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F. HYDROCARBON POTENTIAL

To date, all hydrocarbon occurrences in the Otway Basin have been in the Cretaceous. Very little is known about the potential of the Jurassic, and the Paleozoic is considered to be economic basement. The Otway Group appears to have some potential as a source for oil and gas, and the Pretty Hills and Crayfish Sandstones show good reservoir characteristics.

The basal Upper Cretaceous Waarre Formation has a good show record, and, where overlain by Belfast shale, presents a good opportunity for hydrocarbon entrapment. The Upper Cretaceous contains thick shales, such as at Voluta 1-A, that should be good source rocks, and there are abundant reservoirs in the upper sandstone units.

The Tertiary has been extensively fresh water flushed in wells drilled so far. In the seaward direction, interfingering of massive sands with silts and shales will probably inhibit flushing, and reservoir, source and seal rocks may be present.

G. PREVIOUS GEOPHYSICAL SURVEYS

The landward areas adjoining the Esso-Hematite tenements have been explored by reflection seismograph, gravity meter and airborne magnetometer. The results are summarized in various Subsidy Reports made to the Bureau of Mineral Resources. For a comprehensive bibliography, see "A Preliminary Review of the Otway Basin", Record 1966/170 by Bureau of Mineral Resources.

The Esso-Hematite tenements were previously explored by the Flinders Island-Kingston Survey, the Cape Grim to Cape Jaffa Marine Seismic Survey, the Offshore Otway Basin Marine Seismic Survey and the Offshore Otway Basin Marine Seismic and Magnetic Survey, EP-67. In addition, the Bass Strait and Encounter Bay Aeromagnetic Survey obtained reconnaissance information over the Otway Basin. Final subsidy reports of these surveys have been presented to the Bureau of Mineral Resources.

At the commencement of the ER-68 Survey, there were available on the Esso Hematite tenements 1064 miles of single fold data, 1554 miles of three fold CDP data and 3334 miles of six fold CDP data. Modern digital processing techniques have been applied to 218 miles of single fold, 380 miles of three fold and 2188 miles of six fold CDP data under subsidy of the BMR. The remaining data were analog processed.

RESULTS OF CURRENT SURVEYA. FIELD WORK

## 1) Seismic Survey

A total of 1110 miles of 12 fold CDP data was recorded digitally in the ER-68 Survey. A 2400 meter neutrally bouyant streamer cable was towed at a depth of 40 feet with an offset distance of 850 feet from the first geophone group to the recording boat. Energy source was Aquapulse, the Esso Production Research Company developed sleeve exploder in which a mixture of propane and oxygen is ignited 25 feet subsea with the combustion products vented through an exhaust line to the atmosphere. Four Aquapulse guns were detonated simultaneously with recordings made from 24 groups of 32 pressure sensitive crystal seismometers per group through an SDS 1010 binary gain amplifier onto an I.B.M. 9 track format digital magnetic tape with a sample period of two milliseconds. Aquapulse detonations were repeated approximately every 25 meters so that four pops (of four guns each) could be summed to emulate a single shot every 100 meters to result in 12 fold multiple coverage.