Petrel Assessment Unit 39100201

Geologic Summary

Detailed map of this assessment unit

Assessment Input Data

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

Petrel Assessment Unit 39100201
Bonaparte Gulf Basin Geologic Province 3910
USGS PROVINCE: Bonaparte Gulf Basin (3910)  
GEOLOGIST: M.G. Bishop

TOTAL PETROLEUM SYSTEM: Keyling/Hyland Bay-Permian (391002)

ASSESSMENT UNIT: Petrel (39100201)

DESCRIPTION: Offshore discoveries in Joseph Bonaparte Gulf, Australia. Gas and condensate at Petrel and Tern fields sourced by Early Permian coals and marine shales and Late Permian deltaic shales deposited in a late-rift/post-rift sag basin.

SOURCE ROCKS: The Keyling Formation delta-plain coals; TOC 35 wt. % and HI 230, and marginal marine shales; TOC 2.8 wt. % and HI 95. The Hyland Bay Formation pro-delta shales are also high in gas-prone organic carbon; TOC 1.6 to 2 wt. % and HI 55 to 240.

MATURATION: Peak hydrocarbon generation for the Keyling Formation was Late Permian through Early Triassic; Late Cretaceous through Tertiary for the Hyland Bay Formation.

MIGRATION: Lateral migration toward the flanks of the basin and to the Petrel structure and continued vertical migration with movement of Ordovician salt.

RESERVOIR ROCKS: Reservoir rocks include Permian sandstones from barrier bar, fluvial, deltaic and shallow marine environments.

TRAPS AND SEALS: Anticline traps and salt-related doming dominate. Seals are primarily intraformational. The seal at Tern field is the shallow marine Mount Goodwin Formation.

REFERENCES:
**Petrel**

**Assessment Unit - 39100201**

**EXPLANATION**

- Hydrography
- Shoreline
- **3910** Geologic province code and boundary
- Country boundary

- Gas field centerpoint
- Oil field centerpoint

Assessment unit code and boundary

Projection: Robinson. Central meridian: 0
SEVENTH APPROXIMATION
NEW MILLENNIUM WORLD PETROLEUM ASSESSMENT
DATA FORM FOR CONVENTIONAL ASSESSMENT UNITS

Date: 3/25/99
Assessment Geologist: T.S. Ahlbrandt
Region: Asia Pacific Number: 3
Province: Bonaparte Gulf Basin Number: 3910
Priority or Boutique: Priority
Total Petroleum System: Keyling/Hyland Bay-Permian Number: 391002
Assessment Unit: Petrel Number: 39100201

* Notes from Assessor
MMS growth factor. Gas pipeline planned.

CHARACTERISTICS OF ASSESSMENT UNIT

Oil (<20,000 cfg/bo overall) or Gas (>20,000 cfg/bo overall): Gas

What is the minimum field size? 10 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: 0

Median size (grown) of discovered oil fields (mmboe): 3263
Median size (grown) of discovered gas fields (bcfg): 256

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) median no. max no.
Gas fields: min. no. (>0) median no. max no.

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 median size max. size
Gas in gas fields (bcfg): min. size median size max. size
### AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

<table>
<thead>
<tr>
<th></th>
<th>minimum</th>
<th>median</th>
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<tbody>
<tr>
<td>Oil Fields:</td>
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<tr>
<td>Gas/oil ratio (cfg/bo)</td>
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<tr>
<td>NGL/gas ratio (bngl/mmcfg)</td>
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<td>Gas fields:</td>
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<tr>
<td>Liquids/gas ratio (bngl/mmcfg)</td>
<td>22</td>
<td>44</td>
<td>66</td>
</tr>
<tr>
<td>Oil/gas ratio (bo/mmcfg)</td>
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### SELECTED ANCILLARY DATA FOR UNDISCOVERED FIELDS

(variations in the properties of undiscovered fields)

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<td>Oil Fields:</td>
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<tr>
<td>API gravity (degrees)</td>
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<td>Sulfur content of oil (%)</td>
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<td>Drilling Depth (m)</td>
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<td>Depth (m) of water (if applicable)</td>
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<td>Gas Fields:</td>
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<tr>
<td>Inert gas content (%)</td>
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<td>CO₂ content (%)</td>
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<td>Hydrogen-sulfide content (%)</td>
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<tr>
<td>Drilling Depth (m)</td>
<td>2300</td>
<td>3000</td>
<td>4000</td>
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<tr>
<td>Depth (m) of water (if applicable)</td>
<td>40</td>
<td>85</td>
<td>130</td>
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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

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<tr>
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<th>Oil in Oil Fields:</th>
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<td>Richness factor (unitless multiplier):</td>
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<td>Volume % in parcel (areal % x richness factor):</td>
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<td>Portion of volume % that is offshore (0-100%)</td>
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<th>Gas in Gas Fields:</th>
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<td>Richness factor (unitless multiplier):</td>
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<tr>
<td>Volume % in parcel (areal % x richness factor):</td>
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<td>Portion of volume % that is offshore (0-100%)</td>
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Petrel, AU 39100201
Undiscovered Field-Size Distribution

Minimum field size: 60 BCFG
Mean number of undiscovered fields: 21.5

GAS-FIELD SIZE (BCFG)

UNDISCOVERED GAS FIELDS (No.)

48-<96 96-<192 192-<384 384-<768 768-<1536 1536-<3072 3072-<6144 6144-<12288 12288-<24576