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EL 1017

MOUNT FINKE [HEARTBREAK HILL]

PROGRESS REPORTS FOR THE PERIOD 28/7/82 TO 27/1/84

Submitted by

Amoco Minerals Australia Co.
1983

Enquiries: Customer Services
Ground Floor
101 Grenfell Street, Adelaide 5000

Telephone: (08) 8463 3000
Facsimile: (08) 8204 1880

PRIMARY INDUSTRIES AND RESOURCES SA

CONTENTS ENVELOPE 4896

TENEMENT: E.L. 1017 - Mt. Finke.

TENEMENT HOLDER: AMOCO Minerals Aust. Co.

AMOCO MINERALS AUSTRALIA COMPANY

EL 1017 HEARTBREAK HILL, SOUTH AUSTRALIA.

REPORT FOR FIRST QUARTER, ENDING 28TH OCTOBER, 1982.

INTRODUCTION

Exploration Licence 1017, of 1966 square kilometres was granted on 28th July, 1982 and is due to expire on 29th January, 1983. It carries a six month expenditure committment of $25,000.

It was acquired in order to assess the base and precious metal potential of Archean to Middle Proterozoic volcanics, granites and sediments of the Gawler Craton. Airborne magnetic data, recently generated by SADME, provided some initial target areas.

The ground had been recently relinquished by French uranium explorer Afmeco, who drilled several shallow percussion holes into gneissic basement, in what is now the north western corner of EL 1017 (Afmeco EL 580). Afmeco were primarly seeking uranium in basement rocks and tertiary cover sequences.

Unless otherwise requested, we will follow the practice of making quarterly reports brief, and providing detailed exploration data, maps etc. in annual reports and reports following the completion of major exploration phases.

EXPLORATION

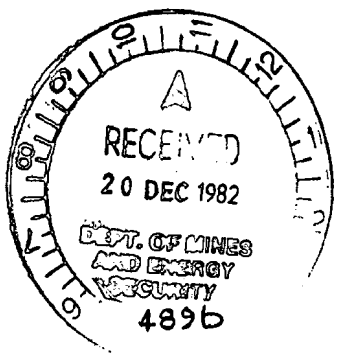
Exploration during the quarter involved geological reconnaissance, and interpretation of the relevant part of the SADME Kokatha detailed aeromagnetic survey data, by contract geophysicist C.G. Anderson, and ground location and magnetic detailing of a number of discrete positive aeromagnetic anomalies.

A number of samples of granites, volcanics and sediments from widely scattered Archean to Middle Proterozoic outcrops - totalling less than one percent - were submitted for geochemical and petrological analysis.

EXPENDITURE

Approximate expenditure for the quarter was:

Salaries	$4650
Cookery	730
Field Costs (pegs, topofil, flagging etc)	950
Maps and air photos	400



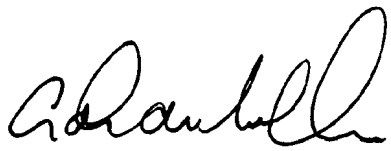
Expenditure Cont.

Vehicle Costs	$1385
Fuel	325
Communications	200
Transportation (Railway fares)	40
Depreciation of geophysical equipment	100
Geophysical Interpretation (C.G. Anderson)	625
Annual rental in advance	2950
Overheads/administration	1235
TOTAL	$13590

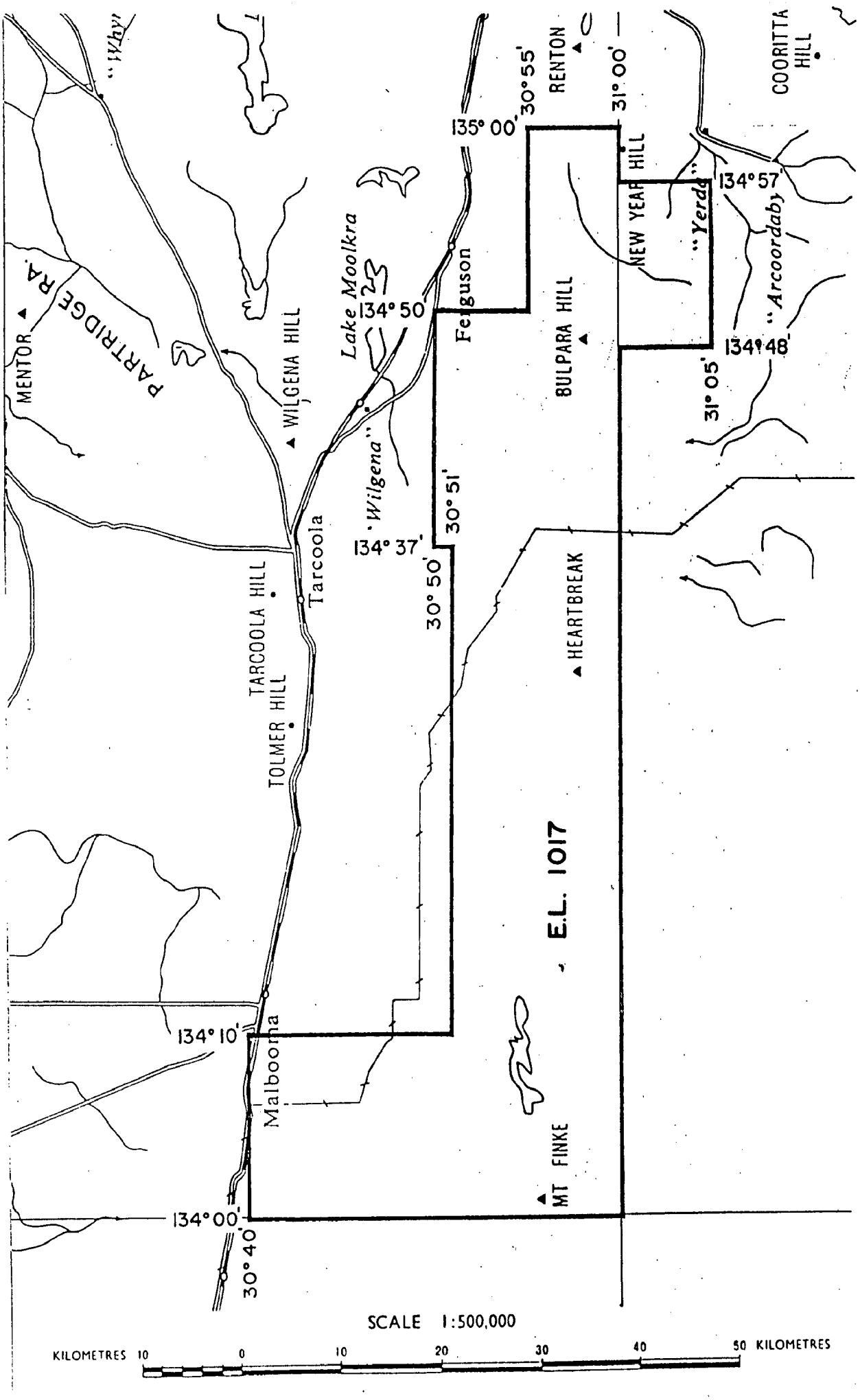
FUTURE WORK

Second quarter work involves gravity surveying of a number of the discrete magnetic anomalies and follow up geochemical sampling as warranted.

Yours faithfully,
AMOCO MINERALS AUSTRALIA COMPANY



Graham Miller
Senior Geologist



NOTE: There is no warranty that the boundary of this Exploration Licence is correct in relation to other features on the map. The boundary is to be ascertained by reference to the Australian Geodetic Datum.

AMOCO MINERALS AUSTRALIA COMPANY

EXPLORATION LICENCE 1017,

HEARTBREAK HILL.

REPORT FOR SECOND AND THIRD QUARTERS,

ENDING APRIL, 28TH, 1983.

MAY 20TH, 1983.

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APPENDICES

1. Expenditure Statement
2. Interpretation of Aeromagnetic Data, by C. G. Anderson.
3. Geochemical Analyses
4. Mineralogical Reports.

PLANS.

No.	Title	Scale
W 2825	Location Map	1: 500 000
W. 2824	Geology	1:100 000
W 2818	Aeromagnetic Contours	1:100 000
W 2596	Interpretation of Detailed Aeromagnetic data	1:100 000
W 2597	Gravity Contours (SADME data)	1:250 000
W 2800	Geophysical Data - Anomaly 1	1: 10 000
W 2801	" " " 2 sheet 1	1: 10 000
W 2802	" " " 2 sheet 2	1: 10 000
W 2803	" " " 5	1: 10 000
W 2816	" " " 7	1: 5 000
W 2813	" " " 8	1: 5 000

KEY WORDS.

Tarcoola (SH 53-10) 1:250 000 sheet.
Heartbreak Hill
Mt. Finke
Kenella Rocks
Bulpara Hill
Archean
Lower Proterozoic
Middle Proterozoic
Mulgathing Complex
Hutchison Group
Syn-tectonic Granite
Tarcoola Beds
Gawler Range Volcanics
Post-tectonic Granite
Banded Iron Formation (BIF)
Chert
Graphitic Shale
Gold
Tin
Copper
Lead
Zinc
Tungsten
Barium
Magnetite
Metasomatic
Volcanic
Hydrothermal
Roof Pendant
Geochemistry
Magnetic
Aeromagnetic
Magnetic Susceptibility
Gravity.

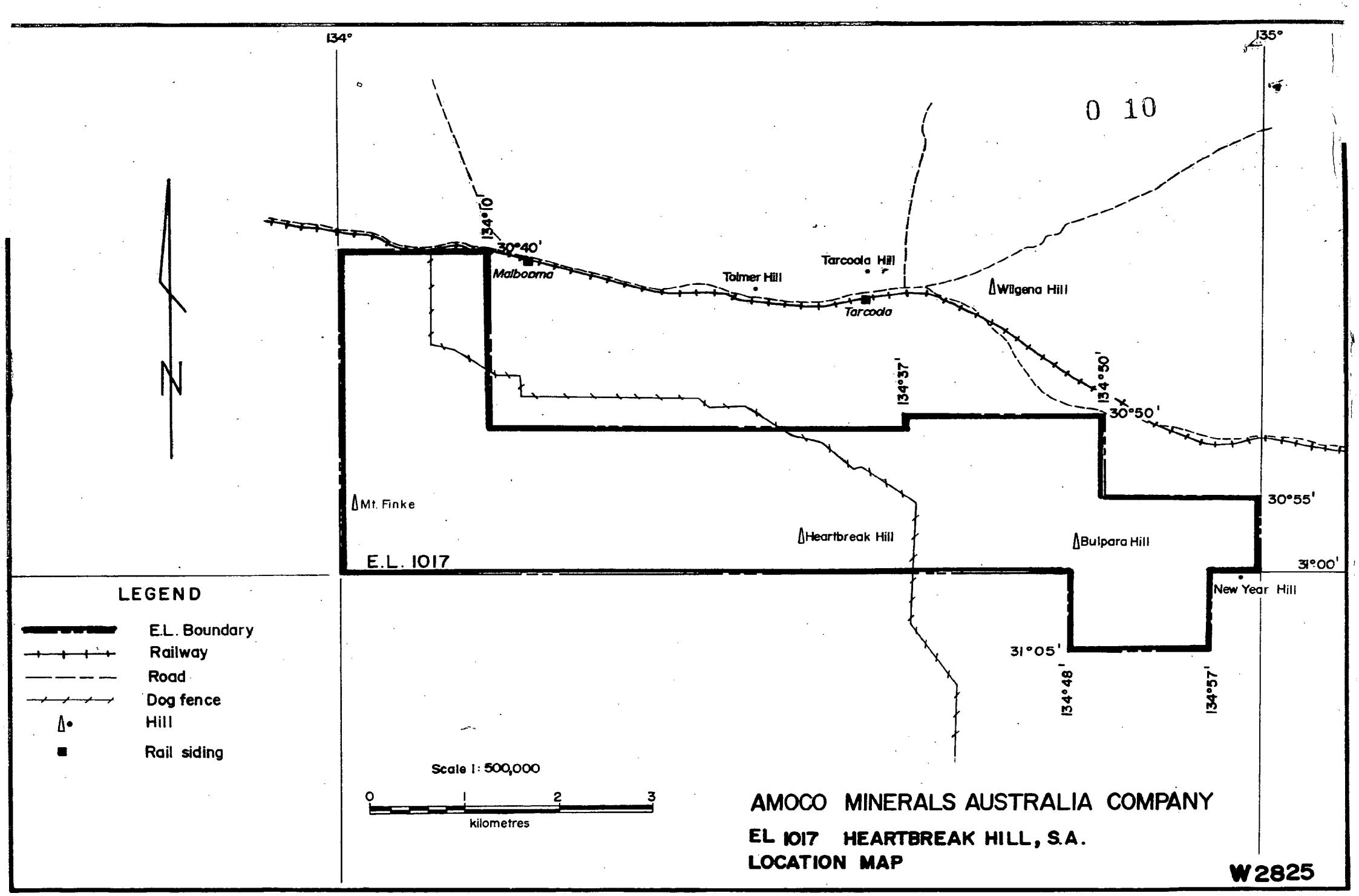
SUMMARY.

Exploration Licence 1017, covering 1966 square kilometres of the Precambrian Gawler Craton in the centre of South Australia, is considered prospective for economic gold, tin and base metal deposits of volcanic/hydrothermal origin. There are a number of sub-economic examples of such deposits in the region.

Amoco's work so far has comprised a geophysical interpretation of that (eastern) part of the licence covered by a SADME detailed aeromagnetic survey, ground location and geophysical surveying of a number of selected aeromagnetic anomalies and geological reconnaissance/geochemistry.

A number of interesting geophysical and geochemical anomalies require follow-up work and the initial assessment of a large part of the licence remains to be completed. Extremely scarce outcrop throughout and poor aeromagnetic coverage for the western half of the licence make this assessment difficult.

Future work on the licence will be managed by CRA Exploration under a joint venture arrangement.



AMOCO MINERALS AUSTRALIA COMPANY

EL 1017 HEARTBREAK HILL, S.A.

LOCATION MAP

W2825

INTRODUCTION.

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Exploration Licence 1017, of 1966 square kilometres, was granted on 28th July 1982 and had an initial expiry date of 27th January 1983 and a 6 month expenditure committment of $25,000. Subsequently the licence term was extended to January 27, 1984 for an additional $50,000 expenditure committment. The licence was acquired in order to assess the base and precious metal potential of Archean to Middle Proterozoic volcanics, intrusives and sediments of the Gawler Craton.

Using the common affiliation of pyrrhotite/magnetite with base and precious metal mineralisation in Precambrian crystalline rocks, SADME detailed aeromagnetic data available for the eastern part of the licence provided some initial target areas.

LOCATION AND ACCESS

E.L. 1017 is situated 20 kilometres south of the town of Tarcoola in central South Australia. It is 720 kilometres from Adelaide and at the junction of the trans-Australian and Alice Springs railway lines. It has 700 people; hospital, police, postal, basic grocery, and fuel services are available. Regular passenger and freight rail services connect Tarcoola with Kalgoorlie, Adelaide and Alice Springs. A two directional strip in Tarcoola is used mainly by the Royal Flying Doctor Service.

The majority of E.L. 1017 covers vacant crown land south of the vermin-proof fence. North of the fence, the licence covers portions of the Mulgathing, Wilgena and North Well Pastoral Station leases and tracks leading south from Tarcoola provide good access. A four-wheel drive track which runs due south from Malbooma outstation to just north of Ceduna, provides access to the western end of E.L. 1017, while a track which follows the fence provides access to the central area of the licence. The eastern end of the licence is easily accessed via tracks leading south from the trans-Australian railway line. Movement off tracks is mainly restricted to four-wheel drives only, and, in some areas is largely confined to east-west trending corridors between large sand dunes. Access is very difficult in areas of sand dunes with thick scrub cover.

PREVIOUS EXPLORATION

French uranium explorer, Afmeco, held the ground immediately before Amoco. They were primarily seeking uranium in Precambrian basement and Tertiary cover sequences and drilled a number of shallow percussion

holes with negative results. The drill hole locations and lithologies are shown on plan W 2824. Other tenement holders in the area have been Archean Explorations Pty. Ltd., with S.M.L. 505 in 1971, and Abadon Holdings N.L., who held a number of S.M.L.'s and E.L.'s from 1970 to 1974.

In what is now E.L. 1017, Archean Explorations carried out surface sampling of quartz-ironstone reefs from an extensive area of soft decomposed shale/siltstones from the lake system east of Mt. Finke (Davidson, 1971). No gold or base metals were found, though anomalous molybdenum was reported.

At Pinding Rocks, north of the licence, they sampled gossanous quartz reefs with anomalous silver (500 ppm), copper (800 ppm), lead (800 ppm), bismuth (1500 ppm) and tungsten (500 ppm). The reefs are in greisen zones in post tectonic granite; rhyodacite intrusives are nearby.

Abadon Holdings completed a rotary percussion/diamond drilling programme in the Kenella Rocks area near the eastern margin of the licence. (Holcopek, 1972 and 1974). They drilled nine holes, totalling 948 metres, to test a geochemically anomalous quartz-hematite-goethite outcrop and a number of associated geophysical anomalies. In one hole they intersected 9.1 metres of 260 ppm copper, 680 ppm lead and 1.6% zinc. A selected split core sample from this zone was analysed by Amoco (Appendix 3A) and found to contain 2000 ppm copper, 4.9% lead, 4.5% zinc, plus 1800 ppm bismuth. The mineralisation is in a sulphidic-chloritic-hematitic zone in green quartz-magnetite-pyroxene-amphibole gneiss (BIF) interlayered with pinkish quartz-felspar gneiss. The BIF, up to 25 metres wide, contains felspathic, biotitic, garnetiferous and calcitic laminae; there is evidence of tectonic stress and retrograde metamorphism (Daly, Webb and Whitehead 1977).

AMOCO'S EXPLORATION.

Exploration by Amoco to date has comprised an interpretation of the SADME detailed aeromagnetic data available for the eastern half of the licence, ground location of a number of aeromagnetic anomalies with follow-up magnetic/gravity surveying and general reconnaissance/geochemical sampling.

Geophysical Interpretation

This was carried out by a contract geophysicist C.G. Anderson. His report is attached as Appendix 3, while plan W 2596 shows his interpretation; the aeromagnetic data interpreted is shown on plan W 2818. Anderson also considered the regional gravity pattern (plan W 2597) in his interpretation.

Ground Geophysics

Aeromagnetic anomalies selected for 1982 ground follow-up were mainly those associated with inferred syn- or post tectonic granite and thought possibly sourced by pyrrhotite/magnetite in segregations, alteration zones, breccia pipes or roof pendants.

Amoco have so far located eight separate magnetic anomalies on the ground (Ref. plan W 2818). After an initial assessment of shape/amplitude by reconnaissance ground magnetic surveying, grid magnetic and gravity surveys were carried out on three anomalies (1, 2 and 5) and magnetic surveys only, on a further two (7 and 8). Grid magnetic data was collected by Amoco personnel and optical levelling and gravity data by contract geophysicist P. Mewkill. All grid data collected are shown on plans W 2800, 2801, 2802, 2803, 2813 and 2816. During the initial ground location of the anomalies, samples of any out-cropping rocks were taken and submitted for geochemical/mineralogical analyses.

A summary of the geophysical follow-up is:-

Anomaly 1.	Location:	581300N 452500E
	Amplitude	3400 nT 0.75 milligals
	Shape:	Circular
	Dimensions:	1200 x 1500 metres
	Outcrop:	Possible syntectonic magnetitic granite (T.S. 56715) 350 metres S.S.W. of anomaly centre; magnetic susceptibility 400-2000 x 10^{-5} S.I.
Anomaly 2.	Location:	582800N, 45100E
	Amplitude:	2400 nT. 0.75 milligals.
	Shape:	Circular
	Dimensions:	600 x 800 metres.
	Outcrop:	Granite, similar to that at Anomaly 1. 2500 metres north of anomaly centre.
Anomaly 5.	Location:	586000N, 450000E
	Amplitude:	1400 nT 2 1 milligals.
	Shape:	Circular
	Dimensions:	800 x 800 metres
	Outcrop:	None.

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Anomaly 7.	Location:	586400N, 474100E.
	Amplitude:	4000 nT
	Shape:	Linear
	Dimensions:	1000 x 300 metres.
	Outcrop:	Magnetitic calc-silicate (with 3.15% barium), magnetic susceptibility 9000-12800, 100 metres south of anomaly centre. Possible syntectonic granite, susceptibility 750-1250, and non magnetic post-tectonic granite nearby.
Anomaly 8.	Location:	561150N, 490250E
	Amplitude	2000 nT.
	Shape:	Circular
	Dimensions:	900 x 1200 metres
	Outcrop:	Diorite of uncertain age and magnetic susceptibility 200-2000, 420 metres N.E. of anomaly centre.

Anomaly 7 is the only one for which the source is probably known. The barium geochemistry here makes this anomaly still interesting, however. Part of Anomaly 8 appears due to the diorite seen in outcrop. No modelling of the magnetic/gravity data has yet been carried out.

Geochemical Sampling.

Sampling, unrelated to magnetic anomalies, was carried out in and around the lakes east of Mt. Finke, over an outcropping ridge of metamorphosed chert to the north of Mt. Finke (416500E, 590500N) and in the Bulpara Hill area, in the eastern part of the licence. Sample locations are plotted on plan 2824 while geochemical and petrological results are discussed under "Property Geology".

REGIONAL GEOLOGY.

Exploration Licence 1017 is in the Tarcoola-Kingoonya region, near the centre of the Gawler Craton in South Australia. Precambrian crystalline rocks on the area are generally divided into three major groupings of volcanics, sediments and intrusives.

Late Archean - Early Proterozoic, aged around 2400 M.A. and known as the Mulgathing Complex.

Lower Proterozoic, aged approximately 2000-1580 M.A. and divided into lower (Hutchison Gp.) volcanics, schists and

BIFs) and upper (Lincoln Complex-) granitoids and gneisses.

Middle Proterozoic, aged about 1580-1450 M.A. The volcanics are the regionally extensive Gawler Range Volcanics (G.R.V.) There may be two major phases of these volcanics, the older of which appear to be intercalated, in the Kingoonya-Tarcoola area, with the Tarcoola Beds sediments.

Two major orogenies, producing tight folding and significant metamorphism are recognised: the Sleafordian, 2500-2300 M.A. and Kimban, 1820-1580 M.A. Middle Proterozoic layered rocks (post-Kimban orogeny) are gently to moderately folded.

The orogenic affiliations of older granites and equivalents in the region present mapping problems. On Amoco's map (plan W 2824), strongly foliated and deformed granitoids have been tentatively allocated to the Mulgathing complex. Granites mapped separately are slightly foliated syntectonic and non-foliated post-tectonic types. Daly (1981) has two ages for syntectonic intrusives in the Tarcoola area: 2300 M.A. at Glenloth and 1560-1700 M.A. at Mulgathing. The post tectonic granites (Hiltaba), are probably co-eval with the latter part of the GRV.

Much of the central Gawler Craton precambrian geology is obscured by mesozoic and younger (particularly Quaternary sand) cover. Upper Proterozoic? clastic sediments (Pandurra Fm.) on-lap older rocks to the east and north east of Kingoonya only.

Commercially exploited mineralisation in the region is restricted to gold in the Tarcoola, Glenloth and Earea Dam areas and tin at Glenloth and South Lake. At Tarcoola, the major deposit (Tarcoola Blocks) comprises mineralised quartz reefs in graphitic slates/ siltstones of the Tarcoola Beds adjacent to a magnetitic post-tectonic granite. There are also narrow zones of quartz reef mineralisation, with sericitization/pyritization aureoles, in the granite. Andesite dykes, of presumed GRV affiliation, cut the Tarcoola Beds in the mine area. Production from the Tarcoola Blocks has been 1750 kg; nearby mines contributed 590 kg.

Gold of uncertain origin at Glenloth (280 kg.) occurs in quartz reefs filling shear zones in syntectonic granites, gneiss and dolerite. The reefs are typically narrow (less than one metre) but high grade (up to 15 grams/tonne). Pyrite, minor chalcopyrite and variable argillitic/chloritic and sericitic alteration and magnetite development can accompany the mineralisation, while copper, lead and zinc geochemistry is elevated in and near mineralised zones. An example of syntectonic granite taken from one of the Glenloth shaft dumps (TS 57935) was noticeably magnetitic. Dolerites are often proximal to mineralisation, while GRV acid dykes are seen (often as float) in the area.

Gold mineralisation at Earea Dam (58 kg) occurs in quartz veins in foliated granitic rocks and appears to be closely associated with dolerite intrusions. Minor gold mineralisation at Company Well (E.L. 966) occurs with shearing/felspathisation of Mulgathing Complex? rocks; there is a GRV rhyolite dyke adjacent.

Several hundred kilograms of tin concentrate have probably been won from South Lake, 3 km south of Earea Dam. The tin occurs in quartz greisen veins in a garnet-bearing quartzo-felspathic gneiss on the southern edge of the lake. No production figures are available for a greisen zone in foliated granite at Mt. Mitchell (Glenloth). Recent work by Santos has indicated low and patchy values.

There are low grade tin greisens in post-tectonic granite at Warna Rockhole (north of E.L. 1017) and at Kokatha (south-east). Minor polymetallic mineralisation at Pinding Rocks and Kenella Rocks was mentioned under "Previous Exploration".

PROPERTY GEOLOGY.

The locations of all known precambrian outcrops (about 1 to 2%) in the licence and their tentative stratigraphic position are shown on plan W 2824. A summary of the lithological, geophysical and mineralisation characteristics is listed below:-

Mulgathing Complex. (Late Archean to early proterozoic.)
The quartz-magnetite-pyroxene-amphibole (BIF) and quartzofelspathic lithologies in the Kenella rocks area are considered part of the Mulgathing Complex. Age dating of quartzofelspathic gneisses nearby provided a figure of 2488 ± 130 MA (Daly, Webb, Whitehead 1977). Metamorphosed basic volcanics at Hopeful Hill, Deception Hill and Little Mt. Finke and granitoids in percussion holes north of Mt. Finke, are possibly the same age.

Interpretation of the SADME detailed aeromagnetic data by C.G. Anderson (Appendix 2) suggests the Kenella Rock's BIFs and Hopeful Hill volcanics (plus a small BIF outcrop) to be part of the same W.S.W. - E.N.E. zone trending through the eastern part of the licence. Measured magnetic susceptibilities of the Hopeful Hill volcanics are 400-2000 ($\times 10^{-5}$ S.I.); the BIF here is 2500.

A calcic-plagioclase, K-felspar, pyroxene, garnet, magnetite rock (T.S. 56512) near the centre of magnetic Anomaly 7, may represent a metamorphosed calcareous pelitic rock of the Mulgathing Complex. A sample of the small outcrop area of this rock contained 3.15% barium, it has a magnetic susceptibility of 9000-12500.

A possible metamorphosed and weathered impure chert (T.S. 56754) at 416500E, 590500N, north of Mt. Finke, may also be a Mulgathing Complex rock. It can be anomalous in barium (6450 ppm) and lead (140 ppm).

Hutchison Group (Lower Proterozoic)

BIF, graphitic schist and chert, micaceous schist and phyllite and rare quartzite and sandstone outcropping in the salt lake system east of Mt. Finke have been mapped by SADME (Daly 1975) as Mulgathing Complex rocks but are probable Hutchison Group equivalents. This is suggested by the typically finely laminated nature of the BIF and a layered chert, part of which has the appearance of being ex-carbonate, and the schist/phyllite association compared with the gneissic nature of the BIF and associated rocks in the Kenella Rocks area. Relevant T.S. descriptions are 56752, 56753, 57937 and 57939.

Fractured and rusty, cherty BIF (sample 56757) from the lakes area contained anomalous arsenic (145 ppm) with above-background zinc (150 ppm). Another chert sample (56505) carried 110 ppm copper.

The meta-chert at 416500E, 590500N and possibly the calc silicate at magnetic Anomaly 7 may be Hutchison GP (or even Tarcoola Beds?), rather than Archean/Lower Proterozoic.

Syntectonic Granite (Lower Proterozoic?)

Weakly foliated, variably metamorphosed, possible syntectonic granites and equivalents have been mapped by previous workers at the Glenloth gold mining area, S.E. of the licence (TS: 57935) and S.S.E. of Mt. Finke, (34317, 19). Amoco has located similar rocks south of the magnetic Anomaly 1 Centre (56715), 2.5 kilometres north of Anomaly 2, and near Anomaly 7.

The outcrops at Glenloth and the Amoco magnetic anomalies are parts of large areas of syntectonic granite inferred by Anderson's geophysical interpretation (Ref. plan W 2597). While a spatial association with gold mineralisation (Glenloth) is demonstrated, the role such granite may have played in the genesis of the mineralisation is not clear. The age(s) of the granite(s) is uncertain.

Gawler Range Volcanics. (Middle Proterozoic).

No GRV outcrop in the licence area but silicified porphyritic trachyte of presumed GRV affiliation was found in Afmeco hole TLM 17, and Rhyolite reported from hole TLM 11, in the north eastern part of the licence; the hole locations are shown on Plan 2824. The volcanics are typically fresh and unaltered. Anderson's geophysical interpretation (plan W 2586) shows a large area of GRV beneath alluvium to the south and south east of Afmeco's drilling.

Tarcoola Beds. (Middle proterozoic)

At Mt. Finke, on the western border of the licence, heavy mineral (martite) banded, cross bedded felspathic sandstone/quartzite is overlain by a thick sequence of grey green sandstone/quartzite. These moderately steeply dipping rocks, folded into a SW plunging syncline, are considered part of the Tarcoola Beds. Some of the heavy mineral banded rocks contain up to 22.5% iron and can be slightly

anomalous in barium (to 3150 ppm) and tin (14 ppm). The base of the sequence is not seen.

Generally flat dipping isolated siltstone/sandstone outcrops around the lakes east of Mt. Finke are also grouped with the Tarcoola Beds. TS 34316 from this area is a siltstone/sandstone breccia which contains 50 ppm arsenic and 8 ppm tin. South of Malbooma, Tarcoola Bed's interbedded quartzites, sandstones and siltstones are overlain by strongly cross-bedded felspathic sandstone; dips here are typically gentle (30^{o}). There is evidence (felspathisation) of granitic intrusion.

As previously mentioned, the barium-anomalous meta-chert at 416500E 5900500N, may well belong to the Tarcoola Beds.

Post-Tectonic Granite (Middle Proterozoic)

Inferred post-tectonic (Hiltaba) granites and equivalents in the licence area are typically pink to red, medium to coarse grained and with a variable biotite content. There are a number of scattered outcrops of these rocks and Anderson considers them to underline much of the eastern part of the licence. Many possible outcrops east of the Mt. Finke Lakes, marked on the Malbooma published 1:100 000 scale geological map, could not be located by ground reconnaissance. There are very large exposures in the Malbooma area and scattered outcrops for some distance south.

No clearly post-tectonic granites from E.L. 1017 were thin sectioned, but examples from nearby Warna rockhole and Kokatha were examined (TS 57936, 57938) and described as medium to coarse-grained, with 55-65% alkali felspar, 20-30% quartz and 10% plagioclase. The Kokatha example had 5% each of chloritized biotite and hornblende and 2% fluorite while the other had 5% biotite (partly chloritized) and trace fluorite. They are clearly late stage granites.

Some of the outcrops from the large area of inferred post-tectonic granite in the eastern half of E.L. 1017 are similar in appearance to these granites; others vary in grain size and biotite content. Some were anomalous in tin/tungsten:

> 56508, a porphyritic biotite granite from north of magnetic Anomaly 7: 20 ppm tungsten.
>
> 56516, a medium grained granite with abundant K-Felspar and some biotite: 10 ppm tin, 25 ppm tungsten.
>
> 5651M, similar to above, from Bulpara Hill area: 14 ppm tin and 15 ppm tungsten.
>
> 56521, granite with slightly elevated magnetite content (magnetic susceptibility 200 x 10^{-5} SI Vs 0-50 for others in area): 75 ppm tin with 65 ppm copper (copper background is less than 20).

Other Intrusives

A dioritic intrusive of uncertain age, outcrops to the northeast of magnetic Anomaly 8. Basic to intermediate intrusives are proximal to gold mineralization at Glenloth and Tarcoola. The Tarcoola intrusive is clearly late Middle Proterozoic but the age of the Glenloth (dolerite) dykes is uncertain. Acid dykes near gold mineralization at Company Well, (EL 966), and mineralized (copper, lead, silver, bismuth, tungsten) quartz-limonite veins at Pinding Rocks, north of EL 1017, are probable GRV affiliates.

Structure

Given the extremely poor outcrop and lack of detailed aeromagnetic data for most of the licence, little can be stated about the structural features of the licence area other than that the major fold direction is east-west. There has obviously been a number of fold events (ref. TS 57939) affecting the older rocks of the area and the folding is tighter. Folding of the Tarcoola Beds is typically gentle and open.

A number of major structural breaks can be inferred from the SADME detailed aeromagnetic data for the eastern portion of the licence. The exact nature and significance of these is uncertain. Likewise, a number of Landsat and air photograph lineaments that traverse the area have an unknown significance.

EXPENDITURE

Expenditure to date on the licence has been $24,122.23. An expenditure statement is attached (Appendix 1).

FUTURE WORK

The Exploration Programme for the immediate future has yet to be framed. It will be managed by CRA Exploration under a joint-venture arrangement. This agreement is at the second draft stage and, when finalised, will be lodged with SADME for ratification before siging by Amoco and CRA.

G Kary,
Geologist

p.p. Graham Miller

G C Miller,
Senior Geologist

24th May, 1983.

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SANTOS staff , 1981-1982. Various reports on Exploration Licence 752, Mount Mitchell.

APPENDIX 1.

EXPENDITURE STATEMENT

AMOCO MINERALS AUSTRALIA COMPANY

EXPENDITURE FOR THE PERIOD APRIL 30, 1982 TO APRIL 30, 1983

EXPLORATION LICENCE NO.1017

Salaries and Wages	6,080.01
Supplies	90.23
Supplies - maps	155.40
Cookery	388.01
Field Office Rent	1,365.00
Field Supplies	951.25
Freight	9.65
Aircraft Charter	-
Travel	581.35
Communications	502.16
Geophysics	2,297.08
Consultants/Contractors	1,208.80
Drilling	-
Assays	1,746.98
Legal Fees	-
Equipment Rental	386.00
Equipment Operation & Maintenance	819.84
Property Payments	2,960.00
Outside Services	-
	19,541.76
Overhead	4,580.47
	$24,122.23

T.J. CONQUEST
ACCOUNTANT
150

APPENDIX 2.

INTERPRETATION OF AEROMAGNETIC DATA, BY C.G. ANDERSON

INTERPRETATION OF DETAILED AEROMAGNETIC DATA FROM THE SADME "KOKATHA" SURVEY, IN THE "HEARTBREAK HILL" AREA, S.A.

FOR AMOCO MINERALS

AUSTRALIA COMPANY.

BY C. G. ANDERSON

SEPTEMBER 1982.

1. Introduction.

At the request of Amoco Australia Minerals Company an interpretation of detailed aeromagnetic data has been undertaken for a portion of the "Heartbreak Hill" licence area (E.L. 1017) in central South Australia. Approximately sixty percent of the eastern licence area lies within the area of the "Kokatha" detailed aeromagnetic survey flown for the SADME in 1978/79 by Austral Airsurveys Ltd.

The licence area occurs in the south-eastern portion of the Tarcoola 1:250 000 sheet, near the north-eastern edge of the Gawler Craton. Regional geology consists of Archaean/Lower Proterozoic meta-sediments and volcanics, extensively intruded and overlain by granite plutons and (predominantly) acid volcanics associated with the mid-Proterozoic Kimban Orogeny. Economic interest in the region has been largely restricted to minor gold workings in the Glenloth and Tarcoola areas, but the presence of small surface accumulations of tin near "Kenella Rocks" raises the potential for economic tin deposits associated with the granite intrusions. Consequently, the primary objective for the nagnetic interpretation was delineation of the magnetic expression and boundaries of granites within the area. Since outcrop within the licence occupies less than five percent of the total area, any additional lithology associations apparent in the magnetic data have also been outlined to assist in subsequent exploration of the area.

2. Data Specifications.

The eastern part of Amoco's licence area is covered by the "Kokatha" aeromagnetic survey. The survey was flown on an overlapping grid system of flight lines with 400 meter flight line spacing for N-S lines and 1000 metre spacing for E-W lines. Survey altitude was 90 metres AGL. Considerable difficulties were experienced by the contractor during both acquisition and processing, due partly to navigation difficulties in the relatively featureless terrain and the resulting errors in location recovery. Magnetic relief in the area, while not large in absolute magnitude, is relatively erratic and the location difficulties led to errors in levelling of the magnetic data on the "grid" system of tie lines. Hand-contoured data were accepted and published, at 1:50 000 scale, by the SADME in 1981, and in general terms the data appear to be reasonably reliable. Some initial ground recovery of magnetic features, conducted by Amoco staff, confirmed the accuracy of the data location.

In addition to magnetic contours, regional gravity data re-contoured at 1:50 000 scale were supplied for the interpretation. Within the licence area, regional gravity stations have been established on a seven by seven kilometre grid. Details of outcrop geology within the licence and surrounding areas are available at 1:100 000 scale (Malbooma and Tarcoola sheets). Finally, coloured copies of the aeromagnetic data at 1:250 000 scale were acquired for comparison with regional geological mapping.

3. Regional Geology and established Magnetic associations.

The licence area occurs near the north eastern margin of the Gawler Craton, within the "Wilgena Sub-Domain" of Thomson (1980). Magnetic expressions of major lithologies within the region have been partly established from detailed surveys within areas of outcrop.

3.1 Archaean

Within the Tarcoola area, Archaean-age rocks of the "Mulgathing Complex" (Thomson, 1980) include strongly magnetic BIF, meta-sediments and basic volcanics/intrusives, in addition to areas of the "Glenloth Granite". From areas of outcrop within the area of the "Kokatha" survey, it is apparent that areas of meta sediments are characterised by relatively continuous, linear anomalies of moderate amplitude, frequently including larger amplitude anomalies due to BIFs. The major outcrop of Glenloth Granite, near the north western corner of the Gairdner sheet, is also covered by the "Kokatha" survey and is apparent as a well-defined area of low-amplitude, irregular magnetic relief, with some more linear features probably related to basic intrusives.

3.2 Lower Proterozoic.

Lower Proterozoic metasediments of the Hutchison Group and overlying Lincoln Complex are well-developed in the southern area of the Craton, and BIF of probably Hutchison Group age is recorded east and northeast of Tarcoola township, (Daly et al 1978). These units have not been recognised in the vicinity of the licence area however, and although the magnetic expression of these lithologies is highly variable, the magnetic data do at least suggest that no major development of Lower Proterozoic BIF occurs within the area.

3.3 Mid-Proterozoic

The Mid-Proterozoic period was dominated by complex igneous and volcanic activity with the intrusion of two major granite phases (Hiltabe Granite) and extrusion of the Gawler Range Volcanics and associated volcanoclastic sediments. On a regional scale, these units are essentially non-magnetic, with the exception of some basic lavas and intrusives within the volcanics. The Hiltaba Granite is extensive in sub-crop within the licence area, and is apparent as an area of low magnetic relief, although granite margins are not well-defined in the magnetic data. Thomson (1980) indicates 'synorogenic' and 'late' phases to the granite intrusion and these may have signifcant magnetic distinctions (below).

4. Discussion of Results.

The interpreted distribution of major lithologies within the licence and surrounding areas is shown in Plan W 2596 at 1:100 000 scale. Magnetic relief within the area is complex and magnetic differences between some lithologies (e.g. acid GRVs and non-magnetic granite) will not necessarily be resolved. Main features of the inferred structure and lithology distributions are as follows.

4.1 Structure

Two dominant structural trends are inferred within the licence area and remaining portions of the Kokatha survey. Firstly, Archaean metasediments, including BIF, are interpreted in E-N-E trending structures immediately north of the licence area and also through the Kenella Well - Hopeful Hill area. Major dislocations of magnetic features are indicated across north-westerly trending structures, particularly the interpreted faults F1 and F2 (Plan W 2596), which coincide with major changes in magnetic character in the survey area south of the licence.

4.2 Glenloth Granite Distribution

Two areas of probable Glenloth Granite equivalents have been interpreted within the licence - a large, relatively complex area east of Deception Hill and a smaller area, east of Black Camp Hill. Magnetic relief in both areas is comparable with that observed in the area of outcropping Glenloth Granite on the Gairdner sheet. These two areas are bound by relatively steep, linearly extensive magnetic gradients, indicative of 'granite' margins continuing to considerable depth. Within the area defined by these gradients, magnetic relief is moderate, with several larger amplitude equidimensional anomalies inferred within the granite. These may be due to rafts of magnetic metasediments, magnetite segregations etc. or possibly basic plugs within the pluton.

Comparison with regional gravity data (Plan W 2596) indicates that major gravity lows are generally associated with the interpreted occurrences of the Glenloth Granite.

4.3 Archaean Metasediments

Magnetic expression within the two E-N-E trending structures outlined above is characteristic of Archaean metasediments in the region. Narrow linear anomalies of up to 2000 nTs magnitude are attributed to BIFs, and lower amplitude linear features in these zones are consistent with metasediments and basic volcanics/intrusives. In the southern areas of inferred metasediments (Plan W 2596), magnetic relief is generally comparable, but individual anomalies are often areally broader. This may be due to lithology variations (e.g. Lower Proterozoic Lincoln Complex metasediments in the south?) or changes in structure for the Archaean sequence.

Several larger amplitude, equidimensional anomalies within areas of inferred metasediments may be due to more complex structure within magnetic horizons or possibly basic intrusive activity. Ultra-basic intrusives/extrusives have been recorded from areas of comparable magnetic relief in the Mulgathing area (Warne 1969).

4.4 Mid Proterozoic (Hiltaba) Granite

Regional mapping and the extent of outcrop within the licence area indicate that the Hiltaba Granite is a dominant lithology in the area. This is confirmed by the large areas of low magnetic relief within the central part of the licence, but it is apparent that the granite is magnetically "inhomogeneous". Several areas of slightly higher than average relief, bounded by reasonably persistent gradients, are apparent in the magnetic data and have been delineated as "moderately magnetic Hiltaba Granite" in Plan W 2596. These areas are not as well defined as the inferred Glenloth Granite boundaries, particularly in the area around Heartbreak Trig point where surrounding magnetic relief is more complex, but the distinction between granite 'types' is reasonably clear in the magnetic data. While there is insufficient mapping to determine if the magnetic distinction has been recognised in the field, Thomson (1980) records granite outcrops in the vicinity of Bulpara Hill as older 'synorogenic' granites, suggesting that the low magnetic relief areas may represent this phase of intrusion.

Regional gravity data show little association with the distribution of either of these granite 'types'.

4.5 Gawler Range Volcanics (?).

A large area of low amplitude, irregular relief in the eastern part of the survey area has been designated as probable Gawler Range V olcanics. The magnetic expression is typical of flat-lying volcanics, although the level of relief is somewhat greater than 'normally' observed over GRVs.

5. Conclusions.

Given that the lack of outcrop in the licence area makes recognition of definite magnetic associations difficult, the following conclusions appear to be valid:

i) The two areas of indicated "Glenloth Granite" have the more classical indications of deep-seated granite plutons - i.e. distinct magnetic gradients defining margins and strong negative gravity association.

ii) A narrow zone of folded metasediments, including BIF and possibly basic/ultra-basics is indicated within the licence area in the Kenella Well - Hopeful Hill area.

iii) Magnetic expression of the Hiltaba Granite is variable, with two possible granite 'types' indicated. Magnetic expression appears to change across N-W trending fault structures F1 and F2.

iv) Flat-lying, magnetic flows within the Gawler Range Volcanics are indicated in the north-eastern portion of the licence.

v) An area of lower magnetic relief, indicative of Hiltaba Granite, is apparent in the area of old tin workings near Kenella Well.

vi) The Glenloth Gold Field coincides with the major occurrence of magnetic "Glenloth Granite".

6. Recommendations.

Several anomalies within the western part of the survey (Anomalies 1-6 - Plan W 2596) have been designated for ground recovery by Amoco. Anomalies 1 to 5 lie within the area of interpreted Glenloth Granite and follow-up with geochemical sampling and/or shallow percussion drilling in these areas should be considered. In addition, Anomalies 7 and 8 (Plan W 2596) should be followed up to investigate the interpreted granite bodies in each case. Anomaly '8' is relatively unusual for an area of 'Hiltaba' Granite and consequently may be slightly higher in priority if the Hiltaba Granite is considered as prospective.

The prospects for base metal deposits within the metasediments in the area should not be over-looked. The area of complex structure within BIF, west of Hopeful Hill, may be prospective for volcanogenic deposits, comparable with South African deposits at Aggeneys (Campbell and Mason 1979) and also Broken Hill-style mineralisation.

C.G. ANDERSON.

References:

Campbell, G. and Mason, R. 1979 "The Application of Airborne and Ground Geophysical Techniques to the search for Magnetite - Quartzite associated base metal deposits in Southern Africa" in "Geophysics and Geochemistry in the search for Metallic Ores" Can. Geol. Surv. Report 31.

Thomson, B.P. (Compier) 1980 Geological Map of South Australia, 1:1 000 000 SADME.

Warne, S.B. 1969 Kennecott Exploration Aust. Pty. Ltd. and Otter Exploration N.L. SML's 261, 333, 491, 638, 643, 644 Tarcoola. SADME.

APPENDIX 3A.

ROCK CHIP GEOCHEMICAL ANALYSES.

COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB COM820919 O/N : 17214

0 32

Results in ppm

SAMPLE	Cu	Pb	Zn	Ni	Co	Cd
56755	10	<4	6	<4	<4	<1
56756	8	4	4	<4	<4	<1
56757	40	50	150	80	16	<1
56758	16	18	20	4	6	<1

.../2

COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB COM820919 O/N : 17214

0 33

Results in ppm

SAMPLE	%Fe	Mn	Cr	Ag	Au	Hg	As
56755	0.60	16	44	<1	<0.05	<0.05	16
56756	6.30	14	4	<1	<0.05	<0.05	50
56757	29.0	360	110	<1	<0.05	<0.05	145
56758	3.70	70	65	<1	<0.05	<0.05	28

COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB COM820919 O/N : 17214

0 34

Results in ppm

SAMPLE	Ba	Bi	Mo	Sn	Ta	U	W
56755	45	<4	<4	<4	<10	<4	<10
56756	80	<4	<4	8	<10	4	<10
56757	220	<4	<4	<4	<10	<4	10
56758	105	<4	<4	<4	<10	<4	<10

Method of Analysis :		
As Ba Bi Mo Sn Ta U W	:	XRF1
Cu Pb Zn Ni Co Cd	:	AAS1
Fe Mn Cr	:	AAS2/2A
Ag	:	AAS3
Au	:	AAS5A
Hg	:	AAS7

AMOCO MINERALS AUSTRALIA COMPANY

W 56755

0 35

SAMPLER	DATE	TECHNICAL CONTRACTOR
G.K	26/04/82	Assay

AREA		ROCK TYPE Slate ?? (P)	SAMPLE TYPE
PROJECT Mt Finke Recon			SOIL/SILT
SAMPLE LOCATION North side salt lakes near B.T.F.			ROCK OUTCROP ✓
			IRONSTONE CAP
		COLOUR	TRENCH
		TEXTURE	AUGER (R.A.B.)
REMARKS Petrology Sample		HARDNESS	PERCUSSION
		SPECIFIC GRAVITY	D. D. H. CORE
ALTERATION 56753 IS Identical		MINERALIZATION	RESULTS

JAS R GEE PRINTERS

W 5675

AMOCO MINERA
AUSTRALIA COM
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 56756

SAMPLER	DATE	TECHNICAL CONTRACTOR
G.K.	24/04/82	Assay

AREA		ROCK TYPE Siltstone (P)	SAMPLE TYPE
PROJECT Mt Finke Recon			SOIL/SILT
SAMPLE LOCATION 2 KM south of salt lakes west of road			ROCK OUTCROP ✓
			IRONSTONE CAP
		COLOUR	TRENCH
		TEXTURE	AUGER (R.A.B.)
REMARKS		HARDNESS	PERCUSSION
		SPECIFIC GRAVITY	D. D. H. CORE
ALTERATION		MINERALIZATION	RESULTS

JAS R GEE PRINTERS

W 5675

AMOCO MINERA
AUSTRALIA C
5 MILL STREET, P

AMOCO MINERALS AUSTRALIA COMPANY

W 56758

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	26/04/82	Assay		
AREA		ROCK TYPE Chert? - Qtz - hyall. fractured & rusty	SOIL/SILT	
PROJECT Mt Finke Recom			ROCK OUTCROP	✓
SAMPLE LOCATION B.I.F north edge of salt lakes			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS Simulorite 56752		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

0 36

W 56758

AMOCO MINERAL AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 56757

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	26/04/82	Assay		
AREA		ROCK TYPE B.I.F	SOIL/SILT	
PROJECT Mt Finke Recom			ROCK OUTCROP	✓
SAMPLE LOCATION B.I.F (1400,5000 Nat) north edge of salt lakes			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

W 56757

AMOCO MINERALS AUSTRALIA COMP
5 MILL STREET, PERTH

ANALYTICAL REPORT

0 37

JOB COM822445 O/N : W 17707

Results in ppm

SAMPLE	Cu	Pb	Zn	Ni	Co	Bi	Au
56572	6	46	6	<4	<4	<4	<0.05
56573	6	55	<2	<4	<4	<4	<0.05
56574	10	50	<2	<4	<4	<4	<0.05
56575	12	80	6	<4	<4	<4	<0.05
56576	220	34	40	110	22	<4	<0.05
56577	310	320	360	800	200	<4	<0.05
56578	24	6	8	12	<4	<4	<0.05
56579	95	40	80	140	24	<4	<0.05
56580	18	14	4	10	<4	<4	<0.05
56581	46	32	65	18	16	<4	<0.05
56582	26	70	55	22	12	<4	<0.05
56583	70	20	90	85	36	<4	<0.05
56584	65	28	85	90	42	<4	<0.05
56585	60	34	42	46	10	<4	<0.05
56586	48	28	28	28	8	<4	<0.05
56587	50	14	55	75	26	<4	0.05
56588	8	6	4	<4	<4	<4	<0.05
56589	34	22	28	18	<4	<4	<0.05
56590	22	12	20	16	<4	<4	<0.05
56591	36	16	46	16	<4	<4	<0.05
56592	12	6	12	10	8	<4	<0.05
56593	6	<4	4	<4	<4	<4	<0.05
56594	18	10	22	22	6	<4	<0.05
56595	18	4	8	12	<4	<4	<0.05
56596	8	<4	<2	<4	<4	<4	<0.05

ANALYTICAL REPORT

0 38

JOB COM822445 O/N : W 17707

Results in ppm

SAMPLE	Cu	Pb	Zn	Ni	Co	Bi	Au
56597	28	6	46	20	20	<4	<0.05

Method of Analysis : Cu Pb Zn Ni Co Bi : AAS1
Au : AAS5a

COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

ANALYTICAL REPORT

0 39

JOB COM822445 O/N : W 17707

Results in ppm

SAMPLE	Ba	Sn	Mo	W	%Fe	Mn	Cr
56572	730	6	<4	<10	0.30	30	36
56573	1550	<4	<4	<10	0.26	20	40
56574	3500	<4	<4	<10	0.27	24	48
56575	4150	<4	<4	<10	0.24	28	36
56576	30	4	<4	<10	6.65	200	180
56577	60	<4	10	<10	24.0	1200	1500
56578	35	<4	<4	<10	1.25	120	100
56579	270	<4	<4	<10	27.0	1000	180
56580	440	<4	<4	<10	5.15	95	55
56581	150	<4	<4	<10	6.85	200	180
56582	100	<4	<4	<10	6.10	210	80
56583	50	<4	<4	10	19.0	390	150
56584	260	<4	4	<10	21.0	560	200
56585	175	<4	<4	<10	19.0	300	110
56586	200	<4	4	<10	19.0	340	130
56587	230	8	<4	10	26.0	730	150
56588	20	<4	<4	<10	1.20	30	75
56589	60	8	<4	<10	10.0	150	170
56590	190	<4	<4	10	8.20	42	90
56591	15	<4	<4	<10	14.0	190	90
56592	15	<4	<4	<10	3.70	60	46
56593	10	<4	<4	<10	0.50	46	50
56594	150	<4	<4	<10	8.20	140	30
56595	50	<4	<4	<10	5.30	85	55
56596	130	<4	<4	<10	0.54	22	36

ANALYTICAL REPORT

0 40

JOB COM822445 O/N : W 17707

Results in ppm

SAMPLE	Ba	Sn	Mo	W	%Fe	Mn	Cr
56597	780	<4	<4	<10	6.10	310	16

Method of Analysis : Ba Sn Mo W : XRF1
Fe Mn Cr : AAS2/2A

AMOCO MINERALS AUSTRALIA COMPANY

Sheet 1 of 1 Date 30/11/82

Sample Data Sheet

Order N° 17707 Code 01 02 03 04 05

E.L. 1017

Project A80-88 Area Heartbreak Hill Sample Type Rock Sampled by DG & L

Sample N°	LOCATION – – Hole N° & Interval or Grid Ref	Sample Length	ASSAYED FOR Ni	Cu	Zn	Pb	Ag	Au					Remarks
56572	150mN OF SOIL LINE AT 100mW		-	CRUSH, THEN PULVERIZE									DIRTY CHERT
573	050mN 100mW			TO -100 MESH									WEST OF HAUNES N MT FINKE
574	000mN 100mW												"
575	050mS 100mW			ASSAY			ALL		SAMPLES				"
576	ROCK SAMPLE LINE SALT LAKES EAST OF MT. FINKE 0+00			FOR									ROCK SAMPLE LINE CHERT
577	0+25 E												Fe LATERITE
578	0+50 E		-	Cu, Pb, Zn, Ni, Co, Bi									MICACEOUS GREEN SCHIST TO PHYLLITE
579	0+75 E			By AAS 1									"
580	1+00 E												"
581	1+25 E		-	Cr, Mn by AAS 2									B.I.F
582	1+50 E		-	Fe by AAS 2A									"
583	1+75 E												"
584	2+00 E		-	Ba, Sn, W, Mo by									AS 56578
585	2+25 E			XRF 1									"
586	2+50 E												"
587	2+75 E		-	Au by AAS 5A									Fe RICH SST
588	3+00 E												"
589	3+25 E												AS 56578
590	3+50 E												"
591	3+75 E												ISOLATED QTZ POOLS IN LAKE BED
592	4+00 E												"
593	4+25 E												"
594	SHALE POINT JUST S.W. OF ABOVE												over 25m strike SHALE
595	"												~25m N.E BIF
596	SOUTHERN LARGE OUTCROP OF DIRTY CHERT ~2kms W 56572												AS IN (56572) DIRTY CHERT
56597	~300m E 300mN ON YERDA GRID												DIORITE TO BASALT

COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

ANALYTICAL REPORT

0 42

JOB COM822005 O/N : W 17668

Results in ppm

SAMPLE	Cu	Pb	Zn	Ni	Co	Bi	Au
56508	12	22	26	<4	<4	<4	<0.05
56509	6	10	40	<4	<4	<4	<0.05
56510	26	6	36	30	10	<4	<0.05
56511	2	6	10	<4	<4	<4	<0.05
56512	10	18	20	34	<4	<4	<0.05
56513B	18	10	46	20	<4	<4	<0.05
56514B	6	8	24	8	<4	<4	<0.05
56515	18	10	65	46	<4	<4	<0.05
56516	16	26	14	<4	<4	<4	<0.05
56517	12	18	14	<4	<4	<4	<0.05
56518	6	24	14	<4	<4	<4	<0.05
56519	4	20	32	<4	<4	<4	<0.05
56520	8	70	14	<4	<4	<4	<0.05
56521	65	24	28	<4	<4	<4	<0.05
56522	4	20	12	<4	<4	<4	<0.05
56523B	6	6	26	14	<4	<4	<0.05
56524	4	6	20	<4	<4	<4	<0.05
56525B	12	8	32	16	<4	<4	<0.05
56526B	8	6	30	12	<4	<4	<0.05
56527B	10	8	42	24	<4	<4	<0.05
56528B	6	6	30	14	<4	<4	<0.05
56529B	8	10	36	20	<4	<4	<0.05
56530B	8	10	34	14	<4	<4	<0.05
56531	4	6	14	<4	<4	<4	<0.05

Method of Analysis : Cu Pb Zn Ni Co Bi : AA81
Au : AA85A

ANALYTICAL REPORT

0 45

JOB COM822005 O/N : W 17668

Results in ppm

SAMPLE	Ba	Sn	W	Mo	%Fe	Mn	Cr
56508	290	<4	20	<4	0.95	160	26
56509	610	6	10	<4	1.50	150	34
56510	160	6	10	<4	3.20	320	40
56511	1150	6	<10	<4	0.55	40	42
56512	3.15%	<4	<10	<4	3.30	295	24
56513B	115	<4	<10	<4	1.60	190	40
56514B	350	<4	<10	<4	0.95	80	42
56515	340	14	<10	<4	32.0	450	40
56516	25	10	25	<4	0.70	110	70
56517	40	14	15	<4	0.75	150	48
56518	40	8	10	<4	0.65	80	44
56519	600	10	<10	<4	1.40	220	36
56520	75	6	10	<4	0.65	110	60
56521	200	75	<10	<4	1.10	160	60
56522	35	8	<10	<4	0.65	130	42
56523B	145	4	<10	<4	1.30	100	36
56524	920	6	<10	<4	0.50	55	26
56525B	250	<4	<10	<4	1.40	130	60
56526B	200	4	<10	<4	1.60	140	65
56527B	220	4	<10	<4	1.70	120	42
56528B	230	<4	10	<4	1.35	130	46
56529B	200	6	<10	<4	1.50	160	50
56530B	220	<4	<10	<4	1.55	160	30
56531	1600	<4	<10	<4	0.45	34	40

Method of Analysis : Ba Sn W Mo : XRFI
Fe Mn Cr : AAS2/2A

AMOCO MINERALS AUSTRALIA COMPANY

Sample Data Sheet

Order N° 17668 Code COMLABS 01 02 03 04 05

Project A80-88 Area E.L. 1017 Sample Type ROCK / SILT Sampled by G.K / AH.

Sample N°	LOCATION – – Hole N° & Interval or Grid Ref	Sample Length	ASSAYED FOR Ni	Cu	Zn	Pb	Ag	Au	Remarks
56508	N.W. OF ANOM (A)				PREP				U 44
509	NEAR ANOM (A)				SAMPLES				
510	"				# 56508 → 56512,				
511	"				# 56515 → 56522, 56524,				
512	"				# 56581				MAY BE CAUSE ANOM (A) QC
56513(B)	SEE TARCOOLA 1:100,000 SHEET				CRUSH THEN PULVERIZE				SILT
514(B)	"				TO – 100 MESH				SILT
515	3.5 KM WEST OF HOPEFUL HILL								B.I.F.
516	AIR PHOTO # 198 SUY 2427				SAMPLES				
517	"				56513(B), 56514(B), 56523(B)				
518	"				56525(B) → 56530(B)				
519	"								
520	"				PULVERIZE TO – 100 MESH				
521	"								
522	"				ASSAY ALL SAMPLES				
523(B)	AIR PHOTO # 198 SUY 2427				FOR				SILT
524	"				– Cu, Pb, Zn, Ni, Co, Bi				
525(B)	AIR PHOTO # 082 SUY # 2031				By AAS 1				SILT ↓ CHILDARA
526(B)	"								"
527(B)	"				– Cr, Mn by AAS 2				"
528(B)	"								"
529(B)	"				– Fe by AAS 2A				" SIMPLE
530(B)	"								"
56531	"				– Ba, Sn, W, Mo by XRF 1				ROCK ↑
					– Au by AAS 5A				

AMOCO MINERALS AUSTRALIA COMPANY

W 56508

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	28/09/82			
AREA Heathcock Hill		ROCK TYPE Granite - large feldspar phenocrysts - dark ferromagnesian crystals	SOIL/SILT	
PROJECT A 80-88			ROCK OUTCROP	
SAMPLE LOCATION ~1.7 KM N.W. on anom (A) 7 ~9.4 KM S.S.W of Wilgena H.S.			IRONSTONE CAP	
		COLOUR - Isle + 56501	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS Eyh?? on 100'000 map "Jarcoola"		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

0 45

W 56508

AMOCO MINERAL AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 56509

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	28/09/82			
AREA H. Hill		ROCK TYPE Granite - poorly to non-foliated	SOIL/SILT	
PROJECT A 80 88			ROCK OUTCROP	✓
SAMPLE LOCATION - near anom A 7 ~1.2 KM S.E. of 56508			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS sure -5 750-1250 x 10		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

W 56509

AMOCO MINERALS AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W .56511

0 46

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	28/09/82			
AREA H. Hill		ROCK TYPE Granite - pink med grained - associated with # 56510	SOIL/SILT	
PROJECT A80-88			ROCK OUTCROP	✓
SAMPLE LOCATION as 56510			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS B GEE PRINTERS

W 56511

AMOCO MINERALS AUSTRALIA COMPA
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W .56510

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	28/09/82			
AREA H. Hill		ROCK TYPE Amphibolite - poorly foliated - may be ex-dacite dykes	SOIL/SILT	
PROJECT A80-88			~~ROCK OUTCROP~~ FLOAT	✓
SAMPLE LOCATION as 56509			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS susc ~ 350 X10⁻⁵		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	

W 56510

AMOCO MINERALS AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W .56512

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	28/09/82			
AREA H.Hill		ROCK TYPE Calc - silicate - very siliceous, minor diopside & garnet - several areas with large ~1 cm magnetite crystals	SOIL/SILT	
PROJECT A80-88			ROCK OUTCROP	✓
SAMPLE LOCATION As on # 56509 etc.			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	

AMOCO MINERALS AUSTRALIA COMPANY

W 56515

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	28/09/82		SOIL/SILT	
AREA Hopefull Hill		ROCK TYPE Banded Qtz - Magnetite rock	ROCK OUTCROP	✓
PROJECT A 80-88			IRONSTONE CAP	
SAMPLE LOCATION ~3.5 KM west of Hopefull Hill		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS Mag susc 25000 → 55000 x10 -5 S.I.		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

0 47

W 56515

AMOCO MINERALS AUSTRALIA COMPA
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 56516

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	29/09/82		SOIL/SILT	
AREA Bulpara Hill		ROCK TYPE Granite - med grained abundant K-spar, some biotite, smoky Qtz crystals - non-foliated	ROCK OUTCROP	✓
PROJECT A-80-88 E.L. 1017			IRONSTONE CAP	
SAMPLE LOCATION See air Photo 196 Run 2427 or 100,000 Tarcoola Map.		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS marked Pgh on map - similar to 56511		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

W 56516

AMOCO MINERAL
AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 56517

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	29/09/82	(P)	SOIL/SILT	
AREA Bulpara Hill		ROCK TYPE Granite as in 56516, slightly darker pink, due to greater weathering	ROCK OUTCROP	✓
PROJECT A-80-88			IRONSTONE CAP	
SAMPLE LOCATION ~50m N.E. Bulpara Hill Trig point		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS Mag susc ~0		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	

W 56517

AMOCO MINERALS AUSTRALIA COMPANY

W .56518

SAMPLER	DATE	TECHNICAL CONTRACTOR
G.K.	29/09/82	(P)

AREA	PROJECT
Bulpara Hill	A 80-88

SAMPLE LOCATION: See Air Photo 196 by 2427 or Tarcoola 1:100,000 Map

REMARKS:

ALTERATION:

ROCK TYPE: Granite - as in 56516, 56517 - mag susc ~15 x10⁻⁵ S.I. units

COLOUR:

TEXTURE:

HARDNESS:

SPECIFIC GRAVITY:

MINERALIZATION:

SAMPLE TYPE	
SOIL/SILT	
ROCK OUTCROP	✓
IRONSTONE CAP	
TRENCH	
AUGER (R.A.B.)	
PERCUSSION	
D. D. H. CORE	

RESULTS:

0 48

W 56518

AMOCO MINERAL AUSTRALIA COMI
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W .56519

SAMPLER	DATE	TECHNICAL CONTRACTOR
G.K.	29/09/82	(P)

AREA	PROJECT
Bulpara Hill	A 80-88

SAMPLE LOCATION: See Air Photo 196 by 2427 or Tarcoola 100,000 Map Sheet

REMARKS:

ROCK TYPE: Granite - large Feldspar Phenocrysts, dark Quartz Crystals

COLOUR:

TEXTURE:

HARDNESS:

SPECIFIC GRAVITY:

SAMPLE TYPE	
SOIL/SILT	
ROCK OUTCROP	✓
IRONSTONE CAP	
TRENCH	
AUGER (R.A.B.)	
PERCUSSION	
D. D. H. CORE	

W 56519

AMOCO MINERAL AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W .56520

SAMPLER	DATE	TECHNICAL CONTRACTOR
G.K.	29/09/82	(P)

AREA	PROJECT
Bulpara Hill	A80-88

SAMPLE LOCATION: See Air Photo # 196 by 2927 or Tarcoola 1:100,000 map sheet

REMARKS: Mag susc ~ 10x10⁻⁵ S.I.

ROCK TYPE: Granite - as in previous samples

COLOUR:

TEXTURE:

HARDNESS:

SPECIFIC GRAVITY:

SAMPLE TYPE	
SOIL/SILT	
ROCK OUTCROP	✓
IRONSTONE CAP	
TRENCH	
AUGER (R.A.B.)	
PERCUSSION	
D. D. H. CORE	

W 56520

AMOCO MINERALS AUSTRALIA COMPANY

W 56521

SAMPLER	DATE	TECHNICAL CONTRACTOR
G.K.	29/09/82	(P)

AREA	PROJECT	SAMPLE LOCATION	REMARKS	ALTERATION
Bulpara Hill	A80-88	See Air Photo 196 Lvy 2427		

ROCK TYPE	COLOUR	TEXTURE	HARDNESS	SPECIFIC GRAVITY	MINERALIZATION
Granite mag susc ~200x10⁻⁵ S.I.					

SAMPLE TYPE	
SOIL/SILT	
ROCK OUTCROP	✓
IRONSTONE CAP	
TRENCH	
AUGER (R.A.B.)	
PERCUSSION	
D. D. H. CORE	
RESULTS	

0 49

W 5652

AMOCO MINERAL. AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 56522

SAMPLER	DATE	TECHNICAL CONTRACTOR
G.K.	29/09/82	(P)

AREA	PROJECT	SAMPLE LOCATION	REMARKS	ALTERATION
Bulpara Hill	A80-88	See Air Photo 196 Lvy 2427 or Jarcoola 1:100,000 Map Sheet	Mag susc 5 → 20 x 10⁻⁵ S.I.	

ROCK TYPE	COLOUR	TEXTURE	HARDNESS	SPECIFIC GRAVITY	MINERALIZATION
Granite - pink - K-spar rich, minor biotite and some smoky quartz crystals					

SAMPLE TYPE	
SOIL/SILT	
ROCK OUTCROP	✓
IRONSTONE CAP	
TRENCH	
AUGER (R.A.B.)	
PERCUSSION	
D. D. H. CORE	
RESULTS	

W 56522

AMOCO MINERAL. AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 56524

SAMPLER	DATE	TECHNICAL CONTRACTOR
G.K.	30/04/82	

AREA	PROJECT	SAMPLE LOCATION	REMARKS	ALTERATION
S.E. Hopefull Hill	A80-88	See Air Photo 198/2427 or B/W #080/Lvy 2032	Mag susc 20 - 65 x 10⁻⁵ SI.	

ROCK TYPE	COLOUR	TEXTURE	HARDNESS	SPECIFIC GRAVITY	MINERALIZATION
Granite? - light colour med to crse crystalline minor pegmatic sections					

SAMPLE TYPE	
SOIL/SILT	
ROCK OUTCROP	✓
IRONSTONE CAP	
TRENCH	
AUGER (R.A.B.)	
PERCUSSION	
D. D. H. CORE	
RESULTS	

W 56524

0 50

AMOCO MINERALS AUSTRALIA COMPANY

W 56531

SAMPLER G. K.	DATE 30/9/82	TECHNICAL CONTRACTOR	SAMPLE TYPE	
AREA E.L. 1017		ROCK TYPE Granite-? med grained with minor pegmatite sections - may be an adamellite	SOIL/SILT	
PROJECT A 80-88			ROCK OUTCROP	✓
SAMPLE LOCATION Childers Heat See B/W air Photo # 082 Surv 2032			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

W 56531

AMOCO MINERAL. AUSTRALIA COMP
5 MILL STREET, PERTH

ANALYTICAL REPORT

0 51

JOB COM822229 O/P : W 17680

Results in ppm

SAMPLE	Cu	Pb	Zn	Ni	Co	Bi
57935	14	46	60	8	<4	<4
57936	LNR	LNR	LNR	LNR	LNR	LNR
57937	8	26	10	10	<4	<4
57938	LNR	LNR	LNR	LNR	LNR	LNR
57939	10	4	6	<4	<4	<4
34355	2	4	55	10	<4	<4
34356	18	420	10	8	<4	28
34357	16	14	28	26	<4	<4
34358	2	4	40	4	<4	<4
34359	32	120	36	<4	<4	200
34360	6	16	40	14	<4	<4
34361	4	90	<2	<4	<4	14
34362	6	300	8	<4	<4	<4
34363	4	10	48	<4	6	<4

Method of Analysis : Cu Pb Zn Ni Co Bi : AAS1

COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

ANALYTICAL REPORT

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JOB COM822229 O/E : W 17680

Results in ppm

SAMPLE	Ba	Sn	W	Mo	%Fe	Mn	Cr
57935	360	4	<10	4	2.05	470	46
57936	LNR	LNR	LNR	LNR	LNR	LNR	LNR
57937	10	12	15	4	26.0	140	44
57938	LNR	LNR	LNR	LNR	LNR	LNR	LNR
57939	410	<4	<10	4	4.40	24	40
34355	1400	34	<10	<4	2.20	440	12
34356	1150	240	10	6	0.85	46	26
34357	1100	20	<10	<4	0.90	230	46
34358	100	8	<10	8	1.00	680	80
34359	65	150	85	4	5.80	30	105
34360	320	8	10	8	7.10	170	80
34361	6450	<4	<10	4	0.30	30	120
34362	1250	<4	<10	4	2.10	50	85
34363	1350	<4	10	4	4.20	900	80

Method of Analysis : Ba Sn W Mo : XRFl
Fe Mn Cr : AAS2/2A

Sample Data Sheet

Order N° 17680 Code 01 02 03 04 05

Project A80-88 Area HEARTBREAK HILL KOKATHA Sample Type ROCK Sampled by G.K / G.M.

Sample N°	LOCATION – – Hole N° & Interval or Grid Ref	Sample Length	ASSAYED FOR: Ni	Cu	Zn	Pb	Ag	Au					Remarks
* 57935	GLENLOTH			PREP									QTZ-KSPAR MAGNETITE
* 57936	WARNA ROCKHOLE				CRUSH THEN								0 55 GRANITE
* 57937	B.I.F. NTH SALT LAKE				PULVERIZE TO -100 MESH								FINELY BANDED B.I.F
* 57938	KOKATHA GORGE WELL												GRANITE
* 57939	B.I.F N¼ SALT LAKE, EAST MT. FINKE			ASSAY									GREEN SILTSTONE/SLATE
57940	KO 13 1900		*	#	57935 → 57939								FLOAT
941	" 1850		*	#	34355 → 34363								OUTCROP
942	" 1925			FOR:	Cu, Pb, Zn, Ni, Co								"
943	" 1725				Ba by AAS 1								"
944	" 1800												"
945	KO.006 600				Cr, Mn by AAS 2								"
946	" 650												~~SOIL/SILT~~
947	" 690				Fe by AAS 2A								SOIL/SILT
948	" 700												FLOAT
949	" 1175				Ba, Sn, W, Mo by								"
57950	" 1225				XRF 1								"
34351	KO 017 2450				Au by AAS 5A								OUTCROP
352	" 2475												"
353	" 2500			ASSAY									"
354	" 2550				* 57940 → 57950 AND								"
* 355	N.W. AIRSTRIP KOKATHA				# 34351 → 34354								GREISEN
* 356	"		ONLY FOR										"
* 357	"				Mo, Sn, W, Ba, As by								"
* 358	"				XRF 1								GRANITE
* 359	WARNA ROCKHOLE Sn ANOM				Au by AAS 5A								GREISEN
* 360	ROAD CUT, WEST WHITE RANGE DIGS												SCHIST PYRITIC
* 361	AR NORTH OF DUNES, WEST OF ROAD TO MT FINKE												DIRTY CHERT
* 362	1.6km N² Mr. Mitchell												GRANITE
* 34363	KO 017 ~2000m												LITHIC FLOW

AMOCO MINERALS AUSTRALIA COMPANY

W 57937

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
		Pontifex + Combs		
AREA Woodcock Hill		ROCK TYPE	SOIL/SILT	
PROJECT Northern Bulk			ROCK OUTCROP	
SAMPLE LOCATION Sandy bank dust. May Sus 180			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

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AMOCO MINERALS AUSTRALIA COMPANY

W 57939

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
		PONTIFEX + COMBS		
AREA MT FINKE		ROCK TYPE SILTSTONE - SLATE GREEN WITH OXIDIZED ZONES ALONG FRACTURES	SOIL/SILT	
PROJECT A 30-88			ROCK OUTCROP	✓
SAMPLE LOCATION SILTSTONE & SLATE, GREEN TO RED COLOUR FROM B.I.F IN SALT LAKE EAST MT FINKE			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

ANALYTICAL REPORT

0 55

JOB COM821859 O/N : W 17398

Results in ppm

SAMPLE	Cu	Pb	Zn	Ni	Co	Bi	Au
57925	6	10	4	<4	<4	<4	<0.05
EL-1017 56501	6	10	38	<4	<4	<4	<0.05
56502	14	22	20	<4	<4	<4	<0.05
56503	10	14	28	<4	<4	<4	<0.05
56504	22	12	18	<4	<4	<4	<0.05
56505	110	6	6	<4	<4	<4	<0.05
56506	60	40	130	48	24	<4	<0.05
56507	4	140	6	<4	<4	<4	<0.05

Method of Analysis : Cu Pb Zn Ni Co Bi : AAS1
Au : AAS5A

COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

ANALYTICAL REPORT

0 56

JOB COM821859 O/N : W 17398

Results in ppm

SAMPLE	Ba	Sn	W	Mo	%Fe	Mn	Cr
57925	150	6	<10	<4	0.15	50	<4
56501	470	<4	<10	4	1.35	145	<4
56502	210	<4	<10	6	0.85	120	<4
56503	340	6	10	4	1.10	165	<4
56504	760	<4	<10	6	0.65	120	<4
56505	35	10	<10	<4	1.10	50	10
56506	540	<4	10	6	31.0	700	230
56507	800	6	<10	4	0.40	46	42

Method of Analysis : Ba Sn W Mo : XRF1
Fe Mn Cr : AAS2/2A

Sample Data Sheet

Order No 17398 Code COMLABS 01 02 03 04 05

Project A80-88/A81-100 Area MT. FINLEY EAST KDP 1 Sample Type Rock + 1 Core Sampled by G.K./GCM

Sample No	LOCATION – – Hole No & Interval or Grid Ref	Sample Length	ASSAYED FOR Ni	Cu	Zn	Pb	Ag	Au				Remarks
57925	(Karaie) KD 1 262.2m	15cm	PREP CRUSH, PULVERIZE TO -100 MESH									Gr 5??
56501	mt 3 mile East anom # 1		ASSAY ALL SAMPLES FOR:									Rock
56502	S^d OF BLACK CAMP HILL											"
56503	"		Cu, Pb, Zn, Ni, Co, Bi by AAS 1									"
56504	CIRCULAR FEATURE ON AIR PHOTO N^d OF DOG FENCE											" (float)
56505	N^d EDGE OF SALT LAKE NEAR B.T.F OUTCROP											"
56506	"		Mn, Cr by AAS 2									"
56507	N^d OF BIG DUNES WEST OF ROAD AB OUTCROP											"
			Fe ~~Fe, Mn~~ by AAS 2A									
			Ba, Sn, W, Mo by XRF 1									
			Au by AAS 5A									
			SLUS ON # 57925 ONLY, Ag by AAS 3A									
							A81-100 $ 19.55					
			EL. 1017				A80-88 $ 122.85					
			prep 1.75 per									
			Assay 15.80 per									
			17.55									
			$ 140.40 + $2.00 for Ag									
			CA									

W 56501

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	7/05/82 ~~19/05/82~~			
AREA A-80-88 E.L. 1017		ROCK TYPE Granite - large K-spar phenocrystic - dark grey turbid Qtz crystals	SOIL/SILT	
			ROCK OUTCROP	✓
PROJECT Anom 1			IRONSTONE CAP	
SAMPLE LOCATION ~ 500m S of centre		COLOUR	TRENCH	
		TEXTURE - very fresh	AUGER (R.A.B.)	

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AMOCO MINERALS AUSTRALIA COMPANY

W 56502

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	19/05/82			
AREA South Black Camp Hill		ROCK TYPE Granite, quite weathered, pink dark Qtz crystals	SOIL/SILT	
			ROCK OUTCROP	✓
PROJECT A80-88 E.L. 1017			IRONSTONE CAP	
SAMPLE LOCATION Eph ? south of Black camp hill		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	

W 56501

AMOCO MINERAL AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 56503

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	19/05/82			
AREA South Black Camp Hill		ROCK TYPE Xenolith in Eph Granite (56502)	SOIL/SILT	
			ROCK OUTCROP	
PROJECT A80 88 E.L. 1017			IRONSTONE CAP	
SAMPLE LOCATION		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	

W 56502

AMOCO MINERALS AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 56504

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.				
AREA Mt. Finke East		ROCK TYPE grainier granite "float"	SOIL/SILT	
			ROCK OUTCROP	
PROJECT A80 88			IRONSTONE CAP	
SAMPLE LOCATION near circular feature on air photo - north of dog fence		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	

W 56503

AMOCO MINERAL AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 56505

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	26/04/82			
AREA Mt Finke East		ROCK TYPE Chert (P)	SOIL/SILT	
PROJECT A 80 88			ROCK OUTCROP	✓
SAMPLE LOCATION N side of salt lake east of Mt Finke near B.I.F. on lake edge			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

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W 565?

AMOCO MINER/
AUSTRALIA CO
5 MILL STREET, PERT

AMOCO MINERALS AUSTRALIA COMPANY

W 56506

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K.	26/04/82			
AREA Mt Finke East		ROCK TYPE B.I.F. - highly weathered (P)	SOIL/SILT	
PROJECT A 80-88 EL 1017			ROCK OUTCROP	✓
SAMPLE LOCATION B.I.F along north edge of salt lake east of Mt Finke			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	

W 56506

AMOCO MINERAL
AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 56507

MPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
GK				
REA MT. FINKE		ROCK TYPE Chert? - lo fine Qtzite (P)	SOIL/SILT	
ROJECT A 80-88			ROCK OUTCROP	✓
AMPLE LOCATION WEST OF ROAD NORTH OF START OF BIG DUNES			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
		MINERALIZATION	RESULTS	

W 56507

AMOCO MINERALS
AUSTRALIA COMPA
... 1ST PERTH

APPENDIX 3B

SOIL AND STREAM SEDIMENT GEOCHEMICAL ANALYSES.

COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

ANALYTICAL REPORT

0 61

JOB COM830148 O/N : W 17726

Results in ppm

SAMPLE	Au
56701 B	<0.05
56702 B	<0.05
56703 B	<0.05
56704 B	<0.05
56705 B	<0.05
56706 B	<0.05
56707 B	<0.05
56708 B	<0.05
56709 B	<0.05
56710 B	<0.05
56711 B	<0.05
56712 B	<0.05
56713 B	<0.05
56714 B	<0.05
56715 B	<0.05
56716 B	<0.05
56717 B	<0.05
56718 B	<0.05
58214 B	<0.05
58215 B	<0.05
58216 B	<0.05
58217 B	<0.05
58218 B	<0.05
58219 B	<0.05
58220 B	<0.05

E.L 1017
Soil Sample Traverse over quartzite ridge at location
416500E
590500N
B = -20 +40 Mesh fraction
A = -80 mesh fraction.

ANALYTICAL REPORT

JOB COM830147 O/N : W 17725

0 62

Results in ppm

SAMPLE	Cu	Pb	Zn	Ni	Co	Bi
56701 A	70	26	85	16	14	<4
56702 A	16	10	44	14	8	<4
56703 A	30	10	50	12	8	<4
56704 A	20	12	36	10	10	<4
56705 A	34	22	46	16	22	<4
56706 A	32	12	50	12	16	<4
56707 A	32	12	42	12	16	<4
56708 A	26	10	50	14	12	<4
56709 A	16	10	42	14	18	<4
56710 A	46	34	65	24	16	<4
56711 A	48	20	75	16	20	<4
56712 A	2	<4	16	<4	<4	<4
56713 A	6	6	32	<4	<4	<4
56714 A	10	6	36	<4	<4	<4
56715 A	8	10	28	<4	<4	<4
56716 A	10	8	34	6	<4	<4
56717 A	8	6	26	8	<4	<4
56718 A	4	<4	16	<4	<4	<4
58214 A	30	14	28	12	18	<4
58215 A	30	16	32	10	18	<4
58216 A	36	16	28	16	24	<4
58217 A	32	14	28	10	8	<4
58218 A	46	18	38	18	16	<4
58219 A	28	16	26	12	12	<4
58220 A	30	12	36	14	10	<4

BL 1017

COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

ANALYTICAL REPORT

0 63

JOB COM830147 O/N : W 17725

Results in ppm

SAMPLE	%Fe	Mn	Cr	As	W	Sn	
56701 A	2.80	620	18	10	<10	6	
56702 A	2.30	210	8	3	<10	<4	
56703 A	2.50	270	8	<2	<10	<4	
56704 A	1.80	260	8	3	<10	<4	
56705 A	3.70	410	40	7	<10	<4	
56706 A	3.75	440	10	4	<10	<4	
56707 A	2.80	340	16	6	<10	6	
56708 A	3.35	400	10	2	<10	6	
56709 A	2.80	330	10	2	<10	<4	
56710 A	3.50	580	36	12	<10	<4	
56711 A	5.20	680	18	10	<10	6	
56712 A	1.00	30	<4	2	<10	<4	BL 1017
56713 A	1.25	150	16	<2	10	<4	
56714 A	1.35	140	14	2	<10	6	
56715 A	1.35	120	12	2	<10	10	
56716 A	1.55	140	12	2	<10	4	
56717 A	1.30	120	10	3	<10	6	
56718 A	1.05	60	6	<2	10	<4	
58214 A	1.95	210	18	5	<10	6	
58215 A	2.00	190	10	6	<10	6	
58216 A	2.25	230	12	6	<10	4	
58217 A	2.10	180	10	4	<10	4	
58218 A	4.90	460	16	7	<10	<4	
58219 A	1.85	150	6	5	<10	<4	
58220 A	2.30	210	14	2	<10	<4	

(A) fraction

56701A	SEE SAMPLE		STREAM
702	LOCATION MAP	ALL SAMPLES MARKED	"
703	E.L. 2217	A	"
704			"
705		SAMPLE PREP	"
706		- NONE REQUIRED	0.64
707		SAMPLES ALLREADY	"
708		TO - 80	"
709			"
710		ASSAY FOR:	"
711			"
712	E.L. 1017	: Cu, Pb, Zn, Ni, Co, Bi	SOIL
713	Ba Pb in	by AAS 1	"
714	Dirty Chert		"
715	line 1	: Cr, Fe, Mn by	"
716	strike	AAS 2	"
717	25 m		"
56718	stations	: As, W, Sn by XRF 1	"
			STREAM
58214			
215			
216			
217			
218			
219			
220			
221			
222			
223			
58224			

Cost - 12+87 = 105 samples @ 16.80 per ~ 1764.00

OFFICE COPY

* AB2-104 E.L 2217 - $1646.40
* A00-60 E.L 1017 - $117.60

} 1764.00

W . 56513

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
D.H.	28/09/82			
AREA H. Hill		ROCK TYPE Mean sample	SOIL/SILT	✓
PROJECT A 80-88			ROCK OUTCROP	
SAMPLE LOCATION ~30 m N and of E.W. fence line (which is 7.2 km S of Wilgena			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS -80 (A) (B) -20+40 } fractions		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

0 65

AMOCO MINERALS AUSTRALIA COMPANY

W . 56526

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
Harris	30-9-82			
AREA E.L. 1017		ROCK TYPE	SOIL/SILT	
PROJECT A80-88			ROCK OUTCROP	
SAMPLE LOCATION #082 Air photo B/W 2032			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	

AMOCO MINERALS AUSTRALIA COMPANY

W . 56527

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
Harris	30-9-82			
AREA ~~Utamaya~~ E.L. 1017		ROCK TYPE	SOIL/SILT	✓
PROJECT A-80-88			ROCK OUTCROP	
SAMPLE LOCATION #082 Air Photo B/W 2032			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	

AMOCO MINERALS AUSTRALIA COMPANY

W 56514

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
D.H.	28/09/82			
AREA Heartbreak Hill		ROCK TYPE Stream sample	SOIL/SILT	✓
PROJECT A 80-88			ROCK OUTCROP	
SAMPLE LOCATION ~ 300 m upstream from Dam on road just S.E. of Wilgena			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

0 66

AMOCO MINERALS AUSTRALIA COMPANY

W 56523

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
G.K. (D.H.)	30/09/82			
AREA Hopefull Hill		ROCK TYPE Stream Sample	SOIL/SILT	✓
PROJECT A 80-88			ROCK OUTCROP	✓
SAMPLE LOCATION See Air Photo 198 2427 or 1:100,000. Parcoola Map Sheet			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS B GEE PRINTERS

AMOCO MINERALS AUSTRALIA COMPANY

W 56525

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
S Harris	30.9-82			
AREA E.L. 1017		ROCK TYPE	SOIL/SILT	✓
PROJECT A-80-88			ROCK OUTCROP	
SAMPLE LOCATION # 082 Air photo 2033			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY		

AMOCO MINERALS AUSTRALIA COMPANY

W 56528

SAMPLER Harris	DATE 30-9-82	TECHNICAL CONTRACTOR	SAMPLE TYPE
AREA E.L. 1017		ROCK TYPE	SOIL/SILT ✓
PROJECT A-80-88			ROCK OUTCROP
SAMPLE LOCATION 082 air photo B/W 2032			IRONSTONE CAP
		COLOUR	TRENCH
		TEXTURE	AUGER (R.A.B.)
REMARKS		HARDNESS	PERCUSSION
		SPECIFIC GRAVITY	D. D. H. CORE
ALTERATION		MINERALIZATION	RESULTS

JAS R GEE PRINTERS

67

AMOCO MINERALS AUSTRALIA COMPANY

W 56529

SAMPLER D.H.	DATE 30/9/82	TECHNICAL CONTRACTOR	SAMPLE TYPE
AREA E.L. 1017		ROCK TYPE	SOIL/SILT ✓
PROJECT A 80-88			ROCK OUTCROP
SAMPLE LOCATION Chilcora Sheet B/W Air Photo # 082 Log 2032			IRONSTONE CAP
		COLOUR	TRENCH
		TEXTURE	AUGER (R.A.B.)
REMARKS		HARDNESS	PERCUSSION
		SPECIFIC GRAVITY	D. D. H. CORE
ALTERATION		MINERALIZATION	RESULTS

AMOCO MINERALS AUSTRALIA COMPANY

W 56530

SAMPLER D.H.	DATE 30/9/82	TECHNICAL CONTRACTOR	SAMPLE TYPE
AREA E.L. 1017		ROCK TYPE	SOIL/SILT ✓
PROJECT A 80-88			ROCK OUTCROP
SAMPLE LOCATION Chilcora Sheet B/W Air Photo # 082 Log 2032			IRONSTONE CAP
		COLOUR	TRENCH
		TEXTURE	AUGER (R.A.B.)
REMARKS		HARDNESS	PERCUSSION

APPENDIX 3C.

DIAMOND DRILL CORE (KENELLA ROCKS) GEOCHEMICAL ANALYSES

COMLABS Pty Ltd
COMPUTERISED ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB COM 800245

Results in ppm

0 69

SAMPLE	Cu	Pb	Zn	Ni	Co	Bi	Cd	%Fe	Cr	Mn
43373	26 [10]	12 [20]	22 [22]	12	<4 [25]	<10 [25]	<2	23.5	8	310
4	2000 [2100]	4.9% [2.21]	4.5% [4.7]	32	28 [30]	1800 [1400]	260	6.50	4	3600
5	60	60	65	8	<4	<10	<2	3.80	<4	570
6	16	85	85	8	<4	<10	<2	27.0	4	320
7	220	16	185	44	50	<10	<2	11.5	12	1100
8	8	16	28	8	<4	<10	<2	20.5	8	920
9	310	20	130	16	<4	<10	<2	24.0	12	630
43380	10 [36]	36 (31)	34 [42]	8	<4 [25]	<10	<2	21.0	4	600

Method of Analysis - Cu, Pb, Zn, Ni, Co, Bi, Cd : AAS 1/1A
Fe : AAS 2A
Cr, Mn : AAS 2

COMLABS METHODS

AAS 1/1A : Acid attack and/or fusion then A.A.S ; Sample weight 5-10 grams ; Accuracy ± 5%.

AAS 2/2A : As Above

Check Methods

Cu, Zn, Co & Bi by inductively coupled plasma (I.C.P) emission spectroscopy after acid attack.

Pb, Bi, by A.A.S, accuracy ± 10%.

COMLABS Pty Ltd
COMPUTERISED ANALYTICAL LABORATORIES

0 70

ANALYTICAL REPORT

JOB COM800245

Results in ppm

SAMPLE	As	Ba	Hg	Mo	Sn	U	W	Au
43373	4 [<2]	<10 [20]	<4 [<50]	4 [<2]	<4 [<5]	4	30	0.10
4	10 [3]	<10 [30]	24 [<5]	<4 [<2]	4 [60]	<4	<10	0.05 [0.14]
5	2	830	4	<4	<4	<4	<10	<0.05
6	4	<10	6	4	<4	<4	<10	<0.05
7	6	440	6	<4	<4	6	10	<0.05
8	4	220	4	6	6	<4	<10	<0.05
9	8	<10	4	4	4	4	<10	0.05
43380	32 [42]	<10 [42]	<4 [<50]	<4 [25]	<4 [<5]	<4	<10	<0.05

Method of Analysis - As, Ba, Hg, Mo, Sn, W, U : XRF 1
Au : AAS 5

ComLABS Methods

XRFI : Philips 1220 X-ray spectrometer, minimum sample weight is ~~10g~~ 20 grams; accuracy ± 5%

AASS : Aqua regia attack and (depending on gold level) extraction into an organic solvent containing a complexing agent; sample weight 80 grams; accuracy variable.

check methods

~~Cu, Zn~~ ~~As, Ba,~~
Ba, Mo by I.C.P after acid attack.

AMOCO MINERALS AUSTRALIA COMPANY

Sheet 1 of 1 Date 28.7.80

Sample Data Sheet

Order No 13830 Code 01 02 03 04 05

Project TARCOOLA Area Keynella Rocks Sample Type SPECIAL Sampled by G.M.

Sample No	LOCATION – – Hole No & Interval or Grid Ref	Sample Length	ASSAYED FOR	Remarks
43373	Keynella Rocks			
	DDH 1A 48'		Analyse all Rocks	
43374	485'		for	
43375	246' 6"		Bi, Co, Cu, Ni, Cd	
			Pb, Zn by	
43376	275'		AAS I	
43377	486' 6"		Fe, Cr, Mn by AAS II	
	DDH 4A		As, Ba, Hg, Mo,	
43378	246'		Sn, U, W by XRF1	
43379	398'		Au by AA55	
43380	9A. 307	No		

0 72

AMOCO MINERALS AUSTRALIA COMPANY

W 43373

SAMPLER GM	DATE 2/7	TECHNICAL CONTRACTOR Comlabs	SAMPLE TYPE	
AREA		ROCK TYPE	SOIL/SILT	
PROJECT			ROCK OUTCROP	
SAMPLE LOCATION Kenneth Rocks DDH 1A 428'		BL	IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	✓
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

W 4337

AMOCO MINERALS AUSTRALIA COMPA

5 MILL STREET, PERTH

0 73

AMOCO MINERALS AUSTRALIA COMPANY

W 43374

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
AREA		ROCK TYPE Remarkable elaborite Non magnetic	SOIL/SILT	
PROJECT Kennetta Rock DND 1A			ROCK OUTCROP	
SAMPLE LOCATION " 485'			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

W 4337

AMOCO MINERALS AUSTRALIA COMPA
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 43375

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
AREA		ROCK TYPE Red K. Felspar Rich Slightly magnetic Metasediments	SOIL/SILT	
PROJECT Kennetta Rock			ROCK OUTCROP	
SAMPLE LOCATION DDH 1A " 346' 6"			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS Faulty Hole.		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE ✓	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

W 4337

AMOCO MINERALS AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 43376

0 74

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
AREA Kambalda		ROCK TYPE Highly magnetic Metasediment with fine chloritic matrix	SOIL/SILT	
PROJECT DDist 1/1			ROCK OUTCROP	
SAMPLE LOCATION 275'			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

W 4337

AMOCO MINERALS AUSTRALIA COMPA
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 43377

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
AREA Kambalda		ROCK TYPE Slightly magnetic	SOIL/SILT	
PROJECT DDist 1/1		Metasediment with f.g. green chloritic matrix	ROCK OUTCROP	
SAMPLE LOCATION 400' 6"			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

W 4337

AMOCO MINERALS AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 43378

0 75

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
AREA		ROCK TYPE Highly magnetic coarsely hammocky metasediment with green sericite chloritic matrix	SOIL/SILT	
PROJECT			ROCK OUTCROP	
SAMPLE LOCATION Reynella Rocks 4A 244'			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

W 4337

AMOCO MINERAL
AUSTRALIA COMP
5 MILL STREET, PERTH

AMOCO MINERALS AUSTRALIA COMPANY

W 43379

SAMPLER	DATE	TECHNICAL CONTRACTOR	SAMPLE TYPE	
AREA		ROCK TYPE Moderately magnetic Highly chloritic	SOIL/SILT	
PROJECT			ROCK OUTCROP	
SAMPLE LOCATION 4A 398'			IRONSTONE CAP	
		COLOUR	TRENCH	
		TEXTURE	AUGER (R.A.B.)	
REMARKS		HARDNESS	PERCUSSION	
		SPECIFIC GRAVITY	D. D. H. CORE	
ALTERATION		MINERALIZATION	RESULTS	

JAS R GEE PRINTERS

W 4337

AMOCO MINERALS
AUSTRALIA COMPA
5 MILL STREET, PERTH

APPENDIX 4.

MINERALOGICAL REPORTS.

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

0 77

MINERALOGICAL REPORT NO. 3731

10th June, 1982

TO:	Mr. G. Miller, Amoco Minerals Australia Co., P.O. Box 47, NORWOOD, S.A. 5067
YOUR REFERENCE:	Order No. W17212
MATERIAL:	Rock samples
IDENTIFICATION:	56751, 56752, 56753, 56754
WORK REQUESTED:	Thin section and description
SAMPLES & SECTIONS:	Returned to you with this report

PONTIFEX & ASSOCIATES PTY. LTD.

Ref Wood Brook Hill

56751 : weakly gneissic megacrystic granite;
accessory fine magnetite,
apatite and trace allanite

78

This rock consists essentially of alkali felspar megacrysts to about 3 mm long, within a generally finer, allotriomorphic to granoblastic metamorphosed matrix (or groundmass) of quartz, plagioclase, alkali felspar and biotite, with accessory opaques and apatite.

The alkali felspar megacrysts are perthitic; they contain fine inclusions of quartz, plagioclase and biotite, and are locally cut by zones of recrystallisation.

Plagioclase grains are up to 6 mm across and have an irregular pattern of sericitisation.

The quartz areas which form about 30% of the rock have a grain size of 0.5 to 3 mm, and have a fairly even distribution, aggregated with the felspars. Small biotite flakes (5 - 7%) have a weak preferred orientation, in trains commonly within and along the margins of elongate quartz domains, to constitute part of the weak gneissic fabric.

Accessory fine granular magnetite and apatite generally occur in loose association with biotite. A single complex grain of allanite gradational to epidote with intergrown carbonate occurs more or less within an argillised/sericitised felspar crystal.

Magnetic Anomaly I

56752 : layered metachert, dark layers with minor fine carbonaceous material (?graphite) and accessory pyrite

Macroscopically this is a quartzitic rock with light grey layers about 5 - 15 mm wide intercalated with darker grey layers of similar width and locally bifurcating.

Petrographically all layers are seen to consist essentially of an irregular granoblastic micromosaic of quartz, locally granoblastic (i.e. with polygonal texture), and weakly commonly oriented.

The dark layers are due to fine to dust-like opaque, apparent carbonaceous material, in trains and discontinuous laminae. A check was made for crystalline carbonaceous material, i.e. graphite, in polished section.

Accessory fine pyrite (3 - 5%) is also scattered, mainly through the dark layers.

The rock is identified essentially as a cherty chemical sediment.

56753 : very fine graphite-sericite-quartz schist ("black-shale"), semi-concordant quartz stringers and veining (+ drusy voids), through disturbed layers ("silicified black shale")

About 75% of this rock consists of a diffuse metamorphic micromosaic of quartz, crowded with strongly oriented sericite and dispersed extremely fine carbonaceous material (including graphite seen in polished section). Commonly the sericite and graphite are relatively concentrated into foliae.

The remaining 25% consists of fine crystalline vein quartz, as variably continuous, semi-concordant stringers along the layering/schistosity, and along conformable layers 6 mm thick, in which the schist is distorted and dislocated. In these, the vein quartz forms minor, elongated drusy cavities, with prismatic quartz crystals protruding into voids, indicating crystallisation at low pressures.

It seems possible that the graphite-rich/poor layering has been tightly folded about the schistosity, since the layering and schistosity are disturbed in the vicinity of the quartz veining.

57937 : weathered banded iron formation, composed of microcrystalline quartz, highly irregular 'primary' hematite and very extensively limonitised carbonate, with folded and dislocated layering.

This rock consists essentially of deformed layers made up of variable concentrations of microcrystalline quartz mosaic, highly irregular grains of hematite, and of limonite replicas after carbonate (including minor residuals of carbonate), and minor possible replicas after calc-silicate crystals. Clearly defined layers are recognisable but these are confused by microfaults? or'tectonic slides" roughly parallel to the axial plane of the main fold. The layers are:

1. a reddish hematitic unit, with small lenses and irregularly ragged grains of hematite intergrown with ill-defined quartz rich patches, and minor very extensively oxidised carbonate.

2. a pale orange limonitic unit dominated by completely oxidised carbonate incorporating minor quartz and the same highly irregular hematite grains.

3. a unit of two quartz microbands, separated by a quartz-limonite microband. This 'triple banded' unit is about 1 - 2 mm thick and is locally offset by microfaults and slides, but is the clearest "marker horizon" in the sequence.

Note that the hematite grains in this sample are 'primary' i.e. they are not martite pseudomorphs after magnetite. Commonly the hematite displays a multiple twinning.

56754 : vaguely layered, microcrystalline "quartzite", small patches of kaolinite ± trace carbonate, have a layered distribution, and apparently replace metamorphic silicate minerals, possibly including garnet; (metamorphosed and weathered impure chert ?)

This rock is dominated by an elongated, metamorphic micromosaic of quartz grains, with their C-axes apparently with a preferred orientation at about 45° to a prevailing, fine, macro-layering.

Spots and lenses of kaolinite (10%), to 0.8 mm across, have a more or less layered distribution throughout this quartz mosaic, and the shape of these suggests that they replace former garnet and/or felspar, possibly but seemingly less likely, biotite and/or hornblende; some of these kaolinite spots contain minor carbonate.

There is no evidence of accessory detrital minerals, or of any relict sedimentary textures.

The rock is interpreted as a metamorphically recrystallised, impure chert.

4165001E
5905001N

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

0 83

MINERALOGICAL REPORT NO. 3892

10th November, 1982

TO: Mr. G. Miller,
Amoco Minerals Aust. Co.,
P.O. Box 47,
NORWOOD, S.A. 5067

YOUR REFERENCE: Order No. W17672

MATERIAL: Rock sample

IDENTIFICATION: 56512

WORK REQUESTED: Thin section preparation and description

SAMPLE & SECTION: Returned to you with this report

PONTIFEX & ASSOCIATES PTY. LTD.

56512 : vaguely layered, heterogeneous, mainly plagioclase/K-spar granulitic rock, minor hedenbergite, calcium-garnet sphene and magnetite; (genesis uncertain but possibly a hornfelsed felspathic igneous rock, possibly a high-grade metamorphosed calcareous-pelitic facies)

Most of this rock consists of a vaguely layered, but otherwise rather heterogeneous granuloblastic aggregate of calcic plagioclase and alkali felspar, in subequal abundance, but with irregular plagioclase-rich "lenses" to 20 x 10 mm which may reflect an original porphyritic or clastic texture. The plagioclase (35 - 40%) is finer grained (0.3 - 0.6 mm) than the alkali felspar (0.5 - 2 mm) but generally has a more prominent metamorphic/polygonal crystal form.

Finer grained calc-silicate minerals : deep green hedenbergitic-clinopyroxene (10%); orange-brown ?andradite garnet (or almandine-grossular ?) also about 10%; and lesser small grains of sphene occur in irregular lenses and patches and, more rarely, as disseminations and in vague layers.

The grain size of these components ranges from a few microns to 0.5 mm. The largest aggregates form vein-like masses to 4 mm wide, with minor magnetite and zircon. The magnetite grains are from a few microns to 1 mm in size.

Hebridge sill

34316 : breccia of weathered clayey siltstone fragments in a clay-rich quartz sandstone matrix

0 85

This rock has well aligned blocks of weathered clay-rich siltstone to about 7 x 2 mm, set in a matrix of quartz sandstone with a clay cement. The fragments appear to have been continuous beds as individual laminae can be traced from fragment to fragment across the thin section. They appear to have been fractured in-situ and engulfed in a sand composed of angular quartz grains about 0.2 mm across.

The matrix mineralogy is obscure, but it appears that clays and opal are present in the siltstone and sandstone areas, together with limonite and minor calcite.

Small casts scattered along an exposed bedding plane appear to represent former evaporite crystals.

The evidence suggests a very shallow water (?intertidal) laminated clay/siltstone, fractured, and locally dislocated as a plastic but fairly coherent sediment during a subaerial hiatus, then invaded by a sandy facies 'clumped' more or less vertically on top - by an unknown process. This introduction of the sand has extended the dislocation of the tabular clay/siltstone blocks. This dislocation and introduction of sand was followed by a clay/silt layer in which the evaporite minerals? formed.

34317 : kaolinised gneissic leucogranodiorite

This rock was originally a weakly gneissic granodiorite with a grain size about 4 mm. The primary mineralogy was : quartz 35 - 40%; alkali felspar 10%; plagioclase 50 - 55%.

The plagioclase is completely altered to fine massive kaolin; the alkali felspar is relatively fresh, but is locally veined by kaolin and/or hematite.

The quartz areas have recrystallised to ragged grains 0.5 - 2 mm across with sutured grain boundaries and undulose extinction.

Fractures cutting the rock are locally lined with carbonate, probably of superficial origin.

34318 : quartz-albite mylonite with minor hornblende and garnet, also a mylonitised quartz-tourmaline vein, possibly derived from a pegmatite.

Most of this rock is a laminated quartz-albite mylonite with lenticular quartz and albite laminae 0.1 to 0.5 mm wide. The quartz has a very strong optical orientation, which is typical for mylonite, but in this case the C-axes of the quartz are at 45° to the lamination, but rotated from the lamination in the same sense throughout the section. (With the 1st order [gypsum] plate inserted, and the nicols crossed, all the quartz in the section is either yellow or blue depending on the orientation of the lamination relative to the nicols.)

Thin laminae of recrystallised green hornblende with very minor garnet occur in the quartz, albite mylonite.

The quartz-tourmaline vein is 15 - 20 mm wide, and about 20% of its quartz grains lack the usual strong orientation direction. Fragments of bluish to greenish brown tourmaline (10%), up to 4 mm across, are angular and veined by quartz. Minor albite and chlorite are intergrown with some of the tourmaline.

34319 : porphyritic microgranite with biotite and hornblende

This sample is a porphyritic microgranite with phenocrysts of alkali felspar and quartz to 4 mm across, and sericitised plagioclase to 2 mm across. The groundmass is granular with a grain size of 0.5 - 1 mm. It is mostly quartz, alkali felspar and minor plagioclase but has poikilitic grains of dark green hornblende, and dark brown biotite to 2 mm across. Accessory minerals include possible altered allanite and magnetite.

The alkali felspar is perthitic and argillised. There is minor myrmekite as bodies up to 1 mm within and adjacent to the alkali felspar.

[HAND SPECIMEN: Foliated]

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. 3921

0 89

7th December, 1982

TO: Mr. G. Miller,
Amoco Minerals Australia Co.,
6 The Parade,
NORWOOD SA 5067

YOUR REFERENCE: Order No. W17378

MATERIAL: Rock samples

IDENTIFICATION: 57935 to 57939

WORK REQUESTED: Thin section and description

SAMPLES & SECTIONS: Returned to you with this report.

PONTIFEX & ASSOCIATES PTY. LTD.

Tab " Heartbreak Hill

Comments

Questions about the possible late-stage nature of the granite samples described here-in are commented on as follows.

Sample 57935 is distinguished from the other samples by it's granodioritic composition, and by it's stressed, partly recrystallised, and weakly foliated nature.

Sample 57936 is an undeformed biotite granite with chloritised biotite, accessory magnetite, zircon, apatite, allanite and fluorite. These accessories and the lobate nature of the quartz grains suggest a high level, late-stage granite.

Sample 57938 is a medium to coarse granophyric granite, gradational to quartz-syenite, with minor biotite hornblende, accessory fluorite, zircon, metamict allanite. This is also considered to be a late-stage granitoid.

57935 : weakly foliated, chloritised-biotite-granodiorite, with deformed and partly recrystallised quartz; accessory magnetite, pyrite, apatite allanite.

0 91

This rock is deformed and has a weak foliation largely defined by a common elongation of recrystallised quartz and alkali felspar crystals, and by a weak schistosity in the biotite. The mineralogy is: 25% quartz; 50 - 55% plagioclase; 10 - 15% alkali felspar; 7% biotite; with traces of epidote ? magnetite, apatite and pyrite. The epidote has cores of ?metamict allanite. The biotite is chloritised with associated small granules of leucoxene; it is locally kinked.

The plagioclase and alkali felspar are granular to subhedral, with a grain size of 0.5 - 4 mm (mostly over 2 mm). The deformation in the quartz is manifest as partial recrystallisation, with sutured grain boundaries, to ragged grains up to 2 mm long, and rarely as lenses to 8 mm long.

This rock appears to have been intruded during a period of deformation, and is thus unlikely to be a late-stage granitoid as questioned in the field notes.

GLENLOTH. - NEAR Au. MINERALIZATION

57936 : undeformed, medium grained, biotite granite; plagioclase partly sericitised; biotite rarely chloritised and accompanied by accessory magnetite, lesser zircon, apatite, metamict allanite fluorite.

This is a medium grained biotite granite with the following essential composition: 55% strongly perthitic alkali felspar, 30% quartz; 10% plagioclase; 5% biotite.

Some of the quartz grains have lobate, smoothly curved outlines suggesting that this is a high-level late-stage granite (unlike No. 57935).

The quartz and alkali felspar are 1 - 6 mm in grain size and anhedral, the plagioclase 0.5 - 2 mm and subhedral with sericitised cores. The biotite flakes are unoriented and part elongate at right angles to the basal cleavage. They are locally altered to chlorite+ leucoxene, and some flakes are accompanied by trace fluorite, which also tends to indicate a late-stage granite.

Accessory minerals are metamict allanite, magnetite, apatite and zircon, all more or less associated with biotite. Rare grains of fluorite to 0.5 mm are interstitial to quartz felspar and adjacent to biotite.

57938 : undeformed, medium to coarse, granophyric granite, transitional to quartz syenite; minor biotite hornblende, accessory fluorite zircon and trace metamict allanite.

The essential mineralogical composition of this sample is 65% alkali felspar; 20% quartz; 10% plagioclase; 5% each of chloritised biotite and hornblende; 2% fluorite. It thus lies close to the compositional boundary between granite and quartz syenite.

Alkali felspar occurs as large euhedral crystals to 12 x 8 mm, locally rimmed by granophyre and partly rimmed by plagioclase. Most of the plagioclase occurs as subhedral crystals to 6 mm long, strongly altered to iron-stained clay. Numerous fine to coarse granophyre domains 1 - 5 mm across are present, as well as some related, but separate quartz grains to 4 mm across, locally with a bipyramidal outline.

The biotite is locally altered to chlorite with associated leucoxene, and the hornblende occurs in clusters of quite small, deep green coloured grains.

Fluorite occurs as two closely spaced patches 1 - 2 mm long between plagioclase and quartz. Accessory very small crystals of zircon and apparent metamict altered allanite accompany biotite.

GORGE WELL - KOKATHA

57939 : contact between multiple deformed (micro-crenulated) sericite-rich phyllite, and sericitic quartz sandstone.

Most of this sample is a sericitic phyllite with about 15% quartz and 3 - 5% fine scattered ilmenite and rutile. The primary S_1 schistosity is folded about a very strong crenulation cleavage (S_2) at a high angle to both the overall trend of the cleavage and to the lithological layering (bedding), suggesting proximity to the nose of a fold. A compositional layering is parallel to S_2 and consists of alternating quartz free and quartz-bearing laminal 0.05 - 0.3 mm thick. The wider quartz-free laminae are further folded by crenulations with an axial plane (S_3) at about 30° to S_2. The ilmanite occurs as unoriented plates about 0.1 mm long, the rutile occurs as minute (50 micron) dispersed grains.

The sandstone layer has quartz grains 0.1 - 0.3 mm diameter scattered through a limonite-stained sericitic matrix with a confused and not clearly identifiable schistosity, possibly S_2.

The rock is cut by limonite lined fractures some of which are parallel to S_2.

North Side of Salt Lake System, East of Mt Tuin

AMOCO MINERALS AUSTRALIA COMPANY

Exploration Licence 1017, Heartbreak Hill, South Australia

REPORT FOR FOURTH QUARTER, ENDING JULY 28TH, 1983

This Licence is part of a block of five contiguous Exploration Licences which are covered by a joint venture agreement with CRA Exploration Pty Ltd.

Finalization of the agreement has been delayed and 1983 work on the properties, to be managed by CRA Exploration, is yet to commence.

Expenditure on the Licence remains at $24,122.23.

Graham Miller
Senior Geologist

15th August, 1983

AMOCO MINERALS AUSTRALIA COMPANY

Exploration Licence 1017, Heartbreak Hill, South Australia

FIFTH QUARTERLY REPORT, FOR PERIOD ENDING OCTOBER 28TH, 1983

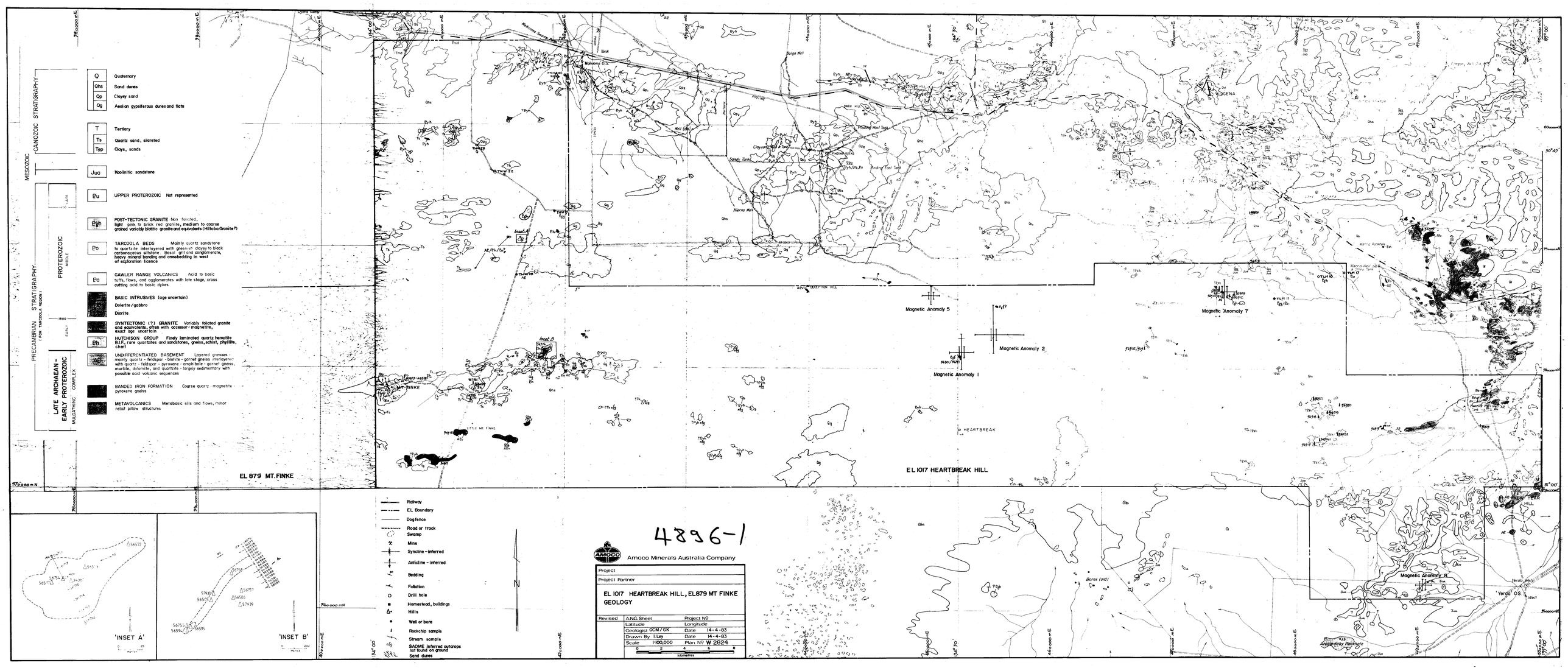
This Licence is part of a block a five contiguous Exploration Licences which was to be covered by a joint venture agreement with CRA Exploration Pty Ltd.

Because of the inability of the respective managements to agree on a number of contractural items the agreement did not materialize. It wasn't until November that discussions were terminated and so, in the period under review, no work was carried out.

Expenditure, not including legal expenses, remains at $24,122.23

Graham Miller
Senior Geologist

29th December, 1983


MESOZOIC
CAINOZOIC STRATIGRAPHY
Q Quaternary
Qhs Sand dunes
Qp Clayey sand
Qg Aeolian gypsiferous dunes and flats
T Tertiary
Ts Quartz sand, silcreted
Tpp Clays, sands
Juc Kaolinitic sandstone
PRECAMBRIAN STRATIGRAPHY
Pu UPPER PROTEROZOIC Not represented
Pgh POST-TECTONIC GRANITE Non foliated, light pink to brick red granite, medium to coarse grained variably biotitic granite and equivalents (=Hiltaba Granite?)
Po TARCOOLA BEDS Mainly quartz sandstone to quartzite interlayered with greenish clayey to black carbonaceous siltstone. Basal grit and conglomerate, heavy mineral banding and crossbedding in west of exploration licence
Pa GAWLER RANGE VOLCANICS Acid to basic tuffs, flows, and agglomerates with late stage, cross cutting acid to basic dykes
BASIC INTRUSIVES (age uncertain)
Dolerite / gabbro
Diorite
SYNTECTONIC (?) GRANITE Variably foliated granite and equivalents, often with accessor magnetite, exact age uncertain
Eh HUTCHISON GROUP Finely laminated quartz hematite B.I.F., rare quartzites and sandstones, gneiss, schist, phyllite, chert
AE UNDIFFERENTIATED BASEMENT Layered gneisses - mainly quartz - feldspar - biotite - garnet gneiss interlayered with quartz - feldspar - pyroxene - amphibole - garnet gneiss, marble, dolomite, and quartzite - largely sedimentary with possible acid volcanic sequences
BANDED IRON FORMATION Coarse quartz - magnetite - pyroxene gneiss
METAVOLCANICS Metabasic sills and flows, minor relict pillow structures
PROTEROZOIC
LATE
EARLY
LATE ARCHAEAN - EARLY PROTEROZOIC
MULGATHING COMPLEX
EL 879 MT. FINKE
EL 1017 HEARTBREAK HILL
Magnetic Anomaly 1
Magnetic Anomaly 2
Magnetic Anomaly 5
Magnetic Anomaly 7
Magnetic Anomaly 8
HEARTBREAK
MT. FINKE
LITTLE MT. FINKE
'INSET A'
'INSET B'
Railway
EL Boundary
Dog fence
Road or track
Swamp
Mine
Syncline - inferred
Anticline - inferred
Bedding
Foliation
Drill hole
Homestead, buildings
Hills
Well or bore
Rockchip sample
Stream sample
BADME inferred outcrops not found on ground
Sand dunes
N
4896-1
Amoco Minerals Australia Company
Project
Project Partner
EL 1017 HEARTBREAK HILL, EL879 MT FINKE
GEOLOGY
Revised
A.N.G. Sheet
Project N?
Latitude
Longitude
Geologist GCM/GK
Date 14-4-83
Drawn By I.Ley
Date 14-4-83
Scale 1:100,000
Plan N? W 2824
kilometres

473100 E | 473300 E | 473500 E | 473700 E | 473900 E | 474100 E | 474300 E | 474500 E | 474700 E | 474900 E | 475100 E

587400 N

587200 N

587000 N

586800 N

586600 N

586400 N

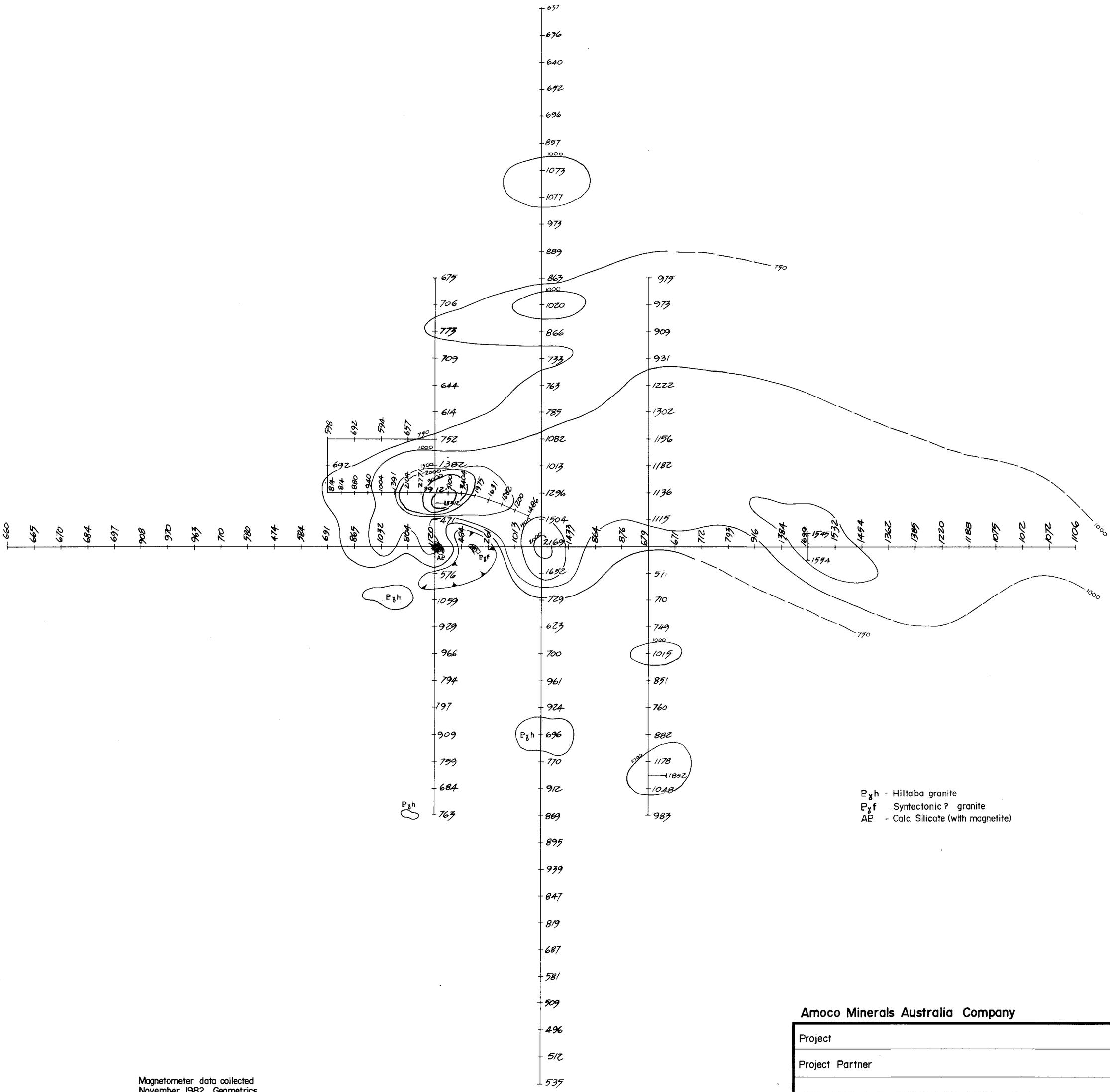
586200 N

586000 N

585800 N

585600 N

585400 N



Magnetometer data collected November 1982. Geometrics G816 instrument was used.

Add 57,000 to all readings.

Outcrop

Amoco Minerals Australia Company

Project

Project Partner

EL 1017 HEARTBREAK HILL, S.A.

ANOMALY 7

Revised	ANG Sheet No.	Project No.
	Latitude	Longitude
	Geologist G. Kary	Date
	Drawn by I. Ley	Date 9 - 3 - 83
	Scale 1 : 5,000	Plan No. **W 2816**

0 100 200 300 400 metres

4896-2

455100 E

585300 N

584800 N

584300 N

583800 N

583300 N

582800 N

582300 N

581800 N

581300 N

453600 E

454100 E

454600 E

454900 E

455100 E

455300 E

456600 E

456100 E

456600 E

457100 E

457600 E

BOUGUER GRAVITY CONTOURS

MAGNETIC CONTOURS

Syntectonic ?

NOTES

GRAVITY

Surveyed by: P. Mewkill, October 1982
Instrument: Lacoste and Romberge

Gravity Base Level: Arbitrary
Density: 2·67 gm/cc

GROUND MAGNETICS

Surveyed by: Amoco, October 1982
Instrument: Geometrics G816
Proton Precession

Amoco Minerals Australia Company

Project

Project Partner

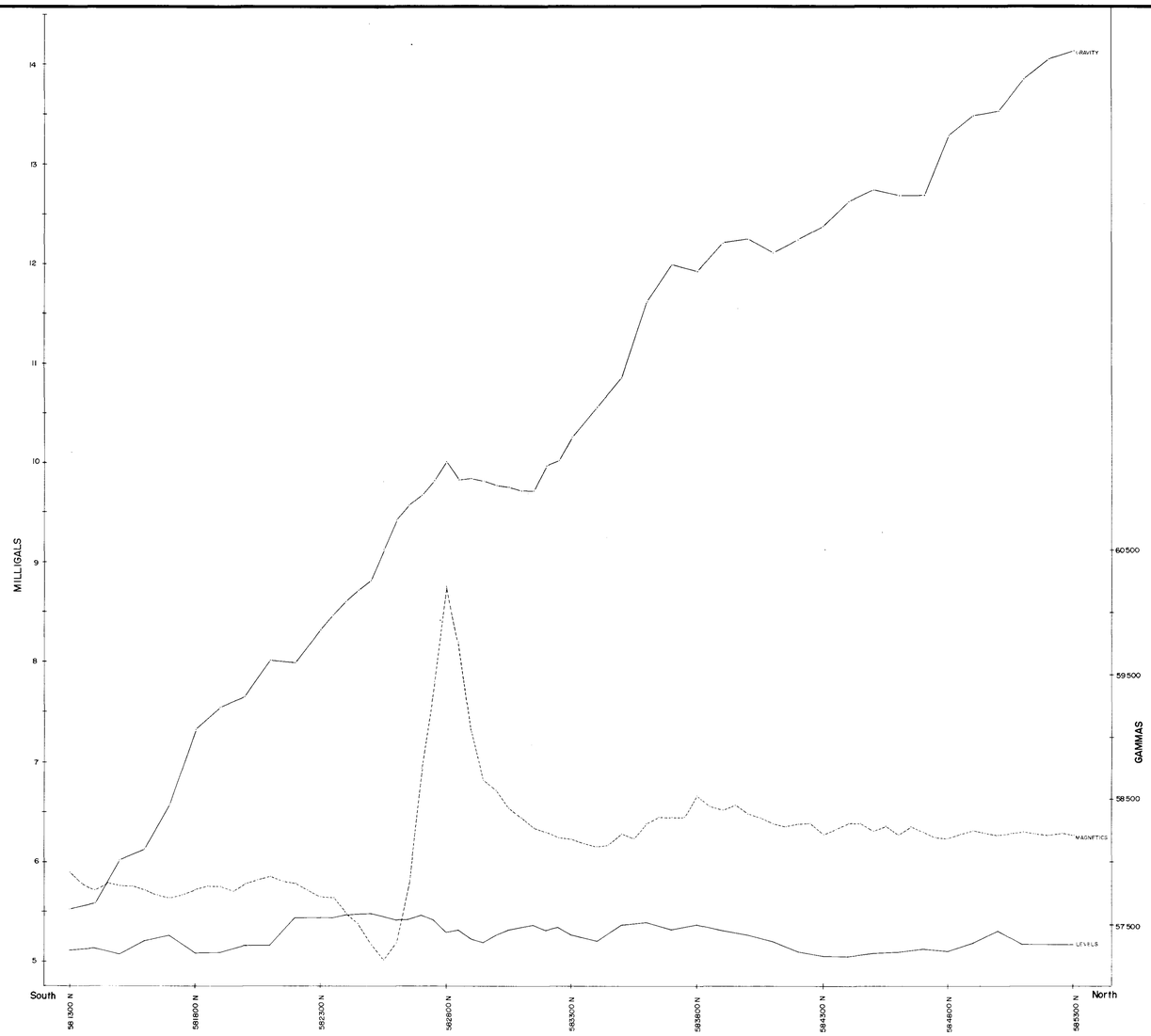
EL 1017 HEARTBREAK HILL, S. A.
ANOMALY 2
GEOPHYSICAL DATA

Sheet 1

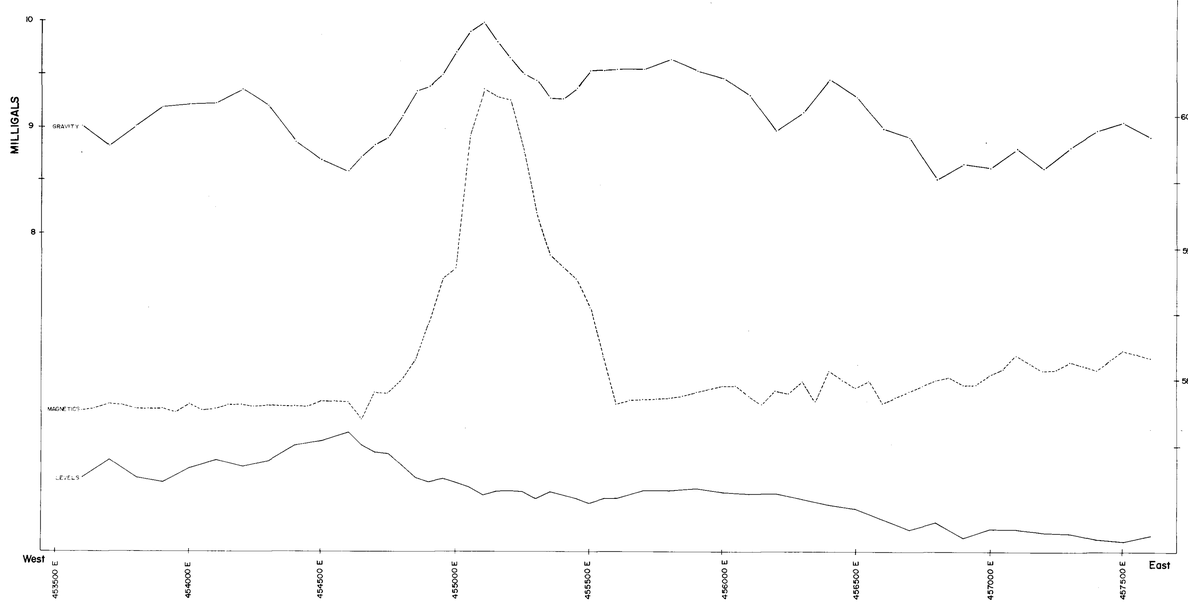
Revised	A.N.G. Sheet No	Project No	
	Latitude	Longitude	
	Geologist GC Miller	Date	30-11-82
	Drawn By I Ley	Date	30-11-82
	Scale 1:10,000	Plan No	W 2801

0 200 400 600 800 metres

4896-3



TRAVERSE 455100 E



TRAVERSE 582800N

NOTES

GRAVITY

Surveyed by: P. Mewkill, Octobe 1982
Instrument: Lacoste and Romberge

Gravity Base Level: Arbitrary
Density: 2·67 gm/cc

Levelling: Optical

GROUND MAGNETICS

Surveyed by: Amoco, October 1982
Instrument: Geometrics G816
Proton Precession

Amoco Minerals Australia Company

Project

Project Partner

EL 1017 HEARTBREAK HILL, S.A.
ANOMALY 2
GEOPHYSICAL DATA

Sheet 2

Revised	A.N.G. Sheet N°	Project N°
	Latitude	Longitude
	Geologist GC Miller	Date 31-11-82
	Drawn By I Ley	Date 31-11-82
	Scale 1:10,000	Plan N° W 2802

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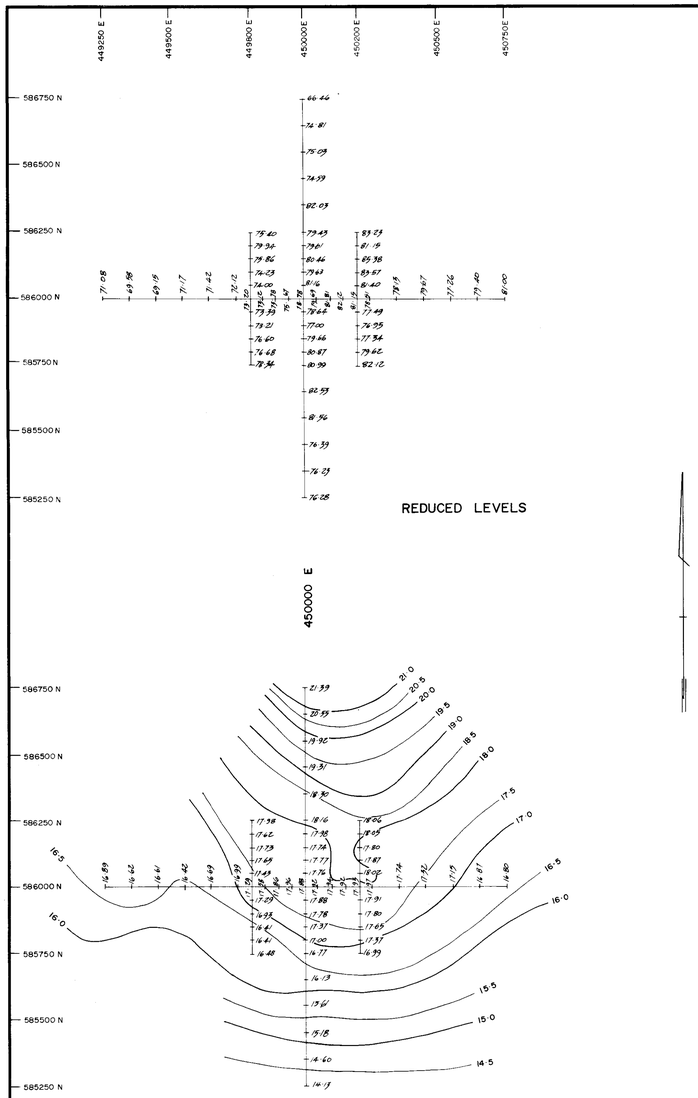
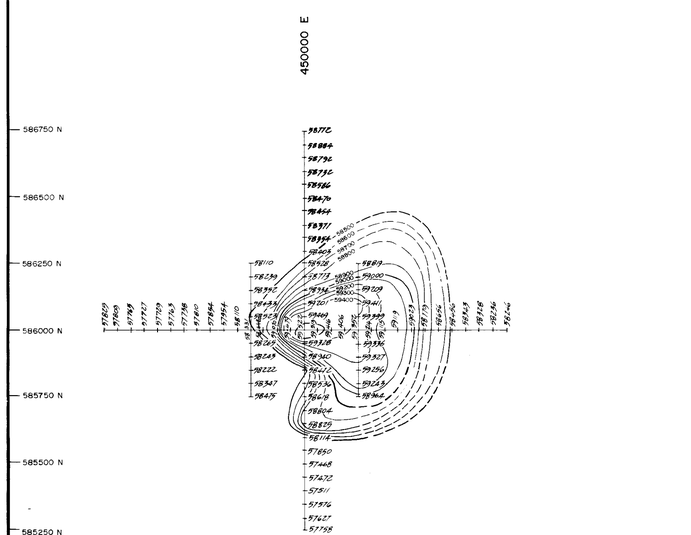
metres

4896-4

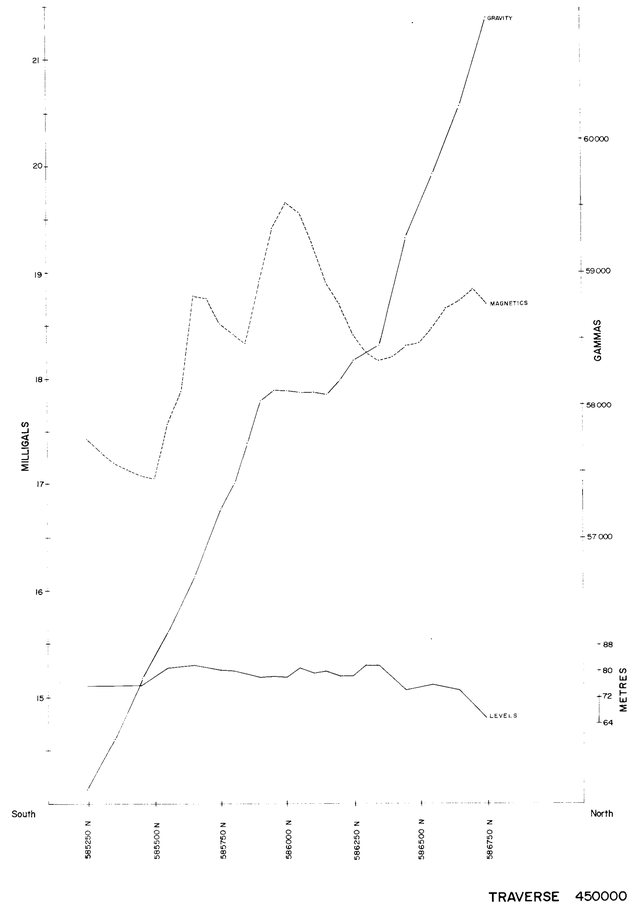


REDUCED LEVELS

BOUGUER GRAVITY CONTOURS



MAGNETIC CONTOURS



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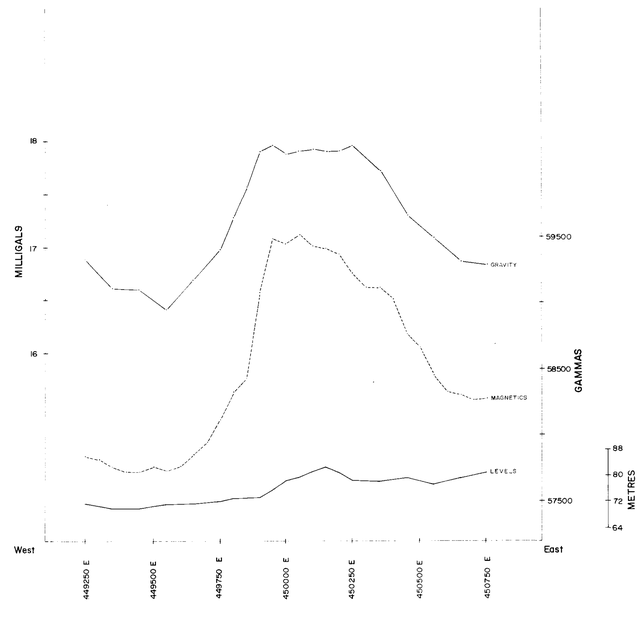


TRAVERSE 586000 N

NOTES

GRAVITY

Surveyed by: P. Mewkill, October 1982
Instrument: Lacoste and Romberge

Gravity Base Level: Arbitrary
Density: 2·67 gm/cc

Levelling: Optical.

GROUND MAGNETICS

Surveyed by: Amoco, October 1982
Instrument: Geometrics G816
Proton Precession

Amoco Minerals Australia Company

Project

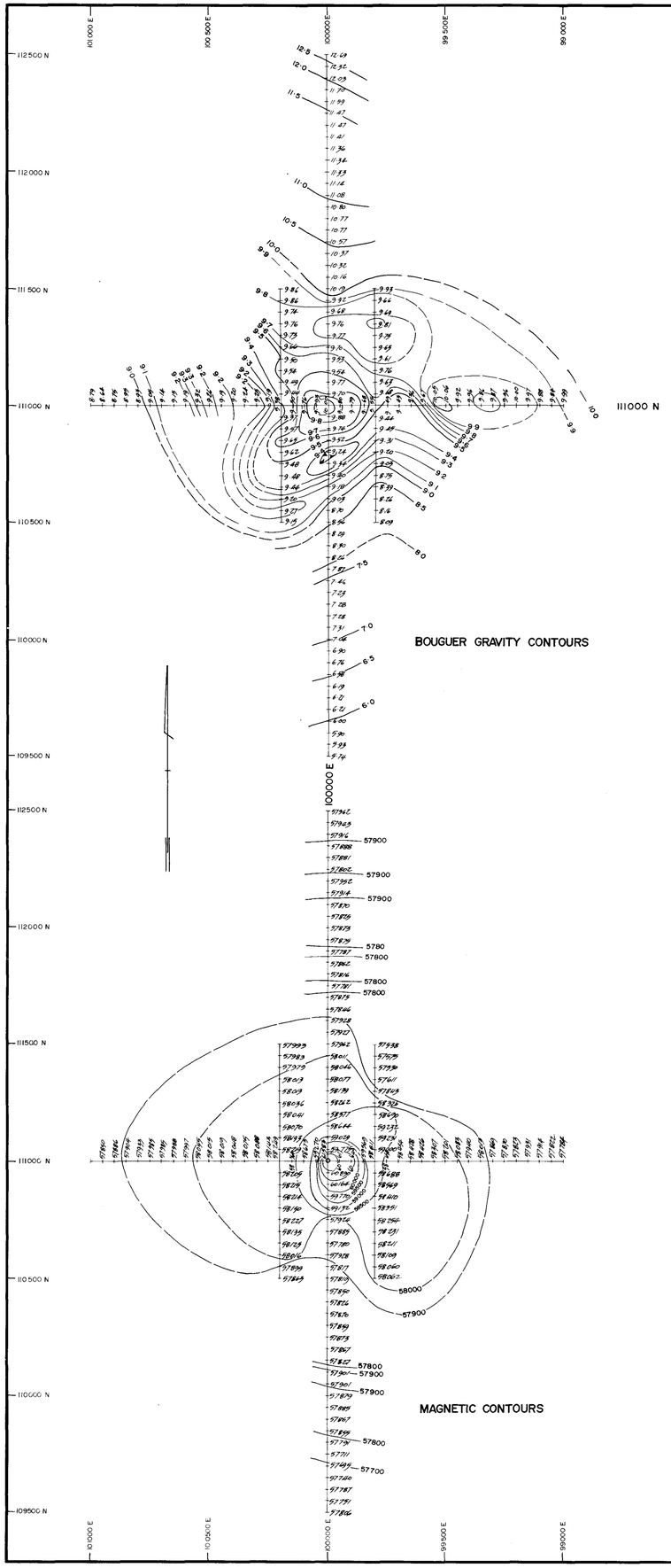
Project Partner

EL 1017 HEARTBREAK HILL, S.A.
ANOMALY 5
GEOPHYSICAL DATA

Revised	A.N.G. Sheet N°		Project N°
	Latitude		Longitude
	Geologist GC Miller	Date	1-12-82
	Drawn By I Ley	Date	1-12-82
	Scale 1:10,000	Plan N°	W 2803

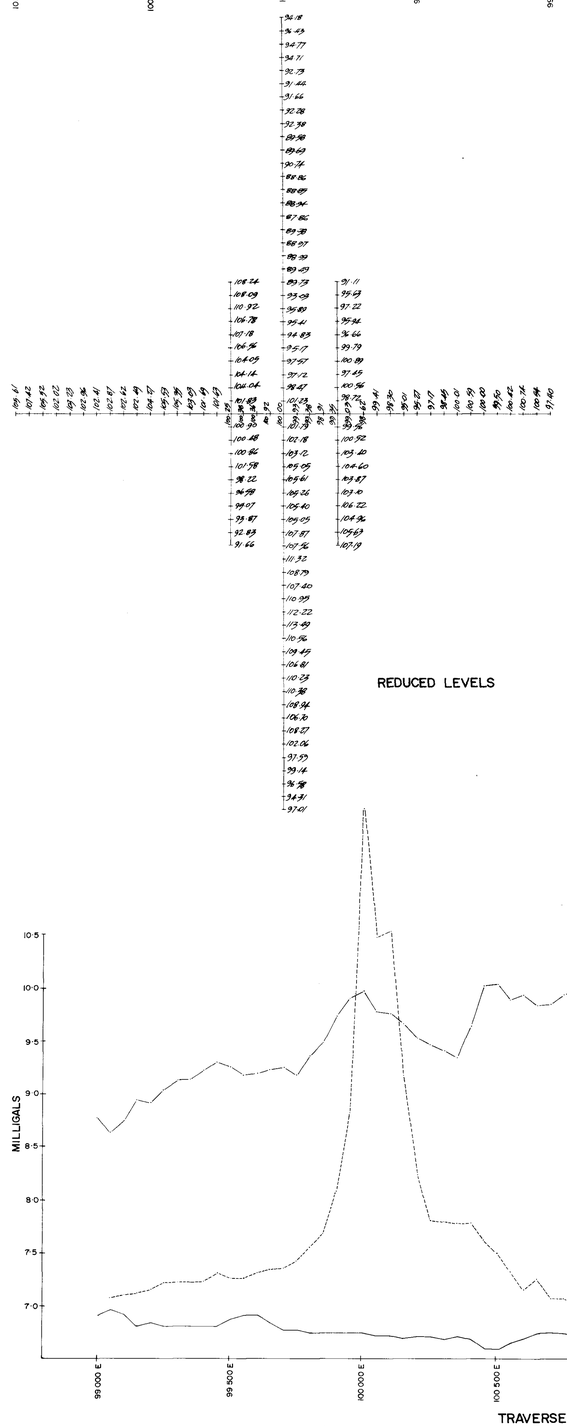
0 200 400 600 800
metres

4896-5



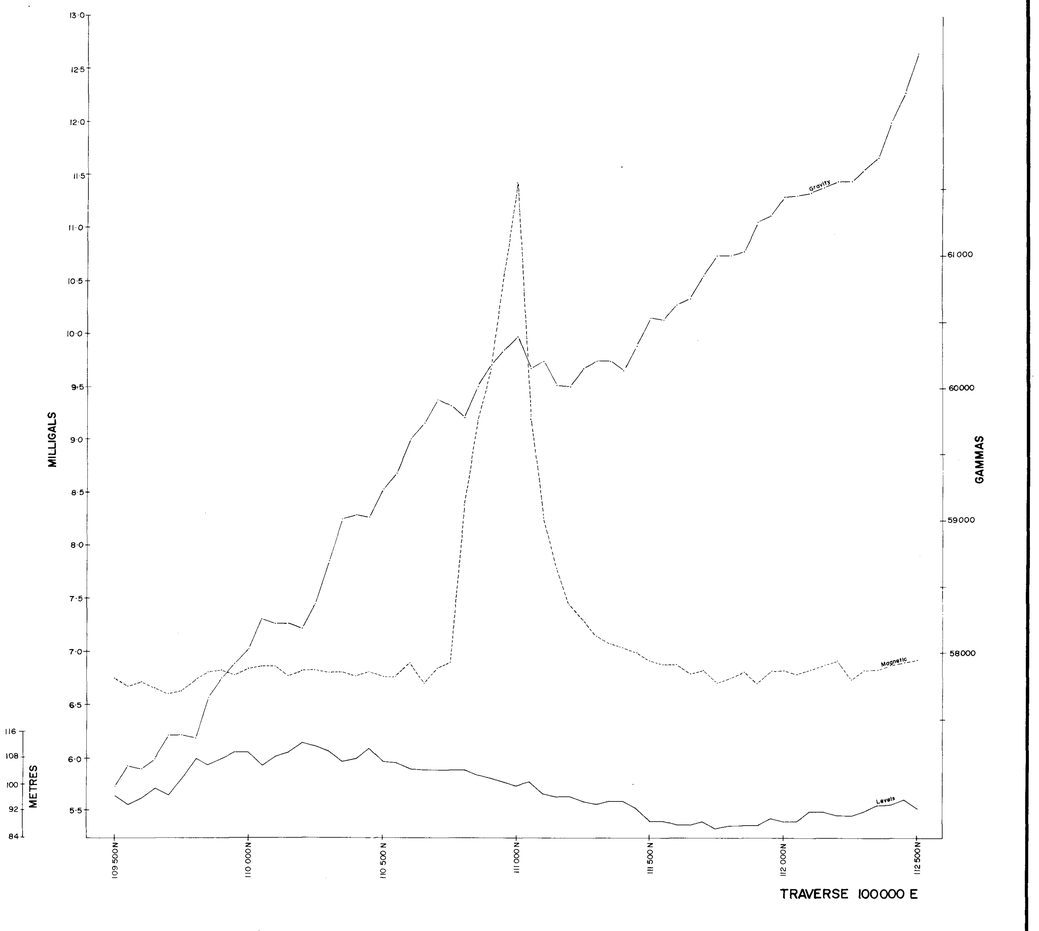
BOUGUER GRAVITY CONTOURS

MAGNETIC CONTOURS



REDUCED LEVELS

TRAVERSE 111000 N



TRAVERSE 100000 E

Note: Coordinates used on this plan were arbitrary, centre point of grid as shown here corresponds to 581300 N AMG 422500 E AMG

NOTES

GRAVITY

Surveyed by: P. Mewkill, October 1982
Instrument: Lacoste and Romberge

Gravity Base Level: Arbitrary
Density: 2·67 gm/cc

Levelling: Optical

GROUND MAGNETICS

Surveyed by: Amoco, October 1982
Instrument: Geometrics G816 Proton Precession

Amoco Minerals Australia Company

Project

Project Partner

EL 1017 HEARTBREAK HILL, S.A.
ANOMALY 1
GEOPHYSICAL DATA

Revised	A.N.G. Sheet NO	Project NO	
	Latitude	Longitude	
	Geologist GCMiller	Date	14-12-82
	Drawn By ILey	Date	14-12-82
	Scale 1:10,000	Plan NO	W 2800

0 200 400 600 800 metres

4896-6

380000mE
390000mE
400000mE
410000mE
420000mE
430000mE
440000mE
450000mE
460000mE
470000mE
480000mE
490000mE
500000mE
510000mE
600000mN
590000mN
580000mN
570000mN
560000mN
550000mN
540000mN
133°45'
134°00'
134°15'
134°30'
134°45'
135°00'
30°45'
31°00'
Malbooma R.S.
Malbooma
KYCHERING HILL
Tarcoola Mine
Au
Heartbreak Hill anomalies No.'s 1-9
ANOMALY 1
ANOMALY 2
ANOMALY 3
ANOMALY 4
ANOMALY 5
ANOMALY 6
ANOMALY 7
ANOMALY 8
ANOMALY 9
30° 51' S
30° 50' S
30° 55' S
134° 37' E
134° 50' E
134° 57' E
EL 1017
EL 879
DM 448/82
Vermin Proof Fence
Salt Lakes
LOCATION MAP
Coober Pedy
Tarcoola
Woomera
Pt Augusta
ADELAIDE
Scale 1:10,000,000
0 200 400
134°00'
134°30'
135°00'
30°40'
31°00'
31°20'
ADASTRA
Malbooma
Tolmer Hill
Tarcoola Hill
Tarcoola
Wilgena Hill
BMR
AUSTRAL
Mt Finke
Heartbreak Hill
Bulpora Hill
New Year Hill
AERODATA
EL 879
EL 1017
DM 448/82
LEGEND
EL Boundary
Railway
Road
Dog fence
Hills
0 1 2 3 kilometres
Scale 1:500,000
Flown by Aerodata Services Pty Ltd., 1980
Survey height: 90m., Line spacing 400m., Contour interval 10 gammas
Flown by Austral Air Surveys Pty Ltd., 1978
Survey height: 90m., Line spacing 400m N-S., 1000m E-W., Contour interval 10 gammas
Flown by Bureau of Mineral Resources., 1961
Line spacing 1600 m
Flown by Adastra Hunting Geophysics Ltd., 1957
Line spacing 1600 m
4896-7
AMOCO
Amoco Minerals Australia Company
Project
Project Partner
EL 1017 HEARTBREAK HILL, EL879 MT FINKE
DM448/82 ARCOORDABY ROCKHOLE, S.A.
AEROMAGNETIC COVERAGE
Revised
A.N.G. Sheet
Project No
Latitude
Longitude
Geologist G. Kary
Date 26-1-83
Drawn By I. Ley
Date 26-1-83
Scale 1:100,000
Plan No W 2818
0 2 4 6 8
kilometres

134°30' 134°45' 135°00' 135°15'

30°45'

31°00'

31°15'

Au Au Tarcoola

Au Sn Earea Dam

△ Heartbreak Hill

△ Bulpara Hill

EL 1017

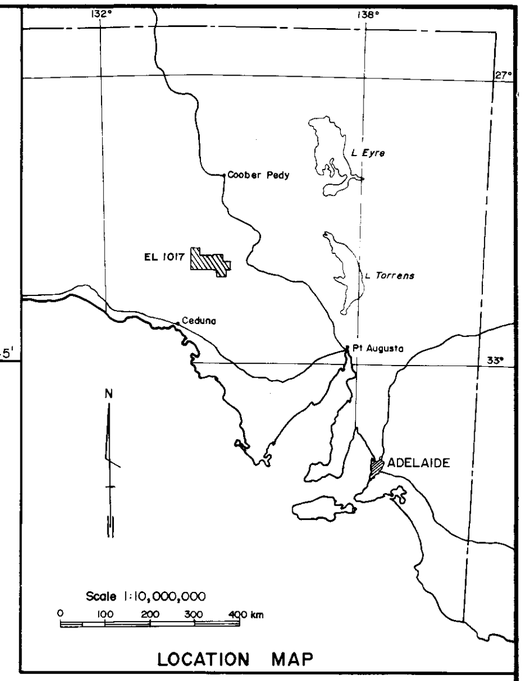
Glenloth Goldfield

Chitanilga Hill △

-30

-40

+



LOCATION MAP

Index to 1:250,000 sheets

TARCOOLA	KINGOONYA
CHILDARA	GAIRDNER

LEGEND

- Interpreted position of Glenloth granite
- -40 Gravity contours
- Fault - interpreted
- EL Boundary
- Mine
- △ Hills

4896-8

Amoco Minerals Australia Company

Project

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EL 1017 HEARTBREAK HILL, S.A.

GRAVITY CONTOURS

Revised	A.N.G. Sheet		Project Nº
	Latitude		Longitude
	Geologist	C ANDERSON	Date 18-9-82
	Drawn By	I. LEY	Date 18-9-82
	Scale	1:250,000	Plan Nº W 2597

0 5 10 15 20 kilometres

489650 E | 489850 E | 490050 E | 490250 E | 490450 E | 490650 E | 490850 E | 500050 E

562650 N

562450 N

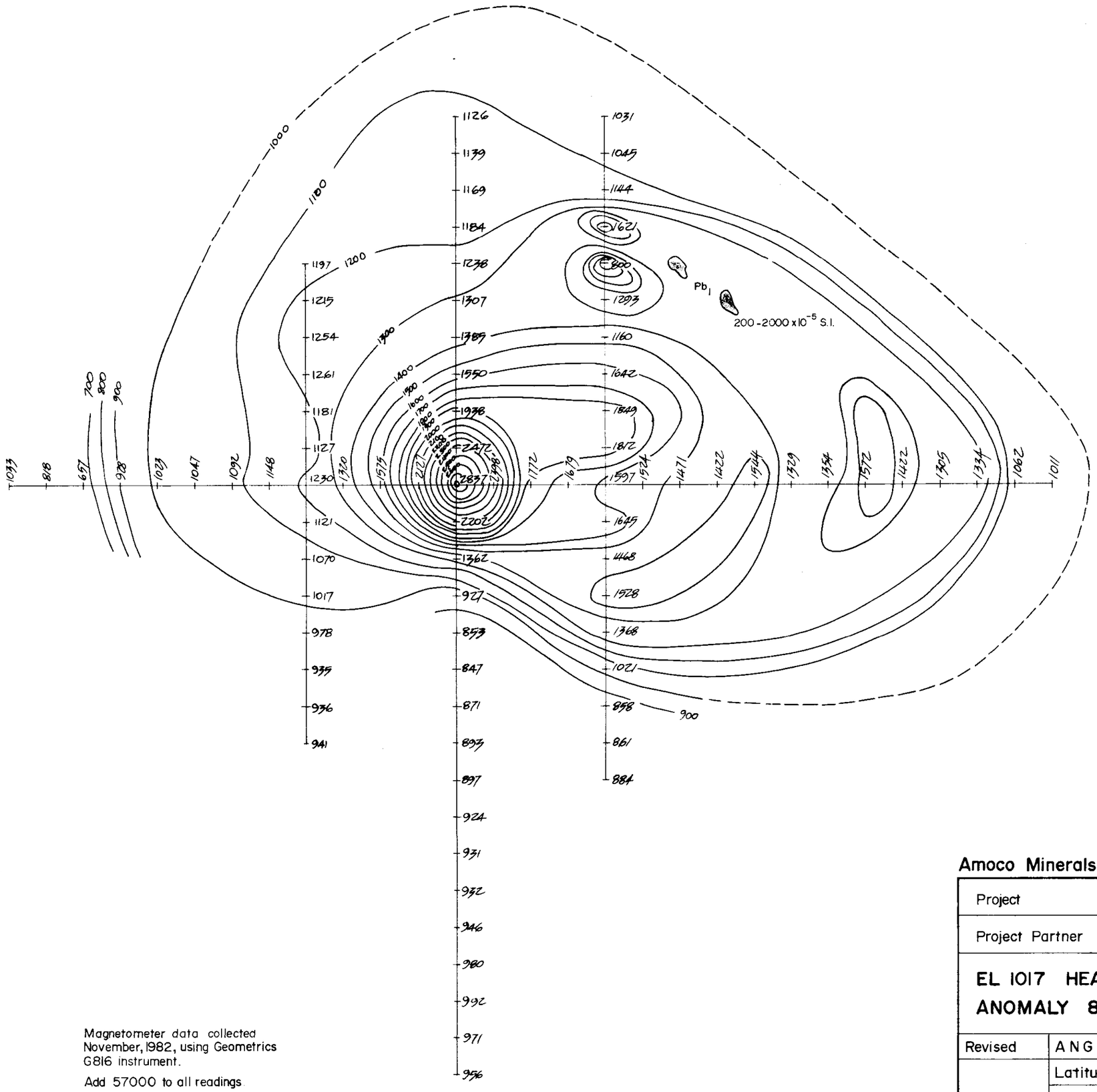
562250 N

562050 N

561850 N

561650 N

561450 N



Magnetometer data collected November, 1982, using Geometrics G816 instrument.

Add 57000 to all readings.

Outcrop

Amoco Minerals Australia Company

Project		
Project Partner		
EL 1017 HEARTBREAK HILL, S.A. ANOMALY 8		
Revised	A N G Sheet No.	Project No.
	Latitude	Longitude
	Geologist GC Miller	Date
	Drawn I. Ley	Date 8-3-83
	Scale 1:5,000	Plan No. W 2813

0 100 200 300 400 metres

4896-9

134° 30'
30° 50'
134° 40'
30° 40'
30° 45'
135° 00'
30° 50'
30° 55'
134° 30'
134° 40'
134° 50'
135° 00'
31° 00'
31° 05'

Deception Hill
Tala Hill
Black Camp Hill
Eareq Dam
Au
Sn
Kenella Well (old)
Hopeful Hill
Bulpara Hill
New Year Hill
HEATBREAK HILL
EL 1017
FZ
F1
1
2
3
4
5
6
7
8
9
10
11
12
13

LEGEND

- Carpentaria Volcanics (G-RV's)?
- 'Non-magnetic' Hiltaba equivalent
- 'Weakly-magnetic' Hiltaba equivalent
- Archaean (?) meta-sediments and volcanics
- Magnetically complex 'Granites - Glenoth equivalent ?
- Isolated magnetic high, with Amoco identification
- Major magnetic horizon - BIF
- Major dislocation/fault
- Linear magnetic high
- Railway
- Syncline - inferred
- Anticline - inferred
- E.L. Boundary
- Mine
- Well or Bore
- Hills

4896-10

AMOCO MINERALS AUSTRALIA COMPANY

Project
Project Partner

EL 1017 HEARTBREAK HILL, S.A.
INTERPRETATION OF DETAILED AEROMAGNETIC DATA

Revised	A.N.G. Sheet		Project No.
	Latitude		Longitude
	Geologist	C. ANDERSON	Date 13 - 9 - 82
	Drawn By		Date 16 - 9 - 82
	Scale	1:100,000	Plan No. # 2596

0 5 10 Kilometres