ENVELOPE 2958

TENEMENT: EL 273, Comstock

TENEMENT HOLDER: Amoco Minerals Australia Company

CONTENTS

PLANS		Scale	Company Plan no.	SADME Plan no.
	Buckaringa Project - Comstock Prospect. Composite geology, geochemistry and geophysics.	1: 5 000	M77-656	2958-8

END OF CONTENTS

AMOCO MINERALS AUSTRALIA COMPANY

FINAL REPORT

E.L. 273, SOUTH AUSTRALIA

JOHN JOHNSON - MAY 1977

and a detailed evaluation was carried out. This consisted of gridding, soil sampling, detailed geologic mapping, ground magnetics and I.P., followed by diamond drilling.

SUMMARY

Exploration Licence No. 273 encompasses an area of 12 square kilometers and is located 25 kilometers north of Quorn in South Australia.

The tenement protects an area of strongly leached basal Cambrian siltstones and sandstones which contain anomalous base metal geochemistry. These overlie the Proterozoic Pound Quartzite. These units have been folded into a synclinal structure which was considered favourable for the concentration of base metal sulphides.

Detailed exploration included soil sampling, magnetics and induced polarization surveys which indicated favourable targets for drilling. Two diamond holes were drilled which failed to intersect economic grades of mineralization.

CONCLUSIONS AND RECOMMENDATIONS

No further exploration is recommended within Exploration Licence No. 273 and the tenement should be relinquished.

CONTENTS

FIGURES

CROSS SECTIONS

ENCLOSURES

1. - Comstock Prospect
Composite Geology; Geochemistry and
Geophysics (bound with text)

APPENDICES

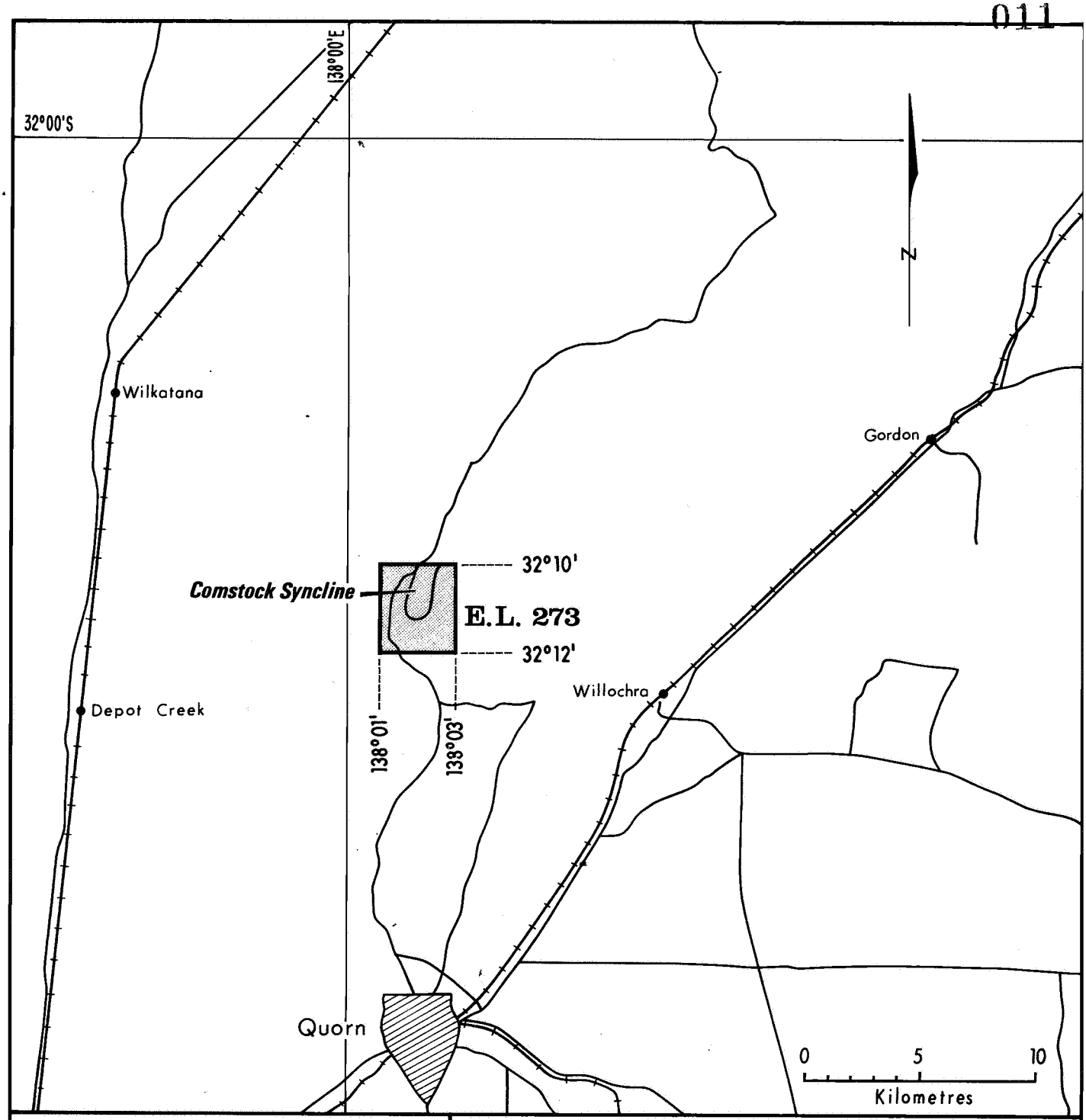
Supporting data to this report is appended and enclosed in separate folder

LOCATION AND ACCESS

The area is located 250 kilometers north of Adelaide in South Australia and more accurately, 25 kilometers north of Quorn. Major rail and road services are nearby and the tenement is well served by farm tracks. The property is favourably situated with respect to power, water, and population (Figures 1 and 2).


SIMPSON
DESERT
Palm Valley
Henbury Meteorite Craters
Henbury
Hugh R.
Rodinga
The Finke
Erldunda
Finke
Kulgera
L. Neale
Lake Amadeus
Mount Olga 3507
Ayers Rock 2845
Bedourie
Diamantina
Monkira
Birdsville
Abminga
Musgrave Ranges
Mount Woodroffe 4723
Reserve
The Stevenson
Ilbunga
The Hamilton
The Alberga
Welbourne Hill
Oodnadatta
The Macumba
Arckaringa Ck
The Neales
Warrina
Lake Eyre
The Officer
The Warburton
Mungerannie
Cordill Downs
Clifton Hills
Innamincka
Cooper's Creek
Strzelecki Ck
Etadunna
Gregory
L.Blanche
SOUTH
AUSTRALIA
DESERT
L.Dey-Dey
L.Maurice
Coober Pedy Opal Mines
Stuart Ra.
Strangways Springs
The Margaret
L. Eyre South
Marree
L Callabonna
Moolawatana
Aborigines Reserve
Maralinga
Leigh Creek
Lake Frome
Barton
Tarcoola
Woomera Missile Base
Andamooka Opal Field
Prohibited Area
Kingoonya
Woomera
Lake Torrens
Hughes
Fisher
PLAIN
Koonalda Cave
Nullarbor
Eucla
L Everard
Lake Gairdner
Island Lagoon
Woocalla
St Mary Peak 3822
Wilpena Pound
Curnamona
Siccus
Flinders Ranges
Colona
Penong
Cape Adieu
Fowler's Bay
Ceduna
Hawker
Quorn
Cockburn
L.Macfarlane
Wirrulla
Yardea
Gawler Ranges
Port Augusta
Wilmington
Yunta
Streaky Bay
Cape Bauer
Poochera
Minnipa
L.Gairdner
Iron Knob
Orroroo
Streaky Bay
Buckleboo
Iron Baron
Whyalla
Peterborough
Kyancutta
Kimba
Port Pirie
Jamestown
Gladstone
AUSTRALIAN BIGHT
Anxious Bay
Lock
Spalding
Elliston
EYRE PENINSULA
Cleve
Cowell
Burra
Spencer Gulf
Wallaroo
Clare
Robertstown
Mount Hope
Moonta
Kadina
Balaklava
Eudunda
Morgan
Renmark
Coffin Bay
Cummins
Waikerie
Barmera
Whidbey Point
Tumby Bay
Maitland
Barossa Valley vineyards
Kapunda
Gawler
Tanunda
Swan Reach
Port Lincoln
Minlaton
Salisbury
Elizabeth
Sedan
West Point
Thistle I.
ADELAIDE
Edithburgh
Cleland Wildlife Reserve
Mannum
Murray Bridge
Glenelg
Karoonda
Pinnaroo
Cape Spencer
Investigator Strait
Willunga
Strathalbyn
Tailem Bend
Rapid Bay
Gulf St Vincent
Cape Borda
Kingscote
Victor Harbour
Encounter Bay
Meningie
Flinder's Chase Sanctuary
Kangaroo I.
Keith
Bordertown
Lacepede Bay
Kingston S.E.
Cape Jaffa
Guichen Bay
Robe
Naracoorte
Penola
Beachport
Millicent
Mount Gambier
Discovery Bay
Cape Nelson
Adelaide-Cape Town 5733 Nautical Miles
Melbourne-Mauritius 4594 Nautical Miles
Melbourne-Cape Town 6247 Nautical Miles
200 km

Location



AMOCO MINERALS AUSTRALIA COMPANY

Project **BUCKARINGA S.A.** No. **A-76-36**

COMSTOCK

LOCATION MAP

Geologist **G.R.Bennett** Date **NOVEMBER, 1976**

Figure 2

GEODRAFTING SERVICES

OWNERSHIP

Exploration Licence No. 273 is held soley by Amoco Minerals Australia Company.

DESCRIPTION OF THE PROPERTY

Exploration Licence No. 273 encompasses an area of 12 square kilometers and was granted for a period of 12 months from November 23rd, 1976 (Figure 2). The tenement allows Amoco Minerals prospecting rights for copper, lead, zinc, silver, gold, cobalt and molybdenum.

GEOLOGY

Regionally, Upper Proterozoic and Cambrian sediments have been folded into a series of synclines and anticlines. The stratigraphic units considered to have economic interest are the Parachilna Formation and the basal portion of the Wilkawillina Limestone.

Stratigraphy

The stratigraphy of the Exploration Licence area can be divided into the following:-

a. Upper Proterozoic:

The Pound Quartzite is a hard, massive, white to light brown, quartz sandstone of medium grainsize. It is well bedded and in places exhibits such features as

graded bedding and current bedding.

b. Cambrian

The Parachilna Formation is essentially a thin bedded siltstone unit with minor sandstone and shaley lenses. It is generally poorly exposed and extensively weathered. It varies in colour from white to yellow-brown depending on the limonitic-hematitic content. The unit is estimated to be 100 to 120 meters thick.

The Wilkawillina Limestone is a massive, well bedded, grey limestone directly overlying the Parachilna Formation in this area. This unit is largely masked by soil cover.

Structure

The above units have been tightly folded about north-south trending axes. The Comstock Syncline plunges approximately 25^{o} to the north, and the eastern and western limbs dip at about 60^{o} towards the center of the basin. Several major faults cut obliquely across the syncline and minor faulting is common in the nose area.

Drilling results led to a reassessment of the outcrop geology. A poorly outcropping quartz horizon in the central portion of the syncline which was previously considered part of the Parachilna Formation, was re-interpreted as representing a small anticline in the basement Pound Quartzite. This markedly downgraded mineralization potential of the property.

Mineralization

Anomalous base metal values are confined to conformable manganiferous ironstones and ferruginous shales and sandstones, although no conclusive evidence of layered or stratiform massive sulphides was noted during surface exploration. Petrologic examination of specimens suggested that the base metals formed as discrete sulphide grains in interstices of the sandstones.

Drilling failed to intersect base metal sulphides in either hole. Low zinc values, up to 1%, were recorded in manganese rich iron stones in each drill hole. A narrow zone (approximately 20 centimeters) contained 1.2% zinc probably as a carbonate. This is discussed more fully by Pontifex (Appendix 1).

Amoco Mapping

The Comstock Syncline was mapped at a scale of 1:2,000 using air photos for control. The information was then transferred to 1:5,000 scale basemap. Mapping was hindered by soil and alluvial cover in the valley floor and by Pound Quartzite scree on the valley sides.

The aim of this mapping was to determine the attitude and probable thickness of the prospective Parachilna Formation. Very few field measurements of value could be obtained from this unit due to its highly weathered nature. The most meaningful attitudes were determined on the Pound Quartzite.

GEOCHEMISTRY

Soil Geochemistry

The southern portion of Comstock Syncline was sampled at 20 meter intervals along traverses 60 meters apart, and the northern portion at 40 meter intervals along traverses 180 meters apart. A total of 455 samples were collected from the 'B' horizon and sieved to the minus 80 mesh and analysed for copper, lead and zinc.

Copper

The main copper anomaly is centered at 750N, 300W within a discontinuous zone having a 250 meter strike length and width of 50 meters. Copper values are approximately five times background.

Two smaller second order anomalies, twice background occur on lines 810N, 120E and 450N, 240W (Enclosure 1).

Lead

The lead anomalies although smaller, are coincident with copper-zinc anomalies. The 250 ppm contour on the western limb trends parallel to the strike of the country rock (see Enclosure 1). Background values are about 100 ppm.

Zinc

Three elongate anomalous zinc anomalies, which are ten times background, are associated with discontinuous manganese ironstone outcrop on both western and eastern limbs of the fold. In the vicinity of the fold hinge there is a broad elongate second order zinc anomaly enclosing small highly anomalous zones (Enclosure 1). Background for zinc in 'B' horizon soils is about 100 ppm.

The strongest and best defined zone on the western limb extends for a distance of 360 meters and has a maximum width of approximately 40 meters. The highest zinc value in this zone is 1,500 ppm at 750N, 300W. A broad elongate zone of lower geochemistry is centered at approximately 540N, 30W. This broad zone could correlate with shallow dipping beds within the hinge area.

A small, though strong, zinc anomaly is centered on line 810N, 120E with coincident anomalous copper and lead. This anomaly is associated with a prominent outcrop of limonite impregnated shales.

Rock Geochemistry

The gossanous zone is anomalous in copper and zinc. From ten samples submitted, six are anomalous. Sample No. 14369 of ferruginized, manganiferous, tuffaceous sulphide bearing arenite contains 950 ppm copper, 170 ppm lead, 2,500 ppm zinc, 1% manganese, 13 ppm arsenic, 5.4 ppm silver and 200 ppm antimony. From polished section description, the gossan

appears to have at least 10% clastic sulphide grains as sparse persistent pyrite and sphalerite a few microns in size.

Sample No. 14368, sampled near No. 14369, was anomalous in coper 950 ppm, lead 200 ppm, zinc 2,500 ppm, arsenic 25 ppm, silver 3.8 ppm, manganese 1% and antimony 240 ppm. From polished section description, sulphides are associated with leached voids in the volcanic rock fragments.

Sample No. 14370 contains anomalous copper 520 ppm, lead 290 ppm, zinc 2,000 ppm, arsenic 21 ppm, silver 2.8 ppm, manganese 1% and antimony 400 ppm. From polished section description, this argillaceous siltstone and sandstone contains oxidised and sparse unaltered pyrite and chalcopyrite of a few microns in size. Portions of the rock are, however, cavernous because of the removal by leaching of sulphides after oxidation and boxwork formation.

Anomalous antimony and arsenic values are associated with anomalous copper-zinc geochemistry indicating that these two elements could be pathfinders during reconnaissance programs.

GEOPHYSICS

Magnetometer and induced polarization surveys were carried out over the gridded area.

Magnetics

A ground magnetometer survey over seven line kilometers of grid with readings at 20 meter intervals was carried out using a Proton G816 magnetometer. The contoured magnetics show that the trend of the magnetic highs is generally offset downdip from the anomalous zone, (Figure 1).

A high located at 810N, 40E indicates a dip of approximately 75 degrees west of a shallow body, 30 to 40 meters below surface.

Induced Polarization

Induced polarization and resistivity survey was conducted over 4.8 kilometers of grid. A dipole-dipole array with a dipole spacing of 100 meters was used. Resistivity pseudosections show distinct resistivity contrasts between the resistive Pound Quartzite and the conductive Parachilna Formation.

Percentage Frequency Effect pseudosections indicate a strong I.P. effect between three and five times background on three of the six lines surveyed. These responses locate electrical conductors at approximately 810N, 50W, 620N, 50W, 450N, 150W (Enclosure 1).

The I.P. conductor is coincident with anomalous zinc geochemistry.

PETROLOGY

Three surface samples were submitted to A.W.G. Whittle for mineralogic examination. Details are appended to this report. One specimen was submitted to I. Pontifex for identification and this report is also appended.

DRILLING

Two holes were drilled on the Comstock Prospect within E.L. 273, for a total of 505 meters. The contractor employed was Longyear Australia Pty. Limited using a Longyear 38 wireline rig. Both holes were angle holes, BSA-77-1 being at minus 60 degrees and BSA-77-2 at minus 80 degrees. Core recovery on the first hole was quite good, however, on the second hole it was extremely poor being as low as 10% over some sections.

The manganiferous and ferruginous sections of each hole were split and the half core bulked and analysed in either 30 centimeter or 100 centimeter lengths. All samples were crushed, pulverized and analyzed for copper, lead, zinc, silver and magnanese by A.C.S. Laboratories, Adelaide. Results from these analyses are included in the drill logs enclosed. A detailed description of each hole follows,

Hole No. BSA-77-1

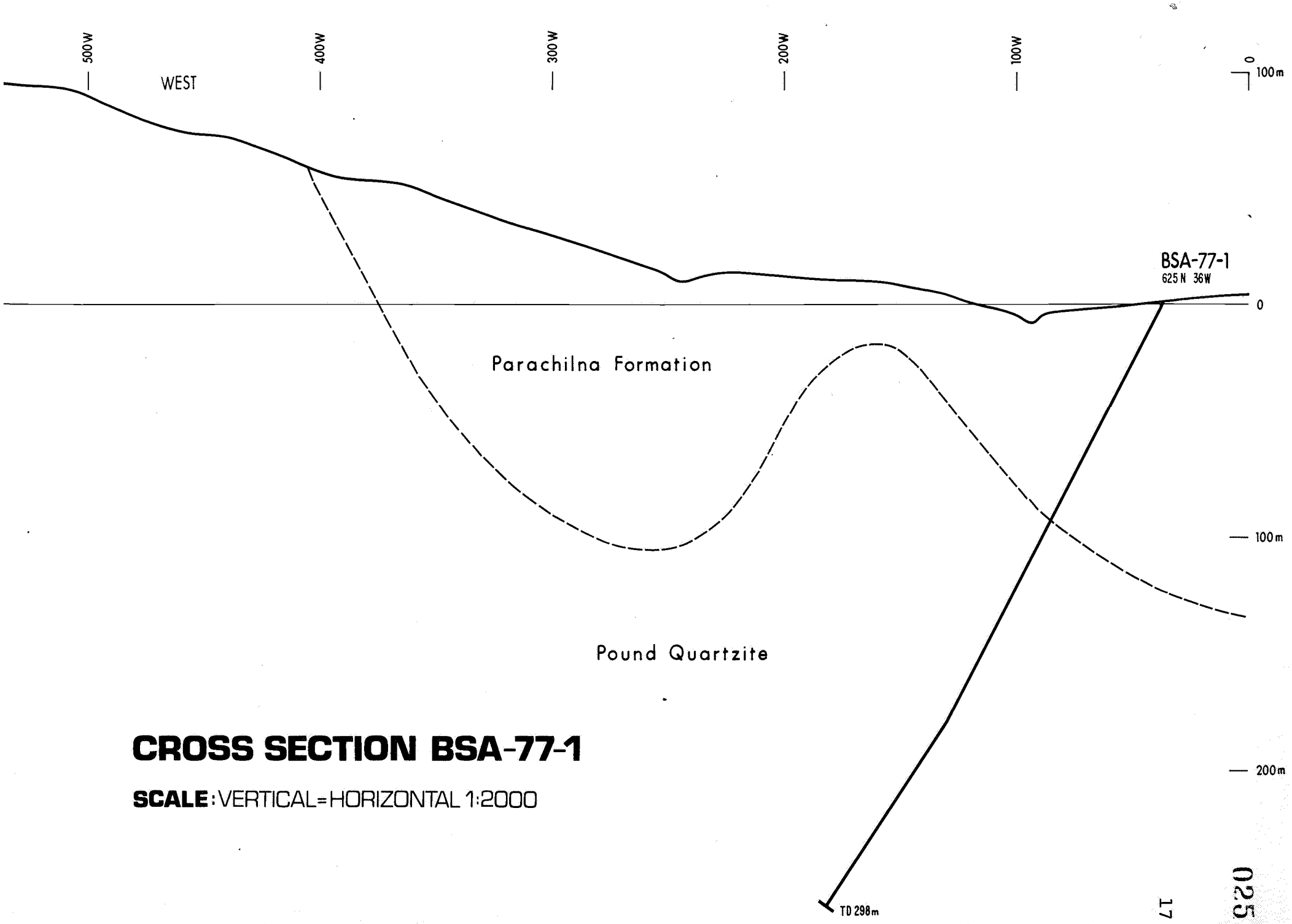
Grid Location: 625N, 36W. Declination: 60° heading grid west. Total Depth: 298 meters

This hole was collared in an ironstone capping and diamond coring commenced immediately. The capping contained significant zinc values but no evidence of sulphides was noted. After passing through the ironstone, heavily weathered shales and siltstones were encountered to nearly 90 meters. At approximately 100 meters a quartzitic horizon was intersected. Surface evaluation showed this was apparently a thin bed and drilling proceeded. The hole, however, was terminated in the quartzite and it is suspected that this represents a refold of the Pound Quartzite. The hole failed to intersect the anomalous zone. The explanation of drill results are illustrated in the section for hole BSA-77-1. No evidence of sulphide mineralization was noted in the hole.

Hole No. BSA-77-2

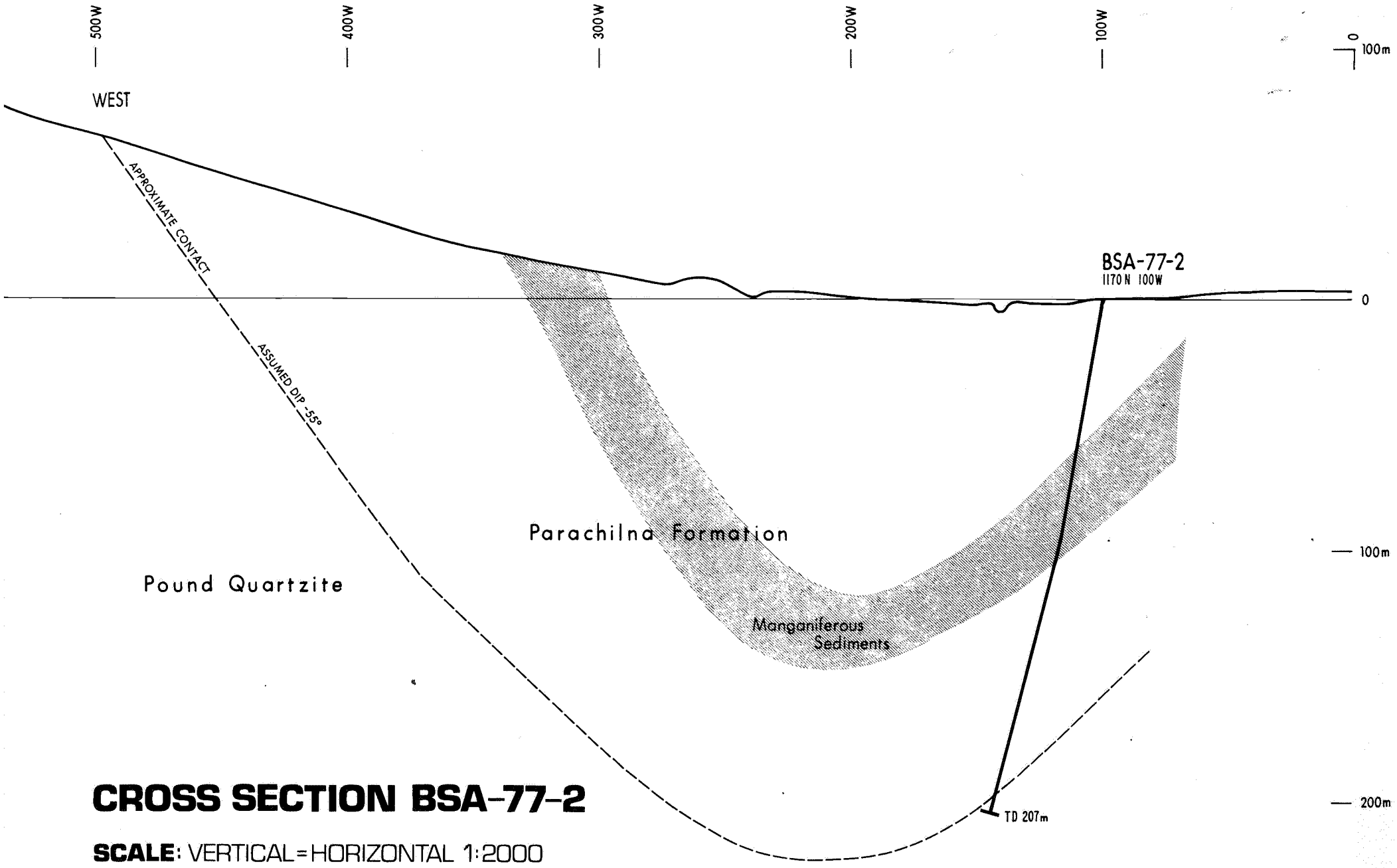
Grid Location: 1170N, 100W. Declination: 80° heading grid west. Total Depth: 207 meters.

This hole was collared on an alluvial flat and tricone drilling was used to 58 meters. Minor near surface core drilling was necessary to penetrate abundant large quartzite boulders in the overburden. Coring commenced in a manganiferous sediment which again contained significant zinc values (up to 1%). A narrow carbonate horizon intersected at approximately 140 meters also contains 1% zinc values. However, no sulphides were noted in the hole, although it should be noted that core recovery was extremely poor. Oxidation was much deeper in this hole (approximately 150 meters vertically).



CROSS SECTION BSA-77-1

SCALE: VERTICAL=HORIZONTAL 1:2000



CROSS SECTION BSA-77-2

SCALE: VERTICAL=HORIZONTAL 1:2000

The information contained in this report was compiled and collated by John Johnson.

FOR JOHN JOHNSON

AMOCO MINERALS AUSTRALIA COMPANY

TOTAL EXPENDITURE TO MAY 31, 1977

EXPLORATION LICENCE NUMBER 273

Salaries	5,806.28
Supplies Office	1,208.35
Cookery	1,778.57
Field Office Rent	88.00
Field Supplies	1,109.15
Freight	351.36
Travel	2,287.92
Communications	31.80
Geophysics	1,433.00
Drilling	31,076.11
Other Contractors	255.73
Assays	1,058.80
Equipment Rental	2,525.76
Equipment Operation & Maintenance	816.80
Property Acquisition	8.00 ?
Overhead	15,551.24
	65,386.87

T.J. CONQUEST
Accountant

APPENDICES TO FINAL REPORT EL. 273, SOUTH AUSTRALIA

INCLUDES

GEOCHEMICAL ASSAY RESULTS
MINERALOGICAL REPORTS
GROUND MAGNETICS DATA SHEET
INDUCED POLARIZATION SURVEY
DRILL LOGS

GEOCHEMICAL ASSAY RESULTS

GEOCHEMICAL AND MINERALOGICAL
LABORATORIES (WA) PTY. LTD.
21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847

Phone: 65 4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. W 7381	Our Ref. P14032
Date In 20.12.76	Date Out 5.1.77
Client: AMOCO MINERALS AUSTRALIA CO.	
Samples Identification: As per sheets.	

ANALYTICAL REPORT

REMARKS

* = These samples have been checked.

[illegible] 10% [illegible]
[illegible] CHECKED BY AAS

ANALYTICAL TECHNIQUE	ELEMENTS	PRECISION AT LEVEL		LIMIT OF DETECTION
AAS (WC1-RX10$_A$)	Cu Pb Zn	10%	300ppm	2
	Mn	10%	1000ppm	2

AAS — *Geochemical Analysis by Atomic Absorption Spectrophotometry. Sample attack by methods giving highest extraction within cost-limitations. Conditions carefully controlled to give high precision. Suitable for levels up to 1%.*

Sorting — *Sorting Analysis. As above but technique extended to operate in percentage range. Generally suitable for levels up to 15%*

Colorimetric — *Geochemical Analysis by Colorimetry. Used for elements which cannot be determined by AAS due to poor sensitivity — Sample attack by methods giving highest extraction within cost limitations. Generally suitable for levels up to 1000 ppm. Above 1000 ppm AAS can usually be used.*

PRECISION *is determined with standards similar in composition to the samples. The value given is ± two standard deviations. This means that if the analysis is repeated sixteen times, on average only one result will differ from the mean by more than the value given. Results are usually rounded to the nearest 0.5 standard deviation.*

This laboratory is registered by the National Association of Testing Authorities, Australia.

These results comprising 1 *pages, have been obtained in accordance with the Association's terms of registration.*

NATA SIGNATORY

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

Typist: F. Cardoso
P14032/1

Analyst		SN	EC	SN	EC
Sample No.		Cu	Pb	Zn	Mn
270N	00 *	32	220	200	260
	20E	30	190	140	220
	60E	28	100	96	220
	100E	24	76	84	220
	140E	22	48	56	320
	180E	16	22	40	340
	220E	16	24	38	340
	260E	18	24	42	300
	20W	14	150	46	96
	60W *	10	80	24	90
INTERNAL STANDARD					
	100W	12	88	22	92
	140W	16	34	40	160
	180W	16	26	28	210
	220W	20	30	40	160
	260W	18	24	34	210
270N	300W	22	30	40	200
330N	00	32	210	210	340
	20E	42	190	300	450
	40E	60	250	370	540
	60E *	50	180	290	510
	80E	36	108	180	320
	100E	26	94	120	290
	120E	28	78	116	290
	140E	16	68	72	300
330N	160E	14	30	36	240

not requested C.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample S/R sample not received.

These results are authentic only when accompanied by cover sheet signed by the registered NATA signatory

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

REPORT No. 035 SHEET No.

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P14032/2

Analyst		SN	EC	SN	EC
Sample No.		Cu	Pb	Zn	Mn
330N	180E	14	28	28	260
	200E	14	30	40	220
	220E	12	24	32	190
	240E	16	30	40	240
	260E *	14	30	40	210
	280E	18	30	40	220
	20W	28	400	140	290
	40W	36	400	190	310
	60W	24	250	100	220
	80W	18	300	60	180
INTERNAL STANDARD					
	100W	20	150	40	108
	120W	20	30	54	240
	140W	12	30	30	240
	160W	10	30	26	200
	180W *	16	40	48	180
	200W	14	38	44	150
	220W	36	30	40	250
	240W	14	24	36	230
	260W	18	24	38	200
	280W	16	24	36	200
	300W	20	22	42	220
300N	320E	16	28	40	240
300N	0	60	390	740	700
	20E	56	190	500	700
300N	40E *	56	210	480	730

not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

These results are authentic only when accompanied by cover sheet signed by the registered NATA signatory

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

REPORT No. 036 SHEET No.

GEOCHEMICAL ANALYSIS

P14032/3

All results in parts per million unless otherwise stated.

Analyst		SN	EC	SN	EC
Sample No.		Cu	Pb	Zn	Mn
3903I	60E	60	200	460	600
	80E	58	320	430	460
	100E	36	150	150	180
	120E	34	116	190	350
	140E	28	68	100	410
	160E	14	40	36	190
	180E	10	40	28	150
	200E	12	54	30	120
	220E	10	48	26	88
	240E *	10	58	26	72
INTERNAL STANDARD					
	260E	16	58	36	140
	280E	16	46	36	150
	20N	82	470	820	570
	40N	46	400	380	390
	60N	56	450	270	290
	80N	52	350	260	330
	100N	60	320	190	240
	120N	22	60	64	270
	140N	30	110	94	330
	160N *	30	100	90	360
	180N	50	230	190	560
	200N	40	200	150	450
	220N	30	160	240	360
	240N	30	110	120	290
3904I	260N	28	90	100	250

not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

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GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P14032/4

Analyst		SN	EC	SN	EC
Sample No.		Cu	Pb	Zn	Mn
390N	280W	20	64	74	220
	300W	22	82	60	220
390N	320W	20	86	50	190
450N	00	96	300	1100	900
	20E *	80	250	820	1400
	60E	52	190	330	500
	100E	12	44	32	150
	140E	18	68	48	250
	180E	16	104	36	170
	220E	14	76	32	140
INTERNAL STANDARD					
	260E	18	32	28	140
	20W	210	390	1160	1000
	60W	120	290	660	1500
	100W	260	340	720	4400
	140W *	76	190	280	1150
	180W	170	410	880	4400
450N	220W	160	270	700	5300
510N	00	74	90	530	2150
	20E	100	230	860	1100
	40E	85	170	660	1400
	60E	112	220	780	4000
	80E	16	56	50	220
	100E	46	88	160	460
	120E	40	84	180	250
510N	140E *	42	130	62	140

not requested S.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

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GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P14032/S

Analyst		SN	EC	SN	EC
Sample No		Cu	Pb	Zn	Mn
510N	160E	20	82	40	140
	180E	24	116	38	106
	200E	14	80	40	170
	220E	14	56	32	150
	240E	16	90	36	130
	260E	16	50	32	140
	280E	16	56	34	160
	20W	82	100	660	2950
	40W	104	120	530	2100
	60W *	130	166	640	4000
INTERNAL STANDARD					
	80W	78	130	470	3900
	100W	86	74	350	1700
	120W	110	80	290	1450
	140W	50	104	130	540
	160W	58	92	220	1100
	180W	150	250	720	4100
	200W	94	140	390	1400
	220W	96	150	410	1600
	240W	74	90	210	600
	260W *	76	112	220	480
	280W	18	80	42	260
	300W	16	56	40	180
530S	300W	16	80	38	130
520S	0	74	150	1400	~ 1%
510S	20E	56	74	610	9800

not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

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GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

REPORT No. SHEET No.

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P14032/6

Analyst		SN	EC	SN	EC
Sample No.		Cu	Pb	Zn	Mn
570N	40E	70	70	700	9500
	60E	44	66	400	2700
	80E	42	72	170	1500
	100E	120	260	680	2650
	120E *	90	170	550	8500
	140E	90	170	330	2450
	160E	100	180	310	1250
	180E	140	170	230	400
	200E	64	140	110	220
	220E	22	94	42	170
INTERNAL STANDARD					
	240E	16	116	28	78
	260E	18	28	40	290
	280E	18	28	36	230
	300E	20	26	40	300
	20W *	76	114	720	~ 1%
	40W	86	86	470	3900
	60W	130	103	840	5000
	80W	84	94	800	4900
	100W	52	150	260	1250
	120W	106	150	340	4200
	140W	140	66	370	6500
	160W	210	50	500	9800
	180W	220	98	550	7500
	200W	160	110	520	2700
570N	220W *	120	130	410	4200

-not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

These results are authentic only when accompanied by cover sheet signed by the registered NATA signatory

GEOMIN LABORATORIES

SYDNEY -- DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P14032/7

Analyst		SN	EC	SN	EC
Sample No.		Cu	Pb	Zn	Mn
570N	240W	74	300	450	2400
	260W	60	450	360	290
	280W	150	400	180	420
	300W	58	180	150	330
	320W	46	200	210	290
	340W	36	100	180	280
	360W	18	1650	48	260
	380W	18	50	48	250
570N	400W	18	46	46	190
630N	60 *	50	70	640	6000
INTERNAL STANDARD					
	20S	38	74	200	2300
	60S	36	42	92	650
	100S	28	38	64	600
	140S	24	36	50	320
	180S	30	60	70	250
	220S	48	106	66	190
	260S	16	40	34	180
	300S	18	28	38	220
	25N	52	80	700	7500
	60N *	104	50	540	7000
	100N	170	86	330	1950
	140N	230	120	330	1900
	180N	810	60	350	6000
	220N	230	330	600	6300
630N	260N	140	150	240	>1%

-not requested G.T. 1% greater than 1%. T/F to follow K below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

REPORT No. 041 SHEET No.

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P14032/8

Analyst		SN	EC	SN	EC
Sample No.		Cu	Pb	Zn	Mn
630N	300W	98	94	240	500
	340W	14	140	26	200
630N	380W	20	140	36	220
690N	00	36	48 ≁	290	3900
	20E *	42	66	210	950
	40E	58	140	370	2100
	60E	70	106	400	1450
	80E	74	94	430	1650
	100E	72	74	410	650
	120E	76	80	230	550
INTERNAL STANDARD					
	140E	60	68	140	340
	160E	44	80	160	240
	180E	26	42	60	250
	200E	26	46	70	250
	220E *	22	54	66	200
	240E	16	30	40	260
	260E	14	24	36	210
	280E	18	28	38	200
	300E	18	26	38	240
	20W	56	84	450	6000
	40W	34	30	44	290
	60W	32	38	56	350
	80W	130	150	300	2100
	100W	150	76	310	2650
[illegible]	120W *	520	56	390	2750

— not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

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GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

REPORT No. 042 SHEET No.

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P14032/9

Analyst		SN	EC	SN	EC
Sample No.		Cu	Pb	Zn	Mn
690N	140W	180	84	350	1550
	160W	290	108	480	3900
	180W	180	170	350	850
	200W	30	170	42	140
	220W	34	220	58	190
	240W	28	380	56	190
	260W	30	350	62	170
	280W	20	330	46	120
	300W	18	160	36	150
	320W *	36	40	44	200
INTERNAL STANDARD					
	360W	32	38	46	220
	380W	86	98	170	1650
	400W	80	108	350	2850
690N	420W	66	80	350	5400
750N	00	56	58	200	800
	20W	68	60	250	1550
	40W	68	70	320	1250
	60W	68	100	300	750
	80W	46	140	270	420
	100W *	36	550	350	600
	120W	62	90	420	600
	140W	70	64	170	310
	160W	40	64	92	170
	180W	44	60	80	150
750N	200W	38	42	56	138

-not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P14032/10

Analyst		SN	EC	SN	EC
Sample No.		Cu	Pb	Zn	Mn
750N	220E	22	62	60	250
	240E	16	40	32	240
	260E	16	34	36	320
	280E	18	30	40	360
	300E *	18	36	44	320
	20W	106	94	570	1300
	40W	72	78	500	4400
	60W	54	90	200	1500
	80W	36	38	50	600
	100W	44	30	86	500
INTERNAL STANDARD					
	120W	72	120	300	3500
	140W	140	150	360	4800
	160W	92	60	200	1700
	180W	170	62	320	1250
	200W *	100	70	350	1100
	220W	200	78	370	1150
	240W	220	90	390	950
	260W	230	94	390	1050
	280W	430	120	900	2000
	300W	500	200	1500	2450
	320W	350	104	880	1500
	340W	112	360	200	470
	360W	54	210	230	350
	380W	62	210	150	240
750N	400W *	54	260	110	190

-not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/F sent previously I.S. insufficient sample SNR sample not received.

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GEOMIN LABORATORIES

REPORT No. 044 SHEET No.

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P14032/11

Analyst		SN	EC	SN	EC
Sample No.		Cu	Pb	Zn	Mn
870N	20E	64	56	350	1250
	40E	72	54	260	2150
	60E	56	52	250	3700
	80E	72	78	360	1500
	100E	46	72	230	750
	120E	58	50	150	380
	140E	56	50	140	310
	160E	60	60	140	320
	180E	40	44	88	200
	200E *	60	70	90	190
INTERNAL STANDARD					
	220E	34	120	68	200
	240E	22	34	52	200
	260E	16	34	30	130
	280E	16	30	32	160
	300E	20	30	42	300
	20W	80	60	340	1650
	40W	74	62	330	1650
	60W	78	104	250	2350
	80W	82	36	140	2150
	100W *	62	50	230	2750
	120W	74	80	350	2100
	140W	78	90	68	430
	160W	36	30	58	220
	180W	28	30	46	330
870N	200W	28	30	38	240

- not requested G.T. 1% greater than 1%. T/F to follow < below limit of detection S/P sent previously i.s. insufficient sample SNR sample not received.

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GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

REPORT No. 045 SHEET No.

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P14032/12

Analyst		SN	EC	SN	EC
Sample No.		Cu	Pb	Zn	Mn
670N	220W	24	32	66	150
	240W	130	80	200	440
	260W	160	118	320	1500
	280W	210	150	400	1700
	300W *	220	118	540	1750
	320W	170	180	490	1300
	340W	104	240	220	400
	360W	50	83	70	190
	380W	50	96	62	200
670S	400W	54	90	62	230
INTERNAL STANDARD					
990N	20S	18	32	34	130
	60S	22	28	36	120
	100S	50	114	430	2200
	140S	68	190	600	2100
	180S *	76	68	300	240
	220S	20	40	46	350
	260S	12	32	26	120
	20W	24	36	62	330
	60W	80	96	250	1600
	100W	160	170	340	950
	140W	116	130	220	1000
	180W	60	44	98	1000
	220W	28	44	92	490
	260W	50	32	80	340
1310N	300W *	80	50	66	540

not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

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GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P14032/13

Analyst		SN	EC	SN	EC
Sample No.		Cu	Pb	Zn	Mn
990N	340W	50	38	70	500
990N	380W	20	32	38	200
810N	20E	62	50	240	900
	60E	90	56	290	650
	100E	140	74	680	1250
	140E	64	70	340	1000
	180E	48	70	140	300
	220E	24	100	44	180
	260E	14	70	28	120
	300E *	14	60	34	130
INTERNAL STANDARD					
	20W	120	160	900	1100
	60W	50	86	240	1150
	100W	92	110	240	2500
	140W	66	50	180	1050
	180W	36	30	50	200
	220W	20	34	32	270
	260W	140	150	180	400
	380W	130	250	150	370
	340W	350	280	1200	2300
810N	380W *	140	230	430	590

-not requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

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GEOCHEMICAL AND MINERALOGICAL
LABORATORIES (W.A.) PTY. LTD.
21 WYNYARD STREET, BELMONT, PERTH, W.A. 6104

Registered Laboratory Number 847

Phone: 65 4322 (3 Lines)
Telex: 92418
Cables: Geochem Perth

Your Ref. E 7931	Our Ref. P14032
Date In 20.12.76	Date Out 5.1.77
Client: AMOCO MINERALS AUSTRALIA CO.	
Samples identification: As per sheets.	

ANALYTICAL REPORT

REMARKS

All samples have been checked.

[illegible] 1% [illegible]
[illegible] BE CHECKED BY [illegible]

ANALYTICAL TECHNIQUE	ELEMENTS	PRECISION AT LEVEL		LIMIT OF DETECTION
AAS ($HClO_4$)	Cu Pb Zn	10%	300ppm	2
Col/$HClO_4$	As	30%	50ppm	1
Col/Fusion	Sn	30%	30ppm	20
AAS (Aqua Regia)	Ag	20%	2ppm	0.2
	Mn	10%	1000ppm	2
Col/Fusion	Sb	20%	100ppm	2
LG 5	Au	20%	10ppm	0.05

AAS *Geochemical Analysis by Atomic Absorption Spectrophotometry. Sample attack by methods giving highest extraction within cost-limitations. Conditions carefully controlled to give high precision. Suitable for levels up to 1%.*

Sorting *Sorting Analysis. As above but technique extended to operate in percentage range. Generally suitable for levels up to 15%.*

Colorimetric *Geochemical Analysis by Colorimetry. Used for elements which cannot be determined by AAS due to poor sensitivity — Sample attack by methods giving highest extraction within cost limitations. Generally suitable for levels up to 1000 ppm. Above 1000 ppm AAS can usually be used.*

PRECISION *is determined with standards similar in composition to the samples. The value given is ± two standard deviations. This means that if the analysis is repeated sixteen times, on average only one result will differ from the mean by more than the value given. Results are usually rounded to the nearest 0.5 standard deviation.*

This laboratory is registered by the National Association of Testing Authorities, Australia.

These results, comprising 3 *pages, have been obtained in accordance with the Association's terms of registration.*

DATA SIGNATORY

GEOMIN LABORATORIES

SYDNEY — DARWIN — KALGOORLIE — PERTH

REPORT No. 048 SHEET No.

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

Typist: P. Cardozo

P14032/1

Analyst	CP	EC	CP	HD	HD
Sample No.	Cu	Pb	Zn	As	Sn
14366	190	98	1600	12	x
67	230	180	1600	127	x
68	950	260	2500	25	x
69	950	170	2500	13	x
70	520	290	2000	21	x
71	200	70	820	61	x
72	210	70	940	200	x
73	530	230	780	210	x
74	290	72	1400	20	x
14375	850	28	3300	6	x
INTERNAL STANDARD					

ot requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

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GEOMIN LABORATORIES

REPORT No. SHEET No.

SYDNEY — DARWIN — KALGOORLIE — PERTH

GEOCHEMICAL ANALYSIS

All results in parts per million unless otherwise stated.

P14032/1A

Analyst	CP	CP	SN	EC
Sample No.	As	Mn	Sb	Au
14336	2.8	2200	600	x
67	3.0	1100	600	x
68	3.6	>1%	240	x
69	5.4	>1%	200	x
70	2.8	>1%	400	x
71	2.2	1200	200	x
72	3.6	650	460	x
73	15	>1%	400	x
74	1.6	>1%	120	x
14338	3.3	>1%	240	x
INTERNAL STANDARD				

Requested G.T. 1% greater than 1%. T/F to follow X below limit of detection S/P sent previously I.S. insufficient sample SNR sample not received.

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A.C.S. Laboratories Pty. Ltd
50 MARY STREET
UNLEY, S.A. 506
P.O. BOX
UNLEY, S.A. 506
PHONE: 272 5733

050

13 APR

→ COMSTOCK

ANALYTICAL RESULTS

Samples from: Amoco Minerals (Aust) Coy.
Area: Quorn.
Samples of: Cores.
Preparation: Crushed & pulverised.
Batch No.: A S. 421. (Your O/N E. 4004)

Sheet No.: 1.
Date: 5.4.77.

SAMPLES WILL BE DISPOSED OF AFTER TWO MONTHS UNLESS WE ARE OTHERWISE ADVISED

Sample Description	CuPPM	PbPPM	ZnPPM	AgPPM	MnPPM
No. - 1	140	620	2160	5	3200
2	120	680	2320	5	3300
3	170	620	2700	5	4400
4	160	820	2200	2	4250
5	360	620	4300	5	>10000
6	380	790	4300	5	>10000
7	210	260	3000	5	>10000
8	280	660	4050	2	>10000
9	280	580	4000	5	>10000
10	400	420	5300	5	>10000
1	330	620	5100	2	>10000
2	200	820	4100	2	>10000
3	180	720	4300	2	>10000
4	280	630	4900	5	>10000
5	330	820	4300	5	>10000
6	360	490	4500	5	>10000
7	210	520	3250	2	>10000
8	300	710	4100	5	>10000
9	460	340	4600	2	>10000
20	470	220	5900	2	>10000
1	260	180	4000	5	>10000
2	310	160	3700	5	>10000
3	250	240	4650	5	>10000
4	200	240	5700	2	2500
No. -25*	200	250	5000	5	>10000
Repeat and Check					
No. -12	210	830	4100	2	>10000
No. -22	300	170	3700	5	>10000

* N.B. - Please note sample No. 25 received - not listed on advice note.

ANALYTICAL METHODS: Cu, Pb, Zn, Ag, Mn by AAS following HCl leach and HCl/HNO_3 leach in latter stages of 0.25g sample.

NATA

DISTRIBUTION: Amoco Minerals - Nth Sydney
Quorn.

Signed .....

*49217

A.C.S. Laboratories Pty. Ltd
50 MARY STREET
UNLEY, S.A. 506
P.O. BOX
UNLEY, S.A. 505
PHONE: 272 5733

051

ANALYTICAL RESULTS

→ Comstock

Samples from: Amoco Minerals (Aust) Company.
Area: Quorn.
Samples of: Core & Rocks.
Preparation: Crushed & pulverised.
Batch No.: A S. 429

Sheet No.: 1.
Date: 13.4.77.

SAMPLES WILL BE DISPOSED OF AFTER TWO MONTHS UNLESS WE ARE OTHERWISE ADVISED

Sample Description	CuPPM	PbPPM	ZnPPM	AgPPM	MnPPM
Nos. - 26	390	210	3500	2	>10000
7	430	180	5500	5	>10000
8	480	160	6000	2	>10000
9	230	160	6250	2	>10000
30	260	180	7000	2	>10000
1	200	140	7250	2	>10000
2	460	180	9000	5	>10000
3	70	160	5500	2	>10000
4	60	160	4750	2	>10000
5	60	180	5000	2	>10000
6	60	210	4750	2	>10000
7	130	180	6500	2	>10000
8	70	170	6000	2	>10000
9	60	210	4500	2	>10000
40	110	170	7750	2	>10000
Nos. - 41	SAMPLE NOT RECEIVED.				
S. - 1	>10000	60	170	2	1600
S. - 2	>10000	60	130	2	1300
S. - 3	>10000	80	100	2	1700
S. - 4	>10000	50	120	2	750
S. - 5	>10000	60	100	2	800
MU - 1	>10000	40	70	<2	500
MU - 2	>10000	60	90	<2	850
E2 - 1	4700	60	120	2	700
E2 - 2	4800	70	80	2	700
W1 - 1	250	100	40	2	3900
W1 - 2	>10000	40	140	2	2100
Mu - 2-1	9500	60	100	2	1300
Mu - 2-2	>10000	60	130	<2	1100
Mu - 2-3	>10000	70	120	<2	1500
Repeat and Check					
Nos. 34	60	170	4800	2	>10000
Nos. 40	120	170	7750	2	>10000

ANALYTICAL METHODS: Cu, Pb, Zn, Ag, Mn by AAS following HCl leach and HCl/HNO_3 leach in latter stages of 0.25g sample.

DISTRIBUTION: Amoco Minerals (Aust) Coy. Sydney. & (Mr. J. Johnson).

Signed .....

*43217

MINERALOGICAL REPORTS

A.W.G. Whittle and Associates

Ian R. Pontifex and Associates

A.W.G. WHITTLE & ASSOCIATES.

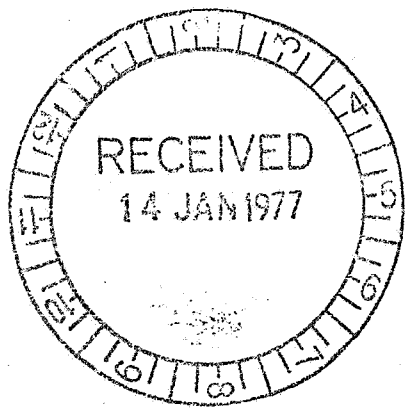
MINERALOGICAL REPORT.

Report AMOCO 14/76.

SAMPLES 14368 - 370.

(Order W 7382)

P.G. Mattinson.



DISTRIBUTION:

Copies 1 & 2 - Perth.

January 12, 1977.

SAMPLES 14368 - 370.

The report provides from one thin and three polished sections, descriptions, classifications and interpretations of the origin of the metal contents in rock outcrop samples which were submitted by Mr. P.G. Mattinson.

Analyses by A.C.S. Laboratories Pty. Ltd are appended.

The preparation of a thin section which would yield useful results was possibly only from 14369. However, all three samples were examined comparatively from polished sections.

The thin section of 14369 indicates that these are lithic tuffaceous siltstones and sandstones. The bedding is an expression of size classification within the sediment, hence there are finer and coarser siltstone lamellae which are interspersed with others containing sand-grade size lithic fragments. The latter include fragments of quartzite, and of silicified acid volcanic rock.

The entire matrix component amongst the clastic quartz and rock fragments has been completely impregnated by goethite; and by more or less manganese oxides, both of which are exotic supergene additions to the sediments. The selected bedding plane-oriented zones in which manganese oxides are dominant may be readily seen in the transverse cuts through the hand specimens.

The specific information available from the polished sections is as follows.

14368. Ferruginised-manganiferous tuffaceous-argillaceous arenite.

Cu 940; Pb 280; Zn 2400; Ag 2; As 40; Sn 50; Sb <30

The textural and structural characteristics are comparable with those of 14369. While large areas of the rock matrix consist of ferruginised clays, 3-4 mm thick bands of highly concentrated manganese oxides extend at wide intervals, for distances of several cm through the rock. There is no boxwork; and there is no evidence

of fine sulphide inclusions in the clastic quartz grains. However, small leach voids in the volcanic rock fragments indicate that minor amounts of sulphides were contained by these.

14369. Ferruginised-manganiferous tuffaceous sulphide-bearing arenite.
Cu 880; Pb 430; Zn 2000; Ag 5; As 60; Sn 100; Sb < 30

There are more numerous fragments of altered volcanic rock in this sample; and furthermore, much of the coarser clastic quartz contains oxidised fine grained sulphides, as well as sparse persistent pyrite and sphalerite of a few microns size.

The rock matrix was selectively ferruginised and manganese-oxide-impregnated, as in the case of 14368; but within the matrix the secondary oxides outlined remnants of sulphide boxwork and leach voids of 0.1-0.2 mm size. The identities of these sulphides cannot be ascertained from the remnants, but there appears to have been at least 10% clastic sulphide grains.

14370. Ferruginised-manganiferous tuffaceous-argillaceous arenite.
Cu 650; Pb 590; Zn 2000; Ag 2; As 20; Sn 100; Sb < 30

This thinly bedded sequence of argillaceous siltstones and sandstones also contains scattered lithic fragments, as well as quartz grains with oxidised and sparse unaltered pyrite and chalcopyrite of a few microns size. It can be said to be somewhat tuffaceous.

There is an abundance of manganese oxides along some of the bedding planes. Those portions of the rock which display only ferruginisation are however cavernous because of the removal by leaching of stratiform sulphides. Since there is absolutely no residual boxwork, no comment in respect to the identities of these sulphides can be made.

CONCLUSION.

These rocks exhibit very little positive evidence in boxwork or fine sulphides, of more than minor amounts of the base metal sulphides. However, they contain proportions of the products of volcanic rocks; and they did contain small proportions of clastic pyrite.

It will be noted that the geochemical characteristics of all three rocks are similar. This is consistent with their being comparable facies, each with a significantly high proportion of exotic manganese oxides.

Although the rocks were in part leached, exotic manganese oxides have since accumulated in them. These oxides can be considered to have progressively adsorbed the base metals from the circulating groundwaters which deposited the manganese and iron oxides. The metals have surely accumulated in the near surface environment from the trace amounts which were present in these and in contiguous tuffaceous rocks. The samples supplied would not in themselves appear to have significant potential for base metal sulphides; for in depth below the manganiferous zones, it is unlikely that the geochemical values would be as high.

A.W.G. Thittle & Associates,
Mineralogical Consultants.

January 12, 1977.

ADELAIDE SYDNEY

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TELEX: AA82623

ANALYTICAL RESULTS

Samples from: Dr. A.W.G. Whittle & Assoc.
Area:
Samples of: Rocks.
Preparation: Crushed & pulverised. Sheet No.: 1.
Batch No.: A 1869. (Your O/N 327) Date: 7.1.77.

SAMPLES WILL BE DISPOSED OF AFTER TWO MONTHS UNLESS WE ARE OTHERWISE ADVISED

Sample Description	Cuppm	Pbppm	Znppm	Agppm	Asppm	Snppm	Sbppm
14368	940	280	2400	2	40	50	<30
14369	880	430	2000	5	60	100	<30
14370	650	590	2000	2	20	100	<30

ANALYTICAL METHODS: Cu, Pb, Zn, Ag by AAS following HCl leach and HCl/HNO_3 leach in latter stages of 0.25g sample. As by modified Gutzeit method. Sn, Sb by Emission Spectrography Scheme ES.

DISTRIBUTION: Dr. A.W.G. Whittle & Assoc.

Signed .....

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Buchanan & Assays 058

Ian R. 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. 2134

29th April, 1977

TO: Mr. J. Johnson,
Amoco Minerals Australia Co.,
c/- L. Reay,
218 Tapleys Hill Road,
SEATON, S.A. 5023

YOUR REFERENCE: Sample personally delivered

MATERIAL: Rock sample

IDENTIFICATION: No. 41
Project A-76-36

WORK REQUESTED: Petrographic examination

SAMPLE & SECTIONS: Retained

PONTIFEX & ASSOCIATES PTY. LTD.

Sample 41

Project A-76-36: vaguely layered, (sandy) impure magnesic-dolomite or magnesite, clouded with fine carbonaceous material; dislocated and recrystallised; trace disseminated pyrite and rare trace chalcopyrite

This is a massive microcrystalline, generally dark grey rock with a somewhat disrupted, fine wavy layering (and local laminations), and erratic discontinuous white stringers.

The main reason for this examination was to find why it seemed heavier than "normal". An S.G. determination indicated a value of 3.47.

In thin section it is seen to consist of essentially microcrystalline to cryptocrystalline carbonate. This carbonate is commonly clouded by, and the layering more or less delineated by ultra fine opaque dust, almost certainly of organic derivation, but not clearly crystalline (graphite).

Local poorly defined areas of quite coarsely crystalline carbonate are relatively clear. Accessory (3-5%) single, subrounded to subangular quartz grains, average size 0.3 mm are randomly scattered. The white stringers are recrystallised carbonate, with some central drusy cavities.

.../

Sample 41 contd. :

Petrology alone cannot confirm the carbonate species, but considered together with the S.G., acid reaction and alizarin red staining, essentially the whole of the rock appears to consist of impure magnesic-dolomite or magnesite.

In a rough polished section, accessory (1%), extremely fine (2-10 micron), grains of pyrite and lesser chalcopyrite were seen randomly dispersed through darker coloured domains in the rock.

S.A.

061

Ian R. 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

MEMORANDUM TO: Mr. J. Johnson,
Amoco Minerals Australia Co.,
c/- L. Reay,
218 Tapleys Hill Road,
SEATON, S.A. 5023

MEMORANDUM FROM: I. R. Pontifex

SUBJECT: Chemical analysis sample No. 41
(Project A-76-36)

DATE: 11th May, 1977

Following our recent phone conversation I herein confirm, on paper, the chemical assay analysis for sample no. 41, previously described in my Report No. 2134, dated 29/4/77. The results reported by A.C.S. Laboratories are:-

Cu	<0.01% (15 ppm)
Pb	<0.01% (190ppm)
Zn	1.22%
Fe	26.0%
Mn	16.0%

In the light of these results I would suggest that the carbonate which forms the great majority of this sample, and previously identified as impure magnesic-dolomite or magnesite, is in fact a more complex carbonate, involving substitution of Ca and Mg by Fe, Mn and probably Zn.

.../2

SG

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Memorandum to J.Johnson

Re-assessment of the thin section indicates that much of the "opaque dust" referred to in Report 2134 is probably manganese oxide. Certainly the clear crystalline carbonate appears to be predominantly "dolomitic", however some faintly brownish layers may approach a siderite composition.

To positively establish the mode of occurrence of the Zn, and the identity of the carbonate species, it is suggested that several more representative samples are examined in thin and polished section in conjunction with selected chemical analysis.

IAN R. PONTIFEX

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IAN R. PONTIFEX

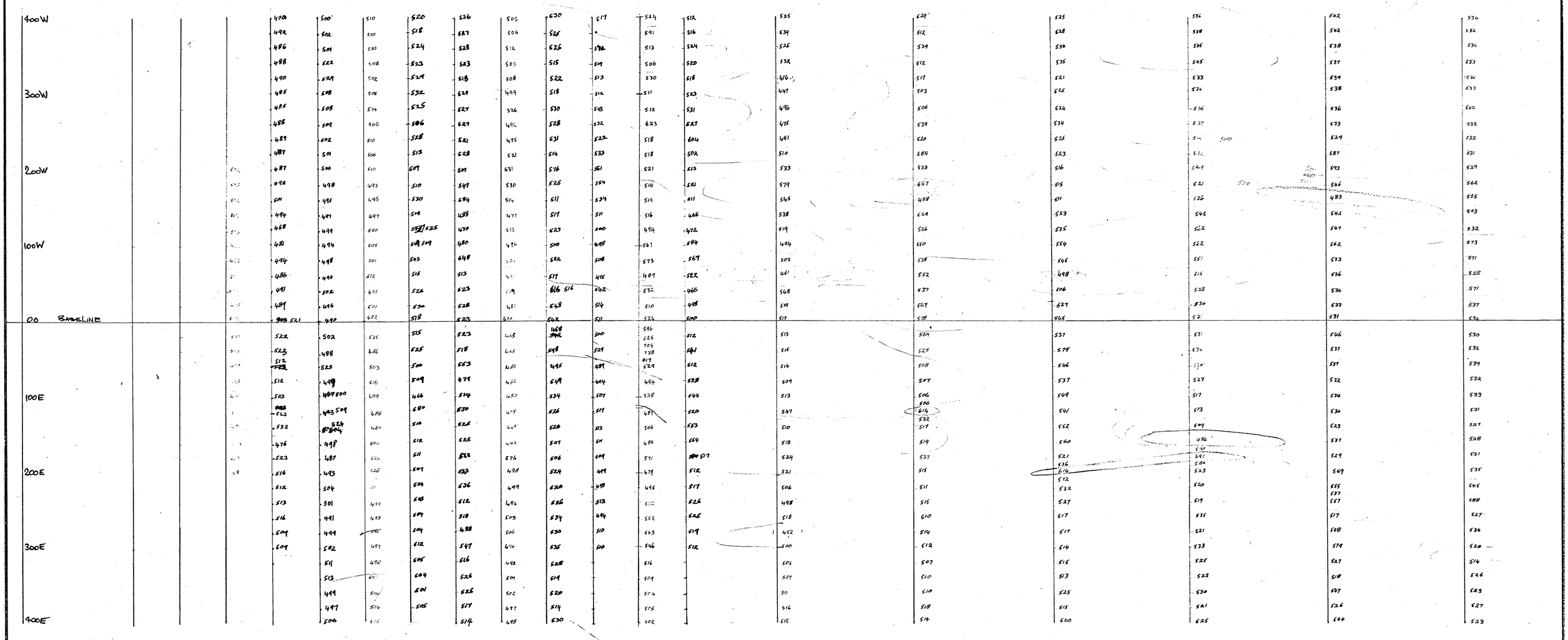
GROUND MAGNETICS DATA SHEET

BUCKARINGA PROJECT / COMSTOCK PROSPECT / EL 273 S.A

GROUND MAGNETICS

DATA SHEET

GAMMAR / 20m INTERVAL / PROTON G 816 MAGNETOMETER



Amoco Minerals Australia Company 1977

29587

Scale 1:2500

INDUCED POLARIZATION SURVEY

Solo Geophysics and Company

SOLO GEOPHYSICS AND CO.

22 AVENUE ROAD PROSPECT SOUTH AUSTRALIA 5082

030

TELEPHONE 44 6

29th December, 1976.

Mr. Bryce Roxbrough,
Amoco Minerals Aust. Co.,
P.O. Box 949,
NORTH SYDNEY, N.S.W. 2060.

Dear Bryce,

Enclosed are four copies of data obtained on the Induced Polarization survey at the Buckaringa Prospect near Quorn in South Australia during period December 14th to 18th.

lines:	1155N	100 metre dipole dipole from 4E to 4W
	990N	"
	810N	"
	630N	"
	450N	"
	270N	"

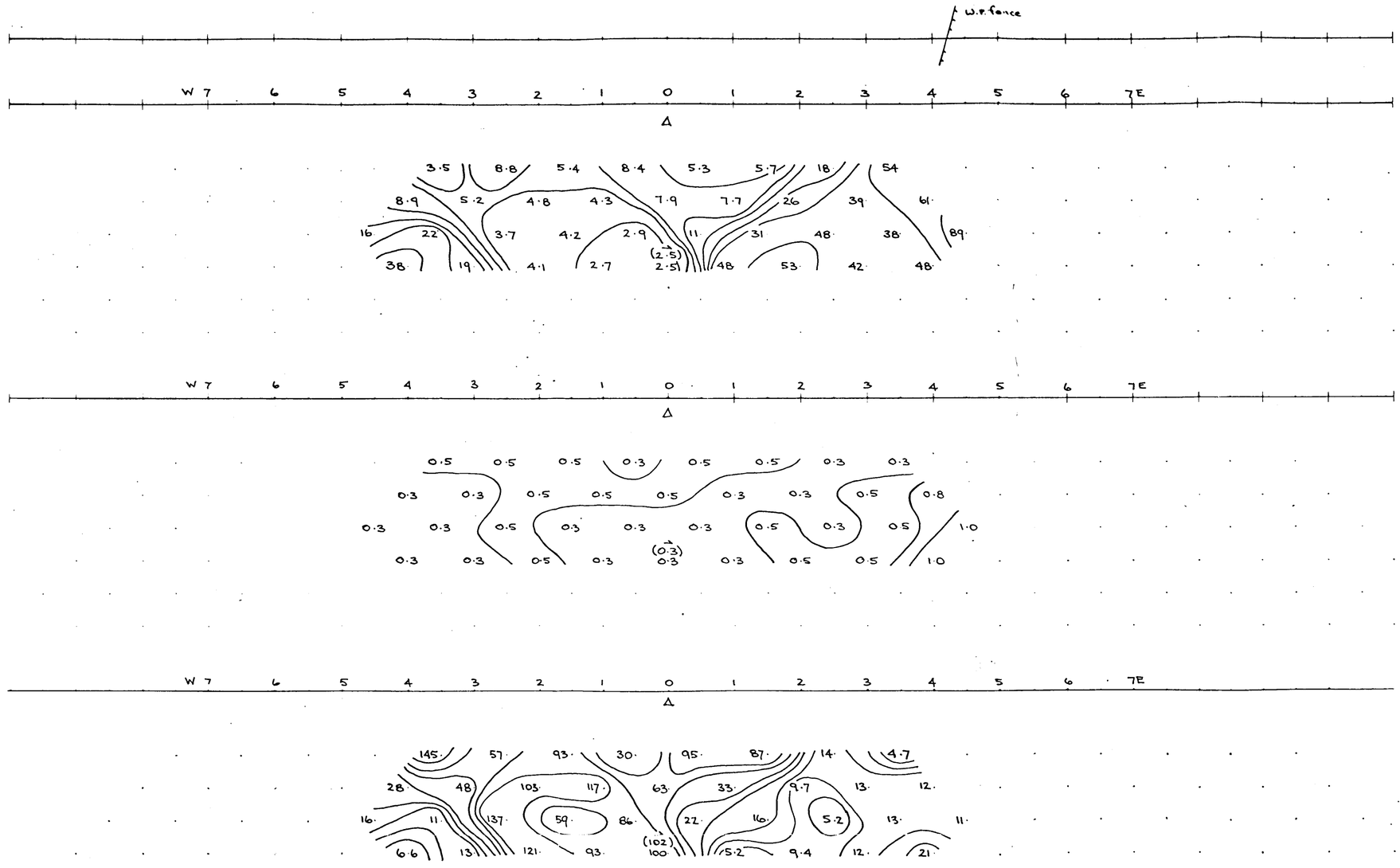
One copy of each of above lines has also been forwarded to Phil Matinson in Perth. Owing to the timing of the survey the Christmas period delayed processing of the data.

Thank you for the opportunity to assist your exploration programme.

Yours sincerely,

B. A. RAU

copies: B. Roxbrough, Sydney 4
P. Matinson, Perth 1
file 1



Culture Plan

Apparent Resistivity (ohm-m)

P.F.E.

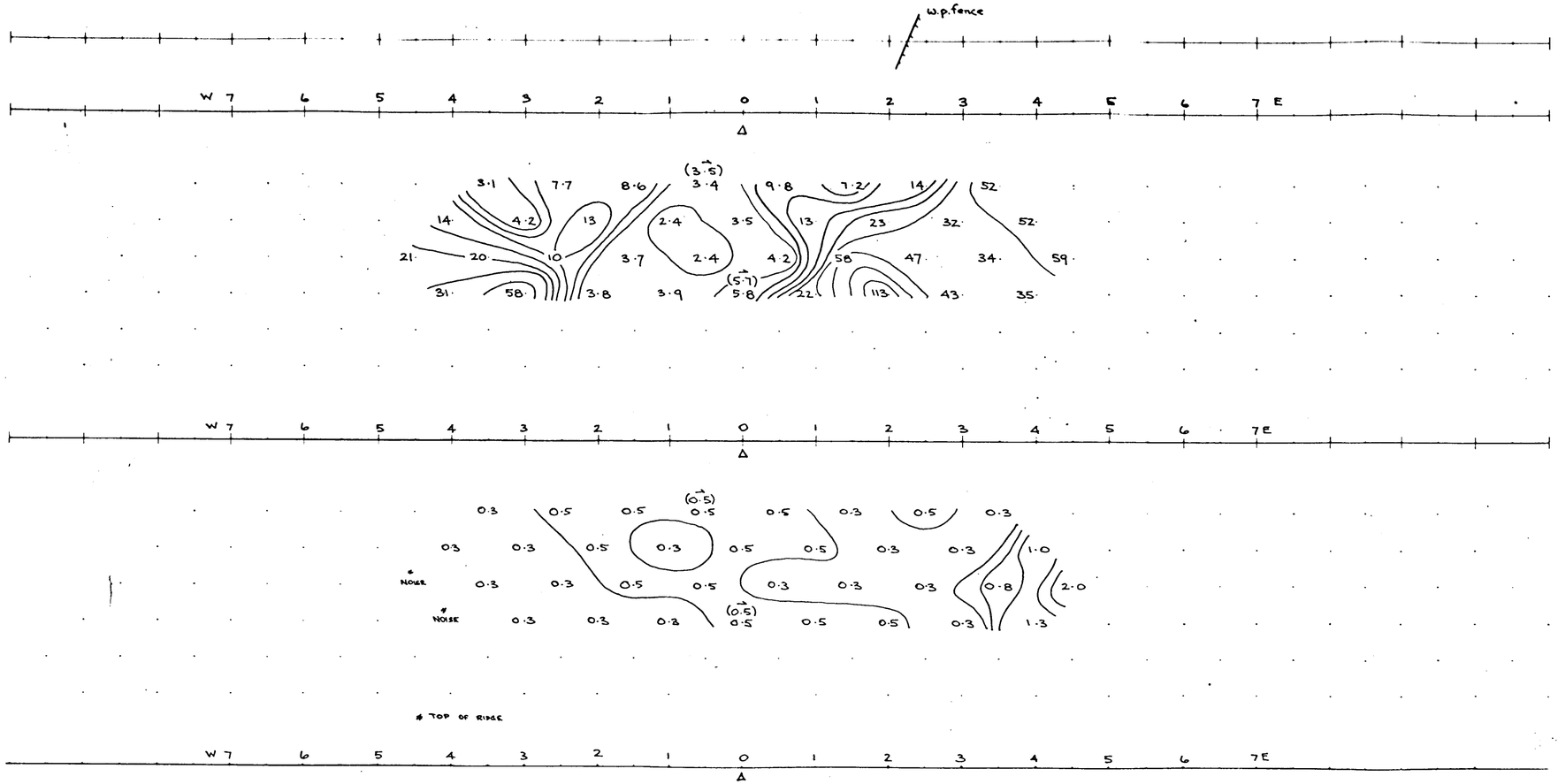
M.F.

INDUCED POLARIZATION & RESISTIVITY SURVEY

PROJECT	QUORN – S.A.
GRID	BUCKARINGA
LINE	1155 N Brg. 88°
SCALE	1 5000
ARRAY	DIPOLE DIPOLE
TRANSMITTER DIPOLE	100 METRES
RECEIVER DIPOLE	100 METRES
TRANSMITTER TYPE	McPHAR P660
TIMING SEQUENCE	
FREQUENCIES	2 5 & 0 3 HZ
RECEIVER TYPE	McPHAR P660
INTEGRATION TIME	
ELECTRODE TYPE	FOIL
CREW LEADER	BRIAN RAU.
DATE OF SURVEY	15-12-76
PLOTTED BY	BRIAN RAU

SOLO GEOPHYSICS AND CO.
22 AVENUE ROAD,
PROSPECT, S.A. 5082
TEL. 44 6604

2958-1



Culture Plan

Apparent Resistivity (ohm-m)

P.F.E.

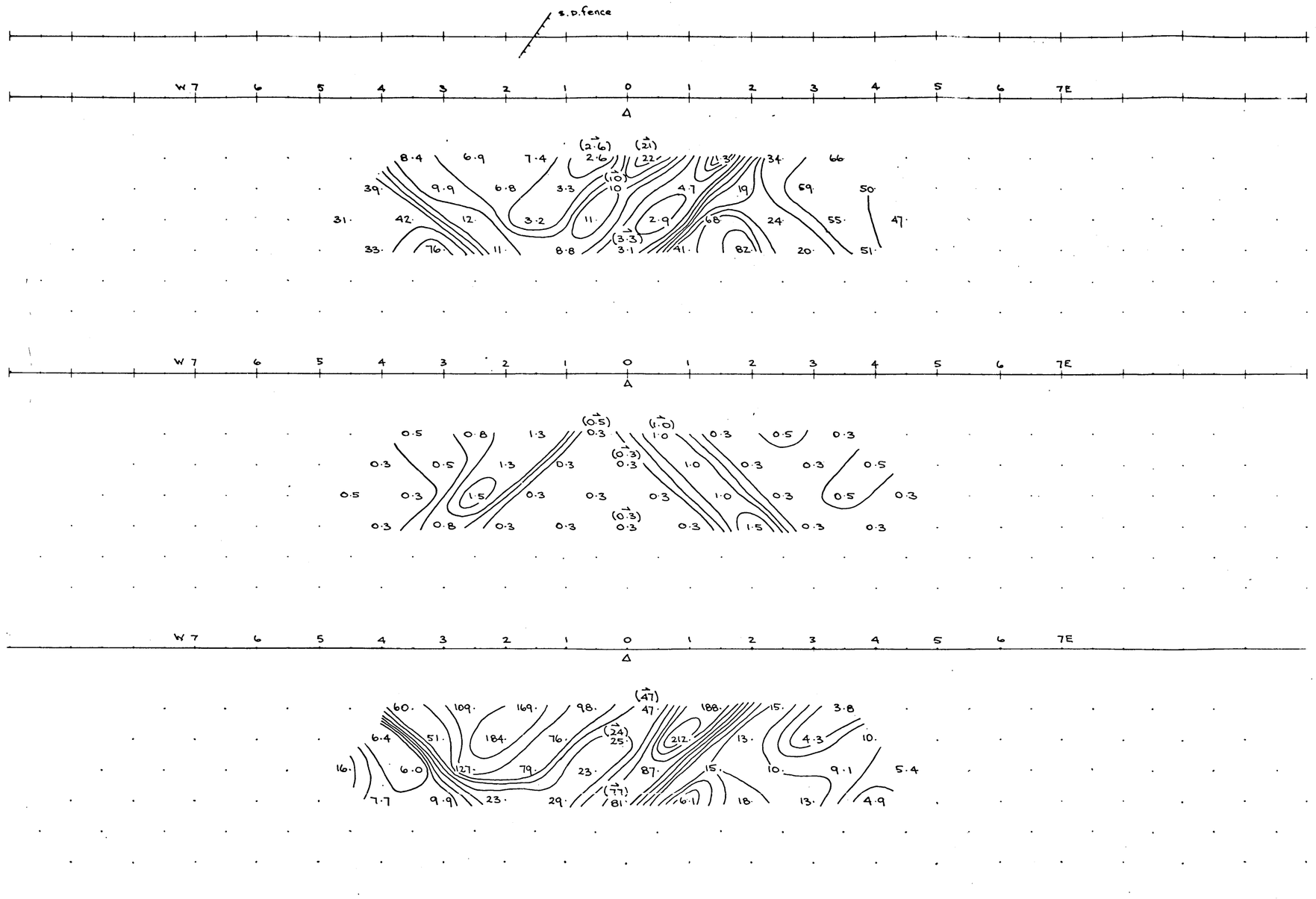
M.F.

INDUCED POLARIZATION & RESISTIVITY SURVEY

PROJECT	QUORN – S.A.
GRID	BUCKARINGA
LINE	990 N BRG 88°
SCALE	1 5000
ARRAY	DIPOLE DIPOLE
TRANSMITTER DIPOLE	100 METRES
RECEIVER DIPOLE	100 METRES
TRANSMITTER TYPE	MCPHAR P660
TIMING SEQUENCE	
FREQUENCIES	2·5 & 0·3 HZ
RECEIVER TYPE	MCPHAR P660
INTEGRATION TIME	
ELECTRODE TYPE	FOIL
CREW LEADER	BRIAN. A RAU
DATE OF SURVEY	14-12-76
PLOTTED BY	BRIAN RAU

2958-2

SOLO GEOPHYSICS AND CO.
22 AVENUE ROAD,
PROSPECT, S.A. 5082
TEL. 44 6304

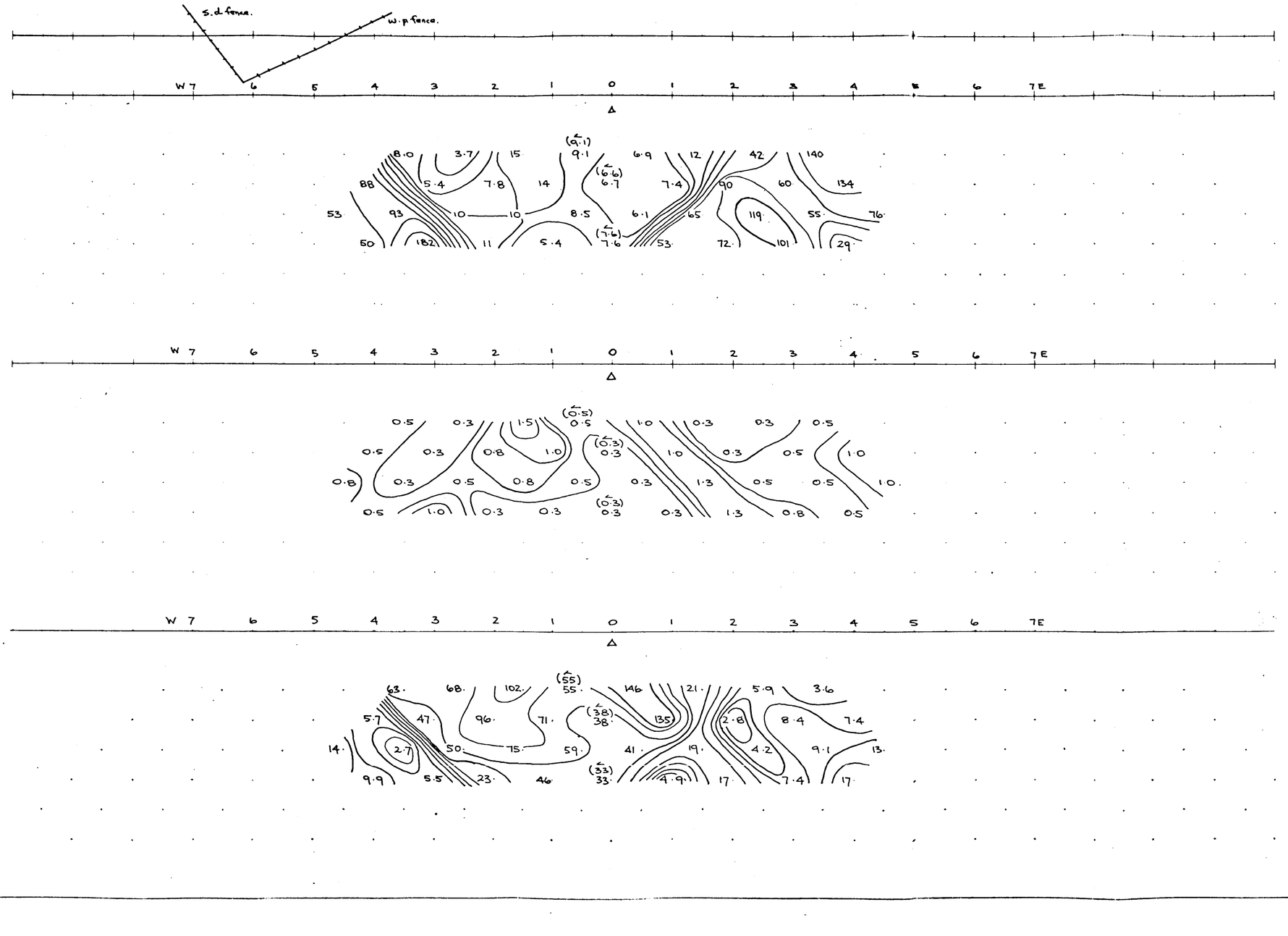


INDUCED POLARIZATION & RESISTIVITY SURVEY

PROJECT	QUORN - S.A.
GRID	BUCKARINGA
LINE	810 N BRG 88°
SCALE	1 5000
ARRAY	DIPOLE DIPOLE
TRANSMITTER DIPOLE	100 METRES
RECEIVER DIPOLE	100 METRES
TRANSMITTER TYPE	McPHAR P660
TIMING SEQUENCE	
FREQUENCIES	2 5 & 0 3 HZ
RECEIVER TYPE	McPHAR P660
INTEGRATION TIME	
ELECTRODE TYPE	FOIL
CREW LEADER	BRIAN RAU.
DATE OF SURVEY	16-12-76
PLOTTED BY	BRIAN RAU

2958-3

SOLO GEOPHYSICS AND CO.
22 AVENUE ROAD,
PROSPECT, S.A. 5082
TEL. 44 6604



Culture Plan

Apparent Resistivity (ohm-m)

P.F.E.

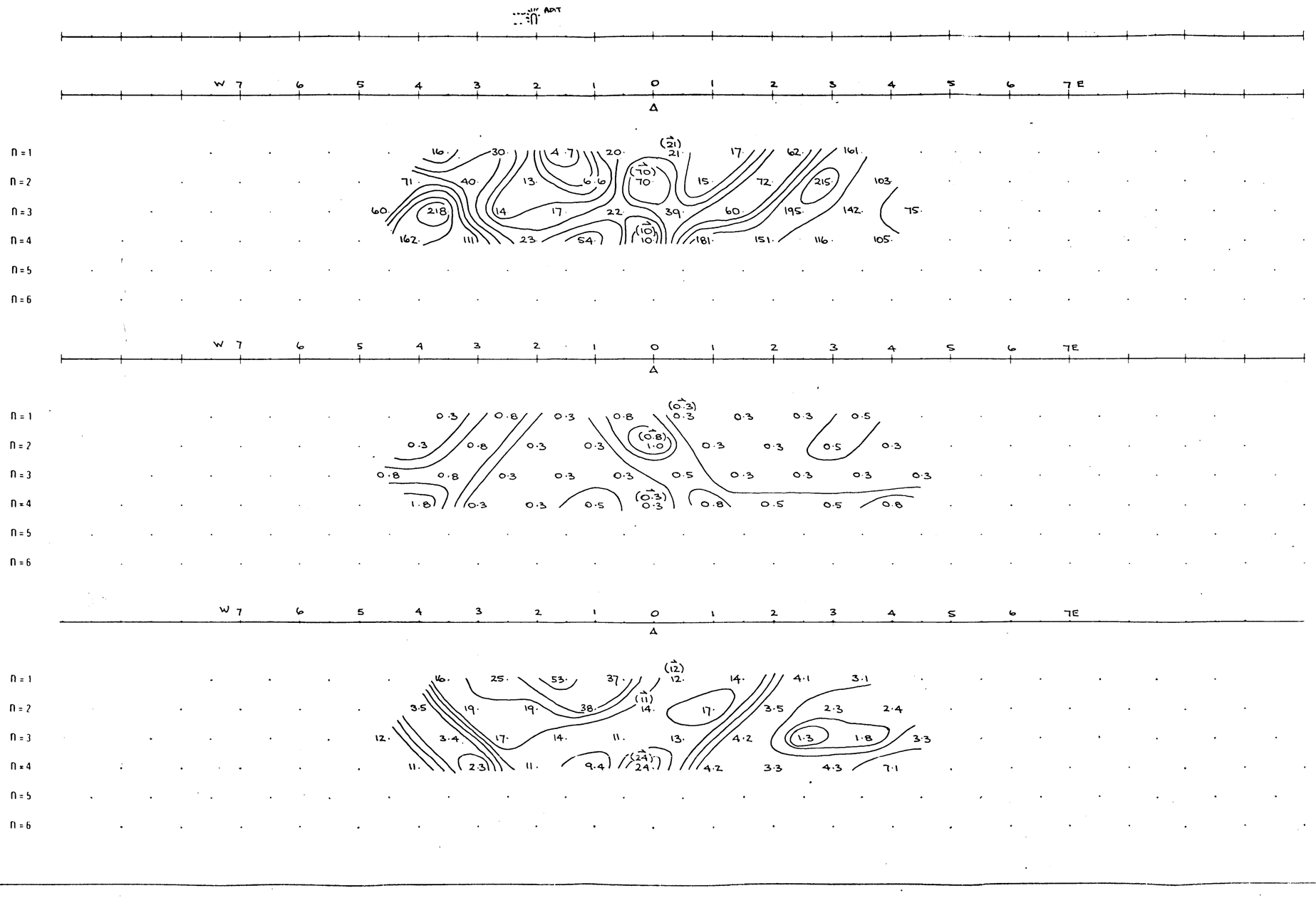
M.F.

INDUCED POLARIZATION & RESISTIVITY SURVEY

PROJECT	QUORN – S.A.
GRID	BUCKARINGA
LINE	630N Brg 88°
SCALE	1 5000
ARRAY	DIPOLE - DIPOLE
TRANSMITTER DIPOLE	100 METRES
RECEIVER DIPOLE	100 METRES
TRANSMITTER TYPE	McPHAR P660
TIMING SEQUENCE	
FREQUENCIES	2.5 & 0.3 HZ
RECEIVER TYPE	McPHAR P660
INTEGRATION TIME	
ELECTRODE TYPE	FOIL
CREW LEADER	BRIAN RAU.
DATE OF SURVEY	16-12-76
PLOTTED BY	BRIAN RAU

2958-4

SOLO GEOPHYSICS AND CO.
22 AVENUE ROAD,
PROSPECT, S.A. 5082
TEL. 44 6304



Culture Plan

Apparent Resistivity (ohm-m)

P.F.E.

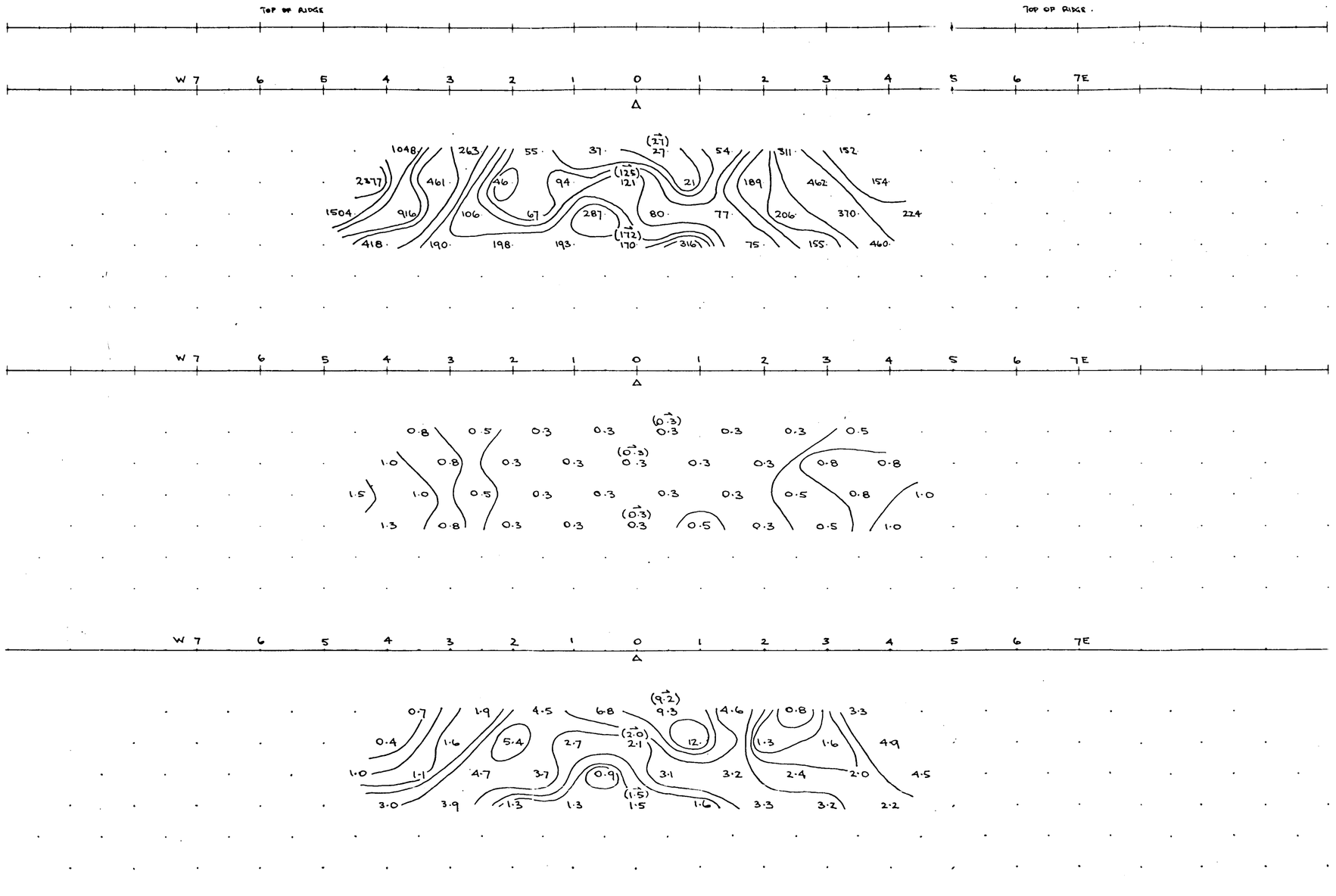
M.F.

INDUCED POLARIZATION & RESISTIVITY SURVEY

PROJECT	QUORN – S.A.
GRID	BUCKARINGA
LINE	450N BRG 88°
SCALE	1 5000
ARRAY	DIPOLE DIPOLE
TRANSMITTER DIPOLE	100 METRES
RECEIVER DIPOLE	100 METRES
TRANSMITTER TYPE	McPHAR P660
TIMING SEQUENCE	
FREQUENCIES	2.5 & 0.3 HZ
RECEIVER TYPE	McPHAR P660
INTEGRATION TIME	
ELECTRODE TYPE	FOIL
CREW LEADER	BRIAN RAU.
DATE OF SURVEY	16-12-76
PLOTTED BY	BRIAN RAU

SOLO GEOPHYSICS AND CO.
22 AVENUE ROAD,
PROSPECT, S.A. 5082
TEL. 44 6604

2958-5



Culture Plan

Apparent Resistivity (ohm-m)

P.F.E.

M.F.

INDUCED POLARIZATION & RESISTIVITY SURVEY

PROJECT	QUORN – S.A.
GRID	BUCKARINGA
LINE	270 N BRG 88°
SCALE	1 5000
ARRAY	DIPOLE DIPOLE
TRANSMITTER DIPOLE	100 METRES
RECEIVER DIPOLE	100 METRES
TRANSMITTER TYPE	McPHAR P660
TIMING SEQUENCE	
FREQUENCIES	2 5 & 0 3 HZ
RECEIVER TYPE	McPHAR P660
INTEGRATION TIME	
ELECTRODE TYPE	FOIL
CREW LEADER	BRIAN RAU
DATE OF SURVEY	17/12/76
PLOTTED BY	BRIAN RAU

2958-6

SOLO GEOPHYSICS AND CO.
22 AVENUE ROAD,
PROSPECT, S.A. 5082
TEL. 44 6604

DRILL LOGS

Amoco Minerals Australia Company — **DRILL LOG** — PROJECT Nº A-76-36 — HOLE Nº BSA-77-1 — Page 1/2

PROPERY BUCKARINGA	LATITUDE 625N	START	
HOLE Nº BSA-77-1	DEPARTURE 36W	FINISH	
BEARING: GRID 270° TRUE	ELEVATION	LENGTH	
DIP COLLAR 60° CORE SIZE NQ/BQ	DRILL SECTION	LOGGED BY J. JOHNSON	

BORE HOLE SURVEY — INSTRUMENT ACID ETCH

DEPTH	DIP	BEARING	DEPTH	DIP	BEARING	DEPTH	DIP	BEARING
100m	61°		298m	57½°				
175m	61°							
280m	57½°							

METERAGE FROM	METERAGE TO	DESCRIPTION	MINERALIZATION %
0.00	1.8	Weathered soil. Tricone drilling	
1.8	10.80	Massive ferruginous manganese cap	
10.80	43.00	Soft ferruginous clays. Predominantly yellow and brown with a few scattered manganese rich iron bands.	
43.00	56.60	Oxidized light red brown sandstone	
53.00	53.30	Quartz vein	
56.60	59.10	Purple Red siltstones	
59.10	67.90	Purple brown sandy siltstones	
67.90	76.90	Grey calcareous sandy siltstones	
70.90	76.90	Scattered mottled clay beds	

SAMPLE Nº	METERAGE FROM	METERAGE TO	METERAGE LENGTH	ASSAYS Cu	Pb	Zn	Ag	Mn
1	1.8	2.10	0.30	140	620	2160	5	3200
2	2.10	2.50	0.40	120	680	2320	5	3300
3	2.50	2.80	0.30	170	620	2700	5	4400
4	2.80	3.10	0.30	160	820	2200	2	4250
5	3.10	3.45	0.35	360	620	4300	5	>1%
6	3.45	3.80	0.35	380	790	4300	5	>1%
7	3.80	4.15	0.35	210	260	3000	5	>1%
8	4.15	4.45	0.30	280	660	4050	2	>1%
9	4.45	4.80	0.35	280	580	4000	5	>1%
10	4.80	5.15	0.35	280	580	4000	5	>1%
11	5.15	5.50	0.35	330	620	5100	2	>1%
12	5.50	5.80	0.30	200	820	4100	2	>1%
13	5.80	6.15	0.35	180	720	4300	2	>1%
14	6.15	6.50	0.35	289	630	4900	5	>1%
15	6.50	6.80	0.30	330	820	4300	5	>1%
16	6.80	7.20	04.0	360	490	4500	5	>1%
17	7.20	7.90	0.70	210	520	3250	2	>1%
18	7.90	7.20	0.30	300	710	4100	5	>1%
19	8.20	8.50	0.30	460	340	4600	2	>1%
20	8.50	8.80	0.30	470	220	5900	2	>1%
21	9.80	9.00	0.20	260	180	4000	5	>1%
22	9.00	10.30	0.30	310	160	3700	5	>1%
23	10.30	10.60	0.30	250	240	4650	5	>1%
24	10.60	11.00	0.40	200	240	5700	2	2500
25	15.90	16.15	0.25	200	250	500	5	>1%

290

Amoco Minerals Australia Company PROPERTY BUCKARINGA PROJECT Nº A-76-36 HOLE Nº BSA-77-1 Page 2/2

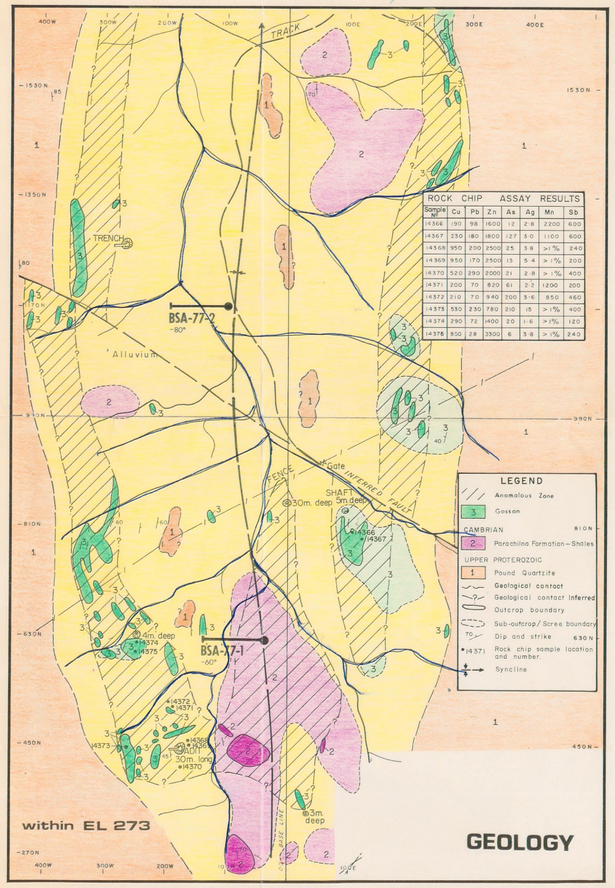
FOOTAGE FROM	FOOTAGE TO	DESCRIPTION	MINERALIZATION %	SAMPLE Nº	FOOTAGE FROM	FOOTAGE TO	FOOTAGE LENGTH	ASSAYS
76.90	79.90	Yellow brown siltstone						
		77.10 to 77.20 Intraformational breccia						
79.90	81.70	Purple brown lime rich siltstone						
81.70	84.75	Ferruginous yellow red interbedded fine sandstone and siltstones						
84.75	91.75	Grey white calcareous siltstones						
91.75	105.70	Well sorted grey quartz sandstone with calcareous cement						
105.70	110.00	Quartz sandstone with calcareous cement being replaced gradually with silceous cement.						
110.00	298.80	Medium grained quartzite with minor clay lenses to 10 cm (probably Pound Quartzite)						
		END OF HOLE						

8940

Amoco Minerals Australia Company — **DRILL LOG** — PROJECT Nº A-76-36 — HOLE Nº BSA-77-2 — Page 1/1

PROPERY BUCKARING	LATITUDE 1170N	START 3m 58.40m	BORE HOLE SURVEY						INSTRUMENT				
			DEPTH	DIP	BEARING	DEPTH	DIP	BEARING	DEPTH	DIP	BEARING		
HOLE Nº BSA-77-2	DEPARTURE 100W	FINISH 13.90m 207m	130m	78°	Acid Etch								
BEARING:GRID 270° TRUE	ELEVATION	LENGTH 10.90 128.60m	200m	76°	Acid Etch								
DIP COLLAR -80° CORE SIZE NQ/BQ	DRILL SECTION	LOGGED BY J. Johnson											

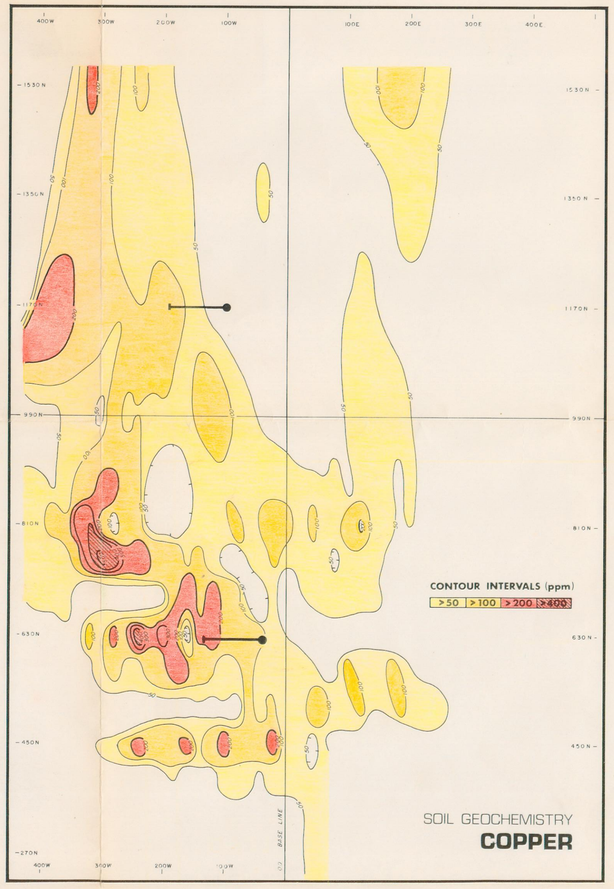
METERAGE FROM	METERAGE TO	DESCRIPTION	MINERALIZATION %	SAMPLE Nº	METERAGE FROM	METERAGE TO	METERAGE LENGTH	ASSAYS Cu	ASSAYS Pb	ASSAYS Zn	ASSAYS Ag	ASSAYS Mn
0	3	Precollar Tricone										
3	13.90	NQ in alluvium large quartzite boulders										
		10.90 - 13.90 recent calcrete cap rock										
13.90	58.40	Oxidized rock (Tricone)										
58.40	85.90	Manganese rich ironstone		26	58.40	59.20	0.80	390	210	3500	2	>1%
				27	59.20	60.20	1.00	430	180	5500	2	>1%
		Core size change @ 61.00 m NQ to BQ		28	60.20	61.00	0.80	480	160	6000	2	>1%
				29	61.00	62.00	1.00	230	160	6250	2	>1%
		Hard bands interspersed with numerous clay filled voids.		30	62.00	63.00	1.00	260	180	7000	2	>1%
		Core recovery poor in clay rich horizons.	Core recovery 40%	31	63.00	64.00	1.00	200	140	7250	2	>1%
				32	64.90	65.80	0.90	460	180	9000	5	>1%
		58.40 - 64.00 mn-ironstone		33	71.00	72.00	1.00	70	160	5000	2	>1%
		64.00 - 64.90 clay		34	72.00	72.80	0.80	60	160	4750	2	>1%
		64.90 - 79.90 mn-ironstone		35	74.00	75.00	1.00	60	180	5000	2	>1%
		79.90 - 84.00 clay and oxidized rock		36	75.00	76.00	1.00	60	210	4750	2	>1%
		84.00 - 85.90 mn-ironstone		37	76.00	77.40	1.40	130	180	6500	2	>1%
			Core recovery 30%	38	77.40	79.90	2.50	70	170	6000	2	>1%
				39	84.00	85.00	1.00	60	210	4500	2	>1%
85.90	175.60	Weathered and highly oxidized siltstones and fine sandstones. Variable colour dominant brown and yellow with minor grey calcareous bands.		40	85.00	85.90	0.90	110	170	7750	2	>1%
		144.20 - 144.40 hard grey mineral very heavy										
175.60	200.10	Grey calcareous well sorted medium grained sandstone and minor siltstones										
200.10	207.00	Well sorted white quartzite										
	207.00	E N D O F H O L E										



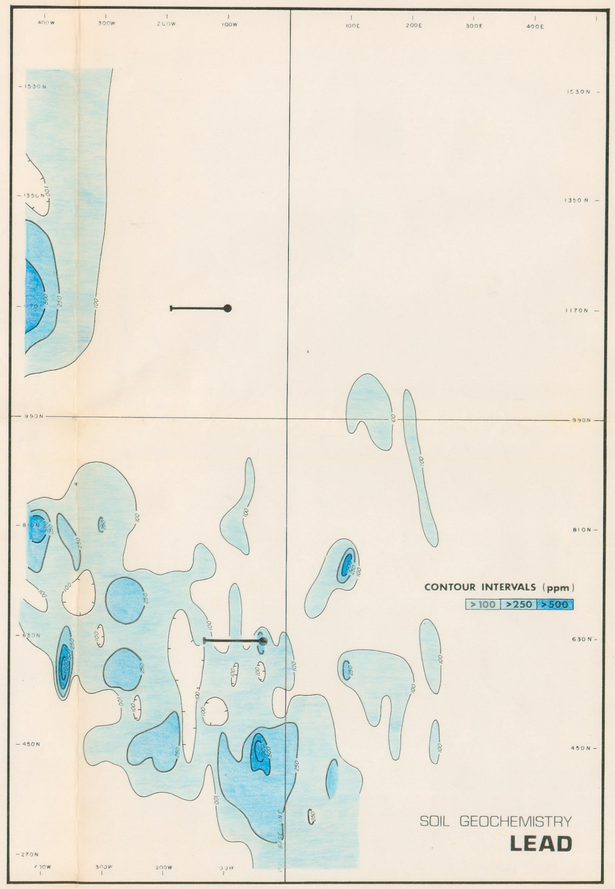
ROCK CHIP ASSAY RESULTS

Sample No.	Cu	Pb	Zn	As	Ag	Mn	Sb
14366	190	98	1600	12	2·8	2200	600
14367	230	180	1800	127	3·0	1100	600
14368	950	200	2500	25	3·8	>1%	240
14369	950	170	2500	13	5·4	>1%	200
14370	520	280	2000	21	2·8	>1%	400
14371	200	70	820	61	2·2	1200	200
14372	210	70	940	200	3·6	850	460
14373	550	230	780	210	15	>1%	400
14374	290	72	1400	20	1·6	>1%	120
14376	850	28	3500	6	3·8	>1%	240

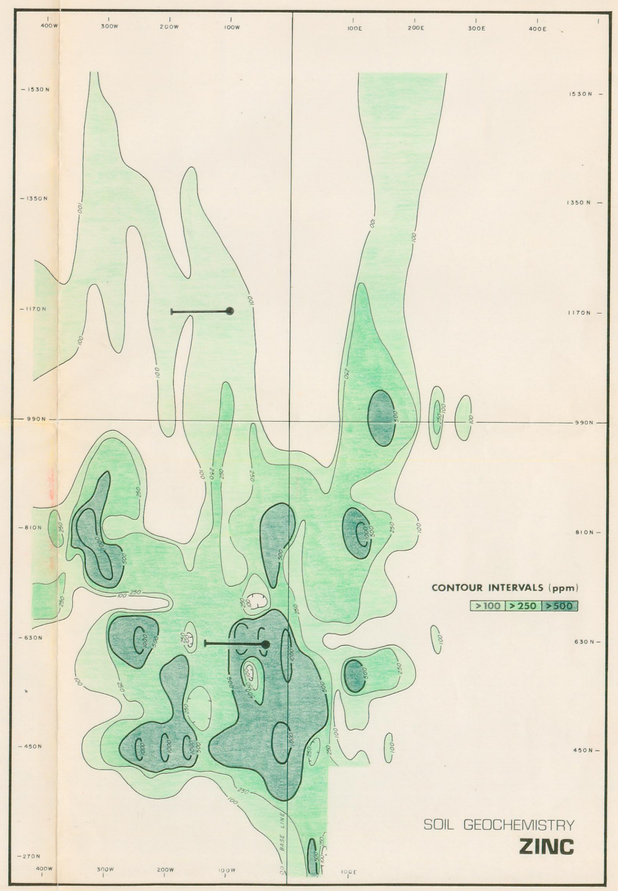
GEOLOGY



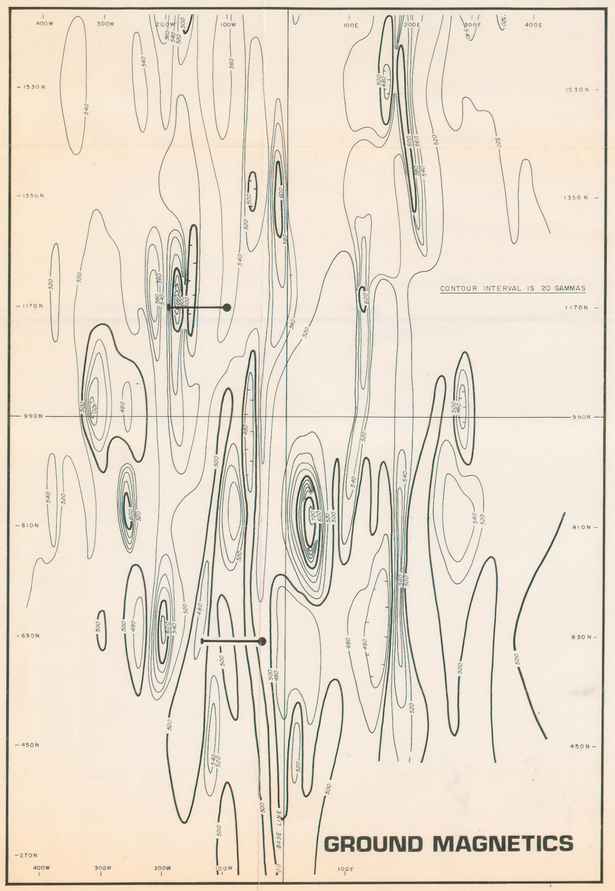
SOIL GEOCHEMISTRY
COPPER



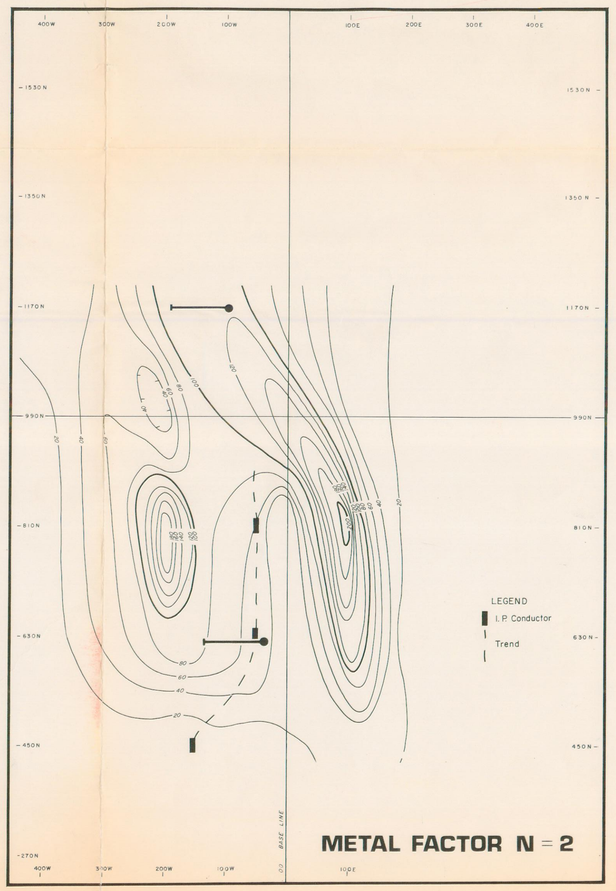
SOIL GEOCHEMISTRY
LEAD



SOIL GEOCHEMISTRY
ZINC



GROUND MAGNETICS



METAL FACTOR N = 2

SOIL GEOCHEMISTRY NOTE

PREPARATION & ANALYSIS

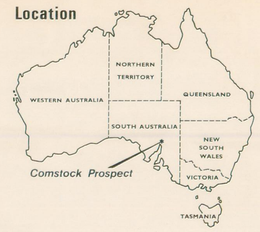
Dry sieved to -80 mesh, then A.A.S. after $HClO_4$ leach at 190° for 2 hours. Geomin.

N

1:5000

0 100 500 Meters

Location



AMOCO

Amoco Minerals Australia Company

Project BUCKARINGA		Nº A-76-36
Project Partner		
Comstock Prospect **COMPOSITE GEOLOGY GEOCHEMISTRY and GEOPHYSICS**		
Map Ref. ANG 1-54-1	Latitude 31°17' S	Longitude 138°5' E
Surveyed P.G.M.	Date Jan. 1977	Scale 1:5000
Drawn B.J.Z.	Date Mar. 1977	Drawing Nº M.77-656

2958-8

Enclosure 1