

DEPARTMENT OF MINES
SOUTH AUSTRALIA

RIB 65/117

DOLOMITE DEPOSIT, UP-AND-DOWN ROCKS, TANTANOOLA

Seas. 195 & 200. Hd. Hindmarsh, Co. Grey

- S.A. Silicates Co. Pty. Ltd. -

by

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MAP

<u>Plan No.</u>	<u>Title</u>	<u>Scale</u>
67-826	Tantanoola Dolomite Deposit, Geological Plan and Cross-sections.	1 in. = 100ft.

Rept. Bk. No. 65/117
G.S. No. 3855
D.M. 1140/62

18th December, 1967

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ABSTRACT

At Up-And-Down Rocks the Oligocene polyzoal Gambier Limestone has been irregularly dolomitised. The deposit, which is 14 road-miles south-east of Millicent, supplies about 10,000 tons of dolomite a year for the manufacture of sheet glass. The dolomite is pale brown to pink and varies from very hard rock to loose sand; all varieties are acceptable providing the grade exceeds 17.4% MgO.

In an area to the south, south-east and east of the present workings, diamond drilling has revealed 1,400,000 tons of dolomite under 80,000 cu. yds. of overburden. Drill-core samples of this reserve have a weighted average composition of 18.32% MgO and Fe_2O_3 ranges from 0.08% - 0.42%.

INTRODUCTION

Fourteen road-miles to the south-east of Millicent, adjacent to the Princes Highway, the South Australian Silicates Co. Pty. Ltd. operate a quarry located on a ridge of limestone and dolomite. The outcrop is known as Up-And-Down Rocks, and contains the Tantanoola Cave, a local tourist attraction, near its northern end.

Formerly quarried as ballast for the South Australian Railways, the dolomite is now exclusively used for the manufacture of sheet-glass by the Australian Glass Manufacturers Co. Pty. Ltd. at Wandanong, Victoria. The yearly requirement is about 10,000 tons of dolomite with an MgO content greater than 17.4%. No particular

physical state is specified.

In 1962 the Company engaged the Mines Department to drill the deposit. As a result over 750,000 tons of dolomite was proved (Johns 1963b). This report describes a further programme of diamond drilling carried out on behalf of the Company in 1967 to assist in land acquisition.

Present workings are situated on section 200, Hd. Hindmarsh, but drilling was extended into section 195 to the south. The land is privately owned, with mineral rights alienated from the Crown. The Company holds mineral leases and rights of entry over both sections.

PREVIOUS REPORTS

Several reports on the deposit are published, details of which are shown in the list of references (p8) Cochrane (1952a) described in detail the geology of Up-and-Down Rocks in conjunction with a drilling programme for the S.A. Railways. A summary of this appears in Cochrane (1952b). Johns (1963b) reported on the drilling programme carried out on behalf of the present Company in 1962. The occurrence of dolomite is also listed in Johns (1963a).

GEOLOGICAL SETTING

Cochrane (1952a) summarises the geology of the deposit as follows.

"The local bedrock originally consisted of series of Miocene (now believed to be Oligocene to Middle Miocene (Ludbrook, 1967)) marine bryozoal limestones. Subsequently these were locally irregularly dolomitized over an area of more than 700 acres. Relatively greater erosion of the less resistant limestones during the post Miocene marine peneplanation left the harder dolomites stranded as a cliff above the

general level of the surrounding plain. During Pleistocene times there were a number of transgressions and recessions of the sea over this area and evidence of two of these coastal migrations is afforded by shell deposits on the Miocene rocks. Following the final recession of the Pleistocene seas, aeolian sand deposits have accumulated over much of the eastern aspect of the ridge."

"The bryozoan limestone beds in the region are usually horizontal or nearly so. However, structures observed in the dolomitic oolite (1/2 mile to the north of section 200) and occurring poorly at the surface indicate low to moderate angles of dip of the dolomites over a large part of the area surveyed....The general structure is of a monoclinial fold with the eastern side of the ridge being on the down warp side."

The dolomite and limestone ridge is mapped as Gambier limestone by Sprigg et al (1951). At the present site of investigation the limestone is an off-white calcarenite composed chiefly of broken remains of polyzoa, with occasional shells of brachipodia and Pecten-type mullusca. With increasing dolomite content the colour changes to pale brown and buff, and finally to pink. Both the limestone and the dolomite exhibit all degrees of hardness, varying from loose sand to very hard recrystallised rock. The sand is thought to be derived from the recrystallised rocks by later leaching.

ECONOMIC GEOLOGY

General

This report describes the results of a programme of 14 diamond drill holes sited to the south-east of the Company's quarry. Bore locations are shown on the accompanying plan (67-826) which was prepared by the author from a plane-table survey. The present plan is an extension and an overlap of the southern portion of the plan

prepared by Johns (Johns, 1963b). The quarry face is as it stood on 15th June, 1967.

Drilling commenced on 21st June 1967 and ended on 26th July 1967 after penetrating a total of 551.25 ft. Depths of individual holes ranged from 20.3 to 60.2 ft., and were designed to test the rock to approximately the level of the present quarry floor (RL 200). Holes were taken deeper in the south-western portion of the area where the ground surface lies near RL200.

The core was logged as described in the following section.

Sample intervals were selected for analysis on a visual basis. Core was split longitudinally, half being sent for partial chemical analysis at the Australian Mineral Development Laboratories (AMDEL) and the remainder is stored in the Core Laboratory at the Works Depot of the Department of Mines.

Core Logging

The logging technique used here is similar to that used by the Engineering Section of the S.A. Department of Mines, but the following modification has been adopted. The 'fracture' and 'weathering' columns have been combined because of the close relation between the physical state of the core and the degree of weathering of the rock. The weathering symbols used are as follows:

- FR - very hard rock, cemented nearly 100%
- SW - Porous rock, but long pieces of 2 inch core cannot be broken by hand; edges of core will not break away under thumb pressure.
- FW - core broken into discs by drilling action, but 1cm thick discs can be broken by hand only with difficulty; long pieces of core break with difficulty also.

JW - core broken mainly into irregularly shaped pieces; a piece 1 cm. thick can be broken by hand.

OW - sand to weakly consolidated, the latter breaking down even under slight pressure

In the text of the report the term dolomite is used to describe all rock of above-grade MgO content. However, in the logs the lithology is described more correctly in terms of limestone and dolomite, which are defined as follows:

limestone - consolidated rock composed largely of calcium carbonate, but showing no organic structures in hand specimen.

calcarenite - semi-consolidated to consolidated rock composed largely of calcareous skeletal remains and shell debris

The above terms are qualified as

dolomitic - MgO content greater than 17%

moderately dolomitic - MgO content 8-17%

slightly dolomitic - MgO content 3-8%

Throughout the core there occurs a soft, fine-grained, green mineral which makes up a fraction to 2% of the total rock.

One sample (P479/67, bore W2) containing this and other opaque minerals was submitted to AMDEL for petrological examination.

AMDEL Report MP 980-68 states:

"The black mineral was examined in refractive index oils and by X-ray diffraction. It appears to be an iron oxide. The green mineral was examined by X-ray powder photography. It is poorly crystallized and is a mica-type clay mineral and does not appear to be glauconite."

Chemical Analyses

The split core samples were submitted to AMDEL for deter-

mination of CaO , MgO , Fe_2O_3 and acid insolubles. AMDEL reports AN 81-68 and AN 490-68 are incorporated in the logs and are attached as Appendix 2. No analyses were performed on the limestones and calarenites from bores VI, VO2 and VO3.

Values of MgO range from 2.3% to 18.8%, the highest value being returned from drillhole W1. Assuming a cut-off grade of 17.0% MgO the average weighted grade within the area of reserves is 18.32% MgO .

Over the same area the concentration of Fe_2O_3 ranges from 0.08% to 0.42%, while in hole VO1, outside the area of reserves, the maximum figure of 1.5% was obtained. The variation in iron concentration does not seem to be systematic.

Diamond Drilling

The 200ft. grid pattern used by Johns (1963b) was extended to the area investigated in this programme. The location of holes is shown on the accompanying plan 67-826. Logs of holes are attached as Appendix 1. Holes Z1, Z01, Y2, Y1, Y01, X2, X1, and X01 were drilled in the previous programme of Johns.

The drilling has disclosed the following important features:

- a. dolomite thins to the south east
- b. hard, pink dolomite is developed to the south
- c. soft dolomite and dolomite sand occurs to the east
- d. dolomite of acceptable chemical grade occurs in all holes drilled in the block outlined on the plan
- e. above-grade dolomite appears to extend below the road in the south west
- f. material of acceptable grade extends below the level

of the quarry floor

Reserves

Reserves have been determined for the area enclosing bores with dolomite exceeding 17% MgO content; the area is shown on plan 67-826. It overlaps part of the reserves defined by Johns(1963a). Assuming that 1 cu. yd. of dolomite in situ weighs 2 tons, there are 1,400,000 tons of above-grade dolomite within the indicated area down to the depth of drilling. Except for holes V1 and W2, dolomite of acceptable grade is present at the bottom of all the holes, indicating that further reserves exist at depth.

Overburden, consisting of soil and Pleistocene shell sand and ranging in depth from 0 to 12 ft., amounts to 80,000 cu. yards.

CONCLUSIONS

1. Further drilling has shown that dolomite continues to the south of the present workings.
2. Assuming a cut-off of 17.0% MgO the limit of dolomite has been reached on the eastern and south-eastern sides.
3. The drilling has shown that reserves amounting to 1,400,000 tons occur in a block of consistent grade extending down to a maximum of 30 ft. below the present quarry floor. Additional reserves, as yet undefined, exist below this level.
4. Within this block hard, pink dolomite is restricted to the southern portion; bores on the eastern side intersected much material of sand consistency.
5. Weighted analyses of dolomite in the defined reserves show an average of 18.3% MgO and Fe_2O_3 ranges from 0.08% to 0.42%.

RKT:OB
18.12.1967

R. K. Tarvidas
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GEOLOGIST
NON-METALLICS SECTION

REFERENCES

- COCHRANE, G.W., 1932a Dolomite Deposits at Up-And-Down Rocks near Tantanoola. Mining Review 92: 71-78
- COCHRANE, G.W., 1932b Dolomites of the Lower South-East. Mining Review 93: 117-121
- JOHNS, R.K., 1963a Limestone, Dolomite and Magnesite Resources of South Australia. Geol. Surv. S. Australia Bull. 38
- JOHNS, R.K., 1963b Tantanoola Dolomite Deposit Up-And-Down Rocks. Mining Review 118: 5-15
- LUDERBROOK, N.H., 1967 Correlation of Tertiary Rocks of the Australasian Region. Tertiary Correlations and Climatic Changes in the Pacific. Rept. 11th Pacific Science Congress, 1966
- SPRIGG, R.C., COCHRANE, G.W., SOLOMON, M. 1951 Sheet Penola, Geological Atlas of Australia, 1:250,000. Geol. Survey S. Aust.

APPENDIX 1

Logs of diamond-drill holes

PROJECT S.A. SILICATES CO. PTY. LTD. LOG OF DIAMOND DRILL HOLE

SECTION 195 HUNDRED HINDMARSH

FEATURE TANTANOOLA DOLOMITE QUARRY

LOCATION 3 1/4 mile SE. Tantanoola.

CO-ORDINATES

ANGLE FROM HORIZONTAL 90°

DIRECTION

R.L. Surface 252

R.L. Collar 252

Datum arbitrary

DESCRIPTION OF CORE	WEATHERING	LOG	STRUCTURES	PERCENTAGE	WATER	DRILLING	ANALYSIS
SOIL - dark grey to dark brown, humic; c. 85% fine-grained, subangular to well rounded quartz; c. 20% clay and decaying plants.							
CLAY - brown, plastic; c. 60% clay; 40% fine-grained, subangular to well rounded quartz.							
DOLOMITIC LIMESTONE - buff, sand to soft rock, fine-grained.							
DOLOMITIC LIMESTONE - buff to pale pink, moderately hard.							
DOLOMITIC LIMESTONE similar 6.0-9.5 ft.							
DOLOMITIC CALCARENITE, grey (pink bottom 1 ft), very hard, fine-grained (0.1 to 0.4 mm); green mineral 1-2%; black inter-granular aggregations, 3 to 5% in places.							
DOLOMITIC CALCARENITE, buff with pink sections (see log), moderately hard to soft dolomite.							
DOLOMITIC CALCARENITE, grey, hard, similar 16.0 to 19.5 ft.							
DOLOMITIC CALCARENITE, buff, similar 19.5 to 33.0 ft.							
RECRYSTALLIZED LIMESTONE white, moderately hard							
DOLOMITIC CALCARENITE similar 37.5 to 48 ft.							

Not applicable

1250 ft

245 ft

240 ft

235 ft

230 ft

225 ft

220 ft

215 ft

210 ft

205 ft

50 ft

Pocket of shell grit.

Shell grit bands ~ 0.2 cm thick, 15 cm apart; black ore minerals enclose the bands.

A few dark pink bands c. 3 mm thick.

Fossil-fragment voids with cross sections circular to oblong ~ 1 mm; occasional joints coated with grains and fine needles of calcite.

Fossil-fragment voids mainly circular cross sections ~ 1 mm wide; some voids simulating brachiopods. Voids c. 10% of total rock.

Pink band

Pink bands c. 1/2 cm wide.

Cavity with sinter-like fine to medium-grained calcite, coated with black ore.

1-inch thick pockets of unreplaced shell fragments

Fossil-fragment voids c. 5%

34.0%

18.5%

0.13%

0.52%

34.8%

17.8%

0.17%

0.34%

NON METALLIC MINERALS SECTION

DRILL NO. 7

TYPE E 1000

DRILLER Duryea

START 18 July 67

FINISH 20 July 67

LOCATED BY R. TARYVDAS

DATE 27 July 67

TRACED N.H.E.

CHECKED L.V.W.

REEL NO. 2

DATE \$ 6193

REEL NO. 2

DATE \$ 6193

PROJECT S.A.SILICATES CO.
PTY. LTD.

LOG OF DIAMOND DRILL HOLE

HOLE No. V.I.
SERIAL No. 612/68

FEATURE TANTANOOLA DOLOMITE
QUARRY.

LOCATION 3 1/4 mile SE. Tantanoola.

SECTION 195

HUNDRED HINDMARSH

COORDINATES.

ANGLE FROM HORIZONTAL 90°

DIRECTION

R.L. Surface 252 FT.

R.L. Collar 252 FT.

Datum arbitrary

DESCRIPTION OF CORE	DEPTH FEET	LOG	STRUCTURES JOINTS, VEINS, SEAMS, SHEARED ZONES, CRUSHED ZONES	TEST CORE LOGS % WATER LEVEL DATE	CASING LOGS DATE	TEST CORE LOGS % WATER LEVEL DATE	ANALYSES Oxide Loss % DATE	ANALYSES Oxide Loss % DATE	ANALYSES Oxide Loss % DATE	ANALYSES Oxide Loss % DATE
RECRYSTALLIZED LIMESTONE similar 48 to 49 ft.	1									
POLYZOAL CALCARENITE, pale gray, interstitial material partly recrystallized to calcite.	2									
RECRYSTALLIZED LIMESTONE similar 48 to 49 ft.	3									
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	100									

END OF HOLE 58.2 FT

16.82

WEATHERING

FW - Fresh
MW - Moderately weathered
HW - Highly weathered
CW - Completely weathered

C. Approx. about
Less than
Much less than
Core lift
OF the order of
Joint

RACTURE LOG

1.4 IN. GA.
4.4 IN. DIA.
17.5 IN. DIA.

Natural fractures per
foot of core
Equivalent diameter
in inches



Dolomitic limestone



Soil



Dolomitic calcarenite



Shell sand



Calcarenite



Quartz sand



Recrystallized limestone



Clay

NON METALLIC MINERALS SECTION

DRILL No. 7
TYPE E 1000
DRILLER Duryea
START 18 July 1967
FINISH 20 July 1967

LOGGED BY
R. TARRYDAS
DATE 27 July 67
TRACED N.H.E.
CHECKED L.V.W.

SHEET 2 OF 2

DRG. No. S6193 a 1/218

FILE NO. VU 2
 SERIAL NO. 616/68

SECTION 105 HUNDRED HINDMARSH
COORDINATES R.L. Surface
ANGLE FROM HORIZONTAL 90° R.L. Center
DIRECTION — Datum

R.L. Scatter 234 FT
 R.L. Collier 234 FT
 Datum arbitrary

DESCRIPTION OF CORE	WEATHERING LOG	CORE DEPTH LOG	STRUCTURES (FOLDS, VEINS, SEAMS, SHEARED ZONES, CRUSHED ZONES)	LITHOLOGY LOG	WATER LEVEL	CASSIDUS DATE	DRAINAGE LOG	ANALYSIS	OTHER
SOIL, rusty brown to black, clayey (20 to 30%); quartz sand; fine-grained.		1-23 ft.							
SHELL SAND. Fine to coarse-grained with quartz 5 to 10%; weakly consolidated; unconsolidated 6-8 ft.		23-25 ft.							
POLYZOAL CALCARENITE, fine to coarse-grained, partly recrystallized. No core.		25-27 ft.							
RECRYSTALLIZED LIMESTONE, fine-grained, off-white, very hard. No core.		27-29 ft.							
POLYZOAL CALCARENITE similar 8-14.6 ft.		29-31 ft.							
CALCITE SAND, buff to pale grey, fine-grained, slightly to moderately dolomitic. (5-10% Est).		31-33 ft.							
POLYZOAL CALCARENITE, much recrystallized (60 to 70%) pale grey, hard.		33-35 ft.							
CALCITE SAND nondolomitic.		35-37 ft.							
POLYZOAL CALCARENITE mainly broken branches N & E, moderately hard to soft, pale grey, dolomite < 5%. No core.		37-39 ft.							
No core.		39-41 ft.							
No core.		41-43 ft.							
No core.		43-45 ft.							
END OF HOLE 40.0 FT		40.0 ft.							

Not analysed

END OF HOLE 40.0 FT

WEATHERING.

LB	• Fresh	C.	Approx. about
SW	• Slightly weathered	<	Less than
MW	• Moderately "	<<	Much less than
HW	• Highly "	→	Core lift
GW	• Completely "	~	Of the order of
			Joint

FRANKLIN 104

1 4 16 64	Number of types per
1-2-3-4-5-6-7-8-9-10-11-12	first of case
12 3 1/4 3/16	Equivalent diameter
	in inches

五

Dolomitic limestone

遊

Dolomitic
calcarenit

Calcareenit

PLATE 1

Re-captolliz
line, along

Soil

She
Sar

Quar
Sant



Class

NON METALLIC MINERALS SECTION

DRILL NO. 7
TYPE E 1000
DRILLER Duryea
START 25 July 1967
FINISH 25 July 1967

INDEXED BY
 R. TARVYDAS
 DATE 27 July 67
 TRACED N.H.E.
 CHECKED L.V.W.

Page 1 of 1 Doc No: S6195 Kcl 13

REF ID: A6221A MB

7222-3494

PROJECT S.A. SILICATES CO.
PTY. LTD.

LOG OF DIAMOND DRILL HOLE

HOLE No. VO.3.
SERIAL No. 617/68FEATURE TANTANOOLA DOLOMITE
QUARRY
LOCATION 3/4 mile SE. Tantanoola.SECTION 105 HUNDRED HINDMARSH
COORDINATES
ANGLE FROM HORIZONTAL 90°
DIRECTION —R.L. Surface 229 FT.
R.L. Collar 229 FT.
Datum arbitrary

DESCRIPTION OF CORE	WEATHERING	DEPTH LOG	FRACTURE LOG	STRUCTURES JOINTS, VEINS, STAINS, SHEARED ZONES, CRUSHED ZONES	LOSS OF CORE % DATE	WATER LEVEL DATE	CASING LOSS DATE	CaO	MgO	Fe ₂ O ₃ Acid insoluble
SOIL: fine quartz-sand with plant remains.		1 - 2.25 ft	333							
QUARTZ SAND buff to pale gray, fine to medium- grained (0.1 to 0.5 mm), angular to subrounded.		2.25 ft - 2.5 ft								
QUARTZ SAND, similar above but with 10 to 20% brown clay.		2.5 ft - 2.75 ft								
SHELL SAND c. 80% medium to coarse grained shell fragments; 20% fine to medium grained quartz.		2.75 ft - 3.0 ft								
BROWN CLAY c. 60% fine quartz c. 40%		3.0 ft - 3.25 ft								
SHELL SAND buff, slightly clayey top 1 ft; fine to medium grained elsewhere.		3.25 ft - 3.5 ft								
PURE SAND (Drillers log).		3.5 ft - 3.75 ft								
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		28.5 ft - 28.75 ft								
		28.75 ft - 29.0 ft								
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		29.75 ft - 30.0 ft								
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		40.75 ft - 41.0 ft								
		41.0 ft - 41.25 ft								
		41.25 ft - 41.5 ft								
		41.5 ft - 41.75 ft								
		41.75 ft - 42.0 ft								
		42.0 ft - 42.25 ft								
		42.25 ft - 42.5 ft								
		42.5 ft - 42.75 ft								
		42.75 ft - 43.0 ft								
		43.0 ft - 43.25 ft								
		43.25 ft - 43.5 ft								

7022-3537

PROJECT S.A.SILICATES CO. PTY. LTD.		LOG OF DIAMOND DRILL HOLE		HOLE No. W.2. SERIAL No. 822/67	
FEATURE TANTANOOLA DOLOMITE QUARRY.		SECTION 200 HUNDRED HINDMARSH		RL Surface 259 FT RL Collar 259 FT	
LOCATION 3 1/4 mile SE. Tantanoola.		COORDINATES ANGLE FROM HORIZONTAL 90°		Diphen arbitrary	
DIRECTION —		STRUCTURES JOINTS, VENS, SEAMS, SHEARED ZONES, CRUMPLED ZONES		LIFE CORP % 5-10 DATE 10-100	
DESCRIPTION OF CORE		DEPTH FEET	FRACTURE LOG	CaO MgO Fe2O3 Acid Insoluble	
SOIL - dark brown, loosely packed, fine to medium- grained quartz held together by brown clays and fines.		0	1 4 16 64	No water encountered	
RECRYSTALLIZED LIMESTONE fine grained, off white, moderately hard, green mineral c. 1%.		1 2 3 4 5	Intergranular porosity.	34.0% 18.4% 0.20% 0.49%	
DOLOMITIC CALCARENITE buff, soft.		5 6 7 8 9 10	Leached fossil cavities with tubular cross sections c. 10% of rock; crystal framework open.	No core	
No core		11 12 13 14 15	Shell voids c. 5% of total impressions of bivalve beaks; rod like depressions 0.2 to 0.5 mm wide to 1 cm long.	No core	
DOLOMITIC CALCARENITE off- white to pink, fine grained, hard but with 1/2 cm wide softer bands; scattered c. 1% green mineral.		16 17 18 19 20	Voids mainly intergranular; shell voids c. 12%.	No core	
DOLOMITIC CALCARENITE soft, porous, pale pink to buff.		21 22 23 24 25	Rare fossil fragments visible.	No core	
DOLOMITIC CALCITE SAND powdery.		26 27 28 29 30	PETROLOGICAL SAMPLE P479/67	No core	
RECRYSTALLIZED LIMESTONE partly in upper 1/2, completely in lower 1/2, off white, moderately hard, fine grained.		31 32 33 34 35	Porosity, mainly intergranular shell and skeletal voids also present, marked near- horizontal orientation.	No core	
DOLOMITIC CALCITE SAND buff, fine grained.		36 37 38 39 40	Leaching slight, some shell voids; impression of brachiopod beak.	No core	
DOLOMITIC CALCARENITE buff to pale pink, soft, fine grained; scattered c. 1% green mineral.		41 42 43 44 45	No structures visible.	No core	
No core		46 47 48 49 50		No core	
DOLOMITIC CALCARENITE mainly buff (pale pink for last 2 ft) green mineral as above.		51 52 53 54 55		No core	
No core		56 57 58 59 60		No core	
RECRYSTALLIZED LIMESTONE powdery, off white, fine grained.		61 62 63 64 65		No core	

18.35

WEATHERING		NON METALLIC MINERALS SECTION	
FB Fair	C. Approx. about	Dolomitic limestone	Soil
SW Slightly weathered	Less than	Dolomitic calcarenite	Shell Sand
MW Moderately	Much less than	Calcarenite	Quartz Sand
FW Fairly	Core lift	Recrystallized limestone	Clay
CW Completely	Of the order of		
FRACTURE LOG		GRILL No. 7 TYPE E 1000 ORIENT Duryed START 21 June 67 FINISH 26 June 67	
Natural features per foot of core Equivalent diameter in inches		FORGED BY R. TARYDAS DATE 7 July 67 TRACED N.H.E. CHECKED L.V.W.	
1 4 16 64 1/8 3/16 1/4 1/2		SHEET 1 of 2 DRG No. S6197 kd13	

PROJECT S.A. SILICATES CO.
PTY. LTD.

LOG OF DIAMOND DRILL HOLE

HOLE No. W2
SERIAL No. 822/67

SECTION 200

HUNDRED HINDMARSH

FEATURE TANTANOOLA DOLOMITE

CO-ORDINATES

R.L. Surface 259

FT.

QUARRY
LOCATION 3/4 mile SE. Tantanoola.

ANGLE FROM HORIZONTAL 90°

R.L. Core 259

FT.

DIRECTION

Dip from arbitrary

DESCRIPTION OF CORE	NEAR LOG	CORE NO. DEPTH LOG	FRACTURE LOG	STRUCTURES (JOINTS, STRESSES, GRAMS, SHEARED ZONES, CRUSHED ZONES)	LEFT CORE LOSS %	RIGHT CORE LOSS %	DATE	Q ₁₀	M ₅₀	Fe ₂ O ₃	Acid Insoluble
DOLOMITIC CALCARENITE buff to rusty-pink; moderately hard, to hard green mineral as at 1234 ft.		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60		A few impressions of shell fragments.							
RECRYSTALLIZED LIMESTONE off white to buff, hard, very calcareous; green mineral as above.		200 ft 60		Irregular voids 0.5 to 2.0 mm across, with limonitic clay coatings.							
				END OF BORE 60.2 ft							
		30									
		40									
		50									
		60									
		70									
		80									
		90									
		100									

WEATHERING

FB — Fresh
SW — Slightly weathered
MW — Moderately
FW — Fairly
CW — Completely

C. Approx. about
< Less than
< Much less than
~ Core left
~ OF the order of
~ Joint

FRACTURE LOG

1 4 16 ft
17 3 1/2 ft

Natural fractures per
foot of core
Equivalent diameter
in inches

Dolomitic
limestoneDolomitic
calcarenite

Calcarenite

Recrystallized
limestone

Soil

Shell
SandQuartz
Sand

Clay

NON METALLIC MINERALS SECTION

DRILL No. 7
TYPE E 1000
DRILLER Duryea
START 21 June 67
FINISH 26 June 67

LOGGED BY
R. TARYVDAS
DATE 7 July 67
TRACED N.H.E.
CHECKED L.V.W.

SHEET 2 of 2

DRG No

S 6197a

Kdls

PROJECT S.A. SILICATES CO.
PTY. LTD.

LOG OF DIAMOND DRILL HOLE

HOLE No. W.I.
SERIAL 828/67

FEATURE TANTANOOLA DOLOMITE
QUARRY

LOCATION 3 1/4 mile SE. Tantanoola.

SECTION 200

HUNDRED HINDMARSH

COORDINATES

ANGLE FROM HORIZONTAL 90°

DIRECTION

R.L. Surface 245

R.L. Collar 245

Date arbitrary

15-27

DESCRIPTION OF CORE	WEATHERING	CORE SLICE DEPTH LOG R.L. FT.	FRAC- TURE LOG 1 4 16 64	STRUCTURES JOINTS, VEINS, SLAMS, SHEARED ZONES, CRUSHED ZONES	PERCENTAGE LOSS DATE	CaO	MgO	Fe ₂ O ₃	Acid insoluble
SOIL. Wet, brown-black, compact, c. 20% medium to fine grained sand.	Not applicable	195 ft							
DOLOMITIC CALCARENITE, buff to pink, friable, finer grained.		1240 ft		Porosity mainly inter- granular; shell voids, mainly spherical c. 10% of rock.					
DOLOMITIC CALCARENITE off white, hard, slightly leached.		1235 ft		Shell voids					
DOLOMITIC CALCARENITE off- white to very pale pink, fine to medium grained, friable; green mineral, c. 1% grains 0.1 to 0.5 mm.		1230 ft		Pink band					
		1225 ft		Porosity intergranular; shell voids c. 5% of rock.					
		1220 ft							
		1215 ft							
		1210 ft		Pink band.					
DOLOMITIC CALCARENITE similar to above, but harder.		1205 ft		Shell voids c. 10%					
		1200 ft							
No core		1195 ft							
No core		1190 ft							
		1185 ft							
		1180 ft							
		1175 ft							
		1170 ft							
		1165 ft							
		1160 ft							
		1155 ft							
		1150 ft							
		1145 ft							
		1140 ft							
		1135 ft							
		1130 ft							
		1125 ft							
		1120 ft							
		1115 ft							
		1110 ft							
		1105 ft							
		1100 ft							
		1095 ft							
		1090 ft							
		1085 ft							
		1080 ft							
		1075 ft							
		1070 ft							
		1065 ft							
		1060 ft							
		1055 ft							
		1050 ft							
		1045 ft							
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		1015 ft							
		1010 ft							
		1005 ft							
		1000 ft							
		995 ft							
		990 ft							
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		975 ft							
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		880 ft							
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		870 ft							
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		855 ft							
		850 ft							
		845 ft							
		840 ft							
		835 ft							
		830 ft							
		825 ft							
		820 ft							
		815 ft							
		810 ft							
		805 ft							
		800 ft							
		795 ft							
		790 ft							
		785 ft							
		780 ft							
		775 ft							
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		525 ft							
		520 ft							
		515 ft							
		510 ft							
		505 ft							
		500 ft							

WEATHERING

FR Fresh C. Approx. about
SW Slightly weathered < Less than
MW Moderately " << Much less than
FW Highly " - Core lift
CW Completely " ~ OF the order of
Joint

FRAC-
TURE LOG

1 4 16 64 Natural fractures per
foot of core
Equivalent diameter
in inches

Do-
lo-
mitic
lime-
stone
Do-
lo-
mitic
calcare-
nites
Calcare-
nites
Recrystallized
lime-
stone

Soil
Shell
Sand
Quartz
Sand
Clay

NON METALLIC MINERALS SECTION

DRILL No 7
TYPE E 1000
DRILLER Duryea
START 26 June 67
FINISH 29 June 67
LOGGED BY R. TARYDAS
DATE 5 July 67
TRACED N.H.E.
CHECKED L.V.W.
SHEET 1 OF 1 DRG No S6198 Kd.13

PROJECT S.A. SILICATES CO.
PTY. LTD.

LOG OF DIAMOND DRILL HOLE

SECTION 195

HUNDRED HINDMARSH

HOLE No. WVO.1.
SERIAL 601/68

FEATURE TANTANOOLA DOLOMITE
QUARRY.

COORDINATES

ANGLE FROM HORIZONTAL 90°

R.L. Surface 243

FT.

LOCATION 3 1/4 mile SE. Tantanoola.

DIRECTION

R.L. Collar 243

FT.

Depth arbitrary

14-02

DESCRIPTION OF CORE	WEATHERING	DEPTH LOG	CRACK LOG	STRUCTURES	LIQUID	WATER	LOSS	CaO	MgO	Fe ₂ O ₃	Acid Insoluble
SOIL block, damp, carbonaceous with fine-grained quartz.		1 240ft	1 4 16 GA								
SHELL SAND well sorted, fine to medium-grained sand of angular to rounded quartz grains and pale brown, abraded shell fragments, ratio 2:3.		2 235ft		8cm band decomposed, waxy calcareous rock with skeletal sticks 0.3 x 5.00mm, of X02/45-5ft).							
DOLOMITIC CALCARENITE buff to pale pink, partly leached, scattered green mineral <1%.		3 230ft		Shell fragment - voids in unweathered portions.							
		4 225ft		Braccio pipe filling.							
		5 220ft									
		6 215ft									
		7 210ft									
		8 205ft									
		9 200ft									
DOLOMITIC CALCARENITE moderately hard, slightly leached, pink to pale pink.		10 195ft		Rare leached voids indicating former presence of fossil fragments.				33.9%	18.6%	0.15%	0.29%
DOLOMITIC CALCARENITE similar above, scattered green mineral 1-2%.		11 190ft									
DOLOMITIC CALCARENITE similar above, but mottled buff pink; green mineral 1 to 2%.		12 185ft		Voids with stick-like cross sections, semi-horizontal alignment.				33.5%	18.5%	0.11%	0.30%
DOLOMITIC CALCITE SAND fine grained, pale pink.		13 180ft									
		14 175ft									
		15 170ft									
		16 165ft									
		17 160ft									
		18 155ft									
		19 150ft									
		20 145ft									
		21 140ft									
		22 135ft									
		23 130ft									
		24 125ft									
		25 120ft									
		26 115ft									
		27 110ft									
		28 105ft									
		29 100ft									
		30 95ft									
		31 90ft									
		32 85ft									
		33 80ft									
		34 75ft									
		35 70ft									
		36 65ft									
		37 60ft									
		38 55ft									
		39 50ft									
		40 45ft									
		41 40ft									
		42 35ft									
		43 30ft									
		44 25ft									
		45 20ft									
		46 15ft									
		47 10ft									
		48 5ft									
		49 0ft									
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		97 0ft									
		98 0ft									
		99 0ft									
		100 0ft									

WEATHERING	DOLOMITIC Limestone	Soil	NON METALLIC MINERALS SECTION
FR - Fresh	DOLOMITIC calcarenite	Shell Sand	DRILL No. 7
SW - Slightly weathered	Calcarenite	Quartz Sand	TYPE E 1000
WW - Moderately	Recrystallized limestone	Clay	DRILLER Ouryea
HW - Highly			START 4 July 67
CW - Completely			FINISH 4 July 67
FRACURE LOG			LOCATED BY R. TARYVDAS
1 4 16 GA - Natural fractures per foot of core			DATE 7 July 67
17 3 1/2 - Impressed diameter in inches			TRACED N.H.E
			CHECKED L.V.W.
			SHEET 1 of 1 DRG No. S 6199 Kd13

PROJECT SA. SILICATES CO.
PTY. LTD.

LOG OF DIAMOND DRILL HOLE

BULL. No. VV03
MATERIAL No. 611/68

FEATURE TANTANOOLA DOLOMITE

SECTION 195

HUNTER HINDMARSH

QUARRY

COORDINATES

R.L. Surface '215

F.T.

LOCATION 3 1/4 mile SE. Tantanoola.

ANGLE FROM HORIZONTAL 90°

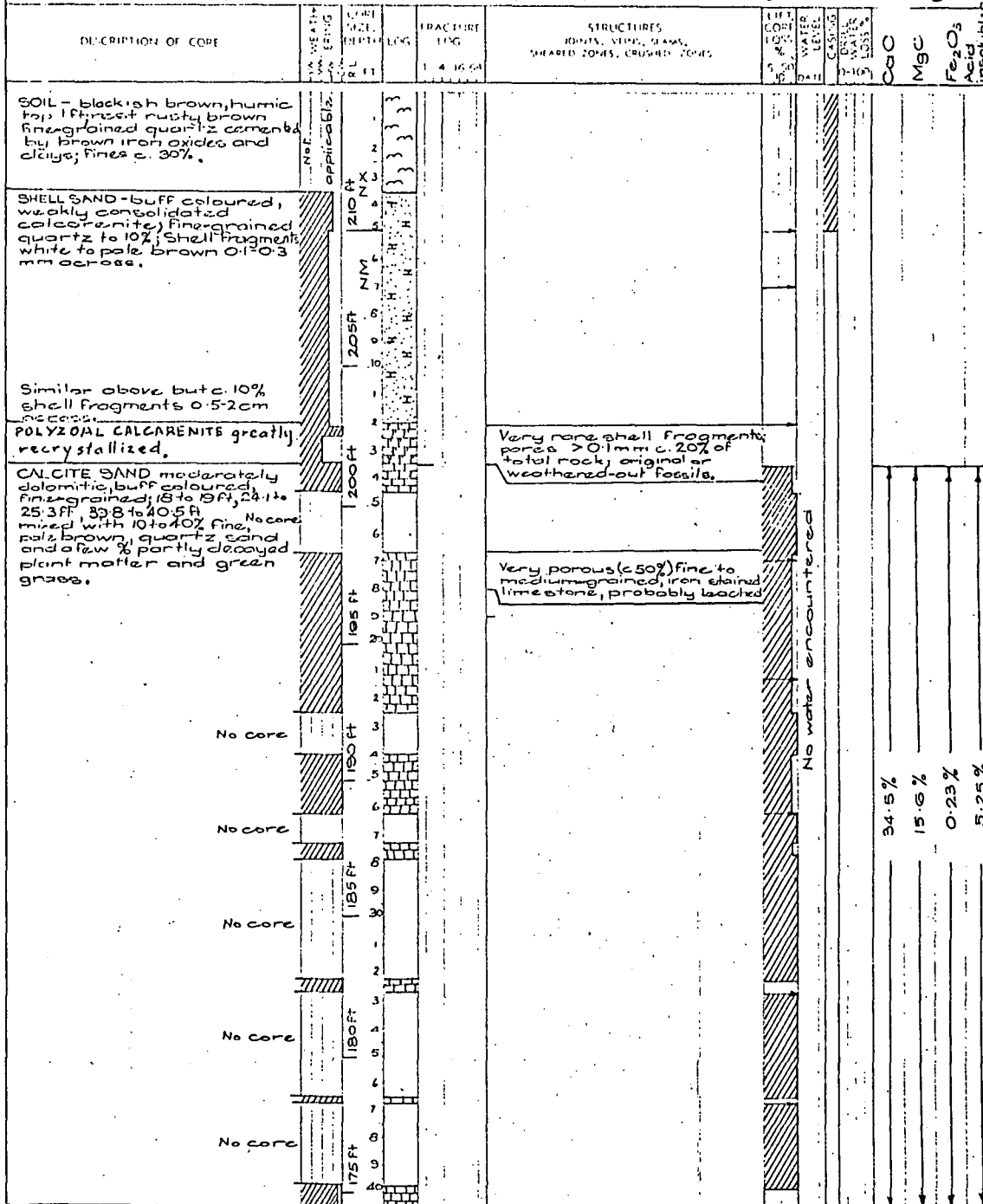
R.L. Collar '215

F.T.

DIRECTION

Datum arbitrary

12.34



END OF HOLE 40.5 ft

WEATHERING

FR - Fresh
SW - Slightly weathered
MW - Moderately
FW - Fairly
CW - Completely

C. Approx. about
Less than
Much less than
Core left
Of the order of
Joint

FRACTURE LOG

1 4 16 64
4 16 64
12 5 1/4 %

Number fractures per
foot of core
Equivalent diameter
in inches



Dolomitic limestone



Soil



Dolomitic calcarenite



Shell



Calcarenite



Quartz sand



Recrystallized limestone



Clay

NON METALLIC MINERALS SECTION

DRILL No 7
TYPE E 1000
DRILLER Duryea
START 17 July 67
FINISH 18 July 67

LOGGED BY R. TARYVDAS
DATE 24 July 67
DRAWN BY N.H.E.
CHECKED L.V.W.

SHEET 1 of 1 DRG No S 6201 Kd.13

PROJECT S.A.SILICATES CO.
PTY. LTD.

LOG OF DIAMOND DRILL HOLE

7022 - 3500

HOLE No. X02

SERIAL No. 603/68

FEATURE TANTANOOLA DOLOMITE
QUARRY

LOCATION 3 1/4 mile SE. Tantanoola.

SECTION 105

HUNDRED HINDMARSH

COORDINATES

ANGLE FROM HORIZONTAL 90°

R.L. Surface 222

FT

R.L. Collar 222

FT

Datum arbitrary

DESCRIPTION OF CORE	WEATHERING	STRUCTURES	LEFT CORE LOSS	WATER LEVEL	GRAVITY	LOSS	Fe ₂ O ₃	Acid Insoluble
SOIL peat-like, brown, porous, fine to medium grained sand c. 60%, rest fine, non clayey.		JOINTS, VENS, STAMS, SHEARED ZONES, CRUSHED ZONES	5.50		0.00			
DOLOMITIC CALCARENITE buff to pink, moderately hard, fine grained.								
CALCITE SAND moderately dolomitic, fine grained.								
POLYZOAL CALCARENITE weathered								
DOLOMITIC CALCARENITE buff with pink mottlings, moderately hard, scattered green mineral c. 2%.								
DOLOMITIC CALCARENITE buff very hard; scattered green mineral grains < 1% black mineral (MnO ₂) segregation 1mm across, < 1% total.								
DOLOMITIC CALCARENITE buff with pink staining, fine grained, moderately leached green mineral c. 1%.								
DOLOMITIC CALCARENITE buff with pink banding 0.2 to 10cm wide and mottling, moderately hard, fine grained.								
DOLOMITIC CALCARENITE similar above but more severely leached.								
DOLOMITIC CALCARENITE buff, fine grained, moderately hard, porous, green mineral c. 1%.								
DOLOMITIC CALCARENITE similar above, but harder and less leached.								
END OF HOLE 32.3ft								

9.85

WEATHERING

FR - Fresh
W - Slightly weathered
MW - Moderately
HW - Highly
CW - Completely

C. Approx. about
L. Less than
M. Much less than
Core left
~ Of the order of
Joint
cf compare
1 4 16 64
12 3 1/2 1/4
Equivalent diameter
in inches



Dolomitic limestone



Soil



Dolomitic calcarenite



Shell Soil



Calcarenite



Quartz sand



Recrystallized limestone



Clay

NON METALLIC MINERALS SECTION

DATE 7
TYPE E 1000
DRILLER Duryea
START 7 July 67
FINISH 7 July 67

LOGGED BY
R. TARYVDAS
DATE 11 July 67
TRACES N.H.E.
CHECKED L.V.W.

DATE 1/01/ DRG No. S6202 Kd.13

PROJECT S.A.SILICATES CO.
PTY. LTD.

LOG OF DIAMOND DRILL HOLE

SECTION 195

HUNDEE HINDMARSH

FEATURE: TANTANOOLA DOLOMITE QUARRY.

ANGLE FROM HORIZONTAL 90°
DIRECTION —

R.L. Sullivan 207 FT
R.L. Cullen 207 FT
Dates arbitrary

LOCATION 3 1/4 mile SE. Tantanoola

DIRECTION

[illegible]

6:19

WEATHERING			NON METALLIC MINERALS SECTION			
FR	Fresh	C. Approx. about		Dolomitic limestone		Soil
W.	Slightly weathered	<< Less than		Dolomitic calcarenite		Shell sand
MW	Moderately	>> Much less than		Calcarenite		Quartz sand
CF	Highly	~ Cone lift		Gypsum efflorescence		Clay
CV	Completely	~ OF the order of joint				
FRACTURE LOG						

PROJECT S.A.SILICATES CO. PTY. LTD.		LOG OF DIAMOND DRILL HOLE		SECTION 105 HUNDRED HINDMARSH		R.L. Surface 196 FT	
FEATURE TANTANOOLA DOLOMITE QUARRY		COORDINATES		R.L. Collar 196 FT		Datum arbitrary	
LOCATION 3/4 mile SE. Tantanoola.		DIRECTION					
DESCRIPTION OF CORE	DEPTH LOG	FRAC. LOG	STRUCTURES JOINTS, STIPS, STAMS, SHEARED ZONES, CRUSHED ZONES	WATER	COLOUR	GRAIN	TESTS
SOIL - porous, brown fine-grained quartz cemented by brown fines.	185 ft						
DOLOMITIC LIMESTONE off white, very hard, fine-grained, pale green minerals c.1%.	180 ft		No structures, porosity nearly nil.				
DOLOMITIC CALCARENITE hard pale pink, stained with limonite.	175 ft		Cavernous openings filled with calcite to 2mm thickness.				
DOLOMITIC CALCARENITE moderately hard to hard, colour mainly buff to pale grey with a few pink bands, fine-grained green minerals < 1% grain size c.0.1mm.	170 ft		limonite 2mm thick				
	165 ft		Fossil-Fragment pores 2-5% average, shapes mainly cylindrical, 5x1mm.				
	160 ft		Pink band				
	155 ft		Pink band				
	150 ft		Pink band				
	145 ft		Pink band				
	140 ft		Cavities 6.1cm wide, filled with fine calcite, incrustations				
	135 ft		Fossil-Fragment pores 2-5% average, similar 8ft-20.5ft				
	130 ft		Incrusted pores similar 20-20.5ft porosity ~ 25%.				
	125 ft		Incrusted voids after branching, polyzoans and bivalves, 5%10% porosity.				
	120 ft		Dense porosity N few %.				
	115 ft		END OF HOLE 30.0ft				
	110 ft						
	105 ft						
	100 ft						
	95 ft						
	90 ft						
	85 ft						
	80 ft						
	75 ft						
	70 ft						
	65 ft						
	60 ft						
	55 ft						
	50 ft						
	45 ft						
	40 ft						
	35 ft						
	30 ft						
	25 ft						
	20 ft						
	15 ft						
	10 ft						
	5 ft						
	0 ft						

9.14

WEATHERING

IF	Fresh	C. Approx. about
SW	Slightly weathered	< Loss than
MW	Moderately	<< Much less than
FW	Fragile	→ Core lift
CV	Completely	~ OF the order of Joint

FRAC. LOG

1 4 in 64
17 3 1/4 in

Mineral fractures per foot of core
Equivalent diameter in inches

	Dolomitic limestone		Soil
	Dolomitic calcarenite		Shell
	Calcarenite		Quartz sand
	Recrystallized limestone		Clay

NON METALLIC MINERALS SECTION

DRILL No. 7	LOGGED BY R. TARRYDAS
TYPE E 1000	DATE 20 July 67
DRILLER Durges	START N.H.E.
START 12 July 67	FINISH LV.W.
FINISH 13 July 67	

DRG No. S6205 Kd13

PROJECT S.A. SILICATES CO.
PTY. LTD.

LOG OF DIAMOND DRILL HOLE

RULE No. 202
SERIAL No. 607/68

FEATURE TANTANOOLA DOLOMITE
QUARRY

SECTION 105

HUNDRED HINDMARSH

COORDINATES

ANGLE FROM HORIZONTAL 90°

R.L. Surface 195 FT.

R.L. Collar 195 FT.

LOCATION 3 1/4 mile SE. Tantanoola.

DIRECTION

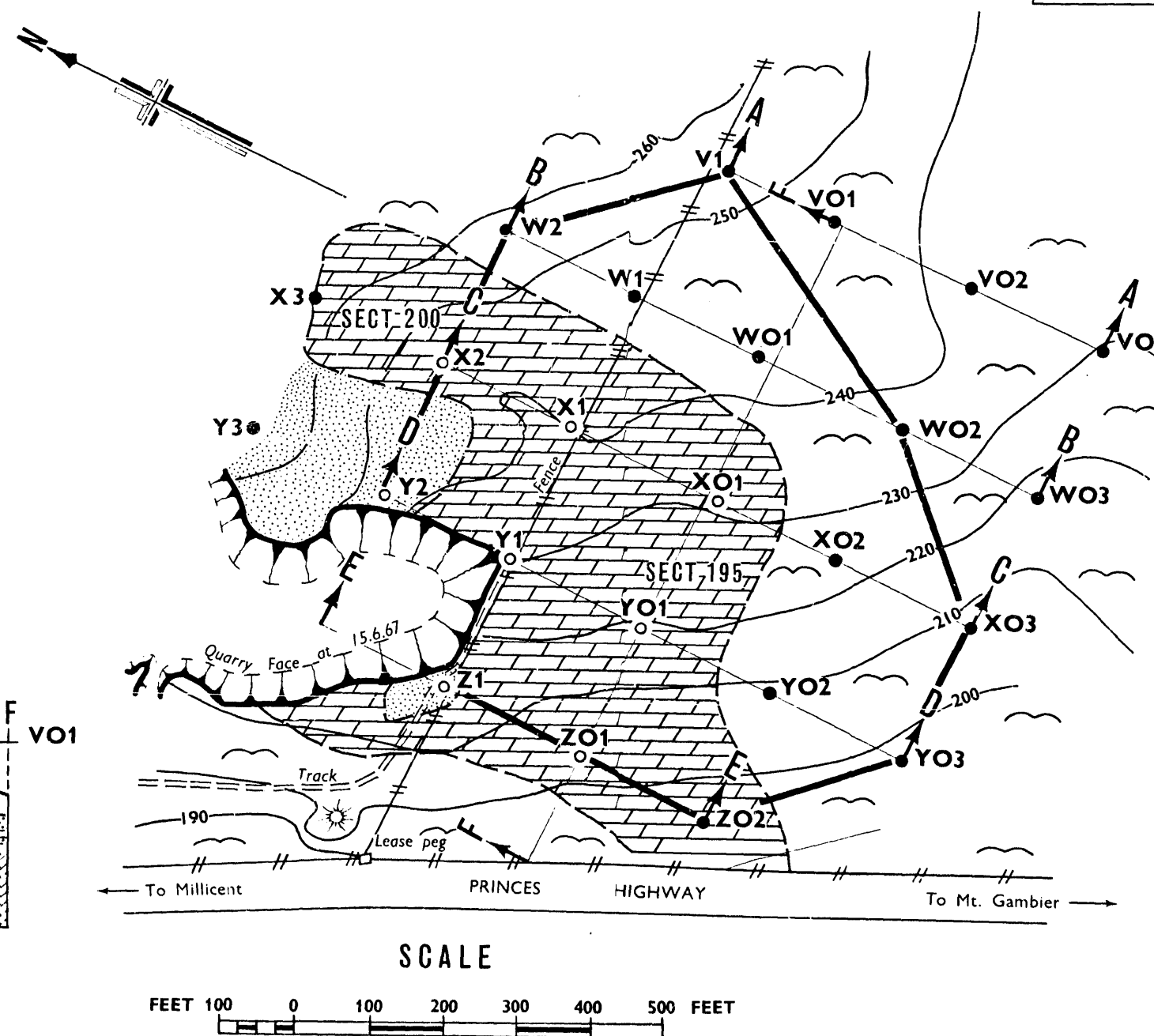
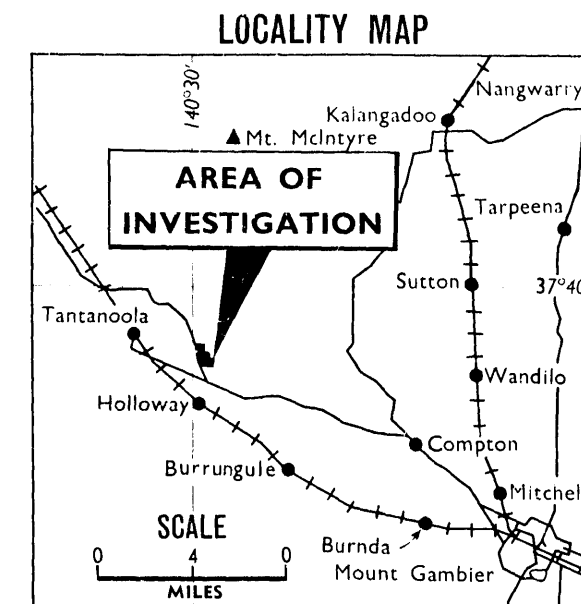
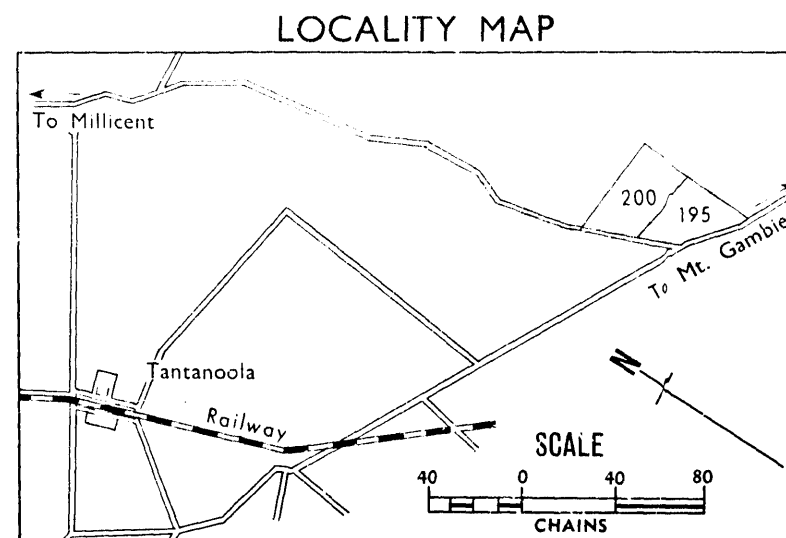
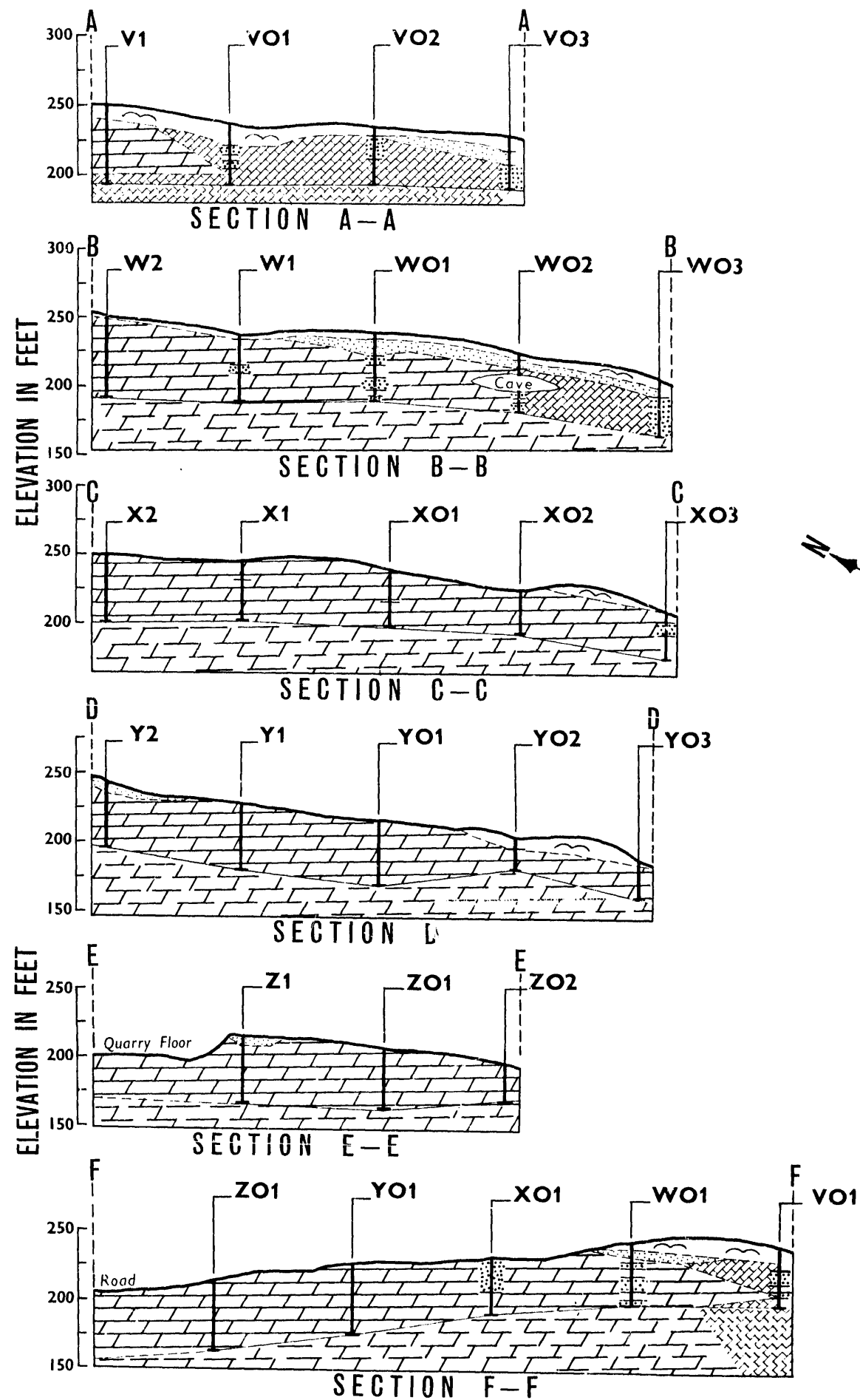
Dip from arbitrary

DESCRIPTION OF CORE	DEPTH FEET	DEPTH METERS	LOG	STRUCTURE JOINTS, STOPS, GAPS, SHELLS, ZONES, CRUSTAL ZONES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION LOSSES	CORRECTION 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APPENDIX 2

Chemical Analyses

BORE	DEPTH IN FEET	Acid-soluble calcium as CaO	Acid-soluble Magnesium as ^{CaO} MgO	Ferric Oxide Fe ₂ O ₃	Acid Insolub. Matter
V1	8 - 33	34.0	18.5	0.13	0.52
	33 - 47.5	34.8	17.8	0.17	0.34
V01	15 - 20.75	43.0	4.35	1.33	6.65
	20.75 - 26.3	31.9	12.5	1.45	11.8
	26.3 - 30.25	52.3	3.10	0.06	0.22
	30.25 - 37.5	41.1	12.4	0.23	0.6
W2	4.6 - 15.0	34.0	18.4	0.20	0.49
	15.0 - 18.1	46.5	8.0	0.08	0.40
	18.1 - 34.3	33.7	18.7	0.15	1.42
	34.3 - 56.0	35.0	17.5	0.18	0.25
W1	5.0 - 26.25	33.6	18.8	0.12	0.32
	26.25 - 50.1	33.6	18.8	0.15	0.24
W01	13.0 - 34.5	33.9	18.6	0.15	0.29
	34.5 - 46.0	33.9	18.5	0.11	0.30
W02	7.0 - 27.0	48.7	2.3	0.42	7.4
	27.0 - 40.0	34.4	18.2	0.14	0.44
W03	13.5 - 40.5	34.5	15.6	0.23	5.25
X02	2.5 - 32.3	34.7	18.1	0.16	0.56
X03	6.0 - 30.1	34.5	18.0	0.19	0.34
Y02	4.8 - 20.3	34.4	18.1	0.15	0.26
Y03	1.5 - 30.0	34.4	18.2	0.22	0.22
Z02	0.2 - 20.75	34.4	18.3	0.16	0.16



LEGEND

- Alluvium
- PLEISTOCENE**
- Shell sand
- OLIGOCENE**
- Dolomite > 17% MgO
- GAMBIER LIMESTONE**
- Limestone < 17% MgO
- Carbonate-sand
- Contours at 10ft. intervals (Arbitrary datum)
- Boreholes drilled 1962
- Boreholes drilled 1967
- Area used in calculating Reserves