Open File Envelope No. 5358

EL 1176 AND EL 1272; MC 2097

RAMCO WEST

PROGRESS REPORTS TO LICENCE EXPIRY/SURRENDER FOR THE PERIOD 23/9/1983 TO 10/2/1988

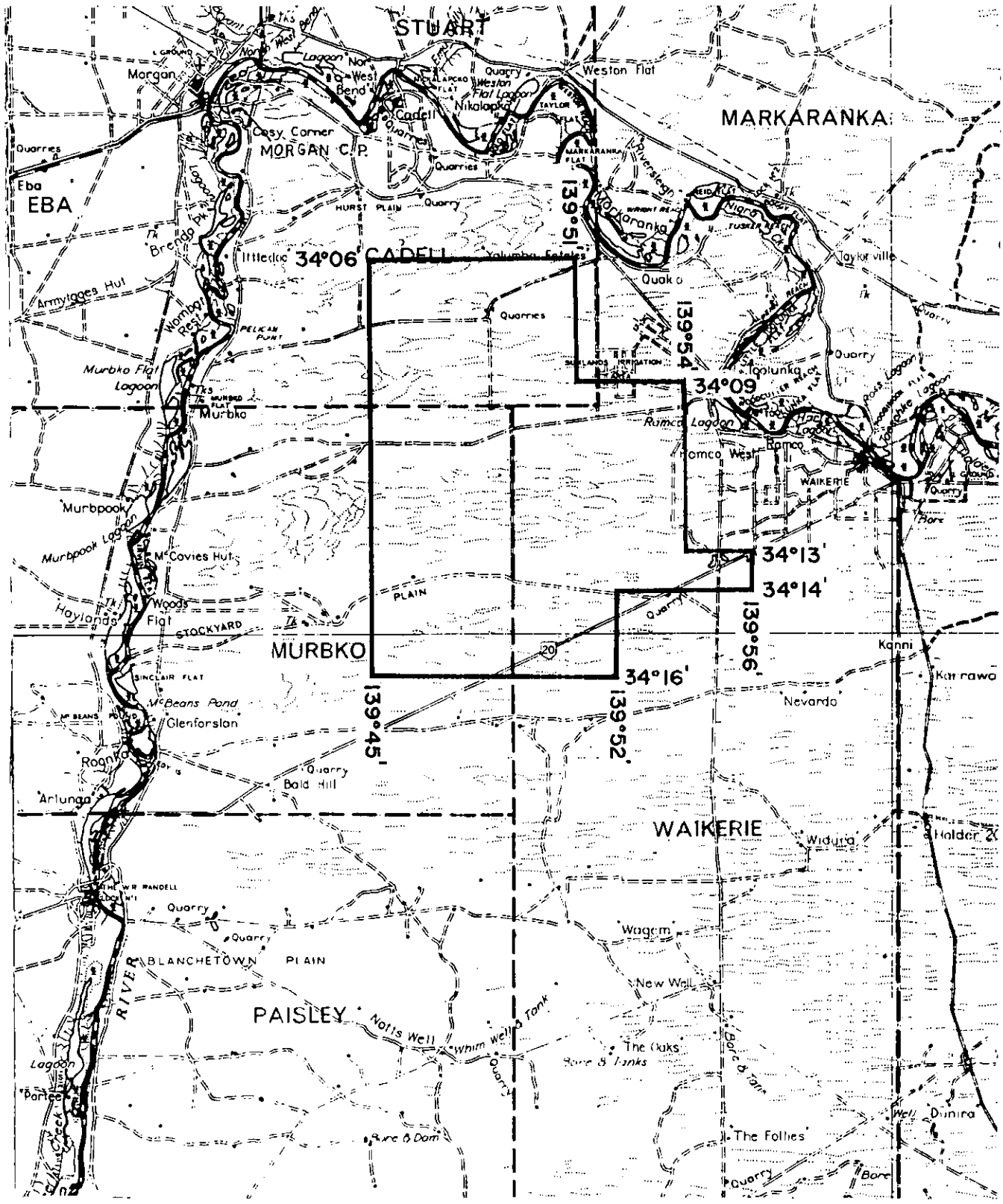
Submitted by
CSR Ltd
1988

Enquiries: Customer Services Branch
Minerals and Energy Resources
7th Floor
101 Grenfell Street, Adelaide 5000

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

Government of South Australia
Primary Industries and Resources SA

SCHEDULE A ✓



EXPIRED

SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

APPLICANT: **CSR LIMITED**

DM: **120/83**

AREA: **225** square kilometres (approx.)

1:250000 PLANS: **RENMARK**

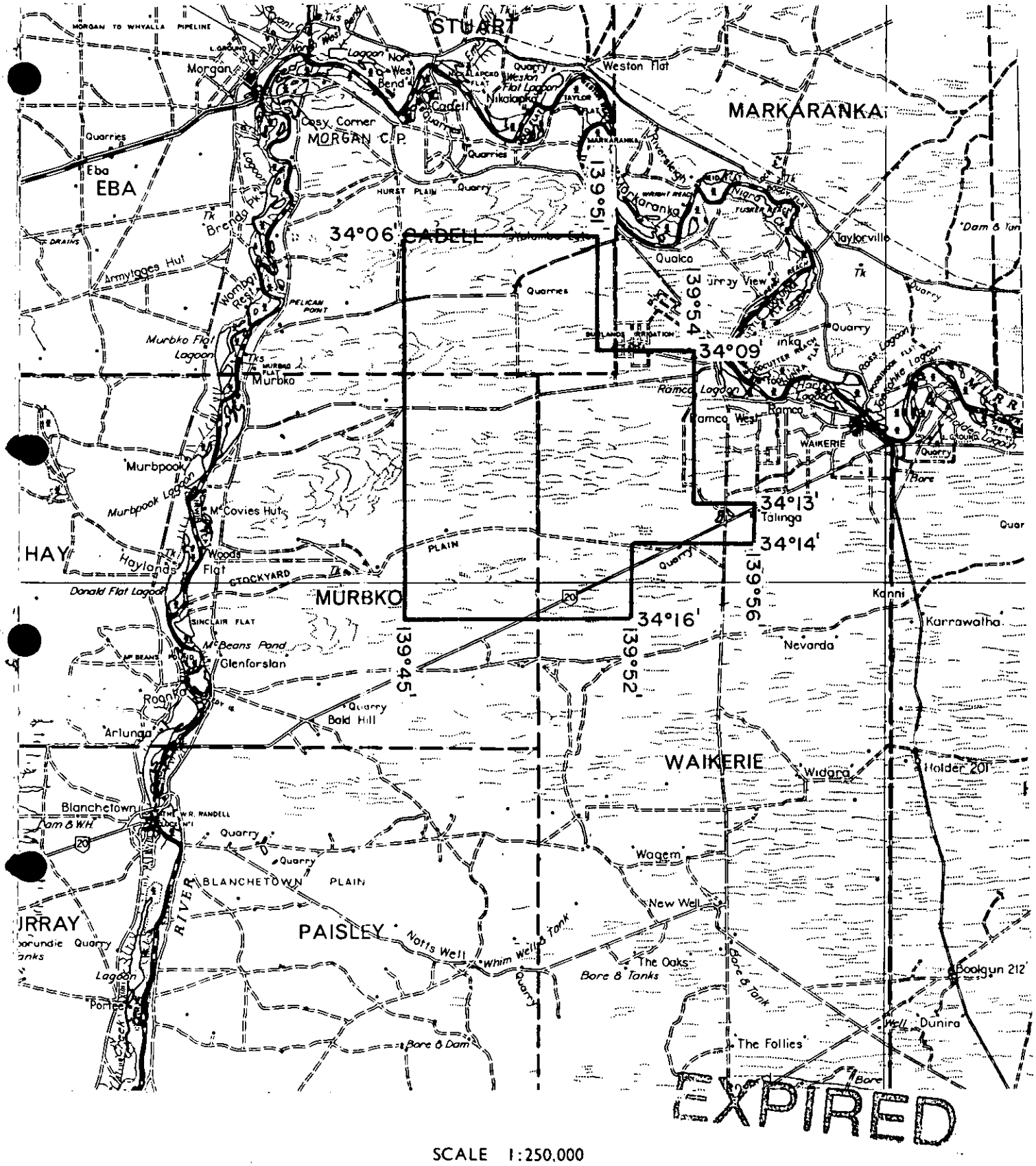
LOCALITY: **RAMCO WEST AREA — Immediately west of Waikerie**

DATE GRANTED: **23·9·83**

DATE EXPIRED: **22·9·84**

EL No: **1176**

SCHEDULE A



SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

APPLICANT: CSR LIMITED

DM: 294/84 AREA: 225 square kilometres (approx.)

1:250000 PLANS: RENMARK

LOCALITY: RAMCO WEST AREA - Approx. 5km west of Waikerie

DATE GRANTED: 11·2·85 DATE EXPIRED: 10·2·86/87/88 EL No: 1272

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TENEMENT HOLDER: C.S.R. Limited.

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CSR Building Materials

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003

DE/eg

15 March 1984

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

Dear Sir,

RE : EL 1176 RAMCO WEST - REPORT FOR THREE MONTHS ENDING 23 DECEMBER 1983

Please find enclosed our report relating to El 1176 for the three months ending 23 December,1983.

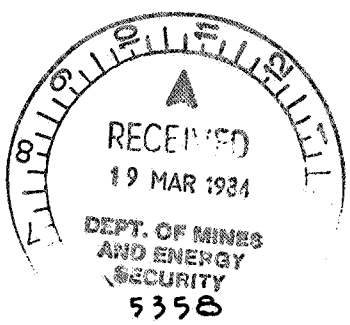
Notice of entry was served by our solicitors, Finlaysons & Co. on the 15 November,1983.

Geological work was confined to preparation for the planned field trip, including the study of topographic maps and aerial photos.

The results of the planned field trip will be presented in the next report.

Yours faithfully,

R.E.S. Layton
STATE MANAGER



CORAKN

EXPLORATION LICENCE 1176

EXPENDITURE : 3 MONTHS ENDING 23 DECEMBER, 1983.

C.L. ADAMSON, CONSULTANT GEOLOGIST	
Office work, geological consulting	$532
Field Work, geological consulting	NIL
CSR LIMITED	
Administration costs, office work	500
Purchase of maps and aerial photos	200
Field work, expenditure	NIL
Purchase of hand auger & other field equipment	500
FINLAYSON & CO., SOLICITORS	
Search of owners, serve notices of entry	661
DEPARTMENT MINES & ENERGY S.A.	
Application, preparation, taxes & rental	412
TOTAL 3ME 23/12/83	$2805
Estimated expenditure 3ME 23/3/84	$7500
Total Expenditure to date	$2805

CORAJY

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19 June 1984

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

Dear Sir,

RE : EL 1176 RAMCO WEST - REPORT FOR THREE MONTHS ENDING 23.3.84

Please find below details on expenditure relating to EL 1176 for the three months ending 23rd March 1983.

The geological field work consisted of examination of gypsum outcrops and measurement of sections where suitable outcrops existed.

Office work consisted of analysis and correlation of data from the field work and the records of bores in the EL area and vicinity.

Personnel - Office and Field Work

C.L. Adamson	:	fees	$3773	
D. Sewell and M. Walton	:	salaries	$1400	
			$5173	$5173

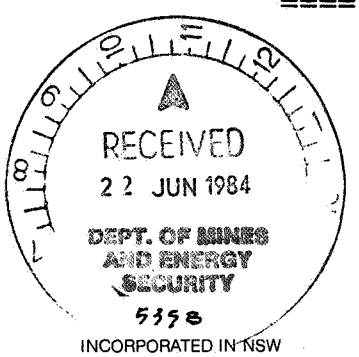
Expenses

Field work during period 8-13 January 1984, Travel, Accommodation, Vehicle Hire etc.	$2370	$2370
		$7543

Yours faithfully,

R.E.S. Layton
STATE MANAGER

CORAIL



Original

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CSR LIMITED

BUILDING MATERIALS DIVISION

GYPSUM PRODUCTS GROUP

RAMCO GYPSUM DEPOSIT

EL 1176

REPORT FOR 3 MONTHS ENDING 23 JUNE 1984

C.L. Adamson
1 August 1984

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1. INTRODUCTION

Exploratory work on Exploration Licence 1176 was undertaken in January and June 1984. Work was concentrated in the southern portion of the EL area where most gypsum outcrops occur, but all likely outcrop areas were inspected.

The purpose of the field work was to examine surface outcrops in the vicinity of old excavations or abandoned Mining Leases and locate other positions where gypsum was exposed at the surface or in excavations.

During January a hand auger, 50mm diameter, was used to obtain deeper samples where surface indications showed the presence of the underlying gypsum bed. This method of drilling suffers severe limitations in this area due to the presence of both calcrete, which generally overlies the gypsum bed, and the hard gypsarenite in the unweathered section of the gypsum bed. However, it was most useful in proving the presence of the gypsum bed at several locations.

A back-hoe was used in June, but its effectiveness also was limited by the calcrete and hard gypsarenite. However, it exposed some extra gypsum occurrences and enabled more extensive examination and sampling of the top of the fresh gypsum.

Existing geological data relevant to the area ~~is~~ are contained in the information, both published and unpublished, available from the Department of Mines and Energy, South Australia and listed in References.

Field and office work was carried out in January, 1984, with the assistance of CSR Scholarship holders, Donna Sewell and Matthew Walton. During June, Michael Florance assisted with the field work.

2. PREVIOUS MINING ACTIVITY

Within the area of EL 1176 at least three Miscellaneous Leases have been held at various times over the area of principal gypsum outcrops in Section 51, Hundred of Waikerie. Miscellaneous Leases ML402, ML606 and ML704 are shown on the map in the Department of Mines and Energy.

Willington (1952) records a total production from Hd. Waikerie of 1295 tons (1316 tonnes) between 1917 and 1950 and that Wohling and Marschall in 1952 held 16 acres (6.5 ha) under lease. The largest abandoned lease area covered all the obvious workings in Section 51.

Principal mining sites are 4 and 8, with minor activity at Site 3. Some trenches have been excavated at Site 9.

At Site 12 in Section 28 a few tonnes of kopi have been scraped from the surface. No lease was recorded in this vicinity.

3. GENERAL GEOLOGY

Barnes and Warren (1980) described the Blanchetown gypsum deposits which occur within the Blanchetown clay. The general geology of Ramco El 1176, from the initial observations, is similar to that at Blanchetown.

A large part of the EL area is covered by sandy soil which is cultivated for wheat. These sand areas contain dunes which may be higher than the 50m contour.

That area of the EL not under agricultural use, covered by sand hills, or not exhibiting gypsum outcrops in depressions, is generally a plain-like feature close to the 30 m contour. This is covered by shallow soil and a very hard calcrete horizon of variable thickness. In these investigations the strata below the calcrete could not be investigated at most locations, due to the limitations of hand augering and excavating strength of the back-hoe.

The topography is typical of a karst area with no surface drainage systems and numerous enclosed depressions formed by solution of the gypsum and the underlying limestones, which are overlain, in places, by the gypsum bed.

4. GYPSUM BED

Gypsum, either rock gypsum (gypsarenite), loose gypsum crystals or kopi (gypsite), was found only where the calcrete cap has been removed or thinned by quarrying, or by natural processes, such as formation of sinkholes. Where obvious kopi is not present clues to its presence were found on the edge of depressions in rabbit or ant holes.

In many cases, calcrete can be observed in depressions below the 30m level, i.e. below the general level of the calcrete plain surface. This feature inhibited the use of the hand auger and back-hoe at many locations.

All outcrops of kopi were observed to occur at points of steeper slopes on the depression edges.

The main area of gypsum occurrences is located in Section 51 Hundred of Waikerie with a westerly extension into Section 23 Hundred of Murbko. This area is over 4 km long with a width of 1.25 km.

Another area of gypsum exposures is situated along the Ramco Point to Murbko Road. In this area, two road aggregate quarries expose the top of the gypsarenite bed at Sites 1 and 2 (Map 2) and Bore 24S penetrates the full thickness of the bed.

It is possible that the gypsum bed is continuous between the two areas of outcrops, a distance of 6km, but no outcropping evidence has been found to support this hypothesis. However, gypsum has been recorded, in this vicinity, in Bores 2R and 681. Much of this area is covered by sand hills and is cultivated for wheat.

The evidence of hand auger drilling, back-hoe trenches, and shallow excavations indicates that the Ramco gypsum is similar to the Blanchetown deposit both in general appearance and presence of solution cavities. These cavities are filled with clay and sand. An old pit at Site 4 exhibits this feature which is probably common.

5. GYPSUM OCCURENCES

5.1 Previous Bores

Roberts (1965) records gypsum in some bores in the area. This programme was associated with drainage investigations and was carried out by rotary non-cored methods. Fine grained gypsarenite could have been penetrated and not recognised as gypsum, as is the case with Bore 681.

Positive gypsum bed identifications with no indications of quality were made in Bores 25S (4.3 m thick), 2R (13.7m thick) and 24S (7.9m thick) as well as in other bores outside the EL area.

Recent bores, by the Department of Mines and Energy, 680 and 681 show gypsum in the bore cuttings at the surface, but gypsum was only recorded in Bore 680 (limestone and gypsum 1.5 to 8.0m). The log for bore 681 shows sandy clay and sandstone from 1.0 to 20.0m.

5.2 Auger Holes and Shallow Excavations

5.2.1 Ramco Refuse Reserve Area

These two exposures (Sites 1 and 2) are located where calcrete has been removed for road material. At both locations about 1.5m of calcrete and sandy clay have been removed to reveal the top of the hard gypsarenite bed. The maximum penetration into this gypsum was noted at Site 2 where about 0.3m had been excavated. At the eastern end of Site 1, closest to Bore 24S the top of the gypsum bed is hard gypsarenite compared with the bore record which shows the top of the gypsum bed as gypseous clay.

A sample of the rock gypsum (gypsarenite) collected in 1983 from the road material quarry near the rubbish dump contained 94.5% gypsum.

5.2.2 Occurrences in Section 51 and adjacent areas

The main area of surface gypsum occurrences is located in south western part of Section 51 and closely adjacent areas in Sections 23 and 401.

At site 3 a backhoe trench was excavated from the lower level of the upper calcrete down the slope. Hard gypsarenite prevented penetration into the unweathered material. The sections illustrated in Figure 2 are similar to that exposed at Site 3.

Once intersected the rock gypsum at all sites halted any further penetration by hand auger or back-hoe. In places the auger was forced sideways into suspected solution cavities. In these positions gypsum and sandy clay was recovered.

Sites 3, 4, 5, 8 and 9 showed extensive kopi outcrops. Kopi thicknesses encountered were less than 1 m thick except at Site 3, hole 4 where 1.12m of kopi was measured.

The thickness of the rock gypsum was estimated from the exposed sections at Site 3 (6.0 m of gypsum), Site 4 (4.5 m of gypsum) and Site 8 (4.5 m of gypsum). See Figure 2.

Samples for analysis were taken at Sites 3,4, and 8.

6. CONCLUSIONS

6.1 Areas of Interest

(a) Sections 23 and 51

This is the main area containing gypsum exposures. These are distributed over an east-west distance of about 4km and a width of about 1.25km with a possible area of 4.25km^2.

This area is physically limited by the presence of sand dunes to the north and south. To the east and west no gypsum occurrences have been noted and it is not known whether this is due to the termination of the gypsum bed or lack of suitable topography to provide exposures.

The quantity of gypsum, assuming a 2 m thick bed in this area could be of the order of 10 million tonnes. ~~Appendix B details the estimation.~~

(b) Ramco Refuse Reserve

This area is restricted by surrounding wheat cultivation, mainly on sand-hill country. There is a possible area of about 1.25km^2 where the overburden may not be excessive.

Considerable parts of the 1.25km^2 would be eliminated owing to the presence of roads and the area of depression in the vicinity of the Refuse Reserve. A thick bed of economic gypsum may make a small surface area viable, but there is not sufficient data, at present, on which to estimate possible quantities.

6.2 Quality

The samples collected from the upper section of the gypsarenite bed in January and June 1984 were analysed for gypsum content and soluble salts. For the top 2-3m of the bed the average results at various sites are shown in the following table.

Site No.	Gypsum %	Na Cl %
3	83.4	0.095
8	76.9	0.067
4	86.3	-
Blanchetown auger drilling by S. Aust Dept of Mines and Energy	79.3	-

Samples from sites 3,4 and 8 were taken at locations where the gypsum bed is cropping out in the scarp at the edge of depressions (Fig 2).

At site 4 the old mine workings had exposed the surface of the hard gypsarenite bed from which a sample was collected in several increments. At sites 3 and 8 a back-hoe trench exposed the top of the hard gypsarenite from which samples were collected.

The result for Blanchetown was obtained from 46 samples collected from auger holes by Barnes and Warren (1980).

All the quality figures in the table represent the raw ore quality and after processing to remove fines consisting of sand and clay the material at Blanchetown is up-graded over 90%. It is anticipated that the gypsum at Ramco can be similarly treated.

The figures from the Ramco samples and the figure for Blanchetown are not strictly comparable as the methods of obtaining the samples were different at each place.

7. RECOMMENDATIONS

The initial investigation has produced promising results, and has indicated that drilling will be required to produce samples and data from the full section of the gypsum bed.

The South Australia Department of Minerals and Energy is at present using a combined percussion and rotary drilling rig capable of core drilling on a road investigation in a calcrete area.

They suggest that this machine would be satisfactory for the Blanchetown and Ramco deposits and are interested in organising a joint investigation among lease holders at Blanchetown to spread establishment and other fixed costs associated with hire of this equipment. If this scheme eventuates Ramco could be included.

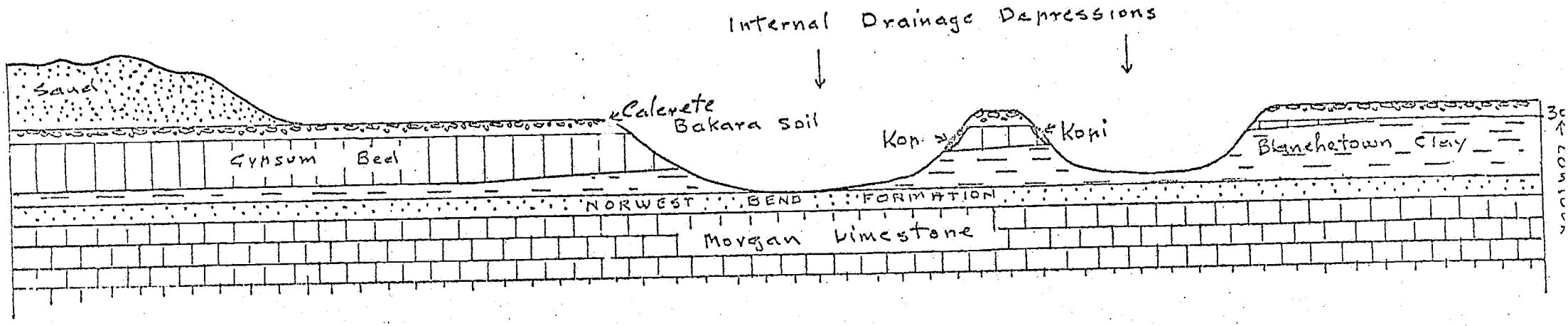
It is recommended that the next investigation stage be collection of samples by drilling and that costs and timing of programme be investigated.

8. REFERENCES

Barnes, L.C. and Warren, J.K. 1980 Blanchetown gypsum deposits. Report No 1 - Results of geological investigation and auger drilling in 1979. Dept of Mines and Energy Report No. 80/142.

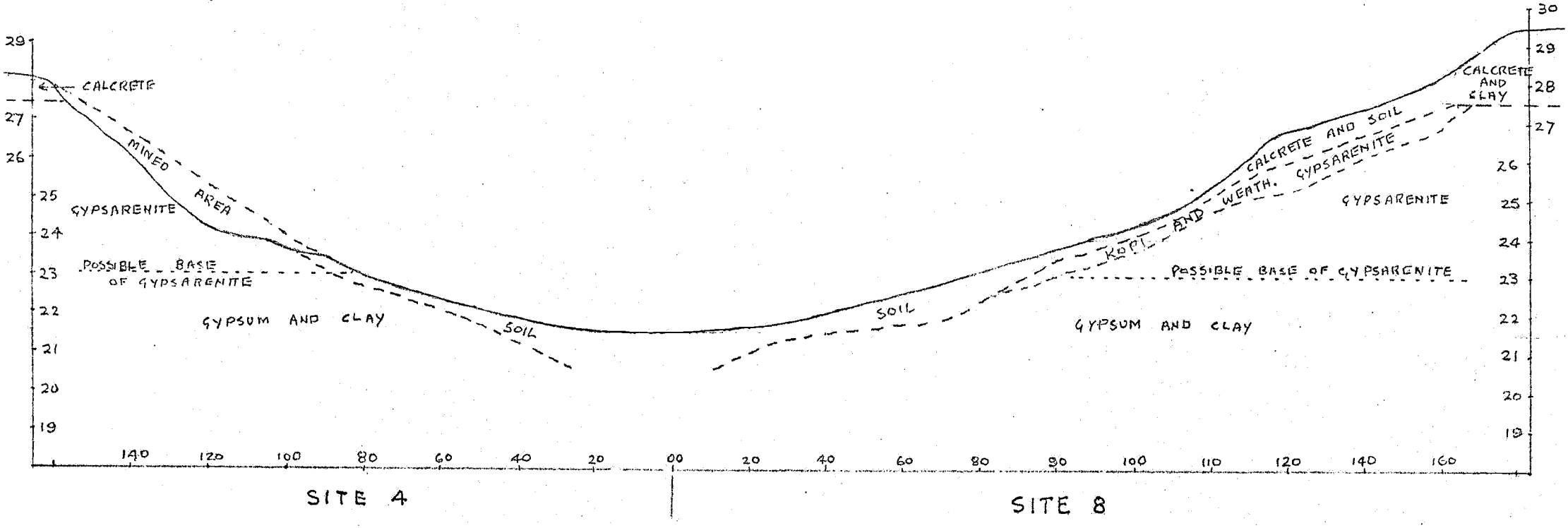
This report is published in Mineral Resources Review, South Australia No. 152.

Roberts, G.T. 1965 Murray River drainage investigations. Report No 3 Unpublished Report South Australia Dept of Mines.



DIAGRAMMATIC SECTION

Fig. 1



SECTION SITE 4 AND 8

Fig. 2

Hill Bro

Ruin

Sheds

Yards

Shed

Refuse Tip
Rubbish Dump

Qualco

Golf Course

SUNLANDS IRRIGATION AREA

Mara Pana

STURT HIGHWAY

EL 1176

SCALE 1:25,000

METRES 1000 0 1 2 3 4 5 KILOMETRES

Enlargement from CADELL 1:50,000 SHEET

CONTOUR INTERVAL 10 METRES

RECEIVED 21 AUG 1984 DEPT. OF MINES & ENERGY

5358

EL
RAMCO

CSR LIMITED

SADME BORE Penetrated GYPSUM

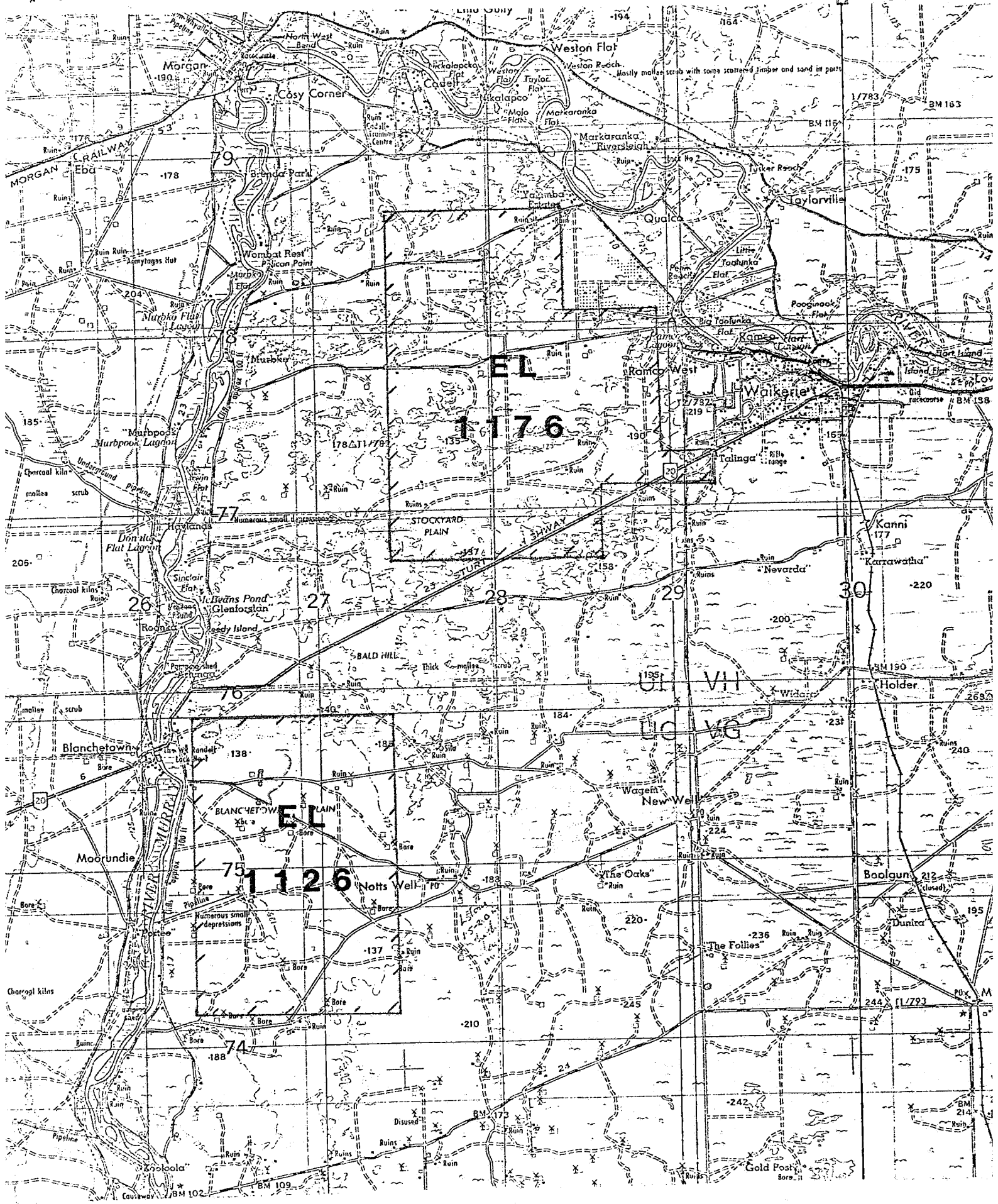
TRENCH SAMPLE SITE

GYPSUM OCCURRENCE

C.L. Adamson 25.6.84

MAP 2

5358-1



SCALE 1:250 000

kilometres 0 5 10 15 20

MAP 1

CSR L - 022

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GYPSUM PRODUCTS GROUP
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3 January 1985

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

Dear Sir,

RE : EL 1176 RAMCO WEST : REPORT FOR 3 MONTHS ENDING 23.9.84

The work involved during the period entailed preparation of a report covering field work performed during the previous 3 month period. The report dated 1st August 1984 has already been submitted to you. NONE DUE } ? — was for PE 23.6.84
NONE RCD. } • + was received.

The expense details associated with this work are attached.

Yours faithfully,

per R.E.S. LAYTON
State Manager

RECEIVED
4 JAN 1985
DEPT. OF MINES AND ENERGY SECURITY

CORAAK
Gyprock
® Plasterboard

INCORPORATED IN NSW

EXPLORATION EXPENSES EL 1176 RAMCO

Period 3 Months Ending 23.9.84

C.L. Adamson, Consultant Geologist, Sydney	
Office work	$ 1158.00
CSR Limited, Adelaide	
Office work	$ 1200.00
Expenditure for Period	$ 2358.00
T O T A L E X P E N D I T U R E :	$ ~~19745.00~~ 17387.

2358 added twice. Somewhere along the line.

CORAAK

024

CSR Building Materials

ILD/ab

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22 January 1985

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

Dear Sir,

RE : EL 1176 RAMCO WEST :
3 MONTHS ENDING 23.12.84

No field work was carried out on this area pending a decision on the most appropriate method for future sampling of the areas. Our Mr. C. Adamson is liaising with your Mr. L. Barnes on this issue. Details of the ongoing expenditure associated with this EL are attached.

Yours faithfully,

R.E.S. LAYTON
State Manager

ATTACH.

EXPENSES EL 1176 RAMCO WEST

PERIOD 3 MONTHS ENDING 23.12.84

C.L. Adamson, Consultant Geologist, Sydney

Office Work	$ 38.60
CSR Limited, Adelaide	
Office Work	$ 500.00
Expenditure for period :	$ 538.60

TOTAL EXPENDITURE : $20283.60

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CSR Building Materials

ILD/ir

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9 July 1985

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

Dear Sir,

Re: EL 1272 - RAMCO WEST
Report for 3ME - 10 May 1985

No field work was carried out in the area during the period.

Our intention is to commence a drilling programme on approximately the 9th July. This work, which will be similar to that now being carried out on EL 1126 at Blanchtown, will have the objective of further defining the extent of the reserves of gypsum.

Details of the expenditure on EL 1272 are attached.

Yours faithfully,

R.E.S. LAYTON
State Manager

EXPENSES EL 1272 - RAMCO WEST

Period 3ME 10th May 1985.

C.L. Adamson, Consultant Geologist, Sydney.	
Office work	$ 19
CSR Limited, Adelaide,	
Office work	$ 250
	$ 269

CORAAB

SAMME

028

CSR LIMITED

GYPSUM PRODUCTS GROUP

EL 1272 - RAMCO

REPORT FOR 3 MONTHS ENDING 11 AUGUST 1985

C L Adamson
Consulting Geologist

43 Holt Avenue
Cremorne NSW 2090
23 August 1985

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4	CONCLUSIONS	9
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MAPS

1	Part of EL 1272 1:50 000
2	Bore Locations July 1985 Programme 1:25 000

1 SUMMARY

The drilling programme of July 1985 has indicated an economic gypsum deposit extending over an area about 4.5 km long and in excess of 1 km wide. The total area containing gypsum is decreased by the presence of extensive depressions, devoid of gypsum.

Twenty five bores were drilled in this programme and further drilling is required to refine the data and to calculate possible gypsum quantities.

In addition, analyses are not yet available of the samples collected from the bores. When results are available the future programme can be defined.

The July drilling programme was confirmed to a relatively small area of EL 1272. Gypsum also occurs in road material quarries on the Murbko - Ramco Rd. This area is about 5-6 km north of the recent investigation area and is of unknown extent and thickness. Drilling will be required to evaluate this deposit.

In conclusion, the drilled area is promising and this, together the untested area to the north warrants further investigation.

2 INTRODUCTION

2.1 General

During July 1985 25 bores totalling 129 m were drilled in the vicinity of the abandoned mining leases in Section 51, Hundred of Waikerie. The area of investigation extended into adjacent sections. Maps 1 and 2 give the general and detailed locations of the bore sites. Map sites, which are locations of back-hoe pits and surface observations during previous field work are also located on these maps.

Analyses of samples obtained from the recent drilling programme have not yet been completed. These will be presented in the next report. However, Table 2 summarises the drilling results.

2.2 Previous Investigation

The initial investigation was confined to surface observations and a few hand auger holes. These sites were later tested by excavation of pits by a back-hoe. For results see Table 1.

TABLE 1

EL 1272

Notes on Map Sites
Most sites are plotted on Map 2

Site No	Gypsum recorded	Remarks
1	Yes	Plotted on Map 1
2	Yes	" "
3	Yes	Site of back-hoe trench. See report dated 1 August 1984
4	Yes	" " "
5	Yes	Rabbit burrows show gypsum crystals on spoil heaps Back-hoe pit in depression below burrows bottomed on hard calcrete at 1.6 m
6	Yes	Back-hoe pit 0.0-0.6 Calcrete rubble 0.6-0.9 Kopi 0.9-1.3 Gypsarenite, weathered 1.3 Gypsarenite, hard
7	Yes	Four pits downslope exposed calcrete underlain by gypsarenite with lowest pit in calcrete rubble to 1.4 then very hard calcrete
8	Yes	Site of back-hoe trench. See report dated 1 August 1984.
9	Yes	Same site as 22. Original observation was gypsum crystals from rabbit burrows
10	Yes	Back-hoe pit 0.0-0.4 Calcrete rubble 0.4-0.6 Kopi 0.6-1.0 Gypsarenite, weathered 1.0 Gypsarenite, hard

Site No	Gypsum recorded	Remarks
11	Yes	Back-hoe trench about 1 m deep on side of depression. Upper section of trench exposes about 1 m of kopi and weathered gypsarenite with hard qypsarenite at bottom. Lower end of trench bottomed on hard calcrete at 1.0 m with red sand above
12	Yes	Old small excavation about 0.3 m exposing weathered gypsarenite
13	Yes	Back-hoe pit 0.0-0.50 Soil and nodular calcrete 0.5-1.5 Kopi 1.5-1.6 Gypsarenite, weathered 1.6 Gypsarenite, hard
14	Yes	Back-hoe pit 0.0-0.4 Soil and calcrete 0.4-0.8 Kopi 0.8-1.25 Gypsarenite, weathered 1.25 Gypsarentie, hard
15	Yes	Two pits on slope Pit 15A 50 m from Pit 15B which is about 3 m higher than Pit 15A Pit 15A - Lower Pit 0.0-0.1 Soil 0.1-1.1 Kopi grading down to gypsarenite 1.1-1.5 Gypsum with brown clay grading to grey-green at bottom 1.5 Greenish grey clay with some gypsum crystals Pit 15B - Upper pit 0.0-0.6 Kopi white 0.6-1.0 Gypsarenite 1.0 Gypsarenite, hard

Site No	Gypsum recorded	Remarks
16	Yes	Three pits on hill side. Similar section to Site 15 with bottom in greenish grey clay
17	No	Back-hoe pit to 2.0 m. Mottled red yellow-green sandy clay at bottom. Pit in depression
18	No	Back-hoe pit in depression 0.0-1.6 Reddish sandy clay with calcrete
19	Yes	Back-hoe pit on side of depression exposes about 1.5 m of kopi and gypsarenite with gypsum in floor.
20	Yes	Back-hoe pit 2.1 m deep showed only red sandy clay with calevete pebbles. On this site Bore 14 encountered gypsum at 2.2 m
21	Yes	Pit 1.8 m deep in depression 0.00-1.70 Soil, reddish sandy with calcrete rubble 1.70-1.75 Clay yellowish-green sandy 1.75-1.80 Gypsarenite with thin clay inter-beds, 1.80 Gypsarenite hard
22	Yes	Back-hoe pit on edge of depression 0.0-0.3 Soil and calcrete 0.3-0.6 Kopi 0.6-0.9 Gypsarenite, weathered 0.9 Gypsarenite, hard
23	No	Back-hoe to 1.5 bottomed on hard calcrete.

Excavation of pits is the ideal way to examine many gypsum deposits, but this method has severe limitations in the gypsum beds associated with the Blanchetown clay. The rock gypsum is too hard for small mobile back-hoes to excavate and the calcrete above the gypsum is impossible to excavate.

For these reasons a suitable drilling method must be used for exploration.

2.3 The drilling programme

Owing to the fact that the general pattern of extension of the deposit outisde the area of previously observed gypsum occurrences was unknown, no detailed plan for drilling was formulated. Thus drilling was not on a grid pattern and hole locations were planned as the work progressed.

Locations of holes were fixed on aerial photographs and then transferred to the 1:25 000 map.

One of the main objectives was to define the economic limits of the deposit. These limits are controlled by three criteria.

(a) Thinning and deterioration of the gypsum bed.

(b) Presence of sand dunes which conceal kopi outcrops and provide excessive over burden. In addition, much of the country is or has been under crop cultivation.

(c) Presence of depressions which extend below the stratigraphic position of the gypsum bed.

2.4 The drilling plant

The contractor was Southern Drilling Pty Ltd of Norwood who supplied an Investigator Mark IV plant mounted on a Mercedes 4 x 4 truck.

The air compressor for the reverse circulation cuttings removal was also mounted on the truck. Roller bits, 100 mm diameter, were used for all drilling.

In places hard calcrete caused slow penetration and due to the unstable nature of the walls this method was continued rather than extract the rods to fit a hammer.

Another delay in drilling was caused by the heavy plastic which clogged the airways in the bit and prevented removal of cuttings. This mainly occurred at the base of the gypsum bed below the sample collection interval.

Drilling in the gypsum bed was rapid and required the services of two people to measure depths, change sample bags, and record information.

2.5 Sampling

Samples were collected at the bottom of a cyclone mounted on the side of the truck. The condition of the samples could be described as well ground and visually were estimated to be mostly less than 600 mm with a minor proportion of larger particles to 2.5 mm.

Visual estimates of quality were difficult due to the small grain size, particularly out of direct sunlight where no reflecion from minute cleavage fragments could be seen.

As the full sample from a 100 mm bore hole was too large to transport, each sample was reduced in a riffle to three sub-samples of about 1.5 - 2 kgs each. These sub-samples were distributed as follows.

1. South Australia Department of Mines and Energy (SADME).

2. Gyprock Factory Adelaide for retention

3. Gypsum Products Group Laboratory at Concord for analysis.

Where the contamination by clay or sand was very obvious no samples were collected.

3. DRILLING RESULTS

3.1 Summary of results

Table 2 presents the summary of the results of all the bores drilled. Map 2 shows the location of these bores.

In this table the over burden thicknesses can be accepted as definite figures. The gypsum bed thicknesses represent the measured interval over which gypsum was encountered and obviously include inferior gypsum zones at the base of the bed. It is equally true that sampled intervals also include inferior material near the base of the gypsum bed. None of these figures can be regarded as economic bed thicknesses.

These results can indicate where the gypsum bed is of sufficient thickness to contain an economic zone in the upper part.

TABLE 2

EL 1272

SUMMARY OF DRILLING

July 1985

BORE NO	DEPTH m	O/B m	GYPSUM BED m	SAMPLES INTERVAL m	SAMPLES THICK. m	REMARKS
1	4.60	1.60	2.40	1.60-4.00	2.40	
2	5.10	-	NG	- -	-	
3	3.60	-	NG	- -	-	
4	4.80	1.40	3.00	1.40-4.10	2.70	
5	5.80	2.40	2.80	2.40-5.20	2.80	
6	3.50	-	NG	- -	-	
7	3.30	-	NG	- -	-	
8	4.00	1.80	2.00	1.80-3.80	2.00	
9	3.00	1.90	0.60	NS	-	
10	6.40	1.60	2.80	1.60-4.40	2.80	
11	5.50	1.70	2.10	NS	-	Fine sandy clay with gypsum
12	5.30	2.00	2.50	2.00-4.30	2.30	
13	5.60	2.00	2.50	2.00-4.50	2.50	
14	5.70	2.20	3.20	2.20-5.40	3.20	
15	3.40	1.70	1.50	1.70-3.20	1.50	
16	4.80	1.50	3.10	1.50-4.20	2.70	
17	4.80	3.10	1.60	NS	-	
18	6.50	1.50	4.50	1.50-5.20	3.70	
19	5.00	1.90	3.10	1.90-4.00	2.10	
20	8.70	1.60	4.30	1.60-5.50	3.90	
21	4.40	1.50	2.40	1.50-3.90	2.40	
22	5.80	2.10	0.60	NS	-	
23	5.70	3.00	1.00	NS	-	
24	6.10	1.50	3.70	1.50-4.70	3.20	
25	7.80	1.60	4.90	1.60-5.40	3.80	

NG = No gypsum visible
NS = Not sampled
OB = Overburden

Table 3 gives a summary of information from SADME bores in the area. Map 1 shows the location of these bores. See Roberts (1965) for details.

TABLE 3

SUMMARY OF SADME DRILLING 1965

Geohydrological Investigation

Bore No	Depth m	Reduced Levels (MSL) m				Gypsum thick. m	Remarks
		Collar	Gypsum bed Top	Gypsum bed Bottom	Oyster bed top		
2R	18.6	33.3	28.4	14.7	-	13.7+	Bottom in gypsum
3R	6.4	32.7	-	-	28.4	-	No Oysters, but lime-stone recorded at 28.4
4R	10.1	33.4	-	-	25.5	-	
5R	8.5	32.9	-	-	24.9	-	
14R	24.4	49.2	-	-	28.8	-	
15R	32.0	56.1	-	-	25.0	-	
24S	11.0	31.5	30.0	23.0	23.0	7.0	
25S	6.1	29.5	-	-	25.2	-	No oysters, but lime-stone recorded at 25.2

During a more recent investigation SADME drilled two bores, 680 and 681, at locations shown on Map 1 gypsum was encountered at shallow depths but significant details were not recorded.

3.2 Discussion of results

The area underlain by gypsum is an area generally free of sand dunes or other sand cover. A calcreted plain surface similar to Blanchetown Plain occupies a lower area between extensive sand areas to the north, east and south. The exposed gypsum occurences are similar to those at Blanchetown, as they crop out on the slopes of depressions about the 30 m contour position.

The area investigated in Sections 22 and 23, Hundred of Murbko and Sections 51 and 40, Hundred of Waikerie appears to contain the southern portion of a gypsum deposit which extends northwards under an extensive area of high sand hills. There are no records of gypsum to the south, west or east of the area investigated in July 1985 programme. To the north and north-east gypsum has been recorded in bores and at road material excavations near the rubbish dump on the Murbko-Ramco road.

Continuity between these occurrences and the investigation area has yet to be proved. In any case, due to the thick sand cover and extensive cultivation, gypsum in this area probably would not be of economic interest.

Further discussion of the drilling results must await the analytical results.

4. CONCLUSIONS

From visual examination of the drilling samples the area is considered worthy of more detailed investigation. Better definition of the deposit is required and another drilling programme is proposed.

In addition, the areal extent and thickness of the gypsum deposit at the Ramco rubbish dump are both un-investigated and unknown. Drilling is required in this area, which is limited in area by sandhills and cultivation. However, with suitable quality and sufficient thickness a viable deposit could be present at this site.

When the analyses have been completed the future programme can be planned.

REFERENCES

Adamson, CL 1984 — Ramco gypsum deposit EL 1176. Report for 3 months ending 23 June 1984. CSR - GPG Report

Roberts, GT — Murray River drainage investigation Progress Report No 3 Geological Survey No 3266 Department of Mines, South Australia

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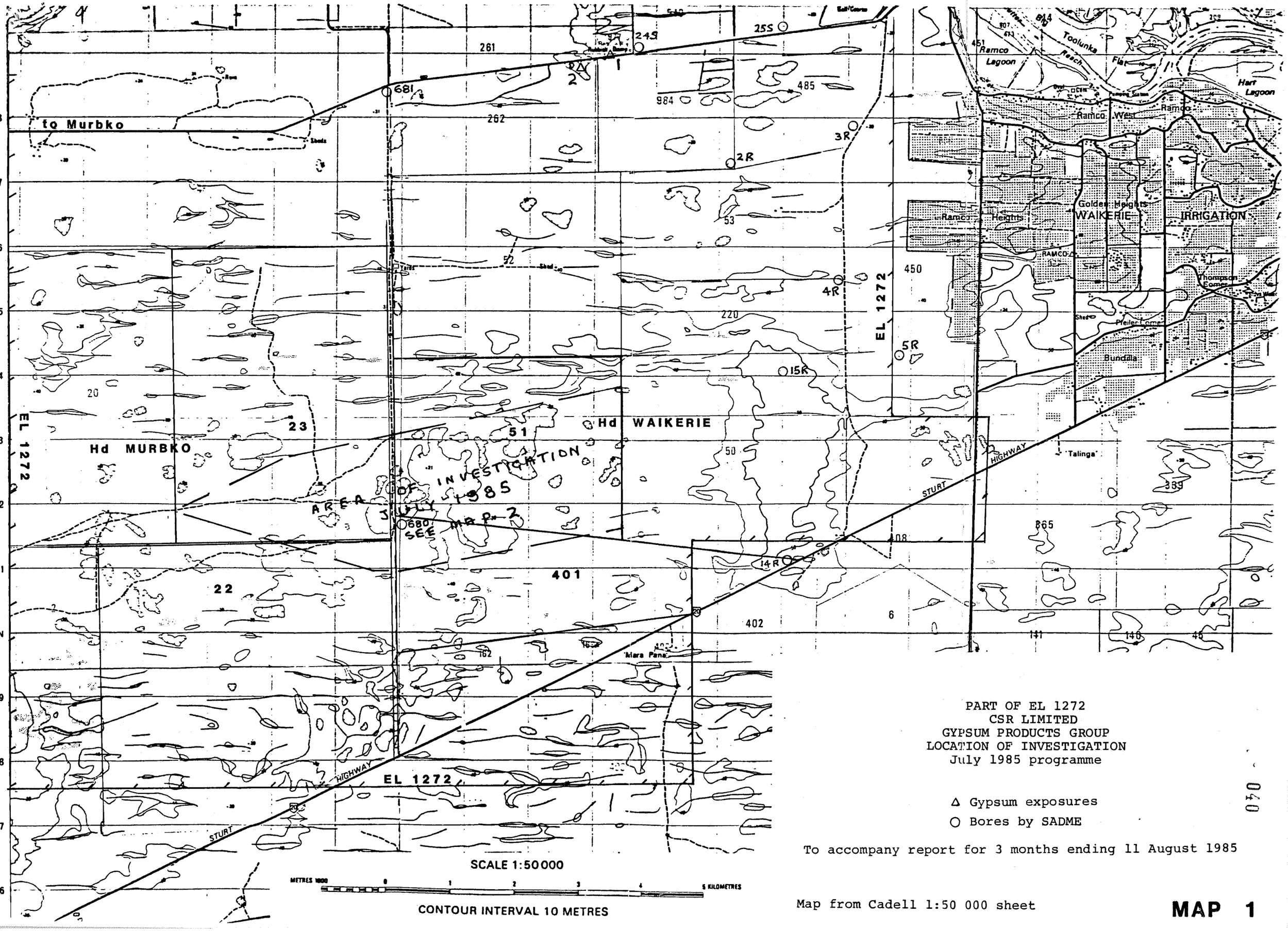


PART OF EL 1272
CSR LIMITED
GYPSUM PRODUCTS GROUP
LOCATION OF INVESTIGATION
July 1985 programme

△ Gypsum exposures
○ Bores by SADME

To accompany report for 3 months ending 11 August 1985

040

Map from Cadell 1:50 000 sheet

MAP 1

SAND

AND

CULTIVATION

23

22

401

51

'Mara Pana'

86 87 88 89 390 91 92 93

1:25 000

0 1 2 3

KILOMETRES

CONTOUR INTERVAL 10 METRES

Map enlarged from Cadell 1:50 000 sheet

16 ○ Bore locations, subject to minor amendment

11 △ Pit Locations

To accompany report for 3 months ending 11 August 1985

EL 1272
CSR LIMITED
GYPSUM PRODUCTS GROUP
BORE LOCATIONS
July 1985 programme

041

MAP 2

Exploration Licence 1126 - Ramco Exploration Costs

Period - 12 May to 11 August 1985

Geological consultant	
Field and office work	$ 3642
Drilling and associated costs	2868
Travel expenses	
Air fares, hire vehicle taxis, accommodation and meals.	708
Office overheads (HO)	1500
Field assistance - M. Florance	1500
Transport costs - M. Florance	200
Adelaide office expenses	1000
	$11418
To Date Expenditure	**$11687**

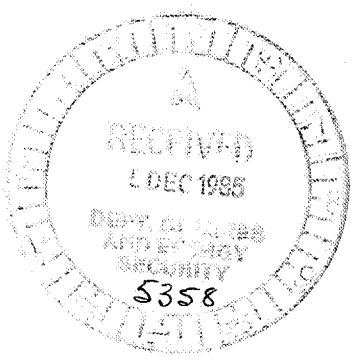
CORAAA

EL 1272 - RAMCO

Current Situation

The drilling programme using the SADME plant originally planned to commence in late October was delayed due to a prior drilling committment which was further delayed by rain.

It was then planned for drilling to commence on 2nd December, but the supply of suitable bits for the plant, as advised by Mr. D. Lock, Principal Engineer, Drilling and Engineering Service on 26th November 1985 has resulted in a further re-scheduling to the 3rd February 1986.



CORABX

EXPLORATION LICENCE EL1272 - COSTS

Period 3 Month Ending 11th November 1985

Geological Consultant	
Field and office work	$ 1,100
Drilling and associated costs	nil
Travel Expense	$ nil
Office overheads (Head office)	$ 500
Laboratory costs	$ 500
Adelaide Office expenses	$ 500
	$ 2,600

TO DATE EXPENDITURE **$14,287**

CORABX

CSR LIMITED

GYPSUM PRODUCTS GROUP

EL 1272 - RAMCO

REPORT FOR 3 MONTHS ENDING 11 NOVEMBER 1985

C L Adamson
Consulting Geologist

43 Holt Avenue
Cremorne NSW 2090

1 INTRODUCTION

The report records the analyses of samples obtained during the July 1985 drilling programme.

Other details of the programme were reported in the previous 3 monthly report for the period ending 11 August 1985.

2 ANALYTICAL RESULTS

These are presented in Table 1. No attempt has been made to critically assess these results as the next drilling programme is due to commence in the near future and then more data will be available.

CONCLUSIONS

The initial conclusions indicate that the gypsum quality at Ramco is similar to that at Blanchetown and that the over burden ratios may be more favourable than Blanchetown.. However, there are more depressions in the ground surface at Ramco and this may eliminate some areas of possible reserves.

TABLE 1

EL 1272 - RAMCO

SUMMARY OF SAMPLED BORES

BORE NO	O/B m	SAMPLE NO	SAMPLE INTERVAL FROM m	TO m	THICK--NESS	GYPSUM CONTENT %
1.	1.60	1/1	1.60	2.20	0.60	77
		1/2	2.20	3.10	0.90	76
		1/3	3.10	3.70	0.60	76
4	1.40	4/1	1.40	2.10	0.70	85
		4/2	2.10	2.85	0.75	67
		4/3	2.85	3.60	0.75	70
		4/4	3.60	4.10	0.50	76
5	2.40	5/1	2.40	3.00	0.60	83
		5/2	3.00	4.10	1.10	81
		5/3	4.10	4.50	0.40	74
		5/4	4.50	5.20	0.70	81
8	1.80	8/1	1.80	2.60	0.80	87
		8/2	2.60	3.40	0.80	83
		8/3	3.40	3.80	0.40	77
10	1.60	10/1	1.60	2.50	0.90	87
		10/2	2.50	3.10	0.60	78
		10/3	3.10	NC	) 1.30	77
		10/4	NC	4.40	)	78
12	2.00	12/1	2.00	2.70	0.70	84
		12/2	2.70	3.50	0.80	83
		12/3	3.50	4.30	0.80	84

TABLE 1

EL 1272 - RAMCO

SUMMARY OF SAMPLED BORES

BORE NO	O/B m	SAMPLE NO	SAMPLE INTERVAL FROM m	TO m	THICK--NESS	GYPSUM CONTENT %
13.	2.00	13/1	2.00	3.10	1.10	79
		13/2	3.10	4.00	0.90	89
		13/3	4.00	4.50	0.50	51
14	2.20	14/1	2.20	3.10	0.90	88
		14/2	3.10	4.20	1.10	80
		14/3	4.20	4.60	0.40	73
		14/4	4.60	5.40	0.80	88
15	1.70	15/1	1.70	2.60	0.90	54
		15/2	2.60	3.20	0.60	39
16	1.50	16/1	1.50	2.40	0.90	91
		16/2	2.40	3.00	0.60	89
		16/3	3.00	4.20	1.20	85
18	1.50	18/1	1.50	2.50	1.00	89
		18/2	2.50	3.20	0.70	89
		18/3	3.20	4.10	0.90	86
		18/4	4.10	5.20	1.10	53
19	1.90	19/1	1.90	3.00	1.10	89
		19/2	3.00	4.00	1.00	87
20	1.60	20/1	1.60	2.50	0.90	87
		20/2	2.50	3.80	1.30	65
		20/3	3.80	4.90	1.10	83
		20/4	4.90	5.50	0.60	78

TABLE 1

EL 1272 - RAMCO

SUMMARY OF SAMPLED BORES

BORE NO	O/B m	SAMPLE NO	SAMPLE INTERVAL FROM m	TO m	THICK--NESS	GYPSUM CONTENT %
21	1.50	21/1	1.50	2.40	0.90	81
		21/2	2.40	3.00	0.60	79
		21/3	3.00	3.40	0.40	78
		21/4	3.40	3.90	0.50	79
24	1.50	24/1	1.50	2.40	0.90	87
		24/2	2.40	3.50	1.10	65
		24/3	3.50	3.90	0.40	83
		24/4	3.90	4.70	0.80	78
25	1.60	25/1	1.60	3.20	1.60	83
		25/2	3.20	3.60	0.40	75
		25/3	3.60	4.50	0.90	79
		25/4	4.50	5.40	0.90	63

NC = Not recorded

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SADME COPY

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CSR LIMITED

GYPSUM PRODUCTS GROUP

EL 1272 - RAMCO

REPORT FOR 3 MONTHS ENDING 11 MAY 1986

C L Adamson
Consulting Geologist

43 Holt Avenue
Cremorne NSW 2090
30 May 1986

CONTENTS

1 SUMMARY

2 INTRODUCTION

3 PREVIOUS GEOLOGICAL REFERENCES

4 DRILLING AND SAMPLING

5 DRILLING RESULTS

6 CONCLUSIONS

7 REFERENCES

MAPS

1 Locality map EL1272 1:250 000

2 CSR Bore locations 1985-1986 1:50 000

3 CSR Bore locations 1985-1986 1:10 000

1 SUMMARY

This report presents the results of drilling and sampling on EL 1272 druing July 1985 and February 1986. Drilling was carried out at two localities. The northern area located along the Murbko Road in the vicinity of the Ramco Rubbish Dump showed an erratic distribution of gypsum quality with the area being ristricted by sand and cultivation.

Most drilling was done on the southern locality in the vicinity of the old Mineral Leases. The 1986 sampling programme showed that the quality of the gypsum bed varied more than expected from the 1985 drilling. The possible reserves are futher limited by the considerable areas of karst features where the gypsum bed has been either partially or completely removed by solution.

With the present data it would not be possible to estimate proven reserves. More drilling would be required to achieve this objective.

2. INTRODUCTION

This report for the 3 months period ending 11 May 1986 presents the results of all the results obtained by drilling on Exploration Licence 1272. Previous reports have presented partial data which have been incorporated in this presentation.

The first drilling programme was completed in July 1985 when Bores 1 to 25 were drilled. In February 1986 Bores 26-64 were drilled. For the 1985 programme Northbridge Drilling of Norwood (Adelaide) was the contractor, using a Warman Investigator Mark V rig. In 1986 the South Australia Department of Mines and Energy (Drilling and Engineering Services) was the contractor, using a similar plant to that used by Northbridge. Both contractors performed satisfactorily.

3. PREVIOUS GEOLOGICAL REFERENCES

No previous gypsum investigations have been made in the area of EL1272. Willington (1952) lists small gypsum production from Sec 51 Hundred of Waikerie from 1917 to 1950.

GT Roberts (1965) in a study of the influence of the Blanchetown Clay on sub-surface drainage encountered gypsum associated with Blanchetown clay in the area of the Exploration Licence. Most bores were located outside the Licence area. Most bores encountered gypsum with excessive overburden and the logs are descriptively vague.

However, one bore 24S located near Ramco rubbish dump recorded gypsum at 1.50 m and in addition, is located adjacent to a depression close to a main road. On inspection it was discovered that a road material quarry in the calcrete rubble overburden had exposed the top of a rock gypsum bed.

4. DRILLING AND SAMPLING

The first programme was drilled with reverse air circulation using a tri-cone rotary bit drilling a hole about 75mm diameter. This method produced a fully ground smaple which was collected in a bucket from a cyclone, during which a minor amount of fine dust was lost.

By visual inspection of the drill product it was possible to classify its qualitatively into the following grades.

(a) No gypsum
(b) Gypsum with contamination.
Not worth sampling
(c) Gypsum - Probable low or average grade.
(d) Gypsum - Probable high grade.

Only (c) and (d) of the above categories were sampled, but the analyses show that an occasional sample of category (b) was collected. When the sample consisted of very fine particles qualitative evaluation was difficult. However, in most cases a very fine grained sample indicated a high clay content.

During the February 1986 programme the first hole (C26) was drilled with a rotary coring bit which was not satisfactory. Soft zones in the gypsum bed were completely ground, while hard zones produced hard rock gypsum core of varying lengths. These sometimes jammed in the reverse circulation exhaust hose and caused blockages which when released arrived at the sampling cyclone out of sequence. Sample results from Bore C26 are indicative of quality, but cannot be accepted with the same confidence as results from the other bores.

All bores after 26 were drilled with a rotary non-coring bit similar to that used for the 1985 programme. Drilling in the gypsum bed was achieved without any problems. However, it was not possible to determine the proportion of clay, silt and sand that was contributed by infilled solutions cavities.

The most difficult drilling conditions were caused by massive calcrete and dense plastic clay. Both slowed the drilling rate considerably.

The calcrete when massive resulted in very slow penetration. Broken or rubbly calcrete was penetrated with reasonable speed. Plastic clay stopped penetration by completely clogging the bit and sealing the central exhaust air-way. Extraction and cleaning the bit was the only solution.

Each sample was collected in buckets and then stored in large plastic bags for sample splitting at a later date. This procedure was adopted to enable drilling to continue without interruption.

Bore sites were generally chosen to avoid being placed in depressions. Three sites (C26, C28 and C32) were located in road material quarries which had exposed the top of the gypsum bed.

Two sites (C15 and C17), located in depressions produced poor results compared with nearby bores. Depressions are karst features where gypsum has been removed by solution.

From preliminary surface reconnaissance two prime areas for investigation emerged.

There were:

(a) The area along the Murbko road to the west of the rubbish dump and,

(b) the area in the vicinity of the old mining leases in Sec 51 Hundred of Waikerie.

5. DRILLING RESULTS

Table 1 presents a summary of the bore results with sample analyses. The analytical results have been confined to combined water determination for gypsum purity to the closest whole percentage. No other determinations have been attempted as the impurities are most probably similar to those at Blanchetown. As mentioned earlier, Bore 26 did not produce satisfactory samples, with the result that only the sample from the top section was retained. The lower samples were discarded as not being reliable. Also the gypsum bed thickness may not be a economic workable thickness. In all other cases NS represents material not regarded as worth sampling.

TABLE 1

EL 1272

SUMMARY OF DRILLING
"C" SERIES OF BORES

BORES 1-25 WERE DRILLED IN JULY 1985

BORE NO	DEPTH m	GYPSUM m	SAMPLES			O/B BED GYPSUM m	
	INTERVAL m	THICK m	%				
1	4.60	1.60	2.40	1.60	2.20	0.60	77
				2.20	3.10	0.90	76
				3.10	3.70	0.60	76
				3.70	4.00	0.30	NS
2	5.10	-	NG	-	-	-	-
3	3.60	-	NG	-	-	-	-
4	4.80	1.40	3.00	1.40	2.10	0.70	85
				2.10	2.85	0.75	67
				2.85	3.60	0.75	70
				3.60	4.10	0.50	76
				4.10	4.40	0.30	NS
5	5.80	2.40	2.80	2.40	3.00	0.60	83
				3.00	4.10	1.10	81
				4.10	4.50	0.40	74
				4.50	5.20	0.70	81
6	3.50	-	NG	-	-	-	-
7	3.30	-	NG	-	-	-	-
8	4.00	1.80	2.00	1.80	2.60	0.80	87
				2.60	3.40	0.80	83
				3.40	3.80	0.40	77
9	3.00	1.90	0.60	1.90	2.50	0.60	NS

NG = No gypsum visible
NS = Not sampled
O/B = Overburden
NR = Not recorded

EL 1272

SUMMARY OF DRILLING

BORE NO	DEPTH m	O/B m	GYPSUM BED m	SAMPLES INTERVAL m		THICK m	GYPSUM %
10	6.40	1.60	2.80	1.60	2.50	0.90	87
				2.50	3.10	0.60	78
				3.10	NR	)1.30	77
				NR	4.40	)	78
11	5.50	1.70	2.10	1.70	3.80	2.10	NS Fine sandy clay with gypsum
12	5.30	2.00	2.50	2.00	2.70	0.70	84
				2.70	3.50	0.80	83
				3.50	4.30	0.80	84
				4.30	4.50	0.20	NS

EL 1272

SUMMARY OF DRILLING

BORE NO	DEPTH m	O/B m	GYPSUM BED m	SAMPLES INTERVAL m		THICK m	GYPSUM %
13	5.60	2.00	2.50	2.00	3.10	1.10	79
				3.10	4.00	0.90	89
				4.00	4.50	0.50	51
14	5.70	2.20	3.20	2.20	3.10	0.90	88
				3.10	4.20	1.10	80
				4.20	4.60	0.40	73
				4.60	5.40	0.80	88
15	3.40	1.70	1.50	1.70	2.60	0.90	54
				2.60	3.20	0.60	39
16	4.80	1.50	3.10	1.50	2.40	0.90	91
				2.40	3.00	0.60	89
				3.00	4.20	1.20	85
17	4.80	3.10	1.60	3.10	4.70	1.60	NS
18	6.50	1.50	4.40	1.50	2.50	1.00	89
				2.50	3.20	0.70	89
				3.20	4.10	0.90	86
				4.10	5.20	1.10	53
				5.20	5.90	0.70	NS
19	5.00	1.90	3.10	1.90	3.00	1.10	89
				3.00	4.00	1.00	87
				4.00	5.00	1.00	NS
20	8.70	1.60	4.30	1.60	2.50	0.90	88
				2.50	3.80	1.30	79
				3.80	4.90	1.10	74
				4.90	5.50	0.60	55
				5.50	5.90	0.40	NS
21	4.40	1.50	2.40	1.50	2.40	0.90	81
				2.40	3.00	0.60	79
				3.00	3.40	0.40	78
				3.40	3.90	0.50	79

EL 1272

SUMMARY OF DRILLING

BORE NO	DEPTH m	O/B m	GYPSUM BED m	SAMPLES INTERVAL m		THICK m	GYPSUM %	
22	5.80	2.10	0.60	2.10	2.70	0.60	NS	
23	5.70	3.00	1.00	3.00	4.10	1.10	NS	
24	6.10	1.50	3.70	1.50	2.40	0.90	87	
				2.40	3.50	1.10	65	
				3.50	3.90	0.40	83	
				3.90	4.70	0.80	78	
				4.70	5.20	0.50	NS	
25	7.80	1.60	4.90	1.60	3.20	1.60	83	
				3.20	3.60	0.40	75	
				3.60	4.50	0.90	79	
				4.50	5.40	0.90	63	
				5.40	6.50	1.10	NS	
BORES 26-64 WERE DRILLED IN FEBRUARY 1986								
26	6.60	0.00	6.30	0.00	2.00	2.00	88	Note 1
				2.00	3.50	1.50	NS	
				3.50	6.30	2.80	NS	
27	5.00	2.40	2.35	2.40	3.50	1.10	83	
				3.50	4.00	0.50	84	
				4.00	4.75	0.75	66	
28	3.75	0.20	2.80	0.20	1.40	1.20	88	Note 2
				1.40	2.00	0.60	83	
				2.00	2.40	0.40	85	
				2.40	3.00	0.60	NS	

Note 1 Drill collar on top of gypsum bed in quarry beside Ramco Rubbish Depot. Drilled with coring bit-not satisfactory - see text.

Note 2 Drill collar in old road gravel quarry.

EL 1272

SUMMARY OF DRILLING

BORE NO	DEPTH m	O/B m	GYPSUM BED m	SAMPLES INTERVAL m		THICK m	GYPSUM %
29	3.50	-	NG	-	-	-	-
30	3.90	2.10	1.70	2.10	2.80	0.70	NS
				2.80	3.50	0.70	Clay
				3.50	3.80	0.30	NS
31	3.50	-	NG	-	-	-	-
32	5.70	0.55	3.85	0.55	1.90	1.35	81
				1.90	3.00	1.10	82
				3.00	4.00	1.00	87
				4.00	4.40	0.40	NS
33	5.50	2.30	2.70	2.30	3.20	0.90	83
				3.20	4.00	0.80	82
				4.00	5.00	1.00	25
34	3.60	-	NG	-	-	-	-
35	4.60	3.20	1.00	3.20	4.20	1.00	NS
36	4.50	1.50	2.80	1.50	2.80	1.30	82
				2.80	3.70	0.90	70
				3.70	4.30	0.60	65
37	4.00	1.60	2.00	1.60	2.80	1.20	85
				2.80	3.40	0.60	81
				3.40	3.60	0.20	NS

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EL 1272

SUMMARY OF DRILLING

BORE NO	DEPTH m	O/B m	GYPSUM BED m	SAMPLES INTERVAL m		THICK m	GYPSUM %	
38	5.00	1.50	2.30	1.50	2.20	0.70	86	
				2.20	2.80	0.60	89	
				2.80	3.80	1.00	86	
39	5.60	2.00	3.60	2.00	2.80	0.80	81	
				2.80	3.50	0.70	87	
				3.50	4.50	1.00	81	
				4.50	5.00	0.50	NS	
				5.00	5.60	0.60	NS	
40	4.50	1.50	2.90	1.50	2.50	1.00	84	
				2.50	3.40	0.90	86	
				3.40	4.40	1.00	73	Note 3
41	5.60	1.60	2.80	1.60	2.30	0.70	83	
				2.30	2.80	0.50	87	
				2.80	4.00	1.20	84	
				4.00	4.40	0.40	85	
42	4.80	2.20	2.60	2.20	3.00	0.80	77	
				3.00	3.80	0.80	84	
				3.80	4.00	0.20	NS	
				4.00	4.80	0.80	NS	

Note 3 This sample included a patch of brown sand and clay in the central portion of the sample interval. Maybe cavity infill.

EL 1272

SUMMARY OF DRILLING

BORE NO	DEPTH m	O/B m	GYPSUM BED m	SAMPLES INTERVAL m		THICK m	GYPSUM %
43	4.00	2.20	1.60	2.20	3.80	1.60	NS
44	3.00	2.00	0.50	2.00	2.50	0.50	NS
45	4.10	2.30	1.80	2.30	2.80	0.50	NS
				2.80	4.10	1.30	NS
46	5.80	2.30	2.20	2.30	3.50	1.20	61
				3.50	4.50	1.00	22
47	4.50	1.80	2.20	1.80	2.60	0.80	86
				2.60	3.40	0.80	81
				3.40	4.00	0.60	83
48	5.70	2.80	2.90	2.80	3.30	0.50	NS
				3.30	5.70	2.40	NS
49	5.80	1.80	3.80	1.80	2.80	1.00	85
				2.80	3.70	0.90	76
				3.70	4.70	1.00	78
				4.70	5.60	0.90	NS
50	4.70	2.00	2.70	2.00	4.70	2.70	NS
51	4.20	2.00	2.20	2.00	2.60	0.60	90
				2.60	3.40	0.80	86
				3.40	3.80	0.40	87
				3.80	4.20	0.40	NS

EL 1272

SUMMARY OF DRILLING

BORE NO	DEPTH m	O/B m	GYPSUM BED m	SAMPLES INTERVAL m		THICK m	GYPSUM %
52	3.60	2.00	1.60	2.00	2.60	0.60	86
				2.60	3.20	0.60	86
				3.20	3.60	0.40	NS
53	5.00	2.80	1.20	2.80	3.60	0.80	NS
				3.60	4.00	0.40	NS
54	5.00	2.10	2.90	2.10	2.80	0.70	86
				2.80	3.50	0.70	87
				3.50	4.40	0.90	85
				4.40	5.00	0.60	NS
55	4.40	2.00	2.40	2.00	2.80	0.80	NS
				2.80	4.40	1.60	NS
56	4.40	2.00	2.40	2.00	2.80	0.80	84
				2.80	3.80	1.00	83
				3.80	4.40	0.60	NS
57	4.40	1.40	2.00	1.40	2.60	1.20	83
				2.60	3.40	0.80	86
58	5.30	3.50	1.80	3.50	5.30	1.80	NS

EL 1272

SUMMARY OF DRILLING

BORE NO	DEPTH m	O/B m	GYPSUM BED m	SAMPLES INTERVAL m		THICK m	GYPSUM %
59	4.70	1.80	2.70	1.80	2.80	1.00	90
				2.80	4.00	1.20	88
				4.00	4.50	0.50	NS
60	5.70	2.70	2.90	2.70	4.00	1.30	NS
				4.00	5.60	1.60	NS
61	4.80	2.00	2.80	2.00	2.70	0.70	87
				2.70	4.30	1.60	77
				4.30	4.80	0.50	NS
62	4.00	-	NG	-	-	-	-
63	4.50	1.80	1.50	1.80	2.60	0.80	72
				2.60	3.30	0.70	NS
64	5.80	1.90	3.80	1.90	2.80	0.90	82
				2.80	3.50	0.70	80
				3.50	5.70	2.20	NS

6. CONCLUSIONS

The results of the drilling February 1986 programme showed that the gypsum bed has a greater quality variation than indicated by the July 1985 drilling. The ground available for possible mining is generally limited by the presence of sand and sand dunes which overlie the calcreted surface above the Blanchetown clay where the gypsum bed occurs sporadically. These sandy areas generally increase the overburden to unacceptable amounts so that these areas were avoided during the drilling programme. Much of the sandy country has been cleared for grain cultivation.

In addition, the areas of topographic depressions representing karst features means that a very large percentage of the area with promising gypsum quality must be ignored as containing possible reserves.

Before any areas could be adequately defined for Mineral Leases more drilling should be carried out. The data accumulated at this stage could not be used to calculate proven reserves.

7. REFERENCES

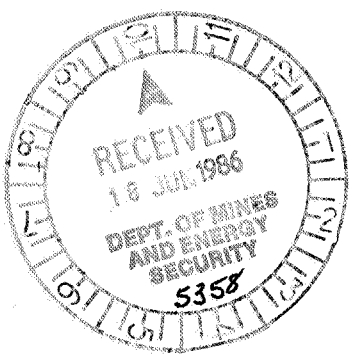
Adamson, C L	1984	Ramco gypsum deposit EL1176 Report for 3 months ending 23 June 1984 CSR-GPG report
Adamson, C L	1985	EL1272 - Ramco Report for 3 months ending 11 August 1985 CSR-GPG report. Note EL1176 was re-numbered EL1272
Barnes, L C and Warren, J K	1983	Blanchetown gypsum deposits, Geological investigations, 1979 Dept of Mines and Energy Min. Res. Review for 1980 No 152, p79
Roberts, G T	1965	River Murray drainage investigation. Progress Report No 3. Unpub. report S. Australia Dept of Mines DM 980/65
Willington, C	1952	Gypsum resources of South Australia. S. Aust. Min. Revue. No 92 p171, 191

CSR LIMITED

EL1272 - RAMCO

Period 3 Month Ending 11th May, 1986

Geological Consultant - Colin Adamson	
- Office work	$1050.00
Drilling & Associated costs	$3700.00
Field Assistance - Karen Lablach	$1500.00
Travel Expense - Consultant air fares, hire vehicle, taxis, accommodation	$1050.00
Office Overheads - Sydney	$1400.00
Office Overheads - Adelaide	$ 500.00
	$9200.00
To date expenditure	$23500.00



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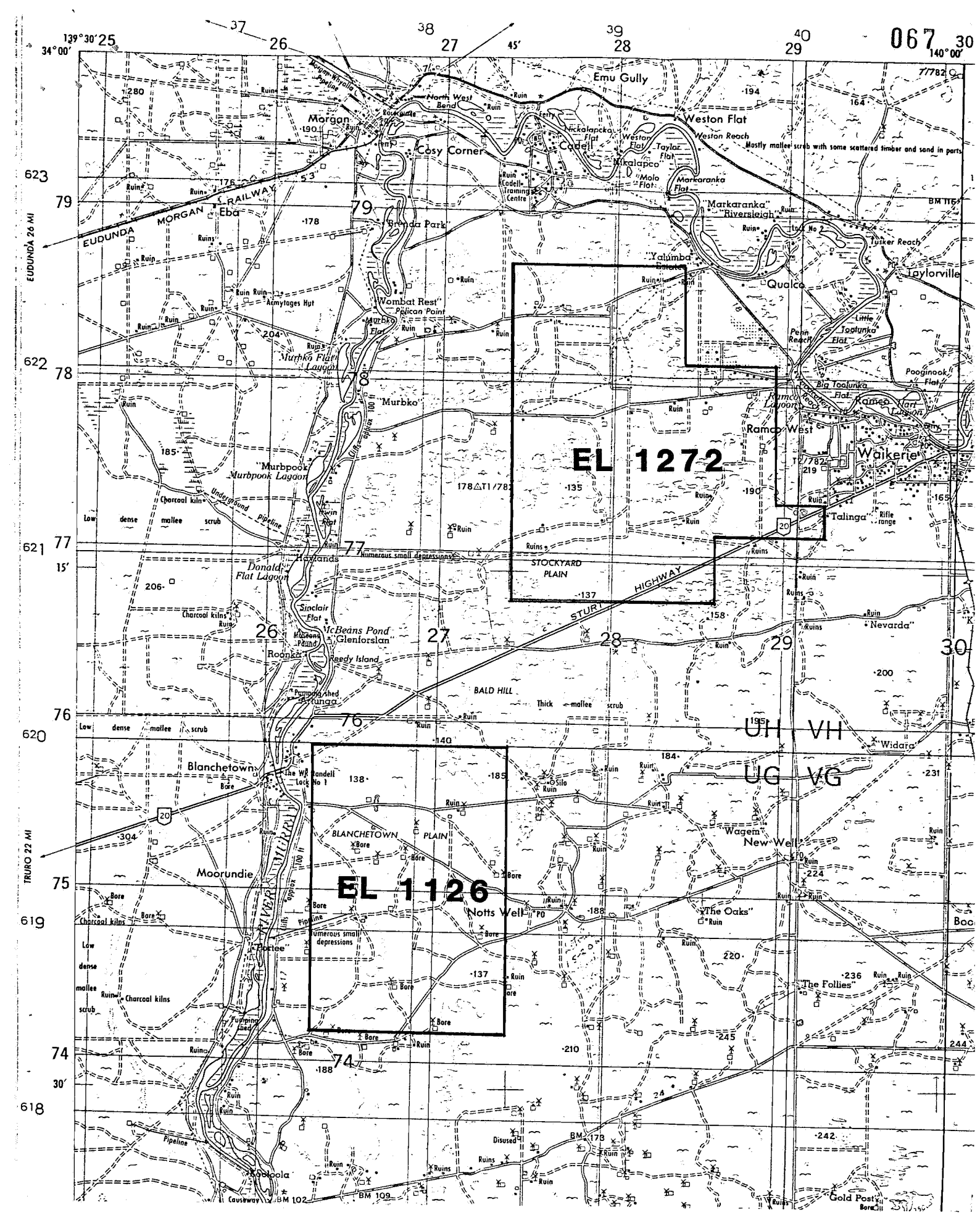


EL 1272

LOCALITY MAP

Report C.L. Adamson 30 May 1986

MAP 1

068

SUNLANDS IRRIGATION AREA

EL 1272

FOR DETAILS SEE MAP 3

C35 C26 C28 C27 C31 C29 C32 C34 C33 C30 C23 C22 C2 C3 C6 C7

Ruin · Sheds · Yards · Shed · Refuse Rds · Rubbish Dump · Mara Pana

STURT HIGHWAY

SCALE 1:50000

METRES 1000 0 1 2 3 4 5 KILOMETRES

CONTOUR INTERVAL 10 METRES

Report C.L. Adamson 30 May 1986

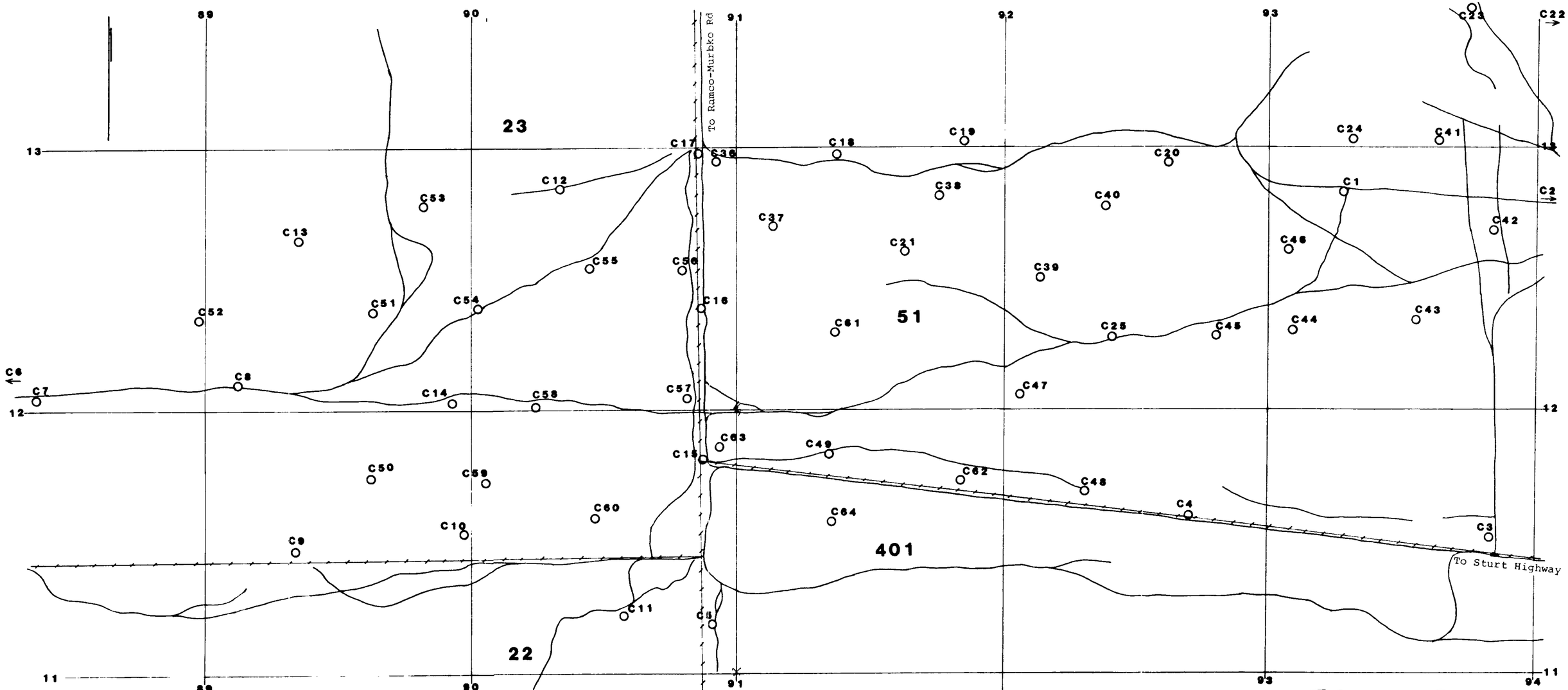
Map from Cadell and Notts Well
1:50 000 Map Sheets

PART OF EL 1272 - RAMCO

CSR BORE LOCATIONS

1985 - 1986

MAP 2



Map from enlarged aerial photo
SVY 2887-153

Grid from Cadell and Notts Well
1:50 000 Map Sheets

Report C.L. Adamson 30 May 1986

0 metres 1000
1:10 000

PART OF EL 1272 - RAMCO
CSR BORE LOCATIONS
1985 - 1986

5358-2

MAP 3

CSR Building Materials

ILD:sbt

CSR LIMITED
GYPSUM PRODUCTS GROUP
SOUTH AUSTRALIA STATE OFFICE
37 PLYMOUTH ROAD
WINGFIELD SOUTH AUSTRALIA
BOX 58 PO
ROSEWATER EAST SOUTH AUSTRALIA 5013
TELEPHONE (08) 268 7855
TELEX AA82112
FAX GROUP 3 (08) 347 0387

22 December, 1986.

The Director General,
Dept of Mines & Energy,
P.O. Box 151,
EASTWOOD S.A. 5063.

Dear Sir,

Re: EL 1272 RAMCO - REPORT FOR 3ME 11th AUGUST 1986

No further work was carried out in this area during the above period. The final report for 3ME 11th November 1986 will appear shortly.

Yours faithfully,

R.E.S. LAYTON
State Manager.

CSR 070

CSR Building Materials
ILD:sbt

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23 April, 1987.

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

Dear Sir,

Re: EL 1272 Ramco
Reports for 3ME 10th Nov. 1986 and for 3ME 10th Feb 1987

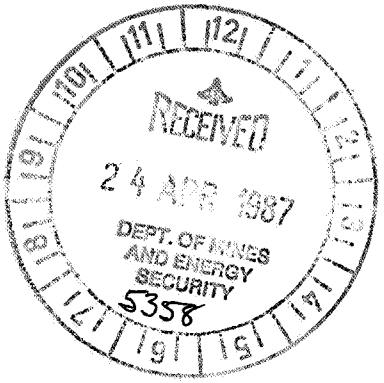
The exploration programme for this area will depend entirely on the outcome of our drilling programme in EL 1126 at Blanchetown. If this extensive drilling programme, at Blanchetown confirms that their (?) are reserves of high quality gypsum then we will have no need to pursue EL 1272 further. However if the reverse is the case then we will proceed with an extensive drilling program in the Ramco area.

At this stage therefore no additional field work has been carried out in the area.

Details of the costs accrued in the above periods (only adminstration) are attached.

Yours faithfully,

Ian Downie
OPERATIONS MANAGER



Enc.

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Gyprock Plasterboard

INCORPORATED IN NSW

EXPLORATION LICENCE 1272 - RAMCO

Costs for periods 3ME 10th November 1986 and 3ME 10th February 1987.

Office overheads	-	$1,200
To date expenditure	-	$24,700

LT6AGZ

L 072

CSR Building Materials

ILD:wjg

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12 August, 1987.

Director General,
Department of Mines & Energy,
P.O. Box 151,
EASTWOOD, S.A. 5063.

Dear Sir,

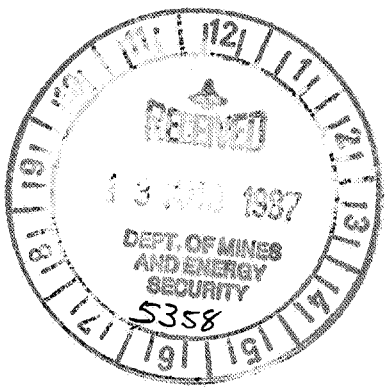
Re : EL 1272 - Quality Report 10th May, 1987

No work has been carried out in the area. We expect to complete the analysis of the reserves in MC 2097 by end of November 1987. The outcome of this analysis will determine whether we carry out further work on EL 1272 or not.

The August qaurterly report for this licence will indicate the expenditure situation.

Yours faithfully,

Ian Downie
OPERATIONS MANAGER



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ILD:wjg

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ROSEWATER EAST SOUTH AUSTRALIA 5013
TELEPHONE (08) 348 1400
FAX GROUP 3 (08) 348 1423

19 November, 1987.

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

Dear Sir,

Re : Exploration Licence 1272 - Quarterly Report 10/08/87

We are currently drilling and testing reserves in MC 2097. As advised in our last report, the outcome of this work will determine what future work will be carried out on EL 1272.

Yours faithfully,

Ian Downie
STATE MANAGER

LT9 ADC

CSR Gyprock The Plasterboard

CSR 074

CSR Building Materials

ILD:wjg

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FAX GROUP 3 (08) 348 1423

04 March, 1988.

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

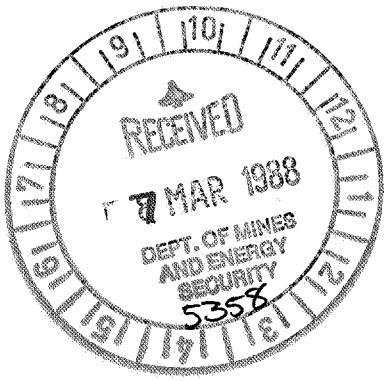
Dear Sir,

Re : Exploration Licence EL1272 - Quarterly Report 10/11/87

The drilling and sampling programme carried out in MC2097 has indicated that the reserves are of satisfactory quality. We have therefore applied for a lease over MC2097. Consequently we do not need to carry out any further work on EL1272 and will now let the licence lapse.

Yours faithfully,

Ian Downie
STATE MANAGER



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