DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

REPT. BK. NO. 89/7
SHELLGRIT RESOURCES, EASTERN SPENCER GULF, SOUTH AUSTRALIA - 1984 DRILLING AND SAMPLING PROGRAMME

GEOLOGICAL SURVEY

By

E.A. DUBOWSKI
SENIOR GEOLOGIST

&

R.J. SOUTH
TECHNICAL OFFICER

MINERAL RESOURCES BRANCH

JANUARY, 1989

DME 470/81

CONTENTS PAGE

TABLES

PLANS

Figure	Title	Scale	Plan No.
1	Location and Map Sheet Index	1:500 000	S20443
2	Port Germein to Port Pirie Shellgrit Deposits and Drillhole Locations	1:25 000	88-528
3	Wood Point to Fisherman Bay Shellgrit Deposits and Drillhole Locations	1:25 000	88-527
4	Fisherman Bay to Tickera Shellgrit Deposits and Drillhole Locations	1:25 000	88-526

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

REPT.BK.NO. 89/7
DME. NO. 470/81
NEC NO. 1

SHELLGRIT RESOURCES, EASTERN SPENCER GULF, SOUTH AUSTRALIA - 1984 DRILLING AND SAMPLING PROGRAMME

ABSTRACT

A series of arcuate beach ridges, generally less than 2 metres high, lie within 1 km of the coastline between Port Germein and Tickera. These Holocene ridges range in age from 4400 years to present and are composed of shell fragments.

Sporadic production from Hds. Pirie and Wandearah since 1907, totals 115,635 tonnes mainly for use as limestone flux.

An auger drilling programme of 309 holes has outlined total reserves of 26.5 million tonnes of shellgrit with all but 3.2 million tonnes lying within the 800 metre coastal zone.

INTRODUCTION

Shellgrit has been worked sporadically since 1907 from Hds. Pirie and Wandearah with a total of 115,635 tonnes being mined for use as limestone flux. No systematic mapping, drilling, analysis or documentation of the resource has previously been attempted.

The 1984 drilling programme followed investigations undertaken on the eastern side of Gulf St. Vincent (Pain and South, 1987). Drilling was carried out with a Daihatsu - mounted machine auger between May and June 1983 and September 1984 and was supervised in the field by R. J. South, Technical Officer. Other deposits occur further north between Port Germein and Port Augusta, particularly in the Yatala Harbor - Red Cliff Point area but these were not investigated in the current programme.

Air photo interpretation of the area between Port Germein and Tickera was undertaken in 1988 to produce a map of the extent of the shellgrit resources.

For the purpose of this study the area was divided into three sub-areas - Figure 1:

1. Port Germein to Port Pirie
2. Wood Point to Fisherman Bay
3. Fisherman Bay to Tickera

LOCATION, ACCESS AND TOPOGRAPHY

The deposits lie within 1 km of the coastline between Port Germein, 215 km NW of Adelaide, and Tickera, 150 km NW of Adelaide. At Fisherman Bay, north of Port Broughton, shell grit deposits are generally found along the margins of the embayment.

Ease of access to the deposits depends upon location:

. between Port Germein and Port Pirie there is reasonable access along public tracks between Highway One and the coast.

. between Jarrold Point and Fisherman Bay access is via farm tracks, but there are very few on the northern part of the area between Wood Point and Jarrold Point.

. between Port Broughton and Tickera there is limited public access but most of this area can be accessed via a farm track running most of the length of the shellgrit deposit.

The topography is generally flat and underlain by beach and samphire deposits. Mangroves are present between Point Jarrold and Port Pirie. Shellgrit dunes form an undulating surface generally less than 2 metres above the adjacent swamps, although immediately north of Fisherman Bay heights of up to 7 metres are reached.

PREVIOUS INVESTIGATIONS

A summary of shellgrit investigations, along the eastern coast of Gulf St. Vincent, is presented in Pain and South (1987).

There had been no previous comprehensive assessment of shellgrit resources along the coast of Spencer Gulf although Miles (1956) examined shell dunes at Port Paterson, approximately 13 km south of Port Augusta. Consolidated shell dunes assayed 56.97% CaCO and unconsolidated shell dunes assayed 85.24% $CaCO_3$.

Johns (1963) obtained one sample of shellgrit from BHAS leases at Wood Point which assayed 8l.3% $CaCO_3$.

Investigations by BHAS of their Wood Point leases in 1954 delineated reserves totalling 681,700 tonnes averaging 45.5% CaO, which at 25,000 tonnes per year, was sufficient for approximately 27 years.

MINERAL TENURE

Two classes of mining tenements are current in the Wood Point - Fisherman Bay area, Mineral Leases and Extractive Mineral Leases.

Under the Mining Act 1971, as amended, 'Extractive Minerals' means sand, gravel, stone, shell, shale or clay, but does not include minerals mined for a prescribed purpose such as limestone flux.

Ten claims were initially obtained by Broken Hill Associated Smelters Pty. Ltd. (BHAS) at Wood Point (Hd. Wandearah) in April 1949. Mineral Leases 3008 - 3017 were granted over these claims for 21 years from 1 July 1955. All but one of these leases was subsequently cancelled; ML 3008 in Section E expires on 30 June, 1990.

A further lease, ML 4325 in Section 1048 Hd. Mundoora, was granted to BHAS on 3 December 1973, and is still current. The leases are held by BHAS as reserve areas in case of supply disruption from their Coffin Bay deposit.

EML 5503 in Section 205 Hundred of Wandearah was granted to L. R. Ferme for 7 years from 12 February 1988. No production has been recorded to date.

PRODUCTION

Production of shellgrit from the Spencer Gulf deposits has been very sporadic and is given in Table 1. All recorded production has been used for limestone flux except for 15 tonnes mined by the Port Pirie Corporation for agricultural use in 1940.

TABLE 1
TOTAL SHELLGRIT PRODUCTION

Hundred	Producer	Year	Tonnes
Pirie	J. Campbell	1907	14,459
		1908	12,829
		1909	9,104
		1910	14,073
		1911	13,402
	Pt. Pirie Corp.	1940	15
			63,882
Wandearah	BHAS	1951	3,009
		1952	8,337
		1953	5,890
		1954	19,691
		1955	4,689
		1956	9,850
		1957	287
			51,753

GEOLOGICAL SETTING

Burne and Colwell (1982) defined Spencer Gulf as a "funnel-shaped extension of the southern Australian continental carbonate province ... which lies in a compound rift valley system known as the Torrens Sunklands". The northern gulf region is an area considered to be seismically active (McCue and Sutton 1979).

Broad intertidal and supratidal zones are developed on the eastern side of the gulf on which Burne and Colwell (1982) recognised two types of shoreline: exposed to wave action;

characterised by shell beach strandline and berms composed of decomposing sea-grass;

protected, no significant wave action;

characterised by growth of mangroves (Avicennia marina) which protect the complex intertidal zone.

The shellgrit deposits form long, low, arcuate beach ridge systems in the high intertidal zone and are constructed of

molluscs and gastropods from the low intertidal to subtidal zone, transported landwards by wave action on rising tides and during storm activity (Burne 1982).

Studies of the coastal sediment stratigraphy and chronology (Burne 1982; Burne and Colwell 1982; Hails and others 1983; Belperio and others 1984) have been used to determine Holocene sea levels. Burne (1982) used material from beach ridges, base of the intertidal and top of the subtidal facies as sealevel indicators. Carbon 14 dates on shell ridges from near Wood Point gave ages from 4400 to 970 years, younging seaward. One sample from Fisherman Bay gave an age of 2630 years. On his evidence Burne (1982) concluded that sea levels were up to 5.2 metres higher than present levels 5000 years ago and that shorelines have prograded over the last 5000 years.

Belperio and others (1984) used age-height data on the Posidonia australis seagrass facies to conclude that sea level was at least 2.5 metres higher than present levels from 6000 to 1700 years ago. A fall in sea level to present levels occurred between 1740 and 1640 years BP, a result of local tectonic uplift.

The name St. Kilda Formation was proposed by Firman (1966) for the mangrove, samphire and supratidal sediments north of Adelaide. Cann and Gostin (1985) recognised the St. Kilda Formation to include all Holocene sediments deposited under marine processes.

On the basis of Belperio and others (1984), it is suggested that the eastern-most shell ridges within Fisherman Bay (Figure 3) marked the developing shoreline within a sheltered embayment prior to local tectonic uplift. Subsequent intertidal and evaporitic sediments developed within the bay leaving tidal channels as evidence of prior high water level.

DRILLING

Drilling was accomplished in two stages using a Gemco power auger mounted on a Diahatsu 4WD light truck. A total of 220 holes were drilled in the first programme between Port Germein and Port Broughton in the period 2 May to 16 June 1983. A further 89 holes were drilled between Port Broughton and Tickera from 25 - 28 September 1984.

R. J. South, Technical Officer, SADME supervised both programmes with assistance from S. Ewen, M. Flintoft,
B. Atterton and A. Smith.

Auger holes reached a maximum of 9 metres, although most were less than 2 metres. A summary of drillhole intersections is presented in Table 2 with details of each hole given in Appendix 1.

TABLE 2

Summary of Drill Hole Intersections

	No. of Holes		Shellgrit Inter-section	Average Over-burden (m)	Average Shellgrit Thickness (m)
Port Germein to Port Pirie	60 (Nos.1-6)		57	0.3	1.2
Wood Point to Fisherman Bay	146 (Nos.61-206)		138	0.2	1.6
Fisherman Bay to Tickera	103 (Nos.207-309)	93	0.2	1.4	
Total	309		288		

CHEMICAL ANALYSES

Of the 309 holes drilled, a selection of 166 samples were analysed, with results presented in Appendix 2. Calcium carbonate content was calculated from the CaO analyses assuming all CaO is present as carbonate. Results are summarized in Table 3.

TABLE 3
Summary of Chemical Analyses

	No. of samples	Range CaCO3	Average CaCO3
Port Germein to Port Pirie	21	23-78%	48%
Wood Point to Fisherman Bay	62	30-88%	75%
Fisherman Bay to Tickera	83	20-89%	59%

Although all areas are capable of producing shellgrit the area between Wood Point and Fisherman Bay has an overall higher average CaCO3, although it is much lower than shellgrit present on the eastern St. Vincent Gulf (Pain and South, 1987).

RESERVES

Reserves were calculated from drillhole intersections and a density of one tonne per cubic metre has been assumed for in situ material i.e. shellgrit and overburden. This is consistent with density used by Pain and South (1987) for the shellgrit resources of Eastern St. Vincent Gulf.

All drill holes except 194 and 195 which were not located, are shown on Figures 2 to 4. For the purpose of this report drill holes were numbered commencing at Port Germein and finishing at Tickera. Not all the shellgrit assessed in this report was accessible to the drill rig.

Seven areas are outlined on Figures 2 to 4, for which reserves are calculated. Shellgrit within and outside the 800 metre coastal protection zone were calculated separately. Tables 4 and 5 presents a summary of reserves for all areas, with figures being rounded down to nearest thousand tonnes.

TABLE 4

Shellgrit Reserves - Eastern Spencer Gulf

	Within 800 m Coast Zone		Outside 800 m Coast Zone	
	Overburden	Shellgrit	Overburden	Shellgrit
Port Germein to Port Pirie				
Area 1	788,000	2,76,000		
Area 2	38,000	109,000	14,000	35,000
Wood Point to Fisherman Bay				
Area 3	1,968,000	10,591,000	432,000	2,453,000
Area 4	462,000	3,990,000	42,000	191,000
Area 5			61,000	236,000
Fisherman Bay to Tickera				
Area 6	1,235,000	5,695,000	129,000	363,000
Area 7	4,000	205,000		
TOTAL	4,495,000	23,316,000	678,000	3,278,000

TABLE 5

Total Shellgrit Reserves

		Overburden	Shellgrit
Area 1	788,000	2,726,000	
	2	52,000	144,000
	3	2,400,000	13,044,000
	4	504,000	4,181,000
	5	61,000	236,000
	6	1,364,000	6,058,000
	7	4,000	205,000
TOTAL	5,173,000	26,594,000	

From the data presented in Tables 4 and 5, only 3.2 million tonnes of the total 26.5 million tonnes lie outside the 800 metre coastal zone, amounting to 12% of the inferred reserves.

Shellgrit resources north of Area 3, between Wood Point and Point Jarrold have not been drilled and are excluded from reserve estimates because of inaccessibility.

CONCLUSIONS

Shellgrit resources on Eastern Spencer Gulf have been used mainly as limestone flux.

Total recorded production since 1907 is 115,635 tonnes of which only 15 tonnes has been used for agricultural purposes.

Of the 26.5 million tonnes inferred reserves within the areas investigated, 3.2 million tonnes lie outside of the 800 metre coastal protection zone.

Grade is significantly lower than shellgrit on Eastern St. Vincent Gulf, thus restricting its use.

ED:RS;AM

E. DUBOWSKI

R. SOUTH

REFERENCES

Belperio, A.P., Hails, J.R., Gostin, V.A. and Polach, H.A. 1984. The stratigraphy of coastal carbonate banks and Holocene sea levels of northern Spencer Gulf, South Australia. Marine Geology, 61, 297 - 313.

Burne, R.V. 1982. Relative fall of Holocene sea level and coastal progradation, northeastern Spencer Gulf, South Australia. BMR Journal of Australian Geology & Geophysics, 7, 35 - 45.

Burne, R.V. and Colwell, J.B. 1982. Temperate carbonate sediments of northern Spencer Gulf, South Australia: a high salinity 'foramol' province. Sedimentology, 29, 223 - 238.

Cann, T.H and Gostin, V.A. 1985. Coastal sedimentary facies and foraminiferal biofacies of the St Kilda Formation at Port Gawler, South Australia. Transactions of the Royal Society of South Australia, 109 (4), 121-142.

Firman, J.B. 1966. Stratigraphic units of Late Cainozoic Age in the Adelaide Plains Basin, South Australia. Quarterly Geological Notes, Geological Survey of South Australia, 17, 6 - 9.

Hails, J.R. Belperio, A.P. and Gostin, V.A. 1983. Holocene sea levels of upper Spencer Gulf, South Australia, in Hopley, D. (ed) 1983 Australian sea levels in the last 15,000 years: a review. Australian Report for IGCP 61, Department of Geography, James Cook University of North Queensland, 48 - 53.

Johns, R.K. 1963. Limestone, Dolomite and Magnesite resources of South Australia. Geological Survey of South Australia, Bulletin 38, 61 - 63.

McCue, K.F. and Sutton, D.J., 1979. South Australian earthquakes during 1976 and 1977. Journal of the Geological Society of Australia, 26, 231 - 236.

Pain, A.M. and South, R.J. 1987. Shellgrit resources, eastern St. Vincent Gulf - Port Gawler to Port Wakefield. South Australian Department of Mines & Energy, Unpublished Report 87/108.

APPENDIX 1

EASTERN SPENCER GULF SHELLGRIT DRILL HOLE DATA

APPENDIX 1A

Shellgrit Drillhole Data: Port Germein to Port Pirie

DH No.	Overburden Thickness (m)	Shellgrit Thickness (m)	DH No.	Overburden Thickness (m)	Shellgrit Thickness (m)
1	0.3	0.9	30		
2	0.4	1.1	31	0.2	1.0
3	0.4	1.1	32	0.3	1.0
4	0.4	1.1	33	0.4	1.6
5	0.4	0.9	34	0.3	1.2
6	0.3	1.2	35	0.2	1.1
7	0.4	1.1	36	0.1	1.4
8	0.3	1.3	37	0.2	1.2
9	0.3	1.1	38	0.3	1.1
10	0.3	0.9	39	0.4	0.9
11	0.3	1.2	40	0.3	2.2
12	0.3	1.9	41	0.2	1.3
13	0.3	1.2	42	0.3	2.2
14	0.2	1.2	43	0.2	1.1
15	No sample		44	0.3	1.0
16	0.3	1.2	45	0.2	1.1
17	0.3	1.1	46	0.2	1.1
18	0.2	1.1	47	0.2	1.0
19	0.8	1.0	48		3.0
20	0.8	0.5	49		3.0
21	1.3	1.2	50	0.7	0.6
22	0.1	1.2	51		1.5
23	0.3	1.0	52	0.5	0.7
24	No sample		53	0.2	1.0
25	0.4	1.6	54	0.3	1.0
26	0.4	1.5	55	0.5	0.9
27	0.4	1.1	56	0.2	0.8
28	0.4	0.8	57	0.3	1.0
29	0.2	1.0	58	0.2	0.4
			59	0.2	1.0
			60	No sample	

APPENDIX 1B

Shellgrit Drillhole Data: Wood Point to Fisherman Bay

DH No. (m)	Overburden Thickness (m)	Shellgrit Thickness (m)	DH No.	Overburden Thickness	Shellgrit Thickness
61	0.2	1.8	105	0.2	1.0
62	0.3	0.9	106	0.3	1.4
63	0.3	1.0	107	0.2	1.0
64	0.3	0.9	108	0.2	0.8
65	0.3	1.0	109	0.2	0.8
66	0.3	0.9	110	0.2	0.8
67	0.2	1.3	111	0.3	1.4
68	0.2	1.8	112	0.3	1.0
69	0.1	1.9	113	0.3	1.0
70	0.3	0.5	114	0.2	0.8
71	0.1	0.6	115	0.2	0.8
72	0.3	2.7	116	0.1	0.9
73	0.2	0.9	117	0.5	0.6
74		1.3	118	0.1	1.2
75	0.2	1.0	119	0.1	1.1
76	0.1	1.4	120	0.1	2.4
77	0.3	0.7	121		0.6
78	0.1	1.2	122	0.2	1.3
79	0.2	0.8	123	No sample	
80		1.0	124	0.2	0.8
81	0.2	1.2	125	0.3	0.5
82		1.3	126	0.3	0.8
83		1.2	127	0.3	1.2
84	0.2	0.7	128	0.4	1.6
85	0.2	1.2	129	0.1	1.4
86	0.2	0.8	130	0.4	2.6
87	0.2	1.1	131	0.8	1.7
88	0.2	0.6	132	0.4	2.6
89	0.1	0.7	133	0.5	2.0
90	0.2	1.1	134	0.4	2.6
91	0.3	1.2	135	No sample	
92	0.3	0.9	136	0.6	1.9
93	0.2	1.5	137	0.3	2.2
94		1.7	138	0.6	0.4
95	0.2	1.1	139	0.5	2.5
96	0.2	1.0	140	0.4	1.6
97	0.2	2.3	141	0.4	2.1
98	0.3	0.9	142	0.3	4.2
99	0.3	0.5	143	0.4	1.6
100	0.2	1.4	144	0.3	1.2
101	0.3	1.0	145	0.3	1.2
102	0.2	1.2	146	0.3	1.2
103	0.2	1.1	147	0.3	1.2
104	0.2	1.0	148	0.2	1.3

APPENDIX 1B (Continued)

DH No.	Overburden Thickness (m)	Shellgrit Thickness (m)	DH No.	Overburden Thickness	Overburden Thickness	Shellgrit Thickness
149		1.5	191			5.5
150	0.4	1.1	192			7.7
151		9.0	193			2.5
152	0.3	2.2	194	0.2		2.4
153	0.3	0.7	195	No Sample		
154	0.3	2.2	196	No Sample		
155	0.3	0.7	197	0.3		1.2
156	0.3	0.7	198	0.3		0.7
157	0.1	0.7	199	0.1		0.6
158	0.3	1.0	200	0.3		1.2
159	0.2	1.0	201	0.2		1.6
160	0.2	0.8	202	0.3		1.7
161	0.4	1.2	203			
162	No Sample		204	0.3		0.7
163	0.5	2.0	205	0.3		0.4
164	0.3	2.2	206	0.3		1.5
165	0.4	1.6				
166		2.3				
167	0.2	1.0				
168	0.5	0.7				
169	0.3	1.2				
170	0.3	1.2				
171	0.2	1.7				
172	0.2	2.4				
173	0.4	1.1				
174		0.5				
175	No Sample					
176	0.4	1.0				
177	0.5	4.0				
178		2.7				
179	0.4	1.8				
180	No Sample					
181	No Sample					
182	0.5	1.0				
183	0.3	2.7				
184		3.0				
185		3.0				
186		4.5				
187		7.8				
188		3.0				
189		4.0				
190		4.0				

APPENDIX 1C

Shellgrit Drillhole Data: Fisherman Bay to Tickera

DH No.	Overburden Thickness (m)	Shellgrit Thickness (m)	DH No.	Overburden Thickness	Shellgrit Thickness
207		1.3	251	0.1	1.3
208		0.6	252	0.1	0.9
209	No sample		253	Sand	
210		3.0	254	0.7	1.3
211		2.8	255	0.3	1.2
212		1.9	256	0.1	1.4
213	0.2	1.2	257	0.2	1.6
214		1.2	258	0.1	1.4
215		0.4	259		1.5
216	0.2	1.0	260	0.5	1.4
217	0.3	1.1	261	0.2	1.7
218	0.3	0.7	262	0.5	2.0
219		1.0	263	0.3	1.1
220	0.3	0.9	264	0.3	1.2
221	0.5	1.0	265	0.3	1.5
222	0.2	1.1	266	0.1	0.8
223	0.3	0.8	267	0.1	1.1
224	0.2	2.3	268	0.2	1.4
225	Sand		269	0.2	0.6
226	0.1	2.0	270	0.2	1.1
227	0.2	1.0	271	1.0	0.5
228	0.1	1.1	272	0.6	1.5
229	0.2	2.3	273	0.2	2.3
230		2.0	274	0.2	0.8
231	0.3	1.6	275	0.2	0.6
232	0.3	1.9	276	0.2	1.0
233	0.2	1.6	277	0.3	0.6
234	0.3	3.2	278	0.4	0.8
235	0.3	3.2	279	0.2	1.2
236	0.2	3.3	280	0.3	0.6
237	0.2	2.8	281	0.1	0.9
238	0.2	2.8	282	0.4	0.4
239	0.25	2.65	283	0.2	1.1
240	0.2	2.6	284	0.1	0.8
241	0.5	1.0	285	0.4	1.1
242	0.3	2.5	286	0.3	0.7
243	0.2	1.3	287	Sand	
244	Sand		288	1.0	1.8
245	0.2	1.7	289	0.3	2.2
246	0.2	1.8	290	0.2	0.5
247	Sand		291	0.4	0.8
248	0.2	1.3	292	0.2	0.8
249	0.2	1.1	293	0.2	0.8
250		2.0	294	1.0	0.5

APPENDIX 1C (Continued)

DH No.	Overburden Thickness (m)		Shellgrit Thickness (m)
295	0.2		1.9
296	0.2		1.1
297	0.4		0.8
298	0.2		1.0
299	0.3		1.1
300	0.3	0.7	
301	0.3		1.1
302	Sand		
303	Sand		
304	Sand		
305	Sand		
306			1.3
307			1.3
308	0.1		1.3
309			1.4

APPENDIX 2

EASTERN SPENCER GULF SHELLGRIT CHEMISTRY

DH No.	SHELLGRIT INTERSECTION (metres)	SiO2 %	TiO2 %	Al2O3 %	Fe2O3 %	MnO %	MgO %	CaO %	Na2O %	K2O %	P2O5 %	LOI %	TOTAL %	CaCO3 %
PORT GERMEIN TO PORT PIRIE														
3	0.4 - 1.5	65	0.16	2.16	0.86	0.02	1.08	16.2	0.33	0.63	<0.01	13.6	100.04	29
6	0.3 - 1.5	51.2	0.14	1.61	0.71	0.02	1.3	24.2	0.34	0.44	<0.01	20.9	100.86	43
8	0.3 - 1.6	53.2	0.13	1.39	0.53	0.01	1.36	23.2	0.3	0.46	<0.01	20.4	100.98	41
12	0.3 - 2.2	70.5	0.11	1.55	0.52	0.01	0.72	14.3	0.19	0.6	<0.01	12.3	100.8	25
13	0.3 - 1.5	36.6	0.1	0.75	0.53	0.01	1.68	32.9	0.34	0.24	<0.01	28	100.85	59
16	0.3 - 1.5	45.1	0.1	1.11	0.46	0.01	1.33	28	0.31	0.35	<0.01	24.2	100.97	50
21	1.3 - 2.5	71.6	0.15	2.26	0.98	<0.01	0.64	12.7	0.26	0.71	0.05	11.4	100.75	23
25	0.4 - 2.0	70.2	0.14	1.52	0.75	<0.01	0.55	13.9	0.19	0.6	0.05	12.2	100.1	25
28	0.4 - 1.2	47.8	0.11	1.18	0.48	<0.01	1.09	26.8	0.3	0.38	<0.01	22.8	100.94	48
30		59.9	0.15	1.72	0.8	<0.01	0.8	18.8	0.21	0.67	0.07	16.6	99.72	34
31	0.2 - 1.2	46.1	0.13	1.39	0.6	0.01	1.31	26.5	0.42	0.53	0.04	23.9	100.93	47
35	0.2 - 1.3	29.6	0.05	0.64	0.26	0.01	1.57	35.1	0.39	0.23	<0.01	30.7	98.55	63
37	0.2 - 1.4	50	0.05	0.75	0.23	<0.01	0.93	26.1	0.29	0.31	0.02	22.1	100.78	47
39	0.4 - 1.3	27.3	0.03	0.51	0.2	0.01	1.45	37.1	0.5	0.18	0.03	32.6	99.91	66
41	0.2 - 1.5	39.9	0.03	0.69	0.22	<0.01	1.42	30.6	0.33	0.3	0.04	26.8	99.73	55
43	0.2 - 1.3	36.6	0.04	0.72	0.22	0.01	1.54	31.7	0.38	0.31	0.04	27.8	99.36	57
45	0.2 - 1.3	41.1	0.05	0.8	0.23	0.01	1.24	30.3	0.41	0.34	0.05	26.4	100.93	54
49	0 - 3.0	51.8	0.05	0.93	0.21	0.01	1.34	24.1	0.21	0.46	0.06	21	100.17	43
52	0.5 - 1.2	39.6	0.05	0.78	0.23	<0.01	0.89	30.9	0.03	0.28	0.03	26.6	99.39	55
56	0.2 - 1.0	16.2	0.01	0.31	0.14	0.02	1.29	43.7	0.41	<0.05	<0.01	37.2	99.28	78
57	0.3 - 1.3	34.4	0.05	0.77	0.25	0.01	1.17	33.6	0.3	0.27	0.03	29.1	99.95	60
WOOD POINT TO FISHERMAN BAY														
62	0.3 - 1.2	6	0.02	0.31	0.14	<0.01	2.02	48.7	0.58	<0.05	0.04	42.3	100.11	87
65	0.3 - 1.3	6	<0.01	0.22	0.12	<0.01	1.73	49.4	0.92	<0.05	0.03	42.1	100.52	88
68	0.2 - 2.0	17.9	0.05	0.52	0.16	<0.01	1.7	42.1	0.57	0.18	0.02	36.9	100.1	75
70	0.3 - 0.8	9.5	0.02	0.34	0.18	<0.01	2.02	44.9	1.09	0.06	0.02	41.4	99.53	80
72	0.3 - 3.0	36.6	0.05	0.75	0.23	<0.01	1.47	31.6	0.4	0.3	0.02	28	99.42	56
73	0.2 - 1.1	9.7	0.02	0.27	0.16	0.01	1.35	46.4	0.65	<0.05	<0.01	40.6	99.16	83
74	0 - 1.3	8.25	0.01	0.22	0.16	<0.01	1.94	46.4	0.74	<0.05	<0.01	41.3	99.02	83
75	0.2 - 1.2	9.35	0.02	0.36	0.19	<0.01	1.4	46.6	0.5	<0.05	0.03	40.4	98.85	83
78	0.1 - 1.3	19.5	0.03	0.43	0.2	<0.01	1.47	41.1	0.44	0.13	0.02	36.1	99.42	73
79	0.2 - 1.0	25.1	0.03	0.49	0.19	<0.01	1.42	38.2	0.53	0.13	0.02	33.5	99.61	68
81	0.2 - 1.4	6.95	<0.01	0.16	0.09	<0.01	1.8	48.2	0.55	<0.05	<0.01	41.6	99.35	86
82	0 - 1.3	8.45	<0.01	0.23	0.13	<0.01	1.98	46.9	0.65	<0.05	0.03	40.8	99.17	84
83	0 - 1.2	8.35	<0.01	0.19	0.09	<0.01	1.86	46.8	0.6	<0.05	<0.01	41	98.89	84
85	0.2 - 1.4	47	0.08	0.96	0.31	<0.01	0.92	26.8	0.42	0.35	0.04	24	100.88	48
87	0.2 - 1.3	25.5	0.05	0.54	0.19	<0.01	1.23	37.4	0.56	0.18	0.02	33.2	98.87	67
90	0.2 - 1.3	14.4	<0.01	0.23	0.09	<0.01	1.23	44.9	0.59	0.06	<0.01	38.5	100	80
91	0.3 - 1.5	12.2	0.02	0.36	0.14	<0.01	1.8	44.8	0.54	<0.05	0.01	39.2	99.07	80
92	0.3 - 1.2	10.6	0.04	0.42	0.15	<0.01	1.56	45.2	0.79	0.11	0.01	40	98.88	81
95	0.2 - 1.3	10.6	0.02	0.25	0.1	<0.01	1.37	46.2	0.71	<0.05	0.02	39.8	99.07	83
98	0.3 - 1.2	26.8	0.06	0.56	0.24	<0.01	1.05	37.2	0.53	0.23	<0.01	32.4	99.07	66
102	0.2 - 1.4	8.9	0.02	0.28	0.11	<0.01	1.58	46.4	0.73	0.06	<0.01	40.8	98.88	83
108	0.2 - 1.0	13	0.02	0.34	0.11	<0.01	1.42	44.8	0.77	0.06	<0.01	39.1	99.62	80
110	0.2 - 1.0	9.15	<0.01	0.22	0.08	<0.01	1.62	47.2	0.69	<0.05	<0.01	40.8	99.76	84
111	0.3 - 1.7	47.1	0.07	0.79	0.16	<0.01	0.91	27.1	0.53	0.31	0.03	23.9	100.9	48
114	0.2 - 1.0	17.8	0.02	0.39	0.14	<0.01	1.52	41.4	1.02	0.1	<0.01	37.7	100.09	73
117	0.5 - 1.1	66.8	0.07	0.9	0.23	<0.01	0.63	16.8	0.22	0.39	0.06	14.7	100.8	30
122	0.2 - 1.5	9.85	0.01	0.32	0.13	<0.01	1.62	47.1	0.48	<0.05	0.04	40.7	100.25	84
124	0.2 - 1.0	8.4	0.03	0.42	0.18	<0.01	2.32	45.7	1.46	<0.05	0.06	42.4	100.97	82
127	0.3 - 1.5	26	0.09	0.76	0.29	<0.01	1.49	36.3	0.78	0.36	<0.01	32.8	98.87	65
128	0.4 - 2.0	58.5	0.14	1.94	0.71	0.01	1.18	18.9	0.56	0.66	0.29	17.6	100.49	34

EASTERN SPENCER GULF SHELLGRIT CHEMISTRY

DH No.	SHELLGRIT INTERSECTION (metres)	SiO2 %	TiO2 %	Al2O3 %	Fe2O3 %	MnO %	MgO %	CaO %	Na2O %	K2O %	P2O5 %	LOI %	TOTAL %	CaCO3 %
129	0.1 - 1.5	61.1	0.13	1.24	0.4	<0.01	1.1	17.8	0.41	0.5	<0.01	16.6	99.28	32
130	0.4 - 3.0	17.3	0.1	0.91	0.32	<0.01	1.49	40.7	0.81	0.36	<0.01	36.6	98.59	73
132	0.4 - 3.0	20.8	0.12	1.05	0.32	<0.01	2.16	38.1	0.8	0.39	<0.01	35	98.74	68
133	0.5 - 2.5	7.15	0.06	0.45	0.16	<0.01	1.43	47	0.73	0.23	<0.01	41.7	98.91	84
136	0.6 - 2.5	13.4	0.1	0.86	0.33	<0.01	2.3	41.5	0.74	0.31	0.02	38.7	98.26	74
140	0.4 - 2.0	20.2	0.13	0.99	0.44	<0.01	3.52	36	1.24	0.4	<0.01	35.7	98.62	64
141	0.4 - 2.5	17.1	0.1	0.88	0.36	<0.01	2.28	39.7	0.79	0.36	<0.01	37	98.57	70
144	0.3 - 1.5	10.8	0.07	0.42	0.13	<0.01	2.82	42.5	1.32	0.29	<0.01	40.6	98.95	76
146	0.3 - 1.5	9.45	0.06	0.36	0.12	<0.01	2.86	44	1.12	0.25	<0.01	41.3	99.52	79
147	0.3 - 1.5	6.7	0.05	0.32	0.11	<0.01	2.6	44.9	0.91	0.22	0.02	42.2	98.03	80
149	0 - 1.5	5.6	0.05	0.28	0.1	<0.01	2.28	46	1.13	0.19	<0.01	43.1	98.73	82
150	0.4 - 1.5	14.2	0.09	0.54	0.18	<0.01	1.47	42.5	0.81	0.32	0.01	38.6	98.72	76
152	0.3 - 2.5	5.5	0.06	0.34	0.14	<0.01	1.66	47	0.75	0.22	<0.01	42.6	98.27	84
163	0.5 - 2.5	29.3	0.09	0.76	0.21	<0.01	1.31	34.7	0.58	0.36	0.01	30.7	98.02	62
165	0.4 - 2.0	20.1	0.08	0.67	0.24	<0.01	1.65	39.4	0.49	0.33	<0.01	35.3	98.26	70
167	0.2 - 1.2	6.5	0.04	0.32	0.21	<0.01	2.58	45.9	0.5	0.17	0.01	42	98.23	82
170	0.3 - 1.5	8	0.04	0.43	0.18	<0.01	1.84	46.2	0.49	0.14	0.01	41	98.33	83
172	0.2 - 2.6	6.4	0.03	0.27	0.11	<0.01	2	47.2	0.58	0.13	0.02	42	98.74	84
173	0.4 - 1.5	3.2	0.03	0.19	0.08	<0.01	1.77	48.6	0.77	0.11	<0.01	43.8	98.55	87
176	0.4 - 1.4	19.00	0.10	0.94	0.4	<0.01	1.77	39.6	0.53	0.35	0.02	35.3	98.01	71
178	0 - 2.7	3.08	0.04	0.24	0.09	<0.01	1.48	49.5	0.64	0.16	<0.01	42.8	98.03	88
183	0.3 - 3.0	5.9	0.05	0.31	0.12	<0.01	1.72	47.7	0.52	0.19	<0.01	41.5	98.01	85
185	0 - 3.0	4.66	0.04	0.24	0.12	<0.01	1.94	48.3	0.6	0.16	<0.01	42.5	98.56	86
187	0 - 7.8	17.3	0.06	0.47	0.17	<0.01	2.02	41.6	0.42	0.24	0.03	35.9	98.21	74
188	0 - 3.0	11.2	0.08	0.75	0.56	<0.01	1.94	44.5	0.58	0.25	0.01	38.9	98.77	79
191	0 - 5.5	5.9	0.4	0.25	0.12	<0.01	2.1	48.3	0.47	0.16	0.05	41.3	99.05	86
194	0.2 - 2.6	20.7	0.09	0.67	0.25	<0.01	1.37	39.4	0.49	0.31	<0.01	34.8	98.08	70
198	0.3 - 1.0	4.4	0.03	0.29	0.3	<0.01	1.33	48.9	0.78	0.1	<0.01	43.1	99.23	87
200	0.3 - 1.5	7.7	0.03	0.32	0.15	<0.01	1.05	47.7	0.85	0.08	0.03	41.7	99.61	85
202	0.3 - 2.0	3.44	0.04	0.25	0.14	<0.01	1.14	49	0.65	0.17	<0.01	43.3	98.13	88
203		13.1	0.08	0.55	0.17	<0.01	1.96	41.9	1.56	0.3	<0.01	39.6	99.22	75
205	0.3 - 0.7	12.3	0.09	0.58	0.22	<0.01	2.08	41.4	1.74	0.32	0.02	40.3	99.05	74
FISHERMAN BAY TO TICKERA														
207	0 - 1.3	6.05	0.1	0.22	0.12	<0.01	1.17	49.8	0.66	<0.05	<0.01	42.1	100.22	89
211	0 - 2.8	31.6	0.04	0.52	0.21	<0.01	1.33	35.3	0.33	0.09	0.04	30.5	99.6	63
214	0 - 1.2	29.6	0.08	0.94	0.54	<0.01	0.92	36.2	0.33	0.41	0.02	30.9	99.94	65
218	0.3 - 1.0	44	0.13	2.06	0.83	<0.01	1.23	26.6	0.44	0.38	0.04	24.6	100.31	48
220	0.3 - 1.2	55.2	0.13	1.93	0.83	<0.01	1.07	21.7	0.35	0.38	<0.01	19.2	100.79	39
221	0.5 - 1.5	27.1	0.03	0.54	0.2	<0.01	1.54	38.1	0.42	0.11	0.03	32	100.07	68
222	0.2 - 1.3	38	0.04	0.61	0.22	<0.01	1.73	32.7	0.29	0.13	0.03	27	100.75	58
223	0.3 - 1.1	18.3	0.04	0.63	0.27	<0.01	2.22	41.7	0.42	0.15	0.04	36.3	100.07	74
224	0.2 - 2.5	41.4	0.06	0.75	0.29	<0.01	1.92	29.9	0.29	0.24	0.03	25.6	100.48	53
226	0.1 - 2.1	40.7	0.05	0.66	0.28	<0.01	1.82	30	0.3	0.21	0.01	25.6	99.63	54
227	0.2 - 1.2	48.8	0.04	0.56	0.24	<0.01	1.18	25.1	0.25	0.18	0.03	22.9	99.28	45
228	0.1 - 1.2	20.4	0.03	0.48	0.23	<0.01	2.08	41	0.42	0.11	0.03	35.2	99.98	73
229	0.2 - 2.5	35.1	0.04	0.54	0.27	<0.01	1.63	34.1	0.29	0.17	0.03	27.9	100.07	61
230	0 - 2.0	22.9	0.02	0.4	0.2	<0.01	1.86	40.2	0.39	0.13	0.04	34.1	100.24	72
231	0.3 - 1.9	17.5	0.02	0.33	0.18	<0.01	1.9	43.1	0.38	0.07	0.03	36.6	100.11	77

DH No.	SHELLGRIT INTERSECTION (metres)	SiO2 %	TiO2 %	Al2O3 %	Fe2O3 %	MnO %	MgO %	CaO %	Na2O %	K2O %	P2O5 %	LOI %	TOTAL %	CaCO3 %
232	0.3 - 2.2	20	0.03	0.52	0.42	<0.01	2.04	41.2	0.43	0.11	0.03	35.3	100.08	74
233	0.2 - 1.8	24.2	0.02	0.37	0.12	<0.01	1.42	39.4	0.3	<0.05	0.01	33.4	99.24	70
234	0.3 - 3.5	77.3	0.04	0.45	0.1	<0.01	0.59	11.4	0.13	0.15	<0.01	9.65	99.81	20
235	0.3 - 3.5	33.8	0.03	0.39	0.12	<0.01	1.22	34.8	0.34	0.09	<0.01	29.3	100.09	62
236	0.2 - 3.5	43.7	0.03	0.48	0.1	<0.01	1.02	29.5	0.25	0.11	0.03	25.3	100.52	53
237	0.2 - 3.0	37.6	0.02	0.37	0.1	<0.01	1.08	33.3	0.28	<0.05	<0.01	27.4	100.15	59
238	0.2 - 3.0	41.6	0.03	0.43	0.9	<0.01	0.95	30.5	0.24	0.1	0.02	25.5	100.27	54
239	0.25 - 2.9	39.40	0.03	0.42	0.11	<0.01	1.11	32.2	0.27	0.06	0.01	26.4	100.01	58
240	0.2 - 2.8	33.6	0.02	0.37	0.15	<0.01	1.03	35.3	0.37	<0.05	<0.01	29.5	100.34	63
241	0.5 - 1.5	47.3	0.04	0.52	0.15	<0.01	1.42	27	0.22	0.1	0.01	23.3	100.06	48
242	0.3 - 2.8	34.8	0.03	0.41	0.11	<0.01	1.07	34.3	0.36	0.09	0.02	28.9	100.09	61
243	0.2 - 1.5	35	0.02	0.27	0.4	<0.01	1.22	33.5	0.34	0.05	0.02	29.8	100.62	60
245	0.2 - 1.9	41.9	0.03	0.39	0.12	<0.01	1.01	31	0.25	0.07	<0.01	25.2	99.97	55
246	0.2 - 2.0	37.9	0.03	0.46	0.18	<0.01	0.87	33.1	0.39	0.09	0.02	27	100.04	59
248	0.2 - 1.5	47.4	0.04	0.51	0.18	<0.01	1.37	26.8	0.23	0.1	0.01	23.5	100.14	48
249	0.2 - 1.3	37.9	0.04	0.52	0.22	<0.01	0.94	32.9	0.34	0.14	0.01	27.1	100.11	59
250	0 - 2.0	28.3	0.03	0.42	0.15	<0.01	1.32	37.1	0.52	0.1	0.11	32.7	100.75	66
251	0.1 - 1.4	23.5	0.03	0.45	0.19	<0.01	1.63	39.8	0.32	0.07	0.03	34.1	100.12	71
252	0.1 - 1.0	12.8	0.02	0.28	0.09	<0.01	1.68	46.8	0.47	<0.05	0.01	38.7	100.85	84
254	0.7 - 2.0	54.4	0.03	0.45	0.16	<0.01	0.78	23.6	0.14	<0.05	0.08	21.2	100.84	42
255	0.3 - 1.5	33.8	0.02	0.37	0.15	<0.01	1.25	35	0.22	<0.05	<0.01	29.4	100.21	63
256	0.1 - 1.5	22	0.03	0.53	0.24	<0.01	1.49	40.3	0.32	0.09	0.02	34.6	99.62	72
257	0.2 - 1.8	19.4	0.04	0.53	0.2	<0.01	1.27	42	0.44	0.1	0.01	36.1	100.09	75
258	0.1 - 1.5	11	0.02	0.26	0.1	<0.01	1.35	46.1	0.5	<0.05	0.01	39.8	99.14	82
259	0 - 1.5	67.1	0.07	1.2	0.54	<0.01	0.93	15.2	0.31	0.21	<0.01	13.5	99.06	27
260	0.5 - 1.9	31.1	0.01	0.35	0.17	<0.01	1.16	36.5	0.26	<0.05	<0.01	30.5	100.05	65
261	0.2 - 1.9	32.8	<0.01	0.33	0.11	<0.01	0.96	35.5	0.32	<0.05	<0.01	30.2	100.22	63
262	0.5 - 2.5	39.3	0.01	0.34	0.11	<0.01	0.81	32	0.28	<0.05	<0.01	27.7	100.55	57
263	0.3 - 1.4	39.8	0.03	0.52	0.18	<0.01	1.13	32	0.28	<0.05	<0.01	27.1	101.04	57
264	0.3 - 1.5	34.2	<0.01	0.26	0.08	<0.01	0.97	35.2	0.32	<0.05	<0.01	29.2	100.23	63
265	0.3 - 1.8	21.2	<0.01	0.27	0.13	<0.01	0.92	42.3	0.38	<0.05	<0.01	34.9	100.1	76
266	0.1 - 0.9	22.7	<0.01	0.27	0.12	<0.01	1	41.7	0.33	<0.05	<0.01	34.1	100.22	74
267	0.1 - 1.2	31.5	<0.01	0.26	0.08	<0.01	0.74	36.9	0.36	<0.05	<0.01	30.2	100.04	66
268	0.2 - 1.6	42.3	0.03	0.63	0.21	<0.01	1.24	30.2	0.29	0.1	<0.01	25.3	100.3	54
269	0.2 - 0.8	26.8	0.01	0.37	0.16	<0.01	1.22	38.7	0.39	<0.05	<0.01	32.5	100.15	69
270	0.2 - 1.3	24.9	0.03	0.39	0.13	<0.01	0.95	39.2	0.5	0.12	<0.01	35.5	101.72	70
272	0.6 - 2.1	35.5	0.01	0.37	0.17	<0.01	0.85	34.6	0.19	<0.05	<0.01	28.4	100.09	62
273	0.2 - 2.5	49.8	0.01	0.36	0.1	<0.01	0.47	25.3	0.2	<0.05	<0.01	23	99.24	45
274	0.2 - 1.0	30.4	0.01	0.37	0.12	<0.01	0.59	37.1	0.33	0.1	0.02	31.1	100.14	66
275	0.2 - 0.8	32.2	0.02	0.28	0.11	<0.01	0.73	36.7	0.32	<0.05	<0.01	29.8	100.16	66
276	0.2 - 1.2	27.5	<0.01	0.32	0.15	<0.01	0.8	39.4	0.38	<0.05	<0.01	31.6	100.15	70
277	0.3 - 0.9	49.9	0.03	0.43	0.18	<0.01	0.56	25.3	0.14	<0.05	<0.01	22.2	98.74	45
278	0.4 - 1.2	15.9	0.03	0.57	0.23	<0.01	1.15	45.5	0.37	0.07	<0.01	37.2	101.02	81
279	0.2 - 1.4	37.9	0.01	0.33	0.14	<0.01	0.49	34.1	0.27	<0.05	<0.01	26.9	100.14	61
280	0.3 - 0.9	44.5	0.02	0.48	0.2	<0.01	0.52	28.4	0.33	0.06	<0.01	24.7	99.21	51
281	0.1 - 1.0	43.7	0.01	0.37	0.14	<0.01	0.78	30.2	0.24	<0.05	0.01	24.9	100.35	54
282	0.4 - 0.8	35.1	0.04	0.53	0.18	<0.01	0.72	34.5	0.27	0.1	0.03	28.8	100.27	62
283	0.2 - 1.3	48.2	0.03	0.43	0.17	<0.01	0.51	27.1	0.21	<0.05	<0.01	23.6	100.25	48
284	0.1 - 0.9	30.8	0.02	0.4	0.18	<0.01	1.14	36.6	0.29	<0.05	<0.01	30.7	100.13	65
285	0.4 - 1.5	49.8	0.02	0.39	0.14	<0.01	0.48	25.6	0.25	0.07	<0.01	22.2	98.95	46

EASTERN SPENCER GULF SHELLGRIT CHEMISTRY

DH No.	SHELLGRIT INTERSECTION (metres)	SiO2 %	TiO2 %	Al2O3 %	Fe2O3 %	MnO %	MgO %	CaO %	Na2O %	K2O %	P2O5 %	LOI %	TOTAL %	CaCO3 %
286	0.3 - 1.0	39.8	0.04	0.69	0.38	<0.01	0.95	32.1	0.33	0.11	<0.01	26.2	100.6	57
288	1.0 - 2.8	49.5	0.05	0.68	0.27	<0.01	1.63	23.5	0.26	0.16	0.03	22.2	98.28	42
289	0.3 - 2.5	49.2	0.05	0.67	0.24	<0.01	1.04	24.2	0.37	0.2	0.02	22.1	98.09	43
290	0.2 - 0.7	29.3	0.03	0.54	0.3	<0.01	1	36.9	0.39	0.12	0.02	32	100.6	66
291	0.4 - 1.2	22.9	0.03	0.55	0.16	<0.01	1.42	40	0.46	0.13	0.04	34.4	100.09	71
292	0.2 - 1.0	27.8	0.05	0.71	0.36	<0.01	1.22	37.2	0.65	0.23	0.04	31.8	100.06	66
293	0.2 - 1.0	30.4	0.03	0.61	0.18	<0.01	0.98	36.7	0.61	0.25	0.02	30.3	100.08	66
295	0.2 - 2.1	43.4	0.05	0.85	0.22	<0.01	1.47	26.6	0.43	0.44	0.03	24.6	98.09	48
296	0.2 - 1.3	32.2	0.03	0.68	0.2	<0.01	1.13	35.4	0.47	0.27	0.03	29.7	100.11	63
297	0.4 - 1.2	49.6	0.06	3.44	0.35	<0.01	0.65	22.2	0.88	2.1	0.04	19.4	98.72	40
298	0.2 - 1.2	28.6	0.03	0.71	0.19	<0.01	1.06	37.6	0.55	0.34	0.04	31	100.12	67
299	0.3 - 1.4	56.9	0.05	4	0.34	<0.01	0.56	19	0.85	2.34	0.04	16.6	100.68	34
300	0.3 - 1.0	51.5	0.05	3.82	0.27	<0.01	0.55	22	0.85	2.18	0.04	19	100.26	39
301	0.3 - 1.4	51.9	0.06	3.9	0.31	<0.01	0.59	21.8	0.81	2.34	0.06	19	100.77	39
306	0 - 1.3	33.2	0.04	3.66	0.3	<0.01	0.78	31.8	0.95	2.32	0.05	27.2	100.3	57
307	0 - 1.3	42.8	0.04	4.28	0.37	<0.01	0.78	24.8	0.95	2.64	0.03	22.1	98.79	44
308	0.1 - 1.4	40.5	0.04	4.52	0.34	<0.01	0.86	26.1	0.94	2.98	0.03	22.8	99.11	47
309	0 - 1.4	39.6	0.04	4.12	0.32	<0.01	0.84	28.2	0.95	2.5	0.03	23.8	100.4	50

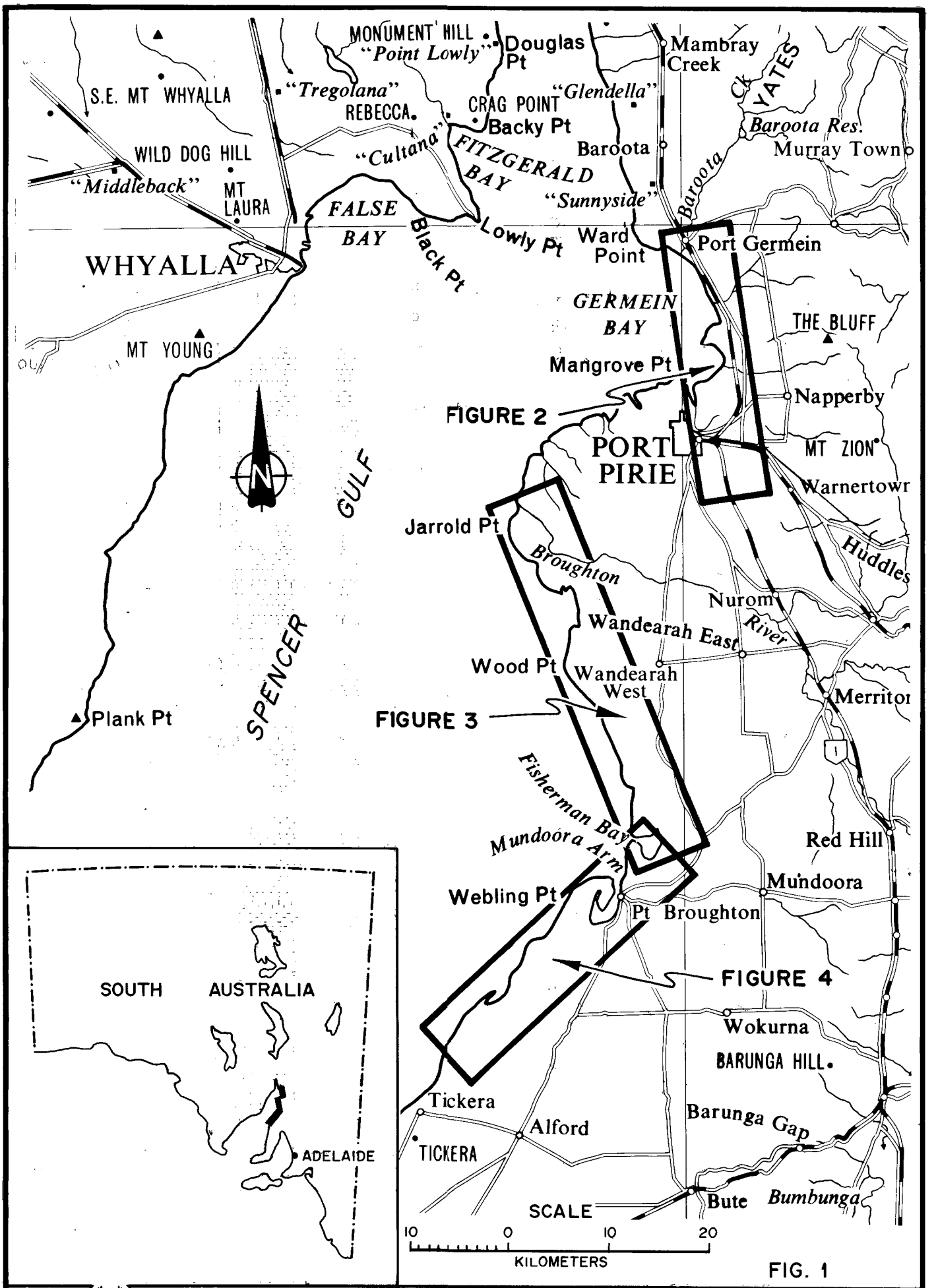


FIG. 1

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

COMPILED E. Dubowski

C.D.O. 9.2.89 DATE

DRAWN E. Calabio

SCALE 1:500 000

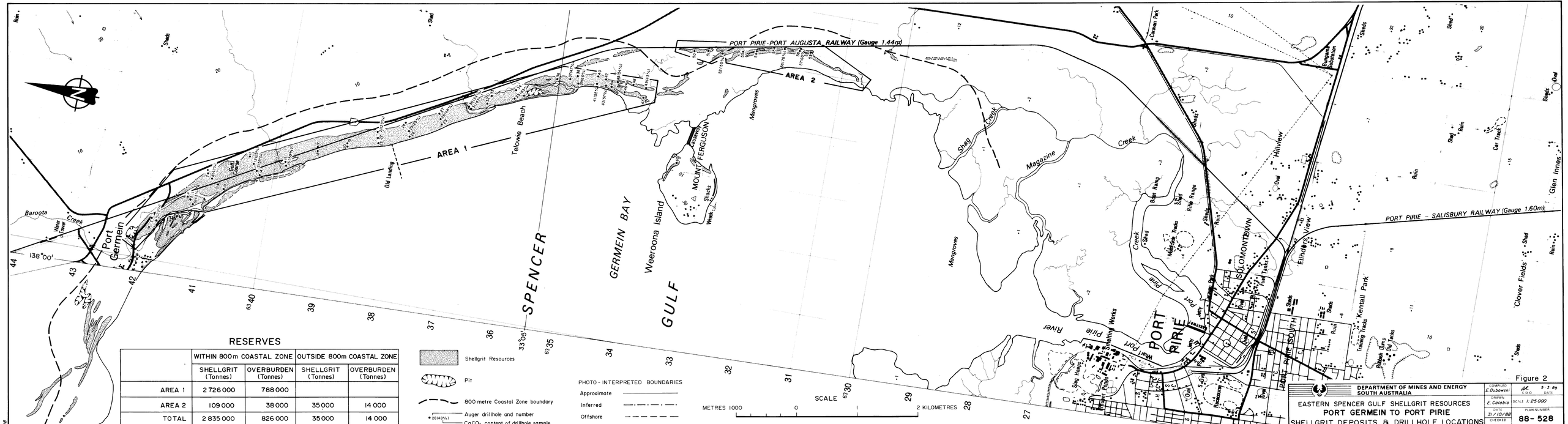
DATE 31/10/88

CHECKED

PLAN NUMBER S 20443

EASTERN SPENCER GULF SHELLGRIT RESOURCES
LOCATION AND MAP SHEET INDEX

4718



RESERVES

	WITHIN 800m COASTAL ZONE		OUTSIDE 800m COASTAL ZONE	
	SHELLGRIT (Tonnes)	OVERBURDEN (Tonnes)	SHELLGRIT (Tonnes)	OVERBURDEN (Tonnes)
AREA 1	2 726 000	788 000		
AREA 2	109 000	38 000	35 000	14 000
TOTAL	2 835 000	826 000	35 000	14 000

Shellgrit Resources

Pit

800 metre Coastal Zone boundary

28(48%) Auger drillhole and number $CaCO_3$ content of drillhole sample

PHOTO-INTERPRETED BOUNDARIES

Approximate

Inferred

Offshore

Figure 2

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA

EASTERN SPENCER GULF SHELLGRIT RESOURCES

PORT GERMEIN TO PORT PIRIE

SHELLGRIT DEPOSITS & DRILLHOLE LOCATIONS

COMPILED	E.Dubrawski	5.2.89 DATE
DRAWN	E. Calabia	SCALE 1:25 000
DATE	31/10/88	PLAN NUMBER
CHECKED		88-528

RESERVES

	WITHIN 800m COASTAL ZONE		OUTSIDE 800m COASTAL ZONE	
	SHELLGRIT (Tonnes)	OVERBURDEN (Tonnes)	SHELLGRIT (Tonnes)	OVERBURDEN (Tonnes)
AREA 3	10,591,000	1,968,000	2,453,000	432,000
AREA 4	3,990,000	462,000	191,000	42,000
AREA 5			236,000	61,000
TOTAL	14,581,000	2,430,000	2,880,000	535,000

Figure 3

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

EASTERN SPENCER GULF SHELLGRIT RESOURCES

WOOD POINT TO FISHERMAN BAY

SHELLGRIT DEPOSITS & DRILLHOLE LOCATIONS

COMPILED E. Dubowski	C.D.O. DATE 9·2·89
DRAWN E. Calabio	SCALE 1:25 000
DATE 28/10/88	PLAN NUMBER
CHECKED	88–527

RESERVES

	WITHIN 800m COASTAL ZONE		OUTSIDE 800m COASTAL ZONE	
	SHELLGRIT (Tonnes)	OVERBURDEN (Tonnes)	SHELLGRIT (Tonnes)	OVERBURDEN (Tonnes)
AREA 6	5 695 000	1 235 000	363 000	129 000
AREA 7	205 000	4 000		
TOTAL	5 900 000	1 239 000	363 000	129 000

Figure 4

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

EASTERN SPENCER GULF SHELLGRIT RESOURCES

FISHERMAN BAY TO TICKERA

SHELLGRIT DEPOSITS & DRILLHOLE LOCATIONS

COMPILED E. Dubowski	C.D.O. 9.2.89 DATE
DRAWN E. Calabio	SCALE 1:25000
DATE 20/10/88	PLAN NUMBER 88-526
CHECKED	