

DEPARTMENT OF MINES
SOUTH AUSTRALIA

SCOUT DRILLING FOR BRICK CLAY IN
THE WILLUNGA BASIN AND SHALE AT CLARENDON
Client - Southern Clays Pty. Ltd.

by

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Rept.Bk.No. 74/29
G.S. No. 5345
D.M. No. 511/73

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AMDEL Report MT.1440/74 by M.D. Ware (Scientific Officer - Materials Technology).	

Plan No.	Title	Scale
S10627	Southern Clays Pty.Ltd. Scout Drilling Programme Location and Regional Geology.	1:250,000
73-920	Southern Clays Pty.Ltd. Scout Drilling Programme Location and Geological Sections.	1:50,000

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DEPARTMENT OF MINES
SOUTH AUSTRALIA

Rept.Bk.No. 74/29
G.S. No. 5345
D.M. No. 511/73

SCOUT DRILLING FOR BRICK CLAY IN
THE WILLUNGA BASIN AND SHALE AT CLARENDON

Client - Southern Clays Pty. Ltd.

ABSTRACT

A series of thirteen scout holes were drilled in the Willunga Basin and a further six holes in the Clarendon area to locate clay and shale deposits suitable for brick manufacture.

Abundant clay of Pleistocene Age was encountered in the Willunga - Aldinga area but its suitability for brick making is doubtful due to the presence of carbonate. The weathered Precambrian shale from Clarendon is suitable, provided its firing characteristics are enhanced by blending with a plastic clay.

INTRODUCTION

Mr. J. Begg, representing Southern Clays Pty. Ltd. requested a scout drilling programme in the Willunga - Aldinga and Clarendon areas to locate clay and shale suitable for brick manufacture.

Drill holes were sited by the writer within areas indicated by Mr. Begg. Nineteen holes were drilled along road reserves between 25th and 28th September, 1973, for an aggregate depth of 91.20 metres. A Gemco auger drill mounted on a Landrover was used. Samples were collected over 0.5 metre intervals and logged on site by the writer. Geological logs of these holes are attached in Appendix I.

Five samples selected from the holes in the Aldinga - Willunga area and a sample from each of the six holes in the Clarendon area were submitted to Australian Mineral Development Laboratories - Ceramics Section for assessment. The report by M.D. Ware (Scientific Officer, Materials Technology) is attached as Appendix II.

Drill hole sites are shown on the accompanying plan (No.73-920) together with two cross-sections for the Willunga-Aldinga area.

GEOLOGICAL SETTING

The Willunga Basin, is a tectonic valley in Precambrian sediments of the Adelaide System, bounded on the southeast by the Willunga Fault and on the west by Gulf St. Vincent. The basin occupies a northeast-southwest depression approximately 160 square kilometres in area. Orientation is due to late Tertiary faulting which also tilted the basin to the southeast at a low angle.

Permian, Tertiary and Quaternary sediments fill the basin to a maximum known thickness of 207 metres (680 feet) and are generally covered by a veneer of Recent soil, calcrete and alluvium.

The clay investigated is part of the Ochre Cove Beds of Pleistocene age, which were deposited in a non marine environment on a platform cut earlier by the Pliocene sea. The beds consist of grey-green clays which grade laterally into sandy limestone (Firman, 1969; Twidale et. al., 1966).

The shales in the Clarendon area belong to the Adelaide System of Precambrian age. These fine grained sediments were

deposited in a stable, shallow water environment and later folded and faulted together with the other units of the Mt. Lofty Ranges. During the Tertiary Period, deep weathering produced the characteristic mottled clays and weathered shales which are exposed in road cuttings in this area.

DRILLING PROGRAMME

Willunga Basin

Drillholes SC 1 to SC 9 were drilled along Malpas Road on an east-west ridge which rises to a maximum height of 65 metres (215 feet) above sea level near hole SC 3. From this point the ground slopes gently to the west to hole SC 9 about 45 metres (150 feet) above sea level. The drill holes were spaced at half section intervals of 0.6 kilometres. Additional holes SC 10 to SC 12 were drilled along a north-south line (Bayliss Road) to ascertain lateral variations in the clays and test the lower zones not reached in the first nine holes.

Dark, Recent soil was encountered within the top 0.5 metre in each of the holes, overlying a zone of carbonate rich, calcareous clay. This zone, usually about 2 metres thick, contained abundant small nodules and grains of carbonate in the upper part. The carbonate content decreased with depth and the clays became lighter in colour and slightly sandy. Overall the clay was fairly consistent varying from olive to light yellowish brown in colour.

Red to yellowish red clay containing minor fine sand was encountered below the olive brown clay. Hole SC 11 bottomed in red mottled sand beneath the red clay. Results of these holes are summarised in Table 1 and represented graphically on cross-sections plan No. 73-920.

Table 1 - Summary of Drilling Results - Willunga Basin
(All values in metres)

Hole No.	<u>Over-burden</u>	<u>Olive brown Clay interval thick-ness</u>	<u>Red Clay interval</u>	<u>thick-ness</u>	<u>Sand interval</u>	<u>thick-ness</u>
SC 1	2.2	2.2-5.0	2.8	-	-	-
SC 2	2.0	2.0-5.0	3.0	-	-	-
SC 3	3.0	3.0-6.2	3.2	-	-	-
SC 4	2.3	2.3-7.7	5.4	7.7-9.5	1.8	-
SC 5	2.5	2.5-5.0	2.5	-	-	-
SC 6	3.0	3.0-5.0	2.0	-	-	-
SC 7	4.0	4.0-5.0	1.0	-	-	-
SC 8	3.0	3.0-7.0	4.0	-	-	-
SC 9	1.3	1.3-5.0	3.7	-	-	-
SC10	3.0	3.0-4.7	1.7	4.7-5.7	1.0	-
SC11A	0.7	-	-	-	-	-
SC11	2.5	2.5-3.4	0.9	3.4-5.2	1.8	5.2-5.5
SC12	2.7	2.7-5.0	2.3	-	-	-

A small portion of each sample was treated with dilute hydrochloric acid. The intensity of the reaction was used as a guide to the carbonate content. The samples (listed in Table II) representing clay low in carbonate content, were selected for preliminary laboratory testing:

Table II. Samples Selected for Test Firing, Willunga Basin

<u>Sample No.</u>	<u>Hole No.</u>	<u>Interval(metres)</u>	<u>Colour</u>	<u>Acid Reaction</u>
A960/73	SC 3	4.5 - 6.5	Olive	Slight to moderate
A959/73	SC 3	6.5 - 7.0	Red	Slight to moderate
A958/73	SC 4	4.5 - 8.0	Olive	Moderate
A957/73	SC 8	6.0 - 7.0	Yellowbrown	Nil
A961/73	SC 8	3.0 - 6.0	Yellowbrown	Slight - moderate

Clarendon

Six holes viz. SC13 to SC18, were drilled in the Clarendon area. Each hole was stopped when the drilling rate became unsatisfactorily slow in harder semi-weathered shale.

The following samples were selected for testing from a depth sufficient to avoid topsoil contamination.

Table III - Samples Selected for Test Firing - Clarendon.

Sample No.	Hole No.	Interval (metres)
A.962/73	SC.13	2.0 - 3.5
A.963/73	SC.14	1.0 - 2.5
A.964/73	SC.15	1.0 - 3.5
A.965/73	SC.16	1.0 - 4.75
A.966/73	SC.17	1.0 - 2.55
A.967/73	SC.18	1.0 - 4.0

RESULTS OF LABORATORY TESTING

Willunga Basin - Overall the clays were of poor quality and unsatisfactory for brick manufacture, due to the presence of carbonate and possibly other soluble salts. Localised bloating may occur if inadequately mixed when used in a blend.

Clarendon - All samples exhibited a similar fired appearance, the main disadvantage was their friability. Samples from holes SC13 and SC16 were the most satisfactory and could possibly be used without blending. The remainder should be suitable if blended with a plastic component.

CONCLUSIONS

Large quantities of olive brown clay of Pleistocene age have been indicated by thirteen auger drill holes in the Willunga Basin.

Sample intervals with low carbonate content exhibited poor firing characteristics. Hence no further investigation of the olive ~~green~~ brown clay is warranted.

Red clays elsewhere in the Adelaide area have been used for brickmaking. However, the red clay encountered in this programme was similar in firing characteristics to the olive to brown clays. Further sampling and testing in topographically low areas may locate carbonate free zones of red clay.

Weathered Precambrian shale was encountered at six sites near Clarendon.

All samples showed promise as a raw material for brick manufacture, with samples from holes SC 13 and SC 16 being the most satisfactory.

Grid drilling is required to delineate reserves in properties adjacent to these scout holes.

D. C. Scott

D.C. SCOTT
GEOLOGIST

INDUSTRIAL MINERALS SECTION

29th January, 1974

REFERENCES

Firman, J.B. (1969) in Parkin L.W. (ed.) Handbook of South Australian Geology. p.186-192, 220-222.

Twidale, C.R., Daily, Brian and Firman, J.B. (1966). Eustatic and Climatic History of the Adelaide Area, South Australia: A Discussion. p.237-242.

APPENDIX I

Geological Logs of Drillholes

LAT
LONG
PURPOSE NON METALLICS
MINERAL BRICK CLAY
BORE S/No 206/74
PROJECT SOUTHERN CLAYS
PLAN REF 73-520 SEC 212 HD WILLUNGA
D.M. 511/73 REPT BK 74/29

HOLE NO SCI
RIG GEMCO
DEPTH 5m
ANGLE 90°
AZIMUTH -
ELEV

DEPARTMENT OF MINES - SOUTH AUSTRALIA
LOG OF AUGER DRILL HOLE

AGE FORM	CLASS	DESCRIPTION	LOG	DEPTH m	ACID REACT SI M S VS	CLAY SAND SS SC VC MC CS	SPECIAL COMMENTS	DEPTH FT
RECENT		Topsoil - dark brown, clayey with a few small carbonate nodules, up to 1cm.						
PLEISTOCENE	OVERBURDEN	Clay - brown - with numerous small white carbonate nodules	T T T T T	1				
		Limestone - brownish yellow to white. Few hard nodules up to 1cm. - mostly soft, becoming clayey past 1.9m.		2				
	CLAY	Clay - olive. Change from above gradational. Calcareous in upper 1m. Trace of sand throughout.	T T T T T	3				
	BRICK		T T T T T	4				
	POSSIBLE		T T T T T	5				
		5m End of hole.						
ACID REACTION		CLAY : SAND (%Clay)	MOISTURE		ENVIRONMENT & RESOURCES DIVISION			
SI	Slight	SA Clean sand 0 - 5	Dry		DRILL NO. 184		LOGGED	
M	Medium	SC Slightly clayey 5 - 15	Damp		TYPE GEMCO		D.C. SCOTT	
St	Strong	MC Moderately clayey 15 - 30	Wet		DRILLER J. DAVIS		DATE 2-10-73	
VS	Very Strong	VC Very clayey 30 - 45			START		TCD. A.G.R.	
		CS Clay sand 45 - 55			FINISH		CKD.	
		VS Very sandy 55 - 70			25-9-73			
		MS Moderately sandy 70 - 85						
		SS Slightly sandy 85 - 95						
		CL Clay 95 - 100						

RIG GEMCO

RIG GEMCO

DEPTH 5m.

ANGLE 90°

AZIMUTH —

ELEV.....

P.F NO 610323 MO

LOG OF AUGER DRILL HOLE

RIG GEMCO

LAT

LONG

PURPOSE NON METALLICS PROJECT SOUTHERN CLAYS

DEPTH 7m

ANGLE 90°

MINERAL BRICK CLAY

PLAN REF 73-920 SEC 210 HD WILLUNGA

AZIMUTH -

BORE S/No 906/74

D.M. 511/73

REPT BK 74/29

ELEV

AGE FORM	CLASS	DESCRIPTION	LOG	DEPTH m	ACID REACT	CLAY SAND	SPECIAL COMMENTS	DEPTH FT.
RECENT					SI M S VS	SS SC VC CS VS MS SS CL	SAMPLE NO.	
		<i>Topsail - dark grey, clayey</i>						
PLEISTOCENE	OVERBURDEN	<i>Clay - pale yellow</i>	T T					
		<i>Calcareous - numerous grains & small nodules of carbonate up to 5mm.</i>	T T	1				
			T T	2				
	CLAY	<i>Clay - olive yellow slightly calcareous Gradation change from above.</i>	T T	3				
		<i>Clay - olive. Trace of carbonate in upper 1m of zone. Slightly sandy, stiff. Becoming hard near 6m.</i>	T T	4				
	BRICK		T T	5				
	POSSIBLE	<i>Clay - red, semi-plastic. Trace of sand.</i>	T T	6			A980/73	
		<i>7m End of hole</i>		7			A959/73	

ACID REACTION		CLAY : SAND (%Clay)		MOISTURE	ENVIRONMENT & RESOURCES DIVISION	
SI	Slight	SA Clean sand	0 - 5	Dry 	DRILL NO 184	LOGGED
M	Medium	SC Slightly clayey	5 - 15		TYPE GEMCO	D.C. SCOTT
St	Strong	MC Moderately clayey	15 - 30	Damp 	DRILLER J. DAVIS	DATE 2-10-73
VS	Very Strong	VC Very clayey	30 - 45		START } 25-9-73	TCD A.G.R.
		CS Clay sand	45 - 55	Wet 	FINISH }	CKD
		VS Very sandy	55 - 70			
		MS Moderately sandy	70 - 85			
		SS Slightly sandy	85 - 95			
		CL Clay	95 - 100			

LOG OF AUGER DRILL HOLE

RIG GEMCO

LAT

DEPTH 9.5m

PURPOSE NON METALLICS PROJECT SOUTHERN CLAYS

ANGLE 90°

MINERAL BRICK CLAY PLAN REF.73-920 SEC 209 HD WILLUNGA

AZIMUTH -

BORE S/No 906/74 D.M. 511/73 REPT.BK 74/29

ELEV.

AGE FORM	CLASS	DESCRIPTION	LOG	DEPTH m	ACID REACT	CLAY SAND	SPECIAL COMMENTS	DEPTH FT.
RECENT		Top soil - dark grey-brown clayey			SI M S VS	50 50 0 0 50 50		
PLEISTOCENE	OVERBURDEN	Clay - yellow brown. Calcareous with abundant grains & small nodules of carbonate.	T T T T T T T T T T	1				
			T T T T T T T T T T	2				
	CLAYS	Clay - olive. Change from above gradational. Trace of carbonate to 4m. 5 to 10% coarse sand.	T T T T T T T T T T	3				
			T T T T T T T T T T	4				
	BRICK		T T T T T T T T T T	5				
			T T T T T T T T T T	6				
			T T T T T T T T T T	7				
	POSSIBLE	Clay - light red-brown. Up to 5% sand.	T T T T T T T T T T	8				
			T T T T T T T T T T	9				
		9.5m End of hole						

A958/73

ACID REACTION

CLAY SAND (%Clay)

MOISTURE

ENVIRONMENT & RESOURCES DIVISION

SI Slight
M Medium
St Strong
VS Very Strong

SA Clean sand 0-5
SC Slightly clayey 5-15
MC Moderately clayey 15-30
VC Very clayey 30-45
CS Clay sand 45-55
VS Very sandy 55-70
MS Moderately sandy 70-85
SS Slightly sandy 85-95
CL Clay 95-100

Dry 
Damp 
Wet 

DRILL NO 184
TYPE GEMCO
DRILLER J. DAVIS
START } 26-9-73
FINISH }

LOGGED
D.C. SCOTT
DATE 2-10-73
TCD A.G.R.
CKD

SHEET 1 OF 1

DRG. NO. S10671 Hall

LAT

LOG OF AUGER DRILL HOLE

RIG GEMCO

LONG

DEPTH 5m

PURPOSE NON METALLICS PROJECT SOUTHERN CLAYS

ANGLE 90°

MINERAL BRICK CLAYS

PLAN REF 73-920 SEC 209 HD WILLUNGA

AZIMUTH -

BORE S/No

906/74

D.M. 51/73

REPT. BK. 74/29

ELEV

AGE FORM	CLASS	DESCRIPTION	LOG	DEPTH m	ACID REACT	CLAY : SAND	SPECIAL COMMENTS	DEPTH FT.	
RECENT		Topsoil - dark grey-brown Sandy clay							
PLEISTOCENE	OVERBURDEN	Clay - yellow. Calcareous abundant grains & small nodules of carbonate, becoming less abundant with depth.	T	1					
			T						
			T						
			T						
			T						
	POSSIBLE BRICK CLAY	Clay - olive. Few small grains of carbonate in upper 1m. Slightly sandy throughout, 5 to 10%.	T	3					
			T						
			T						
			T						
			T						
		5m End of hole.							
ACID REACTION		CLAY : SAND (%Clay)		MOISTURE	ENVIRONMENT & RESOURCES DIVISION				
SI Slight	SA Clean sand	0 - 5	Dry	DRILL NO 184		LOGGED			
M Medium	SC Slightly clayey	5 - 15		TYPE GEMCO		D.C. SCOTT			
St Strong	MC Moderately clayey	15 - 30	Damp	DRILLER J. DAVIS		DATE 2-10-73			
VS Very Strong	VC Very clayey	30 - 45		Wet	START } 26-9-73	TCD			
	CS Clay sand	45 - 55	FINISH }						
	VS Very sandy	55 - 70							
	MS Moderately sandy	70 - 85							
	SS Slightly sandy	85 - 95							
	CL Clay	95 - 100							
				SHEET 1 OF 1		DRG. NO. S10672			

LOG OF AUGER DRILL HOLE

RIG GEMCO

LAT

LONG

PURPOSE NON METALLICS PROJECT SOUTHERN CLAYS

DEPTH 5m

MINERAL BRICK CLAY PLAN REF 73/920 SEC 390 HD WILLUNGA

ANGLE 90°

BORE S/No 906/74 D.M. 511/73 REPT BK 74/29

AZIMUTH -

ELEV

AGE FORM	CLASS	DESCRIPTION	LOG	DEPTH m	ACID REACT SI M S VS	CLAY SAND MS CL	SPECIAL COMMENTS	DEPTH FT.
RECENT		Topsoil - dark grey - brown, loamy						
PLEISTOCENE	OVERBURDEN	Clay - olive. Few small carbonate nodules & grains in upper part of this zone - rare past 3m. 5 to 10% coarse sand grains.		1				
				2				
				3				
				4				
	POSSIBLE BRICK CLAY			5				
		5m End of hole.						

ACID REACTION

CLAY : SAND (%Clay)

MOISTURE

ENVIRONMENT & RESOURCES
DIVISION

SI Slight
M Medium
St Strong
VS Very Strong

SA Clean sand 0-5
SC Slightly clayey 5-15
MC Moderately clayey 15-30
VC Very clayey 30-45
CS Clay sand 45-55
VS Very sandy 55-70
MS Moderately sandy 70-85
SS Slightly sandy 85-95
CL Clay 95-100

Dry ☐
Damp ☒
Wet ☐

DRILL NO. 184
TYPE GEMCO
DRILLER J. DAVIS
START 26-9-73
FINISH
LOGGED D.C. SCOTT
DATE 5-10-73
TCD. AGR.
CKD.

SHEET 1 OF 1 DRG. NO. S10673 Hall

LAT

LOG OF AUGER DRILL HOLE

RIG GEMCO

LONG

DEPTH 5m

PURPOSE NON METALLIC PROJECT SOUTHERN CLAYS

ANGLE 90°

MINERAL BRICK CLAY PLAN REF. 73-920 SEC. 384 HD. WILLUNGA

AZIMUTH -

BORE S/No 306/74

D.M. 511/73

REPT. BK. 74/29

ELEV

AGE FORM	CLASS	DESCRIPTION	LOG	DEPTH m	ACID REACT SI M S VS	CLAY: SAND 50 50 00 00 00 00	SPECIAL COMMENTS	DEPTH FT.
RECENT		Topsoil - black brown, Loamy with some carbonate nodules						
PLIESTOCENE	OVERBURDEN	Clay - pale brown. Calcareous - abundant small nodules & grains of carbonate		1				
		Calcareous Clay - pale yellow, very abundant carbonate, upto 5% sand		2				
				3				
		Clay - light yellowish - brown. Carbonate grains still common in upper 1m of this zone. Change from above zone gradational		4				
	POSSIBLE BRICK CLAYS	5m End of hole		5				

ACID REACTION		CLAY: SAND (%Clay)		MOISTURE	ENVIRONMENT & RESOURCES DIVISION	
SI	Slight	SA Clean sand	0 - 5	Dry	DRILL NO. 184	LOGGED
M	Medium	SC Slightly clayey	5 - 15		TYPE GEMCO	D.C. SCOTT
St	Strong	MC Moderately clayey	15 - 30	Damp	DRILLER J. DAVIS	DATE 5-10-73
VS	Very Strong	VC Very clayey	30 - 45		START } 26-9-73	TCD. AGR.
		CS Clay sand	45 - 55	Wet	FINISH }	CKD
		VS Very sandy	55 - 70			
		MS Moderately sandy	70 - 85			
		SS Slightly sandy	85 - 95			
		CL Clay	95 - 100			

LOG OF AUGER DRILL HOLE

LAT
LONG
PURPOSE NON METALLICS PROJECT SOUTHERN CLAYS
MINERAL BRICK CLAY PLAN REF 73-920 SEC 388 HD WILLUNGA
BORE S/No 906/74 D.M. 511/73 REPT BK 74/29

HOLE NO SCB
RIG GEMCO
DEPTH 7m
ANGLE 90°
AZIMUTH —
ELEV

AGE FORM	LOG	DESCRIPTION	LOG	DEPTH m	ACID REACT SI M S VS	CLAY: SAND 50 40 30 20 10 0	SPECIAL COMMENTS SAMPLE NO.	DEPTH FT.
RECENT								
OVERBURDEN		Topsail - dark brown, clayey						
		Clay - reddish-brown						
		Some carbonate grains						
				1				
		Clay - yellowish brown						
		Few small carbonate grains, becoming very rare past 3m. Up to 5% sand		2				
PLEISTOCENE				3				
				4				
				5			A961/73	
				6				
							A957/73	
		7m. End of hole		7				

ACID REACTION		CLAY : SAND (%Clay)		MOISTURE	ENVIRONMENT & RESOURCES DIVISION	
SI Slight		SA Clean sand	0 - 5	Dry 	DRILL NO. 184	LOGGED
M Medium		SC Slightly clayey	5 - 15		TYPE GEMCO	D.C. SCOTT
St Strong		MC Moderately clayey	15 - 30	Damp 	DRILLER J. DAVIS	DATE 5-10-73
VS Very Strong		VC Very clayey	30 - 45		START } 26-9-73	TCD AGR
		CS Clay sand	45 - 55	Wet 	FINISH	CKD
		VS Very sandy	55 - 70			
		MS Moderately sandy	70 - 85			
		SS Slightly sandy	85 - 95			
		CL Clay	95 - 100		SHEET 1 OF 1 DRG. NO. S10675 Hall	

LOG OF AUGER DRILL HOLE

HOLE NO. SC9
RIG GEMCO
DEPTH 5m
ANGLE 90°
AZIMUTH —
ELEV

ACID REACTION		CLAY : SAND (%Clay)		MOISTURE	ENVIRONMENT & RESOURCES DIVISION	
SI Slight	SA Clean sand	0 - 5	Dry	DRILL NO. 184	LOGGED	
M Medium	SC Slightly clayey	5 - 15	Damp		TYPE GEMCO	D.C. SCOTT.
St Strong	MC Moderately clayey	15 - 30		Wet	DRILLER J. DAVIS.	DATE 5-10-73
VS Very Strong	VC Very clayey	30 - 45	FINISH } 26-9-73		START	TCD. AGR.
	CS Clay sand	45 - 55				CKD.
	VS Very sandy	55 - 70				
	MS Moderately sandy	70 - 85				
	SS Slightly sandy	85 - 95				
	CL Clay	95 - 100				
				SHEET 1 OF 1		DRG. NO. S10676 Hall

LOG OF AUGER DRILL HOLE

HOLE NO SC10
RIG GEMCO
DEPTH 5.7m
ANGLE 90°
AZIMUTH -
ELEV

ACID REACTION		CLAY : SAND (%Clay)		MOISTURE	ENVIRONMENT & RESOURCES DIVISION	
SI Slight	SA Clean sand	0 - 5	Dry		DRILL NO. 184	LOGGED
M Medium	SC Slightly clayey	5 - 15			TYPE GEMCO	D.C. SCOTT
St Strong	MC Moderately clayey	15 - 30	Damp		DRILLER J. DAVIS	DATE 8-10-73
VS Very Strong	VC Very clayey	30 - 45			START } 27-9-73	TCD. AGR
	CS Clay sand	45 - 55	Wet		FINISH }	CKD
	VS Very sandy	55 - 70				
	MS Moderately sandy	70 - 85				
	SS Slightly sandy	85 - 95				
	CL Clay	95 - 100			SHEET 1 OF 1 DRG. NO. S10677	

HOLE NO .11A.

LAT...

LONG

PURPOSE NON-METALLICS PROJECT SOUTHERN CLAYS

MINERAL BRICK CLAY PLAN REF. 73-920 SEC 201 HD WILLUNGA

BORE S/No 906/74 D.M. 511/73 REPT BK 74/29

RIG GEMCO.

RIG GEMCO.

DEPTH: 0.7m

ANGLE 90°

AZIMUTH - . . .

ELEV.....

AGE FORM	CLASS	DESCRIPTION	LOG	DEPTH m	ACID REACT	CLAY: SAND	SPECIAL COMMENTS	DEPTH FT
RECENT	OVER- BURDEN				SI M S VS	2 3 4 5 6 7 8 9		
		Topsoil - dark brown, loamy with some carbonate nodules near 0.4m						
		Limestone - white, partly silicified Becoming very hard past 0.6m						
		0.7m End of hole						
		NOTE: HOLE STOPPED DUE TO VERY SLOW PENETRATION PAST 0.6m						

ACID REACTION		CLAY : SAND (%Clay)		MOISTURE	ENVIRONMENT & RESOURCES DIVISION	
SI Slight	SA Clean sand	0 - 5	Dry	DRILL NO. 184	LOGGED	
M Medium	SC Slightly clayey	5 - 15	Damp		TYPE GEMCO	D.C. SCOTT
St Strong	MC Moderately clayey	15 - 30		Wet	DRILLER J. DAVIS	DATE 5-10-73
VS Very Strong	VC Very clayey	30 - 45	FINISH		START	TCD AGR
	CS Clay sand	45 - 55		27-9-73	CKD	
	VS Very sandy	55 - 70				
	MS Moderately sandy	70 - 85				
	SS Slightly sandy	85 - 95				
	CL Clay	95 - 100				

LAT
LONG
PURPOSE NON METALLICS PROJECT SOUTHERN CLAYS
MINERAL BRICK CLAY PLAN REF.73-920 SEC 200 HD WILLUNGA
BORE S/No. 906/74 D.M. 511/73 REPT.BK 74/29

HOLE NO. 11
RIG GEMCO
DEPTH 5.3m
ANGLE 90°
AZIMUTH -
ELEV.

DEPARTMENT OF MINES—SOUTH AUSTRALIA
LOG OF AUGER DRILL HOLE

AGE FORM	CLASS	DESCRIPTION	LOG	DEPTH m	ACID REACT	CLAY SAND	SPECIAL COMMENTS	DEPTH FT.
RECENT		Topsoil - dark brown. Loamy with some carbonate nodules						
PLEISTOCENE	OVERBURDEN	Calcareous Clay - pale brown very abundant small nodules & grains of carbonate. Some sand.	T T T T T T	1				
			T T T T T T	2				
	CLAY	Clay - pale olive. Still with a few carbonate grains in upper 1/2m. Change from above zone gradational. Up to 10% sand	T T T T T T	3				
	BRICK	Clay - reddish yellow. Up to 20% sand. Few small carbonate grains. Hard	T T T T T T	4				
	POSSIBLE	Clay - light red. 10-15% sand quite hard.	T T T T T T	5				
		Clay - red. Hard, compact with 10%-15% sand.	T T T T T T					
	SAND	Sand light red, mottled. Fine grained. Up to 30% clay						
		5.5m End of hole						

ACID REACTION		CLAY : SAND (%Clay)		MOISTURE	ENVIRONMENT & RESOURCES DIVISION	
SI	Slight	SA	Clean sand	0 - 5	DRILL NO. 184 TYPE GEMCO DRILLER J. DAVIS START } 27-9-73 FINISH }	LOGGED D.C. SCOTT DATE 5-10-73 TCD AGR CKD
M	Medium	SC	Slightly clayey	5 - 15		
St	Strong	MC	Moderately clayey	15 - 30		
VS	Very Strong	VC	Very clayey	30 - 45		
		CS	Clay sand	45 - 55		
		VS	Very sandy	55 - 70		
		MS	Moderately sandy	70 - 85		
		SS	Slightly sandy	85 - 95		
		CL	Clay	95 - 100		

LOG OF AUGER DRILL HOLE

RIG GEMCO

LAT

LONG

DEPTH 5m

PURPOSE NON METALLICS PROJECT SOUTHERN CLAYS

ANGLE 90°

MINERAL BRICK CLAY PLAN REF: 73-920 SEC 383 HD WILLUNGA

AZIMUTH

BORE S/N 906/74

D.M. 511/73

REPT. BK 74/29

ELEV

AGE FORM	CLASS	DESCRIPTION	LOG	DEPTH m	ACID REACT. SI M S VS	CLAY : SAND 50 40 30 20 10 0	SPECIAL COMMENTS	DEPTH FT.
RECENT		Topsoil - dark brown. Loamy with some carbonate nodules						
PLEISTOCENE	OVERBURDEN	Calcareous Clay - very pale brown with abundant carbonate	T T T T T T T T T T	1 2				
		Clay - yellowish brown. Still with some carbonate grains in upper 1/2 m. Change from above zone gradational 5 to 10% sand	T T T T T T T T T T	3 4				
		5m End of hole		5				
	POSSIBLE BRICK CLAY							

ACID REACTION		CLAY : SAND (% Clay)		MOISTURE	ENVIRONMENT & RESOURCES DIVISION	
SI	Slight	SA	Clean sand 0 - 5	Dry	DRILL NO 184	LOGGED
M	Medium	SC	Slightly clayey 5 - 15	Damp	TYPE GEMCO	D.C. SCOTT
St	Strong	MC	Moderately clayey 15 - 30	Wet	DRILLER J DAVIS	DATE 5-10-73
VS	Very Strong	VC	Very clayey 30 - 45		START } 27-9-73	TCO
		CS	Clay sand 45 - 55		FINISH }	CKD
		VS	Very sandy 55 - 70			
		MS	Moderately sandy 70 - 85			
		SS	Slightly sandy 85 - 95			
		CL	Clay 95 - 100			

SHEET 1 OF 1	DRG. NO S10680 Hall
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RIG . . . GEMCO
DEPTH 3.5m
ANGLE . . . 90°
AZIMUTH . . .
ELEV

LOG OF AUGER DRILL HOLE

ACID REACTION		CLAY : SAND (%Clay)		MOISTURE	ENVIRONMENT & RESOURCES DIVISION	
SI Slight	M Medium St Strong VS Very Strong	SA Clean sand	0 - 5	Dry 	DRILL NO 184	LOGGED
		SC Slightly clayey	5 - 15		TYPE GEMCO	D.C. SCOTT
		MC Moderately clayey	15 - 30	Damp 	DRILLER J DAVIS	DATE 5-10-73
		VC Very clayey	30 - 45		START	TCD
		CS Clay sand	45 - 55	Wet 	FINISH	27-9-73
		VS Very sandy	55 - 70			
		MS Moderately sandy	70 - 85		CKD	
		SS Slightly sandy	85 - 95			
	CL Clay	95 - 100				
				SHEET 1 OF 1		DRG. NO. S10681Haid

LOG OF AUGER DRILL HOLE

HOLE NO. SC 14
RIG GEMCO
DEPTH 2.5m
ANGLE 90°
AZIMUTH —
ELEV

P.F NO 810329 MG

LAT

LOG OF AUGER DRILL HOLE

RIG GEMCO

LONG

DEPTH 3.5m

PURPOSE NON METALLICS PROJECT SOUTHERN CLAYS

ANGLE 90°

MINERAL BRICK SHALE PLAN REF 73-920 SEC 75B HD KUITPO (NTH)

AZIMUTH

BORE S/No

966/74

D.M. 50/73

REPT BK

74/29

ELEV

AGE FORM	CLASS	DESCRIPTION	LOG	DEPTH m	ACID REACT	CLAY SAND	SPECIAL COMMENTS	DEPTH FT.
RECENT	O/B	Topsoil-dark grey to grey. Loamy plus some gravel, becoming clayey						
PROTEROZOIC	BRICK SHALE & CLAY	Clay-reddish yellow with few sand grains, becoming harder past 2m. Yellowish brown past 2m (approx.) with occasional small patches of white clay		1				
				2				
		Weathered shale-reddish yellow with occasional patch of white clay		3				
		Weathered shale-brownish yellow, very hard past 3m. powdery.						
		3.5m End of hole						

A964/73

ACID REACTION

CLAY : SAND (%Clay)

MOISTURE

ENVIRONMENT & RESOURCES DIVISION

SI Slight
M Medium
St Strong
VS Very Strong

SA Clean sand 0-5
SC Slightly clayey 5-15
MC Moderately clayey 15-30
VC Very clayey 30-45
CS Clay sand 45-55
VS Very sandy 55-70
MS Moderately sandy 70-85
SS Slightly sandy 85-95
CL Clay 95-100

Dry ☐
Damp ☒
Wet ☐

DRILL NO 184
TYPE GEMCO
DRILLER J DAVIS
START } 28-9-73
FINISH }
LOGGED D.C. SCOTT
DATE 9-10-73
TCD AGR
CKD

SHEET 1 OF 1 DRG NO S10683H40

LAT

LOG OF AUGER DRILL HOLE

RIG GEMCO

LONG

DEPTH 4.75m

PURPOSE NON METALLICS PROJECT SOUTHERN CLAYS

ANGLE 90°

MINERAL BRICK SHALE PLAN REF 73-920 SEC 73B HD. KUITPO (NTH.)

AZIMUTH -

BORE S/No 906/74

D.M. 511/73

REPT BK 74/29

ELEV

AGE FORM	CLASS	DESCRIPTION	LOG	DEPTH m	ACID REACT	CLAY SAND	SPECIAL COMMENTS	DEPTH FT.
RECENT	PROTEROZOIC				SI M S VS	SS SC VC MC CS VS	SAMPLE NO.	
		Topsoil - black, loamy with some yellow sand	///					
		Clay - reddish-yellow to yellow. Trace of sand in upper part of zone	- - -	1				
	BRICK SHALE & CLAY	Weathered shale - yellow. Becoming very hard, compact past 4.5m. Cuttings powdery past 3.5m.	- - -	2				
			- - -	3			A965/73	
			- - -	4				
		4.75m End of hole						

ACID REACTION

CLAY SAND (% Clay)

MOISTURE

ENVIRONMENT & RESOURCES DIVISION

SI Slight

M Medium

St Strong

VS Very Strong

SA Clean sand

SC Slightly clayey

MC Moderately clayey

VC Very clayey

CS Clay sand

VS Very sandy

MS Moderately sandy

SS Slightly sandy

CL Clay

0 - 5

5 - 15

15 - 30

30 - 45

45 - 55

55 - 70

70 - 85

85 - 95

95 - 100

Dry

Damp

Wet

DRILL NO 184

TYPE GEMCO

DRILLER J DAVIS

START 28-9-73

FINISH

LOGGED

DC SCOTT

DATE 9-10-73

TCD AGR

CKD

SHEET 1 OF 1

DRG NO S10684.H46

LOG OF AUGER DRILL HOLE

RIG GEMCO.

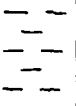
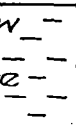
DEPTH 2.55m.

ANGLE 90°

AZIMUTH

ELEV.

LAT
LONG
PURPOSE NON METALLICS PROJECT SOUTHERN CLAY
MINERAL BRICK SHALE PLAN REF.73-920 SEC 706 HD NOARLUNGA
BORE S/No 906/74 D.M. 511/73 REPT. BK 74/29

AGE FORM	CLASS	DESCRIPTION	LOG	DEPTH m	ACID REACT SI M S VS	CLAY SAND SS VS	SPECIAL COMMENTS SAMPLE NO.	DEPTH FT.
RECENT	OVER- BURDEN	Topsoil—dark brown. Loamy becoming clayey						
PROTEROZOIC	BRICK SHALE & CLAY	Clay—brownish-yellow. Occasional fragments of white quartz upto 2mm. *		1				
		Weathered shale—yellow with white patches in upper 1/2m. Still with rare quartz fragments. Very hard past 2m		2			A966/73	
		2.55m End of hole						
		* NOTE: VEIN QUARTZ FLOAT OBSERVED IN AREA ADJACENT TO HOLE.						

ACID REACTION		CLAY : SAND (%Clay)		MOISTURE	ENVIRONMENT & RESOURCES DIVISION	
SI	Slight	SA Clean sand	0 - 5	Dry 	DRILL NO. 184	LOGGED
M	Medium	SC Slightly clayey	5 - 15		TYPE GEMCO	D.C. SCOTT
St	Strong	MC Moderately clayey	15 - 30	Damp 	DRILLER J. DAVIS	DATE 9-10-73
VS	Very Strong	VC Very clayey	30 - 45		START 28-9-73	TCD AGR
		CS Clay sand	45 - 55	Wet 	FINISH	CKD
		VS Very sandy	55 - 70			
		MS Moderately sandy	70 - 85			
		SS Slightly sandy	85 - 95			
		CL Clay	95 - 100			

LAT
LONG
PURPOSE NON METALLIC PROJECT SOUTHERN CLAYS
MINERAL BRICK CLAY PLAN REF 73-020SEC 1417 HD NOARLUNGA
BORE S/NO 206174 D.M. 51173 REPT.BK. 74129

DEPARTMENT OF MINES - SOUTH AUSTRALIA
LOG OF AUGER DRILL HOLE

HOLE NO SC18
RIG GEMCO
DEPTH 4m
ANGLE 90°
AZIMUTH -
ELEV.

AGE FORM	CLAS	DESCRIPTION	LOG	DEPTH m	ACID REACT	CLAY SAND	SPECIAL COMMENTS	DEPTH FT.
RECENT	OVER BURDEN				SI M S VS	5 8 2 5 0 5 1 2 5	SAMPLE NO.	
		Top soil - brown, loamy plus some gravel in upper 0.3m. Clay becoming more abundant with depth						
PROTEROZOIC	SHALE	Weathered shale yellow to brownish yellow with few patches of white clay. Very hard past 3m - powdery cuttings		1				
				2				
	BRICK			3				
		4m End of hole		4				

206174

ACID REACTION

CLAY : SAND (%Clay)

MOISTURE

ENVIRONMENT & RESOURCES DIVISION

SI Slight
M Medium
St Strong
VS Very Strong

SA Clean sand 0 - 5
SC Slightly clayey 5 - 15
MC Moderately clayey 15 - 30
VC Very clayey 30 - 45
CS Clay sand 45 - 55
VS Very sandy 55 - 70
MS Moderately sandy 70 - 85
SS Slightly sandy 85 - 95
CL Clay 95 - 100

Dry ☒
Damp ☒
Wet ☒

DRILL NO. 184
TYPE GEMCO
DRILLER J DAVIS
START } 28-9-73
FINISH }

LOGGED
D.C. SCOTT
DATE 10-9-73
TCD
CKD

SHEET 1 OF 1 DRG. NO. S10686

APPENDIX II - Results of Test Firing
Preliminary Assessment for
Brick Manufacture
AMDEL Report MT.1440/74

by

M.D. Ware
(Scientific Officer - Materials Technology)

IDENTIFICATION

APPLICANT'S MARK	DEPT.SAMPLE NO.	HOLE NO.	INTERVAL METRES	LOCALITY	AMDEL NO.
1	A957/73	SC8	6-7	Willunga-Aldinga area	CE4454
2	A958/73	SC4	4.5 - 8	Willunga-Aldinga area	CE4455
3	A959/73	SC3	6.5 - 7	Willunga-Aldinga area	CE4456
4	A960/73	SC3	4.5-6.5	Willunga-Aldinga area	CE4457
5	A961/73	SC8	3-6	Willunga-Aldinga area	CE4458
6	A962/73	SC13	2-3.5	Clarendon area	CE4459
7	A963/73	SC14	1-2.5	Clarendon area	CE4460
8	A964/73	SC15	1-3.5	Clarendon area	CE4461
9	A965/73	SC16	1-4.75	Clarendon area	CE4462
10	A966/73	SC17	1-2.55	Clarendon area	CE4463
11	A967/73	SC18	1-4	Clarendon area	CE4464

1. INTRODUCTION

On behalf of Southern Clays Pty. Ltd. the South Australian Mines Department undertook a short drilling programme in the Willunga-Aldinga and Clarendon areas. The object being to define possible deposits of plastic clay and shale suitable for brick manufacture. In all, eighteen holes were sited and drilled using a Gemco auger. The samples collected have been logged by the South Australian Mines Department. To date six shale samples from the Clarendon area have been tested and five clay samples from the Willunga-Aldinga area. The clay samples tested were selected based on the results of a brief "acid drop" test which indicated that the majority of the materials contain a carbonate mineral in varying proportions, from low to very high. From past experience with clays from this area the presence of a high percentage of carbonate, 10% or more, causes premature vitrification and bloating. The clay samples examined were selected as follows:

(a) Samples 1-4 represent material which showed little or no fissibility with the acid drop test.

(b) Sample 5 represents a section containing material of varying carbonate content. The results on this sample should reflect the properties of the remaining samples of clay not tested which contain relatively high levels of carbonate.

2. EXAMINATION PROCEDURE

Samples selected for testing were crushed in a mortar and pestle to pass 16 mesh B.S., moistened with water and pressed into 2.5 cm. diameter buttons for firing. The pressed materials were dried at room temperature, then 45°C and finally at 105°C and fired in a semi muffle oil fired Major kiln at fifty degree intervals between 950°C and 1200°C with half an hour soak on temperature.

Each fired specimen was measured to determine the firing shrinkage and water absorption was determined by 24 hour cold water immersion. Results are shown in Table 1.

3. DISCUSSION AND RECOMMENDATIONS

3.1 Clays

Sample CE4454 (A957/73 SC8 6-7m)

This material has a relatively low vitrification temperature and begins to bloat at 1100°C. The degree of scumming and bloating is possibly indicative of a high proportion of carbonate and soluble salt being present.

Used in moderate proportions the clay may be satisfactory for blending with a more refractory shale to lower the firing temperature.

Sample CE4455 (A958/73 SC4 4.5-8m)

Being less plastic than the previous sample this clay has a low firing and drying shrinkage. It begins to bloat between 1050°C and 1100°C. Surface cracks are evident from 950°C and edges are generally rough throughout the range. The water absorption is fairly constant up to 1050°C when the material begins to bloat and vitrify, however, the absorption results could be slightly high due to the body cracks.

Very little advantage could be derived from the use of this clay in a blend as it has a low degree of plasticity and a short vitrification range which is accompanied by bloating. It is not recommended for brick manufacture.

Sample CE 4456 (A959/73 SC 3 6.5-7m)

This is a non plastic clay with a very short vitrification range. It fires to form a friable body below 1100°C and bloats above this temperature. It has none of the properties satisfactory for brick manufacture and has no potential use in this industry.

Sample CE4457 (A960/73 SC 3 4.5-6.5m)

Basically a non plastic material similar to the previous sample although the vitrification range (1050-1150°C) is slightly greater.

It may possibly be used in a brick body but not in any major proportion. A plastic component would still be necessary for production of a good quality extruded body.

Sample CE4458 (A961/73 SC8 3-6m)

A pseudoplastic clay very high in carbonate which produces a scum at and above 1050°C and induces bloating at and above 1100°C.

Although the clay appears plastic it is relatively short and would be unsatisfactory for extrusion. It is not recommended for brick making.

3.2 Shales

All of the shale samples examined have a similar fired appearance and their main disadvantage is their friability. Samples CE4459 and CE4462 are the most satisfactory for brick production and may possibly be used without blending if fired to around 1050°C. Further tests are however necessary to ascertain their extrusion behaviour.

The remaining materials are relatively friable even at higher temperatures and develop hair-line cracks upon firing. Samples CE4460 and CE4463 are slightly refractory but could be suitable if blended with a plastic component.

Similarly sample CE4464 may be satisfactory if blended with a plastic component to increase body strength and lower the water absorption to around 12% at 1000 - 1050°C.

3.3. General

Overall the clays are of poor quality and are not satisfactory for brick manufacture. The presence of carbonate and possibly other soluble salts is deleterious to the fired products and use of the clays in blends may introduce localized bloating if inadequately mixed.

Since the results on samples CE4454 to CE4457 are somewhat less than encouraging, and these represent the better selected samples, it is recommended that an alternative source area for clay be sought. If this is not possible then deeper drilling in the same area is recommended following by further similar tests. (In general the clays improve with depth and the carbonate content reduces).

All of the shales may be further investigated depending upon the availability of each material. However, samples CE4459 and CE4462 should have priority.

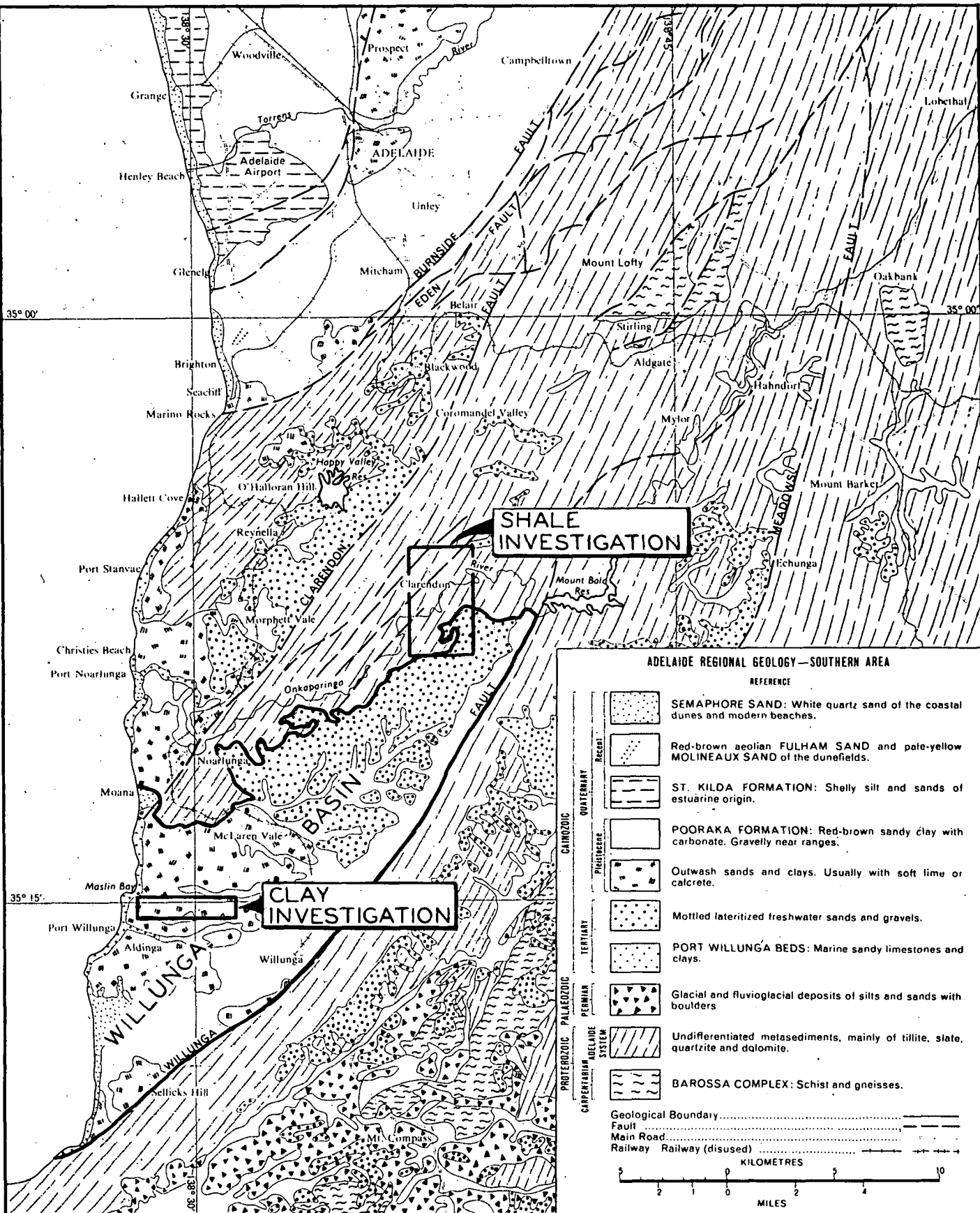
TABLE 1

SAMPLE	TEMP. °C	FIRED COLOUR	% TOTAL SHRINKAGE	% WATER ABSORPTION	COMMENTS
CE4454	105	Greyish olive 10Y	1.3	-	Clean
	950	Moderate Reddish brown 10R	7.2	3.9	Smooth and firm
	1000	Moderate Reddish brown 10R	8.3	2.3	Slight hair-line cracks
	1050	Moderate Reddish brown 10R	8.0	1.0	Slight scumming and bloating. More surface hair-line cracks.
	1100	Dark Reddish brown 10R	3.7	0.6	Scumming and slight bloating. Hair-line cracks on surface.
	1150	Dark Reddish brown 10R	-2.0	1.2	Scumming and bloating. Surface hairline cracks.
					Slightly ragged
CE4455	105	Light olive grey 5Y	0.8	-	
	950	Moderate Reddish brown 10R	2.7	7.6	Hair-line surface cracks
	1000	Moderate Reddish brown 10R	3.0	8.8	Hair-line surface cracks. Rough surface.
	1050	Moderate Reddish brown 10R	3.3	7.0	Hair-line surface cracks. Rough surface.
	1100	Dark Reddish brown 10R	2.9	3.9	Hair-line surface cracks. Slight scumming and rough surface.
	1150	Dark Reddish brown 10R	-1.1	3.1	Hair-line cracks. Scumming and slight bloating. Very rough surface.

CE4456	105	Pale Reddish brown 10R	0.6	-	Pitted surfaces
	950	Moderate Reddish brown 10R	0.6	9.6	Pitted and hair-line surface cracks. Rough and crumbly surface.
	1000	Moderate Reddish brown 10R	1.0	8.5	Pitted and hair-line surface cracks. Rough and crumbly surface.
	1050	Moderate Reddish brown 10R	1.0	9.6	Pitted and hair-line surface cracks. Rough and crumbly surface.
	1100	Dark Reddish brown 10R	0.9	8.4	Slightly pitted and rough surface. Hair-line cracks.
	1150	Dark Reddish brown 10R	-3.4	2.8	Rough surface, slight scumming and bloating. Hair-line cracks.
CE4457	105	Moderate yellowish brown 10YR	0.7	-	Slightly rough surface.
	950	Moderate Reddish brown 10R	2.6	8.9	Hair-line surface cracks. Rough edges.
	1000	Moderate Reddish brown 10R	2.8	9.1	Hair-line cracks on surface.
	1050	Moderate Reddish brown 10R	2.9	7.9	Hair-line cracks on surface.
	1100	Dark Reddish brown 10R	3.2	4.0	Hair-line cracks on surface. Slightly scumming.
	1150	Dark Reddish brown 10R	-3.2	2.4	Hair-line surface cracks. Bloating and scumming.
CE4458	105	Light olive grey 5Y	0	-	Pressed cleanly
		Moderate Reddish brown 10R	6.4	6.8	Slightly pitted.
	1000	Moderate Reddish brown 10R	7.4	5.2	Slightly pitted. Few surface cracks.
	1050	Moderate Reddish brown 10R	8.5	3.5	Surface cracks and slight scumming.
	1100	Dark Reddish brown 10R	4.5	1.2	Surface hair-line cracks. Slight bloating and increased scumming.
	1150	Dark Reddish brown 10R	-9.5	1.5	Larger hair-line cracks. Scumming and bloating.

CE4459	105	Dusky yellow 5Y	0.2	-	Pressed cleanly.
	1000	Moderate Reddish orange 10R	3.0	11.4	Smooth surfaces, slightly ragged edges.
	1050	Moderate Reddish orange 10R	4.9	8.7	Smooth surfaces.
	1100	Moderate Reddish orange 10R	5.6	7.2	Smooth surfaces.
	1150	Dark Reddish brown 10R	6.8	3.9	Smooth surfaces.
	1200	Very dusky red 10R	7.9	1.8	Smooth surfaces.
CE4460	105		0.3	-	Slightly pitted surface.
	1000	Moderate Reddish orange 10R	1.4	14.4	Few surface hair-line cracks. Rough surface.
	1050	Moderate Reddish brown 10R	1.7	13.8	Few surface hair-line cracks. Rough surface.
	1100	Moderate Reddish brown 10R	2.3	12.5	Surface hair-line cracks. Rough surface.
	1150	Moderate Reddish brown 10R	2.3	12.2	Surface hair-line cracks. Rough surface.
	1200	Dark Reddish brown 10R	2.2	12.0	Surface hair-line cracks. Rough surface.
CE4461	105		0.3	-	Pressed slightly rough.
	1000	Moderate Reddish orange 10R	2.3	15.1	Slightly rough surface with a few hair-line surface cracks.
	1050	Moderate Reddish orange 10R	3.6	11.8	Slightly rough surface with a few hair-line surface cracks.
	1100	Moderate Reddish	4.1	10.5	Rough surface with a few hair-line surface cracks.
	1150	Moderate Reddish brown 10R	4.2	10.6	Slightly rough with a few hair-line surface cracks.
	1200	Dark Reddish	4.4	9.8	Slightly rough with a few hair-line surface cracks.

CE4462	105	-0.1	-	Pressed cleanly.
	1000 Moderate Reddish orange 10R.	1.5	15.6	Smooth surfaces.
	1050 Moderate Reddish orange 10R.	3.4	12.1	Smooth surfaces.
	1100 Moderate Reddish brown 10R.	5.0	8.0	Smooth surfaces.
	1150 Greyish red 5R	6.9	3.4	Smooth surfaces.
	1200 Very dusky red 10R	7.7	1.1	Smooth surfaces.
CE4463	105	-0.2	-	Pressed fairly cleanly.
	1000 Moderate Reddish orange 10R.	1.1	19.1	Smooth surfaces with a few hair-line cracks.
	1050 Moderate Reddish orange 10R.	2.4	17.2	Smooth surfaces with a few hair-line cracks.
	1100 Moderate Reddish brown 10R.	3.3	14.8	Smooth surface with a few hair-line cracks.
	1150 Moderate Reddish brown 10R.	4.3	13.4	Smooth surfaces with a few hair-line cracks.
	1200 Dark Reddish brown 10R.	4.7	11.6	Smooth surfaces with increased cracks.
CE4464	105	-0.0	-	Pressed cleanly.
	1000 Moderate reddish orange 10R	0.7	15.9	Fairly smooth surfaces.
	1050 Moderate Reddish orange 10R.	1.6	14.4	Fairly smooth surfaces.
	1100 Moderate Reddish orange 10R.	3.1	12.3	Fairly smooth surfaces.
	1150 Greyish red 10R	4.8	7.9	Smooth surfaces.
	1200 Greyish red 5R	6.4	4.4	Smooth surfaces.



NON METALLICS
SECTION

DEPARTMENT OF MINES—SOUTH AUSTRALIA

Scale: 1:250,000

Compiled: D. SCOTT

SOUTHERN CLAYS PTY. LTD.

Date: 11TH DEC. 1973

Drn. A.G.R. Ckd. A.F.

SCOUT DRILLING PROGRAMME
LOCATION AND REGIONAL GEOLOGY

Drg. No.

S10627

Geology from Adelaide and Barker
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SHALE INVESTIGATION



CLAY INVESTIGATION

