EXPLORATION AND PRODUCTION IN THE EROMANGA BASIN, CENTRAL AUSTRALIA

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ABSTRACT

The Eromanga Basin has an area of about 1,000,000 km$^2$ and is the largest of three sub-units of the Great Artesian Basin, which covers one fifth of the Australian continent. The basin contains a Lower Jurassic to Upper Cretaceous sequence up to 3,000 m thick. It is underlain by several older basins that have influenced Eromanga Basin deposition.

The central part of the Eromanga Basin, which overlies and is adjacent to the Permian and Triassic Cooper Basin, produces both oil and gas. The Cooper Basin also contains major gas reserves, but less oil. The first Eromanga Basin discovery was made in 1976; subsequent discoveries, particularly those since 1981, have led to an active exploration and development program. Two liquids pipelines, totaling more than 1,700 km in length, have been completed since October 1982. The region now produces crude oil, condensate, liquid petroleum gas, and natural gas.

The Eromanga Basin contains mainly nonmarine, fluviatile and lacustrine sequences. The major discoveries are structurally trapped at the top of thick, braided-fluviatile sandstone bodies (the Hutton and Namur reservoirs). However, some traps are stratigraphic, related to point-bar and lacustrine-delta sandstone. Future exploration is expected to shift increasingly toward the search for stratigraphic traps.

Eromanga Basin crude oils appear to have been generated from marginally mature to early-mature source rocks. High pour-point oils typical of Hutton reservoirs were derived from organic material in spores and resins. Low pour-point oils of the Murta and Namur reservoirs originated from algal and bacterial lacustrine material. The high pour point of the bulk of the crude (approximately 23°C) has presented problems in piping the oil 1,000 km to the eastern coast refineries. Diluents of low pour-point oil and condensate as well as chemical pour-point depressants are used to overcome pumping problems.

The location of the Eromanga Basin fields, in a remote arid area far from logistical services, has provided major engineering challenges. Development of the liquids reserves of the Eromanga Basin and the underlying Cooper Basin commenced in December 1981. By the end of 1986, approximately $2 billion will have been spent on this project.

Exploration coverage in the Eromanga Basin is sparse. In the prospective central portion, drilling density is less than 6 wells per 1,000 km$^2$. The nearest outcrops of the reservoir sections are several hundred kilometers away. Accordingly, exploration relies heavily on subsurface techniques, including seismic surveys and regional and detailed structural and stratigraphic analyses. However, exploration activity is increasing. During 1984, approximately 20,000 km of seismic line will have been recorded and 100 exploration wells will have been drilled. This activity reflects a common belief that the Eromanga Basin is the most prospective onshore region in Australia.