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SML 646

ORROROO

PROGRESS REPORTS TO LICENCE SURRENDER FOR THE PERIOD 18/11/1971 TO 28/9/1972

Submitted by
Electrolytic Zinc Co. of Australasia Ltd
1972

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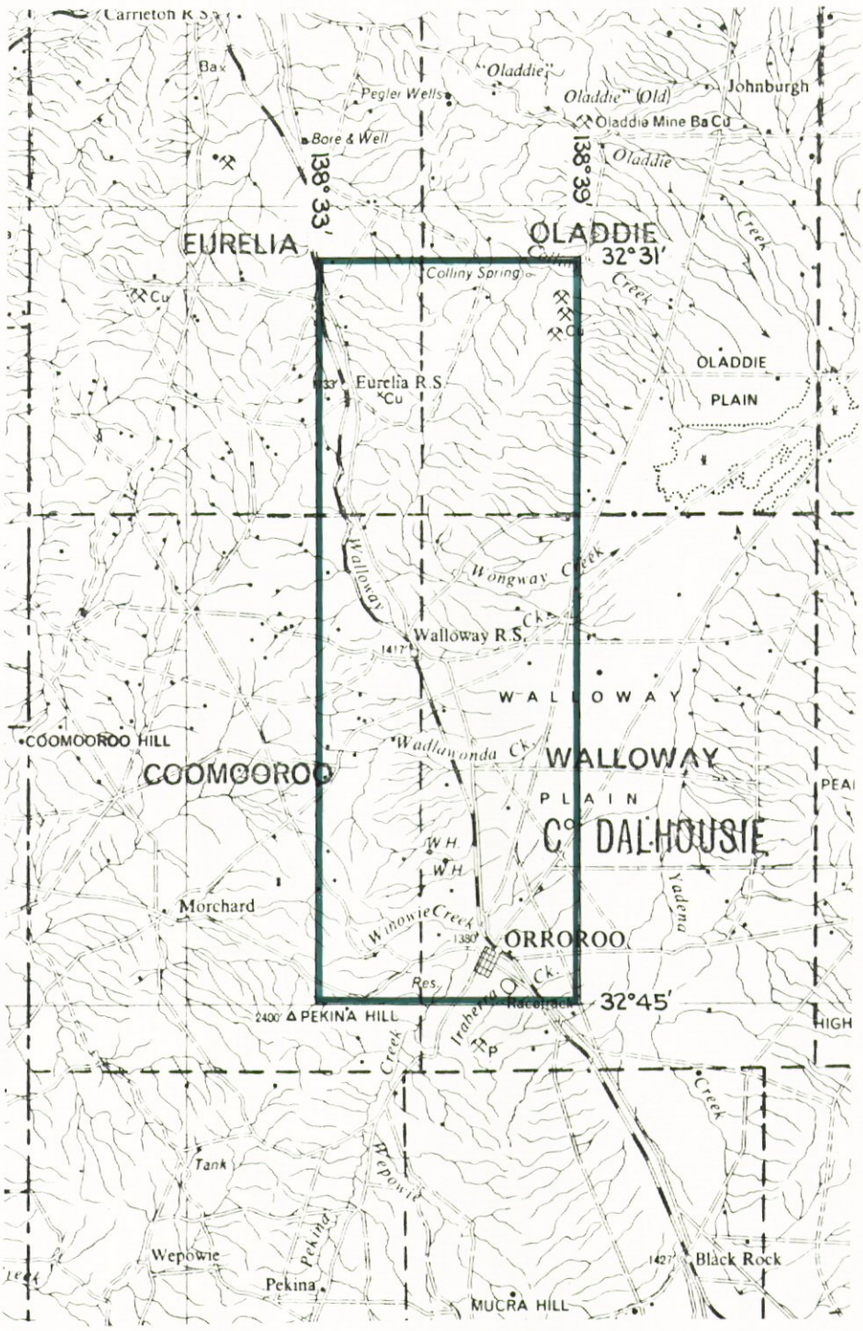
Government of South Australia
Primary Industries and Resources SA



SCALE 1:250000

ELECTROLYTIC ZINC CO. OF A/ASIA LTD.

DOCKET D.M. 1174/71 AREA 95 SQ MILES

1:250000 PLANS . ORROROO

LOCALITY

S.M.L. No. 646 EXPIRY DATE 17·11·72

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TENEMENT: S.M.L. 646

TENEMENT HOLDER: Electrolytic Zinc Co. of Australasia Ltd.

REPORT:
HORN, R.A. 1972
Orroroo - 3 months ended 18/2/72.
Mineral Claims Nos. 7445 to 7450.
NO PLANS (pgs.3-9)

REPORT:
1972
Orroroo - 3 months ended 18/5/72.
Mineral Claims Nos. 7445 to 7450. (pgs.10-31)

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CA	153-2	Dispersion of Nb, Ni, Cu, and Zn.	(1832-2) A2
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REPORT:
1972
Orroroo - 3 months ended 18/8/72.
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ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

EXPLORATION DEPARTMENT

SPECIAL MINING LEASE NO. 646
and
MINERAL CLAIMS NOS. 7445, 7446, 7447, 7448, 7449, 7450

ORRORO

Report on three months ended 18th February, 1972

CONTENTS:

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

EXPLORATION DEPARTMENT

SPECIAL MINING LEASE NO. 646
and
MINERAL CLAIMS NOS. 7445, 7446, 7447, 7448, 7449, 7450

Report on three months ended 18th February, 1972

INTRODUCTION

This report covers work undertaken in Special Mining Lease No. 646 and in six Mineral Claims, numbered 7445, 7446, 7447, 7448, 7449 and 7450, which are situated within the Lease.

It is also desired to draw to the attention of the Senior Warden evidence of exploratory work undertaken in the Mineral Claims.

PEG MAINTENANCE - Mineral Claims 7445-7450

Claim pegs and trenches were examined on 9th December, 1971, 13th January and 27th January, 1972, and found to be in accordance with Department of Mines regulations.

INVESTIGATIONS

(A) Petrology and Mineralogy

Intrusive rocks with kimberlitic and carbonatitic affinities were examined microscopically to determine their possible similarities to previously described rocks from the carbonatite/kimberlite suites of Norway, Siberia, Canada and Africa.

The following rock types were identified:

(i) Carbonatite

Green coloured rocks consisting largely of calcite, commonly occurring in coarse laths, with associated serpentinised olivine (~15%) are considered to show close similarities to known carbonatites.

Accessory minerals include:

Magnetite
Chlorite
Phlogopite (altering to chlorite)
Rutile(?)

Olivine is commonly replaced by calcite.

A xenolith was examined microscopically and found to be dissimilar texturally and mineralogically from the surrounding host material but similar to other carbonatites in the vicinity.

(ii) Kimberlite

Phlogopite-bearing rock showing close similarities in hand specimen to samples supplied by Anglo American Corporation from their Terowie kimberlite field was examined microscopically.

Close similarities in general texture and primary mineralogy were noted.

Two types of kimberlite have been distinguished depending on the presence of phlogopite or olivine phenocrysts. A summary of mineralogy is shown below:

Calcite	pyrite	)
Phlogopite	sphalerite	)
Olivine	chalcopyrite	) traces
Apatite	covellite	)
Leucoxene	goetnite	)
Perovskite		
Chromite		
Magnetite		

3...

The Terowie material differs in having a dolomitic groundmass, a higher ilmenite/chromite-magnetite ratio and the presence of pyroxenes.

(iii) Contact Rocks

The contact rocks consist largely of dolomite showing varying degrees of brecciation.

Metasomatic crystals of talc, adularia, albite and phlogopite are present. Quartz and calcite are abundant,

Minor quantities of rutile, sphalerite, zircon and tourmaline have been identified.

(B) Geochemistry

Spectrographic scans were carried out on several samples representative of the three rock types above. (see Report - Central Mineralogical Services 71/11/17 Addendum - Appendix I of this report)

Niobium results were checked by XRF and found to be underestimated (see Report - AMDEL AN2471/72 - Appendix II of this report).

Compositions were within the range of those described from established carbonatite provinces.

(C) Geology

Geological mapping at a scale of 1:10,000 over the area of the Mineral Claims and the surrounding Lease has commenced.

Problems were encountered in mapping the contact of the Brighton Limestone and the Walloway Diapir.

A further dyke of carbonatite/kimberlite material was located some four miles south of the original discovery.

A geological map and description will be available for inclusion in Report No. 2.

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FUTURE PROGRAMME

Mapping at a scale of 1:10,000 will continue. Mapping at a scale of 1:2,500 will commence.

Further geochemical and petrological studies will be undertaken.

PERSONNEL

Central Mineralogical Services of Adelaide undertook all petrological and mineralogical investigations. Spectrographic scans were performed by AMDEL. All geological mapping was undertaken by a senior geologist.

for R. A. HORN,
Senior Geologist,
Exploration Department.

RAH:RK

APPENDIX I

ADDENDUM REPORT CMS 71/11/17

SPECTROGRAPHIC RESULTS

Numbering System:-

CMS (Quoted to Amdel)	T.S. No. (Report CMS 71/11/17)	K.D.C. No.
1	7597	18
2	7598	19
3	7595	16
4	7593	8
5	7596	17
6	7594	5
7	7605	14E

A re-organisation of significant results is presented below:-

Group	Rock Name	Elements Present (ppm) Co	Ni	Cr	V	Nb	Be	Cu	Pb	Zn	Sn	Ba	Sr	Rb	Y	La	Ce	P	Na	K	Ti
Group 1																					
CMS 4 8 (TS 7593)	Limestone (calcite-rock)	5	10	80	10	–	–	10	3	–	–	–	100	10	–	–	–	–	100	10000	800
CMS 6 5 (T.S. 7594)	Dolomite Breccia	5	5	30	20	–	1	25	5	–	–	–	–	10	–	–	–	–	100	10000	600
CMS 5 17 (TS 7596)	Dolomite Rock with sphalerite	5	20	80	20	–	1	40	5	1000	–	–	100	15	–	–	–	–	200	10000	1000
CMS 1 18 (TS 7597)	Dolomite Breccia	5	10	80	30	–	–	40	5	–	1	200	100	100	–	–	–	–	500	>10000	1500
Group 2																					
CMS 2 19 (TS 7598)	Serpentinised-olivine and calcite rock	40	150	600	120	80	–	40	5	30	1	600	1500	–	–	–	–	300	3000	1000	3000
Group 3																					
CMS 3 16 (TS 7595)	Phlogopite-calcite rock (dominantly)	30	120	250	120	40	1	40	10	–	1	1000	800	10	10	200	300	300	300	2000	2500
CMS 7 14E (TS 7605)	Phlogopite-calcite rock (with minor replaced olivine)	40	100	450	120	80	3	40	10	20	1	1000	800	20	10	100	–	100	1000	10000	2500

APPENDIX II

amdel
The Australian Mineral Development Laboratories

Flemington Street, Frewville, South Australia 5063
Phone 79 1062, telex AA82520

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Please address all correspondence to the Director
In reply quote: AN3/501/0 - 2471/72

ADDENDUM REPORT

17 December 1971

The Manager
Central Mineralogical Services
231 Magill Road
MAYLANDS SA 5069

REPORT AN2471/72

YOUR REFERENCE:	Order 74
IDENTIFICATION:	CMS 2, 3 and 7
DATE RECEIVED:	15/11/71

As requested by Mr Horn of Electrolytic Zinc Co of Australasia Ltd, samples CMS 2, 3 and 7 which were originally analysed by the semi-quantitative spectrographic method have been repeated and also checked qualitatively by X.R.F. This work indicates that they contain 200 ppm Nb, approximately.

Enquiries quoting AN2471/72 to Officer in Charge please.

Analysis by: R.R. Robinson

Officer in Charge, Analytical Section: A.B. Timms

for F.R. Hartley
Director

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ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

EXPLORATION DEPARTMENT

Special Mining Lease No. 646

and

Mineral Claims Nos. 7445 to 7450

Report No. 2 for three months ended 18th May, 1972

PLANS TO ACCOMPANY THIS REPORT:

B153-1	Orroroo - geochemistry
CA153-2	Orroroo - geochemistry
D153-3	Orroroo - geology
D153-4	Orroroo - geology

1832

CONTENTS:

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

EXPLORATION DEPARTMENT

SPECIAL MINING LEASE NO. 646 and MINERAL CLAIMS NOS. 7445 to 7450

Report No. 2 for three months ended 18th May, 1972

INTRODUCTION

This report covers exploration work undertaken in Special Mining Lease No. 646 and in six Mineral Claims, Numbers 7445, 7446, 7447, 7448, 7449 and 7450, situated within the boundaries of the Lease.

It is also our intention to present to the Senior Warden of the Department of Mines evidence of work undertaken in the Mineral Claims.

ABSTRACT

The problems of classifying the intrusive rocks in the Orroroo lease are described. Evidence is presented, supporting the classification of the rocks within the "picritic porphyrite" of Frantsesson (1970). Field relations and local geology are described.

It is concluded that the picritic porphyrite (sensu Frantsesson, 1970) at Orroroo does not represent a source of potentially economic minerals.

PEG MAINTENANCE - MINERAL CLAIMS 7445 to 7450

Claim pegs and trenches marking the boundaries of the above Mineral Claims were examined on 29th March and 2nd May, 1972, and found to be maintained in accordance with Department of Mines regulations.

INVESTIGATIONS

The igneous rocks examined within the lease were found to have close affinities with the kimberlite/carbonatite suite. The problems of classification and nomenclature are presented below:

1. KIMBERLITES

(a) Definition

Kimberlites, carbonatites and related rocks have been classified in various systems depending upon the petrogenesis postulated by differing authorities.

The term kimberlite was coined to describe the primary diamond-bearing rock at Kimberley, South Africa. Olivine, serpentine, biotite, bronzite, chrome diopside, pyrope and ilmenite were noted as characteristic minerals. Since that time, several definitions of the name have been formulated; the two examples below illustrate the "wider" and "narrower" versions respectively.

"A variety of mica peridotite consisting essentially of olivine, phlogopite and subordinate melilite with minor pyroxene, apatite, perovskite and opaque oxide. Some examples contain diamond."
Dictionary of Geological Terms, Am. Geol. Soc., 1957.

"Porphyritic, alkalic peridotite, containing rounded and corroded phenocrysts of olivine (serpentinised, carbonatised or fresh), phlogopite (fresh or chloritised), magnesian ilmenite, pyrope and chrome-rich pyrote set in a fine-grained groundmass composed of second generation olivine and phlogopite together with calcite (and/or dolomite), serpentine (and/or chlorite), magnetite perovskite and apatite. Diamond and garnet peridotite xenoliths may or may not occur."
Mitchell, R. H., 1970.

Although the diamond is of prime importance to the economic geologist, it may not be regarded as unduly significant in the overall classification of lamprophyric rocks to the theoretical geologist.

For exploration purposes, it is convenient to describe any rock which has kimberlitic affinities and contains diamond mineralisation as kimberlite. It has been found in practice that such rocks possess certain mineralogical and chemical characteristics (such as magnesium-rich garnets and ilmenite and iron:titanium ratios) which are constant between widely separated kimberlite fields.

Kimberlites are therefore defined by properties which in other igneous rocks would be considered minor variations. For economic purposes, the "narrower" definition of Mitchell (1970) is preferred.

(b) Classification

Kimberlites show close petrological relation to lamprophyres, peridotites, carbonatites and to eclogite breccia pipes, and diatremes. Kimberlite breccia, kimberlite tuff, basaltic kimberlite, lamprophyric kimberlite, etc., are names frequently encountered in the literature on the subject. Frantsesson, 1970, presents the most comprehensive classification of kimberlites and related rocks. With some misgivings as to the suitability of such adjectives as "picritic" to describe a feldspar-free rock, all terminology in this report is sensu Frantsesson, 1970, viz:

Group I	Pyrope hyperbasites	(a) olivinites + dunites (b) peridotites (c) pyroxenites (eclogites) (f) garnetites
Group II	Xenoliths in kimberlites	(a) olivine/ilmenite rock (b) ilmenite/diopside symphectite (c) ilmenite/phlogopite rock (d) glimmerite (e) ilmenite nodules
Group III	Dykes and inclusions in kimberlites	picritic porphyrites, subvolcanic alnoites, melilite basalts.

(a) consisting of Group I, II, and III minerals
(b) Group II and III minerals
(c) Group I minerals with ilmenite

Kimberlites are further subdivided on textural grounds into kimberlite breccias, micaceous kimberlite, tuffaceous kimberlites, etc.

2. ORROROO INTRUSIVES

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(a) Mineralogy

Olivine

Olivine represents approximately 20 per cent by volume of the non-micaceous intrusives at Orroroo, and is a minor constituent of the micaceous variety.

A bright green colour observed in this mineral suggests a forsterite composition.

Serpentinisation is common, and replacement of olivine by calcite grades from minor rim corrosion to calcite pseudomorphs. Olivine is commonly found in two generations in kimberlites, rounded xenocrysts and idiomorphic crystals in the groundmass. (The xenocrysts, in contrast to the groundmass crystals, show great resistance to alteration) Large rounded crystals identified at Orroroo are probably xenocrysts.

Phlogopite

Phlogopite occurs both as phenocrysts and in the groundmass, and represents approximately 28 per cent by volume of the micaceous material but is a minor constituent of the non-micaceous variety. The crystals are commonly rounded and show intense alteration to a deep green (chromium rich ?) chlorite.

Calcite

The enrichment of the intrusive rocks by calcite derived from the host dolomites and limestones has obscured the primary calcite composition.

The less decomposed dyke material (II), however, shows a primary calcite composition in excess of 40 per cent which occurs largely as coarse to fine laths in the groundmass. Minor calcite is present in veins, and as alteration of olivine crystals. Most of the intrusives are largely calcite rocks, which explains their initial identification as carbonatites.

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Opaque Minerals

The following opaque minerals have been identified:

1. Magnetite
2. Chalcopyrite
3. Pyrite
4. Goethite
5. Leucoxene.

No ilmenite has been identified, but it is probably represented among the abundant minute opaque minerals. Magnetite grains are zoned; the outer layers consist of hematite and goethite. The inner core in some cases is grey in colour, possibly due to the presence of chromite. Trace amounts of sulphides are present.

Garnet

A garnet with a refractive index of 1.85 was found to be the titanium-andradite, melanite, which is present in the Swedish rocks of kimberlitic affinites. Huckenholz and Yoder (1971) have established that andradite has a very wide stability field. The titanium variety is common in felsic differentiates of the alkali rock suite.

(b) Petrochemistry

Spectrographic scans were undertaken to determine trace and minor element values in an attempt to both identify the rocks by their petrochemical character and determine the content of potentially economic minerals. No significant concentrations of economic elements were determined (see Appendix I).

Petrochemical characteristics for chromium, phosphorous and nickel were compared with those of several reported carbonatites, kimberlites and related rocks, and found to agree most closely with analyses of picritic porphyrite (sensu Frantsesson) from Egientei (see Appendix II).

In general the most diagnostic element for the kimberlite/carbonatite group of rocks is niobium. Background values for igneous rocks quoted by Hawkes and Webb (1962) are ultramatic 15 ppm and mafics 20 ppm.

Orroroo picritic porphyrite values vary between 100 ppm and 650 ppm niobium.

Barium and cerium are also anomalously high compared to other igneous rocks. Cerium values are anomalous in some samples.

(c) Classification and Nomenclature

The mineralogy of the Orroroo rocks is similar to that of the picritic porphyrites (sensu Frantsesson, 1970) viz:

Egientei	Frantsesson, 1970		Orroroo
Pseudomorphs of serpentine	23.10%	20%	Olivine
Phlogopite	19.99%	25%	Phlogopite
Titanomagnetite, perovskite	10.90%	10%	Total opaque
Apatite			
Groundmass			
Carbonate of groundmass	12.80%	40%	Total carbonate
Serpentine of groundmass	25.84%		

The Egientei material is close mineralogically to that of Orroroo.

Frantsesson (1970) includes the Egientei intrusion in Group III as picritic porphyrites. He describes them as finely crystalised rocks of "massive texture, black or dark green in colour in hand specimen".

Olivine is generally replaced by carbonate and serpentine. Kimberlite indicator minerals, pyrope, chrome-diopside and picro-ilmenite are absent.

Picritic porphyrites are subdivided according to their texture into micaceous and basaltoid varieties

(equivalent to the lamprophyric and basaltic kimberlites).

Petrochemical characteristics of the Orroroo material and the picritic porphyrites also show close similarities. Frantsesson (1970) has demonstrated the principal differences of kimberlites and picritic porphyrite, viz:

1. Formation of picritic porphyrites in a single stage of crystallisation.
2. Absence of crystalloblastic structures and structures of magnetic brecciation.
3. The presence of a smaller number of minerals.
4. Petrochemical features, e.g., increased talc, iron, titanium, cerium and alkalis. Decreased magnesium and chromium.

It must be emphasised that the Walloway intrusions may be classified with kimberlites using the wider definition of the term. Watson (1967) described the mineralogy of the Bachelor Lake kimberlite which is indistinguishable from the Walloway porphyrites. However, the terminology introduced by Frantsesson (1970) is considered more convenient as a distinction is drawn between "lamprophyric periodotites" with no diamonds in association with other characteristic minerals and true kimberlites.

GEOLOGY

Mapping has been undertaken in the area of both the Special Mining Lease and the Mineral Claims at scales of 1:10,000 and 1:2,500.

(a) Stratigraphy

(i) Tarcowie Siltstone

Siltstones mapped by Binks (1971) as Tapley Hill Formation were included in the Tarcowie Siltstone Formation on the basis of their predominantly green colour.

Scott (1972) describes the formation as consisting of finely-bedded calcareous siltstone with a prominent cleavage caused by the parallel orientation of sericite crystals.

In some areas rhythmic bedding has the appearance of varve sedimentation.

Large fragments of green Tarcowie siltstone are present in the carbonate matric of the Walloway diapir.

The Brighton Limestone/Etina Formation limestones and dolomites overlie the siltstones in the southern part of the 1:10,000 map area. To the north, the siltstone/carbonate sedimentary contact is obscured by brecciation associated with diapirism.

(ii) Etina Formation/Brighton Limestone

A limestone and dolomite succession with minor shale, siltstone and sandstone interbeds overlies the Tarcowie siltstone conformably. (?)Stromatolite fossils have been identified in the south of the 1:10,000 mapped area. The contact of the sedimentary carbonates and the diapiric material is difficult to determine. Within the diapiric breccia are blocks of relatively unfractured saccharoidal dolomite indistinguishable from the Etina Formation carbonates. Red rounded "millet seed" sand grains are a distinctive feature of Etina limestones in the area.

(b) Walloway Diapir

The Walloway diapir intrudes at the contact of the Tarcowie siltstone and the Etina Formation.

The matrix of the diapiric breccia consists of banded carbonate, which Scott (1972) considers to be consistent with fluidisation. The mineralogy is shown below (scott, 1972):

Calcite) Dolomite)	major
Talc) Biotite) Adularia) Pyrite) Goethite)	minor

It can be seen in the northern part of the 1:10,000 mapped area that the diapir pinches out, and terminates in an apophysis some 5 feet in width. Intense faulting and brecciation in the host Tarcowie siltstone reflects the considerable pressures involved in the emplacement of the carbonate breccia.

The Willouran age of the material of many of the Flinders Ranges diapirs is undisputed, and by analogy it may be concluded that the Walloway diapir has a similar source. However, no fragments of identifiable Willouran material were found in the course of our investigations. Field relations indicate that the Etina Formation has been brecciated "in situ" and possibly mobilised to intrude the Tarcowie siltstone.

(c) Igneous Intrusions

Dykes of picritic porphyrite intrude both the diapir and the Tarcowie siltstone. Details of these intrusions are given below. Roman numerals refer to the 1:2,500 geological map.

I to VI

Green coloured rocks occurring as dykes intruding the diapiric breccia represent the most common occurrences of picritic porphyrites in the lease. The sparcity of

phlogopite places them within the basaltoid variety of Frantsesson. Field relations indicate that the dykes intrude the diapir and were not rafted up in the course of diapirism. A small dyke among a swarm in the Wongway Creek (I) was apparently intruded as a highly viscous material, judging by its lens shape.

VII and VIII

Dykes of unknown affinity intrude Tarcowie siltstone to the south-east of the Walloway diapir. Scott (1972) has identified accessory adularia, talc, phlogopite, tourmaline, rutile and chlorite in an essentially carbonate rock. Scott (op. cit.) identified one sample as carbonatitic breccia, which is supported by the dyke-like intrusive nature of the bodies. Geochemical analyses did not reveal significant niobium or cerium anomalies. It is possible that these dykes have a similar origin to the diapiric breccia and are therefore not igneous.

IX

A small phlogopite-rich dyke intrudes the diapiric breccia in the Wongway Creek. The abundance of phlogopite is characteristic of the micaceous picritic porphyrite (sensu Frantsesson, 1970).

X

Dykes similar to IX were identified in the Walloway Creek some three miles south of the exposures I to IX.

Scott (1971) considered the petrology to be similar to that of a xenolith found in a basaltoid picritic porphyrite from dyke III. The titanium-rich andradite, melanite, was identified by electron probe analysis (Schultz, 1972).

Minor dykes of pencil-thin dimensions were found intruding creeks and fissures in the vicinity of the dykes.

(d) Tectonics

Binks (1971) shows the Walloway diapir to occupy the east limb of a syncline bearing slightly east of north and passing northward into the White Valley syncline. Mapping to the north of the diapir has shown the presence of several minor north-west trending faults.

Cleavage in the Tarcowie siltstone trends approximately parallel to the White Valley syncline.

(e) Trachyte

A fine-grained trachyte dyke intrudes diapiric breccia some 400 feet north from the micaceous picritic porphyrite (IX). This dyke is some 2 feet thick, subparallel to the banding of the breccia, and is itself brecciated.

A similar rock-type has been described from the Toror carbonatite complex of eastern Uganda (King and Sutherland, 1966).

Accessory minerals include phlogopite, (?)rutile, and (?)olivine. Secondary tourmaline occurs in fractures and is exposed as prominent black crystals on weathered surfaces.

GEOCHEMISTRY

Samples were collected at minor creek intersections, and at intervals of some 500 feet in the Wongway Creek.

Sieving was carried out in the field and the +20, -20+40, and -40 fractions submitted to McPhar Geophysics Pty. Ltd. of Unley, for copper, lead, zinc and nickel determinations. Analysis was by atomic absorption spectroscopy following a concentrated $HClO_4$ leach for one hour on a 0.25g. sample.

In addition, five samples from creeks draining the largest exposed picritic porphyrite dyke were assayed by XRF for niobium.

Base metal values showed no increase towards known igneous bodies. Niobium values were high (35 ppm) in drainage areas immediately adjacent to exposed picritic porphyrite. Background niobium in the Wongway Creek is 10 ppm.

CONCLUSIONS

The similarity both petrochemically and mineralogically of the Orroroo intrusions to the picritic porphyrites of Egientei (Frantsesson, 1970) is striking.

However, it has been noted above that the Orroroo material may be classified as kimberlite (sensu lato).

The abundance of carbonate is anomalous for the picritic porphyrite (sensu Frantsesson) and may not be adequately explained by replacement of olivine. The essentially carbonate-olivine composition of some of the dykes suggests affinities with carbonatites.

Rather than apply such terms as calcareous mica peridotite (micaceous picritic porphyrite) and calcareous peridotite (basaltoid picritic porphyrite), which bear no reference to the assumed affinities of the rocks, it was considered reasonable to use terminology of the kimberlite associates for the following reasons:

1. Geochemical characteristics are consistent with the kimberlite-carbonatite suite
2. Presence of phlogopite mica
3. Association of known kimberlites at Terowie some 50 miles to the south (Anglo American Corporation comm.)

Frantsesson's terminology is considered to be the most thorough and comprehensive available, and was used in preference to South African usage.

Should the "indicator minerals" pyrope, chrome-diopside and picro-ilmenite be identified in the Orroroo intrusives, it is apparent in Frantsesson's classification that these dykes then should be classified as kimberlite.

SIGNIFICANCE OF PICRITIC PORPHYRITES

Economically, picritic porphyrites have no significance apart from their close relationship to kimberlites.

It is probable that the kimberlite of Terowie, the picritic porphyrite of Orroroo and the phlogopite-rich andesites of the Spalding diapir (Gibson, 1968) are consanguineous.

The presence of kimberlites and associated rocks in a geosyncline has been reported previously only in Malaita (Allen and Deans, 1965) and Borneo (v. Bemmelen, 1949). It is significant that the third reported occurrence should be within the same geographical province.

FUTURE PROGRAMME

The heavy fraction (specific gravity >3) of creek debris derived from picritic porphyrite dykes will be examined for kimberlite indicator minerals and diamonds.

It is envisaged that a composite sample of several tons, representing the known exposures, will provide a representative sample.

PERSONNEL

All work was undertaken under the supervision of a senior geologist.

Two field assistants collected geochemical samples and analyses were undertaken by McPhar Geophysics Pty. Ltd, of Unley.

APPENDIX I

TRACE AND MINOR ELEMENT CONTENT OF ORRORDO INTRUSIVES

[redacted]

Sample No.	Values in parts per million																			
	Ca	Ni	Cr	Ag	Nb	Au	Cu	Pb	Zn	Th	Ba	Sr	Rb	Y	La	Ce	P	Mo	K	Ti
6104	50	150	200	0.1	100	ND	100	5	20	ND	500	1000	10	ND	100	ND	800	ND	500	>10,000
6105	80	300	300	0.1	200	ND	100	10	30	ND	800	500	10	ND	150	ND	1000	ND	300	>10,000
6106	100	250	300	0.1	200	ND	100	10	30	ND	800	500	10	ND	150	ND	800	ND	500	>10,000
6107	100	250	300	0.1	250	ND	30	10	50	ND	500	200	10	ND	200	400	800	ND	500	>10,000
6108	100	300	300	0.1	200	ND	150	10	30	ND	500	100	10	ND	200	400	1000	ND	500	10,000
* 1a	-	ND	-	-	650	-	ND	-	-	Trace	700	350	ND	ND	200	900	-	-	-	10,000 TiO_2
*15	-	200	-	-	440	-	Trace	-	-	ND	5500	1100	ND	ND	ND	700	-	-	-	8,000 TiO_2
*14e	-	100	-	-	300	-	100	-	-	ND	5000	950	20	ND	100	ND	-	-	-	4,000 TiO_2
8443	50	100	200	ND	100	ND	20	5	30	ND	300	200	20	ND	100	ND	100	-	2,000	10,000
8439	-	-	-	-	-	-	-	-	-	-	-	50	20	ND	ND	ND	ND	ND	5,000	1,000
7598	40	150	600	-	400	-	40	5	30	-	600	1500	ND	ND	ND	ND	300	-	1,000	3,000
7595	30	120	250	-	400	-	40	10	ND	-	1000	800	10	10	200	300	300	-	2,000	2,500
7605	40	100	450	-	400	-	40	10	20	-	1000	800	20	10	100	ND	100	-	10,000	2,500
8446	5	5	20	ND	250	ND	3	3	ND	ND	800	ND	30	10	150	ND	100	ND	10,000	>10,000

* XRF by Dr. A. Livingstone, Institute of Geological Sciences, London.

APPENDIX II

PICRITIC PORPHYRITES (after Frantsesson, 1970)

		Cr	P	Ni
Picritic porphyrite	(average of 7)	135	3300	155
Picritic porphyrite	(average of 12)	550	3100	315
Velikan	(average of 7)	680	3700	400
Kimberlite field	(average of 17)	480	4400	630
Nadezhda Pipe		200	2650	1100
Original 'Naya'		n.a.	3200	n.a.
Tylkacha Pipe		n.a.	2000	n.a.
Average (picritic porphyritic)		470	4200	440

ORROROO

6104	200	800	150
6105	300	1000	300
6106	300	800	250
6107	300	800	250
6108	300	1000	30
1a	n.a.	n.a.	n.d.
15	n.a.	n.a.	200
14e	n.a.	n.a.	100
7595	250	300	120
7605	450	100	100
8443	200	100	100
7598	600	300	150
Average Orroroo Carbonatite	300	900	200

APPENDIX III

TRACE ELEMENT CONTENTS OF CARBONATITES

(from Gellatly, D.C., 1969)

CARBONATITES	NIOBIUM			BARIUM			STRONTIUM			LANTHANUM			YTTRIUM		
	Min.	Max.	Av.	Min.	Max.	Av.	Min.	Max.	Av.	Min.	Max.	Av.	Min.	Max	Av.
Strangways Range (Gellatly, 1969)	20	450	78	200	1000	635	800	1500	1108	-100	700	173±12	80	100	137
Tundulu (Garson, 1962)	20	1000+	557+	500	1000+	886+	1000	1000+	1000+	450	1000+	854+	70	1000+	431
Chilwa Island (Garson & Smith, 1958)	x	2500	Ca 520	300	4000	1783	2000	1%+	3885+	300	1500	917	25	300	101
Darkainle (Gellatly, 1963)	13	290	80	20	160	55	45	550	211	-100	700	326±10	50	350	145
Iron Hill (Coetzee, 1963)	27	315	121	-	-	-	700	8600	5000	-	-	-	-	-	-
Dorowa (Johnson, 1961)	30-	30	17±13	55	3200+	771+	950	3200+	1270+	35	100	50±19	30-	120	66±3
Sangu (Coetzee, 1963)	5	1000+	127	-	-	-	200	2500	1200	-	-	40	-	-	28
Mbeya (Coetzee, 1963)	-	-	-	-	-	-	6800	7300	7050	-	-	180	-	-	95
Spitzkop (Coetzee, 1963)	15	646	201	-	-	-	200	2500	1200	-	-	-	-	-	-
Russian localities (Kapustin, 1966)	-	-	-	-	-	-	-	-	-	18	34	26	-	-	-
Tanganyika (Bowden, 1962)	1500	1.05%	-	1500	1.05%	5730	2500	1.24%	5730	200	700	483	5-	100	45
General averages															
(Gold, 1966)	-0	0.52%	1198	trace	8.40%	3800	trace	18.24%	9100	-	-	-	0	1000	138
(Weber, 1964)	-	-	-	64	130	144	680	21 00	214	-	-	-	-	-	-
(Higazy, 1954)	-	-	-	290	4000	1985	1000	1%+	7750+	140	700	435	45	300	140

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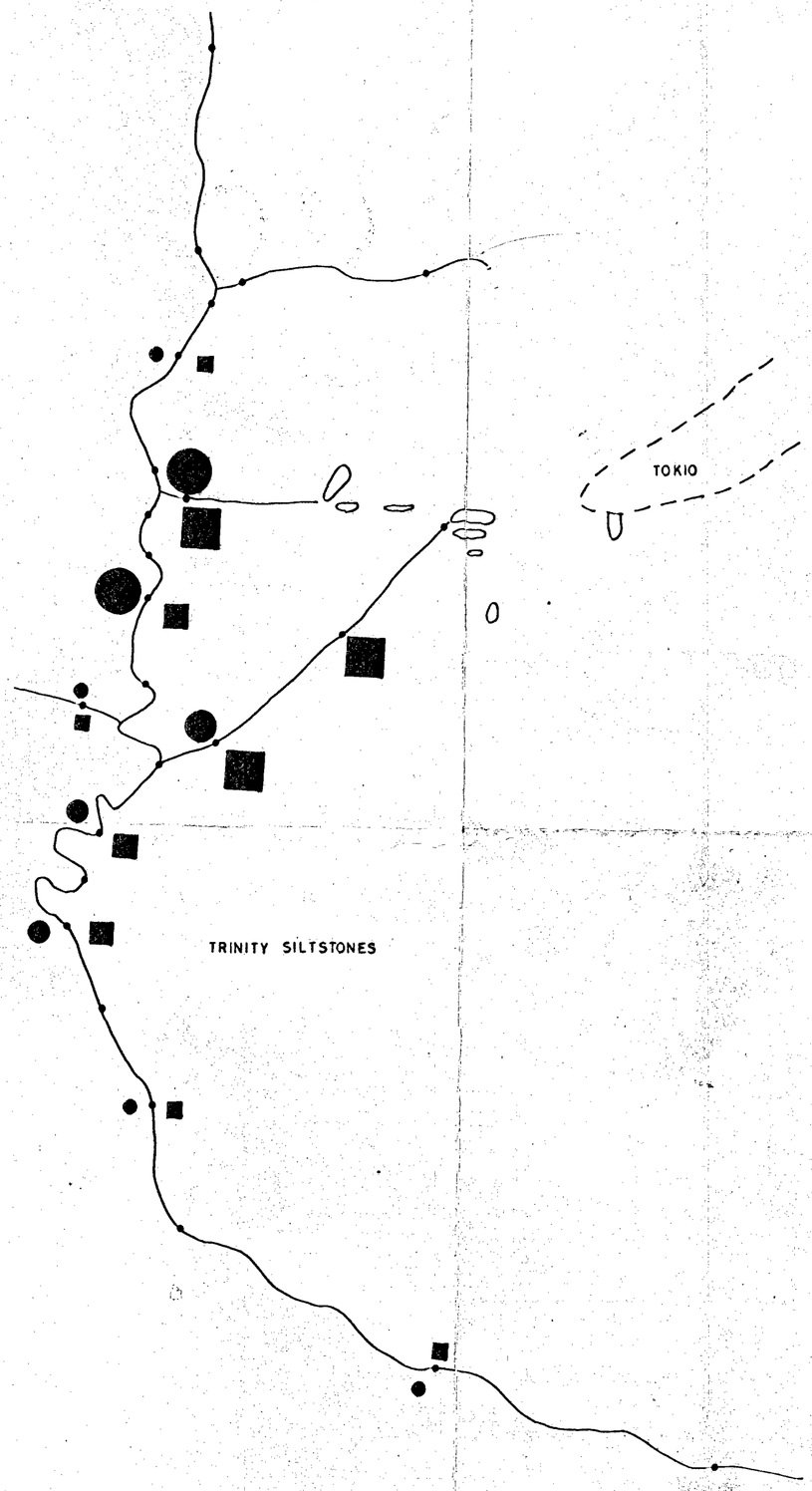


LEGEND.

Nb	Ni
≥ 29 ppm	≥ 241 ppm
15 - 28	221 - 240
8 - 14	21 - 61
3·6 - 7	Kimberlite.

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: ORRORoo — SOUTH AUSTRALIA

DISPERSION OF NIOBIUM AND NICKEL IN -10+20 MESH(B.S.S.) Fraction of Stream Sediments, American Mine, Arkansas.

(After P. Gregory & J.S. Tooms-"Geochemical Prospecting for Kimberlites" in Colorado School of Mines Vol.64. No.1 1969 pgs. 265 -305.)

SCALE: 1:2,400	Survey: R.A. Horn.	REF. NO.
Reference:		B153-1
Date: May 1972	Drawn: C.M.	Checked:

ENV 1832-1

LIMESTONE

PORPHYRITES

DOLOMITE BRECCIA

SILTSTONE

5358

5357

5356

5354

5355

Niobium

Chromium

Nickel

%
Frequency

ppm

A: 459 Kimberlite Samples
Yakutiya, U.S.S.R.

B. 13 Walloway Porphyrite Samples.

LEGEND.

Nb	Ni	Cu	Zn
30 ppm	75 ppm	40-45 ppm	85 ppm
15 ppm	55-60 ppm	30 ppm	65 ppm
10 ppm	35 ppm	15 ppm	30 ppm
			20 ppm

ELECTROLYTIC ZINC CO OF A'ASIA LTD.

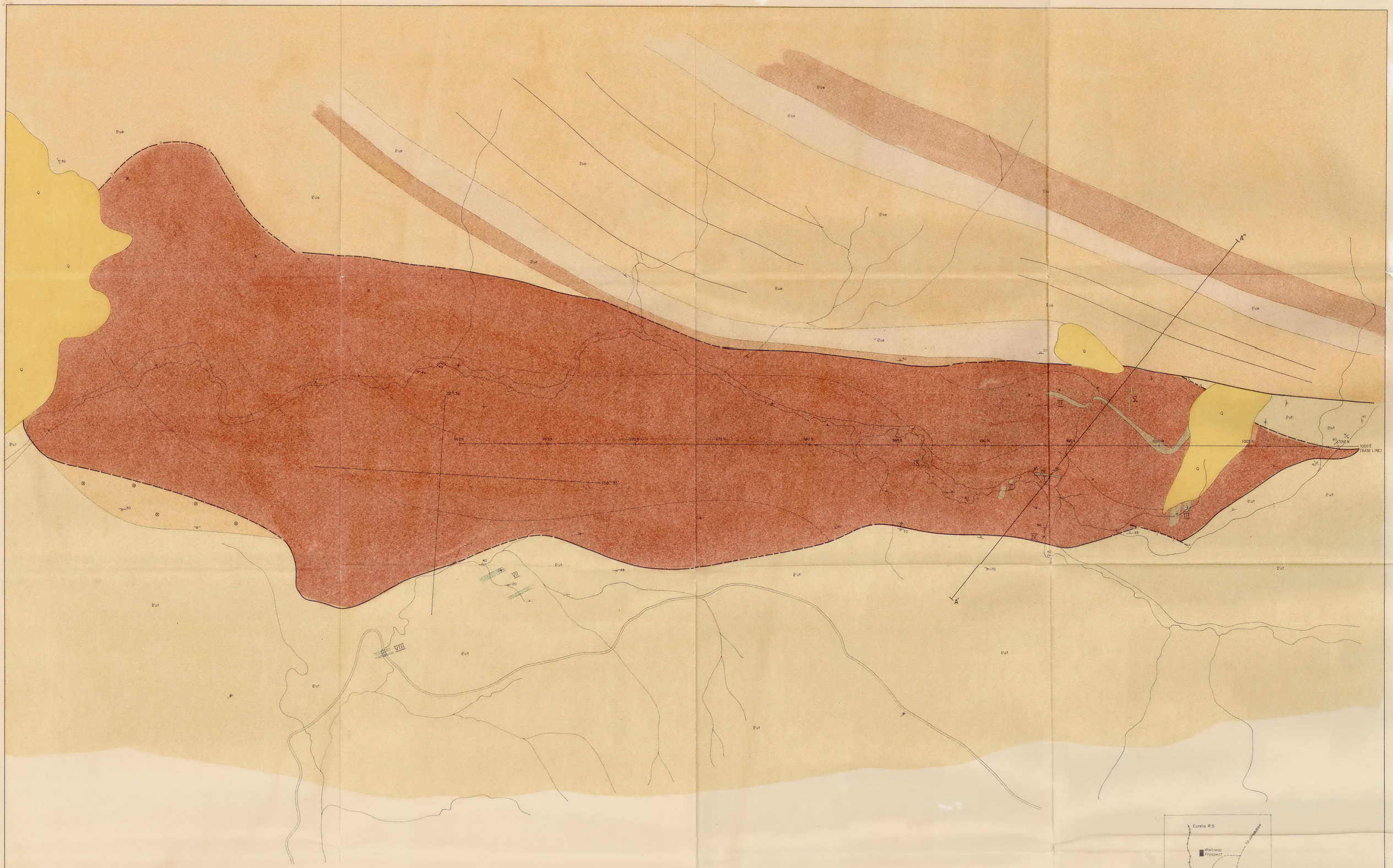
PROJECT: ORROROO — SOUTH AUSTRALIA

DISPERSION OF Nb, Ni, Cu and Zn. IN - 20 + 40 MESH (B.S.S.)
Fraction of Stream Sediments Draining Porphyrites, Walloway Prospect.
AND
VARIATION OF Nb, Cr and Ni VALUES
In Yakutiya Kimberlite and Walloway Porphyrites
Litinski V.A. (Geochem. 9. 1969)

SCALE: 1: 2,500 | Survey: R.A. Horn.
Reference:
Date: May 1972 | Drawn: C.M. | Checked:

REF. NO. Or...
CA1532

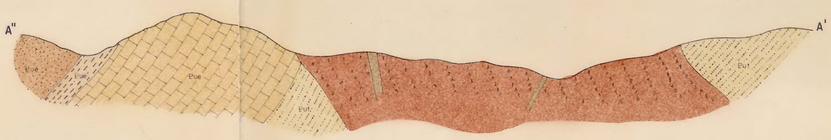
ENV 1832-2



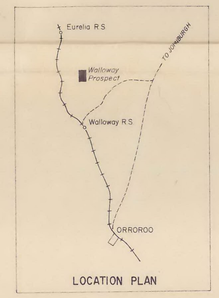
LEGEND

		Q	Quaternary to Recent gravels, sands and clays.	
PROTEROZOIC	ADELAIDE SYSTEM	MARINOAN	Bue	Shale Buff, decomposed with minor Pyrite mineralisation.	Brighton Limestone and Etina Formation
			Bue	Siltstone and Sandstone, brown weathering grey arenaceous sediments.	
			But	Limestone and Dolomite, grey to black with abundant rounded red quartz sand grains	Umberatana Group
		STURTIAN	But	Tarcowie Siltstone, Quartz with abundant Calcite and accessory detrital Muscovite, Tourmaline and Zircon minor Sericite and Chlorite due to low grade metamorphism.	
				Diapiric Intrusion.	
		II		Picritic Porphyrite, Calcite, Olivine, Phlogopite rock	

1. Geological Boundary.
2. Fault.
3. Bedding, Facing.
4. Flow banding in breccia and Dykes.
5. Trend lines in sediments.
6. Flow lines in breccia.
7. Macrofossil abundant.
8. Road.
9. Stream.



INTERPRETED SECTION ALONG A'- A''



LOCATION PLAN

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT : ORRORoo — SOUTH AUSTRALIA

WALLOWAY PROSPECT — GEOLOGY

SCALE 1 : 2500 | Survey R A Horn | REF. NO. D 153-3

Reference

Date April '72 | Drawn M.G. | Checked

WALLOWAY R.S.

TO ORRORO

CREEK

WALLOWAY

Gladdie Park

Dam

Camp

Old Farm House

HUNGRAY

VII

VIII

REFERENCE

Quaternary to Recent - sands and clays.

UPPER PROTEROZOIC

Etina formation? - silty limestone and dolomites with shale bands.

Tarcowie Siltstone - green, well-bedded, prominent cleavage.

Diapiric intrusion.

II Porphyrite.

Quartz and calcite veins.

Geological boundary, dashed where approximate.

Fault, dashed where approximate.

Strike and dip of bedding.

Vertical bedding.

Strike and dip of bedding, Facing unknown.

Strike and dip of cleavage.

Vertical cleavage.

Inclined banding in diapir.

Vertical banding in diapir.

Road.

Track.

Railway.

Fence.

Drainage.

Trend lines.

ORIGINAL

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: ORRORO — SOUTH AUSTRALIA

RECEIVED 10 JUL 1972 DEPT. OF MINES SECURITY 1832

WALLOWAY PROSPECT

GEOLOGY

SCALE: 1 : 10,000 | Survey: R. A. Horn.

Reference:

Date: June 1972 | Drawn: F.L.S. | Checked: R.A.H.

REF. NO. DA153 · 4

ENV-1832-4

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED
EXPLORATION DEPARTMENT

Special Mining Lease No. 646

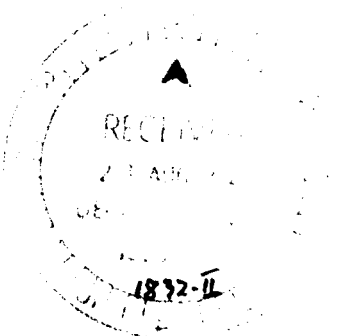
and

Mineral Claims Nos. 7445 to 7450

Report No.3 for three months ended 18th August, 1972.

PLANS TO ACCOMPANY THIS REPORT:

DA 153-7	Stream Geochemistry	-	Copper Values
DA 153-8	" "	-	Lead Values
DA 153-9	" "	-	Zinc Values
DA 153-10	" "	-	Nickel Values



DISTRIBUTION LIST

Copy No.

1. The Director,
S.A.Dept. of Mines (Adelaide)

2. The Mngr. Expl. Dept.
Electrolytic Zinc Co. of A/asia Ltd (Melbourne)

3. File - Electrolytic Zinc
Co. of A/asia Ltd. (Adelaide)

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED

EXPLORATION DEPARTMENT

034

SPECIAL MINING LEASE NO. 646

and

MINERAL CLAIMS NOS. 7445 to 7450

Report No. 3 for three months ended 18th August, 1972.

INTRODUCTION:

This report covers exploration work undertaken in Special Mining Lease No. 646 and in the six Mineral Claims No's 7445, 7446, 7447, 7448, 7449, 7450 which lie within the boundaries of the Special Mining Lease. This work completes the initial program of exploration undertaken. As this exploration has not yielded promising results, this Company has ceased negotiations with the claimholders for purchase of the Mineral Claims, and the claimholders have relinquished the Claims.

SUMMARY:

It was concluded in the previous report that the picritic porphyrites at Orroroo do not represent a source of potentially economic minerals. However, as a final check, a large sample (some 30 cu. yards) of creek debris derived from the picritic porphyrite dykes was taken. A heavy mineral concentrate was obtained from this sample, and was examined for diamonds and for kimberlite indicator minerals. No diamonds or indicator minerals were found.

Plans showing the results of stream geochemistry, which was reported on in Report No. 2, are included in this present report.

RECOMMENDATIONS:

It is recommended that no further exploration be undertaken in the area by this Company, and that Special Mining Lease No. 646 be relinquished.

Test on Large Sample

The earlier petrological, petrochemical and geological work led to the conclusion that some of the intrusive bodies present in the area were picritic porphyrites. While picritic porphyrites are not generally known as sources of diamond production, the rocks certainly lie within the kimberlitic suite, and may be considered as potentially diamondiferous.

In the petrological examinations (and in examination of heavy fractions from stream sediment samples), no diamonds were found, and few examples of minerals which are regarded as indicators for kimberlites. However, indicator minerals are a minor constituent, and diamonds when present form an extremely small portion of a kimberlite. Thus, it was concluded that to effectively test for indicator minerals and diamonds, it is necessary to take a very large sample of the intrusive bodies or of stream debris derived from the bodies. It was decided that large samples of stream debris would be taken from streams draining off the known kimberlitic bodies and that these would be combined into one sample for testing. The samples were excavated for us by and under the guidance of Anglo-American Co. personnel, who were working on kimberlites in the Terowie area. The samples were combined into one totalling some thirty (30) cubic yards.

The large sample was transported to Terowie and fed through Anglo-American's heavy media plant to obtain a heavy mineral concentrate. The concentrate obtained weighed some 80 lbs.

The concentrate was divided into two portions, one of which was retained, the other was submitted to Central Mineralogical Services for testing. A copy of the report (CMS 72/6/20) by Mr. H.W.Fander is included herewith as Appendix I.

From this report, it is seen that no diamonds were found and, with the possible exception of ilmenite, no kimberlite indicators. Thus, it must be concluded that the kimberlitic intrusives from which this sample originated are non-diamondiferous.

While geochemical analyses on this sample give moderately high values for Co, Ni, Cu, Pb and Zn, the results cannot be taken as promising as the mineralogy of the sample suggests that the Co and Ni has been collected by the manganese minerals present and the base metals by the goethite. Additionally, the values recorded from this heavy media concentrate are undoubtedly much higher than the values in the original stream debris sample.

Stream Sediment Sampling

In Report No.2 (for three months ended 18th May, 1972) it was reported that stream sediment samples were taken at minor creek intersections and at intervals along Wongway Creek. Further details and results of tests on samples are submitted herewith.

A total of 45 samples were taken within the Mineral Claims and the Special Mining Lease. The samples were divided into two portions. One portion was sieved in the field to obtain the +20, -20 +40 and -40 mesh fractions, which were submitted to McPhar for copper, lead, zinc and nickel determinations. The results of these determinations are expressed on the accompanying plans. As stated in the previous report, the base metal values show no increase towards known igneous bodies.

It is perhaps worth noting that, while the considerable variation between values for the +20, -20 +40 and the -40 mesh fractions appears to be fairly random, on the average, the -20 +40 mesh fraction gives slightly higher values for copper, lead and nickel, while the +20 mesh fraction gives higher values for zinc.

Some seventeen of the second portions of the samples were selected, and heavy mineral concentrates were obtained by TBE separation. These concentrates were examined for indicator minerals for kimberlites and for indications of further bodies of picritic porphyrites. With the possible exception of ilmenite, no kimberlite indicators were found, and no indications of further picritic porphyrites.

APPENDIX I

Central Mineralogical Services Pty. Ltd.

231 Magill Road
Maylands, S.A. 5069
Telephone ~~63 5559~~
42 5659

25th July 1972

Mr. R. Horne,
Electrolytic Zinc Company of Australasia Limited,
90 Fullarton Road,
NORWOOD, S.A. 5067

REPORT CMS 72/6/20

YOUR REFERENCE:	Verbal request
DATE RECEIVED:	26th June 1972
SAMPLE NOS:	1 only 209 Concentrate
SUBMITTED BY:	Mr. R. Horne
WORK REQUESTED:	Mineralogy

H.W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES

Date 25/7/72

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
209
Concentrate

Job No. CMS 72/6/20 Date Received: 26/6/72

Reference Verbal request Mr. R. Horne

Sample No. 209

Nature of Sample: Concentrate

DESCRIPTION **SECTION No.**

a. Hand Specimen:

b. Microscopic:

Half the sample was sent to Amdel for analyses, and the results are attached. The remainder was screened through a 12 mesh sieve, and the -12 mesh material examined in detail.

+12 mesh fraction. This consists of rock fragments (fine-grained sediments), quartz, goethite pseudomorphs after pyrite, hematite, ilmenite, manganese nodules, and occasional barite grains.

-12 mesh fraction. This is very similar to the +12 mesh material in constituents, but goethite pseudomorphs dominate; rock fragments and manganese oxide fragments are insignificant. Small grains of non-opaque minerals were hand-picked. All proved to be quartz or barite.

It is believed that the geochemical results can be correlated with the mineralogy. In particular, the Ni-Co results are most probably related to the manganese oxide nodules. The base metals Zn-Cu-Pb are probably contained within the goethite.

H.W. Fander, M.Sc.

amdel
The Australian Mineral Development Laboratories
Flemington Street, Frewville, South Australia 5063
Phone 79 1662, telex AA82520

040

Please address all correspondence to the Director
In reply quote: AN3/501/0 - 80/73

14 July 1972

The Manager
Central Mineralogical Services Pty Ltd
231 Magill Road
MAYLANDS SA 5069

REPORT AN80/73

YOUR REFERENCE:	Application dated 6/7/72
IDENTIFICATION:	209 - concentrate
DATE RECEIVED:	6/7/72

Enquiries quoting AN80/73 to Officer in Charge please.

Analysis by: R.R. Robinson

Officer in Charge, Analytical Section: A.B. Timms

for F.R. Hartley
Director

pkm

AMDEL ANALYTICAL SERVICE

JOB: ...80/73.... Semi-Quantitative Spectrographic Analysis Schemes A1,A2,A3,A4,A5 & A6 BATCH .....

Form 60 Results in ppm unless otherwise stated. Detection limits in brackets

Sample No	209
A1	
Co (5)	1,500
Ni (5)	500
Cr (20)	20
V (10)	
W (50)	
Mo (3)	100
Mn (10)	
Ta (100)	X
Nb (20)	X
Be (1)	
Th (100)	X
Pt (10)	
Pd (10)	
Os (10)	
Ir (2)	
Rh (2)	
Ru (2)	
A2	
Cu (0.5)	800
Pb (1)	200
Zn (20)	400
Sn (1)	1
Cd (3)	
Bi (1)	
Ag (0.1)	
Au (3)	
Ga (1)	

Sample No.	209
A2 Contd.	
Ge (1)	
As (50)	
Sb (30)	
A3	
Te (20)	
Tl (1)	
P (100)	100
A4	
Na (50)	
Li (1)	
A5	
K (5)	3,000
Rb (10)	10
Cs (30)	
A6	
Ba (50)	
Sr (10)	
Y (10)	10
La (100)	X
Ce (300)	X
Nd (300)	
Pr (100)	
Ti (100)	2,000
Er (100)	
Sc (50)	
Eu (50)	

Results are semi-quantitative. Elements apparently present in concentrations of economic interest should be redetermined by an appropriate accurate analytical technique. X = Not detected at limit quoted.

Geo A1, A2, A3, A5, A6 1x18=18

041

25
30
30

40
45
35

50
50
40

30
35
75

30
30
35

25
25
30

110
140
50

90
100
60

30
30
25

25
35
35

25
25
30

35
45
35

45
40
30

25
20
20

35
35
45

25
30
30

30
50
45

30
30
30

30
25
25

60
80
50

20
15
20

20
20
30

95
130
75

40
30
30

15
15
15

20
15
15

10
20
15

25
25
25

25
25
20

40
40
25

35
30
25

45
45
40

20
20
10

55
80
80

20
25
30

O DAM

45
50
55

20
25
20

15
10
20

50
50
45

73
100
60

20
20
35

45
45
30

■ CAMP

OLD
■ FARM
HOUSE

"Oladdie Park"

25
25
20

15
40
60

■ Farm

Walloway Rly. Sta.

LEGEND

60 — +20 Mesh (B.S.S.)
40 — −20 + 40 Mesh (B.S.S.)
60 — −40 Mesh (B.S.S.)

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: ORRORROO — SOUTH AUSTRALIA

WALLOWAY PROSPECT
STREAM GEOCHEMISTRY
COPPER VALUES

SCALE: 1:10,000	Survey: R.A. Horn.	REF. NO.
Reference:		DA153-7
Date: June 1972	Drawn: D.V.S.	Checked:

40
40
50

50
65
80

55
60
40

35
45
55

45
50
40

30
60
50

55
90
50

40
70
70

40
45
45

60
45
50

40
40
50

40
80
55

35
25
40

35
40
55

35
50
50

40
45
50

50
70
50

30
60
35

30
40
40

60
85
55

45
40
50

60
30
50

40
30
40

40
40
45

45
55
45

40
50
40

40
50
40

35
40
40

50
40
50

40
40
50

55
50
50

40
45
60

55
80
85

40
45
70

0 DAM

40
33
45

40
70
40

40
40
35

25
40
40

50
45
45

65
90
65

40
30
60

55
60
60

40
45
35

50
50
45

Walloway Rly. Sta.

Farm

■ CAMP

OLD FARM HOUSE

"Oladdie Park"

LEGEND

60 — +20 Mesh (B.S.S.)
40 — -20 + 40 Mesh (B.S.S.)
60 — -40 Mesh (B.S.S.)

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: ORRORROO — SOUTH AUSTRALIA

RECEIVED
28 AUG 1972
DEPT. OF MINES
SECURITY
1832-6

WALLOWAY PROSPECT
STREAM GEOCHEMISTRY
LEAD VALUES

SCALE: 1:10,000	Survey: R. A. Horn.	REF. NO.
Reference:		DA153-8
Date: June 1972	Drawn: D.V.S.	Checked:

ENV 1832-6

85 75 70
85 80 70
100 85 95
80 80 110
85 75 70
75 75 65
90 110 65
90 90 65
85 70 60
65 50 70
80 60 63
70 65 65
65 50 50
75 70 60
75 70 75
60 60 60
75 60 60
60 55 55
30 55 70
75 70 60
20 80 25
30 30 35
65 55 50
15 20 30
20 20 35
75 90 65
35 40 45
65 50 65
65 65 70
75 75 50
80 60 60
80 65 65
50 40 45
75 90 90
55 40 40
0 0 1 M
70 50 60
80 70 75
50 40 40
95 90 80
60 50 50
34 30 50
70 75 70
80 70 75
50 40 60
60 60 60
50 40 60
Farm
Walloway Rly. Sta.
■ CAMP
OLD FARM HOUSE
"Oladdie Park"

LEGEND

60 +20 Mesh (B.S.S.)
40 −20 + 40 Mesh (B.S.S.)
60 − 40 Mesh (B.S.S.)

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: ORRORROO — SOUTH AUSTRALIA

RECEIVED 28 AUG 1972 DEPT. OF MINES SECURITY 1832-7

WALLOWAY PROSPECT
STREAM GEOCHEMISTRY
ZINC VALUES

SCALE: 1:10,000 | Survey: R. A. Horn. | REF. NO. DA153-9
Reference:
Date: June 1972 | Drawn: D.V.S. | Checked:

ENV 1832-7

60
60
50

50
60
70

60
70
60

70
90
60

60
60
55

55
60
50

90
150
60

70
100
85

60
55
45

50
50
40

55
60
50

50
60
50

10
15
10

60
60
50

55
60
60

50
60
55

50
75
90

70
100
70

90
140
100

45
35
35

30
35
30

40
45
50

45
45
40

40
65
45

45
55
50

45
45
50

75
60
50

60
60
50

70
75
70

40
30
50

65
100
120

40
40
70

O'DAM

65
70
60

70
75
55

45
50
35

40
35
30

110
150
80

40
30
45

60
65
50

CAMP

OLD FARM HOUSE

"Oladdie Park"

50
45
40

40
25
40

Farm

Walloway Rly. Sta.

LEGEND

60 — +20 Mesh (B.S.S.)
40 — −20 + 40 Mesh (B.S.S.)
60 — − 40 Mesh B.S.S.

ELECTROLYTIC ZINC CO. OF A'ASIA LTD.

PROJECT: ORRORROO — SOUTH AUSTRALIA

RECEIVED
28 AUG 1972
DEPT. OF MINES
SECURITY
1832-E

WALLOWAY PROSPECT
STREAM GEOCHEMISTRY
NICKEL VALUES

SCALE: 1:10,000 | Survey: R. A. Horn. | REF. NO. DA153-10
Reference:
Date: June 1972 | Drawn: D.V.S. | Checked:

ENV 1832-8