CHAPTER 12

DISCOVERIES, DEVELOPMENT AND FUTURE PROSPECTS—EROMANGA BASIN, AUSTRALIA

R.J.S. Hollingsworth
CSR Oil and Gas Division
Adelaide, South Australia

ABSTRACT

The Eromanga Basin covers an area of about 1 million km$^2$ and is the largest subbasin of the Great Artesian Basin which occupies about one-fifth of the Australian continent. The basin contains an Early Jurassic to Late Cretaceous clastic sequence which attains a maximum thickness of about 3000 m in depocenters related to underlying Paleozoic basins.

Although the first commercial hydrocarbon discovery in the Eromanga Basin in 1976 was gas, subsequent discoveries have been mainly oil, thereby establishing the basin as a predominantly oil province. Currently some 60 oil fields, 4 fields containing oil and gas, and 5 gas fields have been discovered. Oil fields are characteristically small, containing recoverable reserves of less than 9 MMSTB, and most fields have less than 1 MMSTB. Present estimates of proved and probable oil and sales gas reserves are about 115 MMSTB and 60 BCF respectively, with oil production currently about 53,500 BPD and sales gas production at about 7.5 MMCFD.

Exploitation of oil fields has been marked by rapid commencement of production, with the mode dependent on proximity to the pipeline facilities at Moomba and Jackson. Fields of sufficient productivity close to these facilities are connected by oil trunklines, whereas oil from more distant fields is brought to the appropriate facility by truck.

The Eromanga Basin is widely regarded as the most prospective onshore basin in Australia, yet exploration coverage is still relatively sparse. Numerous challenges are still considered to exist in understanding the factors controlling accumulation, and further exploration is anticipated to result in additional discoveries.

INTRODUCTION

The Eromanga Basin covers an area of about 1 million km$^2$ within four states in central eastern Australia—Queensland, South Australia, New South Wales, and the Northern Territory (Figure 1). The basin contains a sequence of Early Jurassic to Late Cretaceous clastic sediments which have a maximum thickness of approximately 3 km in depocenters related to pre-existing underlying basins. Underlying the Eromanga Basin are several Late Carboniferous-Late Triassic basins, as well as deformed to strongly folded and overthrust Paleozoic and Proterozoic sediments and Precambrian crystalline basement. The most important of the underlying Late Carboniferous-Late Triassic basins, with respect to petroleum exploration, is the Cooper Basin, which contains a maximum of about 2 km of nonmarine sediments.

Currently, the Cooper Basin supplies about 40% of Australia’s domestic natural gas requirements. Most of the production is from Permian coal-rich fluvial sediments. The exploration history and development in the Eromanga Basin has been strongly influenced by the discovery pattern in the Cooper Basin.

Although the Eromanga Basin had been explored since 1924, the first commercial hydrocarbon discovery was made in 1976, when gas was discovered at Namur 1 in sandstones of the Late Jurassic- Early Cretaceous Namur Sandstone Member. This discovery was made some 13 years after the first commercial discovery in the Cooper Basin. In 1978 the major breakthrough in the Eromanga Basin exploration occurred at Strzelecki 3. This well was drilled primarily to assess the Permian but discovered oil in the Middle Jurassic Hutton Sandstone, producing a flow of 2400 BOPD. This discovery firmly established the petroleum potential of the basin and led to a reassessment of the widely held belief that the Eromanga Basin section was flushed because of widespread artesian water drive.

Further discoveries were made after the Strzelecki 3 success, and in December 1981 the Jackson field was discovered in southwest Queensland. Apart from establishing the petroleum prospectivity of this sector of the Eromanga Basin, the field was large enough to justify building a 790-km oil pipeline to Moonee. This pipeline has enhanced the commercial viability of exploitation of discoveries in this region.

To the end of June 1986 some 11 gas pools and 115 oil pools have been discovered in the Eromanga Basin. About 600 exploration wells have been drilled to date through the Eromanga Basin section. About 70% of this drilling has occurred since 1959. Production from the Eromanga Basin commenced in December 1982 from the Strzelecki field in South Australia. Jackson field in Queensland was brought on stream in February 1984 following the completion of the Jackson-Moonee pipeline.

This paper reviews discoveries and subsequent development during a phase of high activity in what is regarded as the