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SML 645

CARALUE BLUFF

REVIEW OF EXPLORATION IN THE CARALUE BLUFF AREA FOR THE PERIOD 1/11/70 TO 31/10/72

Submitted by
Mines Administration Pty Ltd
1972

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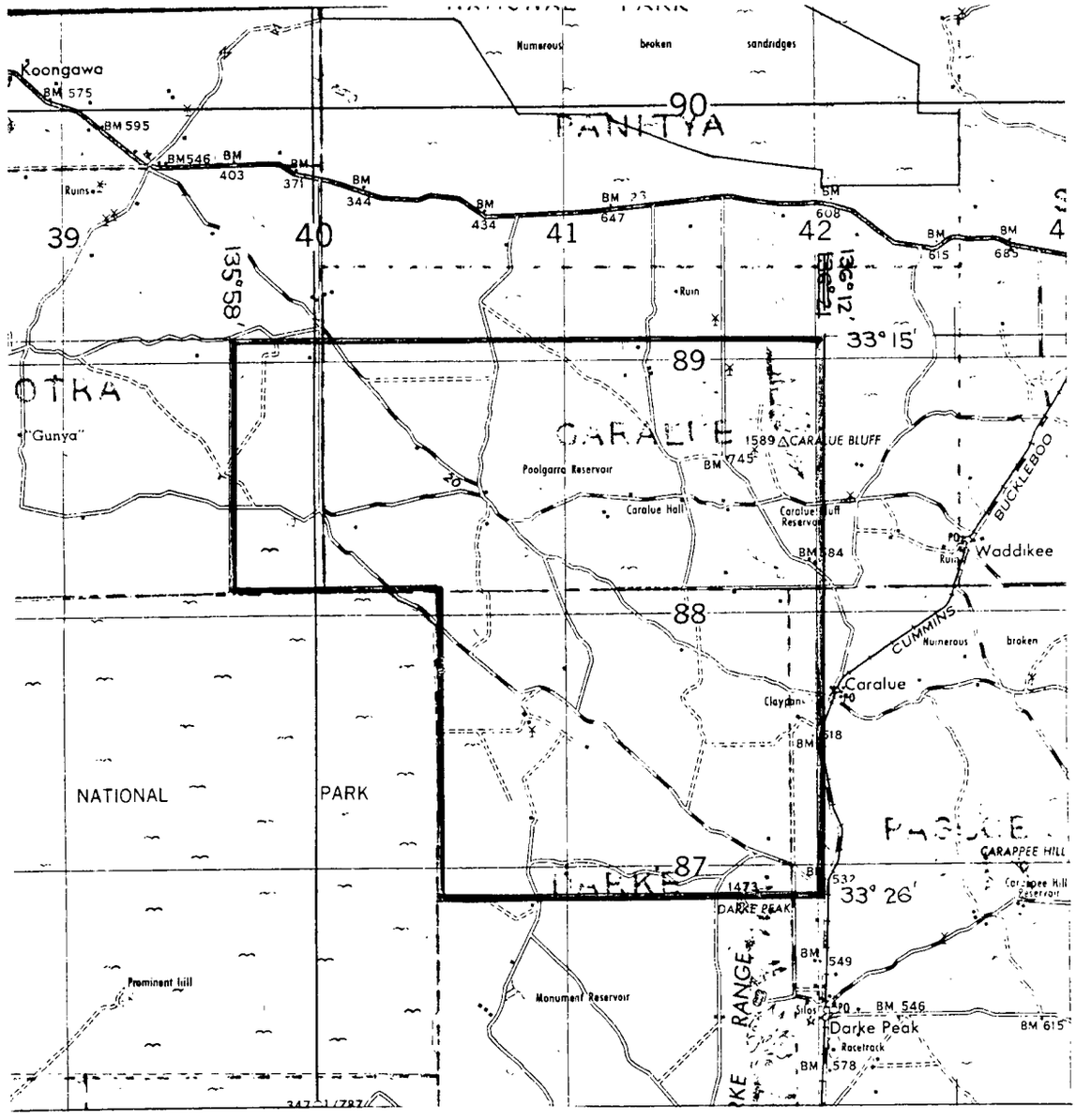

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MINES ADMINISTRATION PTY. LIMITED

REVIEW OF EXPLORATION IN THE CARALUE BLUFF AREA

EYRE PENINSULA

SOUTH AUSTRALIA

by

DAVID BRUNT

BRISBANE, Qld.
October, 1972.

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LEASE DETAILS

Exploration in the Caralue Bluff area on the Eyre Peinsula was undertaken by Mines Administration Pty. Limited in late 1969 with the granting of two Special Mining Leases 343 and 344 covering an area of 1648 square miles. Subsequently a third area SML.469 was taken up immediately to the west - an area of 365 square miles.

These leases covered exploration for all minerals, but the chief interest was sedimentary uranium. The model we were following was the uranium accumulations in Tertiary sands of Wyoming. In this project Mines Administration Pty. Limited was acting for a joint venture with Teton Exploration Drilling Co. of Wyoming U.S.A. (50:50).

After initial evaluation SML.343 (Rudall) and 469 (Lock) were given up; but SML.343 was renewed on 1st November 1970 for another twelve months. At that time a lesser area was obtained under a new title (SML.645) and this expires on 31st October 1972.

REGIONAL GEOLOGY

The physiography and geology of the leases is typical of much of the central Eyre Peninsula. The area is essentially of low to moderate relief marked by a widespread pattern of NW-SE trending red-brown sand dunes - now mostly fixed by vegetation. To the south and east there are isolated Precambrian granitic and metamorphic ridges that provide strong relief.

Precambrian metasedimentary and igneous rocks, largely undifferentiated and forming part of the Gawler Cratonic Block, underlie the Cainozoic of the area; as noted above they also crop out in places. In Tertiary times the Precambrian rocks occupied an extensive peneplain surface which was subject to intense chemical leaching, with the local development of in situ kaolin, particularly in the pallid zone overlying the more feldspathic metasediments and igneous rocks.

Tertiary clays, silts, lignitic in part, and interbedded sands were deposited in depressions on the irregular Precambrian palaeosurface. The sands were generally thin but varied up to 120 feet in thickness and appear to be deposited under fluviatile conditions. It has not been possible to correlate the sands over any great distance - but this would be expected in a stream pattern. Anomalous radioactivity has been found associated with the uppermost section of these basal sands in one area.

Quaternary clays up to 50 feet thick cap the Tertiary sands and extend laterally well beyond the sand channels, and are in turn overlain by up to 60 feet of (?) aeolian sands; the latter extend to the surface over a great deal of the area and consist mostly of heavily iron stained quartz grains.

URANIUM EXPLORATION

Preliminary work consisted of a literature study of the existing geological and water bore information including data on basement depths and the distribution of sands within the Cainozoic sediments. Following this evaluation exploratory work fell into five categories:-

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1. Sampling of Groundwaters.

2. Airborne Scintillometer Reconnaissance.

3. Openhole Drilling.

4. Geophysical Techniques.

5. Chemical Study of Kaolin. *

Groundwater Sampling

All accessible water bores within the three leases were sampled for U_3O_8. It was hoped that any anomalous values of U_3O_8 obtained would indicate at least broad areas of interest for subsequent drilling programmes. An analogy was drawn from the Frome Embayment, South Australia, where uranium values from water samples in the general vicinity of the Beverley Prospect are significantly higher than background values. The results were very inconclusive; for although a large number of water bores have been drilled, most of the groundwater has proved to be too saline for use and practically all the bores have been abandoned and were not accessible. Water samples were only obtained from a limited number of bores and none showed significant uranium content (i.e. greater than 5 p.p.b. U_3O_8).

Airborne Scintillometer Survey

An airborne scintillometer survey was undertaken over the entire area using a Cessna 182 fitted with a Nuclear Enterprise Scintillometer (5" crystal). Operating altitude was between 150 and 200 feet at an average airspeed of 100 knots. No indicative anomalies were detected, but this could be the surface sands and soil completely masking the radioactivity of the underlying sediments.

Drilling Programme

The results of the groundwater sampling programme and the aerial survey did not delineate any specific drilling targets. Initially therefore, exploration drilling was by necessity of a reconnaissance nature in an attempt to locate favourable host sands. The only controls were earlier work by Kerr-McGee and the regional gravity interpretation - that in its simplest configuration could be used as a basement structure contour map.

Reconnaissance drilling programmes were conducted in late 1969 and late 1970 and a total of 26 open holes totalling 9303 feet were drilled. All holes were logged for total gamma radiation, single point resistivity and self potential. Continuous 5 foot cuttings samples were collected and lithologically described. These samples have been retained for future reference. Drill hole locations are shown on the enclosed Location Map and results are tabulated on the attached drilling record sheets.

The results of this work were quite encouraging and substantiated previous thoughts on the prospectiveness of the area. The drilling has indicated an uneven undulating basement with Tertiary valley fill deposits occurring in channels cut into the basement; the whole area is overlain in part by residual deposits and a Quaternary veneer. Significant radioactivity was picked up in two areas -

Rudall area
Caralue Bluff area.

* Kaolin was discovered in the course of the uranium exploration but will be considered in a separate section.

Rudall Area

In the area of interest (covered by SML.344) a shallow basin has developed in which marine and freshwater Tertiary sediments have been deposited. These consist of interbedded clays, thin sands, lignites and gravels. The thickness of this sequence ranges from about 100 to in excess of 500 feet.

The drilling programme for uranium consisted of two phases - the first to check prospects between two holes drilled by Kerr-McGee near Tuckey and the second to extend reconnaissance drilling southwest from Konanda.

In the Tuckey area extensive drilling carried out by Kerr-McGee Corporation detected radioactive anomalies associated with lignitic sand and mudstones - the best hole reported .029% U_3O_8. In late 1969 MTA drilled 10 close-spaced holes to check out the possibility of geochemical cell development in the vicinity of holes R10, R11 and R12 drilled by Kerr-McGee. A cross section showing the holes drilled and their correlation is attached (Plate 1).

Anomalous radioactivity was associated with a well defined sand unit designated the "A Sand" occurring in a claystone-lignite sequence. The A Sand occurs at a depth of 100 feet, ranges from 10 to 20 feet thick; it is generally medium to coarse grained, subangular to subrounded, poorly sorted and slightly feldspathic. Strong colour contrasts exist within the sand representing oxidized and unoxidized phases ("fresh" and "altered" ground). The unaffected sand is pyritic with some lignite in contrast to the altered sand which has limonite and some haematite staining of the quartz grains - and neither pyrite or carbon. The evidence indicates some lateral movement of oxidizing fluids in this stratigraphic unit. The "B Sand" occurs at an average depth of 120 feet and is at least 140 feet thick. The full section was not penetrated in any of the holes. The sand is medium grey, coarse to very coarse, poorly sorted, subrounded to subangular, quartzose and with abundant pyrite and lignitic matter. No alteration of the sand was detected.

The highest radioactivity occurs in fresh A Sand in drill holes RX-3A, RX-9 and RX-8. This radioactivity is interpreted to give a peak value of .01 to .015% U_3O_8 in RX-8. In the stratigraphically equivalent altered sand in holes RX-4 and RX-7 the radioactivity is less. The reason for the anomalous radioactivity in about the same position in both altered and unaltered A Sand is not clear. If it is caused by lateral migration it is unlikely that drilling between RX-9 and RX-7 would significantly improve results. A more probable solution is that the uranium carried in solution through the sand, has been preferentially deposited on the lignites. No anomalous radioactivity is found associated with the B Sand.

In late 1970 eight reconnaissance drill holes were drilled west of Rudall in two profiles along the edge of a shallow Tertiary basin. The holes and their correlation are shown on Plate 2. Although the drilling revealed a locally thick Tertiary section with strongly developed lignites, very few sands were penetrated. Lignitic sands and lignite were penetrated in drill holes DP-2, DP-3, DP-4 and DP-5. The sands were generally medium to light grey, coarse grained, poorly sorted, subangular to subrounded, quartzose to subarkosic, with abundant pyrite and lignitic material. Arkosic sandstone was penetrated in DP-26 and DP-27.

Modest anomalous radioactivity was found associated with lignites in a Tertiary sand sequence in drill holes DP-4, DP-26 and DP-27. A peak reading of X4 shale background was recorded in DP-4. Other anomalies recorded in DP-1, DP-5 and DP-25 were associated with basement granite and granite gneiss. XRF assays from cuttings samples in DP-4 showed that both the uranium and thorium were anomalous but the results were quite low (8 p.p.m. U_3O_8; 15 p.p.m. Th.).

Caralue Bluff Area

Strong radioactive anomalies were associated with a sinuous sand channel. The sand unit is generally light grey in colour, predominantly quartzose but with some light grey feldspar, minor dark accessory minerals; pyrite and carbonaceous material are present in some holes. The sand is coarser in the lower part, subangular to angular and poorly sorted. It becomes finer grained near the top, subrounded and is subarkosic in part. The upper portion of the sand overlaps mudstones on the margins of the channel and is generally reddish-brown to brown in colour.

Anomalous radioactivity was found in five drill holes - DP-16 DP-24 and DP-30 to 32. As noted above there was a clear association with the upper part of the channel sand deposits. The radioactivity in DP-24 extended over six feet with a single peak of 1365 API units. The anomalous zone in DP-30 consisted of three kicks over the interval of about 9 feet with the highest peak recorded being 2180 API units. Assuming that the anomaly is due mainly to uranium which is in equilibrium, the peak grade would be about 0.05% U_3O_8. This is yet to be confirmed by coring and chemical analysis. Cuttings from DP-24 were analysed for uranium and thorium and although absolute values were small, the uranium content was highly anomalous (U_3O_8 ranged up to 52 p.p.m. and thorium 7 p.p.m.). Cuttings were also analysed from DP-30 but only 12 p.p.m. U_3O_8 was detected. It is believed that this much lower value was due to greater leaching and contamination of the very friable sand in this hole.

A profile drilled approximately seven miles east of the above area and close to Caralue Bluff itself encountered modest anomalous radioactivity in a yellowish grey kaolinitic claystone. The drill holes concerned were DP-6 and DP-9 to DP-13. Assays of cuttings from the anomalous section indicate that the gamma response is primarily due to thorium. Absolute values in DP-9 were 275 p.p.m. thorium 28 p.p.m. uranium. It is not likely that the uranium or the thorium would suffer significant leaching in this mudstone lithology and so the bulk of the response is almost certainly due to thorium.

Cross sections showing the holes drilled and their correlation are are presented. Cainozoic correlations based on drilling results in the Caralue Bluff area are enclosed (Plates 3 and 4). Plate 4 also contains a structure contour map of the top of the channel sand, and isopach maps of the channel sand and also the overlying sediments as presently defined. These maps indicate the trend and configuration of the channel. From an examination of the structure contours and present day drainage in the area it is probable that the palaeostream in which the favourable sands were deposited flowed towards the southwest.

Geophysical Techniques

After the initial drilling it became apparent that the Caralue Bluff area warranted additional work - but would be hampered by the total lack of outcrop. It was decided to try out geophysics to help delineate Tertiary channels - and thus cut down the amount of wasted drilling. The uraniferous sand delineated in the vicinity of DP-24 and DP-30 is apparently part of a sinuous fluvial deposit and it was decided to try a close spaced gravity grid to pinpoint the channel. The existing gravity coverage of the area provided a regional interpretation only - but did suggest that a quite uniform basement gravity response could be expected, thus allowing the quite small responses from the Tertiary section to be recorded.

A detailed gravity survey was conducted by Wongela Geophysical Pty. Ltd. over six square miles in the vicinity of DP-24 and 30. Observations were made at a total of 165 gravity stations and the results were presented as Bouger anomaly profiles and contour maps. It was hoped that the courses of the channels could be picked up by the small gravity differences (estimated to be about 0.2 milligals). In practice the Precambrian basement directly below the Tertiary section showed contrasts ten times the above figure and completely masked any responses due to the Tertiary channels.

Following the failure of the microgravity survey to provide meaningful results about the Tertiary channels, alternative geophysical methods were considered. Ground magnetics were ruled out because of the strong magnetic contrasts in the basement rocks as seen from the South Australian Department of Mines 1:250,000 scale aeromagnetic maps of the area. Induced polarization and also resistivity dipole-dipole (combining sounding and profiling) were rejected as both were quite unproved and trouble could be expected with the saline ground waters.

A shallow seismic survey would be most likely to suceed in delineating the channel but expenditure on exploration of this nature would be of a similar order to that for open hole drilling. The problem appears to be one that can only be resolved by the continuation of costly open hole drilling.

KAOLIN

In the course of reconnaissance drilling near Caralue Bluff a thick section of white to very light grey kaolin was intersected in a number of drill holes in the vicinity of DP-13 and DP-14. The kaolin occurs at a depth of about 30 feet and is up to 50 feet thick. Preliminary testing of cuttings samples from DP-13 and DP-14 have been carried out by AMDEL in Adelaide. While the cuttings are contaminated by drilling muds as well as other uphole lithologies these initial tests have been most encouraging. It appears that the kaolin quality could be sufficiently good to meet the requirements for paper filling or paper coating.

Chemical tests showed that the cuttings samples consisted of kaolin containing 27% freequartz, a trace of illite - but no montmor illonite. (This is very essential to achieve a suitable viscosity). The iron (Fe_2O_3) and titanum content in the total sample was reduced to 15% in the -2 micron fraction, about average in paper quality clays. A brightness factor of 87% was determined and this again is well within acceptable limits.

CONCLUSIONS

In one area uranium is certainly associated with Tertiary channel sands infilling palaeo-valleys on the Precambrian basement; there, five of the eight drill holes that encountered the channel sand had anomalous radioactivity due to uranium mineralization. In a second area the uranium is tied up in lignite and carbonaceous shale, but in the absence of sand in the section would not be nearly as prospective.

The general area is quite prospective - but deposits would probably not be large. However the indications are that the depth of overburden would not be great, to an extent offsetting the size factor. An ore deposit at depths of only 100-120 feet with "soft" overburden could easily be mined by open pit methods. Grades of only 2-3 lb. U_3O_8 per ton could be encouraging in this situation.

In view of the failure of geophysics in outlining the channel courses, a large amount of open hole drilling would be involved in exploration.

The preliminary analyses of heterogeneous cuttings samples for kaolin show the potential of one area at least for clay of paper filler or paper coating grade. Exploratory drilling and further testing of larger representative samples would be necessary to establish the potential of the deposit.

RECOMMENDATIONS

Further exploration for both uranium and kaolin would require reconnaissance open hole drilling and the commitment of substantial funds. The delineation of the stream channel system near DP-24 and 30 and checks for uranium concentrations would require a 5,000 feet drilling programme. The programme would involve 20 to 30 holes drilled to an average depth of 200 feet; all holes should be logged for single point resistivity, spontaneous potential and total gamma radioactivity, together with detailed lithological control.

The more attractive area would be south west of DP-24 but the proximity of a National Park would pose problems. Initially the drilling would have to be mainly to the north of DP-24.

A further 5,000 feet of drilling on wide spaced centres in the Caralue Bluff area is recommended to locate additional stream channel sands. The results would also be useful in assessing the extent of the kaolin defined in DP-13 and DP-14. The work would obviously be concentrated in the magnetic lows.

A small drilling programme utilizing a rat hole rig would be necessary to obtain large kaolin samples for analyses. A 1,500 feet drilling programme involving 10 to 20 holes to an average depth of 90 feet is envisaged in this regard. Further testing of a typical kaolin section using bulk (5-20 lb.) samples is required. These results in conjunction with the geological information should enable an initial assessment of the kaolin deposit to be made.

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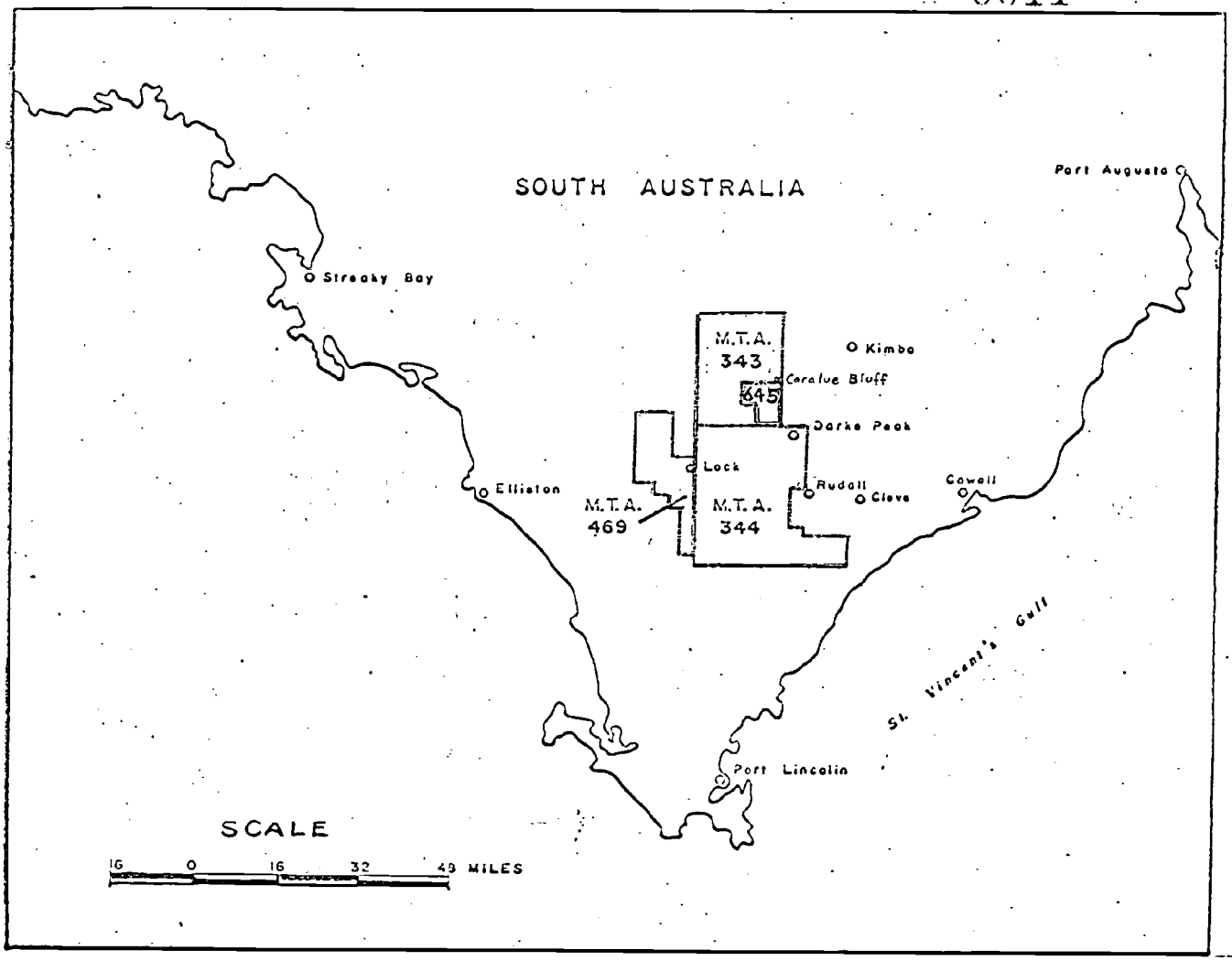

LOCATION MAP

M.T.A. SPECIAL MINING LEASES

EYRE PENINSULAR

SOUTH AUSTRALIA

DRILL HOLE DATA

SML 344, EYRE PENINSULA

Drill Hole	Location	Elev.	TD	Probe Depth	Formation Tops	Alt.	Fresh	Radio Activity	Remarks
RX-1	½ mile west of Tuckey Tank corner. See attach. locality map.	370'	200	190	Tertiary "A" Sand unit 104- * Thickness Approx. 17 ft.		X	Barren	Overall fresh appearance - Carbon and traces pyritized carbon.
					"B" sand unit 140-* to T.D.		X	Barren	Lignitic sand - abundant pyrite
RX-2	Approx. ½ mle S Kerr-McGee R-11 See att.loc.map	355'	290	287	"A" Sand unit 88* Thickness 6 ft.		X	Anomalous 2 times background at top of sand. approx.4 times background at base of sand.	
					"B" sand unit approx. 100' to TD		X?	Barren	Note: absence of pyrite and carbon (lignite)
RX-3A	Approx. 162' S RX-9	360'	200	129	"A" sand 100 ft Thickness 12 ft.		X	4 times backgrd at top of sand 2 times backgrd near base	RX-3 lost circulation and moved to Loc. RX-3A. Note: Change in Probe Log from Gamma 25°/S/in to 100°/S/in.
					"B" Sand approx. 130' to TD		X	Barren	Abundant lignite separates "A" and "B" sandstone units.
RX-4	Approx. 0.1 mle South of RX-3A	355'	127	109	"A" Sand 95' Thickness 10'+	X		2 times bgd at top of sand	Lost circulation at 105; drilled to 125' with no return - ran push tube 125-127, secured lignite.
					"B" Sand Not Penetrated		X		Probe to 109' - after washing hole - lignite zone near top of "B" Sand.
RX-5	Approx.0.05 mle south RX-4	360'	220	212	"A" sand 95' Thickness 10 ft.		X	Two radioactive kicks 2-2½ times background.	Sand is fresh. carbon and pyrite both present
					"B" sand approx. 118' to T.D.		X	Barren	Sand is fresh - pyrite but very only traces of lignite - compared to strongly lignitic zones in same horizon in holes to the north.

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SML 344, EYRE PENINSULA

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Drill Hole	Location	Elev.	T.D.	Probe Depth	Formation Tops	Alt.	Fresh	Radio Activity	Remarks
RX-6	Approx. ½ mle north of R-11	380'	150	147	"A" Sand 108' Thickness 8 ft.		X	Slight trace approx. 1½ times ackground	Trace matrix pyrite and carbon
					"B Sand 122' to TD		X	Barren	Very lignitic pyritic sand.
RX-7	Approx. 325' S of R-11(Kerr-McG)	370'	150	150	"A" Sand 105' Thickness approx 16 ft.	X		V. slight traces	Scattered orange limonite stains 20-30% of grains. No pyrite; no carbon noted.
					"B" Sand approx. 134' to T.D.		X	Barren	Very lignitic, no pyrite noted.
RX-8	Approx. 150' North of RX-2	360'	290	287	"A" Sand 92' Thickness 10 ft		X	Approx. 4 times background	Fresh sandstone - with traces of pyrite and lignite.
					"B" Sand 110' to T.D.		X	Barren	Fresh sandstone - pyrite throughout interval with very slight traces lignite.
RX-9	Approx. 162' south of RX-7	365'	150	150	"A" sand 105' Thickness 9 ft.		X	Approx. 4 times back-grd. near top, trace near base	Fresh sandstone with pyrite and carbon.
					"B" Sand 120' to TD		X	Barren	Abundant lignite and traces of pyrite
RX-10	Approx. 18 miles SE between Kerr McGee Holes V-21 andV22. (See Verran Geologic Sht)	208'	105?	68	Lower Tertiary-Cambrian Fm.?			Slight traces approx. 40'	Quartzitic sandstone, very hard, dense Sandstone with granitic rock fragments;twisted off and lost two lengths of drill pipe and bit in hole.

* Tops picked from E-logs when possible.

DRILL HOLE DATA

EYRE PENINSULA, OCTOBER-NOVEMBER 1970

Drill Hole Name & No.	Location (Grid Ref. - Refer to Map SI 53 - 7 Kimba 1:250,000)	Elev. (ft.)	Depth Drilled (ft.)	Depth Probed (ft.)	Formation Tops	Alt.	Fresh	Radioactivity	Remarks
L-1	357841 SML.469	Approx. 116'	253	250	Quaternary-Tertiary 0-220' Precambrian 220'	Surface Alt.		No anomalous radioactivity	Gamma probe breakdown at 77 ft. coming out of hole on first run. Upper part of hole run with different probe.
L-2	360841 SML.469	Approx. 209'	135	133	Quaternary-Tertiary 0-135' Precambrian 135'	Surface Alt.		No anomalous radioactivity	Section penetrated predominantly sand.
L-3	363838 SML.469	Approx. 179'	115	110	Quaternary-Tertiary 0-95' Precambrian 95'	Surface Alt.		Small anomalous "kick" at 78 ft.	Anomalous radioactive kick associated with light grey kaolinitic claystone.
L-4	360843 SML.469	Approx. 200'	155	150	Quaternary-Tertiary 0-154' Precambrian 154'	Surface Alt.		Anomalous radioactive kick at 100 ft. peaked at approx.936 API units.	Radioactive kick within a sandstone unit. Assays 10 ppm U_3O_8 <5 ppm Th.
L-5	357848 SML.469	Approx. 228'	175	177	Quaternary-Tertiary 0-145' Precambrian 145'	Surface Alt.		No anomalous radioactivity	Lignitic section 110-115 ft.

Drill Hole Name & No.	Location (Grid Ref. - Refer to Map SI 53 - 7 Kimba 1:250,000)	Elev. (ft.)	Depth Drilled (ft.)	Depth Probed (ft.)	Formation Tops	Alt.	Fresh	Radioactivity	Remarks
L-6	354842 SML.469	Approx. 215	275	272	Quaternary-Tertiary 0-260' Precambrian 260'	Surface Alt.		Small anomalous kick at 104ft. approx. 390 API units.	Radioactive kick in sand.
L-7	350856 SML.469	Approx. 183	410	405	Quaternary-Tertiary 0-410'	Surface Alt.		Small anomalous kick at 378ft. approx. 400 API units.	Radioactive kick in sand. Assays - 370-380 <5 ppm U_3O_8; <5 ppm Th. 380-390 5 ppm U_3O_8; <5 ppm Th.
L-8	365835 SML.469	Approx. 194	197	196	Quaternary-Tertiary 0-115' Precambrian? 115'	Surface Alt.		No anomalous radioactivity	Section from 115-190 ft. appears to be decomposed metamorphic rock.

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Drill Hole Name & No.	Location (Grid Ref. - Refer to Map SI 53 - 7 Kimba 1:250,000)	Elev. (ft.)	Depth Drilled (ft.)	Depth Probed (ft.)	Formation Tops	Alt.	Fresh	Radioactivity	Remarks
DP-1	414856 SML.344	Approx. 455 152 m	280 93 m	273	Quaternary-Tertiary 0-250' Precambrian 250' 83 m 69 m S.S.	Surface Oxid.		206-216 pk. .06 MR/hr. 216-252 high background 266-TD.pk. .06+ MR/hr.	Lithology from 200-250 - appears to be reworked and/or decomposed Quartz-feldspar Gneiss 250-265 Mica Schist 265-270 Quartz-feldspar Gneiss.
DP-2	412855 SML.344	Approx. 418	450	448	Total depth in Tertiary	Surface Oxid.		No anomalous readings.	Abundant Lignite at TD.
DP-3	409853 SML.344	Approx. 404	450	448	Total depth in Tertiary	Surface Oxid.		No anomalous readings.	Increase of Lignite at TD.
DP-4 154509	413855 SML.344	Approx. 444 148 m	270 90 m	256	Quaternary-Tertiary 0-255' Precambrian 255' 85 m 63 S.S.	Surface Oxid.		173-180 pk. .055 MR/hr. 240-260 pk. approx. .052 MR/hr.	Anomalous radioactivity 173-180 in altered sandstone. Assays: 185-200, 8 ppm U308, <5 ppm Th. 200-220, 5 ppm U308, <5 ppm Th. 250-270. <5 ppm U308, 15 ppm Th.
DP-5	414853 SML.344	Approx. 459 153 m	255 85 m	253	Quaternary-Tertiary 0-235' Precambrian 235' 78 m 75 S.S.	Surface Oxid.		130-226 very high background. 234-240, .09 MR/hr. 246-TD, .067 MR/hr.	Very high background in mudstone-sandstone sequence. Highest kick near contact of Sedimentary Section and Granite Gneiss. 246-TD in Granite-Gneiss.

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Drill Hole Name & No.	Location (Grid Ref.-Refer to Map SI 53 - 7 Kimba 1:250,000)	Elev. (ft.)	Depth Drilled (ft.)	Depth Probed (ft.)	Formation Tops	Alt.	Fresh	Radioactivity	Remarks
DP-6	415872 SML.343	Approx. 570 157m	190 63m	186	Precambrian 170' 57m 100 S.SE	Surface Alt.		High background 86 - 150' with peak at 123'.	Highest anomalous readings in yellowish grey Kaolinitic claystone. Assay 130-140, 13 ppm U_3O_8, 47 ppm Th.
DP-7	412875 SML.343	Approx. 481	15	NL	Quaternary (?)	Surface Alt.		NL	Very hard drlg., Siliceous Limonite-Hematite banding with Quartzite fragments.
DP-8	406878 SML.343	Approx. 422 141m	115 38m	109	Quaternary-Tertiary 0-85' Precambrian 85' 28m	Surface Alt. 113 S.SE		No anomalous radioactivity.	Decomposed Granite-Gneiss at 85', becomes fresh very hard at 100'.
DP-9 170631	415874 SML.343	Approx. 641 214m	90 30m	86	Precambrian 80' 27m 189 S.SE	Surface Alt.		50-68' .10 MR/hr.	Anomalous kick in yellowish grey Kaolinitic Claystone. Assay 55-65, 18 ppm U_3O_8 145 ppm Th., 65-75, 28 ppm U_3O_8, 275 ppm Th.
DP-10	412870 SML.343	Approx. 480 160m	200 67m	196	Quaternary-Tertiary 0-195' Precambrian 195' 65m	Surface Alt. 95. SSE		90 - 120' high background.	Total Depth in Quartzite.
DP-11	409870 SML.343	Approx. 434 145m	152 51m	149	Quaternary-Tertiary 0-148' Precambrian 148' 49m	Surface Alt. 96 S.SE		No anomalous radioactivity.	Granite-Gneiss at Total Depth.

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Drill Hole Name & No.	Location (Grid Ref. - Refer to Map SI 53 - 7 Kimba 1:250,000)	Elev. (ft.)	Depth Drilled (ft.)	Depth Probed (ft.)	Formation Tops	Alt.	Fresh	Radioactivity	Remarks
DP-12 170634	415875 SML.343	Approx. 618 206 m	138 46 m	136	Precambrian 135' 45m 161 S.SE	Surface Alt.		Anomalous kicks at 60', 68-78', 95-108', 113-122' 126-132'	Kicks predominantly in yellowish grey and light greenish grey claystone. Assays: 60-85', 27 ppm U_3O_8, 160 ppm Th. 105-120', 30 ppm U308, 105 ppm Th. 120-138' 23 ppm U308, 45 ppm Th.
DP-13	415.5/878 SML.343	Approx. 573 191 m	145 48 m	142	Precambrian 140' 47m 144 S.SE	Surface Alt.		Anomalous kick 82-85'.	Kick in yellowish grey claystone.
DP-14	410881.5 SML.343	Approx. 488 163 m	80 27 m	77	Precambrian 75' 25m 138 S.SE	Surface Alt.		No anomalous radioactivity.	Pink feldspars with green accessory minerals and feldspar, probable Granite.
DP-15	408884 SML.343	Approx. 440 147m	165 55 m	158	Precambrian 155' 52 m 95 S.SE	Surface Alt.		No anomalous radioactivity	White to light grey kaolinitic claystone from 60-155'.
DP-16	403884.5 SML.343	Approx. 355 118 m	265 88 m	261	Quaternary-Tertiary 0-250' Precambrian 250' 83m 35m S.SE	Sands - Alt.		Kicks at 30ft. 52', 62' and from 204 to TD. Very high background.	Sandstone from 95' to 160 appears altered, from 160 to 185 appears fresh.
DP-17	400884 SML.343	Approx. 329 110 m	133 44m	129	Precambrian 130' 43 m 67 S.SE	Surface Alt.		No anomalous radioactivity	Claystones from 50-130' probable residual type deposits.

6019

Drill Hole Name & No.	Location (Grid Ref. - Refer to Map SI 53 - 7 Kimba 1:250,000)	Elev. (ft.)	Depth Drilled (ft.)	Depth Probed (ft.)	Formation Tops	Alt.	Fresh	Radioactivity	Remarks
DP-18	400889 SML.343	Approx. 346 115m	18 6m	NL	Precambrian 15' 5m	Surface Alt. 110 S.S.E		NL	Decomposed Granite-Gneiss 5-15', becomes fresh at 15'.
DP-19	395885 SML.343	Approx. 306 102m	190 93m	185	Precambrian 185' 62m	Surface Alt. 40 S.S.E		No anomalous radioactivity	Thin very hard siliceous ironstone banding associated with sands and siltstone 30-40'.
DP-20	389884 SML.343	Approx. 347	30	NL		Surface Alt.		NL	Very hard siliceous ironstone banding at 25'.
DP-21	388886 SML.343	Approx. 477 159m	170 57m	163	Precambrian 165' 55m	Surface Alt. 104 S.S.E		No anomalous radioactivity	Decomposed Granite-Gneiss at TD, very hard drlg.
DP-22	388889 SML.343	Approx. 504 135m	225 75m	222	Precambrian 215' 72m	Surface Alt. 63m S.S.E		No anomalous radioactivity	Decomposed Mica-Schist at 215', became very hard drlg. 220'.
DP-23	402884 SML.343	Approx. 348	250	197	Quaternary-Tertiary 0-TD	Surface Alt.		Gamma-probe not working properly.	Sandstone from 140-TD definitely fresh, traces of pyrite throughout. Lost circulation.
DP-23A	50' west of DP-23	Approx. 348	215	210	Quaternary-Tertiary 0-TD	Surface Alt.		No anomalous radioactivity	Well developed channel sand. Total thickness 145+'. Lost circulation in this zone.

Drill Hole Name & No.	Location (Grid Ref. - refer to Map SI 53 - 7 Kimba 1:250,000)	Elev. (ft.)	Depth Drilled (ft.)	Depth Probed (ft.)	Formation Tops	Alt.	Fresh	Radioactivity	Remarks
DP-24	402881.5 SML.343	Approx. 364 121m	250 83m	246	Precambrian 245' 82m 39 S.SE	Surface Alt.		104-110', 1365 API units	Anomalous kicks in brown to brownish black sandstone. Grab sample 52 ppm U_3O_8, 7 ppm Th.
DP-25	409858.5 SML.344	Approx. 426 142m	40 13m	40	Precambrian 35' 12m 130 S. SE	Surface Alt.		8-34', 38-40' very high background	Anomalous kicks associated with decomposed granite or granite gneiss.
DP-26	409856 SML.344	Approx. 404 135m	184 61m	174	Precambrian 180' 60m 75 S. SE	Surface Alt.		138-TD very high background	Anomalous readioactivity associated with sandstone with abundant feldspar.
DP-27	413855 SML.344 .25 mile west of DP-5	Approx. 460 153m	255 85m	232	Precambrian TD. 85m 68 S. SE	Surface Alt.		Anomalous kicks at 124' 142', 145'.	Anomalous radioactivity in argillaceous sandstone.
DP-28	404881 SML.343	Approx. 373	120	119	Quaternary-Tertiary 0-120'	Surface Alt.		No anomalous radioactivity.	Granite-Gneiss at TD.
DP-29	403881.2 SML.343	Approx. 367 122m	150 50m	151	Quaternary-Tertiary 0-115' Precambrian 115' 38m	Surface Alt. 84 S.SE		No anomalous radioactivity.	Metamorphics at TD.
DP-30	402882 SML.343	Approx. 360 120m	230 77m	227	Quaternary-Tertiary 0-210' Precambrian 210' 70m 50 S.SE	Surface Alt.		Anomalous radioactivity 115-123' pks. to 2180 API units.	Grab sample assay 12 ppm U_3O_8. Radioactive kick in sandstone, correlated with same zone in DP-24.

Drill Hole Name & No.	Location (Grid Ref. - refer to Map SI 53 - 7 Kimba 1:250,000)	Elev. (ft.)	Depth Drilled	Depth Probed	Formation Tops	Alt.	Fresh	Radioactivity	Remarks
									0021
DP-31	401882.5 SML.343	Approx. 354 115m	155	152	Quaternary-Tertiary 0-145' Precambrian 145' 45m.	Surface Alt. 70 S.SE		Anomalous radioactivity upper kick at 120', 780 API units; lower kick at 132' 780 API units.	Anomalous radioactivity represented as twin peaks may represent residual mineralization.
DP-32	401.5/882 SML.343	Approx. 353 118m	260	254	Quaternary-Tertiary 0-255' Precambrian 255'. 85m,	Surface Alt. 335.5		Twin peaks Upper 115' 780 API units; Lower 128', 975 API units.	Twin peaks may represent residual mineralization.
DP-33	401881 SML.343	Approx. 346	155	152	Quaternary-Tertiary 0-TD	Surface Alt.		No anomalous radioactivity.	Sand at 60' correlates with mineralized sand in DP-30 and DP-24.

KIMBA

EDITION 1 - AAS

REFER TO THIS MAP AS: SI 53-7 EDITION 1 SERIES R 50

SML 645

SML 343

SML 344

SML 469

PENINSULA

HAMBIDGE NATIONAL PARK

HINCKS NATIONAL PARK

EYRE PENINSULA

LOCATION MAP

M.T.A. SPECIAL MINING LEASES

343, 344, 469, 645

EYRE PENINSULAR

SOUTH AUSTRALIA

Scale: 1:250,000

• DP-10: M.T.A. Drill Hole

RECEIVED 28 NOV 1972 DEPT. MINES SECTION 2143

2143-1

A

RX - 2

RX - 8

RX - 5

RX - 4

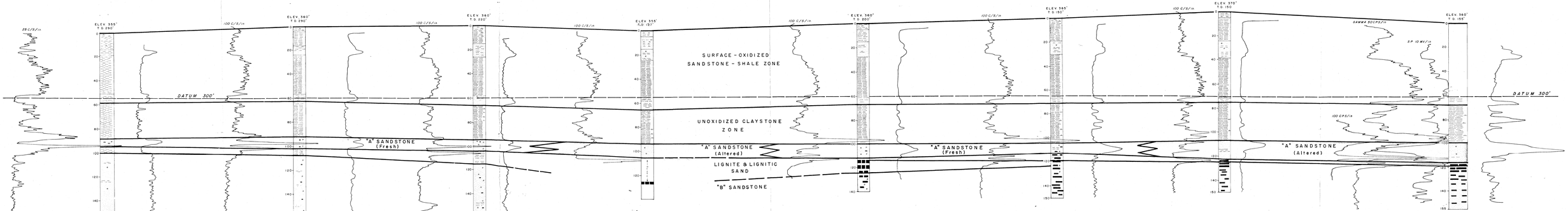
RX - 3A

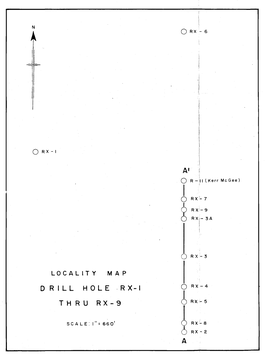
RX - 9

RX - 7

A'

R-11 (Kerr McGee)





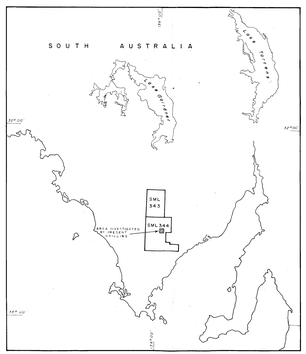


PLATE 1

NORTH - SOUTH CROSS SECTION

RUDALL AREA

SML 344 Eyre Peninsula

R. JOHNSON, DECEMBER 1969

2143-2

A

DP-3
Elev. approx. 404'
T.D. 450'

DP-2
Elev. approx. 418'
T.D. 450'

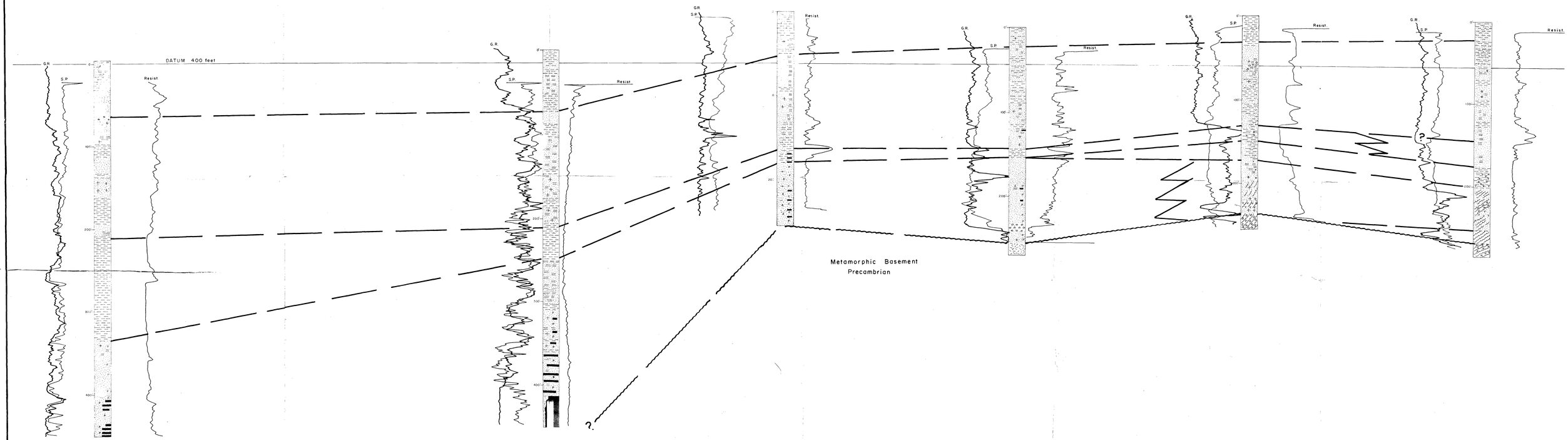
DP-27
Elev. approx. 460'
T.D. 255'

DP-4
Elev. approx. 444'
T. D. 270'

DP-5
Elev. approx. 459'
T.D. 255'

DP — 1
Elev. approx. 455'
T. D. 280'

A'



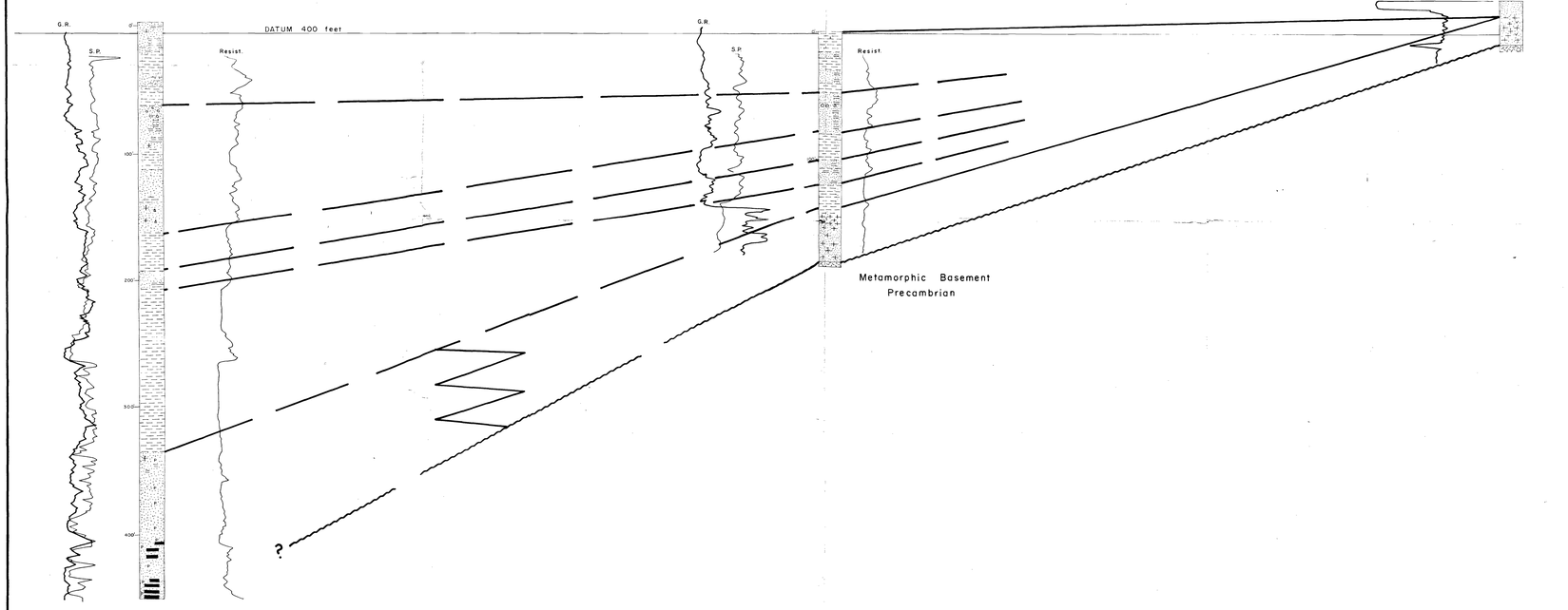
B

DP-3
Elev. approx. 404'
T. D. 450'

DP—26
Elev. approx. 404'
T.D. 184'

DP-25
Elev. approx. 426'
T.D. 40'

B'



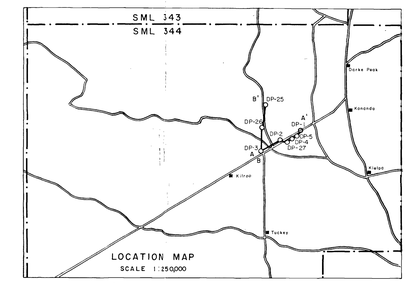


PLATE 2

CROSS SECTIONS S.M.L. 344 (Rudall)

Eyre Peninsula, South Australia

DECEMBER, 1970.

2143-3

D
DP-22
Approx. Elev. 504'
T.D. 225'
DP-21
Approx. Elev. 477'
T.D. 170'
D.P-20
Approx. Elev.
T.D. 30'
DP-19
Approx. Elev. 306'
T.D. 190'
DP-17
Approx. Elev. 329'
T.D. 140'
DP-23 A
Approx. Elev. 348'
T.D. 230'
DP-16
Approx. Elev. 355'
T.D. 265'
DP-15
Approx. Elev. 440'
T.D. 160'
DP-14
Approx. Elev. 488'
T.D. 80.
D'
DATUM 400 feet
Metamorphic Basement
Precambrian
E
DP-18
Approx. Elev. 346'
T.D. 18'
DP-17
Approx. Elev. 329'
T.D. 132'
DP-31
Approx. Elev. 354'
T.D. 150'
DP-32
Approx. Elev. 353'
T.D. 254'
DP-30
Approx. Elev. 360'
T.D. 220'
DP-24
Approx. Elev. 264'
T.D. 246'
DP-29
Approx. Elev. 367'
T.D. 150'
DP-28
Approx. Elev. 373'
T.D. 120'
DP-8
Approx. Elev. 422'
T.D. 115'
E'
DATUM 400 feet
Metamorphic Basement
Precambrian
LOCATION MAP
SML 343
SML 344
F
DP-11
Approx. Elev. 434'
T.D. 156'
DP-10
Approx. Elev. 480'
T.D. 200'
DP-6
Approx. Elev. 570'
T.D. 190'.
DP-9
Approx. Elev. 641'
T.D. 90'
DP-12
Approx. Elev. 618'
T.D. 138'
DP-13
Approx. Elev. 573'
T.D. 145'
F'
DATUM 500 feet
Metamorphic Basement
Precambrian
G.R.
S.P.
Resist.

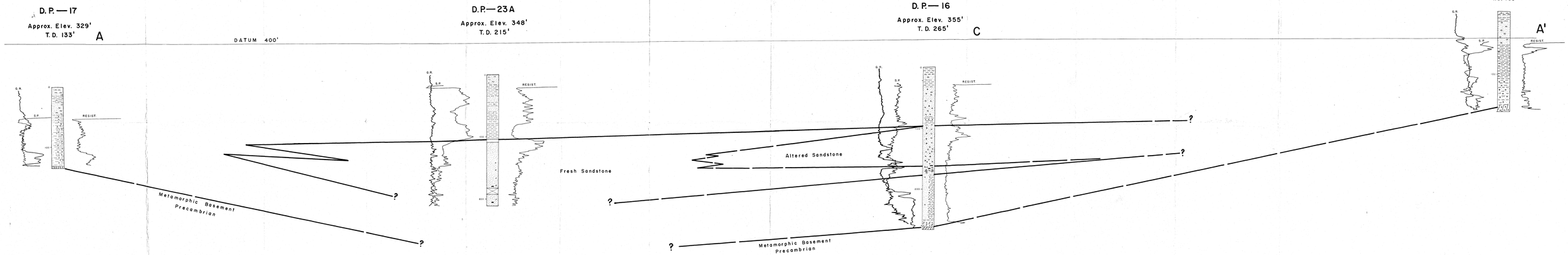
PLATE 3

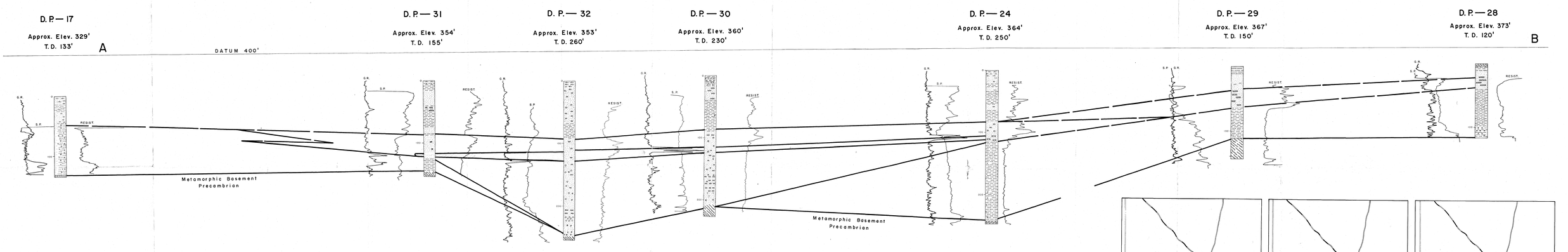
CROSS SECTIONS S.M.L. 343 (Caralue Bluff)

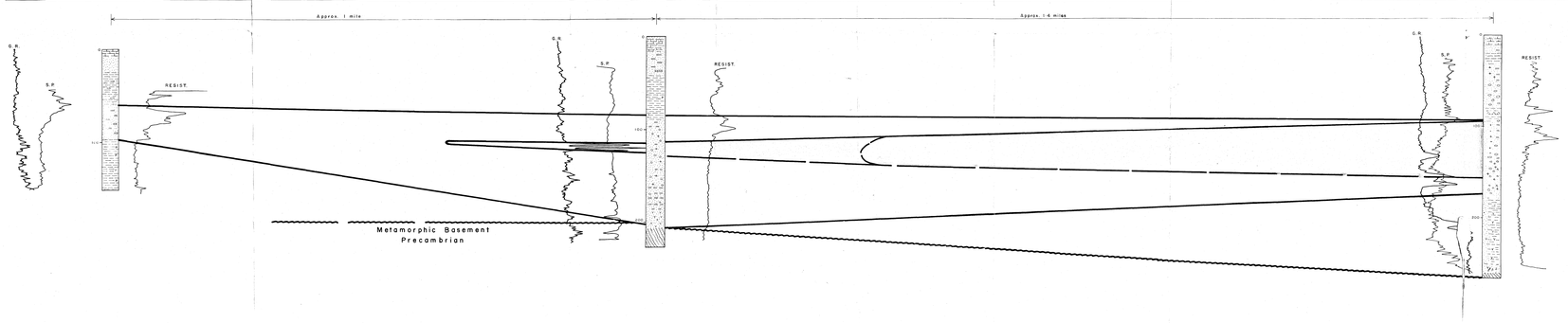
Eyre Peninsula, South Australia

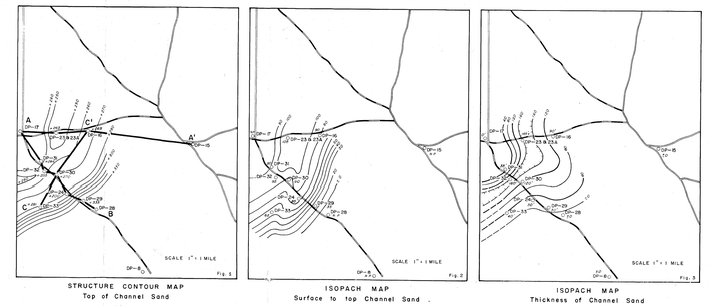
DECEMBER, 1970.

2143-4









STRUCTURE CONTOUR MAP
Top of Channel Sand
DATUM M.S.L.

ISOPACH MAP
Surface to top Channel Sand
CONTOUR INTERVAL 10'

ISOPACH MAP
Thickness of Channel Sand
CONTOUR INTERVAL 10'

LEGEND

- Probable Uranium Concentration
- Indicated Barren ground
- Possible Secondary Target

PLATE 4

GEOLOGICAL MAPS & CROSS SECTIONS

S.M.L. 343 (Caralue Bluff)

Eyre Peninsula, South Australia

DECEMBER, 1970

2143-5