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SML 628

KANGAROO ISLAND

PROGRESS REPORTS TO LICENCE EXPIRY / SURRENDER, FOR THE PERIOD 15/9/1971 TO 14/9/1972

Submitted by
Mines Administration Pty Ltd
1972

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Enquiries: Customer Services Branch
Minerals and Energy Resources
7th Floor
101 Grenfell Street, Adelaide 5000

Telephone: (08) 8463 3000
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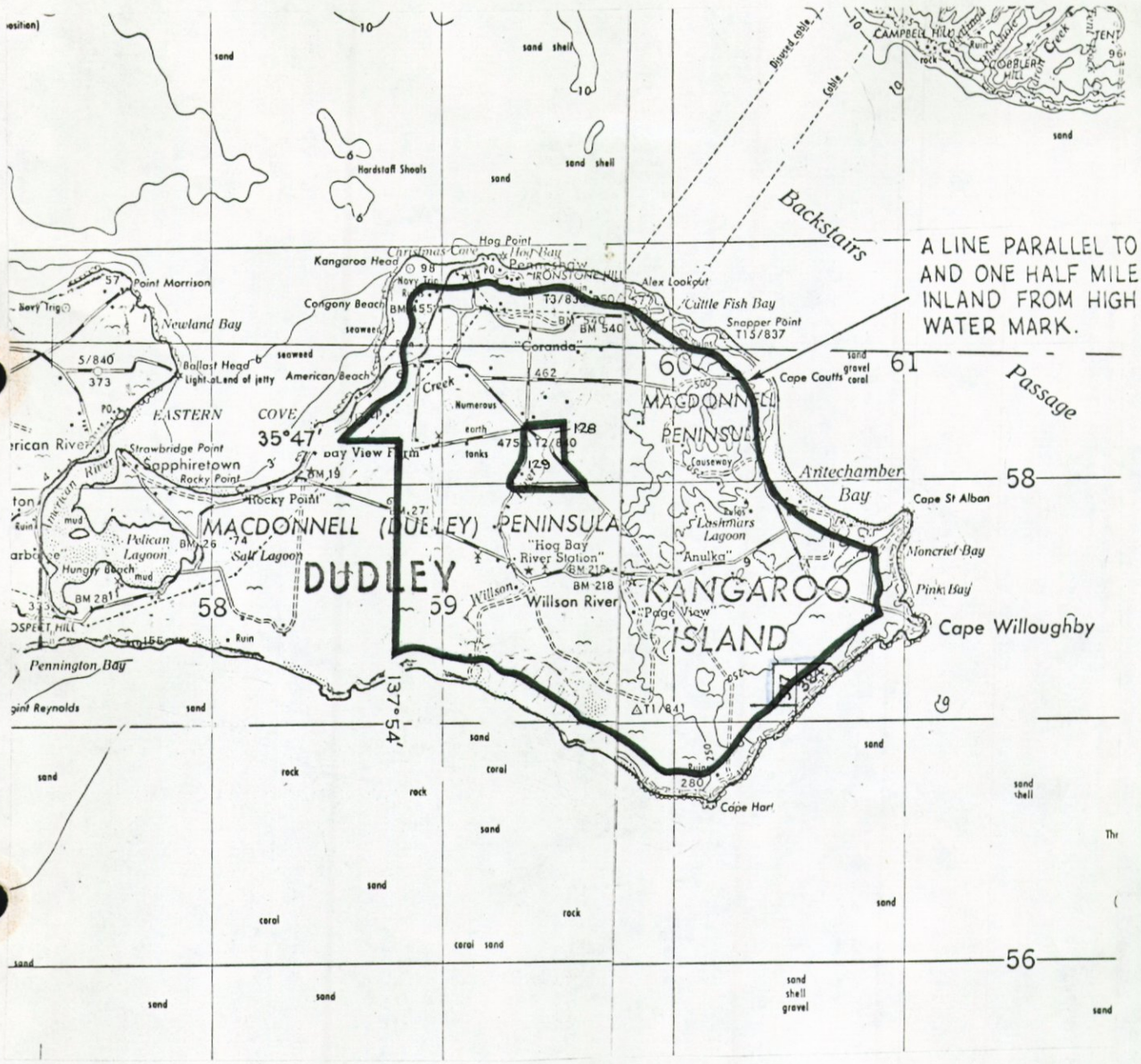

BEACH PETROLEUM N.L.

DOCKET DM 789/71 AREA 95 SQ MILES

1:250000 PLANS . KINGSCOTE · BARKER .

LOCALITY

S.M.L. No. 628 EXPIRY DATE 14-9-72

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TENEMENT: S.M.L. 628 - Kangaroo Island.

TENEMENT HOLDER: Beach Petroleum N.L.

0003

REPORT ON

S.M.L. 628, KANGAROO ISLAND

for

BEACH PETROLEUM N.L.

by

A.T. von Sanden and K. Rochow
GEOSURVEYS OF AUSTRALIA PTY. LIMITED

December, 1971

1971/33

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28 JUN 1972
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SECURITY
1807

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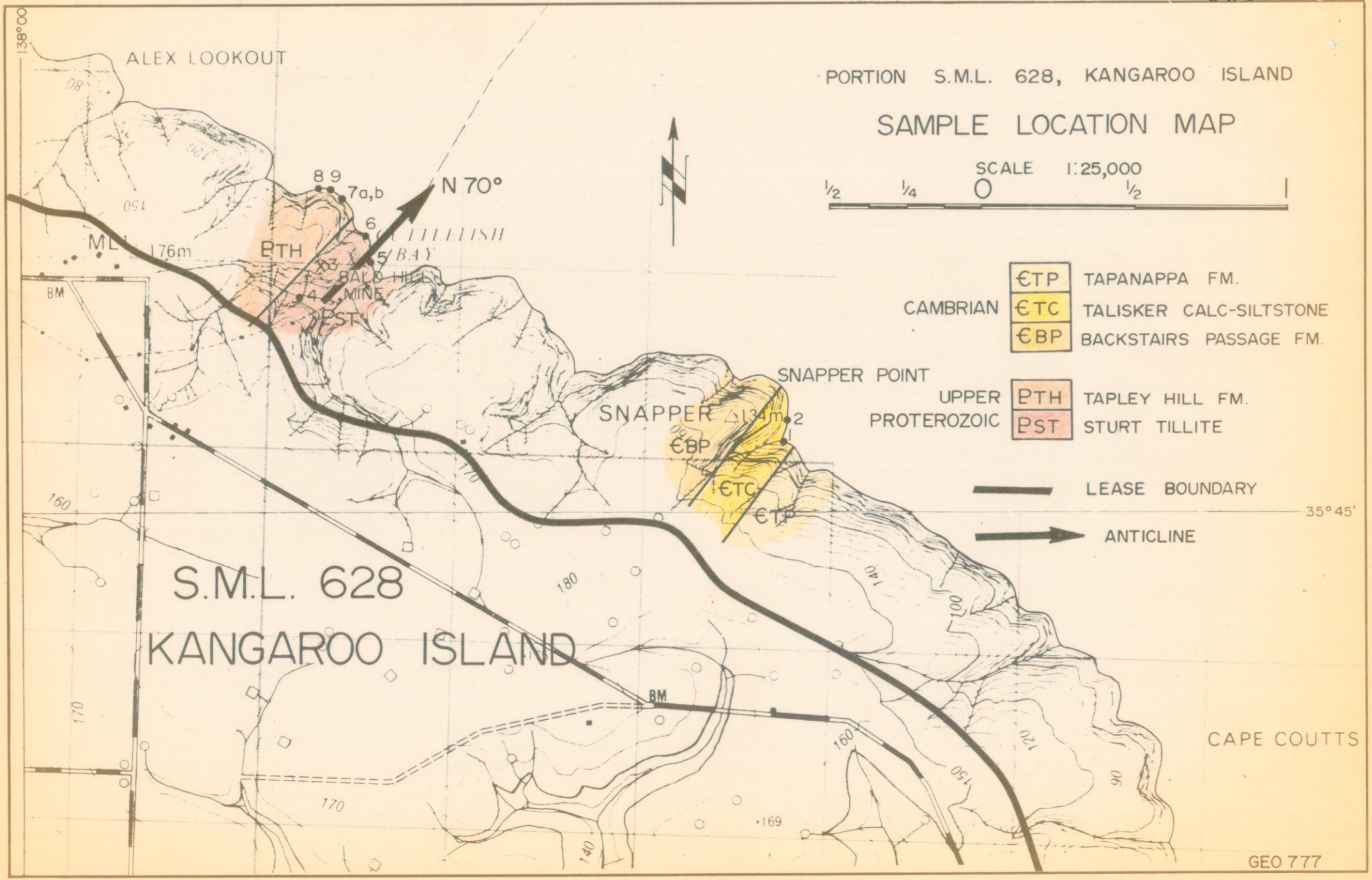
APPENDIX

FIGURE


PORTION S.M.L. 628, KANGAROO ISLAND
SAMPLE LOCATION MAP
SCALE 1:25,000
½ ¼ 0 ½ 1
ALEX LOOKOUT
138°00
35°45'
N 70°
ML
176m
PTH
PST
BM
BALD HILL MINE
SNAPPER POINT
SNAPPER
134m
€BP
€TC
€TP
CAMBRIAN
€TP TAPANAPPA FM.
€TC TALISKER CALC-SILTSTONE
€BP BACKSTAIRS PASSAGE FM.
UPPER PROTEROZOIC
PTH TAPLEY HILL FM.
PST STURT TILLITE
LEASE BOUNDARY
ANTICLINE
S.M.L. 628
KANGAROO ISLAND
CAPE COUTTS
GEO 777

INTRODUCTION

During the month of December 1971 the writers in the company of Dr. B. Daily of the University of Adelaide and Dr. R. George and J. Kappelle of Mines Exploration Pty. Ltd., carried out an investigation into mineralisation of the portion of Upper Proterozoic and Cambrian metasediments occupying the east limb of a north plunging regional anticline along the northern coast of Dudley Peninsula, Kangaroo Island.

Grab samples were taken from outcrops showing indications of sulphide mineralisation and also from gossans and bleached zones. These were submitted for analysis of copper, lead, zinc, nickel and in one case gold. The results are appended as an appendix to this report.

G E O L O G Y

The interpretation of the geology of Dudley Peninsula is at present undergoing revision. The outcrops in this portion of Kangaroo Island were originally mapped by Sprigg (1953) and subsequently in part by Thomson & Horwitz (1962) who included them all in the Kanmantoo Group. However, Daily and Milnes (1971, 1972) have located Upper Proterozoic metasediments and Lower Cambrian arkoses, metasiltstones and marbles underlying the Kanmantoo Group rocks.

The following table summarises the stratigraphy of the lease area.

TABLE

STRATIGRAPHY OF S.M.L. 628

(After B. Daily, 1971,72)

AGE	FORMATION	
CAINOZOIC	Sands, clays, limestones	
JURASSIC	Tholeiitic basalt	
PERMIAN	"Cape Jervis Beds" equivalents	
LOWER CAMBRIAN	KANMANTOO GROUP	TAPANAPPA FORMATION
		TALISKER CALC-SILTSTONE
		BACKSTAIRS PASSAGE FORMATION
		CARRICKALINGA HEAD FORMATION
	Upper portion of this sequence eliminated by faulting	
	WANGKONDA FORMATION	
	MT. TERRIBLE FORMATION	
UPPER PROTEROZOIC	MARINOAN	Not differentiated
	STURTIAN	BRIGHTON LIMESTONE
		TAPLEY HILL FORMATION
		STURT TILLITE

DISCUSSION

Sulphide rich bands were located in both the Upper Proterozoic units and Cambrian Kanmantoo Group units in the areas investigated. Pyrrhotite appears to be the major sulphide constituent while arsenopyrite dominated at one locality west of Cuttlefish Bay (locality 9, map GEO.777).

The sulphides are disseminated throughout the rocks and often appear to be concentrated along bedding planes. Two mechanisms of sulphide concentration were noted. One where pyrite mineralisation was associated with quartz veins intersecting bedding, the other where arsenopyrite mineralisation had concentrated in the axis of a tight anticlinal fold.

The old Bald Hill gold mine on the western hillside above Cuttlefish Bay, was visited and the spoil dump around the shaft (locality 3) was sampled with negative results. The following is an extract from the "Record of the mines of South Australia," (Brown, 1908) :-

> "BALD HILL - Locality, Cuttlefish Bay, Kangaroo Island. Prospected in 1896, and it was stated that battery crushings yielded 3dwts. of gold per ton; it was also stated that by the Christmas process of extraction 12dwts. per ton was obtained; and 5 tons treated by Haycraft resulted in 15dwts. per ton. In December, 1898, the Government Geologist examined this property and reported that a shaft had been sunk and a tunnel driven into a large quartz lode, 18ft. to 20ft. wide, near the top of Bald Hill. No gold is visible in the stone, but pyrites show occasionally. The rocks and veinstones are favorable to the occurrence of gold, but samples assayed gave no returns of gold or silver. More surface prospecting advisable."

One bleached zone was sampled (locality 8) from the Sturt Tillite, but no traces of secondary copper mineralisation were observed throughout the succession. An ironstone gossan exhibiting boxworks was sampled (locality 7a) just to the east of the forementioned bleached zone. An analysis of this gossan gave anomalous results for copper, lead, zinc and nickel (see appendix).

CONCLUSIONS

All the Upper Proterozoic and Cambrian units investigated contain disseminated sulphides with intervals of rich sulphide bands. No economic ore mineralisation was noted but structural conditions inland may allow the concentration of mineralisation into ore grade. Conditions such as thrusts, shears, tight folds and anticlinal closures should be sought for.

It is recommended that an initial systematic sampling and mapping program be instigated along the northern coast of Dudley Peninsula possibly using a boat for access due to the steep nature of the cliffs. Special attention should be paid to the thrust faults west of Alex Lookout and Snapper Point (Daily & Milnes, 1971). It is suggested that a portion of the gossan from locality 7A be submitted to N. Trueman of M.E.P.L. for mineragraphic study as analysis indicated that this material contains an anomalous proportion of copper, lead, zinc and nickel.

An aeromagnetic anomaly at Cape St. Albans, four miles southeast of Cape Coutts is shown on the Kingscote 4 mile geophysical map series published by the Geological Survey of South Australia. The trend and intensity of the anomaly approaches that arising from the Talisker shear zone on Fleurieu Peninsula and should be investigated. This anomaly is in close proximity (?contact zone) to the Palaeozoic granites of Cape Willoughby but outcrops of these rocks elsewhere on Kangaroo Island do not correspond to a significant aeromagnetic anomaly.

Following the mapping and sampling, a series of ground magnetometer traverses should be completed across the outcrop area to determine whether these beds can be detected and followed inland. Here an extensive laterite capping and isolated basalts cover the Upper Proterozoic and Cambrian units and may mask magnetic indications of sulphide concentration.

However, any decision to carry out larger scale systematic ground magnetic or other surveys should await some encouragement from the initial sampling program.

A.T. von Sanden

A.T. VON SANDEN

K. Rochow

K. ROCHOW

REFERENCES

BROWN, H.Y.L., (1908): Record of the mines of South Australia, fourth edition. Dept. Mines S. Aust., p201.

DAILY, BRIAN AND MILNES, A.R., (1971): Discovery of Late Precambrian tillites (Sturt Group) and younger metasediments (Marino Group) on Dudley Peninsula, South Australia. Search 2 (11).

_____ (1972): Significance of basal Cambrian metasediments of andalusite grade, Dudley Peninsula. Kangaroo Island, South Australia. Search (In Press).

SPRIGG, R.C., (1953): Kingscote 4 mile geological atlas series. Geol. Surv. S. Aust.

THOMSON, B.P., and HORWITZ, R.C., (1962): Barker 1 : 250,000 geological atlas series. Geol. Surv. S. Aust.

A P P E N D I X

SAMPLE ANALYSES

by
A.M.D.E.L.

SAMPLE LOCATION	Cu	Pb	Zn	Ni	Au
1	35	10	20	40	-
2	80	30	210	95	-
3	10	< 5	< 5	10	< 5
4	15	30	25	20	-
5	45	10	35	50	-
6	20	10	45	25	-
7A	90	70	170	150	-
7B	65	10	55	60	-
8	70	5	20	40	-

Note: All values in p.p.m.

For locations see map GEO. 777

REPORT ON

A

GEOCHEMICAL SAMPLING

PROGRAMME

S. M. L. 628, KANGAROO ISLAND

for

BEACH PETROLEUM NO LIABILITY

by

K. Rochow B.Sc. Hons. and A. T. von Sanden
GEOSURVEYS OF AUSTRALIA PTY. LTD.

March, 1972

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1972/5

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MAPS

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ENCLOSURE 3. ROCK CHIP SAMPLING - LEAD AND ZINC. SCALE 1:10,000 B.P. 502

ENCLOSURE 4. STREAM SEDIMENT SAMPLING - COPPER AND NICKEL. SCALE 1:50,000 B.P. 498

ENCLOSURE 5. STREAM SEDIMENT SAMPLING - LEAD AND ZINC. SCALE 1:50,000 B.P. 499

0016

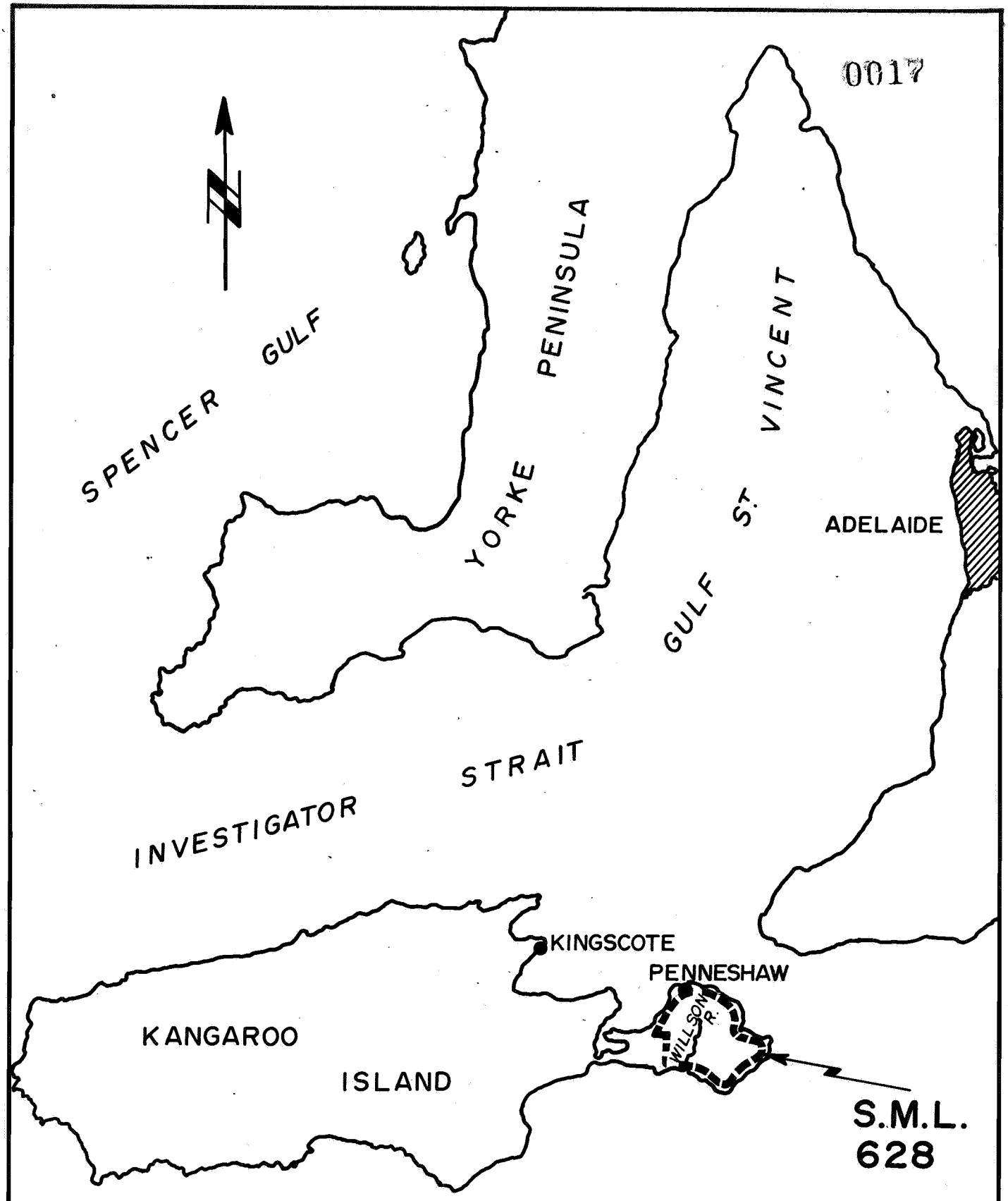
I. INTRODUCTION

Special Mining Lease 628 covers most of Dudley Peninsula on Kangaroo Island and is held by Beach Petroleum N.L. (Fig. 1, B.P. 500).

As the result of a preliminary investigation of sulphide mineralisation in Upper Proterozoic and Cambrian metasediments along the northern coastline of Dudley Peninsula (von Sanden and Rochow, 1971), detailed geochemical sampling programmes were undertaken in specific areas of the lease. These included sampling of the outcrops along portion of the northern coastline and sediment sampling in a stream system extending across the apparent regional strike of the Proterozoic and Cambrian rocks.

The object of these sampling programmes was to detect any concentration of metals which may prove of economic interest.

The field programme commenced on the 4th February and concluded on the 11th February, 1972. The writers were assisted by Mr. L. Scarman during the field programme.



MILES 10 0 10 20 MILES

SCALE 1:1,000,000

BEACH PETROLEUM N.L.

S.M.L. 628

KANGAROO ISLAND

LOCALITY MAP

GEOSURVEYS OF AUSTRALIA PTY. LTD.

Author K.R., A.T.v.S.	Date MARCH 1972	Scale 1:1,000,000
Map Ref 1·53-16, 1·54-13	Drawn N.B.	
Report No. 1972/5	Figure 1.	Drg. No. BP 500

0018

II. GEOLOGY

(A) GENERAL

The interpretation of the geology of Dudley Peninsula is at present undergoing revision by Dr. B. Daily of the University of Adelaide. The outcrops in this portion of Kangaroo Island were originally mapped by Sprigg (1953) and subsequently in part by Thomson and Horwitz (1962) who included them all in the Kanmantoo Group. However, Daily and Milnes (1971, 1972) have located Upper Proterozoic metasediments and Lower Cambrian arkoses, metasiltstones and marbles underlying the Kanmantoo Group rocks.

Table I summarises the stratigraphy of the lease area.

B. ECONOMIC GEOLOGY

Low grade iron sulphides are widely distributed throughout the Upper Proterozoic and Cambrian metasediments along the northern coastline of Dudley Peninsula. The distribution within the Talisker Calc-siltstone is relatively uniform while within the Upper Proterozoic units, the iron sulphides are concentrated in definite bands.

The iron sulphides are predominantly pyrrhotite with rare pyrite. No definite base metal sulphides were recognised, however copper carbonate staining was observed from one locality in the Sturt Tillite. As the iron sulphide mineralisation appears conformable to bedding, it is assumed that it represents an original component of the sediments; forming under reducing conditions.

Mining within the lease area has been confined to the old Bald Hill gold mine located on a quartz-filled shear zone. Additional shallow workings are found in pegmatites where, in addition to felspar, some gem quality tourmaline was obtained. None of these sites are at present being worked.

TABLE I

STRATIGRAPHY OF S.M.L. 628
(After Daily & Milnes, 1971,72)

AGE	FORMATION	
CAINOZOIC	Sands, clays, limestones	
JURASSIC	Tholeiitic basalt	
PERMIAN	"Cape Jervis Beds" equivalents	
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UPPER PROTEROZOIC	MARINOAN	Not differentiated
	STURTIAN	BRIGHTON LIMESTONE
		TAPLEY HILL FORMATION
		STURT TILLITE

0020

III. GEOCHEMICAL SAMPLING PROGRAMME

(A) COASTAL SECTION

Good exposures of Proterozoic and Palaeozoic rocks on Dudley Peninsula are limited to the cliffs along the coastline. Isolated exposures occur inland only where streams have cut through the shallow alluvial cover.

The steep cliffs forming the northern coastline of the Peninsula offer almost continuous outcrop sections of the older metasediments which strike almost perpendicular to the coast. Sulphide bands within the outcrop section appear to be conformable to bedding and are readily recognised by heavy iron staining produced during weathering.

Although the coastal areas lie outside the confines of S.M.L. 628 (a strip of land extending a half mile inland from high water mark is reserved from mining operations), they offer an excellent opportunity to continuously sample the sulphide-rich Upper Proterozoic and Cambrian strata. Any anomalous mineralisation could then be followed back into the S.M.L.

A reconnaissance survey (von Sanden and Rochow, 1971) had established the presence of significant sulphide-mineralisation in the Upper Proterozoic Sturt Tillite and Tapley Hill Formation, and the Cambrian Talisker Calc-siltstone. These units were systematically sampled at fifteen feet intervals along the base of the cliffs between Snapper Point and Alex Lookout (see Enclosures 2 and 3, B.P. 501 and 502). If the presence of a sulphide band was noted between the sampling intervals, then this was also chip sampled. During an inspection by boat of the northern coastline, a six feet wide sulphide band with associated iron staining was observed in the Tapanappa Formation near Alex Lookout. This was also sampled.

In order to investigate the aeromagnetic anomaly at Cape St. Albans (von Sanden and Rochow, op. cit), a survey of the coastline was undertaken as this again offered the best outcrop. The survey was extended to the contact zone between the Kanmantoo Group metasediments and Palaeozoic granites. This is an irregular intrusive contact with large rafts or zenoliths of Kanmantoo Group rocks suspended within the marginal zone of the granite. The Kanmantoo metasediments at Cape St. Albans are distinct from and probably younger than the Tapanappa Formation sediments outcropping on the northwestern side of Antechamber Bay (see Enclosure 1, B.P. 503).

Palaeozoic (or older) rock outcrops on the southern coastline of Dudley Peninsula are fairly restricted and access where outcrops do occur, is difficult. Rock chip samples were taken at Cape Hart and one and a half miles east of False Cape. Sediments in the Cape Hart area consist of sandstones, sometimes calcareous, and commonly exhibiting large scale cross bedding. These appear very similar to metasediment outcrops observed at Cape St. Albans.

Sampling points were located on South Australian Department of Lands air photos where possible. For the area between Snapper Point and Alex Lookout a photographic enlargement of the Department of Lands "Willoughby" Compilographic Series map sheet, was used.

(B) STREAM SEDIMENT SAMPLING

Sampling was largely confined to the Willson River system, the largest stream system within the lease area, extending from one and a half miles inland of Alex Lookout on the northern coast of Dudley Peninsula, to Mouth Flat on the southern coast (Enclosure 1, B.P. 503). The river flows semi-permanently, its upper reaches being dammed to form the Penneshaw township water supply.

The sampling procedure used was to take a shovel-full of sediments from the centre of the river or tributary to a depth of about 6 inches, at approximately 800 feet intervals. The positions were marked directly onto South Australian Department of Lands air photos. These points were then transferred to the Department of Lands "Willoughby" Compilographic Series map sheet at a scale of 1:50,000.

Outcrops of Cambrian (or older) metasediments encountered during sampling of the stream system were chip sampled. The outcrops observed consist of metasiltstones and sandstones, calcareous in part and occasionally crossbedded and pebbly. They appear referable to the Tapanappa Formation as seen exposed along the northern coast.

A stream flowing into Cuttlefish Bay on the northern coast was also sampled geochemically in order to detect any anomalies arising from the subsurface occurrence of Upper Proterozoic metasediments.

IV. RESULTS

(A) COASTAL SECTION

The rock chip samples were submitted to the Australian Mineral Development Laboratories (AMDEL) for preparation and analysis by Atomic Absorption Spectroscopy. The samples were tested for copper, nickel, lead and zinc, and the analytical results are shown in Appendix I. The results are also depicted graphically in relation to geology on Enclosure 2 (B.P. 501) for copper and nickel and on Enclosure 3 (B.P. 502) for lead and zinc, these being at a scale of 1:10,000.

The results for each element will now be dealt with separately:

COPPER (Cu) - An overall background of approximately 40 ppm is apparent in the intervals sampled. The only unit proving to be anomalous was the Sturt Tillite, where five values of around 200 ppm were recorded. Narrow mineralised fractures at one locality (sample R46A) gave a value of 600 ppm.

NICKEL (Ni) - The background within the intervals sampled is approximately 40 ppm. One isolated anomalous value of 240 ppm was recorded from a sulphide band within the Sturt Tillite (sample R61A).

LEAD (Pb) - The background over the interval sampled is approximately 15 ppm. Only one anomalous value of 120 ppm was recorded, this being within the Tapley Hill Formation (sample R23).

ZINC (Zn) - The background value of zinc content varies over the intervals measured and is highest in the calcareous units. Six values of 200 ppm or greater were recorded and these are shown below.

0023

UNIT	STATION	ZINC (ppm)
Tapanappa Fm.	R255	230
Talisker Calc-siltstone	SR31	210
	R183	450
	R192	230
	R251	310
	R255	230
Tapley Hill Fm.	R20	200

The results for the Cape St. Albans area and the southern coast are not anomalous in the elements tested for. The rock chip sampling of outcrops along the Willson River also gave insignificant results. Results for the latter three areas are shown on Enclosures 4 and 5 (B.P. 498 and 499). Sampling at Cape St. Albans in the vicinity of the aeromagnetic anomaly detected the presence of ilmenite and micaceous haematite. These samples when tested with a Sharpe fluxgate magnetometer gave an anomalous reading. The zone of aeromagnetic anomaly also coincides with the position of a postulated fault on the western flank of Cape St. Albans.

(B) STREAM SEDIMENT SAMPLING

The stream sediment samples were sieved and the 80 mesh fraction analysed by AMDEL using Atomic Absorption Spectroscopy for copper, nickel, lead and zinc. When there was no 80 mesh return, the sample was crushed and sieved to the required mesh size. Rock chip samples collected during the stream sediment programme were treated as for (A) above. The analytical results are shon in Appendix II and also on Enclosure 4 (B.P. 498) for copper and nickel and Enclosure 5 (B.P. 499) for lead and zinc, at a scale of 1:50,000.

The results for each element will now be dealt with separately:

COPPER (Cu) - One isolated anomaly of 70 ppm (sample S143) was detected near the headwaters of a tributary of Willson River (see Enclosure 4, B.P. 498).

0024

NICKEL (Ni) - No significant anomalies were detected.

LEAD (Pb) - A zone of anomalous values ranging from 70 to 120 ppm occursbetween samples S113-S121 and S8-S14, (see Enclosure 5, B.P. 499). In this area an examination of rock outcrops revealed the presence of a tight anticlinal fold. It is concluded that this structural feature may act as a concentrating mechanism for lead mineralisation.

ZINC (Zn) - Only one anomaly was detected, that being at S149 with a value of 100 ppm. This sample was taken from a tributary of Willson River.

V. CONCLUSIONS

It is considered that outcrops of known sulphide bearing metasediments of Cambrian and Upper Proterozoic age along the northern coastline of Dudley Peninsula were sampled in sufficient detail to locate any significant intervals of base metal mineralisation or at least their halos.

Above background concentrations of copper were located only in the Sturt Tillite. These anomalies were modest and occur in isolated samples distributed at random throughout the formation. One relatively high value of 600 ppm Cu. occurs in a sample taken from narrow mineralised fractures in the Sturt Tillite near the core of a small anticline. Consequently it is assumed that mobilization of mineralisation within zones of tectonic stress here has resulted in copper enrichment. This enrichment however, remains too low to encourage additional exploration inland along this structural trend.

Anomalous concentrations of zinc were detected from the Tapanappa Formation, Talisker Calc-siltstone and the Tapley Hill Formation. The highest anomalies occur within the Talisker Calc-siltstone which is consistent with that expected in calcareous environments. Consequently these anomalies are considered too low to be significant. The isolated zinc anomalies from the other units also appear to have no economic significance.

The reconnaissance stream sediment sampling programme revealed one isolated copper and one zinc anomaly. These are not coincident. A broad zone of low lead anomalies was located along Willson River mainly within the National Park reserve. This may represent concentration of mineralisation within a structural feature. A more detailed stream sediment sampling programme in conjunction with geological mapping is desirable to pinpoint the origin of these base metal anomalies.

This initial phase of exploration did not reveal any base metal anomalies of sufficiently high intensity to warrant large expenditure for follow-up surveys beyond that indicated above. However, Dr. B. Daily (pers. comm.) has located the position of the Kanmantoo mineralised sequence within the Kanmantoo Group on the southern coastline of Fleurieu Peninsula. Consequently further mapping by Dr. Daily to delineate this stratigraphic interval on Dudley Peninsula may define additional areas for sampling.

VI. REFERENCES

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VON SANDEN, A.T., and ROCHOW, K., (1971): Report on S.M.L. 628, Kangaroo Island. Unpublished report for Beach Petroleum N.L. by Geosurveys of Aust. Pty. Ltd.

VII. AUTHORS

K. ROCHOW
GEOLOGIST

A.T. VON SANDEN
ASSISTANT GEOLOGIST

ANALYTICAL RESULTS - ROCK CHIP SAMPLES

Analyses by A.M.D.E.L. using Atomic Absorption Spectroscopy. Results in p.p.m. Values in brackets show detection limits. Sample locations are shown on Enclosures

Sample No.	Cu (2)	Pb (5)	Zn (1)	Ni (5)	Comments
R 3	5	< 5	15	20	Cape St. Albans
5	5	25	15	10	" " "
20	10	35	200	70	
21	10	25	90	25	
22	120	120	100	10	
23	30	15	95	30	
24	30	10	110	55	
25	25	20	140	25	
26	25	30	100	15	
27	20	20	40	5	
28	30	10	45	25	
29					No outcrop
30	30	10	100	30	
31					No outcrop
32	5	5	25	< 5	
33	95	10	40	25	
34	35	5	70	30	
35	10	10	35	10	
36					no outcrop
37					No outcrop
38					No outcrop
39	95	10	20	50	
40	50	20	40	30	
41	110	15	55	35	
42	200	30	90	40	
43	35	< 5	45	10	
44	30	10	70	5	
45	40	15	75	20	
46	40	5	65	20	
46A	600	10	25	75	Sulphide band between sampling interval.

Sample No.		Cu (2)	Pb (5)	Zn (1)	Ni (5)	Comments
R	47	40	30	55	25	
	48	40	15	55	30	
	49	10	10	75	10	
	50					No outcrop
	51					No outcrop
	52	25	<5	85	20	
	53	60	5	25	20	
	54	90	10	65	25	
	55	20	<5	35	5	
	56	5	<5	5	<5	
	57	10	<5	5	<5	
	58	20	<5	25	<5	
	59	25	5	35	<5	
	60	35	<5	25	10	
	61	25	<5	15	<5	
	61A	270	30	180	240	Sulphide band between sampling interval
	62	20	<5	5	<5	
	63	25	<5	25	<5	
	64	5	20	95	20	
	65	10	5	55	5	
	66	5	5	100	5	
	67	10	5	75	20	
	68	10	5	40	<5	
	69	15	5	75	<5	
	70	40	5	25	<5	
	71	60	5	40	<5	
	72	55	<5	40	<5	
	73	40	<5	15	<5	
	74	15	5	45	<5	
	74A	430	15	10	30	Sulphide band between sampling interval
	75	55	10	80	<5	
	76	35	10	70	20	
	77					No outcrop
	78					No outcrop
	79	10	10	90	5	
	80	5	10	85	<5	
	81	10	5	85	<5	
	82	15	10	100	10	
	83	10	10	90	10	
	84	5	5	75	10	
	85	210	10	20	25	

Sample No.	Cu (2)	Pb (5)	Zn (1)	Ni (5)	Comments
R 86	5	5	85	<5	
87	15	5	100	25	
88	30	5	65	20	
89	15	15	110	30	
90	10	5	25	<5	
91	5	35	60	<5	
92	95	15	15	<5	
93	5	10	25	10	
94	10	10	90	5	
95	30	<5	35	5	
96	5	5	15	<5	
97	10	5	10	<5	
98	35	5	30	20	
99	10	<5	20	<5	
100	15	10	30	15	
101	25	5	45	<5	
102	15	25	90	10	
103	35	45	90	25	
104	25	10	40	5	
105	5	15	70	15	
106	10	<5	70	10	
107	10	10	70	5	
108	15	25	25	5	
109	40	25	95	30	
110	30	35	110	30	
111	40	10	95	25	
112	35	5	110	40	
113	30	15	110	30	
114	35	35	130	40	
115	30	25	110	30	
116	30	30	75	25	
117	40	25	70	25	
118	35	10	100	30	
119	25	10	85	20	
120	35	40	110	30	
121	25	10	60	20	
122	15	10	55	10	
123	15	5	75	15	
124	70	15	110	25	
125	15	10	100	20	

Sample No.	Cu (2)	Pb (5)	Zn (1)	Ni (5)	Comments
R 126	40	15	100	25	
127	15	20	55	70	
128	25	25	130	50	
129	25	10	130	30	
130	25	15	140	30	
131	35	15	110	25	
132	35	5	120	30	
133	25	10	110	25	
134	30	10	110	20	
135	35	20	110	30	
136	35	20	120	30	
137	15	10	110	20	
138	30	10	100	25	
139	30	10	100	25	
140	15	15	55	15	
141	25	10	95	25	
142	25	5	110	30	
143	15	10	90	20	
144	30	20	110	30	
145	25	25	95	20	
146	35	20	110	40	
147	15	15	85	20	
148	15	20	85	20	
149	30	20	100	30	
150	30	20	110	30	
151	30	20	100	25	
152	15	15	85	20	
153	30	20	110	40	
154	35	10	110	30	
155	30	10	85	20	
156	30	10	110	40	
157	25	10	110	20	
158	25	15	100	20	
159	30	10	110	30	
160	30	15	95	30	
161	40	20	110	40	
162	25	10	120	20	
163	25	10	120	30	
164	15	10	60	20	
165	30	15	110	20	
166	30	20	120	30	
167	30	10	120	30	
168	35	10	110	30	
169	35	10	120	30	
170	30	15	170	30	

Sample No.	Cu (2)	Pb (5)	Zn (1)	Ni (5)	Comments
R 171	30	10	110	25	
172	15	30	90	20	
173	25	15	95	20	
174	25	20	100	25	
175	25	15	90	20	
176	25	15	75	20	
177	15	10	75	20	
178	15	15	75	20	
179	25	15	95	25	
180	25	20	100	25	
181	25	10	90	30	
182	30	20	150	30	
183	30	10	450	30	
184	30	20	100	30	
185	25	10	95	25	
186	30	10	110	25	
187	25	10	140	25	
188	30	15	110	30	
189	35	10	140	30	
190	30	10	110	30	
191	35	5	100	30	
192	30	5	230	25	
193	15	10	60	10	
194	15	10	130	20	
195	35	10	110	40	
196	25	10	95	25	
197	30	10	110	25	
198	15	10	70	20	
199	25	15	90	20	
200	50	15	70	10	
201	25	15	95	25	
202	15	5	60	20	
203	10	10	60	10	
204	25	5	90	25	
205	15	15	40	10	
206	15	10	70	20	
207	15	15	70	20	
208	25	20	100	25	
209	15	15	70	20	
210	10	10	55	10	
211	30	10	120	30	
212	15	10	85	20	
213	35	5	110	30	
214	15	10	75	20	
215	15	15	100	25	

Sample No.	Cu (2)	Pb (5)	Zn (1)	Ni (5)	Comments
R 216	25	5	85	25	
217	25	20	95	25	
218	15	15	60	25	
219	30	10	100	25	
220	30	15	90	25	
221	30	15	110	25	
222	30	20	110	25	
223	15	25	45	10	
224	15	15	40	10	
225	15	15	70	10	
226	10	20	70	20	
227	15	10	85	20	
228	10	15	70	15	
229	25	15	85	25	
230	10	20	65	10	
231	5	15	45	5	
232	30	15	95	25	
233	25	15	100	25	
234	25	20	100	25	
235	30	5	100	25	
236	35	10	130	60	
237	30	25	110	30	
238	15	15	85	20	
239	15	<5	65	30	
240	15	<5	50	25	
241	10	5	65	30	
242	10	5	30	20	
243	15	<5	60	25	
244	30	10	100	40	
245	30	10	90	40	
246	25	10	85	40	
247	30	10	100	50	
248	30	10	110	55	
249	25	10	110	55	
250	30	10	110	55	
251	40	10	310	60	
252	30	10	90	50	
253	35	20	120	60	
254	30	20	100	55	
255	30	70	230	55	
256	55	20	170	60	

Sample No.	Cu (2)	Pb (5)	Zn (1)	Ni (5)	Comments
SR 10	25	<5	120	40	
10A	15	10	45	30	Sulphide band between sampling interval
11	25	5	20	30	
12	25	10	60	30	
13	25	5	30	30	
14	35	20	25	30	
15	30	10	50	40	
16	30	10	30	30	
17	30	10	40	40	
18	15	10	40	30	
19					No outcrop
20					No outcrop
21	15	10	50	30	
22	15	10	45	30	
23	25	20	85	35	
24	30	10	120	30	
25	25	10	45	30	
26	25	10	25	35	
27	25	10	40	30	
28	70	10	25	85	
29	30	5	25	30	
30	35	10	120	50	
31	50	5	210	70	
32	15	5	30	30	
33	35	5	150	50	
34	30	5	25	30	
35	30	5	25	30	
36	35	5	20	30	
37	15	5	20	25	
38	15	5	40	30	
39	40	5	25	40	
39A	25	<5	45	40	East of False Cape
39B	<5	5	15	20	Cape Hart

APPENDIX II

ANALYTICAL RESULTS - STREAM SEDIMENT SAMPLES

Analyses by A.M.D.E.L. using Atomic Absorption Spectroscopy. Results in p.p.m. Values in brackets show detection limits. Sample locations are shown on Enclosures

Sample No.	Cu (2)	Pb (5)	Zn (1)	Ni (5)	Comments
S 1	5	15	25	25	
2	5	5	20	20	
3	5	5	25	25	
4	5	5	20	20	
5	< 5	5	15	10	
6	5	5	25	20	
7	10	10	45	30	
8	10	15	60	25	
9	5	90	15	30	
10	5	90	15	25	
10A	30	15	70	35	Rock chip
11	5	15	20	20	
11A	5	10	60	30	Rock chip
12	5	5	20	20	
12A	10	< 5	55	30	Rock chip
13	10	10	25	30	
13A	15	5	65	30	Rock chip
14	5	65	15	25	
14A	10	5	45	25	Rock chip
15	5	5	20	20	
16	5	5	15	15	
17	5	5	15	10	
18	5	< 5	10	10	
19	5	5	10	10	
20	5	5	15	5	
21	5	5	15	< 5	
22	5	5	10	5	
23	5	5	10	10	
24	5	5	10	10	
25	<5	5	5	10	

Sample No.	Cu (2)	Pb (5)	Zn (1)	Ni (5)	Comments
S 26	5	5	10	10	
27	10	5	20	25	
27A	5	5	50	30	Rock chip
28	<5	10	15	20	
29	<5	10	10	10	
30	5	15	15	20	
31	10	5	20	30	(See rock chip S137 same location)
31A	15	<5	70	40	Rock chip
32	<5	5	10	10	
33	5	5	10	10	
34	<5	5	5	5	
35	5	5	10	15	
40	<5	10	60	15	
41	<5	10	40	10	
42	5	<5	40	10	
43	10	<5	25	5	
44	10	5	30	20	
45	10	10	30	20	
46	10	5	40	20	
47	10	5	35	20	
48	15	5	50	30	
49	15	5	45	30	
100	5	5	30	25	
101	5	10	20	20	
102	5	10	25	20	
102A	5	5	60	30	Rock chip
103	5	5	20	20	
104	5	10	20	15	
105	5	55	20	30	
105A	5	5	65	30	Rock chip
106	5	5	15	15	
107	5	55	20	30	
108	<5	5	15	10	
109	5	15	20	15	
110	5	110	15	40	
111	5	10	20	20	
112	10	20	30	50	
113	5	75	15	40	
113A	10	5	60	30	Rock chip
114	10	5	30	30	
114A	5	<5	60	30	Rock chip
115	5	40	15	30	
116	5	90	15	50	

Sample No.	Cu (2)	Pb (5)	Zn (1)	Ni (5)	Comments
S 117	5	80	15	30	
117A	5	10	65	40	Rock chip
118	5	70	15	30	
119	5	120	20	40	
120	10	90	20	30	
120A	15	5	60	30	Rock chip
121	10	5	30	20	
122	10	5	25	30	
123	5	10	25	15	
124	5	5	25	20	
125	5	<5	15	< 5	
125A	55	10	65	40	Rock chip
126	5	5	10	10	
127	10	5	25	25	
128	5	5	15	10	
129	5	5	20	15	
130	5	5	20	15	
131	5	5	20	10	
132	5	5	20	10	
133	5	5	25	10	
134	5	5	15	10	
134A	5	5	80	40	Rock chip
135	5	<5	15	15	
136	15	25	30	20	
137	Renumbered S 31A (See S 31)				
138	10	25	40	20	
139	10	20	30	15	
140	5	5	25	15	
140A	5	5	65	40	Rock chip
141	5	5	15	15	
142	<5	<5	15	10	
143	70	10	20	15	
144	5	<5	10	10	
145	5	<5	10	10	
145A	5	10	40	30	Rock chip
146	<5	<5	10	10	
147	5	5	10	15	
148	5	10	20	25	
148A	10	10	85	55	Rock chip
149	30	10	100	30	
150	10	10	30	20	
151	10	10	20	20	
152	5	10	20	20	

Sample No.	Cu (2)	Pb (5)	Zn (1)	Ni (5)	Comments
S 153	5	10	25	20	
154	5	10	20	15	
200	5	5	20	20	
201	10	5	25	35	
202	5	10	30	20	
203	5	5	20	15	

GEOLOGY

CAINOZOIC		SANDS, AEOLIANITE
		LATERITE
JURASSIC		BASALT
PERMIAN		FLUVIOGLACIALS
LOWER PALAEOZOIC		GRANITE
L. CAMBRIAN	KAMANTOO GROUP	TAPANAPPA FM.
		TALISKER CALC-SILTSTONE
		BACKSTAIRS PASSAGE FM.
		CARRICKALINGA HEAD FM.
		UNDIFFERENTIATED
		WANGKONDA AND MOUNT TERRIBLE FMS.
UPPER PROTEROZOIC	MARINO GROUP	UNDIFFERENTIATED
	STURT GROUP	BRIGHTON LIMESTONE
		TAPLEY HILL FM.
		STURT TILLITE
		PEGMATITE

BACKSTAIRS PASSAGE

FOR DETAIL SEE ENCLOSURES 2 and 3.

BEACH PETROLEUM N.L.		
S.M.L. 628		
KANGAROO ISLAND		
GEOLOGICAL AND SAMPLE LOCATION MAP		
GEOSURVEYS OF AUSTRALIA PTY. LTD.		
Author A.T.v.S & K.R.	Date May 1972	Scale 1:50,000
Map Ref. 1:53:16, 1:54:13	Drawn N.B.	
Report N° 1972/5	Enclosure N° 1	Drg. N° BP 503

KANGAROO HEAD
HOG POINT
CHRISTMAS COVE
Penneshaw
HOG BAY
THE FRENCHMAN'S ROCK
CONGORY BEACH
IRONSTONE HILL
ALEX LOOKOUT
SNAPPER POINT
CAPE COUTTS
ANTECHAMBER BAY
ROCKY POINT
DUDLEY PENINSULA
KANGAROO ISLAND
ASHMAN LAGOON
CAPE ST ALBANS
MONCRIEFF BAY
CAPE WILLOUGHBY
PORKY FLAT
NATIONAL PARK
Black Point
FALSE CAPE
CAPE HART

R 202, R 254, R 201, R129, R128, R 20, R256, R256, SR39, SR10, R5, R3

LEGEND

- ROCK CHIP AND STREAM SEDIMENT SAMPLE
- ROCK CHIP SAMPLE
- STREAM SEDIMENT SAMPLE
- MINE
- 75° STRIKE AND DIP
- VERTICAL
- FAULT

SCALE 1:50,000

MILES 0 1 2 3 MILES

35°42' 43' 44' 35°45' 46' 47' 48' 49' 35°50' 52' 53' 54'

137°49' 50' 51' 52' 53' 54' 137°55' 56' 57' 58' 59 138°00' 01' 02' 03' 04' 05' 06' 07' 08' 09'

1807-1

138°00'00"
138° 01' 00"
138° 02'00"
138°03'00"
35° 44' 00"
35° 45' 00"
35° 46' 00"

Cu 55 30 p.p.m.
Ni 60 55 p.p.m.

R256 R255 ALEX LOOKOUT

SULPHIDE BAND

R202 R254 R201 R129 R128 R92 R40 R20 S49 S48 S47 S46 S45 S44 S43 S42 S41 S40

67° 68° 30° 50° 45° 42° 55° 60° 65°

F

SPRIGG INLET

SNAPPER POINT SR39 SR10

COPPER

NICKEL

p.p.m. 0 100

202 210 220 230 240 250 254

201 200 190 180 170 160 150 140 130 129

128 120 110 100 90 80 74A 70 61A 60 50 46A 40 30 20

N.O. 430 270 600 N.O. N.O. N.O.

N.O. 30 240 N.O. 75 N.O. N.O. N.O.

39 30 20 10A 10 15 N.O. 30

INVESTIGATOR STRAIT

BACKSTAIRS PASSAGE

KANGAROO ISLAND

AREA COVERED BY ROCK CHIP SAMPLING MAPS.

LOCALITY MAP

LEGEND

- DAM
- BUILDING
- R92 ROCK CHIP SAMPLE
- S40 STREAM SEDIMENT SAMPLE

NOTE:— ROCK CHIP SAMPLE LOCATIONS ARE AT 15 FOOT INTERVALS.

SCALE 1: 10,000

YARDS 100 0 100 200 300 400 500 600 700 800 900 1,000 YARDS

METRES 100 0 100 200 300 400 500 600 700 800 900 1,000 METRES

GEOLOGY

- GEOLOGICAL BOUNDARY
- N.O. NO OUTCROP
- 67° STRIKE and DIP
- F FAULT
- F THRUST FAULT
- 30° MAJOR OVERTURNED ANTICLINE WITH PLUNGE

LOWER CAMBRIAN — KANMANTOO GROUP
- TAPANAPPA FM.
- TALISKER CALC-SILTSTONE
- BACKSTAIRS PASSAGE FM.
- CARRICKALINGA HEAD FM.

LOWER CAMBRIAN
- WANGKONDA FM.
- MOUNT TERRIBLE FM.

UPPER PROTEROZOIC — MARINO GROUP
- UNDIFFERENTIATED

UPPER PROTEROZOIC — STURT GROUP
- BRIGHTON LIMESTONE
- TAPLEY HILL FM.
- STURT TILLITE

GEOLOGY AFTER DAILY and MILNES (1971,72).

BEACH PETROLEUM N.L.

S.M.L. 628

KANGAROO ISLAND

Rock Chip Sampling COPPER and NICKEL

GEOSURVEYS OF AUSTRALIA PTY. LTD.

Author A.T.vS., & K.R.	Date MARCH 1972	Scale 1:10,000
Map Ref. 1·53·16, 1·54·13	Drawn. N.B.	
Report N° 1972/5	Encl. N° 2 -	Drg. N° BP 501

1807-2

138°00'00"

138° 01' 00"

138° 02' 00"

138° 03' 00"

35° 44' 00"

35° 45' 00"

35° 46' 00"

Pb 20 70 p.p.m.
Zn 170 230 p.p.m.
R256 R255
ALEX LOOKOUT
SULPHIDE BAND
R202
R254
67°
R201
R129
68°
R128
R92
30°
R40
CUTTLEFISH BAY
R20
50°
45°
S49
42°
S48
S47
S46
S45
S44
S43
S42
S41
S40
SPRIGG INLET
55°
SNAPPER POINT
SR39
60°
SR10
65°

LEAD
ZINC
p.p.m.
202 210 220 230 240 250 254
201 200 190 180 170 160 150 140 130 129
128 120 110 100 90 80 74A 70 61A 60 50 46A 40 30 20
N.O.
39 30 20 10A 10

INVESTIGATOR STRAIT
BACKSTAIRS PASSAGE
KANGAROO ISLAND
AREA COVERED BY ROCK CHIP SAMPLING MAPS.
LOCALITY MAP

LEGEND

- DAM
- BUILDING
- R92 — ROCK CHIP SAMPLE
- S40 — STREAM SEDIMENT SAMPLE

NOTE:— ROCK CHIP SAMPLE LOCATIONS ARE AT 15 FOOT INTERVALS.

SCALE 1: 10,000

YARDS 100 0 100 200 300 400 500 600 700 800 900 1,000 YARDS
METRES 100 0 100 200 300 400 500 600 700 800 900 1,000 METRES

GEOLOGY

- GEOLOGICAL BOUNDARY
- N.O. — NO OUTCROP
- 67° — STRIKE and DIP
- F — FAULT
- F — THRUST FAULT
- 30° — MAJOR OVERTURNED ANTICLINE WITH PLUNGE

LOWER CAMBRIAN / UPPER PROTEROZOIC

KANMANTOO GROUP
- TAPANAPPA F.M.
- TALISKER CALC-SILTSTONE
- BACKSTAIRS PASSAGE F.M.
- CARRICKALINGA HEAD F.M.

MARINO GROUP
STURT GROUP
- WANGKONDA F.M.
- MOUNT TERRIBLE F.M.
- UNDIFFERENTIATED
- BRIGHTON LIMESTONE
- TAPLEY HILL F.M.
- STURT TILLITE

GEOLOGY AFTER DAILY and MILNES (1971,72).

BEACH PETROLEUM N.L.

S.M.L. 628

KANGAROO ISLAND

Rock Chip Sampling
LEAD and ZINC

GEOSURVEYS OF AUSTRALIA PTY. LTD.

Author A.T.vS., & K.R.	Date MARCH 1972	Scale 1:10,000
Map Ref. 1·53·16, 1·54·13	Drawn. N.B.	
Report N° 1972/5	Encl. N° 3	Drg. N° BP 502

1807-3

BACKSTAIRS PASSAGE

BEACH PETROLEUM N.L.

S.M.L. 628

KANGAROO ISLAND

Stream Sediment Sampling COPPER and NICKEL

GEOSURVEYS OF AUSTRALIA PTY. LTD.

Author A.T.v.S. & K.R.	Date MARCH 1972	Scale 1:50,000
Map Ref. 1:53·16, 1:54·13	Drawn N.B.	
Report N° 1972/5	Enclosure N° 4	Drg N° BP 498

COPPER & NICKEL

P.P.M.

0 – 20	
20 – 40	
40 – 60	
60 – 80	
80 – 100	

10/25 ROCK CHIP VALUE P.P.M. } COPPER / NICKEL

KANGAROO HEAD
HOG POINT
CHRISTMAS COVE
Penneshaw
jetty
ferries berth
HOG BAY
THE FRENCHMAN'S ROCK
CONGONY BEACH
EASTERN COVE
ROCKY POINT
CAPE COUTTS
SNAPPER POINT
ALEX LOOKOUT
LOOKOUT
R 202
R 254
R 201
R 129
R 128
R 20
R 256
R 255
SR39
SR10
Cu S49 Ni
S45
S40 Ni
Cu
Cu S7 Ni
S5
S1
S100
S105
S111
S110
S112
S115
Ni S119
S118 Cu
S120 Ni
S8 S121
S10
S15
S 20
S21
S122
S125
S130
S135
S136
S22
S25
S30
Ni
S35
S31 Ni
Cu
S 138 Ni
Cu
S140
S145
S150
S154
S203
S200
ANTECHAMBER BAY
CAPE ST ALBANS
RED HOUSE BAY
R5
R3
MONCRIEFF BAY
PINK BAY
CAPE WILLOUGHBY
WINDMILL BAY
NATIONAL PARK
DUDLEY PENINSULA
KANGAROO ISLAND
Black Point
FALSE CAPE
A
B
CAPE HART

LEGEND

- ROCK CHIP AND STREAM SEDIMENT SAMPLE
- ROCK CHIP SAMPLE
- STREAM SEDIMENT SAMPLE

SCALE 1:50,000

MILES 0 1 2 3 MILES

1807-4

BEACH PETROLEUM N.L.

S.M.L. 628

KANGAROO ISLAND

Stream Sediment Sampling
LEAD and ZINC

GEOSURVEYS OF AUSTRALIA PTY. LTD.

Author A.T.v.S.& K.R.	Date MARCH 1972	Scale 1:50,000
Map Ref. 1-53-16, 1-54-13	Drawn N.B.	
Report N° 1972/5	Enclosure N° 5	Drg. N° BP 499

LEAD & ZINC

P.P.M.

0 – 20
20 – 40
40 – 60
60 – 80
80 – 100
100 – 120

5/60 } ROCK CHIP VALUE P.P.M } LEAD / ZINC

LEGEND

- ROCK CHIP AND STREAM SEDIMENT SAMPLE
- ROCK CHIP SAMPLE
- STREAM SEDIMENT SAMPLE

SCALE 1:50,000

MILES 0 1 2 3 MILES

1807-5