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EL 1371

SANDSTONE

PROGRESS REPORT FOR THE PERIOD 19/12/86 TO 18/12/90

Submitted by
Roebuck Resources NL
1990

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PRIMARY INDUSTRIES AND RESOURCES SA

ENVELOPE 6809

TENEMENT: EL 1371 - Sandstone.

TENEMENT HOLDERS: Roebuck Resources NL and Australian Clays Ltd.

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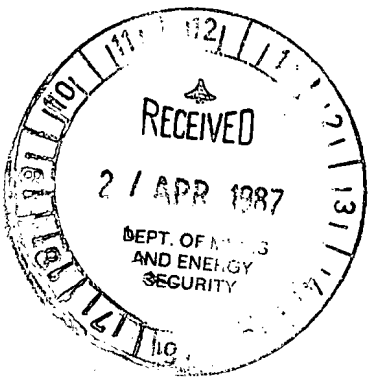
ROEBUCK RESOURCES N.L.
EXPLORATION LICENCE 1371
SANDSTONE, SOUTH AUSTRALIA
QUARTERLY REPORT FOR THE PERIOD
18TH DECEMBER 1986 TO 17TH MARCH 1987



TECHNICAL REPORT NO. 42

PERTH, APRIL 1987

BY: S.B. WARNE

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FIGURES

1. INTRODUCTION

Exploration Licence 1371 was granted for 1 year to Roebuck Resources N.L. and Australian China Clays Ltd on the 19th December, 1986. Our objectives are to establish the extent, quality and commercial potential of palygorskite bearing clays of the Garford Formation discovered by the Department of Mines and Energy.

Prior to grant date the area was inspected in company with an officer of the Department of Mines and Energy and locations of earlier Department auger holes in various lakes were established. Outcrops of palygorskite-bearing Garford Formation beds were examined at P.B. Lake, Jubilee Lake and other sites. Two auger holes, at P.B. and Stevenson Lakes, confirmed the nature of dolomitic palygorskite horizons in the area.

2. EXPLORATION

It was proposed to collect a 20 tonne bulk sample for testing in Melbourne and further samples of clays from playa lakes within the Garford Paleochannel using a back hoe.

Heavy rains late 1986 and early 1987 delayed this work with two attempts abandoned due to boggy conditions. The work was subsequently completed early March, 1987.

Fifteen backhoe cuts in seven lake depressions, to depths of 3.6 metres below surface, yielded samples of a variety of clay types and more information on clay deposits across the paleochannel section.

A 20 tonne sample was collected from Lake Stevenson within 200 metres of a Department of Mines and Energy auger site where palygorskite clays were proved by testing to have a 100 per cent absorbency characteristic one to two metres below surface.

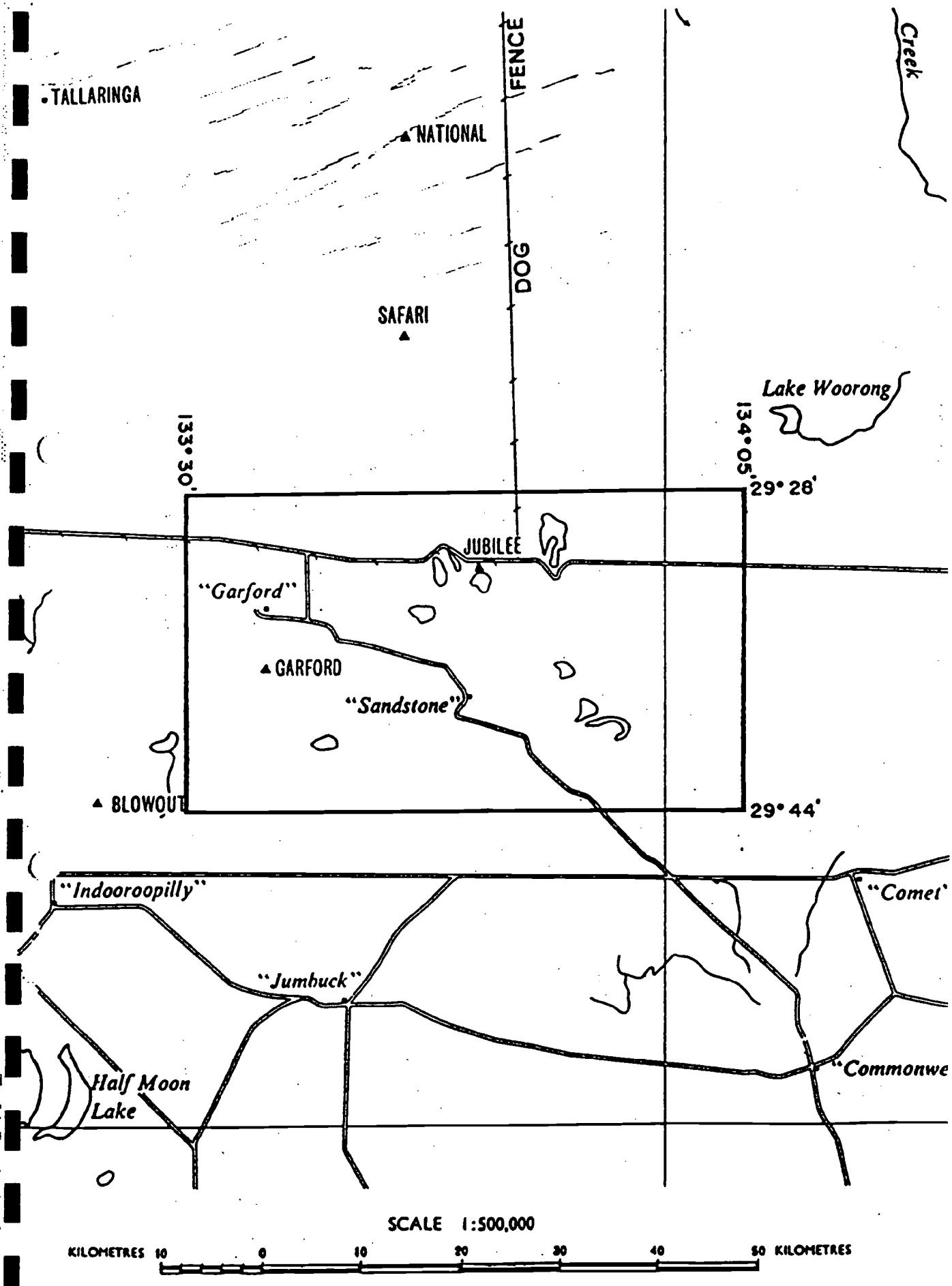


FIGURE 1

NOTE: There is no warranty that the boundary of this Exploration Licence is correct in relation to other features on the map. The boundary

2.1 Sample Testing

Thirty nine samples were submitted to Amdel for absorbency tests with request for an examination of the clay mineralogy of selected samples. The results of this work are not yet to hand.

for S.W. WARNE
Consulting Geologist

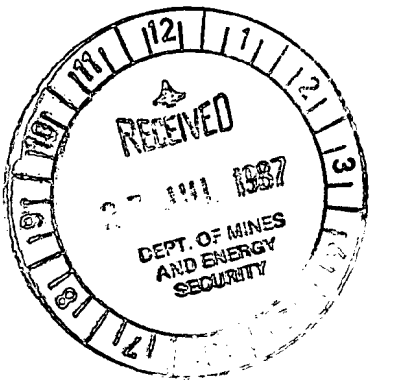
3. EXPENDITURE

EXPLORATION EXPENDITURE
EL 1371 SANDSTONE (S.A.)
THREE MONTHS TO 17.3.87

Contractors - Geological	813
Geologist - in House	2154
Freight and Delivery	4
Leasing and Rental	140
Loose Tools and Equipment	31
Mines Department Fees	3434
Mining Tenements - Administration	19
Printing and Stationery	11
Telephone and Postage	33
Travel and Accommodation	1010
Vehicle Expenses	388
	8038
*Overhead Costs	1206
TOTAL:	$ 9244

*Office services, depreciation, depletion, rentals amortisation of assets, auditing.

ROEBUCK RESOURCES N.L.
EXPLORATION LICENCE 1371
SANDSTONE, SOUTH AUSTRALIA
QUARTERLY REPORT FOR THE PERIOD
19TH MARCH TO 18TH JUNE 1987



TECHNICAL REPORT NO: 53

PERTH, JULY 1987

BY: S.B. WARNE

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FIGURES

1. INTRODUCTION

Exploration Licence 1371 was granted for one year to Roebuck Resources N.L. and Australian China Clays Ltd., on the 19th December, 1986. During the first quarter a 20 tonne bulk sample of dolomitic palygorskite clay from Lake Stevenson and 10-20 kg. bulk samples from fifteen backhoe cuts in Garford Formation clays were delivered to Australian China Clays Ltd. in Melbourne for testing. Duplicates of forty two backhoe samples were submitted to Amdel to determine their water absorbency and the mineralogy of thirteen of these samples determined.

2. EXPLORATION RESULTS

2.1 Amdel Testing

The results of AMDEL testing were:

1. Optimum calcining conditions were found to be 650 degrees celcius for two hours.
2. The best absorbency values were from samples high in dolomite and palygorskite.
3. The overall absorbency values of the samples were comparable with commercial pet litters (commercial litters have absorbencies in the range 74-86%).

Amdel concluded: "The material represented by these samples appears to have excellent potential for development as a commercial source of absorbent clay".

2.2 Australian China Clay Ltd.

No advice has been received from Australian China Clays Ltd. in regard to any laboratory tests that may have been carried

out on the samples submitted to them. Roebuck Resources N.L. has received formal notification from Australian Clays Ltd. of its withdrawal from the joint venture.

Permission has been given to Mr. Neville Cawte of Murray Bridge, S.A., to retrieve some of the sample material from Melbourne. Mr. Cawte approached Roebuck in regard to testing of material from Sandstone for a particular pet litter mix.

2.3 Area Assessment

Reconnaissance of the licence area together with results from backhoe cuts showed:

(a) The boundaries of the Garford paleochannel correspond closely to previous boundaries inferred in Department of Mines and Energy mapping. Any extension of the channel east of PB Lake, or west of Aurora Tank cannot be established without subsurface investigation due to sand and other superficial cover. Exploration for clays beneath anything except very shallow cover is not warranted.

(b) Large volumes of high absorbency clays are indicated, in order of prospectivity, in the vicinity of Crater Lake, Lake Stevenson, PB Lake. Future effort will be directed toward deposits in these areas.

(c) Areas outside the paleochannel and dune covered sections of paleochannel hold low potential for viable clay deposits. An assessment of the southwest portion of paleochannel in the Garford area downgraded its potential.

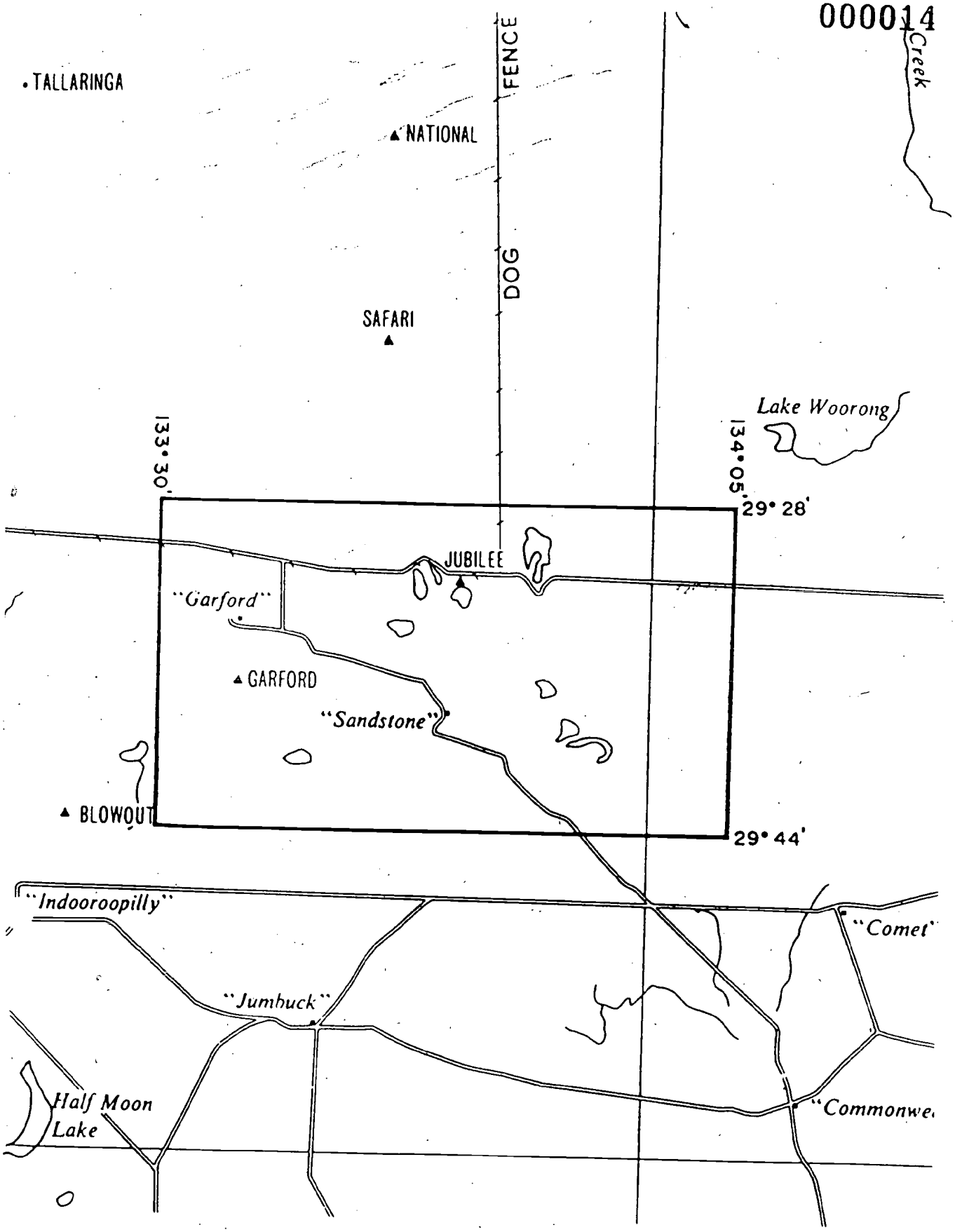
It was decided to reduce the area of the exploration licence to cover Crater Lake, Lake Stevenson and PB Lake deposits.

3. EXPENDITURE

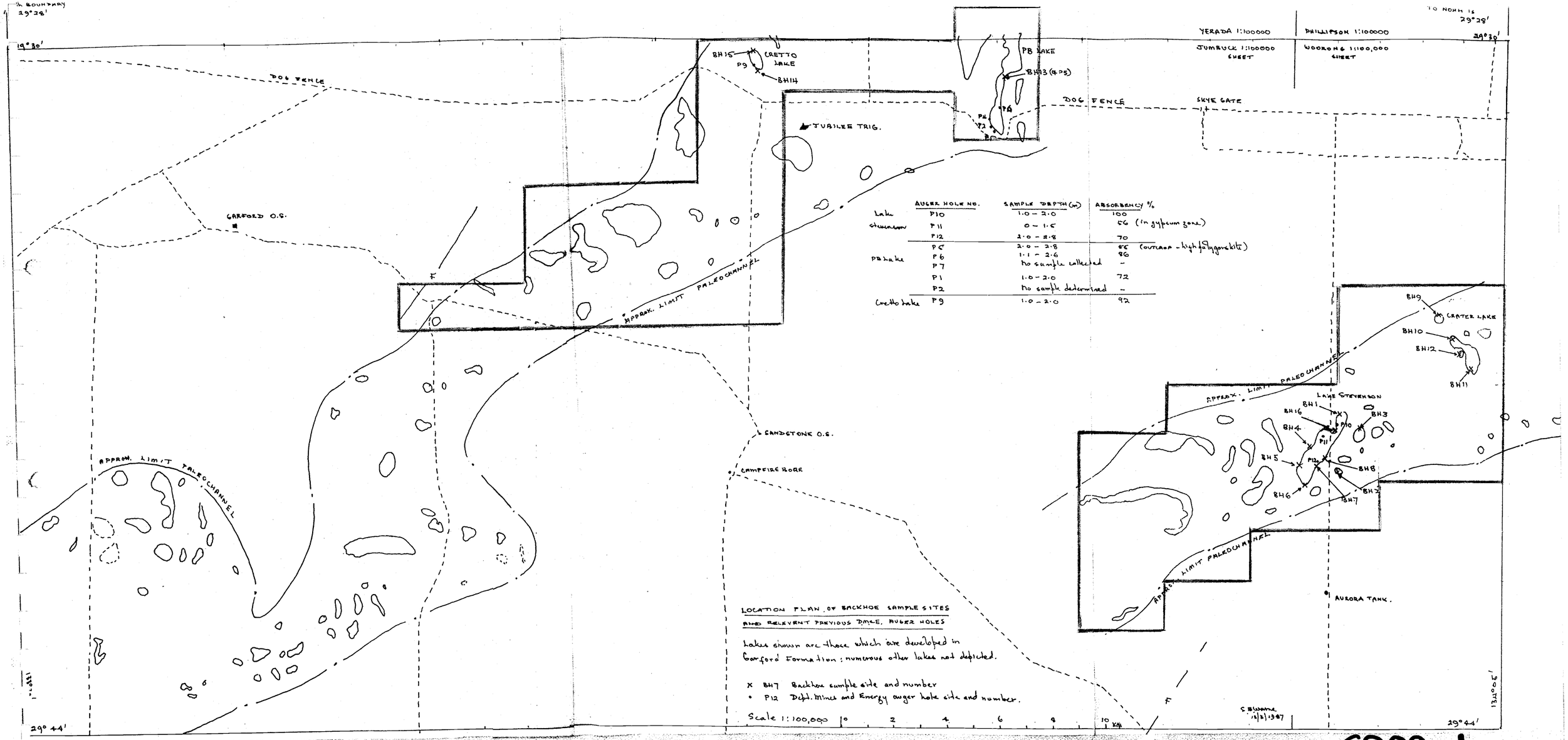
EXPLORATION EXPENDITURE
E.L. 1371 SANDSTONE (S.A.)
THREE MONTHS ENDED 18.6.87

Assaying & Testing	3326
Contractors - Geological	6548
Contractors - Other	1678
Geologist - In House	923
Freight & Delivery	3058
Leasing & Rental	3570
Loose Tools & Equipment	213
Mines Department Fees	-
Mining Tenements - Administration	-
Printing & Stationery	6
Telephone & Postage	100
Travel & Accommodation	1440
Vehicle Expenses	1040
*Overhead Costs	3285
TOTAL:	$ 25187

*Office services, depreciation, depletion, rentals, amortisation of assets, auditing.



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



	AUGER HOLE NO.	SAMPLE DEPTH (m)	ABSORBENCY %	
Lake Stevenson	P10	1.0 – 2.0	100	
	P11	0 – 1.5	56	(in gypsum zone)
	P12	2.0 – 2.8	70	
PB lake	P5	2.0 – 2.8	86	(outcrop - highly hygroscopic)
	P6	1.1 – 2.6	96	
	P7	no sample collected	–	
	P1	1.0 – 2.0	72	
	P2	no sample determined	–	
Cretto lake	P9	1.0 – 2.0	92	

LOCATION PLAN OF BACKHOE SAMPLE SITES AND RELEVENT PREVIOUS DMLE, AUGER HOLES

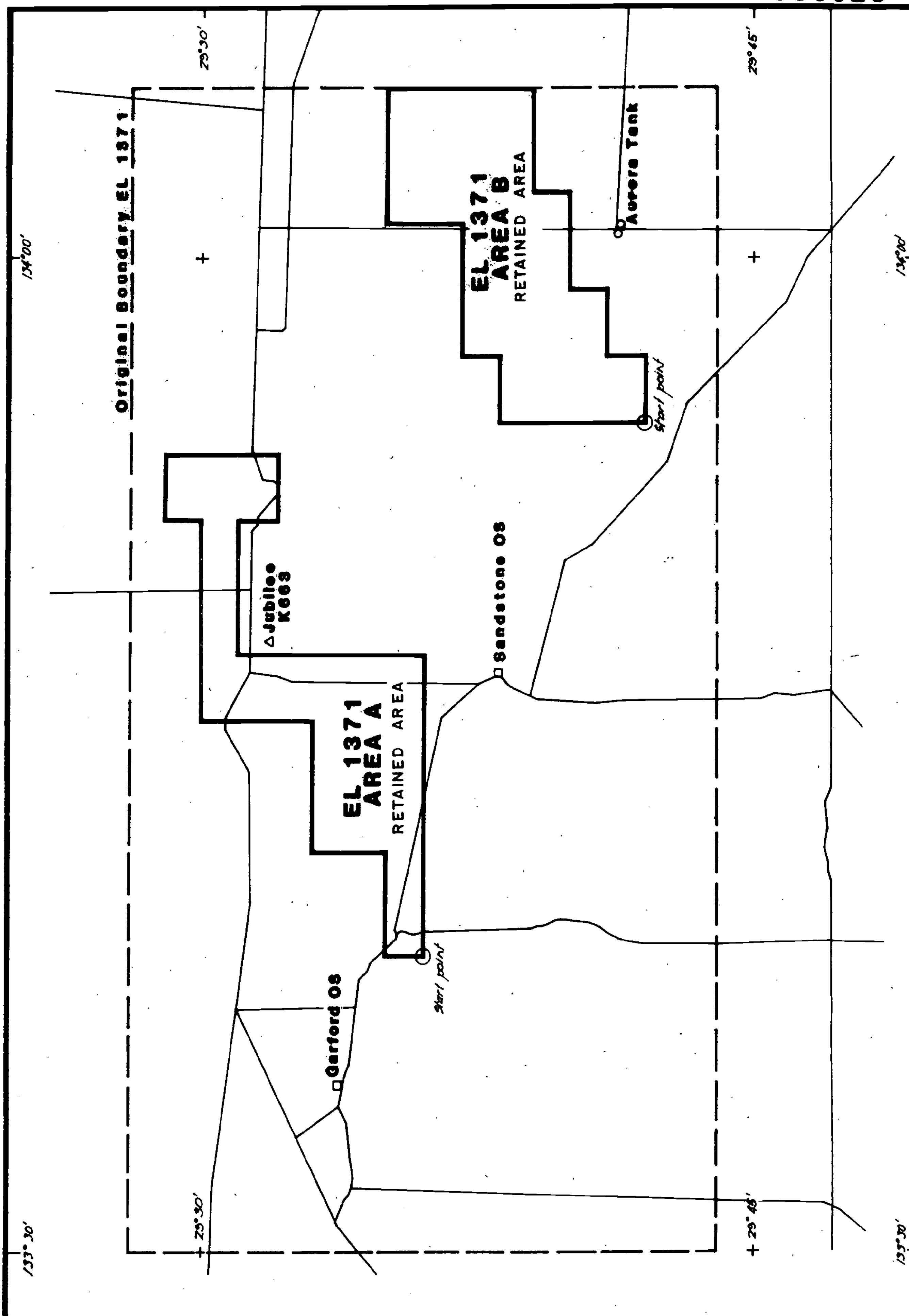
Lakes shown are those which are developed in Garford Formation; numerous other lakes not depicted.

X BH7 Backhoe sample site and number

• P12 Dept. Mines and Energy auger hole site and number.

Scale 1:100,000 0 2 4 6 8 10 KM

6809-1



ROEBUCK RESOURCES NL

Partial Surrender of Tenement

EL 1371

Scale, 1 : 250 000 **Date, July 1987**

Port Coober Pedy

ROEBUCK RESOURCES N.L.
EXPLORATION LICENCE 1371
SANDSTONE
SOUTH AUSTRALIA
QUARTERLY REPORT FOR THE PERIOD
19TH JUNE TO 18TH SEPTEMBER, 1987

Prepared by
S.B. Warne
for
Roebuck Resources N.L.

TECHNICAL REPORT NO. 69
PERTH, OCTOBER 1987

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LIST OF FIGURES

1. INTRODUCTION

Exploration Licence 1371 was granted to Roebuck Resources N.L. and Australian China Clays Ltd., on the 19th December, 1986 for a period of one year. Australian China Clays Ltd. withdrew from the joint venture during the second quarter of the licence period.

A series of palygorskite bearing clays from beneath lake surfaces in the area were tested by AMDEL and results received during the second quarter confirmed their potential for development as a commercial absorbent clay.

2. THIRD QUARTER ACTIVITIES

Mr. N. Cawte, Murray Bridge S.A.

Mr N. Cawte approached Roebuck regarding a possible joint venture to treat and market palygorskite in a pet litter mix incorporating crushed limestone from his works at Murray Bridge and was given permission to retrieve bulk sample material previously delivered to Australian China Clays Ltd. in Melbourne.

Mr Cawte reported he had tested a small quantity of material using a ceramic kiln and intended to prepare sample product mixes. Mr Cawte was invited to submit a joint venture proposal to Roebuck prior to August but failed to do so.

Market Survey/Testing

Industry enquiries and literature studies were undertaken to gauge immediate market potential and style for a new resource. This indicated testing of bulk samples using a suitable commercial kiln would be necessary.

To this end, various kiln ovens/operators in Adelaide and Melbourne were approached to either carry out the necessary work on a contract or joint venture basis.
Two companies have expressed interest in a joint venture and discussions are continuing.

Pyrotherm Pty. Ltd., design engineers, Perth have been approached to ascertain whether their fluidized bed equipment can be successfully adapted to calcine palygorskite clays.

S.B. WARNE

3. EXPENDITURE

EXPLORATION EXPENDITURE
E.L. 1371 SANDSTONE (S.A.)
THREE MONTHS ENDED 18.9.87

Contractors - Geological	63
Drafting	143
Geologist - In House	615
Mining Tenements - Administration	168
Printing & Stationery	6
Stamp Duty	54
Overheads	157
Total:	1206

*Office services, depreciation, depletion, rentals, amortisation of assets, auditing.

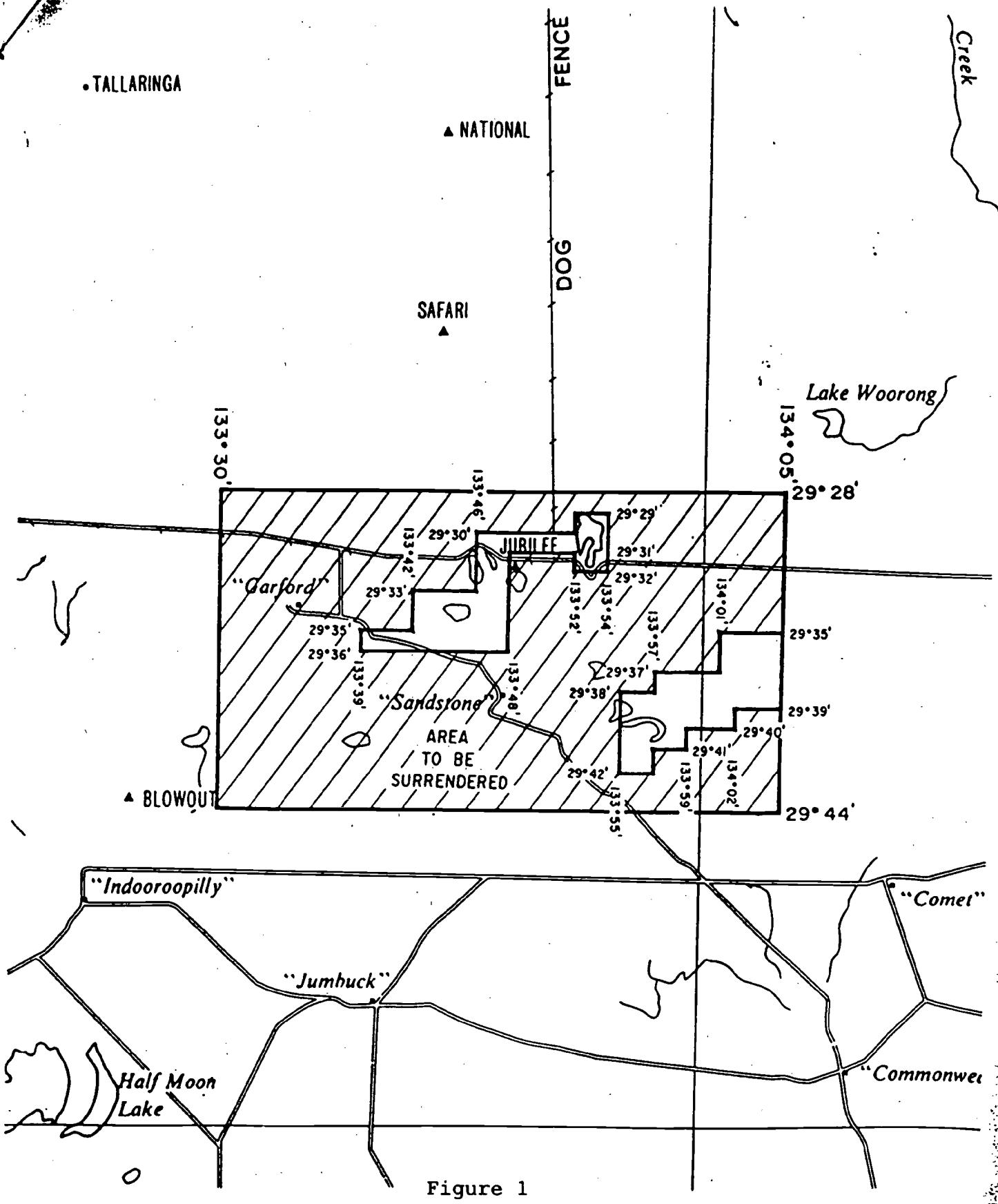

Figure 1

SCALE 1:500,000

KILOMETRES 10 0 10 20 30 40 50 KILOMETRES

APPLICANT: ROEBUCK RESOURCES N.L.

DM: 221/86

AREA: ~~1669~~ 227 square kilometres (approx.)

1:250000 PLANS: COOBER PEDY

LOCALITY: SANDSTONE OS AREA – Approx. 110km SW of Coober Pedy

DATE GRANTED: 19-12-86 DATE EXPIRED: 18-12-87 EL No: 1371

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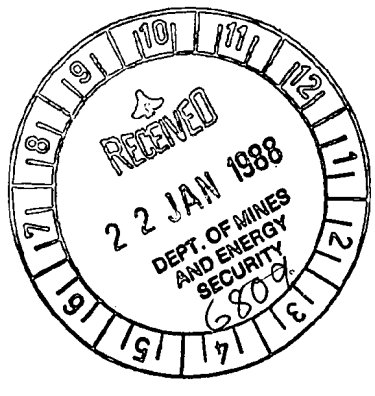
ROEBUCK RESOURCES N.L.
REPORT FOR THE PERIOD
19TH SEPTEMBER 1986
TO
18TH DECEMBER 1987
SANDSTONE
EL 1371
SOUTH AUSTRALIA

Prepared by
S.B. Warne
for
Roebuck Resources N.L.

TECHNICAL REPORT NO. 81
PERTH, DECEMBER 1987



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SUMMARY

Sampling and testing of Miocene Garford Formation clays of a paleochannel in the Sandstone area confirmed the presence of dolomitic palygorskite with absorbencies in the range 75-100%, comparable to currently marketed absorbent clays.

The clay deposits are 1-3 m in thickness beneath a veneer (to 0.5 m) of gypsum contaminated material covering lake depressions developed in the Garford Paleochannel.

The sorptive qualities of the clay depend on a mix of dolomite-palygorskite. Highest absorbencies correspond with samples having a dominant dolomite and subdominant palygorskite content.

Sampling has shown large tonnages of easily mined clays are available. Pilot plant testing of bulk samples is required to determine optimum handling and calcining procedures for commercial development.

1. INTRODUCTION

Reconnaissance sampling of palygorskitic clays occurring in the Garford Paleochannel, a Miocene feature marked by a series of playa lakes and salinas southwest of Coober Pedy, was completed by the Department of Mines and Energy (Robertson, 1984). This work indicated off-white, dolomitic palygorskite clays of the Garford Formation deposited in the channel over extensive areas. Calcined samples gave absorbencies in the range 52-100%.

Roebuck Resources N.L. and Australia China Clays Ltd applied for an exploration licence covering the southwest portion of the paleochannel in 1986 to further investigate the clay deposits.

2. LAND TENURE

Exploration Licence 1371 covering approximately 1669 km^2 in the Sandstone area was granted for one year to Roebuck Resources N.L. and Australia China Clays Ltd., 19th December, 1986 (Figure 1).

During 1987, Australia China Clays Ltd withdrew from the joint venture with Roebuck Resources N.L.

Following regional sampling and assessment Roebuck Resources N.L. surrendered a portion of the licence and reduced the holding to two areas covering the most prospective portions of the channel in the vicinity of Jubilee Trig (Area A - Figure 2) and Aurora Tank (Area B - Figure 2).

Prior to expiry, application was made to extend the term of the licence for a further twelve month period.

3. WORK COMPLETED

A 20 tonne bulk sample of palygorskite clay from Lake Stevenson and a series of 10-20 kg bulk samples from fifteen backhoe cuts in Garford Formation Clays, representing

diverse areas, were delivered to Australian China Clays Ltd in Melbourne. Australian China Clays Ltd had indicated intention to use their laboratory facilities to exhaustively test the characteristics of the clay samples but Roebuck Resources N.L. were not advised of any work having been completed. Efforts to retrieve the 10-20 kg bulk samples did not meet with any co-operation.

Duplicate samples of the backhoe sampling were fortunately held in Adelaide and 40 samples were submitted to Amdel to determine water absorbencies and the mineralogy of 13 samples determined.

The portion of the 20 tonne bulk sample least affected by heavy rains was retrieved by Mr. N. Cawte of Murray Bridge who calcined the material locally to confirm suitability for a particular pet litter mix.

Roebuck Resources N.L. carried out a preliminary market survey, which suggested a suitable product of known characteristics could achieve local market penetration. Efforts to find an Adelaide based kiln operator to carry out bulk testing promoted interest but could not be proceeded with, due to unknown factors in handling raw material feed and the unsuitability of available kilns.

It appears calcining using a live fluid bed could be the most efficient method. Pyrothum Pty Ltd of Bayswater, W.A. have a fluidised bed pilot plant in Perth which could be suitably set up to test optimum handling and calcining conditions for palygorskite samples.

4. SAMPLING RESULTS

A full report on the backhoe sampling is given in Appendix 1 which includes absorbency testing and mineralogy completed by AMDEL (Report M7914/87).

Two areas in the vicinity of Lake Stevenson and Crater Lake yielded consistent absorbency values for palygorskite clays

indicating immediate deposit potential. These areas were selected for sampling on the basis of ease of access. Extensive other areas exist with enormous tonnage potential but are without access tracks and usually in lakes surrounded by steep dunes and soft, near shore seed and flour gypsum deposits. The absorbency values are summarised in Table 1.

4.1 Lake Stevenson

Sample sites were in the floor of Lake Stevenson except BH2 and BH3 which were in small circular lakes immediately east and separated from Lake Stevenson by a sand ridge.

At Lake Stevenson a zone of gypsum rich material up to 0.5 m deep overlies a 203 m thickness of sorptive clay (75-100 %).

In BH2 and BH3 lakes 70-80^{+}% absorbent clays are over 3 m thick.

Estimated tonnage potentials indicated by the trenches are:

Lake Stevenson	:	8,000,000 tonnes
BH2 Lake	:	700,000 tonnes
BH3 Lake	:	3,000,000 tonnes

The clays are massive, white or off-white, cut out in large firm lumps with the backhoe, and carry rare gypsum crystals and very minor iron oxide speckling.

TABLE 1

Absorbency Values for Lake Stevenson and Crater Lake Samples

LAKE STEVENSON

Hole No.	From(m)		To(m)	Absorbency(%)	Notes
P10	1.0	-	2.0	100	
P11	0	-	1.5	56	in upper gypsum zone
P12	2.0	-	2.8	70	
BH2	0.5	-	1.0	78	
	1.0	-	2.0	78	
	2.0	-	2.5	74	
	2.5	-	2.7	74	
	2.7	-	3.3	65	
	3.3	-	3.6	69	
BH3	0.3	-	1.6	71	
	1.6	-	2.5	67	
	2.5	-	3.3	78	
	3.3	-	3.5	83	
BH4	1.1	-	2.0	82	
	2.0	-	2.7	80	
	2.7	-	3.6	76	
BH7	0.4	-	1.0	66	
	1.0	-	1.8	80	
BH8	2.3	-	2.9	68	
	2.9	-	3.0	100	

CRATER LAKE

BH9	0.8	-	1.3	80	
	1.3	-	1.9	72	
	1.9	-	2.7	63	
BH10	1.0	-	1.7	98	
	1.7	-	2.45	59	
BH11	0.4	-	1.0	89	
	1.5	-	2.35	75	
	2.35	-	3.4	74	

4.2 Crater Lake

In Crater Lake itself 1-1.5 m of stained sorptive clays were indicated beneath a heavily stained near surface zone.

The elongated lake immediately south is of particular interest as, apart from a 3 m thickness of 75-90 % absorbent clay in BH10, BH11 and BH12 sampled very hard dolomite rich rock. In BH10 around 1 m thickness of 98 % absorbent material occurs beneath a crust of brilliant white dolomite rock.

This dolomite rich zone covers a large area and may offer a different product to the normal absorbent clays and warrants further testing.

The mineralogical investigations of clays showed high absorbencies relate to samples having a mix of palygorskite (accessory to dominant, usually subdominant) and dolomite (accessory to dominant, usually dominant). High absorbencies, in all cases, occurred where dolomite content was dominant and palygorskite sub-dominant.

Impurities in highly sorptive clays did not correlate at all with absorbency values and the following minerals were identified and quantified:

kaolinite	:	trace ore sample only	< 5%
quartz	:	trace to accessary	<5-20%
halite	:	trace to accessary	<5-20%
celestite	:	accessory to subdominant BH11	<5-20+%
	:	trace BH13	<5%

5. EXPENDITURE

EXPENDITURE STATEMENT
EXPLORATION LICENCE 1371
19.9.87 TO 18.12.87

Contractors - Geological	300
Drafting	-
Freight & Delivery	10
Mines Department Fees	684
Printing & Stationery	2
Stamp Duty	-
Telephone & Postage	48
	1044
Overheads @ 15%	157
TOTAL:	$ 1201

6. REFERENCES

Barnes, L.C. and Pitt, B.M., 1976:
The Tallaringa Paelodrainage System. ~~Queensland~~ Quarterly Geological Notes, G.S.S.A., 59: 7-10

Benbow, M.C. and Pitt, G.M., 1978:
The Garford Formation, ~~Queensland~~ Quarterly Geological Notes, G.S.S.A., 68: 8-15

Pitt, G.M., Benbow, M.C. Barnes, L.C. Harris, W.K., and Lindsay, J.M., 1978:
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Robertson, R.S. 1984:
Reconnaisance sampling of palygorskite clay, Garford Paleochannel - Coober Pedy, G.S.S.A. Report 84/52 (unpublished)

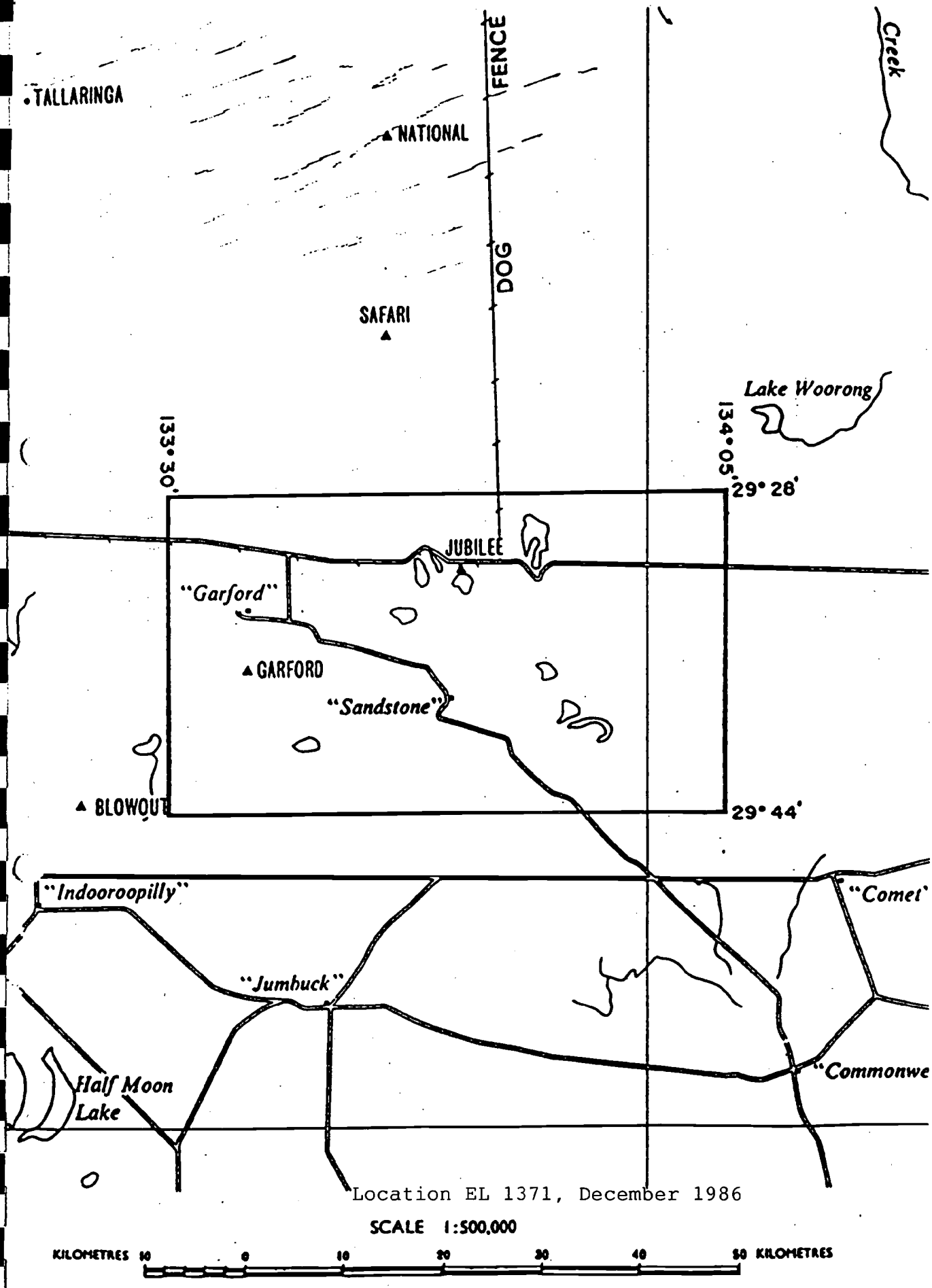
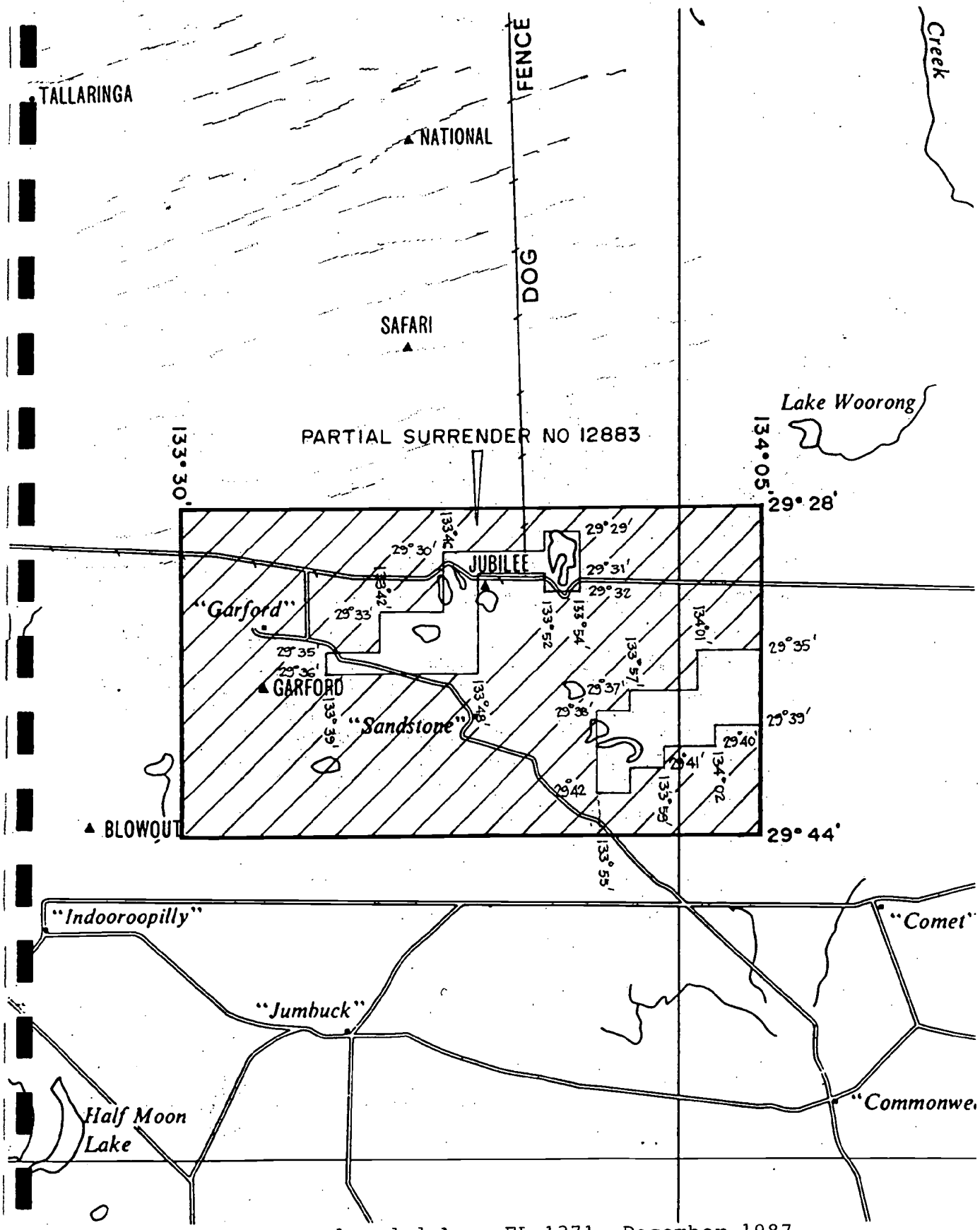


FIGURE 1

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



Amended Area EL 1371, December 1987

SCALE 1:500,000

Figure 2 (1 of 2)

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

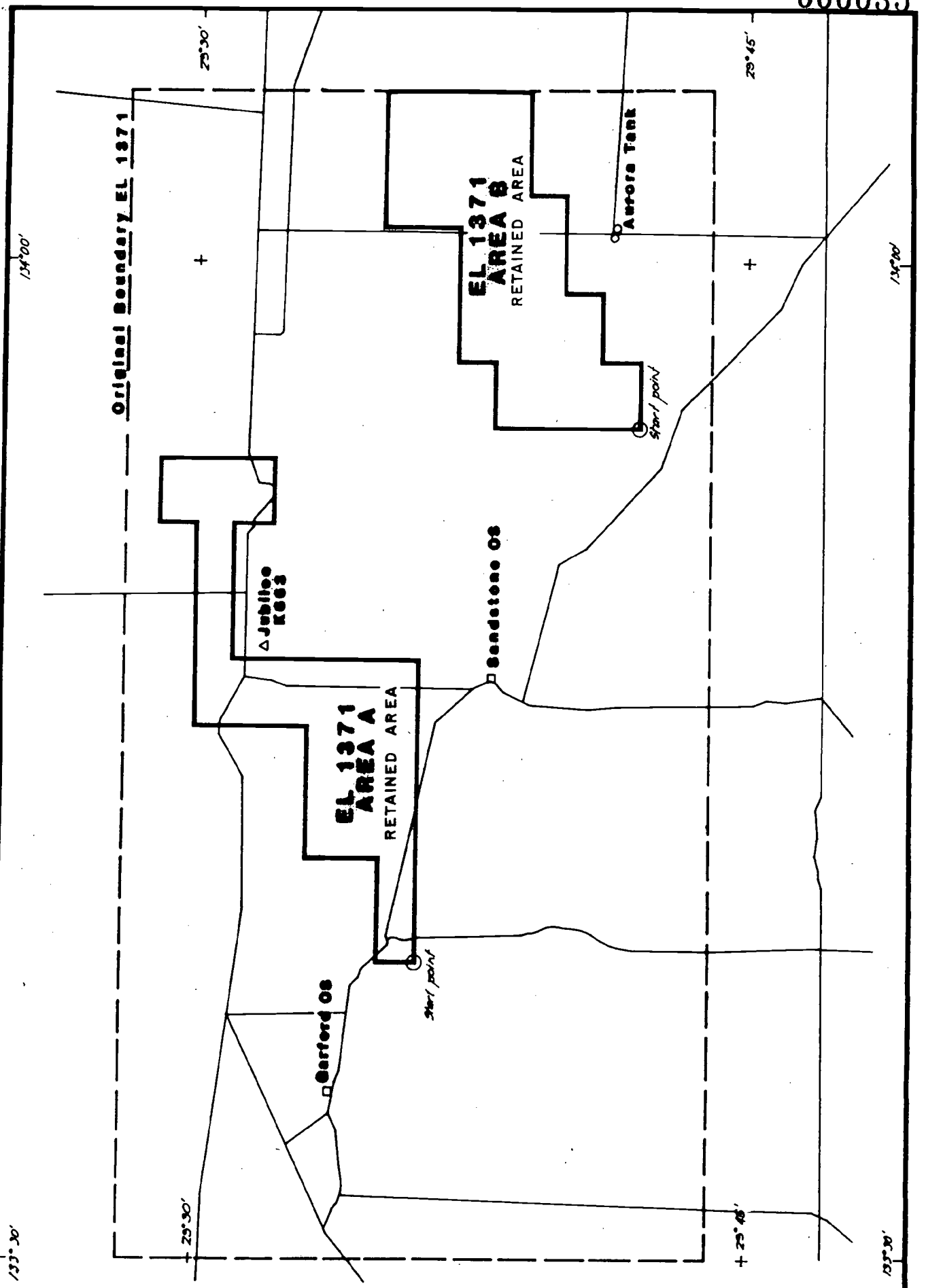


Figure 2 (2 of 2)

N

ROEBUCK RESOURCES NL

Partial Surrender of Tenement

EL 1371

Scale, 1 : 250 000 Date, DEC 1987

Perl Coober Area SURR-6

APPENDIX 1

Sampling Report and Notes - Sandstone EL 1371

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FIGURES

APPENDICES

1. INTRODUCTION

This report documents sampling on Sandstone E.L. 1371, March 1987. The prime purpose of sampling was to obtain a bulk sample of palygorskite bearing clay, determined by the S.A. Department of Mines and Energy as highly sorptive (as described in Report Bk. No. 84/52, "Reconnaissance Sampling of Palygorskite Clay, Garford Palaeochannel - Coober Pedy", R.S. Robertson, July 1984).

Additionally, eight backhoe cuts were completed in the vicinity of the bulk sample site on Lake Stevenson to indicate the immediate extent of clay in the area and seven further cuts sampled clay deposits in three other widely separated areas (Crater Lake, PB Lake, Cretto Lake).

2. STEVENSON LAKE

2.1 Bulk Sample (Site BH16)

The bulk sample site was selected on the basis of the following facts:

1. Located approximately 150 metres from Auger Hole P10 completed by SADME. Palygorskite clay from 1-2 metres depth in this hole had 100% absorbency.

2. It was the only location available where a truck could be brought to a sample site. All other sites are in gypsous soils on or near playa lake beds which are too soft for heavy vehicle movement and are also surrounded by high sand and gypsum dunes. The site chosen was on a shallow outcrop of palygorskite immediately adjacent to a graded station road.

3. The playa lies within the centre of a paleochannel and had considerable potential for near surface Garford Formation that could be tested to indicate potential volume of a palygorskite/sorptive clay resource.

4. Track access to the area was the best available for any playa lake within the licence area.

Before taking the sample, all surface seed gypsum was scraped away leaving a hard, clean surface of palygorskite. The top 0.5 metres was backhoed to one side as waste, since large blades of crystalling gypsum occur in near surface material. The backhoe cut was made 5 buckets wide for the first 0.5 m and then reduced to 2 buckets in the centre of the cut to ensure no contamination by sidewall collapse of near surface material. The bulk sample was then taken from 0.5 - 2 m below the scraped surface which was approximately one metre above lake level (auger hole P10 was was commenced at lake level).

The material collected was a uniform off-white clay except for a 10 cm grey horizon 0.8 m below surface. The grey horizon is a more dense and plastic clay without pore spaces of iron oxide stains; the off-white clay is lightly stained with iron oxide and has abundant open spaces.

2.2 Backhoe Testing

BH1, 4, 8 together with results from P10, P11, P12 indicate palygorskite occurs around and on the lake over an area of 2 km by 0.6 km and is in excess of 3 m in thickness. Identical material of similar thickness occurs in smaller lakes over a dune to the east in BH2, 3.

Gritty, talcose clay in BH5 occurs close to the paleochannel edge and BH6 exposed basement of strongly weathered,

prominently banded biotite-quartz-felspar gneiss of Mulgathing Complex basement.

3. CRATER LAKE AREA

Palygorskite clay was unbottomed at 3.45 m in BH9 and overlies conglomeratic grit below 3.40 m in BH11.

BH10, 12 cut hard, intensely white claystone of unknown composition (possibly dolomite and kaolin). This material covers a large area, is of uniform whiteness and texture, is of considerable thickness, and occurs above or immediately below surface; it requires laboratory appraisal.

4. PB LAKE

A section was cut in an exposed cliff section BH13, at DME auger site P5 primarily to obtain a sample of high content palygorskite clay, 1.8 - 2.3 m below surface (BH samples 7340 and 7340B) which is of relatively low absorbency (55%).

This material outcrops persistently at and just above lake level, particularly on the west side of PB Lake.

Beneath this horizon is a thick (+3.6 m) bed of dark green, highly saponitic, plastic clay of very uniform composition. The bed is widespread and was also intersected in Cretto Lake where it carries 1-3 mm red spherules of oxidised marcasite; it warrants attention in regard to any possible commercial value.

5. CRETTO LAKE

BH14 cut thick absorptive, white clay from surface to 2 m, then lesser quality alternating white and grey bands to 3 m. The better quality material forms the lake floor and would also occur beneath extensive areas of shallow (less than 2 m, with much less than 1 m) overburden and would support a neat, easily accessible, small open cut venture (immediate volume circa 800,000 cu.m).

Logs and sample descriptions for BH1-15 are given on sample sheets 07301-07348.

6. ADDITIONAL NOTES

1. Access to the area is from Wirrida Siding on the Alice Springs railway due west for 60 - 80 km along the Vermin Fence (Dog Fence). This track is mainly flat and only minor works would be required on two sand dunes and one gypsum bank to upgrade it sufficiently to carry heavy trucks.

2. The best grade sorptive clays appear to lie in the centre of paleochannels. The most accessible area and the one holding mosts promise for an immediate definition of a resource is at and in the vicinity of, Lake Stevenson. The lake area itself, supported by samples from BH1, 3, 4, 8, 16 and P10, 11, 12 indicate a potential resource 2 km in length, 0.6 km wide and 2+ m thick (2.4 M cu.m). Additional reserves are indicated by BH2, 3, 9, 11, while many other lake depressions, dominantly lying in the mid-section of the paleochannel, remain to be tested.

3. The paleochannels host major clay deposits of differing types. In addition to the highly sorptive clays, the properties of other materials should be considered due to the large tonnage potentials involved, uniform compositions over wide areas and near, or at, surface occurrences.

4. Further work should rapidly test other lake depressions within the paleochannels of the E.L. area to gain a better overview of clay potential and areas of minimum overburden.

5. Only minor water seepage into the lower section of backhoe cuts was observed. Highly sorptive clays were 'dry' and it appears that even after the exceptionally heavy rains of the last few months, all rainwater was fully absorbed. It may, therefore, be assumed mining of palygorskite clays could proceed without excess water problems and continue through all seasons.

6. The properties and values of low or non-palygorskite bearing clays gathered in this programme need to be known to direct future sampling assessments.

APPENDIX 1.1
Rock Descriptions

COLLECTOR: SBW	DATE: 5/3/87
MAP SHEET: Wonong 1:100000	PHOTO RUN NUMBER:
COST ALLOCATION: BH1	
LOCATION DESCRIPTION: N end Stevenson Lake, immed. W of entry of small drainage into lake.	
SAMPLING METHOD: B with hoe. Core 560B	
DIMENSIONS REPRESENTED:	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

0–0.60 m red sand & flour gypsum with aeolian sand.

STRUCTURE
bedding
foliation
shears
joints
contacts

0.60–1.60 m Massive white clay with H. brown stains (rare) and vertical hairline ?veinlets of dk. material (very minor volume).

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

FIELD IDENTIFICATION: Gargoyle Jm.

Cu	Pb	Zn	Ag	Ni		

K № 07301

COLLECTOR: SBWarne	DATE: 5/3/87.
MAP SHEET	PHOTO RUN NUMBER:
COST ALLOCATION: BH1	
LOCATION DESCRIPTION: See 7301	
SAMPLING METHOD:	
DIMENSIONS REPRESENTED:	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

1.6–2.6 m. Massive white clay with rare rounded blue quartz grains

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

53%

FIELD IDENTIFICATION: Gargoyle Jm.

Cu	Pb	Zn	Ag	Ni		

K № 07302

COLLECTOR	DATE
S B Warne	5/3/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION	
BH1	
LOCATION DESCRIPTION	
See 7301	
SAMPLING METHOD	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
sheers
joints
contacts

2.6m – 3.6m.

Massive white clay with minor creamy (? Fe oxide) stains, increasing qtz grit, larger solution cavities lined with jet black manganese oxide.

Water seeping into hole ~ 2m.

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

49%

FIELD IDENTIFICATION
Bargara Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07303

COLLECTOR	DATE
S B Warne	5/3/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION	
BH1	
LOCATION DESCRIPTION	
See 7301	
SAMPLING METHOD	
Backhoe.	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
sheers
joints
contacts

3.6 – 3.90

Massive, firm white clay. V. minor seepage into hole, clay slightly moister 3.60. Irregular stains of rusty brown (light colour). Dominantly almost pure white.

Trench walls firm, no indication of caving. Unable see any stratification in walls.

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

70%

FIELD IDENTIFICATION
Bargara Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07304

000046

COLLECTOR	DATE
S B Warne	5/3/87
MAP SHEET	**PHOTO RUN NUMBER**

COST ALLOCATION
BH2

LOCATION DESCRIPTION
2nd sewer depression E side road S of Stevenson Lake Crossing.

SAMPLING METHOD
Backhoe.

DIMENSIONS REPRESENTED

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

Surface of red gypsum loam with a white qtz grit on surface. Red loam 3 cm thick.
0.03m – 0.5m. Crumbly white clay with large, clear gypsum crystals.
Sample 0.5 – 1.0 m Massive white clay with rare large gypsum crystals. Minor faint iron oxide staining. fairly dry & hard – cuts out in slabs.

78%

FIELD IDENTIFICATION
Garford Fm.

Cu	Pb	Zn	Ag	Ni		

K Nº 07305

COLLECTOR	DATE
S B Warne	5/3/87
MAP SHEET	**PHOTO RUN NUMBER**

COST ALLOCATION
BH2

LOCATION DESCRIPTION
as for 7305

SAMPLING METHOD
Backhoe.

DIMENSIONS REPRESENTED

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

1.0 – 2.0 m
Massive white clay, irregular rusty speckling of iron oxides (minor), patches of large gypsum crystals – in places ~10% of volume, overall gypsum < 5%.

75%

FIELD IDENTIFICATION
Garford Fm.

Cu	Pb	Zn	Ag	Ni		

K Nº 07306

000047

COLLECTOR: SBWarne	DATE: 5/2/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BH2	
LOCATION DESCRIPTION: See Text.	
SAMPLING METHOD: Bulkhoe.	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

2.0m — 2.5m.
Massive white clay, minor gypsum.
Change at 2.5m to dark green clay, crumbly texture, fine Fe oxide staining.

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

74%

FIELD IDENTIFICATION: barytes Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07307

COLLECTOR: SBWarne	DATE: 5/2/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BH2	
LOCATION DESCRIPTION: See Text.	
SAMPLING METHOD: Bulkhoe.	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

2.5m — 2.7m.
Dk. grey green clay layer. Crumbly texture. Oolitic rusty coloured clay. All clays carry rusty/orange stains, presumed iron oxide.

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

74%

FIELD IDENTIFICATION: barytes Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07308

000048

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
S Blowne	5/3/87	colour, texture, grain size, mineralogy, weathering, boxworks	Gayndah Fm.
MAP SHEET	PHOTO RUN NUMBER		
COST ALLOCATION: BHS			

LOCATION DESCRIPTION: See Box

SAMPLING METHOD:

DIMENSIONS REPRESENTED:

STRUCTURE: bedding, foliation, shears, joints, contacts

ALTERATION: carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay

MINERALISATION: disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary

2.7m — 3.3m.

Horizontal layers dk green grey clay in brownish clay, both with network of rusty stains network of tubular holes.

Only one Sdk. layer ~ 5–10 cm thickness.

Water seeping into hole > 2.5m.

65%

Cu	Pb	Zn	Ag	Ni		

K № 07309

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
S Blowne	5/3/87	colour, texture, grain size, mineralogy, weathering, boxworks	Gayndah Fm.
MAP SHEET	PHOTO RUN NUMBER		
COST ALLOCATION: BHS			

LOCATION DESCRIPTION: See Box

SAMPLING METHOD: Backhoe.

DIMENSIONS REPRESENTED:

STRUCTURE: bedding, foliation, shears, joints, contacts

ALTERATION: carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay

MINERALISATION: disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary

3.3m. — 3.6m.

Wet white clay, possibly minor & very rare qtz grit.

Some H. brown clay.

Limit of backhoe

69%

Cu	Pb	Zn	Ag	Ni		

K № 07310

COLLECTOR: S Bwarne	DATE: 5/3/67
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BH3	
LOCATION DESCRIPTION: Small lake 1km E of Stevenson Lake. N side lake below gypsum rise, near lake bottom.	
SAMPLING METHOD: Brakhole.	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

0 – 0.3 Gypsumous, friable clay – gypsum impregnated Bargora Fm.

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION (Sample 0.3 – 1.6) Hard off-white clay, some crystalline gypsum (minor) Veneers of iron oxide staining Imparts off-white colour. Harder material than BH 1,2.

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

7 1/2 %

FIELD IDENTIFICATION: Bargora Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07311

COLLECTOR: S Bwarne	DATE: 5/3/67
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BH3	
LOCATION DESCRIPTION: see 7311	
SAMPLING METHOD: Brakhole.	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

1.3m – 2.5m. Massive, hard white clay with occas. quartz veins (apparently rare), trace rusty iron oxide along solution tubules.

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

6 7 %

FIELD IDENTIFICATION: Bargora Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07312

000050

COLLECTOR: SBWarne	DATE: 5/3/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BH3.	
LOCATION DESCRIPTION: see 7311	
SAMPLING METHOD: Backhoe.	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

FIELD IDENTIFICATION: Langford Fm.

2.5m — 3.3m.
~10cm dk. Clay layer then off white Clay — no discernable gypsum, wet due to seepage beginning ~ 2.5cm.
(Dk. Clay layer may represent local water table?).
[Later: no, definite strat. horizon].

78%.

Cu	Pb	Zn	Ag	Ni			K № 07313

COLLECTOR: SBWarne	DATE: 5/3/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BH3	
LOCATION DESCRIPTION	
SAMPLING METHOD: Backhoe.	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

FIELD IDENTIFICATION: Langford Formation

3.3m. — 3.5m.

Off white, massive with small channelways carrying iron oxide; some minor dk Clay (probably 2.5cm horizon).

Continues with similar material bottom of hole.

83%.

Cu	Pb	Zn	Ag	Ni			K № 07314

COLLECTOR: SBWarne	DATE: 5/3/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BHH	
LOCATION DESCRIPTION: L. Stevenson NW edge Stand on gypsum slope near lake edge	
SAMPLING METHOD: Bunkhow.	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

0 — 30 cm Red gypsum with aeolian sand

30cm — 60cm. Grey-white clay, some gypsum, near surface weathered, crumbly

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

0.6 — 1.10m firm white clay sample.

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

80%

FIELD IDENTIFICATION: Bangemall Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07315

COLLECTOR: SBWarne	DATE: 5/3/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BHH	
LOCATION DESCRIPTION: See 7315	
SAMPLING METHOD: Bunkhow.	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

1.10m — 2.0m.

firm white clay, iron staining almost absent. Some minor sericitic development of black earthy mineral (traces). Rare blue quartz grains.

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

82%

FIELD IDENTIFICATION: Bangemall Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07316

000052

COLLECTOR: GBWarne	DATE: 5/3/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BH 4	
LOCATION DESCRIPTION: See 7315.	
SAMPLING METHOD: Bulkhoe.	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

2.0m — 2.7m.
firm white clay, uniform composition ne fn 7316
Dry hole to this depth.

80%

FIELD IDENTIFICATION: Bayford Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07317

COLLECTOR: GBWarne	DATE: 5/3/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BH 4	
LOCATION DESCRIPTION: See 7315	
SAMPLING METHOD: Bulkhoe	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

2.7m — 3.6m.
firm white clay quickly becoming wetter and greyish white (faint greenish tinge?)

76%

FIELD IDENTIFICATION: Bayford Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07318

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
SBWarne	6/3/87	colour, texture, grain size, mineralogy, weathering, boxworks	Gnyoro Fm.

MAP SHEET:

PHOTO RUN NUMBER:

COST ALLOCATION: BHS

LOCATION DESCRIPTION: L Stevenson NW side in area of silcrete. On lake edge/bed. Opposite E. ? of gypsum on opp. side lake.

SAMPLING METHOD: Backhoe.

DIMENSIONS REPRESENTED:

STRUCTURE (bedding, foliation, shears, joints, contacts): Surface lake red mud covered with rounded white qtz pebbles. Silcrete caps Gnyoro Fm on lake & NW lake side.

ALTERATION (carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay): 0 - 1.0. firm white clay forms lake bed except for surface veneer red mud, Near surface material carries micaceous clay & gypsum with fine qtz grit.

MINERALISATION (disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary): This material decidedly gritty and micaceous (talcose)

Dominant kaolinite. 42%

Cu	Pb	Zn	Ag	Ni		

K № 07319

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
SBWarne	6/3/87	colour, texture, grain size, mineralogy, weathering, boxworks	Gnyoro Fm.

MAP SHEET:

PHOTO RUN NUMBER:

COST ALLOCATION: BHS

LOCATION DESCRIPTION: As for 7319

SAMPLING METHOD: Backhoe.

OIMENSIONS REPRESENTEO:

ROCK DESCRIPTION: 1.0 - 2.0m

STRUCTURE (bedding, foliation, shears, joints, contacts): White, firm, gritty, micaceous (talcose) clay. Breaks out in slabby masses. Identical to 0-1m section.

ALTERATION (carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay):

MINERALISATION (disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary): Dominant kaolinite 40%

Cu	Pb	Zn	Ag	Ni		

K № 07320

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
Sawarn	6/3/87		Garford Fm.

MAP SHEET:

PHOTO RUN NUMBER:

COST ALLOCATION: BH5

LOCATION DESCRIPTION: As for 7319.

SAMPLING METHOD: Backhoe.

DIMENSIONS REPRESENTED:

ROCK DESCRIPTION (colour, texture, grain size, mineralogy, weathering, boxworks) / **STRUCTURE** (bedding, foliation, shears, joints, contacts) / **ALTERATION** (carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay) / **MINERALISATION** (disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary):

2.0 – 3.0m

Lt. brown, gritty, talcose clay.
Patches brown ? talc – very irregularly
Siebraced.

End of trench.

Dominant kaolinite 43%

Cu	Pb	Zn	Ag	Ni		

K № 07321

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
Sanborne	6/3/87		Garford Fm. ABSENT

MAP SHEET:

PHOTO RUN NUMBER:

COST ALLOCATION: BH6

LOCATION DESCRIPTION: Southern ~~Northern~~ road into Stevenson Lake. In washed out area amongst saltbush away from lake.

SAMPLING METHOD:

DIMENSIONS REPRESENTED:

ROCK DESCRIPTION (colour, texture, grain size, mineralogy, weathering, boxworks) / **STRUCTURE** (bedding, foliation, shears, joints, contacts) / **ALTERATION** (carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay) / **MINERALISATION** (disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary):

0 – 15cm red gypsum/brown medium sand

Then banded basement gneiss – biotite-qtz-alt. feldspar.
feldspars altered to clays (white, soapy.
Only small sample kept.

Cu	Pb	Zn	Ag	Ni		

K № 07322

COLLECTOR	DATE
SBWarne	6/3/47
MAP SHEET	**PHOTO RUN NUMBER**

COST ALLOCATION
BH7

LOCATION DESCRIPTION
L. Stevenson SE side lake adj. gypsum cliff on lake bed.

SAMPLING METHOD
Backhoe.

DIMENSIONS REPRESENTED

ROCK DESCRIPTION colour texture grain size mineralogy weathering boxworks

STRUCTURE bedding foliation shears joints contacts

ALTERATION carbonate chlorite epidote serpentine uralite silica talc clay

MINERALISATION disseminated fractures veins stockwork native sulphide oxide secondary

Lake bed strewn with abundant white & bluish qtz grit & small pebbles.
0 – 0.4m Dark grey clay with large gypsum crystals and mauve carries brown (rusty) earthy mineral in open pore spaces.

Small sample for reference only.

FIELD IDENTIFICATION
Garford Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07323

COLLECTOR	DATE
SBWarne	6/3/47
MAP SHEET	**PHOTO RUN NUMBER**

COST ALLOCATION
BH7

LOCATION DESCRIPTION
See 7323.

SAMPLING METHOD
Backhoe

DIMENSIONS REPRESENTED

ROCK DESCRIPTION colour texture grain size mineralogy weathering boxworks

STRUCTURE bedding foliation shears joints contacts

ALTERATION carbonate chlorite epidote serpentine uralite silica talc clay

MINERALISATION disseminated fractures veins stockwork native sulphide oxide secondary

0.4m – 1.0m.

Cream coloured, firm, dry clay. Appears to have no grit content. Black (?MnO_2) films on ~~fracture~~ bedding faces. No gypsum noted.

66%

FIELD IDENTIFICATION
Garford Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07324

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
S Browne	6/3/87	colour, texture, grain size, mineralogy, weathering, boxworks: 1.0 — 1.8 m.	Bagot Fm
MAP SHEET	PHOTO RUN NUMBER	STRUCTURE (bedding, foliation, shears, joints, contacts): Off white, creamy claystone. Very hard digging. Minor films along some ? bedding planes. Very minor, fine quartz grit. No pore space in this material (unlike highly absorbent palygorskite types of BH1,2,3).	
COST ALLOCATION: BH7		ALTERATION (carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay)	
LOCATION DESCRIPTION: See 07323		MINERALISATION (disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary): Hole abandoned as taking too long to deepen further.	
SAMPLING METHOD: Backhoe		Dolomite dominant Paly subdom 80%	
DIMENSIONS REPRESENTED			

Cu	Pb	Zn	Ag	Ni			K № 07325

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
S Browne	6/3/87	colour, texture, grain size, mineralogy, weathering, boxworks: 0 — 0.4 m reddish red gypsum and massive slab gypsum.	Bagot Fm.
MAP SHEET	PHOTO RUN NUMBER	STRUCTURE (bedding, foliation, shears, joints, contacts): 0.4 — 2.30 m (1.40 struck out). White, crumbly clay with abundant solution holes. Minor 1H. rusty iron stains and weak ? minor staining in cavities.	
COST ALLOCATION: BH8		ALTERATION (carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay): No qtz grains noted.	
LOCATION DESCRIPTION: On gypsum soil flat between road xing Lake Stewart & gypsum cliff on SE side lake		MINERALISATION (disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary)	
SAMPLING METHOD: Backhoe.			
DIMENSIONS REPRESENTED			

Cu	Pb	Zn	Ag	Ni			K № 07326

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
SBWarne	6/3/87	colour, texture, grain size, mineralogy, weathering, boxworks: ~~???~~ 2.30 m – 2.90 m.	Garford Fm.

MAP SHEET:

PHOTO RUN NUMBER:

COST ALLOCATION: BHG.

LOCATION DESCRIPTION: see 07326.

STRUCTURE (bedding, foliation, shears, joints, contacts): Dk. grey clay 2.90 m gradually returning to rusty cream colour to 2.90 m. Clay damp below 2.9 m – wet..

ALTERATION: carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay

SAMPLING METHOD: Backhoe.

MINERALISATION: disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary

DIMENSIONS REPRESENTED:

Cu	Pb	Zn	Ag	Ni			K № 07327

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
SBWarne	6/3/87	colour, texture, grain size, mineralogy, weathering, boxworks: 2.90 – 3.40 m.	Garford Fm.

MAP SHEET:

PHOTO RUN NUMBER:

COST ALLOCATION: BHG

LOCATION DESCRIPTION: see 7326.

STRUCTURE (bedding, foliation, shears, joints, contacts): Creamy coloured wet clay, abundant solution ways, minor clots dark clay (c. 2 cm max). Rusty staining throughout.
Water entering from bottom of hole (3.4 m).

ALTERATION: carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay

SAMPLING METHOD: Backhoe.

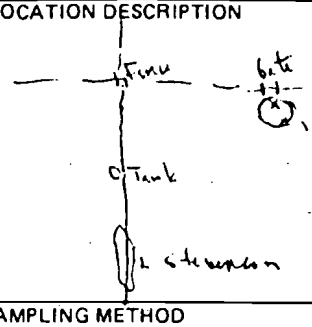
MINERALISATION: disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary

DIMENSIONS REPRESENTED:

Cu	Pb	Zn	Ag	Ni			K № 07328

000058

COLLECTOR: S.R.Warne | DATE: 7/3/87
MAP SHEET | PHOTO RUN NUMBER
COST ALLOCATION: BHG
LOCATION DESCRIPTION: DCL FENCE



SAMPLING METHOD: Bulkhole
DIMENSIONS REPRESENTED

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

Sample

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

FIELD IDENTIFICATION: Gunford Fm.

Small circular lake rimmed N & W by low cliffs of creamy dolomite. Dolomite carries fine qtz grit (aeolian).

0 – 0.80 Flour, seed & crystalline gypsum becoming whitish on approach to clay due to growth of gypsum within clay itself.

0.80–1.30 White clay with fine manganese stainings and mottlings, some dendritic development. Also abundant rusty ? iron oxide stainings. Crystalline gypsum scattered throughout, occasional 5mm clay (brown, hard) ovoids. Plenty of pore space.

Cu	Pb	Zn	Ag	Ni		

K № 07329

COLLECTOR: S.R.Warne | DATE: 7/3/87
MAP SHEET | PHOTO RUN NUMBER
COST ALLOCATION: BHG
LOCATION DESCRIPTION: See 7329

SAMPLING METHOD: Bulkhole
DIMENSIONS REPRESENTED

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

FIELD IDENTIFICATION: Gunford Fm.

1.30 – 1.90 Dark grey-black damp clay with numerous clay pellets (ovoids), dark rusty iron staining, rare blue quartz grains and occasional gypsum needles.

Paragenesis dominant 72%

Cu	Pb	Zn	Ag	Ni		

K № 07330

000059

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
SBWarne	7/3/87	colour, texture, grain size, mineralogy, weathering, boxworks	Garford Fm.

MAP SHEET	PHOTO RUN NUMBER

COST ALLOCATION: BHQ

LOCATION DESCRIPTION: See 7329

SAMPLING METHOD: Backhoe

DIMENSIONS REPRESENTED:

ROCK DESCRIPTION / STRUCTURE (bedding, foliation, shears, joints, contacts) / ALTERATION (carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay) / MINERALISATION (disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary):

1.90 – 2.70 m.
Uniform white or grey-white clay with well developed, small circular faces lined with black earthy mineral (?Mn), also other black earthy and rusty brown stains on fracture faces, pore spaces. Minor, small gypsum needles.

Cu	Pb	Zn	Ag	Ni		

K № 07331

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
SBWarne	7/3/87	colour, texture, grain size, mineralogy, weathering, boxworks	Garford Fm

MAP SHEET	PHOTO RUN NUMBER

COST ALLOCATION: BHQ

LOCATION DESCRIPTION: See 7329

SAMPLING METHOD: Backhoe.

DIMENSIONS REPRESENTED:

ROCK DESCRIPTION / STRUCTURE (bedding, foliation, shears, joints, contacts) / ALTERATION (carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay) / MINERALISATION (disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary):

2.70m — 3.45m.
limit backhoe – clay continues.

As for 7331. Clay more dense, less black staining (access only), v. minor rusty stains. Becoming grey at 3.45m

Cu	Pb	Zn	Ag	Ni		

K № 07332

COLLECTOR	DATE	ROCK DESCRIPTION colour texture grain size mineralogy weathering boxworks	FIELD IDENTIFICATION
SBWarne	7/3/87	Low white dolomite cliffs	Gayford Fm.

MAP SHEET

PHOTO RUN NUMBER

COST ALLOCATION: BH10

LOCATION DESCRIPTION: Crescent lake SE BH9 Lake. Low brilliant white o/c N th end.

SAMPLING METHOD: Backhoe

DIMENSIONS REPRESENTED

ROCK DESCRIPTION / STRUCTURE / ALTERATION / MINERALISATION:

Low white dolomite cliffs N end lake (sample ref. 7333A) to lake level (3m o/c height).

0 – 0.10 m red gypsous lake bed soil

0.10 – 1.0 m hard (almost impenetrable by backhoe), brilliant white clay stone of same texture as clays other areas, feels slightly talcose/kaolinitic, some qtz grains. Very light rusty staining; trace dk. earthy staine.

Cu	Pb	Zn	Ag	Ni			K № 07333

COLLECTOR	DATE	ROCK DESCRIPTION colour texture grain size mineralogy weathering boxworks	FIELD IDENTIFICATION
SBWarne	7/3/87		Gayford Fm.

MAP SHEET

PHOTO RUN NUMBER

COST ALLOCATION: BH10.

LOCATION DESCRIPTION: Cu for 07333

SAMPLING METHOD: Backhoe

DIMENSIONS REPRESENTED

ROCK DESCRIPTION / STRUCTURE / ALTERATION / MINERALISATION:

1.0 m – 1.7 m.

Hard white clay stone & damp greyish clay stone, not quite as hard as 07333. No gypsum in this or previous sample.

Dolomite dominant [illegible] . 98%

Cu	Pb	Zn	Ag	Ni			K № 07334

COLLECTOR: S Bwarm	DATE: 7/3/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BH10	
LOCATION DESCRIPTION: As for 07333	
SAMPLING METHOD: Backhoe.	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

1.7m. — 2.45m
Ten hands for backhoe

As for 7333. Dominantly hard, bright white ? dolom. claystone, rare qtz grains (1mm), minor (trace) iron & manganese oxide stains.

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

Dolomite dom. 59%

FIELD IDENTIFICATION: Bargo Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07335

COLLECTOR: S Bwarm	DATE: 7/3/87.
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BH11	
LOCATION DESCRIPTION: 5th wds lake — same as BH1C (see 7333	
SAMPLING METHOD: Backhoe.	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

Gypsum rises around lake.
Veneer of gypsum soil, crystals on lake surface + qtz pebbles, silcrete fragments

0 — 0.40m Veneer lake soil and immed. into gypsum impregnated white clay.

0.40 — 1.00m White, crumbly, unctuous clay. Rare qtz grains, rare gypsum.

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

FIELD IDENTIFICATION: Bargo Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07336

COLLECTOR: S.B.Warne	DATE: 7/3/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BH II	
LOCATION DESCRIPTION: as for 7336.	
SAMPLING METHOD: Butcher	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

1.0m – 1.5m.
As for 7336. Plastic white clay. – No sample.

STRUCTURE
bedding
foliation
shears
joints
contacts

1.5 – 2.35m. Dark plastic clay, grey to black. Has pockets hard iron stained mineral (prob gypsum), some crystalline gypsum.

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

dominant Polycrystite. 75%

FIELD IDENTIFICATION: Gorge Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07337

COLLECTOR: S.B.Warne	DATE: 7/3/87
MAP SHEET	PHOTO RUN NUMBER
COST ALLOCATION: BH II	
LOCATION DESCRIPTION: As for 7336.	
SAMPLING METHOD: Butcher	
DIMENSIONS REPRESENTED	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

2.35m – 3.40m Sample.
White plastic clay, breaks with conchoidal fracture, patches of iron staining in fine open spaces.

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

3.40 – 3.60m Reference sample 7338A only.
Clayey, conglomeratic grit. Dominantly grit with boulders of silcrete, quartz.

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

Dolomite – Poly – Calcite 74%

FIELD IDENTIFICATION: Gorge Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07338

000063

COLLECTOR: SBWarne
DATE: 7/3/87
MAP SHEET:
PHOTO RUN NUMBER:
COST ALLOCATION: BH12
LOCATION DESCRIPTION: Small lake W side portion of large lake on which BH10,11 completed, roughly midway between 10 & 11
SAMPLING METHOD: Backhoe.
DIMENSIONS REPRESENTED:

ROCK DESCRIPTION (colour, texture, grain size, mineralogy, weathering, boxworks; STRUCTURE: bedding, foliation, shears, joints, contacts; ALTERATION: carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay; MINERALISATION: disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary)

0–0.35 Red aeolian sand.

0.35–1.3 identical to hole BH10.

Dense claystone, bright white with irregular iron oxide stains (trace) & rare ?MnO_2 stains. Feels kaolinitic.

Material very hard to cut into with hoe

FIELD IDENTIFICATION: Garford Fm

Cu	Pb	Zn	Ag	Ni			
							K № 07339

COLLECTOR: SBWarne
DATE: 8/3/87
MAP SHEET:
PHOTO RUN NUMBER:
COST ALLOCATION: BH13
LOCATION DESCRIPTION: PB Lake Cliff Outcrop. Same as SADME sample site P5
SAMPLING METHOD: Backhoe.
DIMENSIONS REPRESENTED:

ROCK DESCRIPTION (colour, texture, grain size, mineralogy, weathering, boxworks; STRUCTURE: bedding, foliation, shears, joints, contacts; ALTERATION: carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay; MINERALISATION: disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary)

Top of cliff

0.0–1.0 Gypsiferous aeolian sand

1.0–1.8 Hard white clay with rusty stains. Similar to 7333

1.8 – ~~[illegible]~~ 3.2 Equiv. SADME Sample ~~[illegible]~~ AU97/92 (Absorb. 37%, dominantly palygorskite).

Dense white clay 1.8–2.1 then white clay with abund. rusty staining and open ~~pots~~ pores.

7340 – top 0.5m.

7340R – bottom 0.9m.

Grey green plastic clay at back. (see 7341)

FIELD IDENTIFICATION: Garford Fm.

Cu	Pb	Zn	Ag	Ni			
							K № 07340 Dolo. 79%

COLLECTOR	DATE
S B Warne	8/3/87

MAP SHEET

PHOTO RUN NUMBER

COST ALLOCATION: BH13

LOCATION DESCRIPTION: As for 7340.

SAMPLING METHOD: Backhoe.

DIMENSIONS REPRESENTED

ROCK DESCRIPTION (colour, texture, grain size, mineralogy, weathering, boxworks; STRUCTURE: bedding, foliation, shears, joints, contacts; ALTERATION: carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay; MINERALISATION: disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary)

3.2 — 3.7+ continuing.

At 3.2 ≃ lake level.

Dark green plastic clay as drilled by SADME in lake bed. Now forms backhoe mounds & rolling into same horizon in lake

Palygorskite. 68%

FIELD IDENTIFICATION: Garford Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07341

COLLECTOR	DATE
S B Warne	8/3/87

MAP SHEET

PHOTO RUN NUMBER

COST ALLOCATION: BH13

LOCATION DESCRIPTION: PB Lake Bed. As for 7340.

SAMPLING METHOD: Backhoe.

DIMENSIONS REPRESENTED

ROCK DESCRIPTION (colour, texture, grain size, mineralogy, weathering, boxworks; STRUCTURE: bedding, foliation, shears, joints, contacts; ALTERATION: carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay; MINERALISATION: disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary)

3.2 — 6.8m. (as clay continued).

limit backhoe.

Dark green plastic clay at first then crumbly & blocky breaking green clay. Minor small qtz grains & irregular rusty iron oxide stained patches (iron staining tends to occur in bands ~ 20cm apart). Colour gradually changes to dark grey. Sample from 5.0–6.8m

illite 37%

FIELD IDENTIFICATION: Garford Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07342

COLLECTOR: S.B. Warne	DATE: 8/3/87
MAP SHEET:	PHOTO RUN NUMBER:
COST ALLOCATION: BH 1d	
LOCATION DESCRIPTION: Cretto Lake 5th core in gypsum clay of lake E side.	
SAMPLING METHOD: Backhoe.	
DIMENSIONS REPRESENTED:	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

0 — 0.30m red gypsum soil

STRUCTURE
bedding
foliation
shears
joints
contacts

0.30 — 1.0 m white plastic a blocky breaking polymictite clay with irreg. iron staining

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

Sample contaminated with grainy gypsum soil.

Distinct 3cm-5cm iron stain horizon at 0.75m.

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

FIELD IDENTIFICATION: Barge Fm.

Cu	Pb	Zn	Ag	Ni		

K № 07343

COLLECTOR: S.B. Warne	DATE: 8/3/87
MAP SHEET:	PHOTO RUN NUMBER:
COST ALLOCATION: BH 1d	
LOCATION DESCRIPTION: Cretto Lake see 7343	
SAMPLING METHOD: Backhoe.	
DIMENSIONS REPRESENTED:	

ROCK DESCRIPTION
colour
texture
grain size
mineralogy
weathering
boxworks

1.0 — 2.0m.

White clay, crumbly, abundant pore spaces - lightly Fe stained, some MnO$_2$; generally very clean material. Very minor contamination by orange red soil.

True outcrop 2.0m.

STRUCTURE
bedding
foliation
shears
joints
contacts

ALTERATION
carbonate
chlorite
epidote
serpentine
uralite
silica
talc
clay

MINERALISATION
disseminated
fractures
veins
stockwork
native
sulphide
oxide
secondary

FIELD IDENTIFICATION: Barge Fm

Cu	Pb	Zn	Ag	Ni		

K № 07344

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
S B Warne	6/3/87	colour texture grain size mineralogy weathering boxworks — 2.0 — 3.0 m.	Garford Fm.
MAP SHEET	PHOTO RUN NUMBER		
COST ALLOCATION: BH 14.		STRUCTURE bedding foliation shears joints contacts — Dense white, brownish, greenish, grey layers with horizontal flecks Fe stain. Wet, saponitic.	
LOCATION DESCRIPTION: Cretto Lake. See 7343.		ALTERATION carbonate chlorite epidote serpentine uralite silica talc clay — white layer / Green layer / white layer / grey - greenish } ↓ gradual incr. towards dark green.	
SAMPLING METHOD: Backhoe			
DIMENSIONS REPRESENTED		MINERALISATION disseminated fractures veins stockwork native sulphide oxide secondary	

Cu	Pb	Zn	Ag	Ni			
							K № 07345

COLLECTOR	DATE	ROCK DESCRIPTION	FIELD IDENTIFICATION
S B Warne	6/3/87	colour texture grain size mineralogy weathering boxworks — 3.0 — 3.75 — continues limit of backhoe.	Garford Fm.
MAP SHEET	PHOTO RUN NUMBER		
COST ALLOCATION: BH14		STRUCTURE bedding foliation shears joints contacts — Dense green waxy saponitic clay with iron oxide orbs which appear to result from oxidation of marcasite.	
LOCATION DESCRIPTION: Cretto Lake. See 7343		ALTERATION carbonate chlorite epidote serpentine uralite silica talc clay	
SAMPLING METHOD: Backhoe			
DIMENSIONS REPRESENTED		MINERALISATION disseminated fractures veins stockwork native sulphide oxide secondary — illite. 47%	

Cu	Pb	Zn	Ag	Ni			
							K № 07346

COLLECTOR	DATE	ROCK DESCRIPTION (colour, texture, grain size, mineralogy, weathering, boxworks)	FIELD IDENTIFICATION
S B Warne	8/3/87	silcrete o/c's immed. north	Garford Fm.

MAP SHEET	PHOTO RUN NUMBER

COST ALLOCATION: BH15

LOCATION DESCRIPTION: Grotto Lake, NW, E side. shallow water on lake. Palygorskite forms lake bed. Large area shallow ground E side lake, ideal for open cut mining.

SAMPLING METHOD: backhoe

DIMENSIONS REPRESENTED:

STRUCTURE (bedding, foliation, shears, joints, contacts):
0–10cm Red lake soil
10cm–35cm White palygorskite clay
Pinkish due to near surface nature.
Sample contaminated by surface soil grains.

ALTERATION (carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay):

MINERALISATION (disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary):

Cu	Pb	Zn	Ag	Ni		

K № 07347

COLLECTOR	DATE	ROCK DESCRIPTION (colour, texture, grain size, mineralogy, weathering, boxworks)	FIELD IDENTIFICATION
S B Warne	8/3/87	0.35 — 0.8m + continuing but hole stopped due to nature of formation	Garford Fm.

MAP SHEET	PHOTO RUN NUMBER

COST ALLOCATION: BH15

LOCATION DESCRIPTION:

SAMPLING METHOD:

DIMENSIONS REPRESENTED:

STRUCTURE (bedding, foliation, shears, joints, contacts):
Grey-green clayey grit, hard to cut with hoe.

ALTERATION (carbonate, chlorite, epidote, serpentine, uralite, silica, talc, clay):
Sharp contact with overlying clay.
(Shallow thickness palygorskite clays may be indicated by proximity to silcrete o/c's — silcrete pebbles in basal Garford Fm).

MINERALISATION (disseminated, fractures, veins, stockwork, native, sulphide, oxide, secondary):

Cu	Pb	Zn	Ag	Ni		

K № 07348

APPENDIX 1.2

Amdel Service Report of Samples

The Australian
Mineral Development
Laboratories

Flemington Street, Frewville,
South Australia 5063
Phone Adelaide (08) 79 1662
Telex AA82520

Please address all
correspondence to
P.O. Box 114 Eastwood
SA 5063
In reply quote:

amdel

13 April 1987

3/0/0 - M7914/87

Roebuck Resources NL
16 Emerald Tce
WEST PERTH WA 6005

Attention Mr S Warne

REPORT M7914/87

YOUR REFERENCE	Request, Mr S Warne.
TITLE	Testing of Absorbent Clays.
MATERIAL	Forty Two samples.
WORK REQUESTED	Absorbency Test and Mineralogy.

Investigation and Report by: Lyn J Day.
Manager, Materials Services: Philip J Parry.

for Dr William G Spencer
General Manager
Applied Sciences Group

Copy to: Mr S Warne
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1. INTRODUCTION

Forty two samples of clay were submitted for testing to determine their water absorbency. It was also requested that thirteen of the samples be examined to determine their mineralogy.

2. PROCEDURES

In order to determine the most appropriate temperature for calcining the samples, two test samples were selected for preliminary testing. Portions of samples 7305 and 7312 were calcined at a number of different temperatures over the range 150-800°C for a period of 4 hours at lower temperatures and 2 hours at higher temperatures. These were then crushed and screened to produce granules of a similar size to commercial pet litters, i.e. -5+2 millimetres. The capacity of the samples to absorb water was determined in comparison to several commercial brands of pet litter.

The absorbency test consisted of soaking a known weight of each sample in water for 1 hour and then draining the sample for half an hour on a 150 micrometer (100 mesh) screen and reweighing. Absorbency of the sample was the amount of water absorbed calculated as a percentage of the dry weight.

The mineralogy of selected samples was determined using X-ray diffraction.

3. RESULTS

The preliminary testing indicated that the optimum calcining conditions for the samples were 650°C for 2 hours. Samples fired at 800°C showed a higher absorbency but also exhibited a tendency to significantly break down while soaking in the water. These results are given in Table 1. The absorbency of all samples calcined at 650°C are given in Table 2. The mineralogy of the samples is given in Table 3.

4. DISCUSSION

Based on the test results obtained, the optimum calcining temperature for these samples was found to be 650°C for two hours. Samples calcined at 800°C exhibited higher absorbencies but also tended to break down in water.

Overall the absorbency values shown by these samples are comparable with commercial pet litters currently on the market. The mineralogy obtained on selected samples indicates that samples high in dolomite and palygorskite show good absorbency values.

5. CONCLUSION

These samples show water abosrbency values comparable with commercial pet litters. The material represented by these samples appears to have excellent potential for development as a commercial source of absorbent clay.

sj:1

TABLE 1: DETERMINATION OF OPTIMUM CALCINING TEMPERATURE.

Temperature	Absorbency (% Dry Weight)	
	7305	7312
150°C	dissolved	dissolved
250°C	dissolved	dissolved
400°C	44	37
500°C	76	54
650°C	78	67
800°C	92*	89*

* Samples showed significant evidence of breaking down in the water.

TABLE 2: ABSORBENCY OF SAMPLES

Sample	Absorbency (% Dry Weight)
7301	54
7302	53
7303	49
7304	70
7305	78
7306	78
7307	74
7308	74
7309	65
7310	69
7311	71
7312	67
7313	78
7314	83
7315	80
7316	82
7317	80
7318	76
7319 Kaolinite	42
7320 "	40
7321 "	43
7324	66
7325 Dole - Peaky	80

Continued...

TABLE 2 Continued....

Sample	Absorbency (% Dry Weight)
7327	68
7328	94
7329	80
7330 Poly.	72
7331	63
7332	62
7334 Dolo - Poly	98
7335 Dolo	59
7336	89
7337 Poly	75
7338 Dolo - Poly.	74
7340	79
7341	68
7342	37
7343	62
7344	57
7345	65
7346	47
7347	55
Embassy	78
Woolworths	74
Kitty Litter	86

TABLE 3: MINERALOGY

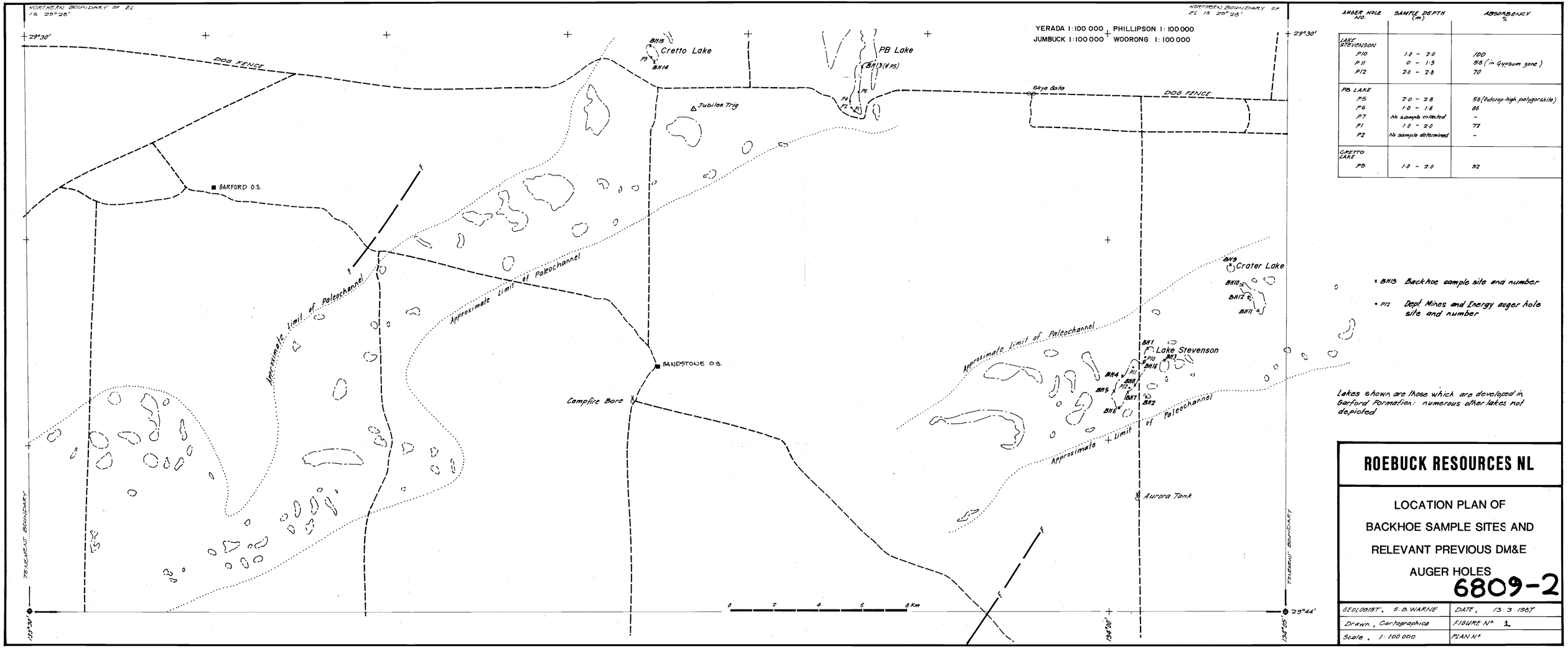
	7319	7320	7321	7325	7330	7334
Kaolinite	D	D	D	Tr	-	-
Quartz	SD	SD	SD	Tr-A	Tr	Tr
Muscovite mica	A	A-SD	SD	-	-	-
Halite	Tr-A	Tr-A	Tr-A	Tr	Tr	Tr-A
Dolomite	-	-	-	D	A	D
Palygorskite	-	-	-	SD	D	SD
Absorbency % dry wt	42	40	43	80	72	98
	BH5	BH5	BH5	BH7	BH9	BH10

	7335	7337	7338	7340	7341	7342	7346
Dolomite	D	Tr-A	D	D	Tr	-	-
Polygorskite	A	D	A-SD	A	D	-	-
Halite	Tr	A	Tr-A	Tr	A	Tr-A	A
Celestite ($SrSO_4$)	-	A	SD	Tr	-	-	-
Quartz	-	Tr-A	Tr	Tr	A	Tr	Tr
Interstratified Clay *	-	-	-	-	-	D	D
Absorbency %	59	75	74	79	68	37	47
	BH10	BH11	BH11	BH13	BH13	BH13	BH14

* Poorly crystalline illitic or interstratified clays.

Key:

D	Dominant
SD	Sub-dominant (>20%)
A	Accessory (approx. 5-20%)
Tr	Trace (<5%)



AUGER HOLE NO.	SAMPLE DEPTH (m)	ABSORBENCY %
LAKE STEVENSON		
P10	1.0 - 2.0	100
P11	0 - 1.5	58 (in Gypsum zone)
P12	2.0 - 2.8	70
PB LAKE		
P5	2.0 - 2.8	56 (Outcrop high palygorskite)
P6	1.0 - 1.6	86
P7	No sample collected	-
P1	1.0 - 2.0	72
P2	No sample determined	-
CRETTO LAKE		
P9	1.0 - 2.0	92

× BH15 Backhoe sample site and number

• P12 Dept. Mines and Energy auger hole site and number

Lakes shown are those which are developed in Garford Formation: numerous other lakes not depicted

ROEBUCK RESOURCES NL

LOCATION PLAN OF BACKHOE SAMPLE SITES AND RELEVANT PREVIOUS DM&E AUGER HOLES

6809-2

GEOLOGIST, S.B. WARNE	DATE, 13.3.1987
Drawn, Cartographica	FIGURE No. 1
Scale, 1:100 000	PLAN No.

APPENDIX 2

Mineralogical Reports on Selected Backhoe Samples by Pontifex and Associates Pty Ltd

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. 4971

30th March 1987

TO:	The Chief Geologist Roebuck Resources NL 16 Emerald Tce WEST PERTH WA 6005
COPY TO:	Mr. Sam Warne 25 Nashwark Cres MOANA S.A. 5169
YOUR REFERENCE:	Rock samples submitted by Sam Warne 16.3.87
IDENTIFICATION:	7322 7333 7339
WORK REQUESTED:	Thin section preparation and description.
SAMPLES & SECTIONS:	Held awaiting collection by Sam Warne

PONTIFEX & ASSOCIATES PTY. LTD.

7322 : biotite quartzofelspathic gneiss; tectonised with with moderate, discontinuous shear, breccia and recrystallisation; patches of kaolinitic clays (?after K-spar) clays also intergrown with disrupted biotite foliae.

This rock has a heterogeneous gneissic texture, with irregular domains of quartz (30%), plagioclase (30%), and patches of white clay (15-20%), with a vaguely layered to quite random distribution through irregularly schistose, altered biotite (25%).

The quartz occurs as essentially coarse single crystal granoblastic grains, strongly stressed and incipiently recrystallised with subgrain development. The plagioclase has a similar mode of occurrence, but more commonly as patches of polygonal micromosaic which appears to be recrystallised coarser grains.

As far as can be ascertained optically, the patches of white clay noted above is kaolinite, and these patches conceivably represent completely, and selectively, altered K-spar.

The extensive biotite is greenish, tends to be locally altered to chlorite and to chloritic-clays. This biotite occurs as irregular foliae which are disrupted and distorted along shears and apparent fractures, with maximum alteration to clays along these disruptions.

Accessory grains of sphene occur in the altered biotite.

7333 : weakly fissile, to massive, cryptocrystalline calcrete, with minor brecciation and recementation structures seen in thin section, accessory scattered quartz grains and limonite staining; (possibly contains ultrafine 'salt', but too fine for positive optical identification).

This sample consists essentially of massive cryptocrystalline supergene calcite, which may be regarded as calcrete (travertine or kunkar). It is moderately friable, and very finely porous, and with minor irregular fine fractures or partings. A poorly defined fissile layering is evident in the hand specimen.

Internal textures seen in thin section reflect local areas of in-situ brecciation and recementation.

Irregular zones and patches (partly weakly colloform), appear to reflect slight differences in concentration of the carbonate, created by solution effects, (?variable leach and deposition). These zones may also however reflect variations in impurities within the carbonate, which are too fine to identify optically but the sample has a salty taste and an impurity may be ultrafine 'salt'. (This could possibly be resolved by XRD if necessary.) Minor limonite grains of uncertain genesis occur locally with some of the grains partly spheroidal. Limonite staining occurs along several voids.

Accessory angular to subrounded quartz grains, ranging in size from 0.2mm to 1mm are randomly scattered.

7339 : massive calcrete, with a patchy fabric seen in thin section possibly reflecting variable concentrations of ultrafine impurities (?halite); randomly scattered quartz grains and accessory small grains of clay or possible gypsum.

This rock is essentially the same as 7333 but it lacks the fissile structure in hand specimen, contains somewhat more scattered quartz grains and there is less evidence of brecciation and in-situ recementation.

It consists of massive cryptocrystalline calcite(calcrete), which in thin section is seen to have extensive irregular patches, more prominant than in 7333, and which appear to include a possible ultrafine isotropic phase. These patches may reflect slight variations in concentration and in cryptocrystalline composition (?"solution effects"), within the calcite; and/or they may reflect variations in concentration of impurities which are not recognisable optically. (This sample has a strong salty taste, thus the calcrete may incorporate ultrafine 'salt', (?ultrafine halite), the identity of which would require investigation by XRD if necessary).

Variably angular to rounded quartz grains range in size from 0.2mm to 2mm and are randomly disposed to form about 10% of the rock. Accessory (<1%) discrete grains of brownish turbid clay, and/or of a possible evaporite mineral (gypsum) are scattered.

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. 4982

14th April 1987

TO:	The Chief Geologist Roebuck Resources NL 16 Emerald Tce WEST PERTH W.A. 6005
COPY TO:	Mr. Sam Warne 25 Nashwark Cres MOANA S.A. 5169
YOUR REFERENCE:	Lake-sediment -carbonate rocks, previously described, Pontifex Report No. 4971 (30.3.87)
IDENTIFICATION:	7333, 7339
WORK REQUESTED:	Confirm identity of carbonate by XRD
SAMPLES & SECTIONS:	Temporarily retained

PONTIFEX & ASSOCIATES PTY. LTD.

INTRODUCTION

Two samples 7333, 7339, were previously described in Pontifex Mineralogical Report No. 4971 as 'calcrete', implying that the carbonate forming the great bulk of each sample was calcareous (calcite). This carbonate material is essentially cryptocrystalline, and microporous. (At the time of examination it was not known to be a Lake Deposit even though minor 'salt' contamination was detected).

The different carbonate species cannot be distinguished between by optical examination in thin section, (particularly in a cryptocrystalline form). The carbonate in these samples was called calcite however, because it readily effervesced upon the application of 0.5% HCl.

This identity was questioned by Sam Warne, thus a check was made on material from 7333, by AMDEL, and found to be dolomite (report No. G2575/87 enclosed).

(The reason for the reaction of this material to dilute HCl, probably relates to its extremely fine crystalline form, emphasised by the extensive, micron-scale porosity).

amdel
technology and enterprise

Amdel
31 Flemington Street,
Frewville, S.A. 5063

Telephone: (08) 372 2700

Address all correspondence to:
P.O. Box 114,
Eastwood, S.A. 5063

Telex: AA82520
Facsimile: (08) 79 6623

13 April 1987

GS 3/0/0

Pontifex & Associates Pty. Ltd.,
26 Kensington Rd.,
ROSE PARK, S.A. 5067

ATT: MR. I. PONTIFEX

REPORT G 2575/87

YOUR REFERENCE:	Order No. 2 dated 10/4/87
IDENTIFICATION:	7333
MATERIAL:	Lake deposit
DATE RECEIVED:	10 April 1987
WORK REQUIRED:	XRD identification, especially of carbonates.
REPORT:	The sample was examined by X-ray powder diffractometry and found to consist of very abundant dolomite with traces of halite and quartz. No calcite was found.

Investigation and Report by: Dr Roger Brown

Manager - Geological Services: Dr Keith J Henley

Keith Henley

for Dr William G Spencer
General Manager
Applied Sciences Group

bp

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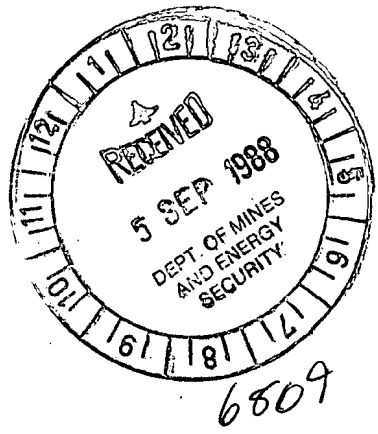
ROEBUCK RESOURCES N.L.
EXPLORATION LICENCE 1371
SANDSTONE
SOUTH AUSTRALIA
QUARTERLY REPORT
FOR THE PERIOD
19TH DECEMBER, 1987 TO
18TH MARCH, 1988

Prepared by
S.B. Warne
for
Roebuck Resources N.L.

* Note: NO WORK UNDERTAKEN FOR THE PERIOD ENDED 18 JUNE 1988.

TECHNICAL REPORT NO. 98
PERTH MAY, 1988



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CONTENTS

1. QUARTER ACTIVITIES

An enquiry regarding the availability and characteristics of Sandstone palygorskite was received from a Japanese buyer through a Sydney agent. A small bulk sample was forwarded direct to the interested party.

A subsequent request for a firm F.O.B. price for raw, dry product was received. It was indicated that Sandstone material would be in competition with an unstated Indian source reputedly supplying at US$50 per tonne.

Continuous effort was maintained during the quarter to gather quotations for the mining, air drying, transporting and placing on board ship through both Pt. Pirie, South Australia an Pt. Adelaide, South Australia.

Indicated feasibility of the sale of material F.O.B. has so far been thwarted by excessively high road and road-rail transport cost estimates. Additional quotations for a variety of options have been requested from contractors for further evaluation.

Concurrently with above work data is being compiled on market potential for processed products.

S.B. WARNE

2. EXPENDITURE

EXPENDITURE STATEMENT
EXPLORATION LICENCE 1371
19.12.87 TO 18.3.88

Contractors - Geological	350
Drafting	132
Freight & Delivery	39
Printing & Stationery	16
	537
Overheads @ 15%	81
TOTAL:	$ 618

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ROEBUCK RESOURCES N.L.
SANDSTONE (EL 1371)
SOUTH AUSTRALIA
QUARTERLY REPORT
FOR THE PERIOD 19TH JUNE, 1988
TO 18TH SEPTEMBER, 1988

Prepared for

Roebuck Resources N.L.

by

S.B. Warne

TECHNICAL REPORT NO. 105
PERTH, NOVEMBER 1988

CONTENTS

1. OVERSEAS ENQUIRY

All quotations received from contractors indicate mining of palygorskite from the licence area and delivery to ship would not be economic.

Alternate quotations are being received and considered from interested parties, including an Eyre Peninsula group suggesting Thevenard, South Australia as a possible loading port.

2. MARKET SURVEY

Possible markets are being considered. The most promising avenue appears to be the market for ordinary grade absorbents used mainly as floor and animal litters. The cost structure of marketing this type of material is being investigated in Western Australia, together with a survey of end-user attitudes and requirements.

3. EXPENDITURE

Expenditure for the period from 19.6.88 to 18.9.88 totalled $5769.00.

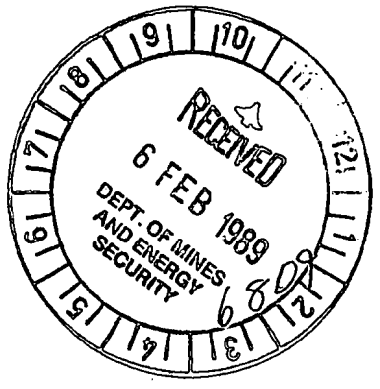
S.B. WARNE

000090

ROEBUCK RESOURCES N.L.
SANDSTONE
EXPLORATION LICENCE 1371
SOUTH AUSTRALIA
REPORT FOR THE PERIOD
SEPTEMBER 10TH, 1988 TO
18TH DECEMBER, 1988

Prepared by
S.B. Warne
for
Roebuck Resources N.L.

TECHNICAL REPORT NO. 107
PERTH, DECEMBER, 1988



CONTENTS

1. INTRODUCTION

Early 1988, an enquiry was received from a Japanese buyer regarding supply of Sandstone palygorskite, F.O.B. ex a South Australian port. A small sample was forwarded to indicate the nature of the raw product and was regarded as of acceptable quality.

Extensive costings, using a variety of mining, transport and port options indicated it was unlikely Sandstone raw material could be economically placed on ship in South Australia at a competitive price, particularly without appropriate loading facilities at port locations. The price of the buyers reputed alternate Indian source (US $50/tonne) could not be matched.

During the year interest in palygorskite was expressed by other parties while alternate and new quotes were received from contractors to mine and handle material to ship. Concurrently, surveys were carried out to assess the nature and requirements of local markets.

2. ACTIVITIES

2.1 GENERAL

An assessment of data gathered during the year showed or indicated:

(a) A major effort, exploring many options, to determine the feasibility of exporting raw material indicated this was currently uneconomic without efficient storage and handling facilities at mine or port coupled with uneconomic mine-port transport.

(b) A survey of prices for locally mined palygorskite and end users in West Australia indicated high mark-ups in the chain producer - distributor - wholesaler - end user. This related particularly to ordinary grade bagged material in one-tonne lots used mainly as floor/animal litter. End users stated price was their most important consideration and would purchase cheaper material of comparable quality if available.

(c) A survey of wholesalers/Super-Market chains in South Australia, several with interstate connection, again showed price to be paramount for comparable quality litter. It appears much material in retail outlets is bagged by small operators buying bulk palygorskite from West Australia. Price advantages are achieved by mixing palygorskite with other non-metallics, e.g., crushed limestone. It appears a comparable South Australian sourced product would achieve a market share and probably dominance if price competitive.

(d) Development of Sandstone palygorskite is most likely to succeed through production of litter material to supply the local market initially. If successful, production could be progressively expanded as markets developed and as the characteristics of local palygorskite and the suitability for more specialized uses became known.

2.2 BULK TESTING

Previous efforts to find a local kiln operater to test Sandstone palygorskite and produce a sample product either as a joint venture partner or on a contract basis were unsuccessful. Two larger kiln operators expressed interest but later declined as testing would interfere with production runs; other operators declined on the basis of contamination of their kilns.

During this quarter an Adelaide operator calcining gypsum and with bagging facilities has indicated the availability of his kiln. Arrangements are being made to mine and transport an intial fifteen tonne bulk sample to Adelaide early 1989.

2.3 COMMERCIAL SAMPLE

From the calcined bulk sample it is intended to bag a litter product to test market reactions.

3. FUTURE PROGRAMME

(a) During the first half of 1989 the result of initial bulk testing of one or more samples will be completed and assessed in regard to:

1) Method of handling and preparation of raw material for kiln feed.

2) Most appropriate calcining conditions.

3) Methods for grading and handling calcined materials prior to bagging.

4) Characteristics of waste fines.

5) Characteristics of bagged samples.

6) Market acceptability of bagged product.

7) Economics of the operation.

(b) Pertinent exploratory work will be completed in the vincinity of Lake Stevenson at the time bulk test sample(s) is/are mined.

4. EXPENDITURE

Expenditure for the period from 10.9.88 to 18.12.88 totalled $536.00

S.B. WARNE

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ROEBUCK RESOURCES N.L.

EXPLORATION LICENCE 1371

SANDSTONE

SOUTH AUSTRALIA

QUARTERLY REPORT

FOR THE PERIOD

19TH DECEMBER, 1988 TO

18TH MARCH, 1989

Prepared by

S.B. Warne

for

Roebuck Resources N.L.

TECHNICAL REPORT NO. 110

PERTH MAY, 1989

CONTENTS

1. INTRODUCTION

During the quarter, intensive enquiries continued, aimed at clarifying the feasibility of mining, calcining, marketing palygorskite.

It appears there is potential to penetrate the existing local market for pet litter and industrial absorbents with a competitive product.

The viability of producing a product in marketable form is heavily dependent on minimizing transport costs and capital expenditure.

A further bulk sample has been collected and will be tested to provide data on calcining and pre-calcining treatment of palygorskite to yield an optimum product.

2. ACTIVITIES

a. WESTERN AUSTRALIA

Details were obtained of Mallina's palygorskite operation sited at Geraldton and a calcining plant which formerly produced pet litter was inspected at Lake Chandler.

b. EASTERN AUSTRALIA

The dominant domestic market exists on the Eastern seaboard with distribution via Melbourne and Sydney. Investigation of this market and discussions with distributors and agents indicates sufficient sales volume could be achieved to support a viable operation provided treatment and total capital costs can be contained.

c. COST CONSIDERATIONS

To minimize transport costs it appears calcining should be done at the mine site and calcined material transported in bulk to a packaging centre close to markets. This rationale reduces tonnage transported (no wet material, no waste) and minimizes damage to packaged material.

A major consideration is the need for a good quality road from the deposit to the Stuart Highway. Road construction and subsequent maintenance are significant cost components.

d. PACKAGING

A variety of packaging alternatives exist and enquiries are continuing to determine the best type of packaging machine and bags giving a balance between capital, operating costs and shelf presentation.

The site for a packaging centre has not been decided, although Port Augusta is the preferred site at present since suitable land appears available and road trains could be used as far as Port Augusta West.

e. BULK SAMPLE

Two tonnes of clay were mined from Lake Stevenson and are currently held in Adelaide pending extrusion and rolling trials prior to calcining.

3. EXPENDITURE

EXPLORATION EXPENDITURE

EXPLORATION LICENCE 1371

SANDSTONE

19.12.1988 TO 18.3.1989

	Contractors - Geological	1100
	Contractors - Other	375
	Drafting	-
	Freight & Delivery	-
	Geologist - In House	-
	Leasing and Rental	241
	Loose Tools & Equipment	-
	Mines Department Fees	-
	Mining Tenements - Administration	-
	Printing & Stationery	42
	Sundries	-
	Telephone & Postage	67
	Travel & Accommodation	118
	Vehicle Expenses	40
*	Overheads	297
	Total:	$2,280

* Office services, depreciation, depletion, rentals, ammortisation of assets, auditing.

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ROEBUCK RESOURCES N.L.

EXPLORATION LICENCE 1371

SANDSTONE, SOUTH AUSTRALIA

QUARTERLY REPORT

FOR THE PERIOD

19TH MARCH, 1989

TO

18TH JUNE, 1989

Prepared for

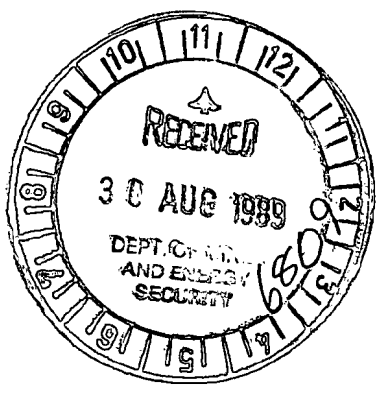
Roebuck Resources N.L.

by

S.B. Warne

TECHNICAL REPORT NO. 115

PERTH, JUNE, 1989



CONTENTS

1. INTRODUCTION

Studies aimed at mining, calcining and marketing palygorskite continued during the quarter.

A United States producer at Attapulgus was approached to possibly enlist their expertise on a consultancy or other co-operative basis. Discussions are continuing.

2. ACTIVITIES

Eastern Australia

Avenues for future marketing were broadly defined and a suitable representative agency structure identified.

South Australia

Portion of a bulk sample stored in Adelaide was forwarded to the United States for preliminary testing. Results are not yet to hand.

3. GENERAL

Discussions with the U.S. producer indicated considerable cost benefits could be achieved by following their experience in treatment, transportation and packaging. It appears further studies of the deposit characteristics, treatment plant requirements, transportation and distribution methods are warranted.

5. EXPENDITURE

EXPLORATION EXPENDITURE

EXPLORATION LICENCE 1371

SANDSTONE

19.3.1989 TO 18.6.1989

	Contractors - Geological	3,970
	Contractors - Other	2,480
	Drafting	-
	Freight & Delivery	125
	Geologist - In House	-
	Leasing and Rental	1,537
	Loose Tools & Equipment	240
	Mines Department Fees	-
	Mining Tenements - Administration	-
	Printing & Stationery	67
	Sundries	399
	Telephone & Postage	419
	Travel & Accommodation	3,942
	Vehicle Expenses	969
*	Overheads	2,122
	Total:	$16,270

* Office services, depreciation, depletion, rentals, ammortisation of assets, auditing.

EXPLORATION LICENCE 1371
SANDSTONE, SOUTH AUSTRALIA
QUARTERLY REPORT FOR PERIOD
19.6.1989 TO 18.9.1989

Detailed studies have now been carried out on the feasibility of producing treated absorbent clays from this very large, high grade deposit. Results indicate that the project is technically feasible, but profitability is marginal. Transport costs form the largest operating expense and is a major obstacle to be overcome.

A sample of material sent to a producer in the United States for testing was found to have good values.

An expenditure Statement is attached.

EXPLORATION EXPENDITURE
EXPLORATION LICENCE 1371
SANDSTONE
19.6.1989 TO 18.9.1989

	Contractors - Geological	280
	Contractors - Other	-
	Drafting	-
	Freight & Delivery	125
	Geologist - In House	-
	Leasing and Rental	-
	Legal Fees	936
	Loose Tools & Equipment	-
	Mines Department Fees	-
	Mining Tenements - Administration	-
	Printing & Stationery	29
	Sundries	-
	Telephone & Postage	2
	Travel & Accommodation	-
	Vehicle Expenses	-
*	Overheads	187
	Total:	$1,434

* Office services, depreciation, depletion, rentals, ammortisation of assets, auditing.

000107

ROEBUCK RESOURCES N.L.

16 EMERALD TERRACE, WEST PERTH 6005
WESTERN AUSTRALIA
TELEPHONE 324 1233
FACSIMILE 324 1224

Our Ref: DM5002:783-100:RDM:wr

10th April, 1990

The Director General,
South Australian Department
of Mines and Energy,
P.O. Box 151,
EASTWOOD S.A. 5063

Dear Sir,

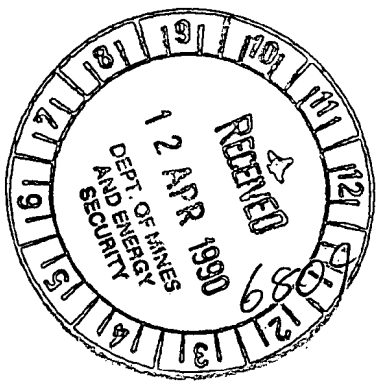
Exploration Licence 1371
Report for Quarter Ended 18.12.89

We wish to report that no work was carried out on EL 1371 during the quarter ended 18.12.89.

Yours faithfully,
ROEBUCK RESOURCES N.L.

R.D. MACLIVER
Land Officer

c.c. Mr. S.B. Warne
25 Nashwauk Crescent
MOANA SA 5169



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ROEBUCK RESOURCES N.L.

1st Floor, 33 Ord Street, West Perth 6005
~~10 EMERALD TERRACE, WEST PERTH 6005~~
WESTERN AUSTRALIA
TELEPHONE 324 1233
FACSIMILE 324 1224

Our Ref: SADM6046:783-100:RDM:wr

31st August 1990

The Director General
South Australian Department
of Mines and Energy
P.O. Box 151
EASTWOOD SA 5063

Dear Sir,

Exploration Licence 1371
Report for Quarter Ended 18.3.1990

We wish to report that no work was carried out on EL 1371 during the quarter ended 18.3.1990.

Yours faithfully,
ROEBUCK RESOURCES N.L.

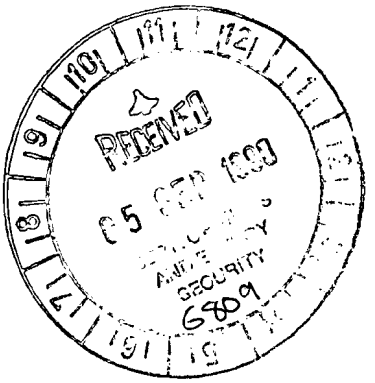
R.D. MACLIVER
Land Officer

c.c. Mr. S.B. Warne
25 Nashwauk Crescent
MOANA SA 5169

EXPLORATION LICENCE 1371
SANDSTONE, SOUTH AUSTRALIA
QUARTERLY REPORT FOR PERIOD
19.3.89 - 18.6.90

The feasibility of producing and marketing treated absorbent clays from this extensive deposit was examined again during the quarter. Transport costs continue to be the main factor mitigating against the project.

A number of parties were contacted during the quarter and several have recently expressed an interest in the project. Discussions are continuing.



ROEBUCK RESOURCES N.L.

1ST FLOOR, 33 ORD STREET, WEST PERTH 6005
WESTERN AUSTRALIA
TELEPHONE 324 1233
FACSIMILE 324 1224

Our Ref: SADM6157:783-100:RDM:WR

12th December 1990

Director General,
South Australian Department
of Mines & Energy,
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Env. 6809

Exploration Licence 1371
Report for quarter ended 18 September 1990.

We wish to report that no work was carried out on Exploration Licence 1371 during the quarter ended 18th September, 1990.

Yours faithfully,
ROEBUCK RESOURCES N.L.

R.D. MACLIVER
Land Officer