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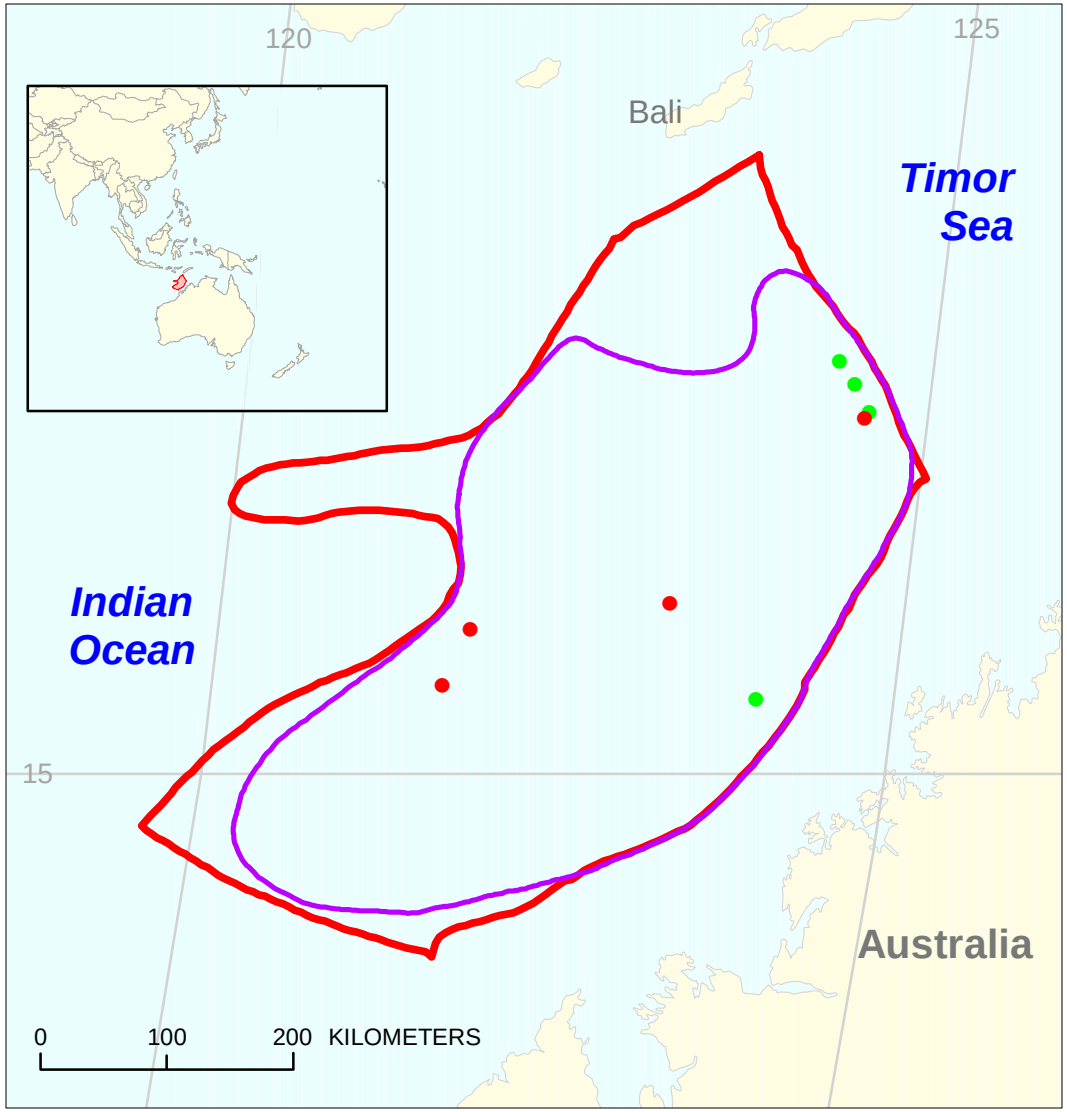
Late Jurassic/Early Cretaceous-Mesozoic Assessment Unit 39130101



Late Jurassic/Early Cretaceous-Mesozoic Assessment Unit 39130101
Browse Basin Geologic Province 3913

Geologic Summary

Detailed map of this assessment unit

Exploration/Discovery-History Data

- Plots of Known Field Sizes
- Plots of Grown Resources
- Tables

Assessment Input Data

Assessment Results

- Assessment Unit Summary
- Detailed Assessment Results
- Undiscovered Field-Size Distributions

USGS PROVINCE: Browse Basin (3913) **GEOLOGIST:** M.G. Bishop

TOTAL PETROLEUM SYSTEM: Late Jurassic/Early Cretaceous-Mesozoic (391301)

ASSESSMENT UNIT: Late Jurassic/Early Cretaceous-Mesozoic (39130101)

DESCRIPTION: The sparsely explored Browse Basin, located offshore northern Australia, was formed as a subsiding and faulted restricted marine basin. Major sediment accumulation was Permian through Cretaceous. Triassic to Cretaceous reservoirs are sourced by Jurassic rocks, sealed by Cretaceous rocks and overlain by Cretaceous and Tertiary shelf carbonates.

SOURCE ROCKS: Potential source rocks range in age from Late Jurassic to Early Cretaceous; TOC 1 to 70 wt. %, HI 100 to 600. The majority of these rocks were deposited in low-energy, restricted marine settings with additional possible source rocks from mixed alluvial plain and deltaic settings.

MATURATION: Present-day geothermal gradients indicate the Upper Cretaceous claystones may be mature in west-central and outer portions of the province and the Lower Cretaceous and older rocks may be mature across most of the province. The source rocks entered the oil window between 70 and 40 million years ago.

MIGRATION: Vertical fault migration from the mature source rocks in the sub-basin to overlying and adjacent traps is the primary migration system. Combination vertical and long-range dip migration within carrier beds is important to feed accumulations discovered on the eastern margin of the province.

RESERVOIR ROCKS: Accumulations have been found in reservoirs of deep-water fan origin to shoreline, deltaic and valley-fill origin ranging in age from Triassic to Upper Cretaceous. These clastic reservoirs have good porosity and permeability.

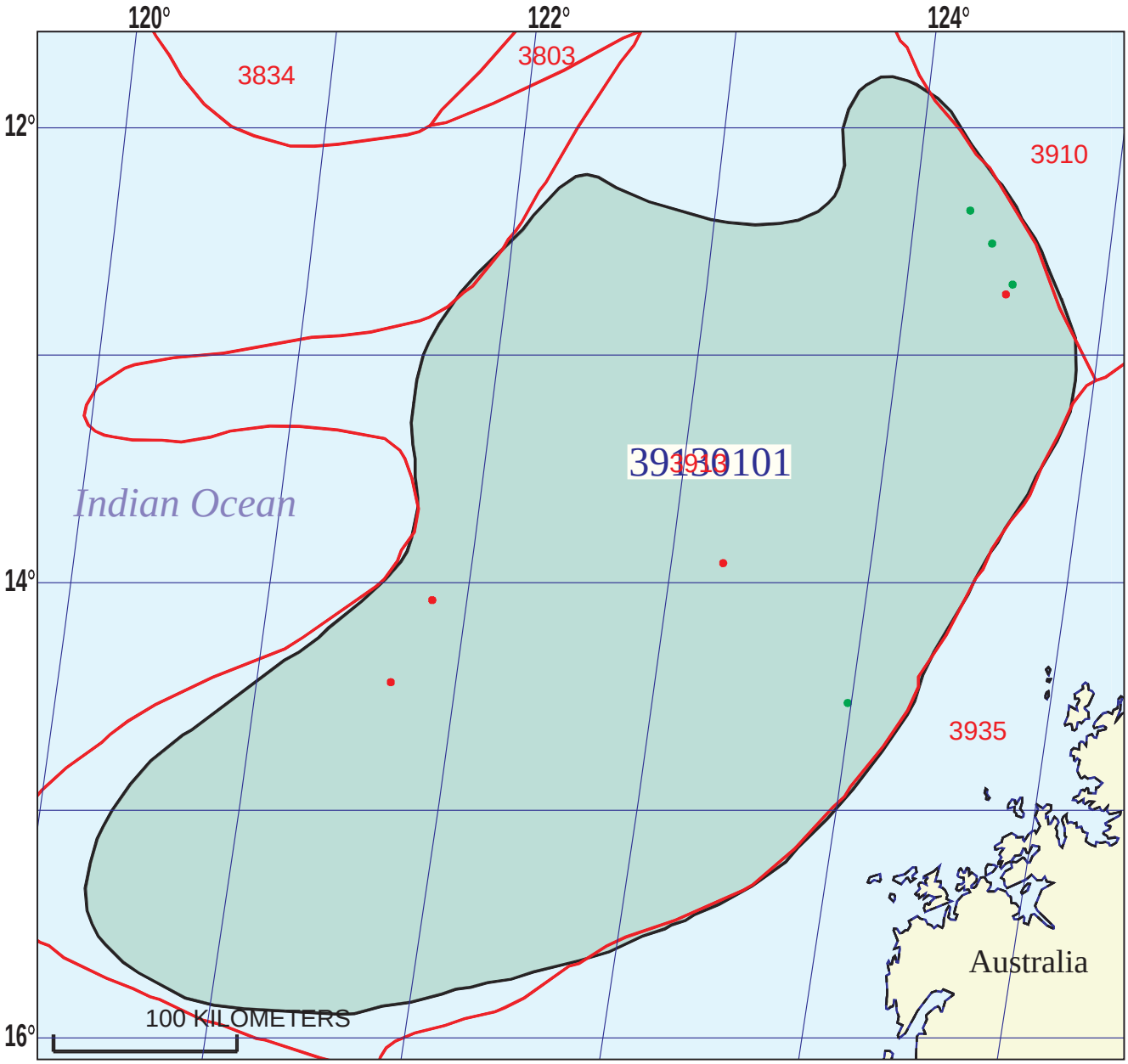
TRAPS AND SEALS: Traps include drape anticlines over fault blocks and tilted fault blocks. Recent discoveries prove drape anticlines over paleo-topography and depositional pinchout against basement are also successful targets. The regional seal is Upper Cretaceous claystone. Intraformational shale and claystone seals also occur.

REFERENCES:

Bishop, M.G., 1999, A total petroleum system of the Browse Basin, Australia–Late Jurassic, Early Cretaceous-Mesozoic: U.S. Geological Survey Open File Report 99-50-I. http://energy.cr.usgs.gov/energy/WorldEnergy/OF99-50-I.

Bradshaw, M.T., Bradshaw, J., Murray, A.P., Needham, D.J., Spencer, L., Summons, R.E., Wilmot, J., and Winn, S., 1994, Petroleum systems in west Australian basins, *in* Purcell, P.G. and Purcell, R.R., eds., The sedimentary basins of Western Australia: Proceedings of Petroleum Exploration Society of Australia Symposium, Perth, 1994, p. 93-118.

Scott, J., 1994, Source rocks of west Australian basins–distribution, character and models, *in* Purcell, P.G. and Purcell, R.R., eds., The sedimentary basins of Western Australia: Proceedings of Petroleum Exploration Society of Australia Symposium, Perth, 1994, p. 141-158.



Late Jurassic/Early Cretaceous-Mesozoic Assessment Unit - 39130101

EXPLANATION

- Hydrography
- Shoreline
- 3913 — Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 39130101 — Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

SEVENTH APPROXIMATION
NEW MILLENNIUM WORLD PETROLEUM ASSESSMENT
DATA FORM FOR CONVENTIONAL ASSESSMENT UNITS

Date:……..	2/24/99		
Assessment Geologist:……..	R.T. Ryder		
Region:……..	Asia Pacific	Number:	3
Province:……..	Browse Basin	Number:	3913
Priority or Boutique……	Priority		
Total Petroleum System:……	Late Jurassic/Early Cretaceous-Mesozoic	Number:	391301
Assessment Unit:……..	Late Jurassic/Early Cretaceous-Mesozoic	Number:	39130101
* Notes from Assessor	MMS growth function.		
	Possible large oil discovery (Cornea) is not in historical database.		

CHARACTERISTICS OF ASSESSMENT UNIT

Oil (<20,000 cfg/bo overall) **or** Gas (≥20,000 cfg/bo overall):… Gas

What is the minimum field size?……. 15 mmboe grown (≥1mmboe)
(the smallest field that has potential to be added to reserves in the next 30 years)

Number of discovered fields exceeding minimum size:…….. Oil: 3 Gas: 4

Established (>13 fields) _____ Frontier (1-13 fields) X Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 31 2nd 3rd 18 3rd 3rd _____

Median size (grown) of discovered gas fields (bcfg):
1st 3rd 10365 2nd 3rd 822 3rd 3rd _____

Assessment-Unit Probabilities:

Attribute	Probability of occurrence (0-1.0)
1. **CHARGE:** Adequate petroleum charge for an undiscovered field ≥ minimum size……	1.0
2. **ROCKS:** Adequate reservoirs, traps, and seals for an undiscovered field ≥ minimum size……	1.0
3. **TIMING OF GEOLOGIC EVENTS:** Favorable timing for an undiscovered field ≥ minimum size	1.0

Assessment-Unit GEOLOGIC Probability (Product of 1, 2, and 3):…….. 1.0

4. **ACCESSIBILITY:** Adequate location to allow exploration for an undiscovered field ≥ minimum size…… 1.0

UNDISCOVERED FIELDS

Number of Undiscovered Fields: How many undiscovered fields exist that are ≥ minimum size?:
(uncertainty of fixed but unknown values)

Oil fields:……min. no. (>0)	4	median no.	13	max no.	32
Gas fields:……min. no. (>0)	10	median no.	28	max no.	70

Size of Undiscovered Fields: What are the anticipated sizes (**grown**) of the above fields?:
(variations in the sizes of undiscovered fields)

Oil in oil fields (mmbo)…… min. size	15	median size	30	max. size	3000
Gas in gas fields (bcfg):…… min. size	90	median size	200	max. size	25000

Assessment Unit (name, no.)
Late Jurassic/Early Cretaceous-Mesozoic, 39130101

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	2000	3000	4000
NGL/gas ratio (bngl/mmcfg)……	30	60	90

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	22	44	66
Oil/gas ratio (bo/mmcfg)……			

SELECTED ANCILLARY DATA FOR UNDISCOVERED FIELDS

(variations in the properties of undiscovered fields)

Oil Fields:	minimum	median	maximum
API gravity (degrees)……	30	40	48
Sulfur content of oil (%)……	0.01	0.05	0.2
Drilling Depth (m) ……	800	2000	3900
Depth (m) of water (if applicable)……	50	150	500

Gas Fields:	minimum	median	maximum
Inert gas content (%)……			
CO_2 content (%)……			
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……	2000	3800	5100
Depth (m) of water (if applicable)……	50	400	700

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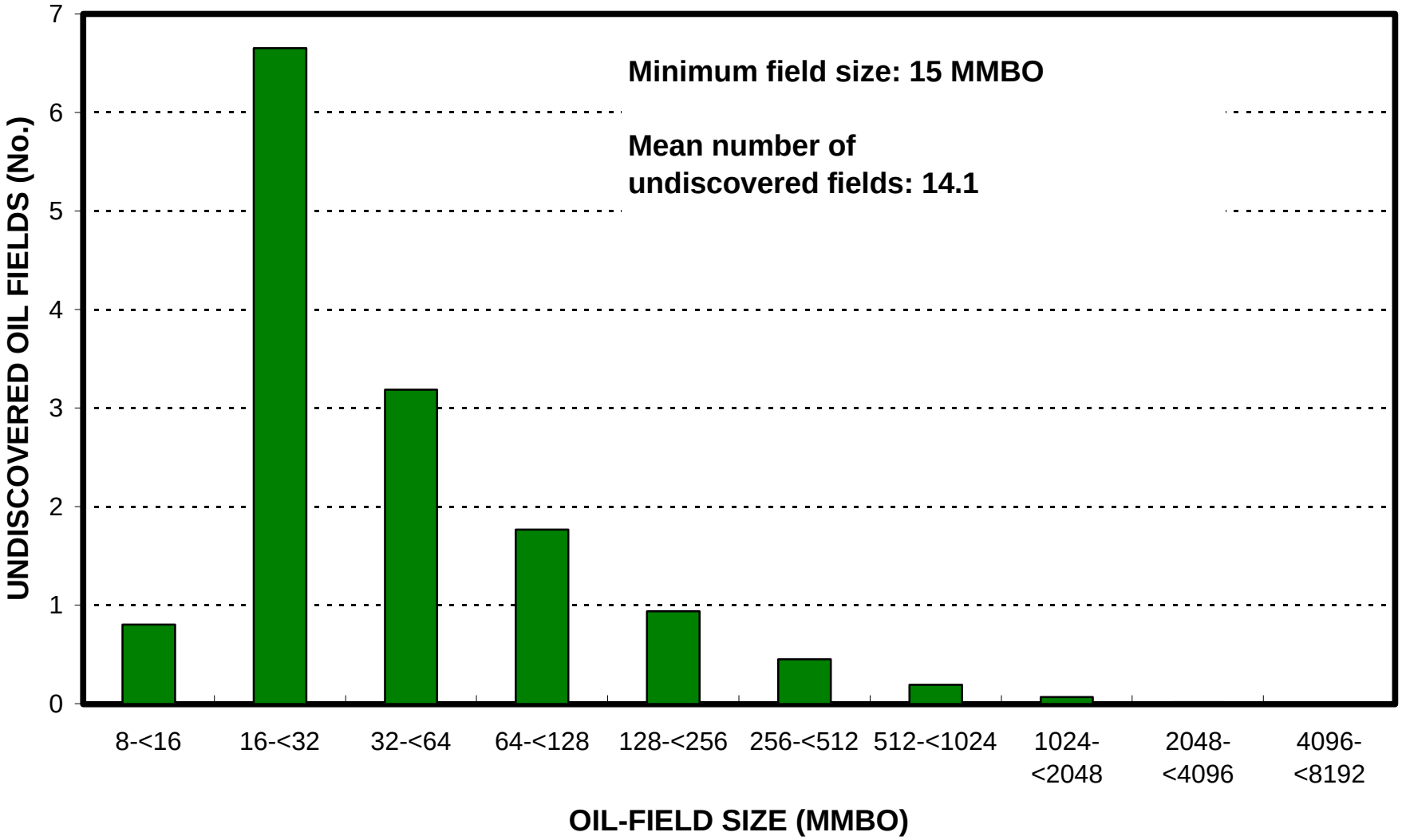
ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT TO COUNTRIES OR OTHER LAND PARCELS (uncertainty of fixed but unknown values)

1. Australia represents 100 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		100	
Portion of volume % that is offshore (0-100%)……		100	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		100	
Portion of volume % that is offshore (0-100%)……		100	

Late Jurassic/Early Cretaceous-Mesozoic, AU 39130101
Undiscovered Field-Size Distribution



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Undiscovered Field-Size Distribution