

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

Assessment of undiscovered conventionally recoverable petroleum resources  
of Australia

By

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Open-File Report 84-214

This report is preliminary and has not been reviewed for conformity with  
U.S. Geological Survey editorial standards and stratigraphic nomenclature.

<sup>1</sup>. Yorba Linda, CA

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# Assessment of undiscovered conventionally recoverable petroleum resources of Australia

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## ASSESSMENT OF ENERGY RESOURCES

This report was prepared as part of the World Energy Resources Program of the U.S. Geological Survey (USGS). The objective of the study is to assess the undiscovered conventionally recoverable resources within the petroleum producing provinces. The study utilizes geological and petroleum engineering data, in conjunction with statistical techniques, to estimate undiscovered resources by a process involving a team of geologists and statisticians. The estimates represent the views of the U.S. Geological Survey estimation team and should not be regarded as an official Department of the Interior position.

Other U.S. Geological Survey reports relating to the assessment of undiscovered conventionally recoverable petroleum resources include the following:

Open File Reports 81-0986 - Persian Gulf Basin and Zagros fold belt  
(Arabian-Iranian Basin)

81-1027 - Volga-Ural Basin

81-1142 - Indonesia

81-1143 - Northeastern Mexico

81-1144 - Southeastern Mexico, northern Guatemala, and Belize

81-1145 - Trinidad

81-1146 - Venezuela

81-1147 - West Siberian and Kara Sea Basins

82-0296 - Middle Caspian Basin

82-1027 - East Siberian Basin, U.S.S.R.

82-1056 - North Africa

82-1057 - Timan-Pechora Basin, U.S.S.R.; Barents-northern  
Kara shelf

83-0598 - Northwestern, Central, and Northeastern Africa

83-0801 - Onshore China

## ACKNOWLEDGMENTS

The resource assessment for this report was prepared in collaboration with the Resource Appraisal Group of the Branch of Oil and Gas Resources.

## INTRODUCTION

The location of the petroleum-prospective basins of Australia is shown in figure 1. Figure 2 shows the geologic/geographic groups of basins used in the assessments (note that pre-Cambrian basins are not included in the assessment areas). Unconditional estimates by the USGS of oil and gas resources in these basins and in aggregate are given in table 1 and figures 3 through 18. Data supplementary to these estimates are supplied in table 2.

# AUSTRALIA

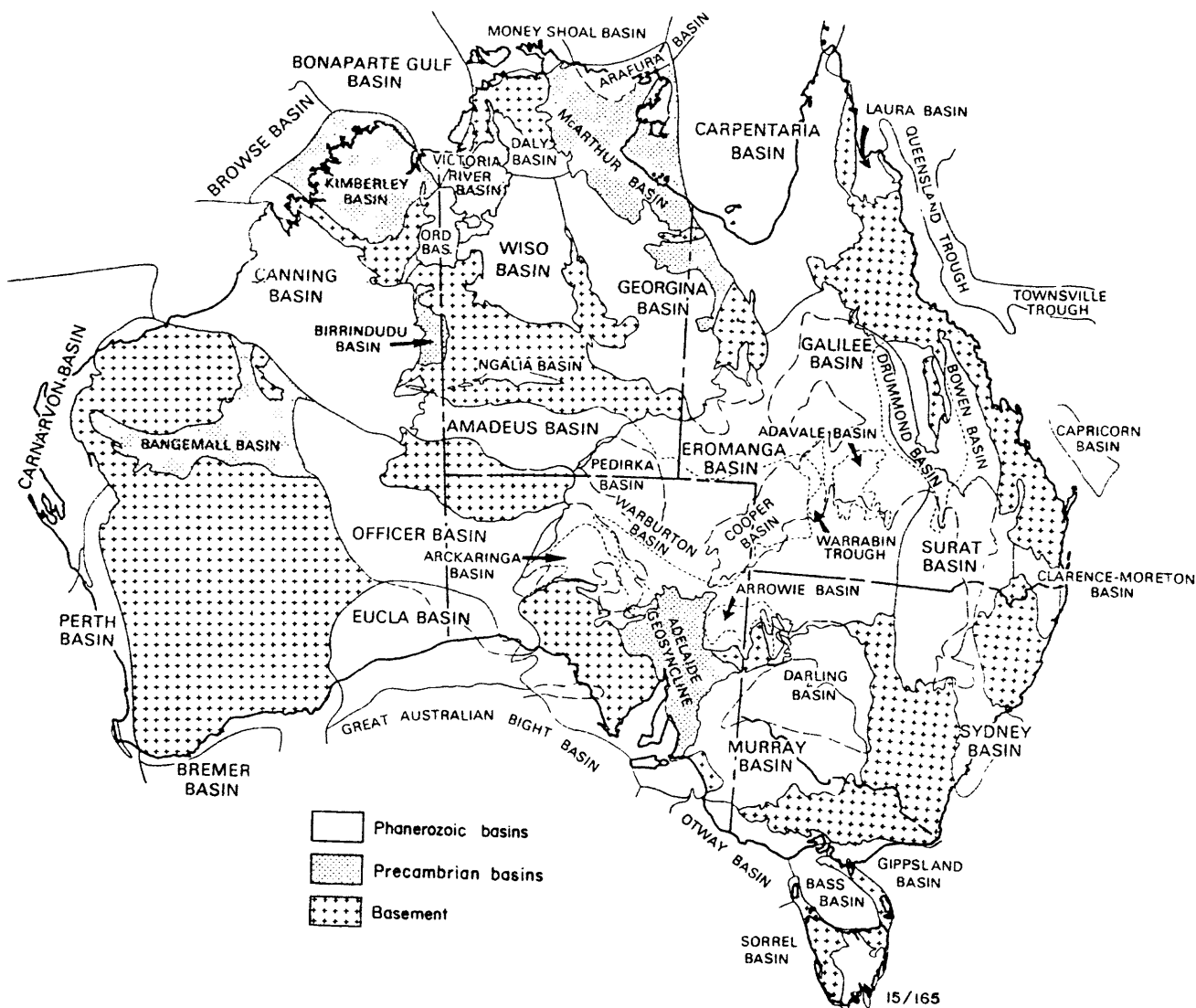


Figure 1.--Sedimentary basins of Australia (Forman, D. J., 1982, personal communication, unpublished).

A U S T R A L I A

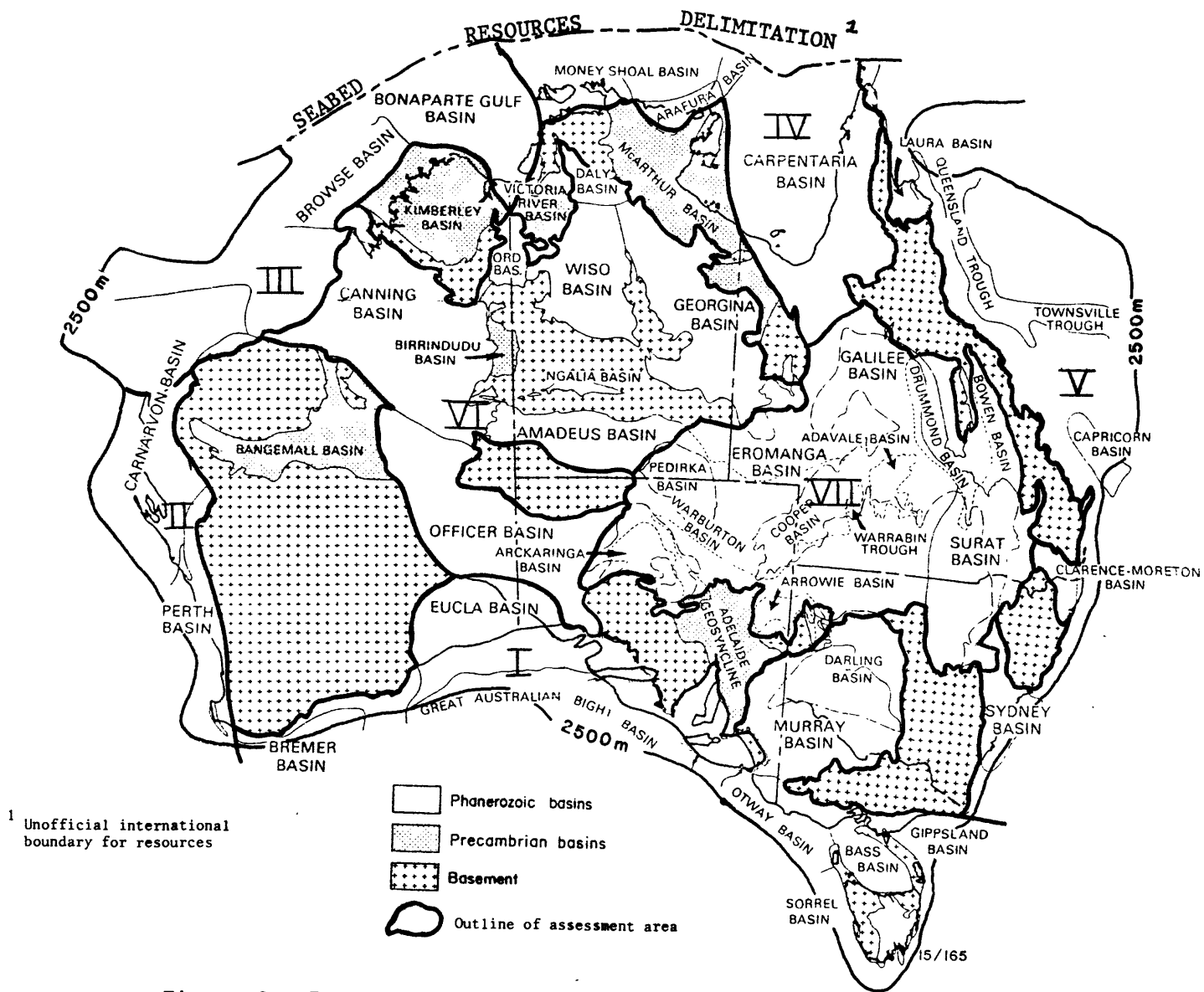


Figure 2.--Petroleum assessment areas

- I. - South coastal basins, onshore and offshore
- II. - West coastal basins, onshore and offshore
- III. - Northwest shelf and slope
- IV. - North coastal basins, onshore and offshore
- V. - East coastal basins, onshore and offshore
- VI. - Central intracratonic basins
- VII. - Southern Great Artesian Basin

Table 1.--Assessment of undiscovered conventionally recoverable petroleum resources of Australia

Unconditional resource assessment by USGS as of 12/1982; see also figures 3 and 4.

Region	Crude oil in billions of barrels (BB)			Natural gas in trillions of cubic feet (Tcf) and billions of barrels of oil equivalent (BBOE) @ 6,000 cu ft/bbl		
	$\frac{\text{Low}}{\text{F}_{95}} \frac{1}{-}$	$\frac{\text{High}}{\text{F}_5} \frac{1}{-}$	<u>Mean</u>	$\frac{\text{Low}}{\text{F}_{95}} \frac{1}{-}$	$\frac{\text{High}}{\text{F}_5} \frac{1}{-}$	<u>Mean</u>
Area I. - South coastal basins	0.60	5.50	2.60	3.90	37.30	17.67
Area II. - West coastal basins	0.07	1.46	0.62	1.58	17.90	8.41
Area III. - Northwest shelf and slope	0.48	5.11	2.25	14.10	104.00	50.00
Area IV. - North coastal basins	0.00	0.20	0.02	0.00	2.00	0.40
Area V. - East coastal basins	0.00	0.12	0.02	0.00	2.22	0.83
Area VI. - Central intracratonic basins	0.14	1.70	0.74	1.12	14.10	6.70
Area VII. - Great Artesian Basin	0.11	1.03	0.46	1.98	23.30	9.65
Total Australia $\frac{1}{-}$	3.65	10.96	6.68	51.13	153.31	93.60
			BBOE	8.52	25.55	15.60

$\frac{1}{-}$  Totals are derived by statistical aggregation; only the Mean total equals the sum of the component parts. Slight differences may exist in the total Mean due to rounding.

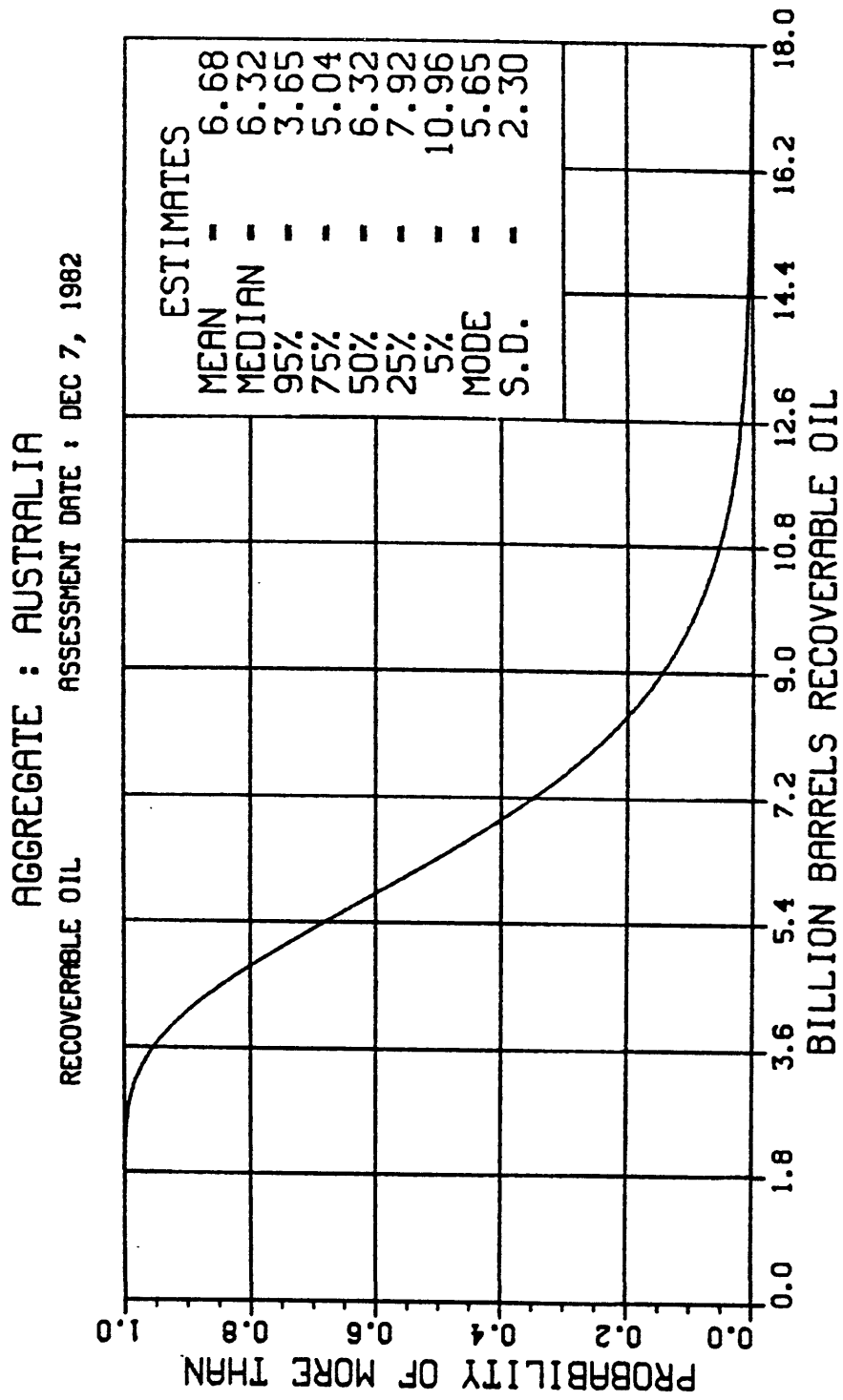


Figure 3.--Aggregate recoverable oil.

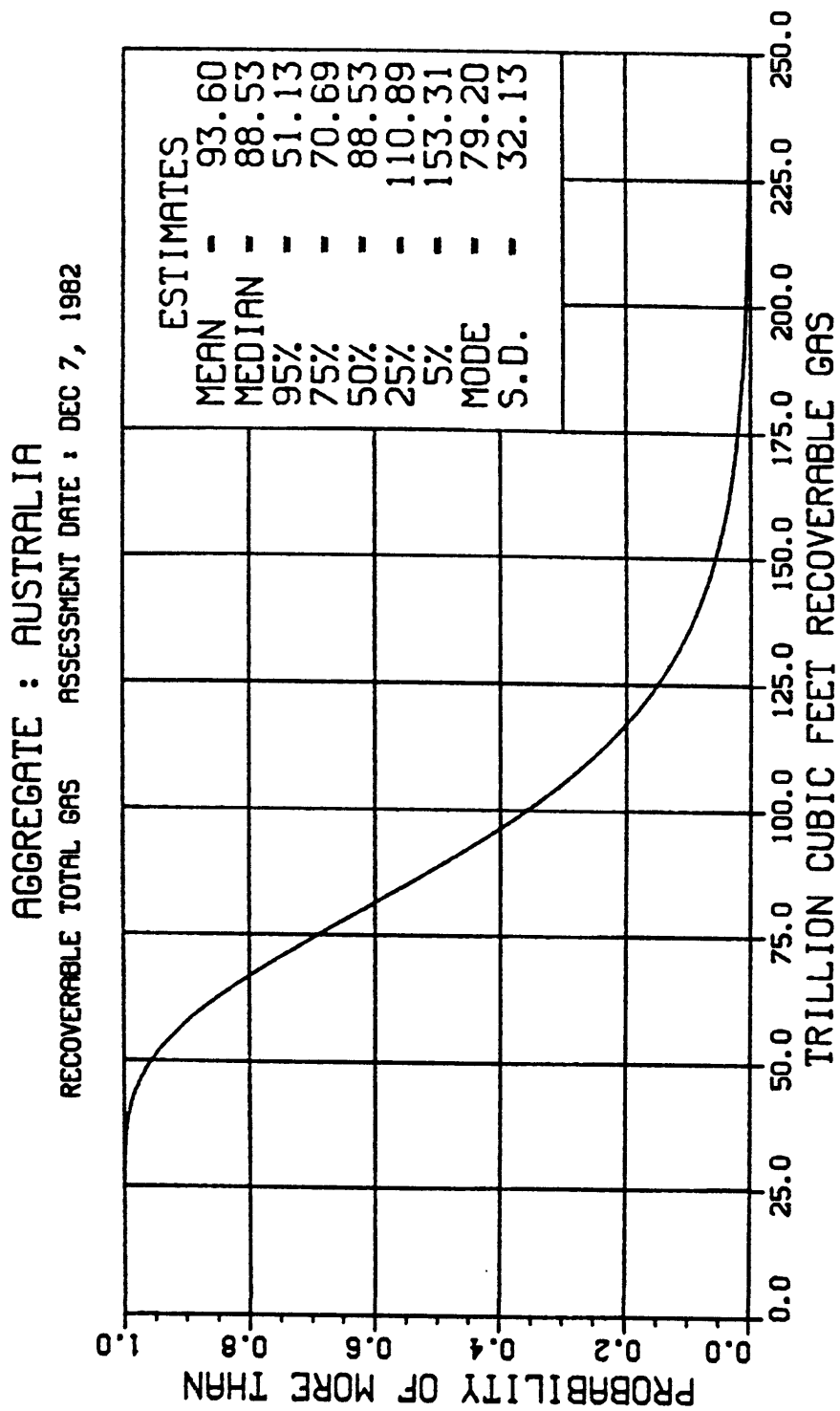


Figure 4.--Aggregate recoverable total gas.



AUSTRALIA, SOUTH COASTAL (ON & OFFSHORE)  
RECOVERABLE OIL      ASSESSMENT DATE : DEC 9, 1982

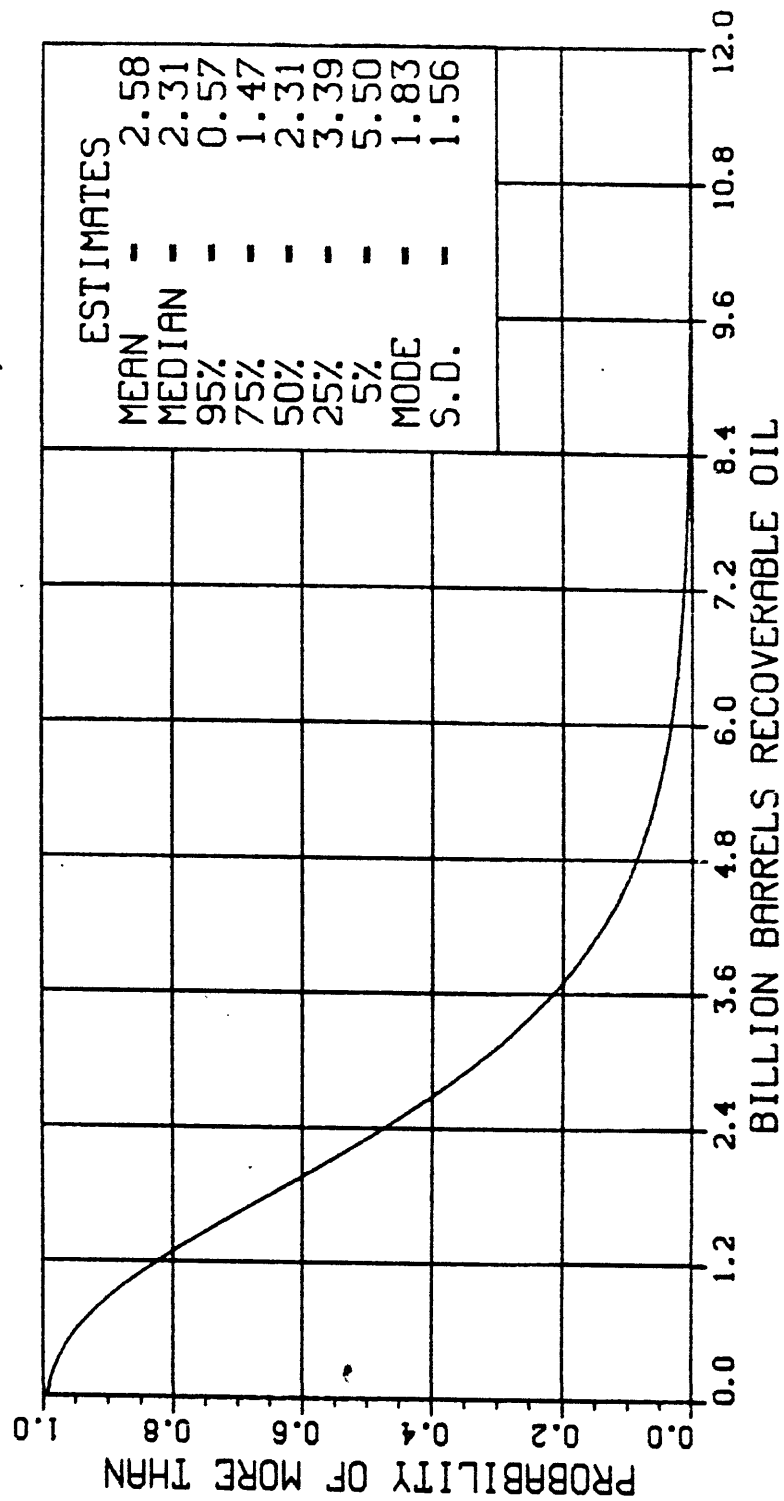


Figure 5.--South coastal (on and offshore) recoverable oil (Area I).

# AUSTRALIA, SOUTH COASTAL (ON & OFFSHORE)

RECOVERABLE TOTAL GAS      ASSESSMENT DATE : DEC 9, 1982

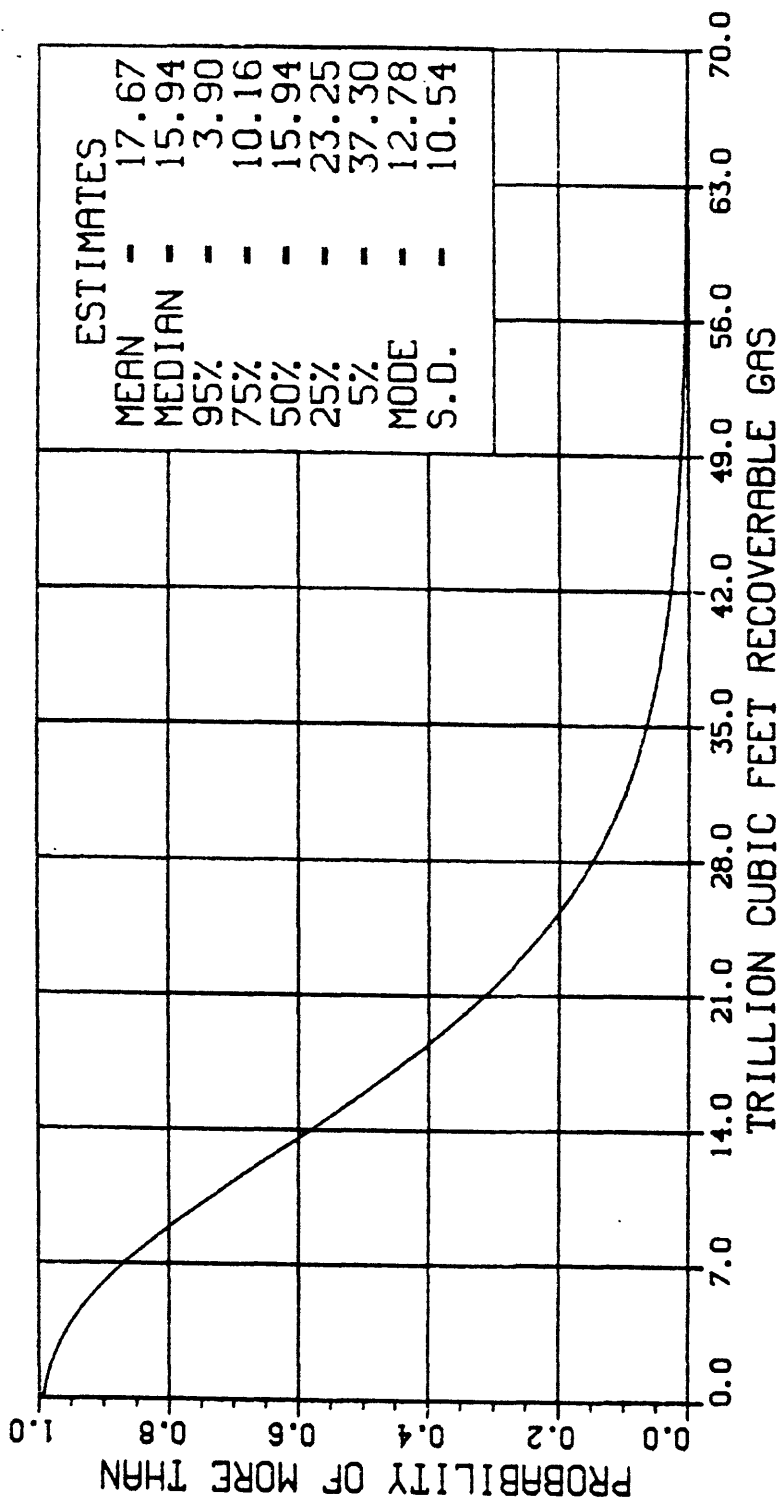


Figure 6.--South coastal (on and offshore) recoverable total gas (Area I).

# AUSTRALIA, WEST COASTAL (ON & OFFSHORE) RECOVERABLE OIL      ASSESSMENT DATE : DEC 9, 1982

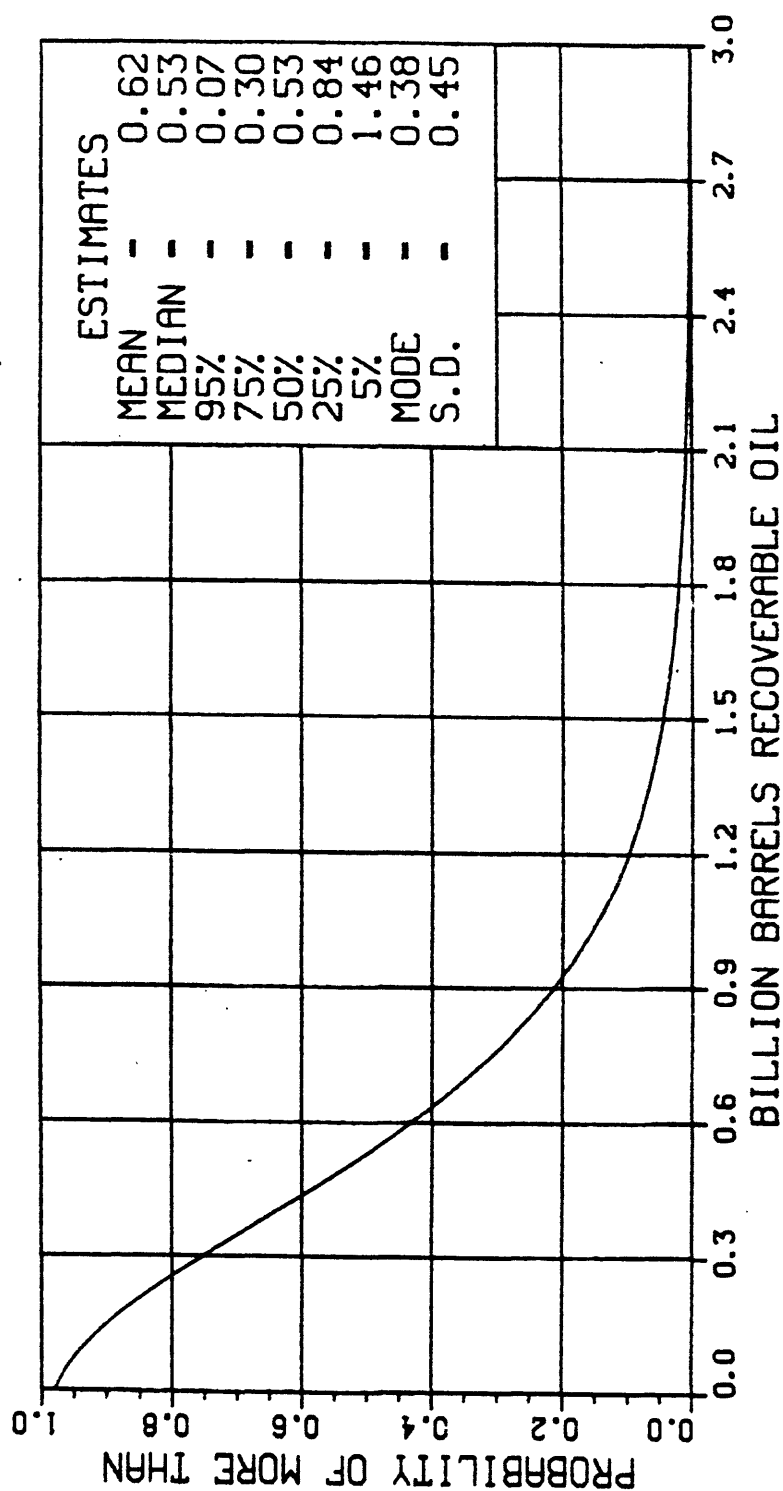


Figure 7.--West coastal (on and offshore) recoverable oil (Area II).

AUSTRALIA, WEST COASTAL (ON & OFFSHORE)  
 RECOVERABLE TOTAL GAS      ASSESSMENT DATE : DEC 9, 1982

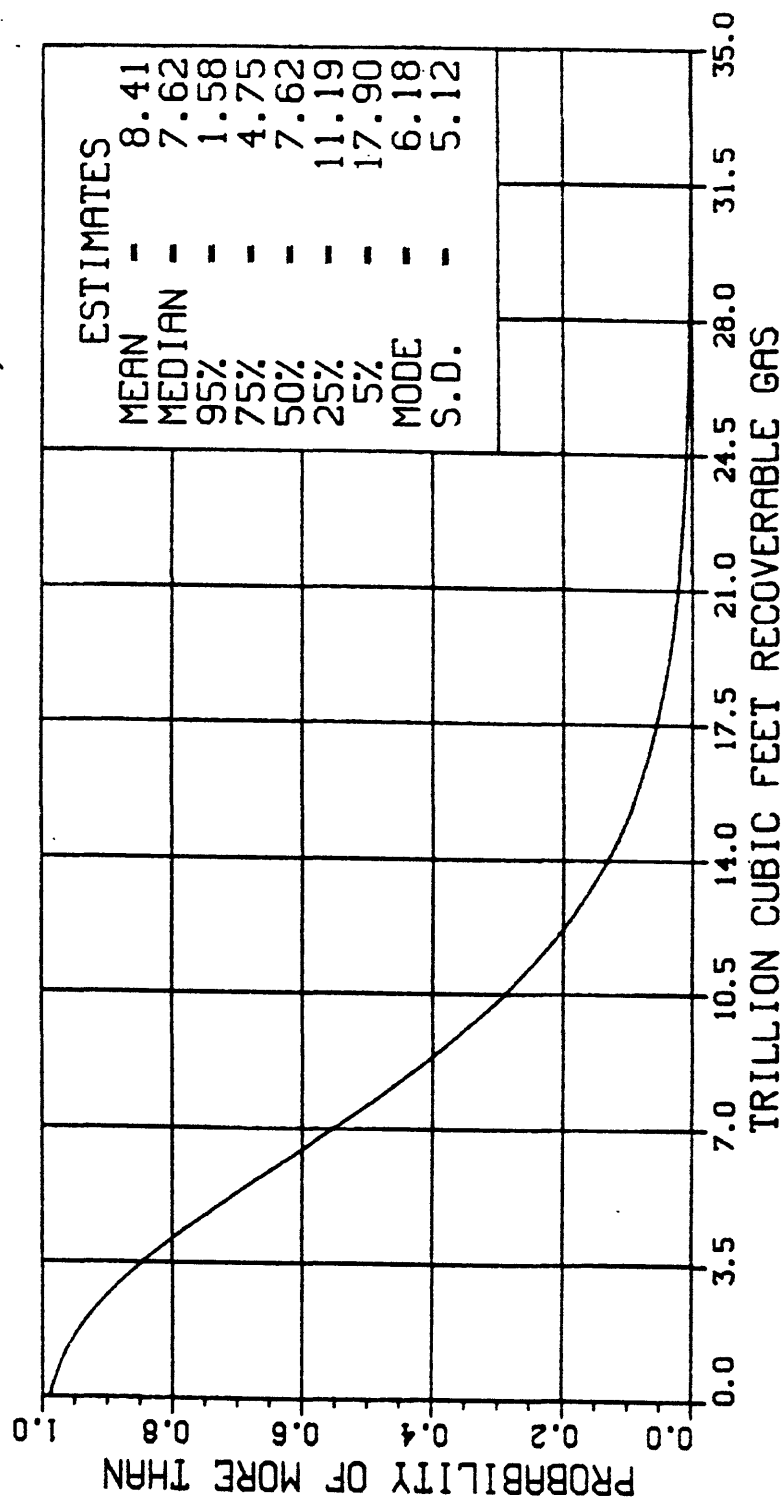


Figure 8.--West coastal (on and offshore) recoverable total gas (Area II).

AUSTRALIA, NORTHWEST SHELF AND SLOPE  
RECOVERABLE OIL

ASSESSMENT DATE : DEC 9, 1982

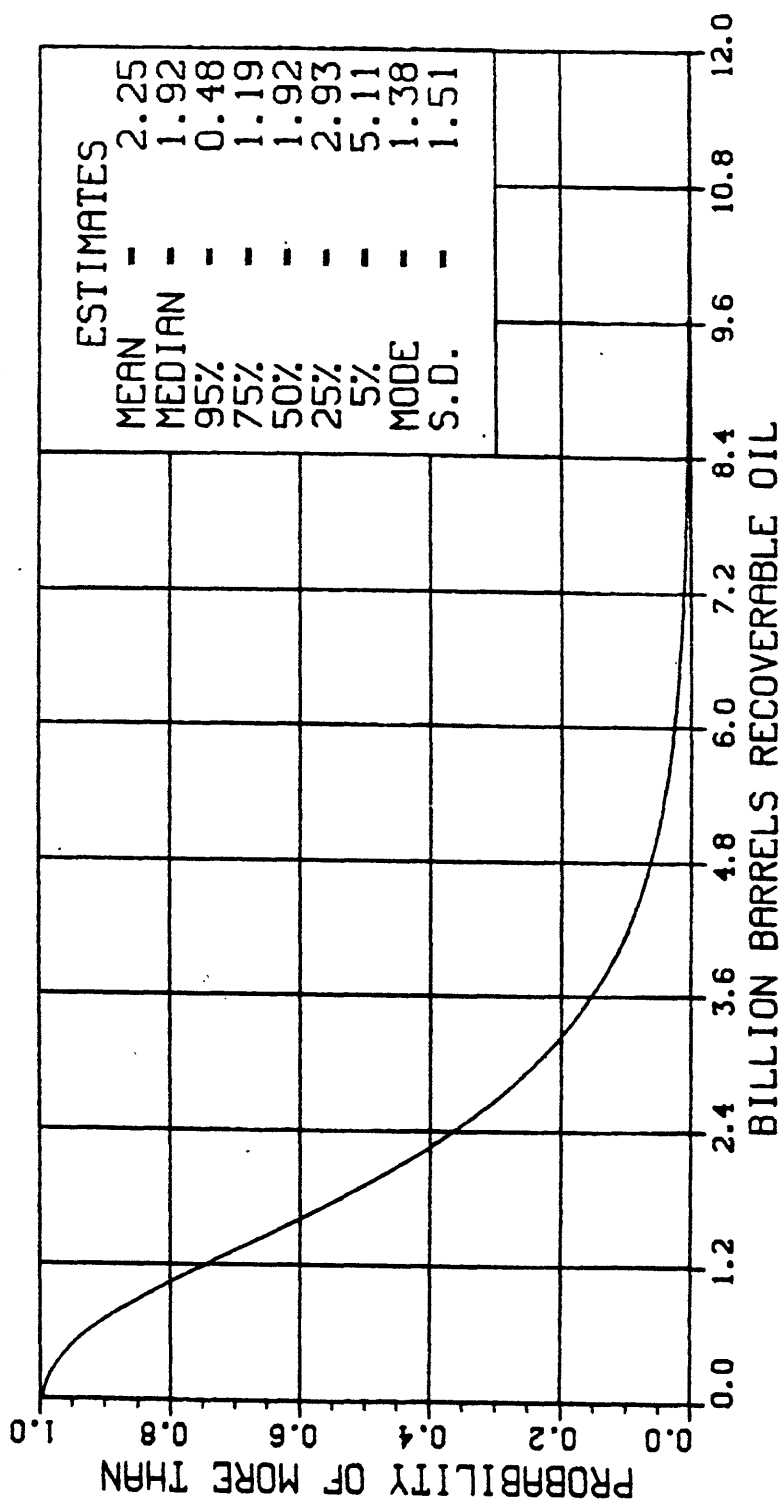


Figure 9.--Northwest shelf and slope recoverable oil (Area III).

AUSTRALIA, NORTHWEST SHELF AND SLOPE  
RECOVERABLE TOTAL GAS      ASSESSMENT DATE : DEC 9, 1982

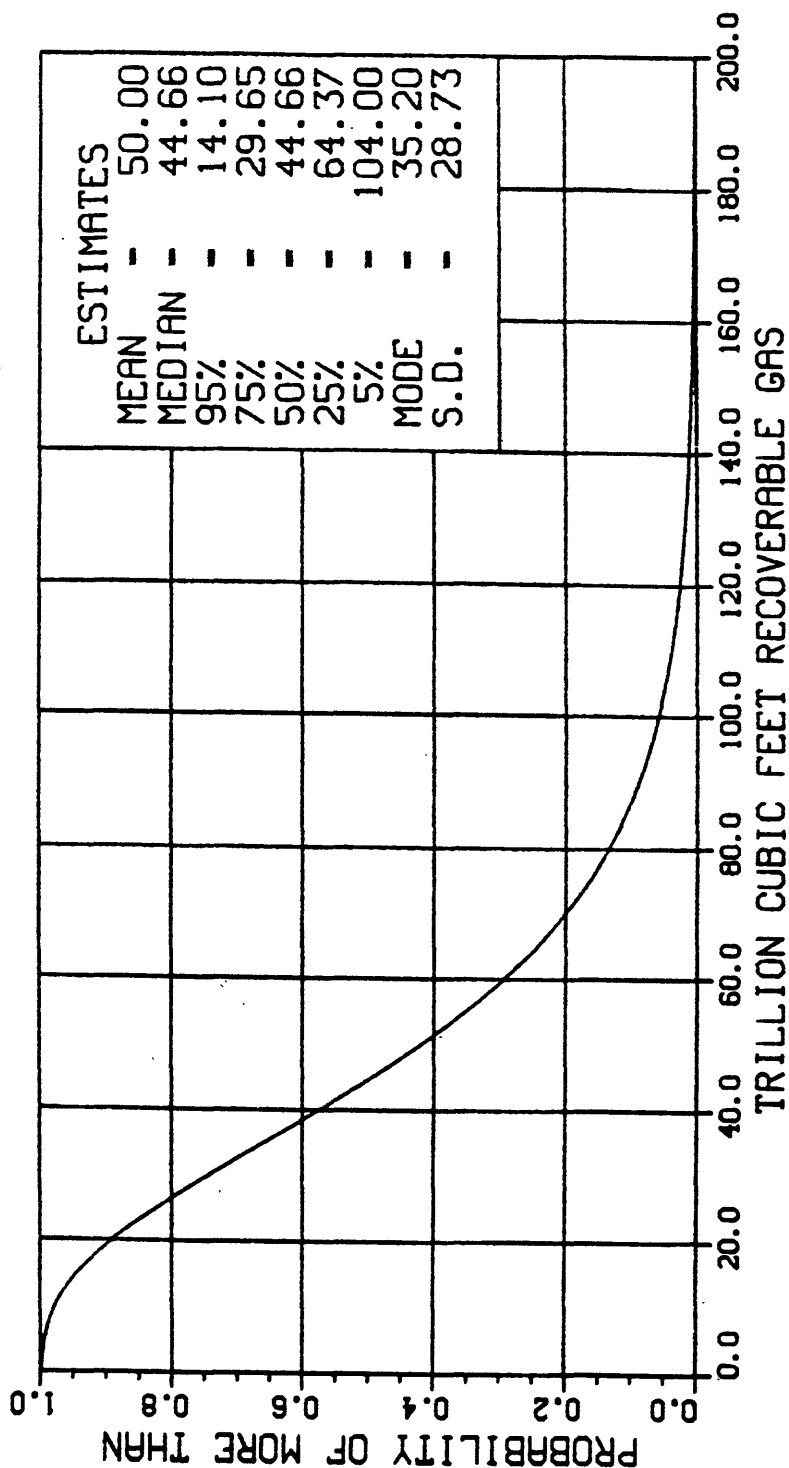


Figure 10.--Northwest shelf and slope recoverable total gas (Area III).

COND \*\* SOLID  
UNCOND \*\* DASH

AUSTRALIA, NORTH COASTAL (ON & OFFSHORE)  
RECOVERABLE OIL ASSESSMENT DATE : DEC 9, 1982

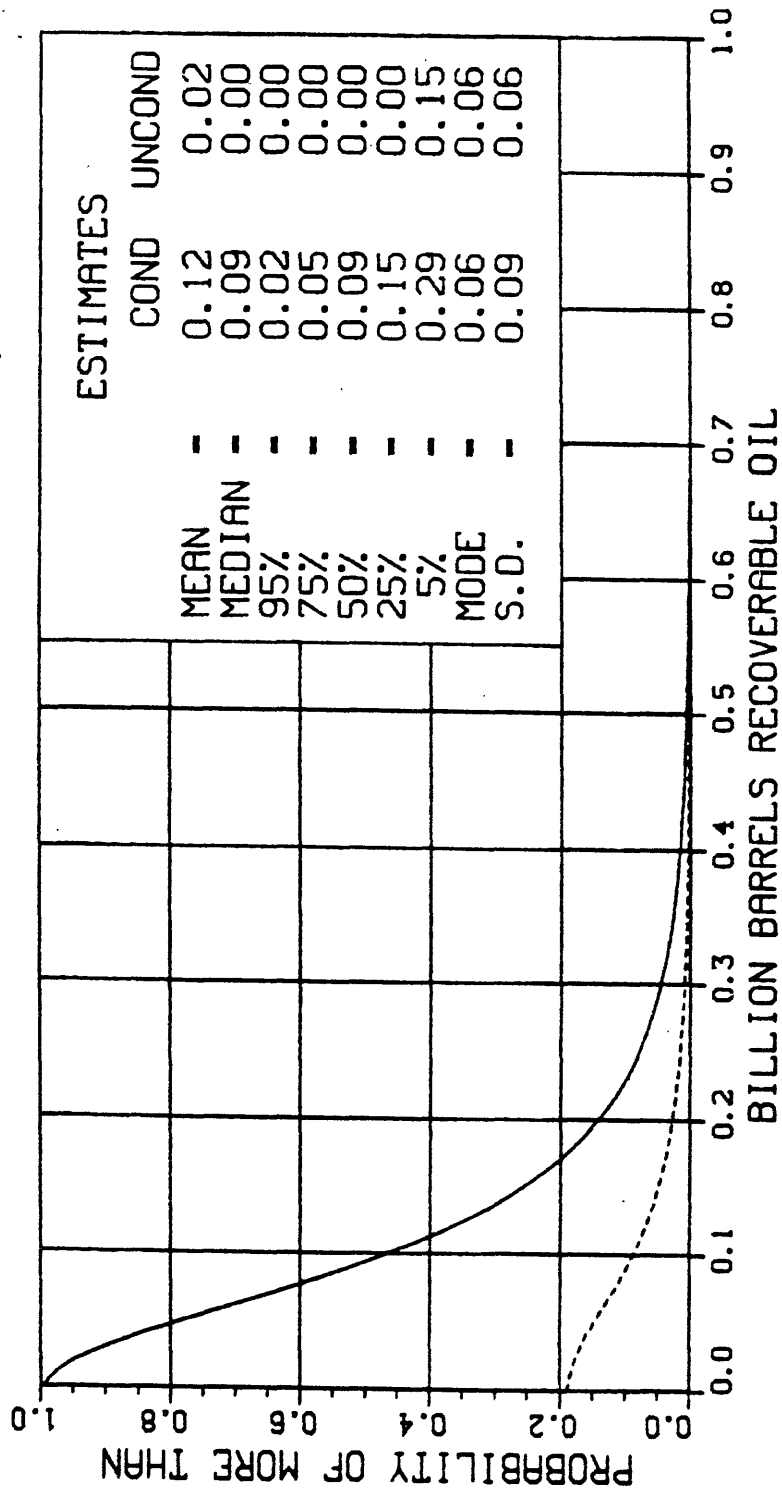


Figure 11.--North coastal (on and offshore) recoverable oil (Area IV).

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# AUSTRALIA, NORTH COASTAL (ON & OFFSHORE) RECOVERABLE TOTAL GAS ASSESSMENT DATE : DEC 9, 1982

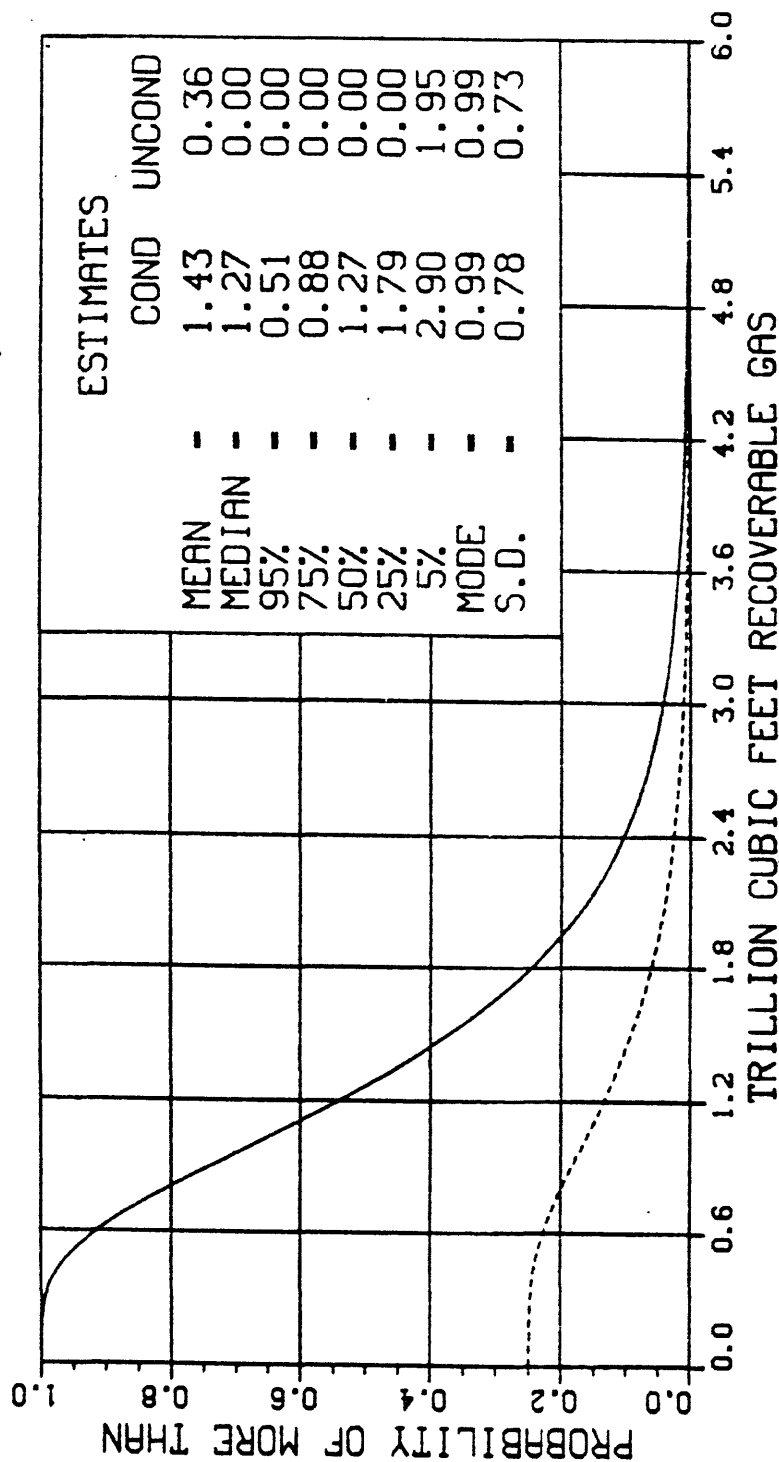


Figure 12.--North coastal (on and offshore) recoverable total gas (Area IV).



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UNCOND \*\* DASH

# AUSTRALIA, EAST COASTAL (ON & OFFSHORE) RECOVERABLE OIL      ASSESSMENT DATE : DEC 9, 1982

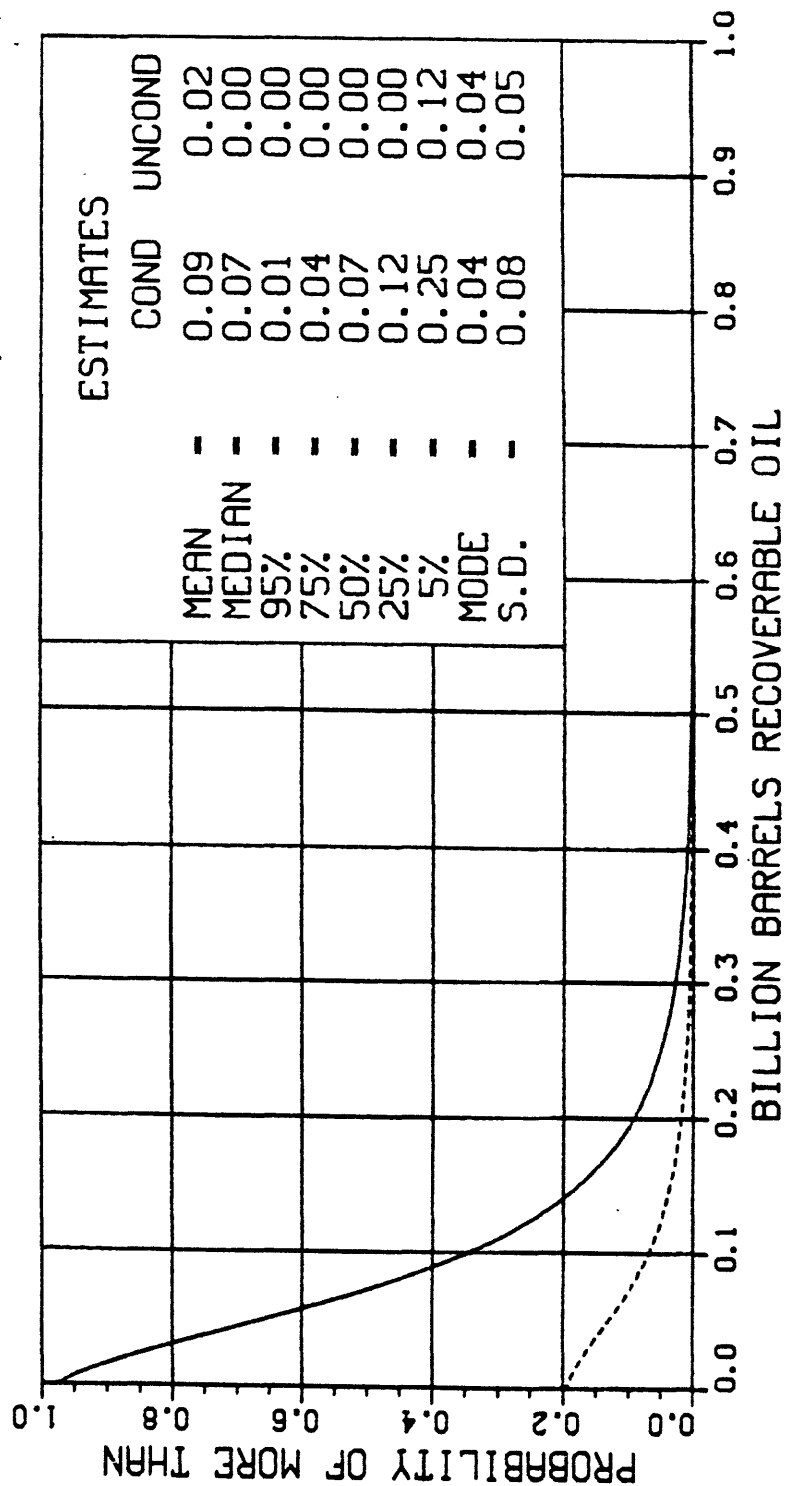


Figure 13.--East coastal (on and offshore) recoverable oil (Area V).

COND \*\* SOLID  
UNCOND \*\* DASH

# AUSTRALIA, EAST COASTAL (ON & OFFSHORE)

RECOVERABLE TOTAL GAS ASSESSMENT DATE : DEC 9, 1982

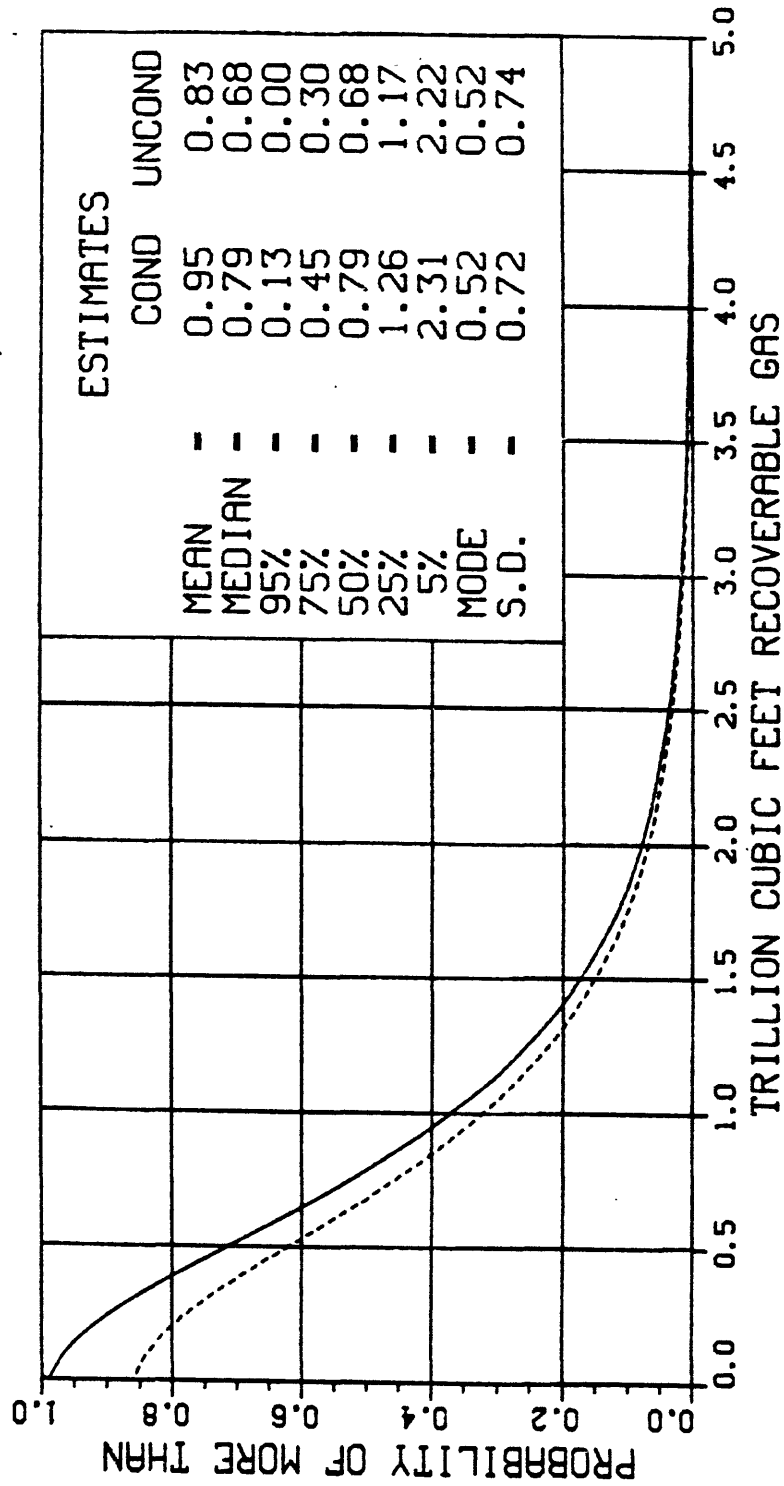


Figure 14.--East coastal (on and offshore) recoverable total gas (Area V).

UNCOND

AUSTRALIA, CENTRAL INTRACRATONIC BASINS  
RECOVERABLE OIL      ASSESSMENT DATE : DEC 9, 1982

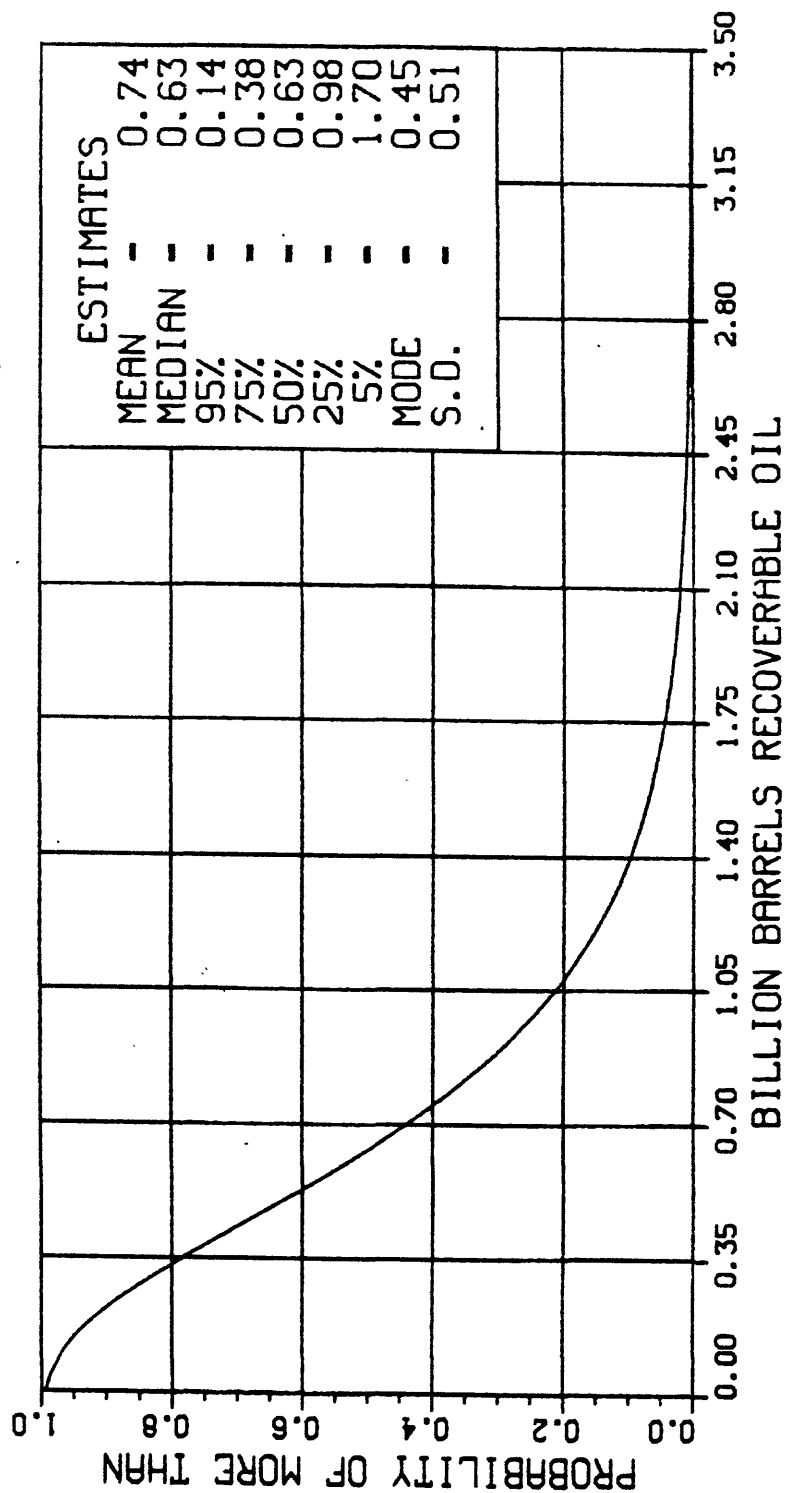


Figure 15.---Central intracratonic basins recoverable oil (Area VI).

AUSTRALIA, CENTRAL INTRACRATONIC BASINS  
RECOVERABLE TOTAL GAS      ASSESSMENT DATE : DEC 9, 1982

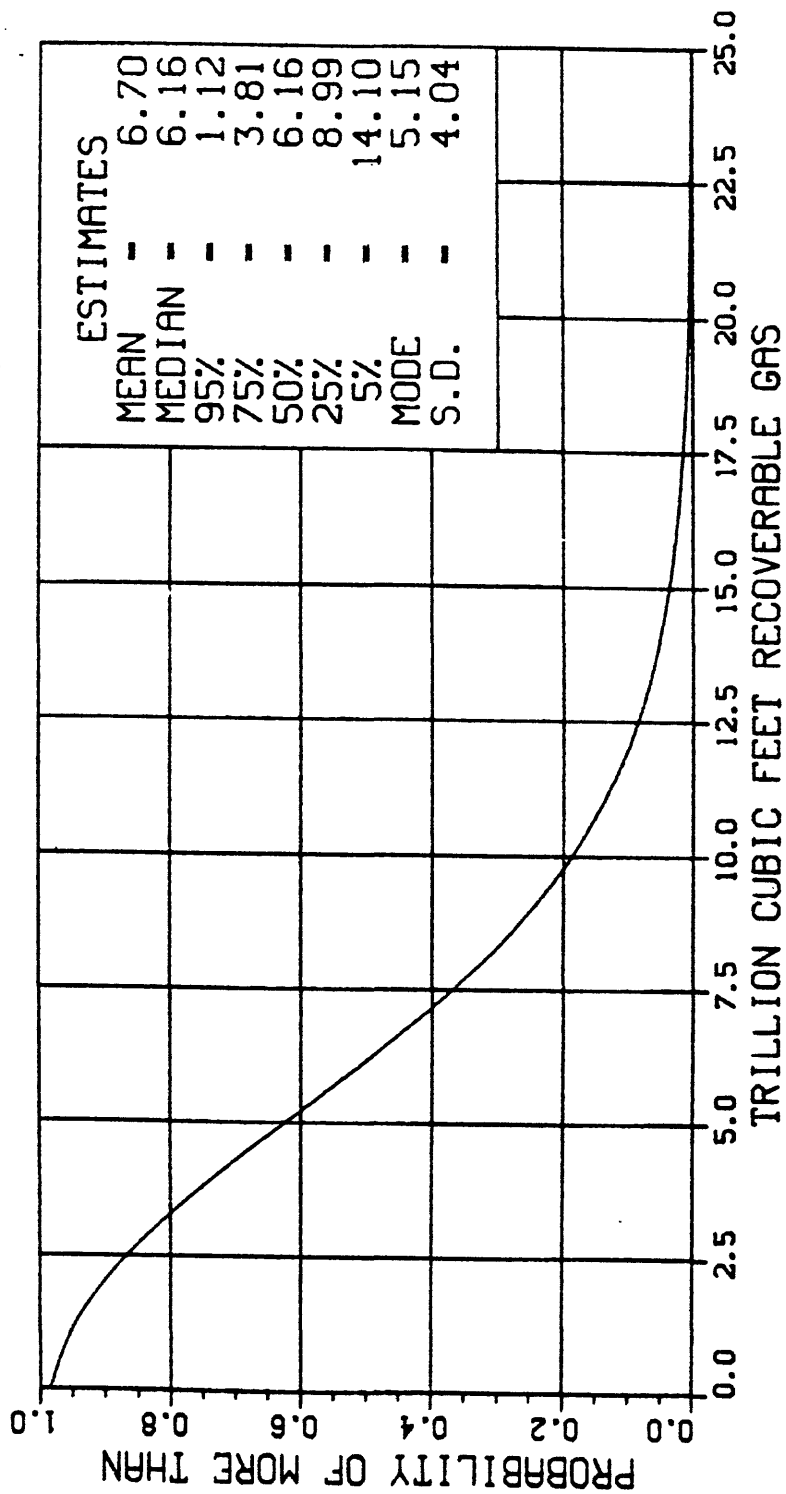


Figure 16.--Central intracratonic basins recoverable total gas (Area VI).

# AUSTRALIA, GREAT ARTESIAN BASIN RECOVERABLE OIL      ASSESSMENT DATE : DEC 9, 1982

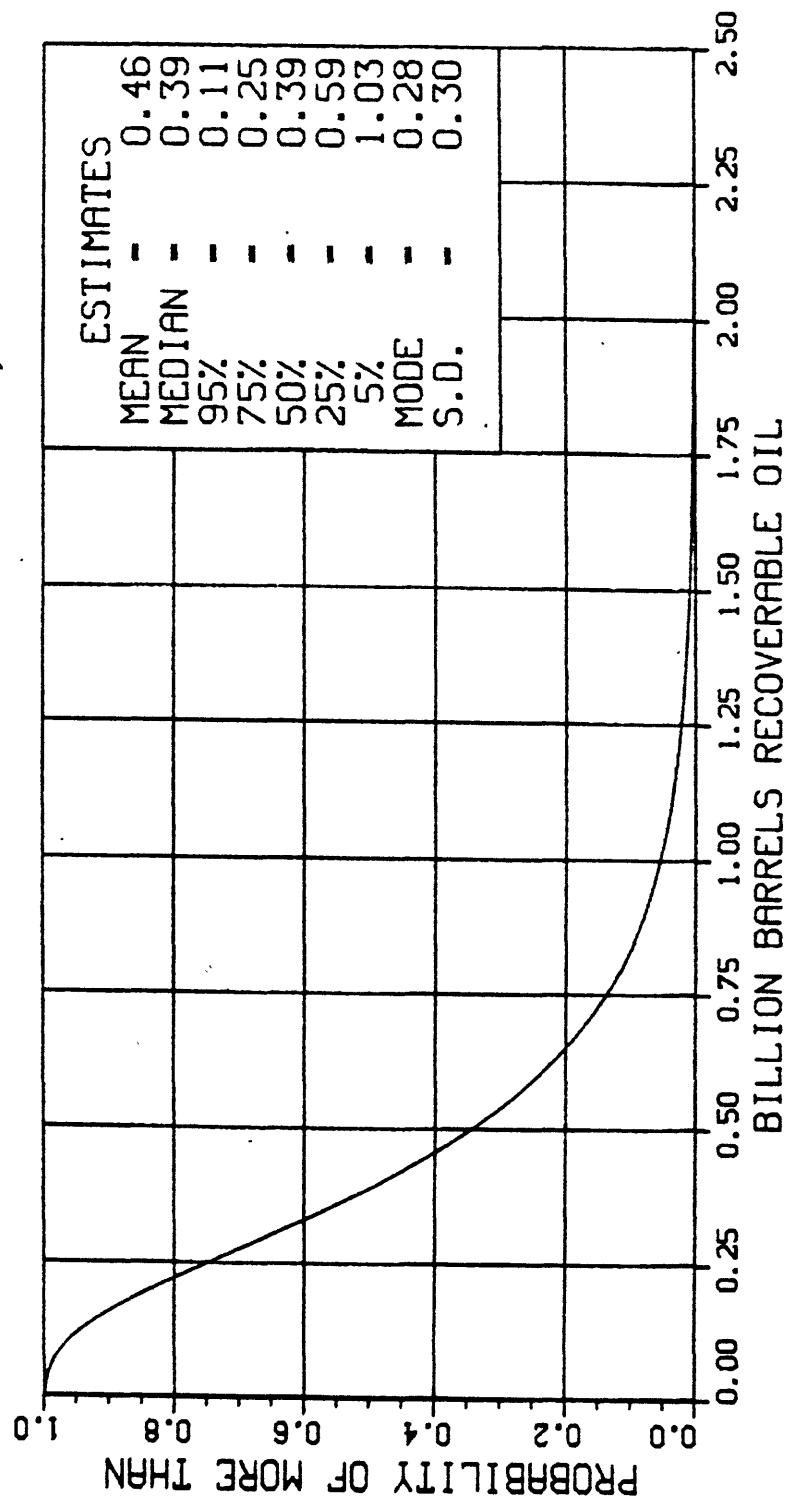


Figure 17.--Great artesian basin recoverable oil (Area VII).

Figure 18. (area 7) AUSTRALIA, GREAT ARTESIAN BASIN  
RECOVERABLE TOTAL GAS ASSESSMENT DATE : DEC 9, 1982

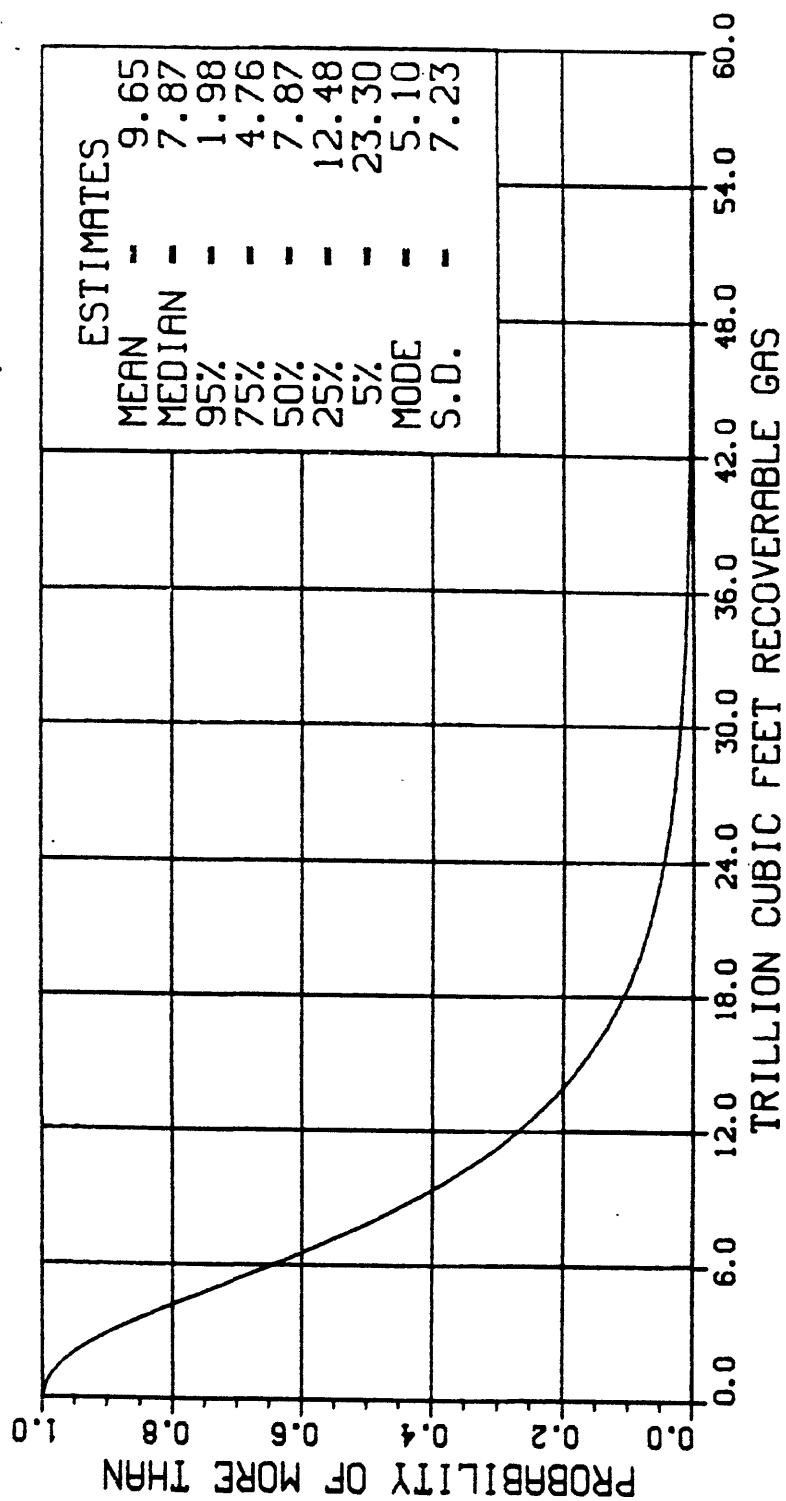


Figure 18.--Great artesian basin recoverable total gas (Area VII).

Table 2.--Supplementary and comparative data supporting this resource assessment of Australia. <sup>1/</sup>

	Crude oil (BB)	Natural gas (Tcf)
1 - Cumulative production	1.65	2.62
2 - Identified reserves <sup>2/</sup>		
Demonstrated	1.62	17.77
Inferred	<u>0.28</u>	<u>14.60</u>
Total	1.90	32.37
3 - Ultimate recoverable resources		
Cumulative production	1.65	2.62
Identified reserves	1.90	32.37
Undiscovered resources (mean)	<u>6.68</u>	<u>93.60</u>
Total	10.23	128.59
		BBOE 21.40

Total oil and gas = 32 BBOE

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<sup>1/</sup> Cumulative production and reserves are from Australian Bureau of Mineral Resources Petroleum Newsletter, N. 88, October 1 to December 31, 1981.

<sup>2/</sup> Follows terminology outlined in USGS Circular 860.

Demonstrated is equivalent to API Proved plus Indicated Additional.  
Inferred represents anticipated reserves growth in existing fields.

## COMMENTS

- Assessment does not include Precambrian basins shown in figures 2 and 3. Until quite recently, the Precambrian sediments were thought to have little or no potential for hydrocarbons, but shows in these beds in several areas in Australia led to the inclusion by Forman of Precambrian basins on his map (1982). It is believed that the amount of oil or gas involved is insignificant compared to that found in younger beds.
- The outer limit of offshore basins was defined as the 2,500-meter water depth for these assessments.
- Exploration wells have been drilled in all Phanerozoic basins (fig. 2) except the Queensland and Townsville troughs in Area V, East Coastal basins.
- Commercial discoveries of oil and/or gas have been found in all assessment areas except IV - North Coastal basins and V - East Coastal basins.
- An oil discovery on the northwest shelf of Australia (Area III) was announced after the completion of this assessment. The discovery well Jabiru 1A lies in 120 m (394 ft) of water at a location in the Timor Sea about 640 km (400 mi) west of Darwin and 300 km (185 mi) from the nearest coast. The well set a record for oil flow in an Australian exploratory well. Flow tests from a 57-meter (187-ft) interval of Jurassic sandstone at 1608 m (5275 ft) produced 41° API oil at rates in excess of 7000 b/day. Continued high well-head pressure indicates good reservoir conditions, and present field-size estimate is 200 million plus barrels of recoverable oil.
- The Jabiru 1A is particularly important in proving the presence of a potential oil-producing Jurassic section in the area. Seismic work has indicated a number of other structures within the general area that should have stratigraphic sections similar to Jabiru and that are now considered to have oil potential. In determining the estimates of the amounts of undiscovered oil and gas in Australia, the northwest shelf was considered to be one of the most potential areas of the country, and the discovery of Jurassic oil at Jabiru tends to confirm this thinking. The range of estimates for the northwest shelf, from .48 billion barrels (95 percent) to 5.11 billion barrels (5 percent) still appears reasonable and will accommodate this successful play.