DEPARTMENT OF MINES
SOUTH AUSTRALIA

RB 62/90

REPORT ON 1965 PROGRAMME OF DIAMOND DRILLING OF MARBLE DEPOSITS AT PENRICE, NEAR ANGASTON

Sections 303, 349, 1740, 1741, Hundred Moorooroo

- I.C.I. Alkali (Aust.) Pty. Ltd. -

by

J.N. Cramsie
Geologist
NON-METALLIC MINERALS SECTION

CONTENTS

APPENDICES

FIGURES ACCOMPANYING REPORT

Plan No.	Title	Scale
L64-170	Marble Deposit Penrice. Sections 303, 349, 1740, 1741 - Hd. Moorooroo. Geological Plan.	1" = 100 feet.
S5131	Marble Deposit Penrice - Graphical Representation of Analysis Information Bores 104, 105, 106.	-

Rept. Bk. No. 62/90
G.S. No. 3436
D.M. 354/64

18th April, 1966.

DEPARTMENT OF MINES
SOUTH AUSTRALIA

Rept. Bk. No. 62/90
G.S. No. 3436
D.M. 354/64

REPORT ON 1965 PROGRAMME OF DIAMOND DRILLING OF MARBLE DEPOSITS AT PENRICE, NEAR ANGASTON

Sections 303, 349, 1740, 1741, Hundred Mooroorco

- I.C.I. Alkali (Aust.) Pty. Ltd. -

ABSTRACT

Thinning of a bed of low grade marble on the western margin of the Penrice marble deposit to the south of the quarry has been confirmed by analyses of cores from three diamond drill holes recently completed. Reinterpretation of results obtained from the original programme of diamond drilling shows that the beds of low grade marble on both the western and eastern margins of the deposit are thinner to the north and to the south of the quarry.

INTRODUCTION

High grade (+95% $CaCO_3$) marble is quarried by I.C.I. Alkali (Aust.) Pty. Ltd. at Penrice, about one mile north of Angaston township, on sections 1740, 1741, 303 and 349, hundred of Mooroorco, County Light for use in chemical manufacture at the Osborne plant.

A decline in the quality of marble produced at the Penrice quarry has caused concern, and early in 1964 the company requested assistance from the Mines Department to investigate the nature and distribution of impurities.

On investigation these were attributed to the quarrying of a bed of low grade marble which is contaminated by silicate minerals marginal to the high grade stone (Cramsie, 1964). A reinterpretation of the original diamond drillingprogramme (Miles, 1949) indicated the extent of these marginal zones. Three diamond drill holes were constructed and the core analysed, to provide a guide to stone quality for the immediate future.

On receipt of these results, the Company sought further information on the width of the low grade marble zone. This report details the results of the diamond drilling (three holes), carried out near the southwestern corner of the quarry; reinterpretation of the original drilling results has been extended.

PREVIOUS REPORTS

The geology of the Angaston marble beds was first reported in detail by Campbell (1945). Particular attention was given to the Penrice area prior to the transfef of quarrying operations from deposits located west of Angaston (subsequently worked by S.A. Portland Cement Co. Ltd.) to the present location at Penrice. Campbell recommended that these operations be test drilled, and proposed a drilling programme of 31 diamond drill holes (subsequently extended to 59 holes). Drilling and assay results were reported by Miles (1949).

Further diamond drilling and a reinterpretation of the deposit have been reported by Cramsie (1964).

REFERENCES

CAMPBELL, J.D. 1945. "The Geology of the Angaston Marble Beds". Unpublished Company Report.

CRAMSIE, J.N. 1964. "Further Diamond Drilling of Marble Deposits at Penrice, near Angaston". Mining Review No. 121 (in press).

MILES, K.R. 1949. "Diamond Drilling Marble Deposits at Penrice near Angaston". Mining Review No. 88, p. 103.

GEOLOGY

The regional geology and the geology of the quarry area have been described in a previous report (Cramsie, 1964).

DIAMOND DRILLING PROGRAMME

The 1964 diamond drilling proved a wide zone of poor quality stone on the western side of the marble bed. The 1965 drilling programme was designed to investigate the width and nature of this band further south towards the axis of the major fold in the marble (see Fig. L64/170). All bores were drilled from marble into schist.

Three diamond drill holes, totalling 625ft. 10ins. in length were constructed between 3rd February and 8th March, 1965, near the southwestern corner of the quarry; the core was logged on site. Core recovery was as follows:-

Bore No.	Depth of Hole	Core Recovery	Core Recovery in Marble
104	231ft. 0ins.	94.5%	96.9%
105	180ft. 0ins.	78.8%	81.5%
106	214ft.10ins.	84.4%	84.1%

Overall Core Recovery: 86.5%

Overall Core Recovery in Marble: 87.4%

Details of core recovery are appended.

RESULTS OF DRILLING

Diamond drill holes 104, 105 and 106 confirmed that the marginal zone of low grade marble on the western boundary of the deposit thins to the south of the quarry area. Summary logs of the bores are given below, while detailed logs are appended.

Silicate minerals occur as impregnations throughout sections of the marble, or as more localised veins or patches in generally cleaner marble.

Bore 104

0ft.	- 125ft.	Marble with occasional flakes of mica.
125ft.	- 140ft.	More heavily mineralised marble (actinolite, mica, scapolite, epidote.)
140ft.	- 175ft.	Marble with traces of mica.
175ft.	- 180ft. 6ins.	Marble, with minor mica.
180ft.6ins	- 231ft.	Interbedded schist and schistose impure marble.

Bore 105

0ft.	- 20ft.	Marble with traces of mica.
20ft.	- 155ft.6ins.	Marble, clean, minor traces of pyrite.
155ft.6ins	- 160ft.	Epidote Rock with brecciated texture - irregular masses of epidote set in fine grained calcareous matrix, with irregular bodies of purer marble.
160ft.	- 175ft.	Altered marble, with epidote and iron oxides.
175ft.	- 180ft.	Micaceous schist.

Bore 106

0ft.	- 40ft.6ins.	Marble, clean.
40ft.6ins	- 64ft.9ins.	Marble with minor brown mica.
64ft.9ins	- 94ft.	Marble, clean.
94ft.	- 102ft.6ins.	Marble, containing minor bands of epidotised marble.
102ft.6ins	- 132ft.6ins.	Marble, with bands of ironstained marble and minor mica.
132ft.6ins	- 154ft.	Marble, moderate mineralisation (scapolite, epidote, mica); ironstaining associated with joints and fractures.
154ft.	- 190ft.6ins.	Marble; traces of scapolite.
190ft.6ins	- 195ft.3ins.	Impure marble, heavily affected by

Bore 106 (contd.)

190ft.6ins- 195ft.3ins. solution, ironstaining and replacement by iron oxides.

195ft.3ins- 214ft.10ins. Mica schist.

ANALYSIS OF CORE

Analysis of core to determine marble quality was carried out by the Company at Osborne. Sampling intervals were chosen by the writer on the basis of observed mineralisation. Forty-three sampling lengths were recommended, generally varying between 5ft. and 20ft. These analysis results have been plotted in Fig. S5131 Variations in marble quality are apparent and weighted averages for analysis results have been calculated as follows:-

Bore 104:

A - Samples 1 to 4 - 0'0" to 46'6"

B - Samples 5 to 10 - 46'6" to 125'2"

C - Samples 11 to 15-125'2" to 180'6"

Bore 105:

D - Samples 16 to 19 - 0'0" to 60'0"

E - Samples 20 to 24 - 60'0" to 134'9"

F - Samples 25 to 28 - 134'9" to 175'0"

Bore 106:

G - Samples 29 and 30 - 0'0" to 40'6"

H - Samples 31 to 33 - 40'6" to 79'3"

J - Samples 34 to 43 - 79'3" to 195'3"

Interval	per cent $CaCO_3$	per cent $MgCO_3$	per cent Al_2O_3, Fe_2O_3	per cent Insols.
A	95.5	1.8	0.6	2.3
B	94.6	2.1	0.7	3.0
C	93.4	2.1	0.8	3.9
D	96.4	1.3	0.6	2.1
E	94.8	2.1	1.1	1.9
F	91.2	1.3	1.6	5.9
G	95.1	1.4	1.1	2.5
H	94.3	1.8	1.6	2.5
J	91.1	1.8	1.6	5.6

REINTERPRETATION OF ORIGINAL DRILLING PROGRAMME

Marginal zones of lower grade marble at Penrice indicated by recent diamond drilling have been more closely delineated by a reinterpretation of analysis information provided by the original drilling programme reported by Miles(1949). The limits of high grade marble are now more accurately defined. (See Fig. L64-170 amended).

The low grade marble zone on the western boundary of the deposit has a maximum width of 400 feet in the centre of quarry workings. The increased width in this area is attributed to structural complications as indicated by a local shallowing of dip. The width of this western low grade zone decreased to both north and south of present quarry workings.

The width of the eastern marginal low grade zone appears to be more consistent, and is up to 130 feet thick. This zone appears to thin to both north and south of the present workings areas also.

The limits of marble with an average $CaCO_3$ content in excess of 95 per cent have been outlined in Fig. L64-170.

CONCLUSIONS

Recent diamond drilling at the Penrice quarry has confirmed that the western marginal zone of low grade marble thins to the south of the quarry area. The width of this zone varies between about 40 feet and 80 feet in the area drilled.

The marble in this zone is of low grade because of the presence of silicate minerals which occur either as dispersed grains or localised veins or patches.

Interpretation of analysis information from the original drilling programme has more accurately defined the limits of high grade marble. Both western and eastern low grade zones narrow to both north and south of the present quarry area.

J.N. Cramsie
Geologist
NON-METALLIC MINERALS SECTION

JNC:SMA
18.4.1966.

APPENDIX I

DIAMOND DRILL LOG

PROJECT: I.C.I. PENRICE QUARRY D.M.: 354/64

BORE NO.: 104

HUNDRED: MOOROORCO SEC.: 1740/41 PLAN REFERENCE: L64-170 (amended)

CO-ORDINATES: 2000N; 2200E R.L. OF COLLAR: 1323ft. (approx)

BEARING: 270° DEPRESSED: 25° DRILLER: K. KALMAR

DATE DRILLING COMMENCED: 4.2.1965 DATE DRILLING COMPLETED: 15.2.65.

LOG

DEPTH From Ft.	In.	To Ft.	In.	
0	0	11	2	Marble, white to pale grey, coarse grained, traces of fine grained brown mica.
11	2	20	3	Marble, white, coarse grained, traces of brown specks of mica or sphene.
20	3	46	6	Marble, white, coarse grained, clean.
46	6	47	5	Marble, pale grey, medium grained, minor brown specks.
47	5	53	6	Marble, white, medium to coarse grained, minor brown specks, with heavier mineralisation along more prominent joints.
53	6	54	3	Marble, white, sheared or heavily jointed, friable, dull lustre; moderate mineralisation - fine grained brown mica and minor epidote.
54	3	55	0	Marble, white, medium grained, minor brown specks.
55	0	69	0	Marble, white, coarse grained, clean.
69	0	69	4	Scapolitised band, moderately altered; thin white scapolite rods up to ½ inch in length associated with a prominent joint.
69	4	71	9	Marble, greyish white, medium grained; minor black specks and minor scapolite development.
71	9	77	0	Marble, light grey, medium to coarse grained, traces black specks.
77	0	77	3	Altered marble, fine grained, dull lustre; moderate scapolite and minor brown mica development.
77	3	100	0	Marble, white, medium grained, clean. Some heavily mineralised bands between 98'0" and 99'0" (brown mica).
100	0	114	0	Marble, white to pale grey, medium to coarse grained, clean; several zones of severe

I.C.I. PENRICE QUARRY - BORE NO. 104 (contd.)

DEPTH From Ft.	In.	To Ft.	In.	
100 cont.	0	114	0	fragmentation (probably associated with close jointing).
114	0	117	0	Marble, pale to medium pink, medium grained, clean.
117	0	122	6	Marble, white to pale grey, medium grained, traces of brown specks.
122	6	123	3	Marble, mid grey, medium grained, minor brown specks.
123	3	125	2	Marble, white, medium grained, clean; core fragmented.
125	2	130	0	Marble, grey, medium grained; moderate mineralisation consisting of green fibrous crystals of actinolite and brown specks of mica; also irregular patches and veins of epidote, and scapolite development associated with jointing.
130	0	130	9	Marble, pale pink, medium grained, clean.
130	9	131	6	Marble, grey, medium grained; veins of moderate actinolite mineralisation, and minor brown specks.
131	6	132	0	Scapolitised marble, strongly altered, friable affected by solution and ironstaining (white scapolite rods to ½ inch long).
132	0	133	0	Marble, white to pink, medium grained, moderat development of scapolite along joint planes.
133	0	138	3	Marble, white to pale grey, medium grained; minor scapolite development along joint planes.
138	3	140	0	Marble, pale grey, fine to medium grained, irregular developments of actinolite and brown speck mineralisation to moderate extent.
140	0	175	0	Marble, pale grey, medium grained; trace of brown speck mineralisation. Several zones of severe fragmentation probably due to close jointing.
175	0	180	6	Marble, light brown, medium grained; minor bands of brown mica mineralisation.
180	6	189	6	Silty schist, light brown, friable; bedding makes 35 degree angle with direction of drilling.
189	6	192	6	Schistose marble, light grey, bedding poorly developed, non-friable. Contains bands of silty schist.
192	6	195	11	Silty schist, light brown, very friable.

I.C.I. PENRICE QUARRY - BORE NO. 104 (contd.)

DEPTH From Ft.	In.	To Ft.	In.	
195	11	224	0	Banded schist, brown-grey, hard, fine grained, strongly banded; minor interbedded pale grey marble bands.
224	0	231	0	Impure marble, light grey; contains considerable epidote.
				END OF D.D. 104 at 231'0"

Bore logged by: J. Cramsie

Date: 10.3.1965.

DIAMOND DRILL LOG

PROJECT: I.C.I. PENRICE QUARRY D.M.: 354/64

BORE NO.: 105

HUNDRED: HOOROOROO SECTION: 1740/41 PLAN REFERENCE: L64-170 (amended)

CO-ORDINATES: 1735N; 2100E R.L. OF COLLAR: 1324 ft.approx.

BEARING: 304 DEPRESSED: 25° DRILLER: K. KALMAR

DATE DRILLING COMMENCED: 18.2.1965. DATE DRILLING COMPLETED: 25.2.1965.

LOG

DEPTH From Ft.	From In.	To Ft.	To In.	
0	0	16	3	Marble, white, medium grained, traces of brown specks of mica.
16	3	19	6	Marble, white to pale grey, coarse, minor brown mica.
19	6	113	0	Marble, white, medium grained; generally clean, but a few scattered traces of fine grained sulphide mineralisation (pyrite?); core severely fragmented 101'0" - 103'9".
113	0	121	0	Marble, mid grey, medium grained, few gtraces fine grained sulphide mineralisation (pyrite?
121	0	134	9	Marble, white, coarse to medium grained, clean; thin (1/8 inch) irregular ironstone vein at 134'6".
134	9	150	0	Marble, light brown, coarse; moderate iron-staining and solution effects associated with closer jointing - several severely fragmented sections of core.
150	0	155	6	Marble, white to pale pink, medium grained, clean.
155	6	160	0	Epidote Rock; brecciated texture with greenish grey irregular masses of epidote set in fine-grained fawn calcareous material; irregular bodies of brown unreplaced marble; core severely fragmented.
160	0	171	0	Altered Marble, light grey; marble has been altered to a variable extent by the introduction of epidote and iron oxide minerals. Rock has been affected by solution and core fragmentation, but is generally quite hard.
171	0	175	0	Altered Marble, similar to (160'-171'), with heavy iron oxide mineralisation.
175	0	180	0	Micaceous Schist, greenish grey, hard; banding poorly developed.
				END OF D.D. 105 at 180'0"

Bore logged by: J. Cramsie

Date: 11.3.1965.

DIAMOND DRILL LOG

PROJECT: I.C.I. PENRICE QUARRY D.M.: 354/64

BORE NO.: 106

HUNDRED: MOOROOROO SECTION: 1740/41 PLAN REFERENCE: L64-170 (amended)

CO-ORDINATES: 1625N; 1960E R.L. OF COLLAR: 1361ft.(approx)

BEARING: 360 DEPRESSED: 25° DRILLER: K. KALMAR

DATE DRILLING COMMENCED: 1.3.1965. DATE DRILLING COMPLETED: 9.3.1965.

LOG

DEPTH From Ft.	In.	To Ft.	In.	
0	0	4	0	Marble, light brown, medium grained, clean.
4	0	40	6	Marble, white to light grey, medium grained, glassy, clean; zones of severe solution effects, with a three foot cavity penetrated between 34'92 and 37'9".
40	6	42	0	Marble, fawn, medium grained, clean; moderate ironstaining associated with jointing.
42	0	42	9	As (40'6" - 42'0"), with minor brown specks.
42	9	44	0	Marble, light fawn, medium grained, moderate brown speck mineralisation; heavy mineralisation associated with joints and fracture planes.
44	0	45	3	Marble, light brown, clean; heavily jointed, with associated ironstaining and minor solution effects.
45	3	48	7	Marble, white, medium grained, minor brown specks;moderate mineralisation and shearing associated with joints and fracture planes, with zones of friable material up to 2 inches wide; mineralisation is mainly brown mica, with iron oxides.
48	7	52	0	Marble, pale grey, medium grained; minor brown mica mineralisation, becoming more intense along joints and fractures.
52	0	52	6	As (45'3" to 48'7").
52	6	56	0	Marble, pale grey, medium grained; moderate brown speck mineralisation.
56	0	57	6	Marble, light brown, medium grained, minor brown speck mineralisation; much of this interval has been heavily altered along joints and fractures to friable ironstained material impregnated with iron oxides and pink clay or altered feldspar.
57	6	58	0	As (56'0" to 57'6"), but alteration is less severe.

I.C.I. PENRICE QUARRY - BORE NO. 106 (contd.)

DEPTH From Ft.	From In.	To Ft.	To In.	
58	0	60	6	Marble, light brown, medium grained, clean; moderate ironstaining and solution effects associated with jointing; some core fragmentation.
60	6	64	9	Marble, white to pale grey, medium grained; minor brown specks.
64	9	74	11	Marble, white, medium grained, clean.
74	11	75	9	Calcareous Rock, recrystallised or otherwise altered to fine grained chalky texture; minor ironstaining and solution effects.
75	9	79	3	Marble, white, medium grained, clean, massive.
79	3	84	0	Marble, fawn and grey, medium grained, minor brown specks; moderate ironstaining and solution associated with jointing.
84	0	90	3	Marble, white, coarse grained, clean, massive.
90	3	90	9	Altered Marble, brown, medium grained; ironstained, with introduction of epidote and iron oxide.
90	9	94	6	Marble, as (84'0" to 90'3").
94	6	97	0	Marble, light grey, coarse, minor brown mica specks, joints widely spaced.
97	0	98	0	Altered marble, similar to (90'3" to 90'9"), but epidote less prominent.
98	0	102	6	Marble, light grey, medium to coarse grained; minor brown mica specks. Contains (99'3" to 99'9"), which is altered marble similar to (97'0" to 98'0").
102	6	107	0	Marble, light grey to light brown, medium grained, clean, massive.
107	0	108	0	Marble, as (102'6" to 107'0"), but moderate brown mica specks.
108	0	109	3	Altered Marble, light brown, medium grained, minor iron oxide deposition.
109	3	111	0	Marble, white, medium grained, clean.
111	0	114	3	Marble, light grey, medium grained, minor brow specks.
114	3	116	9	Marble, pale pink mottled with grey, medium grained, clean.
116	9	120	5	Marble, light brown, medium, clean.
120	5	121	9	Marble, as (114'3" to 116'9").
121	9	123	4	Impure Marble, pale green mottled with brown; probably epidote rich, but fineness of grainsize makes mineral identification difficult.

I.C.I. PENRICE QUARRY - BORE NO. 106 (contd.)

DEPTH From Ft.	In.	To Ft.	In.	
123	4	125	7	Marble, mid brown, medium, clean, strongly ironstained, especially where associated with fracturing.
125	7	132	6	Marble, light fawn, medium grained, clean, massive.
132	6	133	0	Marble, mid brown, medium grained; strongly ironstained, minor solution effects.
133	0	146	0	Marble, fawn, medium grained, clean where massive; heavy ironstaining associated with jointing and fracturing, together with minor fragmentation.
146	0	146	6	Marble, fawn, friable, fine grained; moderate fine grained scapolite, epidote and brown mica mineralisation.
146	6	148	0	Marble, mid brown, medium grained, moderate scapolite and epidote mineralisation; core fragmented.
148	0	149	3	Marble, dark brown, fine to medium grained, heavy scapolite and iron oxide mineralisation.
149	3	154	0	Marble, light brown, medium grained, minor scapolite and epidote mineralisation; core severely fragmented between 152'6" and 153'6".
154	0	161	6	Marble, light brown, medium grained, clean.
161	6	162	6	Marble, dark brown, medium grained; heavy scapolite impregnation with minor epidote
162	6	165	6	Marble, light grey, medium grained, clean.
165	6	169	0	Hole or cavity - no core recovered. (Rods met no resistance, according to driller).
169	0	180	9	Marble, light brown, medium grained, clean; moderate ironstaining associated with jointin and fracturing.
180	9	184	0	Marble, white, medium to coarse grained, clean; moderate ironstaining.
184	0	188	0	Marble, mid brown, medium to coarse grained, clean; moderate ironstaining and solution associated with jointing and fracturing; red-brown iron oxide associated with solution effects.
188	0	190	6	Marble, white, medium to coarse, clean.
190	6	195	3	Impure Marble, severely affected by ironstaining and solution associated with jointing and fracturing, but strongly altering much of the marble; heavy deposition of black iron oxide.

I.C.I. PENRICE QUARRY - BORE NO. 106 (contd.)

DEPTH From Ft.	In.	To Ft.	In.	
195	3	197	3	Mica Schist, grey, fine grained, finely banded, strongly altered, very friable.
197	3	214	10 4	Mica Schist, fine grained, finely banded (dark grey and white); core has "spotted" appearance, due to lensing of lighter coloured bands; lenses of coarser white material (calcareous?) up to ½ inch thick distributed intermittently (average separation 3 - 6 inches).

END OF D.D. 106 at 214'10"

Bore logged by J. Cramsie

Date: 19.3.1965.

APPENDIX II

DETAILS OF CORE RECOVERY

I.C.I. PENRICE QUARRY

D.D. 104 - CORE RECOVERY

From		To		Footage Drilled		Core Recovered	
Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
0	0	2	0	2	0	1	0
2	0	4	0	2	0	0	8
4	0	66	1	2	1	1	10
6	1	11	2	5	1	5	1
11	2	15	9	4	7	4	7
15	9	20	3	4	6	4	6
20	3	24	8	44	5	4	5
24	8	29	3	4	7	4	7
29	3	34	0	4	9	4	9
34	0	38	9	4	9	4	9
38	9	43	6	4	9	4	9
43	6	48	3	4	9	4	9
48	3	53	0	4	9	4	9
53	0	57	6	4	6	4	6
57	6	62	3	4	9	4	9
62	3	67	0	4	9	4	9
67	0	71	9	4	9	4	9
71	9	76	7	4	10	4	10
76	7	81	9	5	2	4	8
81	9	86	6	4	9	4	9
86	6	91	3	44	9	4	9
91	3	96	6	5	3	5	3
96	6	100	0	3	6	3	6
100	0	104	9	4	9	4	7
104	9	108	6	3	9	3	5
108	6	111	0	2	6	2	6
111	0	115	6	4	6	4	6
115	6	118	6	3	0	3	0
118	6	122	2	3	8	3	8
122	2	125	2	3	0	3	0
125	2	128	3	3	1	3	1
128	3	133	0	4	9	4	6
133	0	138	3	5	3	5	3
138	3	143	0	4	9	4	9
143	0	147	9	4	9	4	9
147	9	152	3	4	6	4	6
152	3	157	0	4	9	4	9
157	0	161	9	4	9	4	9
161	9	166	6	4	9	4	9

D.D. 104 CORE RECOVERY (contd.)

From		To		Footage Drilled		Core Recovered	
Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
166	6	171	3	4	9	4	9
171	3	175	0	3	9	3	9
175	0	180	6	5	6	3	9
180	6	185	6	5	0	1	6
185	6	190	6	5	0	3	0
190	6	191	6	1	0	1	0
191	6	195	11	4	5	3	0
195	11	198	8	2	9	2	7
198	8	201	2	2	6	2	6
201	2	206	0	4	10	4	10
206	0	210	6	4	6	4	6
210	6	215	0	4	6	4	6
215	0	219	10	4	10	4	10
219	10	224	8	4	10	4	10
224	8	228	6	3	10	3	10
228	6	231	0	2	6	2	6

D.D. 105 - CORE RECOVERY

From		To		Footage Drilled		Core Recovered	
Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
0	0	6	0	6	0	4	6
6	0	11	2	5	2	5	2
11	2	15	11	4	9	4	9
15	11	20	8	4	9	4	9
20	8	25	5	4	9	4	9
25	5	30	3	4	10	4	10
30	3	35	0	4	9	4	5
35	0	39	9	4	9	4	9
39	9	44	6	4	9	4	9
44	6	49	3	4	9	4	9
49	3	54	0	4	9	4	9
54	0	58	3	4	3	4	0
58	3	68	3	10	0	9	8
68	3	78	3	10	0	8	0
78	3	85	3	7	0	7	0
85	3	94	6	9	3	5	1
94	6	96	8	2	2	2	2
96	8	101	0	4	4	4	4
101	0	105	9	4	9	1	8
105	9	109	3	3	6	3	6
109	3	113	0	3	9	3	7
113	0	117	9	4	9	4	9
117	9	122	9	5	0	5	0
122	9	127	9	5	0	5	0
127	9	130	9	3	0	3	0
130	9	134	9	4	0	2	0
134	9	139	6	4	9	2	6
139	6	144	6	5	0	3	2
144	6	149	6	5	0	3	9
149	6	155	0	5	6	3	1
155	0	160	0	5	0	1	3
160	0	165	9	5	9	1	8
165	9	170	0	4	3	3	0
170	0	175	0	5	0	1	11
175	0	180	0	5	0	0	8

APPENDIX III

ANALYSES OF CORE

D.D. 104 - Analyses

Sample No.	Interval Sampled From	To	$CaCO_3$%	$MgCO_3$%	Fe_2O_3/ Al_2O_3%	Acid Insolubles %
1	0'0"	10'0"	92.6	2.5	0.9	4.2
2	10'0"	20'3"	96.3	1.7	0.6	1.6
3	20'3"	34'0"	96.0	1.5	0.5	2.0
4	34'0"	46'6"	96.6	1.5	0.5	1.4
5	46'6"	55'0"	91.1	2.1	1.1	5.4
6	55'0"	69'0"	96.2	1.3	0.6	2.1
7	69'0"	77'3"	94.8	1.7	0.8	3.4
8	77'3"	96'6"	94.9	2.1	0.3	2.7
9	96'6"	117'0"	94.6	2.7	0.4	2.3
10	117'0"	125'2"	94.4	2.5	0.8	2.3
11	125'2"	130'0"	88.9	2.7	1.3	7.1
12	130'0"	140'0"	93.2	1.9	0.4	4.5
13	140'0"	157'0"	92.8	2.1	0.5	4.6
14	157'0"	175'0"	95.3	1.7	0.5	2.5
15	175'0"	180'6"	93.1	2.1	1.4	4.4

D.D. 106 - CORE RECOVERY

From		To		Footage Drilled		Core Recovered	
Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
0	0	4	6	4	6	2	10
4	6	10	0	5	6	3	3
10	0	14	6	4	6	1	6
14	6	18	9	4	3	4	3
18	9	24	3	5	6	4	10
24	3	30	1	5	10	5	0
30	1	34	9	4	8	1	6
34	9	37	9	3	0	cavity	
37	9	42	9	5	0	5	0
42	9	45	3	2	6	2	6
45	3	50	0	4	9	4	9
50	0	54	9	4	9	4	9
54	9	59	9	5	0	5	0
59	9	64	9	5	0	5	0
64	9	69	9	5	0	5	0
69	9	74	3	4	6	4	6
74	3	79	3	5	0	5	0
79	3	84	3	5	0	4	8
84	3	89	0	4	9	4	9
89	0	93	3	4	3	4	3
93	3	97	3	4	0	3	6
97	3	101	6	4	3	4	3
101	6	104	0	2	6	2	6
104	0	108	9	4	9	4	9
108	9	114	0	5	3	4	11
114	0	118	9	4	9	4	9
118	9	123	6	4	9	4	9
123	6	128	3	4	9	4	5
128	3	132	9	4	6	4	6
132	9	137	6	4	9	4	9
137	6	142	6	5	0	3	4
142	6	147	0	4	6	4	1
147	0	152	6	5	6	3	4
152	6	156	9	4	3	4	0
156	9	162	6	5	9	2	7
162	6	169	0	6	6	2	9
169	0	175	6	6	6	3	6
175	6	180	6	5	0	1	9
180	6	184	6	4	0	4	0
184	6	189	3	4	9	4	9
189	3	194	3	5	0	5	0
194	3	197	3	3	0	3	0

D.D. 106 CORE RECOVERY (contd.)

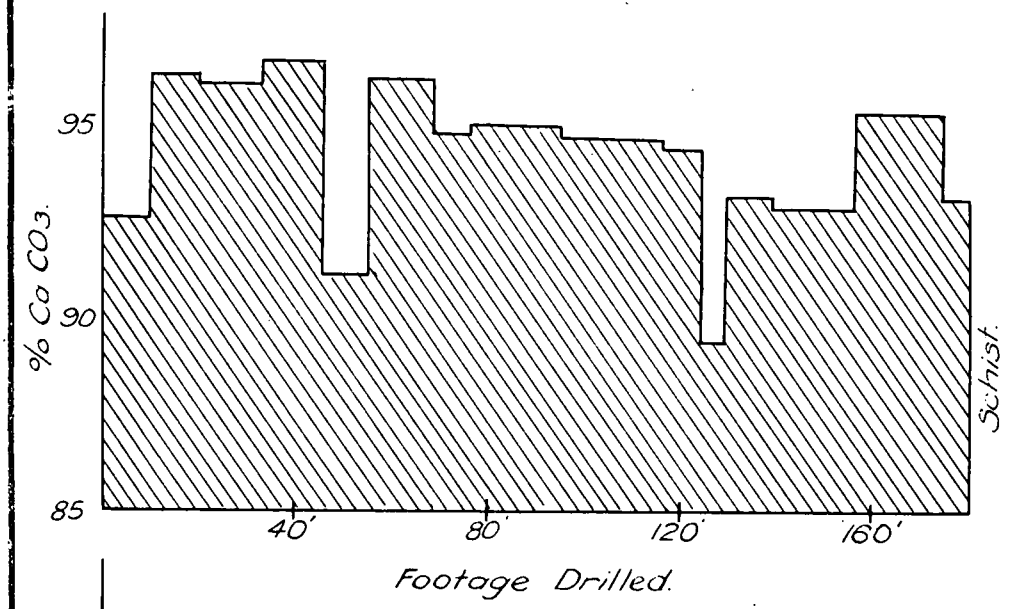
From		To		Footage Drilled		Core Recovered	
Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
197	3	202	0	4	9	4	9
202	0	206	9	4	9	4	9
206	9	211	6	4	9	3	6
211	6	214	10	3	4	2	2

D.D. 105 - Analyses

Sample No.	Interval Sampled From	To	$CaCO_3$%	$MgCO_3$%	Fe_2O_3/ Al_2O_3%	Acid Insolubles %
16	0'0"	10'0"	97.1	1.3	0.6	1.9
17	10'0"	19'6"	96.6	1.3	0.6	2.1
18	19'6"	40'0"	96.4	1.1	0.6	2.0
19	40'0"	60'0"	95.8	1.3	0.5	2.4
20	60'0"	80'0"	94.7	1.9	0.8	2.7
21	80'0"	100'0"	94.7	1.9	0.7	2.6
22	100'0"	113'0"	94.0	1.9	1.5	2.6
23	113'0"	121'0"	95.7	2.5	1.1	0.7
24	121'0"	134'9"	95.2	2.5	1.4	0.9
25	134'9"	150'0"	93.9	1.7	1.7	2.7
26	150'0"	155'6"	92.6	1.5	1.7	4.2
27	155'6"	165'0"	85.6	0.8	2.5	11.1
28	165'0"	175'0"	91.3	1.3	2.0	5.5

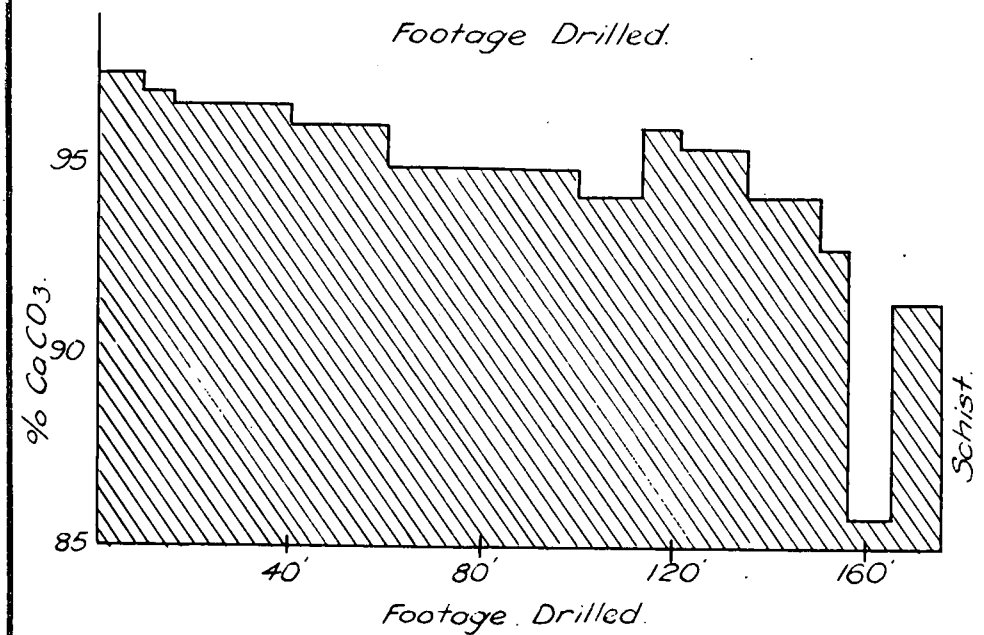
BORE 106 - Analyses

Sample No.	Interval Sampled From	To	$CaCO_3$%	$MgCO_3$%	Fe_2O_3/ Al_2O_3%	Acid Insolubles %
29	0'0"	20'0"	95.0	1.3	1.1	2.6
30	20'0"	40'6"	95.1	1.5	1.1	2.4
31	40'6"	52'0"	94.4	1.9	1.5	2.2
32	52'0"	64'9"	93.7	1.9	1.6	2.9
33	64'9"	79'3"	94.6	1.5	1.6	2.3
34	79'3"	94'6"	92.5	2.3	1.8	3.4
35	94'6"	102'6"	91.3	2.5	2.7	3.5
36	102'6"	114'3"	91.6	2.1	1.9	4.4
37	114'3"	132'6"	88.4	1.5	2.0	8.1
38	132'6"	146'0"	91.6	1.7	1.4	5.3
39	146'0"	154'0"	90.8	1.7	1.6	5.9
40	154'0"	169'0"	91.3	1.7	0.9	6.2
41	169'0"	180'0"	91.0	1.5	1.0	6.5
42	180'0"	190'6"	94.5	1.5	1.4	2.6
43	190'6"	195'3"	86.7	1.5	1.6	10.3



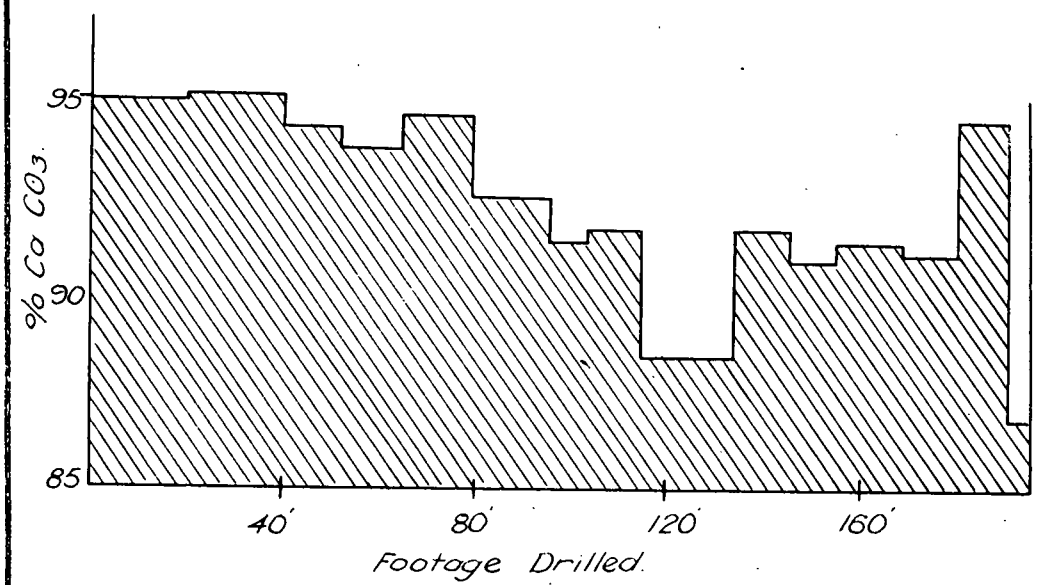
BORE 104
Averages ($Co\ CO_3$).

0'-47' - 95.5%.
47'-125' - 94.6%.
125'-180' - 93.4%.



BORE 105
Averages ($Co\ CO_3$)

0'-60' - 96.4%.
60'-135' - 94.8%.
135'-175' - 91.2%.



BORE 106
Averages ($Co\ CO_3$)

0'-40' - 95.1%.
40'-79' - 94.3%.
79'-195' - 91.1%.

To accompany report by J. N. Cramsie.

DEPARTMENT OF MINES — SOUTH AUSTRALIA

	Drn. J.N.C.	MARBLE DEPOSIT - PENRICE GRAPHICAL REPRESENTATION OF ANALYSIS INFORMATION. BORES 104, 105, 106.	SCALE:
	Tcd. A.M.F.D.		S 5131 Gk. 9.
	Ckd. L.V.W.		
	Exd.		DATE: 14 - 4 - 66.

DEPARTMENT OF MINES — SOUTH AUSTRALIA

LOG OF DIAMOND DRILL HOLE

HOLE No. 110
SERIAL No 633/67

PROJECT I.C.I. ALKALI (AUST.) Pty. Ltd.
FEATURE PENRICE MARBLE
LOCATION 1·75 mi. N. Angaston

SECTION 174 HUNDRED MOORDORO
CO-ORDINATES 1600 N. 2470 E
ANGLE FROM HORIZONTAL 25°
DIRECTION EAST

R.L. Surface Approx 1325 FT.
R.L. Collar " 1325 FT.
Datum L.W.O.S.T. (P.T.Ad) + 1008 ft.

DESCRIPTION OF CORE	SW WEATHERING MW HW CW	CORE SIZE. DEPTH R.L. FT.	LOG	FRACTURE LOG 1 4 16 64	STRUCTURES JOINTS, VEINS, SEAMS, SHEARED ZONES, CRUSHED ZONES	LIFT. CORE LOSS % 5 50 10	WATER LEVEL DATE	CASING	DRILL WATER LOSS % 0-100	Ca CO3 % 80 90 100
		NX			200 to 300 ft: 6 joints at 60-75° to core-axis, rest normal to axis.					98·1
MARBLE light grey, coarse grained (2-4 m.m.); green-brown mica in indistinct bands 70° to axis, 1-3%	mostly fresh	210			stylolitic suture with quartz, feldspar, ? epidote and pellets (2mm. wide) of soft, black mineral.					92·3
		220								95·3
		NX → BX								
		230								
		240			236-305 ft, joints mostly 30-80° to core-axis.		NO WATER ENCOUNTERED			95·5
MARBLE similar above, but coarser grained (2-6 mm)		250								94·9
MARBLE light grey, coarse-grained (2-4 m.m.); brown mica 1-3% when disseminated, but to 5% where indistinctly banded		260								95·8
		270			pyrite and mica bands 65° to core-axis.					96·5
		280								95·3
		290								95·8
MARBLE similar above, but medium grey to brown.		BX 300			petrological sample P1220/66 showing 2in zone of radiating scapolite needles, phlogopite, brown mica.					93·8

WEATHERING
FR — Fresh
SW — Slightly weathered
MW — Moderately "
HW — Highly "
CW — Completely "

FRACTURE LOG
1 4 16 64 — Natural fractures per foot of core
12 3 3/4 1/16 — Equivalent diameter in inches

NON METALLICS SECTION

DRILL No. 24
TYPE
DRILLER Davidson.
START 2-9-66
FINISH 13-9-66

LOGGED BY R. TARVYDAS
DATE 7-10-66
TRACED D.S.
CHECKED L.V.W.

SHEET 3 OF 4 DRG No. S65688 Gh9

P.F. No. 550274 MB

DEPARTMENT OF MINES — SOUTH AUSTRALIA

LOG OF DIAMOND DRILL HOLE

HOLE No. 110
SERIAL No 633/67

PROJECT I.C.I. ALKALI (AUST) Pty. Ltd.
FEATURE PENRICE MARBLE
LOCATION 1·75 mi. N. Angaston

SECTION 1741 HUNDRED MOOROOROO
CO-ORDINATES 1600N. 2470E.
ANGLE FROM HORIZONTAL 25°
DIRECTION EAST

R.L. Surface Approx 1325 FT.
R.L. Collar " 1325 FT.
Datum L.W.O.S.T(P.A.d)=1008ft.

DESCRIPTION OF CORE	WEATHERING SW MW HW CW	CORE SIZE. DEPTH R.L. FT.	LOG	FRACTURE LOG 1 4 16 64	STRUCTURES JOINTS, VEINS, SEAMS, SHEARED ZONES, CRUSHED ZONES	LIFT. CORE LOSS % 5 50 10	WATER LEVEL DATE	CASING	DRILL WATER LOSS % 0-100	Ca CO3% 80 90 100
as above		BX 310			← petrological sample P1221/66 (brown marble)		NO WATER			93·8 92·0 94·3
IRONSTONE, slightly calcareous										
					End of bore 315·2ft.					

20 30 40 50 60 70 80 90 00

WEATHERING
FR — Fresh
SW — Slightly weathered
MW — Moderately "
HW — Highly "
CW — Completely "

FRACTURE LOG
1 4 16 64 — Natural fractures per foot of core
12 3 ¾ ⅜ — Equivalent diameter in inches

NON METALLICS SECTION

DRILL No 24
TYPE
DRILLER Davidson
START 2-9-66
FINISH 13-9-66

LOGGED BY R. TARVYDAS
DATE 7-10-66
TRACED D.S.
CHECKED L.V.W.

SHEET 4 OF 4 DRG. No. S6568c Gk9

LEGEND

- Alluvium
- Sandstone shale and mica schists
- Low grade grey marble and black limestone
- Mica schist with marble bands
- Marble
- Mica schist with marble bands
- Amphibolite dyke
- Intrusive ironstone

SCALE

FEET 100 0 100 200 300 400 500 FEET

Building

QUARRY

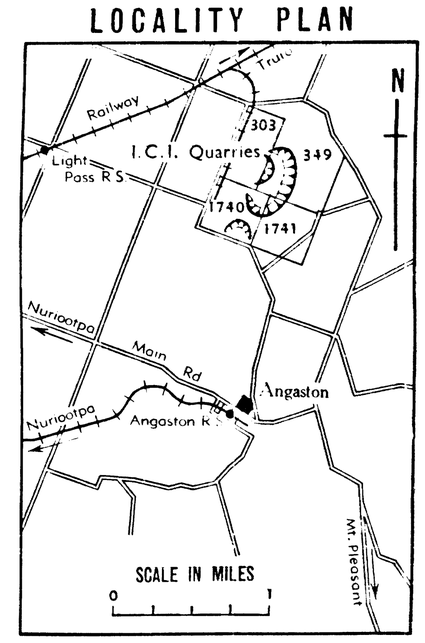
SPOIL

1240 1260 1280 1300 1320 1340 1360 1380

1200 1220 1240

Dep. 18 Dep. 25 Dep. 30

LOCALITY PLAN



REFERENCE TO SIGNS

- Inferred Geological boundaries
- Boundary of marginal low grade zone
- Strike & dip of bedding — 85
- Bore holes – Original drilling programme (Direction and depression of drilling) — 33 Dep. 25°
- Bore holes – New series — 103
- Contours at 20ft. intervals, Datum L.W.O.S.T. Pt. Adelaide = 100·8 — 1320 1300

L 64-170

J. N. Cramsie Geologist

S.A. Dept. of Mines

Figure 1. GEOLOGICAL PLAN showing MARBLE DEPOSIT, PENRICE. Hd. Moorooroo Sections 303, 349, 1740 and 1741.