

**PROSPECTIVITY OF STATE ACREAGE
RELEASE AREAS L10-2 AND L10-3,
BANGEMALL SUPERGROUP**

2010

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Introduction

Release Areas L10-2 (29 307 km²) and L10-3 (29 147 km²) lie in central Western Australia, to the south and west of Newman in the Pilbara region. This area falls predominantly within the Edmund and Collier Basins, the depocentre for the Bangemall Supergroup (Fig. 1). Land use in the region is dominated by cattle grazing, although major iron ore operations lie to the north at Tom Price, Paraburdoo, and Newman. The sealed Great Northern Highway lies in the eastern portion of L10-3 and links Meekatharra to Newman, and the Nanutarra–Wittenoom and Paraburdoo–Tom Price roads run east–west to the north of both release areas. The area has an arid climate with hot, dry summers and mild winters; rainfall is normally during the months of November to April, provided by rain-bearing depressions from the northwest that represent degraded cyclones. In the winter, rain is produced by the interaction of tropical cloud bands from the north-northwest, with strong cold fronts approaching from the southwest. Creeks and rivers are ephemeral, although the major rivers flow after heavy rain, which can impede access to the area when flooded (Martin et al., 2005).

Regional geology and stratigraphy

The Bangemall Supergroup is a Mesoproterozoic ~4–10 km succession of mostly fine-grained siliciclastic and carbonate sedimentary rocks, which unconformably overlie Paleoproterozoic igneous and metamorphic rocks of the Gascoyne Complex, and Paleoproterozoic sedimentary rocks on the margins of the Archean Yilgarn and Pilbara Cratons (Fig. 1). The succession is subdivided into a lower Edmund Group, and an upper, unconformably overlying, Collier Group. Deposition of the Bangemall Supergroup occurred in response to intracontinental extensional reactivation of structures formed during the Paleoproterozoic Capricorn and Mangaroon Orogenies. The Bangemall Supergroup was subsequently deformed during the Neoproterozoic Edmundian Orogeny, and is overlain by Neoproterozoic to Phanerozoic strata of the Officer Basin to the east, and by the Phanerozoic Carnarvon Basin to the west (Fig. 1).

The age of the Bangemall Supergroup is poorly constrained, although its deposition must postdate the intrusion of c. 1620 Ma granites into the unconformably underlying Gascoyne Complex. The most reliable age

constraints are provided by a suite of c. 1465 Ma dolerite sills intruded exclusively into the Edmund Group, and a suite of c. 1070 Ma dolerite sills that were intruded mainly into the Collier Group. Both dolerite suites show localized evidence of magma interaction with wet or partially lithified sediments, including soft-sediment deformation, fluidization, and quench fragmentation. The depositional age of the Edmund Group must therefore be slightly older than 1465 Ma, and the Collier Group slightly older than 1070 Ma (Martin et al., 2008). The regional stratigraphy of the Bangemall Supergroup is summarized in Figure 2.

Petroleum indicators

Mineral holes OD15 and OD23 were drilled by Jubilee Gold Mines NL in the Warakurna Supersuite immediately to the south of the Blake Sub-basin on NABBERU. Both holes encountered bitumen and trace oil in dolomite vugs belonging to the Scorpion Group (Stevens and Carlsen, 1998).

References

- Martin, DMcB, Sircombe, KN, Thorne, AM, Cawood, PA and Nemchin, AA 2008, Provenance history of the Bangemall Supergroup and implications for the Mesoproterozoic paleogeography of the West Australian Craton: *Precambrian Research*, v. 166, nos 1–4, p. 93–110.
- Martin, DMcB, Sheppard, S and Thorne, AM 2005, *Geology of the Maroonah, Ullawarra, Capricorn, Mangaroon, Edmund, and Elliott Creek 1:100 000 sheets: Geological Survey of Western Australia, 1:100 000 Geological Series Explanatory Notes*, 65p.
- Stevens, MK and Carlsen, GM 1998, A review of data pertaining to the hydrocarbon prospectivity of the Savory Sub-basin, Officer Basin, Western Australia: *Geological Survey of Western Australia, Record 1998/5*, 65p.

Most of the references listed above are available on the Western Australia Petroleum Acreage Release, May 2010 CD, as PDF files.

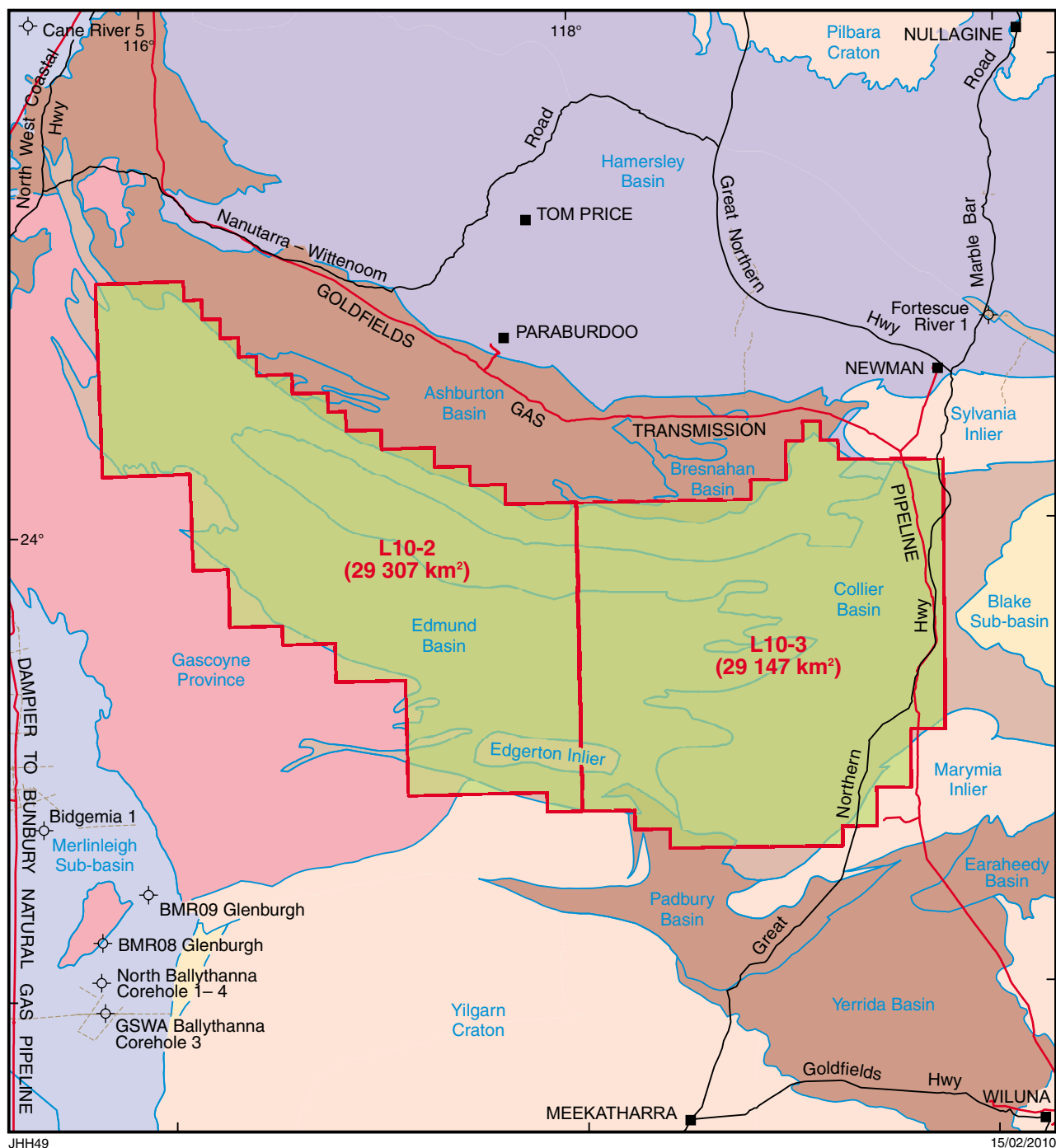


Figure 1. Acreage Release Areas L10-2 and L10-3, showing the location of seismic lines, significant mineral holes, and access roads.

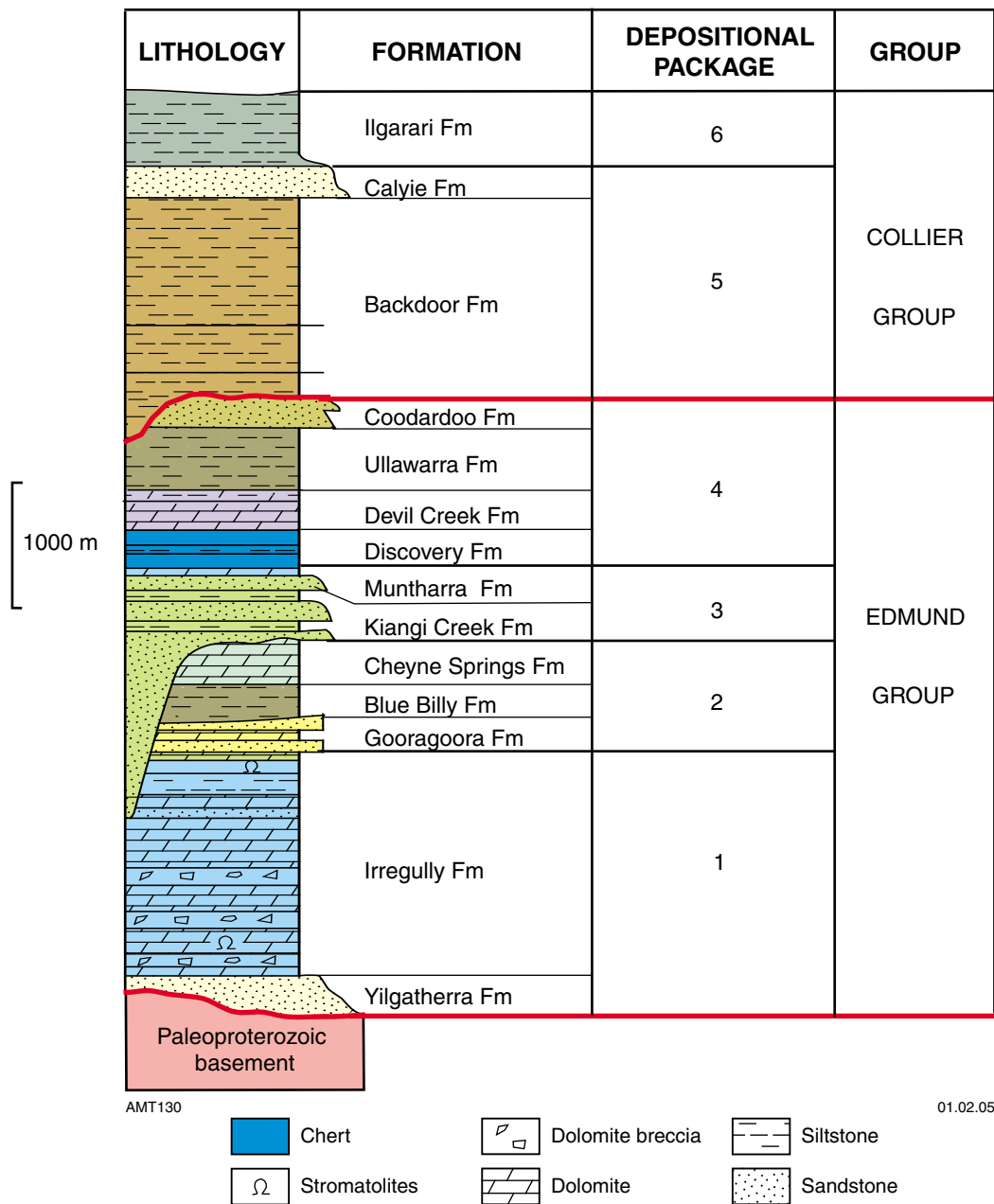


Table 1. Selected petroleum and coal exploration wells adjacent to L10-2 and L10-3. Data extracted from Western Australian Petroleum Information Management System (WAPIMS) and well completion reports

Well	Latitude S	Longitude E	Operator	Year	Class	Status	TD (m)	Elevation (m)	TD age	Oil ^(a) shows	Gas ^(a) shows
OD15*	25°11'18.3"	121°30'38.6"	Jubilee	1996	MIN	P&A	162	Unknown	Proterozoic	Poor (PB)	Nil
OD23*	25°09'57.0"	121°30'45.0"	Jubilee	1996	MIN	P&A	219	Unknown	Proterozoic	Poor (PB)	Nil

NOTES: (a) Shows summarized from well completion reports (PB: pyrobitumen)
 * These wells fall within L10-5; see document relating to this Acreage Release Area for more information
 TD Total depth
 MIN Mineral exploration hole
 P&A Plugged and abandoned
 Jubilee Jubilee Oil NL