DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
NON METALLIC RESOURCES DIVISION

STENHOUSE BAY GYPSUM DEPOSITS
CORE SAMPLING OF SNOW LAKE AND SPIDER LAKE
Hd. Warrenben, Yorke Peninsula

by

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ABSTRACT

Gypsum reserves in Snow Lake and Spider Lake within Innes National Park on southern Yorke Peninsula have been delineated by core sampling and auger drilling.

Snow Lake contains indicated geological reserves of 2.8 million tonnes of gypsum to an average depth of 0.92 m. Average grade of 76.3% $CaSO_4.2H_2O$ is well below that of gypsum from Marion Lake.

Spider Lake contains indicated geological reserves of 2.4 million tonnes of gypsum to an average depth of 1.18 m. Average grade of 91.6% $CaSO_4.2H_2O$ is comparable to material obtained from Marion Lake.

Seed gypsum crystals were precipitated in Holocene times in a series of evaporite basins formed by topographic lows in the Pleistocene Bridgewater Formation limestones.

The lack of a hard floor as exists in Marion Lake will pose problems during mining of Snow Lake and Spider Lake.

INTRODUCTION

The Stenhouse Bay gypsum deposits on southern Yorke Peninsula (see Fig. 1) are the best located in South Australia to supply industries based in Adelaide.

From 1905 to 1973, 6 million tonnes of gypsum were mined from Marion Lake with minor output from nearby Inneston and Spider Lakes.

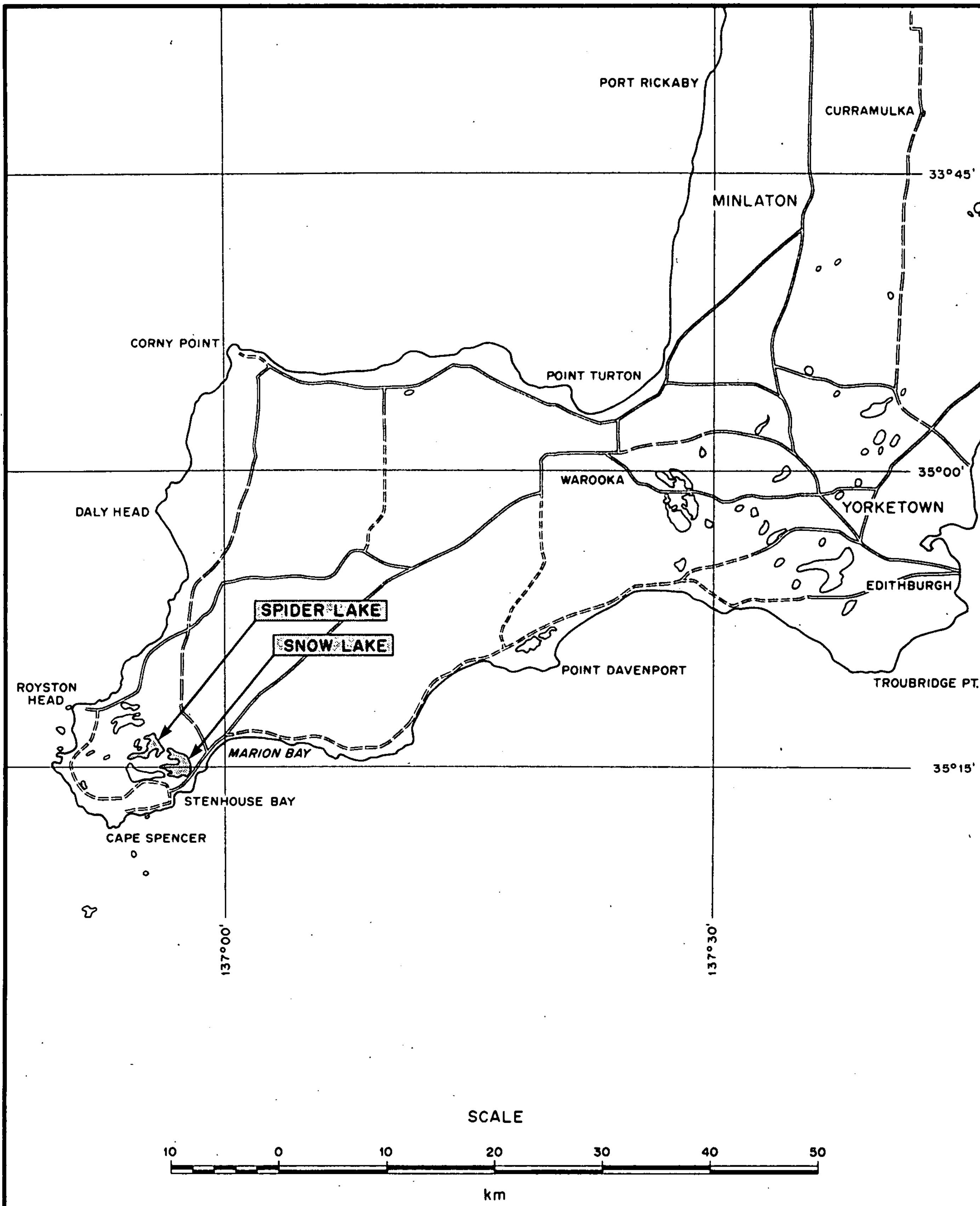

FIG. 1

	DEPARTMENT OF MINES – SOUTH AUSTRALIA	SCALE. 1:500000
COMPILED: J.WARREN	STENHOUSE BAY GYPSUM DEPOSITS SPIDER LAKE AND SNOW LAKE **LOCALITY PLAN**	DATE: AUGUST '76
DRN: R.G. / CKD.		PLAN NUMBER: **S 12299**

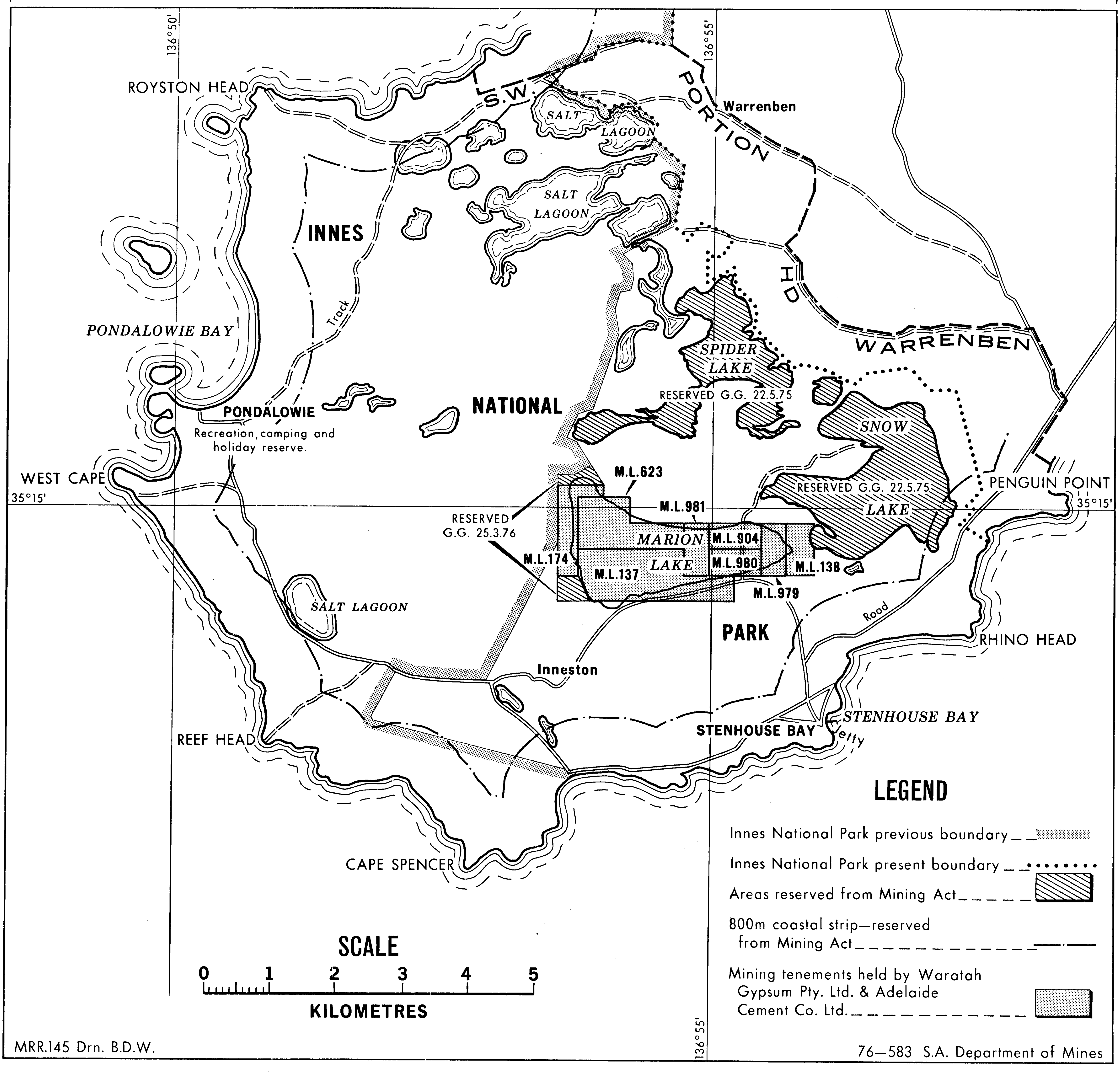

Fig.2 Land and Mineral Tenure, Stenhouse Bay.

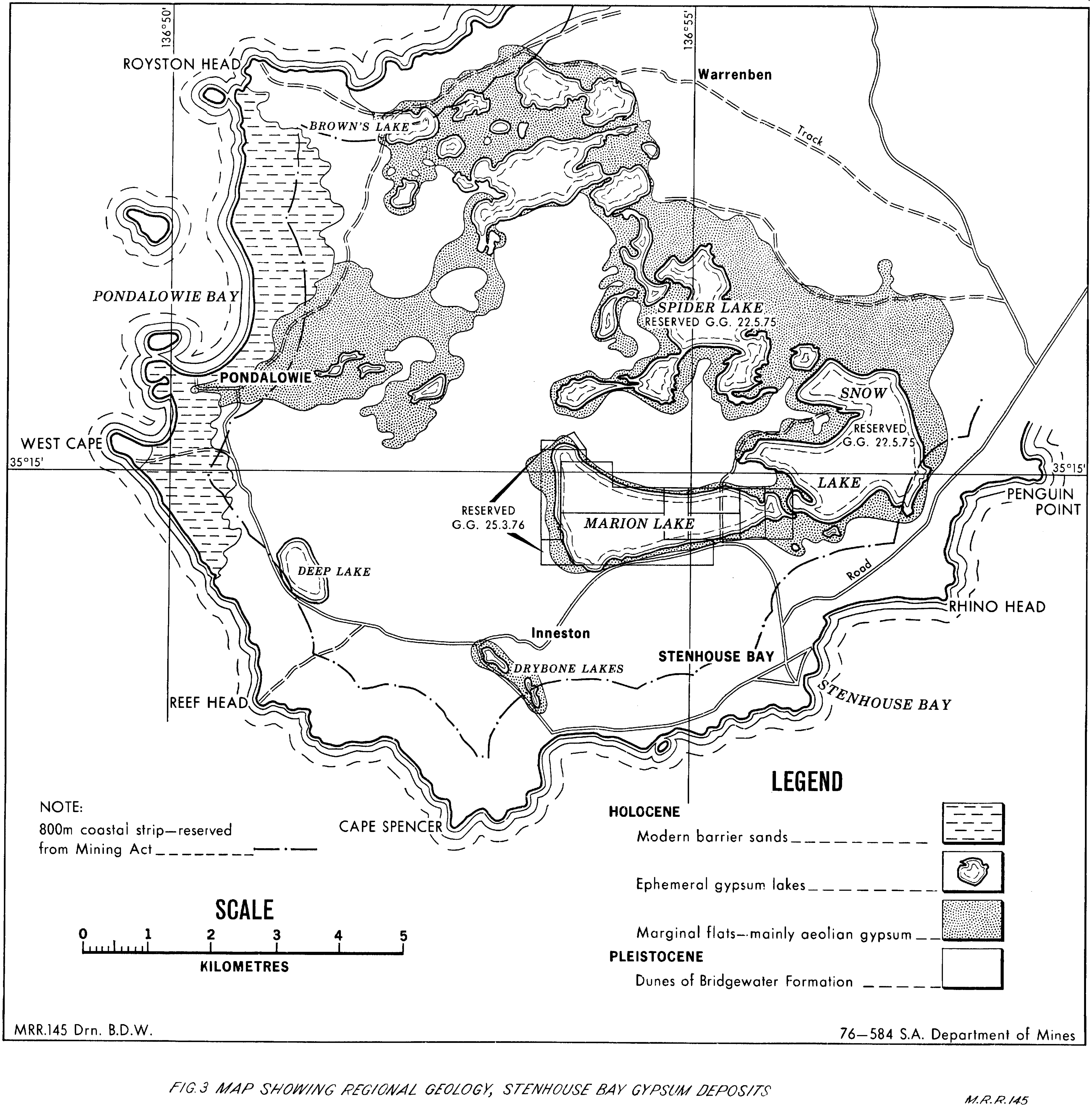

FIG.3 MAP SHOWING REGIONAL GEOLOGY, STENHOUSE BAY GYPSUM DEPOSITS

M.R.R.145

The gypsum remaining in Marion Lake was considered uneconomic and acquisition of all land and improvements owned by Waratah Gypsum Pty. Ltd. was proposed for incorporation into the Innes National Park.

The area was inspected on 15th-16th May, 1974 by M.N. Hiern (then Supervising Geologist, Environment and Resource Division). Reserves in Marion Lake were estimated to exceed 1 million tonnes of backfilled gypsum sand and unworked gypsum sand and rock. The following action was recommended:-

.....retention of the mining tenements over Marion Lake.

.....surrender of leases over Snow Lake and Spider Lake.

.....reservation of Snow Lake and Spider Lake from provisions of the Mining Act, 1971-75.

.....evaluation of gypsum in Snow Lake and Spider Lake by the Department of Mines.

In 1951, 24 holes were drilled in Snow Lake using an auger and sludge pump, but no reserves were calculated (Willington, 1950 and 1952).

This report describes the results of 87 holes drilled by J.K. Warren (Student Geologist) and R.J. Harris (Technical Assistant) during January-February, 1976.

The accompanying plans and sections (Figs. 5-8) are based on a tape and compass survey.

A soft sediment coring device and a hand-held auger were used. Equipment and methods are described in Appendix I and illustrated on Plates 1-7.

Geological logs comprise Appendix II with the results of partial chemical analysis of 76 samples by The Australian Mineral Development Laboratories (AMDEL). The results of full chemical analysis of 14 of those samples are listed in Appendix III.

LOCATION AND TOPOGRAPHY

Snow Lake and Spider Lake are enclosed hyper-saline basins in Hd. Warrenben, Co. Fergusson near the south-western tip of Yorke Peninsula (see Fig. 1). The lakes are respectively, 3 km north north east of and 6 km north north-west of Stenhouse Bay, the township built for employees of Waratah Gypsum Pty. Ltd.

Access is northwards from Stenhouse Bay through the Marion Lake workings. The main track is negotiable by all vehicles except after heavy rain. In summer, the surface of Spider Lake will support a 2 wheel-drive vehicle but Snow Lake will carry only a light 4 wheel-drive vehicle.

The lakes are situated within interdunal depressions of the gently rolling, well vegetated, calcreted aeolian sand dunes of the Bridgewater Formation (Boutakoff, 1963). The surface of the lakes is flat and usually covered with gypsiferous sediment (see Plate 2).

In places, indurated cross-bedded inliers of the material which forms the lake floor, crops out up to 3 metres above the present lake surface.

MINERAL TENURE

Snow Lake, Spider Lake and a small unnamed lake nearby were reserved from Provisions of Parts IV, V, VI, VII and VIII of the Mining Act, 1971-75 on 22.5.75 following surrender of the mining tenements.

Marion Lake is held jointly by Waratah Gypsum Pty. Ltd. and Adelaide Cement Co. Ltd. under Agreement No. 3161, dated 24.2.76 and registered in the Department of Mines on 29.3.76. The tenements covered by the agreement are

Miscellaneous Leases 137, 138, 174 and 623 and Mineral Leases 904, 979, 980 and 981. The north western and north eastern portions of Marion Lake were reserved from the Mining Act, 1971-75 on 25.3.76 to protect a unique assemblage of stromatolites.

The extension of Innes National Park to include freehold land previously owned by Waratah Gypsum Pty. Ltd. and some unallotted Crown land was proclaimed on 8.7.76. Both the previous and current boundaries are shown on Fig. 2.

GEOLOGICAL SETTING

Snow Lake, Spider Lake and associated lakes in the area occupy a northwest-southeast trending topographic low (Fig. 1). The depression may be in part the result of faulting (Crawford, 1965) but the surrounding topography is controlled by the calcreted dune surface of the Bridgewater Formation. Crystalline basement comprises an igneous and metamorphic complex of Carpentarian Age which outcrops sporadically at the base of the spectacular aeolianite coastal cliffs.

The low lying lacustrine area has been inundated by the sea at least twice during the late Pleistocene and Holocene transgressions. At those times, a shallow marine strait several metres deep formed with marine connections near Pondalowie Bay, Browns Lake and possibly Marion Bay (Fig. 3).

Following Holocene transgression, coastal barrier accretion near Pondalowie Bay and Browns Lake and a possible growth of a seagrass bank has produced progressive evolution through marine lagoons to the present chain of shallow ephemeral gypsum carbonate lakes up to 0.5 m deep. The floors of these lakes have been built up by sedimentation to the average level of the present groundwater table.

LAKE STRATIGRAPHY

In plan, the lakes show concentric zoning of classical evaporite basins (see Fig. 3). Carbonate facies crop out around the lake margins or form sills separating the major depositional basins. Gypsiferous sediments infill the deep central basins.

The stratigraphic units encountered in the sampling programme are detailed hereunder from oldest to youngest.

Bridgewater Formation

The floors of the lakes comprise irregularly outcropping, undulose, calcreted Bridgewater Formation, an indurated limestone of Pleistocene age.

Skeletal Grainstone Facies (SGF)

A basal marine transgressive sand composed of sand sized, rounded and broken skeletal fragments disconformably overlies the Bridgewater Formation. Thickness ranges up to 2 m. Where organic matter is present, the unit becomes a black sandy ooze.

Posidonia Bank Facies (PBF)

This marine carbonate bank unit intertongues with and, in places, is laterally equivalent to the Skeletal Grainstone Facies (see Section 1800W, Fig. 7). Thickness varies up to 1 m. The unit is richly fossiliferous and contains undecomposed leaf sheath fibres of the seagrass. *Posidonia australis*. This assemblage is similar to seagrass bank deposits at Shark Bay, West Australia (Davies, 1970).

Radio carbon dating of the fibres indicate an age ranging from 5090 ± 140 to 5860 ± 180 years (von der Borch, Bolton and Warren, in press). This range correlates broadly with the time when post glacial transgression reached its present level along the coastal region of Australia (Thom and Chappell, 1975).

<u>Laminated Gypsum</u> (LG)

All these units are blanketed by a surficial, rhythmically layered gypsiferous unit up to 2 m thick, generally composed of seed gypsum crystals, interlaminated with grey gypsiferous layers contaminated with calcium carbonate. The equivalent unit in Marion Lake has been mined extensively.

Rare gypsum Karst features, such as solution pipes up to 0.30 m wide in the southwestern part of Spider Lake, imply mobilisation of gypsum by an inflow of fresh water from the surrounding Bridgewater Formation.

<u>Aeolian Gypsum</u> (NG)

An annulus of unconsolidated poorly laminated gypsiferous sediment, overlies the laminated gypsum forming an almost continuous belt around the perimeter of the lakes. These dunes, up to 1 m high and from a few to tens of metres wide, have a surficial hummocky morphology and are best developed north of Spider Lake. Seed gypsum has been derived from the poorly laminated upper zone in the lake bed during seasonal drying.

The dunes are fixed on the marginal flat by a vigorous plant growth. Similar lunettes are present on gypsiferous salinas throughout Yorke Peninsula (Crawford, 1965).

MINERALOGY OF THE GYPSUM

Much of the gypsiferous unit is fine-grained, white to grey flour gypsum, locally called "caso". Crystals of fine-sand sized, seed gypsum of tabular habit (averaging 0.75 mm in diam.) are dominant. Seed gypsum grades into small secondary crystals of selenite (up to 5 cm in diameter) which form hard, indurated layers up to 0.10 m thick often at depths of 0.30-0.60 m. This level probably marks the lowest level of the ambient water table.

Below this level, the gypsum is well laminated with laminations about 1 mm thick. Clean layers alternate with dark layers rich in carbonate and organic matter. The latter probably result from a seasonal influx of fresher water. Snow Lake is considered as an outlet for fresher subsurface waters from the northeast (Bleys, 1960). Water also flows into the lakes from the surrounding dunes in the wet winter months.

The undulating cryptalgal laminations may have been produced by subaqueous algal mats as at Deep Lake, 7 km to the west (Warren, 1975).

In the zone of oxidation above the water table, gypsum is poorly laminated due to destruction of organic matter by reduction in water present in the sediment. Core samples of the lunette dunes surrounding the lakes are similar in appearance although higher in gypsum content than laminated gypsum within the lakes.

The major impurity in gypsum is calcium carbonate as either aragonitic micrite mud in the dark layers or sand sized, calcite grains derived from the underlying skeletal grainstone facies. Aragonitic mud is the main impurity in Spider Lake in contrast to calcite grains, known locally as "black spot" in Snow Lake.

RESULTS OF SAMPLING

The results of the 87 holes are summarised in Table 1 from Appendix II and shown on geological sections (Figs. 6 and 7). Sample sites are located on Fig. 4 and Fig. 5 which detail respectively thickness of gypsum and depth to bedrock.

TABLE 1

Thickness of Gypsum

	SNOW LAKE	LUNETTE DUNE	SPIDER LAKE
Sample Sites			
No gypsum	9	-	3
Intersected gypsum	17	4	54
Total holes	26	4	57
Maximum Thickness of Gypsum in metres			
Dune	-	0.96	-
Poorly laminated (NG)	0.80	0.40	1.00
Laminated (LG)	1.60	0.51	1.85
Total	1.90	1.47	2.15
Calculated Average	0.92	-	1.18

In Snow Lake, thickness of gypsum is symmetrical with the present lake border and correlates with depth to bedrock. Maximum thickness of gypsum of 1.9 m coincides with the deepest bedrock area of approximately 4.0 m centred on 1200E 1500S (see section 1200E, Fig. 6). The lake represents an arcuate marine channel which flowed around an outcrop of indurated limestone (see section 400E, Fig. 6).

Spider Lake is more complicated with 4 zones with gypsum thicker than 1.0 m connected by relatively narrow zones of thin gypsum. Three of the thick zones overlie bedrock lows (Fig. 5). The exception is the bedrock low centred about 1800W 800S which is filled with skeletal grainstone facies. Gypsum has formed immediately to the south on relatively shallow bedrock (see section 1800W, Fig. 7). Maximum thickness of gypsum of 2.15 m at 1000W 400N formed in deep water adjacent to a cliff face.

QUALITY OF GYPSUM

The range and weighted average gypsum content in Table 2 for Snow Lake and Spider Lake have been calculated from partial chemical analysis of acid soluble sulphate tabulated in Appendix II. For Snow Lake, the two analyses less than 20% have been excluded.

TABLE 2

Acid Soluble Sulphate (%)

	No. of Samples	Range	Average
Snow Lake	20	22.8-87.3	73.3
Spider Lake	48	71.2-93.5	90.4

The major impurity is calcium carbonate (maximum of 17.65% $CaCO_3$) with lesser salt (maximum of 6.45% NaCl) and magnesia (maximum 1.94% MgO). Acid insolubles, alumina and iron oxide are negligible (see Appendix III).

The acid soluble sulphate content from Appendix II of the samples resubmitted for full chemical analysis is compared to the gypsum content from Appendix III in Table 3.

TABLE 3

Comparison of Chemical Analyses (%)

Sample No.	Appendix II Acid Soluble Sulphate	Appendix III $CaSO_4$	Appendix III Combined H_2O	Appendix III Total
SNOW LAKE				
A622/76	79.5	62.9	19.8	82.7
A614/76	80.2	63.4	19.2	82.6
A634/76	69.1	54.5	19.2	73.7
A613/76	83.8	66.2	19.0	85.2
A628/76	22.8	18.0	7.45	25.45
LUNETTE DUNE				
A635/76	84.2	66.7	19.1	85.8
SPIDER LAKE				
A511/76	89.9	71.1	19.8	90.9
A528/76	90.3	71.4	20.1	91.5
A526/76	91.2	72.1	20.4	92.5
A540/76	90.8	71.8	20.3	92.1
A522/76	71.2	56.3	18.1	74.4
A527/76	93.5	74.0	20.3	94.3
A514/76	91.0	71.9	20.4	92.3
A 22/76	84.7	67.0	19.3	86.3

These data are plotted graphically on Fig. 4 to allow conversion of the average content of acid soluble sulphate in Table 2 to true gypsum content shown in Table 4, which also contains previous analyses from Marion Lake.

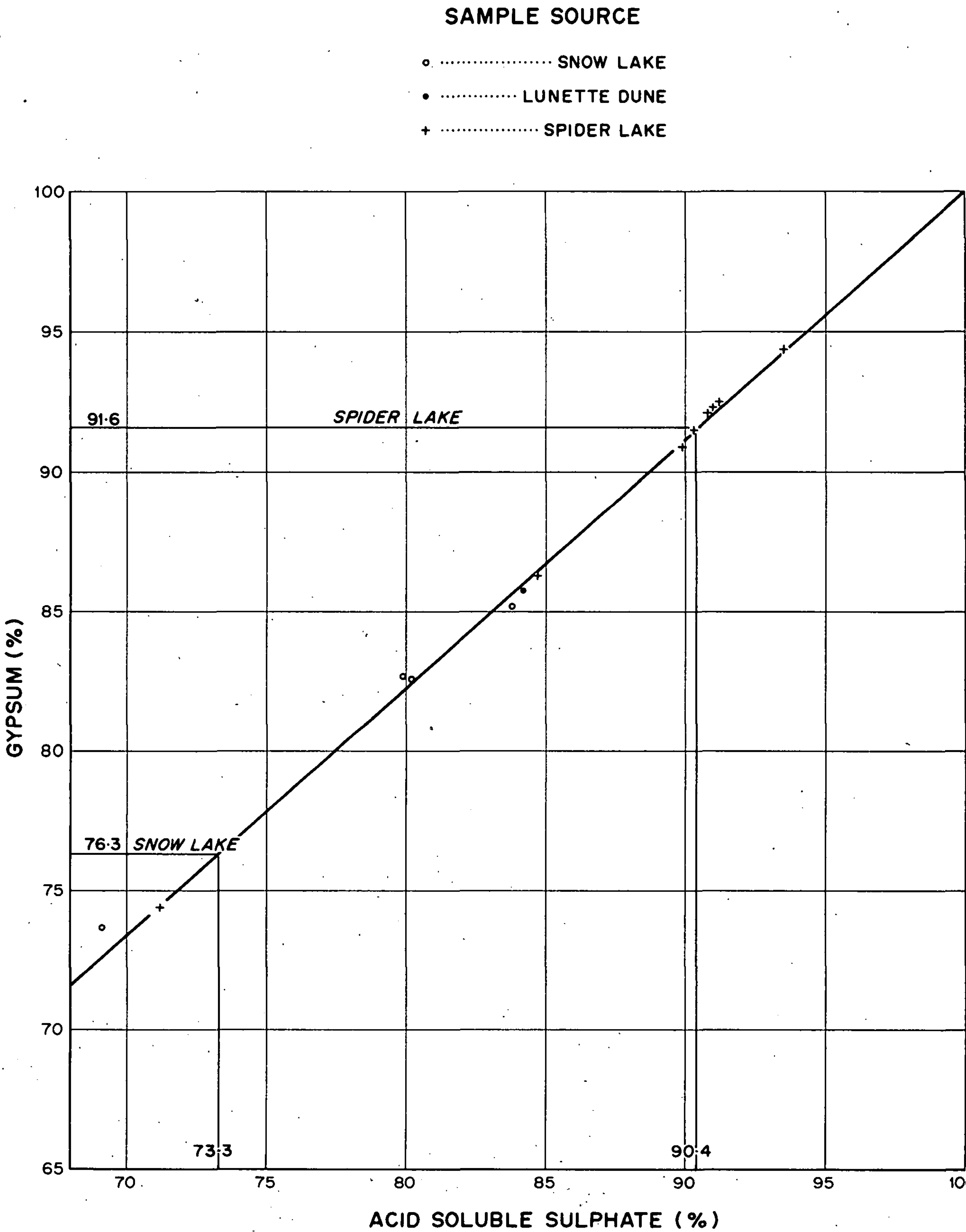

FIG. 4

		DEPARTMENT OF MINES – SOUTH AUSTRALIA	SCALE.
COMPILED: J. WARREN		STENHOUSE BAY GYPSUM DEPOSITS CONVERSION OF ACID SOLUBLE SULPHATE TO GYPSUM CONTENT	DATE: AUGUST '76
DRN: R.G.	CKD.		PLAN NUMBER: S 12300

TABLE 4

Gypsum Content (%)

	Av. Acid Sol. Sulphate	Av. Gypsum Content from Fig. 4
Snow Lake	73.3	76.3
Spider Lake	90.4	91.6
Marion Lake		
Gypsum sand (Dickinson & King, 1951)	-	91.99
Gypsum sand (A607/74)	-	92.5
Washed gypsum sand from stockpile (A608/74)	-	94.7

The gypsum sand in Spider Lake is comparable to that in Marion Lake, from which a product with more than 95% gypsum was obtained (Dickinson & King, 1951).

Mining at Marion Lake is relatively simple because the gypsum sand rests on a hard floor of consolidated selenite crystals in a bed up to 2 m thick.

In contrast, at Snow Lake and Spider Lake, the gypsum is underlain by unconsolidated, soft, boggy calcareous mud and sand. Contamination by this material should be avoided during removal of the gypsum.

RESERVES

Reserves of gypsum listed in Table 5 are based on the following:-

- thickness of gypsum as shown on Fig. 5.
- specific gravity of 1.16 for unconsolidated gypsum (Dickinson and King, 1951).
- lake floor assumed to be horizontal.

. reserves restricted to lake surface free of vegetation.

TABLE 5

Reserves of Gypsum

	Snow Lake	Spider Lake
Area (ha)	267	175
Average thickness (m)	0.92	1.18
Volume (million m^3)	2.46	2.07
Geological reserves (million tonnes)	2.8	2.4

Further reserves of gypsum underlie the lunettes surrounding the lakes. Mining of the marginal flats requires removal of relatively thick overburden of organic matter and may be complicated by:-

. high carbonate contamination towards lake margin.

. extent of karst formation.

. rapidity of basement shallowing.

CONCLUSIONS

At Stenhouse Bay on southern Yorke Peninsula, 6 million tonnes of gypsum were mined from the main deposit on Marion Lake from 1905 to 1973.

Core sampling and auger drilling has outlined the following reserves in nearby Snow Lake and Spider Lake.

	Snow Lake	Spider Lake
Average Thickness (m)	0.92	1.18
Indicated Geological Reserves (million tonnes)	2.8	2.4
Expected Grade (% $CaSO_4$ $2H_2O$)	76.3	91.6

The gypsum in Spider Lake is similar in quality to material mined from Marion Lake whereas Snow Lake is inferior in quality.

A bed of laminated seed gypsum crystals was deposited from concentrated brines during Holocene times when accretion of a coastal barrier had transformed a marine strait into a chain of restricted, continental influenced, evaporite basins.

Thickness, a maximum of 2.15 m in Spider Lake, and purity was controlled by:-

- configuration of Pleistocene bedrock surface.
- concentration of brine.
- influx of groundwater, both marine and terrestrial.
- restriction of brine circulation within the lakes.
- degree of water turbulence.
- inflow of clastic material.

Gypsum overlies a seagrass bank, the posidonia bank faces (PBF) and a basal marine sand, the skeletal grainstone facies (SGF), which all rest disconformably on an undulating surface of indurated limestone of the Bridgewater Formation of Pleistocene age.

The lakes are surrounded by aeolian dunes of poorly laminated seed gypsum derived from the gypsum of the lake.

At present, Snow Lake and Spider Lake are reserved from the Mining Act, 1971-75 and lie within the recently extended Innes National Park.

Mining of these two lakes will require methods that will minimise contamination from the unconsolidated non-gypsiferous sediment underlying the gypsum bed.

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REFERENCES

Bleys, C., 1960. Groundwater Investigation - Hundred of Warrenben. S. Aust. Min. Rev., 109; 113-122.

Boutakoff, N., 1963. The geology and geomorphology of the Portland area. Geol. Surv. Victoria Mem 22.

Crawford, A.R., 1965. The geology of Yorke Peninsula. Geol. Surv. S. Aust. Bull. 39 : 95 pp.

Davies, G.R., 1970. Carbonate bank sedimentation, eastern Shark Bay, Western Australia. In B.W. Logan et al., Carbonate sedimentation and environments, Shark Bay, Western Australia. Am. Ass. Pet. Geol. Mem 13 : 85-168.

Dickinson, S.B. and King, D., 1951. The Stenhouse Bay Gypsum Deposits. S. Aust. Min. Rev. 91 : 95-113.

Hiern, M.N., 1974. Gypsum - South Australia. S. Aust. Dept. Mines unpublished report 74/30.

Jack, R.L., 1921. The Salt and Gypsum resources of South Australia. Geol. Surv. S. Aust. Bull 8, 118 pp.

Thom, B.G. and Chappell, J., 1975. Holocene sea levels relative to Australia. Search 6 : 90-93.

Von der Borch, C.C., Bolton B.R. & Warren, J.K., 1976. Stratigraphy and Petrography of modern stromatolitic limestones from Marion Lake, South Australia. Sedt. Geol. (in press).

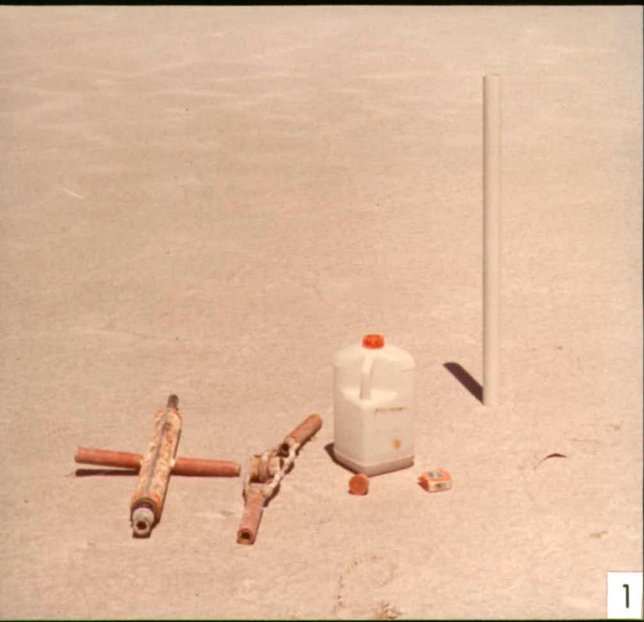
Warren, J.K. 1975. The morphological and environmental relationships of recent stromatolites from Deep Lake : comparisons with Marion Lake and the Geological record. Hons. B.Sc. thesis, unpublished, Flinders Univ. S. Aust., 61 pp.

Willington, C.M., 1950. Assessment of sampling requirements - Snow Lake-Stenhouse Bay. S.A. Dept. Mines unpubl. Report Book 29/18.

________________, 1952. Boring and sampling operations - Snow Lake, Hundred of Warrenben. South Aust. Min. Rev. 93 : 143-146.

APPENDIX I

CORE SAMPLING TECHNIQUES AND PREPARATION OF SAMPLES



1. SLIDE 12929

2. SLIDE 12930

3. SLIDE 12931

4. SLIDE 12932

5. SLIDE 12933

6. SLIDE 12934

7. SLIDE 12935

EQUIPMENT (Plate 1)

Lengths of PVC (40 ml SWV) rigid plastic plumbing pipe.

Hand-held percussion slip hammer or dolly. An inner steel rod, which fits snugly into the piping, is enclosed by a metal sleeve with handles.

A pipe gripping device consisting of two handles attached to a split steel ring which fits tightly around the piping.

Plastic container of water.

Rubber plugs.

Retractable steel measuring tape.

Rolls of plastic adhesive tape.

A set of felt pens.

Hacksaw.

A wooden box.

METHOD OF CORING

A length of pipe was driven vertically into the lake sediment by the slip hammer (Plate 2). Initially, about 1 m of pipe was used.

Several cm of pipe was left protruding above the surface (Plate 3). The space free of sediment and the protruding pipe were measured (Plate 4).

The pipe was filled with water (Plate 5) and a rubber plug pushed into the open end.

The sample was thus retained in place, relatively undisturbed.

The pipe was withdrawn vertically, using the pipe gripping device (Plate 6).

The rubber plug was removed and the water tipped back into the container to reduce amount of water carried.

The total length of pipe and the interval free of sample was measured again and marked on the outside of the pipe with a felt pen.

The top of the sample was marked with an arrow and the grid references were written on the pipe (Plate 7).

For deeper intervals, pipe lengths of 2 m were placed in the existing hole. If 2 m lengths were used to start a hole, the operator stood on a box.

Bedrock was assumed to be reached when penetration of the tube ceased.

The pipe was cut by hacksaw, several cm above the lake surface and the withdrawal process repeated.

HAND AUGERING

A hand auger was used where the pipe could not penetrate hard bands of coarse crystalline gypsum. The sample was bulked over an appropriate interval and placed in a sample bag.

SAMPLING

A groove, 5 mm deep, was cut along both sides of the pipe using a circular saw.

The core was then split in halves using a knife.

Half of the core was used for laboratory examination and chemical analysis and the other half stored.

APPENDIX II

GEOLOGICAL LOGS OF CORE AND AUGER HOLES

WITH

PARTIAL CHEMICAL ANALYSES FOR
ACID SOLUBLE SULPHATE

from AMDEL Reports AN 2312/76 and AN 2588/76

In the geological logs, hereunder, the following abbreviations are used:-

NG - gypsum, not laminated or poorly laminated.

LG - gypsum, well laminated, grey to white.

PBF - Posidonia Bank Facies.

SGF - Skeletal Grainstone Facies.

Floor - Indurated limestone of the Bridgewater Formation.

Each sample marked x was resubmitted for full analysis as detailed in Appendix III.

SNOW LAKE

Depth (m)	Sample No.	Acid Soluble Sulphate (%)	Description
2400E 1200S			
0 - 0.70	A626/76	5.2	Impure SGF.
0.70- 0.98	-	-	PBF with indurated layer at base.
0.98- 1.52	-	-	No sample, bedrock 1.52 m.
2400E 1600S			
0 - 0.35	A632/76	4.25	Rounded calcarenite sand with minor gypsum.
0.35- 0.60	-	-	PBF, black and sandy.
0.60- 0.85	-	-	PBF.
0.85- 1.28	-	-	No sample, bedrock 1.28 m.
2000E 400S			
0 - 0.05	-	-	Calcarenite sand with minor gypsum.
0.05- 0.45	-	-	SGF, brown to dark grey.
0.45- 0.60	-	-	PBF.
0.60- 0.73	-	-	No sample, bedrock 0.73 m.
2000E 800S			
0 - 0.20	-	-	SGF, clean.
0.20- 0.50	-	-	SGF, dirty with carbonate mud.
0.50- 1.35	-	-	SGF, clean on bedrock.
1.35- 1.42	-	-	No sample, bedrock 1.42 m.
2000E 1200S			
0 - 0.70	A625/76	52.1	Gypsiferous carbonate mud.
0.70- 0.97	-	-	Carbonate mud.
0.97- 1.35	-	-	PBF.
1.35- 1.60	-	-	SGF, black and muddy.
1.60- 2.60	-	-	No sample, bedrock 2.60 m.
1600E 00			
0 - 0.20	A616/76	65.8	LG, impure.
0.20- 1.00	-	-	SGF.
1.00- 1.60	-	-	PBF.
1.60- 1.87	-	-	SGF, dirty.
1.87- 2.89	-	-	No sample, bedrock 2.89 m.
1600E 400S			
0 - 0.60	A620/76	57.7	SGF, gypsiferous and carbonaceous.
0.60- 0.70	-	-	PBF.
0.70- 0.80	-	-	Coarse shell accumulation.
0.80- 0.97	-	-	No sample, bedrock? 0.97 m.

1600E 800S

0 - 0.96	A622/76*	79.5	NG, with carbonate
0.96- 1.00	-	-	No sample,bedrock 1.00 m

1600E 1200S

0 - 0.20	A624/76	74.4	Carbonaceous gypsiferous mud-
0.20- 0.60	"	"	NG
0.60- 1.80	"	"	LG
1.80- 2.20	"	-	PBF
2.20- 2.25	-	-	SGF
2.25- 2.70	-	-	No sample, bedrock 2.70 m

1600E 1600S

0 - 0.20	A631/76	79.5	NG
0.20- 0.25	-	-	Indurated shell layer
0.25- 0.35	-	-	PBF
0.35- 0.90	-	-	SGF
0.90- 1.75	-	-	No sample, bedrock 1.75 m

1600E 2000S

0 - 0.15	-	-	SGF
0.15- 0.21	-	-	SGF rich in carbonate
0.21- 0.27	-	-	PBF
0.27- 0.41	-	-	No sample, bedrock 0.41 m

1400E 400N

0 - 0.13	-	-	White carbonate mud with root fibres
0.13- 0.30	-	-	SGF, black and sandy
0.30- 1.34	-	-	No sample, bedrock 1.34 m

1200E 00

0 - 0.10	A615/76	65.3	Impure white gypsiferous sand.
0.10- 0.30	"	"	NG
0.30- 0.60	-	-	SGF, dark grey, coarse.
0.60- 1.00	-	-	SGF, dirty, medium grained
1.00- 1.29	-	-	No sample, bedrock 1.29 m.

1200E 400S

0 - 0.55	A619/76	43.4	SGF, gypsiferous (laminated.
0.55- 1.05	"	"	LG, mud.
1.05- 1.15	-	-	Variegated gypsiferous mud.
1.15- 1.43	-	-	PBF.
1.43- 2.01	-	-	No sample, bedrock 2.01 m.

1200E 800S

0 - 0.30	A621/76	80.9	NG, impure.
0.30- 0.60	-	-	Interbedded SGF and LG.
0.60- 0.80	-	-	SGF, black and sandy.
0.80- 1.05	-	-	PBS, with coarse fragmented shells at base.
1.05- 1.39	-	-	No sample, bedrock 1.39m.

1200E 1200S

0 - 0.40	A623/76	74.7	NG.
0.40- 1.90	"	"	LG.
1.90- 2.15	-	-	Variegated carbonaceous gypsiferous mud.
2.15- 2.56	-	-	PBF.
2.56- 3.00	-	-	No sample, bedrock below 3.0 m.

1200E 1600S

0 - 0.30			NG
0.30- 1.90			LG
1.90- 2.10			Pink-green carbonaceous gypsiferous mud.
2.10- 2.55			PBF
2.55- 3.00			No sample, bedrock below 3.0 m.

800E 00

0 - 0.20	A614/76*	80.2	NG
0.20- 1.55	"	"	LG
1.55- 1.65	-	-	PBF with coarse shells.
1.65- 1.69	-	-	No sample, bedrock 1.69 m

800E 400S

0 - 0.24	A618/76	63.6	NG, impure.
0.24- 0.38	-	-	SGF, clean with large gypsum crystals up to 0.05 m.
0.38- 0.50	-	-	PBF
0.50- 1.45	-	-	SGF, black and sandy.
1.45- 2.07	-	-	No sample, bedrock 2.07m.

800E 1400S

0 - 1.55	A629/76	82.8	LG
1.55- 2.10	-	-	PBF
2.10- 2.25	-	-	SGF, black-grey.
2.25- 2.52	-	-	No sample, bedrock 2.52m.

800E 2200S

0 - 0.80	A634/76*	69.1	NG, carbonaceous.
0.80- 1.36	-	-	PBF
1.36- 1.40	-	-	SGF, dirty.
1.40- 2.40	-	-	No sample, bedrock 2.40m.

600E 1800S

0 - 1.50	A633/76	87.3	Gypsum (auger sample)
1.50- 3.00	-	-	No sample, bedrock below 3.00 m.

400E 00

0 - 0.40	A613/76*	83.8	White-brown dune gypsum.
0.40- 0.60	"	"	NG
0.60- 1.40	"	"	LG
1.40- 1.55	-	-	Gypsum, variegated.
1.55- 1.60	-	-	PBF
1.60- 2.73	-	-	SGF, bedrock 2.73 m.

400E 400S

0 - 0.55	A617/76	73.6	NG
0.55- 0.80	-	-	PBF
0.80- 1.45	-	-	SGF
1.45- 1.95	-	-	No sample, bedrock 1.95m.

400E 1400S

0 - 0.10	A628/76*	22.8	SGF, white, gypsiferous.
0.10- 0.30	"	"	NG, white impure.
0.30- 0.60	"	"	SGF, dark gypsiferous-
0.60- 0.90	-	-	PBF.
0.90- 1.28	-	-	SGF, black.
1.28- 2.25	-	-	No sample, bedrock 2.25m.

00 1400S

0 - 0.25	A627/76	83.5	Gypsum (auger sample).

LUNETTE DUNE

00 00 First Hole

0 - 0.15	A519/76	85.2	Carbonate layer, minor NG.
0.15- 0.58	"	"	LG, coarse 0.18-0.19 m, 0.44-0.47 m.
0.58- 0.74	-	-	SGF black and sandy with gypsum layers.
0.74- 0.86	-	-	LG, with sand and shells.
0.86- 1.13	-	-	PBF
1.13- 2.37	-	-	SGF, bedrock 2.37 m.

00 00 Second Hole

0 - 0.60	A635/76*	84.2	Laminated dune gypsum, coarse 0.40-0.42.
0.60- 1.00	-	-	Interbedded LG and SGF.
1.00- 1.20	-	-	PBF
1.20- 1.48	-	-	SGF, black and sandy.
1.48- 1.52	-	-	No sample, bedrock 1.52 m.

200W 00

0 - 0.96	A549/76	90.3	Fine seed gypsum. Brown soil horizons at 0-0.14 m, 0.26 m, 0.36 m, 0.44 m, 0.81-0.83 m, 0.91-0.97 m.
0.96- 1.47	A506/76	89.5	LG, white, coarse 0.98-1.03 m, 1.39-1.41 m.
1.47- 1.52	-	-	As above with increasing carbonate.
1.52- 2.17	-	-	PBF grading into SGF, bedrock 2.17 m.

400W 00

0 - 0.50	A510/76	91.4	Dune gypsum with organic matter.
0.50- 0.90	A521/76	90.5	NG
0.90- 1.04	"	"	LG

SPIDER LAKE

600W 200N

0 - 0.30	A532/76	89.5	NG
0.30- 1.10	"	"	LG
1.10- 1.20	-	-	LG with increasing carbonate.
1.20- 1.30	-	-	PBF
1.30- 1.60	-	-	Carbonate with PBF with increasing sand.
1.60- 1.70	-	-	SGF
1.70- 1.90	-	-	No sample, bedrock 1.90m.

600W 00

0 - 0.38	A539/76	91.2	NG, carbonate layer 0.08-0.09 m.
0.38- 1.17	"	"	LG, coarse 0.55-0.58 m.
1.17- 1.24	-	-	LG, pink.
1.24- 1.58	-	-	PBF
1.58- 1.75	-	-	SGF, black and sandy.
1.75- 2.19	-	-	No sample, bedrock 2.19 m.

600W 200S

0 - 0.50	A538/76	89.9	NG, coarse 0.31-0.33 m.
0.50- 0.98	"	"	LG
0.98- 1.06	-	-	LG pink.
1.06- 1.74	-	-	PBF black and sandy, with large shells.
1.74- 2.23	-	-	No sample, bedrock 2.32 m.

600W 400S

0 - 0.40	A507/76	89.7	NG
0.40- 1.01	"	"	LG
1.01- 1.05	-	-	LG, pink, coarse 1.015 m - 1.02 m.
1.05- 1.20	-	-	SGF black and sandy with minor PBF.
1.20- 1.36	-	-	As above with PBF.
1.36- 1.50	-	-	SGF black and sandy.
1.50- 3.00	-	-	No sample, bedrock below 3 m.

600W 600S

0 - 0.28	A512/76	90.5	NG, coarse, 0.18-0.21 m.
0.28- 0.65	"	"	LG
0.65- 0.71	-	-	LG, pink with indurated stromatolite fragments below 0.68 m.
0.71- 0.83	-	-	SGF, black and sandy with shells and PBF.
0.83- 1.55	-	-	SGF
1.55- 2.36	-	-	No sample, bedrock 2.36 m.

600W 800S

0 - 1.20	A530/76	89.9	Gypsum (auger sample).

800W 00

0 - 0.38	A511/96* 0.98 m	89.9	NG, coarse 0.21-0.26 m, 0.32-0.36 m.
0.38- 0.94	"	"	LG
0.94- 1.00	"	"	LG, pink.
1.00- 1.27	-	-	SGF, black, muddy.
1.27- 1.45	-	-	PBF, black, muddy.
1.45- 2.00	-	-	SGF, black, muddy.
2.00- 2.36	-	-	No sample, bedrock 2.36 m.

800W 200S

0 - 0.10	A508/76	90.8	NG with minor organic matter.
0.10- 0.48	"	"	NG, coarse 0.36-0.44 m.
0.48- 0.99	"	"	LG
0.99- 1.05	-	-	LG, pink.
1.05- 1.76	-	-	SGF, black and sandy with PBF.
1.76- 2.13	-	-	SGF, muddy.
2.13- 2.67	-	-	SGF, clean and coarse.
2.67- 2.82	-	-	SGF, black and sandy.
2.82- 2.85	-	-	No sample, bedrock at 2.85 m.

800W 400S

0 - 0.33	A502/76	89.7	NG, coarse 0.19-0.21 m. 0.26-0.31 m.
0.33- 1.25	"	"	LG
1.25- 1.30	-	-	LG, pink.
1.30- 1.80	-	-	SGF, with PBF.
1.80- 2.80	-	-	SGF, black and sandy bedrock at 2.80 m.

800W 600S

0 - 0.46	A528/76*	90.3	NG, coarse 0.26-0.30 m, 0.38-0.43 m.
0.46- 1.38	"	"	LG, relatively thick.
1.38- 1.60	-	-	LG, pink and green, minor thick layers grading down to carbonate sandy mud.
1.60- 1.78	-	-	SGF, with PBF.
1.78- 2.29	-	-	No sample, bedrock at 2.29 m.

800W 800S

0 - 0.47	A509/76	92.3	NG, coarse 0.17-0.18 m, 0.20-0.21 m, 0.40-0.43 m.
0.47- 1.11	"	"	LG, coarse 0.64-0.65 m, 1.07-1.10 m.
1.11- 1.13	-	-	LG, green - pink.
1.13- 1.32	-	-	SGF, black and sandy with PBF.
1.32- 1.47	-	-	As above but coarse.
1.47- 1.82	-	-	As above but clean.
1.82- 2.17	-	-	SGF, black and sandy.
2.17- 2.40	-	-	No sample, bedrock at 2.40 m.

1000W 400N

0 - 0.30	A523/76	92.0	NG
0.30- 0.84	"	"	LG, coarse 0.38, 0.49, 0.63 m.
0.84- 2.15	"	"	Auger sample, gypsum. Bedrock below 2.15 m.

1000W 200N

0 - 0.30	A515/76	89.0	NG, fine.
0.30- 0.84	"	"	LG, fine.

1000W 00

0 - 0.43	A505/76	91.2	NG, coarse 0.16-0.18 m, 0.25-0.27 m.
0.43- 1.20	"	"	LG
1.20- 1.30	-	-	LG, pink.
1.30- 1.50	-	-	SGF, black and sandy with PBF.
1.50- 2.24	-	-	SGF.
2.24- 2.69	-	-	No sample, bedrock at 2.69 m.

1000W 600S

0 - 0.53	A544/76	91.0	NG, coarse 0.46-0.47 m.
0.53- 1.00	"	"	LG
1.00- 1.50	"	"	Gypsum (auger sample).
1.50- 2.00			Gypsum, carbonate increasing with depth (auger sample).
2.00			PBF, bedrock below 2.00 m.

1200W 400N

0 - 2.00	A516/76	91.8	Gypsum (auger sample).
2.00- 2.90	-	-	PBF; bedrock at 2.90 m.

1200W 200N

0 - 1.83	A546/76	91.2	Gypsum (auger sample).
1.83- 2.75	-	-	PBF, bedrock at 2.75 m.

1200W 00

0 - 0.55	A543/76	90.1	NG, coarse 0.18-0.21 m, 0.28-0.30m, 0.32-0.45 m, 0.47-0.50 m (coarser than average).
0.55- 0.80	"	"	LG, high organic content.
0.80- 2.00	-	-	Impure gypsum.
2.00	-	-	PBF, bedrock below 2.00 m

1400W 800N

0 - 1.27	A531/76	91.0	Gypsum (auger sample).
1.27- 1.72	-	-	No sample, bedrock at 1.72 m.

1400W 600N			
0 - 1.62	A547/76	89.9	Gypsum (auger sample).
1.62- 2.40	-	-	No sample, bedrock at 2.40 m.
1400W 400N			
0 - 1.62	A520/76	92.3	Gypsum (auger sample).
1.62- 2.53	-	-	No sample, bedrock at 2.53 m.
1400W 200N			
0 - 1.80	A526/76*	91.2	Gypsum (auger sample).
1.80- 3.00	-	-	PBF, bedrock below 3.0 m.
1400W 00			
0 - 0.33	A518/76	92.5	NG, coarse 0.18-0.20 m.
0.33- 0.89	"	"	LG
0.89- 0.95	-	-	LG, pink-green.
0.95- 1.16	-	-	SGF, black and sandy with PBF.
1.16- 1.57	-	-	SGF.
1.57- 1.89	-	-	No sample, bedrock at 1.89 m.
1400W 200S			
0 - 0.36	A501/76	91.0	NG
0.36- 1.00	"	"	LG
1.00- 1.30	-	-	Gypsum, carbonate content increases with depth.
1.30			PBF, bedrock below 1.3 m.
1600W 800N			
0 - 1.02	A513/76	91.6	Gypsum (auger sample).
1.02- 1.05	-	-	Impure gypsum.
1.05- 1.56	-	-	PBF, bedrock at 1.56 m.
1600W 600N			
0 - 1.0	A540/76*	90.8	Gypsum (auger sample).
1600W 200N			
0 - 1.26	A525/76	92.3	Gypsum (auger sample).
1.26- 1.96	-	-	No sample, bedrock at 1.96 m.
1600W 00			
0 - 0.31	0-0.57-	90.8	NG
0.31- 1.50	A541/76	-	LG
1.50- 2.20	-	-	PBF, bedrock at 2.20 m.

1600W 200S

0 - 0.32	A533/76	92.5	NG, coarse 0.17 m.
0.32- 1.30	"	"	LG, coarse 1.30 m.
1.30- 1.50	-	-	Impure gypsum.
1.50			PBF.

1800W 1200N

0 - 0.30	A522/76*	71.2	NG, rich in organic matter 0-0.05 m, root fibres at 0.15 m.
0.30- 0.33	-	-	Gypsum, impure coarse crystals.
0.33- 0.53	-	-	SGF, bedrock at 0.53 m.

1800W 1000N

0 - 0.15	-	-	NG
0.15- 0.70	-	-	SGF
0.70- 1.16	-	-	SGF, dark colour increases with depth.
1.16- 1.33	-	-	No sample, bedrock at 1.33 m.

1800W 800N

0 - 0.38	A535/76	93.5	NG
0.38- 1.00	"	"	LG (auger sample 0.53-1.00 m).
1.00- 1.72			No sample, bedrock at 1.72 m.

1800W 600N

0 - 0.40	A536/76	90.5	NG
0.40- 0.76	"	"	LG, coarse 0.44-0.47 m, 0.51-0.58 m.

No penetration beyond 0.76 m.

1800W 400N

0 - 1.00	A527/76*	93.5	Gypsum (auger sample).
1.00- 1.02	-	-	Gypsum, coarse.
1.02- 1.15	-	-	PBF
1.15- 2.20	-	-	SGF, black, muddy, bedrock at 2.20 m.

1800W 200N

0 - 1.44	A529/76	91.6	Gypsum (auger sample).

1800W 00

0 - 0.33	Flinders	91.7	NG, coarse 0.23-0.30 m.
0.33- 1.43	University	"	LG, coarse 1.43 m.
1.43- 1.60	-	-	LG, pink-green.
1.60- 2.00	-	-	PBF, mud with shell fragments.
2.0- 2.50	-	-	PBF, bedrock at 2.50 m.

1800W 200S

0 - 0.45	A517/76	92.7	NG, coarse 0.12-0.16 m, 0.36-0.42 m.
0.45- 1.43	"	"	LG, (auger sample 0.51-0.70 m).
1.43- 2.00	-	-	PBF, bedrock below 2.00 m.

1800W 400S

0 - 0.39	A504/76	88.4	NG
0.39- 1.72	"	"	LG

1800W 600S

0 - 0.40	-	-	SGF
0.40- 0.50	-	-	SGF, clayey.
0.50- 1.72	-	-	SGF, black and muddy, bedrock at 1.72 m.

1800W 800S

0 - 0.43	-	-	SGF
0.43- 1.27	-	-	SGF, black, muddy.
1.27- 2.70	-	-	As above, bedded, with intercalated coarse sand.
2.70- 2.94	-	-	Carbonate mud, fossil wood at 2.65 m.
2.94- 3.13	-	-	SGF, black, muddy, bedrock at 3.13 m.

1800W 1000S

0 - 0.50	A548/76	87.1	NG
0.50- 1.17	"	"	LG
1.17- 1.23	-	-	LG, pink-green.
1.23- 1.36	-	-	PBF, bedrock at 1.36 m.

1800W 1200S

0 - 1.00	A550/76	85.2	NG
1.00- 1.36	-	-	PBF, bedrock at 1.36 m.

2000W 600N

0 - 0.40	-	-	Impure gypsum.
0.40	-	-	PBF

2000W 00

0 - 0.46	A524/76	90.5	NG, coarse 0.40-0.44 m.
0.46- 0.66	"	"	LG
0.66- 1.17	-	-	LG (auger sample).
1.17- 1.25	-	-	LG, green-pink (coarse at base).

2000W 200S

0 - 0.46	A503/76	90.3	NG
0.46- 1.50	"	"	LG (auger sample 0.66-1.55 m)
1.50- 1.60	-	-	LG, pink green.
1.60	-	-	PBF

2000W 800S

0 - 0.16	-	-	NG, coarse 0.13-0.16 m.
0.16- 1.15	-	-	SGF, black and sandy with depth.
1.15- 2.40	-	-	SGF, bedrock at 2.40 m.

2000W 1000S

0 - 0.30	A514/76*	91.0	NG
0.30- 0.71	"	"	LG
0.71- 0.74	-	-	Gypsum, impure or coarse.
0.74- 0.86	-	-	PBF
0.86- 1.31	-	-	No sample, bedrock at 1.31 m.

2000W 1200S

0 - 0.36	A534/76	90.1	NG, coarse 0.32-0.33 m.
0.36- 1.10	"	"	LG
1.10- 1.17	-	-	Gypsum, impure and coarse.
1.17- 1.21	-	-	PBF
1.21- 1.48	-	-	No sample, bedrock at 1.48 m.

2300W 1250S

0 - 0.18	-	-	NG, coarse 0.16-0.18 m.
0.18- 1.00	-	-	SGF with gypsiferous layers.
1.00- 1.05	-	-	Gypsum, coarse.
1.05- 1.16	-	-	PBF
1.16- 1.25	-	-	No sample, bedrock at 1.25 m.

2500W 1300S

0 - 0.40	A545/76	88.0	NG, coarse 0.38-0.40 m.
0.40- 0.60	"	"	LG
0.60- 1.08	-	-	SGF black and sandy, gypsum in places.
1.08- 1.34	-	-	No sample, bedrock at 1.34 m.

2700W 1400S

0 - 0.24	A537/76	89.7	NG
0.24- 0.45	"	"	LG
0.45- 0.60	-	-	SGF black and sandy.
0.60- 0.70	-	-	PBF
0.70- 0.83	-	-	No sample, bedrock at 0.83 m.

2900W 1400S

0 - 0.18	-	-	NG
0.18- 0.26	-	-	LG
0.26- 0.36	-	-	SGF
0.36- 0.73	-	-	PBF
0.73- 1.16	-	-	No sample, bedrock at 1.16 m.

2900W 1600S

0 - 1.26	A542/76	85.8	LG
1.26- 1.28	-	-	LG, coarse.
1.28- 1.34	-	-	NG, coarse.
1.34- 1.47	-	-	PBF
1.47- 1.91	-	-	No sample, bedrock at 1.91 m.

3100W 1400S

0 - 0.26	-	-	NG
0.26- 0.45	-	-	LG, coarse 0.40-0.45 m.
0.45- 0.55	-	-	PBF
0.55- 0.66	-	-	No sample, bedrock at 0.66 m.

3100W 1600S

0 - 0.40	A21/76	92.5	NG
0.40- 0.89	"	"	LG
0.89- 1.25	-	-	PBF, black, muddy.
1.25- 1.73	-	-	No sample, bedrock at 1.73 m.

3100W 1800S

0 - 0.80	A22/76*	84.7	NG
0.80- 1.80	"	"	LG
1.80- 2.08	-	-	PBF
2.08- 2.15	-	-	SGF
2.15- 2.51	-	-	No sample, bedrock at 2.51 m.

3300W 1600S

0 - 0.36	A23/76	90.8	NG
0.36- 0.88	"	"	LG
0.88- 0.95	-	-	NG, impure and coarse.
0.95- 1.35	-	-	PBF, muddy.
1.35- 1.45	-	-	No sample, bedrock at 1.45 m.

APPENDIX III

CHEMICAL ANALYSES OF SELECTED SAMPLES
AMDEL REPORT AN2711/76

	SNOW LAKE					LUNETTE DUNE	SPIDER LAKE							
Sample Point	1600E 800S	800E 00	800E 2200S	400E 00	400E 1400S	00 00	800W 00	800W 600S	1400W 200N	1600W 600N	1800W 1200N	1800W 400N	2000W 1000S	3100W 1800S
Sample No.	A622/76	A614/76	A634/76	A613/76	A628/76	A635/76	A511/76	A528/76	A526/76	A540/76	A522/76	A527/76	A514/76	A22/76
Chemical Content (%)														
Sulphur trioxide as $CaSO_4$	62.9	63.4	54.5	66.2	18.0	66.7	71.1	71.4	72.1	71.8	56.3	74.0	71.9	67.0
Excess calcium as CaO	5.80	6.30	9.70	5.10	37.4	5.85	4.10	2.35	2.00	2.35	10.7	2.10	1.77	4.95
CO_2	4.70	5.60	7.95	4.90	31.1	5.40	3.35	1.95	2.05	2.30	8.90	2.00	1.70	4.45
Al_2O_3	<0.01	<0.01	0.04	0.03	0.06	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03
Fe_2O_3	0.06	0.06	0.09	0.06	0.16	0.08	0.02	0.04	0.03	0.04	0.12	0.03	0.06	0.08
Acid Insoluble	0.57	0.55	0.77	0.62	0.65	0.75	0.54	0.40	0.34	0.22	1.29	0.28	0.21	0.90
H_2O^- (at 44°C)	0.58	0.47	0.90	0.22	0.29	0.24	0.08	0.15	0.16	0.23	0.29	0.11	0.20	0.28
H_2O^+ (combined)	19.8	19.2	19.2	19.0	7.45	19.1	19.8	20.1	20.4	20.3	18.1	20.3	20.4	19.3
Water sol. Chlorine as NaCl	5.25	4.50	6.45	3.90	2.95	2.50	0.53	3.35	3.10	2.90	4.05	1.38	2.90	2.90
MgO	1.04	0.99	1.52	0.60	1.94	0.48	0.31	0.37	0.52	0.45	0.98	0.23	0.47	0.62

REFERENCE

+ .... SAMPLE POINT

1·83 .... DEPTH OF GYPSIFEROUS SEDIMENT (METRES)

89·9 .... PERCENT GRADE OF GYPSUM

1·5 .... DEPTH CONTOURS OF GYPSIFEROUS SEDIMENT

SCALE

200 0 200 400 600 800 1000

METRES

FIG. 5

DEPARTMENT OF MINES–SOUTH AUSTRALIA

STENHOUSE BAY GYPSUM DEPOSITS
SNOW LAKE AND SPIDER LAKE
THICKNESS AND GRADE OF GYPSUM

	COMPILED: J. WARREN	DRN: R.G.	SCALE: 1:10 000	PLAN NUMBER
DIRECTOR OF MINES		CKD: A.F.	DATE: AUGUST '76	76-585

REFERENCE

\+ .... SAMPLE POINT

2·20 ... DEPTH IN METRES TO BEDROCK (BRIDGEWATER Fm.)

0·92 .... THICKNESS OF NON-GYPSIFEROUS SEDIMENT (m)

—2·5— .... BASEMENT DEPTH CONTOURS

SCALE

200 0 200 400 600 800 1000

METRES

FIG. 6

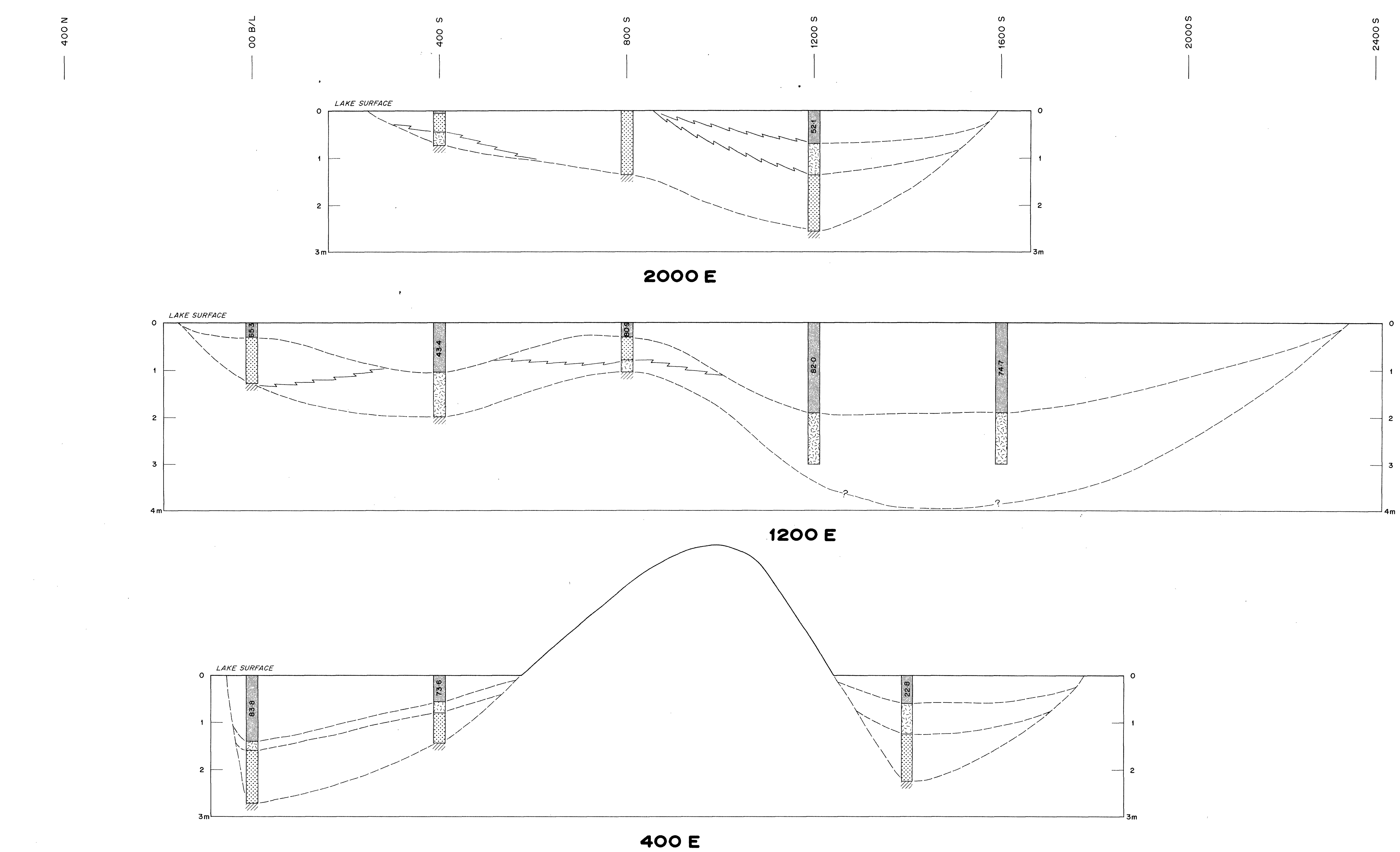
DEPARTMENT OF MINES–SOUTH AUSTRALIA

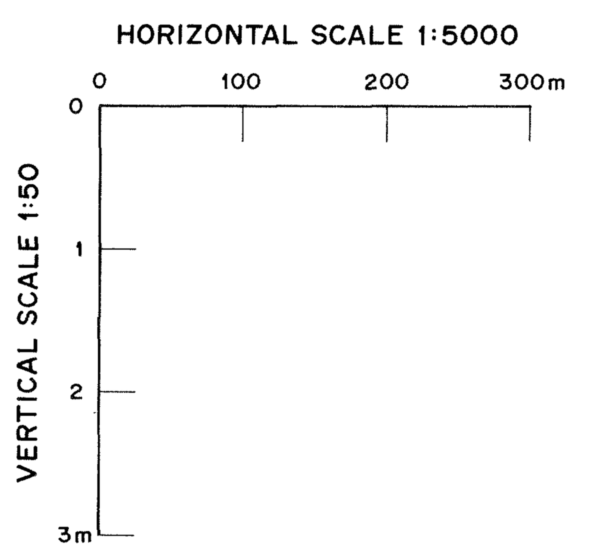
STENHOUSE BAY GYPSUM DEPOSITS

SNOW LAKE AND SPIDER LAKE

DEPTH TO PLEISTOCENE BEDROCK

	COMPILED J.WARREN	DRN R.G.	SCALE 1:10000	PLAN NUMBER
DIRECTOR OF MINES		CKD A.F.	DATE AUGUST '76	76-586





REFERENCE

73·6 GYPSIFEROUS SEDIMENT
..........PERCENT ACID SOLUBLE SULPHATE

POSIDONIA BANK FACIES

SKELETAL GRAINSTONE FACIES

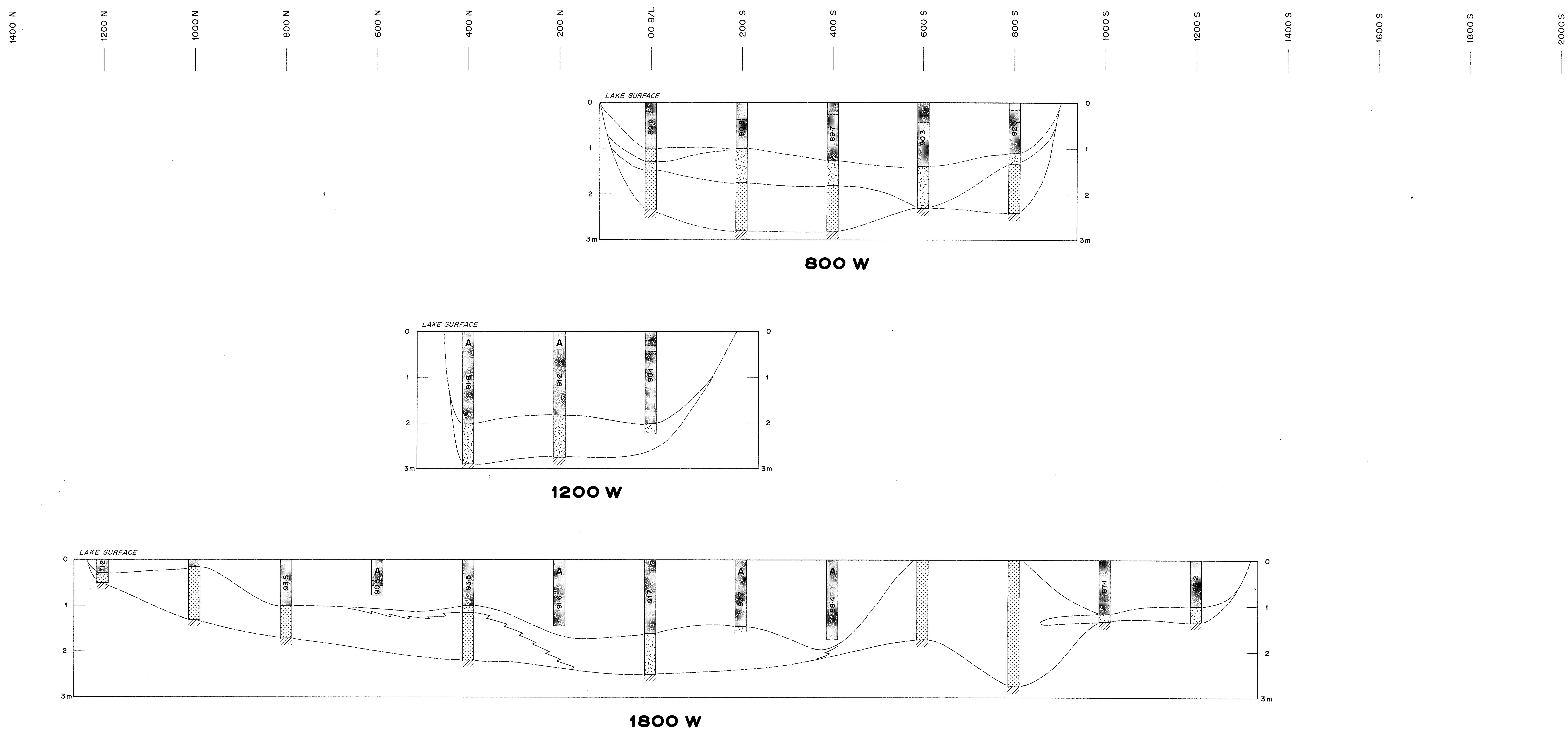
LAKE FLOOR OF BRIDGEWATER FORMATION

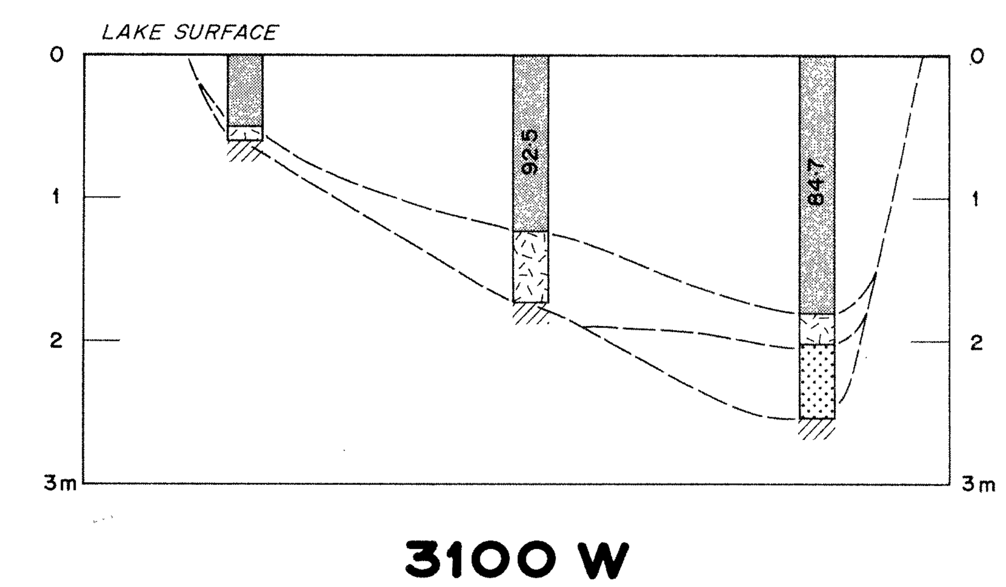
FIG. 7

DEPARTMENT OF MINES–SOUTH AUSTRALIA

STENHOUSE BAY GYPSUM DEPOSITS
HD. WARRENBEN
SNOW LAKE
GEOLOGICAL SECTIONS

	COMPILED: J.WARREN	DRN: R.G.	SCALE: AS SHOWN	PLAN NUMBER
DIRECTOR OF MINES		CKD: A.F.	DATE: AUGUST '76	76-587





REFERENCE

GYPSIFEROUS SEDIMENT WITH BANDS OF COARSE GYPSUM CRYSTALS

93·5 ··········PERCENT ACID SOLUBLE SULPHATE

POSIDONIA BANK FACIES

SKELETAL GRAINSTONE FACIES

LAKE FLOOR OF BRIDGEWATER FORMATION

A AUGERED SAMPLE

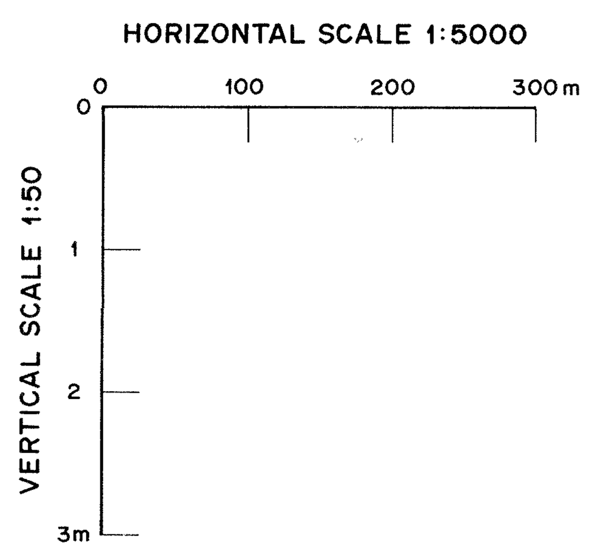


FIG. 8

DEPARTMENT OF MINES–SOUTH AUSTRALIA

STENHOUSE BAY GYPSUM DEPOSITS

HD. WARRENBEN

SPIDER LAKE GEOLOGICAL SECTIONS

DIRECTOR OF MINES	COMPILED: J.WARREN	DRN: R.G.	SCALE: AS SHOWN	PLAN NUMBER
		CKD: A.F.	DATE: AUGUST '76	76-588