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Six Monthly Report
For the Period Ending
22nd February, 1981.
Exploration Licence 20/80
Launceston, Tasmania.

OPEN FILE

AAR Limited
M.V. Cowie
February, 1981.

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INTRODUCTION

Exploration Licence 20/80 - Launceston was granted to AAR Limited of 10 Eagle Street, Brisbane on 22nd August, 1980 and covers an area of 2339 Km² in the Launceston-Campbell Town-Deloraine area as shown on Figure 1.

The Exploration Licence applies to oil shale only and covers the Land Districts of Dorset, Cornwall, Devon, Westmorland and Somerset.

The area covered by the Licence was applied for to investigate the oil shale potential of the known Tertiary sedimentary sequences in this area. No oil shales were known to occur in the sequence, however the structural setting and depositional environment of the sediments over parts of the area were considered to possibly have been conducive to the deposition of oil shales.

During the six month period a review of the literature on the Mines Department water bore investigations and hydrological studies and previous exploration for uranium by Getty Oil Pty. Ltd. was undertaken to outline the most prospective areas for oil shale deposition. Mines Department chip and core samples from the water bore investigations were inspected to gain a greater appreciation of the deposition and post-depositional environment of the Tertiary sediments.

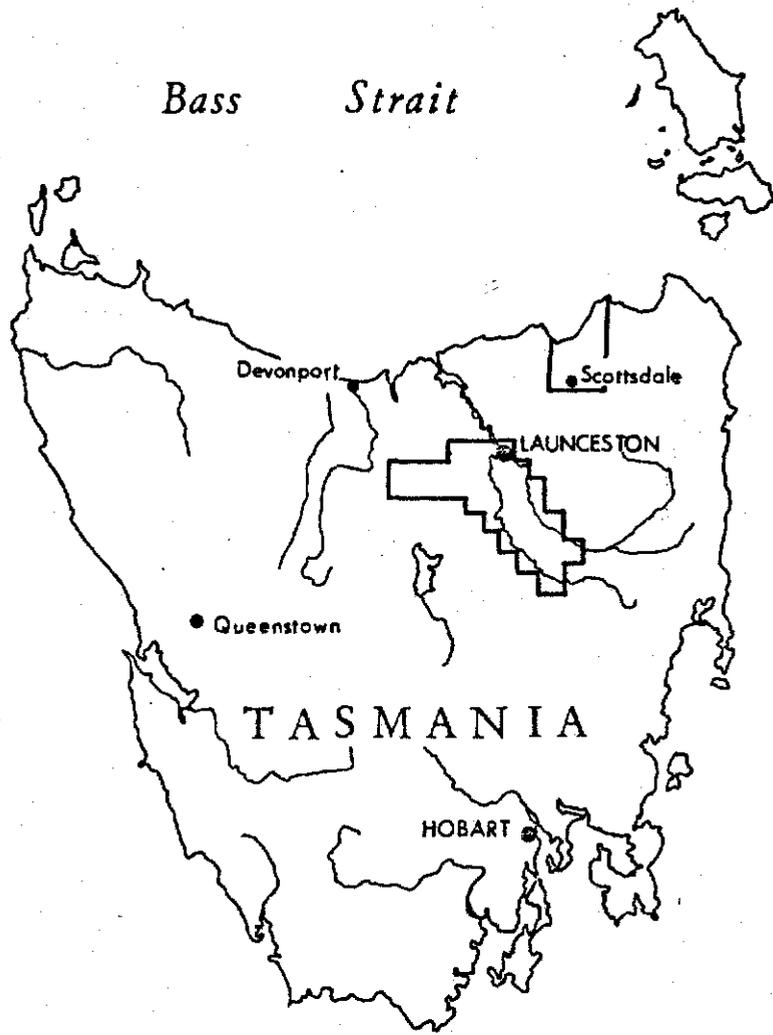
The Tertiary sequence in the Longford-Carrick area was selected as the most prospective depositional environment and a reconnaissance drilling programme was planned to test this area for oil shales at shallow depth.

PREVIOUS INVESTIATIONS

Previous investigations in the region include Tasmanian Mines Department studies on the gravity anomalies (Longman and Leaman, 1971) and the hydrology of the basin (Mathews , in prep.).

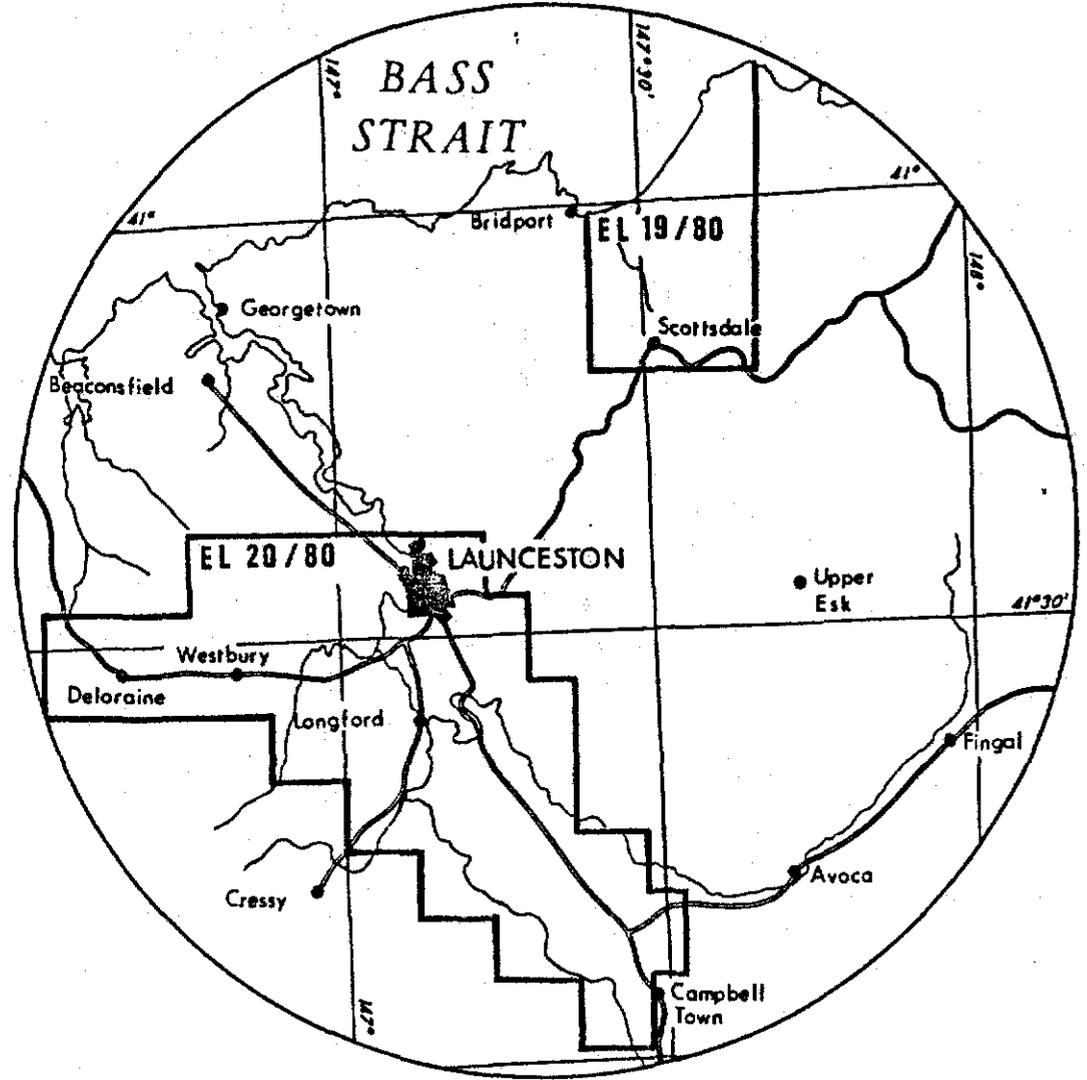
The gravity investigations have outlined the broad structural setting of the Tertiary sediments and sub-basin development as a result of faulting. The water bore investigations have added to the understanding of the sedimentology and stratigraphy within the basin which were previously based largely on mapping of limited surface exposures.

Getty Oil Development Company Limited in a joint venture with Tenneco Australia Inc., undertook a 122 hole reconnaissance drilling programme to search for roll-front type uranium mineralization in the Tertiary sediments under Exploration



0 80 160 KM.

5 cm



**Oil Shale Prospects
E.L. 19/80 and E.L.20/80**

0 10 20 30 40 50 60 km

SCALE 1:1 000 000

Fig. 1.

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Licence 16/72 (T.W. Middleton, 1973). This drilling has led to a greater understanding of the stratigraphy of the basins. Getty Oil's activities were directed at the sandy horizons within the Tertiary, a different environment of interest to that of oil shales.

The geological and geophysical logs of the Mines Department water bores and the uranium exploration drilling have been reinterpreted in broad structural and stratigraphic terms to lay the basis for a depositional model for the sedimentation during the Tertiary.

STRUCTURE

The Tertiary sediments were deposited in a north west orientated, elongate, marginally dip slip faulted series of grabens. The graben system is some 90 Km long and 30 Km wide at its widest section from Cressy to Evandale.

A computerised digital interpretation of the gravity data shows that the faulting has formed a series of half grabens with minor rotation. The marginal faults have moved with their east side down on steeply east-dipping curved plains which probably shallow at depth to the east.

The area can be broadly divided into three sub-basins of sedimentation. The eastern basin, known as the Tamar Graben, and the western basin, the Cressy-Westbury basin, are separated by a relative basement high which forms a sub-basin here termed the Longford sub-basin.

Development of the graben structures and faulting took place contemporaneously with sedimentation which is reflected in the complex stratigraphic relationships across basin margins particularly between the Cressy-Westbury basin and the Longford sub-basin. Growth faults are evident in the lower stratigraphic units but do not appear to penetrate the very uppermost units of the sequences indicating faulting ceased prior to final deposition across the basins.

STRATIGRAPHY (Tertiary Sediments)

The stratigraphy of the basin is strongly controlled by the structural setting and palaeophysiography of the basins. The basic stratigraphy has developed from a fresh water fluvio-lacustrine environment.

Tamar Graben

The Tamar Graben contains predominantly fluviatile sediments, predominantly poorly consolidated sands and silts with minor clay bands and carbonaceous matter. The sediments tend to be coarser in the south and on the eastern margin of the Graben associated with alluvial fans from basement highs in these regions.

In the south in the Campbell Town region and in the north near Evandale the Tertiary sediments are overlaid by relatively thick fresh basalt flows.

A detailed study of the geological logs of all the holes in the Tamar Graben indicated the depositional environment throughout the sequence was not conducive to widespread oil shale deposition in a lacustrine environment.

The Cressy-Westbury Basin

In the Cressy-Westbury basin, available information indicates that the lower units of the sequence consist predominantly of sand and clay units with minor carbonaceous matter which appear to represent gradually accelerating deposition in a fluviolacustrine environment.

This appears to be followed by a period of more vigorous sedimentation which led to the widespread deposition of coarser sands and some gravels in a fully fluviatile environment. The sediments on the eastern side of the basin show a considerable amount of iron staining due either to oxidation during sub-aerial deposition or during post-depositional ground water movement through the coarser sediments.

A period of generally slower subsidence followed during which fine grained blue-grey silting clays accumulated in a low energy environment probably a shallow, partially drained lake. A further tectonic readjustment resulted in the deposition of a widespread coarse sand and, in places, gravel unit.

Restricted circulation and deepening of the basin followed, resulting in the widespread deposition of a relatively monotonous sequence of brownish coloured silty clay, puggy or plastic in nature, and up to 150 m thick in the centre of the basin.

The western margin of the basin typically contains coarser sediments throughout the depositional sequence resulting from alluvial fans developed from the adjacent basement high. The sedimentary sequence is thickest on the western side of the basin and thins gradually to the east.

The thick sequence of brown silty clays which now blankets the basin, on examination from water bore cuttings, is not considered to be prospective for oil shales. The sediments in the north and north west part of the basin, generally north of the Bass Highway and west to Deloraine, are covered by extensive relatively thick basalt flows which render this area non-prospective for shallow oil shales.

The Longford Sub-basin

The Longford sub-basin covers an area of relative basement high between the other two basins and the sedimentary sequence in this area is generally thinner. The eastern edge is marked by the topographically high out-cropping Jurassic dolerites extending intermitently from east of the Longford township in the north to Hummocky Hills in the south.

The eastern portion of the sub-basin was probably separated from the Tamar Graben by the topographic high during most of the depositional phase. On the western side the sub-basin was separated by syn-depositional faulting which has resulted in a marked contrast in stratigraphy in the lower units from that in the adjacent Cressy-Westbury basin.

While the sub-basin is very shallow in the east, a considerable thickness of sediments, in excess of 250 m, was deposited on the central western margin of the sub-basin.

Deposition was fluvio-lacustrine throughout with the lower sequence being predominantly sandy silt and clays which are typified by abundant carbonaceous material. Wood fragments and lignites occur in the deepest tested portion of the sequence and are relatively common throughout all but the present upper sequence.

Sedimentation appears to have resulted from intermitent ponding against the contemporaneously down thrown western margin.

As in the Cressy-Westbury basin the upper sequence is typified by the brownish plastic silty clay. In the Longford sub-basin its thickness is greatly reduced to in the order of 10-20 m thick, however, it does indicate that deposition after the main carbonaceous sequence ceased was continuous across both basins.

The upper portion of the carbonaceous sequence is considered to be prospective for oil shales.

PROPOSED RECONNAISSANCE DRILLING PROGRAMME

A reconnaissance drilling programme of 22 rotary/core holes is proposed to test the upper portion of the carbonaceous sequence in the Longford sub-basin. The investigations will be confined initially to those areas where this horizon occurs at shallow depths which is in the Longford-Carrick region against the basement highs in the northern portion of the sub-basin. The locations of the proposed holes are shown in Figure 2.

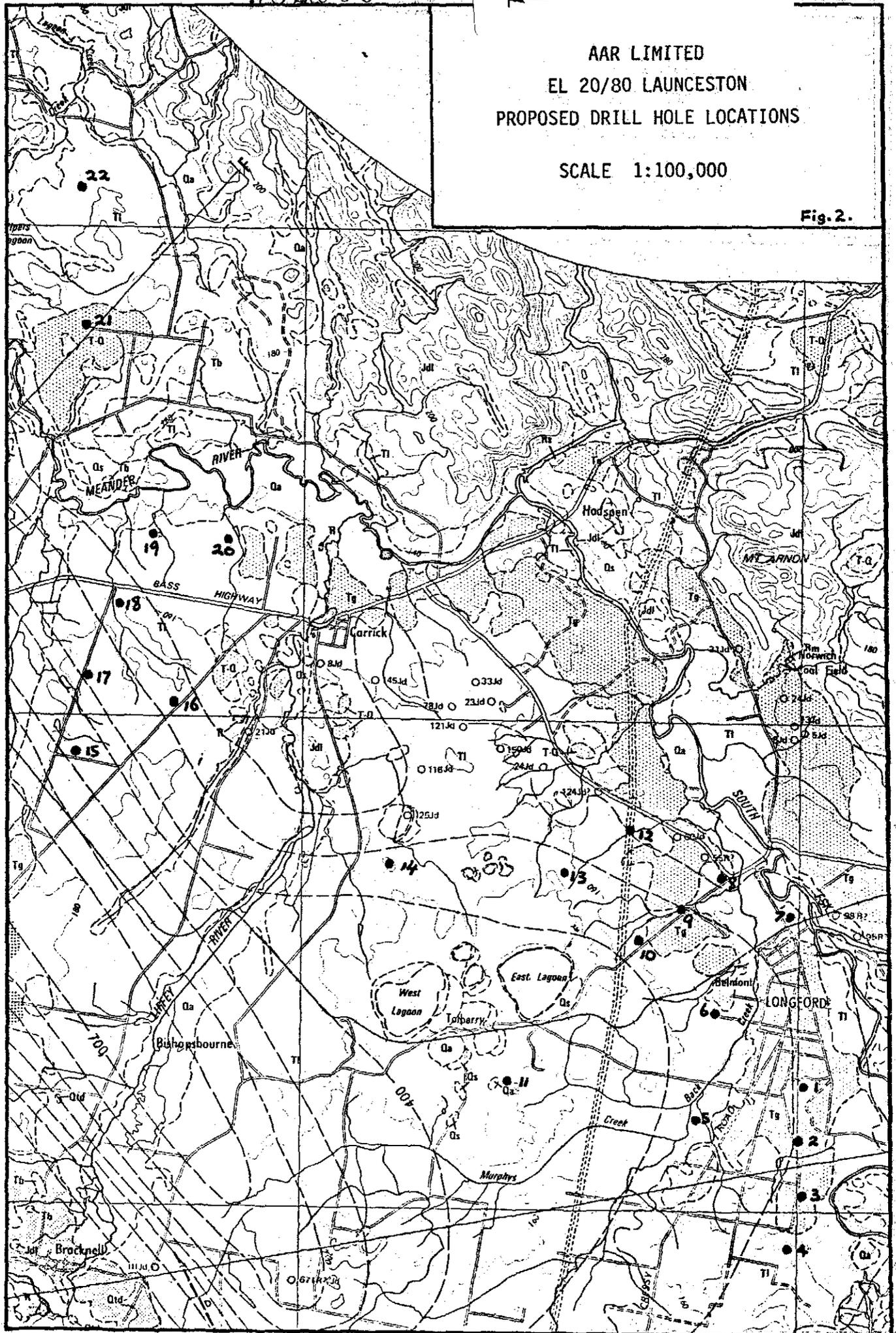
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5 cm

AAR LIMITED
EL 20/80 LAUNCESTON
PROPOSED DRILL HOLE LOCATIONS

SCALE 1:100,000

Fig. 2.



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