	1	"	"	
		28			8	8	1	6	1	"	1	1	"	"	
		29	white kaolinized rock with graphite WB		9	9	1	10	2	"	1	1	"	"	
		30			80	90	1	12	2	"	1	1	"	"	
		31	grey-white " " " "		1	1	2	20	1	"	1	1	"	"	
		32			2	2	1	14	1	"	1	1	"	"	
		33			3	3	3	16	1	"	1	1	"	"	
		34	buff-white " " " "		4	4	2	11	1	"	1	1	"	"	
		35			5	5	1	10	1	"	1	1	"	"	
		36			6	6	2	5	1	"	1	1	"	"	
		37			7	7	5	13	1	"	1	3	"	"	
		38			8	8	2	7	1	"	1	3	"	"	
		39	buff kaolinized rock; angular qtz		9	9	16	7	3	"	1	3	"	"	
		40			90	224000	40	6	5	"	1	1	"	"	
		41			1	1	25	5	3	"	1	2	"	"	
		42	greenish-white (chlorite-)kaolinized rock	<0·1	2	2	24	8	6	"	6	16	"	"	<10
		43		"	3	3	9	7	3	"	2	16	"	"	"
		44	pale brown clay		4	4	55	8	19	"	14	5	"	"	
		47	" " " ; angular qtz		5	7	66	8	22	"	15	7	"	"	
		48	" " " ; qtz-feldspar-biotite rock; green chlorite rock WB	<0·1	6	8	65	7	28	"	16	8	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION

0065

FIELD ENTRY

Date 16-7-81 Sampler / Driller

Area "MATTHEW'S" Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No

Project COATRA

Cost Code 543. Date Desp. 23-7-81

Notes.

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
BLANK	—	—			1	BLANK.	—	—	—	—	—	—	—	—	
76950E	23620N	2m	yellow/loose clayey sand		2	224009	2	4	8	<1	4	6	<5	<20	
		4			3	10	5	5	4	"	3	5	"	"	
		6			4	1	8	3	11	"	5	7	"	"	
		8	orange " " "		5	2	3	1	7	"	3	3	"	"	
		10			6	3	6	1	4	"	1	4	"	"	
		12	red haematite stained whitish kaolin-qtz WB		7	4	5	1	2	"	1	1	"	"	
		14			8	5	6	5	3	"	1	1	"	"	
		16	white kaolin-qtz		9	6	3	2	2	"	1	1	"	"	
		18			10	7	1	1	1	"	1	1	"	"	
		20			1	8	3	1	2	"	1	1	"	"	
		22			2	9	2	2	1	"	1	1	"	"	
		24			3	20	1	2	1	"	1	2	"	"	
		26	reddish kaolin - minor qtz		4	1	4	8	3	"	1	1	"	"	
		28			5	2	2	1	2	"	1	1	"	"	
		30			6	3	2	10	3	"	1	1	"	"	
		32			7	4	4	5	4	"	1	2	"	"	
		34	orange " " "		8	5	4	7	4	"	1	1	"	"	
		35			9	6	3	3	4	"	1	1	"	"	
		36			20	7	5	2	3	"	2	1	"	"	
		37	whitish " " "		1	8	1	1	1	"	1	1	"	"	
		38			2	9	1	2	1	"	1	1	"	"	
		39			3	30	2	1	6	"	1	1	"	"	
		40			4	1	3	7	23	"	1	2	"	"	
Check Sample					5	No 8 Sn 1100	140	221	123	4	159	152	250	1080	

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION 0066

FIELD ENTRY

Date 16-7-81 Sampler / Driller
Area "MATTHEW'S" Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No
Project COOTRA
Cost Code 043 Date Desp. 23-7-81
Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
76950E	23620N	41	greenish-buff kaolin; fine qtz		26	224032	3	4	14	<1	1	1	<5	<20	
		42			7	3	4	33	34	"	1	1	"	"	
		43	green-white qtz-kaolin-mica rock		8	4	8	61	32	"	1	2	"	"	
		44			9	5	8	27	30	"	1	3	"	"	
		45			30	6	6	13	25	"	1	3	"	"	
		46			1	7	10	8	30	"	2	3	"	"	
		47			2	8	4	6	28	"	2	4	"	"	
		48			3	9	9	1	34	"	1	4	"	"	
		49	green+white kaolin-qtz-pale mica rock; orange f.g. granite or gneiss WB	<0·1	4	40	10	16	35	"	2	3	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION

0067

FIELD ENTRY

Date 16-7-81 Sampler / Driller

Area "STUBING'S" Machine ROTAMEC

Grid Priority (urgency)

For location see Map No or Air Photo No

LABORATORY

Order No. Sheet No

Project COOTRE

Cost Code 543 Date Desp. 23-7-81

Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
~~7485[illegible]~~	~~75900N~~	2 m	calc sand + kunkar		35	224041	7	1	6	<1	5	3	<5	<20	
		4			6	2	6	1	2	"	5	2	"	"	
		6			7	3	4	1	3	"	3	2	"	"	
		8			8	4	9	16	7	"	7	32	"	"	
		10	loose orange clayey sand		9	5	4	4	5	"	3	10	"	"	
		12			40	6	2	1	2	"	1	3	"	"	
		14			1	7	3	1	1	"	1	2	"	"	
		16	" " " " : coarse, rounded		2	8	3	1	1	"	1	1	"	"	
		18			3	9	4	1	1	"	2	2	"	"	
		20	haematite stained red + grey hard clay		4	50	11	1	3	"	1	2	"	"	
		22			5	1	9	1	3	"	2	3	"	"	
		24			6	2	13	1	1	"	1	2	"	"	
		25			7	3	18	1	4	"	1	2	"	"	
		26	brown limonite stained pale grey siliceous clay		8	4	9	1	2	"	1	1	"	"	
		27	coarse buff + orange sand, pale grey clay		9	5	7	1	1	"	1	1	"	"	
CHECK SAMPLE.					50	No 9 Sn 100	214	312	192	6	228	216	320	115	
		28		<0.1	1	6	3	1	1	<1	1	1	<5	<20	<10
		29		"	2	7	3	1	2	"	1	1	"	"	"
		30	buff kaolin; minor qtz		3	8	2	1	1	"	1	1	"	"	
		31			4	9	2	1	1	"	1	1	"	"	
		32			5	60	2	1	1	"	1	1	"	"	
		33			6	1	1	3	1	"	1	1	"	"	
		34			7	2	1	1	1	"	1	1	"	"	
		35			8	3	1	4	1	"	1	1	"	"	

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** **EXPLORATION DIVISION**

— UNIVERSAL —

0066

FIELD ENTRY

Date 16-7-81 Sampler / Driller

Area 'STUBLINGS' Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No

Project COOTER

Cost Code 543 Date Desp. 23-7-81

Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Au	Tube No	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
7485O E	25900 N	36m	white kaolin - qtz		59	224C64	1	4	1	<1	1	1	<5	<20	
		37			60	5	3	17	1	"	1	1	"	"	
		38	buff kaolin - qtz		1	6	3	9	1	"	1	1	"	"	
		39			2	7	6	11	1	"	1	1	"	"	
		40			3	8	4	14	2	"	1	1	"	"	
		41	green-white weathered mica - kaolin - qtz rock		4	9	6	6	9	"	1	1	"	"	
		42			5	70	6	4	21	"	4	2	"	"	
		43			6	1	8	10	39	"	6	4	"	"	
		44			7	2	10	13	36	"	8	5	"	"	
		45			8	3	10	4	28	"	8	5	"	"	
		46			9	4	10	3	34	"	12	5	"	"	
		47			70	5	7	3	46	"	14	7	"	"	
		48			1	6	5	3	47	"	10	5	"	"	
		49			2	7	9	5	51	"	15	7	"	"	
		50			3	8	7	3	65	"	19	8	"	"	
		51			4	9	8	3	56	"	16	9	"	"	
CHECK	SAMPLE.				5	No 10 Sn 500	272	408	252	7	293	287	440	520	
		52			6	80	6	3	48	<1	13	7	<5	<20	
		53			7	1	7	3	58	"	15	9	"	"	
		54			8	2	7	1	61	"	17	9	"	"	
		55			9	3	7	4	66	"	15	8	"	"	
		56			80	4	6	3	83	"	18	10	"	"	
		57			1	5	13	2	76	"	17	10	"	"	
		58			2	6	12	5	90	"	38	23	"	"	

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

0069

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION**

FIELD ENTRY

Date 16.7.81 Sampler / Driller

Area STUBING'S Machine Rotamec

Grid Priority (urgency)

For location see Map No. or Air Photo No

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au
74850E	25900N	59m		
		60	green clay; weathered qtz-feldspar-chlorite rock	<0.01

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

LABORATORY

Order No. Sheet No

Project Costlie

Cost Code 543 Date Desp. 23-7-81

Notes.

All results in parts per million unless otherwise indicated

Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
83	224087	11	4	104	<1	26	17	<5	<20	
4	8	3	1	95	"	22	14	"	"	<10

Check Sample

NORTH BROKEN HILL LIMITED | **ANALYTICAL REPORT SHEET** — UNIVERSAL — | EXPLORATION DIVISION 0070

FIELD ENTRY

Date 16-7-81 Sampler / Driller
Area "A 171" Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No.
Project COCTRA
Cost Code [illegible] Date Desp. 23-7-81
Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
76020 E	24100 N	8 m.	orange clayey sand	<0·1	84	224092	14	6	10	<1	4	5	<5	<20	<10
		10	weathered qtz-feldspar rock (granite) WR		5	3	28	1	31	"	3	9	"	"	
		12	" " " " ; kaolinized white-brown limonitic rock		6	4	68	21	28	"	13	17	"	"	
		13	pale qtz-feld rock ; kaolinized lim-speckled f.g. rock with coarse mica		7	5	43	3	25	"	10	11	"	"	
		14			8	6	71	1	49	"	24	18	"	"	
		15			9	7	44	1	18	"	18	14	"	"	
		16			90	8	42	4	21	"	11	7	"	"	
		17			1	9	79	1	33	"	29	13	"	"	
		18	fg qtz-feld mica schist + gneiss ; dk green ?dolerite.	<0·1	2	100	107	1	29	"	14	10	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
—UNIVERSAL—

EXPLORATION DIVISION

FIELD ENTRY

Date: 16-7-81
Sampler / Driller:
Area: "A 158"
Machine: Rotamec
Grid:
Priority (urgency):
For location see Map No:
or Air Photo No:

LABORATORY

Order No:
Sheet No:
Project: Cootra
Cost Code: 543.
Date Desp: 23-7-81
Notes:

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
BLANK	—				1	BLANK.	—	—	—	—	—	—	—	—	
75020 E	22300N	2 m.	Kunkar		2	224101	20	3	36	<1	11	6	<5	<20	
		3		<0.1	3	2	22	2	25	"	8	7	"	"	<10
		4	kunkar; lim-haem stained whitish kaolinized rock	<0.1	4	3	44	1	31	"	8	3	"	"	<10
		5	brown silt; haem-stained weathered basic rock; graphitic feldspar-quartz rock with amphibole veining.	<0.1	5	4	60	1	24	"	13	5	"	"	<10

All results in parts per million unless otherwise indicated

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION

0072

FIELD ENTRY

Date 16-7-81 Sampler / Driller
Area FRISCHKE'S #1 Machine ROTARY
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No
Project COOTRE
Cost Code 543 Date Desp. 23-7-81
Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
79900E	21600N	8m	orange clayey sand		6	224105	8	3	12	5	7	5	<5	<20	
		10			7	6	3	1	6	<1	3	2	"	"	
		12			8	7	1	1	3	"	2	1	"	"	
		14			9	8	3	1	6	"	3	2	"	"	
		16			10	9	2	1	4	"	2	2	"	"	
		18			1	10	7	1	5	"	1	1	"	"	
		20	haematite-limonite; clayey sand		2	11	1	1	2	"	1	1	"	"	
		22	" " ; iron-stained clay	<0.1	3	2	8	1	3	"	2	3	"	"	<10
		24		"	4	3	8	1	3	"	1	1	"	"	"
		26	limonite stained kaolinized rock; limonite.		5	4	11	1	2	"	1	1	"	"	
		28	" " " "		6	5	6	1	3	"	1	1	"	"	
		30	pale grey kaolin-qtz + kaolinized rock		7	6	10	1	5	4	1	1	"	"	
		32			8	7	3	1	3	<1	1	1	"	"	
		34	white kaolin-qtz + weathered granite; limonitic kaolinized rock		9	8	12	1	4	"	2	3	"	"	
		36			20	9	14	3	6	"	7	4	"	"	
		37	white to yellow kaolin-qtz-mica; limonite		1	20	28	4	12	"	9	6	"	"	
		38			2	1	31	2	16	"	12	6	"	"	
		39	brown clay; red + white haematitic kaolinized rock; qtz		3	2	38	4	22	"	8	4	"	"	
		40			4	3	46	8	28	"	12	5	"	"	
CHECK	SAMPLE.				5	No 1 Sn100	10	4	11	<1	6	3	<5	110	
		41			6	4	37	2	27	<1	6	2	"	<20	
		42			7	5	69	1	36	"	19	8	"	"	
		43			8	6	77	1	42	"	29	9	"	"	
		44	pale brown + white kaolin-qtz		9	7	71	1	31	"	24	9	"	"	

SAMPLE TYPE / HOLE No: PERCUSSION SOLES.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION 0073

FIELD ENTRY

Date: 23-7-81
Sampler / Driller:
Area: COOTRA FRISCHKE'S #1
Machine: ROTAMEC.
Grid:
Priority (urgency):
For location see Map No.
or Air Photo No.

Co-ordinates/or From	To	Interval / Depth	Geological description of sample
79900E	21600N	8 m.	
		30 m	RE-CHECK ASSAYS. FROM BULK SAMPLES.
CHECK.	SAMPLE.	—	(PULVERIZED)

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

LABORATORY

Order No.
Sheet No.
Project: COOTRA
Cost Code: 543
Date Desp.: 23-7-81
Notes.

All results in parts per million unless otherwise indicated

Tube No.	Sample No.	~~Cu~~	~~Pb~~	~~Zn~~	Ag					
1	BLANK.				—					
2	224105				5					
3	16				1					
4	No 5.				8					

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION**

0074

FIELD ENTRY

Date 16-7-81 Sampler / Driller
Area FRISCHKE'S #1 Machine ROTAVEC
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No
Project COST39
Cost Code 543 Date Desp. 23-7-81
Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
79900 E	21600 N	45			30	224128	92	1	39	<1	29	10	<5	<20	
		46			1	9	76	12	51	"	23	14	"	"	
		47	brown clay; white-red-brown kaolinized rock; qtz		2	30	66	31	55	"	18	16	"	"	
		48			3	1	54	1	64	"	17	10	"	"	
		49			4	2	27	3	42	"	11	7	"	"	
		50			5	3	32	1	99	"	26	10	"	"	
		51	boxworks (after pyrite?)		6	4	37	6	80	"	26	10	"	"	
		52	limonitic weathered qtz-clay rock ; brown clay		7	5	30	4	53	"	18	9	"	"	
		53			8	6	41	1	67	"	24	11	"	"	
		54	brown micaceous clay; weathered limonitic rock ; qtz ; white kaolin		9	7	45	1	58	"	46	18	"	"	
		55			40	8	43	1	87	"	49	17	"	"	
		56	weathered qtz-limonite (boxworks)-kaolin-martite rock; micaceous pale brown clay		1	9	48	1	84	"	34	15	"	"	
		57			2	40	42	1	78	"	38	17	"	"	
		58			3	1	40	1	79	"	39	16	"	"	
		59	pale brown micaceous clay; qtz-feld rock ; limonite-kaolin-martite rock ; white kaolin WB	<0·1	4	2	46	1	83	"	42	15	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION 0075

FIELD ENTRY

Date 16.7.81 Sampler / Driller
Area FRISCHKE'S #5 Machine Rotamec
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project Central
Cost Code 543 Date Desp. 23-7-81
Notes

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Fi	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
86280E	24900N	2m	calc clay		45	224143	8	4	13	<1	10	6	<5	<20	
		4			6	4	7	3	11	"	6	3	"	"	
		6	dark red haematite; pale grey clay	<0.01	7	5	4	1	9	"	1	1	"	"	<10
		8	" " " " kaolin	"	8	6	4	1	5	"	1	1	"	"	"
		10	white hard kaolin-qtz		9	7	1	1	4	"	1	1	"	"	
← CHECK SAMPLE					50	No 2 Sn500	73	95	68	2	79	71	150	515	
		12			1	8	1	1	1	<1	1	1	<5	<20	
		14	white kaolin-qtz		2	9	1	1	1	"	1	1	"	"	
		16			3	50	1	1	2	"	1	1	"	"	
		18			4	1	1	1	1	"	1	1	"	"	
		20			5	2	1	13	2	"	1	1	"	"	
		21			6	3	6	16	23	"	4	2	"	"	
		22			7	4	10	13	11	"	4	1	"	"	
		23			8	5	41	4	57	"	23	3	"	"	
		24	yellow-green micaceous clay; fine qtz; kaolinized rock		9	6	90	8	132	"	84	19	"	"	
		25			60	7	68	4	130	"	86	23	"	"	
		26	" " " " ; white-green chloritic limonitic kaolinized rock		1	8	89	1	102	"	120	20	"	"	
		27	brown " " " " " " " "		2	9	73	3	89	"	98	21	"	"	
		28			3	60	52	1	61	"	74	15	"	"	
		29	red-brown micaceous clay; haematitic chloritic kaolinized rock		4	1	63	3	90	"	77	17	"	"	
		30			5	2	65	4	82	"	80	17	"	"	
		31	weathered granite; yellow-white-green chlorite-kaolin-qtz rock		6	3	41	4	81	"	43	14	"	"	
		32			7	4	36	5	62	"	41	12	"	"	
		33	whitish qtz-feld bio f.g. gneiss.		8	5	20	3	50	"	29	11	"	"	

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET

— UNIVERSAL —

EXPLORATION DIVISION

0076

FIELD ENTRY

Date 16 - 1 - 81 Sampler / Driller

Area FRISCHKE'S #5 Machine [illegible]

Grid Priority (urgency)

For location see Map No or Air Photo No

LABORATORY

Order No. Sheet No

Project [illegible]

Cost Code 543 Date Desp. 23 - 1 - 81

Notes

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
36280 E	24900 N	34 m.	yellow to white qtz-feld-bio f.g. granite or gneiss BR.	<0·1	69	224166	17	1	[illegible]	<1	26	8	<5	<20	<10

All results in parts per million unless otherwise indicated

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION 0077

FIELD ENTRY

Date 16-7-81 Sampler / Driller
Area HILL'S Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project C...RA
Cost Code 543 Date Desp. 23-7-81
Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Al_2O_3%	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
80380E	14920N	6m	kunkas; orange clayey sand			70	224167	12	26	41	<1	14	5	<5	<20	
		8	haematite-limonite; yellow to pale grey clay			1	8	7	1	6	"	3	3	"	"	
		10				2	9	6	1	4	"	1	2	"	"	
		12				3	70	2	1	3	"	1	1	"	"	
		14	pale grey to orange siliceous sandy clay			4	1	1	1	3	"	1	1	"	"	
		16				5	2	1	1	3	"	1	1	"	"	
		18	white clayey sand			6	3	2	1	3	"	1	1	"	"	
		20			<0.1	7	4	1	1	3	"	1	1	"	"	<10
		22			"	8	5	3	1	2	"	1	1	"	"	"
		24	white kaolin-qtz	17.80		9	6	2	1	2	"	1	1	"	"	
		26		31.90		80	7	1	3	1	"	1	1	"	"	
		28		30.20		1	8	1	5	1	"	1	1	"	"	
		30		36.10		2	9	1	1	1	"	1	1	"	"	
		31		21.90		3	80	3	4	1	"	1	1	"	"	
		32		23.30		4	1	2	9	4	"	1	1	"	"	
		33		26.40		5	2	1	1	3	"	1	1	"	"	
		34	buff kaolin-qtz			6	3	1	1	2	"	1	1	"	"	
		35				7	4	3	1	2	"	1	1	"	"	
		36				8	5	5	5	3	"	1	1	"	"	
		37				9	6	4	3	3	"	1	1	"	"	
		38				90	7	2	2	3	"	1	1	"	"	
		39				1	8	1	1	1	"	1	1	"	"	
		40				2	9	3	3	1	"	1	1	"	"	
		41				3	90	3	4	1	"	1	1	"	"	
SAMPLE TYPE / HOLE No: PERCUSSION SPLES.				Check Sample		4	No3 Sn 800	136	209	130	4	156	142	250	825	

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** **EXPLORATION DIVISION**

— UNIVERSAL —

0076

FIELD ENTRY

Date 16-7-81 Sampler / Driller

Area HILL'S Machine ROTAMAC

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No

Project [illegible]

Cost Code 543 Date Desp. 23-7-81

Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/ Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
BLANK	—	—			1	BLANK	<	—	—	—	—	—	—	—	
20530E	14920N	42m			2	224191	2	12	1	<1	1	1	<5	<20	
		43			3	2	1	10	1	"	1	1	"	"	
		44			4	3	9	4	2	"	1	1	"	"	
		45	buff-pink ~~kao~~ kaolin-qtz + ?qtz-feld rock		5	4	5	8	1	"	1	1	"	"	
		46			6	5	4	5	1	"	1	1	"	"	
		47			7	6	6	8	1	"	1	1	"	"	
		48			8	7	3	10	1	"	1	1	"	"	
		49			9	8	3	8	2	"	1	1	"	"	
		50			10	9	1	8	4	"	1	1	"	"	
		51			1	200	52	3	4	"	2	4	"	"	
		52			2	1	13	3	6	"	16	37	"	"	
		53	green-grey kaolinized feldspar-qtz rock; grey feldspar frags.		3	2	9	4	11	"	11	26	"	"	
		54			4	3	9	3	20	"	32	54	"	"	
		55			5	4	9	4	53	"	37	67	"	"	
		56			6	5	12	6	90	"	13	18	"	"	
		57	blue-green micaceous clay; qtz + grey feldspar frags.		7	6	11	8	83	"	17	31	"	"	
		58			8	7	11	6	90	"	14	15	"	"	
		59	blue-green micaceous clay + kaolinized chloritic rock; qtz + feld frags		9	8	10	5	85	"	15	17	"	"	
		60			20	9	8	7	34	"	9	12	"	"	
		61	green-grey clay; chloritic rock; qtz, feld, pyrite fragments.		1	10	6	5	32	"	8	10	"	"	
		62			2	1	8	6	45	"	11	12	"	"	
		63			3	2	8	6	42	"	9	11	"	"	
	N.B. WASHED SPL.	64	pale grey feld + qtz; green chloritic rock; pyrite B.R.	<0.1	4	3	10	7	60	"	14	20	"	"	<10
				Check Sample	5	No 4 Sn 800	200	296	198	5	236	213	330	820	

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION**

0079

FIELD ENTRY

Date 27-7-81 Sampler / Driller
Area MEANEY'S #1 Machine ROTAMEC
Grid Priority (urgency)
For location see Map No or Air Photo No

LABORATORY

Order No Sheet No
Project COOTRA
Cost Code 543 Date Desp. 5-8-81
Notes

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
BLANK.	———				1	BLANK.	—	—	—	—	—	—	—	—	
76920 E	15620 N	6 m	loose orange clayey sand.		2	224 214	9	19	9	<1	7	13	<5	<20	
		8			3	5	4	1	5	"	5	4	"	"	
		10	loose buff sand.		4	6	1	1	3	"	3	2	"	"	
		12			5	7	3	1	5	"	4	3	"	"	
		14	orange - buff sandy clay.		6	8	3	1	4	"	2	2	"	"	
		16			7	9	2	1	4	"	4	2	"	"	
		18	buff sand + clay; limonite		8	20	2	1	2	"	3	1	"	"	
		20			9	1	1	1	2	"	2	1	"	"	
		22	yellow brown Kaolin WB?		10	2	10	1	2	"	1	1	"	"	
		24	buff Kaolin		1	3	1	1	1	"	1	1	"	"	
		26			2	4	1	1	1	"	3	1	"	"	
		28			3	5	1	5	1	"	2	1	"	"	
		30	white Kaolin - qtz W.B.		4	6	1	2	1	"	2	1	"	"	
		32			5	7	1	2	1	"	2	1	"	"	
		34			6	8	1	12	1	"	3	1	"	"	
		36	pale grey Kaolinized rock.		7	9	1	4	1	"	2	1	"	"	
		38			8	30	170	11	2	"	4	1	"	"	
		40			9	1	13	4	2	"	6	1	"	"	
		42			20	2	12	4	2	"	14	6	"	"	
		43			1	3	20	4	1	"	23	24	"	"	
		44			2	4	10	8	1	"	6	4	"	"	
		45			3	5	13	2	36	"	8	3	"	"	
		46	pale grey Kaolinized rock with pyrite		4	6	12	1	10	"	25	12	"	"	
SAMPLE TYPE / HOLE No: PERCUSSION SPLES.					5	Check Sample No 3 Sn100	140	205	130	4	150	150	250	105	

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION 0080

FIELD ENTRY

Date 27-7-81 Sampler / Driller
Area MEANEY'S #1 Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project COOTRA
Cost Code 543 Date Desp. 5-8-81
Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
76920E	15620N	47m			26	224237	45	8	23	<1	23	7	<5	<20	
		48			7	8	27	10	58	"	43	7	"	"	
		49	pale grey Kaolinized rock; qtz; pyrite.		8	9	38	5	35	"	17	6	"	"	
		50			9	40	43	5	43	"	24	10	"	"	
		51			30	1	54	10	79	"	32	14	"	"	
		52	pale grey siliceous - sericitic rock; abundant pyrite.		1	2	50	7	62	"	28	12	"	"	
		53			2	3	47	7	68	"	16	6	"	"	
		54	grey-buff weathered ? sericitic rock.		3	4	46	2	68	"	10	3	"	"	
		55			4	5	83	6	31	"	77	31	"	"	
		56			5	6	89	5	46	"	72	29	"	"	
		57	weathered siliceous ? sericite rock.		6	7	35	1	27	"	43	16	"	"	
		58			7	8	19	3	20	"	21	7	"	"	
		59	" " " " with pyrite.		8	9	9	2	20	"	16	6	"	"	
		60	Kaolinized ? sericitic rock; pyrite WB.	<0.1	9	50	8	4	19	"	16	6	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION SPLES.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION

0081

FIELD ENTRY

Date 28-7-81 Sampler / Driller

Area WINTER'S #1 Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 5A3 Date Desp. 5-8-81

Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
752006	16800N	2	Sandy Kunkar.		10	224251	13	5	14	<1	12	10	<5	<20	
		4			1	2	12	3	7	"	6	11	"	"	
		6	red haematitic pale grey clay.		2	3	20	1	17	"	4	4	"	"	
		8			3	4	39	3	22	"	7	4	"	"	
		10	WB? red-purple haematitic Kaolin		4	5	53	1	27	"	11	5	"	"	
		12	haematitic limonitic Kaolinized rock.		5	6	55	1	35	"	15	4	"	"	
		14			6	7	53	1	31	"	11	4	"	"	
		16			7	8	68	1	62	"	17	5	"	"	
		17	buff-yellow Kaolin		8	9	57	1	30	"	5	4	"	"	
		18	WB. Iron-stained black speckled whitish Kaolinized rock, amphibolite	<0.1	9	60	31	4	30	"	7	6	"	"	<10
			Check Sample		50	No4,500Sn									

SAMPLE TYPE / HOLE No: PERCUSSION SAMPLES.

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** —UNIVERSAL— EXPLORATION DIVISION 0082

FIELD ENTRY

Date 28-7-81 Sampler / Driller
Area "CO-1" Machine Rotamec
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project Cootra
Cost Code 5.2 Date Desp. 5-8-81
Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
Co 1		2	Kunkar & Sand		51	224261	3	3	10	<1	5	4	<1	<20	
		4	loose orange clayey Sand.		2	2	2	3	7	"	1	4	"	"	
		6	orange clayey Sand, limonite		3	3	2	1	5	"	1	3	"	"	
		8	W.B. White Kaolin - qz.		4	4	1	1	5	"	1	1	"	"	
		10			5	5	1	1	3	"	1	2	"	"	
		12			6	6	1	1	3	"	1	1	"	"	
		14			7	7	1	1	9	"	1	1	"	"	
		16			8	8	1	1	3	"	1	1	"	"	
		18			9	9	1	1	5	"	1	1	"	"	
		20			60	70	1	1	4	"	1	1	"	"	
		22			1	1	1	1	5	"	1	1	"	"	
		24			2	2	1	3	6	"	1	1	"	"	
		26			3	3	1	6	12	"	1	1	"	"	
		28	buff to grey Kaolin, qz. and Kaolinized rock		4	4	10	1	28	"	8	5	"	"	
		30	f.g. Weathered granite		5	5	8	1	32	"	10	7	"	"	
		31			6	6	16	1	40	"	11	7	"	"	
		32			7	7	10	3	46	"	8	5	"	"	
		33			8	8	14	1	34	"	10	5	"	"	
		34	f.g. orange to whitish qz. feldspar-biotite granite	<0.1	9	9	15	1	46	"	13	7	"	"	<10

SAMPLE TYPE / HOLE No: Percussion Samples. Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION**

FIELD ENTRY

Date 28-7-81 ... Sampler / Driller ...
Area "A-138" ... Machine Rotamec
Grid ... Priority (urgency) ...
For location see Map No. ... or Air Photo No ...

LABORATORY

Order No ... Sheet No ...
Project Coatra
Cost Code 543 ... Date Desp. 5.8.81
Notes ...

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
7595○E	19000N	2	Brown Sand, Kunkar.		70	224280	6	1	11	<1	5	3	<5	<20	
		3	Br. yellow-white qtz feldspar-biotite granite or ~~gneiss~~ gneiss		1	1	22	"	36	"	15	11	"	"	
		4			2	2	41	"	58	"	22	14	"	"	
		5			3	3	38	"	61	"	25	15	"	"	
		6	qtz-feldspar-biotite-muscovite gneiss & schist		4	4	29	"	58	"	24	14	"	"	
		7			75	5	29	"	71	"	26	15	"	"	
		8			6	86	32	25	64	"	24	13	"	"	
Check Sample					77	No 5, 800 Sn	275	403	256	7	280	287	280	805	
		9			8	87	28	4	58	<1	25	14	<5	<20	
		10			9	8	48	5	67	1	26	16	"	"	
		11	Br. grey to buff qtz-feldspar-biotite-garnet-gneiss & schist	<0.1	80	89	25	1	58	<1	21	15	"	"	<10

SAMPLE TYPE / HOLE No: Percussion Samples.

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION 0084

FIELD ENTRY

Date 28-7-81 Sampler / Driller
Area MAYS #1 Machine Rotamec
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project Coorra
Cost Code 543 Date Desp. 5-8-81
Notes

Co-ordinates/or From	To	Interval/ Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
72700E	23650N	2	Calc clay.		81	224290	5	3	12	<1	7	4	<5	<20	
	MAYS	4			2	1	1	2	9	"	2	5	"	"	
		6	orange clayey sand.		3	2	1	1	8	"	1	3	"	"	
		8	red-brown haematite - limonite; orange sandy clay.		4	3	2	1	8	"	1	3	"	"	
		10			5	4	1	1	5	"	1	1	"	"	
		12	red & buff haematitic clay; haematite pebbles.		6	5	1	1	3	"	1	1	"	"	
		14			7	6	1	1	3	"	1	1	"	"	
		16			8	7	1	1	3	"	1	1	"	"	
		18			9	8	1	4	2	"	1	1	"	"	
		20	buff-red haematitic kaolin, haematite. WB?		90	9	1	1	4	"	1	1	"	"	
		22			1	300	15	1	4	"	1	1	"	"	
		24	brown-red-buff haematitic limonitic kaolin WB.		2	1	26	1	4	"	4	8	"	"	
		26			3	2	42	2	7	"	5	8	"	"	
		28	buff-red kaolinized rock.		4	3	6	1	4	"	1	2	"	"	
		30			5	4	6	1	4	"	1	1	"	"	
		32			6	5	15	1	4	"	1	3	"	"	
		34	buff-kaolin; qz. weathered brown, mica-rich rock		7	6	29	4	7	"	6	5	"	"	
		36			8	7	18	1	4	"	1	3	"	"	
		38	red micaceous clay. qz.		9	308	11	16	6	"	1	2	"	"	
Check	Sample				100	No 6, 1100 Sn	12	6	10	<1	4	4	<5	100	

SAMPLE TYPE / HOLE No: Percussion Samples.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION**

FIELD ENTRY

Date: 28-7-81
Sampler / Driller:
Area: MAY'S #1
Machine: ROTAMIC
Grid:
Priority (urgency):
For location see Map No.:
or Air Photo No.:

LABORATORY

Order No.:
Sheet No.:
Project: COOTRA
Cost Code: 543
Date Desp.: 5-8-81
Notes:

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
BLANK	—	—			1	BLANK	—	—	—	—	—	—	—	—	
	MAYS	39			2	224309	32	11	32	<1	13	5	<5	<20	
		40	Wer. brown micaceous clay, weathered schist		3	10	80	8	62	"	44	12	"	"	
		41			4	"	15	4	36	"	10	6	"	"	
		42			5	2	54	7	62	"	36	14	"	"	
		43	green amphibolite; pale qtz. feldspar rock.	<0.1	6	3	40	2	42	"	38	17	"	"	<10

SAMPLE TYPE / HOLE No: Percussion Samples

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** EXPLORATION DIVISION

— UNIVERSAL —

FIELD ENTRY

Date 28-7-81 Sampler / Driller

Area HEATH'S Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 543 Date Desp. 5-8-81

Notes.

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Al_2O_3%	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
708806	23225N	2	Kunkar. orange base Sand.			7	224314	6	3	30	<1	7	3	<5	<20	
	Heaths	4	↓			8	5	3	3	45	"	7	3	"	"	
		6				9	6	5	4	6	"	5	7	"	"	
		8				10	7	6	8	4	"	4	5	"	"	
		10				1	8	2	1	6	"	1	1	"	"	
		12				2	9	8	1	7	"	3	1	"	"	
		14	haematite - limonite, brown silt			3	20	6	7	4	"	1	2	"	"	
		16	brown buff limonitic clay.			4	1	6	1	3	"	1	1	"	"	
		18	red & White Sandy clay.			5	2	5	2	4	"	2	1	"	"	
		20	WB. buff Kaolinized rock with qtz & Graphite	29.10		6	3	10	4	3	"	1	1	"	"	
		22		32.10		7	24A	13	3	8	"	1	1	"	"	
		24		34.80		8	24	6	2	4	"	1	2	"	"	
		26		25.20		9	5	15	3	4	"	4	2	"	"	
		28	buff Kaolin	25.60		20	6	7	16	3	"	1	2	"	"	
		30		18.40		1	7	7	13	10	"	1	3	"	"	
		32	buff - Kaolin, Coarse Angular qtz.	18.80		2	8	7	19	4	"	1	5	"	"	
		34		20.60		3	9	34	69	12	"	4	6	"	"	
		36	yellow Kaolinized rock with Weathered Mica & graphite			4	330	96	55	34	"	23	5	"	"	
Check Sample						25	No 7, 100Sn	84	119	66	2	88	86	178	104	

SAMPLE TYPE / HOLE No: Percussion Samples

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** EXPLORATION DIVISION 0087

— UNIVERSAL —

FIELD ENTRY

Date 28-7-81 Sampler / Driller

Area HEATH'S Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 542 Date Desp. 5-8-81

Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
	Heaths	38			26	224331	54	52	40	<1	38	7	<5	<20	
		40			7	2	47	30	19	"	78	17	"	"	
		42	buff brown Kaolinized rock with Weathered mica		8	3	52	47	55	"	37	9	"	"	
		43			9	4	66	67	70	"	39	8	"	"	
		44			30	5	76	39	37	"	24	6	"	"	
		45			1	6	60	44	53	"	12	3	"	"	
		46			2	7	35	34	31	"	12	4	"	"	
		47	buff-white Kaolinized rock.		3	8	13	72	12	"	4	2	"	"	
		48			4	9	28	30	28	"	10	3	"	"	
		49			5	40	47	54	80	"	23	9	"	"	
		50	greenish & white streaky Weathered rock		6	1	48	62	94	"	20	11	"	"	
		51	WB Whitish kaolin-qtz (granite?) with graphite		7	2	40	45	104	"	20	12	"	"	
		52			8	3	37	48	73	"	18	9	"	"	
		53	greenish brown Kaolinized rock.		9	4	97	52	400	"	98	51	"	"	
		54	Weathered brown schist & white granite (calc-silicate)		40	5	70	64	240	"	54	25	"	"	
		55	Massive f.g. green Chloritic Weathered rock		1	6	100	66	217	"	48	24	"	"	
		56			2	7	125	89	213	"	46	24	"	"	
		57	Ditto with graphite		3	8	71	135	110	"	31	16	"	"	
		58			4	9	57	46	117	"	38	18	"	"	
		59	Weathered green chloritic schist		5	50	60	69	128	"	35	19	"	"	
		60	WB " " " "	<0.1	6	1	67	55	108	"	32	17	"	"	<10

SAMPLE TYPE / HOLE No: Percussion Samples.

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** EXPLORATION DIVISION

— UNIVERSAL —

0086

FIELD ENTRY

Date 4-8-81 Sampler / Driller

Area HEATH'S Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No

Project COOTRA

Cost Code 543 Date Desp. 4-8-81

Notes.

Co-ordinates/or From	To	Interval/ Depth	Geological description of sample
BLANK.	———		
7080E	23225N	53m	greenish brown Kaolinized rock.
	HEATHS.	54	weathered brown schist + white granite.
		55	massive f.g. green chloritic weathered rock (calc-silicate).
		56	
		57	DITTO with graphite
		58	
		59	
		60	Weathered green chloritic schist WB.
CHECK	SAMPLE.		" " "
			PLEASE NOTE :— re assayed from bulk samples (calico bags)

All results in parts per million unless otherwise indicated

Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo		
1	BLANK	—	—	—	—	—	—	—		
2	224344	49	30	245	<1	51	27	<5		
3	5	44	49	147	"	36	17	"		
4	6	132	48	297	"	53	28	"		
5	7	118	56	203	"	39	21	"		
6	8	48	61	79	"	25	11	"		
7	9	45	29	103	"	23	14	"		
8	50	50	47	111	"	26	14	"		
9	1	64	50	107	"	27	15	"		
10	No10	272	320	269	6	239	249	330		

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION 0089.

FIELD ENTRY

Date 28-7-81 Sampler / Driller

Area MAY'S #2 Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 543 Date Desp. 5-8-81

Notes.

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
71380E	19780N	6	Kunkar		47	224352	9	8	8	<1	9	5	<5	<20	
		8	Orange clayey Sand.		8	3	9	6	8	"	6	3	"	"	
		10	loose yellow sand.		9	4	6	1	4	"	3	4	"	"	
Check	Sample	[illegible]			50	No 8, 500Sn	152	221	126	4	161	155	230	512	
		12			1	55	2	1	1	<1	1	2	<5	<20	
		14			2	6	1	1	1	"	3	3	"	"	
		16	brown to buff siliceous clay.		3	7	6	2	2	"	3	3	"	"	
		18			4	8	6	3	2	"	1	3	"	"	
		20			5	9	13	3	3	"	1	1	"	"	
		22	buff-white siliceous sandy clay.		6	60	5	6	10	"	3	3	"	"	
		24	WS? white kaolin		7	1	1	4	1	"	1	1	"	"	
		26			8	2	1	12	1	"	1	1	"	"	
		28			9	3	1	7	1	"	1	1	"	"	
		30			60	4	1	6	1	"	1	1	"	"	
		32	buff Kaolin, qtz		1	5	12	4	3	"	1	1	"	"	
		34			2	6	5	5	2	"	1	1	"	"	
		36			3	7	9	9	1	"	1	1	"	"	
		38			4	8	17	21	2	"	1	1	"	"	
		40	Grey Kaolin qtz.		5	9	98	28	2	"	2	1	"	"	
		42			6	70	19	16	2	"	1	1	"	"	
		44			7	1	12	19	4	"	10	9	"	"	
		45			8	2	5	14	26	"	15	13	"	"	
		46			9	3	5	11	24	"	15	13	"	"	
		47			70	4	9	14	21	"	10	9	"	"	
				Check Sample	71	No 9, 300Sn	219	312	185	6	232	215	320	782	

All results in parts per million unless otherwise indicated

SAMPLE TYPE / HOLE No: Percussion Samples.

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION

0090

FIELD ENTRY

Date 28-7-81 Sampler / Driller
Area MAY'S #2 Machine ROTAMEC
Grid Priority (urgency)
For location see Map No or Air Photo No

LABORATORY

Order No Sheet No
Project CONTRA
Cost Code 543 Date Desp. 5 : 8 : 81
Notes

All results in parts per million unless otherwise indicated

Co-ordinates/or From	Co-ordinates/or To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
71380E	67160N	48	WB grey green Kaolin, fine qtz	<0.1	72	224375	11	10	24	<1	13	11	<5	<20	<10

SAMPLE TYPE / HOLE No: Percussion Samples

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** —UNIVERSAL— **EXPLORATION DIVISION** 0091

FIELD ENTRY

Date 28-7-8 Sampler / Driller

Area MAY'S #3 Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No

Project COOTRA

Cost Code 543 Date Desp. 5-8-81

Notes.

Co-ordinates/or From	Co-ordinates/or To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
77750E	205804	2	Kunkar x Sand.		73	224376	4	1	4	<1	5	3	<5	<20	
		4			4	7	2	1	3	"	4	1	"	"	
		6			5	8	3	1	4	"	1	2	"	"	
		8			6	9	2	1	5	"	2	3	"	"	
		10	loose orange clayey Sand.		7	80	4	1	11	"	1	2	"	"	
		12	yellow clayey Sand.		8	1	3	1	13	"	1	3	"	"	
		13	Bx White qz-feldspar-biotite-pink garnet, granite (contaminated) gneiss	<0.1	9	82	7	1	19	"	5	4	"	"	<10

SAMPLE TYPE / HOLE No: Percussion ~~[illegible]~~ Samples.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET

— UNIVERSAL —

EXPLORATION DIVISION

0092

FIELD ENTRY

Date 28-1-81 Sampler / Driller

Area V'BOSCH'S #2 Machine ROTAMEC.

Grid Priority (urgency)

For location see Map No. or Air Photo No

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au
69600E	18350N	6	yellow - brown sandy clay.	
		8		
		10	reddish grey sandy flaky clay.	
		12		
		14	loose red-grey sand; grey clay + limonite cemented sandstone.	
		16		
		18	loose fine pale orange sand.	
		20		
		21	loose brown sand; charcoal N/BR.	<0.1

SAMPLE TYPE / HOLE No:

LABORATORY

Order No. Sheet No

Project COOTRA

Cost Code 543. Date Desp. 5-8-81

Notes.

All results in parts per million unless otherwise indicated

Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
80	224383.	9	1	3	<1	1	3	<5	<20	
1	4	8	1	3	"	1	3	"	"	
2	5	8	1	40	"	1	2	"	"	
3	6	9	1	4	"	1	1	"	"	
4	7	3	1	3	"	1	2	"	"	
5	8	2	1	1	"	1	1	"	"	
6	9	4	1	1	"	1	1	"	"	
7	90	4	1	1	"	1	1	"	"	
8	1	5	1	1	"	1	1	"	"	<10

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION

0093

FIELD ENTRY

Date 28 · 7 · 81 Sampler / Driller
Area V'BOSCH'S #1 Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No
Project COOTRA
Cost Code 543 Date Desp. 5 - 8 - 81
Notes

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
70580 E	16920 N	2	brown sandy clay.		89	224392	9	6	10	<1	6	7	<5	<20	
		4	orange & grey sandy clay.		90	3	5	1	4	"	1	2	"	"	
		6			1	4	7	1	5	"	1	2	"	"	
		8			2	5	7	1	6	"	1	1	"	"	
		10	white clayey fine sand.		3	6	2	1	3	"	1	1	"	"	
		12	orange & white fine loose sand.		4	7	1	1	2	"	1	1	"	"	
		13	red & white fine loose sand. N/BR.	<0·1	5	8	1	1	4	"	1	2	"	"	<10

SAMPLE TYPE / HOLE No:

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION 0094

FIELD ENTRY

Date 29-7-81 Sampler / Driller
Area "A-15" Machine Rotamec.
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No
Project Cootra
Cost Code 543 Date Desp. 5-8-81
Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
BLANK	—				1	BLANK.	—	—	—	—	—	—	—	—	
71750 E	17200 N	2 m	orange clayey sand.		2	224399	6	10	3	<1	1	5	<5	<20	
		4			3	400	3	5	3	"	1	3	"	"	
		6	grey-brown siliceous clay.		4	1	1	2	4	"	1	1	"	"	
		8			5	2	3	3	3	"	1	1	"	"	
		10	buff kaolin; haematite-limonite.		6	3	2	3	4	"	1	1	"	"	
		12	white kaolin w/B.		7	4	1	3	2	"	1	1	"	"	
		14			8	5	1	7	2	"	1	1	"	"	
		16			9	6	1	4	2	"	3	1	"	"	
		18	buff kaolin; qtz.		10	7	1	2	3	"	2	1	"	"	
		20			1	8	2	3	4	"	3	1	"	"	
		22			2	9	2	10	4	"	1	1	"	"	
		24			3	10	16	19	4	"	2	1	"	"	
		26	grey-brown kaolin qtz.		4	1	15	100	5	"	5	4	"	"	
		28	" " " " w/B.		5	2	22	58	8	"	17	30	"	"	
		29	↓ ↓ ↓	<0.1	6	3	12	29	3	"	10	13	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION

0095

FIELD ENTRY

Date 30-7-81 Sampler / Driller

Area MEANEY'S #2 Machine ROTAMEC.

Grid Priority (urgency)

For location see Map No or Air Photo No

LABORATORY

Order No Sheet No

Project COOTRA

Cost Code 543. Date Desp. 5-8-81

Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/ Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
71245 E	13200 N	4 m	yellow clayey sand.		17	224414	4	5	2	<1	1	4	<5	<20	
MEANEYS	2	6	yellow buff sandy clay.		8	5	5	2	3	"	1	2	"	"	
		8			9	6	7	10	3	"	1	2	"	"	
		10	loose dark red + buff fine sand.		20	7	1	1	2	"	1	1	"	"	
		12			1	8	1	2	2	"	2	1	"	"	
		13	loose buff + red fine sand N/BR.	<0·1	2	9	1	2	4	"	1	1	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION

0096

FIELD ENTRY

Date 30-1-81 Sampler / Driller
Area MEANEY'S #4 Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project COOTRA
Cost Code 543 Date Desp. 5-8-81
Notes.

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
71470 E	14600 N	4 m	orange clayey sand.		23	274420	6	19	5	<1	1	44	<5	<20	
MEANEYS	4	6			4	1	3	12	3	"	1	4	"	"	
CHECK	SAMPLE.				5	No 1 Sn 100	11	8	8	<1	5	4	<5	98	
		8			6	2	3	1	1	"	2	2	"	<20	
		10	grey-brown-yellow iron stained clay		7	3	8	1	2	"	3	2	"	"	
		12	pale orange loose + clayey sand.		8	4	2	1	1	"	2	2	"	"	
		14	loose angular poorly sorted sand; red clay-silica cemented sandstone		9	5	1	1	1	"	2	3	"	"	
		16	loose fine orange sand.		30	6	1	1	1	"	2	2	"	"	
		18	loose poorly sorted brown sand.		1	7	1	4	1	"	1	1	"	"	
		20			2	8	3	2	2	"	1	1	"	"	
		22	pale brown silty Kaolin WB?		3	9	4	5	2	"	1	1	"	"	
		24			4	30	1	2	1	"	1	1	"	"	
		26			5	1	1	7	2	"	1	1	"	"	
		28			6	2	1	8	3	"	1	1	"	"	
		30	buff brown silty clay: fine angular qtz WB?	<0·1	7	3	1	21	3	"	2	1	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION

0097

FIELD ENTRY

Date 30-7-81 Sampler / Driller
Area MEANEY'S #1 Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No
Project COOTRA
Cost Code 543 Date Desp. 5-8-81
Notes

All results in parts per million unless otherwise indicated

Co-ordinates From	Co-ordinates To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
76820 E	15520 N	6 m	yellow clayey sand; kunkar.		38	224434	1	7	5	<1	2	2	<5	<20	
		8			9	5	5	12	5	"	6	9	"	"	
		10	orange clayey sand.		40	6	5	7	9	"	2	4	"	"	
		12			1	7	1	1	4	"	1	1	"	"	
		14			2	8	4	1	4	"	2	2	"	"	
		16	yellow - orange sandy clay.		3	9	7	3	6	"	1	3	"	"	
		18	buff brown sandy clay.		4	40	5	3	6	"	1	1	"	"	
		20			5	1	6	1	5	"	1	1	"	"	
		21	buff sandy Kaolin.		6	2	7	1	1	"	2	1	"	"	
		22	pale angular poorly sorted sand; pale grey sandy clay.		7	3	3	1	2	"	4	2	"	"	
		23	brown gritty silt; yellow brown limonite		8	4	3	1	2	"	1	1	"	"	
		24	red + white iron stained Kaolin; limonite WB?		9	5	6	4	2	"	1	1	"	"	
		25	white + red Kaolin-qtz.		50	6	1	3	1	"	1	1	"	"	
		26			1	7	1	3	2	"	1	1	"	"	
		27			2	8	1	7	1	"	2	1	"	"	
		28			3	9	1	5	1	"	2	2	"	"	
		29			4	50	1	3	1	"	1	1	"	"	
		30			5	1	1	8	2	"	2	1	"	"	
		31	limonite stained white Kaolin-qtz (pyritic?)		6	2	1	7	2	"	1	1	"	"	
		32			7	3	1	15	3	"	1	1	"	"	
		33	buff Kaolin -qtz		8	4	12	18	3	"	1	1	"	"	
		34			9	5	2	10	3	"	1	1	"	"	
		35			60	6	22	19	5	"	2	1	"	"	
		36			1	7	3	13	6	"	1	1	"	"	

SAMPLE TYPE / HOLE No: PERCUSSION

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION

0096

FIELD ENTRY

Date 30-7-81 Sampler / Driller

Area MEANEY'S #1 Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 543. Date Desp. 5-8-81

Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/ Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
76820 E	15520 N	37 m	buff to grey Kaolin.		62	224 458	250	15	4	<1	1	2	<5	<20	
		38	buff-grey Kaolin with graphite grey-green soapy clay.		3	9	115	19	6	″	11	4	″	″	
		39			4	60	270	34	6	″	17	12	″	″	
		40			5	1	110	37	110	″	26	8	″	″	
		41			6	2	61	21	24	″	4	3	″	″	
		42	blue-green-grey ? sericitic clay; green grey soapy clay.		7	3	87	17	49	″	26	9	″	″	
		43			8	4	48	11	23	″	9	3	″	″	
		44	green-blue-grey clays.		9	5	41	14	29	″	24	6	″	″	
		45			70	6	57	9	42	″	30	5	″	″	
		46			1	7	61	12	26	″	11	2	″	″	
		47			2	8	48	10	22	″	7	4	″	″	
		48	greenish white to green weathered bedrock clay with w/B graphite	<0·1	3	9	53	8	24	″	8	5	″	″	<10
CHECK	SAMPLE.				4	No 2 Sn 500	73	105	66	2	78	76	140	510	

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION 0098

FIELD ENTRY

Date 30-7-81 Sampler / Driller
Area MEANEY'S #5 Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project COOTRA
Cost Code 543 Date Desp. 5-8-81
Notes.

All results in parts per million unless otherwise indicated

Co-ordinates From	Co-ordinates To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
74500E	15100N	2m	buff-brown sandy clay		75	224470	8	7	11	<1	1	4	<5	<20	
		4			6	1	4	2	4	"	1	2	"	"	
		6			7	2	3	1	2	"	1	1	"	"	
		8	red-brown to buff clayey sand.		8	3	1	1	1	"	1	1	"	"	
		10			9	4	1	1	1	"	1	1	"	"	
		12	buff Kaolin qtz WB.		80	5	1	1	1	"	1	1	"	"	
		14			1	6	1	29	3	"	3	1	"	"	
		16			2	7	1	15	3	"	1	1	"	"	
		18			3	8	9	26	4	"	1	1	"	"	
		20			4	9	1	12	2	"	1	2	"	"	
		22			5	80	22	53	5	"	1	3	"	"	
		24	pale brown Kaolin qtz.		6	1	30	29	8	"	3	7	"	"	
		26	grey-brown Kaolin		7	2	155	37	9	"	54	34	"	"	
		28			8	3	26	14	6	"	2	3	"	"	
		30			9	4	45	10	75	"	8	10	"	"	
		32			90	5	89	11	335	"	115	180	"	"	
		34	dark green soapy (weathered bedrock) clay.		1	6	55	10	92	"	89	78	"	"	
		35	buff to green-grey clay; qtz WBR.	<0.01	2	7	29	12	85	"	57	55	"	"	<10

SAMPLE TYPE / HOLE No:

Check Sample

0100

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** —UNIVERSAL— **EXPLORATION DIVISION**

FIELD ENTRY

Date 30-7-81 Sampler / Driller

Area "A-98-105" Machine ROTAMEC.

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No

Project COOTRA

Cost Code 543 Date Desp. 5-8-81

Notes.

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Al_2O_3 %	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
BLANK				—		1	BLANK.	—	—	—	—	—	—	—	—	
72120 E	18520 N	6m	white Kaolin-qtz WB.	32.20		2	224488	1	1	1	<1	1	1	<5	<20	
		8		35.80		3	9	1	1	1	"	1	1	"	"	
		10		32.80		4	90	1	1	1	"	1	1	"	"	
		12		32.90		5	1	1	1	1	"	1	1	"	"	
		14		35.80		6	2	1	1	1	"	1	1	"	"	
		16		31.90		7	3	1	1	1	"	1	1	"	"	
		18	zzm @ 32.13%	35.40		8	4	1	1	1	"	1	1	"	"	
		20		30.00		9	5	1	5	1	"	1	1	"	"	
		22		22.70		10	6	1	3	1	"	1	1	"	"	
		24		30.90		1	7	1	4	1	"	1	1	"	"	
		26	buff Kaolin qtz.	33.0		2	8	1	8	1	"	1	1	"	"	
		28		25.80		3	9	1	13	2	"	1	1	"	"	
		29		28.40		4	500	1	7	4	"	1	1	"	"	
		30		24.20		5	1	1	12	6	"	1	1	"	"	
		31	angular qtz + feldspar; buff Kaolin (granite).	22.90		6	2	2	9	7	"	2	1	"	"	
		32				7	3	1	4	6	"	2	1	"	"	
		33	pink-buff Kaolinized f.g. granite.			8	4	5	2	28	"	6	1	"	"	
		34				9	5	7	1	27	"	7	3	"	"	
		35	weathered f.g. buff-pink granite WB.		<0.1	20	6	5	1	30	"	5	4	"	"	<10

All results in parts per million unless otherwise indicated

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** EXPLORATION DIVISION 0101

—UNIVERSAL—

FIELD ENTRY

Date 30.1.81 Sampler / Driller

Area MURPHY'S Machine Rotamec.

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No.

Project Cootra

Cost Code 543 Date Desp. 5.8.81

Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
64660E	19680N	8 m	yellow brown sandy clay.		21	224507	5	7	6	<1	2	1	<5	<20	
		10	orange sandy clay N/BR.	<0.1	2	8	1	1	4	"	2	1	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

NORTH BROKEN HILL LIMITED   **ANALYTICAL REPORT SHEET** — UNIVERSAL —   EXPLORATION DIVISION

0102

FIELD ENTRY

Date 30-7-81 Sampler / Driller
Area MAY'S #4 Machine ROTAMEC
Grid Priority (urgency)
For location see Map No or Air Photo No

LABORATORY

Order No Sheet No
Project COOTRA
Cost Code 543. Date Desp. 5·8·81
Notes.

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
74050E	18350N	4m	Kunkar + calc clay		23	224509	6	8	13	<1	7	8	<5	<20	
		6	yellow clayey sand.		4	10	4	2	11	"	7	3	"	"	
CHECK	SAMPLE.				5	No 4 Sn1100	221	324	206	6	237	236	320	1025	
		8			6	1	2	1	6	<1	2	1	<5	<20	
		10			7	2	4	1	3	"	1	1	"	"	
		12	pale grey to red sandy siliceous clay.		8	3	4	1	3	"	1	1	"	"	
		14			9	4	6	1	4	"	1	1	"	"	
		16	red-brown haematite-limonite clay.		30	5	5	1	2	"	1	1	"	"	
		18	red haematite stained pale grey sandy siliceous clay.		1	6	2	1	2	"	1	1	"	"	
		20	pale yellow angular sand + Kaolin WB?		2	7	2	1	2	"	1	1	"	"	
		22	pale brown loose angular clayey sand.		3	8	1	4	1	"	1	1	"	"	
		24			4	9	5	9	1	"	1	1	"	"	
		26	buff silty Kaolin.		5	20	4	8	3	"	1	1	"	"	
		28	pink-white Kaolin; coarse angular qtz.		6	1	3	9	2	"	1	1	"	"	
		29			7	2	29	11	1	"	1	1	"	"	
		30	pale brown Kaolin; angular qtz WB.	<0.1	8	3	6	10	3	"	1	1	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION**

0105

FIELD ENTRY

Date: 30-1-81
Sampler / Driller:
Area: WINTER'S #2
Machine: ROTAMEC
Grid:
Priority (urgency):
For location see Map No.
or Air Photo No.

LABORATORY

Order No.
Sheet No.
Project: Cobra
Cost Code: 543
Date Desp.: 5-8-81
Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
78750E	16800N	2 m	calc. clay		39	224 524	3	3	10	<1	8	3	<5	<20	
		3			40	5	3	4	9	"	5	2	"	"	
		4	orange clayey sand.		1	6	6	2	7	"	2	1	"	"	
		5	[illegible] limonite-biotite microgranite opaline silica WB (contaminated)		2	7	22	2	14	"	6	4	"	"	
		6	B/R		3	8	21	10	18	"	17	7	"	"	
		7	microgranite + schist; coarse qtz feldspar + muscovite chips.		4	9	24	1	47	"	23	9	"	"	
		8			5	30	20	5	43	"	19	9	"	"	
		9	pale coarse granite; microgranite/schist.	<0·1	6	1	16	1	41	"	14	6	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET

— UNIVERSAL —

EXPLORATION DIVISION 010

FIELD ENTRY

Date 30.7.81 Sampler / Driller

Area BEINKE'S #2 Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 543 Date Desp. 5.8.81

Notes.

Co-ordinates/or From	To	Interval/ Depth	Geological description of sample	Al_2O_3%	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
								All results in parts per million unless otherwise indicated								
88500E	20480N	2m	orange clayey sand			47	224532	3	5	7	<1	7	4	<5	<20	
		4	" " " plus haematite - limonite.			8	3	6	1	7	"	1	1	"	"	
		6				9	4	1	3	4	"	1	1	"	"	
CHECK	SAMPLE	8				50	Nos Sn 100	274	395	256	7	265	284	230	105	
		8	pale grey siliceous sandy clay.			1	5	2	1	2	<1	1	1	<5	<20	
		10				2	6	2	1	2	"	1	1	"	"	
		12	pale gritty sand; limonite.			3	7	3	1	1	"	1	1	"	"	
		14	white Kaolin - qtz WB.	24.10		4	8	1	1	1	"	1	1	"	"	
		16		20.80		5	9	1	3	1	"	1	1	"	"	
		18		11.60		6	40	2	5	1	"	2	1	"	"	
		20		12.90		7	1	1	7	1	"	1	1	"	"	
		22		31.40		8	2	1	8	2	"	1	1	"	"	
		24		23.80		9	3	3	7	2	"	1	1	"	"	
		26	buff Kaolin; angular qtz.			60	4	1	9	3	"	1	1	"	"	
		28				1	5	1	11	3	"	1	1	"	"	
		30				2	6	1	12	3	"	1	1	"	"	
		32				3	7	1	20	2	"	1	1	"	"	
		34	coarse angular qtz + feldspar sand (granite) WB.		<0.1	4	8	3	22	18	"	3	1	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** —UNIVERSAL— EXPLORATION DIVISION 0105

FIELD ENTRY

Date 30-4-81 Sampler / Driller
Area FRISCHKE'S #6 Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.
Project COOTRA
Cost Code 543 Date Desp. 5-8-81
Notes

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mn	Sn	W
84100 E	24880 N	2	calc clay		65	224549	4	5	16	<1	10	6	<5	<20	
		4			6	50	4	4	6	"	6	9	"	"	
		6	brown clayey sand; limonite.		7	1	1	1	2	"	1	2	"	"	
		8	buff red siliceous Kaolin.		8	2	3	3	5	"	1	1	"	"	
		10	buff-yellow Kaolin WB.		9	3	2	3	1	"	1	1	"	"	
		12	buff Kaolin - qtz.		70	4	1	4	2	"	1	1	"	"	
		14			1	5	1	4	1	"	1	1	"	"	
		16			2	6	2	5	1	"	1	1	"	"	
		18			3	7	2	7	1	"	1	1	"	"	
		20	buff flaky Kaolin - qtz.		4	8	3	4	1	"	1	1	"	"	
CHECK	SAMPLE.				5	No 6 Sn 500	10	6	7	<1	5	4	<5	502	
		22			6	9	4	21	2	<1	1	1	<5	<20	
		24			7	60	8	45	3	"	2	1	"	"	
		26			8	1	12	44	5	"	3	1	"	"	
		27-28			9	2	16	5	5	"	1	2	"	"	
		30			80	3	13	17	8	"	2	2	"	"	
		32	brown-red-whitish Kaolin qtz.		1	4	24	6	14	"	5	1	"	"	
		34			2	5	88	15	46	"	14	8	"	"	
		36	brown clay.		3	6	116	7	18	"	6	6	"	"	
		38			4	7	25	5	26	"	8	5	"	"	
		40			5	8	59	5	33	"	13	6	"	"	
		42	brown clay; grey f.g. qtz-feld-mica-garnet rock		6	9	13	9	12	"	4	1	"	"	
		43			7	70	23	23	20	"	7	5	"	"	
		44			8	1	19	22	20	"	6	3	"	"	

All results in parts per million unless otherwise indicated

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET

—UNIVERSAL—

EXPLORATION DIVISION

0106

FIELD ENTRY

Date: 30-7-81
Sampler / Driller:
Area: FRISCHKE'S #6
Machine: ROTAMEC
Grid:
Priority (urgency):
For location see Map No.:
or Air Photo No:

LABORATORY

Order No.:
Sheet No:
Project: COOTRA
Cost Code: 543
Date Desp.: 5-8-81
Notes:

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
84100 E	34850 N	45 m			89	224572	25	2	29	<1	8	6	<5	<20	
		46			90	3	9	1	21	"	7	14	"	"	
		47			1	4	100	1	18	"	28	16	"	"	
		48	whitish qtz - feldspar - biotite - pink garnet - f.g. gneiss WB.	<0·1	2	5	54	1	72	"	75	32	"	"	<10

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION 0107

FIELD ENTRY

Date 20-7-81 Sampler / Driller

Area FRISCHKE'S #4 (RPT) Machine ROTAMEC

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 543 Date Desp. 5-8-81

Notes.

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
BLANK					1	BLANK.	–	–	–	–	–	–	–	–	
E4830E	22550N	2m	Kunkar.		2	224576	1	2	5	<1	2	7	<5	<20	
		4	yellow clayey sand		3	7	1	4	5	"	3	6	"	"	
		6			4	8	1	2	3	"	1	3	"	"	
		8	red haematitic pale grey sandy clay.		5	9	1	3	5	"	1	1	"	"	
		10			6	80	3	1	3	"	1	1	"	"	
		12			7	1	3	1	3	"	1	1	"	"	
		14	white Kaolin - qtz.	<0.1	8	2	1	1	1	"	1	1	"	"	<10

All results in parts per million unless otherwise indicated

SAMPLE TYPE / HOLE No: PERCUSSION

Check Sample

0100...

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION

FIELD ENTRY

Date 30-1-81 Sampler / Driller
Area Machine ROTAMEC
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No
Project COOTRA
Cost Code 543 Date Desp. 5-8-81
Notes

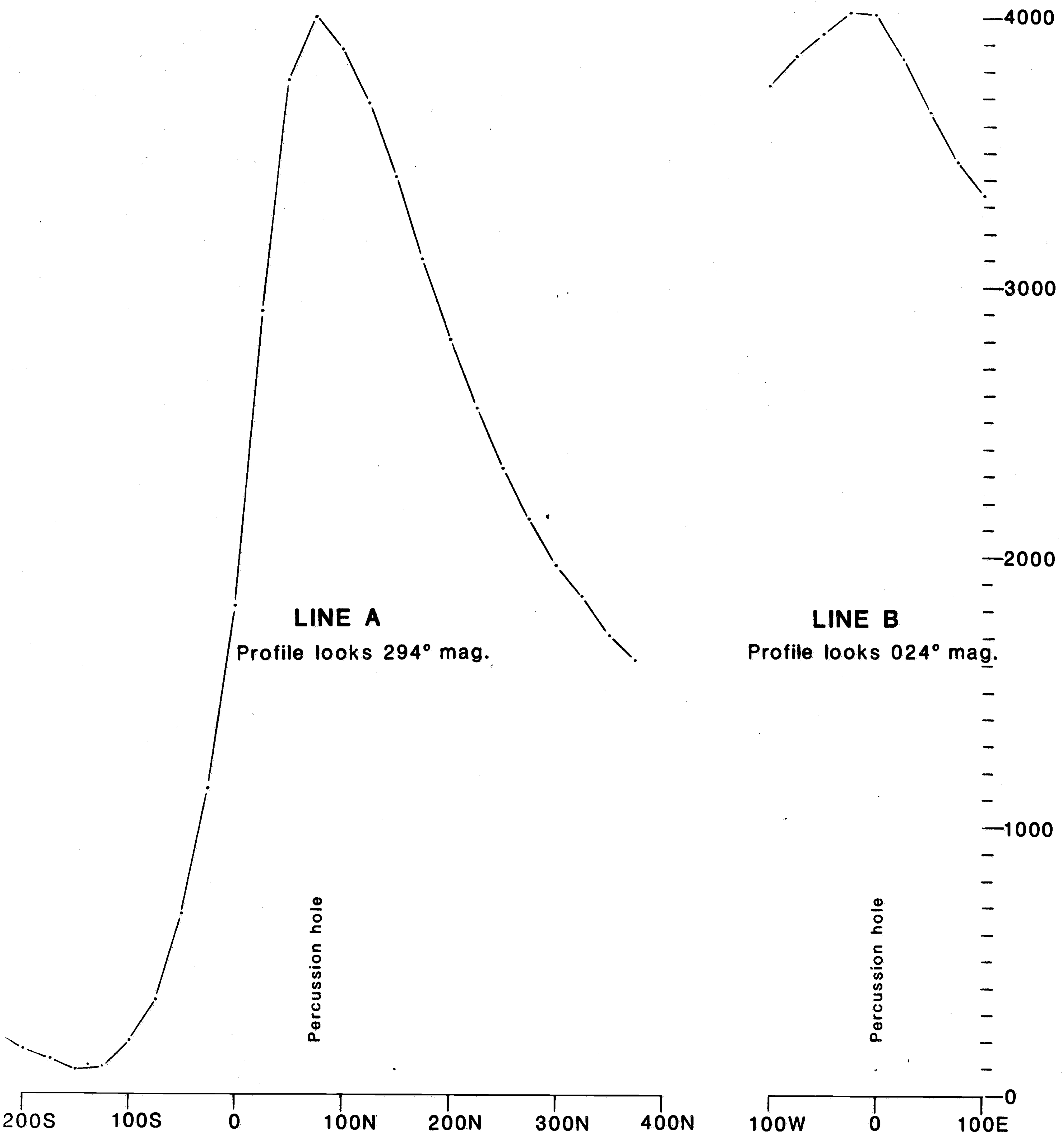
Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Au	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
							All results in parts per million unless otherwise indicated								
F.4	L.C	15	m.		9	214583	1	1	1	<1	1	1	<5	<20	
		16			10	4	1	1	1	"	1	1	"	"	
		17			1	5	1	1	1	"	2	1	"	"	
		18	..		2	6	1	1	1	"	1	1	"	"	
		19			3	7	1	1	1	"	1	1	"	"	
		20			4	8	1	1	1	"	1	1	"	"	
		21			5	9	1	1	2	"	1	1	"	"	
		22			6	90	2	6	6	"	1	3	"	"	
		23	grey-whitish f.g. qtz feldspar - biotite gneiss WB.		7	1	3	8	15	"	2	4	"	"	
		24			8	2	1	1	23	"	3	9	"	"	
		25			9	3	1	1	28	"	3	4	"	"	
		26			20	4	1	1	21	"	3	6	"	"	
		27			1	5	1	1	16	"	5	6	"	"	
		28	grey-white qtz - feld - biotite gneiss or granodiorite. WB	<0·1	2	6	1	1	20	"	6	7	"	"	<10
														94	1·2

SAMPLE TYPE / HOLE No: PERCUSSION.

Check Sample

GROUND MAGNETICS

May's No. 5	Profiles & Plan	Scale 1:5000
Winter's No. 3	Profiles & Plan	Scale 1:5000
Meaney's No. 7	Profile	Scale 1:5000
Meaney's No. 6	Profile	Scale 1:5000
Frischke's No. 4	Plan	Scale 1:5000
Heath's	Profile	Scale 1:5000
May's	Profile	Scale 1:5000
Hier's	Profile	Scale 1:5000
Cant's	Profile	Scale 1:5000
Cumming's No. 2	Profiles & Plan	Scale 1:5000
Meaney's No. 2	Profiles & Plan	Scale 1:5000
Meaney's No. 4	Profile	Scale 1:5000



MAY'S #5

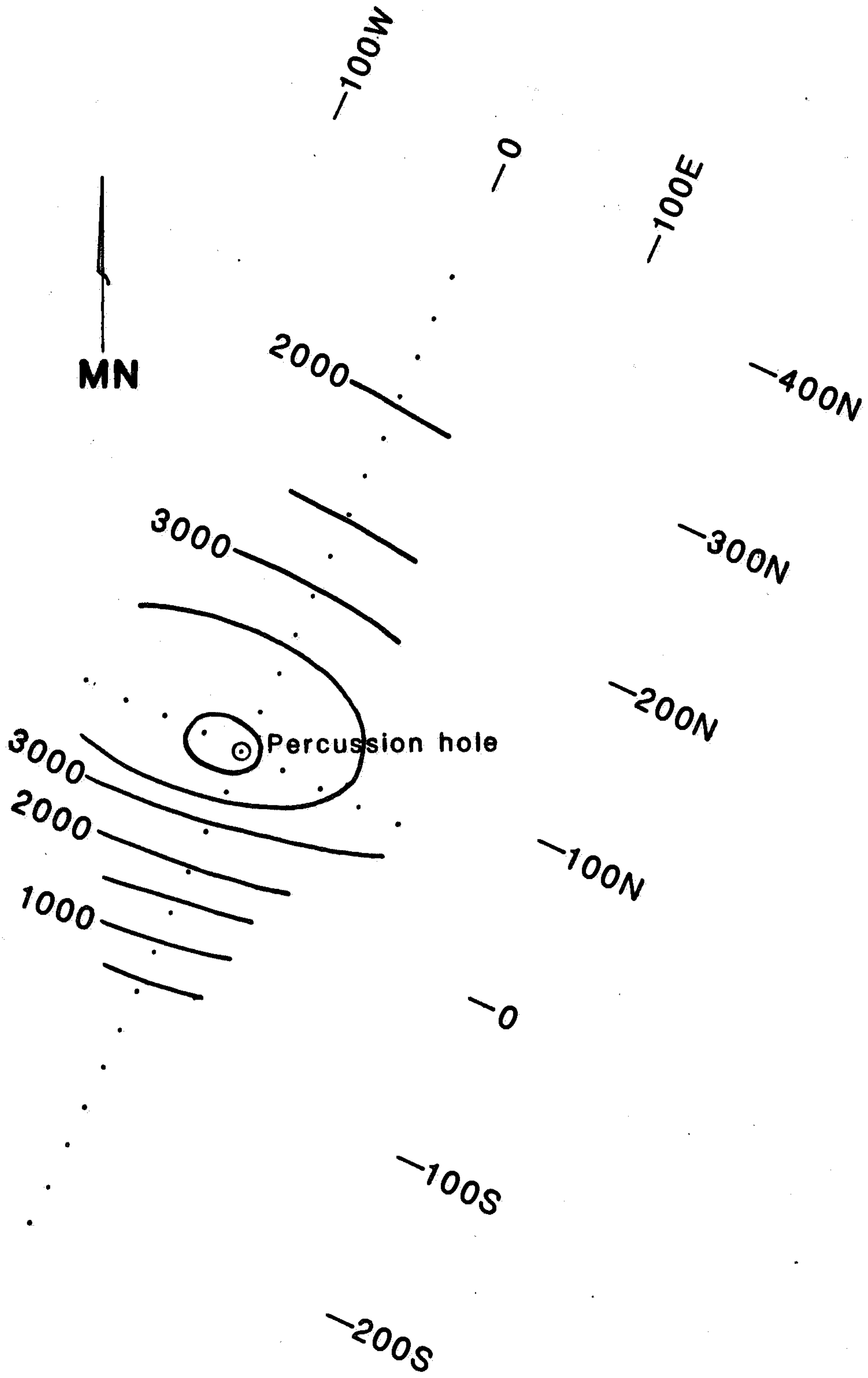
GROUND MAGNETICS

COOTRA AREA E.L.756, S.A.

NORTH BROKEN HILL LTD. / EXPLORATION DIVISION

SCALE 1:5000

DATE Sep. 1981



Contour interval 500 gammas

MAY'S #5

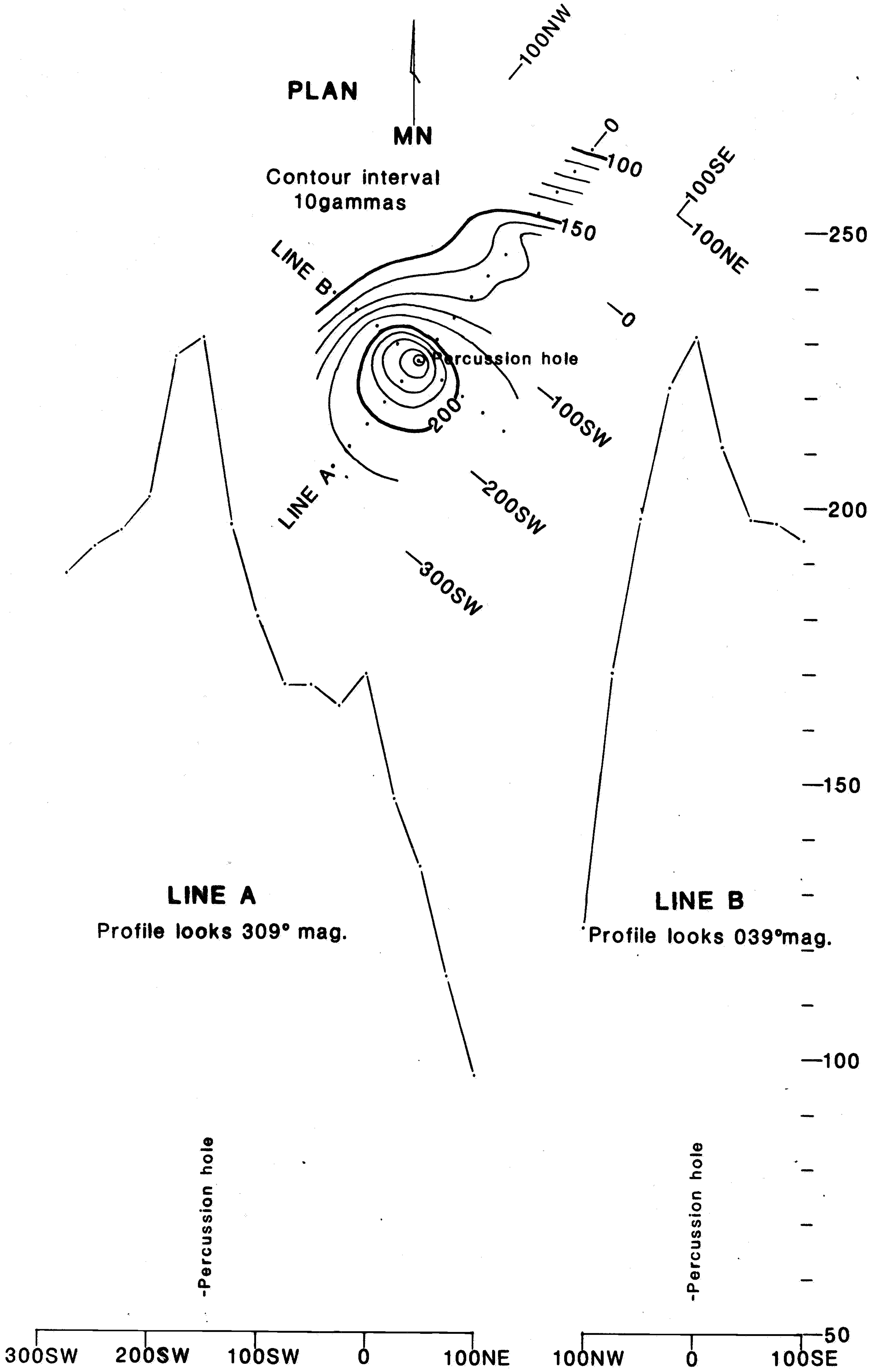
GROUND MAGNETICS

COOTRA AREA E.L.756, S.A.

NORTH BROKEN HILL LTD. / EXPLORATION DIVSION

SCALE 1:5000

DATE Sep. 1981



WINTER'S #3

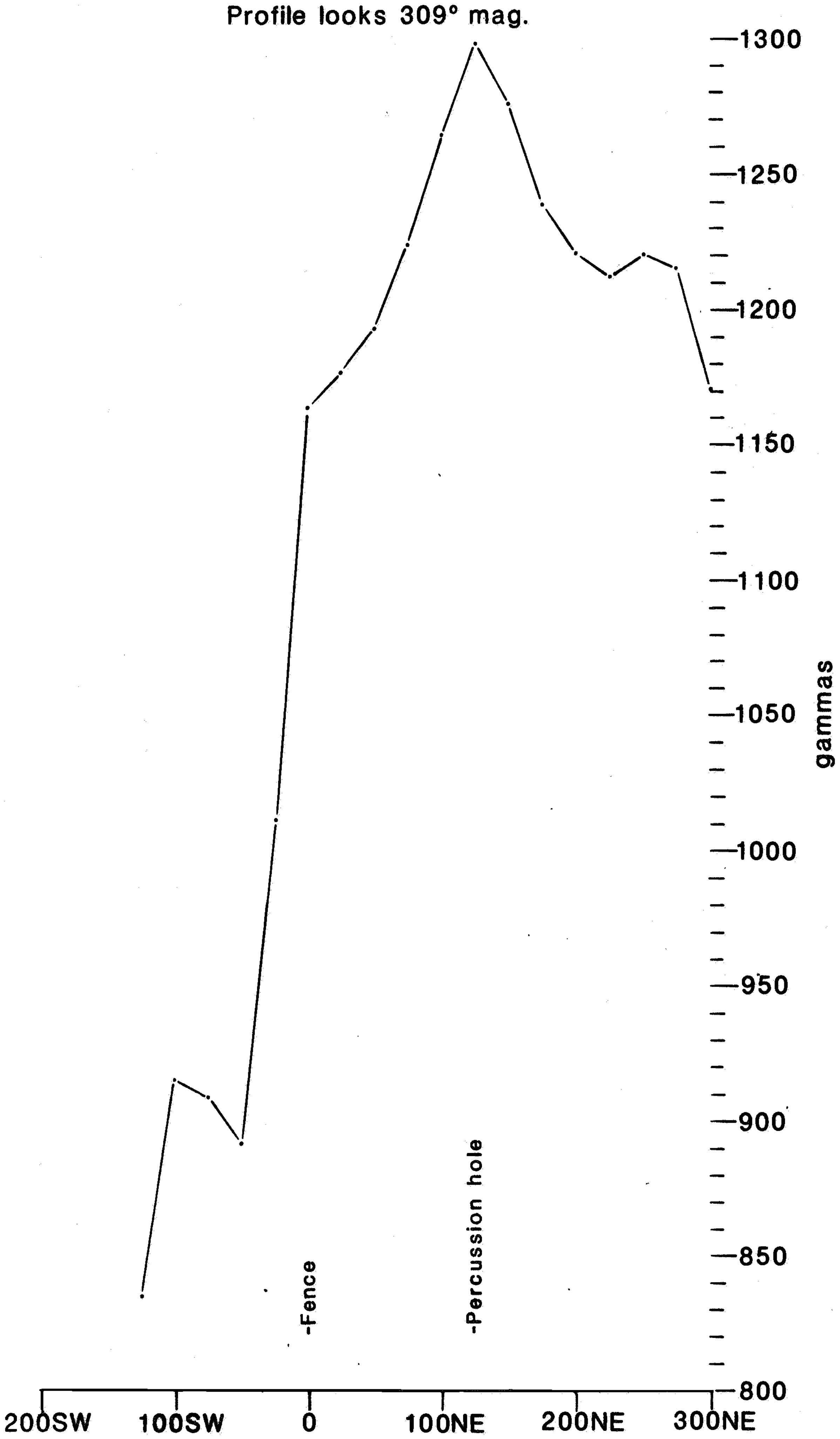
GROUND MAGNETICS

COOTRA AREA E.L.756, S.A.

NORTH BROKEN HILL LTD. / EXPLORATION DIVISION

SCALE 1:5000

DATE Sep. 1981



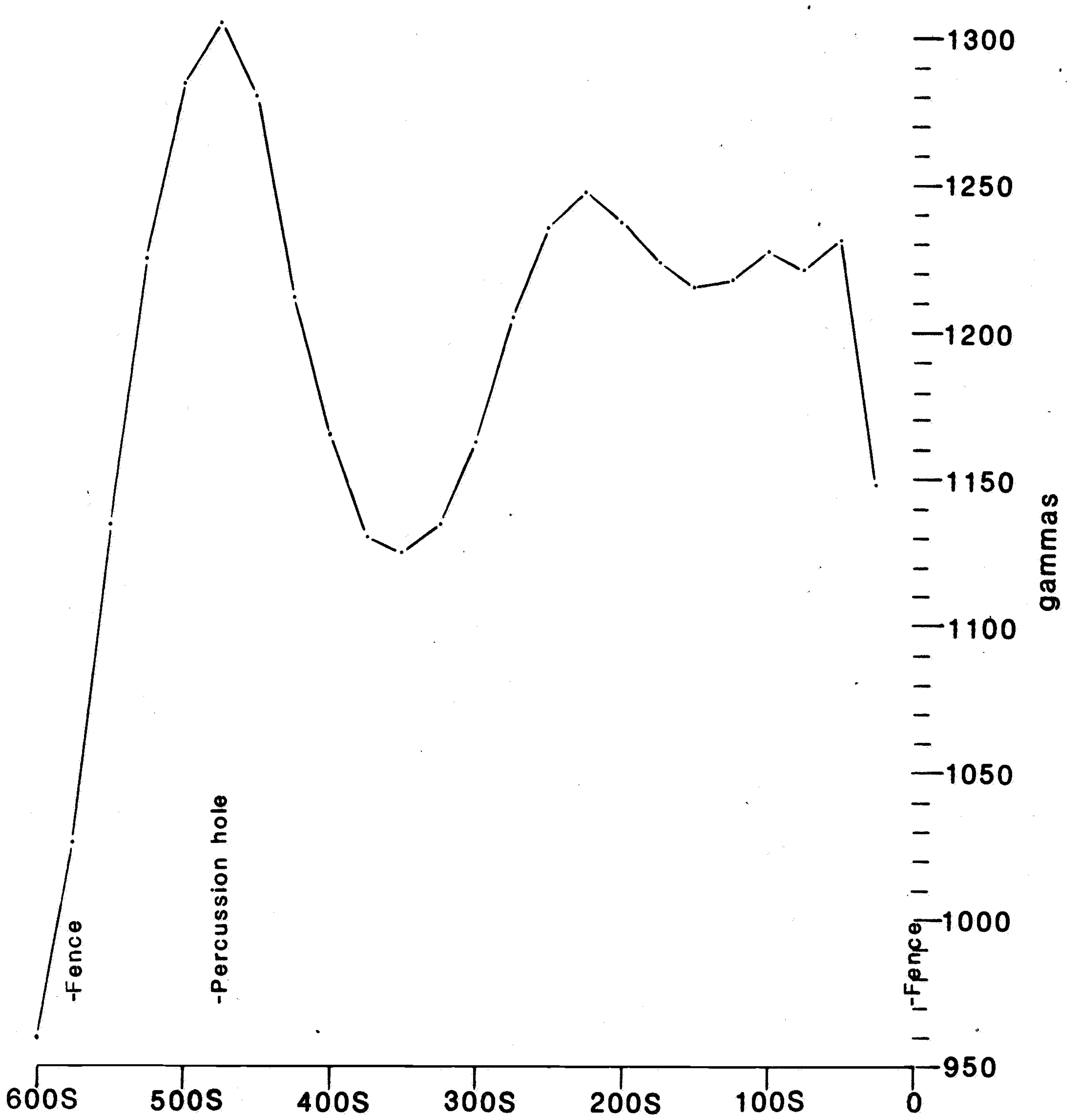
MEANEY'S #7
GROUND MAGNETICS
COOTRA AREA E.L.756, S.A.

NORTH BROKEN HILL LTD. / EXPLORATION DIVISION

SCALE 1:5000

DATE Sep. 1981

Profile looks 279° mag.

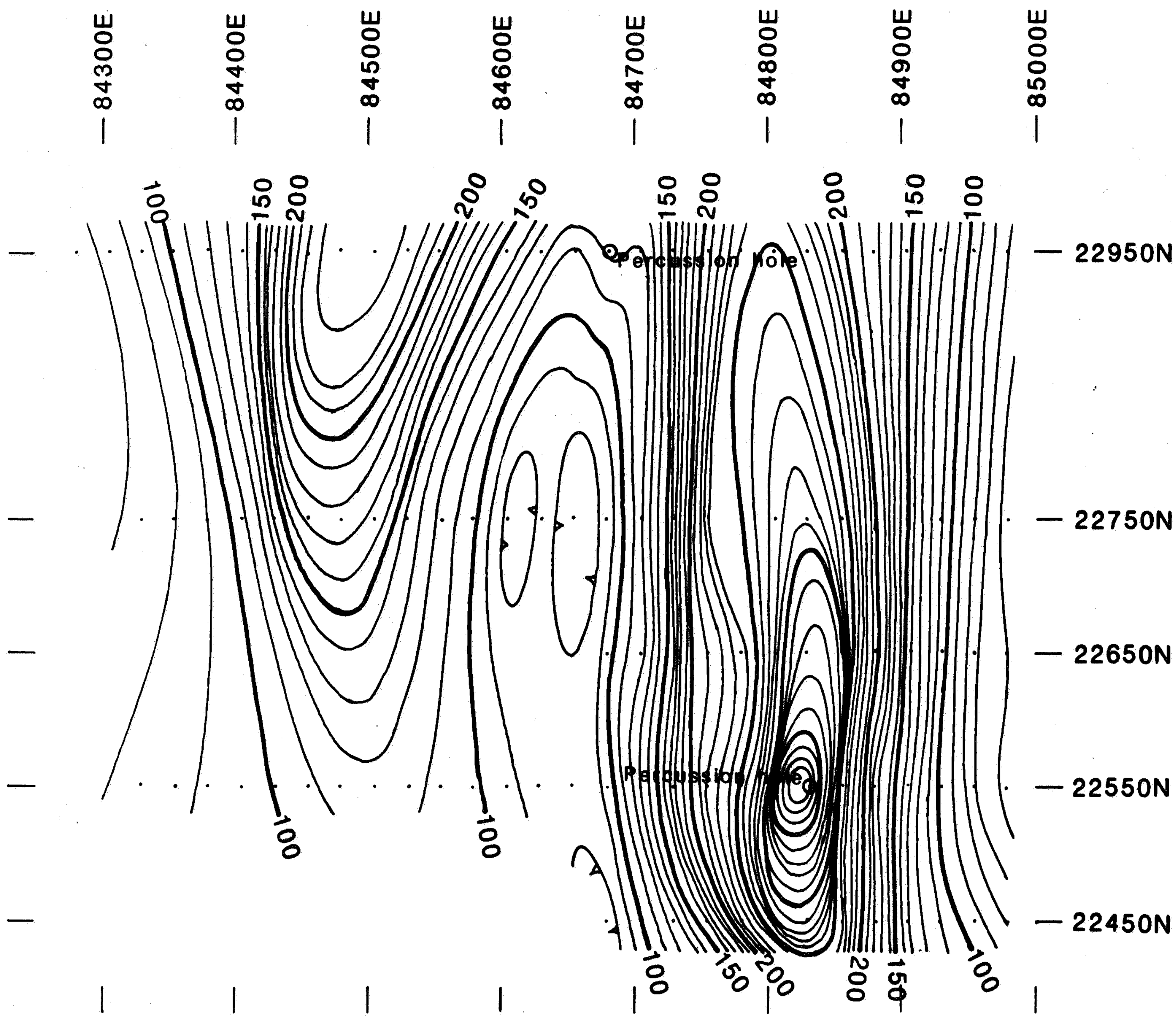


MEANEY'S #6
GROUND MAGNETICS
COOTRA AREA E.L.756, S.A.

NORTH BROKEN HILL LTD. / EXPLORATION DIVISION

SCALE 1:5000

DATE Sep. 1981



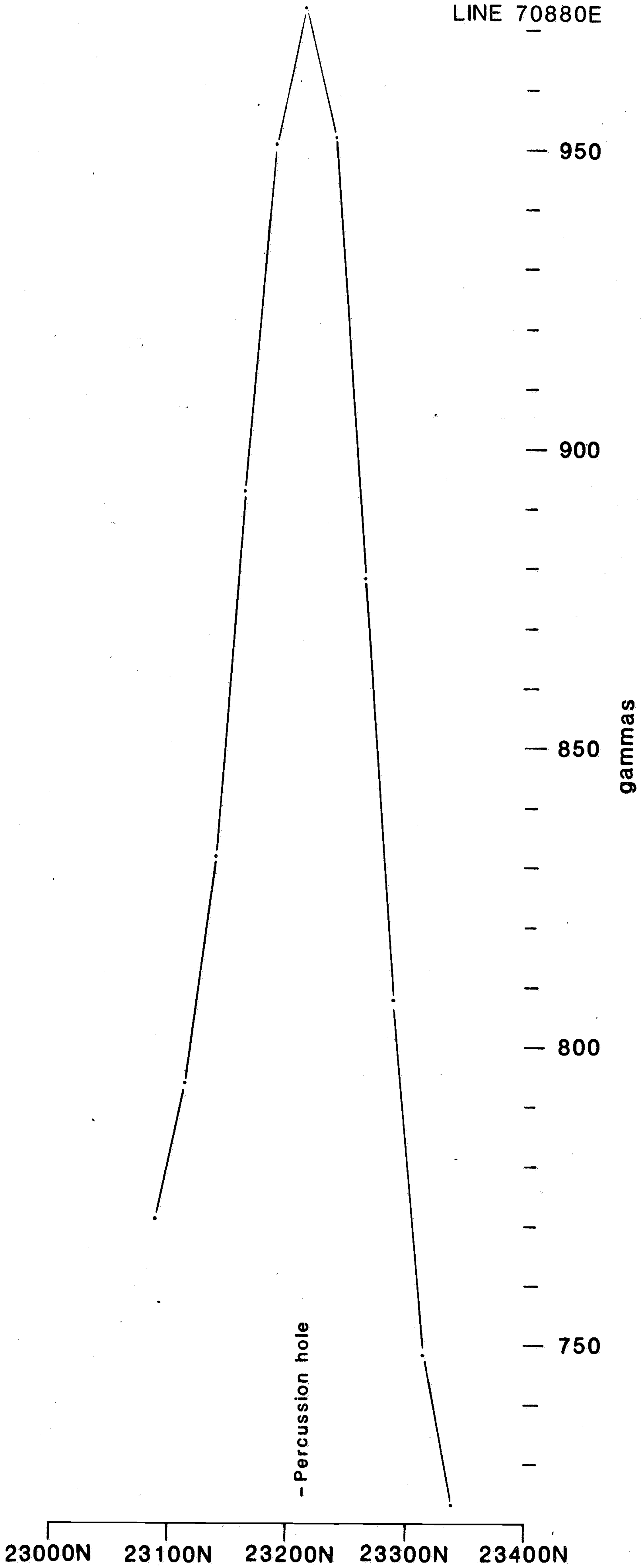
Contour interval 10gammas

FRISCHKE'S #4
GROUND MAGNETICS
COOTRA AREA E.L.756, S.A.

NORTH BROKEN HILL LTD / EXPLORATION DIVISION

SCALE 1:5000

DATE Aug. 1981



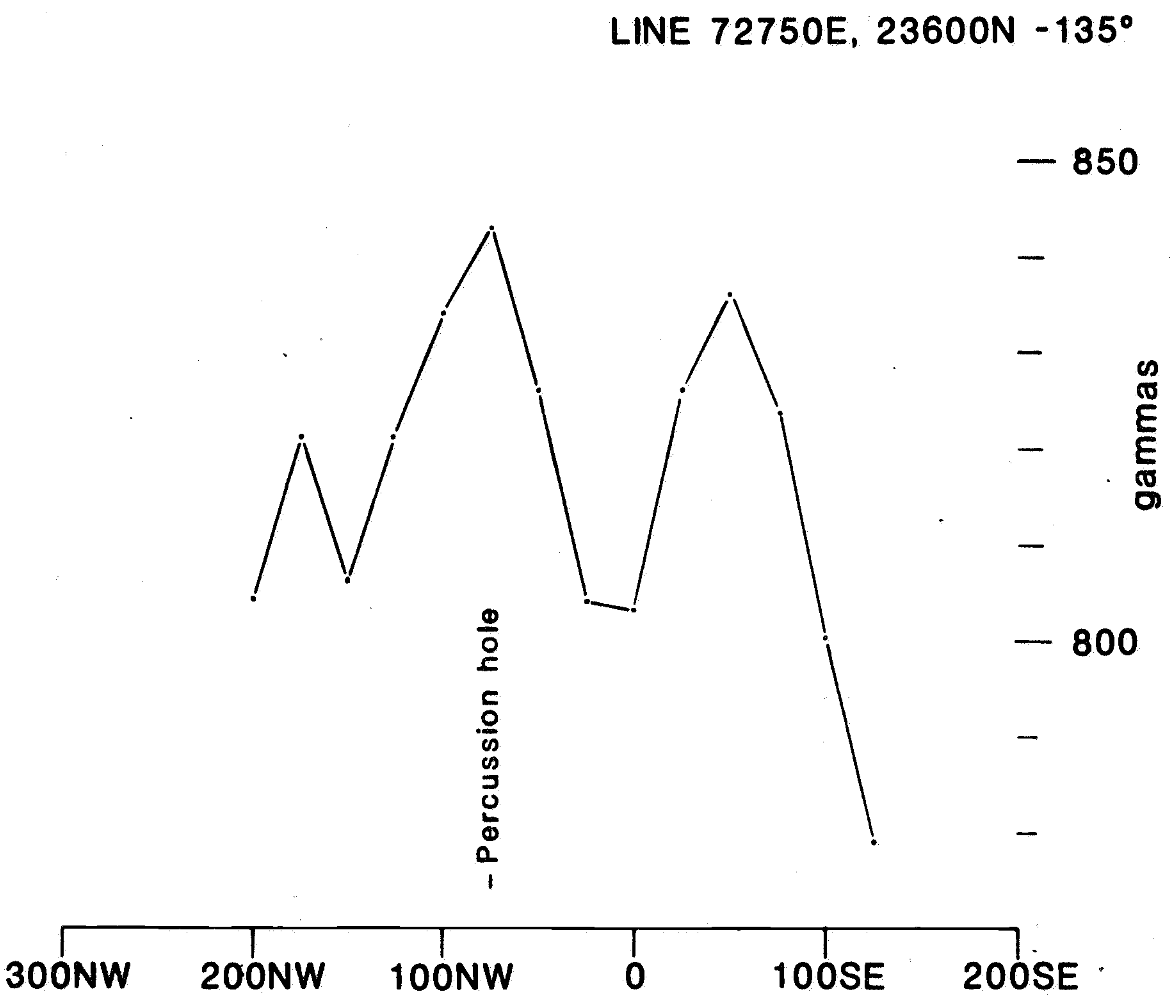
0116

HEATH'S
GROUND MAGNETICS
COOTRA AREA E.L.756, S.A.

NORTH BROKEN HILL LTD / EXPLORATION DIVISION

SCALE 1:5000

DATE Aug. 1981



MAY'S

GROUND MAGNETICS

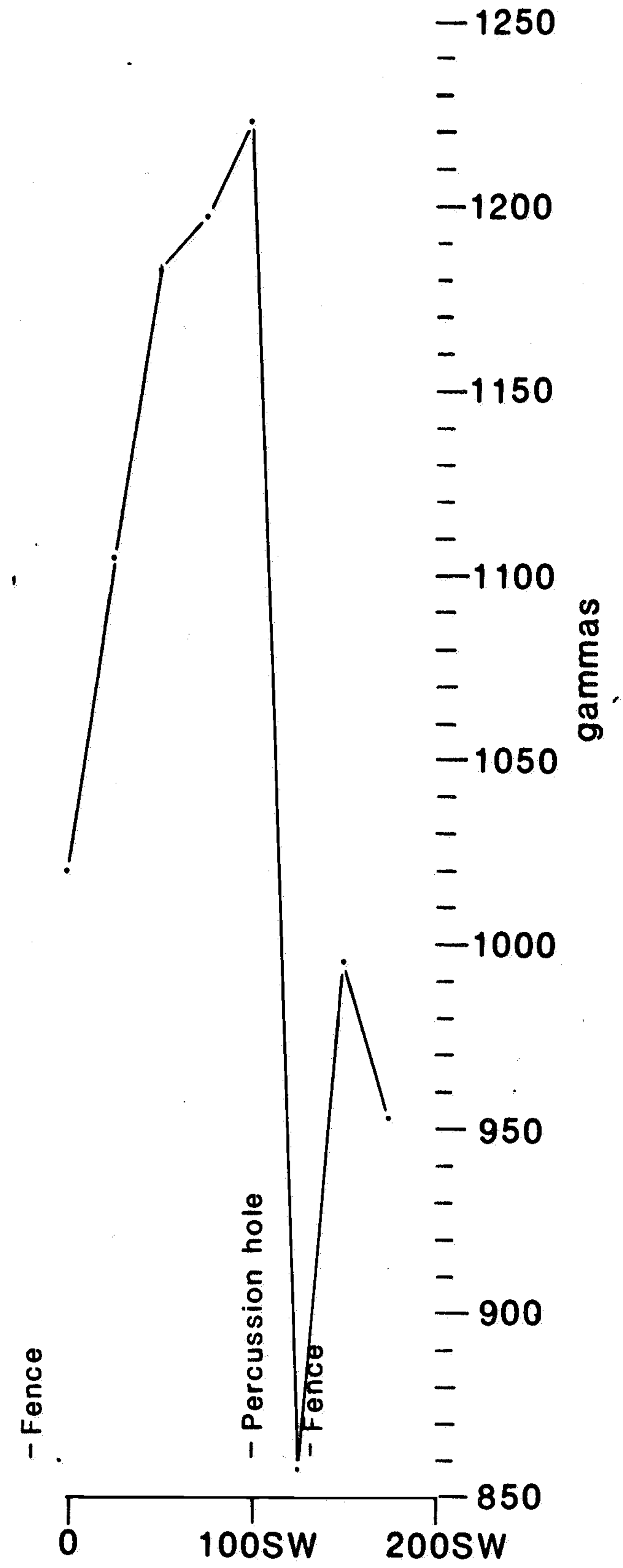
COOTRA AREA E.L.756, S.A.

NORTH BROKEN HILL LTD / EXPLORATION DIVISION

SCALE 1:5000

DATE Aug. 1981

LINE 82400E, 25850N -225°



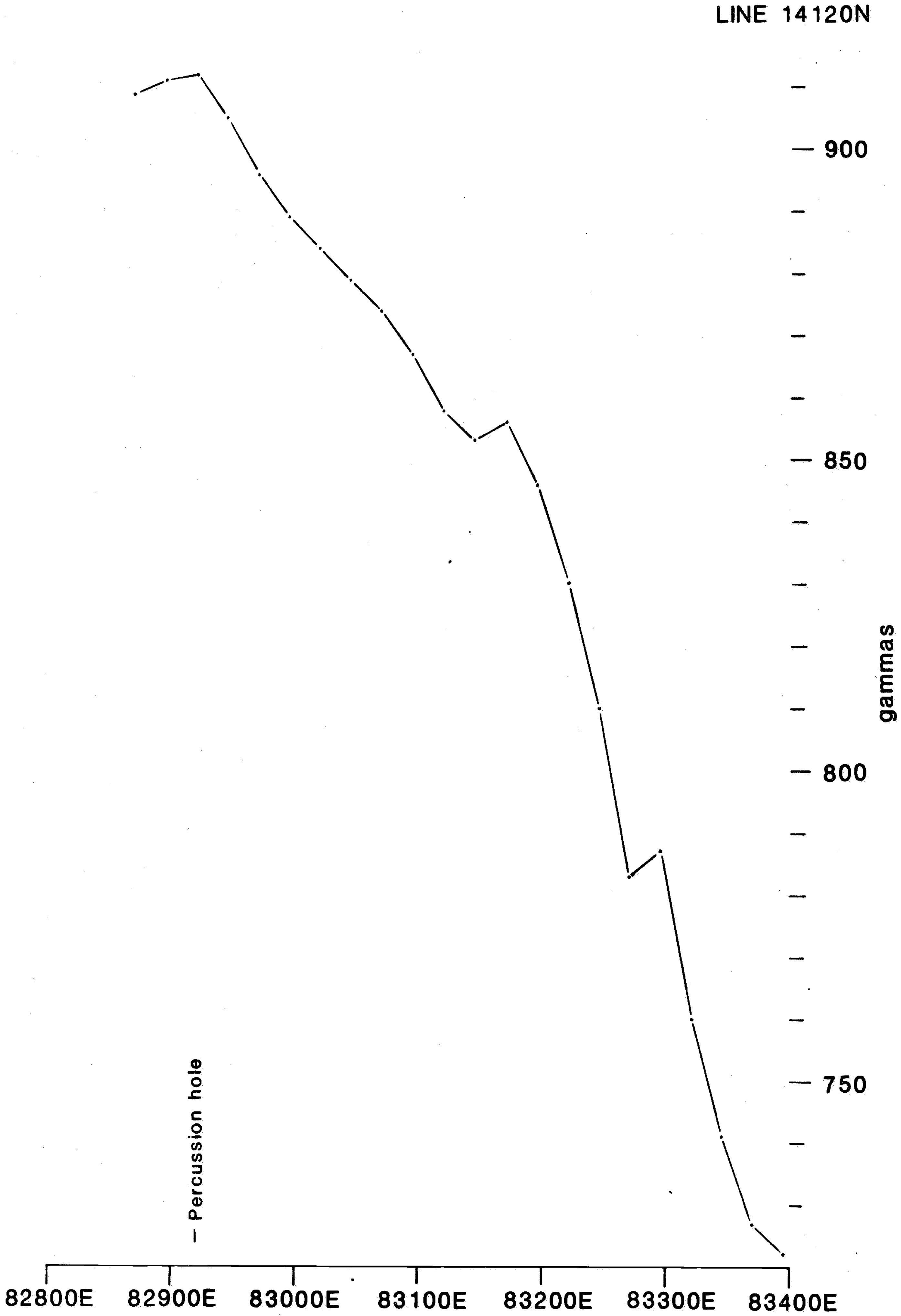
HIER'S
GROUND MAGNETICS
COOTRA AREA E.L.756, S.A.

NORTH BROKEN HILL LTD / EXPLORATION DIVISION

SCALE 1:5000

DATE Aug. 1981

0119



CANT'S

GROUND MAGNETICS

COOTRA AREA E.L.756, S.A.

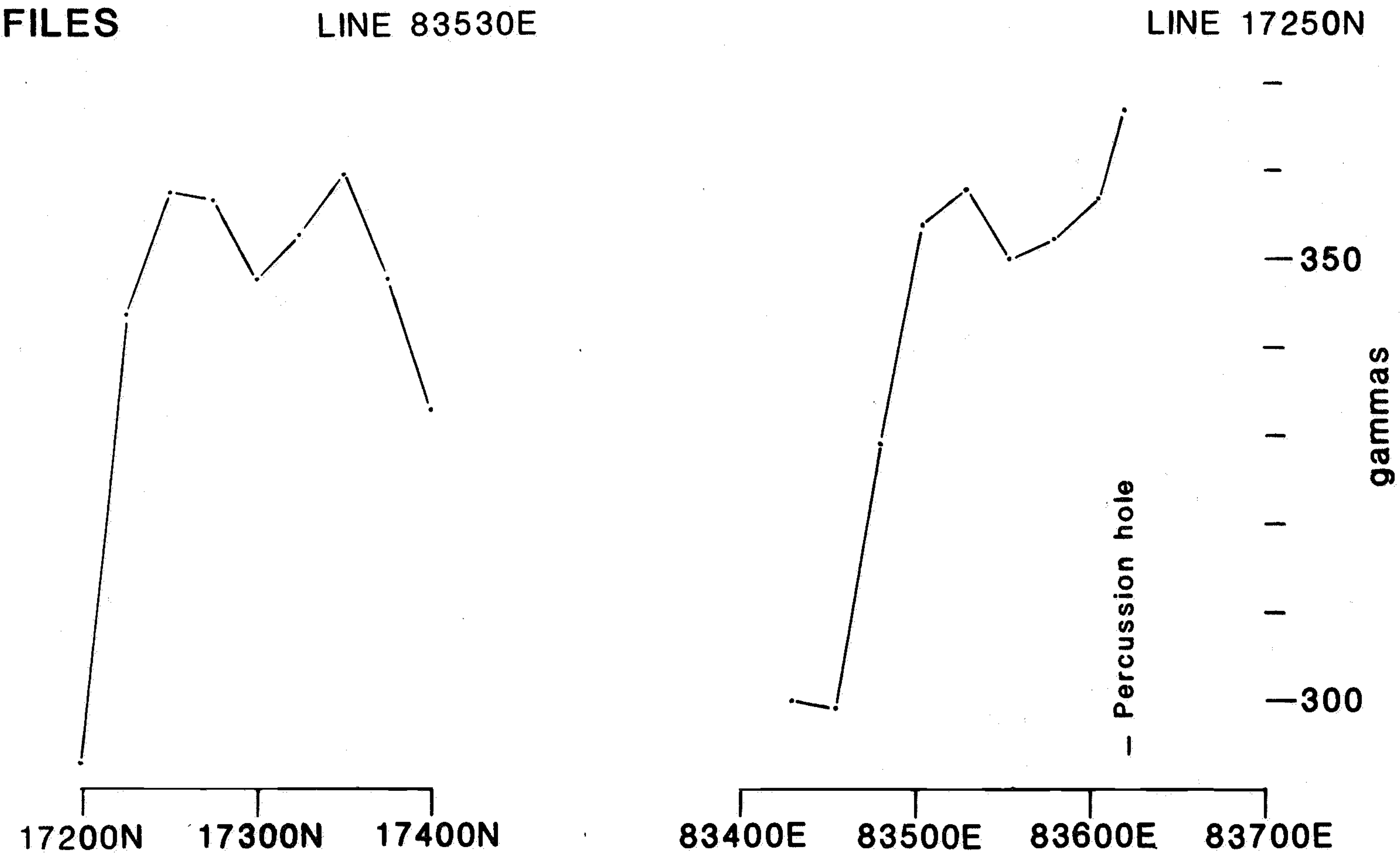
NORTH BROKEN HILL LTD / EXPLORATION DIVISION

SCALE 1:5000

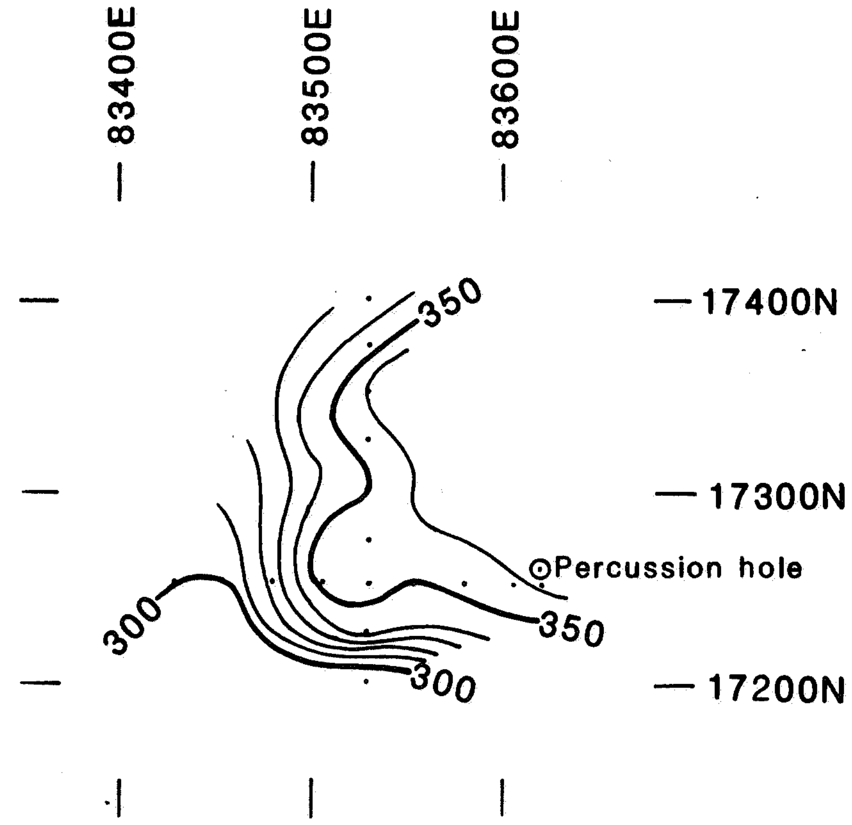
DATE Aug 1981

0120

PROFILES



PLAN



Contour interval 10gammas

CUMMING'S #2

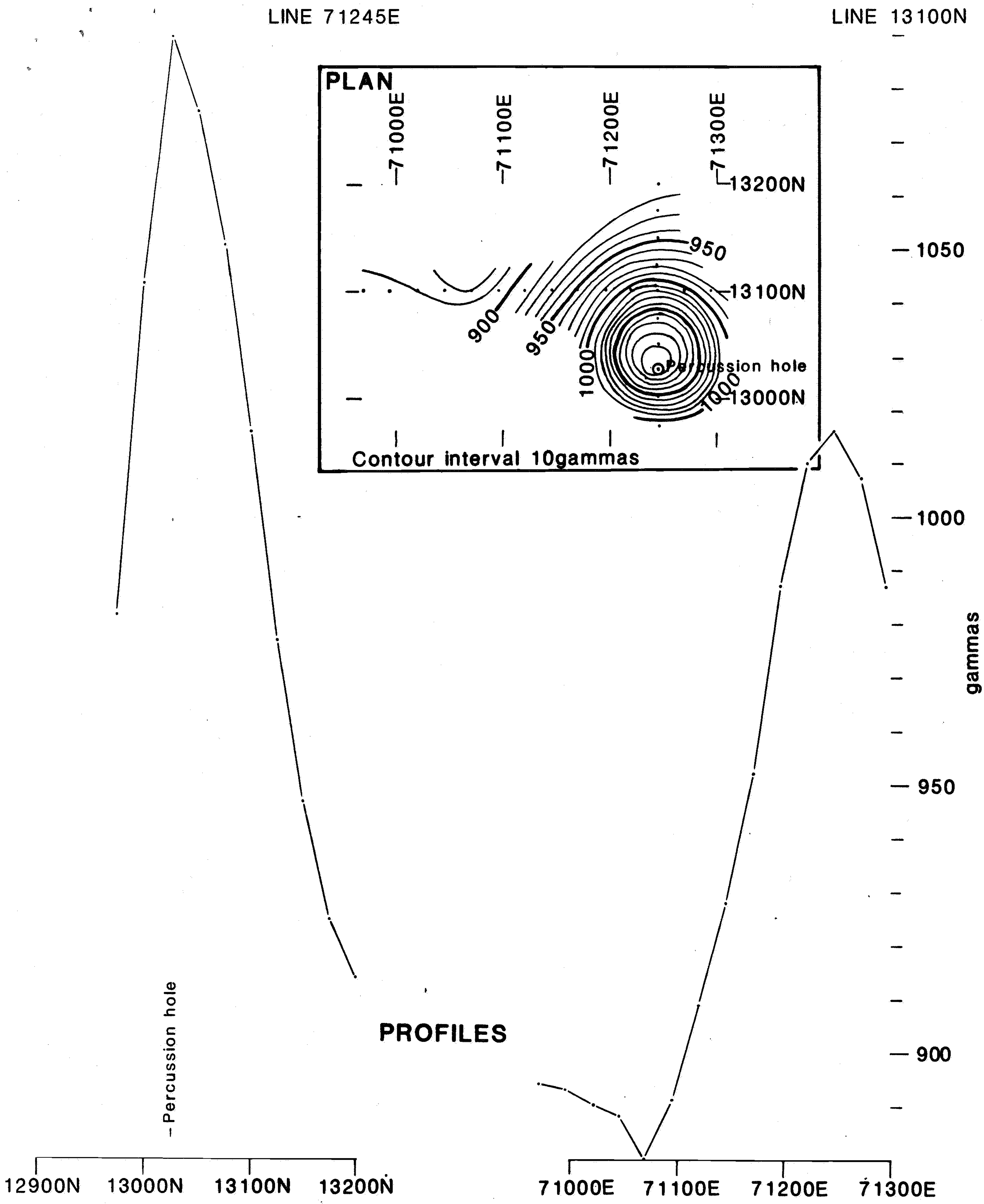
GROUND MAGNETICS

COOTRA AREA E.L.756, S.A.

NORTH BROKEN HILL LTD / EXPLORATION DIVISION

SCALE 1:5000

DATE Aug. 1981

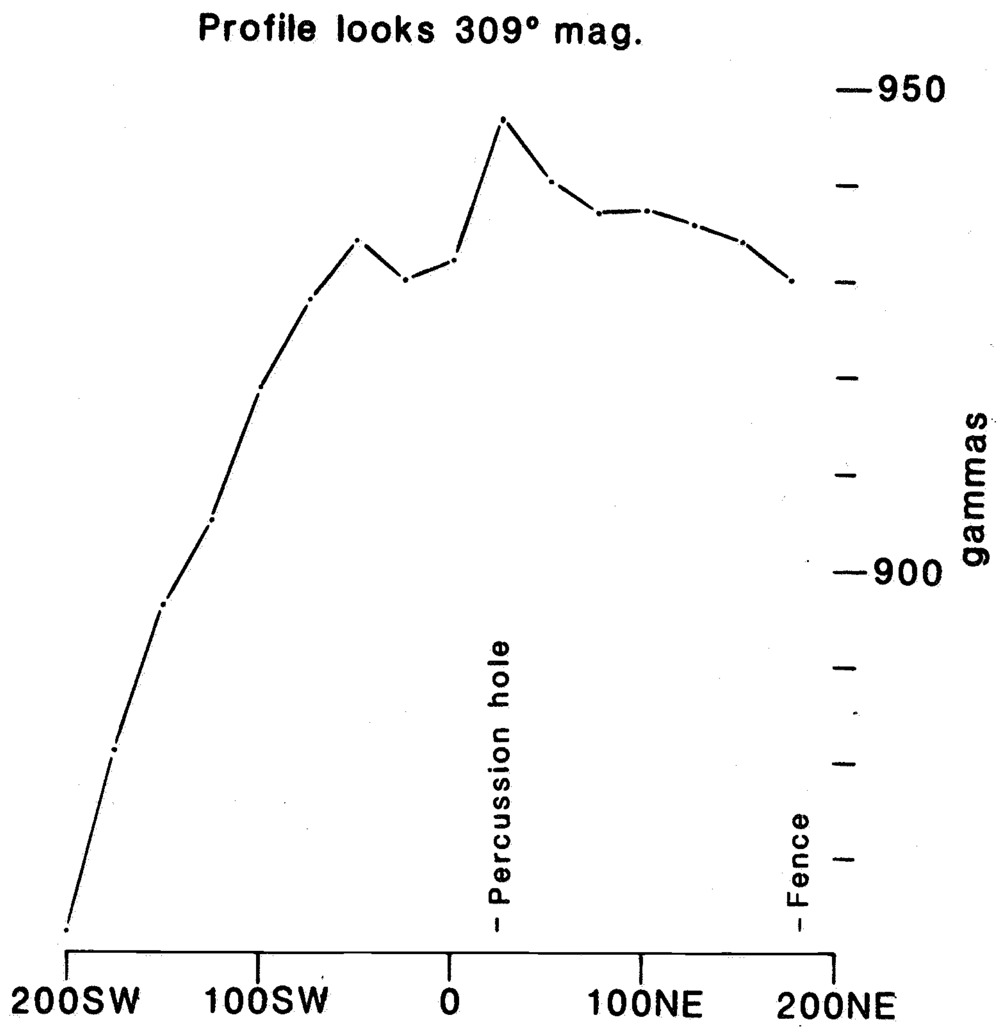


MEANEY'S #2
GROUND MAGNETICS
COOTRA AREA E.L.756, S.A.

NORTH BROKEN HILL LTD / EXPLORATION DIVISION

SCALE 1:5000

DATE Aug. 1981



MEANEY'S #4

GROUND MAGNETICS

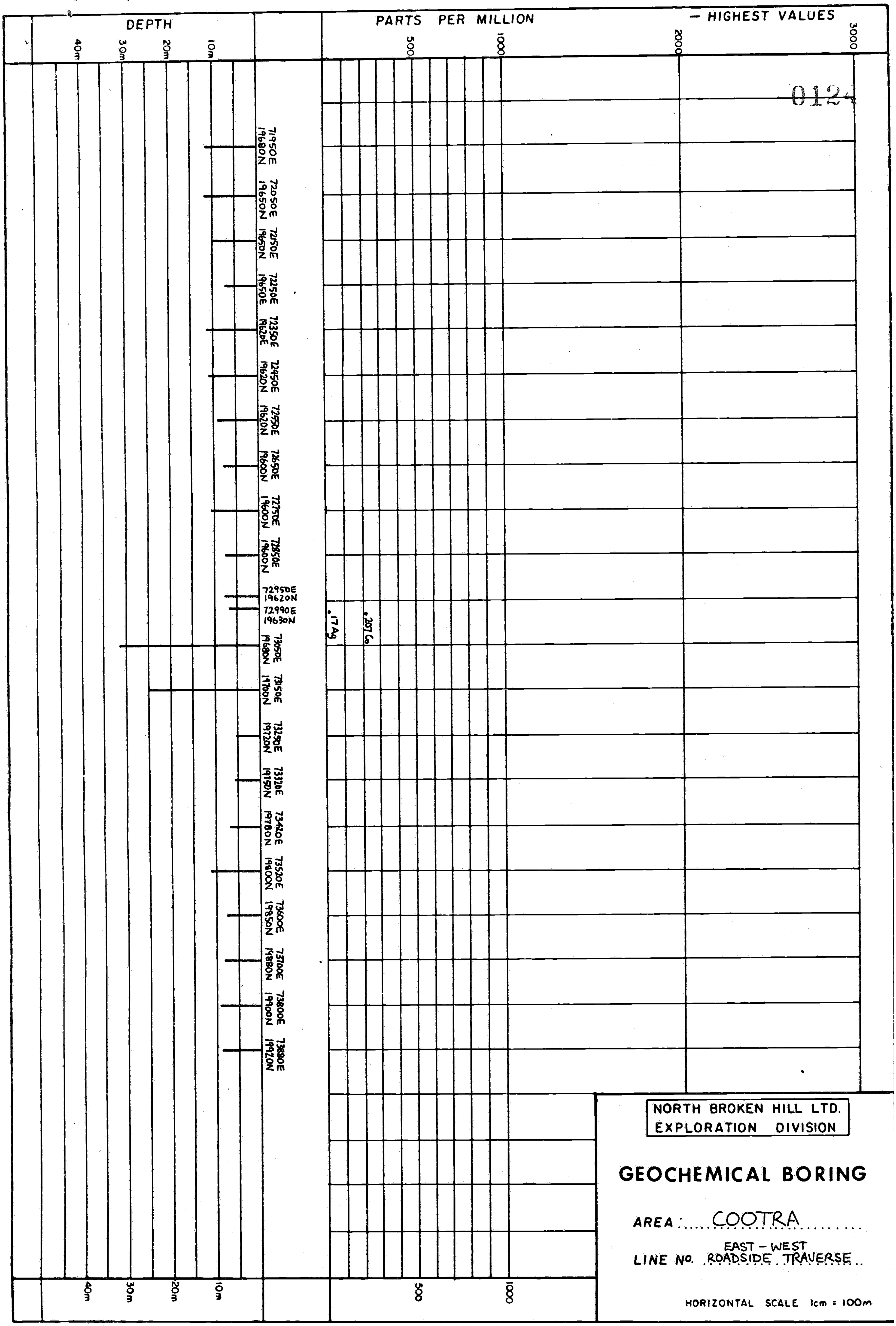
COOTRA AREA E.L.756 S.A.

NORTH BROKEN HILL LTD / EXPLORATION DIVISION

SCALE 1:5000

DATE Aug. 1981

AUGER DRILLING PROFILES



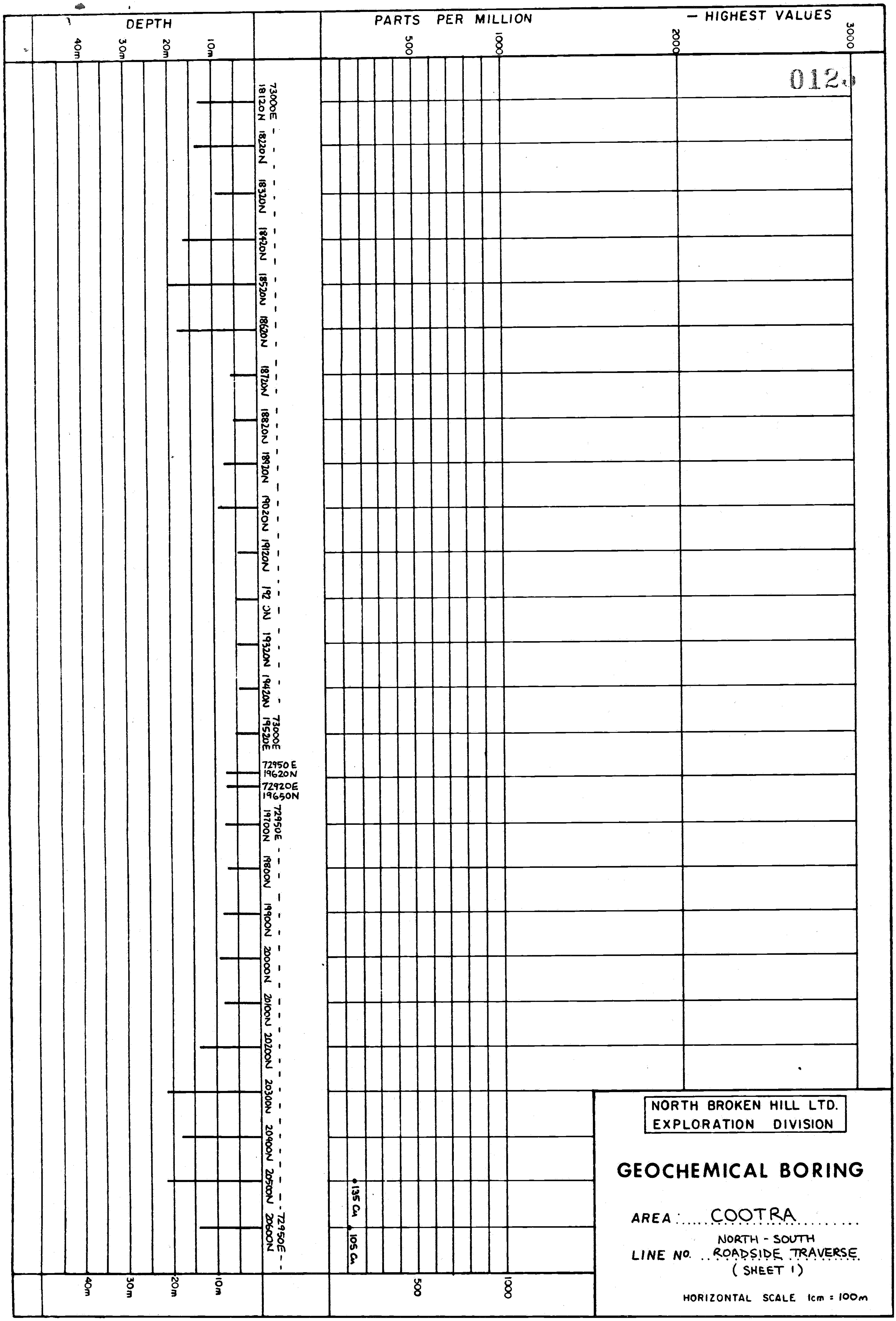
NORTH BROKEN HILL LTD.
EXPLORATION DIVISION

GEOCHEMICAL BORING

AREA: COOTRA

LINE NO. EAST – WEST ROADSIDE TRAVERSE

HORIZONTAL SCALE 1cm = 100m



NORTH BROKEN HILL LTD.
EXPLORATION DIVISION

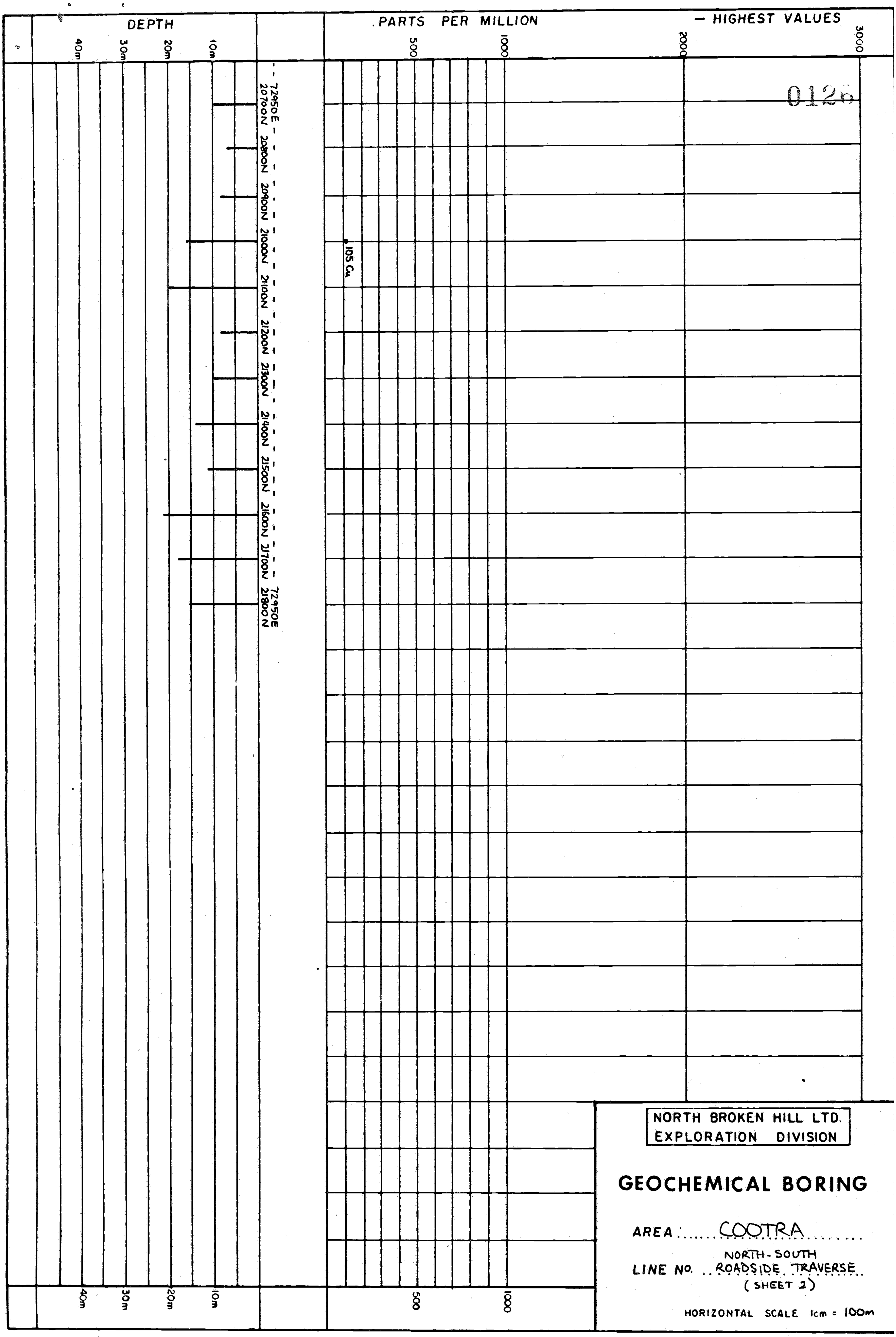
GEOCHEMICAL BORING

AREA: COOTRA

LINE NO. NORTH - SOUTH ROADSIDE TRAVERSE (SHEET 1)

HORIZONTAL SCALE 1cm = 100m

0125



NORTH BROKEN HILL LTD.
EXPLORATION DIVISION

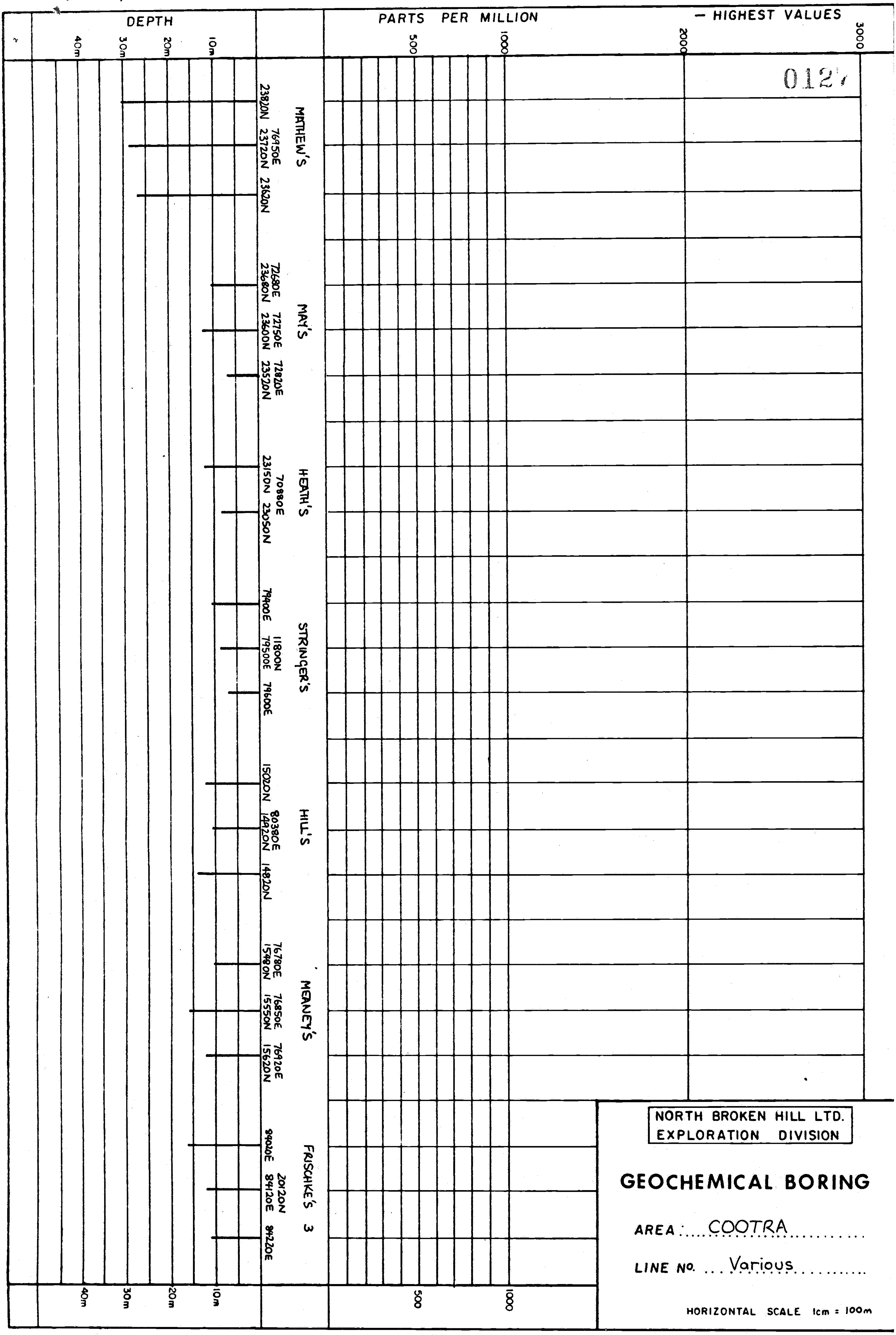
GEOCHEMICAL BORING

AREA: COOTRA

LINE No. NORTH-SOUTH ROADSIDE TRAVERSE (SHEET 2)

HORIZONTAL SCALE 1cm = 100m

0127



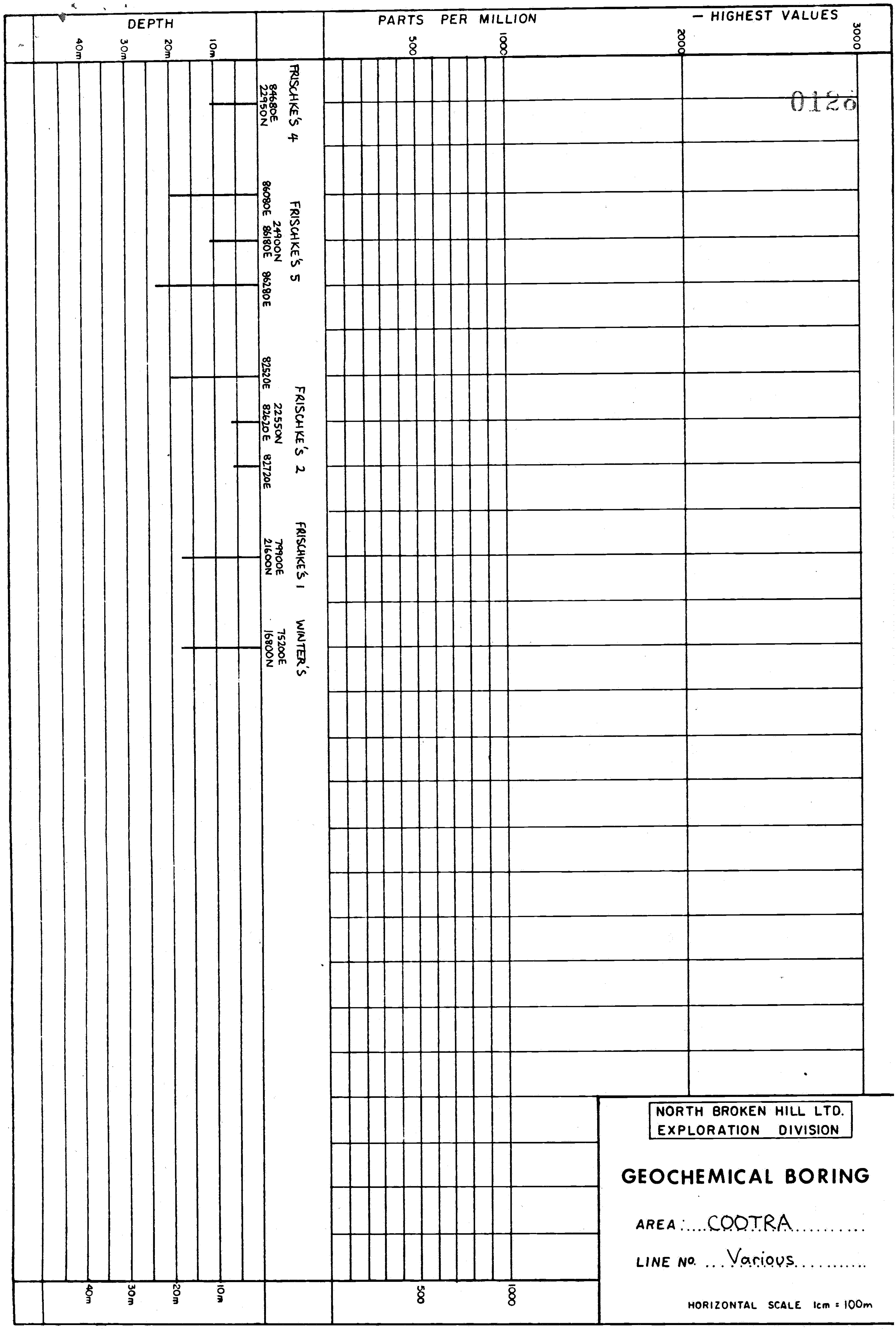
NORTH BROKEN HILL LTD.
EXPLORATION DIVISION

GEOCHEMICAL BORING

AREA : COOTRA

LINE No. Various

HORIZONTAL SCALE 1cm = 100m



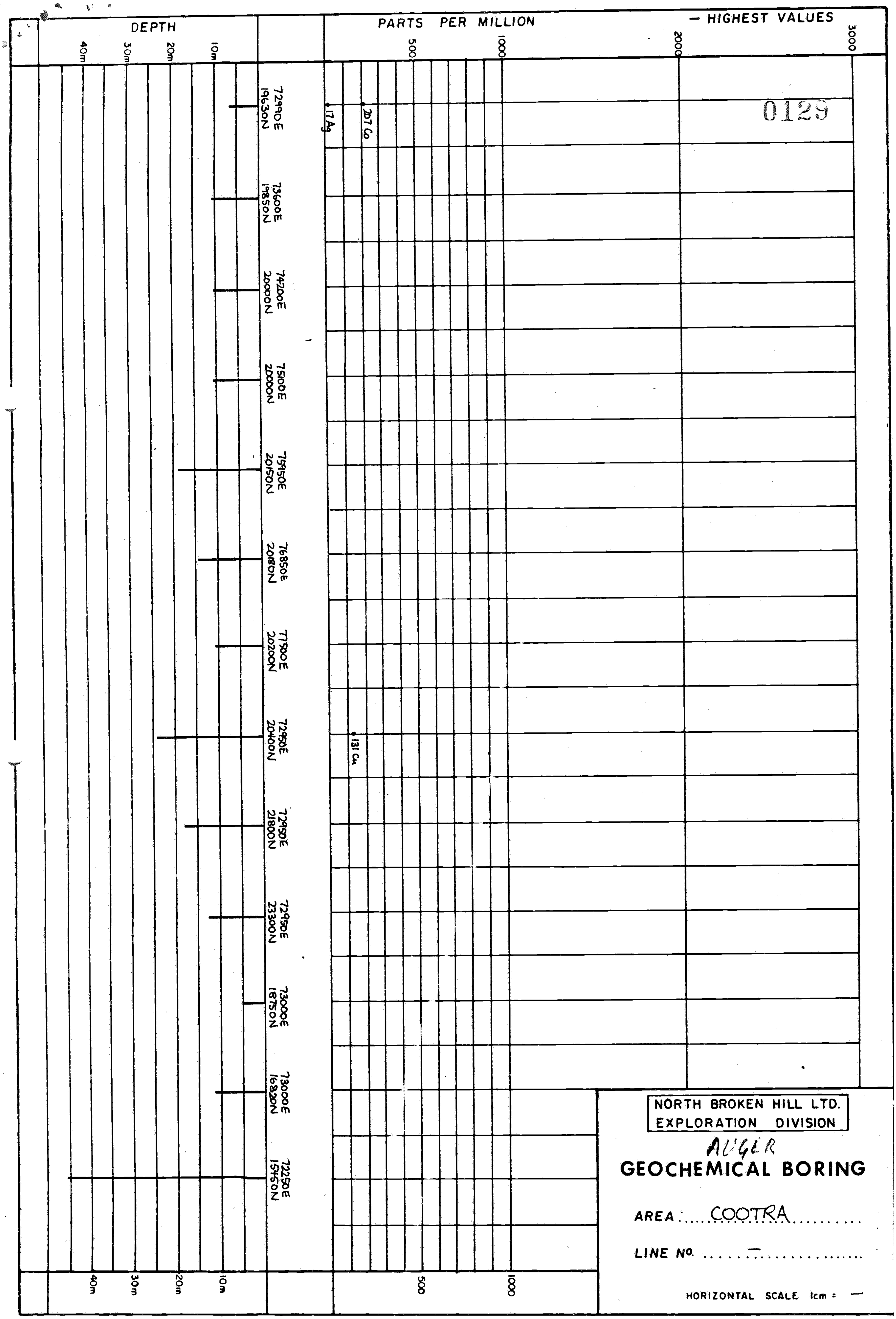
NORTH BROKEN HILL LTD.
EXPLORATION DIVISION

GEOCHEMICAL BORING

AREA : COOTRA

LINE No. Various

HORIZONTAL SCALE 1cm = 100m



NORTH BROKEN HILL LTD.
EXPLORATION DIVISION

AUGER
GEOCHEMICAL BORING

AREA ....COOTRA..........

LINE No. ....—........

HORIZONTAL SCALE 1cm = —

DEPTH		PARTS PER MILLION	— HIGHEST VALUES
40m 30m 20m 10m		500 1000 2000 3000	
	72250E 19650N		
	70900E 19920N		
	69700E 20050N		
	68350E 20050N		
40m 30m 20m 10m		500 1000	

0130

NORTH BROKEN HILL LTD.
EXPLORATION DIVISION

GEOCHEMICAL BORING

AUGER

AREA: COOTRA

LINE No. —

HORIZONTAL SCALE 1cm = —

KYANCUTTA
EYRE HIGHWAY
"Tullamore"
"Morana"
"Mamblin"
"Mambrae"
"Rocky Pines"
Kyancutta Hill
KOONGAWA
"Jungle Ranch"
"Pinegrange"
Lake Warramboo
"Glen Roy"
"Lake Side"
"Omaroo"
"Bens Hill"
E.L.756
"Pine Row"
WARRAMBOO
SEE INSET
"Lea-Brae"
"Pineslope"
"Aruntа"
"Nosredna"
COOTRA
DDH C-7
"Yattarna"
"White Gates"
"Lincoln Dale"
"Gunya"
"Central"
"Delmore"
"Hilltop"
NANTUMA
"Broadview"
"Waroona"
"Karanda"
"Karinga"
"Roadview"
"Panorama"
"Fairview"
KOPI
"Peak-View"
"Kiauna"
"Woodcombe"
"McLaghlan Station"
INSET
LOCATION
Kyancutta
AREA SHOWN
WHYALLA
Port Pirie
Lock
Wallaroo
Moonta
Maitland
Spencer Gulf
Vincent Gulf
Pt Lincoln
Scale 1:2,000,000
Abbreviations
GEOLOGY
White or yellow quartzofeldspathic gneiss or granite
Blue-grey magnetic adamellite / granodiorite
Coarse red magnetic granite
Amphibolite / dolerite
Mica schists
Weathered bedrock clays
Pale siliceous clay with fine quartz
Non-bedrock
LEGEND
Main road
Road
Track
Railway
Building
Lake
Land subject to inundation
Tank or dam
Quarry
DEPT. OF MINES DRILLHOLES
Diamond Drill Hole
Percussion
Rotary (KR Kopi, remainder Warramboo)
KR holes drilled to 11 only
MINES ADMINISTRATION DRILLHOLES
DP 32
NORTH BROKEN HILL LTD. DRILLHOLES
Frischke's #5 10-34m
Percussion drillhole, with name, depth to bedrock & total depth shown.
'All depths in metres'
DRILLHOLE LOCATIONS
COOTRA AREA E.L.980 S.A.
Scale 1:50000
NORTH BROKEN HILL LTD / EXPLORATION DIVISION
Date Aug.1981
Map No.S.A. C / 1h

135° 35'
135° 40'
135° 45'
135° 50'
135° 55'
Oval
Landing ground
KYANCUTTA
EYRE HIGHWAY
"Morana"
"Mambrae"
"Mamblin"
"Tullamore"
Kyancutta Hill
"Rocky Pines"
KOONGAWA
"Jungle Ranch"
"Pinegrange"
PORT LINCOLN - CEDUNA RAILWAY
(salt)
Lake Warramboo
(salt)
(salt)
EYRE HIGHWAY
E.L.756
"Glen Roy"
"Bens Hill"
"Piltainga"
"Lake Side"
"Omaroo"
Co/100
"Pine Row"
Oval
Co/90
WARRAMBOO
33° 15'
"Arunta"
"Nosredna"
Co/8
Co/170
Co/160
Co/150
Co/140
Co/1
Co/20
Co/30
Co/40
Co/5
Co/60
Co/70
COOTRA
"Lincoln Dale"
"Lea-Brae"
"Pineslope"
"White Gates"
Co/110
"Yattarna"
"Gunya"
"Delmore"
"Central"
Co/120
"Hilltop"
"Karanda"
NANTUMA
Co/130
"Broadview"
"Waroona"
"Karinga"
"Roadview"
E.L.756
33° 20'
"Panorama"
"Fairview"
KOPI
HAMBIDGE CONSERVATION PARK
"Peak-View"
"Kiauna"
"Woodcombe"
33° 25'
"McLaghlan Station"
N
LOCATION
Kyancutta
WHYALLA
Port Pirie
AREA SHOWN
Lock
Wallaroo
Moonta
Maitland
Spencer Gulf
Vincent Gulf
Pt Lincoln
Scale 1:2,000,000
LEGEND
Main road
Road
Track
Railway
Building
Lake
Land subject to inundation
Tank or dam
Quarry
AUGER DRILLING
Effective
Doubtful
Ineffective
RECEIVED
10 JUL 1981
DEPT. OF MINES AND ENERGY
4230
AUGER DRILLING
COOTRA AREA E.L. 756 S.A.
Scale 1:50000
1 0 1 2 3 4 5 km
NORTH BROKEN HILL LTD / EXPLORATION DIVISION
Date 10/6/81
Map No.S.A./Coff

4230(I)-3

II

0131

EXPLORATION LICENCE NO. 756

COOTRA AREA, S.A.

REPORT ON WORK CARRIED OUT

BY NORTH BROKEN HILL LTD. DURING THE QUARTER

ENDED 25TH NOVEMBER 1981

February 1982

EXPLORATION LICENCE NO. 756

COOTRA AREA

REPORT FOR QUARTER ENDED 25TH NOVEMBER 1981

GENERAL SUMMARY & ASSESSMENT

During the quarter a decision was taken to diamond drill test the Meaney's Anomaly, located in the central southern part of the area, 22 kilometres east-south-east of Warramboo.

Minor copper, zinc, nickel and cobalt anomalies had been found in percussion drill cuttings of weathered bedrock in this vicinity.

An aeromagnetic anomaly was known here, and gravity surveys indicated that the magnetic body was also dense.

D.D. C-1 was drilled to 121.9 metres, and showed the geophysical anomalies to be due to a banded amphibole rich rock, containing visible fine magnetite and pyrite.

Assaying revealed a 3.76 metre zone of anomalous tungsten, which was then confirmed as scheelite with the ultraviolet light.

The mineralization is believed to approximate the Mittersill (Austria) model, and follow-up drilling is planned.

Details are given in the attached copies of the Company's internal reports for the months of September, October, November and December 1981.

NORTH BROKEN HILL LTD.

P.S. Forwood

P.S. FORWOOD,
Exploration Manager.
PSF:df

4th February 1982

ATTACHMENTS :

1. Statement of expenditure.
2. List of plans.
3. Petrology report by Dr. R.N. England dated 15th December 1981.
4. Internal reports for September, October, November and December 1981.

EXPLORATION LICENCE NO. 756

EXPENDITURE

1ST SEPTEMBER - 30TH NOVEMBER 1981

ELEMENTS OF EXPENSE

Salaries	12474
Wages	3033
Contractors	282
Fuel, Repairs, Stores	2915
Travel	319
Camp Rations	608
General Charges	4255
Administration	2050
	$ 25936

ACTIVITIES

Geology	4426
Sampling	18
Grid Preparation	584
Magnetics	206
Gravity	6320
I.P.	3535
Vehicles	1832
Diamond Drilling	4099
Auger Drilling	875
Air Drilling	1991
Administration	2050
	$ 25936

LIST OF PLANS

1. Contour Plan of Ground Magnetics on Meaney's Grid

   Map No. SA/CO-4 Scale 1:5000

2. Contour Plan of Gravity on Meaney's Grid

   Map No. SA/CO-3 Scale 1:5000

3. Cross Section DDH C-1

   Map No. SA/CO-2 Scale 1:1000

4. I.P. and Magnetic Traverse Locations

   Map No. SA/CO-J Scale 1:50,000

5. I.P. Sections

   Frischke's 21600N
   Meaney's 00NS, 00NS repeat
   100N and 200S.

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COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

SEPTEMBER 1981

GENERAL

An appraisal of existing geophysical data was carried out at a meeting held in Melbourne office on 4th September. Attending the meeting were the Exploration Manager, Mr. P. Forwood, consultant geophysicist Mr. G. Staltari and W. Cowley, geologist based in South Australia.

Two areas of interest were each tested with an induced polarization traverse during the month.

GEOPHYSICS

At the meeting in Melbourne, Guido Staltari considered that I.P. would be able to test bedrock in the Cootra area. Two areas of interest, namely Meaney's and Frischke's 1, were selected.

An I.P. line (76920E, 15620N-249^{o}) extending 2700m with 100m electrode spacing was run to test an area known as Meaney's. Five out of six rotary-percussion holes drilled in this area had encountered weakly anomalous copper, and in some cases zinc and cobalt, values. Pyrite was discovered in three of the holes, but four of the holes encountered graphite which could make interpretation difficult.

Anomalous results were received over 800m W - 1100m W and 1350m W - 1800m W.

Line 21600N, totalling 2100m, also with 100m electrode spacing was read over Frischke's 1, rotary-percussion hole which was drilled on an interestingly shaped circular magnetic anomaly. Only weakly anomalous results were obtained from this line.

It is intended to follow up the Meaney's area with further I.P. traverses and gravity work. Gravity should help to distinguish between anomalies due to pyrite and those due to graphite.

COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

OCTOBER 1981

GENERAL

Testing of the Meaney's area continued with the establishment of a new grid, three induced polarization-ground magnetics lines (one with gravity) and three gravity-magnetics lines.

GEOPHYSICS

The Meaney's grid was established to rationalize co-ordinates, when it was decided that more work was to be done in the area. It is a rectangular grid with its origin at the Meaney's 1 rotary-percussion hole (76920E, 15620N) and grid north trending 339° true (333° magnetic). Under this scheme, the I.P. line already completed (76920E, 15620N - 249°) becomes Line 00NS.

Three lines of induced polarization were read on the Meaney's grid in a follow-up program: 00NS (repeat, staggered electrodes), 100N and 200S. All had 100 metre electrode spacing and the total line coverage was 4.5 kilometres. However, consultant geophysicists Staltari and Rutter advised that the induced polarization survey was not detecting bedrock effects, due to extremely conductive surface layers and should be continued.

Ground magnetic surveys were read over the three I.P. lines.

Gravity and ground magnetics were read at 20 metre intervals on lines 400N, 800N and 400S and gravity only on line 00NS. Results were not to hand at the end of the month.

A total of 624 gravity readings over 12.4 line kilometres and 918 ground magnetics readings over 19.5 line kilometres were taken during the month.

The seven Rotamec holes drilled in the area during the winter give a poor geochemical coverage, and only one hole recovered solid bedrock chips. More geochemical air drilling is needed. However, the Rotamec is not available until late November at the earliest, and probably not until 1982.

COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

NOVEMBER 1981

GENERAL

The results of the gravity and ground magnetics survey on Meaney's grid were plotted up as contour plans.

A coincident gravity-magnetic anomaly on line 400S was tested with DDH C-1, which drilled to 121.9m (400') and recovered banded, magnetic, dark grey feldspar-biotite-amphibole-quartz gneiss or amphibolite.

GEOPHYSICS

A 2 mgal gravity anomaly and a sharp elongated ground magnetic anomaly both peaked at 1025W on line 400S. The sharpness of both peaks suggested a shallow source (100m or less).

DIAMOND DRILLING

DDH C-1 was collared on 25th November and was completed on 1st December at 121.9m (400').

Six rotary-percussion holes had been drilled in the vicinity, but none yielded chips of unaltered bedrock. Low values of Cu, Zn, Ni and Co were obtained in five of these, pyrite in three and graphite in four. The presence of graphite and weathered bedrock clays were thought to indicate a metasedimentary sequence rather than a gneissic-granitic terrain. The elongated nature of the magnetic anomaly appeared not to be in agreement with a basic plug as the source.

Bedrock was reached at 29.25m (96') and consisted of dark grey, banded fine grained feldspar-biotite-amphibole-quartz gneiss or amphibolite to the end of the hole. Since the core was strongly magnetic (magnetite and minor pyrrhotite) and quite dense, the hole was successful in explaining the anomalies.

A preliminary brief log is presented below:-

DDH C-1

Preliminary Log : Dip. 60°, Magnetic azimuth 018° (Grid 045°)

Co-ordinates : Meaney's grid 1044m W, 430m S L-38

COOTRA AREA - DIAMOND DRILLING (cont'd)

0139

A preliminary brief log is presented below:- (cont'd)

0m - 12.20m	*No Core.*
12.20m - 17.05m	*White to pale orange kaolin with minor quartz sand near top and occasional fine black speckling.*
17.05m - 29.25m	*No Core.*
29.25m - 121.90m	*Banded dark grey fine grained, massive feldspar-biotite-amphibole-quartz gneiss or amphibolite. Banding mostly 0.5 - 3cm thick, rarely folded, defined by variations in mafic content and grain size. No foliation evident. Strongly magnetic.* *A paler, mafic-poor alteration is common, and tends to obliterate the bedding.* *Coarser grained feldspar-biotite-amphibole segregations and veins carry pyrite, pyrrhotite and trace chalcopyrite.* *Pyrite and magnetite (and ?pyrrhotite) are disseminated throughout, decreasing slightly towards base.*
121.90m	*END OF HOLE.*

At this stage U/V and scintillometer had NOT been conducted.

A hydrofluoric acid etch performed at 97.5m (320') gave a dip of 70°.

LEASING

Exploration Licence 756 was inadvertently allowed to lapse on 25th November 1981.

//

COOTRA AREA

EXPLORATION LICENCE 756

SOUTH AUSTRALIA

DECEMBER 1981

GENERAL

The discovery of tungsten (as scheelite) within the DDH C-1 diamond drill hole during routine assaying is encouraging. Further ground magnetics, gravity and diamond drilling are planned for the Meaney's area as well as investigation of other areas in the E.L.

The licence had been allowed to lapse but is now under application.

DIAMOND DRILLING

DDH C-1 was completed on 1st December at 121.9 metres within Archaean to Lower Proterozoic dark grey feldspar-biotite-amphibole-quartz gneiss or amphibolite. (petrology indicates retrogressed basic granulite).

The extent of the scheelite bearing zone, as detected with the ultraviolet light is from 81.3 metres to 99.6 metres. However, the zone with most scheelite is from 85.9 metres to 89.3 metres (about 0.1% visual estimate) including the interval 88.45 metres to 89.3 metres (about 1-2% visual estimate).

The only obvious features distinguishing the zone of scheelite bearing amphibolite from barren amphibolite are a slight increase in the amount of feldspar-quartz-biotite-amphibole segregations, and the presence of banded quartz-plagioclase rock. This zone actually has a slightly lower S.G. than the surrounding rocks.

GEOCHEMISTRY

Initially, only Cu, Pb, Zn, Ag, Ni, Co, Mo and Au were determined on the DDH C-1 sludges. The highest value obtained was 190ppm Cu.

Subsequently the sludges were run for Sn and W. Three sludges from 85.35 metres to 94.5 metres assayed >200ppm W. These were redetermined by drill-core method and by North Mine (XRF).

	Geochemistry	Drill-core	North Mine
85.35m - 88.4m	>200ppm W	700ppm W	0.11% WO_3
88.4m - 91.45m	>200ppm W	290ppm W	0.22% WO_3
91.45m - 94.5m	>200ppm W	200ppm W	0.10% WO_3

Core was quartered from 85.35 metres - 101.2 metres and assayed for W with the drill-core method to 97.55 metres and by geochemical method thereafter.

GEOCHEMISTRY (cont'd)

The highest values were:

	Drill-core	North Mine	
85.35m - 86.25m	20ppm W	150ppm WO_3	
86.25m - 88.15m	1100ppm W	0.27% WO_3	3.65m @ 0.17% WO_3
88.1m - 89.0m	700ppm W	0.19% WO_3	
89.0m - 89.9m	900ppm W	0.22% WO_3	

Samples comprising confirmed weathered bedrock from the bottom of 18 Rotamec rotary-air holes and 12 auger holes were analysed for tungsten. The holes selected were those close to the Meaney's area or those with amphibolite or basis schists in bedrock. No anomalous values resulted.

PETROLOGY

Preliminary petrology indicates that the rocks in DDH C-1 are dominantly mafic granulites, often banded and sometimes clinopyroxene-rich. Retrogression of upper greenschist grade has produced hornblende after pyroxene, with pyrite, chalcopyrite and marcasite disseminated in the rock.

One rock is a pegmatitic granulite with euhedral orthopyroxene and apatite (15%) in oligoclase.

A grain of scheelite was noted in one specimen, although this is above the assay zone.

These rocks could have formed from a dolomitic shale or from a basic igneous parent.

LEASING

E.L. 756 was allowed to lapse on 25th November, due to an oversight. When scheelite was reported on 8th December, urgent efforts were made to regain the area. A new licence application was lodged on 9th December, ahead of any competing applications, and the new E.L. is expected to be granted at the end of January 1982.

ORDER No. 4316AN. 4 rocks of mafic composition from the granulite terrain of Eyre Peninsula, Cootra, S.A. DDH C1.

The samples from 32.54m, 35.51m, 52.88m, and 58.98m are granulites which range from almost pristine(32.54 m, 58.98m) to strongly retrogressed(35.51m). The one from 57.83m is a pegmatite with granulite facies mineral assemblage but an igneous texture. Banding is quite common in the granulites and clinopyroxene tends to be the dominant primary mafic mineral. One cannot, therefore discount the possibility that they began their existence as dolomitic shales rather than igneous rocks.

In the granulites, the occurrence of sulphides appears to be related to retrogression. The pegmatite, on the other hand, probably contained a primary sulphide liquid which was trapped as droplets in the crystallising silicates. The hand specimen from 52.88m contains a few small grains of probable scheelite, but none was observed in thin section. The composition of rocks from this hole suggests the possibility of stratiform scheelite.

32.54m. Banded Ca-rich 2-pyroxene-hornblende granulite.

A granoblastic aggregate of clinopyroxene(35%). plagioclase (An_{50},50%), olive brown hornblende(3%), hypersthene(3%), magnetite (4%), and ilmenite(4%), with the following features. Some clinopyroxene forms conspicuous monomineralic layers up to 5mm thick of 1-3mm anhedra. Exsolution lamellae of hypersthene are quite common. Elsewhere the grain size is similar to hypersthene and plagioclase-- about 300μ. Plagioclase is also coarser-grained in layers adjacent to coarse clinopyroxene. Hornblende forms layers of slightly elongate polygons with c-axes oriented parallel to the foliation. Hypersthene also tends to concentrate in layers. Magnetite, with some exsolution lamellae of ilmenite, and separate grains of ilmenite, form 100-200μ polygonal grains, less abundant in the coarse layers. Pyrite(tr) to have formed at a late stage.

35.51m. Retrogressed banded 2-pyroxene-hornblende granulite.

Once similar to the sample from 32.5m, but quite strongly retrogressed, probably in the high greenschist facies. All hypersthene, and most coarse and fine clinopyroxene have been pseudomorphed by sheafs of bluish green hornblende needles. Most plagioclase(An_{50}) has been replaced by fine-grained prehnite and epidote-- possibly in a later, lower-temperature event than the one which produced the blue-green hornblende. Ilmenite has been partly replaced by sphene, and magnetite almost entirely replaced by a brownish pink fine fibrous or platy mineral. Ilmenite layers exsolved from the original magnetite are generally still preserved, and indicate the sites of original magnetite grains. There is little doubt that Fe leached from magnetite and ilmenite has helped form hornblende by reaction with clinopyroxene. Magnetite and ilmenite have low molar volumes, and they are present in much greater molar proportions than their modal percentages indicate.

Disseminated 20-100μ anhedra of pyrite commonly have much smaller blebs of chalcopyrite in contact with, or included in them. 1-30μ anhedra of chalcopyrite are commonly found as inclusions in heavily altered plagioclase. The sulphides now present are clearly related to the retrogression-- and seem likely to have formed at quite low temperature.

An approximate mode is: primary brown hornblende, 8%; clinopyroxene, 5%; plagioclase(much of it altered),38%; ilmenite, 4%; magnetite, tr; blue-green retrograde hornblende, 37%; epidote, 3%; sphene, 1%; prehnite, 1%, pyrite, 2%, chalcopyrite, ½%.

52.88m. Retrogressed banded mafic granulite.

Differs from the last sample in the following respects:- The even grain-size and granoblastic textute of the high-grade assemblage are typical of basic granulites. Coarse-grained clinopyroxene or pseudomorphs after it are absent. All pyroxenes have been pseudomorphed by sheafs of fibrous amphibole. In this sample it shows strong compositional zoning. Near its contact with plagioclase hornblende is blue-green, but in the inner parts of the sheafs pale actinolite predominates. Plagioclase(An_{48}) is almost unaltered. A small amount of biotite has formed along old grain boundaries during retrogression. Biotite and green hornblende have replaced magnetite, leaving only the exsolved (111) lamellae of ilmenite. It is probably a mistake to suppose that a reduction of f_{O_2} is needed to consume magnetite. Formation of ferrohastingsite-rich hornblende during retrogression could achieve this without movement of O_2 or H_2. Consider the following retrograde reaction;

3Diopside+2Albite+Anorthite+Magnetite+Hypersthene+$2H_2O$

$\rightleftharpoons$ 2Ferrohastingsite + $3SiO_2$.

1% or so of marcasite is present in addition to pyrite. Both form 20-100µ anhedra of undoubted low-temperature origin. Rare 10-20µ blebs of chalcopyrite are associated with Fe sulphides. Very rarely, pyrite and chalcopyrite appear to have replaced magnetite by such a reaction as:

$2H_2S + Fe_3O_4 = FeS_2 + 2FeO$(into amphibole) + $2H_2O$.

Such reactions can involve changes of f_{O_2} because equilibria involving sulphides are linked to those involving O_2.

A trace of probable scheelite was observed in hand specimen under ultra-violet light, but none was found in thin section.

An approximate mode is: plagioclase, 45%; primary brown hornblende(which concentrates in layers), 7%; ilmenite, 5%; retrograde Ca-amphibole, 40%; pyrite, 2%; marcasite, 1%, chalcopyrite, tr..

57.83m. Hypersthene-Plagioclase-Apatite Pegmatite.

Stubby euhedral prisms of hypersthene up to 20mm long, and c. 10x1mm prisms of apatite are surrounded by coarse interlocking anhedra of slightly antiperthitic plagioclase(An_{23}), less common quartz, and rare biotite. Rare 200µ composite blebs of pyrite, chalcopyrite, sphalerite, and a brownish limonitic alteration were probably droplets of sulphide liquid trapped in the silicates (especially hypersthene) during crystallisation. Much smaller(<10µ) inclusions of a very high temperature hypersaline aqueous phase are abundant in apatite, and slightly less so in quartz. They are much less abundant in albite and hypersthene(which mineral they appear to have corroded during cooling). Most are crowded with anisotropic daughters, 4 or 5 crystals, probably different species, being quite common. Opaque and yellow crystals occur in some inclusions. They are probably mostly sulphates and sulphides. Rare inclusions contain liquid CO_2 in addition to an aqueous and a vapour phase, but many inclusions appear to contain no vapour phase at all.

A thick rind on each hypersthene grain has been altered to fibrous anthophyllite sharing c-axes with the original hypersthene. A little associated magnetite suggests movement of O_2, but not

0145

necessarily silica. A narrow outer rim of chlorite and green biotite separates the anthophyllite from plagioclase. A little pyrite, in the form of 10-20μ thick veins is associated with the retrogression.

An approximate mode is: hypersthene, 30%; anthophyllite, 15%; plagioclase,28%; apatite,14%; quartz,6%; primary brown biotite, 1%; secondary green biotite, chlorite, 3%; magnetite, 1%; pyrite, 1%; sphalerite, tr; chalcopyrite, tr.

58.98m. 2-pyroxene-hornblende granulite.

Most of the sample consists of an aggregate of polygonal 200-300μ grains of plagioclase(An_{80}, 40%), olive brown hornblende (30%), clinopyroxene (22%), orthopyroxene (5%), ilmenite (2%), and magnetite (½%). In a 3cm ?pegmatoid patch the grain sizes of clinopyroxene and hornblende tend to be larger(up to 5mm and 3mm, respectively). In another part of the section a single 3mm hypersthene grain showing quite prominent clinopyroxene exsolution lamellae has been bent and kinked through 60°. This is evidence of a high-temperature assemblage, possibly an igneous one, which predated the present granoblastic assemblage. In a few cracks and narrow veins ferromagnesian minerals have been altered to talc, haematite, with a tiny trace of marcasite and pyrite.

Notes added

High apatite contents, commonly associated with stratiform scheelite deposits, are, with the exception of the pegmatite(57.83m) ~~are~~ not observed here.

The 2V is a rather low one for orthopyroxene, suggesting a composition of around mg_{40} in all cases. This is perhaps more consistent with an igneous origin for the granulites. On the other hand if fine, persistent banding were typical in this hole a sedimentary origin could be possible.

R.N.England
15/12/81

Banding IS persistent in core as a whole. PH

Map No. SA/CO-4

4230(II)-1

DATE 7/12/81

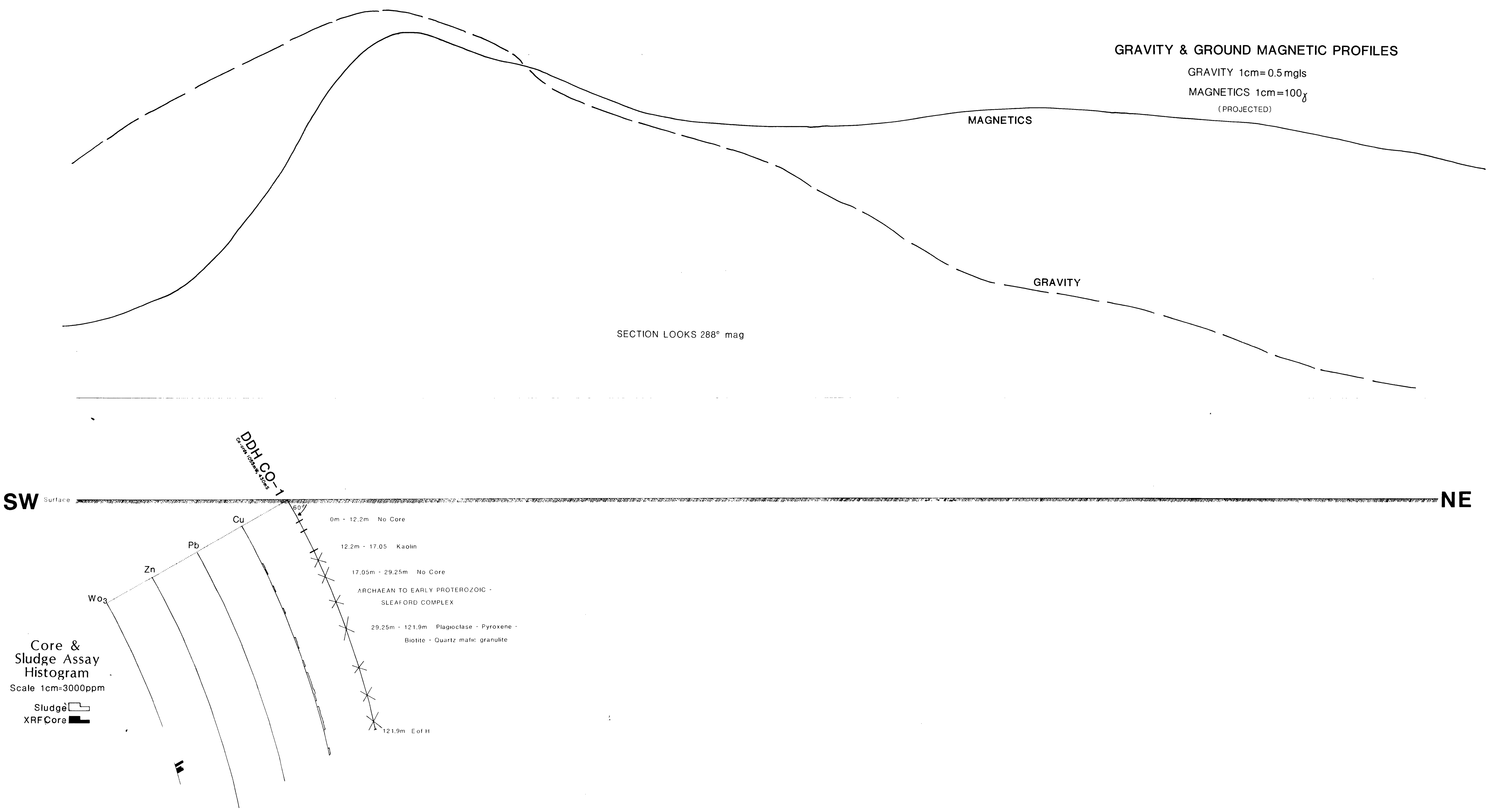
MAP No. SA/Co4

Map No. SA/CO-3

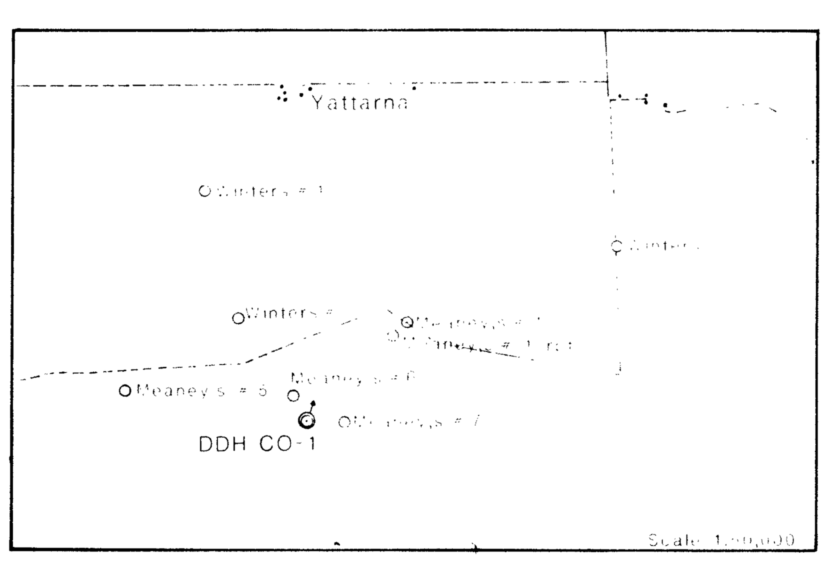
4230(II)-2

DATE 7/12/81

MAP No. SA/Co3



LOCATION MAP



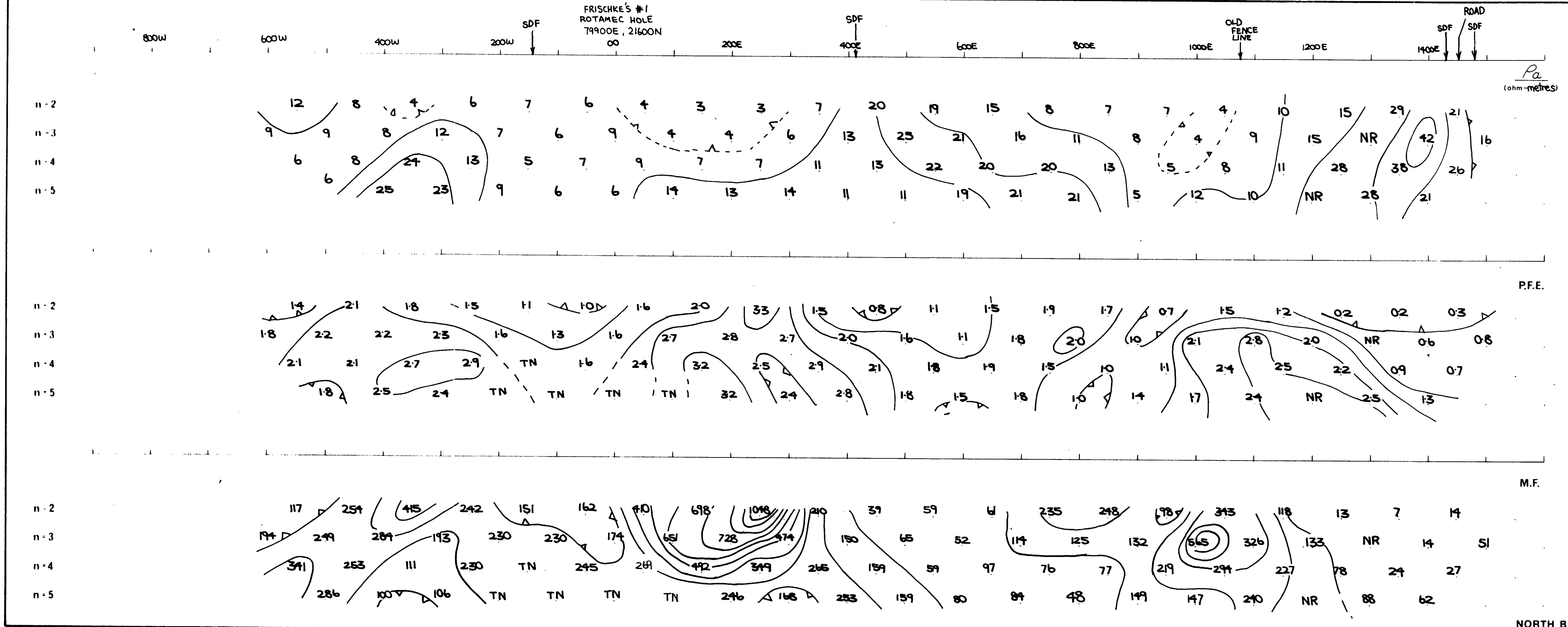
4230(II)-3

DDH CO-1
MEANEYS ANOMALY
COOTRA AREA E.L. 756

NORTH BROKEN HILL LTD, EXPLORATION DIVISION

Date 22/12/81 | Scale 1:1,000 | Map No SA/Co2


4230(II)-4
I.P. & MAGNETIC TRAVERSE LOCATIONS
COOTRA AREA E.L. 756 S.A.
Scale 1:50000
NORTH BROKEN HILL LTD / EXPLORATION DIVISION
Date Oct 1981
Map No.S.A. Co/J
LOCATION
AREA SHOWN
WHYALLA
Port Pirie
Wallaroo
Spencer Gulf
Vincent Gulf
Port Lincoln
LEGEND
Main road
Road
Track
Railway
Building
Lake
Land subject to inundation
Tank or dam
Quarry
I.P. Lines
E.L.756
E.L.756
KYANCUTTA
EYRE HIGHWAY
KOONGAWA
WARRAMBOO
COOTRA
NANTUMA
KOPI
HAMBIDGE CONSERVATION PARK
Lake Warramboo
"Tullamore"
"Rocky Pines"
Kyancutta Hill
"Pinegrange"
"Glen Roy"
"Lake Side"
"Omaroo"
"Bens Hill"
"Morana"
"Mamblin"
"Mambrae"
"Jungle Ranch"
"Piltainga"
"Pine Row"
"Lea-Brae"
"Pineslope"
"Arunta"
"Nosredna"
"Lincoln Dale"
"White Gates"
"Yattarna"
"Gunya"
"Delmore"
"Hilltop"
"Central"
"Broadview"
"Waroona"
"Karanda"
"Karinga"
"Roadview"
"Panorama"
"Fairview"
"Peak-View"
"Kiauna"
"Woodcombe"
"McLaghlan Station"
Frischkes 21600N



AREA: COOTRA

DATE: 16-17-9-81.
OPERATOR: P.R. DAVIS
L.R. DAVIS
LINE: FRISCHKE'S 21600N

ELECTRODE CONFIGURATION

nx
x T x R
x = 100m

FREQUENCY: 3·0 & 0·3 Hz

UNIT: AUSTRAL T842 Tx
McPHAR P660 Rx
SCALE: 1 horiz. unit = 100m
(One horiz. unit represents dipole interval x)

SYMBOLS:

- TL Too low, not recorded.
- TN Too noisy, not recorded.
- N Noisy
- NR Not recorded
- SDF Steel dropper fence
- WPF Wooden post fence

INDUCED POLARIZATION SURVEY

NORTH BROKEN HILL LTD EXPLORATION DIVISION

4230(II)-5

AREA: COOTRA

DATE: 18-20 & 21-9-81
OPERATOR: P.R. DAVIS
L.R. DAVIS

LINE: MEANEY'S GRID 00 NS

ELECTRODE CONFIGURATION

nx
x T · x R
x = 100m

FREQUENCY: 3·0 & 0·3 Hz

UNIT: AUSTRAL T842 Tx
McPHAR P660 Rx

SCALE: 1 horiz. unit = 100m
(One horiz. unit represents dipole interval x)

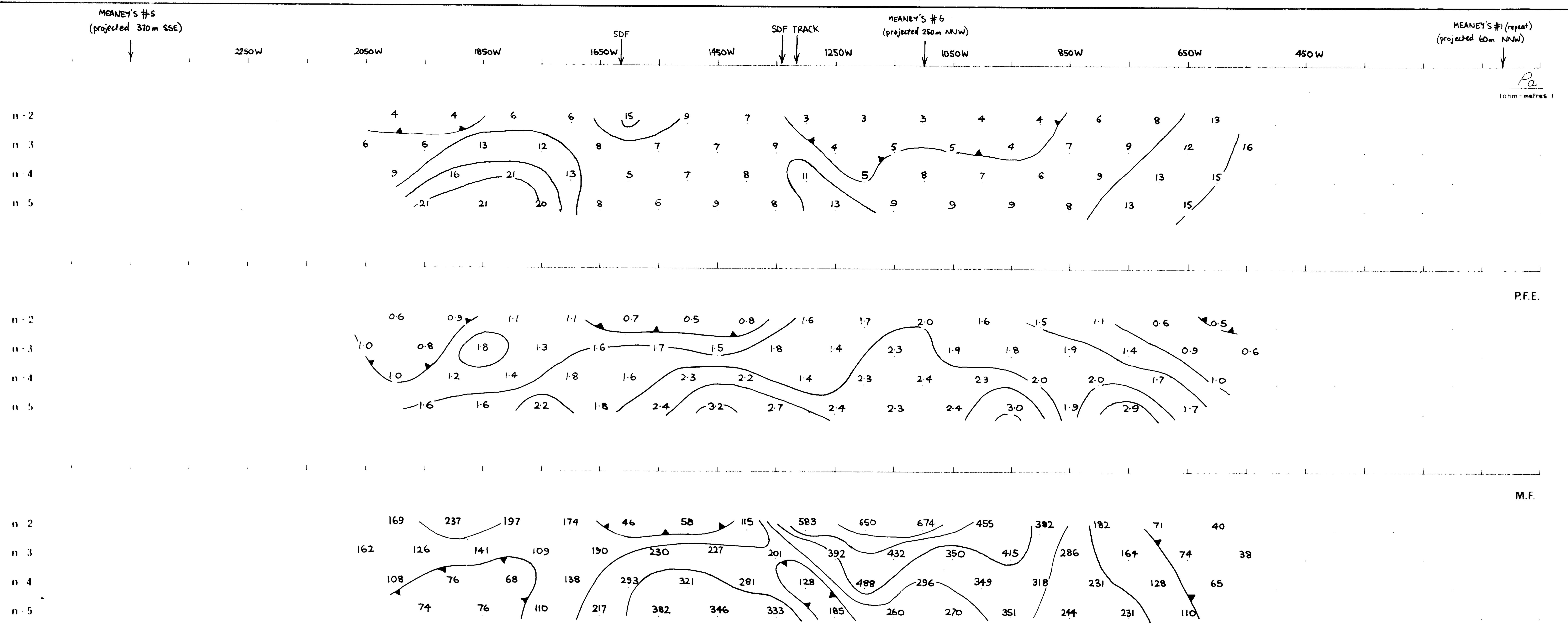
SYMBOLS:

TL Too low, not recorded.
TN Too noisy, not recorded.
N Noisy
NR Not recorded
SDF Steel dropper fence
WPF Wooden post fence

INDUCED POLARIZATION SURVEY

NORTH BROKEN HILL LTD EXPLORATION DIVISION

4230(II)-6



AREA: COOTRA

DATE: 7/10/81

OPERATOR: P. R. DAVIS
L. R. DAVIS

LINE: MEANEY'S GRID 00 NS
(Repeat: staggered)

ELECTRODE CONFIGURATION

nx

x T x R

x = 100m

FREQUENCY: 3·0 & 0·3 Hz

UNIT: AUSTRAL T842 Tx
McPHAR P660 Rx

SCALE: 1 horiz. unit = 100m
(One horiz. unit represents dipole interval x)

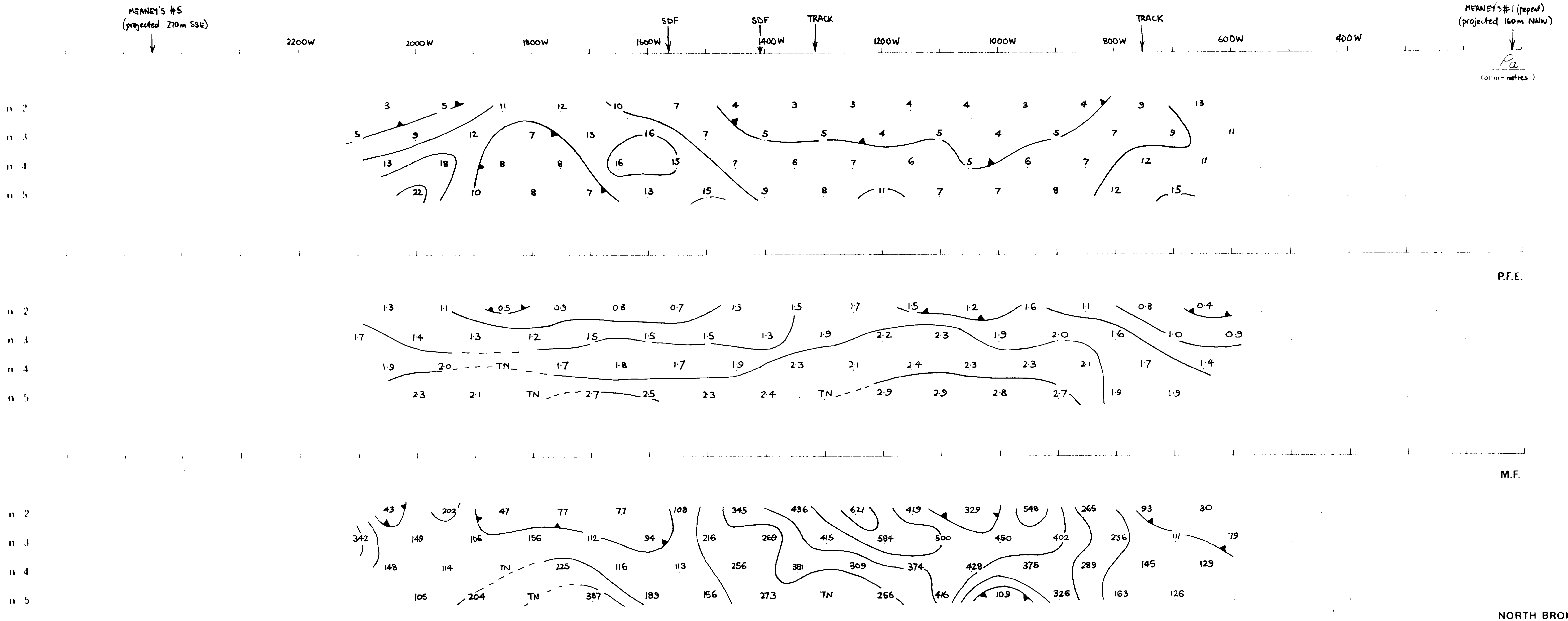
SYMBOLS:

TL	Too low, not recorded.
TN	Too noisy, not recorded.
N	Noisy
NR	Not recorded
SDF	Steel dropper fence
WPF	Wooden post fence

INDUCED POLARIZATION SURVEY

NORTH BROKEN HILL LTD EXPLORATION DIVISION

4230(II)-7



AREA: COOTRA

DATE: 14,15/10/81
OPERATOR: P.R. DAVIS
L.R. DAVIS

LINE: MEANEY'S GRID 100 N

ELECTRODE CONFIGURATION

nx
T
R
x = 100m

FREQUENCY: 3·0 & 0·3 Hz

UNIT: AUSTRAL T842 Tx
McPHAR P660 Rx

SCALE: 1 horiz. unit = 100m
(One horiz. unit represents dipole interval x)

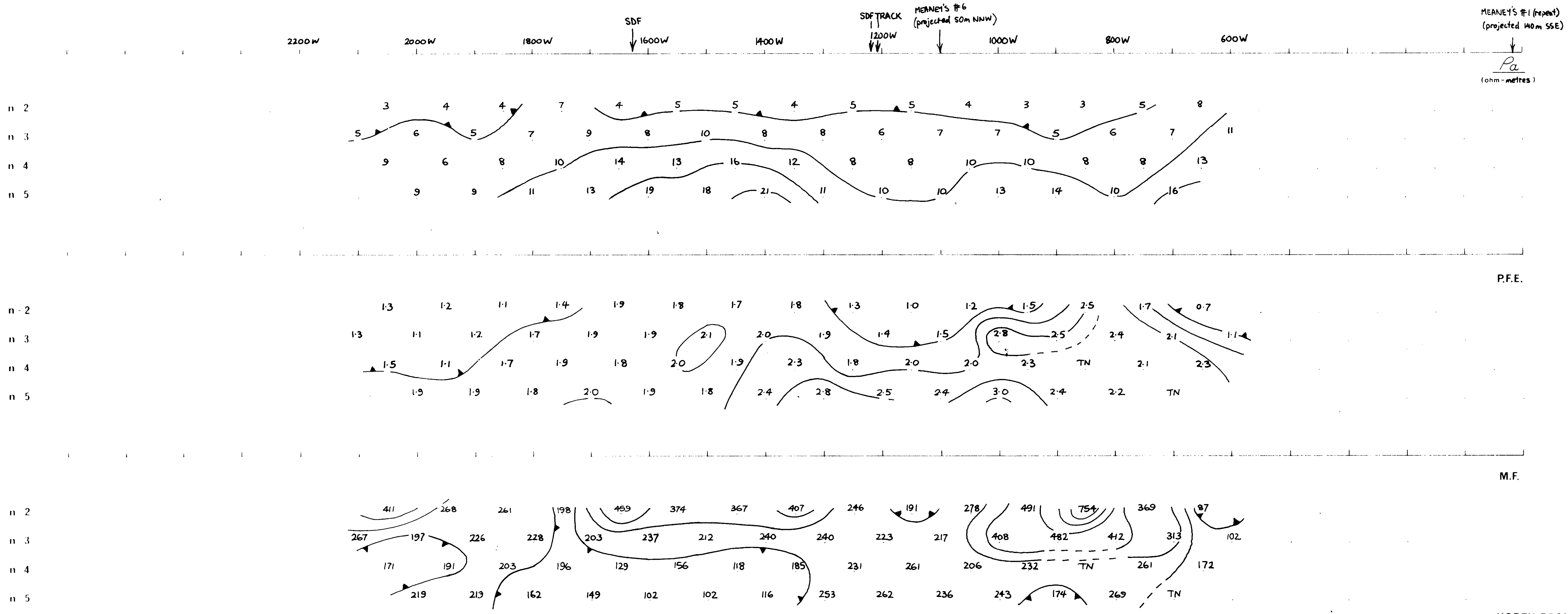
SYMBOLS:

TL Too low, not recorded
TN Too noisy, not recorded.
N Noisy
NR Not recorded
SDF Steel dropper fence
WPF Wooden post fence

INDUCED
POLARIZATION SURVEY

NORTH BROKEN HILL LTD EXPLORATION DIVISION

4230(II)-8



AREA: COOTRA

DATE: 8,9/10/81

OPERATOR: P.R. DAVIS
L.R. DAVIS

LINE: MEANEY'S GRID 200 S

ELECTRODE CONFIGURATION

nx
x T x R

x = 100m

FREQUENCY: 3·0 & 0·3 Hz

UNIT: AUSTRAL T842 Tx
McPHAR P660 Rx

SCALE: 1 horiz. unit = 100 m
(One horiz. unit represents dipole interval x)

SYMBOLS:

- TL Too low, not recorded.
- TN Too noisy, not recorded.
- N Noisy
- NR Not recorded
- SDF Steel dropper fence
- WPF Wooden post fence

INDUCED POLARIZATION SURVEY

4230(II)-9

NORTH BROKEN HILL LTD EXPLORATION DIVISION

II

0146

EXPLORATION LICENCE 980 (previously E.L. 756)

COOTRA AREA

SOUTH AUSTRALIA

Quarterly Report for Period 29th June, 1982
(includes work performed after 25/11/81)

NORTH BROKEN HILL LIMITED,
EXPLORATION DIVISION

18/6/82

INTRODUCTION

a) Location and Logistics

The Cootra exploration licence, No. 980 (previously E.L. 756) is located 320 kilometres northwest of Adelaide and 40 kilometres southeast of Wudinna, near the centre of Eyre Peninsula. Field activities were carried out from the Moonta exploration base, 130 kilometres north-northwest of Adelaide. The Eyre Highway passes just north of the area, and the Wudinna to Port Lincoln road and railway pass through its western extremity. Access within the licence area is possible via gravel and earth roads, passable in all but the wettest weather.

An Exploration Licence was applied for on 17/7/80, and granted as E.L. 756 on 26/11/80, for one year. After having been allowed to lapse due to an oversight, the late discovery of scheelite within the first diamond-drill hole resulted in a re-application being lodged on 8/12/81. The area was granted as E.L. 980 on 29/3/82.

The area is defined as follows;

Starting at the intersection of latitude 33°12'S and longitude 135°36'E, thence east to longitude 136°00'E, thence south to the northern boundary of Hambidge Conservation Park, thence west, and south along the boundary of said park to latitude 33°20'S, thence west to longitude 135°36'E, thence north to the point of commencement.

b) Topography and Land Use

Northwest-southeast trending longitudinal fixed sand dunes dominate the topography of the area, and are superimposed on an undulating plain formed on Quaternary and Tertiary sediments. Higher ground, with a soil development rather than sand dunes, appears to be formed near bedrock highs; it is within these areas that outcrop or sub-outcrop can be found. In the western part of the area, low-lying areas surround normally dry salt lakes. Numerous patches of the native mallee scrub are present, often anchoring the tops of sand dunes against wind erosion. Wheat farms dominate the ares, with minor sheep and cattle grazing and pig raising.

c) Previous Exploration

Aeromagnetic anomalies in the Warramboo and Kopi areas were investigated by the Department of Mines in the early 1960's for iron ore. Numerous ground magnetic and gravity traverses, and an aeromagnetic survey preceded the drilling, totalling four diamond-drill holes, 42 rotary-drill holes, nine percussion holes and 89 auger holes. Magnetite-bearing quartzo-feldspathic gneisses (metajaspilites) were the cause of the anomalies; the Fe content was not of economic grade.

Subsequently two small operators (Hudson and Wallace Pty. Ltd., and Eyre Peninsula Exploration Co. Pty. Ltd.) investigated the area in S.M.L. 49 and 62. Further work was restricted to drilling by Mines Administration Pty. Ltd. for uranium within the Tertiary.

Until North Broken Hill Exploration Divisions' work, no base metal exploration of the Pre Cambrian rocks in this licence area had been carried out, although licences surrounding the Cootra area had been held since late 1979.

REGIONAL GEOLOGY

The Gawler Block is a stable continental platform composed of Archaean to Early Proterozoic gneisses, metasediments and granites and Middle Proterozoic sediments, volcanics and granites. It extends to the Officer Basin in the north and west and to the continental shelf in the south; its eastern boundary is the Torrens Hinge Zone, separating it from the Adelaide Geosyncline.

The Archaean to Early Proterozoic Sleaford Complex is interpreted to extend from southern Eyre Peninsula, through the western half of the Peninsula (including Cootra area), then underneath the Gawler Range Volcanics, to reappear as the Mulgathing Complex in the north and north-west of the Gawler Block.

Both complexes consist mainly of quartzo-feldspathic gneisses intruded by granites, and minor metasediments and basic intrusives.

Outcrop of the Sleaford Complex is poor, especially near the Cootra area, and therefore much of the geology in interpretive.

GEOLOGY OF THE COOTRA LICENCE AREA

Department of Mines drilling was confined to the western third of the area, and intersected quartzo-feldspathic gneisses and metasediments with occasional martite/magnetite, garnet, biotite, or muscovite, and granite or granite-veined metasediments.

Only limited gology was obtained from logs of water bores and Mines Administration Pty. Ltd. drillholes in the vicinity (Table 1 and 2).

Sampling was carried out over all known outcrop or float occurrences, the dominating lithology being quartz-feldspar-biotite (garnet) gneiss. One locality in the northeastern corner yielded samples described as amphibolite but later petrologically identified as mafic granulite. Details are listed in table 3.

The bulk of geological information has come from North Broken Hill's drillholes.

1) Auger drilling - only a few holes reached weathered bedrock, but revealed granite, schist or amphibolite.

2) Percussion drilling - only 4 out of 44 holes were prevented from reaching bedrock by loose caving sand. Bedrock and weathered bedrock can be classified into several groups:

a) off white quartzo-feldspathic gneiss $\pm$ biotite, garnet, martite.
b) blue grey adamellite or granodiorite - often magnetic
c) quartzo-feldspathic-mica schist
d) coarse, red, magnetic post-orogenic granite.
e) amphibolite or dolerite
f) soapy (bedrock) clays - often multicoloured, with graphite
g) silty clay with fine quartz grit, minor pyrite in parts
h) near-pure white kaolinite with fine quartz grit represents weathered bedrock in many holes.

3) Diamond drilling - Following the discovery of scheelite within mafic granulite in DDHC-1, all further drillholes were directed towards this rocktype; except D.D. C7, which was aimed at the original target concept of stratiform sulphides. The retrogressed mafic granulite (DDH C-1) has these characteristics;

- primary mineralogy is clinopyroxene and plagioclase with lesser hypersthene and olive-brown hornblende and magnetite and ilmenite.
- retrogression of upper greenschist grade produced blue green hornblende and actinolite from the pyroxenes, sphene from ilmenite and formed pyrite, chalcopyrite and marcasite and altered the plagioclase.
- retrogression is present as pervasive alteration or as discrete coarse recrystallization or veining.
- uniformly banded throughout, suggesting an origin as basic tuffaceous sediments, or siliceous dolomites.
- scheelite is present as fine disseminations trending to parallel the banding, which is more irregular and slightly contorted in the scheelite zone.
- bands of quartz-plagioclase rock may represent chemical sediments.

As well as the retrogressed mafic granulite, various gneisses and granulites, composed of quartz, feldspar, biotite and lesser amphibole and garnet were encountered in the remaining six holes. These tend to grade towards the mafic granulites with increasing feldspar and amphibole (and pyroxene?).

XPLORATION PROCEDURE

Details of the exploration procedure and results can be found in the quarterly and monthly reports for E.L. 756.

This area was selected for exploration for the following reasons;

1) Possibilities of basemetals occurring in facies equivalents of the iron formations known in the area, at Warramboo.

2) The area was interpreted to be underlain by Archaean (to lower Proterozoic) age rocks. Loose analogies could then be drawn with the Yilgarn Block. In rock types, the area resembles the Willyama block, but the age is wrong.

3) A large broad gravity high is centred in the Cootra area, and the aeromagnetics available showed some anomalies were present. Hence, an Olympic Dam - type target was possible.

4) Most of the area has shallow cover and familiar exploration techniques could be used.

5) Possible lineaments cross the area.

Existing data, from Department of Mines and company drilling and geophysics, water well data and from outcrop and float occurrences were collected. Sampling and assaying of outcrop and float chips and Warramboo drill core was carried out for Cu, Pb, Zn, Ag, Ni, Co, Mo, Sn and occasionally Au and W, without anomalous results.

In order to guide future exploration, an aeromagnetic survey was flown by Geoex Pty. Ltd., over the eastern two-thirds of the licence, and the gravity high was detailed by a close-spaced survey on roads and fence junctions, and levelled using microbarometers.

Seventeen auger holes were drilled on roadsides near the centre of the gravity high zone in a trial program. Only a few holes recovered bedrock and geochemical values were very low.

A further 59 holes at 100m spacing were drilled to fill-in between the existing holes and twelve aeromagnetic anomalies were tested with up to three holes on each, but results were no better. Weathered schist, granite and amphibolite were recovered in a few holes, but in most cases there was no explanation for any magnetic anomaly drilled.

It was then decided to test most of the anomalies where auger drilling had failed, as well as other gravity and aeromagnetic anomalies, with percussion drilling. Ground magnetometer traverses were used to locate twelve holes, and a further 32 were completed, making forty-four holes in all. The cuttings were analysed for Cu, Pb, Zn, Ag, Ni, Co and Mo, and some for Sn, W and Au. The only values of note were weak Cu, Ni, Co and Zn values in the south-central (Meaney's) and northeast area. Weathered bedrock was represented by nearly pure white Kaolinite with angular quartz grit in many holes.

At this stage, the only area which had any encouragement at all was the Meaney's area. Several nearby percussion holes had weak geochemistry, pyrite or graphite and a NW-SE trending lineament had been interpreted from the aeromagnetics, as passing through this area. An I.P. line over Frischke's 1 anomaly had found no response, because overburden was too conductive.

The Meaney's Grid was then established, and three I.P. lines, four gravity lines and six ground magnetic lines were run over the area. Although the I.P. was later shown to be useless in this area, a coincident gravity-magnetic anomaly with a shallow source was shown to be present on line 400S. DDH C-1 was sited to test this anomaly, as a last resort before the area was dropped.

The hole recovered banded, retrogressed mafic granulite, which, because of its high density and strong magnetism, accounted adequately for both gravity and magnetic anomalies. Routine analysis of the sludges for Cu, Pb, Zn, Ag, Ni, Co and Mo yielded poor results. However, subsequent analysis of Sn, and W revealed anomalous tungsten values over nine metres.

An ultraviolet scan showed molybdenum-poor scheelite present between 81.3 and 99.6 metres, with the strongest zone (1-2% visual estimate scheelite) from 88.5m - 89.3m. Quarter-core cut from 85.4-101.2m showed the best interval was from 86.3-89.9m (3.6m @ 0.17% WO_3 X.R.F.)

Subsequently weathered bedrock in 18 percussion and 12 auger holes were analysed for tungsten, without any values being detected.

Because of the apparently stratiform nature of the scheelite, it was considered after some research, that the mineralized horizon could be followed along strike. The Felbertal deposit in Austria, and amphibolite (mafic volcanic)-hosted scheelite occurrences of the Willyama Block, were loosely used as models. Using the ground magnetics as a guide, DDH C-2 and C-3 tested southwards, and DDH C-4 northwards of DDH C-1. Of these, only DDH C-2 recovered significant scheelite. Subsequent study of the drillhole geology and the reading of three further ground magnetometer traverses showed a discrepancy in the actual and interpreted strike.

Interest was switched for a while to two other weaker magnetic-gravity anomalies on the Meaney's grid. Each anomaly was detailed with ground magnetics before drilling. Although successful in recovering mafic granulite, DDH C-5 (Meaney's west) and C-6 (Meaney's east) did not intersect scheelite-bearing strata.

Following these poor results, five aeromagnetic anomalies, widely spaced within the E.L., were selected for testing. A single ground magnetic traverse was carried out over each before the site was pegged.

Only one of the anomalies, the "Arunta" anomaly, was tested, with DDH C-7. This hole also recovered probably mafic granulite at the base; but weak traces of scheelite were present in a weathered, decomposed zone with graphite, pyrite and possible chalcopyrite within biotite-amphibole-feldspar-(chlorite-quartz) granulite or gneiss further up the hole.

At this stage field work ceased because of North Broken Hill Ltd.'s directors decision to cease all exploration on 30th June, 1982.

THE QUESTION OF A MODEL FOR THE COOTRA SCHEELITE MINERALIZATION

Scheelite mineralization at Cootra belongs to a group of deposits termed "stratiform tungsten". Three major groups of occurrences are found:

1) hosted by calcsilicates (regional skarns) in sequences dominated by metasediments.

2) associated with submarine ultramafic (Archaean) or mafic (Proterozoic-Palaeozoic) volcanics.

3) rarely as porphyroblasts in metasediments or in unusual chemical sediments.

The closest analogy is with the submarine Proterozoic mafic volcanic association. In metamorphic terrains the volcanics are represented by amphibolites (mafic granulite at Cootra) and the scheelite occurs within siliceous chemical sediments intercalated with the volcanics. Deposition occurs in a reducing environment, and so graphite and sulphides are common. Anomalous Mo, Cu, Pb, Zn, Be and Sn are often present, and lateral facies changes to exhalative base metals are possible (c.f. Broken Hill deposit).

1) Willyama Block: -Scheelite is present in garnet ±quartz ±epidote ±amphibole rock at the top of a broadly stratigraphic unit of garnet-amphibolite, considered to be equivalent to the Broken Hill mine sequence.

-Minor tourmaline-bearing sediments and quartz-gahnite rocks are present, representing chemical sediments.

-Scheelite occurs as coarse porphyroblasts in recrystallised amphibolite - implies remobilization.

-No distinctive geochemical or geophysical response is known.

2) Felbertal, Austria: -Palaeozoic - tectonic environment can be reconstructed: a) convergent plate margin

b) zoned from near trench Hg → Sb, W → Sb, As → W, carbonates → W, Mo, Bi, Cu, Au, Ag.

c) W associated with first phase of volcanism, spatially and genetically.

-Scheelite occurs in cherts within interbedded ultramafic, mafic, intermediate and acid meta volcanics, clastic and chemical metasediments.

-best scheelite is associated with anomalous Mo, Cu, Bi, Au, Ag, Be and Sn.

-transgressive siliceous zone is interpreted as hydrothermal conduit.

CONCLUSIONS

Prior to the drilling of DDH C-1 the area had yielded no encouragement, but the discovery of scheelite in that hole opened up new possibilities for the Cootra area and elsewhere within the Eyre Peninsula.

In order to explore the Cootra area beyond DDC-7, establishing a better understanding of the geology of the Meaney's area is suggested. A grid-pattern percussion-hole program would be the most efficient method of doing this, especially if a method of recovering a length of core at the bottom is available. Evidence of recrystallization, or of chemical sediments should be noted, and the direction of strike should be established.

Further analysis of the C-1 and C-2 drillcore for elements such as B, Hg, Bi, Be, Sb and As could be carried out to see if any geochemical halo is present around the mineralized horizon.

Once the nature of the mineralization is clarified,other areas of interpreted basic rocks in auger and percussion holes, and in float occurrences could be investigated. Results obtained by other explorers on the Gawler Craton (including Mulgathing Complex) could be scanned; these may be basic rocks not analysed for tungsten; other open areas could be taken up for exploration.

In short, the mineralization potential of the Cootra area has not been adequately tested,. Scheelite is now known to be present, but the original concept of basemetals in a facies relationship with the iron formations remains untested, and requires a further program of R.A.B. geochemical reconnaissance drilling.

P. S. Forwood
for
WAYNE COWLEY

Geologist,
North Broken Hill Limited/Exploration Division.

21/6/82

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ATTACHMENTS

1. *Statement of Expenditure*
2. *List of Plans*
3. *Table 1 - "Geology of water bores in the vicinity of Darke Peak Area".*
4. *Table 2 - "Mines Administration Pty. Ltd., Drill Holes in SML 645, Eyre Peninsula".*
5. *Table 3 - "Float and Outcrop Samples collected from E.L.'s 756 and 980, Cootra Area, S.A."*

EXPLORATION LICENCE NO. 980

EXPENDITURE

1ST DECEMBER, 1981 - 31ST MAY, 1982

Elements of Expense

Salaries	13,289
Wages	2,336
Contractors	38,787
Fuel, Repairs, Stores	3,674
Travel	1,181
Camp Rations	371
Lease Rents, Title Fees	943
General Charges	9,577
Administration	6,841
	$76,999

Activities

Geology	15,147
Sampling - Analysis	2,712
Magnetics	815
Gravity	585
Land Tenure	1,021
Vehicles General	2,114
Diamond Drilling	47,340
Vehicles Drilling	424
Administration	6,841
	$76,999

Cumulative expenditure to date (including E.L. 756) - $191,461

Attachment No. 2

LIST OF PLANS

DRILLHOLE LOCATIONS, - SCALE 1:50,000 - MAP NO. SA C/1H

LOCATION OF MEANEY'S GRID, - SCALE 1:10,000

MEANEY'S GRID, GRAVITY PROFILES, - SCALE 1:5000 :-

LINE 800N

LINE 400N

LINE 00NS

LINE 400S

MEANEY'S GRID, MAGNETIC PROFILES, - SCALE 1:5000 :-

LINE 800N

LINE 400N

LINE 100N

LINE 00NS

LINE 200S

LINE 400S

MEANEY'S PROSPECT, INTERPRETIVE GEOLOGY, - SCALE 1:1000

MEANEY'S PROSPECT, DDH LOCATION AND GROUND MAGNETICS CONTOURS, - SCALE 1:2500

MEANEY'S PROSPECT, GROUND MAGNETIC TRAVERSES OVER DDH'S, - SCALE 1:2500 :-

DDH C-1

DDH C-3

DDH C-4

DDH C-5 (MEANEY'S WEST)

MEANEY'S EAST AREA, DDH LOCATIONS AND GROUND MAGNETIC CONTOURS, - SCALE 1:2500

1.3KM SOUTH OF MEANEY'S, GROUND MAGNETIC CONTOURS, - SCALE 1:2500

"MAY'S 4A" TRAVERSE, GROUND MAGNETIC PROFILE, - SCALE 1:5000

"ARUNTA" TRAVERSE, GROUND MAGNETIC PROFILE, - SCALE 1:5000

"BROADVIEW" TRAVERSE GROUND MAGNETIC PROFILE, - SCALE 1:5000

"HIER'S" TRAVERSE, GROUND MAGNETIC PROFILE, - SCALE 1:5000

"HEATH'S" TRAVERSE, GROUND MAGNETIC PROFILE, - SCALE 1:5000

CROSS SECTION, DDH C-2, - SCALE 1:1000 - MAP NO. SA/C5

CROSS SECTION, DDH C-3, - SCALE 1:1000 - MAP NO. SA/C6

CROSS SECTION, DDH C-4, - SCALE 1:1000 - MAP NO. SA/C7

CROSS SECTION, DDH C-5, - SCALE 1:1000 - MAP NO. SA/C9

CROSS SECTION, DDH C-6, - SCALE 1:1000 - MAP NO. SA/C8

CROSS SECTION, DDH C-7, - SCALE 1:1000 - MAP NO. SA/C10

MEANEY'S GRID, GROUND MAGNETIC CONTOURS, - SCALE 1:5000 - MAP NO. SA/C4

MEANEY's GRID, BOUGUER GRAVITY CONTOURS, - SCALE 1:5000 - MAP NO. SA/C3

TABLE I

GEOLOGY OF WATER BORES IN THE VICINITY OF DARKE PEAK AREA

HUNDRED	SECTION		DEPTH		GEOLOGY
Koongawa	12		31.7m -	42.4m	quartz feldspar gneiss.
Cootra	15		38.7m -	43.9m	quartzite, grey quartz-feldspar gneiss.
	63		32m		N/BR.
Mamblin	7		14.6m -	37.8m	quartz-feldspar gneiss + mica.
	23		38.1m -	39.3m	green decomposed schist.
Warramboo	11		13.7m		N/BR.
	27		11.3m		N/BR.
	Warramboo	(1)	9.4m		N/BR.
		(2)	7.2m		N/BR.
		(3)	6.1m		N/BR.
Wannamana	5		21.9m -	46.0m	weathered mica schist.
	13	(1)	14.0m		N/BR.
		(2)	14.9m		N/BR.
	19		6.4m -	21.0m	lignitic sand.
			21.0m -	28.3m	micaceous clay WB?
	Kyancutta		25.0m		N/BR.
Ulyerra	2 (Musgrave Bore)		29.0m -	68.6m	lignite-bearing.
			105.5m -	106.7m	granite.
	41		27.4m -	79.2m	lignite-bearing.
			82.3m		N/BR.
	43		26m -	39m	carbonaceous sand.
			39m		N/BR.

HUNDRED	SECTION		DEPTH		GEOLOGY
Panitya	2		29.0m -	52.4m	weathered grey amphibolite.
	3		38.7m -	44.2m	micaceous clay + silt + sand.
			44.2m -	49.7m	micaceous clay + grey slate.
	4	(1)	42.7m -	47.2m	micaceous clay WB?
		(2)	55.5m		N/BR.
	6	(1)	47.2m -	56.4m	clay + mica + quartz WB?
		(2)	58.2m -	59.1m	green weathered mica schist + quartz veining.
		(3)	24.4m		decomposed granite.
	11		40.2m	45.1m	grey gritty clay + mica WB?
	17		21.6m -	35.4m	weathered gneiss.
			35.4m -	35.8m	grey-pink dense banded gneiss.
	19		36.0m -	36.6m	grey clay + quartz grit mica WB?
Caral~~e~~ue	5		50.0m		N/BR.
	15		0m -	32.0m	gneiss, altered to 21.3m.
	19	(1)	30.5m -	36.6m	mica schist.
			36.6m -	45.7m	sandstone + quartz.
			45.7m -	61.0m	sandstone + quartz + granite.
			61.0m -	65.5m	micaceous sandstonte.
			65.5m -	70.1m	granite.
			70.1m -	73.2m	quartzite.
			73.2m -	76.2m	black quartz + granite.
			76.2m -	79.2m	"bedrock".
		(2)	75.6m -	79.2m	weathered pink gneiss.
			79.2m -	82.3m	light grey dense gneiss.
	20		5.5m -	7.5m	weathered gneiss.
			7.5m -	8.2m	brown-grey fine grained quartz-feldspar gneiss.
			8.2m -	8.5m	light grey medium grained dense quarta feldspar gneiss.
	24		22.6m -	32.3m	clay + mica WB?

HUNDRED	SECTION		DEPTH	GEOLOGY
	82	(1)	75.9m - 77.7m	"decomposed rock".
			77.7m - 89.9m	mica schist, quartz, sandstone, granite.
			89.9m - 92.0m	medium grained quartz-feldspar gneiss.
		(2)	0.3m - 64.0m	sand + clay + mica N/BR.
			64.0m - 80.8m	sand + gravel of quartz-feldspar gneiss N/BR.
			80.8m - 82.3m	pink quartz-feldspar gneiss.
	90	(1)	0m - 61.0m	"granite".
		(2)	66.4m - 66.6m	quartz-feldspar-mica pegmatite.

Attachment No. 4

0163

TABLE 2

MINES ADMINISTRATION PTY. LTD.

DRILL HOLES IN S.M.L. 645, EYRE PENINSULA

Hole No.	SI 53-7 grid ref	Geology	
DP 6	415 /872	51.8m-57.9m	pC
7	412 /875	4.6m	Quat ? siliceous-limonitic-haematite banded rock and quartzite.
8	406 /878	25.9m-35.1m	pC decomposed to 30.5m
9	415 /874	24.4m-27.4m	pC
10	412 /870	59.4m-60.1m	quartzite
11	409 /870	45.1m-46.3m	granite gneiss
12	415 /875	41.1m-42.1m	pC
13	415.5/878	42.7m-44.2m	pC
14	410 /881.5	22.9m-24.4m	pink feldspar, green accessory minerals, feldspar. (granite?).
15	408 /884	47.2m-50.3m	pC
16	403 /884.5m	76.2m-80.8m	pC
17	400 /884	39.6m-40.5m	pC
18	400 /889	1.5m-5.5m	granite gneiss, decomposed to 5.5m.
19	395 /885	56.4m-57.9m	pC
20	389 /884	9.1m	N/BR (siliceous ironstone at 7.6m).
21	338 /886	50.3m-51.8m	decomposed granite gneiss
22	388 /889	65.5m-68.6m	decomposed mica schist
23	402 /884	76.2m	N/BR (pyritic sandstone to 26.2m).
23A	(15.4m W of 23)	65.5m	N/BR
24	402 /881.5	74.7m-76.2m	pC
28	404 /881	36.6m	N/BR (granite gneiss at T.D.?).
29	403 /881.2	35.1m-45.7m	pC "metamorphics"
30	402 /882	64.0m-70.1m	pC
31	401 /882.5	44.2m-47.2m	pC
32	401.5/882	77.7m-79.2m	pC
33	401 /881	47.2m	N/BR

TABLE 3

FLOAT AND OUTCROP SAMPLES COLLECTED FROM E.L.'s 756 & 980, COOTRA AREA, S.A.

See Map No. SA/Cld for locations

	Locality 1	
Sample	"WMC 80/15"	Calcrete with manganiferous ironstone pebbles included.
	Locality 2	
Sample	"WMC 80/16"	Foliated and lineated quartz-feldspar-biotite gneiss. Minor red garnet.
Sample	"WMC 80/17"	Weakly foliated quartz-feldspar-biotite gneiss or foliated granite.
	Locality 3	
Sample	"WMC 80/18"	Grey calcrete (Mn?)
	Locality 4	
Sample	"WMC 80/19"	Iron-enriched iron formation
Sample	"WMC 80/20"	Iron formation (haematite-rich quartz-feldspar gneiss).
	Locality 5	
Sample	"WMC 80/21"	Coarse quartz-feldspar-biotite schist.
Sample	"WMC 80/22"	Weakly foliated bluish quartz-feldspar-biotite gneiss.
Sample	"WMC 80/23"	Highly altered red-buff clayey ?metasediment (may not be bedrock).
Sample	"WMC 80/24"	Coarse equigranular quartz-feldspar-biotite granulite.
Sample	"WMC 80/25"	Bluish fine grained augen gneiss with garnet.
	Locality 6	
Sample	"WMC 80/26"	Cavernous red-yellow haematitic-limonitic grit.
Sample	"WMC 80/27"	Red, haematitic cherty rock with quartz grit
	Locality 7	
Sample	"WMC 81/6"	Mottled red and grey lateritized schist
	Locality 8	
Sample	"WMC 81/7"	Quartz-feldspar-biotite-garnet gneiss
	Locality 9	
Sample	"WMC 81/8"	Greenish ?clay
Sample	"WMC 81/9"	Massive manganese-oxide rock with quartz grit
	Locality 10	
Sample	"WMC 81/10"	Even grained buff quartz-feldspar granulite.
Sample	"WMC 81/11"	Quartz-perthite-muscovite pegmatite
Sample	"WMC 81/12"	Glassy green ?amphibolite (petrology: garnet-ferrohypersthene-plagioclase-quartz-metasediment)

Sample	*"WMC 81/13"*	*weathered green ?amphibolite (petrology: hornblende-grunerite-plagioclase-quartz amphibolite).*

Locality 11

Sample	*"WMC 81/14"*	*Cherty quartzite*
Sample	*"WMC 81/15"*	*Fine grained green mylonite (petrology: mylonite)*
Sample	*"WMC 81/16"*	*Green-buff feldspar-augen gneiss*
Sample	*"WMC 81/17"*	*Fine grained ?amphibolite (petrology: diopside-actinolite-chlorite-plagioclase-prehnite-zoisite rock - retrogressed mafic granulite)*
Sample	*"WMC 81/18"*	*Coarse grained ?amphibolite (petrology: 2-pyroxene mafic granulite).*

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-2

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 1005W, 517 S

R.L. - **BEARING (Mag)** 018° **DIP** 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			Brief Log of DDH C-2.	
0m	37.0m		No Core.	
			ARCHAEAN TO EARLY PROTEROZOIC - SLEAFORD COMPLEX	
37.0m	81.95m		Weakly to moderately well banded, light grey to pink quartz-feldspar-biotite gneiss or granulite. Minor feldspar-quartz-magnetite pegmatitic segregations. Minor magnetite and pyrite.	
81.95m	157.05m		Dark green-grey, weakly to moderately well banded, weakly to strongly retrogressed, hornblende-plagioclase- two pyroxene mafic granulite. Minor pyrite increasing to 1-2% in more retrogressed zones and in the scheelite-rich zone. Trace scheelite throughout except:- 119.0m - 124.1m minor scheelite. 127.4m - 129.5m minor scheelite. 145.0m - 146.0m minor scheelite. 146.0m - 147.7m ≈ 0.4% scheelite. 147.7m - 149.9m minor scheelite.	
157.05m	159.7m		Quartz-feldspar-biotite gneiss as for 37.0m - 81.95m.	
159.7m	187.0m		Variably retrogressed mafic granulite as for 81.95m - 157.05m.	
187.0m			END OF HOLE.	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-2

STATE South Australia AREA Cootra

GRID Meaney's grid CO-ORDS 1005W, 517S

R.L. - BEARING (Mag) 018° DIP. 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
0m	37.0m		No Core.	
			ARCHAEAN TO EARLY PROTEROZOIC - SLEAFORD COMPLEX	
37.0m	81.95m		<u>Weakly to moderately well banded, light grey to pink quartz-feldspar-biotite gneiss or granulite</u>.	
			Generally moderately well banded, the banding defined by dark, relatively biotite-rich layers to a few mm alternating with light relatively quartz-feldspar rich layers to 1-3cm. The biotite-rich layers are often discontinuous. Weakly banded zones are less common, are of a similar composition (possibly a little more biotite) with the rock having a more mottled texture.	
			Pink, feldspar-quartz rich granoblastic granulite-gneiss layers generally to several cm occur intercalated with the quartz-feldspar-biotite gneiss. These granulite bands reach 30cm and appear gradational with both the pegmatitic segragations and the quartz-feldspar-biotite gneiss.	
			Minor feldspar-quartz-magnetite pegmatitic segragations occur throughout, with individual grains reaching 2cm. The segragations are generally up to several cm thick.	
			The moderately well banded material is fine grained (grains up to 0.5mm) while the weakly banded, mottled material is fine to medium grained (grains to a few mm).	
			Minor mafic (dolerite) dykes to 10cm, crosscutting the banding, very sharp boundaries, mid-dark green.	
			Minor magnetite occurs throughout, but concentrated in pegmatitic segragations as anhedral grains or clots reaching 1cm. Minor disseminated pyrite.	
			Average 30-45% feldspar, 30-40% quartz, 5-20% biotite.	
			37.0m - 40.0m Weakly weathered, moderately to strongly broken, moderately well banded.	
			42.95m - 42.98m Mafic dyke.	
			47.8m - 47.9m Mafic dyke.	
			56.2m - 56.4m Feldspar-quartz-minor biotite granulite layer, average grainsize 2-5mm, minor magnetite.	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-2

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 1005W, 517S

R.L. - **BEARING (Mag)** 018° **DIP** 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			57.0m - 57.3m Strongly broken.	
			57.3m - 57.68m Weakly banded, mottled.	
			57.68m - 57.98m Feldspar-quartz granulite layer, average grainsize few mm, 1% pyrite. Pegmatite over lower few cm's with 2% magnetite.	
			57.98m - 63.4m Weakly banded, mottled.	
			69.0m - 69.3m Feldspar-quartz-minor biotite granulite, average grainsize several mm.	
			71.0m - 71.25m Granulite, average grainsize 3-7mm.	
			72.35m - 72.42m Pegmatite segragation, average grainsize 1cm, reaching 2cm, 8% magnetite grains or clots to 1cm.	
			81.0m - 81.42m Granulite, average grainsize 2-5mm, numerous small segragations or granulite horizons occur in this zone. The quartz is a greyish-purple colour.	
			81.95m Relatively sharp contact between two distinct rock types; probably modified slightly by metamorphism; appears conformable.	
81.95m	157.05m		<u>Dark green-grey, weakly to moderately well banded, hornblende-plagioclase-two pyroxene granulite.</u> Weakly to strongly retrogressed resulting in the formation of blue-green hornblende and minor biotite and epidote, giving the more retrogressed zones a greener colour. The more retrogressed zones are generally discordant with the banding. The banding is defined by dark grey to black bands (often discontinuous) generally less than 1cm thick alternating with mid grey relatively feldspar-rich bands to a few cm.	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-2

STATE South Australia AREA Cootra

GRID Meaney's grid CO-ORDS 1005W, 517S

R.L. - BEARING (Mag) 018° DIP 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°

Minor felsic granulite segragations occur throughout and rarely exceed several cm. Feldspar, quartz, pyroxene and biotite are the main constituents. The segragations range from fine grained to pegmatitic in grainsize. The segragations may in part represent original primary compositional banding.

Trace disseminated scheelite from 112.9m, but becoming strongly mineralized between 145.0m - 147.7m. Minor pyrite throughout except 1-2% in strongly retrogressed zones and up to 1% in mineralized scheelite zone between 145.0m - 147.7m. Average 4% disseminated magnetite.

90.0m	-	92.0m	Felsic segragations (felsic granulite grading to pegmatite) to several cm.
100.7m	-	101.2m	Strongly retrogressed bluish-green colour, very rich in secondary blue-green hornblende.
101.2m	-	108.0m	Moderately retrogressed with several small strongly retrogressed bluish-green zones to a few tens of cm.
119.-m	-	124.1m	Minor scheelite-quartz-feldspar vein at 120.2m - 120.35m.
127.4m	-	129.5m	As for 101.2m - 108.0m, minor scheelite.
129.5m	-	130.5m	Strongly retrogressed, blue-green.
133.8m			1cm blue quartz vein.
140.35m	-	140.75m	Strongly retrogressed, blue-green.
141.35m	-	141.45m	Distinct coarse grained feldspar-quartz-biotite pegmatite.
145.0m	-	146.0m	Minor scheelite visible under U.V., occurs as fine specks concentrated in layers parallel to rock banding.

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-2

STATE South Australia AREA Cootra

GRID Meaney's grid CO-ORDS 1005W, 517S

R.L. - BEARING (Mag) 018° DIP 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			146.0m - 147.7m Approximately 0.4% scheelite, generally fine specks but some grains(?) to 1mm, occasionally in aggregates to a few mm, occurs concentrated in pyrite-rich layers parallel to rock banding (metamorphic and/or original sedimentary layering ?). Rock becomes moderately retrogressed down hole.	
			147.7m - 149.0m Minor scheelite, moderately retrogressed.	
			149.0m - 149.2m Strongly retrogressed.	
			154.0m - 155.0m 10% felsic segragations to several cm.	
			156.55m - 156.68m Very well banded (few mm - 1cm bands) siliceous zone; biotite -rich strongly retrogressed zone with numerous felsic bands.	
			157.05m Relatively sharp conformable contact.	
157.05m	159.7m		Quartz-feldspar-biotite gneiss-granulite as for 37.0m - 81.95m.	
			Moderately well banded, pink to light grey.	
			157.05m - 157.15m Cream-pink.	
			157.15m - 158.15m Pink with numerous coarse (few mm) granulite segragations to a few cm.	
			158.15m - 158.75m Light grey.	
			158.75m - 159.7m Pink with moderate coarse granulite segragations.	
			159.7m Relatively sharp conformable contact.	
159.7m	187.0m		Variably retrogressed mafic granulite as for 91.95m - 157.05m.	
			160.2m - 160.45m Moderately retrogressed.	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-2

STATE *South Australia* **AREA** *Cootra*

GRID *Meaney's grid* **CO-ORDS** *1005W, 517S*

R.L. - **BEARING (Mag)** 018^{o} **DIP** 60^{o}

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			169.0m - 178.0m Often moderately retrogressed.	
			178.7m - 178.8m Strongly retrogressed.	
			178.8m - 178.92m Quartz-feldspar-biotite-hornblende pegmatitic segragation.	
			178.98m - 179.55m 80% quartz-feldspar layers to 15cm, conformable with overall rock banding.	
			179.55m - 180.3m Strongly retrogressed.	
			180.3m - 180.36m Quartz-feldspar-hornblende pegmatitic segragation.	
187.0m			END OF HOLE.	
			No scintillometer response	
			UV scan: [illegible] scheelite present [illegible]	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-3

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 925mW, 575mS

R.L. - **BEARING (Mag)** 078° **DIP.** 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			Brief Log of DDH C-3.	
0m	30.0m		No Core.	
			ARCHAEAN TO EARLY PROTEROZOIC - SLEAFORD COMPLEX	
30.0m	44.8m		Weakly to moderately well banded, feldspar-amphibole-biotite-quartz granulite, gradational between quartz-feldspar-biotite granulite-gneiss and mafic granulite.	
44.8m	49.6m		Massive, green, strongly chloritized dolerite dyke, coarse felted texture, minor host rock inclusions.	
49.6m	54.6m		Strongly re-crystallized feldspar-amphibole-biotite-quartz granulite with several thin dolerite dykes.	
54.6m	55.8m		Massive, dark green-grey, moderately chloritized dolerite dyke.	
55.8m	69.5m		Dark green-grey, weakly banded mafic granulite. Abundant quartz-feldspar bands.	
69.5m	71.7m		Feldspar-amphibole-biotite-quartz granulite intercalated with mafic granulite.	
71.7m	76.0m		Moderately to strongly retrogressed mafic granulite. Trace scheelite at 73.0m and 75.25m.	
76.0m	77.4m		Weakly foliated, whitish grey to pink, quartz-feldspar-lesser chlorite granulite.	
77.4m	78.8m		Moderately to strongly retrogressed mafic granulite as for 71.7m - 76.0m.	
78.8m	83.65m		Massive to very weakly foliated, pink, quartz-feldspar-minor chlorite granulite, similar to 76.0m - 77.4m.	
83.65m	92.0m		Light grey, weakly to moderately well banded, quartz-feldspar-biotite granulite-gneiss. The rock becomes less gneissic in character down hole.	
92.0m			END OF HOLE.	
			No scintillometer report	
			[illegible]	
			73.0 - 75.25m	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-3

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 925mW, 575mS

R.L. - **BEARING (Mag)** 078° **DIP** 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
0m	30.0m		No Core.	
			ARCHAEAN TO EARLY PROTEROZOIC - SLEAFORD COMPLEX	
30.0m	44.8m		Weakly to moderately well banded, feldspar-amphibole-biotite-quartz granulite.	

Gradational between the quartz-feldspar-biotite granulite-gneiss and the mafic granulite seen in DDH C-2.

The banding is defined by dark grey to black amphibole rich layers to a few cm alternating with light grey to white feldspar-quartz-rich layers or segragations to a few cm. Overall the rock is dark grey with numerous white patches and bands.

The rock is weakly to moderately weathered and weakly to strongly broken.

Fine to medium grained, average grainsize 1mm, grains rarely exceed a few mm. The biotite is brown in colour.

Minor strongly magnetic (more mafic) zones, generally non-magnetic. Trace disseminated pyrite.

31.7m	-	33.0m	Moderately to strongly broken, moderately sheared.
33.0m	-	33.6m	Mafic granulite, strongly magnetic.
35.0m	-	36.4m	Strongly siliceous, light grey, composed mainly of quartz and feldspar.
36.6m	-	40.4m	Moderately broken.
41.0m	-	44.1m	Moderately broken.
41.8m	-	41.9m	Massive quartz-feldspar zone.
44.1m	-	44.8m	Strongly broken.
44.8m			Relatively sharp contact.

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
44.8m	49.6m		Massive, green strongly chloritized dolerite dyke.	

Weakly to moderately weathered and broken, medium to coarse grained,average grainsize 1-3mm with zones containing coarse porphyroblasts to several

0173

No Core 0m - 30.0m

MACHINE L-44	NX-NQ 30.0m - 128.33m	LOGGED BY R. Sielecki	
DRILLERS D.M.C. Drilling	BX-BQ -	FINAL CORE STORAGE	Moonta
DATE COMMENCED 19.03.82	AX-AQ -		
DATE COMPLETED 24.03.82	EX -		

ASSAYS						AVERAGE ASSAYS						HOLE SURVEY			
From'	To'	Width'				From'	To'	Width'				Depth'	Mag. Az.°	Trop. Dip.°	Corr. Etch. Dip.°
												0m	018°	60°	
												40m	015°	61°	
												85m	016°	61°	
												90m	018°	60°	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-3

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 925mW, 575mS

R.L. - **BEARING (Mag)** 078° **DIP** 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles
			mm with chlorite alteration rims. The rock often has a medium-coarse felted texture defined by a network of feldspar and chlorite (psuedomorphs) grains to a few mm. Minor host rock inclusions to a few tens of cm occur throughout.Minor disseminated pyrite. The down hole contact is not visible due to core loss.	
49.6m	54.6m		Strongly re-crystallized feldspar-amphibole-biotite-quartz granulite. Similar to 30-44.8m except grains generally several mm across due to coarse re-crystallization.Several thin dolerite dykes as for 44.8m - 49.6m. The lower 25cm contains abundant pink feldspar-quartz veining or segragations. Weakly to moderately broken. Contact down hole obscured by strong K-feldspar-quartz pegmatite veining.	
54.6m	55.8m		Massive, dark green-grey, moderately chloritized dolerite dyke. Similar to 44.8m - 49.6m. Moderate K-feldspar (pink-orange) veining to 1-2cm. Variations within the dyke are similar to those in 44.8m - 49.6m. Minor inclusions of mafic granulite. Sharp contact down hole.	
55.8m	69.5m		Dark green-grey weakly banded mafic granulite. Similar to the mafic granulite in DDH C-2. Weakly to strongly retrogressed, resulting in the formation of blue-green hornblende and biotite. The retrogressed zones are discordant with banding. Abundant feldspar-quartz bands, segragations and veins to several cm occur throughout. Minor dolerite dykes to several tens of cm, rare after 59.0m. Minor pyrite, pyrrhotite and magnetite throughout. The rock is weakly to strongly magnetic. Sharp contact down hole.	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-3

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 925mW, 575mS

R.L. - **BEARING (Mag)** 078° **DIP** 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
69.5m	71.7m		Feldspar-amphibole-biotite-quartz granulite intercalated with mafic granulite. Similar to 30.0m - 44.8m except banding more distinct. Well banded,white and dark green-grey bands averaging a few cm across. The band contacts are generally sharper than for 30.0m - 44.8m. Minor pyrite. Fine to coarse (in re-crystallized segragations) grained. Sharp contact down hole.	
71.7m	76.0m		Moderately to strongly retrogressed mafic granulite Similar to 55.8m - 69.5m except more retrogressed giving the rock a dark bluish-green-grey colour. Very weakly banded with moderate quartz-feldspar segragations. Generally weakly magnetic with minor magnetite and pyrite. Trace scheelite occurs at 73.0m - 75.25m. Sharp contact down hole.	
76.0m	77.4m		Weakly foliated, whitish-grey to pink, quartz-feldspar-lesser chlorite granulite. The foliation is defined by layers of chlorite (after biotite) rich rock to 1cm in thickness. The rock is partly broken, expecially over the lower 30cm, where the rock is brecciated. Trace pyrite in the more chloritic zones. Contact down hole is obscured by broken core-probably sharp.	
77.4m	78.8m		Moderately to strongly retrogressed mafic granulite. As for 71.7m - 76.0m except moderately strongly broken throughout. Relatively sharp contact down hole.	
78.8m	83.65m		Massive to very weakly foliated, pink, quartz-feldspar-minor chlorite granulite. Generally similar to 76.0m - 77.4m. Whitish grey from 78.8m - 79.3m. The core is generally unbroken. Average grainsize 1-3mm. Sharp contact down hole.	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-3

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 925mW, 575mS

R.L. - **BEARING (Mag)** 078° **DIP** 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
83.65m	92.0m		Light grey, weakly to moderately well banded, quartz-feldspar-biotite granulite-gneiss. The banding is defined by alternating dark biotite-rich and light quartz-feldspar-rich layers (generally discontinuous) to 1cm. The banding becomes less strongly developed down hole. Average grainsize 1-3mm, though locally coarser in minor coarse granulite segragations or bands reaching 30cm in thickness. The rock becomes less gneissic in character down hole. Minor magnetite (?), pyrrhotite and pyrite. Minor chlorite increasing down hole.	
92.0m			END OF HOLE.	

No [illegible]

[illegible]
[illegible] - 15.25m

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-4

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 1113mW, 361mS

R.L. - **BEARING (Mag)** 018° **DIP** 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			Brief Log of DDH C-4.	
0m	28.0m		No Core.	
			ARCHAEAN TO EARLY PROTEROZOIC - SLEAFORD COMPLEX	
28.0m	75.95m		Weakly to strongly retrogressed, dark green-grey, feldspar-pyroxene-hornblende-biotite mafic granulite, with minor quartz-feldspar-biotite-garnet granulite-gneiss horizons and quartz-feldspar-biotite-chlorite segragations. Trace scheelite at 74.4m.	
75.95m	79.5m		Well banded quartz-feldspar-biotite-chlorite-garnet granulite-gneiss. Greenish-white-grey colour. Minor bands of mafic granulite.	
79.5m	103.39m		Weakly to strongly retrogressed, weakly to very weakly banded, dark green-grey mafic granulite as for 28.0m - 75.95m.	
103.39m	104.3m		Strongly retrogressed, moderately weathered and broken mafic granulite; weak shear zone.	
104.3m	128.33m		Weakly to strongly retrogressed mafic granulite, lesser quartz-feldspar-biotite-chlorite-garnet granulite-gneiss horizons.	
128.33m			END OF HOLE.	

No scintillometer response

Few specks of scheelite detected [illegible]
74.4m

No Core 0m - 28.0m

MACHINE L-44

DRILLERS D.M.C. Drilling

DATE COMMENCED 25.03.82

DATE COMPLETED 02.04.82

NX-NQ 28.0m - 128.33m

BX-BQ -

AX-AQ -

EX -

LOGGED BY R. Sielecki

FINAL CORE STORAGE Moonta

ASSAYS						AVERAGE ASSAYS						HOLE SURVEY			
From'	To'	Width'				From'	To'	Width'				Depth'	Mag. Az.°	Trop. Dip.°	Corr. Etch. Dip.°
												0m	018°	60°	
												40m	015°	61°	
												90m	018°	60°	
												126m	008°	61°	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-4

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 1113mW, 361mS

R.L. - **BEARING (Mag)** 018° **DIP** 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
0m	28.0m		No Core.	
			ARCHAEAN TO EARLY PROTEROZOIC - SLEAFORD COMPLEX	
28.0m	75.95m		Weakly to strongly retrogressed, dark green-grey, feldspar-pyroxene-hornblende-biotite mafic granulite.	29.0m20°
			Similar to the mafic granulite in DDH C-2.	
			Generally weakly banded, occasionally well banded. The banding is defined by dark grey-green to black bands alternating with mid green-grey feldspar-hornblende rich bands up to a few cm thick. Felsic segragation bands are moderately common.	
			The rock contains zones of intense weathering down to 33.3m. The rock is generally weakly to moderately retrogressed, resulting in the formation of blue-green hornblende.	
			Minor garnet-rich horizons to 10cm's. The garnets are red-pink, subhedral and commonly reach several mm. These quartz-feldspar-biotite-garnet granulite-gneiss horizons have relatively sharp contacts with the host rock. Moderate fine to coarse grained quartz-feldspar-biotite-chlorite granulite bands and segragations occur throughout. Minor quartz-feldspar-biotite pegmatitic segratations.	
			Trace scheelite down hole. Moderately to strongly magnetic, few % disseminated magnetite. Minor pyrite in felsic segragations.	
			34.5m - 37.2m 60% quartz-feldspar-biotite-minor chlorite bands, veins and pegmatitic segragations.	35.0m - 42.5m Folded, low core angles.
			37.9m - 44.0m Several quartz-feldspar-biotite-garnet granulite-gneiss bands 1-10cm thick.	44.0m60°
			51.7m - 57.4m Well banded zone, becoming less well banded down hole.	49.5m45° 52.2m50°
			58.8m - 64.0m Common quartz-feldspar-minor biotite-minor chlorite granulite bands and veins to 60cm.	59.3m50°
			66.1m - 66.7m Quartz-feldspar-biotite-minor chlorite pegmatite.	65.2m45°

No Core 0m - 28.0m

HINE L-44	NX-NQ 28.0m - 128.33m	LOGGED BY R. Sielecki	
RS D.M.C. Drilling	BX-BQ -	FINAL CORE STORAGE	Moonta
COMMENCED 25.03.82	AX-AQ -		
COMPLETED 02.04.82	EX -		

ASSAYS				AVERAGE ASSAYS						HOLE SURVEY			
Width'				From'	To'	Width'				Depth'	Mag. Az.°	Trop. Dip.°	Corr. Etch. Dip.°
										0m	018°	60°	
										40m	015°	61°	
										90m	018°	60°	
										126m	008°	61°	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-4

STATE South Australia AREA Cootra

GRID Meaney's grid CO-ORDS 1113mW, 361mS

R.L. - BEARING (Mag) 018° DIP 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			70.3m - 74.5m Moderately well banded.	
			74.4m Trace scheelite.	
			75.95m Relatively sharp contact.	76.5m - 79.0m Folded, low core angles
75.95m	79.5m		Well banded quartz-feldspar-biotite-chlorite-garnet granulite-gneiss. Greenish-white-grey colour. The banding is defined by quartz-feldspar segragation bands alternating with biotite-chlorite rich bands to 1cm. Red-pink garnets occur in both bands, being most prevalent in the more mafic bands. Garnets comprise 10-40% of the rock, average 1-8mm, with some porphyroblasts exceeding 2cm. Minor mafic granulite bands to 30cm. The bands have sharp contacts with the host rock. Minor pyrite. Relatively sharp contact down hole.	
79.5m	103.39m		Weakly to strongly retrogressed, weakly to very weakly banded, dark green-grey mafic granulite. As for 28.0m - 75.95m. Moderate fine to coarse grained quartz-feldspar-biotite-chlorite granulite bands and segragations. Minor quartz-feldspar-biotite pegmatitic segragations. Minor garnet-rich zones in the felsic horizons. Moderately to strongly magnetic, few % magnetite; minor pyrite. Sharp contact down hole.	
			81.4m - 83.2m Mostly quartz-feldspar-biotite-chlorite granulite, fine to coarse grained, with lesser interbanded mafic granulite.	83.0m 35°
			91.85m - 92.15m Distinct quartz-feldspar-biotite granulite to pegmatite horizon.	92.2m 45°
			93.25m - 96.6m 50% quartz-feldspar-biotite-chlorite-minor garnet granulite interbedded with mafic granulite.	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-4

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 1113mW, 361mS

R.L. - **BEARING (Mag)** 018° **DIP** 60°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			101.5m - 103.39m Strongly retrogressed.	100.8m50°
103.39m	104.3m		<u>Strongly retrogressed, moderately weathered and broken mafic granulite: weak shear zone.</u> Dark blue-green-grey with numerous cream veinlets (sericitic?) to 1mm crosscutting the rock. Generally weakly sheared, strongly in parts. Moderately sharp contact down hole.	102.4m35°
104.3m	128.33m		<u>Weakly to strongly retrogressed mafic granulite, lesser quartz-feldspar-biotite-chlorite-garnet granulite-gneiss.</u> As for 28.0 - 75.95m except 25% more felsic garnet-rich zones (quartz-feldspar-biotite-chlorite-garnet granulite-gneiss). Some isolated garnet porphyroblasts also occur in the mafic granulite. Contacts between the garnet-rich granulite-gneiss and the mafic granulite are generally relatively sharp to weakly diffuse. The garnet-rich zones are identical to the zone between 75.95m - 79.50m, except they are often weakly banded. Moderate quartz-feldspar-biotite-chlorite granulite and pegmatitic zones. Weakly to strongly magnetic, minor pyrite. The mafic granulite is generally massive. 107.8m - 108.25m Strongly retrogressed. 108.25m - 109.15m Quartz-feldspar-biotite-chlorite granulite (pegmatitic in parts). 109.15m - 109.6m Strongly retrogressed. 109.6m - 110.7m Several quartz-feldspar-biotite-chlorite pegmatitic zones.	112.3m 5° 114.3m55° 116.3m55°
128.33m			<u>END OF HOLE</u> in quartz-feldspar-chlorite-sericite pegmatitic zone. No [illegible] [illegible]	120.2m30° 127.9m50°

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-5

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 2162mW, 1616mS

R.L. - **BEARING (Mag)** 009° (grid036°) **DIP** 80°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			Brief Log of DDH C-5.	
0m	23.0m		No Core.	
			ARCHAEAN TO EARLY PROTEROZOIC - SLEAFORD COMPLEX	
23.0m	47.6m		Weakly to strongly retrogressed massive to very weakly foliated, dark green-grey, feldspar-amphibole-pyroxene-biotite mafic granulite similar to mafic granulite in DDH C-2 etc.	
			Abundant feldspar-quartz-biotite-chlorite-(amphibole) granulite and pegmatitic segragations and numerous zones gradational between mafic and felsic granulite. Minor garnet-bearing zones.	
47.6m	83.5m		Moderately foliated, light grey to off white quartz-feldspar-biotite-(amphibole) banded gneiss.	
			Weakly to moderately magnetic. Minor bands of fine to medium grained, pink, massive, quartz-feldspar granulite or gneiss.	
83.5m	87.2m		Pink, moderately well banded, fine to medium grained quartz-feldspar-garnet-biotite-chlorite(?) granulite.	
87.2m			END OF HOLE.	

No Core 0m - 23.0m

MACHINE L-44

DRILLERS D.M.C. Drilling

DATE COMMENCED 03.04.82

DATE COMPLETED 07.04.82

NX-NQ 23.0m - 54.66m

BX-BQ 54.66m - 87.2m

AX-AQ -

EX -

LOGGED BY R. Sielecki

FINAL CORE STORAGE Moonta

ASSAYS						AVERAGE ASSAYS						HOLE SURVEY			
From'	To'	Width'				From'	To'	Width'				Depth'	Mag. Az.°	Trop. Dip.°	Corr. Etch. Dip. °
												0m	009°	80°	
												85m	034°	81°	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-5

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 2162mW, 1616mS

R.L. - **BEARING (Mag)** 009° (grid 036°) **DIP** 80°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			Detail Log of DDH C-5.	
0m	23.0m		No Core.	
			ARCHAEAN TO EARLY PROTEROZOIC - SLEAFORD COMPLEX	
23.0m	47.6m		Weakly to strongly retrogressed. Massive to very weakly foliated, dark green-grey, feldspar-amphibole-pyroxene-biotite mafic granulite.	
			Generally similar to mafic granulite in DDH C-2 etc. Abundant feldspar-quartz-biotite-chlorite-(amphibole) granulite and pegmatitic segragations, the pegmatite grainsize commonly exceeding 2cm. Minor garnet porphyroblasts to 2cm occur in some of the more felsic segragations.	
			The mafic granulite is partially re-crystallized forming a polygonal network with an average grain-size 3-4mm. Minor strongly weathered zones occur up hole.	
			Numerous zones gradational between the mafic and felsic granulites occur. The general composition is feldspar-hornblende-biotite-quartz(?).	
			Weakly to strongly magnetic, few % magnetite. Minor pyrite.	
			Relatively sharp contact down hole.	
			23.0m - 25.2m Strongly retrogressed.	24.0m 60°
			23.6m - 25.4m Moderately to strongly weathered and broken.	
			25.2m - 26.2m Quartz-feldspar-biotite pegmatite.	27.4m 54°
			35.8m - 36.45m Numerous garnet-rich horizons.	34.7m 62°
			42.0m - 47.4m Partially re-crystallized, average grainsize 3-5mm.	42.0m 49°
				45.0m 56°
47.6m	83.5m		Moderately foliated, light grey to off white quartz-feldspar-biotite-(amphibole) banded gneiss.	
			The foliation is defined mainly be aligned biotite grains. The banding is defined by lighter quartz-feldspar bands and darker biotite-rich bands. Minor bands of fine to medium grained, pink, massive, quartz-feldspar granulite or gneiss reaching 30cm across.	

No Core 0m - 23.0m

MACHINE L-44

NX-NQ 23.0m - 54.66m

LOGGED BY R. Sielecki

DRILLERS D.M.C. Drilling

BX-BQ 54.66m - 87.2m

FINAL CORE STORAGE Moonta

DATE COMMENCED 03.04.82

AX-AQ -

DATE COMPLETED 07.04.82

EX -

ASSAYS						AVERAGE ASSAYS						HOLE SURVEY			
From'	To'	Width'				From'	To'	Width'				Depth'	Mag. Az.°	Trop. Dip.°	Corr. Etch. Dip. °
												0m	009°	80°	
												85m	034°	81°	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-5

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 2162mW, 1616mS

R.L. – **BEARING (Mag)** 009° (grid 036°) **DIP** 80°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			Weakly to moderately magnetic, minor disseminated magnetite generally concentrated in biotite-rich bands.	
			The core is moderately broken parallel to the banding and foliation. The rock approaches granulite grade in minor zones. The contact down hole is relatively sharp.	49.5m 80°
			52.7m - 55.1m Moderate pink to off-white quartz-feldspar granulite bands.	53.0m 66° 58.0m 85°
			66.0m - 66.3m Mildly bleached and sericitic.	63.5m 78°
			70.4m - 73.0m Coarser grained granulite-gneiss zone, grains up to several mm.	70.3m 77°
			80.7m - 80.9m Fine grained feldspar-amphibole-biotite relatively mafic granulite.	75.0m - 80.0m high to low angles
			81.8m - 82.5m Pink, quartz-feldspar-biotite-chlorite(?) granulite.	
			82.5m - 83.5m Well banded, light grey gneiss, pink in parts.	83.5m 52°
83.5m	87.2m		Pink, moderately well banded, fine to medium grained quartz-feldspar-garnet-biotite-chlorite(?) granulite.	86.7m 58°
			Well developed granoblastic texture, the banding defined by pink-orange medium grained (average grainsize 1-3mm) bands alternating with off-white finer grained (average grainsize 0.5-2mm) bands. Pink-red to red garnets average 1-4mm across and comprise approximately 2-4% of the rock. Minor disseminated magnetite grains to 2mm.	
87.2m			END OF HOLE.	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. *DDH C-6*

STATE *South Australia* **AREA** *Cootra*

GRID *Meaney's grid* **CO-ORDS** *130mW, 65mS*

R.L. – **BEARING (Mag)** *039° (grid 066°)* **DIP** *80°*

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			Brief Log of DDH C-6	
0m	54.3m		No Core.	
			ARCHAEAN TO EARLY PROTEROZOIC - SLEAFORD COMPLEX	
54.3m	113.33m		Weakly to strongly retrogressed, massive to moderately well banded, dark green-grey, <u>feldspar-amphibole-pyroxene-biotite mafic granulite</u>.	
			Minor feldspar-quartz-biotite-amphibole-chlorite granulite to pegmatitic segragations and veins. Minor feldspar-amphibole segragations.	
113.33m			END OF HOLE.	
			No U/V or scintillometer response.	

No Core 0m - 54.3m

MACHINE L-44

NX-NQ 54.3m - 113.33m

LOGGED BY R. Sielecki

DRILLERS D.M.C. Drilling

BX-BQ -

FINAL CORE STORAGE Moonta

DATE COMMENCED 07.04.82

AX-AQ -

DATE COMPLETED 16.04.82

EX -

ASSAYS						AVERAGE ASSAYS						HOLE SURVEY			
From'	To'	Width'				From'	To'	Width'				Depth'	Mag. Az.°	Trop. Dip.°	Corr. Etch. Dip.°
												0m	039°	80°	
												110m	038°	77°	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-6

STATE South Australia **AREA** Cootra

GRID Meaney's grid **CO-ORDS** 130mW, 65mS

R.L. - **BEARING (Mag)** 039° (grid 066°) **DIP** 80°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
0m	54.3m		No Core.	
			ARCHAEAN TO EARLY PROTEROZOIC - SLEAFORD COMPLEX	
54.3m	113.33m		Weakly to strongly retrogressed, massive to moderately well banded, dark green-grey, feldspar-amphibole-pyroxene-biotite mafic granulite. As for mafic granulite in DDH C-2 etc. Weakly to strongly weathered and broken up hole. The banding generally defined by discontinuous dark bands in a medium to dark groundmass. Generally fine grained, minor medium grained feldspar-amphibole segragations. Minor feldspar-quartz-biotite-(amphibole)-(chlorite) granulite to pegmatitic segragations and veins reaching 1½m. Weakly to strongly magnetic, few % disseminated magnetite. Minor pyrite, trace pyrrhotite.	
			54.3m - 66.5m Core largely strongly broken, weakly to strongly weathered.	57.6m 66°
			66.5m Limit of weathering.	65.0m74° 71.0m57°
			73.2m - 87.0m Moderate feldspar-quartz-biotite-(amphibole)-(chlorite) granulite zones; fine to very coarse grained.	74.0m - 75.5m folded, foliation at low angle to core
			86.0m - 86.3m Strongly broken.	
			111.9m - 113.33m Quartz-feldspar-biotite granulite, pegmatitic in parts.	77.0m48°
113.33m			END OF HOLE.	85.0m70° 92.7m54° 96.3m51° 106.7m73° 110.5m60° 111.9m54°

No U/V or scintillometer response

0191

No Core 0m - 54.3m

HINE L-44

NX-NQ 54.3m - 113.33m

LOGGED BY R. Sielecki

ERS D.M.C. Drilling

BX-BQ -

FINAL CORE STORAGE Moonta

COMMENCED 07.04.82

AX-AQ -

COMPLETED 16.04.82

EX -

ASSAYS					AVERAGE ASSAYS						HOLE SURVEY			
	Width'				From'	To'	Width'				Depth'	Mag. Az.°	Trop. Dip.°	Corr. Etch. Dip.°
											0m	039°	80°	
											110m	038°	77°	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-7

STATE South Australia **AREA** Cootra

GRID Cootra E.L. grid **CO-ORDS** 67900E, 19150N

R.L. - **BEARING (Mag)** 289° **DIP** 80°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			Brief Log of DDH C-7	
0m	67.0m		*No Core.*	
			ARCHAEAN TO EARLY PROTEROZOIC - SLEAFORD COMPLEX	
67.0m	89.2m		*Strongly weathered, decomposed, broken and chloritized biotite-amphibole-feldspar-(quartz) gneiss. Dark green-grey minor garnet-rick horizons quartz feldspar veins and segragations and dolerite dykes. Trace pyrite.*	
89.2m	149.4m		*Weakly to strongly retrogressed, massive to weakly banded, biotite-amphibole-feldspar-(chlorite)-(quartz) granulite-gneiss.* *Dark grey to dark green-grey minor graphite, trace pyrite. Minor feldspar-quartz-biotite ± amphibole granulite veins, segragations and bands.*	
149.4m	177.3m		*Speckled, biotite-feldspar-amphibole-(chlorite)-(sericite)-(quartz) granulite-gneiss.* *Abundant zones rich in white feldspar, several intensely biotite-rich zones. Trace pyrite and pyrrhotite.*	
177.3m	201.0m		*Moderately to strongly retrogressed, partially re-crystallized, feldspar-amphibole-biotite-pyroxene(?) mafic granulite.* *Dark green-grey, massive to weakly banded. Minor feldspar-quartz veins and segragations. Trace pyrite and pyrrhotite.*	
201.0m			*END OF HOLE.*	
			No U/V or scintillometer response	

0193

No Core 0m - 67.0m

HINE L-44	NX-NQ 67.0m - 201.0m	LOGGED BY R. Sielecki	
ERS D.M.C. Drilling	BX-BQ -	FINAL CORE STORAGE	•
COMMENCED 17.04.82	AX-AQ -		Moonta
COMPLETED 28.04.82	EX -		

ASSAYS				AVERAGE ASSAYS						HOLE SURVEY			
	Width'			From'	To'	Width'				Depth'	Mag. Az.°	Trop. Dip.°	Corr. Etch. Dip.°
										0m	289°	80°	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-7

STATE South Australia **AREA** Cootra

GRID Cootra E.L. grid **CO-ORDS.** 67900E, 19150N

R.L. - **BEARING (Mag)** 289° **DIP.** 80°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
0m	67.0m		No Core. ARCHAEAN TO EARLY PROTEROZOIC - SLEAFORD COMPLEX	
67.0m	89.2m		Strongly weathered, decomposed, broken and chloritized biotite-amphibole-feldspar-(quartz) gneiss. Minor zones of relatively unweathered rock, probably richer in feldspar and quartz but poorer in biotite. Generally massive. Dark green-grey. Minor garnet-rich horizons after 79.1m. The garnets are pink-red and reach several mm with very diffuse grain boundaries. Minor quartz-feldspar veining and segragations. Minor quartz-feldspar rich breccia at base of unit. Minor dolerite dyke up hole. Generally non-magnetic. Trace pyrite. Relatively sharp contact down hole marked by end of zone of intense weathering. 69.3m - 69.4m Dolerite dyke. 78.0m - 81.2m Abundant quartz veining. 79.1m Minor garnets in felsic gneiss. 82.3m - 87.8m Garnet-rich quartz-feldspar-biotite-amphibole gneiss. 88.6m - 89.2m Brecciated quartz-feldspar vein.	67.0m - 73.0m Commonly 0-30° 74.0m 60° 82.0m 64°
89.2m	149.4m		Weakly to strongly retrogressed, massive to weakly banded, biotite-amphibole-feldspar-(chlorite)-(quartz) granulite-gneiss. Mid-dark grey to dark green-grey. The massive zones generally have a mottled texture. Banding defined by relatively light coloured feldspar-(quartz)-rich segragation banding set in darker biotite-amphibole rich rock. Minor strongly weathered, decomposed zones up hole with strong development of chlorite and local graphite. The graphite generally occurs associated with slickensides but is also present in some stratigraphic horizons. Moderate pyrite and chalcopyrite(?) associated with the graphite. Fine to medium grained, the grainsize increasing in the re-crystallized zones which are common after 102.5m.	

No Core 0m - 67.0m

MACHINE L-44

DRILLERS D.M.C. Drilling

DATE COMMENCED 17.04.82

DATE COMPLETED 28.04.82

NX-NQ 67.0m - 201.0m

BX-BQ -

AX-AQ -

EX -

LOGGED BY R. Sielecki

FINAL CORE STORAGE Moonta

ASSAYS						AVERAGE ASSAYS						HOLE SURVEY			
From'	To'	Width'				From'	To'	Width'				Depth'	Mag. Az.°	Trop. Dip.°	Corr. Etch. Dip.°
												0m	289°	80°	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-7

STATE South Australia **AREA** Cootra

GRID Cootra E.L. grid **CO-ORDS** 67900E, 19150N

R.L. - **BEARING (Mag)** 289° **DIP** 80°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			Minor feldspar-quartz-biotite±amphibole granulite veins, segragations and bands, fine to very coarse grained, pegmatitic in parts.	
			Retrogression has resulted in the strong development of blue-green hornblende, brown biotite and chlorite (?).	
			Generally non-magnetic. Overall trace disseminated pyrite.	92.0m 5°
			Moderately sharp contact down hole.	100.0m 35°
			98.0m - 100.6m Strongly weathered and decomposed, partly broken.	
			101.2m - 102.3m Moderately graphitic, moderate pyrite, trace chalcopyrite(?).	101.0m - 112.0m 0-20°
149.4m	177.3m		<u>Speckled</u>, <u>biotite</u>-<u>feldspar</u>-<u>amphibole</u>-(<u>chlorite</u>)-(<u>sericite</u>)-(<u>quartz</u>) <u>granulite</u>-<u>gneiss</u>.	112.0m - 163.0m 0-10°
			Weakly to strongly retrogressed, mid-dark grey to green-grey. Similar to above except with numerous zones rich in white feldspar grains (possibly strongly altered - eg. albitized?) to 1-2mm giving the rock a speckled texture.	
			Moderate feldspar-calcite-quartz-(chlorite)-(sericite) veins and segragations. Several intensely biotite-rich zones, composed dominantly of biotite. The rock is often re-crystallized.	
			Trace pyrite and pyrrhotite. The rock is generally non-magnetic.	
			Gradational contact down hole.	
			154.8m - 155.9m Coarse grained feldspar-biotite rich segragation.	
			155.9m - 156.65m Medium grained biotite-rich segragation, probably only a few cm's thick but core is near parallel to segragation banding. Thin (1cm) feldspar-quartz selvedge at base (down hole) of biotite segragation.	
			161.05m - 161.3m Biotite-rich segragation.	

NORTH BROKEN HILL LTD — EXPLORATION DIVISION

HOLE No. DDH C-7

STATE South Australia **AREA** Cootra

GRID Cootra E.L. grid **CO-ORDS** 67900E, 19150N

R.L. - **BEARING (Mag)** 289° **DIP** 80°

From'	To'	Recovery	CORE DESCRIPTION	C. to B. Angles°
			172.0m - 174.5m Relatively biotite-rich zone.	163.0m fold closure
177.3m	201.0m		Moderately to strongly retrogressed, partially re-crystallized, feldspar-amphibole-biotite pyroxene(?)-mafic-granulite.	163.3m28°
			Dark green-grey massive to weakly banded. Often coarsely re-crystallized, equigranular with the grains averaging several mm. Contacts between the coarsely re-crystallized,zones and the finer grained zones can be relatively sharp or gradational. Minor fine to coarse grained feldspar-quartz veins and segragations.	166.5m20° 172.0m - 180.0m 0-20° 182.0m20°
			Trace pyrite and pyrrhotite. The core is rarely weakly magnetic, due mainly to pyrrhotite.	190.0m28°
201.0m			END OF HOLE.	190.0m - 201.0m 10-30°
			No U/V or scintillometer reports	

ORDER No 4332 AN. Petrography of 6 Drill Core Samples.

TS3
543 sent 2C4
W Cawley
544

Hypersthene-biotite-andesine-quartz-magnetite Gneiss(Enderbite).
DDH-C2, 75.4m. Cootra, S.A..

The rock is an aggregate of interlocking anhedra of quartz (0.1-½mm), andesine(An_{28}, 0·5 mm), hypersthene(clots of a few 200µ anhedra), magnetite(50-200µ), with ½mm subhedral tablets of biotite. All the mafic minerals tend to concentrate in bands repeating every 1-3mm. Biotite shows a poorly developed preferred orientation parallel to the layering. A single plagioclase porphyroblast in the section is probably an igneous relic, suggesting that the rock was originally a granodiorite or dacite porphyry. The presence of magnetite and brown biotite suggest I-type chemistry, or, probably less likely, premetamorphic oxidation. 10-100µ anhedra of pyrite and 2-20µ anhedra of chalcopyrite, disseminated, but generally associated with biotite, are at least partly secondary.

Fluid inclusions in quartz are:-(i)Liquid CO_2, probably primary. (ii)Hypersaline aqueous solutions with several daughter crystals(rare, and probably also primary).(iii)Undersaturated aqueous solutions, probably of low temperature secondary origin.

The mineral assemblage is stable in the uppermost amphibolite facies(above the breakdown of cummingtonite) and the lower granulite facies(below the commencement of biotite breakdown).

An approximate mode is: plagioclase, 46%; quartz,40 ; hypersthene, 5%; biotite, 7%, magnetite, 2%; pyrite, tr; chalcopyrite, very small tr.

Hornblende-rich Mafic Granulite. DDH-C2, 145.51m. Cootra, S.A..

This typical mafic granulite strongly resembles the least retrogressed mafic rocks from Broken Hill. Most of the sample is medium-grained,with a well-developed granoblastic texture, consisting of ferrohypersthene(100µ,δ=0.002), clinopyroxene(200µ), brown hornblende(300µ), labradorite(An_{55} with rare calcic cores), magnetite(100µ), ilmenite(100µ), and primary pyrrhotite(100µ) and chalcopyrite(10µ). A coarse pegmatitic patch, 20mm across, consists of quartz and oligoclase-quartz micrographic intergrowth with less common skeletal grains of clinopyroxene. This is surrounded by a hornblende-free zone resulting from the incompatibility of hornblende and quartz at the maximum temperature reached. There is little doubt that the patch has formed by patial melting.

Quartz, which occurs only in the pegmatitic patches, contains abundant fluid inclusions. Many contain liquid CO_2 + vapour(low-relief bubbles with rapid movement). Others containing an aqueous phase + vapour(high-relief bubbles moving only sluggishly) are probably secondary. It is not likely that the CO_2-rich fluids preserved in quartz represent the volatile components of a melt phase, since we know CO_2 to be virtually insoluble in silicate melt. Perhaps flushing by externally derived CO_2 vapour actually caused the melt to freeze.

The only secondary mineral is a trace of pyrite. An approximate mode is: ferrohypersthene, 7%; clinopyroxene, 10%; hornblende, 40%; plagioclase, 36%; magnetite, 4%; ilmenite, 2%; pyrrhotite, 1%; pyrite, tr; chalcopyrite, very small tr.

Unfortunately the section missed the few grains of scheelite in the core sample. Like the material from DDH C1, it appears to be a metamorphosed dolerite or basic volcanic rock. The scheelite appears to be the blue-fluorescing low-Mo type. Naturally, this occurrence invites comparison with the Felberthal deposit. Unfortunately there has not yet been an adequate description in the literature of the Felberthal deposit, and it is even possible that the assertion by Maucher and his followers, that the scheelite is in basic volcanic rocks, is quite wrong. The only samples I have seen have thin, highly continuous layering almost never seen in basic volcanic rocks but characteristic of metamorphosed siliceous dolomites(the deposits are in an amphibolite facies terrain). In fact, they are very similar to the 731' sample from this hole.

Amphibolite Facies Metadolerite. DDH P88, 239'3", Port Broughton, SA.

Most hornblende forms 20-50μ olive green anhedra and subhedral prisms, occurring as clumps in the sites of preexisting igneous ferromagnesian minerals. Plagioclase(c. An_{50}) tends to retain igneous lath shapes and normal zoning. Clinopyroxene forms rare 200μ highly poikilitic grains. A few large amphibole anhedra, up to 5mm across, are zoned from pale actinolitic cores, through blue-green hornblende to rims of the more typical olive green hornblende, and blue-green cores are not uncommon in smaller grains. This feature is found only in prograde sequences (cores of early-formed low-temperature amphibole are sluggish to equilibrate with rising temperature) and is never found in retrogressed granulites.

Clots of ilmenite anhedra, probably igneous relics, are surrounded by biotite flakes, probably formed by K-metasomatism. Another metasomatic mineral, occurring as scattered 100-200μ anhedra, is scapolite. Its birefringence, 0.020, suggests a composition intermediate between marialite($3NaAlSi_3O_8.NaCl$) and meionite ($3CaAl_2Si_2O_8.CaCO_3$). This is somewhat more carbonate-rich than the typical Cloncurry scapolites.

A rise in f_{S_2}, probably after the metamorphic peak, has caused a few scatterred 50μ anhedra of pyrite and rarer 20μ anhedra of chalcopyrite to grow in hornblende-rich areas. It is not clear whether the small amount of Cu needed was introduced or simply scavenged from hornblende. An approximate mode is: hornblende, 50%; plagioclase, 41%; ilmenite, 1%; biotite, 4%,; clinopyroxene, 1%; scapolite, 2%; pyrite,tr; chalcopyrite, very small tr.

Amphibolite. DDH PB-8, 499'3". Port Broughton, S.A..

In many respects similar to the sample from239'3"; the main difference probably being due to more extensive recrystallisation and metasomatism. Igneous features are less obvious. Hornblende here is all olive green, but still forms ½mm aggregates of small grains which in the last sample were clearly pseudomorphs after igneous ferromagnesian minerals. Granoblastic texture is better developed in hornblende and lath-shaped plagioclase is only rarely preserved. Plagioclase tends to form 100-200μ interlocking anhedra. Both biotite and scapolite are more abundant than in the 239' sample, although scapolite has the same optics. Ilmenite is absent, although the more abundant biotite and olive hornblende may hold as much Ti as the last sample. More abundant clinopyroxene forms highly poikiloblastic 1mm anhedra.

Pyrite and chalcopyrite are more common , and it is clear that Cu has been mobilised and concentrated. A vein filled with olive hornblende and clinopyroxene at the metamorphic peak has been reactivated at low temperature and filled partly by chlorite+ microcline(which are compatible only below the lower stability limit of biotite), and quite common 5-200μ anhedra of pyrite and chalcopyrite.

An approximate mode is: hornblende, 50%; plagioclase, 26%; biotite, 10%; clinopyroxene, 5%; scapolite, 8%; pyrite, 1%; chalcopyrite,tr; microcline, tr; chlorite,tr.

Quartz-albite-biotite Finely Banded Metasediment with Stratiform Cu, Zn, and Pb Mineralisation. DDH PB8, 550'6"; Port Broughton, S.A..

Biotite forms 20-50μ brown anhedra and thick subhedral tablets which are concentrated in highly continuous ½mm-thick layers repeating every mm or so. Quartz, albite, and a trace of microcline form interstitial interlocking 20-50μ anhedra. Biotite has an indistinct preferred orientation parallel to the layering. A trace of dark blue-green ferrohastingsite is associated with biotite.

Minor stratiform sulphides occur in the Fe-Mg rich layers. Pyrite forms 30-80μ anhedra and subhedral cubes, chalcopyrite, 5-50μ anhedra, and rare sphalerite, 5-30μ anhedra associated with chalcopyrite. Galena forms extremely rare 30μ anhedra. Only chalcopyrite is remobilised in a few late 200μ-thick calcite veins, where it forms anhedra up to 200μ.

An approximate mode is: quartz, 50%; biotite,30%; microcline, tr; ferrohastingsite, tr; pyrite, 1%; chalcopyrite, 0.2%; sphalerite, tr; galena, v. small tr; albite, 18%. The highly continuous banding is characteristic of chemical sediments.

Banded Quartz-hornblende-biotite Metasediment with Stratiform As, Cu, Pb, Zn mineralisation. DDH PB8, 731', Port Broughton, SA.

Hornblende(deep blue-green ferrohastingsite) occurs in 5mm thick near-monomineralic layers of 50-100μ granoblastic anhedra. These alternate with hornblende-quartz granoblastic aggregates of similar grain-size. Every mm or so within the hornblende-rich layers are highly continuous 200μ-thick lamellae cosisting entirely of layer-parallel 200x50μ biotite tablets. Minor stubby subhedra of apatite are generally associated with hornblende.

The most abundant sulphide, arsenopyrite, forms subidiomorphic grains up to ½mm across (i)concentrated at the boundary of hornblende-rich and more siliceous layers (ii) disseminated and in bands within the more siliceous layers. Pyrite forms overgrowths on arsenopyrite, as well as anhedra and rare cubes, both in As-rich layers and in layers without As. 5-100μ anhedra of chalcopyrite and rare 50μ anhedra of near-colourless sphalerite are associated with the major sulphides. A trace of galena forms 100μ equant anhedra in the siliceous layers.

Tetrahedrite forms small inclusions crowded into a few ?secondary pyrite grains in the As-rich layers. Pyrrhotite forms small rare inclusions in arsenopyrite. Rare 200µ flakes of graphite associated with sulphides are no doubt the remains of hardy, arsenic-eating bugs. Intense pleochroic halos around tiny inclusions in biotite and hornblende of the sulphide-rich layers are an indication of deposition of U or Th along with the other metals.

A small amount of chalcopyrite and even less arsenopyrite are mobilised into rare diopside veins.

Early tetrahedrite and pyrrhotite, and later pyrite, arsenopyrite, and colourless sphalerite suggest a rise in f_{S_2} after sulphide deposition.

An approximate mode is: hornblende, 50%; biotite, 5%; quartz, 40%; arsenopyrite, 3%; pyrite, 1%; chalcopyrite, ½%; galena, tetrahedrite, pyrrhotite, sphalerite, tr. The original rock was a finely laminated chemical sediment, probably a Fe-rich siliceous dolomite. The assemblages suggest mid-to-upper amphibolite facies metamorphism. for the PB8 material.

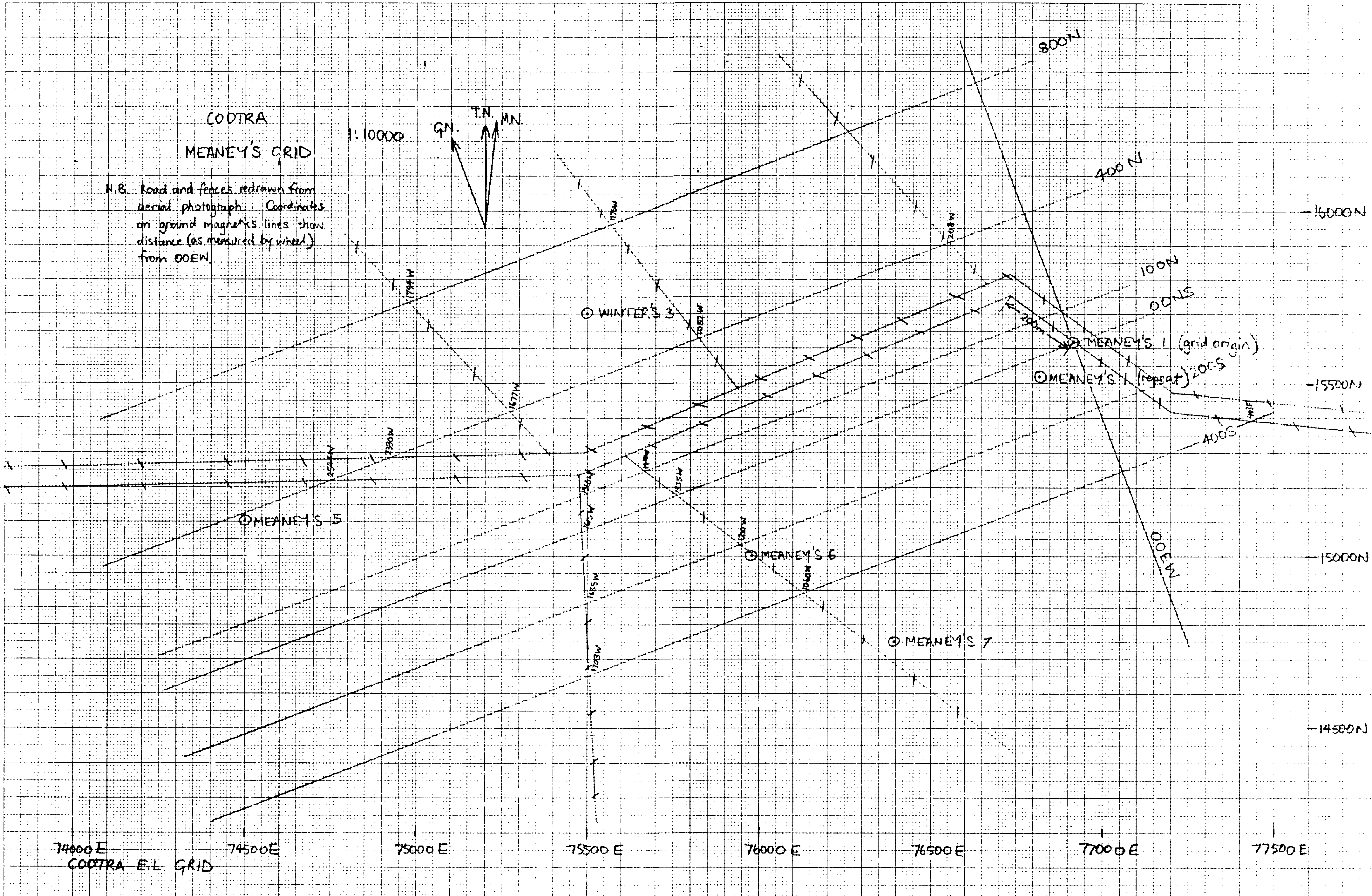
R.N.England,
6 Griffiths St.,
Holt 2615,
A.C.T.. (062)548379
27/4/82

KYANCUTTA
EYRE HIGHWAY
"Morana"
"Mamblin"
"Mambrae"
"Tullamore"
Kyancutta Hill
"Rocky Pines"
"Pinegrange"
KOONGAWA
"Jungle Ranch"
Lake Warramboo
"Glen Roy"
"Lake Side"
"Omaroo"
"Bens Hill"
E.L.756
"Pine Row"
WARRAMBOO
"Lea-Brae"
"Pineslope"
SEE INSET
"Arunta"
"Nosredna"
COOTRA
"Yattarna"
"Lincoln Dale"
"White Gates"
"Gunya"
"Delmore"
"Central"
"Hilltop"
NANTUMA
"Broadview"
"Waroona"
"Karanda"
"Karinga"
"Roadview"
DDH C-7
"Panorama"
"Fairview"
KOPI
"Peak View"
"Kiauna"
"Woodcombe"
"McLaghlan Station"
INSET
Frischke's #5 10-34m
Andrew's 13-48m
Meaney's #2 N/BR-13m
Meaney's #4 22-30m
Murphy's N/BR-10m
LOCATION
Kyancutta
AREA SHOWN
WHYALLA
Port Pirie
Lock
Wallaroo
Moonta
Maitland
Spencer Gulf
Port Lincoln
Vincent Gulf
Scale 1:2,000,000
25,000mN
20,000mN
15,000mN
33°15'
33°20'
33°25'
Abbreviations
m'sed metasediment
qz quartz
fsp feldspar
bio biotite
mgt magnetite
mart martite
grt garnet
amph amphibole
ep epidote
sillim sillimanite
chl chlorite
py pyrite
Mnox Mn oxides
pl plagioclase
orth orthoclase
trem tremolite
decomp decomposed
grtsd granitised
qtzt quartzite
p€ undifferentiated pre Cambrian
N/BR not bedrock
GEOLOGY
White or yellow quartofeldspathic gneiss or granite
Blue-grey magnetic adamellite / granodiorite
Coarse red magnetic granite
Amphibolite / dolerite
Mica schists
Weathered bedrock clays
Pale siliceous clay with fine quartz
Non-bedrock
LEGEND
Main road
Road
Track
Railway
Building
Lake
Land subject to inundation
Tank or dam
Quarry
DEPT. OF MINES DRILLHOLES
Diamond Drill Hole
P Percussion
R Rotary (KR Kopi, remainder Warramboo)
KR holes drilled to 11 only
MINES ADMINISTRATION DRILLHOLES
DP 32
NORTH BROKEN HILL LTD. DRILLHOLES
Frischke's #5 10-34m Percussion drillhole, with name, depth to bedrock & total depth shown.
'All depths in metres'
DRILLHOLE LOCATIONS
COOTRA AREA E.L. 980 S.A.
Scale 1:50000
1 0 1 2 3 4 5 km
NORTH BROKEN HILL LTD / EXPLORATION DIVISION
Date Aug. 1981
Map No. S.A. C /1h

DATE 7/12/81

4230(II)-11

MAP No SA/C 3


COOTRA
MEANEY'S GRID
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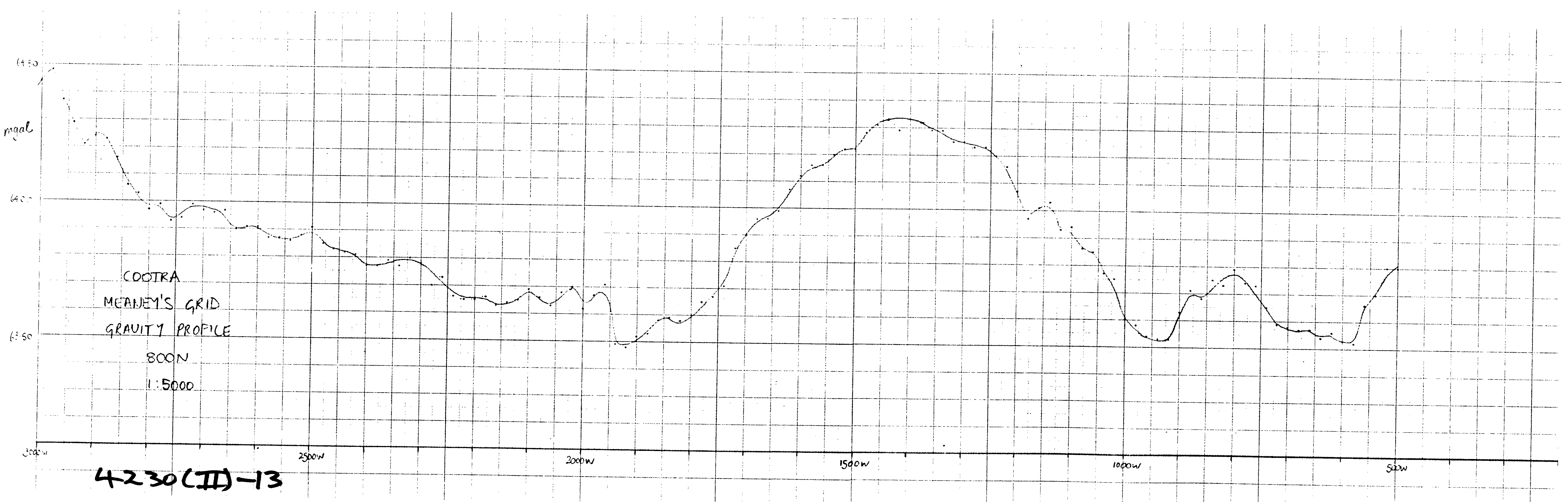
GN.
T.N.
MN.
N.B. Road and fences redrawn from aerial photograph. Coordinates on ground magnetics lines show distance (as measured by wheel) from 00EW.
800N
400N
100N
00NS
200S
400S
00EW
WINTER'S 3
MEANEY'S 1 (grid origin)
MEANEY'S 1 (repeat)
MEANEY'S 5
MEANEY'S 6
MEANEY'S 7
16000N
15500N
15000N
14500N
74000E
74500E
75000E
75500E
76000E
76500E
77000E
77500E
COOTRA E.L. GRID

4230(II)-12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mgal
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COOTRA
MEANEY'S GRID
GRAVITY PROFILE
800N
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2000W
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4230(II)-13

64.50
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MEANEY'S GRID
GRAVITY PROFILE
400N
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4230(II)-14


mgal
COOTRA
MEANEY'S GRID
GRAVITY PROFILE
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500E

4230(II)-15


COOTRA
MEANEY'S GRID
GRAVITY PROFILE
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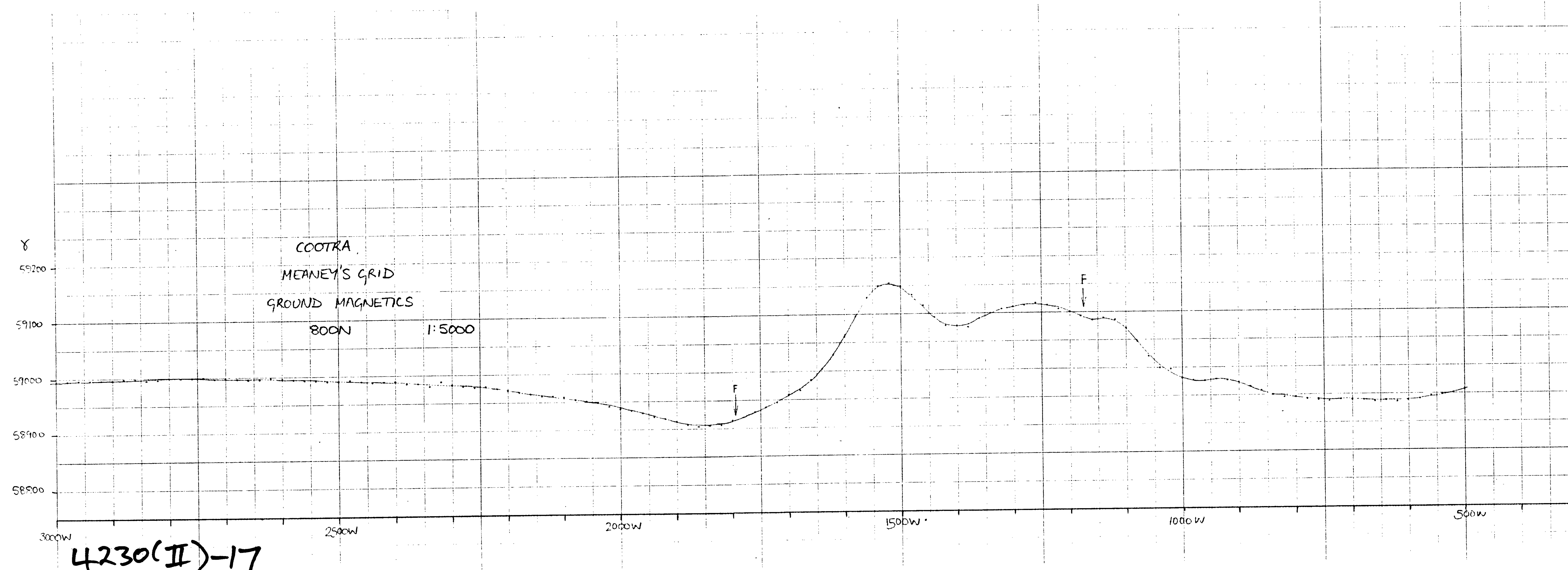
4230(II)-16



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COOTRA
MEANEY'S GRID
GROUND MAGNETICS
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1:5000
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500W

4230(II)-17

59200
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COOTRA
MEANEY'S GRID
GROUND MAGNETICS
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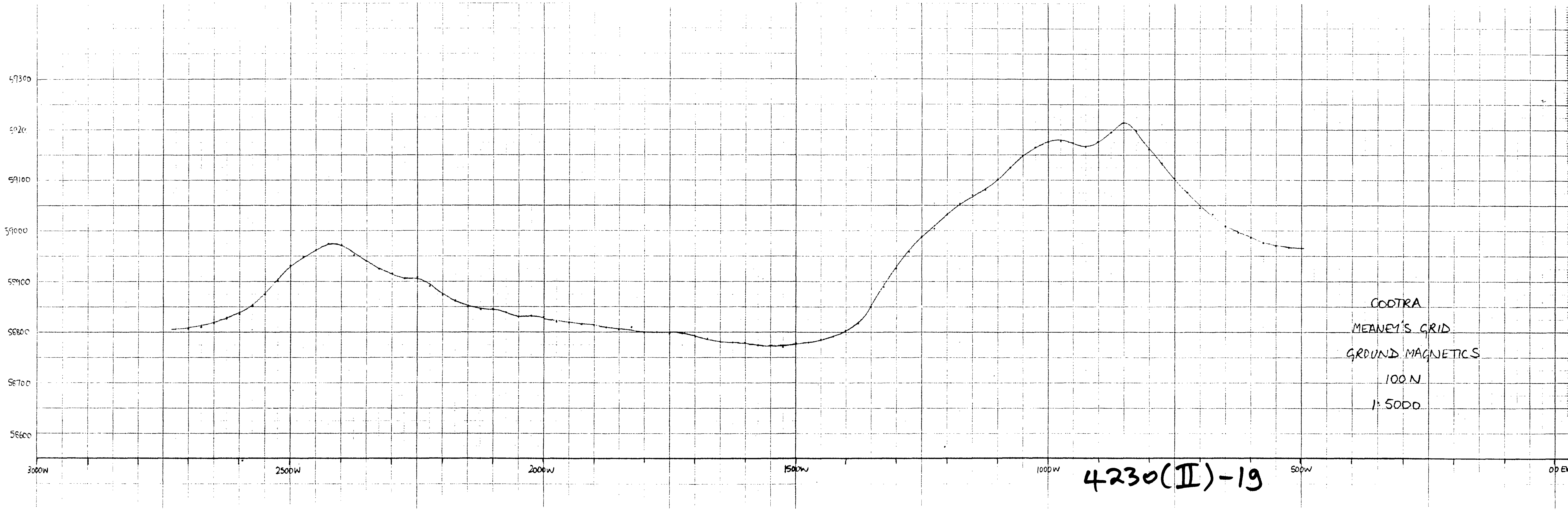
1:5000

4230(II)-18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COOTRA
MEANEY'S GRID
GROUND MAGNETICS
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4230(II)-19


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MEANEY'S GRID
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BRITISH MADE

4230(II)-20

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2000W
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1000W
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COOTRA
MEANEY'S GRID
GROUND MAGNETICS
200 S
1:5000

4230(II)-21

COOTRA
MEANEY'S GRID
GROUND MAGNETICS
400 S
1:5000
59400
59300
59200
59100
59000
58900
58800
58700
58600
3000W
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2000W
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1000W
500W
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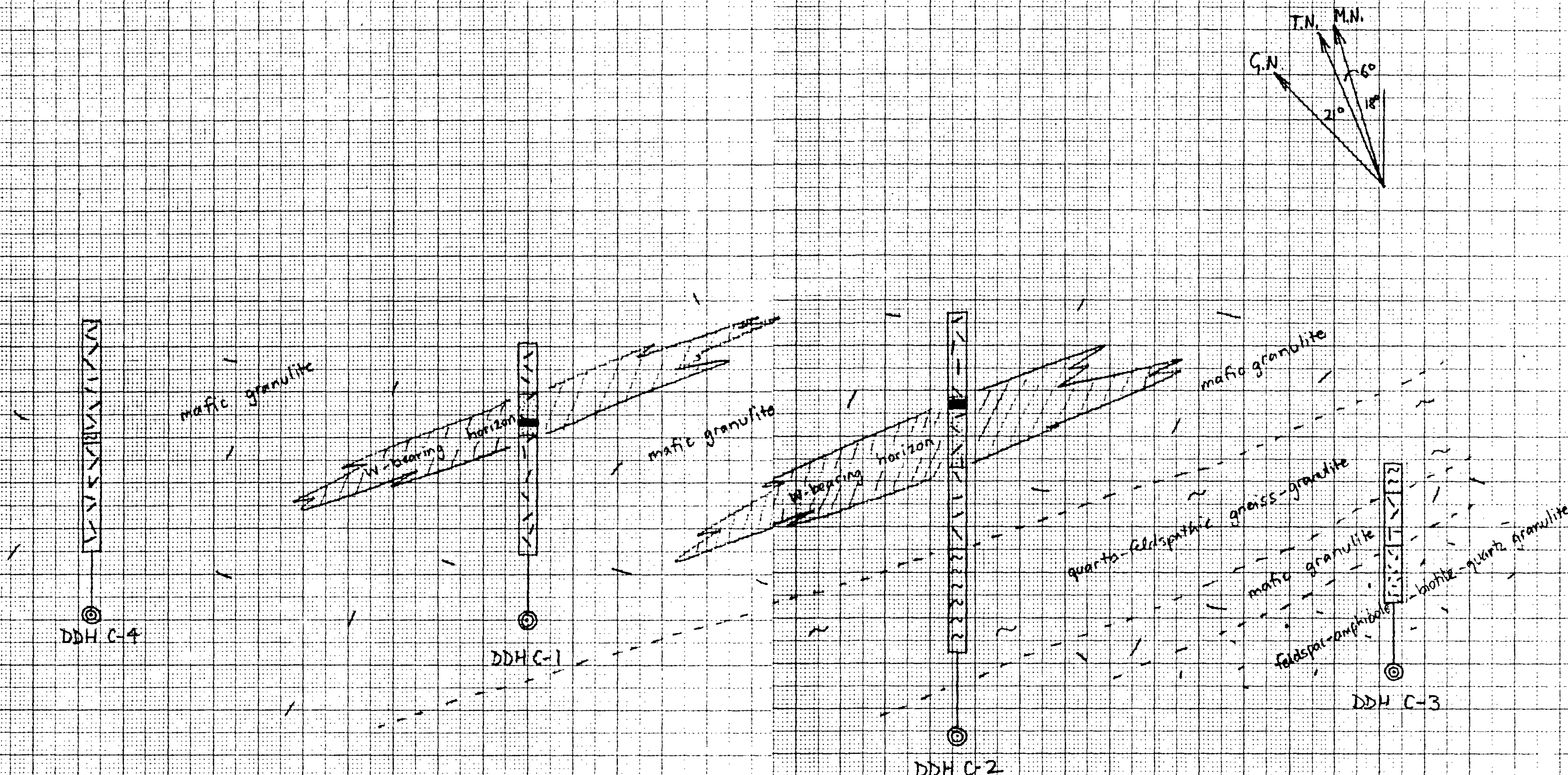
F

4230(II)-22



COOTRA

MEANEY'S PROSPECT

INTERPRETIVE GEOLOGY

Vertical projection of diamond drill holes

1: 1000

LEGEND

mafic granulite

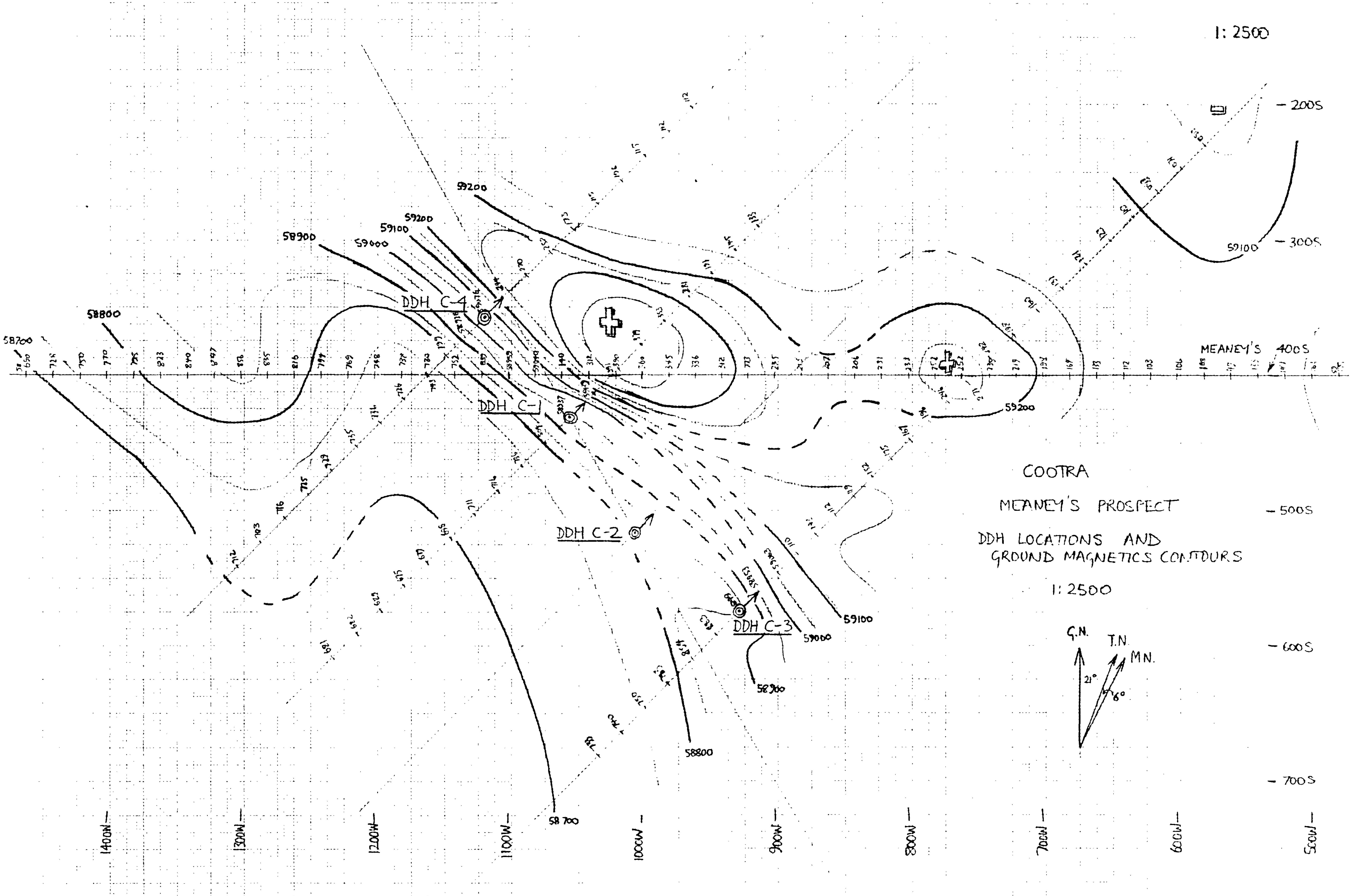
feldspar-amphibole-biotite-quartz granulite

quartzo-feldspathic gneiss-granulite

scheelite recorded

best scheelite intersection

4230(II)-23


1: 2500
COOTRA
MEANEY'S PROSPECT
DDH LOCATIONS AND GROUND MAGNETICS CONTOURS
1: 2500
DDH C-4
DDH C-1
DDH C-2
DDH C-3
MEANEY'S
G.N.
T.N.
M.N.
21°
6°
59200
59100
59000
58900
58800
58700
200S
300S
400S
500S
600S
700S
1400W
1300W
1200W
1100W
1000W
900W
800W
700W
600W
500W

4230(II)-24

Standard Metric A4 Sheet

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET

— UNIVERSAL —

EXPLORATION DIVISION

0203

FIELD ENTRY

Date 24-5-82 Sampler / Driller Chapman

Area Cootra Machine

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project

Cost Code 543 Date Desp. 11-6-82

Notes

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	W
0	3m	3m	C7 SLUDGES			1	1	1	<1	1	1	<5	<10
3	6	"				1	1	1	"	1	1	"	"
6	9	"				1	1	1	"	1	1	"	"
9	12	"				1	1	1	"	1	1	"	"
12	15	"				1	1	1	"	1	1	"	"
21	24	"				1	1	1	"	1	1	"	"
24	27	"				1	1	1	"	1	1	"	"
66	69	"				46	1	54	"	10	15	"	"
69	72	"				60	1	57	"	26	28	"	"
72	75	"				56	1	61	"	24	18	"	"
75	78	"				26	1	48	"	17	15	"	"
78	81	"				72	1	91	"	30	15	"	"
81	84	"				89	1	61	"	25	13	"	"
84	87	"				59	1	53	"	22	12	"	"
87	90	"				228	2	190	"	69	26	"	180
90	93	"				105	3	73	"	60	15	"	60
93	96	"				52	1	50	"	51	13	"	<10
96	99	"				127	1	100	"	55	29	"	40
99	102	"				88	1	91	"	31	17	"	<10
102	105	"				144	3	115	"	45	29	"	"
105	108	"				58	1	67	"	19	12	"	"
108	111	"				77	1	68	"	18	15	"	"
111	114	"				100	1	105	"	36	19	"	"
114	117	"				74	1	56	"	26	15	"	"
			Check Sample		No 2	73	103	72	2	73	72	123	160

SAMPLE TYPE / HOLE No: C7 SLUDGES

Standard Metric A4 Sheet — Instituted 1975

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION** 0204

FIELD ENTRY

Date 24-5-82 ~~Sampler~~ / Driller Chapman
Area Cootam Machine
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No.
Project
Cost Code SM3 Date Desp. 11-6-82
Notes

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	W
117m	120m	3m	C7 SLUDGES			75	1	33	<1	31	11	<5	<10
120	123	"				74	1	41	"	31	13	"	"
123	126	"				72	1	76	"	33	15	"	"
126	129	"				62	1	95	"	36	18	"	"
129	132	"				48	1	105	"	45	25	"	"
132	135	"				56	1	78	"	41	21	"	"
135	138	"				81	1	107	"	43	19	"	"
138	141	"				81	1	168	"	36	18	"	"
141	144	"	Zinc is suspect,			103	1	182	"	40	25	"	"
144	147	"				46	1	218	"	27	15	"	"
147	150	"	from drilling equipment? PJ			72	1	256	"	29	13	"	"
150	153	"				32	1	113	"	20	10	"	"
153	156	"				39	1	206	"	38	10	"	"
156	159	"				82	1	214	"	66	20	"	"
159	162	"				50	1	324	"	50	13	"	"
162	165	"				18	1	282	"	39	12	"	"
165	168	"				18	1	107	"	43	13	"	"
171	174	"				52	1	105	"	80	21	"	"
174	177	"				50	1	83	"	50	15	"	"
177	180	"				64	1	90	"	48	16	"	"
180	183	"				26	1	173	"	21	13	"	"
183	186	"				24	1	120	"	22	12	"	"
186	189	"				23	3	216	"	20	9	"	"
189	192	"				28	1	140	"	21	9	"	"
			Check Sample		BLANK.	—	—	—	—	—	—	—	—

SAMPLE TYPE / HOLE No: C7 SLUDGES.

Standard Metric A4 Sheet Instituted 1975

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
— UNIVERSAL —

EXPLORATION DIVISION

0205

FIELD ENTRY

Date 24-5-82 ~~Sampler~~ / Driller Chapman
Area Cootra Machine
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No
Project
Cost Code 543 Date Desp 2-6-82
Notes

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	W
192m	195m	3m	C7 SLUDGES			49	1	204	<1	17	13	<5	<10
195	198	"				88	1	231	"	22	15	"	"
198	201	"				52	1	98	"	18	11	"	"

All results in parts per million unless otherwise indicated

SAMPLE TYPE / HOLE No: C7 SLUDGES

Check Sample

Standard Metric A4 Sheet — Instituted 1975

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION** 0206

FIELD ENTRY

Date 24-5-82 — ~~Sampler~~ / Driller Chapman
Area Coatra — Machine
Grid — Priority (urgency)
For location see Map No. — or Air Photo No

LABORATORY

Order No. — Sheet No.
Project
Cost Code 543 — Date Desp. 8-6-82
Notes

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	W
0	3m	3m	C 6 SLUDGES			2	1	50	<1	48	1	<1	<10
3	6	"				1	1	43	"	52	1	"	"
6	9	"				1	1	67	"	57	1	"	"
9	12	"				1	1	64	"	46	1	"	"
12	15	"				1	1	39	"	51	1	"	"
15	18	"				1	1	54	"	48	1	"	"
18	21	"				2	1	40	"	28	6	"	"
21	24	"				3	1	39	"	25	1	"	"
24	27	"				6	1	27	"	35	3	"	"
54	57	"				16	1	34	"	25	8	"	"
57	60	"				43	1	29	"	25	25	"	"
60	63	"				62	1	49	"	32	18	"	"
63	66	"				68	1	20	"	39	27	"	"
66	69	"				89	1	28	"	31	25	"	"
69	72	"				146	1	3	"	3	25	"	"
72	75	"				78	1	28	"	46	21	"	"
75	78	"				58	5	66	"	16	12	"	"
78	81	"				54	1	30	"	23	14	"	"
81	84	"				50	1	43	"	37	12	"	"
84	87	"				38	1	1	"	1	11	"	"
87	90	"				30	1	1	"	1	9	"	"
90	93	"				60	1	1	"	1	13	"	"
93	96	"				45	1	1	"	1	11	"	"
96	99	"				70	1	1	"	1	14	"	"
			Check Sample			10	4	6	<1	4	4	<5	160

SAMPLE TYPE / HOLE No: C 6 SLUDGES

Standard Metric A4 Sheet

Instituted 1975

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET
—UNIVERSAL—

EXPLORATION DIVISION

0207

FIELD ENTRY

Date 24-5-82 ~~Sampler~~ / Driller Chapman
Area Cootra Machine
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No
Project
Cost Code 543 Date Desp. 8-6-82
Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	W
99m	102m	3m	C6 SLUDGES			63	1	24	<1	42	11	<5	<10
102	105	"				22	1	79	"	15	6	"	"
105	108	"				41	1	27	"	23	9	"	"
108	111	"				92	1	42	"	38	16	"	"

SAMPLE TYPE / HOLE No: C6 SLUDGES

Check Sample

Standard Metric A4 Sheet Instituted 1975

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** EXPLORATION DIVISION

— UNIVERSAL —

0206

FIELD ENTRY

Date 24-5-82 Sampler / Driller Chapman

Area Cootra Machine

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project

Cost Code 543 Date Desp. 8-6-82

Notes.

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	W	
0	3m	3m	C5 SLUDGES			3	1	2	<1	1	1	<5	<10	
3	6	"				3	1	1	"	1	1	"	"	
6	9	"				2	1	1	"	1	1	"	"	
9	12	"				3	1	1	"	1	1	"	"	
12	15	"				2	1	3	"	1	1	"	"	
15	18	"				5	1	3	"	1	1	"	"	
18	21	"				8	1	4	"	1	1	"	"	
21	24	"				35	1	45	"	1	1	"	"	
24	27	"				34	1	48	"	24	13	"	"	
27	30	"				60	1	29	"	30	11	"	"	
30	33	"				90	1	37	"	39	4	"	"	
33	36	"				57	1	27	"	33	10	"	40	
36	39	"				50	1	28	"	33	10	"	<10	
39	42	"				67	1	44	"	36	14	"	"	
42	45	"				65	1	43	"	34	14	"	"	
45	48	"				71	1	28	"	41	13	"	"	
48	51	"				83	1	35	"	43	14	"	"	
51	54	"				50	1	51	"	30	11	"	"	
54	57	"				28	1	65	"	31	11	"	"	
57	60	"				26	1	48	"	26	9	"	"	
60	63	"				26	1	61	"	35	13	"	"	
63	66	"				21	1	59	"	25	10	"	"	
66	69	"				66	1	81	"	31	12	"	"	
69	72	"				16	1	78	"	20	8	"	"	
				Check Sample		—	—	—	—	—	—	—	—	

All results in parts per million unless otherwise indicated

SAMPLE TYPE / HOLE No: C5 SLUDGES.

Standard Metric A4 Sheet — Instituted 1975

NORTH BROKEN HILL LIMITED — **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION**

0209

FIELD ENTRY

Date 21-4-82 — Sampler / Driller ...
Area Cootra — Machine ...
Grid ... — Priority (urgency) ...
For location see Map No ... or Air Photo No ...

LABORATORY

Order No ... — Sheet No ...
Project Cootra
Cost Code 543 — Date Desp. 8-6-82
Notes ...

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
0 m	3 m	3 m				2	1	3	<1	3	2	<5	<20	<1
3	6	"				1	1	1	"	2	1	"	"	"
6	9	"				1	1	1	"	3	1	"	"	"
9	12	"				2	1	1	"	2	1	"	"	"
12	15	"				1	1	1	"	2	1	"	"	"
15	18	"				2	1	1	"	1	1	"	"	"
18	21	"				2	1	3	"	1	1	"	"	"
21	24	"				3	1	3	"	2	1	"	"	"
27	30	"				54	1	28	"	21	17	"	"	"
30	33	"				67	5	56	"	39	19	"	"	"
33	36	"				42	1	14	"	29	12	5	"	"
36	39	"				56	1	44	"	53	23	17	"	"
39	42	"				65	1	13	"	53	18	<5	"	"
42	45	"				89	1	26	"	54	21	"	"	"
45	48	"				75	1	31	"	78	23	"	"	"
48	51	"				92	1	22	"	66	22	"	"	"
51	54	"				79	2	36	"	58	20	"	"	"
54	57	"				48	1	22	"	65	18	"	"	"
57	60	"				65	1	29	"	52	19	"	"	"
60	63	"				59	1	31	"	45	18	"	"	"
63	66	"				54	1	30	"	46	17	"	"	"
66	69	"				52	1	31	"	59	19	"	"	"
69	72	"				57	1	27	"	52	20	"	"	"
72	75	"				57	1	37	"	60	20	"	"	"
SAMPLE TYPE / HOLE No: C-4 SLUDGES.			Check Sample		No 4 Sn 500	205	310	200	6	210	205	330	500	80

Standard Metric A4 Sheet

Instituted 1975

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — EXPLORATION DIVISION 0210

FIELD ENTRY

Date 21-4-82 Sampler / Driller

Area COOTRA Machine

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 543 Date Desp. 21-5-82

Notes

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
75m	78m	3m.				53	1	35	<1	63	16	<5	<20	<10
78	81	"				60	1	30	"	50	17	"	"	"
81	84	"				39	1	24	"	27	12	"	"	"
84	87	"				70	1	20	"	54	17	"	"	"
87	90	"				85	1	19	"	54	19	"	"	"
90	93	"				58	1	24	"	47	19	"	"	"
93	96	"				53	1	30	"	44	16	"	"	"
96	99	"				74	1	24	"	44	14	"	"	"
99	102	"				39	1	29	"	37	14	"	"	"
102	105	"				55	1	40	"	48	24	"	"	"
105	108	"				52	1	18	"	36	11	"	"	"
108	111	"				43	1	63	"	28	12	"	"	"
111	114	"				47	1	25	"	34	13	"	"	"
114	117	"				53	1	49	"	41	19	"	"	"
117	120	"				39	1	43	"	37	15	"	"	"
120	123	"				70	1	32	"	47	15	"	"	"
123	126	"				74	1	57	"	42	22	"	"	"
					No 5	280	390	270	8	290	255	340	105	100

SAMPLE TYPE / HOLE No: C-4 SLUDGES.

Check Sample

021

FIELD ENTRY

Date 21-4-82 Sampler / Driller
Area Cootra Machine
Grid Priority (urgency)
For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No
Project
Cost Code 543 Date Desp. 5-5-82
Notes.

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
0m	3m	3m				2	1	3	<1	4	2	<5	<20	<10
3	6	"				2	1	4	"	3	2	"	"	"
6	9	"				7	2	7	"	6	3	"	"	"
9	12	"				3	1	3	"	4	3	"	"	"
12	15	"				7	6	7	"	5	2	"	"	"
15	18	"				60	5	10	"	5	5	"	"	"
18	21	"				23	3	8	"	6	4	"	"	"
21	24	"				18	2	15	"	5	4	"	"	"
24	27	"				20	2	12	"	6	4	"	"	"
27	30	"				32	2	25	"	13	9	"	"	"
30	33	"				35	7	62	"	45	23	"	"	"
33	36	"				49	4	120	"	82	45	"	"	"
36	39	"				60	9	100	"	85	47	"	"	"
39	42	"				76	2	90	"	90	53	"	"	"
42	45	"				130	8	130	"	92	54	62	"	60
45	48	"				120	11	140	"	88	54	82	"	30
48	51	"				155	4	110	"	96	40	11	"	20
51	54	"				110	2	125	"	85	43	<5	"	40
54	57	"				44	1	53	"	45	25	"	"	10
57	60	"				73	1	59	"	56	22	"	"	20
60	63	"				82	2	93	"	59	27	18	"	20
63	66	"				66	1	50	"	55	20	23	"	<10
66	69	"				110	3	63	"	75	22	5	"	10
69	72	"				160	2	150	"	86	33	8	"	10
Check Sample						130	205	130	4	150	140	220	98	18

All results in parts per million unless otherwise indicated

SAMPLE TYPE / HOLE No: C-3 SLUDGES.

—UNIVERSAL—

0212

FIELD ENTRY

Date 21-4-82 Sampler / Driller
Area COOTRA Machine
Grid Priority (urgency)
For location see Map No or Air Photo No

LABORATORY

Order No Sheet No
Project COOTRA
Cost Code 543 Date Desp. 5-5-82
Notes

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
72 m	75m	3 m				165	3	130	<1	75	29	<5	<20	<10
75	78	"				100	2	82	"	56	20	"	"	"
78	81	"				36	8	50	"	18	7	"	"	"
81	84	"				34	8	50	"	12	5	"	"	"
84	87	"				29	3	57	"	21	9	"	"	"
87	90	"				38	4	51	"	17	10	"	"	"
		"												

All results in parts per million unless otherwise indicated

SAMPLE TYPE / HOLE No: C-3 SLUDGES.

Check Sample

Standard Metric A4 Sheet

Instituted 1975

NORTH BROKEN HILL LIMITED — ANALYTICAL REPORT SHEET — EXPLORATION DIVISION

— UNIVERSAL —

0213

F I E L D   E N T R Y

Date 17-3-82 Sampler / Driller D. CHAPMAN

Area COOTRA Machine

Grid Priority (urgency)

For location see Map No. or Air Photo No

L A B O R A T O R Y

Order No. Sheet No

Project COOTRA

Cost Code 543 Date Desp. 24-5-82

Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval / Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	[redacted]	W
0m	3m	3m	C-2 SLUDGES			2	3	3	<1	3	1	<5		<1
3	6	"				2	4	10	"	4	1	"		"
6	9	"				4	3	16	"	5	1	"		"
9	12	"				3	3	6	"	2	1	"		"
12	15	"				3	2	4	"	1	1	"		"
15	18	"				10	4	9	"	2	1	"		"
18	21	"				35	6	11	"	4	1	"		"
21	24	"				26	6	10	"	6	1	"		"
24	27	"				22	4	12	"	4	1	"		"
27	30	"				36	6	8	"	2	1	"		"
30	33	"				43	5	6	"	2	1	"		"
33	36	"				60	4	10	"	15	13	"		"
36	39	"				46	9	45	"	55	45	"		"
39	42	"				53	20	80	"	45	37	"		"
42	45	"				46	17	65	"	35	23	"		"
45	48	"				15	14	64	"	13	6	"		"
48	51	"				12	18	63	"	13	6	"		"
51	54	"				13	9	56	"	12	5	"		"
54	57	"				13	9	53	"	15	5	"		
57	60	"				17	9	58	"	18	11	"		"
60	63	"				14	7	74	"	14	7	"		"
63	66	"				16	6	72	"	15	8	"		"
66	69	"				17	7	95	"	15	9	"		"
69	72	"				19	13	190	"	14	9	"		
Check Sample					"	10	5	11	<1	9	6	<5		[illegible]

SAMPLE TYPE / HOLE No: C-2 SLUDGES

Standard Metric A4 Sheet

Instituted 1975

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** **EXPLORATION DIVISION**

— UNIVERSAL —

0214

FIELD ENTRY

Date 17-3-82 Sampler / Driller D. CHAPMAN

Area COOTRA Machine

Grid Priority (urgency)

For location see Map No. or Air Photo No

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 542 Date Desp. 24-5-82

Notes.

Co-ordinates/or From	To	Interval / Depth	Geological description of sample
72m	75m	3m	C-2 SLUDGES

All results in parts per million unless otherwise indicated

Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	[redacted]	W
		28	8	100	<1	10	8	<5		<

SAMPLE TYPE / HOLE No: C-2 SLUDGES.

Check Sample

Standard Metric A4 Sheet

Instituted 1975

NORTH BROKEN HILL LIMITED

ANALYTICAL REPORT SHEET

— UNIVERSAL —

EXPLORATION DIVISION

0215

FIELD ENTRY

Date 26-3-82 ~~Sampler~~ / Driller D. CHAPMAN

Area COOTRA Machine

Grid Priority (urgency)

For location see Map No. or Air Photo No.

LABORATORY

Order No. Sheet No.

Project COOTRA

Cost Code 5H3 Date Desp. 5-5-82

Notes.

All results in parts per million unless otherwise indicated

Co-ordinates/or From	To	Interval/Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
75m	78m	3m	C-2 SLUDGES			25	7	80	<1	14	9	<5	<20	<1
78	81	"				24	5	77	"	14	8	"	.	
81	84	"				33	4	70	"	16	8	"	"	
84	87	"				46	5	72	"	19	13	"	"	
87	90	"				59	5	75	"	30	17	"	"	
90	93	"				57	5	81	"	32	15	"	"	
93	96	"				71	7	73	"	39	17	"	"	
96	99	"				90	3	43	"	56	26	"	"	
99	102	"				92	3	66	"	50	26	"	"	
102	105	"				90	2	77	"	51	28	"	"	
105	108	"				105	1	80	"	51	30	"	"	
108	111	"				130	1	79	"	58	35	"	"	
111	114	"				110	1	81	"	53	30	"	"	
114	117	"				130	1	130	"	51	32	"	"	
117	120	"				84	2	61	"	60	31	"	"	
120	123	"				105	1	82	"	63	33	6	"	
123	126	"	Checked 19/5/82			115	1	75	"	69	39	20	"	
126	129	"				150	1	86	"	89	60	60	"	
129	132	"				110	1	88	"	74	48	18	"	
132	135	"				86	1	90	"	63	37	140	"	
135	138	"				145	14	250	"	78	48	155	"	
138	141	"				145	2	135	"	65	40	14	"	
141	144	"				120	1	125	"	51	32	10	"	
144	147	"				115	2	125	"	56	33	6	"	
			Check Sample		BLANK.	—	—	—	—	—	—	—	—	

SAMPLE TYPE / HOLE No: C-2 SLUDGES.

Standard Metric A4 Sheet

Instituted 1975

NORTH BROKEN HILL LIMITED **ANALYTICAL REPORT SHEET** — UNIVERSAL — **EXPLORATION DIVISION** 0216

FIELD ENTRY

Date 26-3-82 ~~Sampler~~/Driller D. CHAPMAN
Area COOTRA Machine
Grid Priority (urgency)
For location see Map No or Air Photo No

LABORATORY

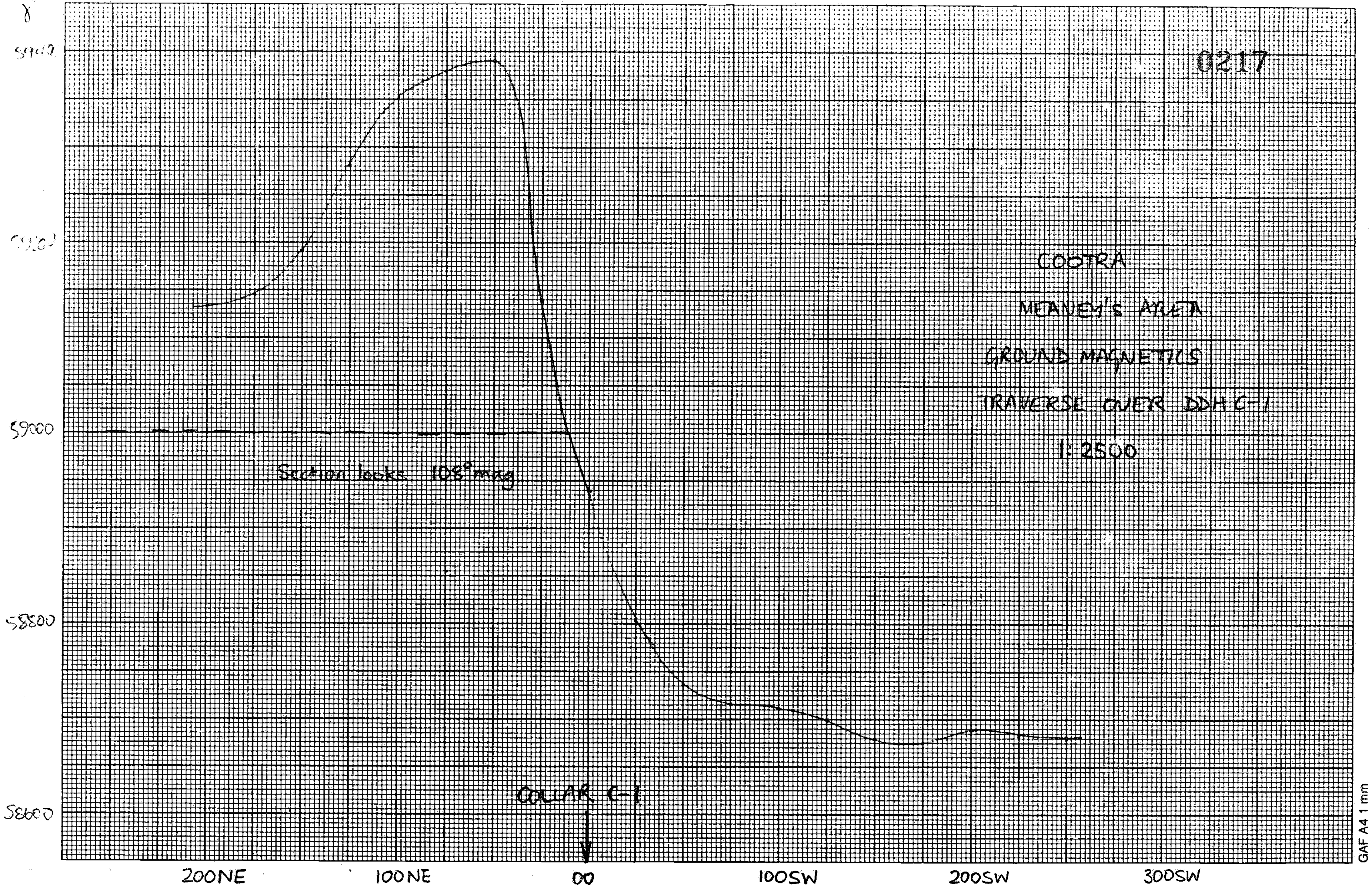
Order No. Sheet No
Project COOTRA
Cost Code 5113 Date Desp. 5-5-82
Notes.

All results in parts per million unless otherwise indicated

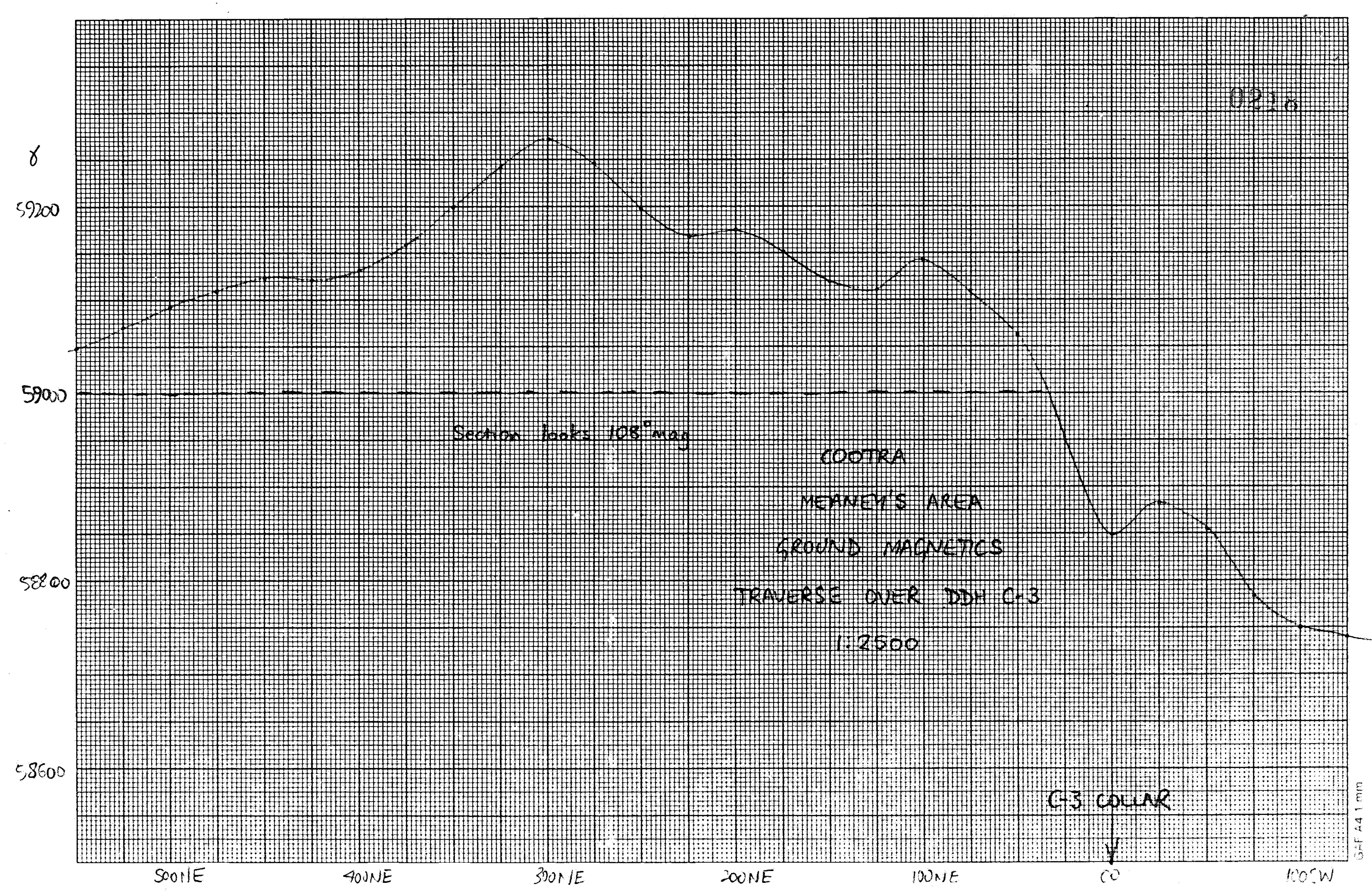
Co-ordinates/or From	To	Interval/ Depth	Geological description of sample	Tube No.	Sample No.	Cu	Pb	Zn	Ag	Ni	Co	Mo	Sn	W
			C-2 SLUDGES											
147m	150m	3m				110	2	120	<1	53	31	8	<20	10
150	153	"				105	2	125	"	53	30	7	"	80
153	156	"				110	1	135	"	56	32	7	"	8
156	159	"				56	7	350	"	22	13	6	"	1
159	162	"				60	9	305	"	22	13	<5	"	<1
162	165	"				86	6	255	"	37	21	"	"	1
165	168	"				110	1	125	"	71	40	"	"	<1
168	171	"				115	1	145	"	70	42	"	"	"
171	174	"				110	1	120	"	67	39	"	"	"
174	177	"				105	1	84	"	63	34	"	"	"
177	180	"				76	14	205	"	42	23	7	"	"
180	183	"				93	41	340	"	45	25	5	"	"

SAMPLE TYPE / HOLE No: C-2 SLUDGES.

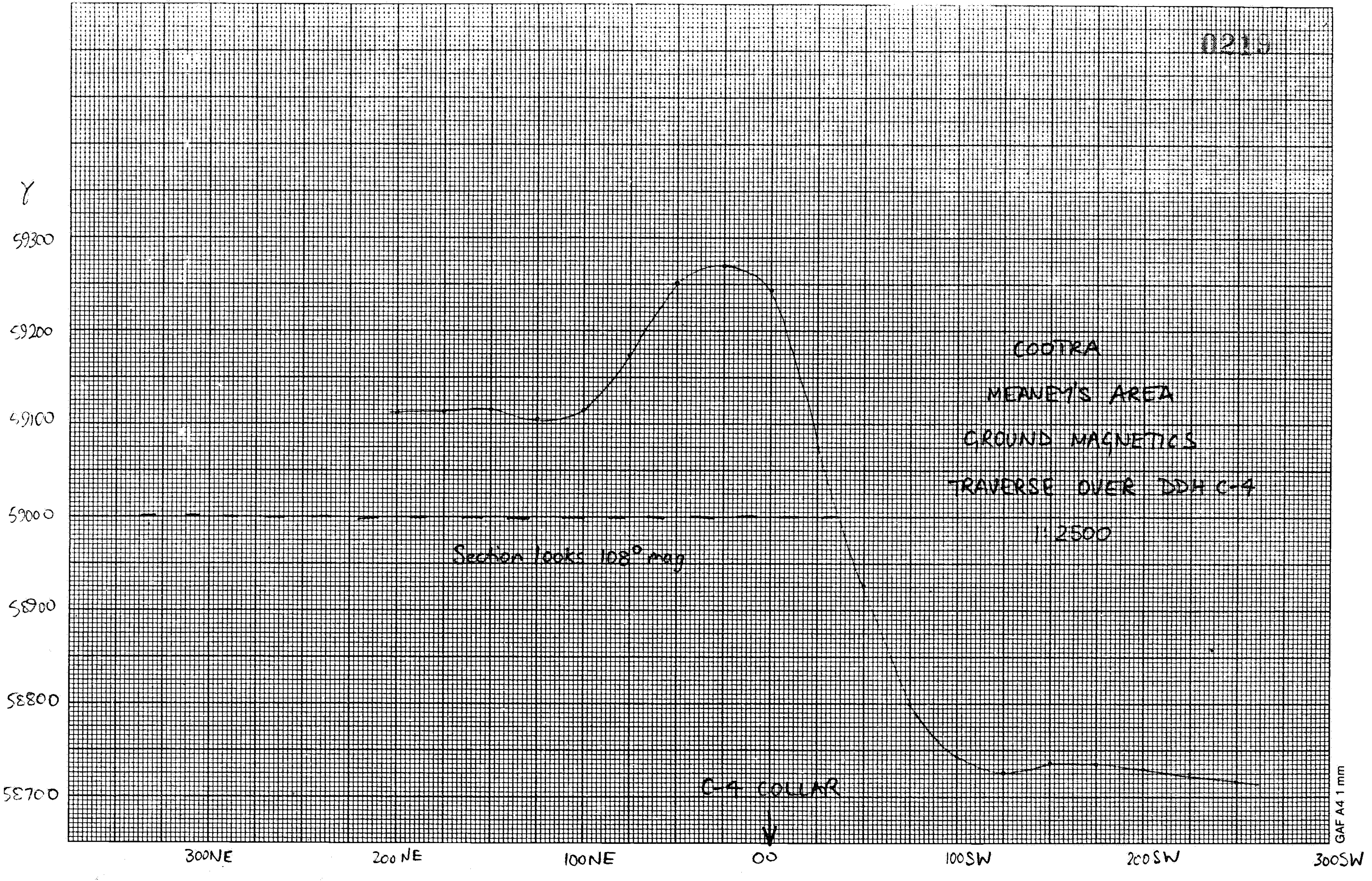
Check Sample

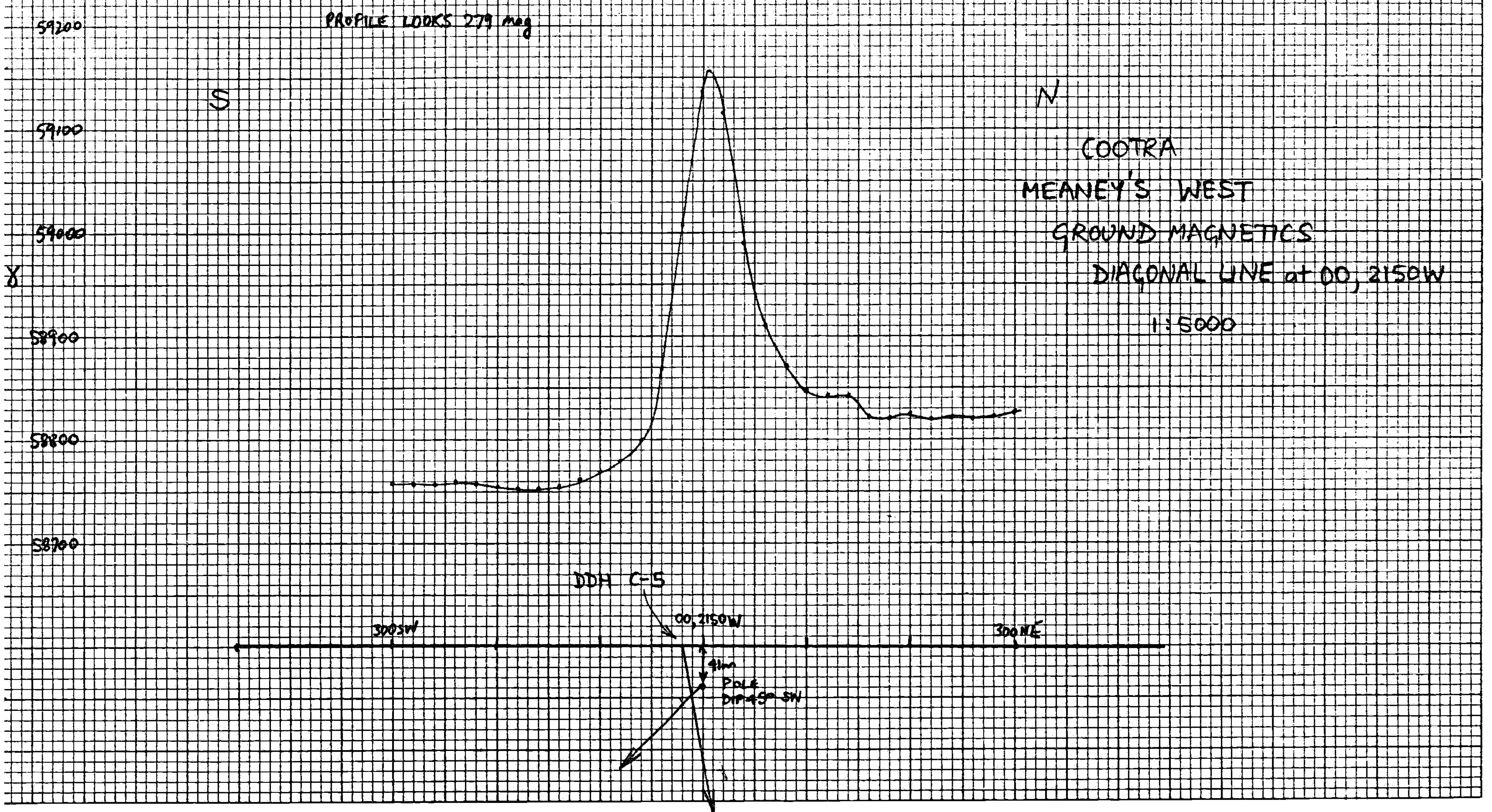


0217
γ
59400
59200
59000
58800
58600
COOTRA
MEANEY'S AREA
GROUND MAGNETICS
TRAVERSE OVER DDH C-1
1:2500
Section looks 108°mag
COLLAR C-1
200NE
100NE
00
100SW
200SW
300SW
GAF A4 1 mm

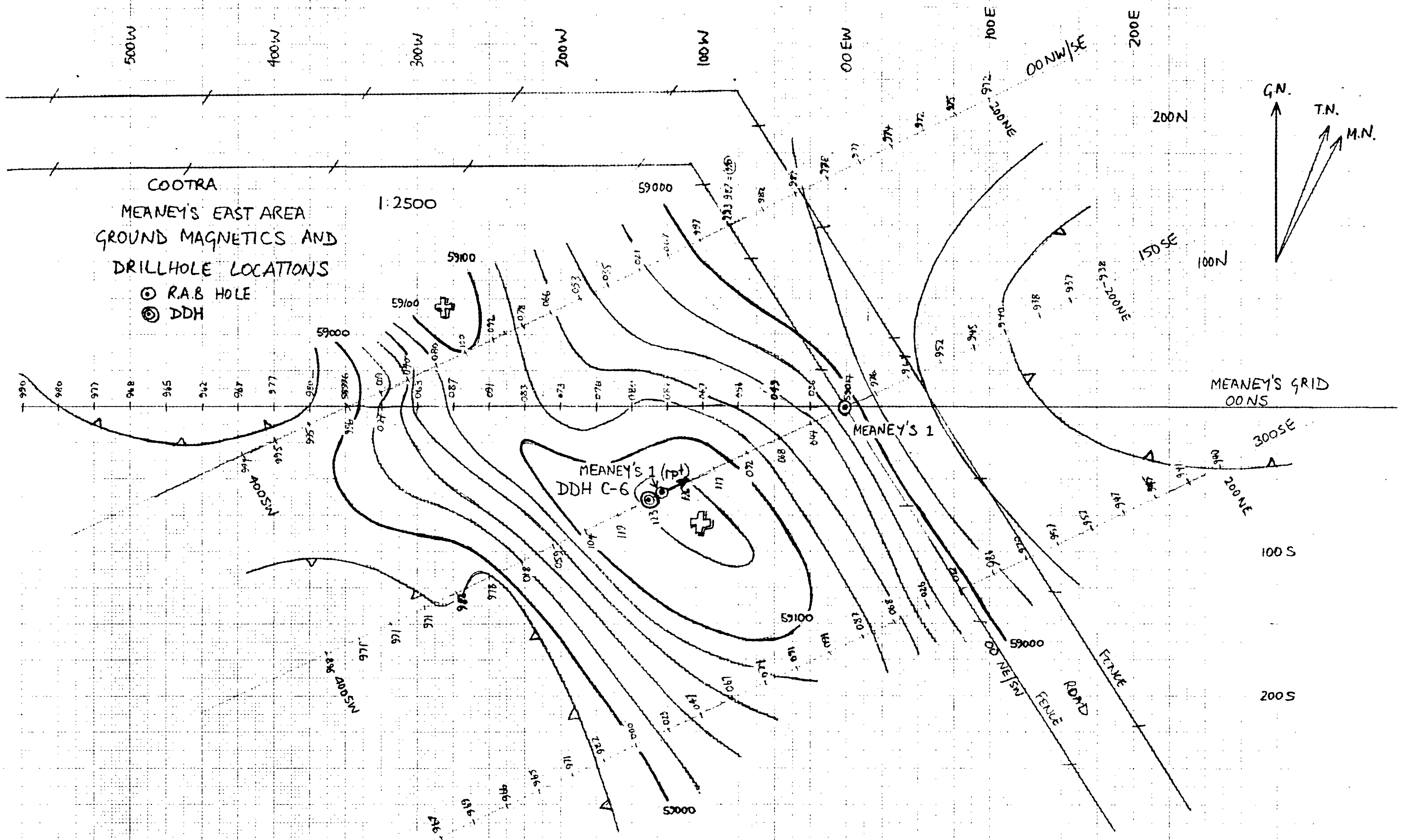


0216
γ
59200
59000
58800
58600
Section looks 108° mag
COOTRA
MEANEY'S AREA
GROUND MAGNETICS
TRAVERSE OVER DDH C-3
1:2500
C-3 COLLAR
500NE
400NE
300NE
200NE
100NE
00
100SW

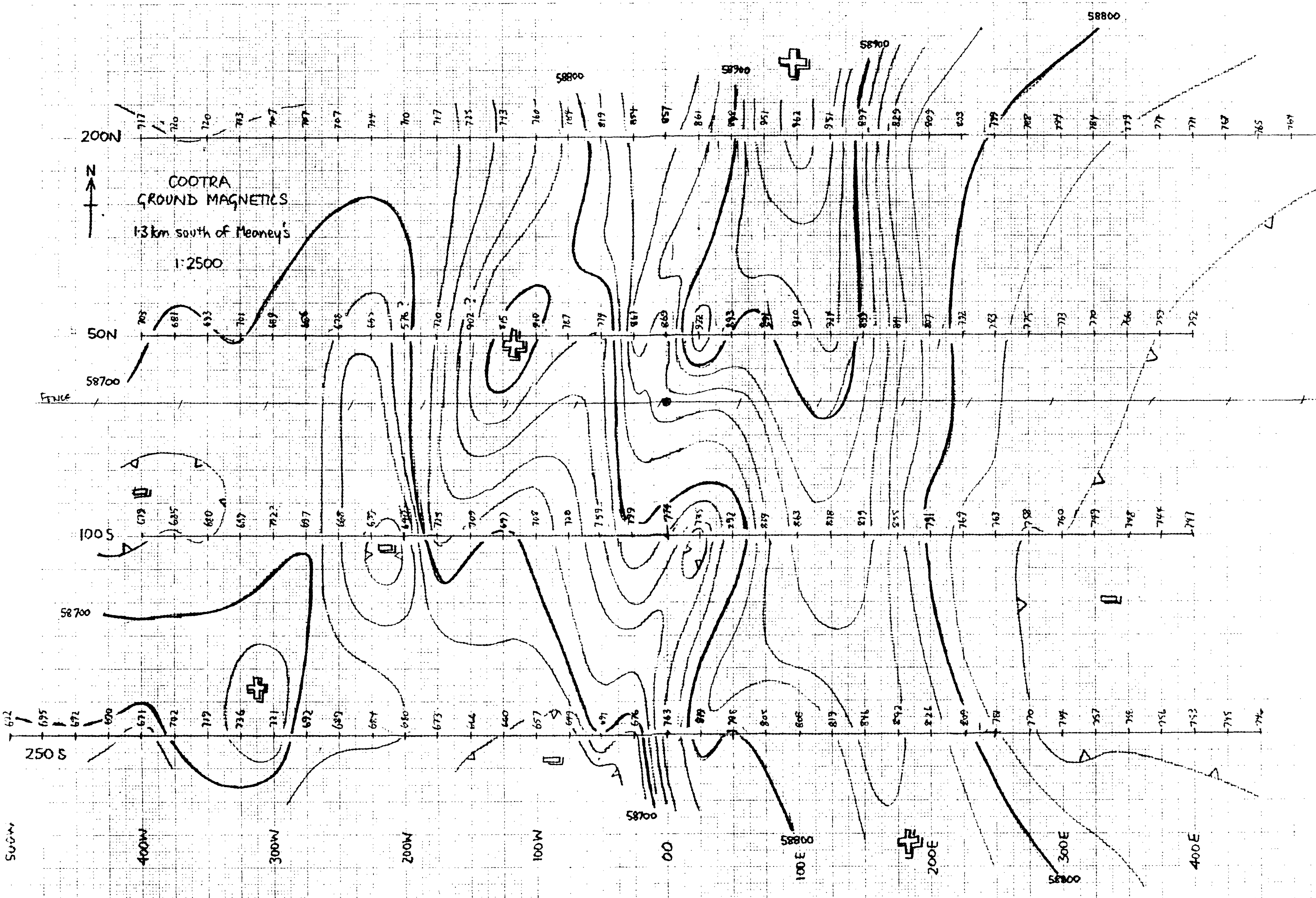

0219
γ
59300
59200
59100
59000
58900
58800
58700
COOTRA
MEANEY'S AREA
GROUND MAGNETICS
TRAVERSE OVER DDH C-4
1:2500
Section looks 108° mag
C-4 COLLAR
300NE
200 NE
100NE
00
100SW
200SW
300SW
GAF A4 1 mm



PROFILE LOOKS 279 mag
59200
59100
59000
γ
58900
58800
58700
S
N
COOTRA
MEANEY'S WEST
GROUND MAGNETICS
DIAGONAL LINE at 00, 2150W
1:5000
DDH C-5
300SW
00, 2150W
300NE
41m
POLE
DIP 45° SW

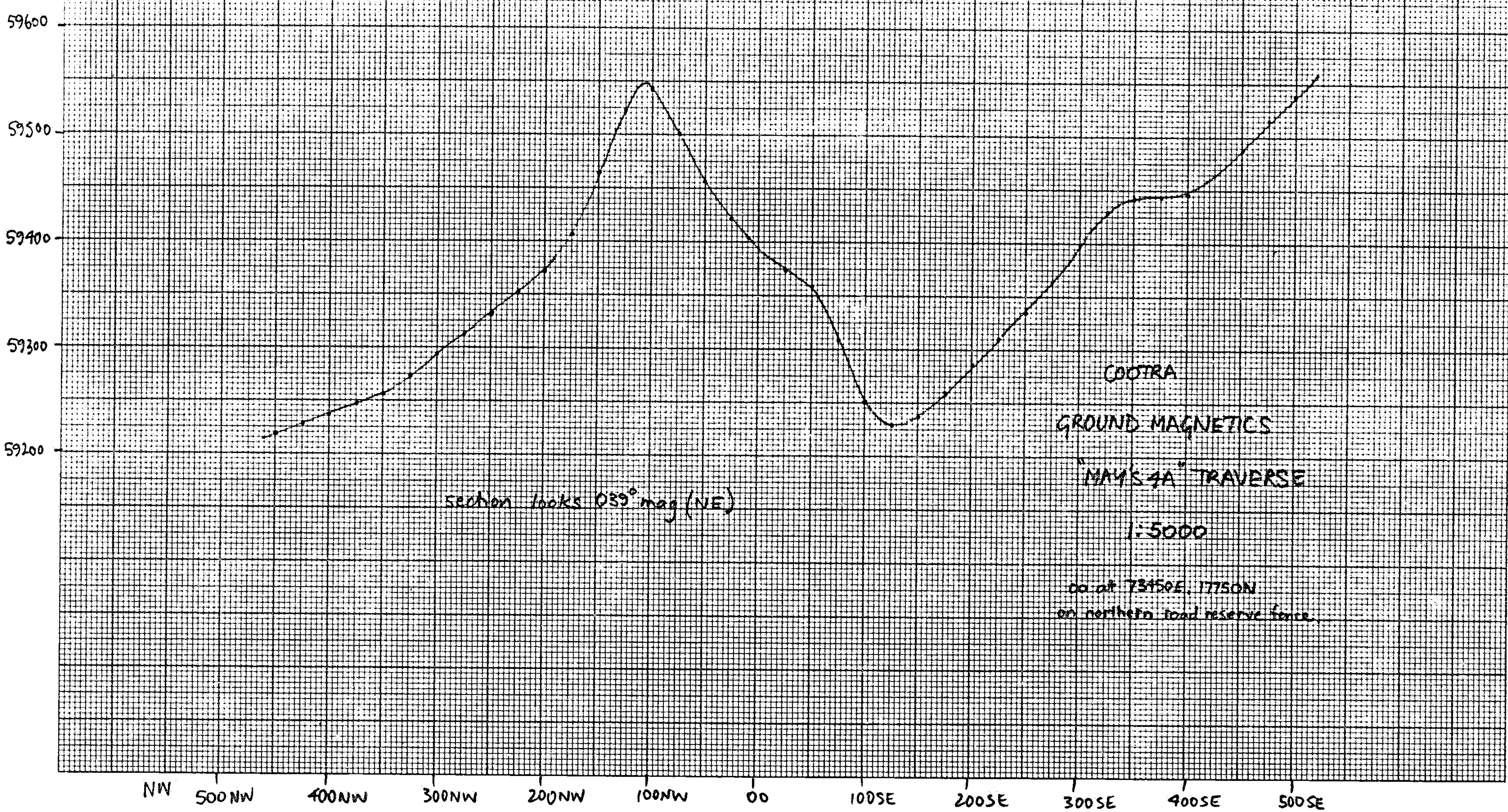

COOTRA
MEANEY'S EAST AREA
GROUND MAGNETICS AND
DRILLHOLE LOCATIONS
R.A.B HOLE
DDH
1:2500
500W
400W
300W
200W
100W
00EW
100E
200E
00NW/SE
200N
100N
150SE
300SE
MEANEY'S GRID
00NS
100S
200S
G.N.
T.N.
M.N.
MEANEY'S 1
MEANEY'S 1 (rpt)
DDH C-6
59000
59100
400SW
200NE
00NE/SW
FENCE
ROAD

4230(II)-25

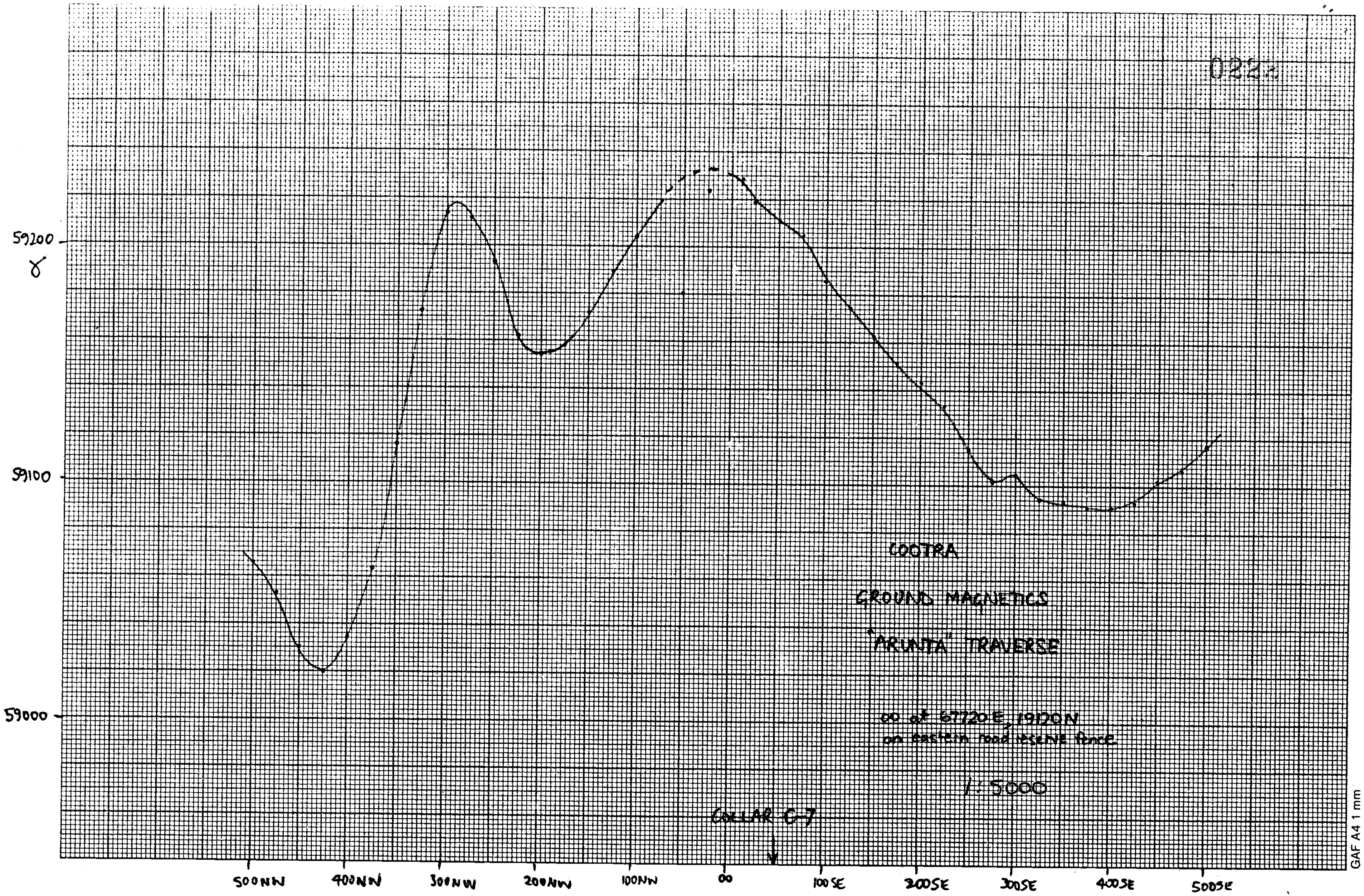


COOTRA
GROUND MAGNETICS
1·3 km south of Meoney's
1:2500
N
200N
50N
FENCE
100S
250S
500W
400W
300W
200W
100W
00
100E
200E
300E
400E
58700
58800
58900

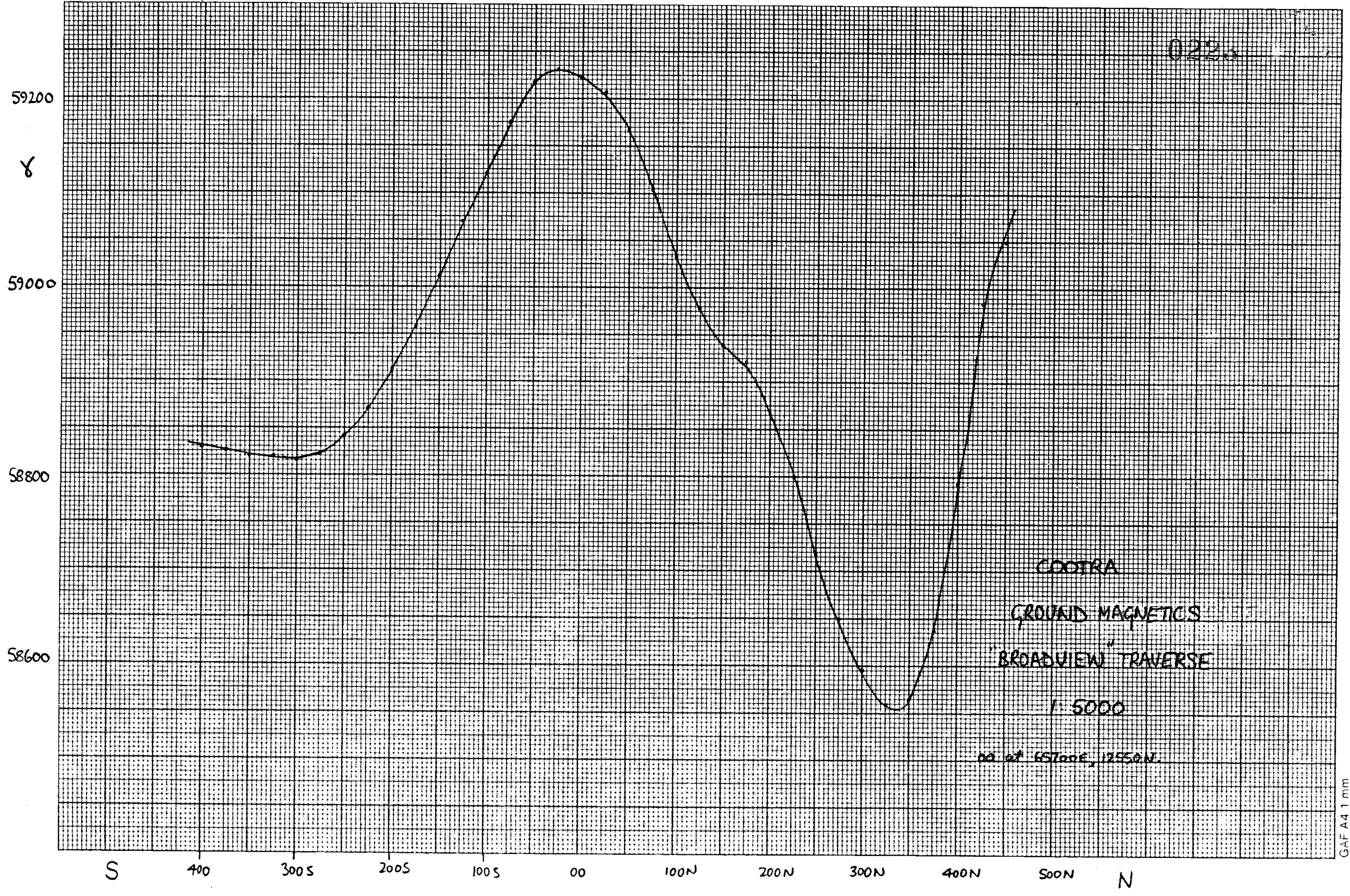
4230 (II)-26

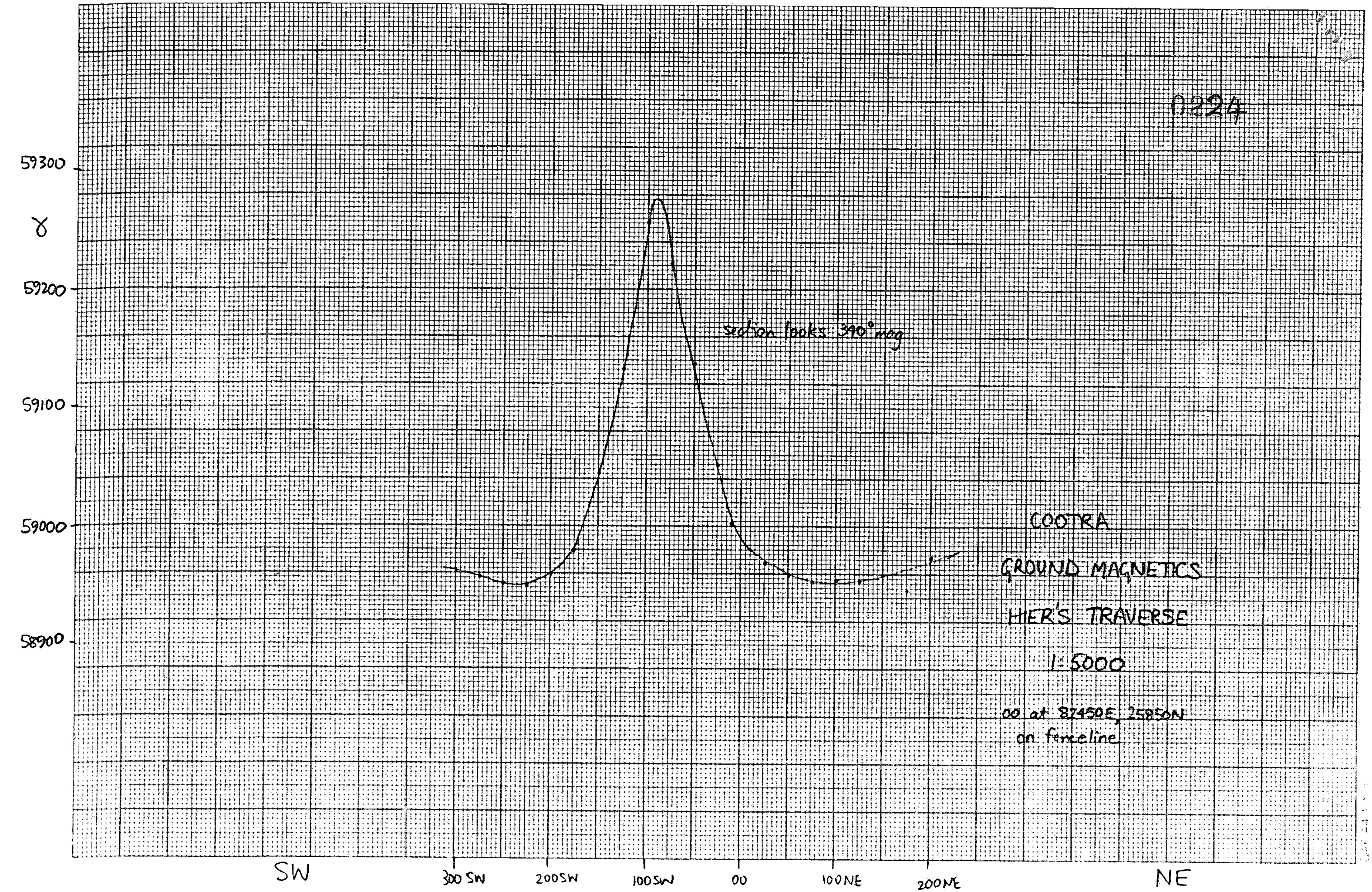

59600
59500
59400
59300
59200
section looks 039° mag (NE)
COOTRA
GROUND MAGNETICS
"MAY'S 4A" TRAVERSE
1:5000
00 at 73450E, 17750N
on northern road reserve fence.
NW
500NW
400NW
300NW
200NW
100NW
00
100SE
200SE
300SE
400SE
500SE

GAF A4 1 mm

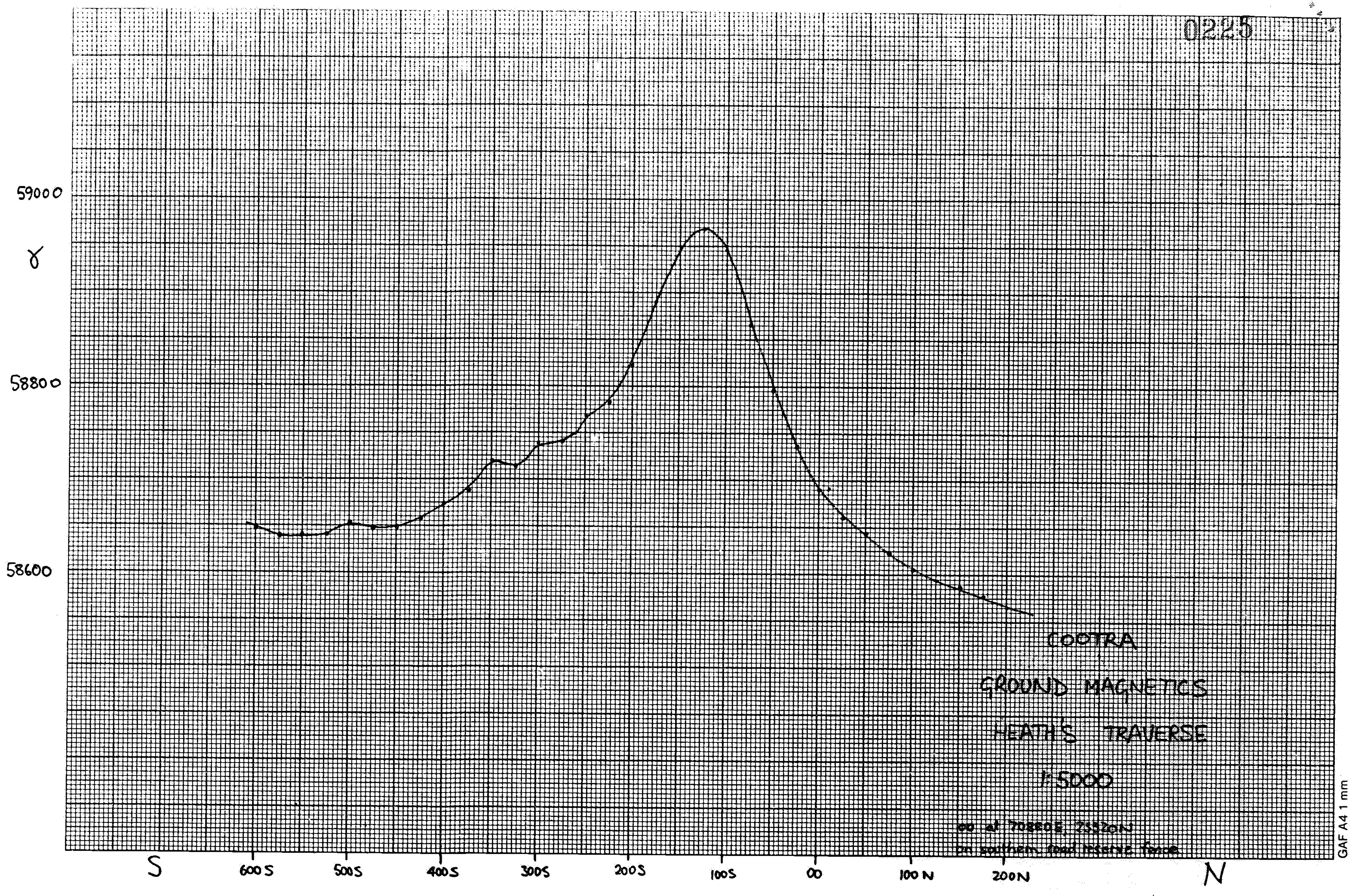


0224
59200
γ
59100
59000
COOTRA
GROUND MAGNETICS
"ARUNTA" TRAVERSE
00 at 67720E, 19120N
on eastern road reserve fence
1:5000
COLLAR C-7
500NW
400NW
300NW
200NW
100NW
00
100SE
200SE
300SE
400SE
500SE
GAF A4 1 mm


022
59200
γ
59000
58800
58600
S
400
300 S
200S
100 S
00
100N
200N
300N
400N
500N
N
COOTRA
GROUND MAGNETICS
"BROADVIEW" TRAVERSE
1:5000
00 at 65700E, 12550N.
GAF A4 1 mm

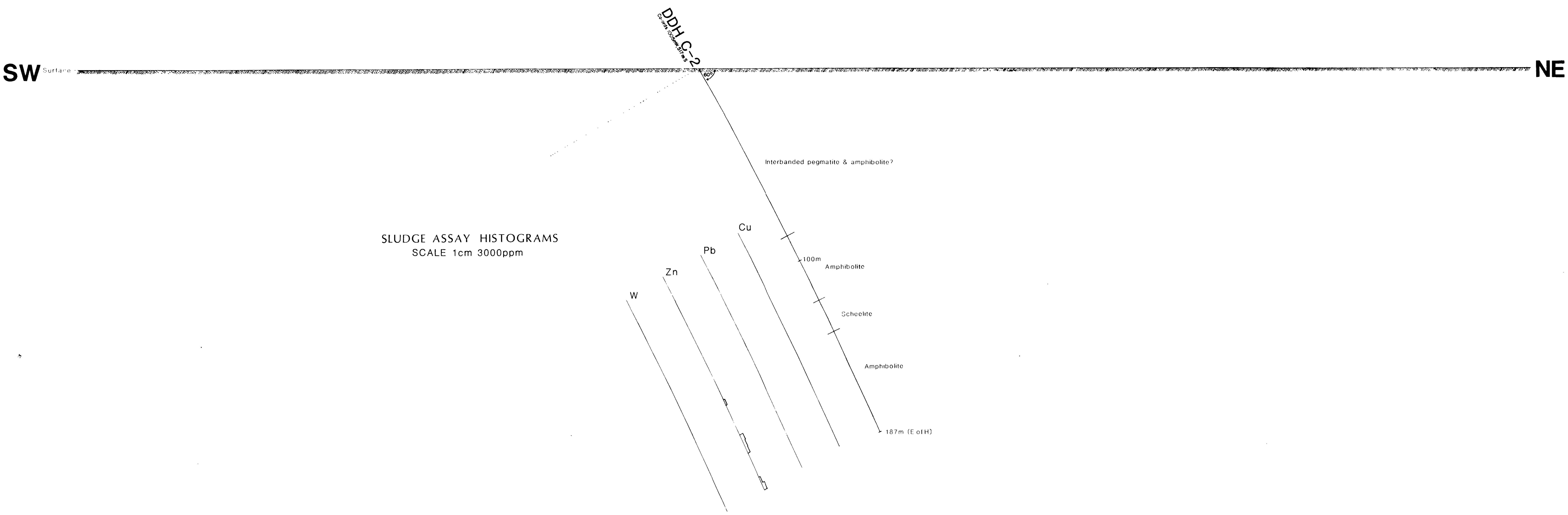


0224
59300
γ
59200
59100
59000
58900
section looks 340° mag
COOTRA
GROUND MAGNETICS
HIER'S TRAVERSE
1:5000
00 at 82450E, 25850N
on fenceline
SW
300 SW
200SW
100SW
00
100NE
200NE
NE



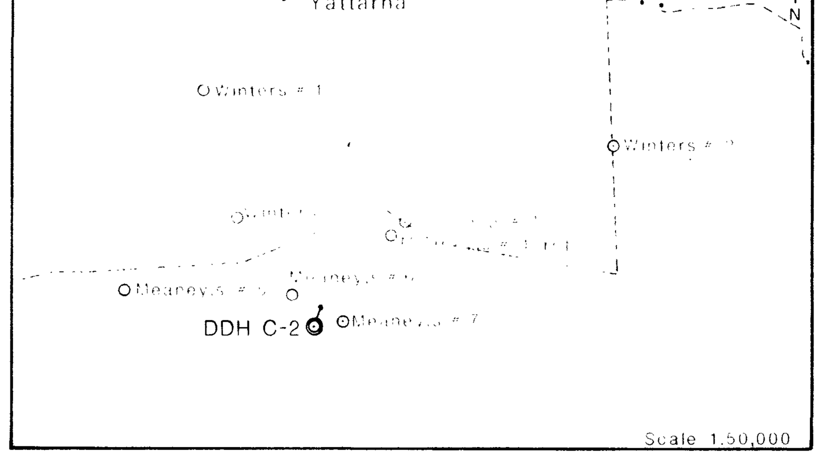
0225
59000
γ
58800
58600
S
600 S
500 S
400 S
300 S
200 S
100 S
00
100 N
200 N
N
COOTRA
GROUND MAGNETICS
HEATH'S TRAVERSE
1:5000
00 at 70880E, 25520N
on southern road reserve fence
GAF A4 1 mm

SECTION LOOKS 288° mag



SLUDGE ASSAY HISTOGRAMS
SCALE 1cm 3000ppm

LOCATION MAP



DDH C-2
MEANEYS ANOMALY
COOTRA AREA E.L.980

NORTH BROKEN HILL LTD, EXPLORATION DIVISION

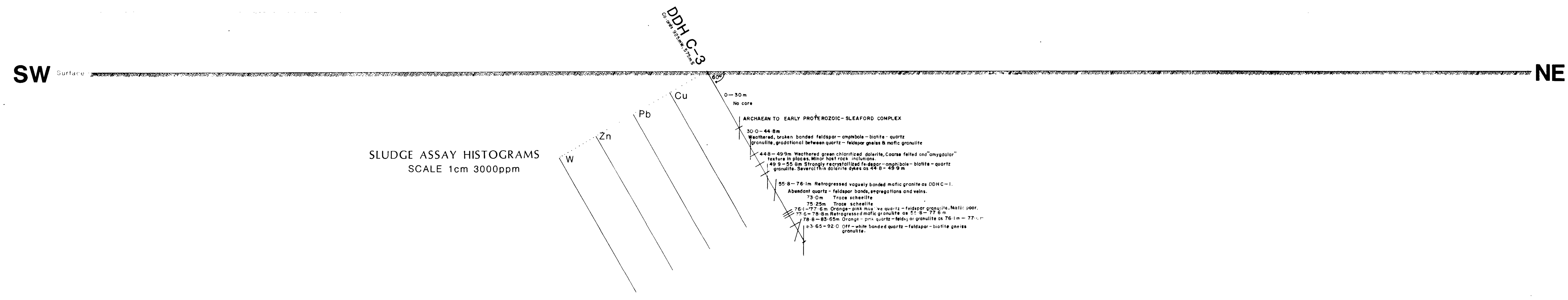
Date 19/5/'82

Scale 1:1,000

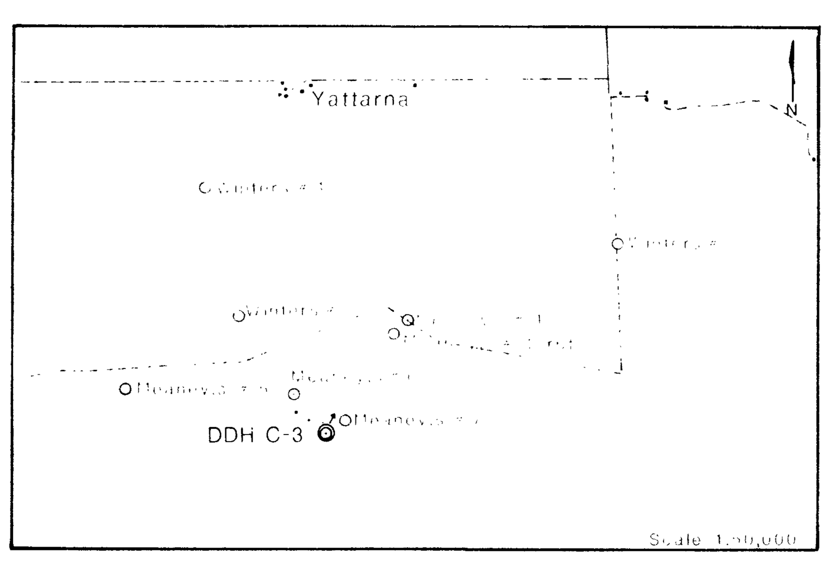
4230(II)-27

Map No. SA/C 5

SECTION LOOKS 288° mag



LOCATION MAP



DDH C-3

MEANEYS ANOMALY

COOTRA AREA E.L.980

NORTH BROKEN HILL LTD/ EXPLORATION DIVISION

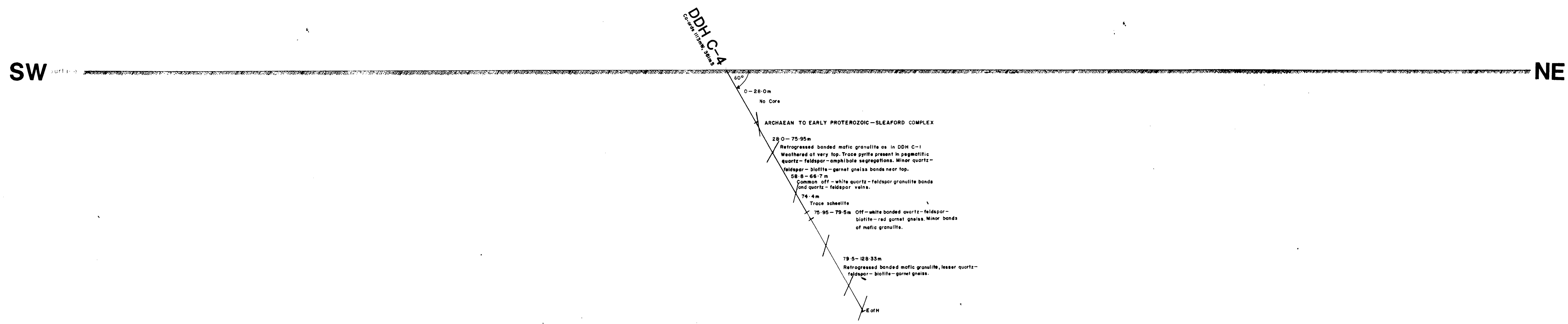
4230 (II)-28

Date 8/2/82

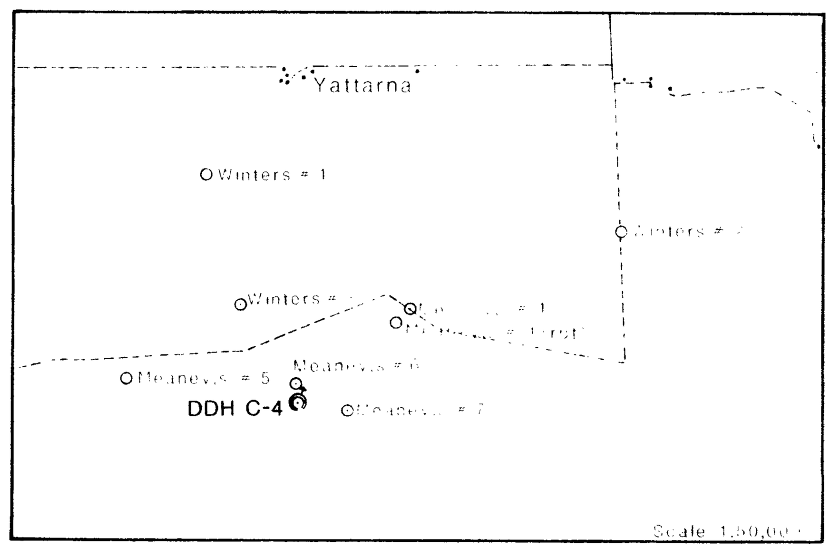
Scale 1:1,000

Map No. SA/C 6

SECTION LOOKS 288° mag



LOCATION MAP



DDH C-4
MEANEYS ANOMALY
COOTRA AREA E.L.980

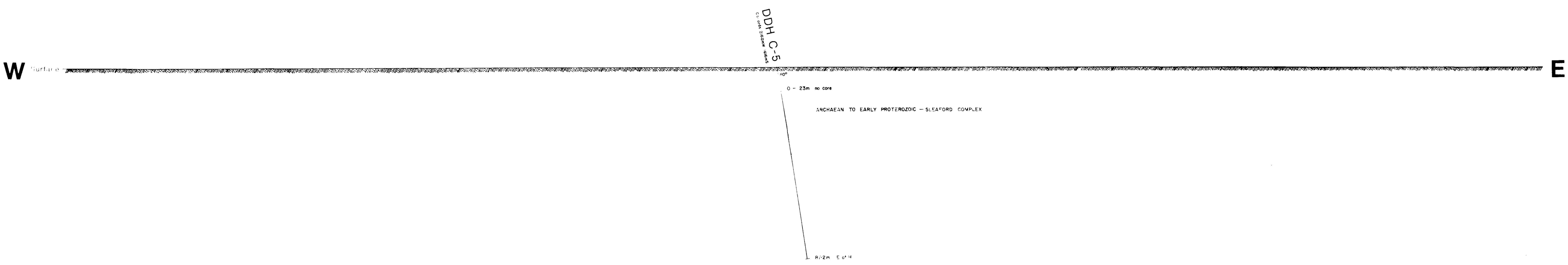
NORTH BROKEN HILL LTD, EXPLORATION DIVISION

Map No SA/C7.

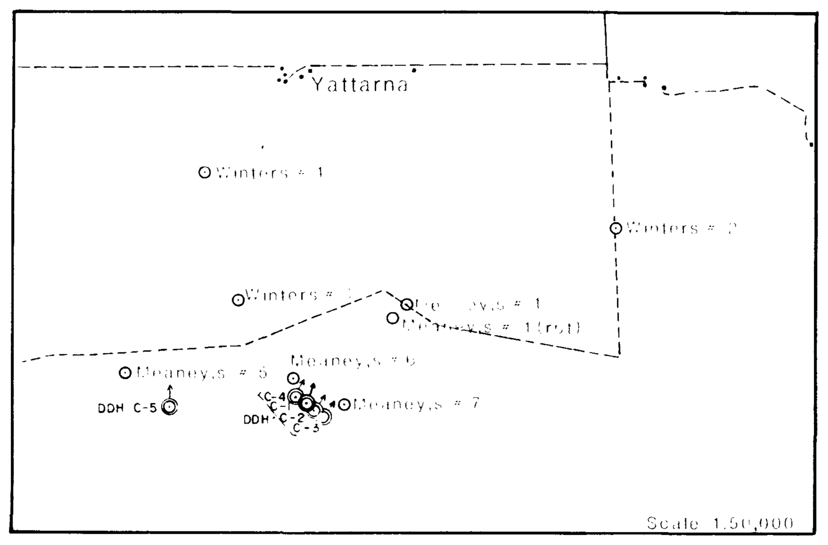
Map No. SA/C 7 | Scale 1:1,000 | Date 6/4/82

4230(II)-29

SECTION LOOKS 279° mag



LOCATION MAP



DDH C-5

MEANEYS ANOMALY

COOTRA AREA E.L. 980

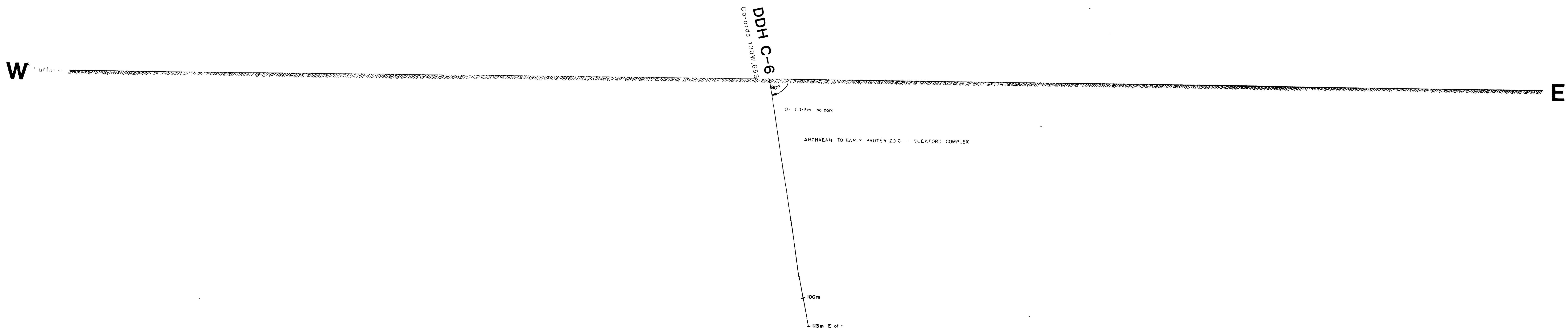
NORTH BROKEN HILL LTD, EXPLORATION DIVISION

Map No. SA/C9

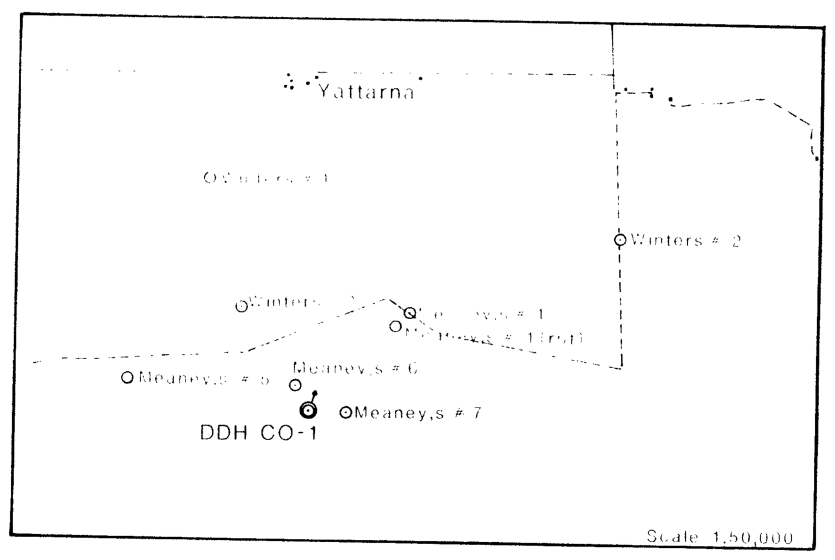
Map No. SA/C9 | Scale 1:1,000 | Date 1/12/81

4230(II)-30

SECTION LOOKS 319° mag



LOCATION MAP



DDH C-6
MEANEYS ANOMALY
COOTRA AREA E.L.980

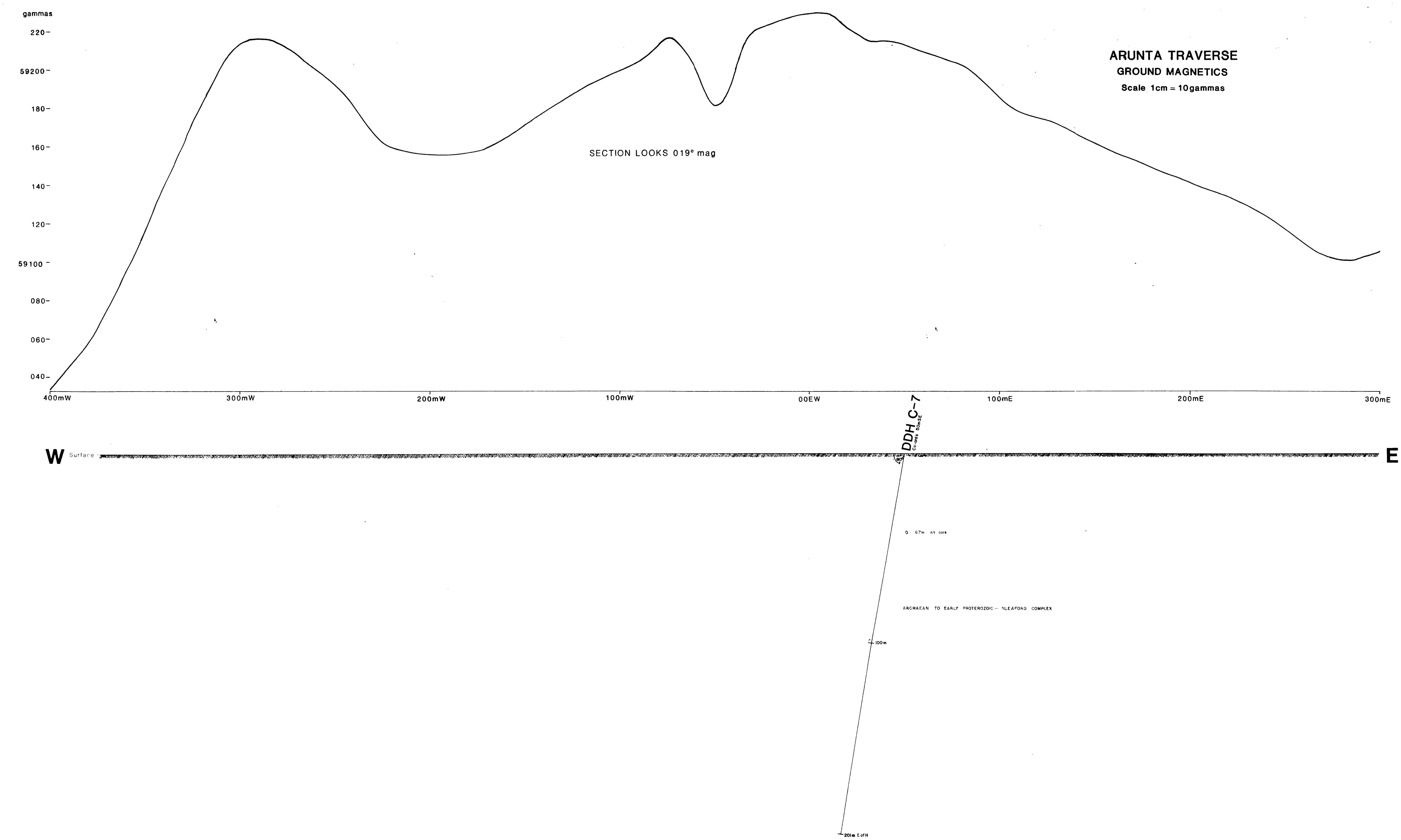
NORTH BROKEN HILL LTD.
Map No. SA/C8
EXPLORATION DIVISION

Map No. SA/C8

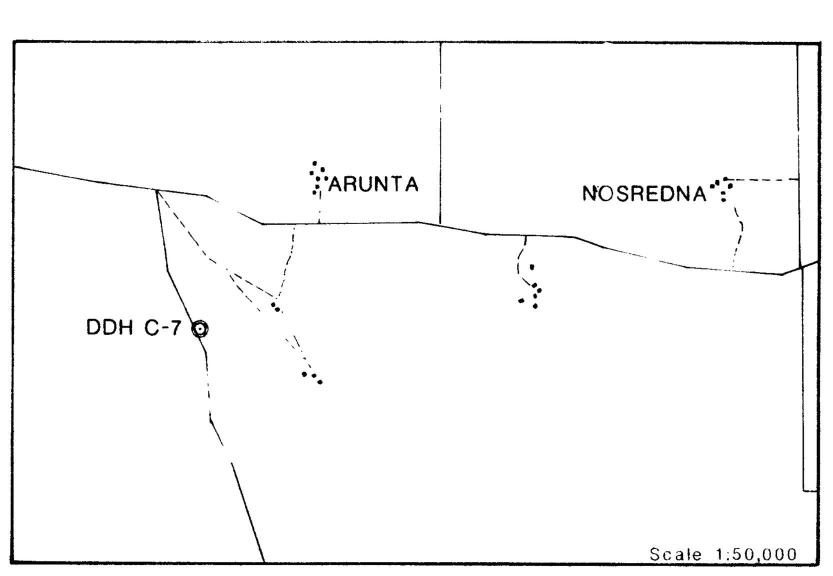
Scale 1:1,000

Date 10/ 5 /82

4230(II)-31



LOCATION MAP



DDH C-7

ARUNTA ANOMALY

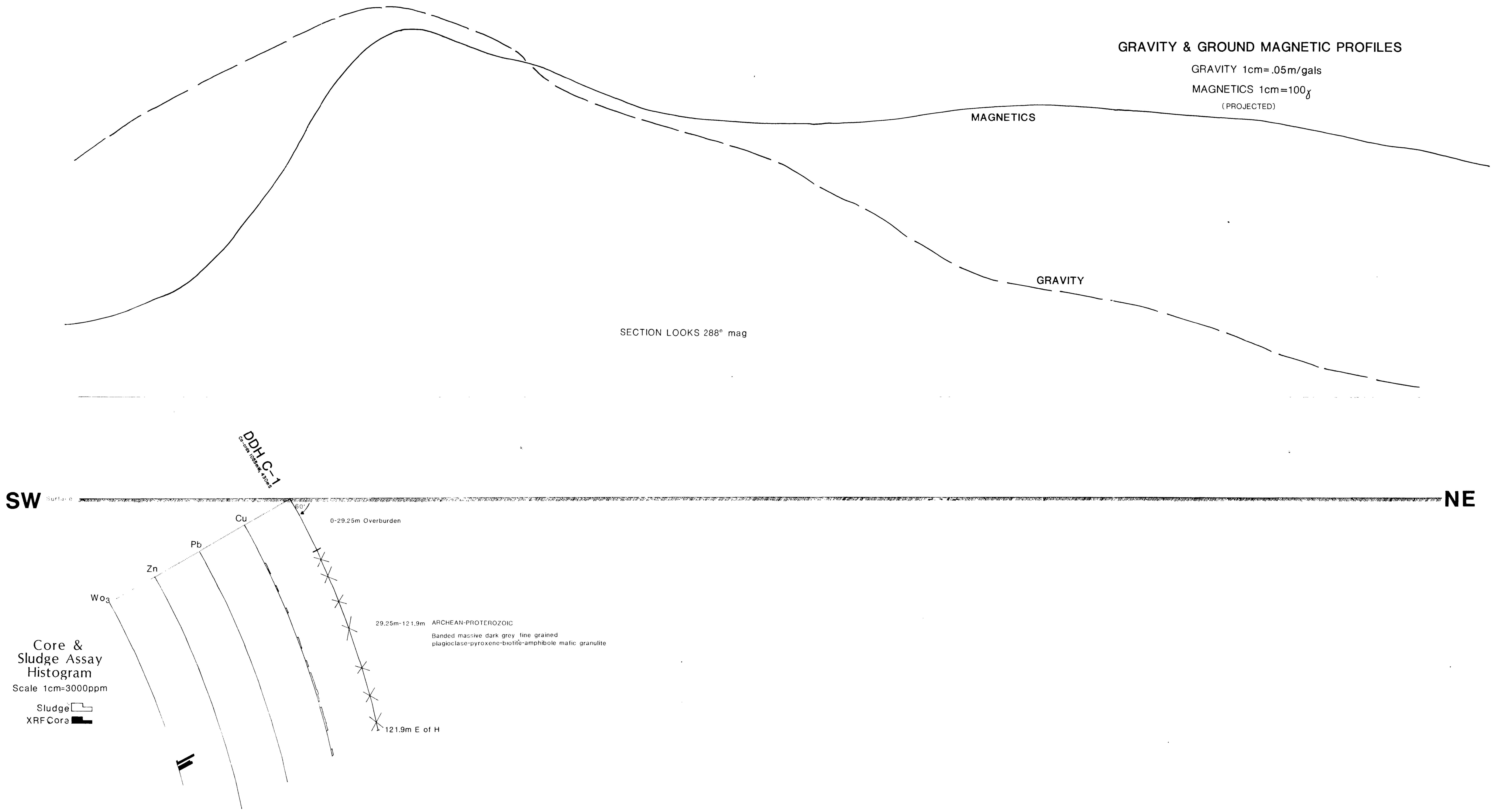
COOTRA AREA E.L. 980

NORTH BROKEN HILL LTD.
map No. SA/C10
EXPLORATION DIVISION

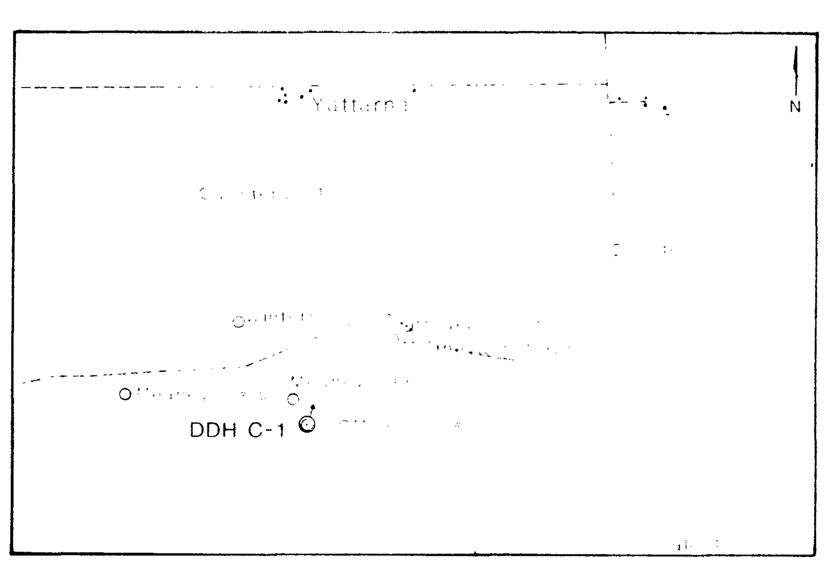
Map No. SA/C/9 | Scale 1:1,000 | Date 10/5/'82

4230 (II)-32


MEANEY'S GRID
GROUND MAGNETICS
COOTRA E.L. 756 S.A.
Contour Interval 50γ
Reading Interval 20m
Rotary-percussion hole
Diamond-drill hole
Scale 1:5000
800 N
400 N
100 N
00EW
00NS
00NS
200 S
400 S
WINTER'S 3
MEANEY'S 5
DDH C-5
MEANEY'S 1
DDH C-6
MEANEY'S 1 (repeat)
MEANEY'S 6
DDH C-4
DDH C-1
DDH C-2
DDH C-3
MEANEY'S 7
DATE 7/12/81
4230(II)-33
MAP No. SA/C 4



LOCATION MAP



DDH C-1
MEANEYS ANOMALY
COOTRA AREA E.L.980

NORTH BROKEN HILL LTD/
EXPLORATION DIVISION

Date 9/3/'82

Scale 1:1,000

Map No SA/C 2

4230(II)-34

III

0226

CRA EXPLORATION PTY. LIMITED

EXPLORATION LICENCE 980 COOTRA AREA S.A.

REPORT FOR THE QUARTER ENDED 29TH SEPTEMBER, 1982.

AUTHOR: I.D. FINCH

COPIES TO: S.A.D.M.E.
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N.B.H. LIMITED.

SUBMITTED BY: I.D. FINCH

ACCEPTED BY: R.D. Kennedy

CONTENTS

1. SUMMARY

A joint venture agreement between North Broken Hill limited and CRA Exploration Pty. Limited was concluded in August. CRA Exploration are henceforth to act as operators for exploration within the E.L.

A review and assessment of all accumulated North Broken Hill Limited data by CRA Exploration staff has commenced.

2. INTRODUCTION

The Cootra exploration licence No. 980 (previously E.L. 756) is located 320 kilometres northwest of Adelaide and forty kilometres southeast of Wudinna.

The area is defined as follows:

Starting at the intersection of latitude 33°12'S and longitude 135°36'E, thence east to longitude 136°oo'E, thence south to the northern boundary of Hambidge Conservation Park, thence west, and south along the boundary of said park to latitude 33°20'S, thence west to longitude 135°36'E, thence north to the point of commencement. (See Plan SAa1804).

An Exploration Licence was applied for on 17/7/80 and granted as E.L. 756 on 26/11/80 for one year. The licence lapsed but a reapplication was lodged on 8/12/81 and the area was granted as E.L. 980 on 29/3/82 for one year.

All work carried out to date by North Broken Hill Limited is the subject of successive quarterly reports since the granting of E.L. 756 on 26/11/80.

3. WORK CARRIED OUT

During the quarter joint venture negotiations between North Broken Hill Limited and CRA Exploration Pty. Limited were entered into, concluding in a signed agreement in late August. As a result all North Broken Hill Limited's data pertaining to the E.L. were handed over to CRA Exploration Pty. Limited who are to act as operators.

A start was made on the assessment of the abovementioned data, and also on the reviewing of all relevant open file literature.

Preparations are underway to view and sample all stored diamond, percussion and RAB holes drilled at Warramboo by S.A.D.M.E during their mid 1960's iron ore search.

Like North Broken Hill Limited, CRA Exploration Pty. Limited believe that the E.L. has potential for hosting strataform/ stratabound base metal deposits similar in style to those at Broken Hill.

4. CONCLUSIONS AND RECOMMENDATIONS

The area is prospective for base metal deposits of the Broken Hill style.

An assessment of all available geotechnical data should be completed, leading to the definition of specific target areas for further work.

Lisa Connor
for
I.D. FINCH

IDF/lmc

KEYWORDS

Kimba SI53-7, Data Review, Joint Venture (J.V.)agreement.

LOCATION

Kimba SI53-7 1:250 000

LIST OF PLANS

Plan No.	Title	Scale
SAa1804	Cootra Area E.L. 980, S.A.	1:50 000

KYANCUTTA
EYRE HIGHWAY
"Morana"
"Mamblin"
"Mambrae"
"Tullamore"
Kyancutta Hill
"Rocky Pines"
"Pinegrange"
KOONGAWA
"Jungle Ranch"
Lake Warramboo
"Glen Roy"
"Lake Side"
"Bens Hill"
"Omaroo"
"Piltainga"
LINE 5000 E
LINE 7000 E
LINE 10000 E
LINE 6720 E
LINE 4000 SE
LINE 5000 SE
PINE ROW PROSPECT (C6)
WARRAMBOO PROSPECT (C1)
NOSREDNA PROSPECT (C2)
"Pine Row"
WARRAMBOO
"Arunta"
"Nosredna"
COOTRA
"Lincoln Dale"
"White Gates"
"Lea-Brae"
"Pineslope"
"Yattarna"
"Gunya"
"Delmore"
"Central"
"Hilltop"
NANTUMA
"Karandi"
"Broadview"
"Waroona"
MEANEY'S PROSPECT (C4)
For enlargement see Plan SAa 2182
BREWERS PROSPECT (C3)
LINE 5000 N
LINE 4000 N
"Karinga"
"Roadview"
EL 980
"Panorama"
"Fairview"
KOPI
"Peak-View"
"Kiauna"
"Woodcombe"
HAMBIDGE CONSERVATION PARK
"McLaghlan Station"
60 000 mE
65 000 mE
70 000 mE
75 000 mE
80 000 mE
85 000 mE
90 000 mE
25 000 mN
20 000 mN
15 000 mN
LOCATION
WHYALLA
Port Pirie
AREA SHOWN
Wallaroo
Spencer Gulf
Port Lincoln
Vincent Gulf
LEGEND
Main road
Road
Track
Railway
Building
Lake
Land subject to inundation
Tank or dam
Quarry
Diamond drill hole - NBH Ltd.
Percussion drill hole - NBH Ltd.
Borehole - 1983 CRAE
Traverse line
4230 (III) - 1
CRA EXPLORATION PTY LIMITED
COOTRA - E.L. 980 - S. AUST.
CRAE - NORTH BROKEN HILL J/V
Ref.: KIMBA SI 53 - 7
Scale : 1 : 50 000
Revised: March 1984 I. Ley
Author. I. D. Finch
Report No. 12556
Date : Sept. 1982
Plan No. SAa 1804

III

CRA EXPLORATION PTY. LIMITED

THIRD QUARTERLY REPORT FOR COOTRA E.L. 980, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 29TH DECEMBER, 1982.

AUTHOR: I.D. FINCH

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N.B.H. LIMITED

DATE: 25TH JANUARY, 1983

SUBMITTED BY:

ACCEPTED BY:

CONTENTS

1. SUMMARY

A review and assessment of all available geophysical data was completed. As a result a plan showing major magnetic trends and interpreted structure was produced.

Five main target areas (C1-C5) were selected for further follow up related to base metal investigations. In addition five kimberlitic targets were identified.

All existing S.A.D.M.E. boreholes over the Warramboo grid were sampled and assayed for base metals, gold and silver. Fresh rock samples appear to be anomalous in tungsten, copper, zinc, barium and manganese. Check assaying is currently being undertaken.

2. INTRODUCTION

The Cootra Exploration Licence No. 980 (previously E.L. 756) is located 320 kilometres northwest of Adelaide and 40 kilometres south east of Wudinna.

The area is defined as follows:

Starting at the intersection of latitude 33°12'S and longitude 135°36'E, thence east to longitude 136°00'E, thence south to the northern boundary of Hambidge Conservation Park, thence west, and south along the boundary of said park to latitude 33°22'S, thence west to longitude 135°36'E, thence north to the point of commencement. (See Plan No. SAa 1804).

An exploration licence was applied for on 17th July, 1980 and granted as E.L. 756 on 26th November, 1980 for one year. The licence lapsed but a reapplication was lodged on 8th December, 1981 and the area was granted as E.L. 980 on 29th March, 1982 for one year.

A joint venture agreement between North Broken Hill Limited and CRA Exploration Pty. Limited was signed in August, 1982 since when the latter have acted as operators.

3. WORK CARRIED OUT

3.1 Geophysics

An assessment of the data supplied by North Broken Hill Limited was completed. The data set comprises detailed aeromagnetics over the eastern two thirds of the E.L., gravity over the central regional high, and detailed ground magnetics and gravity over selected anomalous areas (e.g. Warramboo and Meaney's).

3.1.1 Air Magnetic Interpretation (Plan No. SAa 2028)

The attached plan shows:

i) The major magnetic trends and associated structural interpretation.
ii) Areas to be subjected to further investigation.
iii) Proposed ground magnetic and I.P. traverses to be completed prior to a scout drilling programme.

3.1.2 Target Areas and Proposed Surveys

The selected target areas are either, those areas not previously considered by North Broken Hill Limited or areas showing potential but considered not fully investigated.

3.1.2.1 Area C-1 (Warramboo)

Initially Schlumberger depth soundings and a trial I.P. survey will be completed to confirm the suitability of the latter method to the area.

The main Warramboo iron formation will then be traversed with I.P. to locate all conductive units across the stratigraphy. Detailed ground magnetics at 50 metre stations will be carried out concomitantly. Areas where conductive zones do not correlate with the major magnetic units will be upgraded as stratiform base metal or hematite targets.

3.1.2.2 Area C-2

This area represents the centre of the detailed gravity anomaly high which parallels a strong magnetic high to the immediate north (probable iron formation).

Two ground magnetic traverses, one kilometre apart, will be carried out across the gravity high ridge, both on and off the magnetic high, to delineate any secondary magnetic features.

3.1.2.3 Area C-3

This probable iron formation will be traversed by two ground magnetic lines. Thereafter the results of stratigraphic scout drilling across the main magnetic and secondary magnetic horizons will determine the nature of the geophysical follow up.

3.1.2.4 Area C-4 (Meaney's)

The ground magnetics grid will be detailed at a 50 metre x 20 metre spacing in the vicinity of DDH's C1 to C4 in order to establish the extent and attitude of the tungsten-bearing mafic granulite.

3.1.2.5 Area C-5 (Arunta)

This magnetic horizon was intersected by DDH C7. Anomalous tungsten and some pyrrhotite were recorded. The zone will be further investigated along strike in the vicinity of the maximum gravity response.

3.1.2.6 Kimberlitic Targets

To date, five, discrete magnetic anomalies, in otherwise magnetically quiet areas, have been isolated. These will be recovered by ground magnetics and consideration given to their drill testing.

3.2 Geochemistry

Sampling of all existing S.A.D.M.E. Warramboo boreholes was carried out during the quarter. This involved the sampling of six percussion holes, 32 rotary holes and four diamond drillholes. Samples were bulked over 10 feet intervals to coincide with the S.A.D.M.E. storage system. In all, 868 samples were taken and analysed for tin, tungsten, barium, gold, copper, lead, zinc, cobalt, nickel, manganese and silver.

Other variables such as rock type, sample type, S.A.D.M.E. iron and manganese assays and collar co-ordinates were also recorded. All accumulated information was entered in the Micro Gas computer system. (See Appendix I).

Elevated tungsten, barium, copper and zinc values were returned from numerous horizons throughout the four diamond holes. The best intersections were as follows:

Tungsten	-	450 p.p.m.	x	7.9m in WD1 (Maximum Value =
		640 p.p.m.	x	3.1m)
Copper	-	780 p.p.m.	x	3.1m in WD2 (Maximum Value =
		780 p.p.m.	x	3.1m)
Zinc	-	415 p.p.m.	x	6.1m in WD1 (Maximum Value =
		480 p.p.m.	x	3.1m)
Barium	-	1 892 p.p.m.	x	18.3m in WD2 (Maximum Value =
		2 200 p.p.m.	x	3.1m)
Manganese	-	1.68%	x	36.5m in WD3 (Maximum Value =
		2.4%	x	3.1m).

Selected samples have been resubmitted for check analysis.

In addition a number of spot highs were recorded in the percussion and rotary holes, which generally were less deep and often confined to the oxidised zone. The more outstanding values were as follows:

Lead	-	2 000 p.p.m.	x	3.1 metres in WR19
Tungsten	-	300 p.p.m.	x	3.1 metres in WR18
Copper	-	130 p.p.m.	x	3.1 metres in WR20
Zinc	-	1 700 p.p.m.	x	3.1 metres in WR19.

4. CONCLUSIONS AND RECOMMENDATIONS

i) The geochemistry of the Warramboo diamond drillholes (WD1-4) upgrades that area as one likely to host a Broken Hill style base metal deposit.

An attempt should be made to marry known geology, from the Warramboo core, to the anomalous geochemistry, thus providing target horizons within that stratigraphic unit.

ii) An assessment of all geophysical and geological data has identified four other areas as being prospective for stratiform base metals.

Each area should be tested with the appropriate geophysical technique and, where applicable, with a series of scout R.A.B. holes.

Thereafter upgraded areas should be fully tested by detailed geophysics using those methods best suited to each area.

iii) To date five kimberlitic targets have been identified. These should be ground recovered and, where necessary, drill tested.

I.D. FINCH

IDF/pw

KEYWORDS

Kimba SI 53-7, data review, barium, copper, lead, manganese, tungsten, zinc, ironstone, B.I.F. hosted deposits, Assays-drill.

LOCATION

Kimba SI 53-7 1:250 000

LIST OF PLANS

Plan No.	Title	Scale
SAa 2028	Cootra E.L. - Aeromagnetic Interpretation and Proposed Survey areas.	1: 50 000
SAa 1804	Cootra E.L. 980 South Australia	1: 50 000

LIST OF APPENDICES

Appendix I Warramboo Drillhole Geochemical Data.

APPENDIX I

WARRAMBOO DRILLHOLE GEOCHEMICAL DATA

01234567890123456789   ** RSX-11M V3.2 **   22-DEC-82   15:35:57   DL1:[220,5]WARRAMBOO.LST;2   01234567890123456789
01234567890123456789   ** RSX-11M V3.2 **   22-DEC-82   15:35:57   DL1:[220,5]WARRAMBOO.LST;2   01234567890123456789

0240

```
WW      WW    AAAAAA    RRRRRRRR    RRRRRRRR      AAAAAA    MM      MM  BBBBBBBB      OOOOOO      OOOOOO
WW      WW    AAAAAA    RRRRRRRR    RRRRRRRR      AAAAAA    MM      MM  BBBBBBBB      OOOOOO      OOOOOO
WW      WW  AA      AA  RR      RR  RR      RR  AA      AA  MMMM  MMMM  BB      BB  OO      OO  OO      OO
WW      WW  AA      AA  RR      RR  RR      RR  AA      AA  MMMM  MMMM  BB      BB  OO      OO  OO      OO
WW      WW  AA      AA  RR      RR  RR      RR  AA      AA  MM  MM  MM  BB      BB  OO      OO  OO      OO
WW      WW  AA      AA  RR      RR  RR      RR  AA      AA  MM  MM  MM  BB      BB  OO      OO  OO      OO
WW      WW  AA      AA  RRRRRRRR    RRRRRRRR    AA      AA  MM      MM  BBBBBBBB    OO      OO  OO      OO
WW      WW  AA      AA  RRRRRRRR    RRRRRRRR    AA      AA  MM      MM  BBBBBBBB    OO      OO  OO      OO
WW  WW  WW  AAAAAAAAAA  RR  RR      RR  RR      AAAAAAAAAA  MM      MM  BB      BB  OO      OO  OO      OO
WW  WW  WW  AAAAAAAAAA  RR  RR      RR  RR      AAAAAAAAAA  MM      MM  BB      BB  OO      OO  OO      OO
WWWW  WWWW  AA      AA  RR    RR    RR    RR    AA      AA  MM      MM  BB      BB  OO      OO  OO      OO    ....
WWWW  WWWW  AA      AA  RR    RR    RR    RR    AA      AA  MM      MM  BB      BB  OO      OO  OO      OO    ....
WW      WW  AA      AA  RR      RR  RR      RR  AA      AA  MM      MM  BBBBBBBB      OOOOOO      OOOOOO      ....
WW      WW  AA      AA  RR      RR  RR      RR  AA      AA  MM      MM  BBBBBBBB      OOOOOO      OOOOOO      ....
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LL            SSSSSSSS  TTTTTTTTTT    ;;;;      222222
LL            SSSSSSSS  TTTTTTTTTT    ;;;;      222222
LL          SS              TT        ;;;;    22      22
LL          SS              TT        ;;;;    22      22
LL          SS              TT                        22
LL          SS              TT                        22
LL            SSSSSS        TT        ;;;;          22
LL            SSSSSS        TT        ;;;;          22
LL                  SS      TT        ;;;;        22
LL                  SS      TT        ;;;;        22
LL                  SS      TT          ;;      22
LL                  SS      TT          ;;      22
LLLLLLLLLL  SSSSSSSS        TT        ;;      2222222222
LLLLLLLLLL  SSSSSSSS        TT        ;;      2222222222
```


01234567890123456789   ** RSX-11M V3.2 **   22-DEC-82   15:35:57   DL1:[220,5]WARRAMBOO.LST;2   01234567890123456789
01234567890123456789   ** RSX-11M V3.2 **   22-DEC-82   15:35:57   DL1:[220,5]WARRAMBOO.LST;2   01234567890123456789

SUMMARY

This geochemical data was obtained on samples from South Australian Mines Department drill holes at Warramboo, Central Eyre Peninsular South Australia. The target was iron ore. CRAE's target is base metals associated with banded iron formations.

This work was carried out under the CRAE DPO no. of 80764 of 14/10/82.

Variable Abreviations Used

Abbreviation	Meaning
DH	Drill Hole No.
SN	ppm
W	"
BA	"
AU	"
CU	"
PB	"
ZN	"
CO	"
NI	"
MN1	" CRAE assays
AG	"
RK1	Major rock type
RK2	Minor rock types and minerals
RK3	Minor rock types and minerals
ST	Sample type
%FE	Iron percent (SADME assays)
%MN	Manganese (SADME assays)
D1	Hole depth - start of interval
D2	Hole depth - end of interval
EAST	SADME local grid - feet
NORTH	SADME local grid - feet
RL	SADME local grid - feet - reduced level
HD	Total hole depth

Variable codes used in this data set are as follows:

Drill Hole Code

Hole No.	Drill Type	Code
WP1	percussion	101
WR1	rotary	201
WD1	diamond	301

Sample Type Code

Sample Type	Code
chips	1
float	2
channel	3

AG	-1.000
RK1	1.000
RK2	1.000
RK3	-1.000
ST	-1.000
%FE	-1.000
%MN	-1.000
D1	-1.000
D2	-1.000
EAST	-1.000
NORTH	-1.000
RL	-1.000
HD	-1.000

***** THE FOLLOWING TRANSFORMATIONS WERE USED IN CREATING THIS DATA SET. ****

MN2	=	%MN	*	10000.0
FE	=	%FE	*	10000.0
D1M	=	D1	*	0.304800
D2M	=	D2	*	0.304800
RLM	=	RL	*	0.304800
HDM	=	HD	*	0.304800

****************** NO SELECTIONS WERE MADE DURING CRUNCH ******************

NUMBER OF RECORDS WRITTEN IS : 868
RECORD LENGTH IS : 32

SAMPLE NO.	DH	SN	W	BA	AU	CU	PB	ZN	CO	NI	MN
948712	202	16	5	280	0.1	100	35	28	10	15	450
948713	202	16	5	600	0.05	75	30	30	10	20	490
948714	202	10	5	260	0.05	28	10	24	2.5	10	340
948715	202	4	10	1200	0.025	24	10	20	5	10	310
948716	202	2	5	1100	0.025	36	15	26	5	10	360
948717	202	2	5	1400	0.025	40	15	30	5	10	440
948719	203	14	5	150	0.05	14	20	38	15	25	1200
948720	203	2	5	250	0.05	18	30	95	40	25	33000
948721	203	2	5	1050	0.025	8	25	120	40	20	58000
948722	203	4	5	1050	0.025	6	20	48	30	30	24000
948723	203	10	10	1400	0.05	12	30	110	30	25	75000
948724	203	8	5	2200	0.1	8	20	140	25	15	50000
948725	203	8	5	2100	0.025	2	5	50	20	40	3500
948726	203	4	5	1250	0.025	10	5	32	15	35	3400
948727	203	18	10	65	0.1	12	35	40	2.5	10	160
948728	203	12	5	50	0.1	8	30	36	5	15	310
948729	203	4	5	50	0.1	4	15	32	5	10	380
948730	203	14	5	20	0.05	4	15	28	5	10	430
948731	203	2	5	10	0.025	8	10	26	2.5	5	420
948732	203	2	5	40	0.025	8	10	30	5	5	1500
948733	203	16	5	70	0.15	4	10	36	5	2.5	2900
948734	203	4	5	35	0.05	10	10	32	2.5	2.5	2200
948735	203	2	5	40	0.05	6	10	36	15	2.5	18000
948736	203	18	5	290	0.1	8	25	150	50	10	79000
948737	203	4	5	430	0.05	6	25	120	40	5	79000
948738	203	16	5	540	0.1	12	50	190	60	10	187000
948739	203	16	5	150	0.1	12	55	170	55	15	162000
948740	203	6	5	360	0.05	8	35	110	30	10	90000
948741	203	10	5	780	0.05	6	50	220	55	20	167000
948742	203	12	5	900	0.05	6	35	160	35	15	109000
948743	203	28	5	360	0.025	20	50	110	20	5	55000
948744	203	14	5	1200	0.025	10	15	120	25	25	27000
948745	203	22	10	980	0.025	12	15	90	25	30	22000
948746	203	40	5	1000	0.05	6	15	75	30	35	16000
948747	203	20	5	450	0.15	8	75	60	15	15	9700
948748	204	4	5	400	0.025	85	10	170	15	70	120
948749	204	4	5	470	0.025	46	5	150	15	50	140
948750	204	6	10	140	0.025	36	5	44	15	40	250
948751	204	2	5	520	0.025	55	5	85	25	65	160
948752	204	4	5	25	0.025	6	5	18	5	15	340
948753	204	8	5	10	0.025	14	10	22	5	10	240
948754	204	2	5	5	0.1	14	15	16	5	10	180
948755	204	2	5	5	0.025	14	5	14	5	5	75
948756	204	2	5	5	0.025	85	5	18	5	15	270
948757	204	6	5	5	0.025	50	5	10	5	10	180
948758	204	2	5	5	0.025	30	5	18	5	25	330
948759	204	2	5	110	0.025	14	5	16	10	75	65
948760	204	2	5	220	0.15	42	15	100	10	25	2200
948761	204	10	5	280	0.15	40	5	95	10	20	2000
948762	204	8	5	330	0.025	40	5	70	10	35	400
948764	205	2	5	130	0.025	16	15	95	5	10	50
948765	205	2	5	50	0.025	42	25	85	20	40	35
948766	205	8	5	140	0.025	8	15	50	20	40	40
948767	205	10	5	370	0.025	8	10	90	15	30	20
948768	205	2	5	440	0.025	70	5	44	15	75	120
948769	205	2	5	380	0.025	6	10	34	10	15	90
948770	205	2	5	25	0.025	4	5	16	2.5	10	40
948771	205	4	5	40	0.025	6	5	12	2.5	5	30
948772	205	2	5	15	0.025	6	25	12	2.5	5	65
948773	205	4	5	15	0.025	6	10	16	2.5	5	60

SAMPLE NO.	DH	SN	W	BA	AU	CU	PB	ZN	CO	NI	MN
948833	207	6	5	1500	0.025	12	10	40	10	20	1700
948834	207	2	5	2300	0.05	14	10	44	15	35	3600
948835	208	2	5	1450	0.1	16	30	250	15	25	440
948836	208	8	5	740	0.05	4	15	100	15	25	610
948837	208	8	5	840	0.05	8	15	120	25	30	7500
948838	208	8	5	1150	0.05	30	15	160	30	30	35000
948839	208	4	5	1700	0.025	30	10	180	20	35	21000
948840	208	8	5	1050	0.025	14	5	70	10	25	3400
948841	208	2	5	1400	0.1	18	5	50	20	35	8400
948842	208	14	15	470	0.025	6	25	48	25	20	5300
948843	208	10	5	90	0.15	24	20	44	10	15	430
948844	208	10	5	440	0.15	26	25	60	20	35	780
948845	208	12	5	250	0.1	24	85	85	35	30	960
948846	208	20	5	420	0.15	22	45	80	35	45	980
948847	208	14	5	1050	0.1	42	15	50	15	35	3000
948848	208	6	5	600	0.15	10	20	170	50	20	81000
948849	208	2	5	800	0.05	10	30	140	50	20	64000
948850	208	12	5	1350	0.05	16	15	160	45	30	73000
948851	208	8	5	1300	0.025	20	15	320	70	20	192000
948852	208	6	10	2150	0.025	18	15	330	75	20	197000
948853	208	6	5	2750	0.025	22	15	280	55	20	139000
948854	208	12	5	1800	0.025	50	15	110	35	35	40000
948855	209	12	5	55	0.1	14	20	36	15	25	1800
948856	209	6	5	1600	0.1	44	25	55	15	25	1800
948857	209	2	5	230	0.1	18	10	70	25	30	4300
948858	209	10	5	1400	0.05	16	10	60	15	25	3000
948859	209	2	5	1900	0.05	10	5	36	10	15	2300
948860	209	10	5	820	0.05	14	5	30	15	35	2700
948861	209	12	30	480	0.025	24	15	55	45	45	16000
948862	209	8	5	80	0.025	12	5	26	15	15	2700
948863	209	16	5	45	0.15	18	10	32	20	25	2700
948864	209	2	5	50	0.15	12	10	36	15	20	3100
948865	209	8	5	450	0.1	36	15	55	20	30	3500
948866	209	8	5	680	0.1	16	15	36	15	20	2400
948867	209	8	5	1000	0.15	18	10	48	20	25	3700
948868	209	4	5	2350	0.1	16	5	50	15	15	2400
948869	209	22	10	1050	0.15	10	5	38	25	25	4500
948870	209	2	5	2300	0.1	8	5	28	15	20	5000
948871	209	6	5	2000	0.05	12	10	50	20	25	4700
948872	209	10	5	2450	0.1	8	10	44	15	20	3200
948873	209	8	5	1800	0.1	16	5	36	20	20	4000
948874	209	8	5	2450	0.1	10	5	40	15	25	5100
948875	209	2	5	2950	0.05	12	5	32	20	20	6100
948876	210	4	5	450	0.025	12	20	80	5	10	670
948877	210	2	5	580	0.025	6	15	70	10	20	2800
948878	210	2	5	330	0.025	1	5	30	5	5	80
948879	210	6	5	190	0.025	4	10	22	5	10	520
948880	210	8	5	150	0.025	4	5	18	5	5	480
948881	210	4	5	360	0.025	6	5	16	5	5	110
948882	210	4	5	15	0.025	18	5	24	2.5	5	85
948883	210	2	5	120	0.025	4	5	12	5	10	85
948884	210	2	5	720	0.025	4	5	26	2.5	5	60
948885	210	2	5	170	0.025	6	5	16	2.5	5	65
948886	210	8	5	30	0.025	4	5	12	2.5	5	55
948887	210	8	5	25	0.025	4	5	6	2.5	5	45
948888	210	2	5	5	0.025	4	5	12	2.5	2.5	60
948889	210	4	5	35	0.025	2	10	20	5	5	55
948890	210	2	5	5	0.025	6	10	24	5	20	60
948891	210	2	5	10	0.025	4	10	18	5	10	50
948892	210	2	5	15	0.025	1	10	18	5	10	60

SAMPLE NO.	DH	SN	W	BA	AU	CU	PB	ZN	CO	NI	MN
948953	213	8	5	190	0.025	12	15	28	20	30	2000
948954	213	12	5	70	0.05	10	15	24	25	40	2600
948955	213	10	10	25	0.1	20	15	32	25	40	3000
948956	213	16	5	170	0.05	30	20	65	20	35	2500
948957	213	12	5	560	0.1	10	15	20	30	45	2500
948960	213	8	5	160	0.025	18	5	18	10	15	1000
948961	213	8	5	2050	0.025	24	15	28	10	15	1000
948962	213	12	5	220	0.1	22	10	48	10	20	1400
948963	213	22	10	820	0.05	18	10	48	10	20	1600
948964	213	2	5	1150	0.025	36	10	50	5	10	2000
948965	214	2	5	90	0.05	4	10	20	15	25	2100
948966	214	8	5	75	0.05	4	5	18	5	5	640
948967	214	8	5	1250	0.025	8	40	24	20	35	840
948968	214	2	5	2100	0.025	12	25	46	20	30	890
948969	214	8	5	2300	0.025	14	10	42	10	25	1600
948970	214	2	5	1400	0.025	10	10	140	15	20	4000
948971	214	8	5	1650	0.025	6	5	70	25	40	6300
948972	214	10	5	1100	0.025	36	5	50	25	45	5700
948973	214	14	5	180	0.025	4	5	18	20	35	2800
948974	214	16	5	190	0.025	4	10	26	25	40	2800
948975	214	10	5	140	0.025	4	5	28	25	35	3300
948976	214	14	5	160	0.025	6	10	24	30	40	3600
948977	214	16	5	200	0.05	6	10	22	15	20	1800
948978	214	2	5	760	0.1	6	15	22	5	10	650
948979	214	14	10	1050	0.1	6	15	32	20	25	1500
948980	214	24	5	1500	0.1	14	10	34	40	45	2500
948981	214	24	5	1450	0.1	16	30	28	35	45	2000
948982	214	2	5	2650	0.05	10	10	26	35	50	1600
948983	214	18	5	4300	0.1	40	10	50	30	45	1400
948984	214	14	5	2050	0.1	34	20	60	25	35	2300
948985	214	12	5	1900	0.1	30	10	100	50	40	22000
948986	214	4	10	760	0.1	10	5	38	30	35	9600
948987	214	10	5	1900	0.05	6	5	38	15	25	4800
948988	214	2	5	1700	0.025	4	5	65	20	35	8600
948989	214	12	5	1650	0.05	8	5	70	25	35	8800
948990	215	8	5	100	0.025	6	60	28	5	5	130
948991	215	6	5	220	0.025	4	65	20	2.5	2.5	45
948992	215	4	5	430	0.025	20	30	50	5	5	40
948993	215	2	5	460	0.05	24	25	90	10	10	80
948994	215	2	5	540	0.025	4	10	30	5	5	45
948995	215	6	5	150	0.025	8	10	14	5	5	350
948996	215	10	5	20	0.025	2	25	12	2.5	5	65
948997	215	2	5	5	0.025	2	25	14	2.5	2.5	60
948998	215	6	5	35	0.025	6	30	14	5	2.5	40
948999	215	2	5	130	0.025	2	15	10	2.5	5	40
952000	215	2	5	190	0.025	4	10	6	2.5	2.5	40
952001	215	12	5	55	0.025	100	20	42	2.5	2.5	45
952002	215	6	5	1000	0.025	6	15	14	2.5	2.5	45
952003	215	2	5	620	0.025	2	5	12	2.5	2.5	35
952004	215	4	5	620	0.025	2	5	16	2.5	2.5	30
952005	215	2	5	390	0.025	4	10	14	2.5	2.5	40
952006	215	4	5	400	0.025	6	10	20	2.5	2.5	60
952007	216	14	5	760	0.025	12	5	26	10	30	980
952008	216	2	5	3400	0.025	12	20	26	50	25	46000
952009	216	8	5	1550	0.025	6	5	80	35	50	13000
952010	216	6	5	1450	0.025	4	5	28	15	30	3900
952011	216	4	5	1550	0.025	4	5	75	20	40	5500
952012	216	4	50	3100	0.025	28	30	30	60	10	58000
952013	216	2	10	2700	0.025	16	50	22	50	20	48000
952014	216	6	10	2800	0.025	16	15	32	20	25	9400

SAMPLE NO.	DH	SN	W	BA	AU	CU	PB	ZN	CO	NI	MN
952076	218	8	5	80	0.1	22	25	24	5	15	830
952077	218	12	5	95	0.025	14	30	18	10	15	790
952078	218	2	5	410	0.1	26	20	28	10	15	920
952079	218	20	5	1250	0.25	36	25	36	10	15	810
952080	218	16	5	460	0.1	22	20	24	15	20	1200
952081	218	18	5	620	0.1	24	20	24	15	20	870
952082	218	6	5	1000	0.1	28	20	24	10	20	680
952083	218	2	5	1450	0.1	16	20	32	10	15	990
952084	219	10	5	370	0.025	10	20	110	2.5	10	110
952085	219	4	5	30	0.025	18	2000	860	100	120	90
952086	219	14	5	20	0.025	10	35	1700	250	280	1800
952087	219	8	5	1800	0.025	10	15	510	70	110	4100
952088	219	12	10	1000	0.025	8	15	340	30	45	4200
952089	219	20	5	920	0.05	4	10	450	30	40	4300
952090	219	2	5	1600	0.025	6	5	100	20	30	6000
952093	219	2	5	1400	0.1	8	5	55	20	30	4600
952094	219	8	5	220	0.025	8	15	28	5	10	110
952095	219	2	5	170	0.025	6	10	20	5	10	70
952096	219	4	5	170	0.025	10	10	18	5	15	50
952097	219	6	10	180	0.025	6	10	14	5	15	30
952098	219	4	10	130	0.025	14	15	22	5	20	80
952099	219	4	10	150	0.025	14	20	22	5	20	270
952100	219	6	5	200	0.025	20	40	24	5	25	75
952101	219	2	5	150	0.025	46	25	18	5	15	95
952102	219	10	5	95	0.025	50	290	30	40	45	85
952103	219	2	5	35	0.025	20	270	40	40	40	260
952104	219	8	5	75	0.025	30	250	110	100	150	570
952105	219	6	5	220	0.025	28	35	450	120	190	1600
952106	219	2	5	640	0.025	34	25	220	70	100	2300
952107	219	14	10	840	0.025	28	20	150	55	80	2600
952108	219	4	5	800	0.025	22	25	120	95	200	3500
952109	219	8	5	740	0.025	24	20	150	60	95	3100
952110	219	4	5	900	0.025	24	20	130	45	75	3400
952111	219	4	15	980	0.025	22	20	130	40	65	4500
952112	219	12	15	1100	0.025	32	20	160	55	80	2700
952113	219	10	15	1250	0.025	22	15	100	45	70	5500
952114	219	4	5	1350	0.025	28	20	140	45	65	3800
952115	219	8	10	1400	0.025	20	15	110	35	55	4700
952116	219	8	10	1350	0.025	12	10	75	35	55	6200
952117	219	2	10	1300	0.025	24	20	110	40	60	4400
952118	220	2	5	330	0.025	10	15	30	5	10	220
952119	220	14	5	240	0.05	14	15	30	5	15	120
952120	220	10	5	300	0.025	10	20	26	10	20	1100
952122	220	10	5	3500	0.025	40	120	260	10	55	4300
952123	220	8	5	880	0.05	26	20	55	20	35	870
952124	220	4	5	460	0.1	14	10	42	10	10	2100
952125	220	8	5	1050	0.025	8	5	110	20	25	1200
952126	220	4	5	660	0.025	44	5	80	20	65	560
952127	220	2	5	700	0.025	130	5	75	30	70	640
952128	220	4	10	470	0.025	10	15	38	15	25	4500
952129	220	2	5	130	0.025	10	10	18	5	10	560
952130	220	4	5	310	0.025	8	10	20	5	10	220
952131	220	4	5	220	0.025	10	15	20	5	15	240
952132	220	6	5	120	0.05	12	15	26	5	20	650
952133	220	8	10	80	0.05	14	15	20	10	20	830
952134	220	10	5	150	0.05	12	15	18	15	20	1500
952135	220	6	5	200	0.1	26	25	20	10	20	1000
952136	220	10	10	140	0.05	20	25	30	10	20	1400
952137	220	6	5	460	0.025	16	25	34	10	20	1900
952138	220	8	5	1200	0.025	22	100	32	15	25	5000

SAMPLE NO.	DH	SN	W	BA	AU	CU	PB	ZN	CO	NI	MN
952200	223	4	5	230	0.025	46	25	110	30	55	170
952201	223	2	5	840	0.025	4	10	46	10	10	85
952202	223	8	5	180	0.025	10	10	28	5	10	95
952203	223	10	5	200	0.025	8	5	18	5	10	55
952204	223	10	10	95	0.025	4	15	36	2.5	5	50
952205	223	2	5	110	0.025	8	35	26	2.5	5	65
952206	223	6	5	65	0.025	6	15	16	2.5	2.5	45
952207	223	2	5	30	0.025	18	15	14	2.5	5	35
952208	223	2	5	5	0.025	18	25	12	5	20	25
952209	223	2	5	20	0.025	12	15	16	5	10	25
952210	223	8	5	35	0.025	8	15	20	5	5	50
952211	223	2	5	20	0.025	8	30	28	5	15	40
952212	223	4	5	130	0.025	120	15	140	75	100	270
952213	223	4	5	140	0.025	36	15	55	20	40	110
952214	224	8	5	55	0.05	10	20	24	5	10	85
952215	224	8	5	65	0.1	16	20	100	15	20	880
952216	224	10	5	50	0.025	22	25	130	15	25	750
952217	224	10	5	30	0.025	16	25	220	15	20	660
952218	224	6	5	720	0.025	14	15	110	10	25	870
952219	224	12	5	880	0.025	12	10	210	15	25	1200
952220	224	2	5	1450	0.025	12	10	120	20	45	3600
952221	224	6	10	300	0.025	6	25	22	10	5	95
952222	224	2	5	960	0.025	8	5	46	15	30	2100
952223	224	4	5	65	0.025	2	5	12	2.5	5	80
952224	224	4	5	140	0.025	6	5	20	5	15	180
952225	224	8	5	80	0.025	6	15	16	5	10	80
952226	224	8	5	55	0.025	10	25	22	10	20	630
952227	224	10	5	40	0.025	12	35	20	10	20	770
952228	224	18	5	50	0.025	8	30	18	10	25	1000
952229	224	8	5	60	0.05	6	20	20	15	20	1100
952230	224	2	5	45	0.05	6	20	22	10	20	1100
952231	224	6	5	300	0.05	8	20	26	10	15	970
952232	224	8	15	320	0.05	10	15	30	10	20	920
952233	224	2	5	270	0.025	8	10	28	10	20	750
952234	224	4	5	1250	0.05	6	15	30	10	20	950
952235	224	6	5	560	0.05	10	15	32	10	25	760
952236	224	2	5	960	0.05	10	10	32	10	25	1600
952237	224	2	5	1000	0.1	8	10	32	10	25	1400
952238	224	6	5	1350	0.1	8	10	36	15	25	2500
952239	224	10	5	1350	0.025	8	10	30	10	25	2200
952240	225	2	5	60	0.025	4	15	18	2.5	5	55
952241	225	6	10	80	0.05	8	40	24	10	20	470
952242	225	6	5	520	0.025	24	30	55	5	20	1000
952243	225	2	5	3550	0.1	8	20	48	10	15	440
952244	225	2	10	330	0.025	95	60	170	10	75	460
952245	225	6	5	390	0.025	16	15	55	5	20	510
952246	225	4	5	920	0.05	12	15	48	30	50	4000
952247	225	10	5	640	0.05	12	5	70	25	45	8000
952248	225	2	5	1950	0.025	6	10	32	15	30	5100
952249	225	2	5	370	0.025	2	5	16	5	10	1000
952250	225	2	5	620	0.025	4	15	10	5	5	240
952251	225	2	5	160	0.05	6	45	20	5	10	450
952252	225	18	5	85	0.05	8	40	18	10	10	640
952253	225	8	5	50	0.025	4	15	16	15	25	860
952254	225	14	5	120	0.05	6	30	18	20	30	1000
952255	225	4	5	150	0.025	6	20	20	15	25	980
952256	225	14	5	1300	0.05	8	25	22	15	30	1400
952257	225	8	5	2450	0.025	8	25	26	15	30	1300
952258	225	2	5	6100	0.025	6	15	28	20	40	790
952259	225	6	5	4900	0.025	16	25	48	15	40	1500

SAMPLE NO.	DH	SN	W	BA	AU	CU	PB	ZN	CO	NI	MN
952324	230	8	5	430	0.025	30	10	28	5	5	45
952325	231	2	5	120	0.025	14	15	32	2.5	5	40
952326	231	4	5	460	0.05	80	20	42	80	180	50
952327	231	2	5	1100	0.025	12	10	22	5	10	45
952328	231	6	5	450	0.025	16	10	70	20	40	480
952329	231	8	5	90	0.025	6	5	18	2.5	10	95
952330	231	6	5	90	0.025	1	2.5	1	2.5	2.5	2.5
952331	231	4	5	250	0.025	4	5	12	2.5	5	70
952332	231	2	10	20	0.025	8	10	12	2.5	5	25
952333	231	2	5	150	0.025	8	20	14	2.5	5	35
952334	231	4	5	55	0.025	4	20	6	2.5	5	45
952335	231	4	5	55	0.025	2	15	6	2.5	2.5	40
952336	231	2	5	190	0.025	14	15	10	5	15	95
952337	231	4	5	390	0.025	32	15	26	10	25	70
952338	231	2	10	390	0.025	20	10	30	10	15	60
952339	231	6	5	280	0.025	30	15	55	25	55	80
952340	231	4	5	220	0.025	22	10	38	20	45	95
952341	303	10	100	540	0.025	450	30	470	70	85	3300
952342	303	4	70	2100	0.025	250	25	280	55	65	6000
952343	303	4	65	1600	0.025	170	15	240	50	60	3100
952344	303	16	150	1400	0.025	220	15	320	60	80	11000
952345	303	10	60	900	0.025	120	10	180	40	55	8700
952346	303	2	55	280	0.025	110	20	270	65	55	34000
952347	303	2	70	880	0.025	80	10	160	40	50	8800
952348	303	10	60	840	0.025	90	10	210	35	55	3600
952349	303	4	35	490	0.025	150	10	150	35	55	4200
952350	303	2	180	490	0.025	180	5	230	50	70	1200
952351	303	2	25	1300	0.025	36	10	120	30	50	7100
952352	303	2	25	920	0.025	60	5	140	30	50	4800
952353	303	6	35	480	0.025	80	10	150	35	55	1100
952354	303	2	15	620	0.025	65	10	160	35	45	640
952355	303	2	25	520	0.025	70	10	250	35	60	500
952356	303	6	15	440	0.025	65	110	130	35	60	440
952357	303	6	25	440	0.025	65	10	180	35	60	400
952358	303	8	25	540	0.025	60	10	170	35	50	1300
952359	303	2	20	700	0.025	70	10	200	40	50	1000
952360	303	6	80	410	0.025	340	10	210	25	35	1300
952361	303	2	100	390	0.025	140	15	160	30	45	470
952362	303	4	35	110	0.025	46	10	130	10	20	940
952363	303	2	35	370	0.025	480	15	240	110	50	810
952364	303	2	110	680	0.025	210	10	210	35	50	980
952365	303	2	95	1250	0.025	380	15	210	35	50	8500
952366	303	6	25	120	0.025	38	5	110	5	15	480
952367	303	10	55	1600	0.025	55	10	190	25	40	7600
952368	303	2	45	1900	0.025	46	10	250	30	40	14000
952369	303	2	60	1250	0.025	65	15	190	35	40	7500
952370	303	8	50	1100	0.025	85	10	220	30	40	6200
952371	303	10	70	960	0.025	75	10	180	25	40	5700
952372	303	4	55	1150	0.025	70	10	140	25	35	3300
952373	303	2	110	1300	0.05	120	10	210	35	45	5700
952374	303	10	95	1250	0.05	100	5	210	30	40	7400
952375	303	2	95	1550	0.05	80	5	170	25	30	3600
952376	303	8	50	1100	0.1	60	10	170	20	35	3200
952377	303	2	65	1250	0.1	70	5	110	20	35	4800
952378	303	2	40	1250	0.05	75	5	85	15	25	3800
952379	303	4	35	1500	0.025	36	5	70	15	25	3300
952380	303	8	35	1700	0.05	60	5	95	30	35	13000
952381	303	4	45	1550	0.05	55	10	150	30	40	15000
952382	303	2	40	1850	0.025	50	10	150	25	40	19000
952383	303	6	30	1600	0.05	34	15	170	25	40	22000

SAMPLE NO.	DH	SN	W	BA	AU	CU	PB	ZN	CO	NI	MN
952444	302	10	130	1500	0.05	90	5	130	40	50	11000
952445	302	6	55	1400	0.15	55	10	110	25	30	4600
952446	302	8	80	1550	0.1	55	10	95	30	35	9200
952447	302	12	110	1750	0.025	80	10	110	40	45	14000
952448	302	12	170	1150	0.15	95	5	130	40	50	8200
952449	302	2	140	1400	0.1	120	10	140	40	45	8700
952450	302	6	240	1200	0.025	160	5	220	40	45	5300
952451	302	8	190	1100	0.05	120	5	180	35	40	5300
952452	302	8	300	1150	0.05	250	5	290	45	60	4300
952453	302	8	95	1250	0.025	75	10	140	30	30	5500
952454	302	2	70	1050	0.025	55	5	120	30	25	4000
952455	302	4	65	1350	0.025	60	10	130	35	35	11000
952456	302	12	30	1400	0.025	38	15	140	35	40	15000
952457	302	10	70	1600	0.05	60	10	150	35	40	13000
952458	302	12	130	1700	0.025	80	15	230	45	45	18000
952459	302	4	170	1900	0.025	85	15	230	45	45	15000
952460	302	8	100	1550	0.025	80	20	240	35	45	9000
952461	302	10	85	1950	0.025	60	15	160	35	45	13000
952462	302	2	45	1500	0.025	36	10	140	30	30	21000
952463	302	6	55	1250	0.025	32	10	130	25	25	17000
952463A	302	10	35	1550	0.05	46	15	120	30	40	13000
952464	302	4	55	1350	0.025	44	10	120	35	35	24000
952465	302	6	55	1600	0.025	50	5	120	30	35	18000
952466	302	10	170	1750	0.025	90	10	160	40	45	14000
952467	302	12	95	1500	0.025	80	10	180	40	55	16000
952468	302	14	40	1500	0.025	48	10	100	30	40	8000
952469	302	2	25	2150	0.025	30	10	140	30	35	14000
952470	302	4	30	1550	0.025	30	10	190	30	40	20000
952471	302	8	30	1500	0.025	32	10	140	35	45	14000
952472	302	2	120	1400	0.025	780	10	150	40	50	17000
952473	302	8	140	1750	0.025	100	5	210	40	50	17000
952474	302	10	40	1300	0.05	28	10	150	35	40	17000
952475	302	10	45	1200	0.025	34	10	160	35	45	17000
952476	302	4	30	1400	0.025	26	10	160	30	45	19000
952477	302	4	20	1400	0.025	20	10	90	35	40	15000
952478	302	10	20	2000	0.025	18	10	80	25	40	16000
952479	302	4	80	2200	0.025	55	10	90	35	50	17000
952480	302	14	160	1600	0.025	90	10	140	45	60	17000
952481	302	2	60	1650	0.025	34	10	130	35	40	17000
952482	302	2	200	1750	0.025	95	10	180	45	55	19000
952483	302	6	270	2150	0.025	120	5	200	50	60	14000
952484	302	2	210	1250	0.025	120	5	230	40	55	13000
952485	302	10	220	1550	0.025	140	10	220	45	60	17000
952486	302	2	85	1750	0.025	85	10	140	45	50	14000
952487	302	6	25	1750	0.025	38	10	140	35	40	17000
952488	302	6	75	1600	0.025	60	10	130	35	40	12000
952489	302	14	180	1750	0.025	100	10	250	50	50	11000
952490	302	2	90	1150	0.025	48	5	170	30	30	5000
952491	302	4	600	520	0.025	300	15	360	90	85	1000
952492	302	10	420	500	0.025	220	15	370	65	80	920
952493	302	6	380	580	0.025	250	10	330	65	65	750
952494	302	4	210	450	0.025	170	15	330	50	50	400
952495	301	2	35	1350	0.025	44	10	150	20	30	4500
952496	301	10	70	1550	0.025	65	15	170	25	35	6000
952497	301	4	70	1050	0.025	50	10	130	20	35	3700
952498	301	8	40	1550	0.025	36	10	130	30	35	13000
952499	301	8	20	1550	0.1	28	10	110	20	30	10000
952500	301	4	25	1200	0.025	40	15	140	25	40	8000
952501	301	4	50	580	0.025	85	10	200	30	45	3800
952502	301	4	60	450	0.025	70	10	150	25	25	630

SAMPLE NO.	AG	RK1	RK2	RK3	ST	%FE	%MN	D1	D2	EASTAMG	NORTHAMG
948651	0.5	1	13	-	5	-	-	44	59	542327	6304200
948652	0.5	1	13	-	5	-	-	59	69	542327	6304200
948653	0.5	1	13	-	5	-	-	44	56	563187	6321730
948654	0.5	1	13	-	5	-	-	60	66	563187	6321730
948655	0.5	1	13	-	5	-	-	70	80	563187	6321730
948656	0.5	1	13	-	5	-	-	80	86	563187	6321730
948657	0.5	1	13	-	8	-	-	28	36	563187	6321790
948658	0.5	1	13	-	8	-	-	40	46	563187	6321790
948659	1	1	13	-	8	-	-	50	56	563187	6321790
948660	0.5	1	13	-	8	-	-	60	66	563187	6321790
948661	0.5	1	13	-	8	-	-	70	76	563187	6321790
948662	0.5	1	13	-	8	-	-	80	86	563187	6321790
948663	0.5	1	13	-	8	-	-	90	99	563187	6321790
948664	0.5	1	13	-	8	-	-	100	105	563187	6321790
948665	0.5	1	13	-	8	-	-	14	24	563188	6321821
948666	0.5	1	13	-	8	-	-	24	29	563188	6321821
948667	0.5	1	13	-	8	-	-	29	30	563188	6321821
948668	0.5	1	13	-	8	-	-	35	46	563188	6321821
948669	0.5	16	13	-	8	-	-	49	51	563188	6321821
948670	0.5	1	13	-	8	-	-	55	67	563188	6321821
948671	0.5	1	13	12	8	-	-	67	81	563188	6321821
948672	0.5	1	13	12	8	-	-	85	101	563188	6321821
948673	0.5	1	13	12	8	-	-	105	118	563188	6321821
948674	0.5	16	13	12	8	-	-	118	125	563188	6321821
948675	0.5	1	-	13	8	-	-	31	32	560458	6321338
948676	0.5	20	19	15	8	-	-	0	10	560458	6321338
948677	0.5	1	-	13	8	-	-	10	20	560458	6321338
948678	0.5	1	-	13	8	-	-	20	32	560458	6321338
948679	0.5	20	19	15	1	-	-	0	10	560458	6321308
948680	0.5	1	-	3	1	-	-	10	20	560458	6321308
948681	0.5	2	8	-	8	-	-	20	30	560458	6321308
948682	0.5	8	-	-	8	-	-	30	41	560458	6321308
948683	0.5	8	-	-	8	-	-	41	52	560458	6321308
948684	0.5	2	13	-	6	29.7	0.12	20	22	563189	6321881
948685	0.5	2	13	-	6	21.8	0.13	44	45.5	563189	6321881
948686	0.5	2	13	-	6	22.6	0.12	60	61	563189	6321881
948687	1	2	13	-	6	13.9	0.175	80	81.5	563189	6321881
948688	0.5	16	13	-	6	23	1.58	100	102	563189	6321881
948689	0.5	2	13	-	6	8.85	3.12	128	133	563189	6321881
948690	0.5	2	13	-	6	8.43	1.9	144	147	563189	6321881
948691	0.5	16	-	3	6	47.3	0.06	7	11	563235	6322002
948692	1	19	-	3	6	21.7	0.05	20	22	563235	6322002
948693	0.5	16	-	-	6	36.8	0.115	40	41.6	563235	6322002
948694	0.5	16	-	-	6	21.6	0.3	54	58	563235	6322002
948695	0.5	16	-	-	6	26.2	0.15	58	61	563235	6322002
948696	0.5	16	-	-	6	21	0.6	61	66	563235	6322002
948698	0.5	2	13	-	1	-	-	0	10	563189	6321881
948699	0.5	2	13	-	1	-	-	10	20	563189	6321881
948700	0.5	2	13	-	1	-	-	20	30	563189	6321881
948701	0.5	2	13	-	1	-	-	30	44	563189	6321881
948702	0.5	2	13	-	1	-	-	44	50	563189	6321881
948703	0.5	2	13	-	1	-	-	50	60	563189	6321881
948704	0.5	2	13	-	1	-	-	62	70	563189	6321881
948705	0.5	2	13	-	1	-	-	70	80	563189	6321881
948706	1	16	13	-	1	-	-	80	90	563189	6321881
948707	1	16	13	-	1	-	-	90	100	563189	6321881
948708	1	2	13	-	1	-	-	100	110	563189	6321881
948709	1	2	13	-	1	-	-	110	120	563189	6321881
948710	0.5	2	13	-	1	-	-	120	130	563189	6321881
948711	0.5	2	13	-	1	-	-	130	144.2	563189	6321881

SAMPLE NO.	AG	RK1	RK2	RK3	ST	%FE	%MN	D1	D2	EASTAMG	NORTHAMG
948774	0.5	19	-	-	1	-	-	40	50	563183	6321397
948775	0.5	19	-	-	1	-	-	50	60	563183	6321397
948776	0.5	19	-	-	1	-	-	60	70	563183	6321397
948777	0.5	19	-	-	1	-	-	70	80	563183	6321397
948778	1	19	-	-	1	-	-	80	90	563183	6321397
948779	0.5	19	-	-	1	-	-	90	100	563183	6321397
948780	0.5	19	-	-	1	-	-	100	110	563183	6321397
948781	0.5	6	-	-	1	-	-	110	120	563183	6321397
948782	0.5	6	-	-	1	-	-	120	130	563183	6321397
948783	0.5	6	-	-	1	-	-	130	140	563183	6321397
948784	0.5	6	-	-	1	-	-	140	150	563183	6321397
948785	0.5	6	-	-	1	-	-	150	160	563183	6321397
948786A	0.5	6	-	-	1	-	-	160	170	563183	6321397
948786B	0.5	6	-	-	1	-	-	170	180	563183	6321397
948787	0.5	6	-	-	1	-	-	180	190.5	563183	6321397
948788	0.5	18	13	15	8	22.8	0.07	20	22	562276	6321529
948789	0.5	18	13	15	8	19.4	0.13	40	42	562276	6321529
948790	0.5	18	13	15	8	5.75	0.06	60	62	562276	6321529
948791	1	10	13	12	8	18.7	1.51	80	82	562276	6321529
948792	0.5	10	13	12	8	17.8	1.21	100	102	562276	6321529
948793	0.5	10	13	12	8	27.8	0.66	120	121	562276	6321529
948794	1	10	13	12	8	12	1.25	135	137.25	562276	6321529
948795	0.5	10	13	12	8	7.25	0.19	137.25	141.5	562276	6321529
948796	1	19	15	-	1	-	-	0	10	562276	6321529
948797	0.5	19	15	-	1	-	-	10	20	562276	6321529
948798	1	18	13	15	1	-	-	20	30	562276	6321529
948799	0.5	18	13	15	1	-	-	30	40	562276	6321529
948800	0.5	18	13	15	1	-	-	40	50	562276	6321529
948801	0.5	18	13	15	1	-	-	50	60	562276	6321529
948802	1	18	13	15	1	-	-	60	70	562276	6321529
948803	0.5	10	13	12	1	-	-	70	80	562276	6321529
948804	0.5	10	13	12	1	-	-	80	90	562276	6321529
948805	0.5	10	13	12	1	-	-	90	100	562276	6321529
948806	0.5	10	13	12	1	-	-	100	110	562276	6321529
948807	0.5	10	13	12	1	-	-	110	120	562276	6321529
948808	0.5	10	13	12	1	-	-	120	130	562276	6321529
948809	0.5	10	13	12	1	-	-	130	135	562276	6321529
948810	1	17	-	-	8	-	-	60	62	562274	6321347
948811	0.5	17	-	-	8	7.5	0.12	80	82	562274	6321347
948812	0.5	17	-	-	8	2.85	0.03	100	102	562274	6321347
948813	0.5	17	-	-	8	-	-	120	122	562274	6321347
948814	1	10	12	9	8	5.3	0.3	140	142	562274	6321347
948815	1	10	12	9	8	2.3	1.3	160	162	562274	6321347
948816	0.5	10	12	9	8	9.6	0.04	181	186	562274	6321347
948817	1	19	20	-	1	-	-	0	10	562274	6321347
948818	0.5	19	20	-	1	-	-	10	20	562274	6321347
948819	1	19	20	-	1	-	-	20	30	562274	6321347
948820	0.5	19	20	-	1	-	-	30	40	562274	6321347
948821	0.5	17	-	-	1	-	-	40	50	562274	6321347
948822	1	17	-	-	1	-	-	50	60	562274	6321347
948823	1	17	-	-	1	-	-	60	70	562274	6321347
948824	1	17	-	-	1	-	-	70	80	562274	6321347
948825	0.5	17	-	-	1	-	-	80	90	562274	6321347
948826	0.5	17	-	-	1	-	-	90	100	562274	6321347
948827	0.5	17	-	-	1	-	-	100	110	562274	6321347
948828	1	17	-	-	1	-	-	110	120	562274	6321347
948829	1	10	12	9	1	-	-	120	130	562274	6321347
948830	0.5	10	12	9	1	-	-	130	140	562274	6321347
948831	0.5	10	12	9	1	-	-	140	150	562274	6321347
948832	0.5	10	12	9	1	-	-	150	160	562274	6321347

SAMPLE NO.	AG	RK1	RK2	RK3	ST	%FE	%MN	D1	D2	EASTAMG	NORTHAMG
948893	0.5	18	-	-	1	-	-	140	150	562272	6321135
948894	0.5	6	-	-	1	-	-	150	160	562272	6321135
948895	0.5	6	-	-	1	-	-	160	170	562272	6321135
948896	0.5	6	-	-	1	-	-	170	180	562272	6321135
948897	0.5	6	-	-	1	-	-	180	190	562272	6321135
948898	0.5	6	-	-	1	-	-	190	202	562272	6321135
948899	0.5	6	-	-	1	-	-	202	210	562272	6321135
948900	0.5	6	-	-	1	-	-	210	215	562272	6321135
948901	0.5	6	-	-	1	-	-	215	225	562272	6321135
948902	0.5	6	-	-	1	-	-	225	230	562272	6321135
948903	0.5	19	20	-	8	1.35	0.01	120	122	562281	6321952
948904	0.5	6	-	-	8	-	-	141	142.5	562281	6321952
948905	0.5	19	20	-	1	-	-	0	10	562281	6321952
948906	0.5	6	-	-	1	-	-	10	20	562281	6321952
948907	0.5	6	-	-	1	-	-	20	30	562281	6321952
948908	0.5	6	-	-	1	-	-	30	40	562281	6321952
948909	0.5	6	-	-	1	-	-	40	50	562281	6321952
948910	0.5	6	-	-	1	-	-	50	60	562281	6321952
948911	1	6	-	-	1	-	-	60	70	562281	6321952
948912	0.5	6	-	-	1	-	-	70	80	562281	6321952
948913	0.5	6	-	-	1	-	-	80	90	562281	6321952
948914	0.5	6	-	-	1	-	-	90	100	562281	6321952
948915	0.5	6	-	-	1	-	-	100	110	562281	6321952
948916	0.5	6	-	-	1	-	-	110	120	562281	6321952
948917	0.5	6	-	-	1	-	-	120	130	562281	6321952
948918	0.5	6	-	-	1	-	-	130	140	562281	6321952
948919	0.5	1	13	-	8	13.9	0.06	35	40	560456	6321187
948920	0.5	1	13	-	8	25	0.13	60	65	560456	6321187
948921	0.5	10	13	-	8	11.8	1.08	143	146.7	560456	6321187
948922	0.5	19	20	-	1	-	-	0	10	560456	6321187
948923	0.5	1	13	-	1	-	-	10	20	560456	6321187
948924	0.5	1	13	-	1	-	-	20	30	560456	6321187
948925	0.5	1	13	-	1	-	-	30	40	560456	6321187
948926	0.5	1	13	-	1	-	-	40	50	560456	6321187
948927	0.5	1	13	-	1	-	-	50	60	560456	6321187
948928	0.5	1	13	-	1	-	-	60	70	560456	6321187
948929	0.5	1	13	-	1	-	-	70	80	560456	6321187
948930	0.5	1	13	-	1	-	-	80	90	560456	6321187
948931	0.5	1	13	-	1	-	-	90	100	560456	6321187
948932	0.5	1	13	-	1	-	-	100	110	560456	6321187
948933	0.5	1	13	-	1	-	-	110	120	560456	6321187
948934	0.5	1	13	-	1	-	-	120	130	560456	6321187
948935	1	10	13	-	1	-	-	130	140	560456	6321187
948936	0.5	10	13	-	1	-	-	140	143	560456	6321187
948937	0.5	1	15	-	5	-	-	40	42	560455	6321081
948938	0.5	1	15	-	6	21.8	0.04	60	62	560455	6321081
948939	0.5	18	-	-	6	23.4	0.09	80	81	560455	6321081
948940	0.5	18	-	-	6	15.9	0.1	100	101	560455	6321081
948941	0.5	18	-	-	6	15.6	0.13	120	121	560455	6321081
948942	0.5	18	-	-	6	19	0.08	140	141	560455	6321081
948943	0.5	18	-	-	6	27	0.22	160	162	560455	6321081
948944	1	18	-	-	6	5.45	0.08	180	181	560455	6321081
948945	0.5	2	12	13	6	1.15	0.09	193	194	560455	6321081
948946	0.5	19	20	15	1	-	-	0	10	560455	6321081
948947	0.5	19	20	15	1	-	-	10	20	560455	6321081
948948	0.5	1	15	-	1	-	-	20	30	560455	6321081
948949	0.5	1	15	-	1	-	-	30	40	560455	6321081
948950	0.5	1	15	-	1	-	-	40	50	560455	6321081
948951	0.5	1	15	-	1	-	-	50	60	560455	6321081
948952	0.5	1	15	-	1	-	-	60	70	560455	6321081

SAMPLE NO.	AG	RK1	RK2	RK3	ST	%FE	%MN	D1	D2	EASTAMG	NORTHAMG
952015	0.5	8	-	-	1	-	-	30	40	560457	6321278
952016	0.5	8	-	-	7	-	-	40	50	560457	6321278
952017	0.5	8	13	-	7	-	-	50	60	560457	6321278
952018	0.5	8	13	-	7	-	-	60	70	560457	6321278
952019	0.5	8	13	-	7	-	-	70	80	560457	6321278
952020	0.5	10	13	9	7	-	-	80	90	560457	6321278
952021	0.5	10	13	9	7	-	-	90	100	560457	6321278
952022	0.5	10	13	9	7	-	-	100	110	560457	6321278
952023	0.5	10	13	9	7	-	-	110	120	560457	6321278
952024	0.5	10	13	9	7	-	-	120	130	560457	6321278
952025	0.5	10	13	9	7	-	-	130	140	560457	6321278
952026	0.5	10	13	9	7	-	-	140	150	560457	6321278
952027	0.5	10	13	9	7	-	-	150	154	560457	6321278
952028	0.5	19	20	-	5	-	-	12	20	561668	6321233
952029	0.5	19	20	-	5	-	-	40	41	561668	6321233
952030	0.5	16	13	-	5	10.3	0.04	60	61	561668	6321233
952031	0.5	16	13	-	5	18.4	0.18	80	81	561668	6321233
952032	0.5	16	13	-	5	17.6	0.22	100	101	561668	6321233
952033	0.5	16	13	-	5	24.5	0.34	120	121	561668	6321233
952034	0.5	16	13	-	5	15.9	0.19	140	141	561668	6321233
952035	0.5	16	13	-	5	14.8	0.16	160	161	561668	6321233
952036	0.5	16	13	-	5	13.1	0.16	184	187	561668	6321233
952037	0.5	19	20	-	7	-	-	0	10	561668	6321233
952038	0.5	19	20	-	7	-	-	10	20	561668	6321233
952039	0.5	19	20	-	7	-	-	20	30	561668	6321233
952040	0.5	19	20	-	7	-	-	30	40	561668	6321233
952041	0.5	1	13	-	7	-	-	40	50	561668	6321233
952042	0.5	1	13	-	1	-	-	50	60	561668	6321233
952043	0.5	16	13	-	1	-	-	60	70	561668	6321233
952044	0.5	16	13	-	1	-	-	70	80	561668	6321233
952045	0.5	16	13	-	1	-	-	80	90	561668	6321233
952046	0.5	16	13	-	1	-	-	90	100	561668	6321233
952047	0.5	16	13	-	1	-	-	100	110	561668	6321233
952048	0.5	16	13	-	1	-	-	110	120	561668	6321233
952049	0.5	16	13	-	1	-	-	120	130	561668	6321233
952050	0.5	16	13	-	1	-	-	130	140	561668	6321233
952051	0.5	16	13	-	1	-	-	140	150	561668	6321233
952052	0.5	16	13	-	1	-	-	150	160	561668	6321233
952053	0.5	16	13	-	1	-	-	160	170	561668	6321233
952054	0.5	16	13	-	1	-	-	170	180	561668	6321233
952055	0.5	16	13	-	1	-	-	180	184	561668	6321233
952057	0.5	1	13	-	6	4.1	0.01	20	21	557742	6322006
952058	0.5	1	13	-	6	34.1	0.11	40	41	557742	6322006
952059	0.5	1	13	-	6	28.2	0.13	80	81	557742	6322006
952060	0.5	1	13	-	6	22	0.08	100	101	557742	6322006
952061	0.5	1	13	-	6	24.8	0.13	119	120	557742	6322006
952062	0.5	1	13	-	6	22.1	0.14	130	133	557742	6322006
952063	0.5	1	13	-	6	10.3	0.3	140	148	557742	6322006
952064	0.5	1	13	-	6	18.1	0.49	160	161	557742	6322006
952065	0.5	1	13	-	6	21.7	0.93	169	170	557742	6322006
952066	0.5	1	13	-	6	20.3	0.11	184	185	557742	6322006
952067	0.5	1	13	-	6	17.7	0.06	200	201	557742	6322006
952068	0.5	1	13	-	6	26	0.32	214	215	557742	6322006
952069	0.5	1	13	-	6	20.5	0.17	226	227	557742	6322006
952070	0.5	1	13	-	6	5.65	0.04	237	238	557742	6322006
952071	0.5	10	21	9	5	-	-	247	248	557742	6322006
952072	0.5	10	21	9	6	7.5	1.43	258	260.5	557742	6322006
952073	0.5	19	20	-	7	-	-	0	10	557742	6322006
952074	0.5	1	13	-	7	-	-	10	20	557742	6322006
952075	0.5	1	13	-	7	-	-	20	30	557742	6322006

SAMPLE NO.	AG	RK1	RK2	RK3	ST	%FE	%MN	D1	D2	EASTAMG	NORTHAMG
952139	0.5	1	-	-	7	-	-	110	120	556549	6323534
952140	0.5	1	-	-	7	-	-	120	130	556549	6323534
952141	0.5	16	13	-	7	-	-	130	140	556549	6323534
952142	0.5	16	13	-	7	-	-	140	150	556549	6323534
952143	0.5	16	13	-	7	-	-	150	160	556549	6323534
952144	0.5	16	13	-	7	-	-	160	170	556549	6323534
952145	0.5	6	9	-	7	-	-	170	180	556549	6323534
952146	0.5	6	9	-	7	-	-	180	190	556549	6323534
952147	0.5	6	9	-	7	-	-	190	193	556549	6323534
952148	0.5	19	20	-	6	5.8	0.02	60	61	555938	6323056
952149	0.5	6	9	10	6	11	0.06	80	81	555938	6323056
952150	0.5	6	9	10	6	20.1	0.38	100	101	555938	6323056
952151	0.5	6	9	10	6	21.2	0.18	120	121	555938	6323056
952152	0.5	6	9	10	6	20.6	0.82	140	141	555938	6323056
952153	0.5	6	9	10	6	6.9	1.05	204	208	555938	6323056
952154	0.5	19	20	-	7	-	-	0	10	555938	6323056
952155	0.5	19	20	-	7	-	-	10	20	555938	6323056
952156	0.5	19	20	-	7	-	-	20	30	555938	6323056
952157	0.5	19	20	-	7	-	-	30	40	555938	6323056
952158	0.5	19	20	-	7	-	-	40	50	555938	6323056
952159	0.5	19	20	-	7	-	-	50	60	555938	6323056
952160	0.5	19	20	-	7	-	-	60	70	555938	6323056
952161	0.5	6	9	10	7	-	-	70	80	555938	6323056
952162	0.5	6	9	10	7	-	-	80	90	555938	6323056
952163	0.5	6	9	10	7	-	-	90	100	555938	6323056
952164	0.5	6	9	10	7	-	-	100	110	555938	6323056
952165	0.5	6	9	10	7	-	-	110	120	555938	6323056
952166	0.5	6	9	10	7	-	-	120	130	555938	6323056
952167	0.5	6	9	10	7	-	-	130	140	555938	6323056
952168	0.5	6	9	10	7	-	-	140	150	555938	6323056
952169	0.5	6	9	10	7	-	-	150	160	555938	6323056
952170	0.5	6	9	10	7	-	-	160	170	555938	6323056
952171	0.5	6	9	10	7	-	-	170	180	555938	6323056
952172	0.5	6	9	10	7	-	-	180	190	555938	6323056
952173	0.5	6	9	10	7	-	-	190	200	555938	6323056
952174	0.5	6	9	10	7	-	-	200	204	555938	6323056
952175	0.5	1	9	13	6	17.5	0.03	20	21	555948	6323904
952176	0.5	1	9	13	6	13.1	0.02	40	41	555948	6323904
952177	0.5	8	-	-	6	-	-	60	61	555948	6323904
952178	0.5	1	13	-	6	18.3	0.16	80	81	555948	6323904
952179	0.5	1	13	-	6	21.6	0.05	100	101	555948	6323904
952180	0.5	10	12	13	6	17.7	0.06	120	121	555948	6323904
952182	0.5	10	12	13	6	5.9	0.23	160	162	555948	6323904
952183	0.5	19	20	15	7	-	-	0	10	555948	6323904
952184	0.5	1	9	13	7	-	-	10	20	555948	6323904
952185	0.5	1	9	13	7	-	-	20	30	555948	6323904
952186	0.5	1	9	13	7	-	-	30	40	555948	6323904
952187	0.5	1	9	13	7	-	-	40	50	555948	6323904
952188	0.5	8	-	-	7	-	-	50	60	555948	6323904
952189	0.5	8	-	-	7	-	-	60	70	555948	6323904
952190	0.5	1	13	-	7	-	-	70	80	555948	6323904
952191	0.5	1	13	-	7	-	-	80	90	555948	6323904
952192	0.5	1	13	-	7	-	-	90	100	555948	6323904
952193	0.5	1	13	-	7	-	-	100	110	555948	6323904
952194	0.5	10	12	13	7	-	-	110	120	555948	6323904
952195	0.5	10	12	13	7	-	-	120	130	555948	6323904
952196	0.5	10	12	13	7	-	-	130	140	555948	6323904
952197	0.5	10	12	13	7	-	-	140	150	555948	6323904
952198	0.5	10	12	13	1	-	-	150	160	555948	6323904
952199	0.5	6	10	13	6	7.1	0.11	120	121	555036	6323521

SAMPLE NO.	AG	RK1	RK2	RK3	ST	%FE	%MN	D1	D2	EASTAMG	NORTHAMG
952260	1	10	13	12	7	15.5	-	110	120	563491	6321847
952261	1	10	13	12	7	-	-	120	130	563491	6321847
952262	0.5	10	13	12	7	14.3	-	130	140	563491	6321847
952263	1	10	13	12	7	13.7	-	140	150	563491	6321847
952264	1	10	13	12	7	16.6	-	150	160	563491	6321847
952265	1	10	13	12	7	13.5	-	160	170	563491	6321847
952266	1	10	13	12	7	28.3	-	170	178	563491	6321847
952267	0.5	10	12	13	6	16.3	0.89	60	61	561672	6321596
952268	1	10	12	13	6	12.9	0.5	80	81	561672	6321596
952269	1	10	12	13	6	14.1	1.58	96	100	561672	6321596
952270	0.5	19	20	-	7	-	-	0	10	561672	6321596
952271	0.5	19	20	-	7	-	-	10	20	561672	6321596
952272	0.5	19	20	-	7	-	-	20	30	561672	6321596
952275	0.5	10	12	13	7	-	-	50	60	561672	6321596
952276	0.5	10	12	13	7	-	-	60	70	561672	6321596
952277	0.5	10	12	13	7	-	-	70	80	561672	6321596
952278	0.5	10	12	13	7	-	-	80	90	561672	6321596
952279	0.5	10	12	13	7	-	-	90	100	561672	6321596
952280	1	6	-	-	5	-	-	40	41	554138	6324349
952281	1	6	-	-	8	2.6	0.05	61	66	554138	6324349
952282	0.5	19	20	-	7	-	-	0	10	554138	6324349
952283	0.5	19	20	-	7	-	-	10	20	554138	6324349
952286	0.5	6	-	-	7	-	-	40	50	554138	6324349
952287	0.5	6	-	-	7	-	-	50	60	554138	6324349
952288	0.5	2	6	-	5	-	-	40	41	556524	6321355
952289	0.5	2	6	-	5	-	-	75	76	556524	6321355
952290	0.5	19	20	-	7	-	-	0	10	556524	6321355
952291	1	2	6	-	7	-	-	10	20	556524	6321355
952292	0.5	2	6	-	7	-	-	20	30	556524	6321355
952293	1	2	6	-	7	-	-	30	40	556524	6321355
952294	0.5	2	6	-	7	-	-	40	50	556524	6321355
952295	1	2	6	-	7	-	-	50	60	556524	6321355
952296	0.5	2	6	-	7	-	-	60	70	556524	6321355
952297	0.5	10	13	12	8	21.2	0.08	40	41	556527	6321657
952298	0.5	10	13	12	5	-	-	60	61	556527	6321657
952299	1	10	13	12	6	7.65	0.08	130	135	556527	6321657
952300	0.5	10	13	12	6	13.1	1.2	194	196	556527	6321657
952301	0.5	19	20	-	7	-	-	0	10	556527	6321657
952302	0.5	19	20	-	7	-	-	10	20	556527	6321657
952303	0.5	10	13	12	7	-	-	20	30	556527	6321657
952304	0.5	10	13	12	7	-	-	30	40	556527	6321657
952305	0.5	10	13	12	7	-	-	40	50	556527	6321657
952306	0.5	10	13	12	7	-	-	50	60	556527	6321657
952307	0.5	10	13	12	7	-	-	60	70	556527	6321657
952308	0.5	10	13	12	7	-	-	70	80	556527	6321657
952309	0.5	10	13	12	7	-	-	80	90	556527	6321657
952310	0.5	10	13	12	7	-	-	90	100	556527	6321657
952311	0.5	10	13	12	7	-	-	100	110	556527	6321657
952312	0.5	10	13	12	7	-	-	110	120	556527	6321657
952313	0.5	10	13	12	7	-	-	120	130	556527	6321657
952314	0.5	10	13	12	7	-	-	130	140	556527	6321657
952315	0.5	10	13	12	7	-	-	140	150	556527	6321657
952316	0.5	10	13	12	7	-	-	150	160	556527	6321657
952317	0.5	10	13	12	7	-	-	160	170	556527	6321657
952318	0.5	10	13	12	7	-	-	170	180	556527	6321657
952319	0.5	6	10	-	5	-	-	40	41	557728	6320796
952320	0.5	6	10	-	6	1.2	0.04	68	69	557728	6320796
952321	0.5	19	20	-	7	-	-	0	10	557728	6320796
952322	0.5	8	-	14	7	-	-	10	20	557728	6320796
952323	1	6	10	-	7	-	-	20	30	557728	6320796

SAMPLE NO.	AG	RK1	RK2	RK3	ST	%FE	%MN	D1	D2	EASTAMG	NORTHAMG
952384	0.5	2	21	12	9	-	-	520	530	562276	6321529
952385	0.5	2	21	12	9	-	-	530	540	562276	6321529
952386	0.5	2	12	10	9	-	-	540	550	562276	6321529
952387	0.5	2	12	10	9	-	-	550	560	562276	6321529
952388	0.5	2	12	10	9	-	-	560	570	562276	6321529
952389	0.5	2	12	10	9	-	-	570	580	562276	6321529
952390	0.5	2	12	10	9	-	-	580	590	562276	6321529
952391	0.5	2	12	10	9	-	-	590	600	562276	6321529
952392	0.5	2	12	9	9	-	-	114	120	561677	6322020
952393	0.5	2	12	-	9	-	-	120	130	561677	6322020
952394	0.5	2	12	-	9	-	-	130	140	561677	6322020
952395	0.5	2	12	-	9	-	-	140	150	561677	6322020
952396	0.5	2	12	-	9	-	-	150	160	561677	6322020
952397	0.5	2	12	-	9	-	-	160	170	561677	6322020
952398	0.5	2	12	-	9	-	-	170	180	561677	6322020
952399	0.5	2	12	-	9	-	-	180	190	561677	6322020
952400	0.5	2	12	10	9	-	-	190	200	561677	6322020
952401	0.5	2	12	-	9	-	-	200	210	561677	6322020
952402	0.5	2	12	-	9	-	-	210	220	561677	6322020
952403	0.5	2	12	-	9	-	-	220	230	561677	6322020
952404	0.5	2	12	-	9	-	-	230	240	561677	6322020
952405	0.5	2	12	-	9	-	-	240	250	561677	6322020
952406	0.5	2	12	10	9	-	-	250	260	561677	6322020
952407	0.5	2	12	10	9	-	-	260	270	561677	6322020
952408	0.5	2	12	10	9	-	-	270	280	561677	6322020
952409	0.5	2	12	10	9	-	-	280	290	561677	6322020
952410	0.5	2	12	10	9	-	-	290	300	561677	6322020
952411	0.5	2	12	10	9	-	-	300	310	561677	6322020
952412	0.5	2	12	10	9	-	-	310	320	561677	6322020
952413	0.5	2	12	10	9	-	-	320	330	561677	6322020
952414	0.5	2	12	10	9	-	-	330	340	561677	6322020
952415	0.5	2	12	10	9	-	-	340	350	561677	6322020
952416	0.5	2	12	10	9	-	-	350	360	561677	6322020
952417	0.5	2	12	10	9	-	-	360	370	561677	6322020
952418	0.5	2	12	10	9	-	-	370	380	561677	6322020
952419	0.5	2	12	10	9	-	-	380	390	561677	6322020
952420	0.5	2	12	10	9	-	-	390	400	561677	6322020
952421	0.5	2	12	10	9	-	-	400	406	561677	6322020
952422	0.5	5	1	-	9	-	-	196	205	560455	6321081
952423	0.5	2	26	9	9	-	-	205	215	560455	6321081
952424	0.5	2	10	-	9	-	-	215	225	560455	6321081
952425	0.5	2	12	26	9	-	-	225	232	560455	6321081
952426	0.5	25	-	10	9	-	-	232	246	560455	6321081
952427	0.5	10	13	12	9	-	-	246	255	560455	6321081
952428	0.5	10	12	21	9	-	-	255	265	560455	6321081
952429	0.5	10	12	21	9	-	-	265	275	560455	6321081
952430	0.5	10	12	9	9	-	-	275	285	560455	6321081
952431	0.5	2	12	9	9	-	-	285	295	560455	6321081
952432	0.5	10	12	21	9	-	-	295	305	560455	6321081
952433	0.5	2	12	9	9	-	-	305	315	560455	6321081
952434	0.5	10	12	9	9	-	-	315	325	560455	6321081
952435	0.5	2	12	9	9	-	-	325	335	560455	6321081
952436	0.5	2	12	21	9	-	-	335	345	560455	6321081
952437	0.5	10	12	21	9	-	-	345	355	560455	6321081
952438	0.5	10	12	21	9	-	-	355	365	560455	6321081
952439	0.5	2	12	10	9	-	-	365	375	560455	6321081
952440	0.5	10	12	21	9	-	-	375	385	560455	6321081
952441	0.5	2	12	10	9	-	-	385	395	560455	6321081
952442	0.5	10	12	21	9	-	-	395	405	560455	6321081
952443	0.5	10	12	9	9	-	-	405	415	560455	6321081

SAMPLE NO.	AG	RK1	RK2	RK3	ST	%FE	%MN	D1	D2	EASTAMG	NORTHAMG
952503	0.5	1	24	-	9	-	-	138	148	563235	6322002
952504	0.5	2	-	10	9	-	-	148	158	563235	6322002
952505	0.5	2	-	10	9	-	-	158	168	563235	6322002
952506	0.5	2	-	10	9	-	-	168	178	563235	6322002
952507	0.5	2	9	24	9	-	-	178	190	563235	6322002
952508	0.5	1	12	17	9	-	-	190	195	563235	6322002
952509	0.5	1	24	9	9	-	-	195	204	563235	6322002
952510	0.5	1	12	26	9	-	-	204	214	563235	6322002
952511	0.5	1	12	26	9	-	-	214	220	563235	6322002
952512	0.5	1	-	-	9	-	-	220	230	563235	6322002
952513	0.5	1	-	-	9	-	-	230	240	563235	6322002
952514	0.5	1	1	-	9	-	-	240	244	563235	6322002
952515	0.5	1	-	10	9	-	-	244	254.5	563235	6322002
952516	0.5	1	12	10	9	-	-	254.5	260	563235	6322002
952517	0.5	1	-	-	9	-	-	260	270	563235	6322002
952518	0.5	1	-	-	9	-	-	270	284	563235	6322002
952519	0.5	1	-	-	9	-	-	284	294	563235	6322002
952520	0.5	1	-	-	9	-	-	294	304	563235	6322002
952521	0.5	1	24	12	9	-	-	304	314	563235	6322002
952522	0.5	25	-	-	9	-	-	314	324	563235	6322002
952523	0.5	1	24	-	9	-	-	324	334	563235	6322002
952524	0.5	25	-	-	9	-	-	334	344	563235	6322002
952525	0.5	25	-	-	9	-	-	344	354	563235	6322002
952526	0.5	6	24	-	9	-	-	354	364	563235	6322002
952527	0.5	25	-	-	9	-	-	364	374	563235	6322002
952528	0.5	25	-	-	9	-	-	374	384	563235	6322002
952529	0.5	6	24	-	9	-	-	384	394	563235	6322002
952530	0.5	6	24	-	9	-	-	394	400	563235	6322002

SAMPLE NO.	RL	HD	MN2	FE	D1M	D2M	RLM	HDM
948712	451.2	66	-	-	0	3.048	137.526	20.117
948713	451.2	66	-	-	3.048	6.096	137.526	20.117
948714	451.2	66	-	-	6.096	9.144	137.526	20.117
948715	451.2	66	-	-	9.144	12.192	137.526	20.117
948716	451.2	66	-	-	12.192	15.24	137.526	20.117
948717	451.2	66	-	-	15.24	18.593	137.526	20.117
948719	449.2	201.7	1000	155000	18.288	18.898	136.916	61.478
948720	449.2	201.7	10300	108000	24.384	24.994	136.916	61.478
948721	449.2	201.7	32500	162000	30.48	30.937	136.916	61.478
948722	449.2	201.7	18000	202000	36.576	37.186	136.916	61.478
948723	449.2	201.7	55000	127000	42.672	43.282	136.916	61.478
948724	449.2	201.7	49000	208000	49.378	49.987	136.916	61.478
948725	449.2	201.7	12500	70000	54.864	56.388	136.916	61.478
948726	449.2	201.7	7500	61000	60.96	61.265	136.916	61.478
948727	449.2	201.7	-	-	-3.048	3.048	136.916	61.478
948728	449.2	201.7	-100000	-	3.048	6.096	136.916	61.478
948729	449.2	201.7	-	-	6.096	9.144	136.916	61.478
948730	449.2	201.7	-	-	9.144	12.192	136.916	61.478
948731	449.2	201.7	-	-	12.192	15.24	136.916	61.478
948732	449.2	201.7	-	-	15.24	18.288	136.916	61.478
948733	449.2	201.7	-	-	18.288	21.336	136.916	61.478
948734	449.2	201.7	-	-	21.336	24.384	136.916	61.478
948735	449.2	201.7	-	-	24.384	27.432	136.916	61.478
948736	449.2	201.7	-	-	27.432	30.48	136.916	61.478
948737	449.2	201.7	-	-	30.48	33.528	136.916	61.478
948738	449.2	201.7	-	-	33.528	36.576	136.916	61.478
948739	449.2	201.7	-	-	36.576	39.624	136.916	61.478
948740	449.2	201.7	-	-	39.624	42.672	136.916	61.478
948741	449.2	201.7	-	-	42.977	46.025	136.916	61.478
948742	449.2	201.7	-	-	46.025	49.378	136.916	61.478
948743	449.2	201.7	-	-	49.378	51.816	136.916	61.478
948744	449.2	201.7	-	-	51.816	54.864	136.916	61.478
948745	449.2	201.7	-	-	54.864	57.912	136.916	61.478
948746	449.2	201.7	-	-	57.912	60.96	136.916	61.478
948747	449.2	201.7	-	-	60.96	61.493	136.916	61.478
948748	457.3	114	-	-	24.384	24.994	139.385	34.747
948749	457.3	114	-	-	30.48	31.09	139.385	34.747
948750	457.3	114	-	-	32.918	33.467	139.385	34.747
948751	457.3	114	600	32000	33.223	34.747	139.385	34.747
948752	457.3	114	-	-	0	3.048	139.385	34.747
948753	457.3	114	-	-	3.048	6.096	139.385	34.747
948754	457.3	114	-	-	6.096	9.144	139.385	34.747
948755	457.3	114	-	-	9.144	12.192	139.385	34.747
948756	457.3	114	-	-	12.192	15.24	139.385	34.747
948757	457.3	114	-	-	15.24	18.288	139.385	34.747
948758	457.3	114	-	-	18.288	21.336	139.385	34.747
948759	457.3	114	-	-	21.336	24.384	139.385	34.747
948760	457.3	114	-	-	24.384	27.432	139.385	34.747
948761	457.3	114	-	-	27.432	30.48	139.385	34.747
948762	457.3	114	-	-	30.48	33.833	139.385	34.747
948764	453.5	190.5	-	-	30.48	31.09	138.227	58.064
948765	453.5	190.5	-	-	36.576	37.186	138.227	58.064
948766	453.5	190.5	-	-	42.672	43.282	138.227	58.064
948767	453.5	190.5	-	-	48.768	49.378	138.227	58.064
948768	453.5	190.5	-	-	54.864	55.474	138.227	58.064
948769	453.5	190.5	-	-	56.998	57.912	138.227	58.064
948770	453.5	190.5	-	-	0	3.048	138.227	58.064
948771	453.5	190.5	-	-	3.048	6.096	138.227	58.064
948772	453.5	190.5	-	-	6.096	9.144	138.227	58.064
948773	453.5	190.5	-	-	9.144	12.192	138.227	58.064

SAMPLE NO.	RL	HD	MN2	FE	D1M	D2M	RLM	HDM
948833	460.3	186	-	-	48.768	51.816	140.299	56.693
948834	460.3	186	-	-	51.816	55.169	140.299	56.693
948835	451.2	128.2	700	158000	6.096	6.706	137.526	39.075
948836	451.2	128.2	6500	64500	12.192	12.802	137.526	39.075
948837	451.2	128.2	17500	45500	18.288	18.898	137.526	39.075
948838	451.2	128.2	19400	71500	24.384	24.994	137.526	39.075
948839	451.2	128.2	6100	62500	30.48	31.09	137.526	39.075
948840	451.2	128.2	11200	49000	36.576	37.186	137.526	39.075
948841	451.2	128.2	11000	139000	38.405	39.091	137.526	39.075
948842	451.2	128.2	-	-	0	3.048	137.526	39.075
948843	451.2	128.2	-	-	3.048	6.096	137.526	39.075
948844	451.2	128.2	-	-	6.096	9.144	137.526	39.075
948845	451.2	128.2	-	-	9.144	12.192	137.526	39.075
948846	451.2	128.2	-	-	12.192	15.24	137.526	39.075
948847	451.2	128.2	-	-	15.24	18.288	137.526	39.075
948848	451.2	128.2	-	-	18.288	21.336	137.526	39.075
948849	451.2	128.2	-	-	21.336	24.384	137.526	39.075
948850	451.2	128.2	-	-	24.384	27.432	137.526	39.075
948851	451.2	128.2	-	-	27.432	30.48	137.526	39.075
948852	451.2	128.2	-	-	30.48	33.528	137.526	39.075
948853	451.2	128.2	-	-	33.528	36.576	137.526	39.075
948854	451.2	128.2	-	-	36.576	39.624	137.526	39.075
948855	452.1	159	1700	226000	12.192	12.802	137.8	48.463
948856	452.1	159	1700	203000	18.288	18.898	137.8	48.463
948857	452.1	159	5500	324000	24.384	24.994	137.8	48.463
948858	452.1	159	4100	166000	30.48	31.09	137.8	48.463
948859	452.1	159	1700	44000	36.576	38.1	137.8	48.463
948860	452.1	159	8000	55000	46.634	48.463	137.8	48.463
948861	452.1	159	-	-	0	3.048	137.8	48.463
948862	452.1	159	-	-	3.048	6.096	137.8	48.463
948863	452.1	159	-	-	6.096	9.144	137.8	48.463
948864	452.1	159	-	-	9.144	12.192	137.8	48.463
948865	452.1	159	-	-	12.192	15.24	137.8	48.463
948866	452.1	159	-	-	15.24	18.288	137.8	48.463
948867	452.1	159	-	-	18.288	21.336	137.8	48.463
948868	452.1	159	-	-	21.336	24.384	137.8	48.463
948869	452.1	159	-	-	24.384	27.432	137.8	48.463
948870	452.1	159	-	-	27.432	30.48	137.8	48.463
948871	452.1	159	-	-	30.48	33.528	137.8	48.463
948872	452.1	159	-	-	33.528	36.576	137.8	48.463
948873	452.1	159	-	-	36.576	39.624	137.8	48.463
948874	452.1	159	-	-	39.624	42.672	137.8	48.463
948875	452.1	159	-	-	42.672	45.72	137.8	48.463
948876	468.9	231	-	-	48.768	49.378	142.921	70.409
948877	468.9	231	-	-	54.864	55.474	142.921	70.409
948878	468.9	231	-	-	70.104	70.409	142.921	70.409
948879	468.9	231	-	-	0	3.048	142.921	70.409
948880	468.9	231	-	-	3.048	6.096	142.921	70.409
948881	468.9	231	-	-	6.096	9.144	142.921	70.409
948882	468.9	231	-	-	9.144	12.192	142.921	70.409
948883	468.9	231	-	-	12.192	15.24	142.921	70.409
948884	468.9	231	-	-	15.24	18.288	142.921	70.409
948885	468.9	231	-	-	18.288	21.336	142.921	70.409
948886	468.9	231	-	-	21.336	24.384	142.921	70.409
948887	468.9	231	-	-	24.384	27.432	142.921	70.409
948888	468.9	231	-	-	27.432	30.48	142.921	70.409
948889	468.9	231	-	-	30.48	33.528	142.921	70.409
948890	468.9	231	-	-	33.528	36.576	142.921	70.409
948891	468.9	231	-	-	36.576	39.624	142.921	70.409
948892	468.9	231	-	-	39.624	42.672	142.921	70.409

SAMPLE NO.	RL	HD	MN2	FE	D1M	D2M	RLM	HDM
948953	525.9	197	-	-	21.336	24.384	160.294	60.046
948954	525.9	197	-	-	24.384	27.432	160.294	60.046
948955	525.9	197	-	-	27.432	30.48	160.294	60.046
948956	525.9	197	-	-	30.48	33.528	160.294	60.046
948957	525.9	197	-	-	33.528	36.576	160.294	60.046
948960	525.9	197	-	-	42.672	45.72	160.294	60.046
948961	525.9	197	-	-	45.72	48.768	160.294	60.046
948962	525.9	197	-	-	48.768	51.816	160.294	60.046
948963	525.9	197	-	-	51.816	54.864	160.294	60.046
948964	525.9	197	-	-	54.864	57.912	160.294	60.046
948965	533.4	171	1400	262000	6.096	6.401	162.58	52.121
948966	533.4	171	-	-	12.192	12.497	162.58	52.121
948967	533.4	171	800	132000	24.384	24.689	162.58	52.121
948968	533.4	171	1000	175000	30.48	30.785	162.58	52.121
948969	533.4	171	1800	188000	36.576	36.881	162.58	52.121
948970	533.4	171	11500	153000	42.672	42.977	162.58	52.121
948971	533.4	171	12400	58000	48.768	50.292	162.58	52.121
948972	533.4	171	14900	142000	51.816	52.121	162.58	52.121
948973	533.4	171	-	-	0	3.048	162.58	52.121
948974	533.4	171	-	-	3.048	6.096	162.58	52.121
948975	533.4	171	-	-	6.096	9.144	162.58	52.121
948976	533.4	171	-	-	9.144	12.192	162.58	52.121
948977	533.4	171	-	-	12.192	15.24	162.58	52.121
948978	533.4	171	-	-	15.24	18.288	162.58	52.121
948979	533.4	171	-	-	18.288	21.336	162.58	52.121
948980	533.4	171	-	-	21.336	24.384	162.58	52.121
948981	533.4	171	-	-	24.384	27.432	162.58	52.121
948982	533.4	171	-	-	27.432	30.48	162.58	52.121
948983	533.4	171	-	-	30.48	33.528	162.58	52.121
948984	533.4	171	-	-	33.528	36.576	162.58	52.121
948985	533.4	171	-	-	36.576	39.624	162.58	52.121
948986	533.4	171	-	-	39.624	42.672	162.58	52.121
948987	533.4	171	-	-	42.672	45.72	162.58	52.121
948988	533.4	171	-	-	45.72	48.768	162.58	52.121
948989	533.4	171	-	-	48.768	51.816	162.58	52.121
948990	548.6	117	200	27500	6.096	6.401	167.213	35.662
948991	548.6	117	-	-	12.192	12.497	167.213	35.662
948992	548.6	117	-	-	18.288	18.593	167.213	35.662
948993	548.6	117	100	89000	24.384	24.689	167.213	35.662
948994	548.6	117	100	11500	34.138	35.662	167.213	35.662
948995	548.6	117	-	-	0	3.048	167.213	35.662
948996	548.6	117	-	-	3.048	6.096	167.213	35.662
948997	548.6	117	-	-	6.096	9.144	167.213	35.662
948998	548.6	117	-	-	9.144	12.192	167.213	35.662
948999	548.6	117	-	-	12.192	15.24	167.213	35.662
952000	548.6	117	-	-	15.24	18.288	167.213	35.662
952001	548.6	117	-	-	18.288	21.336	167.213	35.662
952002	548.6	117	-	-	21.336	24.384	167.213	35.662
952003	548.6	117	-	-	24.384	27.432	167.213	35.662
952004	548.6	117	-	-	27.432	30.48	167.213	35.662
952005	548.6	117	-	-	30.48	33.528	167.213	35.662
952006	548.6	117	-	-	33.528	34.138	167.213	35.662
952007	557.5	158	1200	150000	6.096	6.401	169.926	48.158
952008	557.5	158	35200	115000	12.192	12.497	169.926	48.158
952009	557.5	158	18700	86500	24.384	24.689	169.926	48.158
952010	557.5	158	8600	83500	42.672	43.891	169.926	48.158
952011	557.5	158	10200	112000	46.939	48.158	169.926	48.158
952012	557.5	158	-	-	0	3.048	169.926	48.158
952013	557.5	158	-	-	3.048	6.096	169.926	48.158
952014	557.5	158	-	-	6.096	9.144	169.926	48.158

SAMPLE NO.	RL	HD	MN2	FE	D1M	D2M	RLM	HDM
952076	567.2	260.5	-	-	9.144	12.192	172.883	79.4
952077	567.2	260.5	-	-	12.192	15.24	172.883	79.4
952078	567.2	260.5	-	-	15.24	18.288	172.883	79.4
952079	567.2	260.5	-	-	18.288	21.336	172.883	79.4
952080	567.2	260.5	-	-	21.336	24.384	172.883	79.4
952081	567.2	260.5	-	-	24.384	27.432	172.883	79.4
952082	567.2	260.5	-	-	27.432	30.48	172.883	79.4
952083	567.2	260.5	-	-	36.271	37.795	172.883	79.4
952084	509.8	245	-	-	15.24	18.593	155.387	74.676
952085	509.8	245	300	15000	24.384	24.689	155.387	74.676
952086	509.8	245	-	-	30.48	30.785	155.387	74.676
952087	509.8	245	10800	15000	36.576	36.881	155.387	74.676
952088	509.8	245	16600	15000	42.672	42.977	155.387	74.676
952089	509.8	245	-	-	48.768	49.073	155.387	74.676
952090	509.8	245	-	-	54.864	55.169	155.387	74.676
952093	509.8	245	6900	152000	73.152	74.676	155.387	74.676
952094	509.8	245	-	-	0	3.048	155.387	74.676
952095	509.8	245	-	-	3.048	6.096	155.387	74.676
952096	509.8	245	-	-	6.096	9.144	155.387	74.676
952097	509.8	245	-	-	9.144	12.192	155.387	74.676
952098	509.8	245	-	-	12.192	15.24	155.387	74.676
952099	509.8	245	-	-	15.24	18.288	155.387	74.676
952100	509.8	245	-	-	18.288	21.336	155.387	74.676
952101	509.8	245	-	-	21.336	24.384	155.387	74.676
952102	509.8	245	-	-	24.384	27.432	155.387	74.676
952103	509.8	245	-	-	27.432	30.48	155.387	74.676
952104	509.8	245	-	-	30.48	33.528	155.387	74.676
952105	509.8	245	-	-	33.528	36.576	155.387	74.676
952106	509.8	245	-	-	36.576	39.624	155.387	74.676
952107	509.8	245	-	-	39.624	42.672	155.387	74.676
952108	509.8	245	-	-	42.672	45.72	155.387	74.676
952109	509.8	245	-	-	45.72	48.768	155.387	74.676
952110	509.8	245	-	-	48.768	51.816	155.387	74.676
952111	509.8	245	-	-	51.816	54.864	155.387	74.676
952112	509.8	245	-	-	54.864	57.912	155.387	74.676
952113	509.8	245	-	-	57.912	60.96	155.387	74.676
952114	509.8	245	-	-	60.96	64.008	155.387	74.676
952115	509.8	245	-	-	64.008	67.056	155.387	74.676
952116	509.8	245	-	-	67.056	70.104	155.387	74.676
952117	509.8	245	-	-	70.104	73.152	155.387	74.676
952118	550.2	198	-	-	6.096	6.401	167.701	60.35
952119	550.2	198	-	-	12.192	12.497	167.701	60.35
952120	550.2	198	-	-	18.288	18.593	167.701	60.35
952122	550.2	198	4400	134000	30.48	30.785	167.701	60.35
952123	550.2	198	1000	111000	36.576	36.881	167.701	60.35
952124	550.2	198	2000	250000	42.672	42.977	167.701	60.35
952125	550.2	198	2000	253000	48.768	49.073	167.701	60.35
952126	550.2	198	700	46000	54.864	55.169	167.701	60.35
952127	550.2	198	700	47000	58.826	60.35	167.701	60.35
952128	550.2	198	-	-	0	3.048	167.701	60.35
952129	550.2	198	-	-	3.048	6.096	167.701	60.35
952130	550.2	198	-	-	6.096	9.144	167.701	60.35
952131	550.2	198	-	-	9.144	12.192	167.701	60.35
952132	550.2	198	-	-	12.192	15.24	167.701	60.35
952133	550.2	198	-	-	15.24	18.288	167.701	60.35
952134	550.2	198	-	-	18.288	21.336	167.701	60.35
952135	550.2	198	-	-	21.336	24.384	167.701	60.35
952136	550.2	198	-	-	24.384	27.432	167.701	60.35
952137	550.2	198	-	-	27.432	30.48	167.701	60.35
952138	550.2	198	-	-	30.48	33.528	167.701	60.35

SAMPLE NO.	RL	HD	MN2	FE	D1M	D2M	RLM	HDM
952200	476.3	147	200	46000	42.062	42.367	145.176	44.806
952201	476.3	147	200	13000	43.282	44.806	145.176	44.806
952202	476.3	147	-	-	0	3.048	145.176	44.806
952203	476.3	147	-	-	3.048	6.096	145.176	44.806
952204	476.3	147	-	-	6.096	9.144	145.176	44.806
952205	476.3	147	-	-	9.144	12.192	145.176	44.806
952206	476.3	147	-	-	12.192	15.24	145.176	44.806
952207	476.3	147	-	-	15.24	18.288	145.176	44.806
952208	476.3	147	-	-	18.288	21.336	145.176	44.806
952209	476.3	147	-	-	21.336	24.384	145.176	44.806
952210	476.3	147	-	-	24.384	27.432	145.176	44.806
952211	476.3	147	-	-	27.432	30.48	145.176	44.806
952212	476.3	147	-	-	39.624	42.062	145.176	44.806
952213	476.3	147	-	-	42.062	43.282	145.176	44.806
952214	-	179	-	-	6.096	6.401	-	54.559
952215	-	179	1600	253000	12.192	12.497	-	54.559
952216	-	179	700	181000	18.288	18.593	-	54.559
952217	-	179	500	167000	24.384	24.689	-	54.559
952218	-	179	600	141000	30.48	30.785	-	54.559
952219	-	179	1100	148000	36.576	36.881	-	54.559
952220	-	179	1900	337000	42.672	42.977	-	54.559
952221	-	179	-	-	42.977	53.035	-	54.559
952222	-	179	1900	186000	53.035	54.559	-	54.559
952223	-	179	-	-	0	3.048	-	54.559
952224	-	179	-	-	3.048	6.096	-	54.559
952225	-	179	-	-	6.096	9.144	-	54.559
952226	-	179	-	-	9.144	12.192	-	54.559
952227	-	179	-	-	12.192	15.24	-	54.559
952228	-	179	-	191000	15.24	18.288	-	54.559
952229	-	179	-	214000	18.288	21.336	-	54.559
952230	-	179	-	176000	21.336	24.384	-	54.559
952231	-	179	-	179000	24.384	27.432	-	54.559
952232	-	179	-	184000	27.432	30.48	-	54.559
952233	-	179	-	162000	30.48	33.528	-	54.559
952234	-	179	-	132000	33.528	36.576	-	54.559
952235	-	179	-	138000	36.576	39.624	-	54.559
952236	-	179	-	125000	39.624	42.672	-	54.559
952237	-	179	-	136000	42.672	45.72	-	54.559
952238	-	179	-	153000	45.72	48.768	-	54.559
952239	-	179	-	108000	48.768	51.816	-	54.559
952240	-	178	-	-	6.096	6.401	-	54.254
952241	-	178	-	-	12.192	12.497	-	54.254
952242	-	178	1400	236000	18.288	18.593	-	54.254
952243	-	178	600	151000	24.384	24.689	-	54.254
952244	-	178	400	120000	30.48	30.785	-	54.254
952245	-	178	700	79000	36.576	36.881	-	54.254
952246	-	178	6400	165000	42.672	42.977	-	54.254
952247	-	178	6800	200000	48.768	49.073	-	54.254
952248	-	178	1900	186000	53.035	54.254	-	54.254
952249	-	178	-	-	0	3.048	-	54.254
952250	-	178	-	-	3.048	6.096	-	54.254
952251	-	178	-	-	6.096	9.144	-	54.254
952252	-	178	-	338000	9.144	12.192	-	54.254
952253	-	178	-	300000	12.192	15.24	-	54.254
952254	-	178	-	205000	15.24	18.288	-	54.254
952255	-	178	-	-	18.288	21.336	-	54.254
952256	-	178	-	290000	21.336	24.384	-	54.254
952257	-	178	-	246000	24.384	27.432	-	54.254
952258	-	178	-	160000	27.432	30.48	-	54.254
952259	-	178	-	229000	30.48	33.528	-	54.254

SAMPLE-NO.	RL	HD	MN2	FE	D1M	D2M	RLM	HDM
952324	610.2	69	-	-	9.144	12.192	185.989	21.031
952325	480.7	117	100	8200	12.192	12.497	146.517	35.662
952326	480.7	117	-	-	24.384	24.689	146.517	35.662
952327	480.7	117	-	-	28.042	29.566	146.517	35.662
952328	480.7	117	800	39000	34.138	35.662	146.517	35.662
952329	480.7	117	-	-	0	3.048	146.517	35.662
952330	480.7	117	-	-	3.048	6.096	146.517	35.662
952331	480.7	117	-	-	6.096	9.144	146.517	35.662
952332	480.7	117	-	-	9.144	12.192	146.517	35.662
952333	480.7	117	-	-	12.192	15.24	146.517	35.662
952334	480.7	117	-	-	15.24	18.288	146.517	35.662
952335	480.7	117	-	-	18.288	21.336	146.517	35.662
952336	480.7	117	-	-	21.336	24.384	146.517	35.662
952337	480.7	117	-	-	24.384	27.432	146.517	35.662
952338	480.7	117	-	-	27.432	30.48	146.517	35.662
952339	480.7	117	-	-	30.48	33.528	146.517	35.662
952340	480.7	117	-	-	33.528	34.138	146.517	35.662
952341	456	600	-	-	30.48	33.528	138.989	182.88
952342	456	600	-	-	33.528	36.576	138.989	182.88
952343	456	600	-	-	36.576	39.624	138.989	182.88
952344	456	600	-	-	39.624	42.672	138.989	182.88
952345	456	600	-	-	42.672	45.72	138.989	182.88
952346	456	600	-	-	45.72	48.768	138.989	182.88
952347	456	600	-	-	48.768	51.816	138.989	182.88
952348	456	600	-	-	51.816	54.864	138.989	182.88
952349	456	600	-	-	54.864	57.912	138.989	182.88
952350	456	600	-	-	57.912	60.96	138.989	182.88
952351	456	600	-	-	60.96	64.008	138.989	182.88
952352	456	600	-	-	64.008	67.056	138.989	182.88
952353	456	600	-	-	67.056	70.104	138.989	182.88
952354	456	600	-	-	70.104	73.152	138.989	182.88
952355	456	600	-	-	73.152	76.2	138.989	182.88
952356	456	600	-	-	76.2	79.248	138.989	182.88
952357	456	600	-	-	79.248	82.296	138.989	182.88
952358	456	600	-	-	82.296	85.344	138.989	182.88
952359	456	600	-	-	85.344	88.392	138.989	182.88
952360	456	600	-	-	88.392	91.44	138.989	182.88
952361	456	600	-	-	91.44	94.488	138.989	182.88
952362	456	600	-	-	94.488	97.536	138.989	182.88
952363	456	600	-	-	97.536	100.584	138.989	182.88
952364	456	600	-	-	100.584	103.632	138.989	182.88
952365	456	600	-	-	103.632	105.766	138.989	182.88
952366	456	600	-	-	105.766	106.162	138.989	182.88
952367	456	600	-	-	106.162	109.728	138.989	182.88
952368	456	600	-	-	109.728	112.776	138.989	182.88
952369	456	600	-	-	112.776	115.824	138.989	182.88
952370	456	600	-	-	115.824	118.872	138.989	182.88
952371	456	600	-	-	118.872	121.92	138.989	182.88
952372	456	600	-	-	121.92	124.968	138.989	182.88
952373	456	600	-	-	124.968	128.016	138.989	182.88
952374	456	600	-	-	128.016	131.064	138.989	182.88
952375	456	600	-	-	131.064	134.112	138.989	182.88
952376	456	600	-	-	134.112	137.16	138.989	182.88
952377	456	600	-	-	137.16	140.208	138.989	182.88
952378	456	600	-	-	140.208	143.256	138.989	182.88
952379	456	600	-	-	143.256	146.304	138.989	182.88
952380	456	600	-	-	146.304	149.352	138.989	182.88
952381	456	600	-	-	149.352	152.4	138.989	182.88
952382	456	600	-	-	152.4	155.448	138.989	182.88
952383	456	600	-	-	155.448	158.496	138.989	182.88

SAMPLE NO.	RL	HD	MN2	FE	D1M	D2M	RLM	HDM
952444	525.9	928	-	-	126.492	129.54	160.294	282.854
952445	525.9	928	-	-	129.54	132.588	160.294	282.854
952446	525.9	928	-	-	132.588	135.636	160.294	282.854
952447	525.9	928	-	-	135.636	138.684	160.294	282.854
952448	525.9	928	-	-	138.684	141.732	160.294	282.854
952449	525.9	928	-	-	141.732	144.78	160.294	282.854
952450	525.9	928	-	-	144.78	147.828	160.294	282.854
952451	525.9	928	-	-	147.828	148.742	160.294	282.854
952452	525.9	928	-	-	148.742	151.79	160.294	282.854
952453	525.9	928	-	-	151.79	154.838	160.294	282.854
952454	525.9	928	-	-	154.838	157.886	160.294	282.854
952455	525.9	928	-	-	157.886	160.934	160.294	282.854
952456	525.9	928	-	-	160.934	163.982	160.294	282.854
952457	525.9	928	-	-	163.982	167.03	160.294	282.854
952458	525.9	928	-	-	167.03	170.078	160.294	282.854
952459	525.9	928	-	-	170.078	173.126	160.294	282.854
952460	525.9	928	-	-	173.126	176.174	160.294	282.854
952461	525.9	928	-	-	176.174	179.222	160.294	282.854
952462	525.9	928	-	-	179.222	182.27	160.294	282.854
952463	525.9	928	-	-	182.27	185.318	160.294	282.854
952463A	525.9	928	-	-	185.318	188.366	160.294	282.854
952464	525.9	928	-	-	188.366	191.414	160.294	282.854
952465	525.9	928	-	-	191.414	194.462	160.294	282.854
952466	525.9	928	-	-	194.462	197.51	160.294	282.854
952467	525.9	928	-	-	197.51	200.558	160.294	282.854
952468	525.9	928	-	-	200.558	203.606	160.294	282.854
952469	525.9	928	-	-	203.606	206.654	160.294	282.854
952470	525.9	928	-	-	206.654	209.702	160.294	282.854
952471	525.9	928	-	-	209.702	212.75	160.294	282.854
952472	525.9	928	-	-	212.75	215.798	160.294	282.854
952473	525.9	928	-	-	215.798	218.846	160.294	282.854
952474	525.9	928	-	-	218.846	221.894	160.294	282.854
952475	525.9	928	-	-	221.894	224.942	160.294	282.854
952476	525.9	928	-	-	224.942	227.99	160.294	282.854
952477	525.9	928	-	-	227.99	231.038	160.294	282.854
952478	525.9	928	-	-	231.038	234.086	160.294	282.854
952479	525.9	928	-	-	234.086	237.134	160.294	282.854
952480	525.9	928	-	-	237.134	240.182	160.294	282.854
952481	525.9	928	-	-	240.182	243.23	160.294	282.854
952482	525.9	928	-	-	243.23	246.278	160.294	282.854
952483	525.9	928	-	-	246.278	249.326	160.294	282.854
952484	525.9	928	-	-	249.326	252.374	160.294	282.854
952485	525.9	928	-	-	252.374	255.422	160.294	282.854
952486	525.9	928	-	-	255.422	258.47	160.294	282.854
952487	525.9	928	-	-	258.47	261.518	160.294	282.854
952488	525.9	928	-	-	261.518	264.566	160.294	282.854
952489	525.9	928	-	-	264.566	267.614	160.294	282.854
952490	525.9	928	-	-	267.614	270.662	160.294	282.854
952491	525.9	928	-	-	270.662	273.71	160.294	282.854
952492	525.9	928	-	-	273.71	276.758	160.294	282.854
952493	525.9	928	-	-	276.758	279.806	160.294	282.854
952494	525.9	928	-	-	279.806	282.854	160.294	282.854
952495	451.2	400	-	-	20.726	23.774	137.526	121.92
952496	451.2	400	-	-	23.774	26.822	137.526	121.92
952497	451.2	400	-	-	26.822	29.87	137.526	121.92
952498	451.2	400	-	-	29.87	30.785	137.526	121.92
952499	451.2	400	-	-	30.785	32.918	137.526	121.92
952500	451.2	400	-	-	32.918	35.966	137.526	121.92
952501	451.2	400	-	-	35.966	39.014	137.526	121.92
952502	451.2	400	-	-	39.014	42.062	137.526	121.92

0 1 2 3 4 5
Kilometres

LEGEND

- E.L. Boundary
- Major Magnetic High Trends
- Roads
- Proposed Geophysical Traverses
- C-2 Area of Interest
- * Kimberlite Targets
- Interpreted Fault

4230(III)-10

CRA EXPLORATION PTY. LIMITED	
COOTRA E.L.980 AEROMAGNETIC INTERPRETATION AND PROPOSED SURVEY AREAS	
Ref KIMBA SI 53-7	
Scale. 1:50000	
Author GLM	Report No.: 11657
Date MAY 1983	Plan No.: SAa 2028

4230 (III) - 1

CRA EXPLORATION PTY LIMITED	
COOTRA - E.L.980 - S. AUST. CRAE — NORTH BROKEN HILL J/V	
Ref.: KIMBA SI 53-7	
Scale : 1 : 50 000	Revised: March 1984 I. Ley
Author. I. D. Finch	Report No. 12556
Date : Sept. 1982	Plan No. SAa 1804

CRA EXPLORATION PTY. LIMITED

FOURTH QUARTERLY REPORT FOR COOTRA E.L. 980, SOUTH AUSTRALIA FOR THE PERIOD ENDING 29TH MARCH, 1983

AUTHOR: J.P. HOWARD
G.L. MACKEE

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N.B.H. LIMITED

DATE: 25TH MARCH, 1983

SUBMITTED BY: JPHoward.

ACCEPTED BY: [illegible]

CONTENTS

1. SUMMARY

32.6 kilometres of magnetometer and 7.3 kilometres of I.P. traversing were carried out during the quarter. The I.P. technique was not found to give reliable results. However, the magnetometer surveys have defined drill targets at C2 and C3 Prospects and extended potential at Meaney's Prospect.

Contamination during sample preparation caused the elevated copper, zinc and tungsten geochemistry previously reported from diamond drill holes at Warramboo. Further assaying will be carried out. Anomalous zinc, barium and manganese assays from rotary and percussion boreholes will be checked prior to follow-up drilling.

2. CONCLUSIONS

The main Warramboo magnetic anomaly is associated with chemical sediments, minor chalcopyrite and elevated zinc, barium and manganese geochemistry.

Immediately north from the town of Warramboo (Pine Row Anomaly) borehole (percussion and rotary) samples gave anomalous zinc, lead, barium and manganese goechemistry.

C2 and C3 Prospects show potential for stratiform massive sulphide deposits.

A magnetometer survey at Meaney's Prospect indicates potential for further scheelite development along strike.

Elevated zinc, copper, manganese and tungsten assay values in the four diamond drill holes at Warramboo are attributed to wear on the grinding wheel employed.

3. RECOMMENDATIONS

(a) A fence of holes should be drilled for geochemistry at each of the following Prospects - Pine Row, Warramboo and C3.

(b) A percussion hole should test both the magnetic and gravity anomalies at C2 Prospect.

4. INTRODUCTION

The Cootra Exploration Licence No. 980 (previously E.L. 756) is located 320 kilometres northwest of Adelaide and 40 kilometres southeast of Wudinna.

The area is defined as follows:

Starting at the intersection of latitude 33°12'S and longitude 135°36'E, thence east to longitude 136°00'E, thence south to the northern boundary of Hambidge Conservation Park, thence west, and south along the boundary of said park to latitude 33°22'S, thence west to longitude 135°36'E, thence north to the point of commencement. (See Plan No. SAa 2204).

An exploration licence was applied for on 17th July, 1980 and granted as E.L. 756 on 26th November, 1980 for one year. The licence lapsed but a reapplication was lodged on 8th December, 1981 and the area was granted as E.L. 980 on 19th March, 1982 for one year.

A joint venture agreement between North Broken Hill Limited and CRA Exploration Pty. Limited was signed in August, 1982 since when the latter have acted as operators.

The third quarterly reports geochemical results from sampling all available drill core in the Warramboo area. Check assays are described in this report and compilations of the geology of these S.A.D.M.E. boreholes are presented.

5. GEOLOGY

All core from S.A.D.M.E. drillholes in the Warramboo area were examined and compared with existing drill logs (RB 54/19). They were found to be adequate to allow construction of borehole geological cross-sections. (Plans SAa 2069 to 2073 and 2079). Borehole and cross-section locations are shown on Plan no. SAa 2067.

This work highlighted the presence of marble in WD3, which may be a facies equivalent of the iron formation of WD1 and WR1 (see Plan SAa 2066). Minor chalcopyrite and pyrite was noted (thin section 946772 - Appendix I). The presence of chemical sediment (and sulphide) within a stratigraphy rich in iron formations is regarded as indicating good potential for the formation of stratiform sulphide deposits.

6. GEOCHEMISTRY

6.1 Check Assays

The various types of drill hole samples available at S.A.D.M.E. neccessitated taking different types of sample for geochemical determinations. Chips were taken from each 10 foot interval of the percussion and rotary holes and half core samples were taken from those sections of these holes which were "spot cored". A continuous fillet of core sample was taken from each of the diamond drill holes. As most of the elevated zinc and tungsten assay values are confined to this "fillet" type of sample, check assays were carried out on half core. Two of the most anomalous 10 foot intervals from WD1 and WD2 were each divided into three half core samples.

Table 1 presents the assay results.

Table 1: Check Assays of Core Samples

DRILL HOLE	SAMPLE TYPE	SAMPLE INTERVAL (FT)	SAMPLE NUMBER	Cu	Pb	Zn	Co	Ni	Mn	Ag	Au	Sn	W	Ba
WD1	Half core	260 -263.3	888663	10	15	60	10	10	130	< 1	< 0.05	34	< 10	560
	Half core	263.3-266.6	888664	12	25	80	10	10	250	< 1	< 0.05	10	< 10	500
	Half core	266.6-269.9	888665	5	25	65	10	10	120	< 1	< 0.05	< 10	< 10	540
	AVERAGE	260 -270		9	22	68	10	10	167	< 1	< 0.05	15	< 10	533
	Fillet	260 -270	952517	320	10	480	100	85	350		0.025	2	640	520
WD2	Half core	888.0-891.3	888666	25	10	55	15	40	425	< 1	< 0.05	< 10	< 10	440
	Half core	891.3-894.6	888667	48	15	50	10	30	400	< 1	< 0.05	10	15	430
	Half core	894.6-897.9	888668	32	15	60	10	30	360	< 1	< 0.05	< 10	< 10	400
	AVERAGE	888 -898		35	13	55	12	33	395	< 1	< 0.05	< 10	< 11	423
	Fillet	888 -898	952491	300	15	360	90	85	1000		0.025	4	600	520

The average assay values for the three half core samples may be compared, on Table 1, with the assay value for the same interval taken as a fillet sample. Of the 11 elements assayed only barium has a similar value, whilst the elevated zinc and tungsten fillet samples are reduced to only background values when half cored.

The diamond abrasive wheel used for the fillet sampling was subsequently examined and found to be badly worn with several diamonds missing, exposing the matrix. It has been confirmed by the manufacturer of the wheel that zinc and tungsten are components of the matrix (Appendix II).

Intervals of marble, some of which contain small amounts of chalcopyrite, will be reassayed.

6.2 Percussion and Rotary Holes

A summary of geochemical results from rotary and percussion holes is presented on plans SAa 2190, 2191 and 2189. Anomalous zinc, barium and manganese are apparent at Pine Row Prospect (Area C6).

Check assays are being carried out.

7. GEOPHYSICS

During the quarter, ground magnetic traverses were completed across the C-1 (Warramboo), C-2 (Nosredna), C-3 (Brewers), C-4 (Meaney's) and C-6 (Pine Row) prospects. In addition, electrical depth soundings and a dipole-dipole I.P. survey were completed at Warramboo Prospect by Solo Geophysics and Co.

7.1 Presentation of Results

7.1.1 Warramboo Prospect (Area C-1)

Two ground magnetic traverses located the main iron-rich horizons and an along-strike discontinuity of the airborne magnetic anomaly (plan SAa 2174).

On line 7000E, Schlumberger depth soundings were completed both on and off the magnetic horizons to test the resistivity contrast of bedrock/oxidized zone and the thickness of the latter. Plots of the resistivity/depth profiles appear in plans SAa 2175 and SAa 2176. In both cases, the curves show a departure from the idealised horizontal layer case. However, modelling indicates the presence of a conductive oxidized layer approximately 50 metres thick overlying a more resistive bedrock.

On the basis of the above results, line 7000E was traversed by 100 metre spread I.P. (plan SAa 2177). The results show poorly defined bedrock highs at 5400N and 6400N. The associated changeabilities are not reliable due to poor electrode contacts and a low signal to noise ratio of the received voltage decay curves.

Line 7000E and line 10000E were also traversed with 150 metre spread I.P. in an attempt to improve oxidised zone penetration (plans SAa 2178 and SAa 2179). Problems similar to the above persisted and little reliable information can be derived from the data.

7.1.2 Nosredna Prospect (Area C-2)

Two N-E bearing ground magnetic traverses were completed across the magnetic/gravity feature of this prospect (plan SAa 2180). The abrupt termination of the magnetic anomaly between lines 4000E and 5000E, coupled with the continuity of the associated gravity anomaly across both lines, indicates a possible facies change of the (probable) iron formation. Modelling of the data will allow a scout drilling programme to be designed.

7.1.3 Brewer's Prospect (Area C-3)

Two ground magnetic traverses have located the magnetic horizons of this possible synclinal iron formation (plan SAa 2181). It is planned to test the stratigraphy with a scout drilling programme following modelling of the magnetic data.

7.1.4 Meaney's Prospect (Area C-4)

A detailed 50m x 25m ground magnetics survey was completed around North Broken Hill's drill holes DDH C-1 to DDH C-4 (plan SAa 2182). This data is expected to yield more precise information on the extent and attitude of the scheelite-bearing granulites intersected in these holes.

7.1.5 Pine Row (Area C-6)

A single ground magnetic traverse has been completed to define the magnetic horizons of this prospect (plan SAa 2183).

JP Howard.

J.P. HOWARD
& G.L. MACKEE

JPH/GLM/dp

LOCATION

Kimba SI 53-7

KEYWORDS

Assays-drill, barium, copper, lead, manganese, tungsten, zinc, ironstone, B.I.F. hosted deposits, geophys-mag, geophys-I.P., geophys-Schlumberger.

LIST OF PLANS

Plan No.	Title	Scale
SAa 2204	Cootra E.L. 980 - Location plan	1:250 000
SAa 2067	Drill hole location and ground magnetic trends (plan)	1: 25 000
SAa 2066	Interpreted geology (plan)	1: 25 000
SAa 2069	Geological cross-sections A & B	1: 500/1:100(
SAa 2070	Geological cross-sections C	1: 500/1:100(
SAa 2071	Geological cross-sections D'	1: 500/1:100(
SAa 2072	Geological cross-sections D	1: 500/1:100(
SAa 2073	Geological cross-sections E	1: 500/1:100(
SAa 2079	Summary of geological and geochemical cross-sections F, G, H, I, J, K	1: 2 000
SAa 2189	Geochemistry, maximum drill hole assays - zinc	1: 25 000
SAa 2191	Geochemistry, maximum drill hole assays - barium	1: 25 000
SAa 2190	Geochemistry, maximum drill hole assays - manganese	1: 25 000
SAa 2028	(18/5/83) Cootra E.L. 980 aeromagnetic interpretation and proposed survey areas	1: 50 000
SAa 2174	Cootra E.L. 980 Warramboo Prospect T.M.I. profiles	1: 13 333
SAa 2175	Cootra E.L. 980 Warramboo Prospect Schlumberger sounding 5400N/7000E	
SAa 2176	Cootra E.L. 980 Warramboo Prospect Schlumberger sounding 6200N/7000E	
SAa 2177	Cootra E.L. 980 Warramboo Prospect 100m I.P. - Line 7000E	1: 5 000
SAa 2178	Cootra E.L. 980 Warramboo Prospect 150m I.P. - Line 7000E	1: 7 500
SAa 2179	Cootra E.L. 980 Warramboo Prospect 150m I.P. - Line 10000E	1: 7 500
SAa 2180	Cootra E.L. 980 Nosredna Prospect T.M.I. profiles	1: 10 000
SAa 2181	Cootra E.L. 980 Brewers Prospect T.M.I. profiles	1: 20 000

Plan No.	Title	Scale
SAa 2182	Cootra E.L. 980 Meaney's Prospect T.M.I. contours	1: 2 500
SAa 2183	Cootra E.L. 980 Pine Row Prospect T.M.I. profile - Line 5000E	1: 6 667

LIST OF APPENDICES

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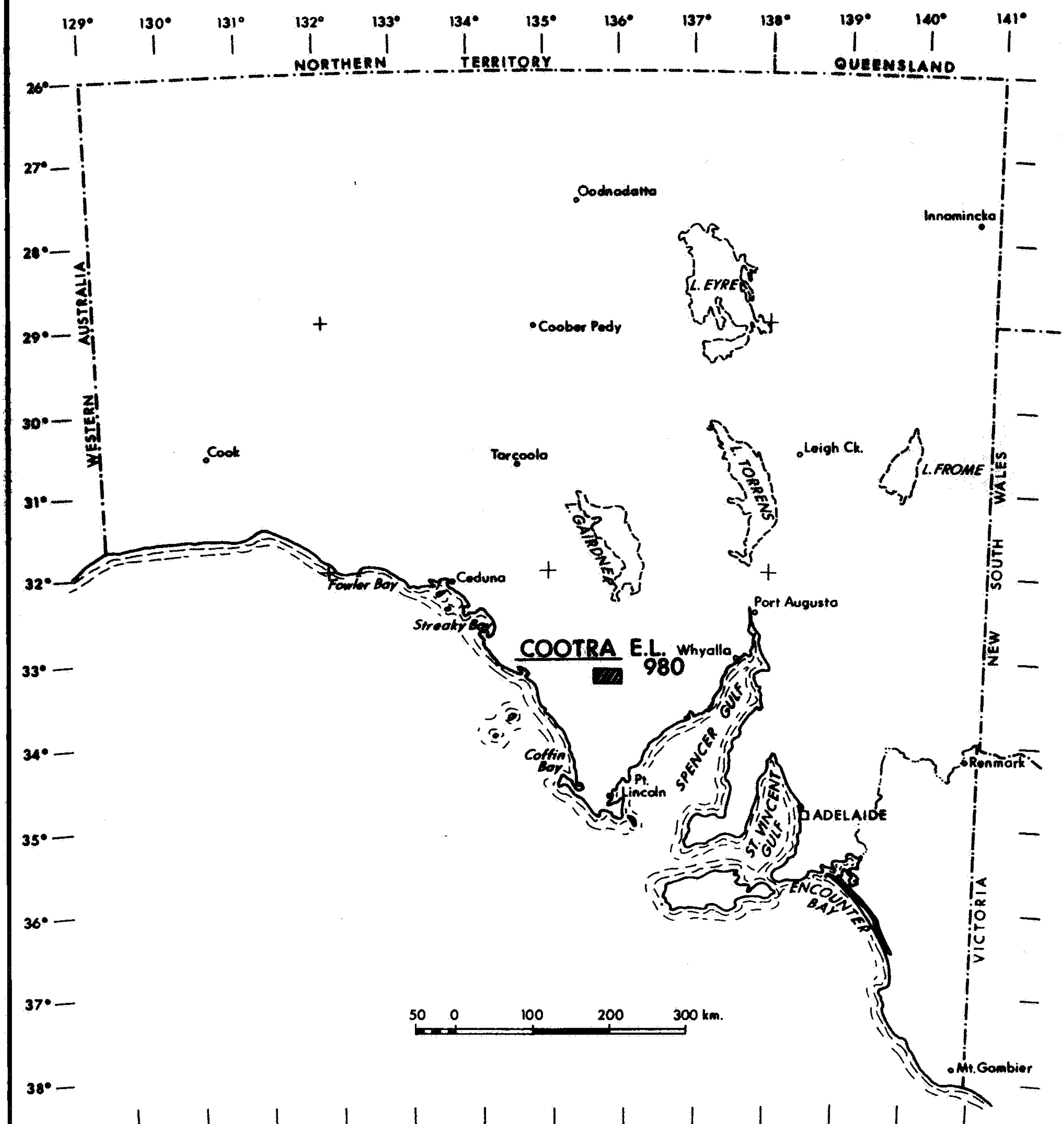

CRA EXPLORATION PTY LIMITED			
COOTRA E.L.980 — STH. AUST. LOCATION PLAN			
REF.	KIMBA SI 53-7		
SCALE	1 : 8000000		
AUTHOR	J. P.H.	REPORT	11657
DATE	May 1983	PLAN No	SAa 2204

APPENDIX I

Petrological Description

The Australian Mineral Development Laboratories
Flemington Street, Frewville, South Australia 5063
Phone Adelaide 79 1662
Telex AA 82520
Please address all correspondence to
P.O. Box 114 Eastwood SA 5063
In reply quote:

0300

amdel

10 June 1982

GS 3/1/6/0

RECEIVED 19 MAY 1983

CRA Exploration Pty. Limited,
6 New West Road,
PORT LINCOLN, SA 5606.

Attention: Mr I.D. Finch

REPORT GS 5689/82

YOUR REFERENCE:	D.P.O. No. B0802 dated 19 April 1982 A/C No. 2726/4403
MATERIAL:	Drill core
IDENTIFICATION:	946755-~~946800~~ 946772
DATE RECEIVED:	23 April 1982
WORK REQUIRED:	Petrographic description

Investigation and Report by: Mark Fanning (EPIC)

Chief - Geological Services Section: Dr Keith J. Henley
Manager, Mineral and Materials Sciences Division: Dr William G. Spencer

Alan Welch

Acting Chief
Geological Services Section
for Norton Jackson
Managing Director

c.c. CRA Exploration Pty. Limited,
PO Box 254,
NORWOOD, SA 5067.

jd/18

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Queensland 4814
Telephone (077) 75 1377

PETROGRAPHIC DESCRIPTION OF NINE SAMPLES

1. INTRODUCTION

Nine samples of drill core were received from CRA Exploration Pty. Limited with a request for routine petrographic description. There was also a request to indicate (1) where an original (pre-metamorphic) sedimentary depositional environment was suspected, (2) the grade of metamorphism and (3) comments on the opaques where present.

2. PROCEDURES

Standard thin sections of the nine samples were prepared and examined using a polarising microscope. Visual estimates of the volume percentages of minerals present were made and these, at best, can only be taken as approximations.

Three samples (946772, 946779 and 946794) contain significant amounts of opaque minerals. Upon consultation with Dr D.R. Kennedy polished thin sections were prepared for each of these samples and subsequently examined under reflected light.

The petrographic descriptions are contained in Section 4 of this report.

3. RESULTS

(a) Samples 946755 and 946759 both contain cordierite and therefore may be considered to have had sedimentary precursors. Samples 946772 and 946784 contain relatively high proportions of garnet, and garnet and biotite respectively. These also may have been derived from the metamorphism of a pelitic sediment. Sample 946779 may have originally contained cordierite. Its present texture suggest metamorphism of a granitoid, but it may have incorporated a sedimentary component during its pre-metamorphic history. The pre-metamorphic nature of samples 946789 and 946794 are uncertain, but the high plagioclase content may relate to a volcanogenic source.

(b) With the exception of sample 946759, all samples are gneissic with granoblastic textures. This texture, taken together with the presence of garnet, cordierite, and red-brown biotite suggests that the pro-grade metamorphic conditions reached the low pressure granulite facies (certainly in the range upper amphibolite to intermediate pressure granulite facies).

(c) Samples 946779 and 946794 both contain significant proportion of magnetite and hematite, with the hematite most likely derived from the magnetite. By analogy the opaques present in the other samples, except 946772 and 946765, are most likely very similar.

Sample 946772 has significant amounts of both oxides (magnetite and hematite) and sulphides (chalcopyrite, pyrite and covellite). The primary chalcopyrite, magnetite and ?pyrite assemblage appears to have been through two alteration/enrichment phases; firstly resulting in pyrite and hematite, and secondly, supergene covellite.

0302

4. PETROGRAPHY

Sample: 946755; TSC36221 WD1 163-164' (50m)

Rock Name:
Cordierite, quartz, plagioclase gneiss

Hand Specimen:
This is a coarse-grained foliated quartzo-feldspathic rock which contains biotite concentrated in lenticular aggregates parallel to and enhancing the foliation. There are several dark greenish black patches which appear to be aggregates of ?cordierite and translucent quartz. In hand specimen the rock is a quartzo-feldspathic gneiss.

Thin Section:
A visual estimate of the constituents present in thin section gives the following:

	%
Plagioclase	36
Quartz	32
Cordierite	20
Biotite	7
Opaques	2
Zircon	1
Dumortierite	trace
Secondary sericite/muscovite	2
Traces of chlorite and ?pinite	

This rock has a distinctive granoblastic texture. It is coarse-grained, grains ranging up to 6 mm in diameter, but typically of the order of 1 to 3 mm. Grain boundaries are commonly interlobate, straight to gently curved contacts are also present.

The prominent constituents of the rock are plagioclase, quartz and cordierite. Plagioclase commonly occurs as multiply twinned equant to elongate grains, oligoclase to andesine in composition. Untwinned plagioclase is also present as are included blebs of quartz and some antiperthite. Plagioclase grain boundaries tend to be more regularly curved to straight, rather than the interlobate quartz and cordierite grain margins.

Quartz shows undulose to strongly undulose extinction. It occurs as primary pro-grade coarse grains 1 to 2 mm in diameter and as secondary interstitial to marginal fine grains and mosaics, derived from the recrystallisation of larger grains. Some of the coarser grains show considerable sub-grain developments with sutured to amoeboid grain boundaries and strongly undulose extinction.

The cordierite shows a wide range of grain sizes; from 0.6 mm or less, to 5 to 6 mm. Rare twinning and pleochroic haloes around zircon, coupled with its biaxial negative character typify the cordierite. Dispersed partial symplectitic intergrowths with quartz are a feature of the larger cordierite grains. Invariably the grain margins are marked by sericitic alteration and (?pinite) which also penetrates through grains as alteration veins.

Biotite has a characteristic reddish-brown pelocrhoism. It usually occurs in aggregates, with somewhat random orientation of the flakes. In such aggregates zircon inclusions and discrete grains are common. Also noteworthy are the elongate needle-like opaque grains forming slivers parallel with the biotite cleavage. Elsewhere the opaques are ragged and irregular, tending to be interstitial.

A distinctive but very minor constituent of this rock is dumortierite(?). It has colourless to vivid violet or bluish-violet pleochroism and usually occurs as rectangular sections.

Other minor primary constituents include zircon, often zoned, and rare garnet.

Common secondary minerals are sericite and muscovite, ?pinite and rare chlorite.

The rock is a high-grade gneiss with a relatively high proportion of cordierite which implies a sedimentary pre-metamorphic origin. The presence of ?dumortierite may indicate some hydrothermal activity.

0304

Sample: 946759; TSC36222 WD1 199-200' (61m)

Rock Name:

Layered quartzo-feldspathic gneiss (±cordierite, ±garnet)

Hand Specimen:

The 12 cm length of core that comprises this sample consists of three interlayered lithologies all of which have a gneissic fabric: (a) quartzo-feldspathic garnet cordierite biotite grains, (b) a more massive granitic gneiss (essentially quartz and feldspar with minor biotite) and (c) a more mafic biotite-rich, cordierite ?plagioclase gneiss. Each of these lithologies have variable thickness but are of the order of a few centimetres. The section is cut through lithologies (b) and (c).

Thin Section:

A visual estimate of the constituents present gives the following:

	%	
Plagioclase	35	
Quartz	34	
Perthite	20	
Cordierite	5	(including pinite)
Biotite	2	
Opaques	1	
Zircon	trace	
Monazite	rare	
Secondary:		
Sericite	2	
Chlorite	1	

This rock has an inequigranular granoblastic texture with grain sizes ranging up to 1.5 cm for perthitic orthoclase, but typically in the range 1 to 3 mm for quartz and plagioclase. Grain boundaries are interlobate to cuspate. The rock is principally granitic in composition, but has a 0.5 to 1 cm thick band, paralleling the foliation, and consisting of cordierite, biotite and opaques in addition to quartz and feldspar.

Finely perthitic orthoclase occurs as several very coarse grains; rare, smaller grains of orthoclase are also present. Plagioclase is commonly multiply twinned equant to elongate grains with an oligoclase-andesine composition. Myrmekitic intergrowths with quartz are present and the plagioclase has been variably sericitised, usually the more calcic cores of larger grains.

Quartz grains generally have irregular outlines. They show undulose to strongly undulose extinction and sub-grain developments, are common. The quartz occurs as included blebs in feldspars or tends to occupy irregular gaps between feldspars.

The cordierite appears to be concentrated in one prominent band through the thin section. Some grains show polysynthetic twinning and pleochroic haloes around zircon inclusions. A major portion of the cordierite has been altered to sericite and pinite.

Reddish-brown biotite occurs in aggregates within the cordierite-rich band, although disseminated single grains are to be found throughout the section. The biotite shows variable chloritisation.

The opaques, similarly are most concentrated with the biotite and cordierite zone. They are typically late, to secondary phases interstitial to the quartz and feldspars, or are found as inclusions or intergrwoths within biotite, invariably paralleling the cleavage traces.

Zircons are present in accessory amounts and often show concentric zonations. Monazite is rare.

Secondary minerals include sericite, chlorite and pinite.

The rock is a high-grade gneiss. The presence of cordierite and garnet suggest a sedimentary pre-metamorphic origin.

Sample: 946765; TSC36223 WDD2 578' (176 m)

Rock Name:
Quartz monzonite

Hand Specimen:
This is a coarse-grained mafic rock with distinctive randomly orientated acicular amphiboles set in a ?feldspathic matrix. The rock appears to be igneous in origin and there is no preferred orientation of the minerals.

Thin Section:
A visual estimate of the constituents present gives the following:

	%
K-feldspar	25
Plagioclase	20
Hornblende	20
Biotite	10
Quartz	8
Epidote	5
Apatite	3
Opaques	3
Sphene	trace
Secondary:	
Sericite	4
Chlorite	2
Calcite	0.5

The dominant feature of this rock is the randomly orientated, medium to coarse-grained, acicular hornblende and elongate biotite flakes set in a mostly microcline and microcline perthite, medium-grained matrix. The grain size is moderately uniform and averages 0.5 to 1.0 mm.

The hornblende is pale greenish-blue in colour. It commonly forms aggregates some with interpenetrating crystals. Green brown biotite, opaques and epidote are usually associated with these hornblende aggregates. Biotite also occurs as randomly orientated discrete flakes.

Opaque grains are found as inclusions or intergrowths with the biotite and hornblende, or occur as discrete irregularly-shaped grains. Chloritisation of the biotite, and to a lesser extent the hornblende, is common. The epidote occurs as more equant, irregularly-shaped grains and appears to be a primary to early secondary constituent of the rock.

The marginally finer-grained feldspathic matrix is mostly composed of microcline, microcline perthite and plagioclase. There is variable sericitisation of the feldspars. Grain boundaries and grain shape are irregular and there may have been some secondary recrystallisation of these feldspars and also quartz. The quartz is a minor constituent and typically shows undulose extinction. It has interlobate to serrated grain margins and tends to merge with adjacent feldspars.

There are abundant very elongate, prismatic, colourless inclusions within the felsic minerals, some of which are 1 mm in length. These are most probably apatite. Isolated grains of epidote, with variable grain sizes, are also common inclusions within the felsic minerals.

Euhedral prismatic sphene is present in accessory amounts.

Secondary calcite can be seen to occur in vacancies left by degrading feldspars. Sericite and chlorite are the dominant secondary minerals.

The mineralogy of the rock suggests that it is a quartz monzonite and its texture has been little modified from the primary igneous crystallisation.

0306

Sample: 946772; TSC36224; PTSC36524 WD3 ~~293~~-294 (89m)

Rock Name:
Pyrite, hematite and magnetite-bearing garnet quartz gneiss

Hand Specimen:
This rock has an indistinct gneissic texture, and tends to be massive with prominent garnet and sulphides. The sulphides are concentrated in one zone of the rock, which parallels the foliation, and mostly consist of pyrite. Another zone in the rock is magnetite rich.

Thin Section:
A visual estimate of the constituents present gives the following:

	%
Quartz	40
Garnet	25
Magnetite and hematite	12
Pyrite	8
Chloritised biotite	5
Apatite	1
Chalcopyrite	1
Secondary:	
Chlorite	5
Muscovite and sericite	3
Covellite	trace

Very encouraging for significant base metal deposit

This rock has an equigranular granoblastic texture and is dominantly composed of quartz, garnet and opaques. The average grain size is approximately 0.8 mm in diameter, most grains are less than 1 mm except some garnets which may be 2 to 4 mm and some opaques which are up to 4.5 mm in length.

The quartz typically shows undulose to strongly undulose extinction and considerable sub-grain developments. A number of grains appear round in outline and have suffered partial or complete internal recrystallisation whilst retaining the round peripheral shape. Some areas consist of quartz mosaics with interlobate to amoeboid grain margins.

The garnets have equidimensional anhedral to round grain shapes. They are typically very strongly cracked and the larger garnets have inclusions of quartz. Some garnet aggregates partially, or completely, enclose quartz and opaque grains. There are rare thin garnet rims to some opaques (?iron oxides). The garnet has a characteristic pale pink coloration in thin section which suggests that almandine is the dominant garnet end member present.

The opaques occupy approximately 20% of the rock, consisting of roughly equal proportions of oxides and sulphides with the oxides perhaps being slightly more dominant. The primary sulphide phase appears to be chalcopyrite which is found as small discrete anhedral grains, 0.1to 0.5 mm in diameter. The smaller chalcopyrite is sometimes found inbedded in the coarse more massive pyrite which ranges up to 1.5 mm or more in diameter. Some of the pyrite has idiomorphic outlines and this suggests a post-metamorphic origin. A late-stage sulphide phase is covellite, which is typically very fine-grained and encircling chalcopyrite.

The primary oxide mineral is magnetite which occurs as massive aggregates up to 2 mm in diameter. Most grains are cracked. Some have been disrupted by the metamorphism and can be seen intergrown with and replacing the outer portions of magnetite grains. In places the magnetite shows octahedral cleavage and martitisation.

A reddish-brown biotite is the pro-grade mica. It typically is associated with the garnet aggregates. Chloritisation of the bitoite can be seen in varying stages of completeness. Muscovite also replaces biotite via a chloritic stage.

Apatite is a relatively common accessory mineral. Zircon is also present.

The prominent secondary minerals are sericite, muscovite and chlorite. These occur in complex aggregates and veins, infilling the cracks within the garnets. They also appear to have preferentially completely replaced a primary metamorphic mineral that was associated with the garnet and opaque aggregates. This mineral may have been cordierite.

The rock is a high-grade gneiss with a high proportion of ore minerals. The dominantly garnet quartz composition suggests derivation from a siliceous sediment with significant amounts of Al and Fe.

rrawboo

Pontifex & Associates Pty. Ltd.

0310

TEL. 332 6744
A.H. 31 3816

26 KENSINGTON ROAD, ROSE PARK
SOUTH AUSTRALIA

P.O. BOX 91, NORWOOD
SOUTH AUSTRALIA 5067

MINERALOGICAL REPORT NO. 3981

by A.C. Purvis PhD

18th March, 1983

TO:	Mr. J. Howard, CRA Exploration Pty. Ltd., 6 New West Road, PORT LINCOLN, S.A. 5606
COPY TO:	The Administrator, CRA Exploration Pty. Ltd., P.O. Box 254, NORWOOD, S.A. 5067
YOUR REFERENCE:	Order No. B0775
MATERIAL:	Drill core samples
IDENTIFICATION:	888751 to 756
WORK REQUESTED:	Thin section preparation and description
SAMPLES & SECTIONS:	Returned to your Port Lincoln address with this report

RECEIVED
19 MAY 1983

PONTIFEX & ASSOCIATES PTY. LTD.

COMMENTS

Most of the samples in this batch are pelitic to quartzo-felspathic high-grade gneisses, in which the assemblages sillimanite-microcline, or garnet-cordierite-microcline are present.

Sample 888752 is an exception, in that it is of purely igneous origin, with euhedral plagioclase crystals and acicular apatite needles. It is considered to be a melanocratic diorite, with some lamprophyric characters indicated by the abundance and euhedral nature of the ferromagnesian minerals (biotite and hornblende). Sample 888755 may be a reconstituted granodiorite.

The pelitic gneisses are commonly layered, with microcline-free, cordierite-rich layers, and cordierite-free, microcline-rich layers, probably reflecting former chlorite-pyrophyllite-rich and chlorite-sericite-rich layers, but also in part controlled by the high-grade mineralogy. Garnet in both layer types represents the iron-rich component of the chlorite.

An unusual feature of sample 888751 is the presence of corundum, separated from quartz by a rim of cordierite only 0.1 mm wide. This suggests that there was very little water in the rock, during the final stages of metamorphism. The low water content would also have prevented partial melting in the microcline-rich layers.

Opaque oxides in the pelitic gneisses include primary granular to bladed hematite, notably in sample 888754, and poikiloblastic magnetite.

**

PDH. WD2 at 267'

888751 : layered biotite-garnet-cordierite-quartz-plagioclase-microcline gneiss with minor magnetite and trace corundum, ilmenite and minute zircon crystals

This is a laminated gneiss with lenses of elongate cordierite grains alternating with microcline-rich gneiss, locally with elongate microcline grains. Garnet (10%) occurs throughout more or less along the layering, and minor to abundant quartz occurs in the microcline layers. Minor antiperthitic-plagioclase also occurs in the microcline layers. Strongly oriented biotite flakes (10%) are common in the microcline layers but absent from the cordierite layers.

Part of the thin section shows a protomylonitic texture with laminae of fine grained recrystallised minerals, notably quartz and magnetite. This area is considerably poorer in microcline and richer in antiperthitic plagioclase than the rest of the rock.

Minor fibrolitic sillimanite (5 - 7%) occurs as inclusions in the cordierite together with opaque oxides. It appears that both ilmenite and magnetite are present, with textures ranging from platy and fine grained to poikiloblasts up to 5 mm long.

In some cordierite lenses the opaque oxides are intergrown with corundum, which may be within 0.1 mm of the nearest quartz grain, indicating a nearly anhydrous composition during metamorphism, and a very limited range of diffusion. A possible reaction is :
biotite + corundum + quartz = cordierite + microcline + water.
Some of the other opaque oxide lenses are rimmed by garnet.

The rock is cut by late-stage retrograde lenticular veins of muscovite and sericite.

DDH WD2 574'

888752 : melanocratic biotite-hornblende diorite with lamprophyric affinities

This rock is characterised by a lack of metamorphic foliation and by the presence of euhedral plagioclase laths and of acicular apatite, both of which indicate an igneous origin for the rock. Mafic minerals (hornblende, biotite) constitute about 40% of the rock and occur as unoriented laths and flakes about 2 mm long.

The plagioclase is also unoriented and is mantled by microcline, with small patches of interstitial microcline also developed. Accessory minerals include sphene and epidote as well as the apatite mentioned above. Opaque grains occur within the epidote and sphene.

DDH WD2 708'6"

888753 : layered (pelitic) gneiss of garnet-sillimanite-biotite-quartz-microcline composition, with minor scattered magnetite grains

This is essentially a finely laminated microcline-rich gneiss with minor biotite, garnet and sillimanite. It contains a lens or layer-parallel vein of quartz with minor plagioclase and sillimanite, and accessory apatite.

The schistosity is defined by lenses of fibrolitic to fine prismatic sillimanite, about 0.2 - 2 mm wide, and with a layer-parallel orientation. The biotite occurs as disseminated well-oriented flakes and in some of the sillimanite lenses, as unoriented poikiloblasts. The microcline is granular and fine to medium grained (0.2 - 1 mm grain size).

Garnet is scattered abundantly (20 - 25%) as euhedral crystals 0.1 - 0.5 mm in size. It is notably concentrated on the margins of the quartz-rich layer or vein, which may have had initially a chloritic alteration selvedge. Biotite poikiloblasts in the garnet-rich layers are partly retrogressed to chlorite.

Minor quartz is present in the microcline-rich areas, and both granular and poikiloblastic opaque oxide grains (5 - 7%) are present. The poikiloblastic grains are magnetite and measure up to 4 mm in diameter, most commonly enclosing garnet.

Plagioclase in the quartz layer is veined by alkali felspar.

DDH WD4 185'

888755 : garnet-biotite (granodioritic) gneiss

This is a foliated quartzofelspathic gneiss, with the broad composition of a biotite granodiorite, with 10% biotite, 25% quartz, 15% microcline, 45 - 50% plagioclase and 3% garnet.

The biotite is pale-brown to greenish and occurs in thin lamellae 0.2 - 2 mm wide. It has a good layer-parallel orientation.

The quartz and felspar are granular with a grain size of 1 - 6 mm. The plagioclase is weakly antiperthitic and weakly sericitised. Abundant myrmekite is adjacent to the microcline.

The garnet occurs as highly poikiloblastic grains to 7 mm diameter; it is fractured and veined by greenish biotite.

Inclusions of zircon are common in the biotite.

DH. WR1 146'

888756 : interlayered, quartz-garnet-sillimanite-cordierite, and quartz-biotite-garnet-microcline gneisses, of pelitic composition; minor fine grains of hematite and/or ilmenite scattered along the gneissosity

This rock has layers about 6 to 10 mm thick, either rich in cordierite with little or no microcline or biotite; or rich in microcline with little or no cordierite or sillimanite.

The cordierite has a relatively uniform orientation throughout, ranging from broadly polygonised large elongate porphyroblasts to 20 mm long, to smaller grains about 1 mm long but with relatively low-angle grain boundaries, and probably formed by rotation of sub-grains. Inclusions in the cordierite consists of opaque oxides (? ilmenite), garnet and fibrolitic sillimanite. Quartz is moderately abundant in the cordierite layer but there is no microcline.

The microcline-rich layers are more granular in texture, with abundant quartz and microcline, and strongly oriented biotite flakes. Minor garnet is scattered throughout and there are some totally sericitised ?cordierite grains to 4 x 0.5 mm, with inclusions of sillimanite. Accessory opaque oxide grains (ilmenite or hematite) are scattered along the layering/schistosity as in the cordierite-rich layer.

The original rock may have had alternating chlorite and sericite-rich layers, now represented by cordierite + garnet, and microcline + biotite + garnet, respectively.

APPENDIX II

Letter from Goldfields Diamond Drilling Co.

+ L

Goldfields

Diamond Drilling Co. Pty. Ltd.

WHOLLY AUSTRALIAN OWNED

Reg. Office: 142 Chesterville Road, Moorabbin, 3189, Australia
Telephone: 555 3311

Manufacturers and suppliers of all types of drilling equipment.

0318

P.O. BOX 68,
Moorabbin, Victoria, 3189, Australia.
Telegrams: "Drilling" Melbourne.

23rd November, 1982.

Strength Mining & Exploration Supplies Pty. Ltd.,
44 Halifax Street,
ADELAIDE 5000

Dear Neil,

re: Goldfields Core Grinder

Following your telephone call expressing concern over possible contamination of core samples by elements of the matrix used in Core Grinder wheels, we submit the following for your consideration: Whilst we cannot for obvious reasons disclose the precise analysis of the matrix, we can indicate general content, however, we would first like to comment on the operational conditions and erosion potential of the wheel. By design the wheel periphery is shaped with a tapered lead-in section merging into a straight finishing section; the whole of these areas being covered with protruding industrial diamond arranged in a sequential pattern to ensure total even coverage of the working surface when the wheel rotates. There is very little possibility of the rock sample coming into direct contact with the matrix during grinding, since it is the diamond "teeth" which actually grind, indeed if the rock were to reach the matrix, erosion would occur over a period and the diamond retention would be weakened.

In practice we find that worn out wheels have virtually no erosion and are discarded because the diamond has worn to a shape where it no longer efficiently grinds the sample, but merely rubs without abrading, not because of matrix loss.

A further consideration is that the wheel matrix composition is very close to that of a diamond corebit matrix, as is the diamond setting method, so there is a similar potential for contamination from that source in any diamond drilled sample.

The matrix is composed of granulated tungsten carbide and iron powder, bonded with a 60/40 brass binding infiltrant, the infiltrant having approximately 10% nickel added. One brand of infiltrant we occasionally use is purported to contain a very small quantity of silver, less than 1%, but we have not used this brand for over a year. Sintering occurs at arount 740°C after which the finished product will have developed a hardness in the range 40-45 Rockwell C.

In summary, we believe that since diamond is the predominant cutting medium, very little contamination is likely.

We trust the foregoing answers your problem, but please do not hesitate to contact me if I can be of any further assistance.

Yours truly,
GOLDFIELDS DIAMOND DRILLING CO. PTY. LTD.

....
Bob R.F. Adams
SALES MANAGER

WP1	Warramboo Percussion Hole 1		Drill Hole Cross-Section A
WR3	Warramboo Rotary Hole 3		Magnetic High Trend
WD4	Warramboo Diamond Hole 4		Road
•	S.A.D.M.E. Drill Hole Collar	^{5}52000 mE	Australian Map Grid Reference
		50000'E	Local S.A.D.M.E. Imperial Grid

0 1 2 3 4 Km

0 2000 4000 6000 8000 10000 ft.

CRA EXPLORATION PTY LIMITED

COOTRA E.L. 980

DRILL HOLE LOCATION AND GROUND MAGNETIC TRENDS

Ref.: KIMBA SI 53-7	Date: Feb. 1983
Author: J.P.H.	Report No. 11657
Scale: 1:25000	Plan No. SAa 2067

4230 (III)-3

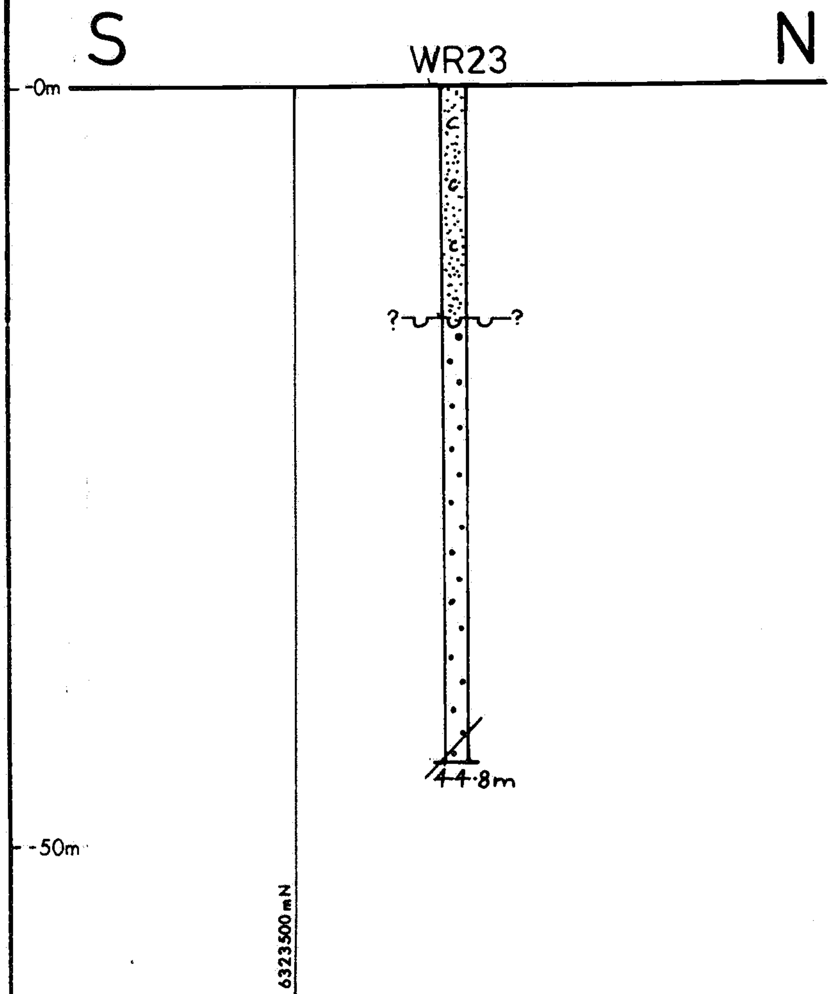
CRA EXPLORATION PTY LIMITED

COOTRA E.L.980

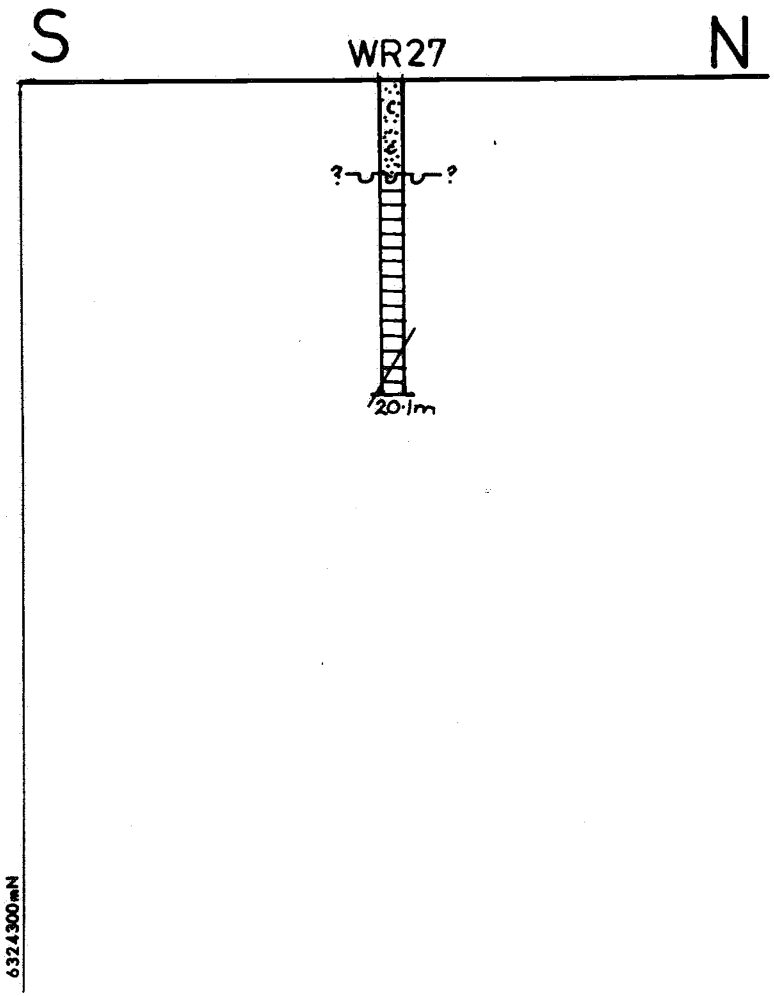
INTERPRETED GEOLOGY

4230 (III)-4

Ref KIMBA SI 53-7	Date
Author J P H	Report No 11657
Scale 1 25 000	Plan No SAa 2066



Cross-section
555000 mE (AMG)



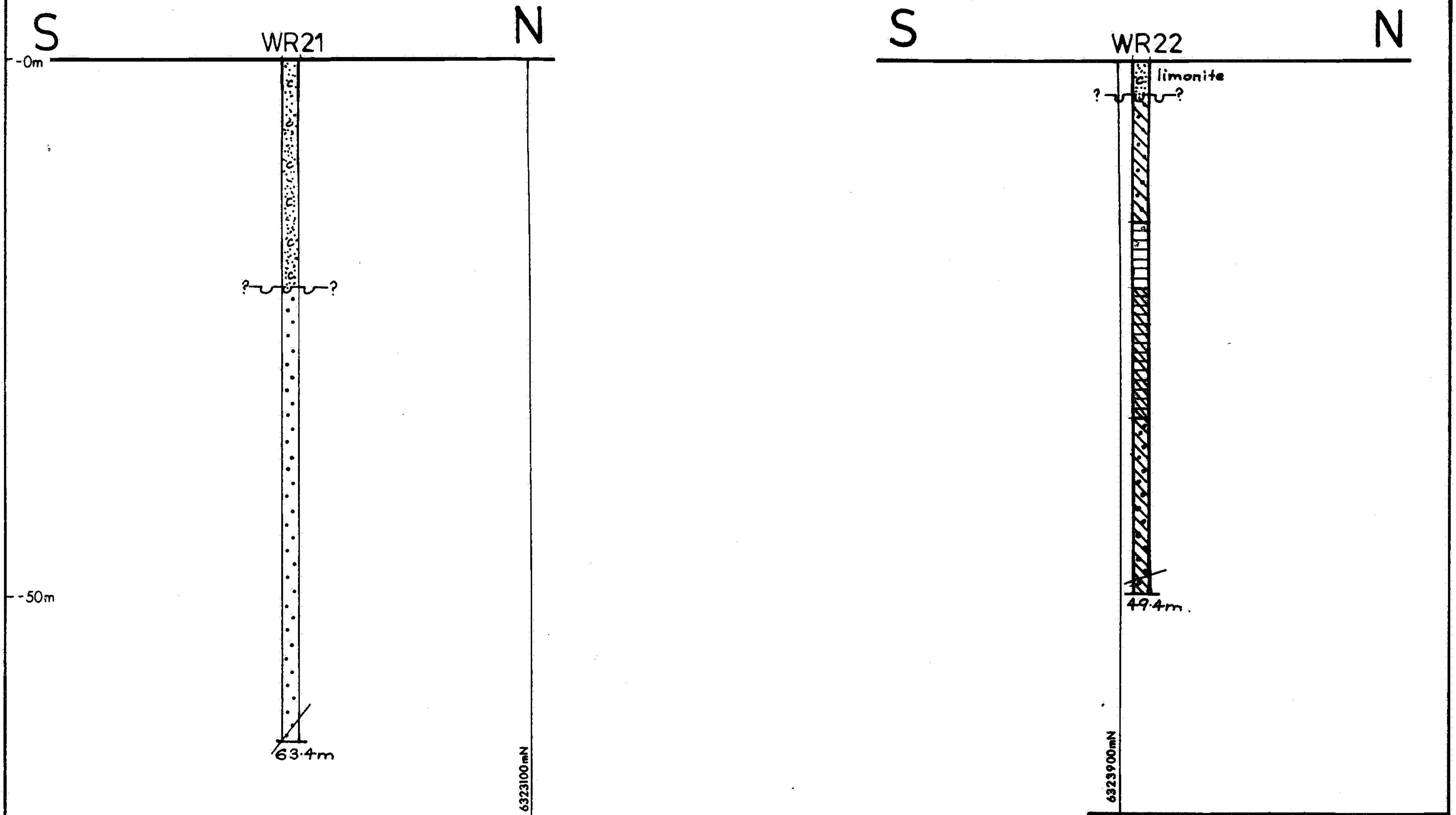
Refer to plan SAa 2079
for legend.

V = 1:500
H = 1:1000

CRA EXPLORATION PTY. LTD.

COOTRA E.L.980
GEOLOGICAL
CROSS-SECTIONS A & B
554138mE & 555000mE (AMG)
Ref.: Kimba SI53-7

Author : J.P.H.	Report N°: 11657
Date : Feb. 1983	Plan N°: SAa 2069



Refer to plan SAa 2079 for legend

V = 1:500
H = 1:1000

CRA EXPLORATION PTY. LTD.

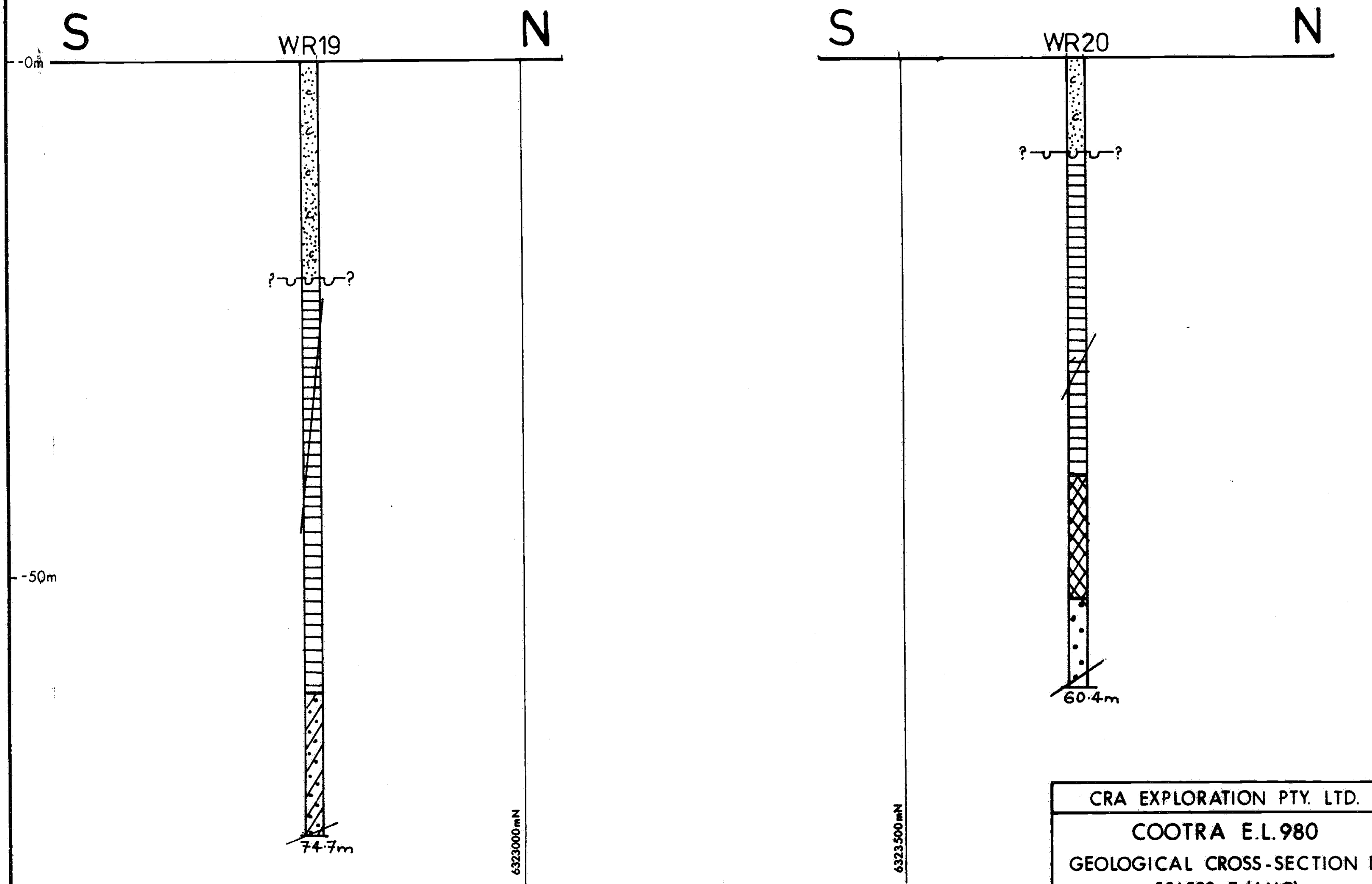
COOTRA E.L. 980

GEOLOGICAL CROSS-SECTION C

555900mE (AMG)

Ref.: Kimba SI53-7

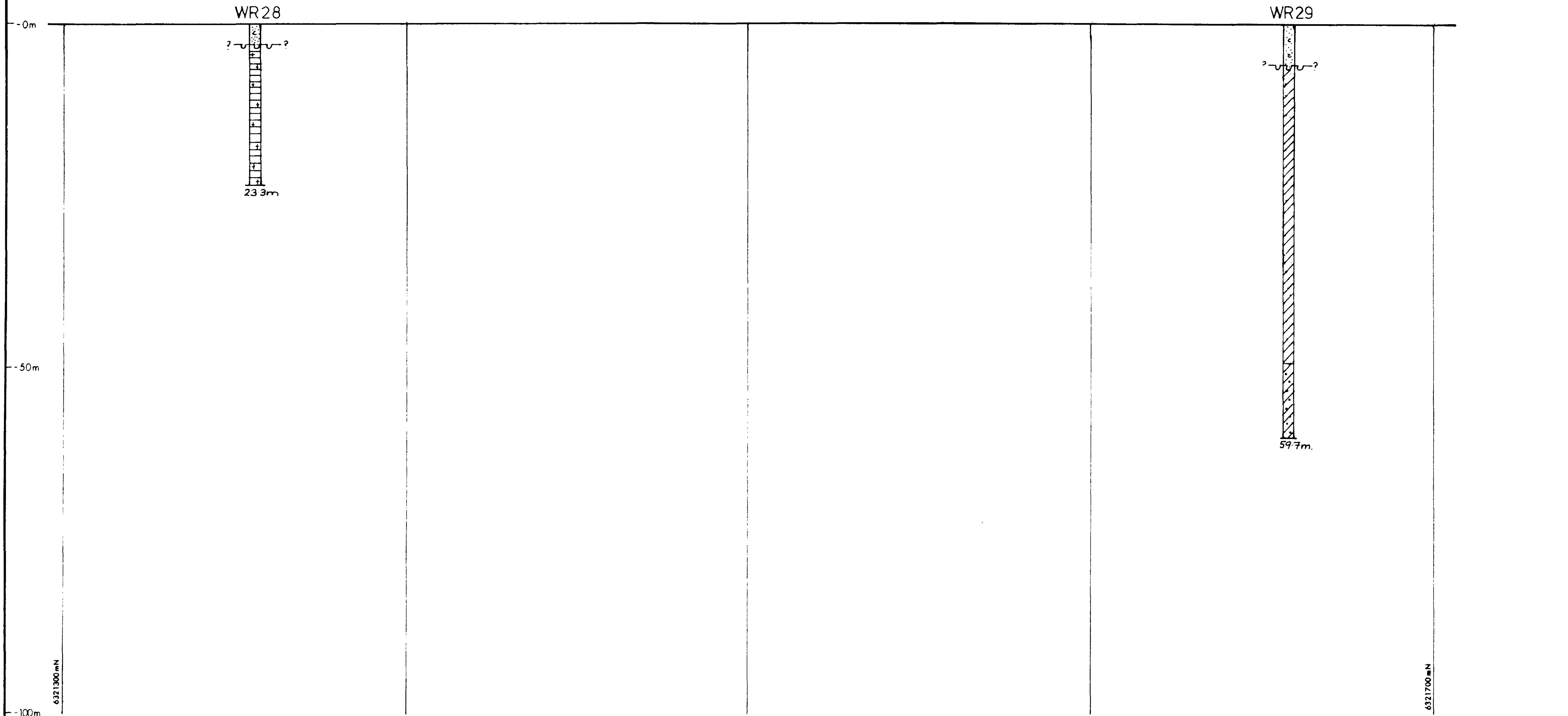
Author : J.P.H.	Report N°: 11657
Date : Feb. 1983	Plan N°: SAa 2070



Refer to plan SAa 2079
for legend

V = 1:500
H = 1:1000

CRA EXPLORATION PTY. LTD.	
COOTRA E.L. 980 GEOLOGICAL CROSS-SECTION D′ 556500mE (AMG) Ref.: Kimba SI53-7	
Author : J.P.H.	Report N°: 11657
Date : Feb. 1983	Plan N°: SAa 2071



Refer to plan SAa 2079 for legend

4230(III)-5

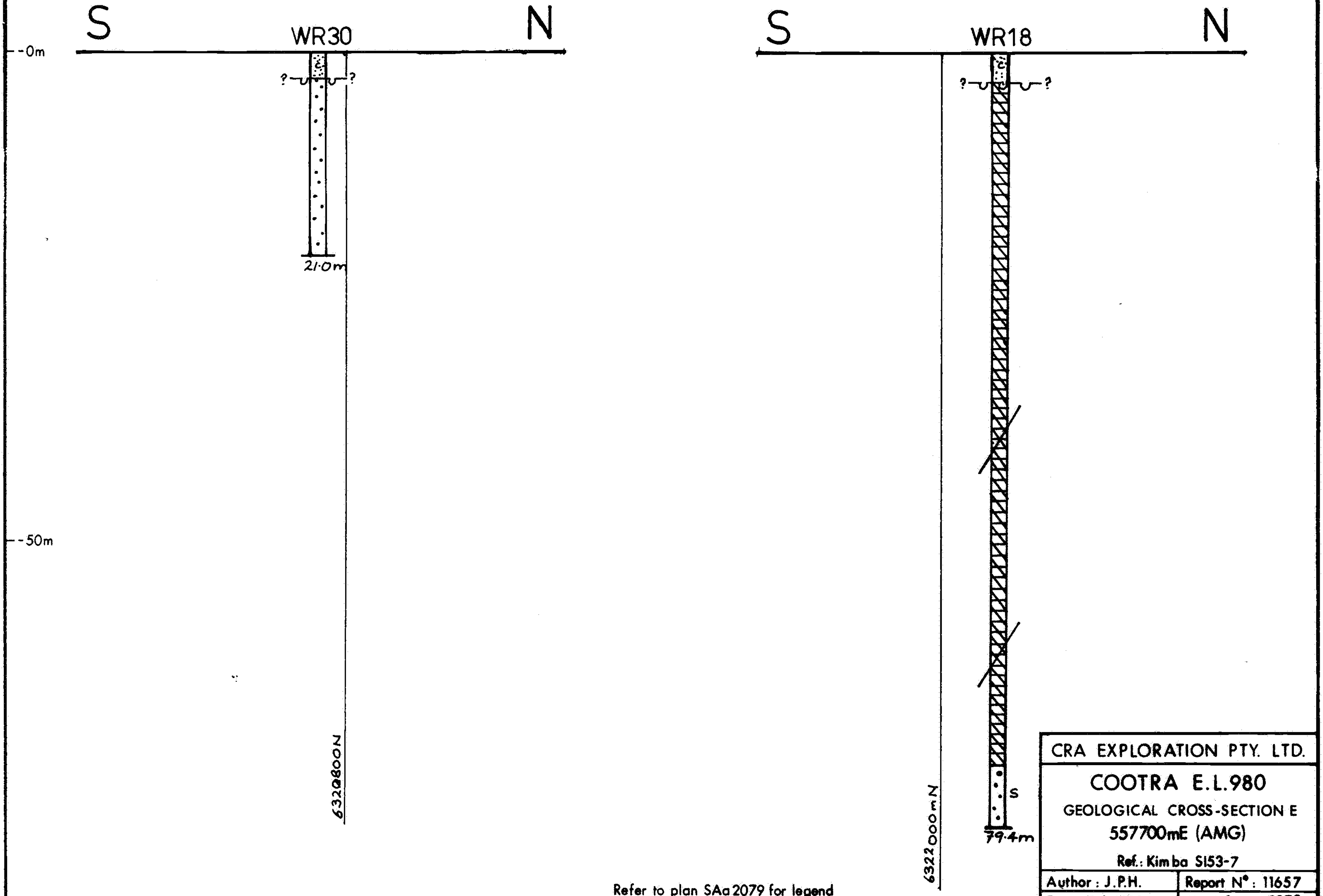
CRA EXPLORATION PTY. LTD.

COOTRA E.L 980

GEOLOGICAL CROSS-SECTION D
556500mE (AMG)

Ref. Kimba SI53-7

Author: J.P.H.	
Date: Feb. 1983	Report N°: 11657
Scale: V=1:500; H=1:1000	Plan N°: SAa 2072



Refer to plan SAa 2079 for legend

CRA EXPLORATION PTY. LTD.

COOTRA E.L.980

GEOLOGICAL CROSS-SECTION E

557700mE (AMG)

Ref.: Kimba SI53-7

Author : J.P.H.	Report N°: 11657
Date: Feb 1983	Plan N°: SAa 2073

4230(III)-6

CRA EXPLORATION PTY. LTD.

COOTRA E.L. 980

SUMMARY OF GEOLOGICAL AND GEOCHEMICAL CROSS-SECTIONS F, G, H, I, J, K SHOWING IRON OXIDES & ZINC

Author. J.P.H.	Ref. KIMBA S153-7
Date · Feb 1983	Report No 11657
Scale. 1:2000	Plan No.: SAa 2079

WP 1	Warramboo Percussion Hole 1	Drill Hole Cross-Section A	
WR 3	Warramboo Rotary Hole 3	Magnetic High Trend	
WD 4	Warramboo Diamond Hole 4	Road	
•	S.A.D.M.E. Drill Hole Collar	552000 mE	Australian Map Grid Reference
		50 000 'E	Local S.A.D.M.E. Imperial Grid
200	Maximum Zinc (ppm) assay result		

CRA EXPLORATION PTY LIMITED

COOTRA E.L. 980
GEOCHEMISTRY
MAXIMUM DRILL HOLE ASSAYS
ZINC

Ref	KIMBA SI 53-7	Date May 1983
Author	J P H	Report No 11657
Scale	1 : 25 000	Plan No SAa 2189

4230 (III) - 7

WP1	Warramboo Percussion Hole 1
WR 3	Warramboo Rotary Hole 3
WD 4	Warramboo Diamond Hole 4
•	S.A.D.M.E Drill Hole Collar
720	Maximum Barium (ppm) assay results

├──┤	Drill Hole Cross-Section A
—·—·—	Magnetic High Trend
– – – –	Road
552000 mE	Australian Map Grid Reference
50000'E	Local S.A.D.M.E. Imperial Grid

CRA EXPLORATION PTY LIMITED

COOTRA E.L. 980
GEOCHEMISTRY
MAXIMUM DRILL HOLE ASSAYS
BARIUM

Ref KIMBA SI 53-7	Date Feb. 1983
Author J P H	Report No 11657
Scale 1 : 25000	Plan No SAa 2191

4230(III)-8

WP1	Warramboo Percussion Hole 1
WR3	Warramboo Rotary Hole 3
WD4	Warramboo Diamond Hole 4
•	S.A.D.M.E. Drill Hole Collar
8·4	Maximum Maganese (%) assay results

├──┤	Drill Hole Cross-Section A
—·—·—	Magnetic High Trend
— — —	Road
552000 mE	Australian Map Grid Reference
50000'E	Local S.A.D.M.E. Imperial Grid

CRA EXPLORATION PTY LIMITED

COOTRA E.L. 980
GEOCHEMISTRY
MAXIMUM DRILL HOLE ASSAYS
MAGANESE

Ref	KIMBA SI 53-7	Date Feb 1983
Author	J P H	Report No 11657
Scale	1 25000	Plan No SAa 2190

4230 (III)-9

LEGEND

E.L. Boundary

Major Magnetic High Trends

Roads

Proposed Geophysical Traverses

C-2 Area of Interest

* Kimberlite Targets

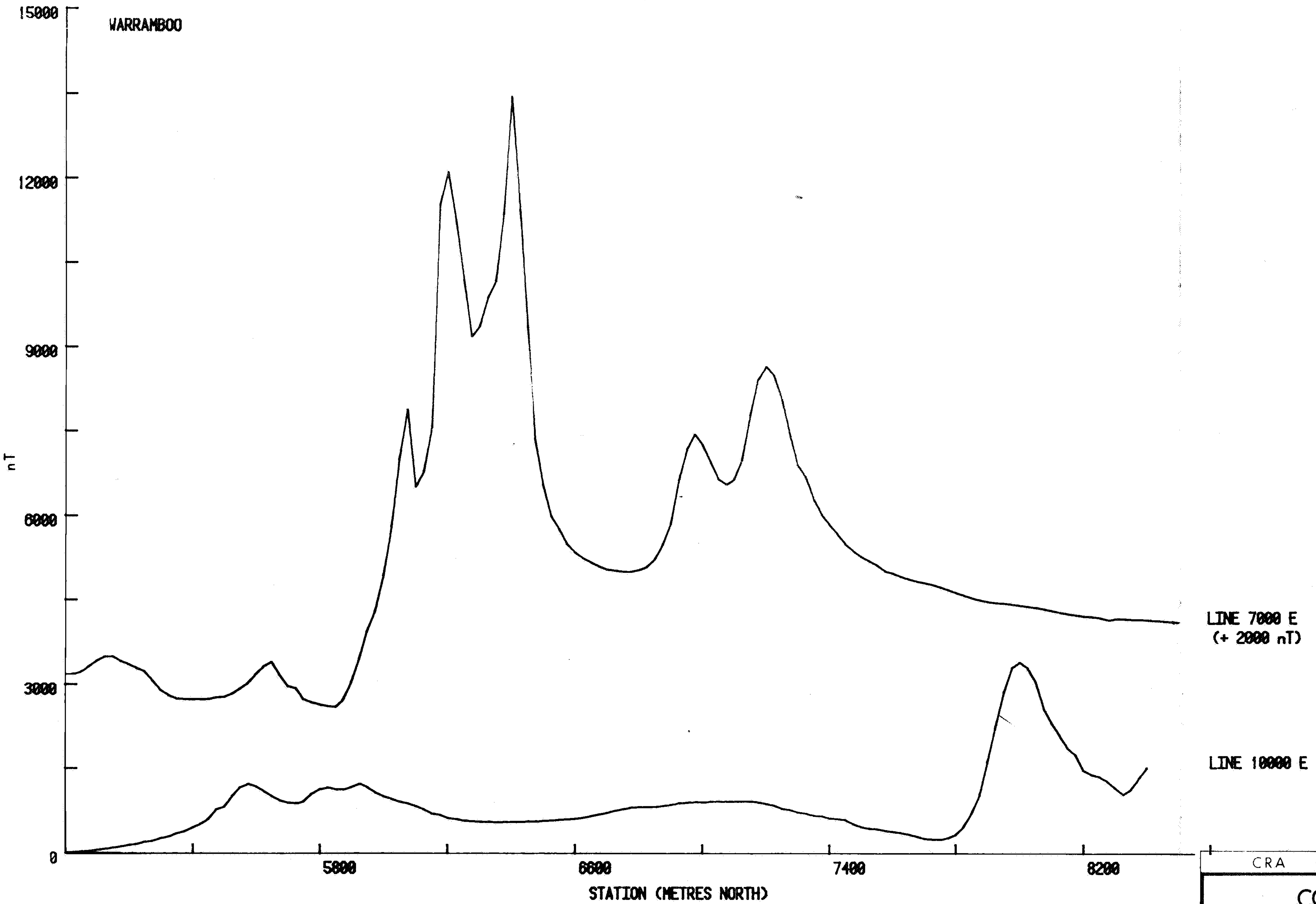
Interpreted Fault

0 1 2 3 4 5

Kilometres

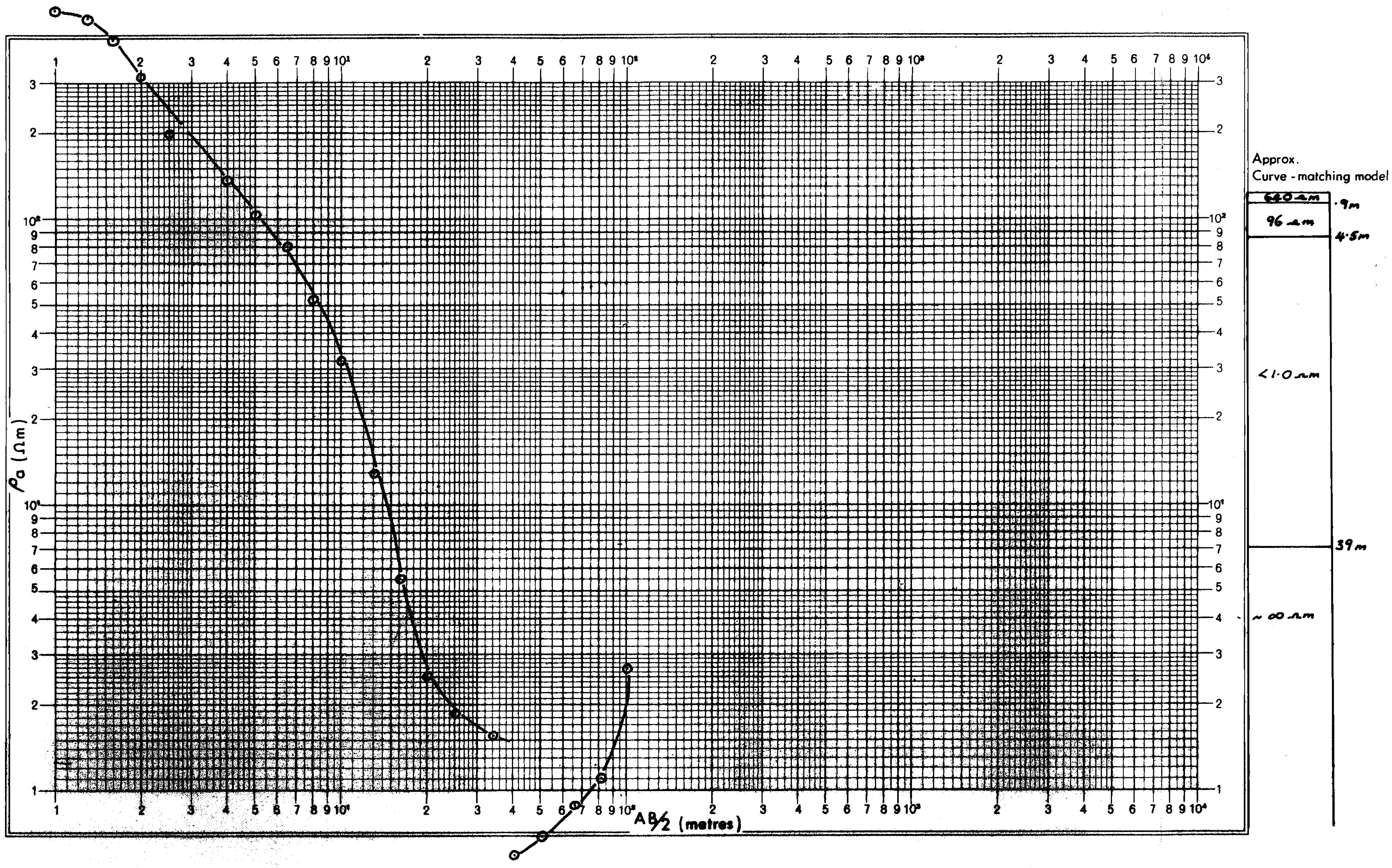
4230(III)-10

CRA EXPLORATION PTY. LIMITED	
COOTRA E.L.980 AEROMAGNETIC INTERPRETATION AND PROPOSED SURVEY AREAS	
Ref KIMBA SI53-7	
Scale. 1:50000	
Author GLM	Report No.: 11657
Date MAY 1983	Plan No.: SAa 2028



CRA EXPLORATION PTY LIMITED	
COOTRA E.L.980 WARRAMBOO PROSPECT – C1 TOTAL MAGNETIC INTENSITY PROFILES	
REF KIMBA SI 53-7	
SCALE 1: 13333	
AUTHOR G.L.M.	REPORT 11657
DATE MAY 1983	PLAN No SAa 2174

0324

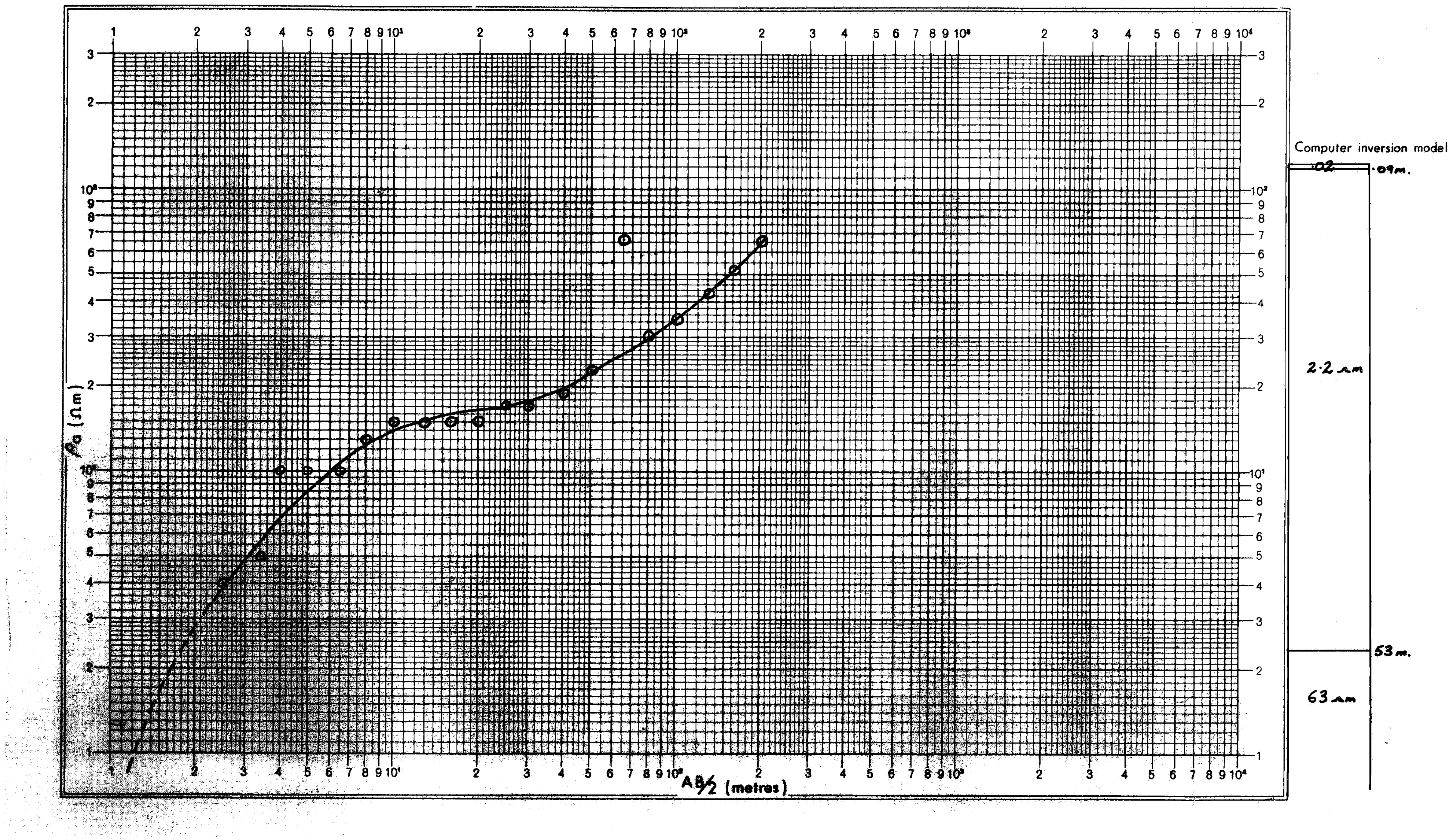


CRA EXPLORATION PTY LIMITED

COOTRA E.L.980

WARRAMBOO PROSPECT
SCHLUMBERGER DEPTH SOUNDING
3400N / 7000E
E - W ELECTRODE EXPANSION

REF. KIMBA SI53-7	
SCALE Log - Log	
AUTHOR G.L.M.	REPORT 11657
DATE JUNE 1983	PLAN No SAa 2175



CRA EXPLORATION PTY LIMITED	
COOTRA E.L.980 C - 0326 WARRAMBOO PROSPECT SCHLUMBERGER DEPTH SOUNDING 6200 N / 7000 E E - W ELECTRODE EXPANSION	
REF. KIMBA SI53-7	
SCALE Log - Log	
AUTHOR G.L.M.	REPORT 11657
DATE MAY 1983	PLAN No SAa2176

TRANSMITTER TYPE: Phoenix IPT - 1B
TIMING SEQUENCE: 2 sec on 2 sec off
RECEIVER TYPE: Huntec Mk IV (Serial No. 1007)
INTEGRATION TIME: m/sec after cut off

SOLO GEOPHYSICS AND COMPANY

AREA:
>3000 ɣ
>4500 ɣ

LINE:
SCALE: 1:5000
DATE:

C.R.A. EXPLORATION PTY. LTD.
Area Office:

Area : COOTRA EL 980
Grid : WARRAMBOO PROSPECT – C1
Line N°: 7000E
Scale : 1 : 5000
Date : 17, 18, 19-3-83

INSTRUMENTATION USED

Rx Type : Huntec Mk IV Sn 1032
Tx Type : a) Phoenix IPT-1B 3·0kw
b) Huntec Mk IV 7·5 kw

METHOD : Dipole, Dipole Array L = 100 m

FREQUENCY DOMAIN : / HzHi / HzLo

TIME DOMAIN

Timing Sequence: 2 sec.on 2 sec.off
Integration Time Recorded : Channels 0-9
50-1550 msec.
Integration Time Plotted : Channels 1-9
200-1550 msec.
Delay Time, TD : 50 msec. after cut off
SECTION A : Apparent Resistivity (ohm/m)
logarithmic contour interval
SECTION B : Apparent Chargeability (mv/v)
contour interval 2 msec.

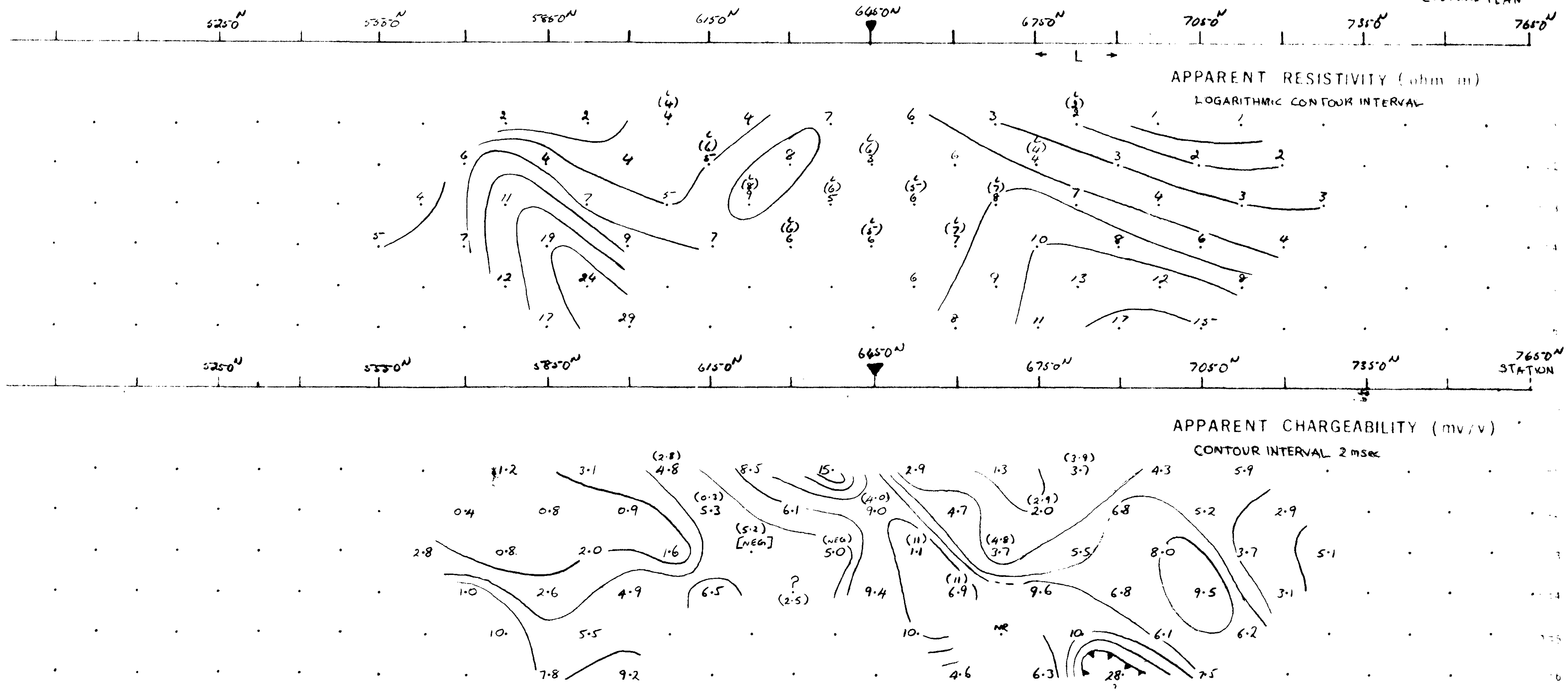
Chargeabilities not reliable - decay curves noisy
- repeatability poor

Surveyed by SOLO GEOPHYSICS AND COMPANY

Report No. 11657
CRAE Plan No. SAa 2177

4230-(III)-11

I.P. & RESISTIVITY SURVEY (DIPOLE-DIPOLE ARRAY L = 100m)



TRANSMITTER TYPE Phoenix IPT 1B
TIMING SEQUENCE 2 sec on 2 sec off
RECEIVER TYPE Huntec Mk IV (Serial No 1007)
INTEGRATION TIME msec after cut off

SOLO GEOPHYSICS AND COMPANY

AREA

LINE
SCALE 1:5000
DATE

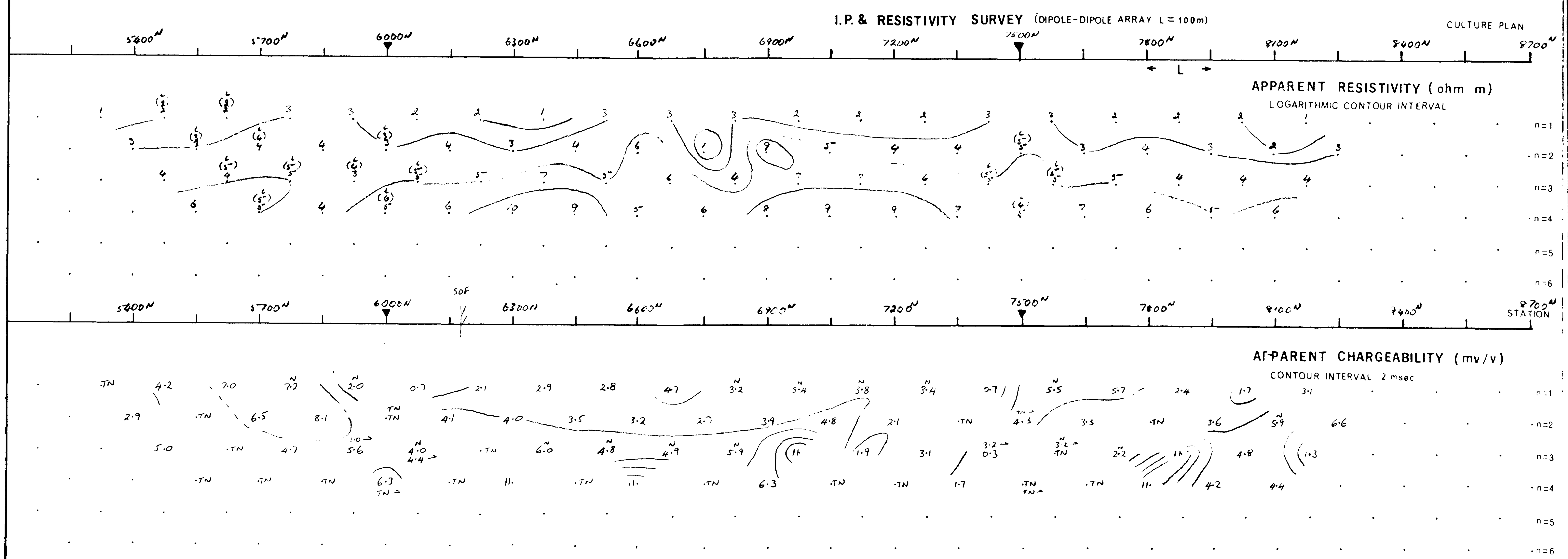
CRA C.R.A. EXPLORATION PTY LTD
Area Office

Area COOTRA E.L. 980
Grid WARRAMBOO PROSPECT — C1
Line N° 7000 E
Scale 1:7500
Date 27-3-83

INSTRUMENTATION USED
Rx Type : Huntec Mk iv Sn 1032
Tx Type : a) Phoenix IPT-1B 3.0 kw
b) Huntec Mk iv 7.5 kw
METHOD : Dipole, Dipole Array L = 150 m
FREQUENCY DOMAIN / HzHi / HzLo
TIME DOMAIN
Timing Sequence: 2 sec on 2 sec off
Integration Time Recorded Channels 0-9
50-1550 msec
Integration Time Plotted Channels
200-1550 msec
Delay Time, TD : 50 msec after cut off
SECTION A : Apparent Resistivity (ohm/m)
logarithmic contour interval
SECTION B : Apparent Chargeability (mv/v)
contour interval 2 msec.
All chargeabilities unreliable - delay curves
V. Noisy

Surveyed by SOLO GEOPHYSICS AND COMPANY

4230(III)-12 Rept. No. 11657 CRAE Plan No. SAa 2178



TRANSMITTER TYPE Phoenix IPT - 1B

TIMING SEQUENCE 2 sec on 2 sec off

RECEIVER TYPE Huntec Mk IV (Serial No. 1007)

INTEGRATION TIME m/sec after cut off

AREA:

LINE:

SCALE: 1:5000

DATE:

SOLO GEOPHYSICS AND COMPANY

C.R.A. EXPLORATION PTY. LTD.
Area Office:

Area : COOTRA E.L.980

Grid : WARRAMBOO PROSPECT — C(

Line N°: 10000E

Scale : 1 : 7500

Date : 30-3-83

INSTRUMENTATION USED

Rx Type : Huntec Mk IV Sn 1032

Tx Type : a) Phoenix IPT - 1B 3·0kw
b) Huntec Mk IV 7·5 kw

METHOD : Dipole, Dipole Array L = 150 m

FREQUENCY DOMAIN : / HzHi / HzLo

TIME DOMAIN

Timing Sequence: 2 sec.on 2 sec.off

Integration Time Recorded : Channels 0-9 50-1550 msec.

Integration Time Plotted : Channels 1-9 200-1550 msec.

Delay Time, TD : 50 msec. after cut off

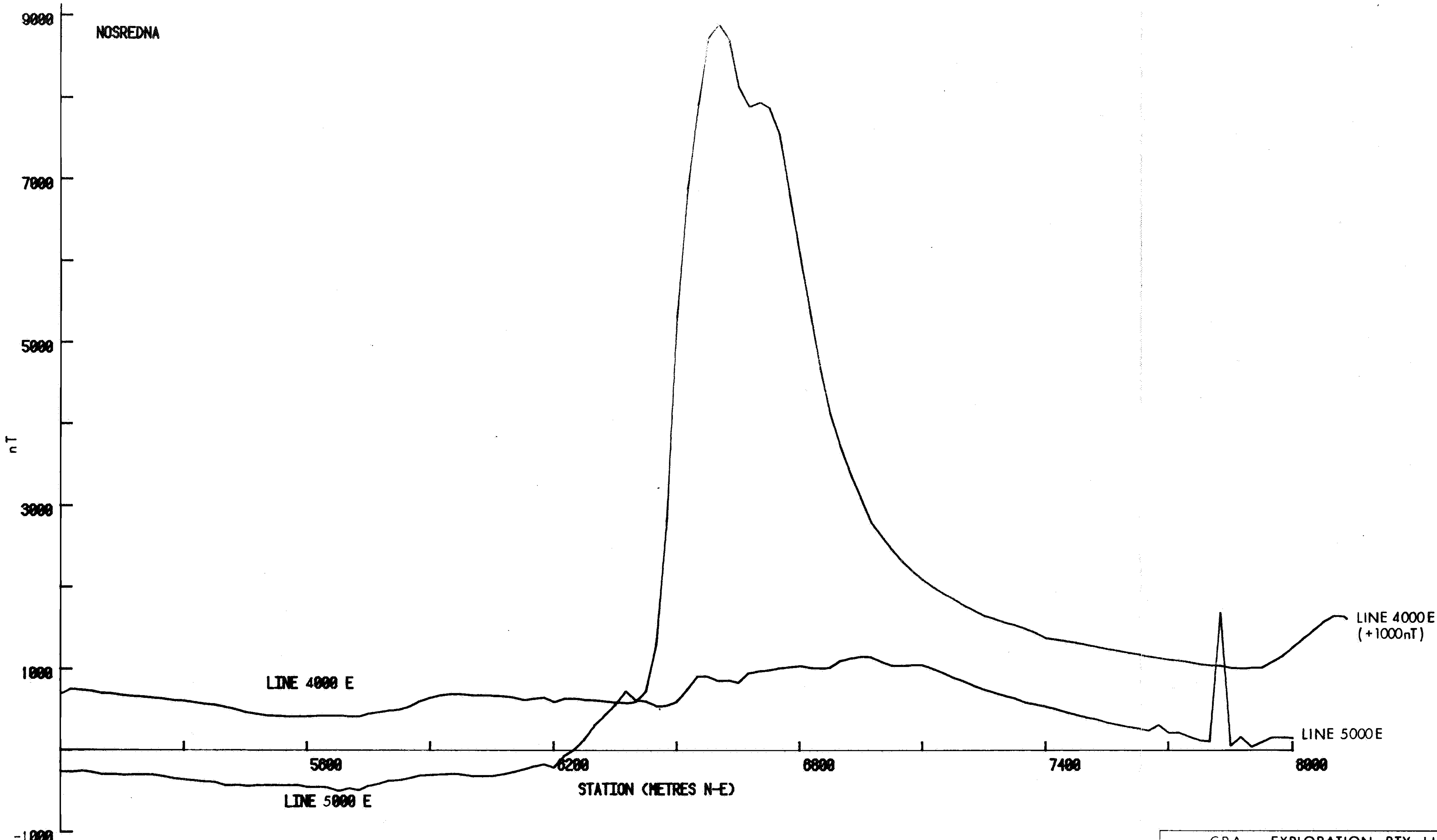
SECTION A : Apparent Resistivity (ohm/m) logarithmic contour interval

SECTION B : Apparent Chargeability (mv/v) contour interval 2 msec.

4230 (111) - 13

Surveyed by SOLO GEOPHYSICS AND COMPANY

Report No. 11657
CRAE Plan No. SAa 2179



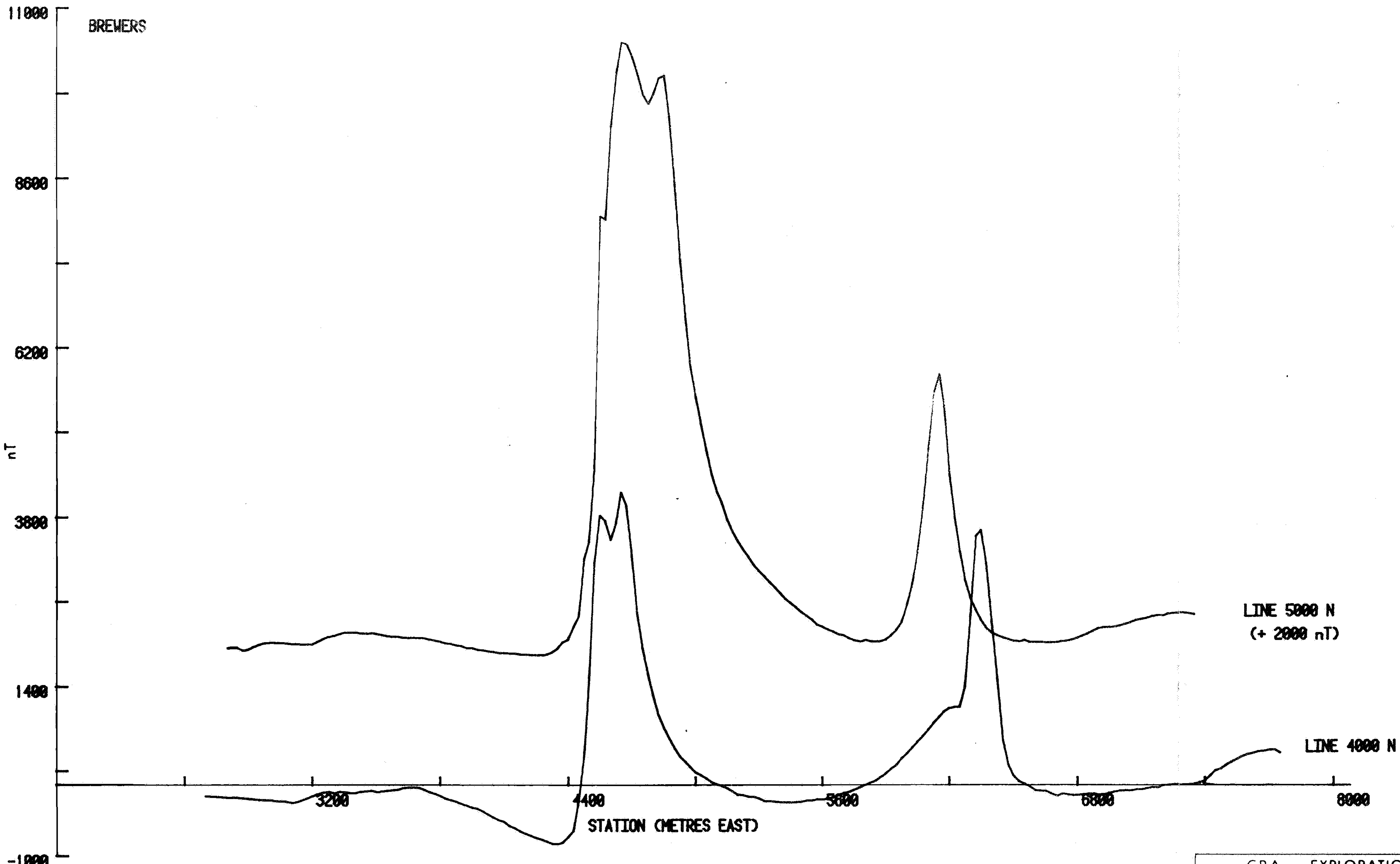
CRA EXPLORATION PTY LIMITED

COOTRA E.L.980

NOSREDNA PROSPECT - C2

TOTAL MAGNETIC INTENSITY PROFILES

REF. KIMBA SI53-7	
SCALE 1: 10000	
AUTHOR G.L.M.	REPORT 11657
DATE MAY 1983	PLAN No SAa 2180



CRA EXPLORATION PTY LIMITED

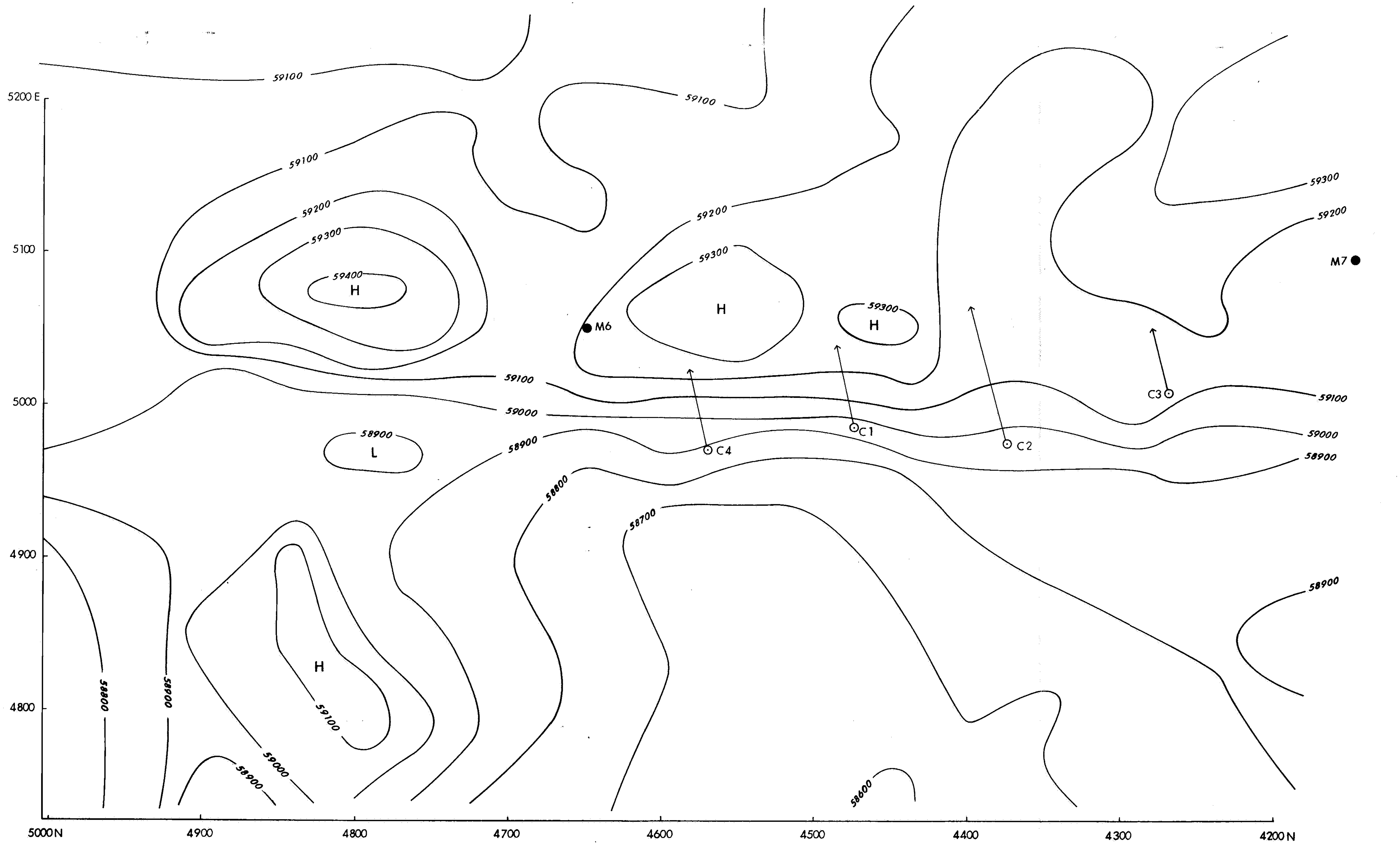
COOTRA E.L.980

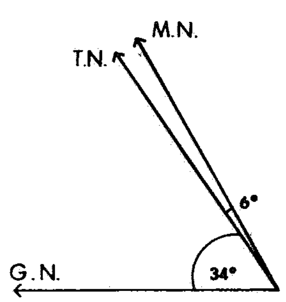
BREWERS PROSPECT —C3

TOTAL MAGNETIC INTENSITY PROFILES

REF. KIMBA SI53-7	
SCALE 1:20000	
AUTHOR G.L.M.	REPORT 11657
DATE MAY 1983	PLAN No SAa2181

0328





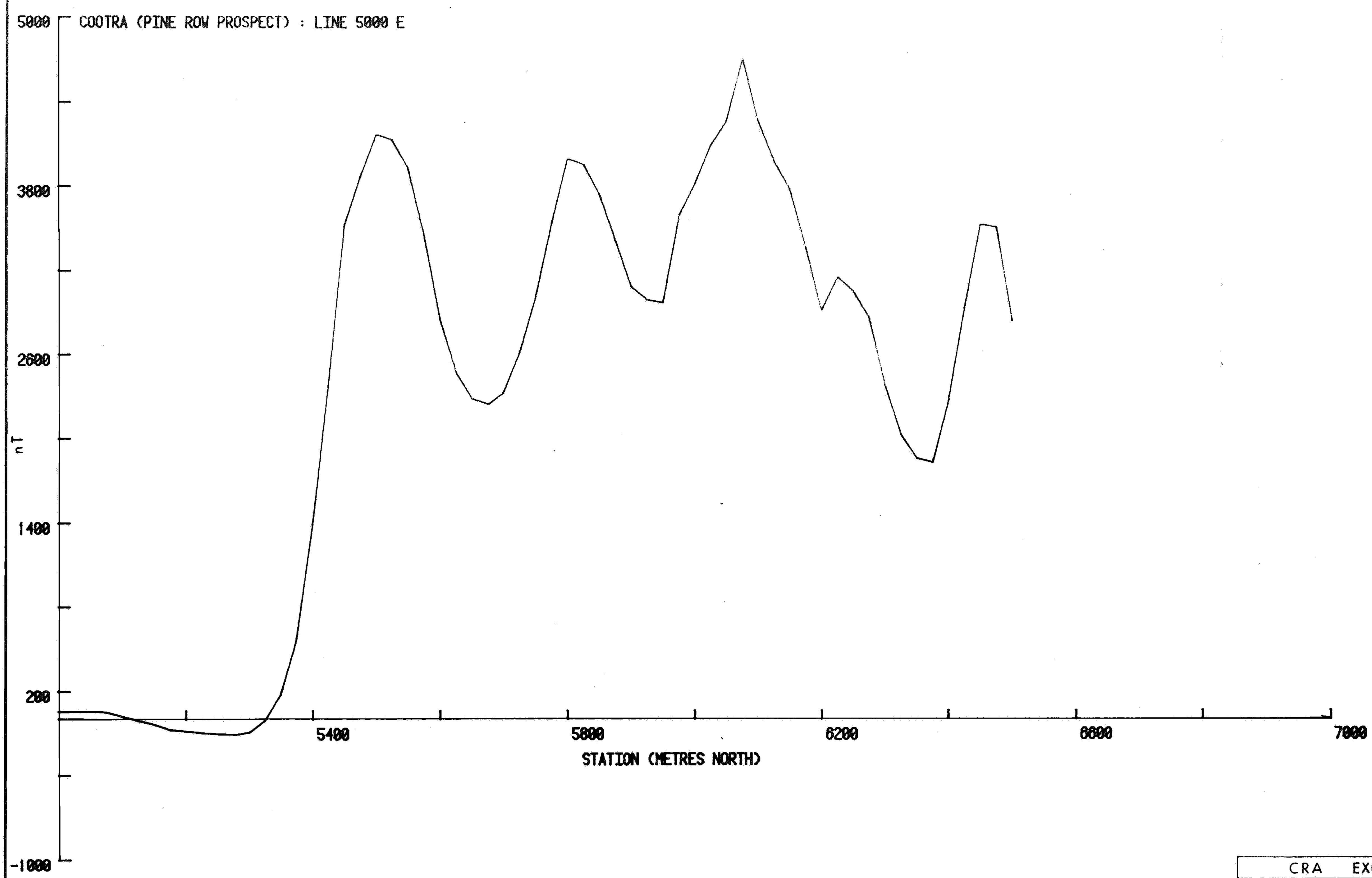
C3 Diamond Drill Hole & Horizontal Projection (N.B.H.)

● M6 Percussion Hole (N.B.H.)

Contour Interval : 100 nT

CRA EXPLORATION PTY LIMITED	
COOTRA E.L. 980 MEANEYS PROSPECT — C4 TOTAL MAGNETIC INTENSITIES	
REF KIMBA SI53-7	
SCALE 1: 2500	
AUTHOR G.L.M.	REPORT 11657
DATE JUNE 1983	PLAN No SAa 2182

0329



CRA EXPLORATION PTY LIMITED	
COOTRA E.L.980 PINE ROW PROSPECT c-6 TOTAL MAGNETIC INTENSITY PROFILES LINE 5000E	
REF. KIMBA SI53-7	
SCALE 1:6667	
AUTHOR G.L.M.	REPORT 11657
DATE MAY 1983	PLAN No SAa 2183

0330

111

0331

C.R.A. EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)

Adelaide Office: 31 OSMOND TERRACE, NORWOOD 5067
Head Office: 55 COLLINS STREET, MELBOURNE 3001

P.O. BOX 254 Norwood
TELEPHONE: [redacted] 42 88
TELEGRAMS: "EXPLORECO"
TELEX: AA 88605

6th July, 1983

Mr. I. Faulks,
South Australia Department of Mines & Energy,
P.O. Box 151,
EASTWOOD. S.A. 5063

Dear Ian,

Attached is the relevant list of locations of the magnetic and I.P. profiles contained in our last (4th quarterly) Cootra report. I see that the sections (profiles) themselves refer only to the prospect by name and not the corresponding number, whereas the plan (2028) refers to the prospect by number only and not by name.

Although this is explained in the text, I must agree that it is unnecessarily messy.

Please accept my apologies and don't hesitate to contact me in future should you require similar clarification.

Yours sincerely,

for

I.D. FINCH

IDF/dp

EL 980
ENV 4230

O.K.

6th July, 1983

FOURTH QUARTERLY REPORT FOR COOTRA
E.L. 980 S.A. - PERIOD ENDING
29TH MARCH, 1983

The following magnetic profiles and I.P. pseudo sections are located on plan SAa 2028. NB line 5000E in the Cl (Warramboo Area) is incorrectly annotated and should read 10,000E.

Plan No.	Area
SAa 2174	Warramboo - Cl
SAa 2175	Warramboo - Cl
SAa 2176	Warramboo - Cl
SAa 2177	Warramboo - Cl
SAa 2178	Warramboo - Cl
SAa 2179	Warramboo - Cl
SAa 2180	Nosredna - C2
SAa 2181	Brewers - C3
SAa 2182	Meaneys - C4
SAa 2183	Pine Row - C6

D. Purdon
for

I.D. FINCH

IDF/dp

III

0333

CRA EXPLORATION PTY. LIMITED

FIFTH QUARTERLY REPORT FOR COOTRA E.L. 980, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 29TH JUNE, 1983

AUTHOR:	J.P. HOWARD
COPIES TO:	CRAE LIBRARY S.A.D.M.E. N.B.H. LIMITED
DATE:	17TH JUNE, 1983
SUBMITTED BY:	
ACCEPTED BY:	

12165

CONTENTS

1. INTRODUCTION

The Cootra Exploration Licence No. 980 (previously E.L. 756) is located 320 kilometres northwest of Adelaide and 40 kilometres south east of Wudinna. (See plan no. SAa 1804).

An exploration licence was applied for on 17th July, 1980 and granted as E.L. 756 on 26th November, 1980 for one year. The licence lapsed but a reapplication was lodged on 8th December, 1981 and the area was granted as E.L. 980 on 29th March, 1982 for one year.

A joint venture agreement between North Broken Hill Limited and CRA Exploration Pty. Limited was signed in August, 1982 since when the latter have acted as operators.

2. WORK CARRIED OUT

Drilling recommended in the fourth quarterly report will be carried out during the sixth quarter.

pp.

J.P. HOWARD

JPH/dp

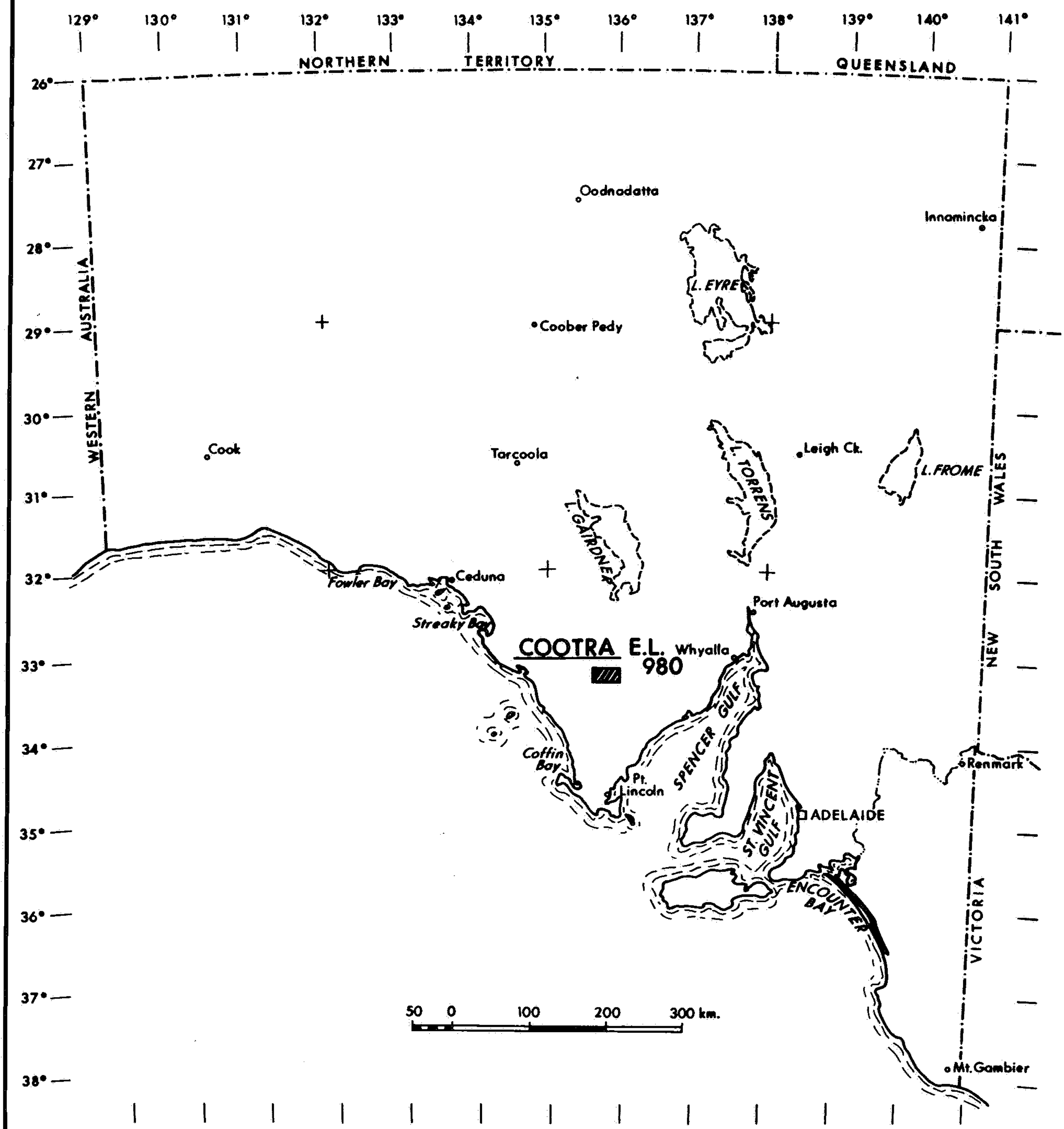
LOCATION

Kimba SI 53-7

LIST OF PLANS

Plan No.	Title	Scale
SAa 2204	Cootra E.L. 980 - Location Plan	1:250 000

0337



CRA EXPLORATION PTY LIMITED	
COOTRA E.L. 980 — STH. AUST. LOCATION PLAN	
REF. KIMBA SI 53-7	
SCALE 1 : 8000000	
AUTHOR J. P. H.	REPORT 12165
DATE May 1983	PLAN No SAa 2204

III

0338

CRA EXPLORATION PTY. LTD.

SIXTH QUARTERLY REPORT FOR COOTRA E.L. 980, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 29TH SEPTEMBER, 1983

AUTHOR: I.D. FINCH

COPIES TO: CRAE LIBRARY
S.A.D.M.E.
N.B.H. LIMITED

DATE: 30TH NOVEMBER, 1983

SUBMITTED BY: Paul Lewis for I.D. FINCH.

ACCEPTED BY: [signature]

12404

CONTENTS

1. INTRODUCTION

The Cootra Exploration Licence No. 980 (previously E.L. 756) is located 320 kilometres northwest of Adelaide and 40 kilometres south east of Wudinna. (See plan no. SAa 2204).

An exploration licence was applied for on 17th July, 1980 and granted as E.L. 756 on 26th November, 1980 for one year. The licence lapsed but a reapplication was lodged on 8th December, 1981 and the area was granted as E.L. 980 on 29th March, 1982 for one year.

A joint venture agreement between North Broken Hill Limited and CRA Exploration Pty. Limited was signed in August, 1982 since when the latter have acted as operators.

The rationale and proposals for a 1983 drilling programme is the subject of the fourth quarterly report. Poor access (heavy winter rains) and lack of availability of a suitable drilling rig has delayed the start of the proposed programme.

2. WORK CARRIED OUT

Unavailability of a suitable drilling rig delayed the commencement of the drilling programme of which Cootra is a part.

Drilling of the four prospects (C-1 Warramboo, C-2 Nosredna, C-3 Brewers and C-4 Meaneys) will begin in early October using the reverse circulation method of Wallis Drilling Pty. Ltd. The rig is also capable of a certain amount of hammer drilling as well as diamond coring.

Paul Lewis
for

I.D. FINCH

IDF/dp

EXPENDITURE

Expenditure for the period 30th September 1983, the nearest accounting period, amounted to $3199.00, comprising:-

	$
Salaries and Wages	1400
General Supplies	10
Vehicles	142
Property and Rent	19
Contractors	400
Assaying	256
General Overheads	972
	$3199

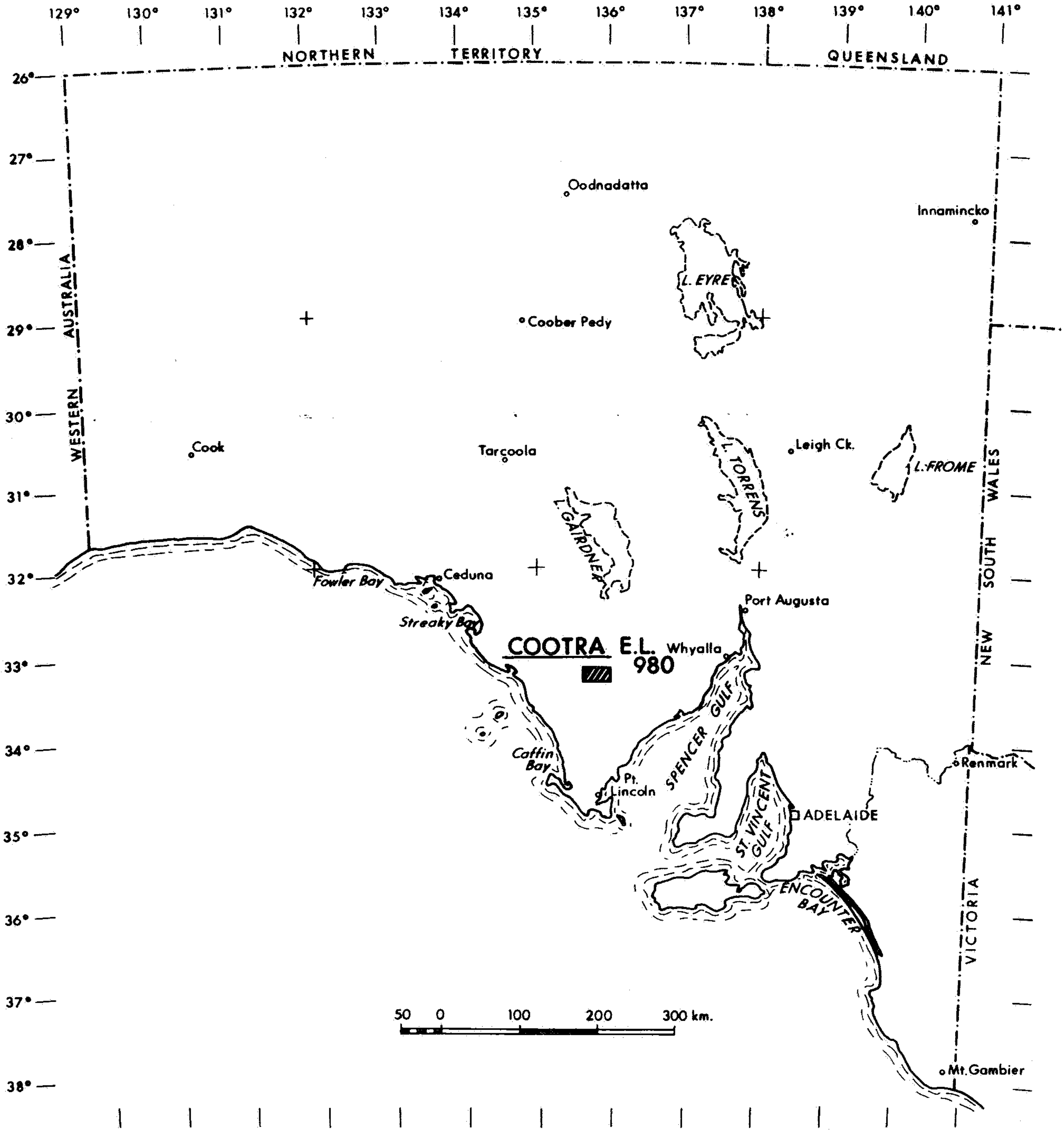
LOCATION

Kimba SI 53-7

LIST OF PLANS

Plan No.	Title	Scale
SAa 2204	Cootra E.L. 980 - Location Plan	1:8000 000

0343



CRA EXPLORATION PTY LIMITED	
COOTRA E.L. 980 — STH. AUST. LOCATION PLAN	
REF. KIMBA SI 53-7	
SCALE 1 : 8 000 000	
AUTHOR J. P. H.	REPORT 12404
DATE May 1983	PLAN No SAa 2204

0344

CRA EXPLORATION PTY. LIMITED

SEVENTH QUARTERLY FOR THE PERIOD ENDING 28TH DECEMBER, 1983 AND RELINQUISHMENT REPORT FOR COOTRA E.L. 980, SOUTH AUSTRALIA

AUTHOR: I.D. FINCH

COPIES TO: CRAE LIBRARY
S.A.D.M.E.
N.B.H. LIMITED

DATE: 20TH MARCH, 1984

SUBMITTED BY:

ACCEPTED BY:

12556

CONTENTS

1. SUMMARY

A 43 hole (2331 metres) drilling programme was carried out at five prospects on the Cootra E.L. 980 - Warramboo, Nosredna, Brewers, Meaney's and Pine Row. The programme was devised following previous geophysical, geochemical and drilling work carried out by the South Australian Department of Mines and Energy, North Broken Hill Limited and CRA Pty. Limited and reported in previous quarterly reports. The main target was stratiform/stratabound base metal deposits associated with iron rich horizons.

Drilling at Warramboo and Pine Row prospects failed to indicate extensions to the chemogenic units intersected by the S.A.D.M.E. drilling (itabirite and marble). Downhole spot high geochemical values (copper/lead/zinc) returned from S.A.D.M.E. drillholes were repeated only as separate spot highs, generally of a lower order, and considered not indicative of a major mineralised system.

Although the local gravity anomaly in the Nosredna area was not conclusively explained by the drilling, it seems likely that elevated palaeotopography is the major cause. Downhole geochemical values in this prospect area remained at low levels.

Scout drilling at the Brewers prospect identified an essentially barren suite of gneissic rocks containing no chemogenic units. High magnetite content in some areas accounted adequately for the elevated magnetic responses. Downhole geochemical values were, again, of a low order.

Diamond drilling at Meaney's prospect failed to indicate strike extensions to the weak tungsten (scheelite) mineralisation encountered in North Broken Hill Limited's boreholes C1-C4. Since only strike extensions of the same mineralised horizon were tested, potential for further tungsten mineralisation may exist elsewhere in the stratigraphy of this mafic granulitic suite.

Anomalously high "total" count readings were plotted from the available radiometrics data. Several small areas were delineated, but no uranium channel anomalies occur.

Following the above discouraging results relinquishment of the E.L. was recommended.

2. CONCLUSIONS

The majority of elevated magnetic responses throughout the E.L. are due to increased magnetite within high grade, essentially barren, gneissic rock suites.

At Warramboo and Pine Row low order downhole geochemical values indicate that these areas are unlikely to host a major stratiform/stratabound base metal ore body, although individual spot high values can occur.

The rock suite at Brewers prospect is similar to those at Warramboo and Pine Row and exhibits little potential for the hosting of major base metal bodies.

The local gravity anomaly at Nosredna prospect is probably due to elevated palaeotopography.

The rock types at Nosredna are also high grade metamorphics exhibiting little encouragement for base metal accumulation either in the form of favourable host rock alteration or elevated downhole geochemical values.

The horizon containing weak tungsten mineralisation at Meaney's prospect has little potential for developing into economic proportions along strike.

Potential for tungsten mineralisation, however, still exists elsewhere in the granulitic stratigraphy at Meaney's prospect.

No uranium anomalies are evident from the airborne radiometric data.

3. RECOMMENDATIONS

Potential for the rocks at Cootra to host major stratiform/stratabound base metal deposits is lacking and relinquishment of the licence is recommended.

4. INTRODUCTION

The Cootra Exploration Licence No. 980 (previously E.L. 756) is located 320 kilometres northwest of Adelaide and 40 kilometres south east of Wudinna. (See plan no. SAa 2676).

An exploration licence was applied for on 17th July, 1980 and granted as E.L. 756 on 26th November, 1980 for one year. The licence lapsed but a reapplication was lodged on 8th December, 1981 and the area was granted as E.L. 980 on 29th March, 1982 for one year.

A joint venture agreement between North Broken Hill Limited and CRA Exploration Pty. Limited was signed in August, 1982 since when the latter have acted as operators.

The rationale and proposals for a 1983 drilling programme is the subject of the fourth quarterly report. Poor access (heavy winter rains) and lack of availability of a suitable drilling rig delayed the start of the proposed programme which eventually commenced in October 1983.

A total of 43 boreholes aggregating 2331 metres of drilling (Reverse circulation and diamond core) was completed. This report details the work carried out during the quarter and discusses the obtained results leading to a recommendation for the relinquishment of the Exploration Licence.

5. PREVIOUS WORK

Survey/Drilling	Metres/ Line Kms.	Operators	Comments	Report
Aeromagnetic	?	S.A.D.M.E.	Part of 1960's Iron ore search. Adastra Hunting Geophysics Ltd. - N/S lines 400 metres apart - mean height of 91 metres	Report Books 54/19, 55/91, 56/33 57/68 57/85 60/48
Drilling of 4 Diamond holes 42 Rotary holes 9 Percussion 89 Auger holes Ground Magnetics		S.A.D.M.E.		
Aeromagnetic Survey	480 sq.kms.	N.B.H.	Geoex - 300m line spacing N/S lines 61m mean height 5γ contours	2nd Qly Rep. E.L. 756
Airborne Radiometrics	480 sq.kms.	N.B.H.	Geoex - 4 channel	2nd Qly Rep. E.L. 756
Drilling:				
88 x Auger holes	(1063m)	N.B.H.	Very few to bedrock	3rd Qly. EL756
44 x R.A.B.	(1545m)		Most to bedrock	3rd Qly. EL756
7 x Diamond holes			Mainly Meaney's Tungsten Prospect	4th/5th Qly. E.L. 756
Grav. Survey	27 kms.	N.B.H.	727 readings	Various EL756 Qly's.
I.P. Surveys	9.3 kms.	N.B.H.	100m spacing Meaney's & Fishke's prospects	4th Qly EL756
Ground Magnetics		N.B.H.	Various locations not always fully reported.	Various Qly's EL756

Continued...

Survey/Drilling	Metres/ Line Kms.	Operators	Comments	Report
Borehole Geochemistry	(868 smpls)	CRAE	Fillet samples taken on SADME cores WD1-4 - contamination probable	3rd Qly EL 980
Geochemistry		CRAE	Check Assays - ¼ core	4th Qly EL 980
Schlumberger Depth Soundings		CRAE	Unsuccessful	4th Qly EL 980
Ground Magnetics	32.6 kms.	CRAE	Defining Airborne Magnetic targets	4th Qly EL 980
I.P. traverses	7.3 kms.	CRAE	Warramboo Anomaly	4th Qly EL980
Drilling 40 R.C. 3 Diamond holes	2331m	CRAE		7th Qly EL980

6. DRILLING

6.1 General

A total of 43 boreholes aggregating 2331.6 metres was drilled in five prospect areas - Warramboo, Nosredna, Brewers, Meaney's and Pine Row (See Plan No. SAa 1804). Of the metres drilled 2128.9 were reverse circulation, 18 metres were percussion, 144.0 metres were diamond cored, whilst a further 40.7 metres were diamond drill spot cored.

In the case of all reverse circulation and percussion drilling, geochemical samples were taken over two metre intervals from the start of weathered basement rocks to the end of the hole. All diamond core was split and half core of relevant sample widths submitted for geochemical analysis. In each case the following elements were assayed for .... tin, tungsten, uranium, iron, manganese, chromium, copper, lead, zinc, nickel, cobalt, molybdenum, gold and silver. The results are contained in the detailed logs presented in Appendix I.

In all, 16 rock, or rock chip, samples were presented to Pontifex and Associates for detailed petrological analysis. The results are contained in Report no. 4200 - Appendix II.

6.2 Warramboo Area (C-1)

S.A.D.M.E. diamond drill hole WD3 intersected carbonate (marble) units and some itabirite within a gneissic suite of rocks. Some sulphides (chalcopyrite and pyrite) were observed in thin section and CRA Exploration Ltd.'s sampling revealed slightly elevated geochemical basemetal values in parts. viz. maximum 480 p.p.m. copper, 110 p.p.m. lead and 470 p.p.m. zinc (two metre sections).

A total of 12 (83CRC22 to 33) vertical, reverse circulation boreholes were drilled on lines 6720E and 7000E to test for increased sulphidic accumulations within the carbonate zone and for further prospective horizons within the stratigraphy. (See plan no. SAa 2635 and Appendix I).

In all 576.4 metres were drilled. No further carbonate unit was encountered and geochemical values remained at background levels for the lithologies intersected - quartzite, gneisses and amphibolites. Maximum values were as follows...
tin - 16 p.p.m. in 83CRC25; tungsten - 20 p.p.m. in 83CRC27; uranium - 55 p.p.m. in 83CRC24; iron - 22.5% in 83CRC27; manganese - 9000 p.p.m. in 83CRC29; chromium - 130 p.p.m. in 83CRC25; copper - 410 p.p.m. in 83CRC27 (amphibolite); lead - 100 p.p.m. in 83CRC23; zinc - 340 p.p.m. in 83CRC33; nickel - 75 p.p.m. in 83CRC23; cobalt - 155 p.p.m. in 83CRC23; molybdenum - 12 p.p.m. in 83CRC23 and 83CRC31; gold and silver values were either at, or below, the respective detection limits of 0.05 p.p.m. and 1 p.p.m.

Geochemical values from these boreholes, as from the previously drilled S.A.D.M.E. boreholes, show no conclusive trend, although individual spot high values do occur.

None of the recently drilled boreholes intersected likely chemogenic units, most holes being completed in essentially barren, garnet gneiss, granite gneiss or various other felsic gneisses of probable clastic sedimentary origin.

No major alteration of the prevailing rock types is evident and occurrence of sulphide minerals is limited to trace or microscopic levels.

The Warramboo Ironstone environment, as tested by earlier S.A.D.M.E. drilling and by recent CRA Exploration Ltd. drilling, does not appear to represent a mineralised system likely to host sizeable stratiform/stratabound base metal orebodies.

A 6.6 kilogram bulked sample of the lamprophyre-like rock in borehole 83CRC33 was analysed for kimberlitic indicator minerals with negative results.

Detailed petrological descriptions of the main rock type in boreholes 83CRC22, 83CRC24, 83CRC26 and 83CRC33 are presented in Appendix II.

6.3 Nosredna Area

A total of eight vertical, reverse circulation holes were drilled over the coincident gravity and magnetic anomalies in this area (83CRC1-8). Hole 83CRC8 was spot diamond cored from 75.4 metres to completion at 97.2 metres. In all 377.7 metres were drilled of which 342.4 metres was reverse circulation, 23.3 metres diamond drilling and 12 metres percussion drilling. Holes 83CRC1 to 6 were drilled on, or adjacent to, line 4000S.E. (holes 83CRC 4 and 5 were offset by 260 metres and 460 metres respectively to avoid excessive crop damage). (See Plan SAa 2634). Hole 83CRC7 was drilled on the north eastern end of line 5000S.E. Whilst 83CRC8 was drilled on the roadside (5000E) between lines 4000S.E. and 5000S.E. (see plan SAa 2633).

Holes 83CRC1 to 6 intersected an essentially barren suite of quartzo-feldspathic gneisses under shallow (± 30 metres) Tertiary cover. An increase in magnetite content in holes 83CRC4 and 83CRC5 accounts for the magnetic anomaly.

Hole 83CRC7 intersected a sheared, high grade amphibolite exhibiting background geochemistry for that lithology. A detailed petrological description is contained in Appendix II.

Prior to the drilling of 83CRC8 a ground magnetic traverse was made along the north/south road between lines 4000S.E. and 5000S.E. (plan no. SAa 2633). The hole was collared on the peak of the magnetic anomaly and drilled vertically. The reverse circulation (air core) technique was discontinued at 75.4 metres and diamond drilling utilised thereafter to the bottom of the hole at 97.2 metres. The main rock type intersected was a garnet rich gneiss with biotite, quartz and minor cordierite and sillimanite (see Appendix II). Magnetic susceptibilities remained at low levels throughout and it must be concluded that the magnetic source is deeper than 97.2 metres.

Throughout the Nosredna drilling, downhole geochemical values remained at low levels - reaching the following maxima.

ELEMENTS	MAXIMUM VALUE (PPM)	BOREHOLE
Tin	28	83CRC5
Tungsten	15	83CRC6
Uranium	14	83CRC3
Iron	27.5%	83CRC4
Manganese	890	83CRC4
Chromium	130	83CRC3
Copper	130	83CRC3
Lead	55	83CRC5 & 8
Zinc	140	83CRC8
Nickel	200	83CRC3
Cobalt	55	83CRC3
Molybdenum	8	83CRC1 & 8
Silver	2	83CRC5
Gold	Below detection (0.05)	

The local gravity anomaly (high) in the area was not fully explained by the drilling, although it may be due to elevated basement topography.

6.4 Brewer's Area

A strongly magnetic unit in the east of the exploration licence was earlier ground recovered on two magnetic traverses - lines 4000N and 5000N. Ten vertical reverse circulation boreholes (83CRC12-21) were drilled for an aggregate of 532 metres to test the stratigraphy in an area of no outcrop. Eight were drilled in fence formation on line 5000N whilst the remaining two were drilled on line 4000N (see plans SAa 2631 and SAa 2632).

All holes reached target depth and intersected a barren suite of quartzo-feldspathic gneisses, granite gneisses and amphibolites. Those holes drilled to test magnetic peaks - viz. 83CRC12, 83CRC15 and 83CRC19 encountered high magnetite content within the gneissic lithologies. Magnetic susceptibilities taken on the rock chips were sufficient to explain the anomalies in each case.

Rock types were very similar to those encountered in the Warramboo ironstone belt. Assay values, with minor exceptions, were of a low order and compatible with intersected lithologies. The following geochemical maxima were obtained...

ELEMENT	MAXIMUM VALUE (PPM)	BOREHOLE
Tin	10	83CRC14, 15, 17, 18 & 19
Tungsten	25	83CRC13 & 17
Uranium	14	83CRC19
Iron	25%	83CRC12
Manganese	2650	83CRC17
Chromium	75	83CRC17
Copper	270	83CRC18
Lead	90	83CRC13
Zinc	630	83CRC17
Nickel	170	83CRC17
Cobalt	130	83CRC17
Molybdenum	< 4	in
Silver	< 1	all
Gold	< 0.05	boreholes

Detailed petrology was carried out on samples from holes 83CRC17 and 20 (see Appendix II).

In all, no encouraging lithlogies or assay values were encountered and the prospect was downgraded accordingly.

6.5 Meaney's Area

Ground magnetic lines 4550N and 4200N were extended in order to assess regional gradient and therefore assist in geophysically modelling the data (see plan no. SAa 2681). Each line was modelled and the results are shown in plans SAa 2679 and SAa 2680 to the south the mafic granulite body appears to be dipping steeply (80^{o}) to the west whilst in the north a shallower dip is inferred (60^{o}), also to the west.

Three boreholes totalling 248 metres were drilled (83CRC9, 10 and 11). 83CRC9 was drilled vertically to test the offset body in the south (line 4200N) whilst holes 83CRC10 and 11 were drilled at -60^{o} on a bearing of 320^{o} magnetic on lines 4650N and 4750N respectively in order to test possible strike extensions of the weak tungsten mineralisation intersected in North Broken Hill's holes C1-C4 (see plan no. SAa 2182).

83CRC9 intersected a basic granulite similar to those encountered by North Broken Hill Limited in their holes C1-C4. A detailed petrological report is contained in Appendix II. Magnetic susceptibilities taken on the core were sufficiently high to adequately account for the magnetic anomaly. Ultra-voilet lamping of the chips and core revealed no fluorescent minerals and returned assay results were unremarkable for the rock type, attaining the following maxima:- 13.5% iron, 400 p.p.m. manganese, 150 p.p.m. chromium, 180 p.p.m. copper, 32 p.p.m. lead, 200 p.p.m. zinc, 145 p.p.m. nickel, 34 p.p.m. cobalt - tin, tungsten, uranium, silver, gold and molybdenum values were all close to, or below, detection limits.

83CRC10 was precollared (reverse circulation) to 27 metres and diamond drilled to completion at 100 metres. No tungsten mineralisation was encountered and the maximum downhole geochemical value recorded was 95 p.p.m. between 44m - 46m. Other geochemistry was normal for the lithology (see Appendix I).

83CRC11 was precollared to 28.3 metres and diamond drilled to its final depth of 100 metres. Tungsten values were generally at or slightly above detection limits (10 p.p.m.) except for a single spot value of 80 p.p.m. from the 68m - 70m interval. Elsewhere a thin zone of slightly elevated copper values (278 p.p.m. x 6.3m from 28 metres to 34.3 metres) was the only anomalous geochemistry.

Although the entire stratigraphic unit (basic granulites) has not been fully tested, significant strike extensions of the weak tungsten (scheelite) mineralisation in C1 to C4 at shallow depth (< 100 metres) is now considered unlikely.

6.6 Pine Row

Spot zinc values of up to 1700 p.p.m. were previously recorded in S.A.D.M.E. boreholes in the Pine Row area. Following completion of a line of ground magnetics through the heart of the area (line 5000E) a fence of 10 reverse circulation boreholes (83CRC34 to 83CRC43) were drilled for an aggregate of 596.6 metres (see plan SAa 2630). All but six metres (spot diamond drill core) were drilled by the reverse circulation method.

Boreholes 83CRC37, 39 and 40 towards the northern and southern ends of the line intersected barren quartz, biotite, feldspar gneisses. Towards the centre of the line the predominent rock type was also gneissic,but with increased amounts of garnet and magnetite. 83CRC36 and 42 intersected meta-basics which in the former case appeared to be layered. Minor chlorite was associated with the gneiss in 83CRC35. An unusual, relatively unmetamorphosed, micaceous ultramafic intrusive was encountered in hole 83CRC38 at the northern extremity of the line.

Downhole geochemistry tended to reflect the intersected lithologies although small spot high anomalies did occur in some fo the gneissic suite. The following table is a summary of the maximum downhole geochemistry returned.

ELEMENT	MAXIMUM VALUE (PPM)	HOLE NO.	ROCK TYPE
Copper	410	83CRC42	amphibolite
Lead	42	83CRC42	amphibolite
Zinc	550	83CRC42	amphibolite
Cobalt	195	83CRC42	amphibolite
Molybdenum	32	83CRC42	amphibolite
Nickel	470	83CRC38	micaceous ultramafic intrusive
Chromium	420	83CRC38	micaceous ultramafic intrusive
Manganese	6200	83CRC35	chlorite/garnet/biotite/magnetite/ quartz/feldspar Gneiss
Uranium	22	83CRC40	quartz/feldspar/biotite Gneiss
Iron	24%	83CRC34*	garnet/ agnetite/feldspar/quartz Gneiss
Tungsten	20 20 20	83CRC34 83CRC35 83CRC40	garnet/magnetite/feldspar/quartz Gneiss chlorite/garnet/biotite/magnetite/ quartz/feldspar Gneiss quartz/felspar/biotite Gneiss
Tin	16 16 16 16	83CRC34 83CRC38 83CRC42 83CRC43	quartz/felspar/magnetite/garnet Gneiss micaceous ultramfic intrusive amphibolite sillimanite/biotite/garnet/quartz/ plagioclase Gneiss

All silver assays $\leq$ 1 p.p.m. (= detection limit)
All gold assays < 0.05 p.p.m. (= detection limit)

* 32% iron was recorded in a lateritic horizon above the basement in hole 83CRC42 (amphibolitic basement).

Samples from the basement rocks in boreholes 83CRC36, 38, 42 and 43 were submitted to Pontifex and Associates for detailed petrological examination. Their report is contained in Appendix II.

A 3.2 kilogram bulked sample of the ultrabasic in hole 83CRC38 was analysed for kimberlitic indicator mineral with negative results.

Although minor isolated geochemical spot highs do occur within rocks of the Pine Row area the overall tenor appears too low to represent an environment capable of hosting major stratiform/stratabound base metal bodies.

7. RADIOMETRICS

The located data tape for the airborne survey completed in April 1981 for North Broken Hill by Geoex Pty. Ltd. included radiometrics data (four channels) in addition to the magnetics data.

All records showing anomalously high "total" count readings were listed and plotted on the original flight-line plan. Several small areas were delineated, but no uranium-channel anomalies were noticeable. No further follow-up of the radiometrics data is warranted.

I.D. FINCH

IDF/dp

035/

EXPENDITURE

Expenditure for the period ended 31st December 1983, the nearest accounting period was $93,149.00, as listed below.

Drilling	$ 57,036
Payroll	11,567
Supplies	1,811
Vehicle	1,357
Travel	434
Property	541
Tenements	1,970
Contractors	390
Laboratory	12,858
Overheads	5,185
TOTAL	$ 93,149

0356

KEYWORDS

Ironstone, BIF hosted deposits, drill-reverse circ., copper, lead, zinc, tungsten, Assays-drill., Geophys-rad.

LOCATION

Kimba SI 53-7 1:250 000

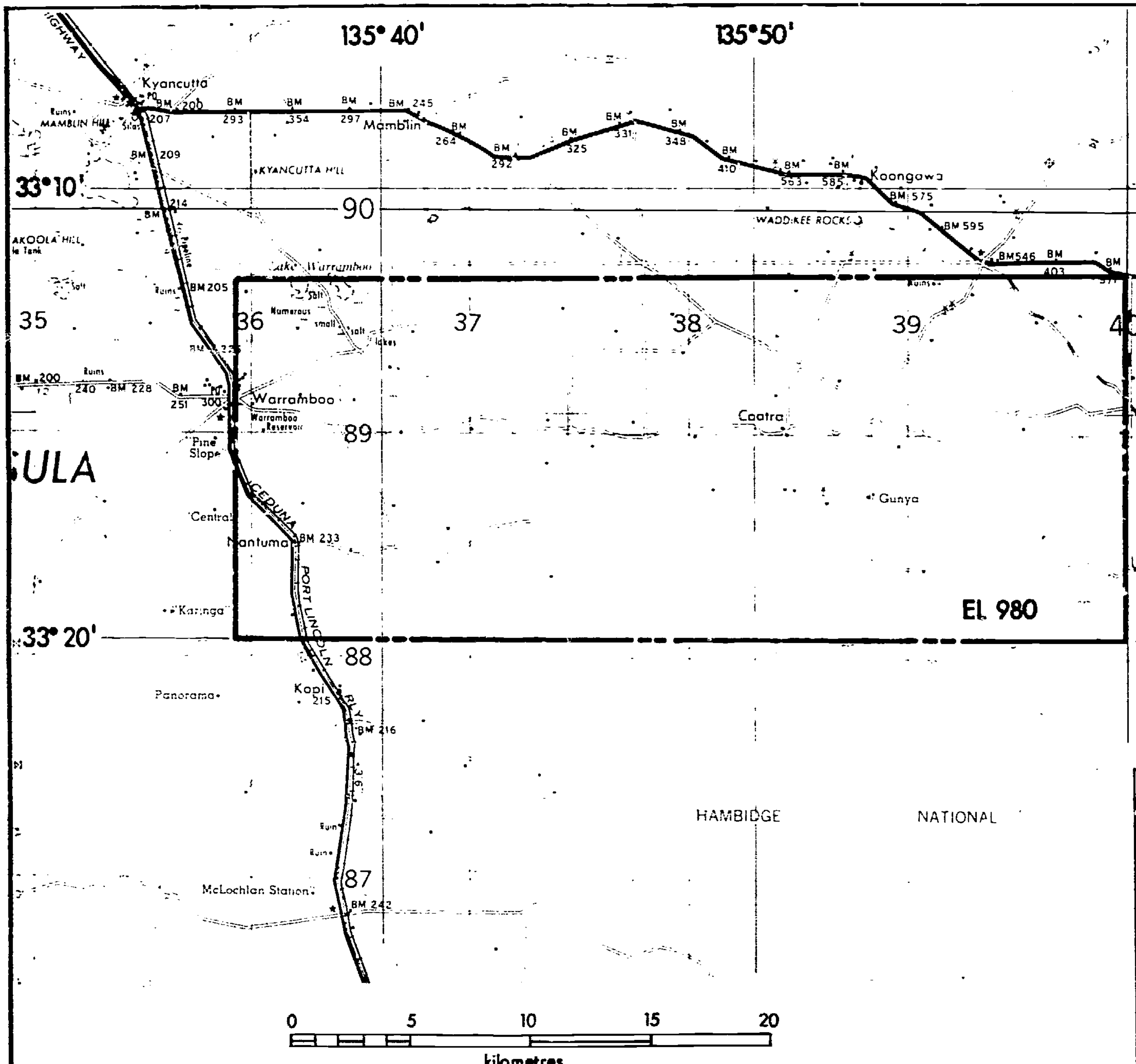
LIST OF PLANS

Plan No.	Title	Scale
SAa 2676	Location Map	1:250 000
SAa 1804	1983 Borehole Location Plan	1: 50 000
SAa 2635	Warramboo Prospect (C-1), Geological cross-section - lines 6720E & 7000E	1: 2 000
SAa 2634	Nosredna (C-2) Prospect, Geological cross-section - line 4000SE	H=1: 5 000 V=1: 1 000
SAa 2633	Nosredna Prospect - line 5000E Drill hole 83CRC8	H=1: 5 000 V 1: 1 000
SAa 2631	Brewer's Prospect - line 4000N	H=1: 5 000 V=1: 1 000
SAa 2632	Brewer's Prospect - line 5000N	H=1: 5 000 V=1: 1 000
SAa 2681	Meaney's Prospect - Stacked Profiles of Ground Magnetics	1: 10 000
SAa 2679	Meaney's Prospect - Ground Magnetic Interpretation - line 4550N	H=1: 8 900 V=1: 10 000
SAa 2680	Meaney's Prospect - Ground Magnetic Interpetation - line 4200N	H=1: 8 900 V=1: 10 000
SAa 2182	Meaney's Prospect - Total Magnetic Intensities and borehole positions	1: 1 500
SAa 2630	Pine Row Prospect (C-6) - Geological cross-section - line 5000E	1: 2 000

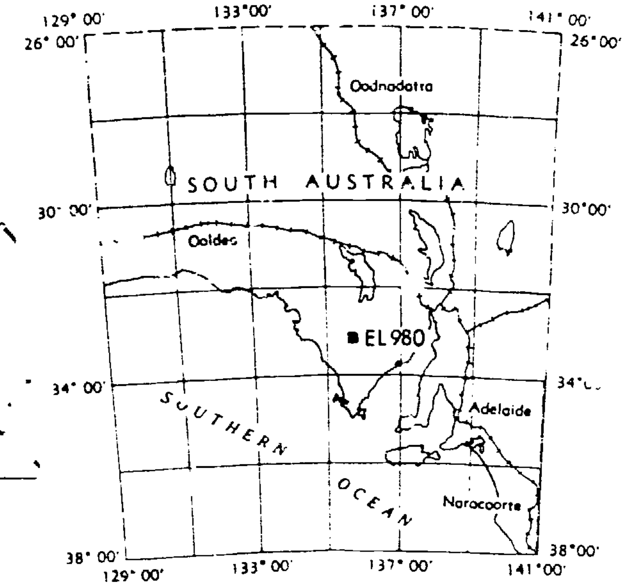
LIST OF APPENDICES

Appendix I — Detailed Logs including Downhole Geochemical Data.

Appendix II — Pontifex and Associates report 4200 - Detailed Petrology.



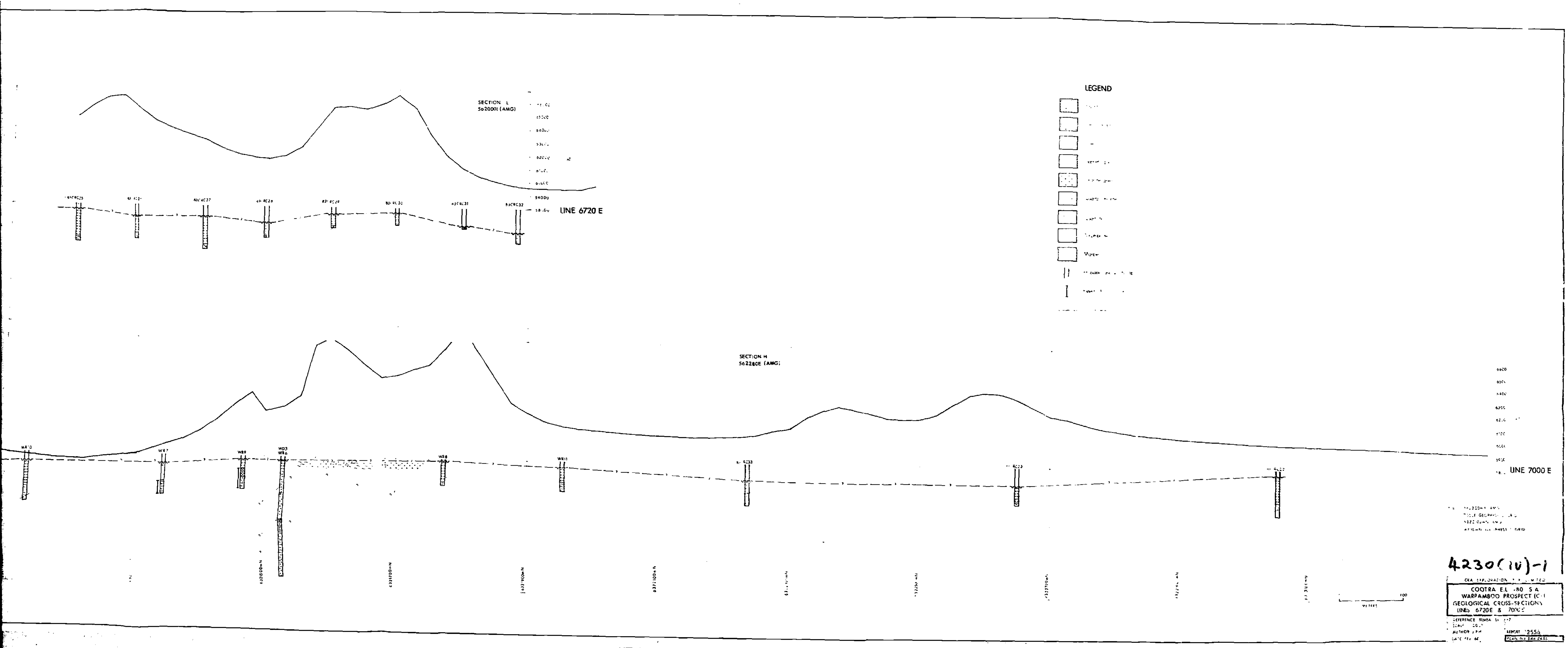
LOCALITY

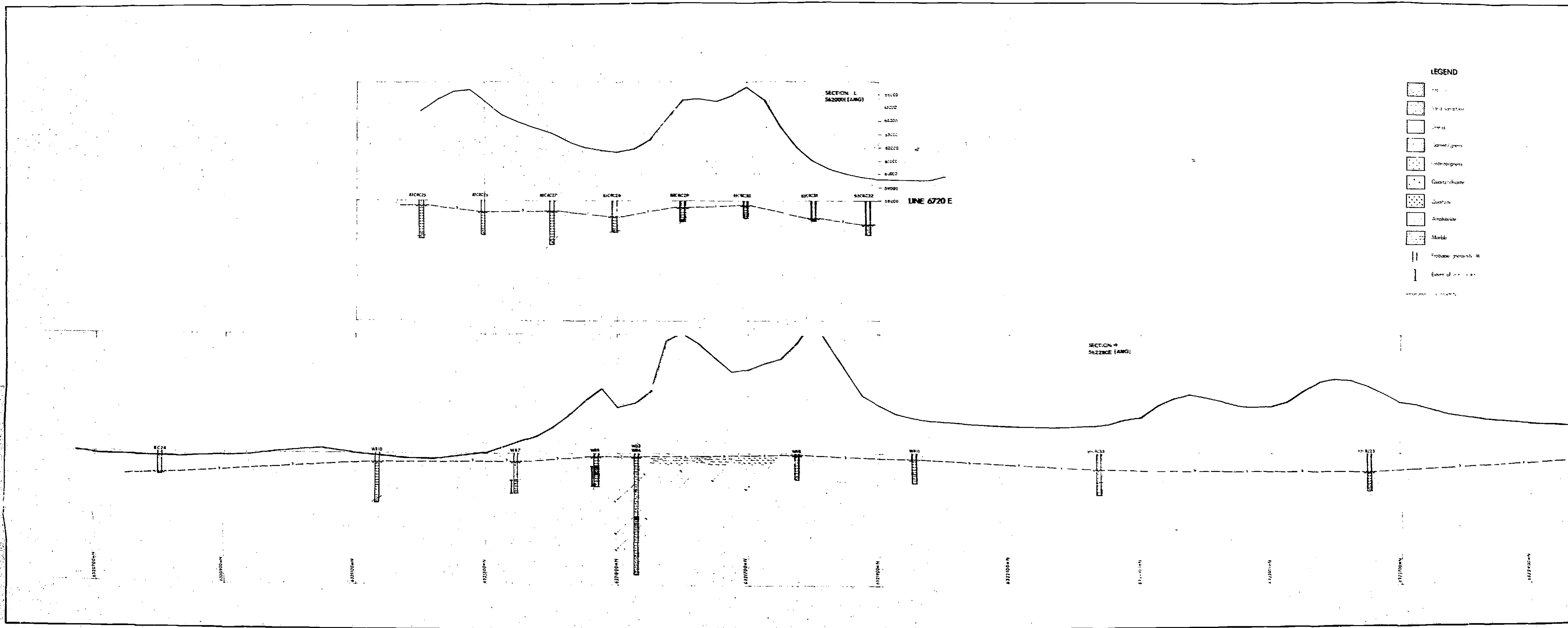


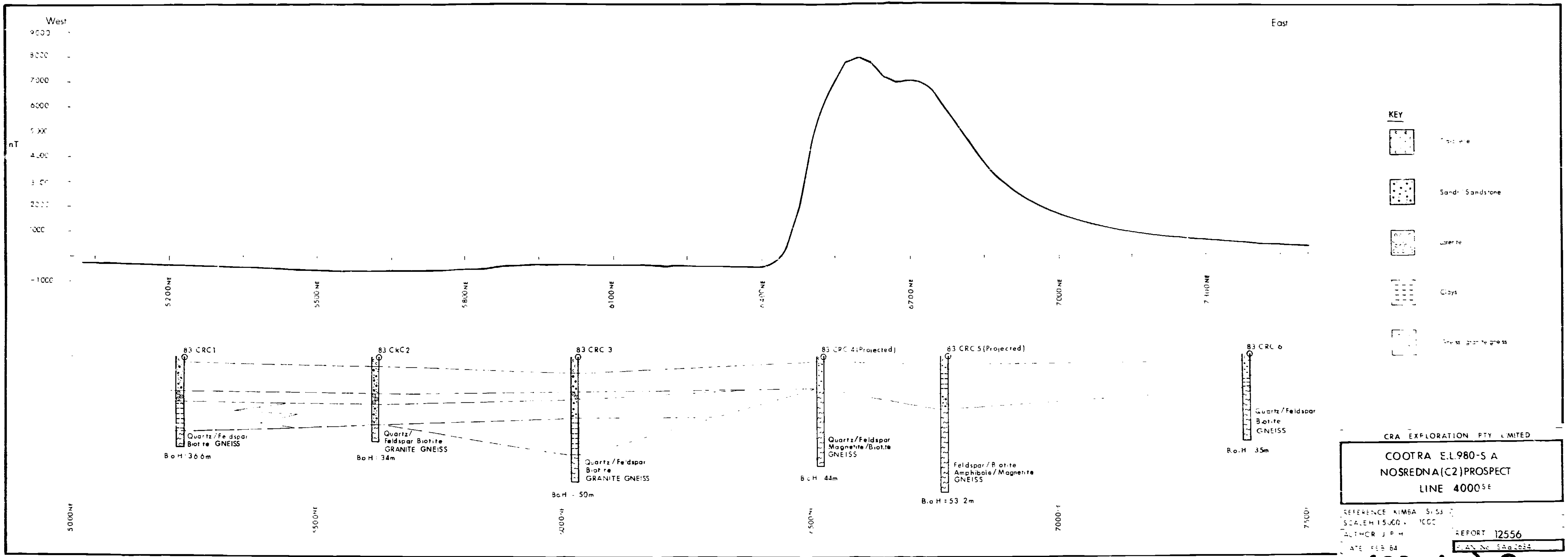
CRA EXPLORATION PTY LIMITED

COOTRA EL 980 - S.A.
LOCATION MAP

REF.	KIMBA SI 53 -7		
SCALE	1:250,000		
AUTHOR	JPH	REPORT	12556
DATE	March 1984	PLAN No	SAa 2676


SECTION L
562000E (AMG)
LINE 6720 E
LEGEND
SECTION H
562280E (AMG)
LINE 7000 E
4230(IV)-1
COOTRA E.L
WARPAMBOO PROSPECT
GEOLOGICAL CROSS-SECTIONS
LINES 6720E &


LEGEND
Quartzite
Marble
LINE 6720 E
WB10
WB7
WB11

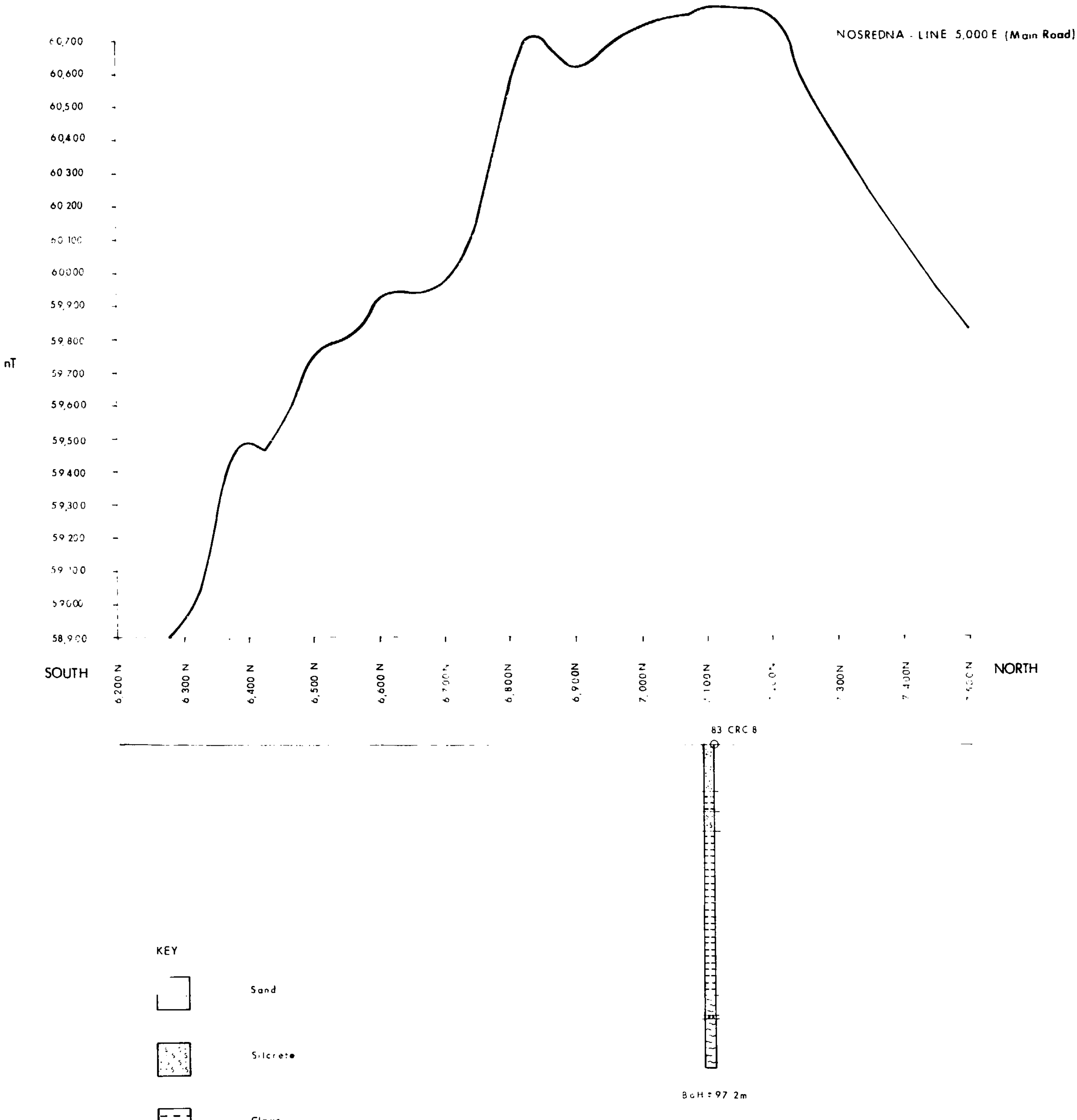


CRA EXPLORATION PTY LIMITED

COOTRA E.L.980-S A
NOSREDNA (C2) PROSPECT
LINE 4000SE

REFERENCE KIMBA
AUTHOR J.P.H.
DATE FEB 84
REPORT 12556

4230(IV)-2



KEY

Sand

Silcrete

Clays

Gneiss

Basic intrusive

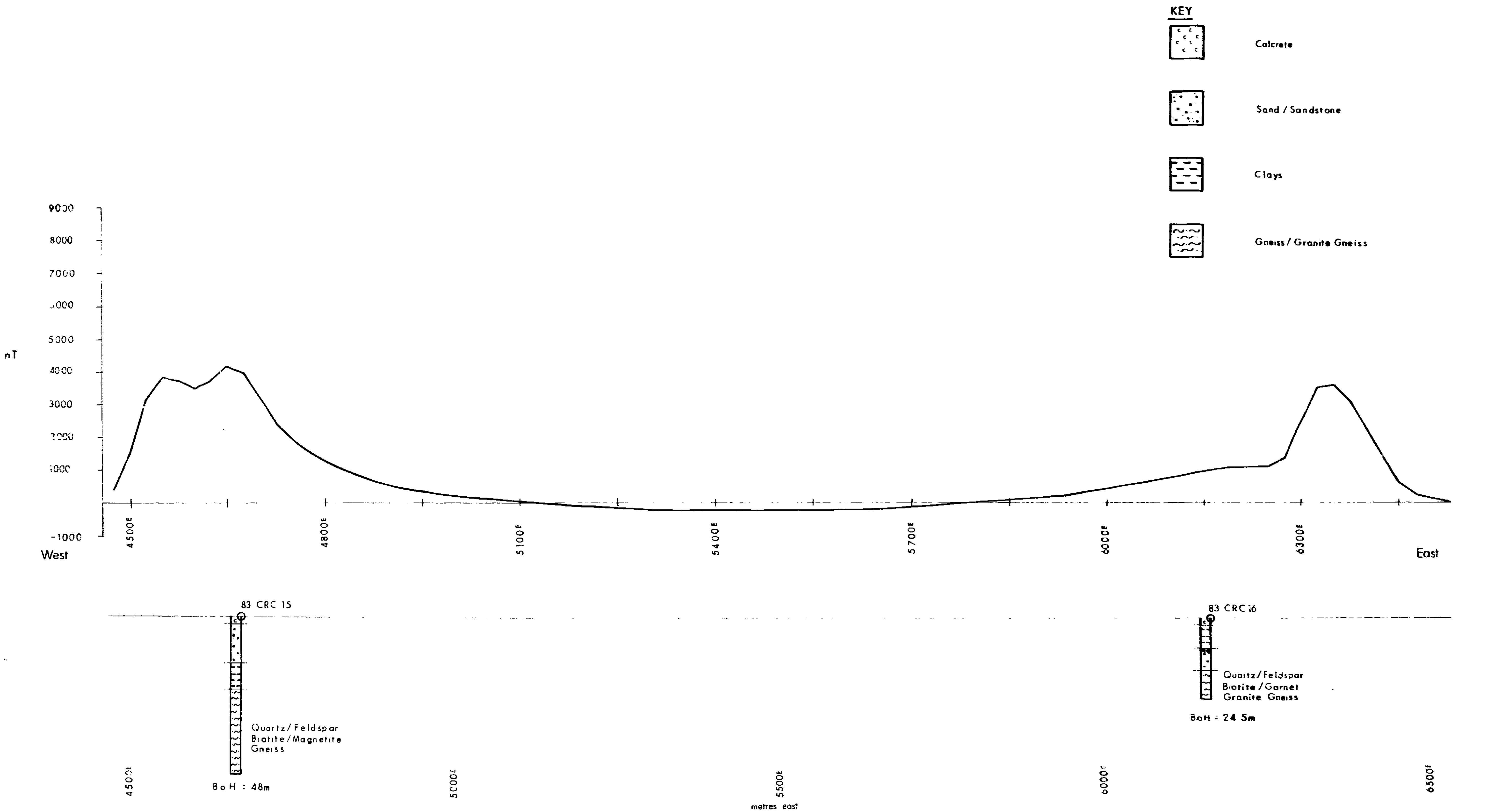
Total magnetic intensity

4230(IV)-3

CRA EXPLORATION PTY LIMITED

COOTRA E.L.980-S.A.
NOSREDNA PROSPECT
LINE 5000E
DRILL HOLE 83 CRC 8

REFERENCE KIMBA SI 53-7
SCALE. H: 1:5000. V: 1:1000.
AUTHOR J PH.
DATE FEB '84
REPORT 12556
PLAN No SAa2633

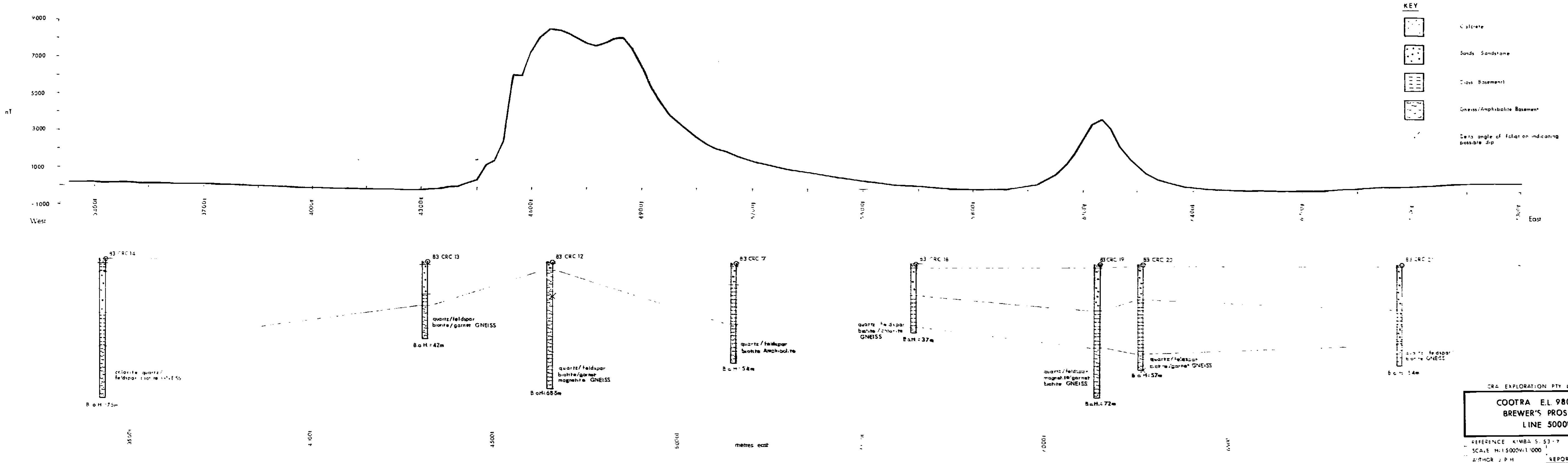


CRA EXPLORATION PTY. LIMITED

COOTRA E.L.980-S.A.
BREWER'S PROSPECT
LINE 4000N

REFERENCE KIMBA SI 53-7	
SCALE H=1:5000 V=1:1000	
AUTHOR JPH	REPORT 12556
DATE FEB '84	PLAN No. SAg 2631

4230 (IV) - 4



CRA EXPLORATION PTY LIMITED

COOTRA E.L. 980-S A
BREWER'S PROSPECT
LINE 5000N

REFERENCE KIMBA S. 53-7
SCALE H: 1 5000 V: 1 1000
AUTHOR J P H
DATE FEB '84
REPORT 12556
PLAN No SAa 2632

4230 (IV)-5

APPENDIX I

Detailed Logs Including Downhole Geochemical Data.

C.R.A. EXPLORATION PTY. LIMITED

PROJECT COOTRA EL

Geological & Assay DRILL CORE LOG

CO-ORDINATES 5130NE/4000SE AZIMUTH Vertical DRILLERS Wallis COMMENCED 8/10/83 DEPTH 36 Cm HOLE No. 83CRC 1

RL COLLAR INCLINATION DRILL TYPE Rotary Air Core COMPLETED 8/10/83 CASING LEFT DPO No(s) 8081

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	SAMPLE No.
0	30			SAND, CALCRETE, LATERITE & CLAY							
				0-14m SAND							
				0-1m brown, fine to medium grained, calcreted in ~~place~~ part							
				1-9m calcareous, medium brown to white, fine grained, subrounded, well sorted,							
				3-4m particularly calcareous							
			10	9-10m red-brown, fine grained, subrounded well sorted, clayey							
				10-12m orange-brown							
				12-13m medium-brown, fine to medium grained subrounded, poorly sorted							
				13-14m pink-brown							
				14-18m LATERITE, orange & red-brown, siliceous, angular chips, iron rich concretions							
			20 Aircore & hammer	18-30m CLAY, white, kaolinitic, soft, sandy.							
					<4	<10	8	0.95	32	<4	915629
			30	Unconformity							
30	35.6			WEATHERED GNEISS	6		8	1.40	50	10	915630
				grey-green & white, some large chips of quartz-feldspar-muscovite	<4		6	1.40	55	6	915631
					<4		8	1.65	240	30	915632
35.6	36.6	10%		GNEISS	Petrology sample 915632						
	BOH		diamond core	Patches up to 2cm diameter of pink, anhedral feldspar with ?myrmekitic intergrowths of quartz on cleavage planes.	All Au values <0.05						
			40	Biotite 20%	Ag <1						
				Quartz-feldspar, fine grained, matrix 60%							
				Minor iron stains							
				Vague foliation at 70° to lca							
			50								

FROM (M)	TO (M)	REC (M)	[illegible]	[illegible]	Cu	Pb	Zn	Ni	Co	M
0	1		9	5						
	2		9	5						
	3		8	5						
	4		9	4						
	5		12	0						
	6		17	5						
	7		15	8						
	8		13	6						
	9		14	15						
	10		11	18						
	11		11	10						
	12		15	80						
	13		12	25						
	14		15	5						
	15		45	90						
	16		85	25						
	17		75	21						
	18		42	15						
	19		24	5						
	20		20	10						
	21		20	7						
	22		21	0						
	23		23	0						
	24		24	0						
	25		29	4						
	26		30	2						
	27		33	5						
	28		33	4						
	29		34	5	14	34	28	8	6	6
	30		36	11						
	31		28	14	22	24	42	8	10	8
	32		27	18						
	33		30	19	14	24	36	10	10	4
	34		30	14						
	35		28	20	22	14	75	12	10	8
	36.5		10	30						
	37									

CRAE 117
PLAN No M 414

SUMMARY AND SPECIAL COMMENTS

LOGGED BY [illegible] DATE 10/10/83

0362

C.R.A. EXPLORATION PTY. LIMITED

PROJECT COOTRA EL

Geological & Assay DRILL CORE LOG

CO-ORDINATES 4000SE/5625NE AZIMUTH Vertical DRILLERS Wallis COMMENCED 10/10/83 DEPTH 34 m HOLE No. 83CRC2

R.L. COLLAR INCLINATION DRILL TYPE Rotary Air Core COMPLETED 10/10/83 CASING LEFT – DPO No(s) B0832

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	CORE DESCRIPTION
0	15		Air core	SAND, CALCRETE & CLAY 0-1m SAND, orange-brown, fine to medium grained, subrounded, well sorted. 1-4m CALCARENITE Sand 50%, fine to medium grained, angular to subangular, well sorted, quartzose. Calcrete 50%, pink-white, hard. 4-9m SAND, light orange-brown, loose. 9-15m SAND & CLAY Sand 50%, fine to medium grained, subangular, poorly sorted. Clay 50%, dark-brown, stiff.
15	19			LATERITE, red-brown, mottled, fine grained, quartz grains <10% to 3mm. Concretionary textures
19	27			SANDSTONE, white, compact. Sand 60%, fine to very coarse grained angular, poorly sorted. Clay 40%, white, as matrix.
				Unconformity
27	34 BOH			GRANITE GNEISS, no clear alignment of minerals Quartz, 60%, clear Feldspar, 25%, greenish-white, anhedral. Biotite, 15%, euhedral to 2mm diameter

Sn	W	U	%Fe	Mn	Cr	SAMPLE No.	FROM (M)	TO (M)	REC (M)	CPS	SIU ×10⁻⁵	Cu	Pb	Zn	Ni	Co	M.
							0	1		5	0						
								2		7	15						
								3		7	11						
								4		8	30						
								5		6	14						
								6		6	12						
								7		8	20						
								8		6	5						
								9		7	5						
								10		9	14						
								11		10	34						
								12		10	20						
								13		9	40						
								14		8	15						
								15		10	24						
								16		12	20						
								17		11	18						
								18		10	6						
								19		10	50						
								20		9	25						
								21		9	65						
								22		11	100						
								23		11	4						
								24		10	5						
								25		9	1						
								26		9	5						
								27		10	14						
<4	<10	4	1.30	80	22	915633	27	28		9	24	4	18	32	8	16	4
								29		12	15						
<4		<4	1.30	100	18	915634		30		13	18	8	14	38	10	16	<4
								31		9	20						
4		<4	1.20	90	16	915635		32		8	20	8	12	34	10	14	<4
								33		11	19						
<4		4	1.50	105	14	915636	33	34		9	20	6	10	50	16	10	<4

All Au values <0.05
" Ag " <1

SUMMARY AND SPECIAL COMMENTS

LOGGED BY [illegible] DATE 11/10/83

0365

DRILL CORE LOG

CO-ORDINATES 4xxx5?/6030NE AZIMUTH Vertical DRILLERS Wallis COMMENCED 10/10/83 DEPTH 50m HOLE No. 83CRC3

RL COLLAR INCLINATION DRILL TYPE Rotary Air Core COMPLETED 11/10/83 CASING LEFT – DPO No(s) B0530

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	CORE DESCRIPTION
0	14			SAND & CALCRETE 0-4.5m SAND, orange-brown, fine to medium grained, subrounded, well sorted 4.5-6.5m CALCRETE, white, sandy 6.5-10m SAND, medium orange-brown, fine to medium grained, subrounded, well sorted. 10-14m SAND, dark orange brown, as above
14	17			LATERITE hard, much core Concretionary iron nodules 40% Average 1cm diam Claystone 60%.
17	24.5		20	SANDSTONE, pink-orange, medium to course grained, subangular, well sorted, clayey, hard.
24.5	39		Rotary Air Core 30	CLAY, white-yellowish, kaolinitic, slightly sandy Unconformity
39	49	30%	40	WEATHERED BASEMENT (? GNEISS) Clay, micaceous (green, after biotite), white, green & orange & quartzose Becoming greener towards base with increase in biotite & degraded feldspar. 47-48m Biotite 40%, feldspar, light green & qtz 48-49m Weathered qtz-feld-biotite gneiss Feldspar, 20%, soft green, biotite 30%, qtz 50%
49	50	10%	50	GRANITE GNEISS – fresh rock Feldspar 30%, pink & white, course grained, subhedral Biotite 25%, vague alignment, Quartz 45%.

All Au values <0.05
" Ag " <1

ASSAY VALUES

FROM (M)	TO (M)	REC (M)	Sn	U	%Fe	Mn	Cr	SAMPLE No.	Au10 As	S10 xoo	Cu	Pb	Zn	Ni	Co	Mo
0	1								<20	0						
	2									0						
										10						
	4									10						
										30						
	6									15						
										10						
	8									5						
										5						
	10									20						
										5						
	12									10						
										10						
	14									10						
										80						
	16									65						
										25						
	18									30						
										35						
	20									10						
										20						
	22									10						
										10						
	24									5						
										20						
	26									0						
										10						
	28									20						
										10						
	30									10						
										15						
	32									10						
										10						
	34									5						
										5						
	36									10						
										20						
	38									10						
38	39									15						
39	40		12	4	1.25	55	4	915637		20	10	20	50	14	14	4
										20						
	42		4	6	1.60	60	14	638		20	20	30	44	22	12	<4
										25						
	44		4	6	2.30	100	10	639		20	28	36	90	24	20	
										20						
	46		4	8	2.70	120	6	640		30	32	22	110	44	24	
										35						
	48		<4	14	6.30	150	130	641		30	130	22	320	200	55	
										20						
	50		<4	8	13.50	100	60	642		55	60	14	170	110	38	

SUMMARY AND SPECIAL COMMENTS ? Shear Zone – Apple green chlorite schist with porphyritic white feldspar talcose slickensides

LOGGED BY J.P. Howard DATE 11/10/83

SHEET 1 OF 1

CRAE H7
PLAN No N 414

Geological & Assay DRILL CORE LOG

0364

CO-ORDINATES 3740SE/6525NE AZIMUTH Vertical DRILLERS Wallis COMMENCED 11/10/83 DEPTH 44m HOLE No. 83CRC 4

RL COLLAR ______ INCLINATION ______ DRILL TYPE Rotary Air Core COMPLETED 11/10/83 CASING LEFT ______ DPO No(s) B0832

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	ASSAY VALUES Sn	W	U	%Fe	Mn	Cr	SAMPLE No.	FROM (M)	TO (M)	REC (M)	CPS	SIU ×10⁻⁵	ASSAY VALUES Cu	Pb	Zn	Ni	Co	Mo
0	13				CALCRETE, SAND, & SANDY CLAY								0	1		<30	20						
					0–2m CALCRETE, rubble up to 15cm D									2			5						
					pink-white, some very fine												15						
					laminations.									4			15						
					2–4m SAND, off-white, fine grained,												8						
					subrounded, well sorted									6			250						
					4–5m SAND, medium orange-brown, fine to												200						
					medium grained, poorly sorted, clayey, stiff									8			200						
					5–6m SAND, orange-brown, fine to medium												40						
			10		subrounded, poorly sorted, loose									10			25						
					6–9m SAND, dark red-brown, fine to												13						
					medium grained, poorly sorted, clayey, stiff									12			10						
			Unconformity		9–13m SANDSTONE, dark brown at top								12	13			6						
					to white at base, fine to medium	<4	<10	<4	7.60	60	20	915643		14			5	14	22	28	20	16	<4
					grained, angular, poorly sorted	6		<4	13.0	60	20	44					15	12	30	30	14	14	
					Sand 60% matrix clay 40%; hard.									16			9						
13	44				WEATHERED BASEMENT (GNEISS)	4		6	7.90	135	16	45					10	36	40	100	28	20	
~~13~~	~~23~~				13–23m CLAY, dominantly white, purple & pink-brown									18			10						
	EOH				Some chips with relict gneiss texture	8		<4	17.0	85	26	46					20	20	28	28	20	16	
			20		& quartz grains									20			10						
						10	10	<4	17.0	55	28	47					16	34	36	40	16	10	
														22			18						
						6	<10	<4	14.0	130	16	48					100	32	40	70	16	20	6
					23–27m CLAY & QUARTZ (Weathered Gneiss)									24			100						
					Clay 80% dark red-brown	6	10	4	27.5	200	34	915649	24	25			200	32	40	60	22	12	4
					Quartz 20% medium grained, glassy									26			84						
																	180						
					27–28m CLAY & QUARTZ, white, some very	4	<10	<4	16.0	150	22	50		28			250	22	30	60	26	22	<4
					iron-rich core pieces												75						
			30		28–32m CLAY & QUARTZ, rust brown, soft	4	<10	<4	16.0	186	34	51		30			29	14	32	60	22	20	
					Minor (?) gossanous ironstone fragments (no Pb,Zn,Cu vis)												60						
					32–37m CLAY & QUARTZ (Weathered Gneiss)	10	<10	6	19.0	240	30	52		32			50	14	32	75	28	28	
					Medium brown												425						
					37–39 CLAY & QUARTZ, dark red-brown	8	10	<4	12.0	890	38	53		34			350	36	22	80	34	26	
																	500						
					39–44m GNEISS, medium grained,	<4	<10	<4	0.55	20	4	54		36			100	6	12	10	10	10	
					quartz 60%; biotite 10%; feldspar ~~minor~~ 20% pink;												250						
					magnetite 5% – iron stained.	8	<10	<4	1.60	18	28	55		38			450	<4	14	10	6	10	
					Foliation at 70° ico												1900						
			40			4		<4	1.25	18	8	56		40			900	4	16	10	10	10	
																	1600						
						6		4	2.30	24	6	57		42			3000	6	12	18	12	10	
						4		<4	3.30	18	<4	915658					3500	4	16	10	14	10	
														44									
			50																				

Magnetite
(?) Pyrolusite – botryoidal
as thin coatings

All Au values <0.05
" Ag " <1

SUMMARY AND SPECIAL COMMENTS ______

LOGGED BY J. Howard DATE 11/10/83

SHEET 1 OF 1

CRAE 117
PLAN No M414

DRILL CORE LOG

CO-ORDINATES 5000E/7050N
RL COLLAR
AZIMUTH
INCLINATION VERTICAL
DRILLERS WALLIS
DRILL TYPE REVERSE CIRC. (AIR CORE)
COMMENCED 12/10/83
COMPLETED 12/10/83
DEPTH 28m.
CASING LEFT
HOLE No. 83CRC 7
DPO No(s) B 0533

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION
0	12				SANDS AND CLAYS 0-1m Buff/brown aeolian sand, fine to very fine 1m-3m light brown/buff mix of sand and calcrete. 3m-5m Red/brown clays with small sand fraction 5m-12m Various mixes of sands and clays from buff colour to red/brown
12	27				SILICIFIED BASEMENT CAPPING 12m-14m brown (dark) mottled silcreted regolithic horizon. limonitic pisolites cemented in silcreted quartz sandstone. 14m-16m Sheared pieces of air core with chalcedony throughout and secondary iron concretions 16m-27m buff to buff/green silicious (core pieces) basement. Dominant green (epidote?) alteration clay mineral - possibly some serpentine. Chalcedony very common. limited amount of iron staining.
27	28				ALTERED BIOTITE/PLAGIOCLASE/EPIDOTE SHEARED ROCK. core chips and pieces black/white/green rock. medium grained crystalline rock with alteration veining parallel to core axis Black mineral may be Hornblende? little obvious foliation (MAFIC GNEISS?) PETROLOGY SAMPLE 947719 "High grade amphibolite - probable shear zone." - Pontifex

Cu	Pb	Zn	Ni	Co	SAMPLE No.	FROM (M)	TO (M)	REC (M)	CPS	ΣU	Sn	W	%Fe	Mn	Cr
									10	15					
									9	16					
									8	35					
									8	20					
									12	15					
									13	5					
									12	5					
									9	10					
									10	24					
									10	75					
									13	25					
									11	20					
10	16	6	12	<4	947712	12			14	30	8	10	4.60	10	20
							14		15	26					
12	18	8	16	4	947713	14			18	26	<4	<10	3.20	6	10
							16		16	26					
28	22	18	24	6	947714	16			12	28	10	<10	7.80	10	16
							18		11	70					
38	22	32	26	10	947715	18			13	40	<4	10	6.30	16	16
							20		14	30					
80	18	46	34	10	947716	20			12	30	<4	10	10.0	16	20
							22		11	28					
60	16	42	32	10	947717	22			13	30	<4	<10	12.0	22	20
							24		11	35					
80	16	55	32	10	947718	24			10	45	4	<10	12.0	26	24
							26		11	40					
80	14	55	32	10	947719	26			14	350	<4	<10	8.80	120	18
							28		9	200					

All Au values <0.05
" U " <4
" Mo " <4
" Ag " <1

SUMMARY AND SPECIAL COMMENTS

LOGGED BY I.D. FINCH DATE 12/10/83

SHEET 1 OF 1

CRAE H7 PLAN No 11444

DRILL CORE LOG

CO-ORDINATES 3540SE/6775NE AZIMUTH Vertical DRILLERS Wallis COMMENCED 11/10/83 DEPTH 53.2m HOLE No. 83CR 5

RL COLLAR INCLINATION DRILL TYPE Rotary Air Core COMPLETED 11/10/83 CASING LEFT – DPO No(s) 80832

036

Core description

DEPTH FROM (m)	DEPTH TO (m)	CORE REC. (m)	CORE SIZE	CORE DESCRIPTION
0	15			SAND, CALCRETE & SANDY CLAY 0–1m SAND, light brown, fine grained, subrounded, well sorted 1–3m CALCRETE, off white, hard 3–5m SAND, medium brown, fine to medium grained, subrounded, poorly sorted 5–15m CLAY, dark brown to orange brown, fine to medium grained, poorly sorted
15	21			~~15–21m~~ SANDSTONE, orange brown, hard Sand 50%, fine to medium, subangular to angular, poorly sorted. Clay 50%, white, hard Unconformity
21	52			VERY WEATHERED BASEMENT CLAY 21–28 CLAY 70%, white, kaolinitic QUARTZ 30%, angular, clear, some aligned at 60° lca as bands 3mm thick, granular. Sticks of core at top. 28–35m As above but grey & orange. N.B. Magnetite content slight from 21–45M. Increases from 45–53M. Generally fine grained 35–43m As above but dark purple. 43–46m As above, but grey-green. 46–49m As above, but medium brown to grey 49–52m As above with purple, brown, grey & pink colours. Gneissic texture increasingly evident.
52	53.2	BOH		52–54m ~~GR~~ GNEISS, qtz 60%, felspar 30% pink, magnetite 5%, bronze mica (?after biotite) <5%. Vague foliation at 60° lca.

Core size marks in log: 10, 20, 30, 40, 50

Assay values

SAMPLE No.	FROM (m)	TO (m)	Sn	W	U	%Fe	Mn	Cr	Cu	Pb	Zn	Ni	Co	Ag	Mo
915660	21	22	16	<10	<4	0.35	30	<4	<2	12	6	6	10	<1	<4
661		24	4			0.40	22	<4	4	28	12	6	6	<1	
662		26	16			0.35	48	12	10	14	20	12	<4	1	
663		28	14	10		0.40	60	14	8	16	20	12		1	
664		30	28	<10	4	0.60	60	14	16	16	22	12		1	
665		32	6		6	0.70	28	10	8	55	18	14	6	1	4
666		34	18		<4	0.90	46	10	10	42	14	12	6	1	4
667		36	18			3.60	110	12	14	46	40	18	<4	1	4
668		38	14			11.0	140	28	10	26	42	16	6	1	4
669		40	<4			17.0	270	28	10	24	26	18	6	1	<4
670		42	10		4	19.0	360	32	26	22	50	28	12	1	6
671		44	<4		<4	24.0	570	30	28	28	70	30	14	2	4
672		46	<4		<4	16.0	470	18	38	22	55	24	12	1	<4
673		48	<4		4	12.0	400	28	46	20	65	24	12	1	
674		50	14		<4	8.00	340	22	28	28	55	24	20	1	
915675		52	12		<4	6.20	165	16	20	12	42	18	16		

All Au values <0.05

Radiometric (CPS ×10³)

FROM (m)	TO (m)	CPS
0	1	<50 / 50
	2	30
	3	20
	4	10
	5	10
	6	5
	7	9
	8	5
	9	5
	10	3
	11	100
	12	125
	13	45
	14	26
	15	16
	16	50
	17	30
	18	24
	19	10
	20	15
20	21	200
21	22	30
	23	24
	24	25
	25	20
	26	40
	27	35
	28	42
	29	26
	30	39
	31	25
	32	35
	33	100
	34	80
	35	66
	36	45
	37	23
	38	55
	39	25
	40	600
	41	300
	42	300
	43	350
	44	80
	45	50
	46	45
	47	20
	48	50
	49	50
	50 / 51	400 / 300
	52	400
	53	300

SUMMARY AND SPECIAL COMMENTS

LOGGED BY [signature] DATE 11/10/83

SHEET 1 OF 1

036

DRILL CORE LOG

CO-ORDINATES 4008E / 7390NE AZIMUTH ___ DRILLERS WALLIS COMMENCED 12/10/83 DEPTH 35m HOLE No. 83CRC 6

RL COLLAR ___ INCLINATION VERTICAL DRILL TYPE RC. (AIR CORE) COMPLETED 12/10/83 CASING LEFT ___ DPO No(s) BO833

Depth From (m)	Depth To (m)	Core Rec. (m)	Core Size	Graphic Log	Core Description	Sn	W	U	%Fe	Mn	Cr	Mo	Sample No.	From (M)	To (M)	Rec (M)	CPS	SI×10	Cu	Pb	Zn	Ni	Co	Ag
0	9				SANDS.												11	38						
					Buff aeolian sands with small calcrete component												9	37						
					from 1 to 3 metres.												9	35						
																	10	25						
																	10	16						
																	9	18						
																	11	10						
																	11	10						
																	11	10						
9	14				SANDS AND CLAYS												12	13						
					sand clay mix – red/brown decreasing												11	15						
					from 60:40 clay fraction to <10% clay												12	15						
					fraction at base.												11	40						
																	12	8						
14	34				SANDS AND CLAYS OF WEATHERED BASEMENT.	4	10	<4	3.35	22	16	<4	947701	14			14	15	16	38	12	<4	<4	<1
					14m-17m Red/brown to orange clays and										16		16	45						
					sands of weathered basement: very small	<4	<10		4.95	55	32		947702	16			17	22	32	24	18	10		
					quartz component.										18		17	30						
					17m-26m Pink to mauve clays. Small	<4			3.05	26	16		947703	18			19	27	16	22	8	8		
					air core pieces exhibit remnant gneissic										20		18	15						
					texture with moderately high proportion of	<4			4.40	16	14		947704	20			10	10	20	24	8	8		
					mica (muscovite?)										22		17	15						
						6			3.10	22	14		947705	22			16	11	24	26	12	18		
															24		16	5						
						4			3.50	32	10		947706	24			14	10	18	22	10	10		
															26		16	10						
					26m-34m light brown to buff/green sandy	<4			2.15	50	4		947707	26			36	15	34	26	50	6		
					clays of weathered basement. Chloritic										28		39	15						
					mica common. Very little quartz.	4			3.15	100	4		947708	28			26	15	44	22	65	16	8	
															30		23	20						
						4	<10		3.80	110	4		947709	30			18	20	50	24	65	20	8	
															32		19	10						
						<4			2.45	75	6		947710	32			18	15	46	22	42	14	8	
															34		18	25						
34	35				Chips and small core pieces. QUARTZ/FELDSPAR/BIOTITE GNEISS	4			2.50	100	14		947711	34	35		15	50	30	20	28	12	6	
					biotite mica about 15% – Some	All Au values <0.05																		
					chlorite alteration.																			

BOH 35m

PETROLOGY SAMPLE 947711

SUMMARY AND SPECIAL COMMENTS

LOGGED BY I.D. FINCH DATE 12/10/83

SHEET 1 OF 1

CRAE 117 PLAN No ...

0386

DRILL CORE LOG

CO-ORDINATES 5000E (mod) / 7100N AZIMUTH ____ DRILLERS WALLIS COMMENCED 12/10/83 DEPTH 97.2 HOLE No. 83CRC 8

RL COLLAR ____ INCLINATION VERTICAL DRILL TYPE REVERSE CIRC. (AIR CORE) COMPLETED 15/10/83 CASING LEFT — DPO No(s). ____

Depth From (m)	Depth To (m)	Core Rec. (m)	Core Size	Graphic Log	Core Description	Cu	Pb	Zn	Ni	Co	Sample No.	From (m)	To (m)	Rec (m)	CHS	SiO	Sn	W	%Fe	Mn	Cr
0	15				SAND.										7	20					
					0m - 14m Light buff aeolian sand - fine										6	46					
					to v. fine grained. Small (<10%)										8	34					
					clay fraction towards base. Minor										8	15					
					amounts of calcrete at 6m-8m										9	10					
					unconsolidated to poorly consolidated										8	10					
					14m - 15m buff/brown (50:50) sand/clay mix										8	7					
					med to fine grained sand fraction.										9	10					
															12	10					
															10	10					
															9	11					
															10	20					
															7	10					
															8	10					
															9	12					
15	20				CLAYS.										9	14					
					Red/brown to brown clays with increasing										9	18					
					sand fraction downwards - becoming siliceous										12	20					
					towards the base.									*	43	30					
														*	42	30					
20	26				SILICEOUS REGOLITH.	10	16	8	8	<4	947720	20			18	22	<4	<10	5.00	10	24
					silicified pallid zone of								22		16	15					
					bleached sands and hematitic concretions	10	10	8	10		947721	22			16	10	4		1.00	8	10
					Occasional rock fragments with remnant								24		13	25					
					gneissic texture - all silicified.	8	16	6	10		947722	24			14	15	8		5.20	8	28
													26		12	15					
26	75.4				SANDS AND CLAYS OF WEATHERED BASEMENT	12	12	6	6		947723	26			15	10	<4		2.85	10	12
					26m - 27m light yellow/buff clays and sand - fine gr								28		18	9					
					27m - 37m light brown to dark brown limonitic	34	14	12	6		947724	28			18	5	<4		2.30	10	18
					clays of weathered basement. Occasional								30		20	12					
					core pieces show siliceous fragments of	34	14	16	6		947725	30			14	9	<4		3.90	18	4
					a fine grained to medium grained								32		14	5					
					gneissic rock	34	14	26	8		947726	32			16	15	4		4.20	18	24
													34		14	10					
						28	16	22	10		947727	34			15	5	<4		3.10	18	16
													36		14	5					
						34	24	22	10		947728	36			14	5	4		3.40	16	20
													38		16	4					
					37m - 42m ~~buff to~~ Mauve to pinkish clays	24	32	18	10		947729	38			19	9	6		3.60	28	28
					with minor siliceous component.								40	*	54	14					
					Also slightly limonitic in parts. Core	30	26	18	8		947730	40			20	9	<4		3.25	18	22
					pieces show some medium grained								42		19	4					
					foliation texture.	55	26	90	24	8	947731	42			18	11	8	10	3.65	28	32
					42m - 53m Buff to yellow/buff clays. Very occasional								44		16	11					
					silica - mostly soft clays of weathered	46	34	75	24	8	947732	44			21	11	6	<10	2.80	32	16
					basement. Very occasional core pieces								46		25	10					
					showing remnant gneissic textures with	65	34	110	40	8	947733	46			11	10	<4		3.00	28	18
					mica (chlorite and biotite) common								48		15	5					
						70	36	120	42	12	947734	48			17	9	<4		2.70	44	14
													50		19	11					

All Au values < 0.05
" U " < 4
" Mo " < 4
" Ag " < 1

SUMMARY AND SPECIAL COMMENTS

LOGGED BY I. D. FINCH DATE 17/10/83

SHEET 1 OF 2

CRAE H7
PLAN No M 414

0365

DRILL CORE LOG

CO-ORDINATES 5000 (local) / 7100N — AZIMUTH — DRILLERS WALLIS — COMMENCED 12/10/83 — DEPTH 97.2 — HOLE No. 83CR 8

RL COLLAR — INCLINATION VERTICAL — DRILL TYPE REVERSE CIRC. (AIRCORE) — COMPLETED 15/10/83 — CASING LEFT — DPO No(s)

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION
43	53		REVERSE CIRCULATION		buff to buff/yellow clays of weathered basement
					53m - 75.4m
					Dark brown to greenish brown clays with very occasional core pieces composed predominantly of pyrophyllite (?talc), chlorite, biotite, kaolinitic clays and very occasionally quartz.
					Clays become slightly greener towards base — increase in serpentinitic / chloritic components.
75.4	97.2		DIAMOND DRILLING		FOLIATED, GARNET RICH, QUARTZ, BIOTITE GNEISS
					75.4m - 78.0m Intensely foliated quartz feldspar biotite garnet (almandine) gneiss. Biotite ≈ 35% quartz ≈ 25%, feldspar (?plagioclase) 20%, Garnet (almandine) 5% to 10% - ?leucite 10% in parts
					78.0m - 81.5m As above - baked towards intrusive
					81.5m - 82.5m Medium to coarse grained intrusive (baked contacts) randomly orientated acicular crystals (amphibole) - dark green to black. All in fine grained green groundmass. Biotite common throughout - also both felsic and mafic xenoliths up to 1cm across.
					82.5m - 84m - bleached / baked country rock (gneiss). Some parts up to 50% garnet - pink almandine.
					84m - 85.8m - As above - possible calc silicate?
					85.8m - 87.4m - As above.
					87.4m - 88.3m. As above but with common (± 10%) soft green alteration mineral - ?serpentinitic
					88.3m - 91m - less biotite than above - generally more felsic rock type - no visible mineralisation.
					91m - 93m As above with trace pyrite
					93m - 95m - Some increase in potash feldspar content - trace pyrite
					95 - 97.2 - As above.
					BOH 97.2 m.

Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FRC (M)	TO (M)	REC (M)	As	Sb	Cu	Pb	Zn	Ni	Co	Mo
<4	<10	<4	2.05	48	12	<1	947735	50			39	11	38	30	50	26	8	<4
									52		23	15						
<4			2.05	34	12		947736	52			24	14	48	28	80	24	8	
									54		42	10						
4			3.40	55	20		947737	54			27	15	44	28	120	30	10	
									56		23	10						
4			3.70	70	16		947738	56			23	14	40	30	120	28	12	
									58		23	21						
<4	10	4	2.55	55	12		947739	58			27	25	38	26	80	18	8	
									60		34	20						
<4	<10	<4	3.85	85	18		947740	60			21	18	48	30	140	42	14	
									62		21	23						
<4			3.05	70	18		947741	62			23	20	50	26	110	36	12	
									64		23	20						
6			2.30	75	12		947742	64			28	26	36	24	75	26	10	
									66		36	30						
<4			3.30	60	16		947743	66			24	21	42	26	110	38	12	
									68		23	20						
<4			3.65	85	32		947744	68			30	18	40	28	140	55	16	
									70		29	15						
<4			2.55	75	20		947745	70			22	7	22	24	80	30	12	
									72		24	65						
4			3.55	140	34		947746	72			19	28	28	18	110	38	14	
									74		18	17						
<4			2.65	110	22		947747	74	75.4		35	40	22	24	90	32	12	
								75.4	~~76~~		11	20						
14	<10	<4	3.30	140	36	<1	947748				12	20	22	20	95	60	14	6
									78		15	20						
8		4	2.90	130	60			78			14	15						
							947749		80		10	20	24	14	85	50	12	6
								80	81.5		11	1500						
<4		<4	4.20	430	110		*947750	81.5	82.5		9	200	70	20	120	180	30	<4
<4		4	2.30	280	55		947751	82.5			10	20	28	10	60	50	14	<4
									84									
<4		<4	2.90	150	60		947752	84			12	40	40	22	130	100	28	8
									85.8									
<4		<4	3.00	230	80		947753	85.8	87.4				40	18	100	65	16	6
10		<4	2.80	160	42		947754	87.4	88.3		9	40	34	55	95	65	18	6
8		6	2.55	220	85			88.3			13	20	36	12	85	120	20	6
							947755											
									91.0m									
4		<4	2.45	160	48		*947756	91.0			12	20	24	8	65	60	12	6
									93.0									
<4		6	2.85	230	44		947757	93.0					22	12	70	48	12	6
									95.0		11	20						
4	10	4	3.10	220	80		947758	95.0					32	8	80	75	14	6
									97.2									

SUMMARY AND SPECIAL COMMENTS: * PETROLOGY SAMPLES. All Au values <0.05

LOGGED BY I. FINCH — DATE 17/10/83

SHEET 2 OF 2

DRILL CORE LOG

CO-ORDINATES 4200N/5175E AZIMUTH DRILLERS WALLIS COMMENCED 17/10/83 DEPTH 48·0 m HOLE No. 83CRC9
RL COLLAR INCLINATION VERTICAL DRILL TYPE REVERSE CIRC. /DIAMOND COMPLETED 18/10/83 CASING LEFT DPO No(s) 60533

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Background cps	Sl·10	Cu	Pb	Zn	Ni	Co	Mo
0	2		REVERSE CIRCULATION – AIR CORE		CALCRETE												7	20						
																	6	10						
2	14				SANDS AND CLAYS												6	50						
					2–5m buff/orange sands – fine to medium												9	40						
					grained – mainly quartz – sub rounded												5	15						
					5m–9m Moderately well consolidated brown												7	14						
					sand with 30% – 40% clay fraction.												7	20						
																	8	40						
					9m–12m Fine grained buff sand – small												9	25						
					(± 10%) clay fraction – particles sub												8	22						
					rounded												6	5						
																	8	22						
					12m–14m Red/brown–brown iron-rich												9	35						
					clay/sand loam – siliceous to base.												9	25						
14	17				SILICIFIED REGOLITH.												9	21						
					Secondary silica very common. Silicified												10	24						
					breccia and sandstone	4	<10	<4	0.80	14	6	<1	947759	16			11	12	10	12	8	10	<4	<4
17	36				WEATHERED BASEMENT CLAYS.										18		9	3						
					17–18m – White, very leached, kaolinitic	4			2.75	12	8		947760	18			8	30	14	14	8	6		
					clay.										20		6	25						
					18–24m White/off white to pinkish (Iron)	<4			5.45	24	14		947761	20			7	30	16	20	12	6		
					weathered basement clays. Fine grained										22		7	20						
					remnant rock textures in core pieces.	4			3.80	18	10		947762	22			8	10	18	20	12	6		
															24		8	5						
					24m–30m As above but light green colour	<4			2.75	18	18		947763	24			7	10	18	26	16	4		
					due probably to chlorite after biotite.										26		9	6						
						6			1.90	32	16		947764	26			9	5	20	24	32	6		
															28		8	30						
						<4			4.85	32	42		947765	28			8	29	30	32	110	10	6	
															30		9	20						
					30m–36m As above but deeper green colour –	6			4.60	44	85		947766	30			7	15	38	16	75	30	8	
					more chlorite. Some quartz also										32		8	10						
						8	10		13.5	250	150		947767	32			8	18	85	18	200	110	28	
															34		9	75						
						<4	<10		7.00	220	85		947768	34			8	55	42	18	110	90	24	
															36		9	100						
36	40		DIAMOND CORE		SHEARED MAFIC/FELSIC GRANULITE.	8	<10	<4	6.00	390	90		947769	36			9	30	180	10	120	145	34	<4
					36m–38m green medium/fine grained recrystallised rock with												10	50						
					some quartz. Heavily sheared. green and vuggy in parts.										39		9	20						
					38m–39m Medium grained biotite rich rock, foliated and heavily	4	<10	4	3.20	400	60		947770	39	40.1		10		24	12	55	65	16	6
40	48				sheared. Quartz plagioclase feldspar and biotite – main mins	6	<10	4	2.80	200	50		947771	40.1	40.5		10	1,000	50	14	60	75	16	<4
					39m–40.1m White quartz rich zone with garnets – up to 1cm across	6	20	<4	3.85	270	22		947772	40.5	42.0		8	10,000	150	6	50	40	20	<4
					MAFIC GRANULITE.	8	<10	4	2.70	290	34	*	947773	42.0			8	10,000	50	6	34	36	10	6
					40.1m–40.4m green fine grained intrusive.										44		8	175						
					40.4–43m foliated mafic granulite. Biotite segregations aligned	4	<10	<4	3.00	380	42		947774	44			9	400	105	6	36	38	16	<4
					in a fine gr. green groundmass. Dissem' PYRITE & Pyrrhotite										46		9	500						
					43m–48m Fine grained green mafic granulite with minor	8	15	<4	2.80	340	16	<1	947775	46			8	600	110	8	44	48	16	<4
					fine gr basic intrusives. Occasional light bands with										48.4		8	1600						
					replaced garnets. Magnetite common in parts. All sheared	All Au values < 0.05																		
					BOH 48m·4																			

SUMMARY AND SPECIAL COMMENTS * PETROLOGY SAMPLE FROM:- 947773

LOGGED BY I.D. FINCH DATE 18/10/83

SHEET 1 OF 1

CRAE 117 PLAN No M 414

DRILL CORE LOG

CO-ORDINATES 5000E/4650N AZIMUTH 320° MAG. DRILLERS WALLIS

RL COLLAR INCLINATION -60° DRILL TYPE Reverse Circ/Diamond.

COMMENCED 18/10/83 DEPTH 100 m. HOLE No. 83CRC10

COMPLETED 23/10/83 CASING LEFT — DPO No(s)

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION
0	4				CALCRETE. With some aeolian sand.
4	9				SANDS AND CLAYS. 4m-5m brown/buff clays and sands. 5m-6m No sample. 6m-9m buff/brown sands.
9	27.7		RC and Percussion		CLAYS AND SANDS OF WEATHERED BASEMENT. 9m-11m red/brown ferruginous clays and sands. Some silicified sections with manganese coatings. 11m-16m Mauve (iron/manganese) clays of weathered basement. Chloritic (+ epidote?) towards base. 17m-19m White leached clays - Kaolinitic. Also slightly talcose or sericitic in part. Fine grained remnant textures in some core pieces. 19m-20m Mauve/white speckled clay, medium grained remnant textures. 20m-21m Buff coloured clay. Uniform medium grain remnant textures. 21m-23m Green to light green soft clays. Kaolinitic with very little quartz component. Some darker green patches. 23m-25m White to grey very leached clays. Green tinge to end. 25m-27.7 As above but buff colour. Rock chips at base.
27.7	100.0		Diamond Drilling		MAFIC GRANULITE. 27.7m-34m Dark (mafic) medium grained rock - amphibole/biotite rich with some lighter minerals - ?plagioclase feldspar. Even grained throughout - banded but not foliated. Sheared and weathered along shears in parts. Pyrite and pyrrhotite throughout as fine disseminations and coatings on fracture planes. Fine dark mineral probably magnetite - (not positive for scheelite with UV lamp). 34m-36m More mottled appearance - light mineral aggregates aligned 30° to core axis. Aggregates are slightly coarser than general texture. 36m-38m as above. 38m-39m Hard siliceous bands 10cm-20cm thick with contacts at high angle to core axis (20°). Some dark mineral concentrates (?biotite) along contacts. Siliceous bands occur up to 45m.

Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	As (b/ground 7)	Sb	Cu	Pb	Zn	Ni	Co	Mo
											9	5						
											9	5						
											8	5						
											7	6						
											8	10						
											NO SAMPLE.							
											7	10						
											9	9						
											10	15						
											10	40						
<4	10	<4	1.60	12	18	<1	947776	10			15	25	16	20	10	16	<4	<4
									12		14	25						
<4	15		1.50	12	6		947777	12			13	45	10	16	10	14		
									14		13	15						
<4	<10		0.80	14	8		947778	14			12	15	8	10	8	4		
									16		10	9						
8			1.00	8	22		947779	16			9	25	14	44	8	<4		
									18		11	10						
6			3.20	12	75		947780	18			11	15	22	48	18	12		
									20		14	20						
<4			4.10	16	80		947781	20			13	10	20	32	12	10		
									22		13	15						
<4			2.30	20	55		947782	22			12	15	24	26	20	10		
									24		12	6						
<4			4.90	44	55		947783	24			11	15	65	18	55	18	8	
									26		9	16						
<4			7.20	26	65		947784	26			10	30	100	14	120	28	10	
									27.7		11	4700						
<4	10	<4	6.35	120	16		947785	27.7	29		11	700	195	8	60	44	24	6
<4	<10	<4	6.30	110	14		947786	29.0	30		11	630	190	8	60	40	22	6
12		<4	5.50	210	24		947787	30.0			8	4800	80	6	65	40	18	<4
									32		10	10000						
6		4	3.70	280	20		947788	32			11	2900	130	12	70	65	28	4
									34		8	2600						
4		<4	2.65	180	26		947789	34			9	4500	80	8	40	48	16	<4
									36		9	3250						
<4		6	2.55	170	26		947790	36			10	4300	100	6	36	46	16	<4
									38		8	250						
<4		<4	1.55	180	28		947791	38	39		11	250	80	8	26	65	14	<4
<4	55	<4	2.55	230	44			39			11	570	90	14	40	80	18	6
							947792				8	2500						
									42		9	3250						
8	<10	4	1.10	95	22		947793	42			9	30	50	4	14	30	8	<4
									44		8	270						
8	95	<4	2.40	140	26		947794	44			8	1000	75	6	26	38	14	
									46		8	3750						
6	<10	4	4.40	170	30		947795	46			7	7200	70	10	50	42	18	
									48		7	10000						
8	<10	<4	4.00	170	20		947796	48			7	9000	70	8	46	36	18	
									50		8	8000						

All Au values <0.05

CRAE H7 PLAN No. 414

SUMMARY AND SPECIAL COMMENTS

LOGGED BY I.D. FINCH DATE 23/10/83

SHEET 1 OF 2

DRILL CORE LOG

CO-ORDINATES 5000^E / 4650^N AZIMUTH 320 MAG. DRILLERS WALLIS COMMENCED 18/10/83 DEPTH 100m HOLE No. 83CRC 10

RL COLLAR INCLINATION -60° DRILL TYPE Reverse circ/Diamond COMPLETED 23/10/83 CASING LEFT DPO No(s).

DEPTH FROM (M) 47 TO (M) 100m — CORE SIZE: DIAMOND DRILLING

CORE DESCRIPTION

MAFIC GRANULITE

dark green/grey mafic granulites with abundant biotite. Biotite/Plagioclase feldspar pegmatites at 56·9m, 59·6m. Coarse crystals of both minerals up to 1·5cms across. Pyrite and pyrrhotite scattered (disseminated) throughout some sections of core. Core angle vary from 20°-25° to core axis to 50°-55° to core axis.

Some finer grained sections occur with increase in mafic content - more amphibole. Occasional radiating marcasite.

Occasional Thin (10cm-20cm) garnet rich silicious bands.

Small pegmatite (mafic) veins occur at 68.7m, 69.1metres and 71metres.

A coarse felsic pegmatite occurs from 71.1m to 71.5m.

Further pegmatitic segregations at 72.1m, 73.3m, ~~74.2m~~ (up to 3cms thick).

74.2m - 74.5m Quartz/feldspar/biotite pegmatite
75.5m - 75.7m As above - sheared at contacts
75.7 - 88.0m Return to normal mafic granulite rock type. Evengrained with minor pegmatites throughout (1cm ±). A biotite rich section exists between 80m and 82.1m. Some shearing occurs at 40° to core axis.

88.0m - 88.4m Silicious, garnetiferous unit.
88.4m - 89m Return to mafic granulite rock
89.0m - 89.7m Coarse felsic (granite/granite gneiss ?intrusive

All pegmatites negative for scheelite under U.V.

89.7 - 100m Mafic granulite as above with shearing at 20° to 25° to core angle at 97.3metres. Minor shears from there to end of hole. Occasional pyrite and pyrrhotite disseminations angle of banding in granulite to core axis ~~is~~ 45°

ASSAY VALUES

SAMPLE No.	FROM (M)	TO (M)	REC (M)	b/4 and (?) cps	[illegible]	Sn	W	U	%Fe	Mn	[illegible]	Ag	Cu	Pb	Zn	Ni	Co	Mo
947797	50			10	9000													
		52		9	8200													
947798	52			8	7900													
		54		8	7250													
947799	54			11	7000													
		56		9	9000													
947800	56			9	7400													
		58		9	4900													
947801	58			9	3500	<4	<10	<4	3.10	140	38	<1	80	30	80	38	18	4
		60		9	1300													
947802	60			10	400	<4			1.50	110	28		75	26	40	46	12	6
		62		9	95													
947803	62			9	400	<4			1.30	80	20		65	14	24	46	10	<4
		64		11	250													
947804	64			7	1000	<4			1.50	110	20		80	6	18	40	12	<4
		66		9	900													
947805	66			8	300	<4	15		1.60	90	24		160	10	22	40	16	<4
		68		10	300													
947806	65			9	2000	<4			3.50	180	16		80	8	50	36	24	<4
		70		7	1000													
947807	70			7	5000	6			3.00	200	38		80	16	50	28	18	6
		72		13	2000													
947808	72			8	500	6	10		2.10	130	16		85	8	32	26	16	<4
		74		7	2500													
947809	74			7	1000	8	<10		2.20	150	46		90	10	32	38	14	8
		76		7	350													
947810	76			8	250	6		6	1.60	130	16		60	8	26	24	14	<4
		78		8	800													
947811	78			13	2000	<4		6	3.20	140	16		180	8	38	22	18	8
		80		10	1500													
947812	80			11	2500	<4	15	<4	3.40	165	18		90	8	46	24	18	<4
		82		9	5000													
947813	82			10	1000	10	<10		1.50	100	18		90	12	22	36	14	12
		84		11	1500													
947814	84			12	1000	<4			1.80	120	24		110	14	24	44	14	6
		86		10	2000													
947815	86			10	3000	6		6	2.40	150	20		75	14	34	34	16	4
		88		7	2500													
947816	88			10	600	6		<4	1.50	110	12		90	16	32	36	12	4
		90		15	550													
947817	90			11	900	8			1.40	130	14		65	14	24	28	12	4
		92		13	500													
947818	92			11	450	8			1.50	110	12		65	10	22	28	10	4
		94		11	500													
947819	94			12	600	4			2.10	90	90		130	10	48	60	16	8
		96		14	700													
947820	96			11	500	<4		6	4.40	630	20		65	12	44	38	20	6
		98		12	1000													
947821	98			10	550	<4	15	<4	4.90	510	24		80	18	60	44	24	6
		100		10	4000													

SUMMARY AND SPECIAL COMMENTS: All Au values < 0.05

LOGGED BY I. D. FINCH DATE 23/10/83

SHEET 2 OF 2

CRAE 117
PLAN No M 414

[illegible] DRILL CORE LOG

CO-ORDINATES 3000E/4750N AZIMUTH 320° mag. DRILLERS [illegible] COMMENCED [illegible]/10/83. DEPTH 46m HOLE No. 83CRC11

RL COLLAR ______ INCLINATION 60° DRILL TYPE Gemco : Percussion COMPLETED 22/10/83. CASING LEFT — DPO No(s) 8665

037[illegible]

DEPTH TO (M)	CORE SIZE	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	Scint LAS	Scint [illegible]	Cu	Pb	Zn	Ni	Co	Mo
	↑	0-7m Light brown sands and calcrete											-	vc5						
		gradational to red brown fine											-							
		medium grained sands at base	6	<10	<4	2.40	55	18	<1	947822	2		8	20	28	16	30	16	8	<4
		Minor clay bands										4	10	5						
			4			1.50	22	8		3	4		10	5	12	12	16	16	4	
												6	9	5						
			<4			1.75	22	12		4	6		9	10	12	12	12	14	<4	
	R.C. and Percussion	7-12 Red brown clayey sands. Fine grained.										8	9	2						
		Minor grey green clay bands.	4			2.60	26	10		5	8		9	10	18	22	18	24		
10												10	13	20						
		12-13 Light brown coarse grained poorly	6	10		2.70	16	10		6	10		11	10	16	18	14	18		
		sorted running sands (possibly ex										12	12	15						
		granite.)	6	<10		15.5	8	44		7	12		15	15	16	22	8	18		
												14	13	20						
		13-21 White kaolinitic sands. Qtz grains	4			2.10	22	18		8	14		13	9	12	28	10	10		
		fine grained and well-rounded rounded										16	14	35						
		Weakly Fe stained @ 15m. Sand content	6			1.40	8	10		9	16		10	5	8	40	8	<4		
		decreases towards base										18	11	-						
			8			0.40	12	14		947830	18		9	2	10	34	10	8		
20		21-23 As for 17-21 but sand grains										20	11	3						
		increasing in size with depth. Reducing	<4			0.70	18	16		31	20		10	-	14	28	12	6		
		environment.										22	14	5						
		23-26 Mottled red brown and green clays	<4			1.10	12	16		32	22		10	5	28	32	14	6		
		(possibly ex highly weathered mafic) transitional										24	11	5						
		to kaolinitic sands with red brown Fe oxides	6	10		3.10	14	36		33	24		13	10	60	22	14	10		
		patches (≈ 1mm).										26	14	10						
		26-27.9 Quartz-feldspar granite. Strongly weathered	6	<10		1.90	10	14		34	26		14	10	140	14	10	6		
	↓	minor Fe staining grainsize 0.5mm-5mm										28	11	50						
	↑	28-28.25 Highly weathered quartz-feldspar-	8	<10	<4	2.70	28	185	<1	947901X	28	28.25	11	5	200	10	14	<4	<4	18
30		biotite gneiss, well foliated low core to	10		<4	2.10	22	55	<1	2X	28.25	29.6	12	8	110	14	22	<4	<4	22
		bedding angle	<4		8	1.10	26	8	1	3X	29.6	30.9	15	15	300	18	30	8	6	8
		28.25-29.6 Pale grey to off white felsic	6		4	1.50	80	90	<1	4X	30.9		[illegible]	5	280	16	38	10	10	10
		granulite. Black green mica (biotite??)										32.9	26	5						
		defines strong foliation	<4	10	<4	3.40	180	24		5X	32.9		11	350	440	10	70	48	50	4
		29.6-30.9 Carbonate rich felsic granulite										34.1	11	1200						
		Light grey with large dark grey (10cm)	4	10	<4	5.50	310	70		6X	34.1		10	6400	350	12	80	42	44	14
		mottled patches.										34.3	10	600						
			<4	10	<4	4.20	145	26		7X	34.3		12	450	46	6	65	20	18	6
												36.0	4	600						
40		30.9-32.9 Coarse grained sheared feldspar biotite	10	25	6	3.40	190	18		8X	36		9	1800	130	6	60	22	22	<4
		mafic granulite										38	9	1300						
		32.9-34.1 Medium grained mesic felsic granulite	<4	<10	4	2.30	160	8		9X	38		8	1000	150	5	70	22	24	8
		Mafic-leucocratic zones define foliation at										40	10	5000						
		30° to core axis. Mafic zones: biotite-		<10	6	3.25	160	20		10X	40		10	5000	120	14	70	38	32	8
		magnetite-sulphides rich segregations.										42	10	[illegible]						
				10	6	3.00	105	10		11X	42		10	5000	34	8	42	14	10	<4
		34.1-34.3 Leucocratic feldspar-minor biotite-										44	11	2500						
		minor amphibole - apple green talc alteration		20	<4	4.80	120	16		12X	44		10	800	55	6	60	8	12	4
		34.3-40.15 Grey fine grained mafic granulite										46	11	800						
50		Chlorite filled veins discordant with											10	3500						

SUMMARY AND SPECIAL COMMENTS All Au values <0.05

LOGGED BY [illegible] DATE 20/10/83.

SHEET 1 OF 3.

CRAE 117
PLAN No M 414

As		33	24		13	10
				26	14	10
[illegible]	Possibly representing locally	34	26		14	10
	derived sediment chert!??			28	11	50
	Extensive quartz veining	947901X	28	28.2[illegible]	11	5
	sub parallel to foliation	2X	28.25	29.6	12	8
		3X	29.6	30.9	15	15
	highly weathered,	4X	30.9		24	5
	sheared, carbonate			32.9	26	5
	veining extensive	5X	32.9		11	300
	strongly weathered			34.1	11	1200
	carbonate veining	6X	34.1		10	[illegible]
	extensive. Black-purple			34.3	10	6000
	coating on fractures (Mn/ox	7X	34.3		12	450
	[illegible] ??)			36.0	4	600
	Strongly weathered and	8X	36		4	1800
	sheared.			38	9	1300
		9X	38		8	1000
	Fine grained sulphide (py)			40	10	500
		10X	40		10	5[illegible]
				42	10	1000
		11X	42		10	5000
	Sulphide developed on			44	11	2500
	[illegible] fracture interfaces	12X	44		10	800
	Coarse sulphides			46	11	[illegible]
	pyrite (+ [illegible] ??)				10	[illegible]

LOGGED BY [illegible]

SHEET 1

03??

C.R.A. EXPLORATION PTY. LIMITED

DRILL CORE LOG

PROJECT: COOTRA.

CO-ORDINATES ______ AZIMUTH: 220° mag. DRILLERS: WALLIS. COMMENCED: 1/10/83. DEPTH: 100.0 HOLE No.: 83CRC 11.

RL COLLAR ______ INCLINATION: 60° DRILL TYPE: Diamond COMPLETED: 22/10/83. CASING LEFT ______ DPO No(s): E.6.6.5

CORE DESCRIPTION

DEPTH FROM (M): 50 — TO (M): 60 — CORE SIZE: Diamond Coring (50 – 100)

poorly defined foliation
At 37, 38.2 and 38.8m coarse grained feldspar - amphibole - sulphide segregations
Cp - arsenopyrite(?) @ 40 m

40.15-43.8 As above but with well defined foliation at 30° to core angle locally coarse grained. Relic coarse grained chloritised amphibole at 40.7m

DEPTH FROM (M): 60 — TO (M): 70

43.8-46.1m As above with leucocratic feldspar - garnet - trace biotite - trace sulphide segregations @ 43.85. Other leucocratic segregations feldspar - trace biotite

46.1-62.5 - Fine grained mafic granulite feldspar - biotite - mafic low core - foliation angle leucocratic segregations @ 45, 49.5 and 51.6m. Large mafic phenocryst (chloritized amphibole ??) at 55m. minor garnet.

DEPTH TO (M): 70

62.5-63.0m Transitional zone from above to leucocratic silicified zone, well defined foliation at 60° to core axis

63.0-65.5m leucocratic feldspar - garnet - chlorite zone. Well foliated.

65.5-75m As for 46.1-62.5m with leucocratic segregation from 69.5-70.4m. Altered "bronzy" mafic phenocryst @ 71.7

DEPTH TO (M): 80

75-78.8m leucocratic feldspar - biotite - garnet chlorite zones with mafic feldspar - biotite - chlorite - amphibole zones defining strong foliation

78.8-87.9m Med. grained intermediate - mafic granulite. Feldspar - biotite - chlorite - amphibole(?) Locally chloritized spots well developed

DEPTH TO (M): 90

87.9-88.1m Leucocratic silicified feldspar - minor mafic segregation

88.1-90.0m leucocratic zone with minor mafic chloritized spots elongated parallel to foliation

90-96.0m As for 46.1-62.5m
Quartz veining @ 93.4m

DEPTH TO (M): 100

ASSAY VALUES

Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Scint cps	Mag	Cu	Pb	Zn	Ni	Co	Mo
6	<10	<4	3.60	105	.18	<1	9479 13X	46			10	2000	100	10	70	23	16	<4
									48		10	500						
<4			2.70	145	20		14X	48			9	6000	75	12	47	20	14	<4
									50		9	2700						
8			2.00	110	18		15X	50			10	4000	55	10	32	22	12	<4
									52		11	5000						
<4			4.10	195	20		16X	52			9	900	65	8	60	18	16	10
									54		9	900						
4			4.10	150	20		17X	54			10	1000	70	8	48	24	16	6
									56		7	1500						
<4	20		2.30	200	18		18X	56			8	4000	110	14	36	40	13	10
									58		9	6000						
<4	<10		2.20	160	22		19X	58			8	700	95	8	32	36	16	8
									60		10	200						
12			4.10	220	16		20X	60			9	300	75	6	55	26	18	6
									62		8	1000						
<4			3.30	240	44		21X	62			10	1200	140	12	65	60	22	8
									64		11	1500						
<4			1.60	170	48		22X	64			11	3000	36	10	28	24	8	19
									65.5		10	800						
10			2.60	190	65		23X	65.5			10	500	85	12	36	65	16	10
									68.0		11	400						
6	80		3.50	260	28		24X	68			12	450	100	10	46	43	13	14
									70		10	500						
<4	10		2.10	230	26		25X	70			10	500	95	8	36	50	16	42
									72		9	300						
6	10		2.50	280	22		26X	72			11	300	80	8	42	46	16	6
									74		9	25						
<4	<10		2.30	300	30		27X	74			10	200	65	8	36	34	16	10
									75		11	400						
<4			1.85	240	34		28X	75			9	400	44	8	60	22	8	10
									76		9	1000						
6		4	1.25	140	42		29X	76			4	1500	30	8	30	14	4	16
									77		10	2000						
<4	10	<4	2.00	290	46		30X	77			9	500	46	10	60	16	8	12
									77.5		11	500						
10	<10	<4	1.15	115	60		31X	77.5			11	1600	38	10	30	8	6	13
									78.8		9	800						
<4		6	1.95	190	26		32X	78.8			9	600	60	8	30	38	12	10
									80		8	600						
4		<4	1.80	170	38		33X	80			9	600	95	8	28	55	14	8
									82		8	700						
8		<4	2.80	210	40		34X	82			9	750	260	8	34	70	22	8
									84		8	900						
12		<4	2.05	240	30		35X	84			8	800	100	6	36	55	16	8
									86		8	600						
<4		6	2.70	310	44		36X	86			9	1600	100	8	40	55	16	8
									87.9		8	1000						
<4		<4	2.05	310	32		37X	87.9			10	1700	75	8	32	50	12	10
									88.1		8	700						

All Au <0.05

SUMMARY AND SPECIAL COMMENTS ______

LOGGED BY: [illegible signature] DATE: 30/10/83

CRAE 117
PLAN No M 414

037

SPECIAL FEATURES WEATH., ALTERATION, FRACTURING VEINING, MINERALIZATION	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Scint cps	Mag sus	AS
associated with fracture	9479 13X	46			10	2000	
and chlorite veins. Sulphide			48		10	800	
present as blebs up to 1mm	14X	48			9	6000	
when associated with chlorite			50		9	2700	
vein. Sulphide ≈ 1%	15X	50			10	4000	
			52		11	5000	
	16X	52			9	900	
			54		9	900	
	17X	54			10	1000	
			56		7	1500	
	18X	56			8	4000	
			58		9	6000	
	19X	58			8	700	
			60		10	200	
	20X	60			9	300	
			62		9	1000	
	21X	62			10	1200	
			64		11	1500	
	22X	64			11	[illegible]	
			65.5		10	800	
	23X	65.5			10	500	
			68.0		11	450	
	24X	68			12	450	
			70		10	500	
	25X	70			10	500	
			72		9	300	
Quartz vein @ 60° to core axis	26X	72			11	300	
@ 72m			74		9	25	
	27X	74			10	200	
			75		11	400	
75-77.5 Altered	28X	75			9	400	
pegmatite segregation			76		9	1000	
Strongly fractured/broken	29X	76			9	1500	
core			77		10	2000	
	30X	77			9	500	
Chlorite vein with trace			77.5		11	500	
sulphide @ 85.5m	31X	77.5			11	1600	
			78.8		9	800	
	32X	78.8			9	600	
			80		8	600	
	33X	80			9	600	
			82		8	700	
	34X	82			9	450	
			84		8	900	
	35X	84			8	800	
			86		8	600	
	36X	86			9	1600	
Trace sulphide @ 92.3m			87.9		8	3000	
associated with 2mm	37X	87.9			10	1700	
chlorite vein			88.1		9	2000	

LOGGED BY DLA

SHEET 2 OF

DRILL CORE LOG

CO-ORDINATES 5000N 4660E AZIMUTH VERTICAL DRILLERS LAWS COMMENCED 28/10/83 DEPTH 68.5m HOLE No. 83CRC12

RL COLLAR INCLINATION DRILL TYPE REVERSE CIRCULATION COMPLETED " CASING LEFT DPO No(s) 82833

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Scint cps	Mag sus	Cu	Pb	Zn	Ni	Co
0	1				White grey calcrete																	
1	4				Red brown ferruginous (goethitic) sands cemented.	8	10	<4	21.0	36	36	947901	1	4			20	8	28	12	16	<4
4	5				Mottled dark red brown - light red brown ferruginous clayey sands	6	10		12.5	20	20	902	4	5			60	6	20	6	8	
5	12				Quartz - feldspar - biotite gneiss, strongly weathered. Core angle 50°.	<4	<10		6.30	22	14	903	5	12			40	8	26	10	14	
12	15				Off white quartz - kaolin weathered rock red brown ferruginous zones	5			2.40	20	10	904	12	15			30	4	38	8	10	
15	16				Yellow brown fine grained clayey sands.	6			7.70	95	22	905	15	16			60	16	34	16	22	
16	17				Yellow brown silicified micaceous rock, very strongly weathered. Foliation defined by weathered accumulated brown mica.	<4			130	80	26	906	16	17			50	10	28	18	16	
17	25				Red brown quartz - feldspar - biotite gneiss. Suggestions of boxworks in strongly ferruginous zones. Strongly mottled. Poorly defined foliation	6			25.0	150	46	907	17	25			150	16	26	55	30	
25	30				Earthy yellow brown quartz - feldspar - biotite gneiss, strongly weathered. Mag susc. 300x10^-5 @ 29m	6	10		19.0	120	55	908	25	30			80	18	24	65	36	6
30	33				Purple brown quartz - feldspar - biotite gneiss strongly ferruginous, almost completely decomposed.	<4	<10		21.0	230	55	909	30	33			300	16	20	38	26	6
33	44				Yellow brown quartz - feldspar - biotite gneiss very fine grained. Minor magnetite	<4	10		13.5	160	55	910	33	44			150	14	18	26	22	4
44	47				Dark purple - white strongly mottled quartz - feldspar - garnet gneiss. Gunmetal grey Fe oxides coatings on fractures. Strongly decomposed	6	<10	4	3.50	100	42	911	44	47			1000	30	12	8	14	4
47	54				Quartz - feldspar - biotite - garnet gneiss Blue grey quartz, anyhow. No Fe staining Extensive epidote alteration in ~~[illegible]~~ mafic ~~[illegible]~~ rich zones (segregations) Magnetite locally abundant	<4	<10	<4	15.5	590	46	912	47	54			10,000	16	20	26	36	10
54	55				Quartz - feldspar - biotite - garnet - magnetite gneiss. Feldspar highly weathered. Foliation well developed	<4	<10		16.0	670	46	913	54	55				14	20	34	38	10
55	66				Fine grained dark grey quartz - epidote - biotite ~~garnet~~ - feldspar gneiss. Foliation sub parallel to core axis. Soft blue white alteration. trace very fine grained sulphide	4	10		16.0	380	42	914	55	66				14	20	36	44	12
66	68.5				Medium grained quartz - feldspar - biotite - garnet gneiss. trace very fine grained sulphide	4	10		15.5	350	36	947915	66	68.5				10	16	48	40	8
					Petrology sample 947915 (P)	All Au values <0.05																
						" Mo " <4																
					B.O.H. 68.5m	" Ag " <1																

SUMMARY AND SPECIAL COMMENTS: Ground water @ 66m. Highly weathered basement from 5m. Magnetic anomaly source from 47m

LOGGED BY DCA DATE 28/10/83

SHEET 1 OF 1

CRAE 117 PLAN No M414

0376

DRILL ~~CORE~~ LOG

CO-ORDINATES 5000N 4320E AZIMUTH — DRILLERS Eqwis COMMENCED 25/10/83 DEPTH 42m HOLE No. 83CRC13

RL COLLAR INCLINATION — DRILL TYPE Reverse Circulation COMPLETED " " CASING LEFT — DPO No(s) 60833

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Mag sus.	[illegible]	Cu	Pb	Zn	Ni	Co
0	1				Pale grey brown calcrete											200×10^{5}						
1	2				Yellow-red sandy clay	4	<10	<4	2.00	60	14	447916	1	2		300		12	22	18	24	6
2					Off white, yellow-buff brown f.gr sands	<4			0.50	14	6	17	2	17		10		8	26	6	10	<4
	17				(gypsum rich ?? v.v.f.gr)																	
17					Off white coarse grained angular blue	<4			0.50	20	12	18	17	18		10		10	26	8	6	
	18				grey qtz ~~sand~~ sand. Some gypsum.																	
18					Buff brown coarse grained clayey sand	6			1.00	14	10	19	18	21		10		14	90	10	6	
	21				some limonite staining																	
21					As for 18-21m but rare fragments of	<4			0.85	22	12	20	21	24		15		16	80	10	6	
	24				kaolinized quartz-feldspar gneiss.																	
24					Light grey quartz-feldspar-biotite-	<4			0.70	55	10	21	24	29		15		42	40	10	36	14
	29				garnet gneiss feldspars kaolinized.																	
29					Dark grey quartz-feldspar-biotite	4			0.90	32	14	22	29	38		15		46	26	145	160	50
	38				gneiss. Feldspars kaolinized.																	
38	39				Fine grained equivalent of 29-38m.	8			0.55	16	12	23	38	39		15		34	18	16	48	28
39					Coarse grained quartz-biotite-trace	<4	10		1.25	16	14	24	39	40		20		18	18	26	130	65
	40				feldspar gneiss. hard. trace groundwater																	
40					Foliated quartz-feldspar-biotite-epidote																	
	42				gneiss, med-coarse grained	<4	25		4.30	260	50	447925	40	42		150		65	16	230	110	46

All Au values <0.05
" Mo " <4
" Ag " <1

B.O.H. 42m.

Scintillometer readings all < 30cps.

SUMMARY AND SPECIAL COMMENTS Recent, weakly magnetic quartz-feldspar-biotite-(garnet) gneiss.

LOGGED BY DLA DATE 28/10/83

SHEET 1 OF 1

CRAE 117 PLAN No. M 414

DRILL CORE LOG

CO-ORDINATES 5000 N, 5430 E AZIMUTH — DRILLERS Wallis COMMENCED 24/10/83 DEPTH 75m HOLE No. 83CRC14

RL COLLAR INCLINATION — DRILL TYPE Reverse Circulation COMPLETED — CASING LEFT — DPO No(s) 60833

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	%Fe	Mn	Cr	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Mag sus	Cu	Pb	Zn	Ni	Co
0	2				Grey - off white calcrete	Fe contamination from cyclone														
2					Red brown clayey sands, clay content										50×10^{-5}					
	7				decreasing at base.										30×10^{-5}					
7					Red brown ferruginous cemented sands															
	14				Brecciated appearance										250					
14					Off white - reddish brown gypsum rich															
	20				kaolinitic fine grained sands.										5					
20					Mottled red brown clay rich fine grained															
	24				sands. Possible relic textures.										5					
24					Mottled grey green - red brown sandy															
	29				clay. Sand grain fine grained										15					
29					Mottled dark grey and buff brown										15					
	47				biotite rich clays.	4	<10	2.10	70	14	947926	45	47			130	60	70	30	10
47					Dark grey chloritic quartz-feldspar-	<4		3.20	160	34	27	47	49			60	36	140	36	10
					biotite gneiss. Strongly weathered, feldspar	<4		4.90	220	12	28	49	51			30	26	110	32	10
	62				kaolinized. Foliation well developed.	4		2.10	90	10	29	51	53			36	20	44	32	12
62					Grey quartz-feldspar-biotite gneiss. Mafic	4	10	3.85	200	14	30	53	55		20	34	18	65	22	10
					and leucocratic segregations form well	8	<10	2.95	170	10	31	55	57			18	20	120	16	8
					defined foliation. Some chloritic zones	10		2.55	170	14	32	57	59			16	18	90	16	8
	75				very clayey. Poor core recovery; clayey	10		2.20	140	10	33	59	61			16	18	60	16	6
						<4		1.30	95	4	34	61	63			14	18	50	12	4
						<4		2.55	160	4	35	63	65			18	16	50	12	6
					B.O.H. 75m	4	10	4.80	240	14	36	65	67			14	12	28	10	6
						4	10	2.85	180	10	37	67	69			18	15	46	12	6
					Sample 947940 collected for petrology	<4	10	2.05	150	24	38	69	71			16	18	50	18	8
						<4	<10	1.75	130	10	39	71	73.			20	20	65	16	6
						<4	<10	1.80	140	4	40	73	75.			16	22	80	18	10

All scintillometer readings < 30cps.

All Au values <0.05
" Mo " <4
" Ag " <1
(" U " <4
(except 947926 - 6)

SUMMARY AND SPECIAL COMMENTS: Basement non magnetic quartz-feldspar-biotite gneiss.

LOGGED BY P.L.A. DATE 29/10/83

SHEET 1 OF 1

CRAE H7 PLAN No M 414

DRILL CORE LOG

CO-ORDINATES 4000N 46 70E AZIMUTH — DRILLERS Wallis COMMENCED 24/11/83 DEPTH 48m HOLE No. 83CRC15

RL COLLAR INCLINATION — DRILL TYPE Reverse Circulation COMPLETED CASING LEFT — DPO No(s) R0833

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Mag. sus.
0	2.				Grey brown calcrete	
2	9				Red brown sandy clays gradational at base to clayey sands.	20×10⁻⁵ / 20
9	10				Mustard yellow very fine grained sands	
10	14				Red brown ferruginous coarse grained cemented sands. Less cemented @ base	20 / 25
14	22				Yellow brown very fine grained clayey sands. Micaceous. Clay content increases towards base.	10
22	23				Strongly mottled off-white - greenish brown quartz - feldspar - biotite gneiss coarse grained.	10
23.	35				Dark grey - medium grained quartz - feldspar - biotite gneiss. Strongly weathered, plastic. Ferruginous at base	15
35	47				More mafic equivalent of 23-35m. Coarse grained quartz rich segregation @ 42m.	40×10⁻⁵
47	48m				Black medium grained quartz feldspar - biotite - magnetite gneiss. Mn and Fe staining extensive. [Mt] ≈ 5%.	20×10⁻²

B.O.H. 48m.

Petrology sample 947950(P) 47-48.

All scintillometer readings < 20 cps.

Sn	W	%Fe	Mn	Cr	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Cu	Pb	Zn	Ni	Co
<4	<10	7.70	340	24	947941	28	30		80	48	80	44	8
4	<10	12.5	760	30	2	30			60	32	75	22	6
4		8.20	670	22	3	32			40	26	60	20	4
<4		12.0	1050	20	4	34			110	32	110	44	14
		12.5	1300	22	5	36			60	28	140	34	10
		6.60	470	14	6	38			65	32	95	42	8
	15	7.60	720	16	7	40			60	24	130	44	10
10	<10	4.35	300	12	8	42			60	24	90	46	12
<4		4.00	260	20	9	44			50	22	130	48	12
<4		14.5	610	38	947950	46	48		14	20	75	44	12
					947950(P)	47	48						

All Au values <0.05
" Mo " <4
" Ag " <1
" U " <4

SUMMARY AND SPECIAL COMMENTS Strongly magnetic quartz - feldspar - biotite - magnetite gneiss

LOGGED BY DLA DATE 29/11/83

SHEET 1 OF 1

CRAE H7 PLAN No M 414

0381

DRILL CORE LOG

CO-ORDINATES 4000N 1160E AZIMUTH — DRILLERS [illegible] COMMENCED 29/10/83 DEPTH 24.5 HOLE No. 83CRC16

RL COLLAR INCLINATION — DRILL TYPE Reverse Circulation COMPLETED — CASING LEFT — DPO No(s). 80833

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	[illegible]
0	2				Grey brown calcrete.	200x10
2					Red brown ferruginous plastic sandy clay	50
	9				Gradational? to clayey sand @ base.	
9					Off white slightly clayey sands with	40
					extensive broken vein quartz, clear & slightly	
	10				smokey.	
10					White quartz-feldspar-biotite pegmatitic	45
	11				granite	
11					Red brown ferruginous sand with biotite	35
	16				feldspar qtz granite fragments	
16					Quartz-feldspar-biotite-garnet	35
					gneiss well foliated, dark red brown	
	17				+ granite fragments as for 11-16m	
17					Coarse grained off white quartz feldspar-	30
					biotite-epidote gneiss + dark red brown	
	18				garnet gneiss	30x10^5
18					Ferruginous red brown - off white coarse	
					grained poorly foliated quartz-feldspar-	(19-20 150x10^5 ST units)
					biotite granite gneiss. minor mafics.	
	24.5				Trace boxworks in ferruginous zones.	

B.O.H. 24.5m

Petrology sample 947956 (19-20m)

All scintillometer readings < 20 cps.

Percussion from 20-24m. Poor sample recovery.

Sn	W	%Fe	Mn	Cr	SAMPLE No.	FROM (M)	TO (M)	REC (M)		Cu	Pb	Zn	Ni	Co
4	<10	2.00	50	24	947951	9	11			12	10	38	34	8
<4		3.00	44	20	52	11	13			12	12	60	36	10
<4		1.85	26	20	53	13	15			10	8	30	20	4
4		2.10	30	20	54	15	17			12	8	42	22	6
8		3.05	28	24	55	17	19			18	14	50	26	6
<4	10	1.50	46	24	56	19	21			12	10	30	34	6
<4	<10	2.10	16	20	57	21	23			20	10	24	32	<4
6	<10	2.90	20	32	58	23	24.5			24	12	32	36	4

All Au values <0.05
" Mo " <4
" Ag " <1
" U " <4

SUMMARY AND SPECIAL COMMENTS Clean magnetic quartz-feldspar-biotite granite gneiss.

LOGGED BY DCA DATE 29/10/83

SHEET 1 OF 1

CRAE H7 PLAN No 414

038

DRILL CORE LOG

CO-ORDINATES 5000N 5160E AZIMUTH — DRILLERS Wallis COMMENCED 31/10/83 DEPTH 54m HOLE No. 83 CRC 17
RL COLLAR INCLINATION — DRILL TYPE Reverse Circulation COMPLETED 31/10/83 CASING LEFT — DPO No(s) 80833

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Mag	Sus	Cu	Pb	Zn	Ni	Co
0					Dark grey calcrete with fine grain red											40	~10					
	2				brown sands.																	
2					Fine - medium grained sands, coarsening											50						
					towards base. Cemented at base																	
	11				Mottled from 9-10m.																	
11	12				Light grey silcreted sands.											30						
12					Light brown - off white fine grained sandy											10						
	24				clays. Relic gneissic fabric																	
24					Mottled buff brown - off white sandy											15						
					clays. Relic gneissic fabric preserved																	
	33				at base																	
33					Dark and light grey banded kaolinized											10						
					biotite gneiss. Plastic, (slightly																	
	38				carbonaceous ??)																	
38					Black carbonaceous - pyritic clays,	<4	<10	<4	225	30	75	918501	38	40		10		100	18	18	42	8
					some light grey blebs (2mm) possibly ex.																	
	39				feldspar.		<10	<4	3.80	75	32	502	40	42				46	22	18	18	6
39	40				Dark grey clayey sands, possibly ex gneiss											10						
40					Grey highly weathered quartz - feldspar -		<10	<4	9.60	65	26	503	42	44		15		44	14	32	18	<4
					biotite gneiss. Kaolinized. Suggestion of																	
	44				Fe staining ex sulphide. Minor sulphide in fractures		20	6	5.40	60	14	504	44	46				95	10	38	70	38
44					Black - slightly pyritic chloritic, talc											30						
	45				clay.		15	<4	3.10	550	16	505	46	48				170	12	630	170	130
45					As above - black sooty alteration											20						
					product. Strongly micaceous - chloritic	8	<10		165	3650	18	506	48	50				60	16	190	70	65
	50				altered gneissic schist 2% sulphide (Groundwater @ 48m)																	
50					Dark grey green well foliated pyritic	<4	<10		5.90	1700	22	507	50	52		70		100	12	130	110	55
	51				quartz - feldspar - biotite gneiss Chlorite veins 2mm																	
51					Light grey, well foliated quartz - feldspar -	<4	<10		705	2050	22	508	52	53		70		60	14	170	100	46
					biotite - garnet - (chlorite) gneiss, minor sulphide																	
	53				Pale green feldspar and chlorite interbands	10	25	4	4.40	910	16	509	53	54				55	12	90	85	44
53					Quartz - feldspar - amphibolite,											200						
	54				black, well foliated. trace sulphide																	

All Au values <0.05
" Ag " <1
" Mo " <4

B.O.H. 54m.

Scintillometer counts all <20cps.

918505 (P) 47-48m.
507 (P) 50-52m } Petrology samples
509 (P) 53-54m.

SUMMARY AND SPECIAL COMMENTS Non magnetic quartz feldspar amphibolite basement with trace sulphide.

LOGGED BY C.L.H. DATE 31/10/83

SHEET 1 OF 1

CRAE H7
PLAN No N 414

0385

DRILL CORE LOG

CO-ORDINATES 5000N 5450E AZIMUTH — DRILLERS Wallis COMMENCED 31/10/83 DEPTH 37m HOLE No. 83CRC15

RL COLLAR INCLINATION — DRILL TYPE Reverse Circulation COMPLETED 31/10/83 CASING LEFT — DPO No(s) 80533

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Mag susc
0					Pinkish - buff brown calcrete fine	
	2				grained sand.	20x10^-5
2	7				Pale red brown very fine grained sand	30
7					Dark red brown fine-med grained	
	9				clayey sand.	50
9					Mottled pale grey - red brown - purple	60
					brown ferruginous sand. Cemented.	
	13				Matrix pale grey cores red brown.	
13					Kaolinitic off white sands + red	25
					brown sands. Minor calcrete possibly	
	15				paleoregolith.	
15					Mottled grey green and red brown	20
	17				cemented sands and clays.	
17					Off white kaolinitic fine grained sands	15
					and clays with possibly some powdery	
	22				gypsum.	
22					Pale brown and off white mottled	15
	30				silty clays.	
30					Grey silty micaceous (biotite) clays.	15
	34				Relic textures from gneiss (?) preserved	
34					Micaceous equivalent of 30-34 probably	20
					gradational to highly weathered schist	
	36				Bad contamination from cyclone	
36					Dark grey green quartz-feldspar-	150
					biotite - chlorite gneiss. Fine grained,	
	37				well foliated	
					E.O.H. 37m.	
					All scintillometer readings < 15cps.	
					Sample 918514 (P) Petrology sample.	

Sn	U	%Fe	Mn	Cr	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Cu	Pb	Zr	Ni	Co
6	<4	1.20	22	22	918510	28	30		14	22	18	60	<4
10	4	1.35	20	20	11	30	32		14	55	16	24	<4
8	4	2.35	22	26	12	32	34		26	34	38	26	6
<4	<4	9.90	190	46	13	34	36		270	22	390	65	46
<4	<4	2.40	120	20	14	36	37						

All Au values < 0.05
" Ag " < 1
" Mo " < 4
" W " < 4

SUMMARY AND SPECIAL COMMENTS Drill hole sited on topographic high sand dune.
Basement quartz-feldspar-biotite-chlorite gneiss.

LOGGED BY D.L.F. DATE 31/10/83

SHEET 1 OF 1

CRAE 47
PLAN No M 444

DRILL CORE LOG

CO-ORDINATES 5000N 4150E AZIMUTH — DRILLERS Wallis COMMENCED 31/10/83 DEPTH 72m. HOLE No. 83CRC14

RL COLLAR INCLINATION — DRILL TYPE Reverse Circulation COMPLETED — CASING LEFT — DPO No(s) B 0833

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Mag susc			Cu	Pb	Zn	Ni	Co
0	2				Buff brown, calcrete											20×10⁻⁵							
2					Pale straw brown running fine grained											40							
	8				dune sand.																		
8					Red brown medium grained clayey sands,											30							
	12				weakly cemented.																		
12					Mottled red brown - pale grey sandy											40							
	13				clay.																		
13					Mottled dark purple brown - yellow brown											45							
					cemented sands. Very ferruginous, grading																		
	19				to yellow brown at base.																		
19					Mottled white - pale yellow brown clayey											30							
					(kaolin) very fine grained sand/silt. Some																		
	25				powdery gypsum.																		
25					Mottled grey white clays with minor large	8	<10	14	0.75	20	<4	918515	30	32		35			42	80	22	75	32
					quartz grains. Minor mafics, traces of	10		4	2.35	90	4	16	32	34					170	65	65	110	90
	31				relic fabric. Trace sulphide	4		<4	1.65	560	4	17	34	36					22	30	28	65	32
31					Dark brown and black clays with marcasite(?)	<4			1.80	40	8	18	36	38		30			40	22	36	50	20
					sulphide nodules (≤3cm) to 39m. Minor	6			1.55	270	10	19	38	40					46	22	44	65	28
	39				garnet and biotite sulphide nodules	5			1.55	180	6	20	40	42					24	20	55	65	22
39					Pale grey brown clays with large quartz grains	<4			1.55	300	6	21	42	44		30			30	20	90	85	26
	44				Micaceous, minor garnet.	4	10		6.35	550	14	22	44	45					22	16	50	42	16
44					Green brown clayey sand with relic gneissic	5	<10		2.00	570	8	23	45	47		650×10⁻⁵			36	18	75	50	16
	45				fabric, minor garnet. Weathered basement.	<4	15		5.50	1250	8	24	47	49					38	16	75	36	14
45					Decomposed coarse grained quartz-	<4	<10		3.75	1150	12	25	49	51		2000×10⁻⁵			38	16	55	46	18
					(feldspar) - biotite - garnet - chlorite - magnetite	6			3.00	460	12	26	51	53		Up to 8000×10⁻⁵			34	16	46	40	16
	63				gneiss. Large granite fragments and ex quartz veining. Water @ 54M	4			8.85	850	19	27	53	55		@ 55-56m			22	14	48	26	14
63					Mafic quartz-feldspar-magnetite-biotite	<4			8.35	630	18	28	55	57		15000×10⁻⁵			26	18	70	28	18
	65				gneiss, well foliated strongly weathered.	4			8.20	700	16	29	57	59					20	14	55	30	14
65					Mafic coarse grained quartz-(feldspar)-	<4			17.5	1150	26	30	59	61		8000×10⁻⁵			16	14	40	20	8
	68				magnetite-biotite-garnet gneiss	<4			8.30	460	16	31	61	63					18	14	55	20	14
68					As for 65-68 + very coarse grained quartz-	8			19.5	1650	22	32	63	65		2000×10⁻⁵			22	18	70	34	12
	69				2 feldspar - biotite - chlorite granite (60:40)	4	15		15.5	1450	26	33	65	67					22	14	60	30	12
69	71				As for 65-68 trace oxidising sulphides associated with granite	6	10		13.5	1300	24	34	67	68					14	14	55	28	12
71					As for 68-69. Sulphide coating	<4	<10		5.00	260	22	35	68	69		4000×10⁻⁵			18	10	34	20	18
	72				fractures in granite (<3% sulphide	6	15		5.85	400	16	36	69	71					18	10	36	26	24
						<4	10		4.90	550	14	37	71	72					18	12	44	44	36

B.O.H 72m.

All Au values <0.05
" Mo " <4
" Ag " <1

All scintillometer readings <20cps.

Petrology sample 918537(P) 71-72m

SUMMARY AND SPECIAL COMMENTS: Strongly magnetic quartz-feldspar-biotite-garnet-magnetite-chlorite gneiss basement.

LOGGED BY: P.L.F. DATE 31/10/83 SHEET 1 OF 1

CRAE H7 PLAN No. N 404

C.R.A. EXPLORATION PTY. LIMITED

DRILL CORE LOG

PROJECT: Cootra (Brewicks)

CO-ORDINATES: 5000N 6270E. AZIMUTH: — DRILLERS: Wallis COMMENCED: 4/1/83 DEPTH: 57m HOLE No.: 83CRC20
RL COLLAR: INCLINATION: — DRILL TYPE: Reverse Circulation COMPLETED: 4/1/83 CASING LEFT: — BPO No(s): E0835

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Mag. susc.
0	1				Buff brown calcrete and fine grained dune sand.	20×10^{5}
1	2				Pale straw brown fine grained dune sand.	50
7	11				Red brown ferruginous medium grained sand	15 / 50
11	12				Pale grey green sandy clay.	20
12	17				Purple brown ferruginous cemented medium grained sands.	10
17	19				Pale grey clayey sand	5
19	28				Mottled off white, purple brown, yellow brown silty clays with coarse grained patches. Weakly cemented, possible relic gneissic fabric	5
28	36				Dark brown and grey silty micaceous (biotite) plastic clays. Rare marcasite (<1.5cm) to 33m. Gradational to less carbonaceous clayey sand at base	
36	37				Brown plastic kaolin sandy clay minor garnet. Probably highly weathered basement.	10
37	48				Dark grey micaceous sandy clays grading to clayey sands at base. Possible relic gneissic fabric. Minor garnet	20
48	57 (51 water table)				Medium quartz - feldspar - biotite garnet gneiss, very well developed foliation defined by leuco (coarse grained quartz-feldspar) and mafic (biotite rich) segregations. Garnet porphyroblasts up to 4mm. Chlorite content increasing with depth to 54m then approximately constant. Some soft (biotite rich ??) zones. Foliation - core axis foliation approx. 30°	20

B.O.H. 57m

All scintillometer readings ≤20 cps.

Petrology sample 918551(P) 56-57m.

Sn	W	%Fe	Mn	Cr	SAMPLE No.	FROM (M)	TO (M)	Cu	Pb	Zn	Ni	Co
4	10	2.95	12	10	918538	30	32	44	80	55	110	45
4	15	3.85	20	14	39	32	34	26	38	60	130	75
<4	<10	2.85	26	12	40	34	36	32	22	130	95	55
6	10	1.70	100	10	41	36	38	38	24	150	65	32
<4	<10	2.75	140	20	42	38	40	36	18	170	75	48
		2.65	110	18	43	40	42	46	18	180	55	30
		2.75	150	14	44	42	44	40	18	160	65	30
		2.70	140	18	45	44	46	50	20	130	55	22
		3.10	130	20	46	46	48	50	20	140	55	24
		3.15	140	16	47	48	50	44	18	140	65	30
		2.35	130	22	48	50	52	55	18	150	75	30
	10	3.25	150	18	49	52	54	38	16	110	60	24
6	10	2.65	120	18	50	54	56	24	14	90	55	22
<4	<10	2.75	90	26	51	56	57	26	14	80	46	16

All Au values <0.05
" Mo " <4
" Ag " <1
(" U " <4
except 918541 - 4)

SUMMARY AND SPECIAL COMMENTS: [illegible] quartz feldspar - biotite chlorite garnet gneiss

LOGGED BY: [illegible] DATE: [illegible]

CRAE 117 PLAN No. M814

DRILL CORE LOG

CO-ORDINATES 5000N 6980E AZIMUTH — DRILLERS Wallis COMMENCED 1/4/83 DEPTH 54m HOLE No. 83CRC21

RL COLLAR INCLINATION — DRILL TYPE Reverse Circulation COMPLETED 4/4/83 CASING LEFT — DPO No(s) B0833

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sr	U	%Fe	Mn	Cr	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Mag Susc.	Cu	Pb	Zn	Ni	Co
0					Brown grey calcrete and fine grain straw										10x10^3					
	1				brown dune sand.															
1					Red brown fine grained slightly clayey										30					
	6				sands.															
6	8				Pale grey silt with gypsum (??) powder										20					
8					Purple brown ferruginous slightly clayey	minor contamination from									20					
	14				sands. Med grained, partially cemented	cyclone.														
14					Off white fine grained - med. grained										10					
	24				sand, coarsening towards base.															
24					Light brown plastic clays and										20					
	33				med - coarse grained sands.															
33					Grey coarse grained - med. grained (*)	<4	<4	0.45	30	18	918552	33	35		20	8	12	6	<4	<4
	40				slightly micaceous sands.	<4		0.85	26	10	3	35	37			8	12	4	12	6
40					Grey brown mottled kaolinitic, micaceous	<4		1.10	28	12	4	37	39		30	6	18	6	22	16
					clays. Locally well preserved relic layering,	8	4	0.75	26	10	5	39	41			6	14	14	14	10
	43				trace chlorite.	4	<4	0.65	22	10	6	41	43			6	16	32	16	8
43					Dark green chloritic gneiss, well defined	6		0.80	20	8	7	43	45		20	6	12	32	24	18
					foliation, highly weathered. minor	4		0.85	24	8	8	45	47			8	12	20	16	12
	53				biotite.	<4		0.80	32	6	9	47	49			8	12	34	16	8
53					Dark grey-green quartz-feldspar-(biotite)	4		0.80	26	6	918560	49	51		20	8	10	40	12	8
	54				gneiss.	4		0.80	24	10	1	51	53			8	10	40	12	8
						<4		0.80	34	12	2	53	54			12	8	60	12	6

B.O.H. 54m.

All scintillometer readings < 20 cps.

Petrology sample 918562 (P) 33-54m

All Au values <0.05
" Mo " <4
" Ag " <1
" W " <10

(*) some pyritic lumps (≤2mm) possibly marcasite
minor contam. 33-40m

SUMMARY AND SPECIAL COMMENTS: Basement quartz-feldspar-(biotite)-chlorite gneiss. Non magnetic.

LOGGED BY P.L.A. DATE 1/4/83

SHEET 1 OF 1

CRAE 117 PLAN No. 4

C R A EXPLORATION PTY LIMITED

PROJECT: COOTRA EL 980 Warramboo Prospect.

~~Geological & assay~~ DRILL CORE LOG

0387

LOCAL GRID CO-ORDINATES: 78000E/76000 / 522000E/6322450N (AMG) AZIMUTH: ____ DRILLERS: Wallis

COMMENCED: 2/11/83 DEPTH: 69.5m HOLE No. 83CRC 22

RL COLLAR: ____ INCLINATION: Vertical DRILL TYPE: Reverse circ. air core

COMPLETED: 2/11/83 CASING LEFT: – DPO No(s): B661

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Au	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SNU/KA?	CPS	Cu	Pb	Zn	Ni	Co	Mo
0	4				SAND, light orange brown, fine grained, subrounded,										0	1		10	<25						
					well sorted, very minor heavy minerals											2		10							
																3		10							
																4		15							
4	7				CALCARENITE.											5		10							
					Sand 60%, clear, fine to medium grained,											6		10							
					subrounded, well sorted,											7		5							
					Carbonate 40%, white, matrix.											8		5							
																9		5							
7	48			10	CLAY											10		10							
					7-11m light grey, stiff											11		5							
					11-14m orange brown to grey to light ~~brown~~ grey											12		5							
					stiff. Samp 11-21m.											13		0							
																14									
					14-21m Clay, white, soft, sandy											15									
					16-17m grey ?carbonaceous											16									
																17									
																18									
																19									
				20												20									
					21-36m Clay, medium brown, sericitic, stiff.											21									
																22									
																23									
																24									
																25									
																26									
																27									
																28									
																29									
				30	29-31m Siltstone (?) dark grey, aphanitic siliceous.	<4	<10	34	12.5	550	20	<0.05	<1	915563	29	30		80		150	40	95	24	4	<4
																31		100							
						<4		20	3.90	160	8		<1	64		32		10		60	60	34	14	4	
																33		0							
					33-34m as above	<4		16	13.0	660	20		<1	65		34		50		70	90	50	20	4	
																35		20							
					36-38m as above	<4		14	9.60	440	12		1	66		36		10		80	100	80	18	6	
					36-48m Clay, medium to dark green, biotitic,											37		20							
					stiff.	<4		10	12.0	600	14		<1	67		38		15		60	70	80	34	8	
																39		30							
				40		6		8	5.20	230	8		<1	68		40		20		60	50	140	60	28	6
																41		0							
						8		10	3.40	170	10		<1	69		42				60	24	90	36	18	<4
																43									
						10		10	4.30	260	10		<1	70		44				32	30	80	30	12	6
																45									
						4		8	6.70	330	10		<1	71		46				38	28	70	48	28	<4
				47												47		30							

All Au <0.05

SUMMARY AND SPECIAL COMMENTS

LOGGED BY: J. Howard DATE: 3/11/83

SHEET 1 OF 2

CRAE 117 PLAN No M414

C R A EXPLORATION PTY LIMITED

DRILL CORE LOG

PROJECT ________ 0386

CO-ORDINATES ________ AZIMUTH ________ DRILLERS ________ COMMENCED ________ DEPTH ________ HOLE No. 83CRC 22

RL COLLAR ________ INCLINATION ________ DRILL TYPE ________ COMPLETED ________ CASING LEFT ________ DPO No(s) ________

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	CORE DESCRIPTION
				Petrology 918590
48	69.5		50	QUARTZ – BIOTITE – FELDSPAR – AMPHIBOLE GNEISS
				Amphibole 60% (OR GNEISSIC AMPHIBOLITE)
				Feldspar 25% – as ... subhedral laminae
				Biotite 10%
				Quartz (?) 5% fine grained, granular.
				Pyrite – very minor.
				? Magnetite – strong deflection of pendulum magnet
				Strong foliation at 65° lca.
				Texture – fine grained to medium grained,
				granular, schistose.
		8m	60	NB Very clayey with < 5% recovery of core
				from 48 to 59m.
				Nearly 100% recovered from 59–69.5m.
	70			

ASSAY VALUES

Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	S/G xG	CB	Cu	Pb	Zn	Ni	Co	Mo
4	<10	8	12.0	810	14	<1	918572	47	48		10	<5	42	24	90	48	26	<4
									49		20						?	
6		6	12.0	900	14	<1	73		50		10		42	28	180	50	26	
									51									
10		6	11.0	900	14	<1	74		52				32	24	90	42	20	
									53									
4		<4	9.0	750	12	1	75		54				36	14	70	50	22	
									55		0							
10		4	10.5	1000	14	<1	76		56		0		28	18	70	50	26	
4		14	10.0	870	16	<1	77		57		80		75	14	80	55	30	
8		14	7.70	940	20	<1	918578		58		40		30	[illegible]	120	55	28	
8		4	5.50	560	22	<1	79		59		40		38	14	90	50	24	8
6		<4	4.80	560	22	<1	918550		60		20		44	10	80	60	30	8
<4		<4	6.80	800	26	1	81		61		30		42	10	85	50	26	6
10		6	5.40	570	24	<1	82		62		35		48	12	80	48	24	6
10		<4	4.40	550	14	<1	83		63		40		32	8	60	46	26	6
10		4	3.80	430	14	<1	84		64		30		32	6	70	48	24	6
6	10	<4	4.20	550	18	<1	85		65		90		60	8	70	55	30	4
6	<10	<4	4.30	500	18	<1	86		66		200		48	6	70	46	26	6
<4	<10	4	3.90	490	16	<1	87		67		10		55	6	80	55	26	8
6		<4	3.80	470	20	<1	88		68		10		40	8	60	50	26	6
<4		<4	3.90	520	22	<1	89		69		25		42	8	70	55	26	8
<4		<4	4.30	550	16	<1	90		70		10		38	6	60	55	26	8

All Au < 0.05

CRAE 117 PLAN No. 416

SUMMARY AND SPECIAL COMMENTS

LOGGED BY ________ DATE ________

SHEET 2 OF 2

038-1

C R A EXPLORATION PTY LIMITED

PROJECT COOTRA EL 980

Geological & assay DRILL CORE LOG

Local Grid:- 7000E/7300N
CO-ORDINATES 562200E/6322650N — AMG
AZIMUTH
INCLINATION Vertical
RL COLLAR
DRILLERS Wallis
DRILL TYPE Reverse circ. air core
COMMENCED 2/11/83 1200 DEPTH 55.2m HOLE No 83CRC23
COMPLETED 2/11/83 1330H CASING LEFT — DPO No(s) B661

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION
0	1.5				CALCRETE off white - hard.
1.5	3				SAND, off white, fine grained, subangular, well sorted
3	21				CLAY 3-8m grey brown & white, stiff. 8-13.5m yellow white, soft. 13.5-21m medium grey to light brown at top to medium grey at base, stiff.
21	55				SAND & CLAY [1200 gal per hr Salty Water] 21-29m Sand 70%, white, coarse grained, subangular well sorted Clay 30%, light brown to grey, soft. 26-27m carbonaceous. 29-38m Clay, dark brown to red brown, mottled, moderately stiff, very micaceous (degraded biotite?) 38-54m Clay 50% light to dark brown, soft. Sand 50%, white, very coarse grained subangular, equant, well sorted. 42-43m granular nodules of dark grey ? silica. 46-47m carbonaceous.

ASSAY VALUES

Sn	W	U	Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Scint. (x10³)	CPS	Cu	Pb	Zn	Ni	Co	Mo
								0	1		35	<25						
									2		15							
									3		10							
									4		10							
									5		10							
									6									
									7									
									8									
									9									
									10									
									11		5							
									12									
									13									
									14									
									15									
									16									
									17									
									18									
									19									
									20									
									21		10							
									22		0							
									23		15							
									24		15							
									25		25							
10	<10	26	5.80	400	26	<1	918591	24	26		15		44	95	60	30	6	<4
									27		15							
12		28	8.80	540	20		92		28		35		36	70	110	26	<4	8
									29		35							
8		26	6.70	400	22		93		30		30		44	80	50	65	10	8
									31		15							
12		14	2.90	200	10		94		32		5		24	42	22	20	8	8
									33		10							
10		22	1.60	120	10		95		34		15		16	55	22	12	4	6
									35		10							
10		20	2.00	150	10		96		36		15		16	110	22	12	4	6
									37		10							
4		16	1.90	140	6		97		38		10		14	75	26	18	16	10
									39		20							
10		18	2.90	190	26		98		40		20		22	130	70	22	8	14
									41		20							
4		12	2.05	140	34		99		42		20		18	65	50	22	14	8
									43		20							
12		12	5.30	270	8		600		44		30		14	65	70	75	155	12
									45		0							
4		10	3.90	210	25		601		46		0		14	40	35	48	120	8
									47		0							

All Au values <0.05

SUMMARY AND SPECIAL COMMENTS

LOGGED BY J Howard DATE 3/11/83

SHEET 1 OF 2

CRAE H7 PLAN No M414

C R A EXPLORATION PTY LIMITED

DRILL CORE LOG

PROJECT

CO ORDINATES | AZIMUTH | DRILLERS | COMMENCED | DEPTH | HOLE No. 83CRC2B

RL COLLAR | INCLINATION | DRILL TYPE | COMPLETED | CASING LEFT | DPO No(s)

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Sil	[illegible]	Cu	Pb	Zn	Ni	Co	Mo
						12	<10	16	2.60	200	8	<1	918 602	47	48		0	<2	20	26	85	18	12	6
															49									
			50			12		14	3.40	250	28		603		50				18	30	50	26	20	12
															51									
						8		16	2.80	240	12		604		52				16	28	60	16	10	8
															53									
						<4		12	2.20	185	34		605		54				12	18	32	22	16	8
54	55		55		SAND, medium grey, very coarse grained, subangular										55									
					equant, well sorted, quartzose	4		10	2.90	230	10		606		55.2				14	28	48	16	16	6
55	55.2				BIOTITE-AMPHIBOLE-FELDSPAR QUARTZ GNEISS.	All Au values							<0.05											
	BOH.				Biotite 10% fine grained.																			
					Amphibole 30% " "																			
					Feldspar/quartz 60% " "																			
					Pyrite - minor.																			
					Foliation 45° lca.																			
					Texture - fine grained, granular,																			
					4p tby																			

SUMMARY AND SPECIAL COMMENTS

LOGGED BY J.P. Howard DATE 3/11/83

SHEET 2 OF 2

CRAE H7 PLAN No.

C R A EXPLORATION PTY LIMITED

Geological & assay DRILL CORE LOG

PROJECT: CCCTRA EL 930

Local Grid 7000E/5400N
CO-ORDINATES (AMG) 562200E/6320?N
AZIMUTH:
RL COLLAR:
INCLINATION: Vertical
DRILLERS: Wallis
DRILL TYPE: Reverse circ air core
COMMENCED: 2/11/83 1420H
COMPLETED: 2/11/83 1600H
DEPTH: 33 m
CASING LEFT: —
HOLE No: 83CRC 24
DPO No(s): B 661

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	CORE DESCRIPTION
0	32			SAND & CLAY
				0-1m Sand, light brown, pinkish, fine grained, subrounded, well sorted, clayey.
				1-2m Clay light brown to light grey, hard.
				2-3m ~~Sand~~ Clay 50%, red-brown-orange, hard
				~~Clay~~ Sand 50% fine grained 95% subangular well sorted
				coarse grained 5%, subrounded
				3-5m Clay, green-orange-red
			10	5-10m Sand, orange brown, fine to medium grained, subrounded, well sorted.
				10-16m Clay, light brown, stiff
				16-18m Sand 50, medium grained, subangular, well sorted. Clay 50%, light brown
				18-20m Sand, light brown, fine to very coarse grained, subangular to subrounded, well sorted.
			20	20-32m Clay 50%, light brown, moderately stiff very sericitic.
				Sand 50%, medium to very coarse grained, subangular to subrounded, poorly sorted, pebbly.
			30	
32	33			Biotite QUARTZITE.
	BOH.			Medium grainsize. Biotite on parting (? bedding planes) at 80° lca
				Quartz grains are strained & translucent glassy - (?) felspar component.
				Texture:- 1-3mm laminations defined by quartz & by biotite
			40	
			48	

Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SIV $\times 10^{-3}$	CPS	Cu	Pb	Zn	Ni	Co	Mo
								0	1		3	≤15						
									2									
									3									
									4									
									5									
									6									
									7									
									8		5							
									9		15							
									10		15							
									11		5							
									12		20							
									13		10							
									14		5							
									15		4							
									16		4							
									17		5							
									18		0							
									19		0							
									20		5							
									21		0							
									22		0							
									23		0							
									24		0							
									25		10							
									26		5							
									27		0							
									28		5							
									29		4							
									30		0							
3	<10	4	0.85	28	8	<1	918610	30	31		0		18	38	16	26	8	8
<4	<10	<4	1.30	135	18	<1	11		32		18		200	10	40	8	10	8
<4	<10	55	1.35	110	22	<1	12		33		15		14	8	38	18	12	8

CRAE 117 PLAN No. M 614

SUMMARY AND SPECIAL COMMENTS

LOGGED BY: JP Howard
DATE: 3/11/83
SHEET 1 OF 1

DRILL CORE LOG

CO-ORDINATES [illegible] AZIMUTH ____ DRILLERS [illegible] COMMENCED [illegible] DEPTH 50 m HOLE No. [illegible] 25

RL COLLAR ____ INCLINATION Vertical DRILL TYPE Reverse circulation air core COMPLETED [illegible] CASING LEFT — DPO No(s) [illegible]

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Scint.	CPS	Cu	Pb	Zn	Ni	Co	Mo
0	0.5		SAND, orange brown, fine grained, subrounded, well sorted									0	1		20	≤20						
			clayey.										2		10							
0.5	2		CALCRETE, off white to pink										3		5							
2	6		CLAY, medium red brown, stiff										4		8							
													5		4							
													6		15							
6	7		SILTSTONE, sandy, dark red brown (hard core 5cm)										7		15							
7	48		CLAY										8		11							
			7-8m purple brown, soft										9		0							
			8-9m light grey, soft										10		10							
			9-10m medium red brown, soft										11		10							
			10-19m medium to light fawn, soft.										12		5							
													13		8							
													14		5							
													15		-							
													16		5							
													17		10							
													18		5							
			19-23.5m dark to medium grey, stiff.										19		10							
													20		10							
													21		10							
													22		5							
													23		5							
			23.5-24m red brown to orange, mottled, stiff										24		5							
													25		5							
													26		5							
													27		15							
													28		20							
													29		50							
			29-~~34~~m dark burgundy red, iron rich, stiff	<4	<10	4	20.0	2100	24	1	918613		30		55		18	20	50	26	10	8
													31		65							
				6		<4	12.0	870	60	1	614		32		70		12	14	46	28	8	10
													33		2000							
			34-48m light to medium grey, increase angular, medium	10		4	135	1600	26	<1	615		34		2000		14	16	40	42	18	6
			grained quartz.										35		5000							
				<4		4	11.0	1300	34	<1	616		36		2000		16	18	36	40	16	8
													37		3000							
				16		<4	14.0	2000	38	1	617		38		5000		16	22	46	36	16	8
													39		8000							
				8		<4	160	2300	34	<1	618		40		7500		20	14	65	42	22	8
													41		9000							
				<4		<4	13.5	1850	30	1	918619	40	42		10000		14	16	44	36	12	4
													43		7000							
				<4		4	10.5	1700	50	<1	620		44		20000		14	12	36	32	14	6
													45		10000							
				6		4	12.0	1800	50	<1	621		46		8500		12	14	46	28	14	6
													47		10000							
48	56		QUARTZ-FELDSPAR-BIOTITE-MAGNETITE GNEISS	4	10	<4	11.0	2500	130	<1	622		48		9000		10	8	50	32	14	6
	EOH		Magnetite 15%, fine grained. Foliation at 75°/ca.	8	<10	<4	17.0	3050	46	1	623		49		5000		18	12	28	38	12	6
				<4	<10	<4	16.0	3100	44	<1	918624		50		20000		14	12	32	38	14	10

SUMMARY AND SPECIAL COMMENTS: Epidote ? calcite mainly in fractures. All Au values <0.05

Texture:- granitised 10mm Q-F bands, granular between these.

LOGGED BY [illegible] DATE 3/11/83

SHEET 1 OF 2

CRAE H7 PLAN No M414

DRILL CORE LOG

CO-ORDINATES ______ AZIMUTH ______ DRILLERS ______ COMMENCED ______ DEPTH ______ HOLE No. SSCRC 25

RL COLLAR ______ INCLINATION ______ DRILL TYPE ______ COMPLETED ______ CASING LEFT ______ DPO No(s) ______ 0395

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Assay Values Sn	W	U	%Fe	Mn	Cr	As	SAMPLE No.	FROM (M)	TO (M)	REC (M)	ASSAY VALUES [illegible]	[illegible]	Cu	Pb	Zn	Ni	Co	Mo
					Biotite, banded, cone in layers	6	<10	<4	14.0	2550	60	<1	918625	50	51		3500	<20	14	10	32	26	10	8
						10			18.0	2400	50	<1	626		52		2500		18	10	[illegible]	28	10	<4
					 glassy, garnetted qz band	<4			14.5	2150	60	1	627		53		3000		18	6	20	32	10	6
					magnetite quartzite.	12			15.0	2850	70	<1	628		54		2700		14	8	20	32	10	4
						4			13.0	2200	80	<1	629		55		2200		12	8	24	26	10	6
	56m					12			14.5	2400	50	1	918630		56		2000		12	10	24	32	10	8
	BOH																							

All Au values <0.05

CRAE H7
PLAN No N414

SUMMARY AND SPECIAL COMMENTS ______

LOGGED BY ______ DATE ______

SHEET 2 OF 2

DRILL CORE LOG

CO-ORDINATES [illegible] AZIMUTH [illegible] DRILLERS [illegible] COMMENCED [illegible] DEPTH [illegible] HOLE No. [illegible] 039[illegible]

RL COLLAR INCLINATION Vertical DRILL TYPE [illegible] COMPLETED 3/11/83 / 2230hrs CASING LEFT DPO No(s) [illegible]

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	[illegible]	[illegible]	Cu	Pb	Zn	Ni	Co	Mo
0	1.5				SAND, light brown, fine grained, subrounded, well sorted									0	1		40	<20						
															2		55							
1.5	3				CALCRETE off-white to pink										3		300							
3	4				CLAY, orange-brown.										4		100							
4	4.2		5		LATERITE, dark red, orange & green, mottled, micaceous										5		65							
															6		20							
4.2	44				CLAY, varicoloured										7		10							
					4.2-7m pink brown to off-white, soft.										8		15							
					7 - 9.5m orange-brown (rust coloured), soft.										9		10							
			10		9.5 - 16m dark grey, stiff, damp.										10		10							
															11		5							
															12		7							
															13		5							
															14		0							
			15												15		0							
					16 - 27m dark brown 80%										16		0							
					light grey-yellow blebs 20%, mottled, soft, silty	4	<10	<4	14.0	1000	44	1	918631	16	17		15		28	28	60	42	28	<4
															18		42							
						8		4	14.0	1350	50	<1	32		19		15		26	22	44	40	18	6
			20												20		6							
						10		6	12.0	990	50	1	33		21				24	22	32	38	16	<4
															22									
						6		<4	13.0	950	48	1	34		23		5		34	18	34	32	12	<4
															24		10							
			25			8		<4	10.0	550	42	<1	35		25		50		18	20	65	32	8	6
															26		15							
					27-44m light grey, moderately stiff.	<4		<4	12.0	2600	46	<1	36		27		45		30	16	60	30	8	8
															28		50							
						8		4	11.5	4900	36	<1	37		29		50		34	12	50	26	8	<4
			30												30		50							
						4		<4	7.30	3400	34	1	38		31		55		60	12	75	30	12	4
															32		20							
						6		4	5.70	1450	26	<1	39		33		25		60	8	80	36	12	<4
															34		10							
			35			<4		8	8.40	2600	44	<1	40		35		7		75	18	70	46	10	6
															36		15							
						4		4	4.90	1300	32		41		37		15		70	16	80	40	10	4
															38		25							
						<4		<4	4.80	1350	24		42		39		10		65	16	95	32	10	6
			40												40		20							
						<4		4	4.70	1150	28		43		41		15		125	18	100	34	10	8
															42		25							
						8		6	4.50	1000	32		44		43		15		50	38	120	36	12	6
															44		15							
44	51		45		MAGNETITE-GARNET QUARTZITE Petrology 918651	4	10	<4	6.20	1850	44		918645		45		20		36	18	250	38	12	6
	BOH.			garnet	Magnetite, granular (0.5mm), 25%	<4	10	6	6.00	1750	44		46		46		2000		70	18	85	34	10	6
					Garnet, granular (0.5mm), light orange brown & pink, 25%	<4	40	<4	16.0	1350	60		47		47		1500		18	14	80	30	8	8
					Quartz, granular (to 1mm?), white, subhedral, 50%	4	<10	<4	13.0	3300	48		48		48		7500		18	12	50	38	10	6
						<4	<10	<4	8.10	2350	60		49		49		3500		16	12	55	38	14	8
					Minor light green clay mainly on fractures	<4	<10	<4	7.90	1650	70		50		50		6000		18	10	70	36	14	6
			50		Foliation:- 5mm wide; bedding at 55° lca	12	15	<4	15.0	2300	70		918651		51		9000		12	10	40	26	14	6

SUMMARY AND SPECIAL COMMENTS Texture:- garnet is porphyroblastic.

All Au <0.05

LOGGED BY G. Howard DATE 3/11/83

SHEET 1 OF 1

CRAE N7 PLAN No M614

DRILL CORE LOG

CO-ORDINATES (AMG [illegible]) AZIMUTH ____ DRILLERS [illegible] COMMENCED [illegible] DEPTH 66m HOLE No. S3CRC 24

RL COLLAR ____ INCLINATION Vertical DRILL TYPE reverse circulation air core COMPLETED 3/11/83 1200HR CASING LEFT — DPO No(s) B661

039

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	ASSAY VALUES Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SUS $\times 10^{-5}$	CPS	ASSAY VALUES Cu	Pb	Zn	Ni	Co	Mo
0	0.5				SAND, medium brown, fine grained, subrounded to									0	1		90	<10						
					well rounded, well sorted, frosty.										2		50							
0.5	2				CALCRETE off-white to pink, hard.										3		70							
2	3.6				CLAY										4		40							
			5		2-3.5m medium red-brown, stiff.										5		40							
					3.5-5m mottled, white-yellow-orange, stiff.										6		30							
					5-6m light grey, soft										7		15							
					6-7m medium brown, soft.										8		45							
					7-14.5m orange brown, soft.										9		5							
			10												10		10							
															11		5							
															12		4							
															13		5							
															14		10							
			15		14.5-16.5m medium grey brown, soft.										15		10							
															16		25							
					16.5-31m dark grey to black, stiff to 25m, soft to 31m										17		20							
					light grey nodules 20%	6	10	<4	17.50	1650	80	<1	919652	17	18		27		60	38	28	36	16	6
															19		45							
			20			18	<10		27.0	2150	60	1	653		20		85		40	26	40	32	10	6
															21		75							
						8	<10		21.0	2000	48	1	654		22		75		24	18	38	30	10	6
															23		45							
						4	15		20.0	2500	42	<1	655		24		100		20	12	50	26	10	6
			25												25		60							
						<4	<10		22.5	2850	34		656		26		90		50	20	65	40	10	<4
															27		35							
						8	10		21.0	2300	40		657		28		50		36	18	60	34	10	
															29		95							
			30			10	<10		22.0	2400	30		658		30		200		30	16	55	32	10	
					31-36m green grey, soft.										31		200							
						8	<10		16.0	1200	28		659		32		250		32	16	80	28	10	
															33		75							
						<4	<10		17.0	1650	40		660		34		75		30	16	100	42	14	
			35												35		35							
						8	10		17.0	2100	38		661		36		70		26	16	65	36	12	
36	59				SAND & CLAY										37		30							
					Sand 10-60%, increasing towards base, very coarse	<4	<10		17.0	1850	46		662		38		95		24	16	70	36	10	
					grained angular to subrounded, well sorted; quartz 70%,										39		95							
			40		magnetite (lumps) 20%, feldspar 10%. Water at 36m.	6	<10		18.0	2700	50		663		40		300		26	16	80	40	12	
					Clay 40%, grey brown, soft										41		200							
					Rock fragments, quartz feldspar gneiss.	<4	<10		16.0	1950	40		664		42		300		28	16	55	34	10	
															43		200							
						6	<10		20.0	1800	38		665		44		200		26	14	42	34	10	
			45												45		200							
						<4			20.50	1900	50		666		46		230		26	16	50	30	10	
															47		300							
						6			13.0	1000	60		667		48		100		18	16	60	36	10	
															49		50							
			50			<4			8.10	810	34		668		50		70		42	20	60	32	10	

SUMMARY AND SPECIAL COMMENTS: All Au <0.05

LOGGED BY J Howard DATE 3/11/83

SHEET 1 OF 2

CRAE 117
PLAN No M414

DRILL CORE LOG

CO-ORDINATES ______ AZIMUTH ______ DRILLERS ______ COMMENCED ______ DEPTH ______ HOLE No. 83CRC 27

RL COLLAR ______ INCLINATION ______ DRILL TYPE ______ COMPLETED ______ CASING LEFT ______ DPO No(s) ______

0390

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SIU	CPS	Cu	Pb	Zn	Ni	Co	Mo
													~~918664~~	50	51		35	<20						
						<4	<10	<4	6.80	700	50	<1	918669	51	52		45		22	24	60	36	12	<4
															53		20							
						<4	20		11.0	1000	60		670		54		30		30	24	60	40	14	
			55												55		300							
						10	<10		21.0	1100	34		671		56		3500		90	16	80	32	14	
															57		1000							
						8	<10		15.5	1150	38		672		58		6000		26	14	42	26	12	
						<4	<10								59		15000							
59	66	-2m	60		MAGNETITE-GARNET-FELDSPAR-BIOTITE QUARTZITE (ITABIRITE)?	<4	<10		9.60	1650	46		673	59	60		4500		20	10	32	30	14	
	(BOX)		good.		Magnetite:- granular to 1mm, concentrated in layers, 20%	<4	<10		11.0	950	42		674		61		400		24	14	60	28	10	
					Garnet:- brown granular, 0.5mm, equant, 5%	4	10	4	6.60	680	48		675		62		400		34	14	50	28	10	
		mag.			Feldspar:- sericitized, white, 20%	4	<10	<4	2.90	800	50		676		63		390		18	12	40	40	14	
					Muscovite:- Biotite:- fine grained 20%	<4			2.10	170	60		677		64		350		38	12	36	26	8	
			65		Quartz:- 35% (?) Amphibole-black	<4			5.20	135	60		678		65		770		410	14	60	70	22	
					Foliation:- 45° lca	6			4.65	250	36		918679		66		2000		410	16	70	70	22	
					Texture:- fine grained, granoblastic																			
						All Au <0.05																		

CRAE 117 PLAN No M 444

SUMMARY AND SPECIAL COMMENTS ______

LOGGED BY ______ DATE ______

SHEET 2 OF 2

DRILL CORE LOG

CO-ORDINATES [illegible] AZIMUTH ______ DRILLERS [illegible] COMMENCED 3/4/83 [illegible] DEPTH 48.5 m HOLE No. 93 CRC 28

RL COLLAR ______ INCLINATION Vertical DRILL TYPE [illegible] COMPLETED 3/4/83 1510 H CASING LEFT ______ DPO No(s) 8661

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	SPECIAL FEATURES WEATH., ALTERATION, FRACTURING VEINING, MINERALIZATION	SAMPLE No.	FROM (M)	TO (M)	REC (M)	ASSAY VALUES SIL XC	CPS						
0	5.5				SAND, medium orange brown, fine grained,			0	1		300	<20						
					subrounded to well rounded, well sorted				2		10							
									3		15							
									4		15							
									5		15							
5.5	6				CALCRETE, off white to pink, hard				6		20							
6	8				SAND, light brown, fine grained, subrounded,				7		15							
					well rounded, well sorted. Clayey towards base				8		40							
8	12								9		20							
			10		LATERITIC CLAY				10		50							
					Clay salmon pink, grey, red, orange, mottled				11		20							
					stiff, <10% hard Fe & Mn rich laterite fragments				12		28							
12	24								13		95							
					SANDY CLAY				14		200							
					Clay medium brown, 10% light grey flecks, stiff				15		350							
					Sand medium grained, subangular.				16		200							
									17		100							
									18		200							
									19		200							
			20						20		70							
									21		70							
									22		65							
									23		200							
						<1	918680	22	24		70		16	50	22	34	16	<4
24	42				CLAY				25		300							
					24–28 m Clay black with white clay flecks		681		26		500		16	40	20	38	30	
					?Manganese rich.				27		650							
							682		28		600		18	44	36	42	30	
					28–33 m Clay, dark brown, soft (wet)				29		600							
			30		& Rock fragments – 10% quartz magnetite (40%)		683		30		600		16	34	18	30	18	
									31		450							
							684		32		450		18	24	48	32	80	
					33–42 m Clay, orange-white-brown, mottled, soft.				33		450							
							685		34		300		16	26	34	24	26	
									35		400							
							686		36		450		20	38	38	28	34	
									37		200							
							687		38		250		16	20	38	30	14	
									39		200							
			40				688		40		400		20	20	90	38	24	
									41		200							
							689		42		250		10	20	40	32	12	
42	47				SAND & CLAY of WEATHERED BASEMENT				43		2000							
					Sand, very coarse grained, subangular,		690		44		350		10	18	38	30	14	
					well sorted. Quartz & magnetite/hematite grains.				45		200							
					Increasing proportion of rock fragments towards base		691		46		650		8	14	30	36	14	
					Clay 50% medium brown, soft.				47		200							
47	48.5	20%							48		500		[illegible]					
					MAGNETITE QUARTZITE		918692	46	48.5		5000		10	10	24	36	10	6
			50		Magnetite granular, up to 40%. 10 mm × 3 mm patches													

SUMMARY AND SPECIAL COMMENTS

Some is granitised with K-feldspar common

Foliation at 70° tca Garnet - brown, stressed 5%

Texture – coarse grained [illegible]

LOGGED BY [illegible] DATE 3/4/83

SHEET 1 OF 1

CRAE 117 PLAN No. M414

[illegible] DRILL CORE LOG

CO-ORDINATES (AMG) 562000E/[illegible]N AZIMUTH ____ DRILLERS Wallis COMMENCED 3/11/83 1100 HR DEPTH 30.2 m HOLE No. 93CRC 29

RL COLLAR ____ INCLINATION Vertical DRILL TYPE Reverse circulation air core COMPLETED 3/11/83 1745 HR CASING LEFT — DPO No(s) B 661

DEPTH FROM (M)	DEPTH TO (M)	CORE REC. (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION
0	0.5				SAND light grey, fine grained, well sorted, subrounded
0.5	1				CALCRETE black to pink.
1	6				SAND
					1-2m Sand, light fawn, fine grained, subangular, well sorted.
					2-3m Sand, medium grey brown, fine grained, subangular, well sorted, clayey.
					3-6m Sand 60%, fine grained, subangular, well sorted; Clay 40%, red brown, stiff.
6	12		10		CLAY, light grey to red brown with lateritic fragments rich in iron manganese & siderite(?) - minor boxworks
12	29.5				CLAY & SAND
					12-25m Sand 50%, medium grained, subangular, well sorted; Clay 50%, medium brown, soft.
			20		
					25-29.5m Sand 80%, very coarse grained, quartz, feldspar, magnetite (60%.) Clay 20% medium brown, soft
29.5	30.2 BOH.		30		FELDSPAR-BIOTITE-MAGNETITE QUARTZITE
					Pink K-spar in 'granitoid' 5-10mm wide bands.
					Biotite 10%
					Magnetite granular, 15%.
					Foliation at 45° to core.
			40		
			50		

Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SIU x10	cps	Cu	Pb	Zn	Ni	Co	Mg
								0	1		40	<20						
									2		1500							
									3		20							
									4		20							
									5		15							
									6		35							
									7		35							
									8		60							
									9		60							
									10		10							
									11		30							
<4	15	<4	13.0	380	36	<1	918693	10	12		250		12	14	26	20	6	<4
									13		200							
4	<10		11.0	780	32		4		14		200		10	14	22	28	10	
									15		300							
<4	<10		14.0	1200	34		5		16		200		12	16	30	34	12	
									17		200							
6	10		12.5	1650	30		6		18		400		10	10	28	36	12	
									19		60							
4	<10		7.40	1100	18		7		20		50		10	12	28	32	10	
									21		90							
<4	<10		7.80	1450	24		8		22		85		10	14	38	38	12	
									23		80							
<4	10		9.00	2150	28		9		24		80		8	14	36	36	10	
									25		55							
6	10		10.0	2150	26		700		26		200		8	12	48	32	10	
									27		200							
6	<10		8.70	3000	26		1		28		200		6	14	30	28	10	
									29		250							
12	10		5.80	8100	34		2		30		250		6	10	16	20	6	
4	<10		6.50	9000	90		918703	30	30.2				8	8	18	20	10	6

All values <0.05

CRAE H7 PLAN No M 444

SUMMARY AND SPECIAL COMMENTS ____

LOGGED BY J.F. Howard DATE 3/11/83

SHEET 1 OF 1

CRA EXPLORATION PTY LIMITED

PROJECT COCTRA EL 980

LOCAL GRID: 6500E/6200N

~~Geological & assay~~ DRILL CORE LOG

CO-ORDINATES (AMG) 562000E/6321700N AZIMUTH ______ DRILLERS Wallis John ~~Jack~~ COMMENCED 4/11/83 · 730HR DEPTH 24.5m HOLE No. 83CRC 30

RL COLLAR ______ INCLINATION Vertical DRILL TYPE Reverse circ. air core. COMPLETED 4/11/83 - 830H CASING LEFT — DPO No(s) B 661

DEPTH		CORE REC	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	ASSAY VALUES							SAMPLE No.	FROM (M)	TO (M)	REC (M)	ppm ASSAY VALUES							
FROM (M)	TO (M)	(M)				Sn	W	U	%Fe	Mn	Cr	Au					SIU ×10⁻⁵	CPS	Cu	Pb	Zn	Ni	Co	Mo
0	6.5				SAND									0	1		10	<18						
					0-5m Sand, light brown, fine grained, subrounded										2									
					well sorted, clear grains, loose, bimodal.										3									
					fine-medium grained well rounded, frosty										4									
					(Collared on sand dune)										5									
					5-6.5m Sand as above but clayey										6									
															7									
6.5	12				LATERITE and CLAY	<4	<10	<4	10.0	140	34	<1	918704	6	8				10	16	8	16	<4	<4
					6.5-8.5m Clay 90, red brown, stiff.										9									
			10		Laterite 10, very hard, iron rich fragments	8			13.0	180	48		705		10		35		14	20	36	20	<4	
					to 3cm, angular.										11		35							
					8.5-10m Clay, medium grey to yellow brown, stiff.	6			20.0	280	70		706		12		90		20	16	80	38	8	
					10-12m Clay 70%, red brown to grey, soft										13		200							
					Laterite 30%, fragments to 4cm, siliceous,	<4			10.5	410	40		707		14		300		22	18	80	40	12	
					micaceous.										15		200							
						<4			14.0	460	44		708		16		150		22	16	70	34	12	
12	21				SAND & CLAY										17		200							
					12-15m Clay, medium brown, sandy, soft.	8			12.0	580	42		709		18		200		22	16	70	38	10	
					15-21m Clay 80%, green grey, very micaceous ~~(biotite)~~										19		300							
			20		(degraded biotite)	<4			15.0	660	80		710		20		300		26	18	20	34	12	
					Sand 20%, medium to coarse grained	6			17.5	610	70		711		21		300		16	16	60	38	12	
					subangular, equant, well sorted.	<4			11.5	730	90		712		22		650		12	14	50	36	10	
						8	10		13.0	630	50		713		23		750		18	14	50	28	8	
21	24.5				BIOTITE-MAGNETITE-FELDSPAR-QUARTZ GNEISS	LNR	LNR	LNR	LNR	LNR	LNR	LNR	714		24		2000		LNR	LNR	LNR	LNR		
	BOH.				Biotite 25%, to 2mm D, fine grained	4	<10	<4	20.0	1000	60	<1	918715		24.5				14	14	40	34	12	<4
					Magnetite 20%, subhedral, granular, fine grained.																			
					K spar & quartz	All Au <0.05																		
					Thinly laminated in part (2mm layers) at 30° tca																			
					Some very coarse grained (feldspar to 1cm D)																			
			30		layers at 70° tca																			
					NB possibly equivalent to CRC 27, but with																			
					lower magnetite content.																			
			40																					

CRAE H7 PLAN No

SUMMARY AND SPECIAL COMMENTS

LOGGED BY J.P. Howard DATE 4/11/83

SHEET 1 OF 1

C R A EXPLORATION PTY LIMITED

Geological & assay DRILL CORE LOG

PROJECT COOTRA EL 730

LOCAL GRID: 6300N / 6800E
CO-ORDINATES (AMG) 562000E / 6321800N AZIMUTH
RL COLLAR
INCLINATION Vertical
DRILLERS Wallis
DRILL TYPE Reverse circ. air core
COMMENCED 4/11/83 1000H DEPTH 28.5m HOLE No. 83CRC 31
COMPLETED 4/11/83 1100H CASING LEFT – DPO No(s) B661

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION
0	0.5				SAND dark brown surface soil, fine grained, subangular, well sorted.
0.5	1.5				CALCRETE grey pink, hard - percussion drilled.
1.5	2				SAND light orange-brown, fine to medium grained, subangular, poorly sorted, clayey.
2	28				SAND & CLAY 2-4m Sand, 50 fine to medium grained, subangular, poorly sorted Clay 50, dark orange brown to red brown, stiff. 4-6.5m Clay, grey-white, soft. 6.5-7m Clay, purple-brown, mottled, micaceous 7-14m Clay, yellow grey, soft, sandy 14-27m Clay 80, medium grey, soft Sand 20, coarse to very coarse grained, angular, equant. 27-28m Sand 80, as above Clay 20, " "
28	28.5 BOH				GARNET-BIOTITE-FELDSPAR-QUARTZ GNEISS Garnet, 10%, 3mmD, concentrated in layers, pink Biotite, 20%, 2mmD. Feldspar 30% white Quartz 40%, medium grained. Strong foliation 2-5mm bands at 30-45° to ca. Texture:- porphyroblastic.

(Depth scale on graphic log: 10, 20, 30, 40)

Sn	W	U	bFe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SIO ($\frac{By}{14}$)	CPS	Cu	Pb	Zn	Ni	Co	Mo
								0	1		75	<20						
									2		35							
											5							
									4		5							
											0							
									6									
									8									
									10									
											10							
									12		5							
											5							
									14		5							
											8							
									16		5							
											6							
									18		7							
											0							
									20		10							
											6							
									22		20							
6	<10	<4	0.40	34	14	<1	918716	21	23		0		18	36	12	8	<4	<4
									24		0							
<4		<4	0.50	36	8		717	23	25		10		16	42	28	8	<4	
									26		5							
4		<4	0.80	46	6		718	25	27		5		24	44	80	14	4	
<4		6	3.10	220	100		719	27	28		10		18	16	48	20	6	12
6		<4	2.30	110	34		918 ~~720~~	28	28.5		10		80	34	80	48	18	8

All Au <0.05

CRAE 117 PLAN No.

SUMMARY AND SPECIAL COMMENTS

LOGGED BY J R Howard DATE 8/11/83

SHEET 1 OF 1

0401

LOCAL GRID:- 6380N/6800E

C R A EXPLORATION PTY LIMITED

~~Geological assay~~ **DRILL CORE LOG**

PROJECT: COOTRA EL 780

CO-ORDINATES (AMG) 6200E / 21880N AZIMUTH ______ DRILLERS Walls COMMENCED 4/11/83 DEPTH 50.5m HOLE No. 83CRC 32

RL COLLAR ______ INCLINATION Vertical DRILL TYPE Reverse circ air core COMPLETED 4/11/83 CASING LEFT — DPO No(s) B661

DEPTH FROM (m)	DEPTH TO (m)	CORE REC (m)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	SPECIAL FEATURES WEATH., ALTERATION, FRACTURING VEINING, MINERALIZATION	SAMPLE No.	FROM (M)	TO (M)	REC (M)	ASSAY VALUES Sio	ASSAY VALUES cps
0	1				SAND light orange brown, fine grained, subangular		0	0-1			5	<20
					well sorted, clayey.			1-2			10	
1	1.5				CALCRETE off-white, softish.						10	
1.5	5.5				SAND, light orange brown, fine to medium grained,			4			10	
					subangular–well rounded, poorly sorted. Clayey						15	
					towards the base.			6			12	
											20	
5.5	37				CLAY			8			18	
					5.5–7.5m Clay, dark brown, stiff.						20	
			10		7.5–10m Clay, white, sandy (medium grained, angular)			10			5	
					10–12m Clay, grey pink, sandy (" ")						0	
								12			0	
					12–14m Clay, light orange-brown, moist.						0	
								14			0	
					14–16m Clay, grey, soft.							
								16				
					16–18m Clay, yellow grey							
								18				
			20		18–21m Clay, grey							
								20				
					21–23m Clay, grey-brown.			22				
					23–33m Clay, light grey.			24				
								26				
								28				
			30					30				
								32				
					33–37m Clay, medium grey.							
								36				
37	49				SAND & CLAY			38				
					Clay 80–40%, top to bottom, medium grey, soft.							
			40		Sand 20–60%, medium to very coarse grained,			40				
					subangular to angular, poorly sorted.							
								42				
								44				
								46				

CORE HT
PLAN No

SUMMARY AND SPECIAL COMMENTS

LOGGED BY J.P. Howard DATE 8/11/83

SHEET 1 OF 2

C R A EXPLORATION PTY LIMITED

DRILL CORE LOG

PROJECT ________ 040..

CO-ORDINATES ________ AZIMUTH ________ DRILLERS ________ COMMENCED ________ DEPTH ________ HOLE No. 83CRC 32

RL COLLAR ________ INCLINATION ________ DRILL TYPE ________ COMPLETED ________ CASING LEFT ________ DPO No(s) ________

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Sil	CF	Cu	Pb	Zn	Ni	Co	Mo
														~~47~~	48		0	<20						
						<4	<10	<4	0.85	80	6	<1	918721	47	49		5	(	16	12	44	14	4	<4
49	50.5		50		BIOTITE-FELDSPAR-QUARTZ GNEISS	<4	<10	<4	1.30	90	44	<1	22		50		5	)	12	14	46	14	6	10
	BCH				Biotite ~5%, 2mm ~~grains~~ flakes well concentrated in foliated layers.	6	10	<4	0.70	56	28	<1	918723		50.5		5	(	14	12	26	10	24	6
					Feldspar white (? plagioclase)	All Au <0.05																		
					Quartz, medium grained, clear.																			
					Chlorite <2%, fine grain, primary.																			
					Texture :- granular																			

SUMMARY AND SPECIAL COMMENTS

LOGGED BY ________ DATE ________

SHEET 2 OF 2

0405

C R A EXPLORATION PTY LIMITED

Geological & assay DRILL CORE LOG

PROJECT: COCTRA EL 980

LOCAL GRID: 7000E/7000N
CO-ORDINATES (AMG): 762200E/6322350N
AZIMUTH:
RL COLLAR:
INCLINATION: Vertical
DRILLERS: Wallis
DRILL TYPE: Reverse circ. air core
COMMENCED: 4/11/83
COMPLETED: 4/11/83
DEPTH: 63m
CASING LEFT: –
HOLE No: 83CRC 33
DPO No(s): B661

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	CORE DESCRIPTION
0	5			SAND 0–1m Sand, medium grey, fine grained, subrounded, well sorted, glassy quartz, humic matter. 1–5m Sand, yellow-white, fine grained, subrounded, well sorted, clayey towards the base.
5	23			SAND & CLAY 5–8m Clay 50, medium green, stiff. Sand 50, fine grained, subrounded, well sorted 8–13m Clay 60, medium orange-brown-grey, minor carbonaceous flecks Sand 40, fine to coarse grained, subrounded, poorly sorted. 13–16m Clay, grey-brown, stiff, carbonaceous flecks common. 16–18m Clay, light-dark grey, stiff 18–23m Clay, light grey, stiff Sand, medium to very coarse grained, angular to poorly sorted.
23	63	?%		23–63m Clay, dark green, chloritic below 30m. Sand, medium to very coarse grained, angular, poorly sorted, feldspathic quartz. Deeply weathered amphibolite as pieces of core throughout. Amphiboles becoming fresher towards the base where they are black 2mm subhedral crystals constituting 60% of the rock. Feldspar still weathered at base, 40% ? foliation at 80° tca.

Graphic log depth marks: 10, 20, 30, 40

ASSAY VALUES

Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Cu	Pb	Zn	Ni	Co	Mo
Petrology 918744									20							
<4	<10	<4	20.0	2500	26	<1	918724		22		60	26	170	46	22	<4
10			16.0	1800	24		5		24		85	20	310	48	18	
<4			7.40	910	20		6		26		90	16	140	42	14	
<4			2.75	250	18		7		28		70	24	80	38	12	
14			2.80	290	18		8		30		70	26	90	40	10	
<4			5.80	690	36		9		32		80	24	120	38	12	
<4			4.70	530	28		30		34		70	22	140	55	16	
4			3.85	330	20		1		36		48	18	150	50	18	
6			4.40	200	20		2		38		65	42	340	70	40	
4	10		4.20	220	26		3		40		48	30	260	48	28	
<4	<10		3.15	200	24		4		42		50	30	120	34	16	
6	<10		6.00	120	20		5		44		60	26	160	38	20	
4	<10		5.20	360	18		918736		46		75	36	220	44	26	8

FROM (M)	TO (M)	SIC	CPS
0	1	15	60
	2	5	
		5	
	4	5	
		10	
	6	5	
		5	
	8	10	
		30	
	10	10	
		20	
	12	10	
		0	
	14	0	
		0	
	16	10	
		0	
	18	0	
		0	
	20	5	
		70	
	22	70	
		70	
	24	20	
		30	
	26	5	
		15	
	28	10	
		20	
	30	15	
		10	
	32	300	
		5	

SUMMARY AND SPECIAL COMMENTS: All Au values < 0.05

LOGGED BY: J.R. Howard DATE: 8/11/83

SHEET 1 OF 2

CRAE 117
PLAN No M414

C R A EXPLORATION PTY LIMITED

DRILL CORE LOG

PROJECT 0404

CO-ORDINATES ______ AZIMUTH ______ DRILLERS ______ COMMENCED ______ DEPTH ______ HOLE No S3C RC 33

RL COLLAR ______ INCLINATION ______ DRILL TYPE ______ COMPLETED ______ CASING LEFT ______ DPO No(s) ______

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SiO / KCS	CAS	Cu	Pb	Zn	Ni	Co	Mo
				A	Clay & fragments of dark green amphibolite below 50m.	4	<10	<4	4.40	340	12	<1	918737	46	48		5	<10	46	46	220	55	28	4
																	20							
			50	A		<4	10	<4	4.50	330	12		8		50		20		40	32	210	34	22	4
																	30							
				A		6	<10	<4	4.00	320	10		9		52		30		50	26	90	20	10	4
																	20							
				A		<4	<10	4	5.10	280	16		40		54		20		110	30	240	28	18	6
																	30							
				A		<4		<4	5.20	280	10		41		56		15		120	34	290	30	22	4
																	20							
				A		8			4.90	500	[illegible]		42		58		40		48	28	160	22	12	<4
				A													35							
			60	A		<4			6.00	780	8		43		60		30		32	26	80	16	8	
																	20							
						6			5.30	640	8		44		62		25		34	22	90	14	10	
				A		<4	10		9.90	1050	18		918745		63		20		16	22	100	26	14	
			70																					

All Au values <0.05

DPO 80669
for heavy mineral
analysis (918569)

CRAE 117
PLAN No M414

SUMMARY AND SPECIAL COMMENTS ______

LOGGED BY ______ DATE ______

SHEET 2 OF 2

040

C.R.A. EXPLORATION PTY LIMITED

Geological & assay DRILL CORE LOG

PROJECT COOTRA EL

FINE ROW

LOCAL GRID 6020N/5000E

CO-ORDINATES (AMG) 536700E / 6323570N AZIMUTH ______ DRILLERS Wallis

RL COLLAR ______ INCLINATION Vertical DRILL TYPE Reverse circ. air core

COMMENCED 4/11/83 1730H DEPTH 67.5m HOLE No. 83CAC 34

COMPLETED 4/11/83 1915H CASING LEFT — DPL No(s) 3661

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	CORE DESCRIPTION	ASSAY VALUES Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	ASSAY VALUES SIU xn's	C+S	Cu	Pb	Zn	Ni	Co	Mo
0	2			SAND, light orange-brown, fine grained, subrounded									0	1		5	<20						
				to well rounded, well sorted.										2		5							
2	6			SAND & CLAY												5							
				2-4m Sand 60, as above										4		5							
				Clay 40, light orange-brown												5							
				4-6m Sand 50, fine to medium grained, subangular										6		500	32						
				well sorted.												100	25						
				Clay 50, medium red-brown.										8		50	<20						
6	11	50%		LATERITIC SILTSTONE Iron rich dark red-												200							
			10	brown, angular fragments up to 15mm, 40% in										10		20							
				matrix. (orange brown siltstone)												10							
11	51			CLAY & LESSER SAND	8	<10	<4	0.70	48	8	<1	918746		12				18	12	6	10	<4	<4
				11-18m purple grey, soft																			
					<4	<10		1.00	110	6		47		14				20	20	16	10	4	<4
					<4	10		7.60	130	36		48		16				14	22	12	20	<4	6
					4	<10		18.0	55	200		49		18				18	26	14	20		8
				18-26m Clay, orange-brown, mottled, hard patches																			
			20		10			11.5	70	42		50		20		0		24	18	8	20		<4
																50							
					4			4.70	44	28		51		22		10		36	14	14	18		
					<4			6.00	85	80		52		24				38	16	12	14		
				26-42m Clay 90, green-grey, soft	<4			6.35	100	50		53		26				20	24	14	14		
				Sand 10-30%, increasing towards base												75							
				Very coarse grained, angular to subrounded, well	6			11.0	100	38		54		28		450		20	18	14	14		
				sorted; Quartz 70%, magnetite, subhedral 30%, feebly												200							
			30		10			18.0	170	70		55		30		60		40	26	14	18		
				36-37m dark purple												40							
					<4			3.70	80	14		56		32		25		36	20	18	10		
																40							
					6			3.60	860	10		57		34		95		22	34	10	12		6
																60							
					4			6.10	2250	24		58		36		50		30	36	10	18	6	<4
																200							
					<4			20.0	1150	38		59		38		50		20	26	20	34	10	
																50							
			40	40-41m C p-brown	<4			24.0	1150	48		60		40		30		18	38	20	40	14	
																25							
				41-42m Mottled, light grey to orange-brown.	<4	10		13.0	570	42		61		42		30		20	20	50	36	12	
				42-51m Cla 80, purple grey, soft.												60							
				Sand 20, coarse to very coarse grained	8	10		12.0	850	34		62		44		30		14	20	38	34	10	
				quartz, magnetite, well sorted												30							
					6	<10		9.80	1250	30		63		46		40		12	18	20	34	8	
																35							

SUMMARY AND SPECIAL COMMENTS All Au values <0.05

LOGGED BY J.P. Howard DATE 5/11/83

SHEET 1 OF 2

CRAE 117
PLAN No. 414

CRA EXPLORATION PTY LIMITED

DRILL CORE LOG

PROJECT

CO-ORDINATES | AZIMUTH | DRILLERS | COMMENCED | DEPTH | HOLE No. 83CRC 34

RL COLLAR | INCLINATION | DRILL TYPE | COMPLETED | CASING LEFT | DPO No(s).

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	% Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SIU $\times 10^{-3}$	CPS	Cu	Pb	Zn	Ni	Co	Mo
						10	<10	<4	10.0	1200	40	<1	64		48		40	<20	12	14	16	34	10	<4
																	200							
			50			<4	<10		15.0	2150	38		65		50		300		14	16	20	30	10	
																	300							
51	62				CLAY, SAND & ROCK FRAGMENTS	10	<10		19.0	1900	34		66		52		600		14	14	38	32	10	
					Clay 60, grey green to 55m purple grey - 62m												700							
					Sand 30, coarse to very coarse grained,	16	<10		20.0	2050	40		67		54		800		40	16	40	32	10	
					quartz, magnetite, well sorted.												900							
					Rock fragments 10-50%; increasing to base.	10	10		17.0	2150	30		68		56		2000		18	20	28	32	10	
																	2000							
						10	10		16.0	1800	32	1	69		58		2500		105	22	65	65	20	
																	1500							
			60			4	10		15.0	1050	42	<1	70		60		2000		160	18	36	38	8	
																	1000							
						4	<10		15.0	1200	60		71		62		4000		48	16	48	38	10	
62	67.5				GARNET-MAGNETITE-FELDSPAR-QUARTZ GNEISS												4000							
	BCH				Garnets 5% light brown, glassy 0.5mm D.	14	<10		23.0	2900	50		72	62	64		5000		18	14	28	38	8	6
					Magnetite 15%	10	<10		21.0	3400	60		918773	64	65		2000		14	12	30	28	10	<4
					Biotite	8	20		18.0	3700	50		918774	65	66		3500		20	14	32	26	10	6
															67.0		2500							
					Strongly foliated [illegible]	6	10		18.0	3750	42		918775		67.5		1500		14	16	38	40	12	<4
					Texture:- medium to coarse grained																			
			70		- irregular granoblastic. (?) granitised metasediment.	Nil Au values <0.05																		

SUMMARY AND SPECIAL COMMENTS

LOGGED BY | DATE

SHEET 2 OF 2

CRAE H7 PLAN No. [illegible]

PINE ROW

C R A EXPLORATION PTY LIMITED

Lithological & assay DRILL CORE LOG

PROJECT: COOTRA EL 980

LOCAL GRID CO-ORDINATES: 6220N/ AMG) 55E 700E/63 2377N
AZIMUTH: —
RL COLLAR: —
INCLINATION: Vertical
DRILLERS: Wallis
DRILL TYPE: Reverse circ. air core
COMMENCED: 5/11/83 1000hr
COMPLETED: 5/11/83 1230hr
DEPTH: 62.8m
CASING LEFT: —
HOLE No.: 83 CRC 55
DPO No(s): 8661

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	SPECIAL FEATURES (WEATH., ALTERATION, FRACTURING, VEINING, MINERALIZATION)	SAMPLE No.	FROM (M)	TO (M)	REC (M)	ASSAY VALUES: SUS $\times 10^{-5}$	ASSAY VALUES: CPS
0	4				SAND, orange brown, fine grained, subangular			0	1		10	<20
					moderately well sorted				2		20	
					medium grained, subrounded						10	
					to rounded, clayey towards the base				4		20	
											200	
4	14				LATERITIC CLAY & SILTSTONE				6		60	
					Lateritic siltstone 40, Fe rich at top						250	
					Clay 60, light purple grey, soft				8		50	
											200	
			10						10		150	
											200	
									12		300	
											200	
									14		200	
14	56				SAND & CLAY						200	
					14-25m Clay 90, yellow-brown, soft, some mottled				16		250	
					Sand 10, coarse grained, subrounded						40	
									18		60	
											40	
			20						20		85	
											15	
									22		250	
											400	
									24		30	
											90	
					25-31m Clay 70, grey, soft; 25-26m red-brown				26		950	
					Sand 30, coarse to very coarse grained						200	
					subrounded, well sorted, red-iron stained.				28		150	
					Quartz & magnetite grains.						200	
			30						30		150	
											200	
					31-38m Clay 70, orange brown				32		45	
					Sand 30, as above.						55	
									34		45	
											60	
									36		56	
											40	
									38		25	
					38-41m Clay 70, grey-brown						70	
			40		Sand 30, as above.				40		200	
											15	
					41-47m Clay 70, light brown, light purple, light grey-green.				42		25	
					Sand 30, as above.						20	
									44		20	
											20	
									46		30	
											20	

SUMMARY AND SPECIAL COMMENTS:

LOGGED BY: J P Kinnard   DATE: 6/11/83

SHEET 1 OF 2

C R A EXPLORATION PTY LIMITED

PROJECT ____________

DRILL CORE LOG

CO-ORDINATES ______ AZIMUTH ______ DRILLERS ______ COMMENCED ______ DEPTH ______ HOLE No. 83CRC35

RL COLLAR ______ INCLINATION ______ DRILL TYPE ______ COMPLETED ______ CASING LEFT ______ DPO No(s) ______

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SUS	CPS	Cu	Pb	Zn	Ni	Co	Mo
					47-50m Clay 60, medium brown, stiff										48		30		5					
					Sand 40, as above												30							
			50		Rock fragments 20%. 'coins'; quartz,	<4	<10	6	12.0	440	34	<1	918776	48	50		30		55	14	90	55	12	<4
					white clay, biotite schist & gneiss												45							
					50-56 Clay 70 medium grey-green.	<4	<10	<4	13.0	670	44		77		52		95		28	12	70	48	14	
					Sand 30, as above.												95							
						<4	15		8.0	1050	28		78		54		200		18	10	60	38	12	
																	200							
						4	15		7.40	1450	28		79		56		150		40	14	60	38	10	
																	150							
56	62.8				CLAY & ROCK FRAGMENTS	4	10		4.40	680	20		80		58		150		32	18	32	20	6	
	BCH				Clay 50 medium yellow-brown, soft.												95							
			60		Rock fragments increase towards base	4	<10		6.30	1150	24		81		60		75		50	18	38	26	8	
						8	<10		10.0	1150	26		82		61		80		38	8	65	46	10	
					CHLORITE-GARNET-BIOTITE-MAGNETITE-	4	10		4.00	1150	22		83		62		90		38	12	42	24	6	
					QUARTZ-FELDSPAR GNEISS	<4	20		4.90	6200	24		915784		62.8		600		125	10	60	34	10	
					Grainsize varies fine to coarse grained.																			
					Chlorite, light green flakes to 1mm to 5%.	All Au values <0.05																		
					Garnet, brown, equant, subhedral to																			
					euhedral, 0.5mm D to 15%. In bands 70% garnet.																			
					Biotite 5-10%.																			
					Magnetite 10-15%(?)																			
			70		Pyrite - minor.																			
					Quartz-feldspar 'granitised' bands (cg)																			
					Foliation 45° lca.																			

SUMMARY AND SPECIAL COMMENTS ______

LOGGED BY ______ DATE ______

SHEET 2 OF 2

CRAE 117 PLAN No.

C R A EXPLORATION PTY LIMITED

~~Geological & assay~~ DRILL CORE LOG

PROJECT: COOTRA EL 980 0405

LOCAL GRID – 1350N / 4960E

CO-ORDINATES (AMG): 556660E / 6323910N

RL COLLAR: ______

AZIMUTH: ______

INCLINATION: Vertical

DRILLERS: Wallis

DRILL TYPE: Reverse circ air core

COMMENCED: 5/11/83 1230

COMPLETED: 5/11/83 1430H

DEPTH: 54m

CASING LEFT: –

HOLE No. 83CRC36

DPO No(s): B661

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	SUS $\times 10^{-?}$ SIU	Cu	Pb	Zn	Ni	Co	Mo
0	2				SAND medium brown, fine grained, subrounded, cla[y]									0	1	45						
2	5				CLAY & SAND										2	40						
					Clay 40, medium orange-brown, hard											30						
					Sand 60, fine grained, subangular, well sorted										4	30						
																80						
5	12				LATERITIC CLAY										6	400						
					Laterite 50, nodular & angular Fe-rich fragments											400						
					Clay 50, rich red-brown, grey towards base.										8	150						
																350						
			10												10	100						
																80						
															12	60						
12	22				INTERBEDDED CLAY, SAND & SILTSTONE.											30						
					Clay, white-grey-yellow, soft										14	20						
					Sand, medium brown, fine grained, subangular											20						
					well sorted, clayey.										16	10						
					Sandstone, white, coarse grained, angular											50						
					to subangular, well sorted, clayey, hard										18	55						
					Siltstone, yellow-pink, hard											15						
			20												20	15						
																35						
															22	20						
22	42				CLAY & SAND											20						
					22–28m Clay, medium brown, soft.										24	20						
																20						
															26	30						
																30						
															28	20						
					28–36m Clay 60, medium, purple grey brown, soft.											20						
			30		Sand 40, very coarse grained, angular to										30	80						
					subangular, well sorted.											30						
															32	80						
																40						
															34	30						
																20						
															36	20						
					36–42m Clay, medium brown, sandy, soft											25						
															38	20						
																20						
			40												40	15						
																20						
															42	20						
42	52				CLAY & ROCK FRAGMENTS											20						
					Clay, green brown-yellow brown, sandy	6	10	4	11.0	320	55	<1	918785	42	44	20	75	18	160	80	14	<4
					Rock fragments to 20% at base – yellow											20						
					– white clay after amphibole	4	<10	<4	12.0	260	50		786		46	20	80	16	165	95	16	6
																20						

SUMMARY AND SPECIAL COMMENTS: All Au values <0.05

LOGGED BY: [signature] DATE: 7/11/83

SHEET 1 OF 2

CRAE 117 PLAN No 414

C R A EXPLORATION PTY LIMITED

PROJECT ____ 0411

DRILL CORE LOG

CO-ORDINATES ____ AZIMUTH ____ DRILLERS ____ COMMENCED ____ DEPTH ____ HOLE No. 83CRC36

RL COLLAR ____ INCLINATION ____ DRILL TYPE ____ COMPLETED ____ CASING LEFT ____ DPO No(s) ____

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	ASSAY VALUES Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	SUS REC	ASSAY VALUES Cu	Pb	Zn	Ni	Co	Mo
				0 –		4	<10	<4	10.5	150	55		918787	46	48	23	70	16	130	80	12	<4
				– 6												20						
			50	1 –		6	<10		17.0	150	90		88		50	15	85	16	180	90	14	
				0 0												20						
				0 0 0		4	10		7.00	95	30		89		52	20	70	18	120	65	14	
52	53			A A	WEATHERED AMPHIBOLITE dark green & white clay	6	15		7.60	130	22		90A		53	20	60	10	170	85	36	
53	54			A A	AMPHIBOLITE	<4	15		4.80	820	18		90B		54	30						
	BOH				1cm wide bands rich in dark green	Petrology 918790B																
					amphibole																	
					Also white-grey feldspar & ? diopside (light	All Au values <0.05																
					green).																	

SUMMARY AND SPECIAL COMMENTS ____

LOGGED BY ____ DATE ____

SHEET 2 OF 2

CRAE 117 PLAN No 4414

CRA EXPLORATION PTY LIMITED

geological & assay DRILL CORE LOG

PROJECT: COOTRA EL 0411

LOCAL GRID CO-ORDINATES (AMG): 6400N/4400E
RL COLLAR: 556620E / 6324010N
AZIMUTH:
INCLINATION: Vertical
DRILLERS:
DRILL TYPE: Reverse circ air core
COMMENCED: 5/11/83 1500H
COMPLETED: 5/11/83 1730H
DEPTH: 50m
CASING LEFT:
HOLE No. 83 CRC 37
DPO No(s):

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION
0	3				SAND & CALCRETE
					Sand 40, fine to medium grained, subangular to subrounded, well sorted, loose
					Calcrete 60, off white to light brown, siliceous
3	5				SAND & CLAY
					Sand 70, fine grained, subrounded, well sorted
					Clay 30, medium orange brown, intermixed.
5	11				LATERITIC SILTSTONE
					Dark brown fragments to 2cm are angular & constitute 40% of the rock which is light yellow-brown
11	14				SAND & CLAY
					Sand 50, medium to coarse grained, subangular.
					Clay 50, white.
14	22.5				LATERITIC CLAY
					14-17m mottled orange-white, 10% small red frag's & hard.
					17-22.5m orange-red hard.
					Clay, grey-brown, soft.
22.5	~~28~~ 41				CLAY
					22.5-28m yellow-brown-white, soft
					28-32.5m yellow-brown, greenish, soft, micaceous.
					32.5-36m purple-grey, sandy, soft
					36-40m brown, sandy, soft.
					40-41m light brown, grey.
41	48				CLAYS, SAND & ROCK FRAGMENTS
					Clay 40, medium green-blue, micaceous sandy.
					Sand 30, medium grained, subangular, well sorted
					Rock fragments - increasing proportion towards the base.

SAMPLE No	FROM (M)	TO (M)	REC (M)	SIU $\times 10^{-5}$	cps
	0	1		45	<30
		2		35	
				35	
		4		45	
				230	
		6		400	
				70	
		8		90	
				55	
		10		53	
				40	
		12		28	
				10	
		14		10	
				47	
		16		95	
				500	
		18		35	
				20	
		20		55	
				45	
		22		73	
				80	
		24		70	
				65	
		26		83	
				55	
		28		60	
				55	
		30		46	
				30	
		32		20	
				15	
		34		10	
				5	
		36		5	
				3	
		38		4	
				0	
		40			

Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No	FROM (M)	TO (M)	REC (M)	Cu	Pb	Zn	Ni	Co	Mo
12	<10	.4	1.85	100	8	<1	915771	40	42		16	16	22	14	4	<4
4			2.60	190	8		72		44		20	16	60	26	6	
6			2.40	130	10		73		46		24	14	60	20	6	

SUMMARY AND SPECIAL COMMENTS: All Au values <0.05

LOGGED BY: J.R. Howard
DATE: 7/11/83

SHEET 1 OF 2

CRAE HT PLAN No. 416

C R A EXPLORATION PTY LIMITED

DRILL CORE LOG

PROJECT

CO-ORDINATES | AZIMUTH | DRILLERS | COMMENCED | DEPTH | HOLE No. 83CRC 37

RL COLLAR | INCLINATION | DRILL TYPE | COMPLETED | CASING LEFT | DPO No(s)

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	Cu	Pb	Zn	Ni	Co	Mo
						6	<10	<4	2.70	170	5	<1	915774	46	48		18	16	80	28	10	<4
48	50				QUARTZ-FELDSPAR-BIOTITE GNEISS	6			1.90	160	17		75	48	49		20	10	48	18	8	<4
	BOH		50		Biotite 25%, some chloritic	8			2.35	220	18		76	49	50		16	8	56	18	8	<4
					Feldspar 35%, white clay																	
					Quartz 40%, medium grained.	All Au values <0.05																
					Foliation 45° cta.																	
			60																			

SUMMARY AND SPECIAL COMMENTS

LOGGED BY | DATE

SHEET 2 OF 2

C R A EXPLORATION PTY LIMITED

[illegible] DRILL CORE LOG

PROJECT C.R.A. EL 980

LOCAL GRID: 6780N / 4930E

CO-ORDINATES (AMG) 565530E / 6374280N

RL COLLAR

AZIMUTH

INCLINATION Vertical

DRILLERS [illegible]

DRILL TYPE [illegible]

COMMENCED [illegible]/83 [illegible]

COMPLETED 7/11/83 1100

DEPTH 63 m

CASING LEFT —

HOLE No. 83CRC 38

DPO No(s) B.E.C.I

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION
0	1.5				SAND fine to medium grained, well rounded, moderately well sorted
1.5	2				CALCRETE orange-white to light brown, hard
2	5				SAND & CLAY
					Sand 60, fine grained, white, well sorted
					Clay 40, orange-brown, intermixed
5	13				LATERITIC SILTSTONE - cored
					Nodular texture (15mm D) dark [illegible] in medium yellow-brown siltstone matrix
			10		
13	24				CLAY
					13-15m white & soft.
					15-18m yellow, soft.
					18-24m white, soft
			20		
24	44				CLAY & SAND
					Clay 80, light grey, soft
					Sand 20, coarse to very coarse grained, angular to subangular, moderately well sorted, intermixed
			30		
			40		
44	62				CLAY, SAND & ROCK FRAGMENTS

ASSAY VALUES

Sn	W		LF	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SiO_2	CPS						
								0	1		45	<50						
									2		45							
											35							
									4		32							
											53							
									6		40							
											65							
									9		30							
											40							
									10		40							
											46							
									12		45							
											27							
									14		10							
											12							
									16		10							
											5							
									18									
									20									
									22									
									24		0							
									26									
									28									
									30									
									32									
									34									
									36									
									38									
									40									
									42									
									44									
<4	<10	6	0.70	36	10	<1	915777	44	46				15	30	22	16	10	<4

SUMMARY AND SPECIAL COMMENTS

All Au values <0.05

LOGGED BY [illegible] DATE 7/11/83

SHEET 1 OF 2

CRA EXPLORATION PTY LIMITED

DRILL CORE LOG

PROJECT ____________ 041

CO-ORDINATES ______ AZIMUTH ______ DRILLERS ______ COMMENCED ______ DEPTH ______ HOLE No. 83 CRC 38

RL COLLAR ______ INCLINATION ______ DRILL TYPE ______ COMPLETED ______ CASING LEFT ______ DPO No(s) ______

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION
					Clay 70-40%, medium grey, soft.
			50		Sand 30%, coarse to very coarse grained,
					subangular, moderately well sorted, (illegible).
					Quartz 60, Feldspar 40, white, angular.
					Rock fragments 0-30%, Quartz-feldspar
					-biotite gneiss.
			60		
62	62.8				AMPHIBOLITE dark green chlorite.
62.8	63 EOH				MAGNETITE-BIOTITE-QUARTZ-FELDSPAR GNEISS
					Magnetite <5% very fine grained.
					Biotite 15% fine grained
					Feldspar - plagioclase. medium grained.
					Quartz - clear " " .
			70		
					Foliation 45° (illegible)

Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	SUS REC (M)	Cu	Pb	Zn	Ni	Co	Mo
4	<10	<4	0.90	48	8	<1	915778	47	45	0	16	16	32	18	10	<4
										0						
6	10	4	1.10	70	10		915779	45	50	0	22	24	42	16	10	
										5						
16	<10	4	0.70	42	55		80		52	0	20	16	22	12	4	
										0						
4		4	0.60	28	18		81		54	5	20	18	16	32	16	
4		<4	0.80	55	10		82		56		16	12	28	40	24	
<4		4	1.05	60	6		83		58		16	14	34	28	14	
<4		6	0.90	65	6		84		60		18	14	36	16	10	
										10						
10		<4	1.30	100	20		85		62	5	30	12	50	28	8	
8		<4	4.10	170	4[illegible]		915786A		63	45						
4		<4	2.30	200	24	1	915786B				46	16	220	470	36	4

Petrology 915786A.

All Au values <0.05

SUMMARY AND SPECIAL COMMENTS ______

LOGGED BY ______ DATE ______

SHEET 2 OF 2

CRAE H7 PLAN No

C R A EXPLORATION PTY LIMITED

Geological & assay DRILL CORE LOG

PROJECT: COOTRA EL 980

LOCAL GRID – 530N/800E
CO-ORDINATES AMG 550 900E / 6322850N AZIMUTH
RL COLLAR
INCLINATION vertical
DRILLERS Wallis
DRILL TYPE Reverse circ aircore
COMMENCED 7/11/83 1130H DEPTH 68m HOLE No. 83CRC 39
COMPLETED 7/11/83 1330H CASING LEFT – DPO No(s) B661

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	SPECIAL FEATURES WEATH., ALTERATION, FRACTURING VEINING, MINERALIZATION	SAMPLE No.	FROM (M)	TO (M)	REC (M)	ASSAY VALUES SIU	ASSAY VALUES CPS
0	1				CALCARENITE			0	1		10	<20
					Sand 70% fine grained, subrounded, well sorted				2		150	
					Calcrete 30% off-white, hard.						36	
1	9.5				SAND & CLAY				4		5	
					Sand 60, fine grained, subrounded, well sorted						5	
					Clay 40, orange brown – red brown, intermixed				6		15	
											10	
									8		25	
											16	
			10		SILTSTONE				10		15	
9.5	11.5				dark brown-red.						30	
									12		20	
11.5	12				SILCRETE						20	
					Orange-white, very hard, hammered, angular				14		30	
					siliceous fragments.						0	
									16			
12	63				SAND & CLAY							
					12–28m Clay 80, light yellow brown – white, soft				18			
					Sand 20, medium – very coarse grained, sub-							
			20		angular, well sorted, clear quartz.				20			
									22			
									24			
									26			
									28			
					28–50m Clay 60, medium grey, soft.							
			30		Sand 40, very coarse grained, subangular,				30			
					well sorted, clear quartz & dark grey-black chips.							
					?amphibolite				32			
									34			
									36			
									38			
			40						40			
									42			
									44			
									46			

CORE NT PLAN No(s)

SUMMARY AND SPECIAL COMMENTS

LOGGED BY J Howard DATE 7/11/83

SHEET 1 OF 2

C R A EXPLORATION PTY LIMITED

DRILL CORE LOG

PROJECT 0411

CO-ORDINATES ______ AZIMUTH ______ DRILLERS ______ COMMENCED ______ DEPTH ______ HOLE No. 83CRC34

RL COLLAR ______ INCLINATION ______ DRILL TYPE ______ COMPLETED ______ CASING LEFT ______ DPO No(s) ______

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SIU	CPS	Cu	Pb	Zn	Ni	Co	Mo
														47	48		0	620						
		50			50-54m as above but firmer clay.										50									
															52									
															54									
					54-63m Sand 60, very coarse grained, rounded,																			
					well sorted, clear quartz	8	<10	<4	0.90	18	22		915787	54	56				50	12	85	50	18	<4
					Clay 40, light grey												20							
					Rock fragments (soft) Quartz-feldspar-	4			2.30	14	28		88		58		600		16	12	130	32	10	
					sericite-pyrite (<2%)												20							
		60				10			0.40	24	22		89		60		25		24	8	24	24	8	
																	25							
						6			0.50	8	18		90		62		20		20	6	8	28	10	
																	30							
63	68				CLAY, SAND & ROCK	<4			2.55	120	18		91		64		50		190	8	48	46	22	
	B.H.				Sand 65-90% very coarse grained, subangular,												35							
					well sorted, quartz, white opaque feldspar & Biotite	6	10		2.50	170	16		92		66		55		48	6	70	44	16	
					Rock fragments 5-20%, increasing												65							
					towards the base	4	15	<4	3.00	290	16		915793	66	68		40		30	6	78	40	20	

Biotite - FELDSPAR - QUARTZ GNEISS

All Au values <0.05

70 Biotite 30%, fine grained, ... grains.

Feldspar greenish & white 30%

Foliation 30° lca

Clay 15%, medium grey

Texture:- fine grained gneiss or coarse schist

CRAE H7

SUMMARY AND SPECIAL COMMENTS

LOGGED BY ______ DATE ______

SHEET 2 OF 2

0417

C R A EXPLORATION PTY LIMITED

PROJECT Cootra EL 480

Geological & assay DRILL CORE LOG

LOCAL GRID.- 500E/5510 N
CO-ORDINATES (AMG) 567000E/6230600N AZIMUTH
RL COLLAR
INCLINATION Vertical
DRILLERS Wallis
DRILL TYPE Reverse Circ. air core
COMMENCED 7/11/83
COMPLETED 7/11/83
DEPTH 55m
CASING LEFT —
HOLE No 83CRC40
DPO No(s) B661

Depth From (m)	Depth To (m)	Core Rec (m)	Core Size	Core Description
0	1		3¼" OD Bit	SAND grey to light brown, fine to coarse grained, subangular to subrounded, poorly sorted, loose.
1	2			LATERITIC SILTSTONE dark red brown 'nodules' in light yellow-brown matrix
2	50			SAND & CLAY
				2-3m Sand 90%, fine to coarse grained, subangular to subround, poorly sorted, loose. Clay 10%, red-brown, as coating on sand.
				3-6m Sand 50%, fine to coarse grained, subangular to subrounded, poorly sorted. Clay 50%, red-brown, firm.
				6-10m Sand as above. Clay 50%, orange-brown, firm.
			Percussion 3¼"	10-11m SILTSTONE mottled red-yellow, siliceous
				11-24m Clay 70%, white, soft. Sand 30%, very coarse grained, subangular, well sorted, clear quartz.
				24-38m Clay 80%, medium grey, soft. Sand 20%, coarse to very coarse grained, angular, well sorted, intermixed.
				38-50m Sand 20-80%, increasing towards the base, coarse to very coarse grained, angular, well sorted, Biotite increases towards base. Clay 80-20% towards base, dark grey, soft.

Sn	W	U	%Fe	Mn	Cr	Ag	Sample No.	From (M)	To (M)	Rec (M)	SIC x10⁻⁵	CPS	Cu	Pb	Zn	Ni	Co	Mo
								0	1		45	630						
									2		30							
											20							
									4		15							
											18							
									6		15							
											30							
									8		30							
											30							
									10		20							
											22							
									12		30							
											5							
									14		0							
									16									
									18									
									20									
											5							
									22		5							
											5							
									24		10							
									26									
									28									
									30									
									32									
									34									
									36									
									38									
PYRITE <5%, some nodules (intergrowth)												39						
6	<10	14	2.20	24	12	<1	915794	38	40				38	26	80	75	90	<4
8	<10	20	1.30	30	32		95		42			40	26	24	16	18	90	8
12	10	22	1.15	42	14		96		44				40	16	8	22	16	<4
											10							
<4	<10	18	1.20	85	14		97		46		5	36	32	18	30	22	14	6
									47		15	35						

All Au values <0.05

LOGGED BY JP Howard DATE 7/11/83

SHEET 1 OF 2.

SUMMARY AND SPECIAL COMMENTS

CRAE H7 PLAN No 444

C R A EXPLORATION PTY LIMITED

DRILL CORE LOG

PROJECT [illegible]

CO-ORDINATES ________ AZIMUTH ________ DRILLERS ________ COMMENCED ________ DEPTH ________ HOLE No. 93CRC40

RL COLLAR ________ INCLINATION ________ DRILL TYPE ________ COMPLETED ________ CASING LEFT ________ DPO No(s) ________

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	As	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SIU KPS	CPS	Cu	Pb	Zn	Ni	Co	Mo
						6	<10	12	2.80	90	34	<1	915796		48		10	42	12	10	22	14	8	6
																	5	<20						
			50			<4		16	2.45	75	32		99		50		5		10	16	28	6	6	<4
					50-54.8m Sand 80% as above												0							
					Clay 20% as above	<4		20	2.70	80	24		800		52		30		14	14	30	8	6	6
					Rock fragment increase to 20% Biotite-												5							
					Quartz feldspar Gneiss	6		20	2.40	[illegible]	36		801		54		20		10	14	28	26	12	6
54.8	55m				BIOTITE-QUARTZ-FELDSPAR GNEISS - hard	4	20	18	1.90	120	70		915802	54	55		15		12	10	24	16	12	6
					Biotite 15% fine to medium grained.	All Au values < 0.05																		
					Feldspar slightly weathered to white colour 30%																			
					Quartz 55%, medium grained.																			
			60		Foliation: -20° lca.																			
					Texture :- medium grained granoblastic																			

CORE HT PLAN No(s)

SUMMARY AND SPECIAL COMMENTS

LOGGED BY ________ DATE ________

SHEET 2 OF 2

PINE ROW

LOCAL GRID 8200N/5000E

C R A EXPLORATION PTY LIMITED

original assay DRILL CORE LOG

PROJECT COOTRA E.L. 960

COORDINATES (AMG) 550700E / 6323200N AZIMUTH ______ DRILLERS Wallis COMMENCED 7/11/83 1330H DEPTH 59.5m HOLE No 83 CRC 41

RL COLLAR ______ INCLINATION Vertical DRILL TYPE Reverse circ air core COMPLETED 7/11/83 1945H CASING LEFT — DPO No(s) 8661

Depth From (m)	Depth To (m)	Core Rec (m)	Core Size	Graphic Log	Core Description	Sn	W	U	%Fe	Mn	Cr	Ag	Sample No.	From (m)	To (m)	Rec (m)	SIU ×10⁻⁵	CPS	Cu	Pb	Zn	Ni	Co	Mo
0	1.5			C C	CALCRETE off white, sandy; large angular chips.									0	1		20	620						
															2		15							
1.5	7				SAND & CLAY												5							
					1.5-3m Sand 50, fine to medium grained,										4		8							
					subangular to subrounded, well sorted												10							
					Clay 50, red-brown, intermixed										6		10							
					3-6m Sand as above												10							
					Clay orange-brown, interbedded										8		20							
					6-7m Sand, orange-brown, loose												7							
7	9		10		LATERITIC SILTSTONE										10		10							
					10% red-brown nodules in yellow-brown matrix												0							
9	14				CLAYSTONE, white to light grey hard core										12									
					at top becoming softer - moist.																			
					Relict gneiss indicated by biotite (?) at 60°...										14									
14	59.3				CLAY & SAND																			
					14-15m Clay honey-yellow, stiff, biotite-relict gneiss text										16									
					15-17m Clay light grey-white & very minor flecks																			
					of purple clay (after garnet). Biotite										18									
					17-18m Clay pink-red stiff.																			
			20		18-44m Clay 80% medium grey										20									
					25-26m dark grey																			
					Sand 20%, coarse to very coarse grained,										22									
					subangular, well sorted, quartzose																			
															24									
															26									
															28									
			30												30									
															32									
															34									
															36									
															38									
			40												40									
															42									
															44		15							
					44-59.5m CLAY, SAND & ROCK FRAGMENTS												10							
				80		<4	10	4	6.90	560	24	<1	915803	44	46		25		12	26	190	55	24	8
																	15							

SUMMARY AND SPECIAL COMMENTS All Au values <0.05

LOGGED BY J. Howard DATE 7/11/83

SHEET 1 OF 2

CRAE H7 PLAN No 8444

0420

C R A EXPLORATION PTY LIMITED

DRILL CORE LOG

PROJECT

CO-ORDINATES | AZIMUTH | DRILLERS | COMMENCED | DEPTH | HOLE No. 83CRC 41

RL COLLAR | INCLINATION | DRILL TYPE | COMPLETED | CASING LEFT | DPO No(s)

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	ASSAY VALUES Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SIU KO	CPS	ASSAY VALUES Cu	Pb	Zn	Ni	Co	Mo
					44-59.3m CLAY, SAND & ROCK FRAGMENTS	6	<10	4	3.90	340	24	<1	915 804		46		20	<20	20	16	350	70	44	30
					Clay 20%, dark grey, soft.												15							
					Sand 50%, coarse to very coarse grained, pebbly	8		<4	4.70	430	44		805		50		35		175	16	90	90	30	6
					at the base, subangular to angular, well sorted.												30							
					Biotite 30%, 2mm flakes, black	<4			5.10	750	22		806		52		10		44	12	110	46	20	6
					Garnet 2-5% rich red, subhedral												15							
					Rock fragments - increasing to 20% at base	6			4.40	710	12		807		54		15		12	12	85	34	14	6
																	16							
						<4			4.30	610	14		808		56		37		12	14	90	36	16	6
																	35							
						4	10		6.00	680	24		809		58		25		26	18	275	46	26	6
						8	<10		3.20	450	30		810		59		25		16	14	130	48	20	6
						4	<10	4	6.15	1050	40		915 811		59.5		45		36	12	6	8	30	6
						All Au values <0.05																		
59.0	59.3				GARNET-BIOTITE-QUARTZ-FELDSPAR GNEISS																			
					Coarse grained gneiss																			
					Garnet 5% pink.																			
					Biotite 15-30%, 2mm diameter.																			
					Feldspar, greenish & white. single euhedral crystals																			
					15x8mm Pyrite <0.5%.	Pyrite <0.5%.																		
59.3	59.5				BIOTITE-QUARTZ-FELDSPAR fine grained GNEISS																			

CRAE 117 PLAN No. M616

SUMMARY AND SPECIAL COMMENTS

LOGGED BY | DATE

SHEET 2 OF 2

PINE ROW

LOCAL GRID 5900N/5000E

CO-ORDINATES (AMG) 556700E/6323450N AZIMUTH

RL COLLAR

C R A EXPLORATION PTY LIMITED

Geological & assay DRILL CORE LOG

DRILLERS Wallis

INCLINATION Vertical

DRILL TYPE Reverse circ. air core

PROJECT COOTRA EL 980

COMMENCED 8/11/83 DEPTH 70m HOLE No. 83CRC 42

COMPLETED 8/11/83 CASING LEFT DPO No(s) B661

DEPTH FROM (M)	TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION
0	2				CALCRETE 50 off white to pink, siliceous, hard rubbly SAND 50, fine grained, subrounded, well sorted.
2	6				SAND & CLAY Sand 60, fine grained, subrounded, well sorted. Clay 40, orange-brown, intermixed.
6	11		10		LATERITIC SILTSTONE, red brown
11	13				SILTSTONE, pink brown
13	19				CLAYSTONE (cored) & CLAY White, sandy, <1% biotite.
19	21		20		CLAY yellow-brown, grey, soft.
21	50		30, 40		SAND & CLAY Sand 50, coarse to very coarse grained, subrounded, well sorted, Fe stains, quartzose, biotitic. Clay 50, medium brown - yellow brown soft intermixed. -49m Sand 40, coarse grained, subangular, well sorted, quartzose (clear) & biotitic, feldspathic Clay 60, medium grey, soft, intermixed.

SAMPLE No.	FROM (M)	TO (M)	REC (M)	Sn	W	U	%Fe	Mn	Cr	Ag	510 VOT	CPS	Cu	Pb	Zn	Ni	Co	Mo
~~415811~~	0	1									10	≤30						
		2									10							
415812				8	<10	<4	0.50	46	12	<1	10		10	12	6	8	<4	6
		4									5							
13				6		4	1.35	50	18		5		12	14	10	18	4	<4
		6									400							
14				4		4	4.50	65	34		480		12	14	8	10	4	6
		8									1500	35						
15				<4		<4	22.0	160	140		650	40	18	22	10	22	4	6
		10									400	≤30						
16				4			32.0	100	185		45		14	30	10	30	<4	8
		12									12							
17				8			9.40	24	18		15		18	20	12	30	4	6
		14									0							
18				6			1.20	34	10				16	10	8	18	<4	6
		16																
19				8			0.40	20	10				12	10	8	16	<4	<4
		18																
20				12			0.50	18	14				16	16	12	12	<4	
		20																
21				8			1.35	38	16				16	10	14	10	<4	
		22																
22				<4			3.40	75	12				24	30	26	16	4	
		24																
23				14		4	5.00	42	18				32	42	30	16	<4	6
		26																
24				<4		<4	3.10	36	12				24	20	22	10	<4	4
		28																
25				12		<4	2.20	38	10				30	12	20	14	<4	
		30																
26				6	10	4	8.05	250	22				60	16	40	26	8	
		32																
27				6	<10	6	9.60	580	34				120	20	80	32	18	
		34																
28				8		10	7.20	210	38				70	36	60	24	10	
		36																
29				16		<4	0.55	60	22				12	12	10	4	<4	
		38																
30				4	10	<4	0.90	120	16				14	12	10	<4		
		40																
31				4	<10	<4	0.60	55	14				12	12	10	4		
		42																
32				8		6	1.00	60	18				18	12	14	4		
		44																
33				<4		4	0.60	110	10				38	10	14	<4		
		46																
34				4		4	0.50	95	10				90	10	12	<4		

SUMMARY AND SPECIAL COMMENTS All Au values <0.05

LOGGED BY J Howard DATE 8/11/83

SHEET 1 OF 2

CRAE 117 PLAN No. 4414

0432

C R A EXPLORATION PTY LIMITED

~~Geological & assay~~ DRILL CORE LOG

LOCAL GRID. 5900N/5000E

PROJECT COOTRA. EL

CO-ORDINATES ______ AZIMUTH ______ DRILLERS Wallis COMMENCED 8/11/83 DEPTH 70.0m HOLE No. 83CRC 42

RL COLLAR ______ INCLINATION Vertical DRILL TYPE Reverse circ. air core/diamond COMPLETED 9/11/83 CASING LEFT — DPO No(s). B661.

Depth From (m)	Depth To (m)	Core Rec (m)	Core Size	Core Description	Sn	W	U	%Fe	Mn	Cr	Ag	Sample No.	From (m)	To (m)	Rec (m)	Sus $\times10^{-5}$	CPS	Cu	Pb	Zn	Ni	Co	Mo
														48		0	630						
				Clay 30, dark brown-grey, soft.	<4	<10	4	0.50	90	14	<1	915835				65		170	12	10	6	6	<4
			50	49-50 Sand 70, coarse grained, subrounded, well sorted										50		20							
				Quartz 40, limonitic stains	<4		6	3.10	440	18		36				15		65	14	20	6	<4	8
				Biotite 10, flakes to 2mm										52		20							
50	60			WEATHERED ROCK FRAGMENTS, CLAY & SAND	8		<4	1.10	80	12		37				30		410	32	60	230	195	<4
				50-52m Rock 50%, quartz, white clay, fresh garnet										54		20							
		Reverse circulation		(fine grained <5%) pyrite 0-5%, intergranular + as	4	10		2.50	130	14		38				5		120	16	80	200	80	6
				paint, chlorite & biotitic 5%.										56		0							
				Clay 25 as above	<4	<10		1.80	100	42		39				5		90	12	120	220	105	<4
				Sand 25 " "										58		5							
				52-54m Biotite schist - 60% fine grained biotite.	4			2.50	170	28		40				5		140	14	550	320	175	8
			60	54-60m Increasing proportion of much weathered										60		15							
				Garnet-biotite-feldspar-quartz gneiss.	<4			3.55	390	22		41	60	61		40		120	18	380	140	75	4
				CLAY } 80-50%.	<4			6.00	4150	24		42	61	62		40		120	10	160	44	38	<4
				Sand }	<4			4.00	2100	28		43	62	62.5		35		32	8	70	50	26	<4
				~~AMPHIBOLE~~	8		4	1.50	26	18		44	62.5	63		45		14	6	70	14	8	32
60	62.5			PYRITITE-GARNET-BIOTITE-FELDSPAR-QUARTZ GNEISS	<4		<4	4.60	1150	22		45	63	64		15		110	12	110	60	30	14
		HQ diamond		Pyrite, ~~2%~~ 0.5%, fine grained	—	—	L	N	R		—	46		65		420		L	N	R		—	
				Garnet, <0.5% " "	—		L	N	R		—	47		66				L	N	R		—	
				Biotite, 15%	—		L	N	R		—	48		67		90		L	N	R		—	
				Feldspar, light green	—		L	N	R		—	49		68		55		L	N	R		—	
			70	Quartz.	—		L	N	R		—	50		69		700		L	N	R		—	
				Strong foliation at 45° tca.	—		L	N	R		—	51		70		630		L	N	R		—	
				Amphibole dark green to black to 20% at	Pyrite																		
				contact. Up to 10% pyrite + Trace chalcopyrite	Chalcopyrite.						All Au values <0.05												
				at contact.																			
62.5	64.5			PEGMATITE																			
				Biotite 10% to 4mm flakes																			
				Garnet 1%, brown, glassy																			
				Pyrite 1%																			
				Chalcopyrite <0.5%.																			
			80	Feldspar, off white to light green																			
				Quartz glassy.																			
				64.00-64.14m Quartz vein - 30° tca, white, opaque - slightly																			
				'serrated' border																			
64.5	70.0			Basic xenolith - 5cm long; biotite, amphibole, garnet, Py th																			
	BOH			Lower contact:- 30° tca - faulted, surface coated with																			
				chlorite & faint pyrite																			
				GARNET-PYRITE-BIOTITE AMPHIBOLITE																			
				64.5-66.15m Hornfels contact - finer grained.																			
			90	66.15-66.25m coarse grained amphibolite.																			
				66.25-70.00m medium grained amphibolite																			
				Pyrite - 5%, fine grained, intergranular																			
				Garnet, brown, 5%, generally in aggregates (0.5m...	Petrology 915851																		
				Amphibole, black 20% + light green 20%.																			
				? Magnetite, silver-black blebs (mm)																			

SUMMARY AND SPECIAL COMMENTS

LOGGED BY ______ DATE ______

SHEET 2 OF 3

CRAE 117 PLAN No. 414

C.R.A. EXPLORATION PTY LIMITED

DRILL CORE LOG

PROJECT

CO-ORDINATES | AZIMUTH | DRILLERS | COMMENCED | DEPTH | HOLE No. 83CRC42

RL COLLAR | INCLINATION | DRILL TYPE | COMPLETED | CASING LEFT | DPO No(s)

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	SPECIAL FEATURES WEATH., ALTERATION, FRACTURING VEINING, MINERALIZATION	SAMPLE No.	FROM (M)	TO (M)	REC (M)	ASSAY VALUES
					65.46-65.64m FAULT. infilled with pyritic pegmatite, dark & light green talc (brecciated) & high zone clay.						
					66.15-66.25m coarse grained amphibolite.						
					66.95-66.97m ?actinolite-feldspar band at 45° to ca						
					69.75m Coarse garnet, red brown, to 6mm D, with about 10% pyrite						

SUMMARY AND SPECIAL COMMENTS

LOGGED BY | DATE

SHEET 3 OF 3

CRAE 117 PLAN No M414

FINE ROW

C R A EXPLORATION PTY LIMITED

Geological & assay DRILL CORE LOG

PROJECT COOTRA EL 980

LOCAL GRID 5800N/5000E
CO-ORDINATES (AMG) 556200E / 6323350N AZIMUTH
RL COLLAR INCLINATION Vertical
DRILLERS Wallis
DRILL TYPE Reverse circ. air core
COMMENCED 9/11/83 DEPTH 46.8m HOLE No. 83CRC43
COMPLETED 9/11/83 CASING LEFT – DPO No(s) B661

DEPTH FROM (M)	DEPTH TO (M)	CORE REC (M)	CORE SIZE	GRAPHIC LOG	CORE DESCRIPTION	Sn	W	U	%Fe	Mn	Cr	Ag	SAMPLE No.	FROM (M)	TO (M)	REC (M)	SIU YIC	Bg 10 cps	Cu	Pb	Zn	Ni	Co	Mo
0	0.5				SAND light grey-brown fine grained, subrounded well									0	1		4	<25						
0.5	1				CALCRETE off white-pink, hard.										2		10							
1	8				SAND & CLAY												0							
					Sand 50, fine to medium grained, subangular well										4		10							
					sorted												40							
					Clay 50, medium brown, intermixed.										6		60							
																	80							
															8		50							
8	13				LATERITIC SILTSTONE												250							
			10		Red brown at the top to orange brown										10		400							
					at the base.												400							
															12		20							
																	15							
13	17				CLAYSTONE, white, sandy.										14		20							
																	20							
															16		5							
																	5							
17	38				SAND & CLAY										18		5							
					17-21m Clay 70, light grey-brown, soft.												20							
			20		Sand 20, coarse grained, subangular, well sorted										20		0							
					Laterite fragments 10, red-brown, angular.												5							
					21-24m Clay 75, dark brown-grey.										22		5							
					Sand 25, coarse grained, subangular well												5							
					sorted										24		10							
					24-26m Clay grey												0							
					Sand as above.										26		0							
					26-30m Clay 75, fawn brown												5							
					Sand 25, as above.										28		5							
																	0							
			30												30		0							
					30-38m Clay 80, grey												0							
					Sand 20 coarse grained, subrounded,	<4	<10	<4	3.70	150	16	<1	915852	30	32		0		24	14	55	28	8	4
					well sorted, intermixed; micaceous, feldspathic (white												0							
					angular, 10% of sand)	6	10	<4	3.45	270	18		53		34		10		14	14	48	28	8	<4
					34-36 & 37-42m purplish												50							
						4	<10	4	5.00	1250	22		54		36		50		16	8	38	28	10	
																	30							
						16		4	4.40	1150	20		55		38		40		18	12	48	30	10	
38	45				SAND, CLAY & ROCK FRAGMENTS												50							
			40		Clay 75-15%, dark grey, soft.	8		6	4.75	1950	28		56		40		75		10	12	42	34	10	
					Sand 20-80%, as above; feldspar 10-30%												55							
					quartz 90-60%,	12		<4	4.60	1750	28		57		42		80		12	10	50	32	10	
					Rock fragments 5%, Garnet, biotite, qf Gneiss												80							
45	46.8					6		4	2.90	530	18		58		44		40		70	10	50	20	8	
	BOH				G	4		<4	3.20	350	28		59	44	45		70		12	10	65	32	8	
					GARNET-BIOTITE-FELDSPAR-QUARTZ GNEISS	10		<4	3.25	1250	24		915860	45	46.8		50		50	12	40	30	10	6
					Garnet, to 25%, fine grained, granular.																			

SUMMARY AND SPECIAL COMMENTS Biotite to 20%
Layers 3mm wide of qf at 45° tca.

All Au values <0.05

LOGGED BY JP Howard DATE 10/11/83
SHEET 1 OF 1

CRAE 117
PLAN No M 414

APPENDIX II

Pontifex and Associates Report 4200

- Detailed Petrology.

Pontifex & Associates Pty. Ltd.

TEL. 332 6744
A.H. 31 3816

26 KENSINGTON ROAD, ROSE PARK
SOUTH AUSTRALIA

P.O. BOX 91, NORWOOD
SOUTH AUSTRALIA 5067

MINERALOGICAL REPORT NO. 4200

16th January, 1984

TO:	Mr. I. Finch, CRA Exploration Pty. Ltd., 6 New West Road, PORT LINCOLN, S.A. 5606
COPY TO:	The Administrator, CRA Exploration Pty. Ltd., P.O. Box 254, NORWOOD, S.A. 5067 Manager - Information Services, CRA Exploration Pty. Ltd., P.O. Box 656, FYSHWICK, ACT. 2069
YOUR REFERENCE:	Order No. B 0835
MATERIAL:	Drill Core
IDENTIFICATION:	918507 to 918790B (not consecutive) 915786A and 915851
WORK REQUESTED:	Thin section preparation and petrographic descriptions
SAMPLES & SECTIONS:	Returned to you with this report

PONTIFEX & ASSOCIATES PTY. LTD.

COMMENTS

The eighteen samples in this batch are described separately in thin section. A rock name, also comments on genesis and comparisons within the suite, are given in the descriptions where appropriate.

(83CRC 9) MEANY'S

Most rocks in the suite consist of amphibolites, gneisses, and granulite (e.g. 947773); indicating a metamorphic grade ranging from upper amphibolite facies, to lower (hornblende) granulite facies. The hornblende in the amphibolites is almost invariably brown, i.e. typical of high-grade metamorphism.

Many of the gneisses contain antiperthitic plagioclase ± myrmekite, which is a manifestation of this upper amphibolite to granulite facies conditions (even in the absence of other minerals characteristic of these grades, e.g. orthopyroxene).

(83CRC 8) NOSREDNA

Garnet and altered cordierite occur together in some of these rocks, accessory sillimanite and trace green spinel occur as inclusions in garnet in 947756.

Exceptions to this high grade assemblage are :-

(83CRC 33) Warramboo

1) 918745 : a coarse biotite rock with patchy spherulitic low-temperature carbonate (?magnesite), with minor coarse plagioclase and trace (?exotic) quartz grains. The biotite is quite random, i.e. without any metamorphic fabric

(83CRC 38) Pine Row

2) 915786A : a massive decussate aggregate of talc, ?vermiculite altered biotite or phlogopite rock, also without metamorphic fabric

It seems likely that these rocks are related, their exact genesis is uncertain but may be generally regarded as Mg-mica-rich differentiates of an ?ultramafic intrusive, possibly with lamprophyric affinity.

(83CRC 17) 918507 : high-grade amphibolite
with weathered layers originally rich
in ?pyroxene and biotite -
(metabasic igneous rock of uncertain exact type)

This is a high grade amphibolite with a polygonal-granular texture, and a grain size of 0.2 - 1 mm. It is essentially composed of subequal amounts of plagioclase and brown hornblende, but some layers are strongly weathered.

Some of the layers have a granular texture and were possibly rich in pyroxene, now altered to limonite-stained clays. Others contain abundant, kinked, weathered biotite with carbonate lenses. Black opaque oxides, magnetite and/or ilmenite occur as common accessories, and there is a trace of apatite.

The original rock was of basic igneous character but its exact nature id difficult to determine because of the metamorphism.

(83CRC 20) 918551 : gneiss composed of (in increasing order of abundance) garnet, biotite, quartz and antiperthitic plagioclase, with traces of microcline (i.e. of gross tonalitic composition)

This rock is a "tonalitic" gneiss with diffuse biotite-rich and quartz-plagioclase layers 2 - 4 mm thick. The biotite defines a strong foliation and is associated with an accessory, unidentified weathered mineral, together with minor garnet and accessory apatite.

The quartzofelspathic areas are granoblastic with a grain size of 0.5 - 4 mm. The plagioclase is weakly to strongly antiperthitic with 5 - 20% exsolved alkali felspar. Traces of microcline occur locally.

(83CRC22) 918590 : high-grade amphibolite with minor orthopyroxene and accessory biotite (?metagabbro)

This rock has a lensoidal/granuloblastic texture and may have been a coarse grained gabbro with a grain size of 5 - 10 mm. The lenses, on a scale of several mm, are alternately hornblende-rich and plagioclase-rich. A strong fabric orientation is seen in the hornblende, and to a lesser extent in the plagioclase.

Smaller lenses containing granular to poikiloblastic orthopyroxene, up to 3 mm long, occur at irregular intervals through the core, and biotite is scattered throughout as a very minor constituent (3 - 5%) and with a weak dimensional orientation. Accessory magnetite (?± ilmenite) and rarer apatite are also present.

(83CRC 24) 918612 : biotite-bearing "tonalite" gneiss including essential antiperthitic plagioclase, and accessory weathered ?hornblende; minor filamentous pyrite

This is a leucocratic gneiss with sparsely distributed but strongly oriented biotite (7%) in lamellae 2 - 5 mm apart.

The bulk of the rock consists of a more or less granuloblastic quartz-plagioclase mosaic, with a grain size of about 1 mm. Much of the plagioclase is antiperthitic with 2 - 10% exsolved alkali felspar. The quartz has undulose extinction and a blocky subgrain texture.

Weathered, accessory, ferromagnesian grains in the biotite-bearing laminae may have been hornblende. Trace of granular, and intergranular/filamentous pyrite occur in this rock.

(83CRC76) <u>918651</u> : layered, biotite-magnetite-garnet-quartz-microcline gneiss, with minor plagioclase (metasediment)

This is a layered metasedimentary gneiss with relatively thick (10 - 15 mm) quartz-microcline layers; alternating with thinner (1 - 5 mm) layers of quartz-garnet, quartz-magnetite-garnet, garnet-biotite and (minor) quartz-plagioclase.

The quartz-microcline layers have a grain size of 1 - 3 mm and a granoblastic texture, and they do contain minor biotite, garnet and magnetite.

The other layers are generally finer grained, but are mostly granoblastic in texture, except for the biotite which is strongly schistose. The magnetite is locally rimmed by a fine grained fibrous mineral, and some of the plagioclase is partly altered to alkali felspar.

(83CKC 33) <u>918745</u> : massive, coarse, greenish-biotite rock incorporating patches of "secondary" fine carbonate (?magnetite), accessory quite coarse altered plagioclase and rarer quartz; (genesis uncertain but possibly of lamprophyric association)

At least 65% of this rock consists of randomly and loosely intergrown flakes of greenish (?vermiculitic) biotite, variably 2 mm to 7 mm long. Some of these flakes are weathered.

As well as being intergrown with each other these flakes are intergrown with highly irregular patchy domains of clouded, more or less spherical carbonate (20% of the rock). The mode of occurrence of the carbonate suggests that it is "secondary", although it is not apparently supergene and apart from invading minor plagioclase (see below) this carbonate does not appear to specifically replace a pre-existing mineral. It reacts only weakly to conc. HCl, and must surely be magnesite.

Minor (5%), coarse (3 mm) plagioclase occurs locally but is invaded and largely replaced by clay-sericite alteration and the secondary carbonate. Rare, small (0.5 mm) grains of quartz (1 - 2%) are peculiarly angular, and may be exotic.

Accessory extremely fine iron sulphide is disseminated.

The genesis of this rock is uncertain, certainly it lacks the metamorphic fabric of most other rocks in the suite. It may have a primary lamprophyre-like genesis.

83CRC 36) 918790 B :

interlayered clinopyroxene-
plagioclase gneiss, and amphibolite
minor scattered magnetite, lesser sphene
and apatite (meta, layered, basic-igneous rock)

This rock has alternating pale and dark layers 5 - 20 mm thick. The pale layers consist essentially of a more or less granuloblastic aggregate of essential clinopyroxene and plagioclase, whereas the dark layers consist of brown hornblende and plagioclase. Magnetite is relatively abundant (5%) in both types of layer.

The pyroxene is commonly rimmed by actinolite, and in the amphibolite layers there are clay-tremolite pseudomorphs after clinopyroxene. The plagioclase is weakly sericitised.

Accessory sphene and apatite are scattered as well as the black opaque grains of magnetite

This rock appears to have been a compositionally layered basic rock.

(83C2C 38) <u>915786 A</u> : massive, fine, decussate talc - ?phlogop·.e, altered biotite rock (cf. 918745)

This rock consists of a massive, compact aggregate of decussate very pale yellowish to very pale greenish ?magnesium-rich biotite, possibly gradational to ?phlogopite and/or altering to ?vermiculite. A subequal amount of relatively colorless mica, which appears to be talc, is also randomly disposed to form an essential part of the whole rock.

Minute grains of rutile occur as clusters in some biotitic flakes (which are partly altered to vermiculite?)

The genesis of this rock is uncertain; it lacks the metamorphic fabric seen in most other core samples, and in this respect, also in respect of its composition, it is similar to 918745. In general terms it appears to be a "micaceous ultra-mafic intrusive".

(83CRC 42) 915851 : heterogeneous amphibolite, including minor clinopyroxene and uralitised orthopyroxene; accessory magnetite, apatite, garnet

This is a massive, medium granuloblastic amphibolite, incorporating irregular lenses or veins of much coarser granular, pyroxene-plagioclase aggregate.

Most of the amphibolite consists essentially of brown hornblende, plagioclase and fresh to uralitised pyroxene, largely clinopyroxene 0.5 to 1 mm in size.

The coarser crystalline lens, with a grain size of 1 to 10 mm, consists of partly uralitised poikiloblasts of clinopyroxene, and grains of orthopyroxene to 5 mm, partly altered to decussate amphibole. The plagioclase in this lens is also coarser (2 mm) than the rest of the amphibolite.

Accessory minerals, mostly in the brown-hornblende amphibolite are magnetite, apatite, and garnet. The garnet is fine grained and anhedral.

(83CK C S) 947756 :

garnet-biotite-plagioclase-microcline-quartz gneiss with minor altered cordierite (metasediment); minor sillimanite, trace green spinel in garnet

This is a quartzofelspathic gneiss with laminae of biotite and garnet, separated by layers and lenses rich in quartz, microcline and antiperthitic plagioclase.

The biotite is strongly oriented and the garnet has strongly oriented inclusions of extremely fine fibrous material which is probably sillimanite.

The texture in the felsic layers is allotromorphic granular. The exsolved alkali felspar in the plagiocalse ranges from rectangular pods to coalescent amoeboid patches up to 0.5 mm long. Myrmekite is common between the plagiocalse and microcline grains.

In one part of the rock there are altered cordierite grains, indicating similarities with sample 947956. Accessory zircon is common in this rock. Rare, very small crystals of deep green isotrop spinel occur in at least two garnet crystals.

(13CRC 9) 947773 : basic granulite,including clino- and orthopyroxene also minor hornblende and magnetite, with a quartz-plagiocalse vein/layer; crosscutting actinolite vein with weakly uralitised margins

This is a basic granulite, composed largely of a subequal amount of more or less granuloblastic plagioclase and clinopyroxene, with minor (?10%) orthopyroxene. Grain size is 0.3 to 1mm. Minor brownish metamorphic hornblende (7 - 10%) and magnetite (3 - 5%) are relatively abundant in ill-defined, lenticular layers.

A layer or vein of quartz with interstitial plagioclase separates an area with relatively abundant clinopyroxene from a more orthopyroxene-rich area. This orthopyroxene granulite area is slightly coarser grained than the clinopyroxene-rich part of the granulite, but also contains disseminated magnetite.

A vein of actinolite cuts the rock and is locally surrounded by areas of uralitised pyroxene.

(8KRC 7) 947719 : vaguely layered, high grade amphibolite, intense weathering to limonitic clays along a probable shear zone, and along crosscutting fractures

The fresher parts of this rock are composed of a vaguely layered, metamorphic granular aggregate, essentially of olive-green hornblende and plagioclase, together with minor to subordinate weathered grains which probably were originally clinopyroxene. Accessory oxidised magnetite is disseminated.

The rock is intensely weathered along incipient joints and fractures at different directions but mostly within a possible shear zone 10 mm wide; with colloform clays variously stained by limonite. Some opal-lined fractures also occur along these shears?

(CR2C 12) 947915 : heterogeneous coarse gneiss with layers variably dominated by quartz-microcline, quartz-plagioclase, and quartz, intergranular magnetite, ± felspar, altered cordierite and garnet

This gneiss is composed of ill-defined, metamorphically granulose layers, with gradational boundaries 5 to 15 mm thick, composed of:-

1) quartz microcline - with a grain size of 1 - 8 mm, containing moderate to minor amounts of magnetite, garnet, altered ?cordierite and biotite. Patches of secondary muscovite-carbonate occur locally, and rare grains of plagioclase and myrmekite are scattered.

2) quartz plagiocalse - quartz grains to 15 mm x 5 mm enclosing weakly antiperthitic plagioclase grains to 6 mm long. Minor magnetite, biotite, sphene, muscovite, and altered ?cordierite, which is extremely difficult to positively identify.

3) quartz magnetite ± microcline ± cordierite - coarse quartz and/or microcline with interstitial, skeletal grains of magnetite to 7 mm across, and minor partly altered cordierite. Garnet accompanies the cordierite in one part of this layer, partly as a rim around the magnetite. The cordierite is mostly present as a rim around the magnetite.

The rock is cut by thin carbonate veins.

(83CRC 1b) 947956 : pelitic gneiss composed largely of quartz-plagioclase-microcline, with minor garnet, altered cordierite, and biotite

This is a relatively homogeneous gneiss. Minor flakes of brown biotite (7 - 10%) are commonly oriented through a more or less granuloblastic aggregate, with a grain size of 0.2 - 1 mm, of essential quartz, microcline, plagioclase, subordiante altered cordierite and partly oxidised garnet.

The cordierite is altered to yellow and colourless clays. The plagioclase, unlike that in the other gneisses, is not antiperthitic. The garnet is rimmed and veined by hematite/limonite.

Accessory opaque oxide plates (? ilmenite or hematite), and small zircon grains, are randomly scattered.

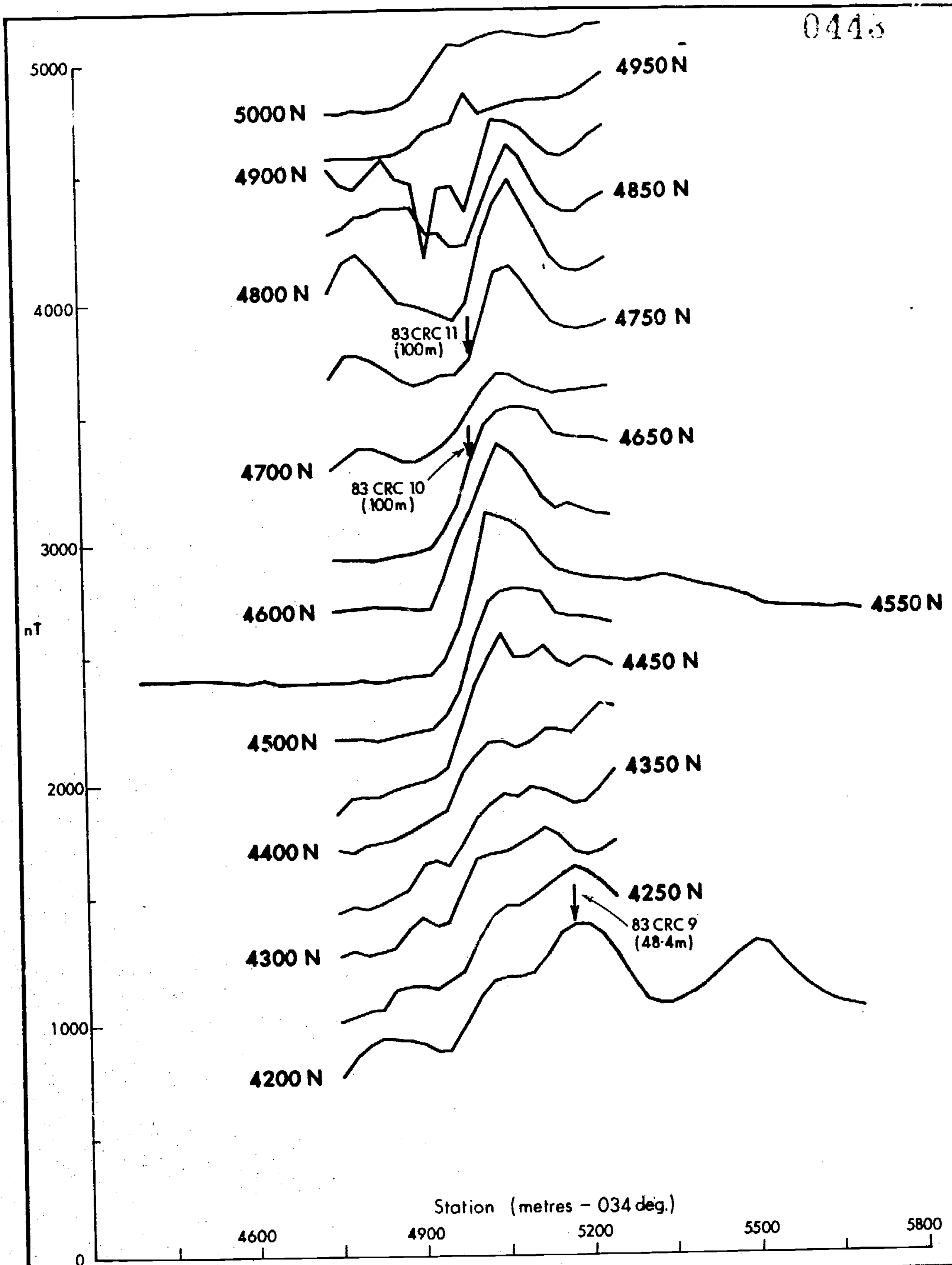
83CRC 43) 915860 : sillimanite biotite garnet, quartz plagioclase microcline, granulitic gneiss; minor magnetite intergranular to garnet.

Slightly undulating, dark coloured gneissic layers up to 5 mm thick, which form about 35% of this rock, consist of aggregate of euhedral garnet crystals (probably almandine), intergrown with subordinate amounts of quite coarse brown biotite and very fine fibrous sillimanite, clustered into variably continuous foliae. Minor, black, opaque magnetite which forms about 5% of the whole rock is locally intergranular within the garnet aggregate.

These layers commonly bifurcate and occur at irregular intervals within a much coarser but inequigranular metamorphic aggregate of quartz; plagioclase with exsolved K-spar (i.e. antiperthitic plagioclase); also individually granular microcline K-spar, all in variable but overall subequal abundance. Minor myrmekite occurs locally.

The rock is interpreted as a lower granulite facies grade metasediment (see previous Pontifex report on similar rocks, No. 4200).

0443



Base Level : 58000 nT

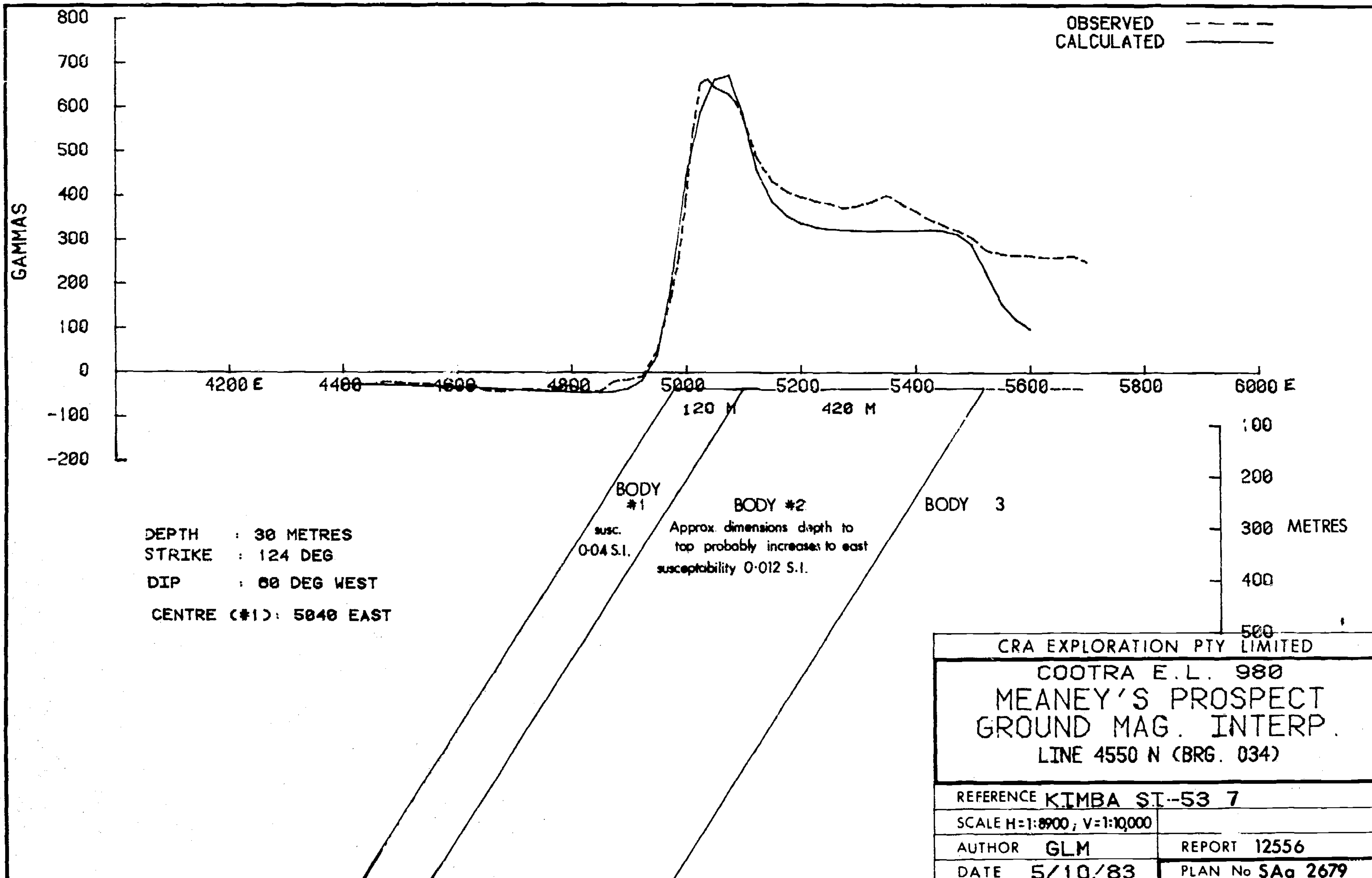
Line Incr. : 250 nT

↓ 1983 CRAE Drill Hole

CRA EXPLORATION PTY LIMITED

COOTRA E.L.980 – S.A.
MEANEY'S PROSPECT
STACKED PROFILES OF GROUND MAGNETICS

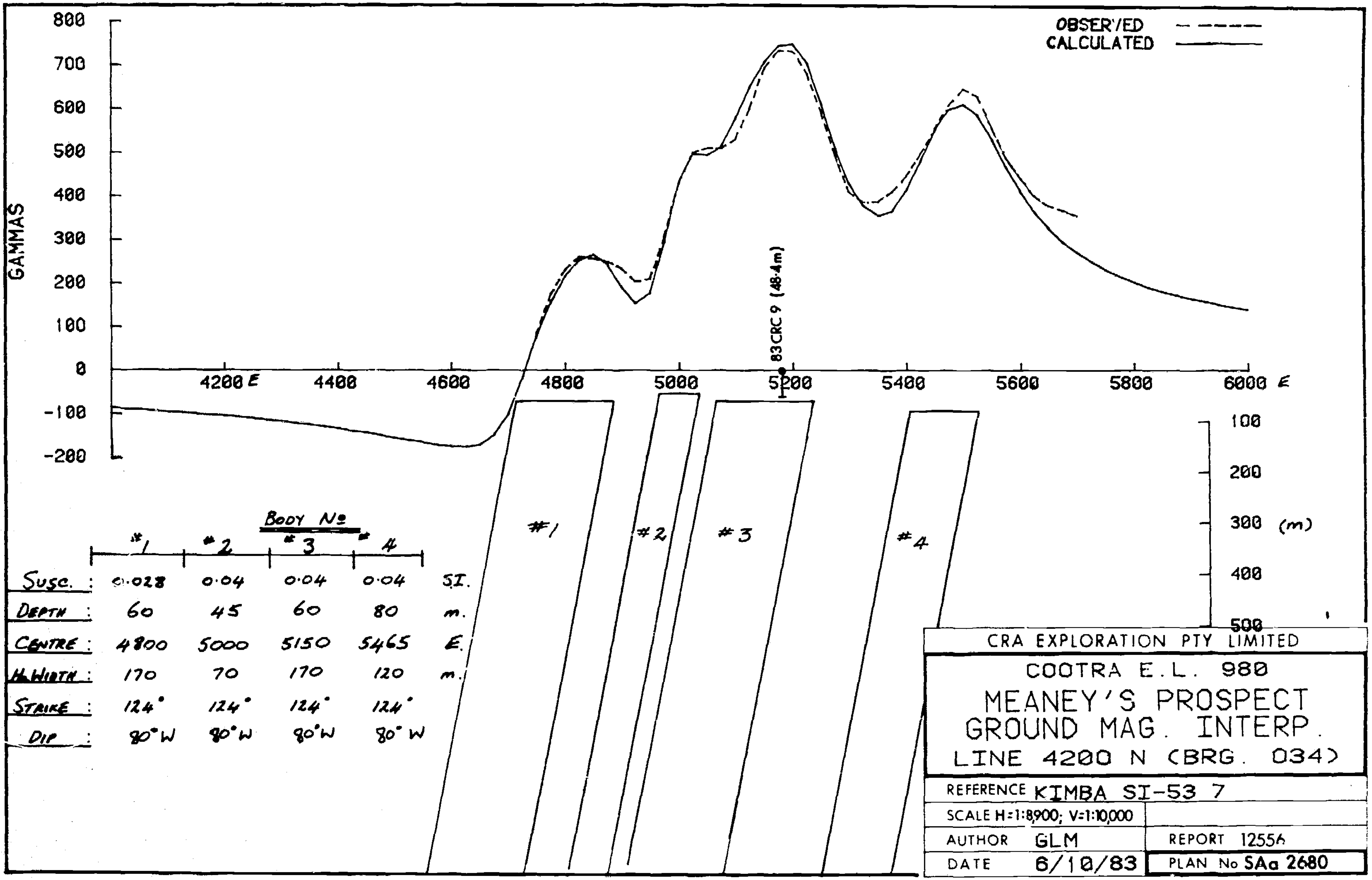
REFERENCE	KIMBA SI 53-7		
SCALE	1 : 10000		
AUTHOR	G L.M	REPORT	12556
DATE	March 84	PLAN No	SAa 2681



CRA EXPLORATION PTY LIMITED

COOTRA E.L. 980
MEANEY'S PROSPECT
GROUND MAG. INTERP.
LINE 4550 N (BRG. 034)

REFERENCE KIMBA SI-53 7	
SCALE H=1:8900; V=1:10,000	
AUTHOR GLM	REPORT 12556
DATE 5/10/83	PLAN No SAa 2679



	Body No #1	#2	#3	#4	
Susc. :	0·028	0·04	0·04	0·04	SI.
Depth :	60	45	60	80	m.
Centre :	4800	5000	5150	5465	E.
H. Width :	170	70	170	120	m.
Strike :	124°	124°	124°	124°	
Dip :	80° W	80° W	80° W	80° W	

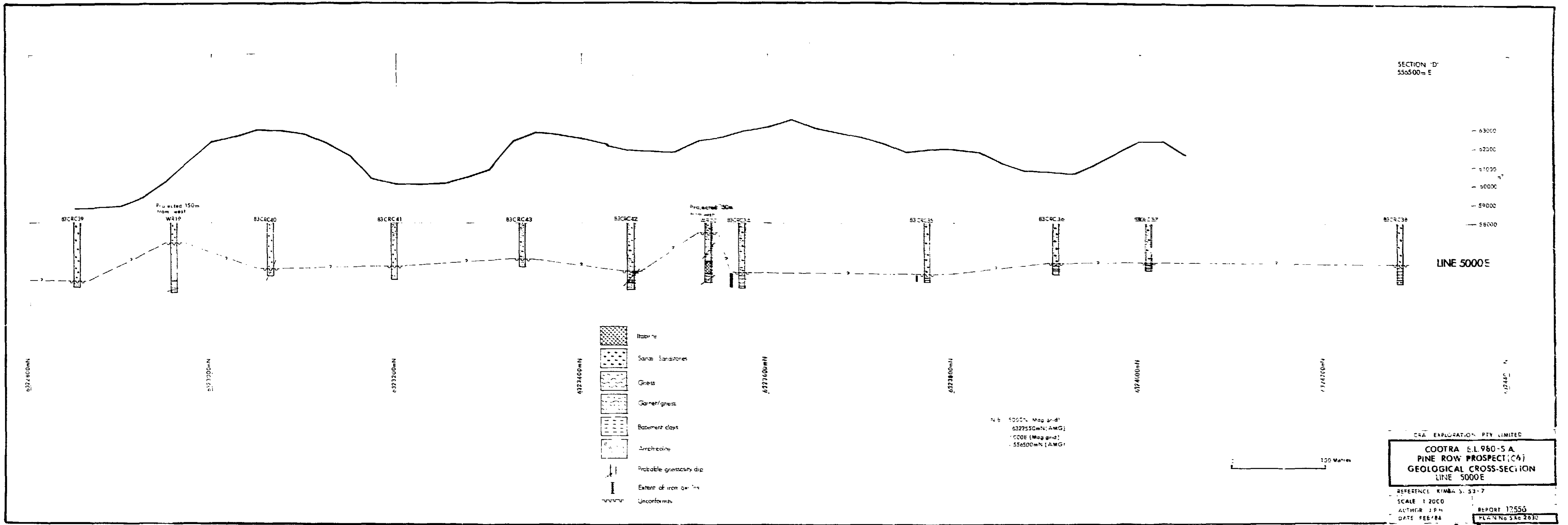
CRA EXPLORATION PTY LIMITED

COOTRA E.L. 980

MEANEY'S PROSPECT GROUND MAG. INTERP.

LINE 4200 N (BRG. 034)

REFERENCE	KIMBA SI-53 7	
SCALE	H=1:8,900; V=1:10,000	
AUTHOR	GLM	REPORT 12556
DATE	6/10/83	PLAN No SAa 2680



SECTION 'D'
556500m E
83CRC39
Projected 150m from west
WR19
83CRC40
83CRC41
83CRC43
83CRC42
83CRC34
83CRC35
83CRC36
83CRC38
LINE 5000E
6323400mN
Itabirite
Sands Sandstones
Gneiss
Garnet/gneiss
Basement clays
Amphibolite
Probable gneissosity dip
Extent of iron gossans
Unconformity
100 Metres
CRA EXPLORATION PTY LIMITED
COOTRA E.L.960-S.A.
PINE ROW PROSPECT (C6)
GEOLOGICAL CROSS-SECTION
LINE 5000E
REFERENCE KIMBA S. 53-7
SCALE 1 2000
AUTHOR J.P.H.
DATE FEB/84
REPORT 12556
PLAN No SAc 2630

4230(IV)-G

TV

0441n

CRA EXPLORATION PTY. LIMITED

EIGHTH QUARTERLY AND RELINQUISHMENT REPORT FOR COOTRA E.L. 980, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 28TH MARCH, 1984.

AUTHOR: I.D. FINCH

COPIES TO: CRAE LIBRARY
SADME
N.B.H. LIMITED

DATE: 9TH APRIL, 1984

SUBMITTED BY: for I.D. FINCH

ACCEPTED BY:

12591

CONTENTS

1. SUMMARY

In the 1960's SADME drilled 144 boreholes in the Warramboo area as part of their search for iron ore. No further work was undertaken until North Broken Hill Limited applied for, and were granted, an exploration licence in 1980. Their target was stratabound base metals. Following acquisition of aeromagnetic surveys, ground magnetics data, gravity survey data and data from a number of I.P. surveys, a total of 139 boreholes (88 x auger holes, 44 x RAB holes and 7 x diamond core holes) were drilled with limited success. Weak tungsten (scheelite) mineralisation was encountered in diamond drill core from mafic granulites on the prospect known as Meaney's.

CRA Exploration entered into a joint venture agreement with North Broken Hill Limited in 1982 and became the operators. All the SADME boreholes were sampled (868 samples) and analysed for a range of elements. Problems of contamination from a worn cutting wheel were overcome, and some spot elevated base metal geochemistry was returned, particularly in the Pine Row and Warramboo prospects. In addition, chemosedimentary units (itabirite and marble) were identified from relogging of the SADME diamond holes and the area was confirmed as having the potential to host stratiform/ stratabound base metal orebodies.

Further I.P., ground magnetics and Schlumberger depth soundings were carried out in 1983 prior to the drilling of 43 boreholes (40 x reverse circulation and 3 x diamond core) later that year. In all, five prospect areas were tested by the 1983 drilling. Spot high assay values were not repeated at Pine Row and Warramboo prospects and the chemogenic lithologies appear to be of limited strike extent. At Meaney's prospect no further tungsten mineralisation was intersected and the newer prospects of Brewers and Nosredna proved to be areas of essentially barren quartzo-feldspathic gneiss with occasional horizons containing increased magnetite. Detailed petrological work on the suite of metamorphic rocks at Cootra suggests a clastic sedimentary origin.

The discouraging results from the 1983 drilling programme severely downgraded the licence area and, as a result, relinquishment was recommended.

2. CONCLUSIONS AND RECOMMENDATIONS

The majority of elevated magnetic responses throughout the E.L. are due to increased magnetite within high grade, essentially barren, gneissic rock suites.

0440

The limited amount of suitable host rocks, absence of chemical alteration and generally low order downhole geochemical results, severely downgrade the area as one likely to host a major stratiform/stratabound base metal ore body.

Potential for tungsten mineralisation elsewhere in the granulite stratigraphy at Meaney's prospect still exists since only the basal contact was fully tested. No geophysical or geochemical technology exists, however, to delineate such a body under +50 metres of younger cover rocks.

Relinquishment of the E.L. is recommended.

3. INTRODUCTION

The Cootra Exploration Licence No. 980 (previously E.L. 756) is located 320 kilometres northwest of Adelaide and 40 kilometres south east of Wudinna (see plan no. SAa 2676).

An exploration licence was applied for on 17th July, 1980, and granted as E.L. 756 on 26th November, 1980, for one year. The licence lapsed but a reapplication was lodged on 8th December, 1981, and the area was granted as E.L. 980 on 29th March, 1982, for one year.

A joint venture agreement between North Broken Hill Limited and CRA Exploration Pty. Limited was signed in August, 1982, since when the latter have acted as operators.

All previous work completed by North Broken Hill Limited and CRA Exploration Pty. Limited is detailed in previous quarterly reports.

This report summarises the work carried out on the E.L. leading to the recommendation for its relinquishment.

4. PREVIOUS WORK SUMMARY

Survey/Drilling	Metres/ Line kms	Operators	Comments	Report
Aeromagnetic	?	SADME	Part of 1960's Iron Ore search. Adastra Hunting Geophysics Ltd. - N/S lines 400 m apart - mean height of 91 m	Report Books 54/19 55/91 56/33 57/68 57/85 60/48
Drilling of 4 Diamond holes 42 Rotary holes 9 Percussion 89 Auger holes Ground Magnetics		SADME		
Aeromagnetic Survey	480 sq. kms	N.B.H.	Geoex - 300 m line spacing N/S lines 61 m mean height 5 γ contours	2nd Qtly Rep. EL 756
Airborne Radiometrics	480 sq. kms	N.B.H.	Geoex - 4 channel	2nd Qtly Rep. EL 756
Drilling: 88 x Auger holes 44 x RAB 7 x Diamond holes	(1063 m) (1545 m)	N.B.H.	Very few to bedrock Most to bedrock Mainly Meaney's Tungsten Prospect	3rd Qtly EL 756 3rd Qtly EL 756 4th/5th Qtly EL 756
Gravity Survey	27 kms	N.B.H.	727 readings	Various EL 756 Qtly's
I.P. Surveys	9.3 kms	N.B.H.	100 m spacing Meaney's & Fishke's Prospects	4th Qtly EL 756
Ground Magnetics +17 Auger holes		N.B.H.	Various locations not always fully reported	Various Qtly's EL 756
Borehole Geochemistry	(868 smpls)	CRAE	Fillet samples taken on SADME cores WD1-4 - contamination probable	3rd Qtly EL 980
Geochemistry		CRAE	Check Assays - ½ core	4th Qtly EL 980
Schlumberger Depth Soundings		CRAE	Unsuccessful	4th Qtly EL 980
Ground Magnetics	32.6 kms	CRAE	Defining Airborne Magnetic targets	4th Qtly EL 980
I.P. traverses	7.3 kms	CRAE	Warramboo Anomaly	4th Qtly EL 980
Drilling 40 R.C. 3 Diamond holes	2331 m	CRAE	All essentially negative Meaney's Prospect	7th Qtly EL 980

for I.D. FINCH

IDF/pw

EXPENDITURE

Expenditure for the period ended 31st March, 1984, the nearest accounting period was $4618.00, as listed below.

Payroll	$ 2098
Supplies	841
Vehicle	567
Travel	53
Contractors	388
Overheads	671
TOTAL	$ 4618

KEYWORDS

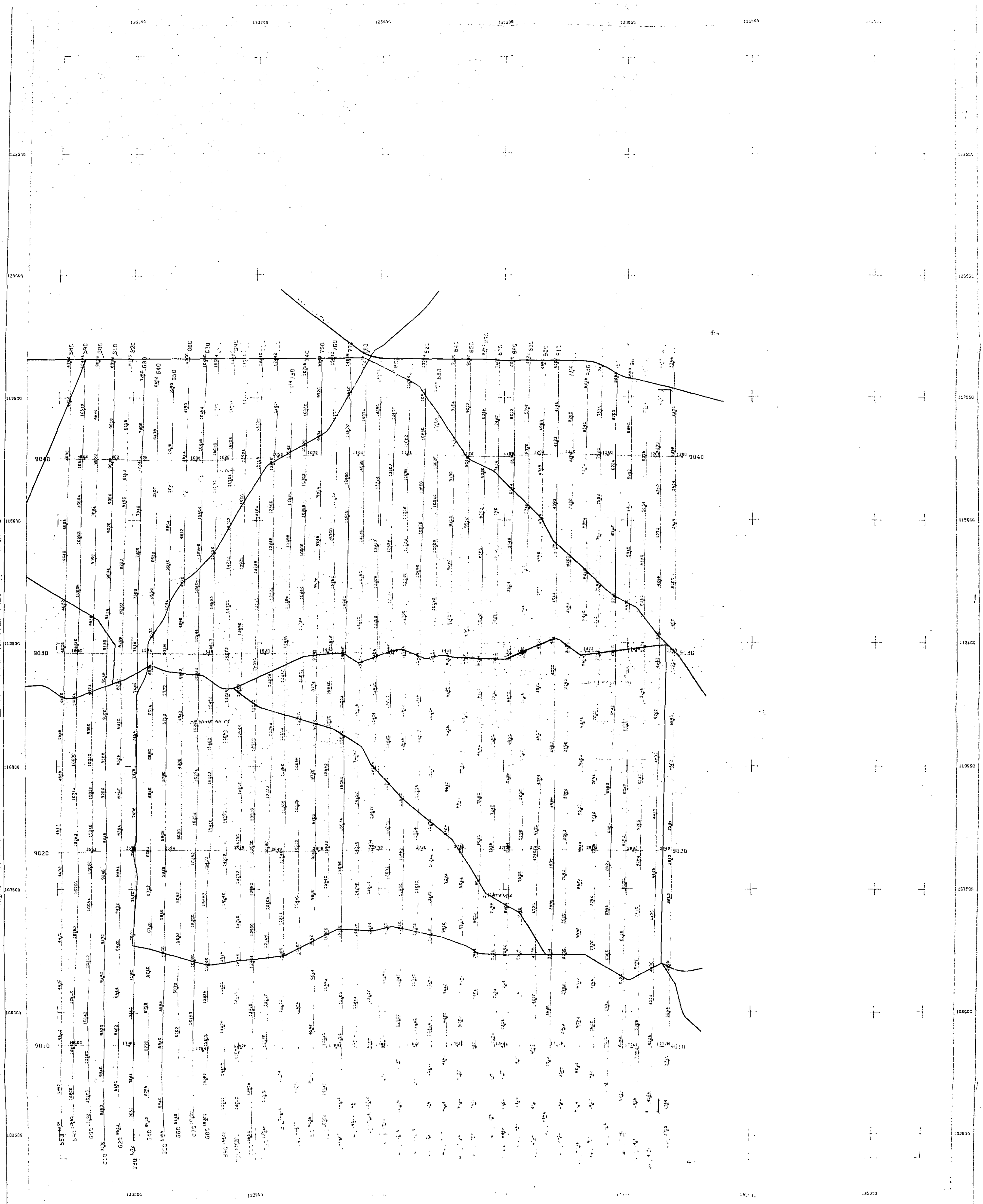
Ironstone, BIF hosted deposits, drill-reverse circ., copper, lead, zinc, tungsten, Assays-drill, geophys.-mag., geophys.-I.P., geophys.-Schlumberger.

LOCATION

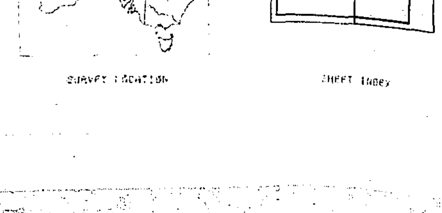
Kimba SI53-7 1:250 000 Sheet, S.A.

LIST OF PLANS

Plan No.	Title	Scale
SAa 2676	Location Map - Cootra E.L. 980	1:250 000



Airborne Geophysical Survey and Compilation ...



SURVEY LOCATION

SHEET INDEX

SURVEY BOUNDARY

PROJECT NUMBER

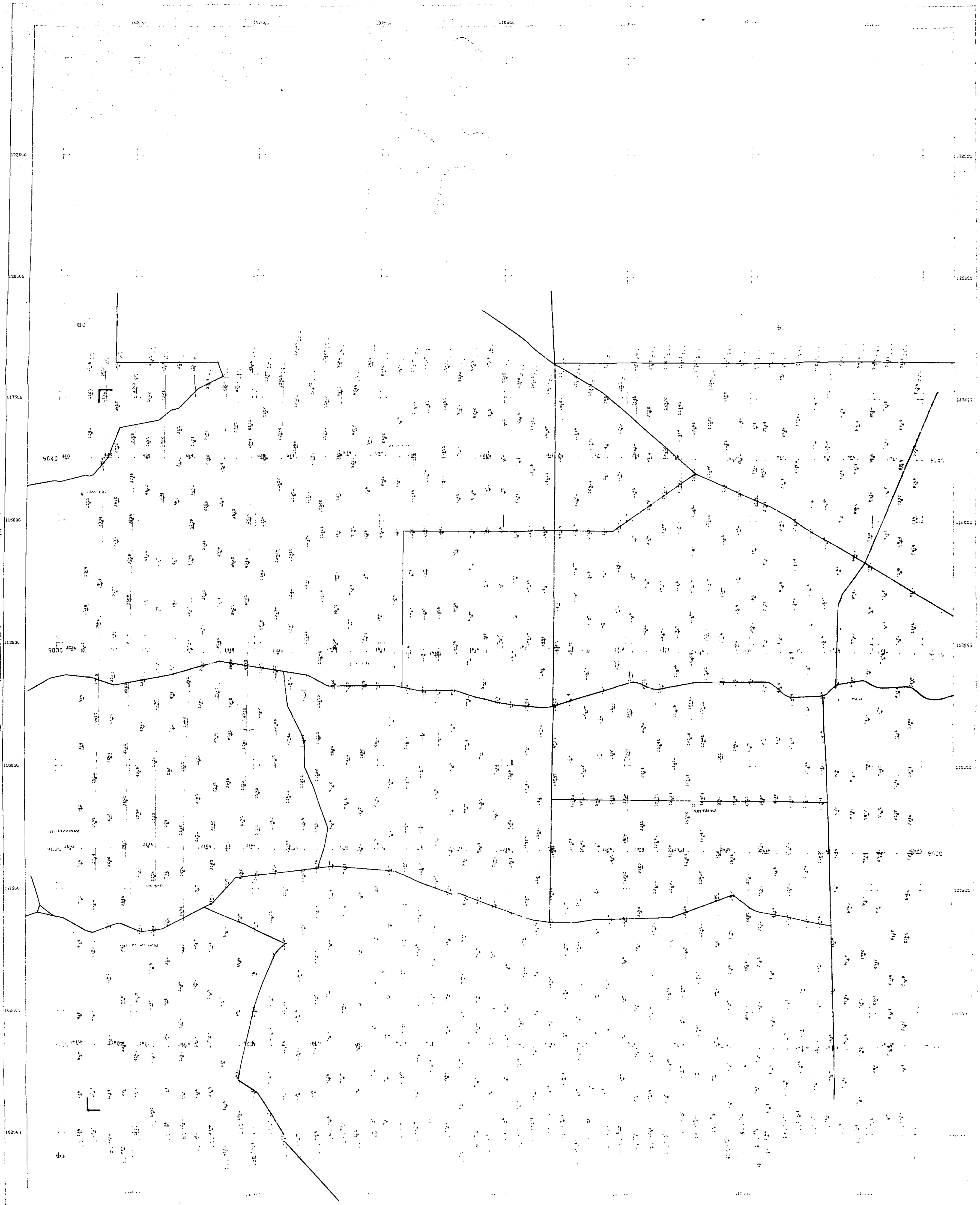
An attempt was made to recover fiducials at intervals of 1.0 kilometre ... on the map.

... flight path map is an overlay for the uncontrolled photomosaic prepared for flight navigation.

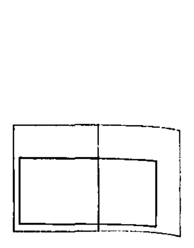
... identified on photomosaic.

The metric coordinates are arbitrary and do not relate to the Australian Map Grid

4230(IV)-7



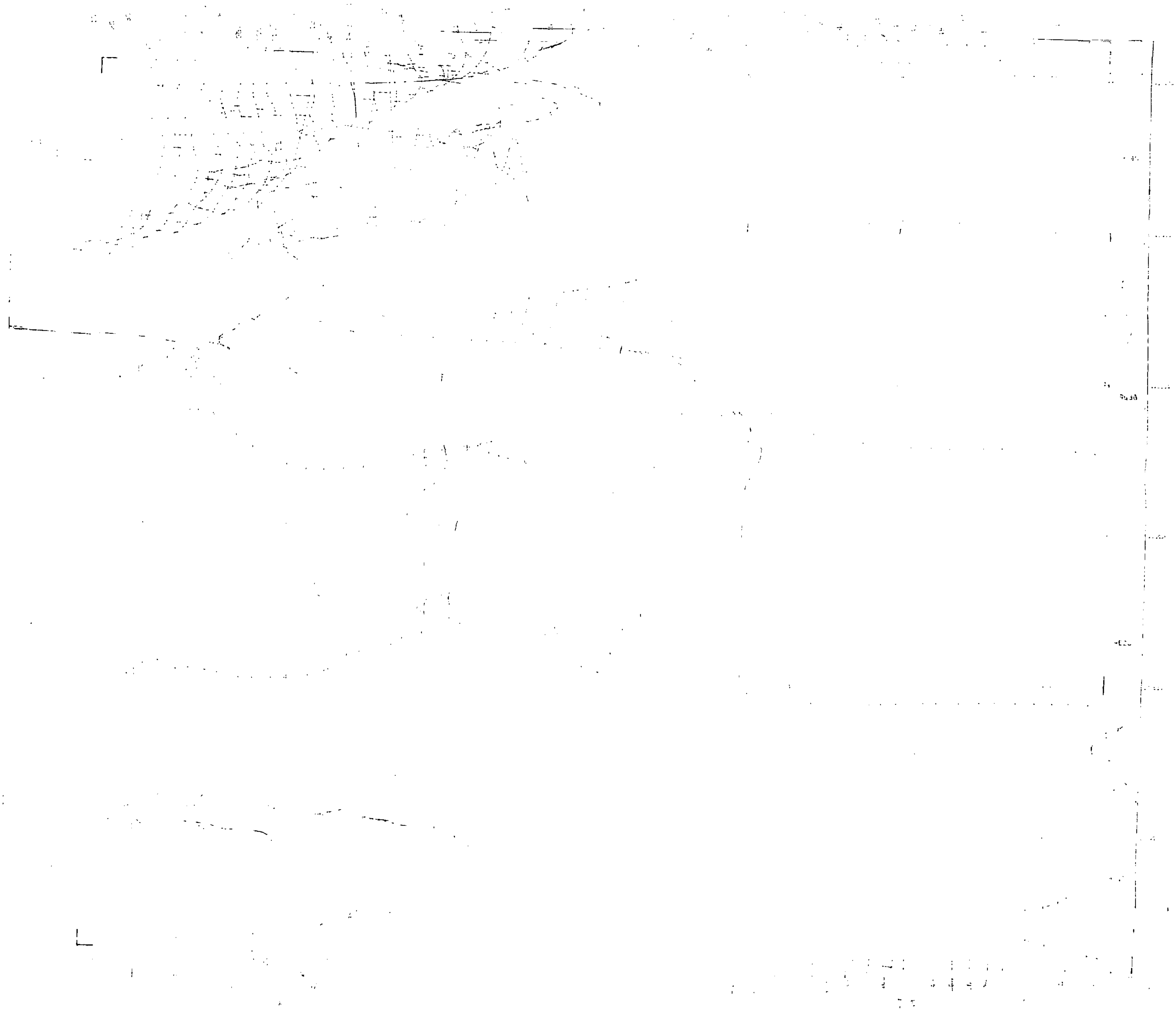
The metric coordinates are arbitrary and do not relate to the Australian Map Grid



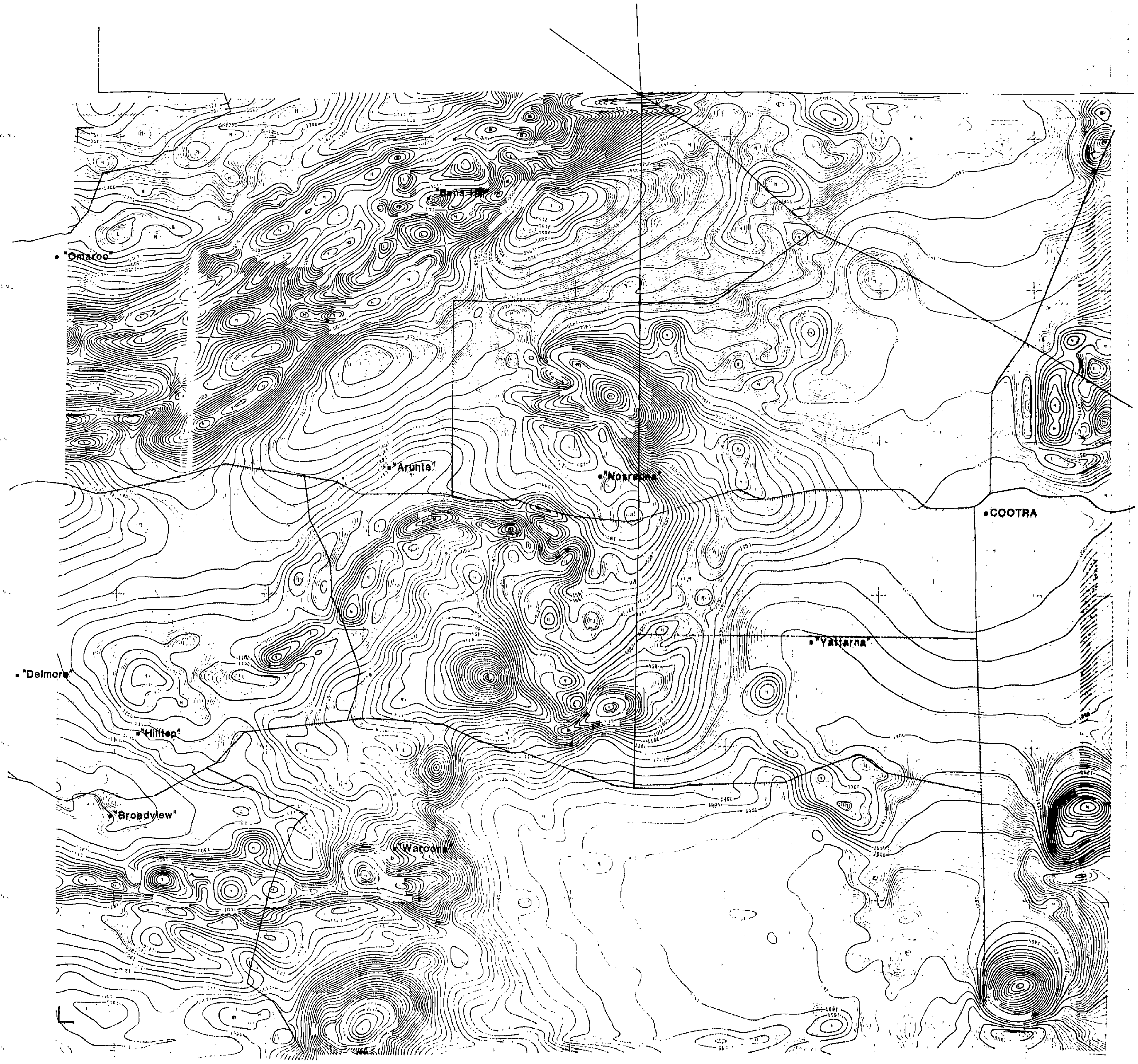
SURVEY BOUNDARY

4230(1U)-8

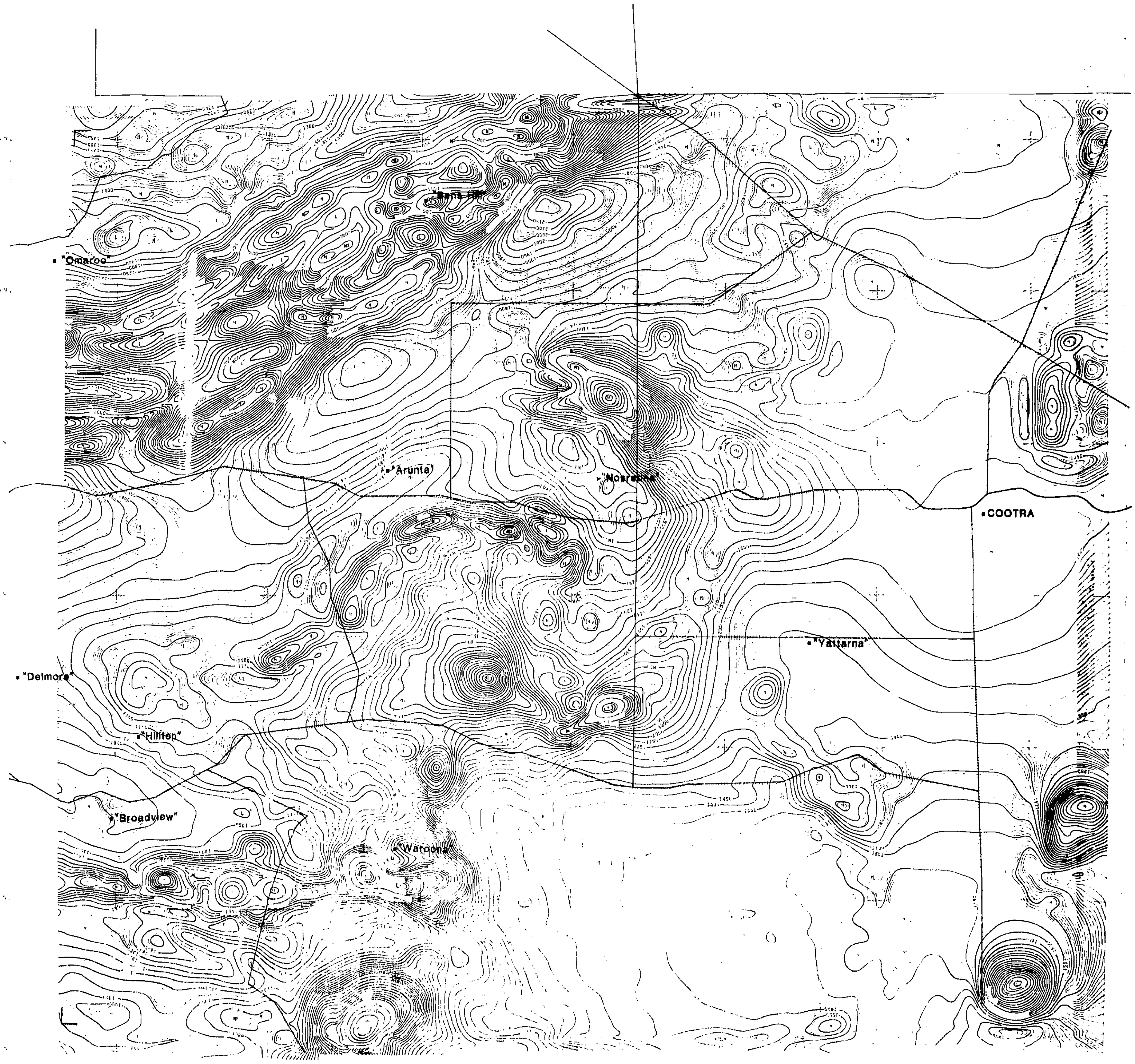
4230(IV)-9

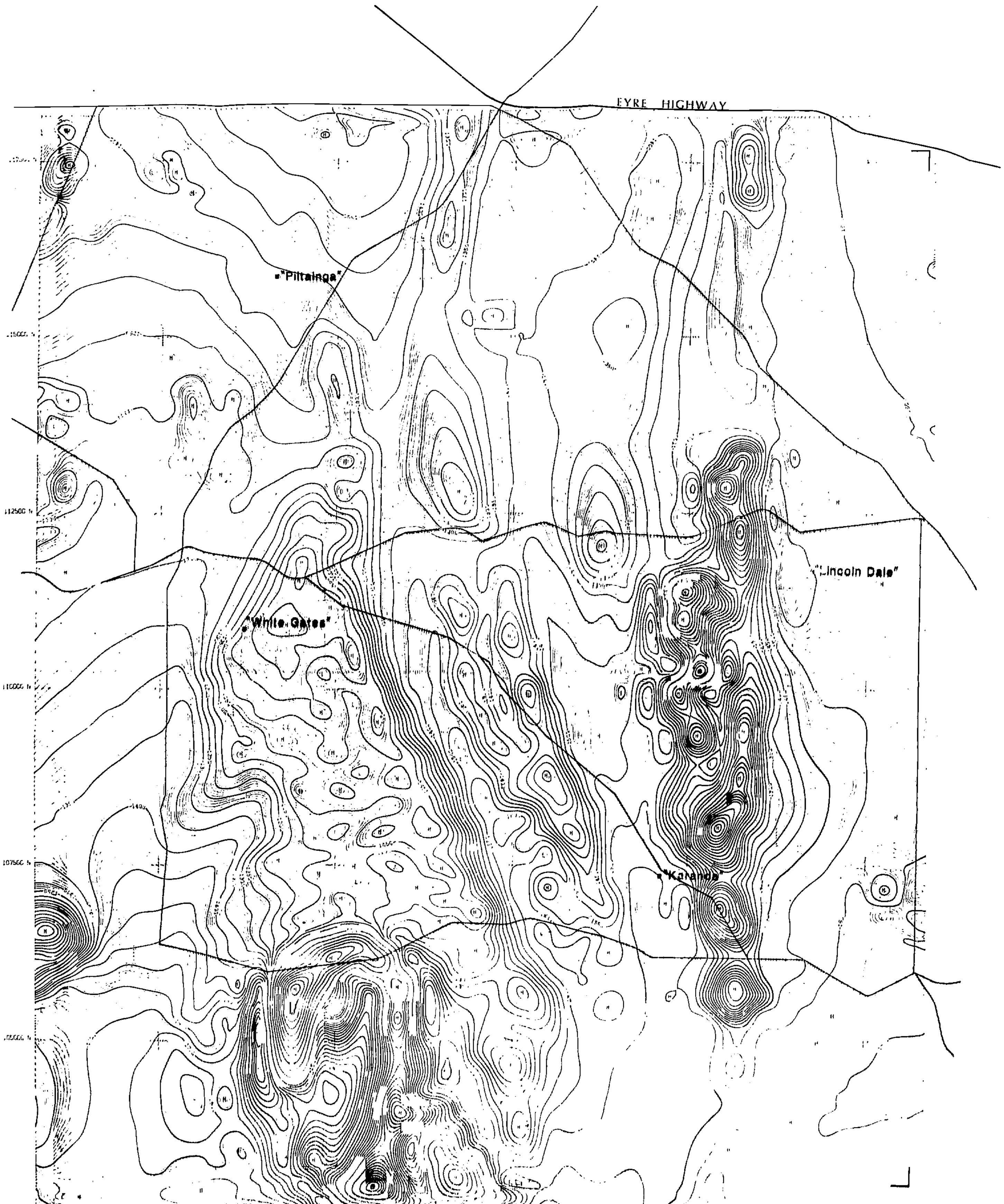


4230(IV)-10


"Omaroo"
"Arunta"
COOTRA
"Yattarna"
"Delmore"
"Hilltop"
"Broadview"
"Waroona"

4230(1U)-11


"Omaroo"
"Arunta"
COOTRA
"Yattarna"
"Delmore"
"Hilltop"
"Broadview"
"Waroona"



The data presented ... magnetic intensity, after subtraction by the International Geomagnetic Reference Field from the observed Total Magnetic Intensity. The data was corrected for diurnal drift using a base station monitor at ... Latitude ... Longitude ... Altitude ... Metres. The sensor height was ... metres. The adopted value for this location was ... nT. Final detailed levelling of the data was performed using tie-line crossover analysis. A simple ... point filter was applied to the data, which was then gridded and contoured using a 100m by 100m mesh cell.

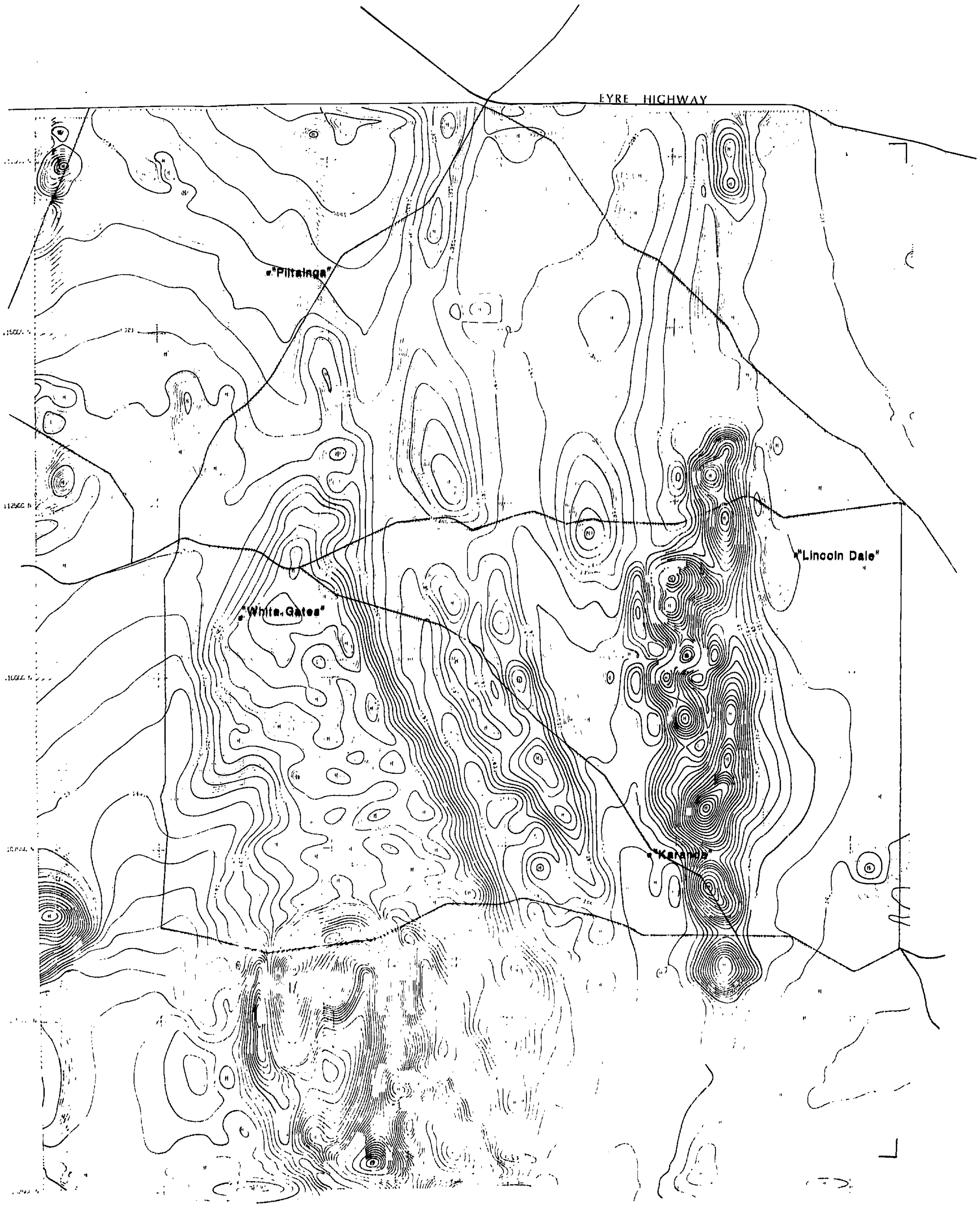
SURVEY BOUNDARY

EQUIPMENT SPECIFICATIONS
... Aircraft
... SYSTEM
... MAGNETOMETER
256 CHANNEL SPECTROMETER
... DETECTOR
... RADAR ALTIMETER
... Camera
... Magnetic Tape
... Magnetometer

The nominal flight line separation was ... metres, and the nominal tie-line ... The observed ... sample interval in the flight direction was ... metres, ... nominal aircraft speed ... Knots ... The mean sensor height was ... metres ... magnetometer ...

1981

4230(IV)-12



SURVEY BOUNDARY

EQUIPMENT SPECIFICATIONS