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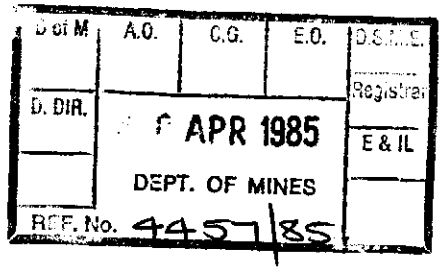


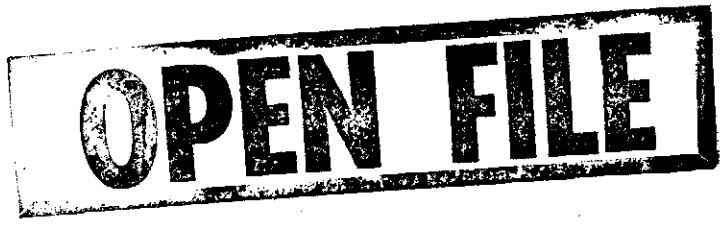
RELINQUISHMENT REPORT ON PEL 20/81

FOR

MEEKATHARRA MINERALS LIMITED

BY R.D. SHAW

FLOWER DOERY BUCHAN PTY. LTD.



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1. SUMMARY

Meekatharra Minerals Limited was licence holder of PEL 20/81, an area of 510 km^2 located on onshore Tasmania near Cranbrook.

The licence area covers what was considered to be a prospective portion of the onshore Tasmania Basin. ERTS imagery interpretation had indicated graben development in this region. Prospective target intervals were sought either in a thickened Tertiary section or in the underlying Parmeener Supergroup of the Oyster Bay graben.

As a major portion of the area is covered with shallow or outcropping Jurassic dolerites, a variety of geophysical techniques were adopted.

The review of the results of previous magnetic surveys were found to be inconclusive. Meekatharra Minerals Limited undertook a detailed gravity survey to evaluate the extent of sediment thickening within the graben. A gravity low coinciding with the general extent of the Oyster Bay graben indicated sediment thickening of 500 to 750 m.

Following the gravity survey, a limited seismic campaign was undertaken to see whether further exploration was warranted. Meekatharra Minerals Limited conducted the Oyster Bay Seismic Survey in July to August, 1982. Seismic penetration was hampered by the presence of shallow dolerites.

Interpretation of the seismic data confirmed that the gravity lows could be explained by variations of typically less than 300 m of Tertiary sediment thickness. These thicknesses are insufficient to provide maturity of any basal Tertiary sequences.

Underlying Parmeener Supergroup sediments, having high interval velocities and poor acoustic impedence contrasts, are interpreted to have little, if any primary porosity. Extensive occurrences of dolerite increases the risk that shallower sections of the Parmeener

Supergroup have been thermally altered and are overmature for hydrocarbon generation.

The unknown relationship between burial maturation, thermal effects of dolerite invasion, and timing of structuring makes the overall prospectivity of the Parmeener Supergoup in this area very poor.

On the basis of these results, it was decided no further exploration could be warranted and that the licence should be relinquished.

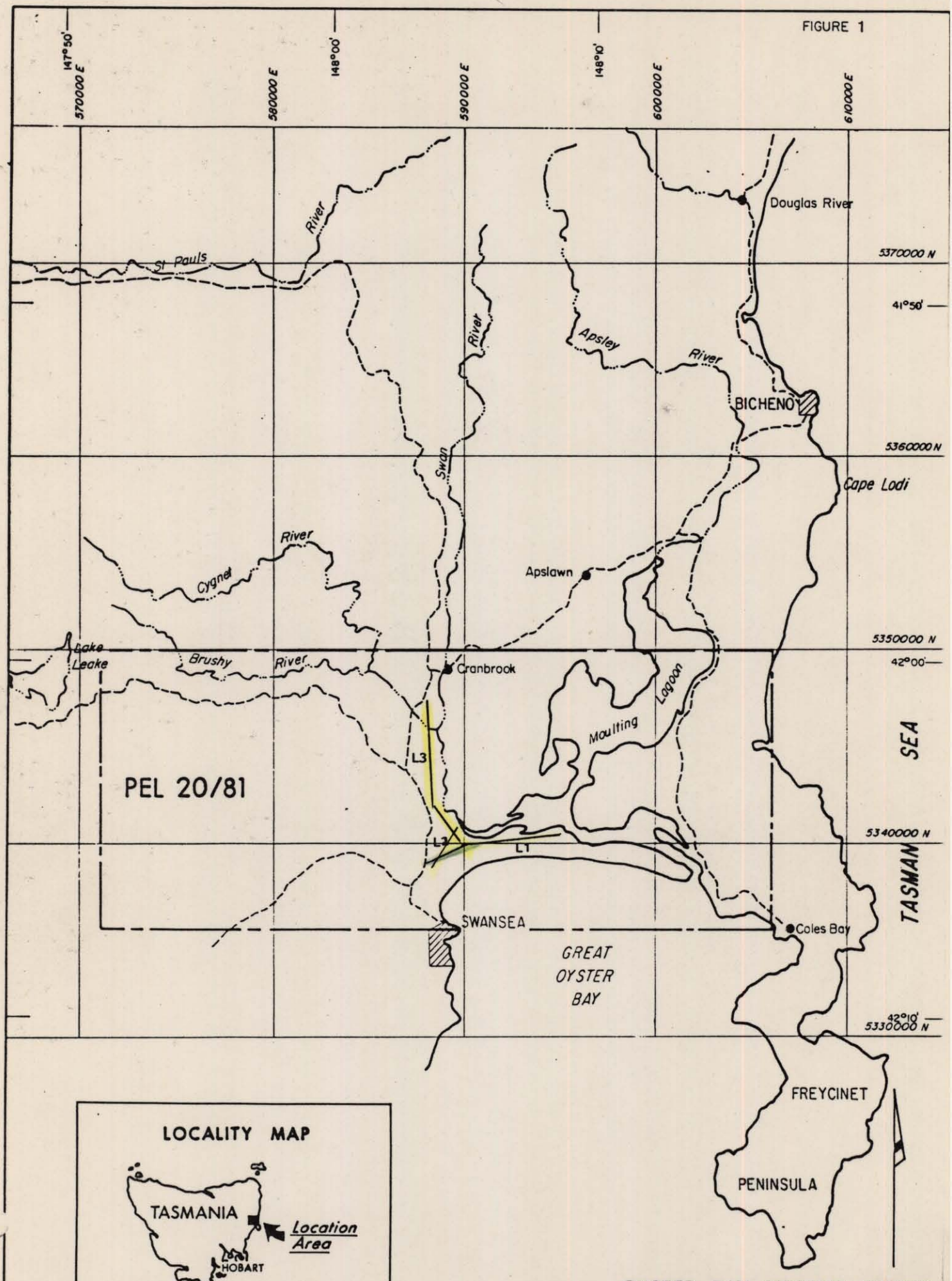
2. INTRODUCTION

The licence area is situated on the Freycinet Peninsula - Swansea Bicheno region of eastern Tasmania. It comprises an area of 510 km^2, described as follows (Figure 1).

In the land district of Glenmorgan and Cornwell in the vicinity of Cranbrook. Commencing at posted notice situate at the southeastern corner of the area, grid co-ordinate 606,050 m E 5,335,470 m N, thence grid west to 571,000 m E, thence grid north to 5,350,000 m N, thence grid east to 606,050 m E aforesaid grid south to the point of commencement.

PEL 20/81 was held by Meekatharra Minerals Limited. This report summarises the exploration results of studies undertaken by Meekatharra in PEL 20/81 during its period as licence holder.

FIGURE 1



OYSTER BAY SEISMIC SURVEY
LOCATION MAP

MEEKATHARRA MINERALS N.L.

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5 cm

3. SETTING

3.1 Topography

Most of the northern and western parts of the licence area are extremely rugged with the lower, and flatter ground generally restricted to the area around Moulting Lagoon, and the Swansea-Cranbrook region. The coastal part comprises open grassland and sand dunes. The steeper portions are mainly tree covered with cleared areas restricted to agricultural holdings.

4. GEOLOGY

4.1 Regional Geology

The licence area covers what was believed to be a prospective portion of the Tasmania Basin.

The Tasmania Basin occupies an area of some 36,000 km^2. To the north the basin disappears, with apparent unconformity, beneath Tertiary-Recent sediments of the Bass Basin. The Tasmania Basin is a relatively shallow basin with its margins outcroping against the Precambrian, and early Palaeozonic sediments in the west, and against Devonian-Carboniferous granite and early Palaeozoic sediments in the east. It comprises both marine and non-marine sequences of Permian-Carboniferous to Triassic age. These have been grouped together as the Parmeener Supergroup.

The Parmeener Supergroup consists of two sequences; a lower regressive-transgressive-regressive Permo-Carboniferious glacio-marine sequence and an upper fresh water, Triassic, sequence. In eastern Tasmania the upper sequence probably rests unconformably on the lower sequence. Total known thickness of the Parmeener Supergroup rarely exceeds 500 m (Clarke et al., 1976).

The Tasmania Basin is essentially flat-lying and structurally undisturbed except where affected by Jurassic or Cainozoic faulting. Cainozoic faulting has produced three grabens at Midlands, Oyster Bay and Derwent.

License 20/81 was taken up to investigate the petroleum prospectivity of graben development in the Oyster Bay region. Target intervals were sought either in a thickened Tertiary section or in the underlying Parmeener Supergroup.

4.2 Local Geology

The major part of the licence area is covered with dolerite outcrops and related rock types. From Bicheno southwards the Freycinet Peninsula is mainly comprised of Lower Carboniferous - Upper Devonian igneous rocks, dominantly adamallite and granites.

Some of the lower sequences of the Basin crop out on the northern Freycinet Peninsula, and around Moulting Lagoon. The St. Pauls River, to the northwest, has also exposed the Basin sequences where it has cut through the Tertiary cover.

Parmeener Supergroup sediments are faulted against basement rocks along the Freycinet Peninsula by a series of NW, NNW, to N-S faults. An ERTS imagery interpretation undertaken by Meekatharra (1980) confirmed the presence of a graben structure in the area. Faults previously mapped along the Freycinet Peninsula were interpreted to form part of the eastern flank of a graben which is oriented NNE-SSW, oblique to the overall NNW elongation of the Tasmania Basin. The western limb of this Oyster Bay graben is masked by dolorite sheets, but probably coincides with the line of topographic highs trending NNE adjacent to the Swan River drainage system, and west of the Swansea-Cranbrook Road.

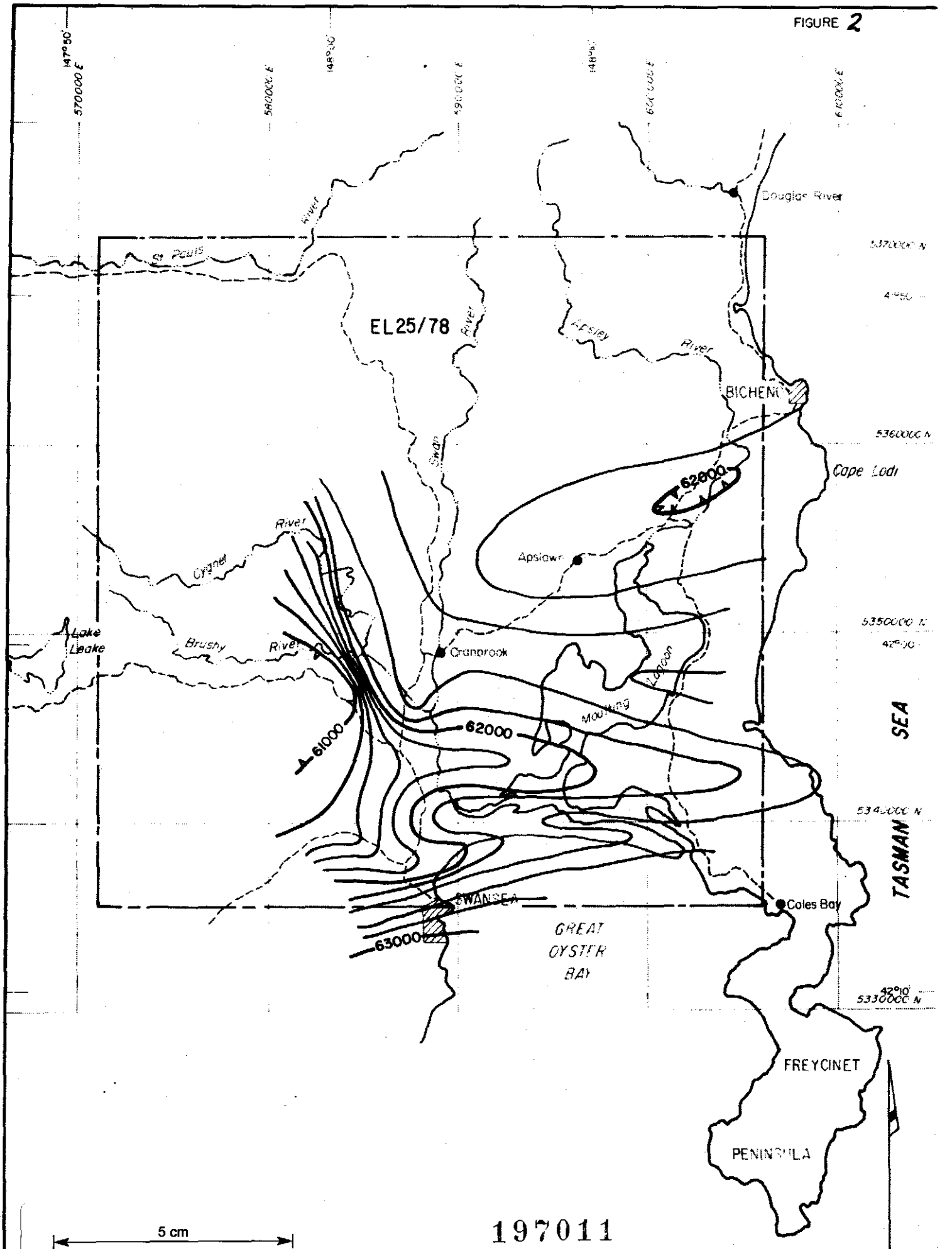
5. GEOPHYSICS

5.1 Magnetics

Two magnetic surveys were carried out in the region, one by Esso, the other by the BMR. Both surveys were hampered by the presence of shallow magnetic basement interpreted to be Jurassic dolerites intruded into the sedimentary sequence.

Meekatharra (1980) examined the magnetic data, however, the results of magnetic surveys conducted in the licence area were inconclusive because of the presence of shallow Jurassic dolerites. A strong gradient recorded west of Cranbrook may coincide with portion of the western margin of the Oyster Bay graben but depth to basement could not be ascertained (Figure 2).

FIGURE 2



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MAGNETIC INTENSITY – SURFACE SURVEY

CONTOUR INTERVAL = 200 gammas

MEEKATHARRA MINERALS N.L

TASMANIA BASIN PROJECT

1:250000

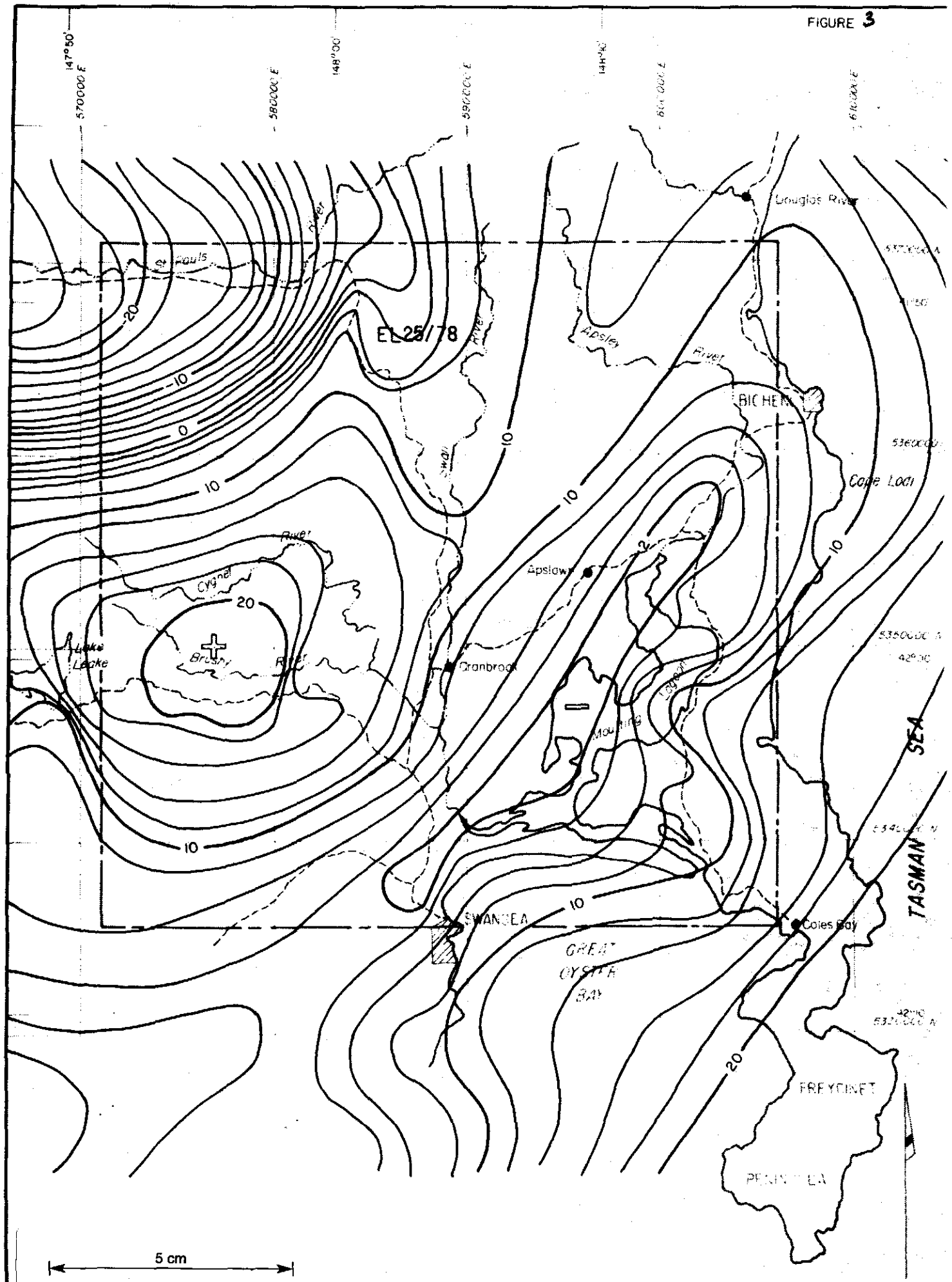
5.2 Gravity

As existing magnetic data could not be usefully interpreted, because of the presence of shallow Jurassic dolerites, Meekatharra Minerals Ltd. conducted a gravity survey to better define regional gravity trends in the permit. The purpose of the Gravity Survey of Moulting Lagoon conducted by Scintrex in 1980 was to obtain detailed gravity data which would be used to evaluate sediment thickening within the graben.

Results showed a low located north of Lake Leake, a low located across Moulting Lagoon and a high located between Lake Leake and Cranbrook. Meekatharra (1980) suggest that the elongate NE trending low at Moulting Lagoon coincides with a thickening within the graben of sediments from at least 500 to 750 m.

This gravity low occurs as a local feature on the regional Bouguer anomaly map produced from data largely collected by the University of Tasmania. The low coincides with the general extent of the Oyster Bay Graben (Figure 3).

FIGURE 3



BOUGUER GRAVITY ANOMALY

CONTOUR INTERVAL= 2 milligals

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TASMANIA BASIN PROJECT

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5.3 Seismic

Following the results of the gravity survey, it was decided to undertake a limited seismic programme to see whether further exploration was warranted. Whilst gravity data suggested Tertiary sediment thicknesses of 500 to 750 m, thicker sequences with higher density and a thicker pre-Jurassic dolerite section could not be dismissed.

The Oyster Bay Seismic Survey was conducted by Meekatharra Minerals Limited in July to August, 1982. The survey was experimental in nature. Principal objectives of the survey were to ascertain the likely thickness within the graben where gravity data suggested maximum sedimentary pile, and to evaluate the suitability of differing reflection techniques (Meekatharra 1982). (Figure 1)

A total of 293 shots were recorded to give 19.7 km of 1200% CDP reflection data. South Eastern Exploration Services Pty. Ltd. of Strathpine Brisbane conducted the seismic acquisition. Data was processed by Seismic Data Processors Pty. Ltd. under the supervision of Flower Doery Buchan Pty. Ltd. who also interpreted the data on behalf of Meekatharra Minerals Ltd.

No previous seismic acquisition had been recorded in the area. Three lines were recorded (Figure) with poor to fair results. Strong reflectors were observed on Lines 1 and 2 between 100 and 200 m secs depth. These coincided with the boundary from which a 5000-6000 m/sec refractor emanated and this was interpreted to be the top of the Jurassic dolerite. Up to 280 m of Tertiary cover, with interval velocities of 2000-3000 m/sec were found to overlie the dolerite.

The strong reflector corresponding to the top of the dolerite exhibited a smooth undulating relief. Penetration of the seismic energy below this reflector was poor. Nevertheless reflectors below the dolerite were observed on all lines. These were layered and had the appearance of a sedimentary sequence.

Based on regional geological considerations, these deeper sediments were correlated with the Parmeener Supergroup. A marked angular discordance was noted between these sediments and the overlying Jurassic dolerites.

Overall poor seismic data quality limited the maximum depth of occurrence of these deeper reflectors to 700 msec. The noise analysis test did however indicate the presence of coherent events down to 1100 msec.

No major structural features were noted from the seismic data. On line 3 some apparent roll-over was shown but this appeared to be fault related.

6. REVIEW OF PROSPECTIVITY

Following the Oyster Bay Seismic Survey, a review was made of all pertinent data.

Interpretation of the seismic data confirmed that the gravity lows mapped across the Oyster Bay Graben could be explained by known variations in the Tertiary sediment section and that these would be typically less than 300 m within the licence area.

These Tertiary thicknesses are insufficient to provide maturation of any basal Tertiary source rocks, and the Tertiary section is no longer considered prospective in this area.

In regard to the underlying Parmeener Supergroup, the seismic data did indicate the presence of some deeper events, down to 1100 msec.

However, there are several factors which militate against the prospectivity of this section.

i. The high interval velocities suggest that the sequence below the dolerite is highly indurated. The velocities are approaching those of cystalline rocks and the absence of any strong basement reflector, between known igneous rocks and overlying sediments, suggests that there may be a metamorphic transitionbetween rock types. Consequently it is likely that there would be little if any primary porosity preserved.

ii. The extensive occurrence of Jurassic dolerites greatly increases the risk that shallower sections of the Parmeener Supergroup would be thermally altered and overmature for hydrocarbon generation.

iii. Shallow widespread occurrences of dolerite make seismic exploration difficult and expensive. Seismic results in this region can be expected to be of poor quality.

iv. The unknown relationship between burial maturation, thermal effects of dolerite invasion and timing of structuring makes the region one of extremely high risk exploration.

On the basis that no substantial Tertiary section was discovered and that the underlying Parmeener Supergroup on this area is considered, for the above reasons, highly unprospective for petroleum exploration exploration, the recommendation to relinquish the licence area was accepted.

BIBLIOGRAPHY

Clarke, M.J., Farmer, N., & Gulline, A.B., 1976.
Tasmania Basin - Parmeener Super Group.
Aus I MM. Monograph 7, Economic Geology of Australia & Papua New Guinea - 3 Petroleum, pp 438 - 443.

Meekatharra 1980. Report on Exploration Licence 25/78, Tasmania for the period to December 31, 1979 for Meekatharra Minerals by Cogar Mining Consultants Pty. Ltd.

Meekatharra 1982. Report on the Oyster Basin Sesimic Survey, Swansea, Tasmania PEL 20/81 for Meekatharra Minerals Ltd. by R. Shaw of Flower Doery Buchan Pty. Ltd.