

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Assessment of conventionally recoverable petroleum resources
of Persian Gulf basin and Zagros Fold Belt
(Arabian-Iranian basin)

by

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

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PREFACE

The following preliminary report is a product of the World Energy Resources Program of the U.S. Geological Survey (USGS). The program is designed to prepare geologically based resource assessments of the potential petroleum basins of the world. Initial investigations of the program focus on the major petroleum-producing regions of the world with the objective of acquiring a critical, unbiased perspective on the resource potential of a field, a basin, and ultimately a country as a whole. In selected areas, follow-on studies to analyze production potential are conducted by U.S. Department of Energy (DOE) petroleum engineers, and the combined results are incorporated in a report for the Foreign Energy Supply Assessment Program (FESAP) of the DOE and the USGS. This USGS Open-File Report includes only the preliminary assessment and some minimal backup data and comments relative to the assessment.

INTRODUCTION

The location of the Arabian-Iranian basin is shown in figure 1. Unconditional estimates by the USGS of oil and gas resources in this basin are given in table 1 and figures 2 and 3. Data supporting these estimates are supplied in table 2.

Assessment region	
Area in mi ²	730,000
Vol. of sed. in mi ³	1,700,000

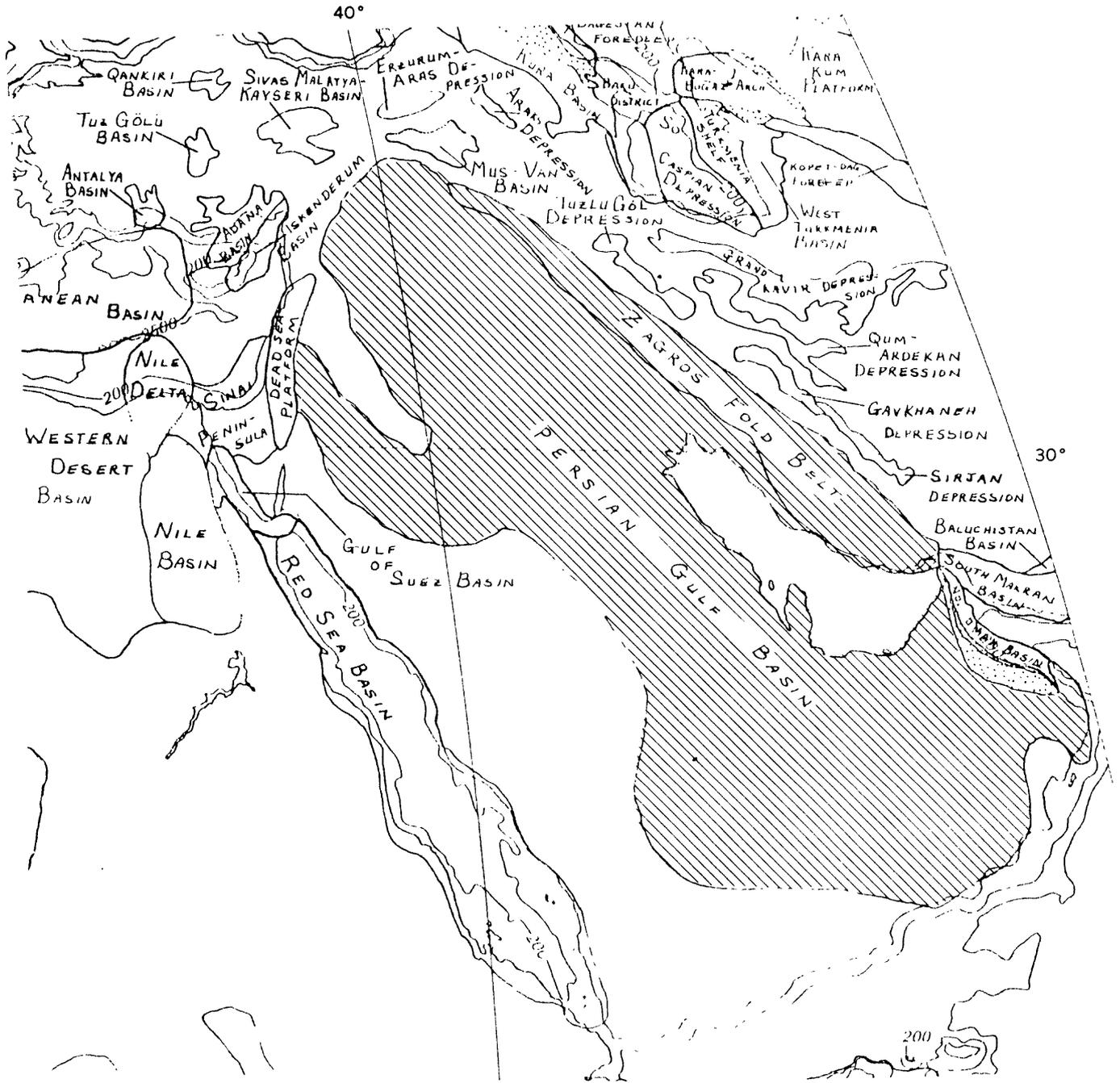


Figure 1.--Location of Arabian-Iranian basin assessment, including Persian Gulf basin and Zagros Fold Belt.

From: Map of Prospective Hydrocarbon Provinces of the World, 1978, U.S. Geological Survey Miscellaneous Field Studies Map MF 1044-B.

Explanation

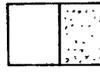
-  Areas containing known oil or gas deposits or which are favorable for their occurrence
-  Subbasin associated with large depocenter
-  Unlabeled and stippled areas judged to be nonprospective for hydrocarbons
-  Scale--25,000 square miles (65,000 square kilometers)

Table 1.--Assessment of conventionally recoverable petroleum resources of the Persian Gulf basin and Zagros Fold Belt (Arabian-Iranian Basin)

Unconditional resource assessment by USGS as of 4/1/81; see also figures 2 and 3

Probability of occurrence in %	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 cuft/bbl.		
	<u>95%</u>	<u>5%</u>	<u>Mean</u>	<u>95%</u>	<u>5%</u>	<u>Mean</u>
Estimate	72	337	174	Tcf 299	1,792	849
				BBOE 50	299	142

Distribution by country of undiscovered recoverable petroleum resources in Persian Gulf Basin and Zagros Fold Belt^{1/}

	Crude Oil (BB)	Natural Gas (TCF)
Saudi Arabia (SA)	57	201
Iran (In)	26	560
Iraq (Iq)	78	31
UAE (U)	7	38
Kuwait (K)	4	11
Oman (On)	2	8
Qatar (Q) ^{2/}	< 1	< 1
Bahrein (B)	$\frac{0}{174}$	$\frac{0}{849}$

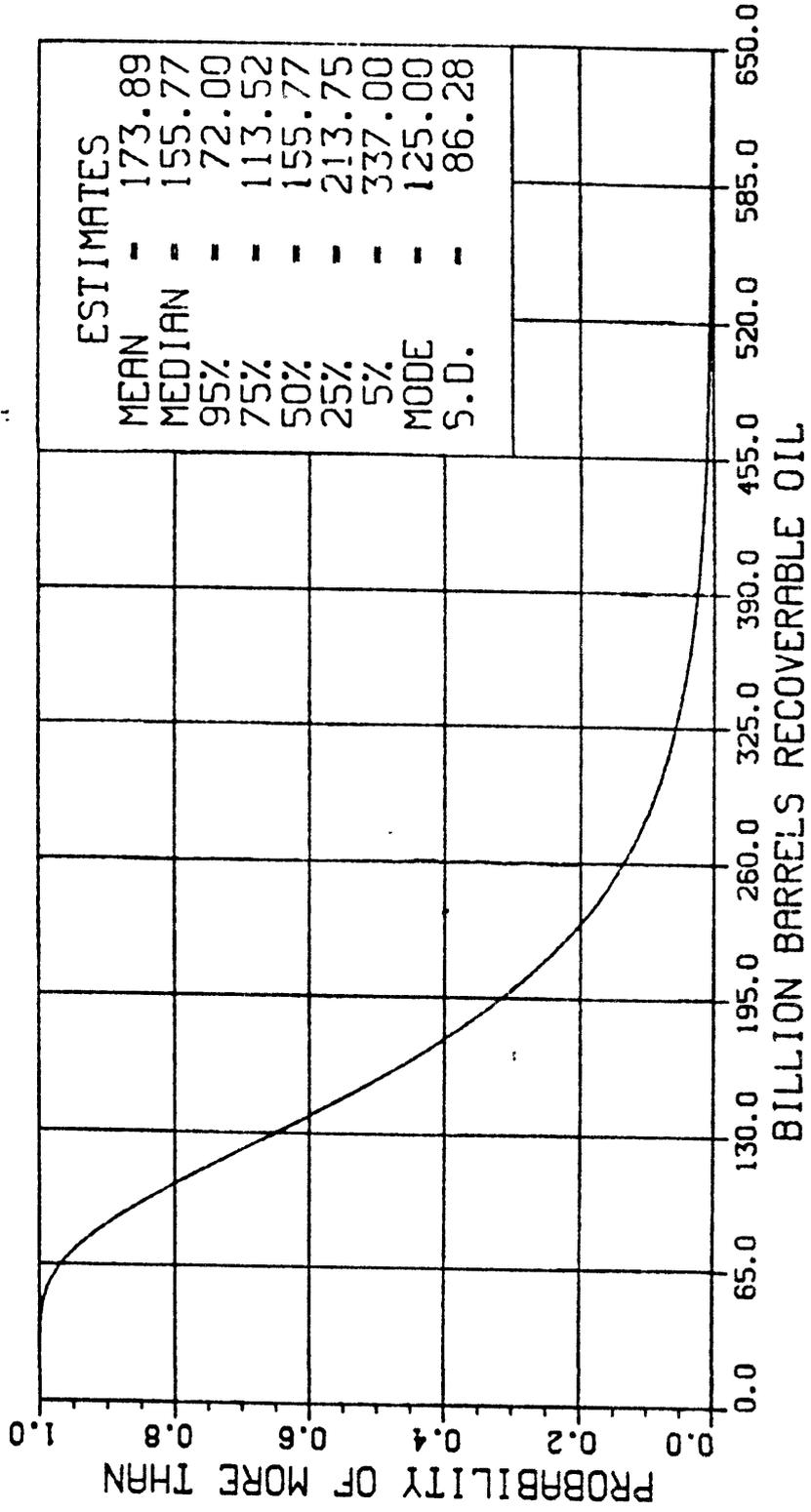
^{1/} Neutral Zone (NZ) potential of 2.2 BB of oil and 17 Tcf of gas is equally divided between Kuwait and Saudi Arabia.

^{2/} Not included in totals.

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Figure 2.- ARABIAN IRANIAN BASIN RECOVERABLE OIL

Assessment Date 4/1/81



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Figure 3.- ARABIAN IRANIAN BASIN RECOVERABLE GAS

Assessment Date 4/1/81

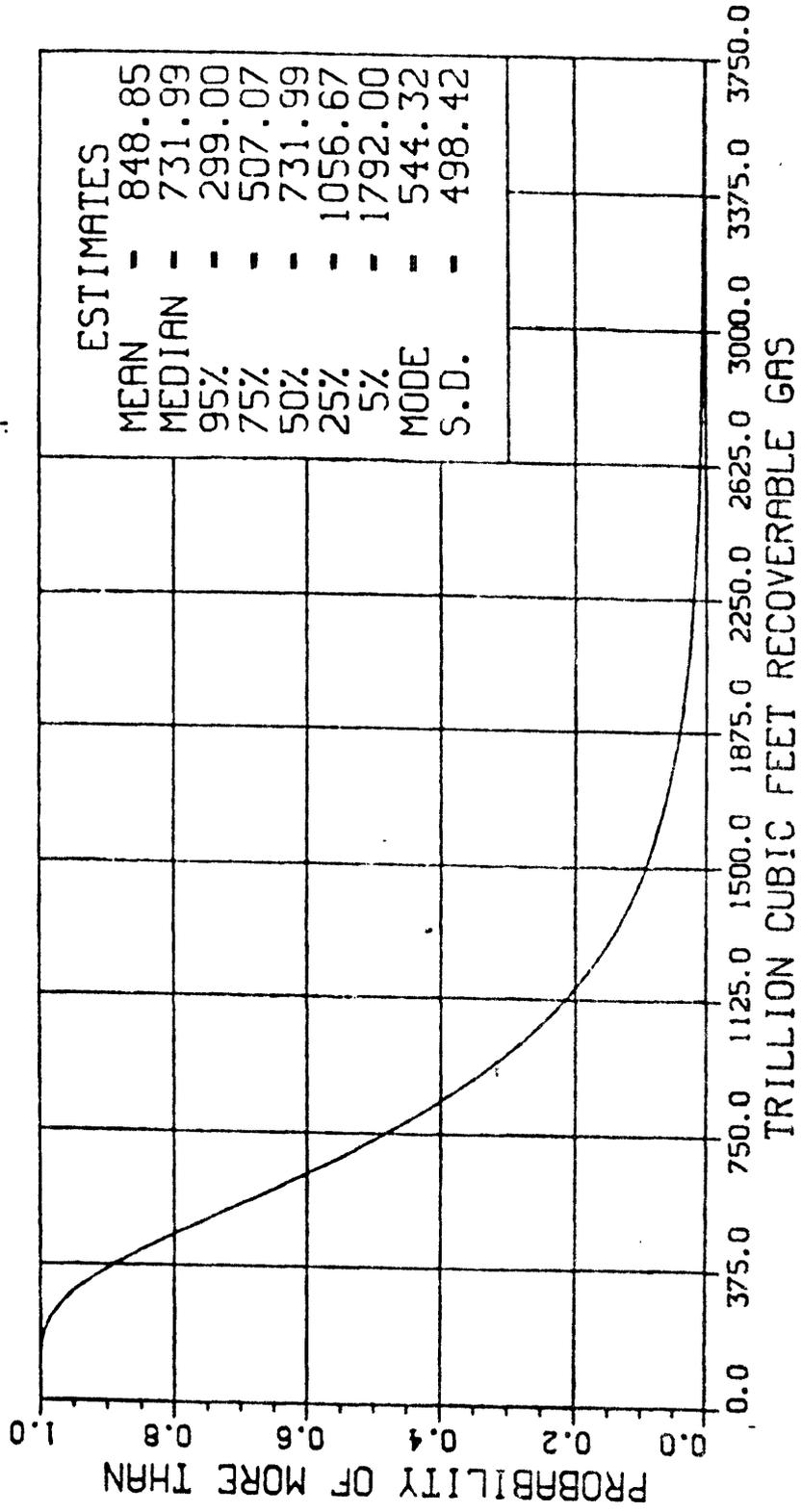


Table 2.--Supplementary and comparative data supporting this resource assessment of the Persian Gulf basin and Zagros Fold Belt^{1/}

<u>Crude Oil</u>		<u>Natural Gas</u>
(BB)		(Tcf)
Cumulative Production		
102-108		+ ^{2/}
Identified Reserves ^{3/}		
Demonstrated	356	517
Inferred	<u>59</u>	<u>563</u>
	<u>415</u>	1,080
		BBOE 180
Original Recoverable Resources (ultimate) of the Basin		
	<u>Oil</u>	<u>Gas (BBOE)</u>
Cumulative Production	108	+ ^{2/}
Identified Reserves	415	1,080
Undiscovered Resources	<u>174</u>	<u>849</u>
	<u>697</u>	1,929+
		BBOE 322+
Total Oil and Gas		1,019+ BBOE

^{1/} Cumulative production and reserves are composited estimates from various sources.

^{2/} Quantity positive but data unavailable.

^{3/} Follows terminology outlined in USGS Circular 831. Demonstrated is equivalent to API Proved plus Indicated additional. Inferred represents anticipated reserves growth in existing fields.

COMMENTS

- Assessment does not cover those parts of a country not included in the Persian Gulf basin - Zagros Fold Belt (or Arabian-Iranian basin).
- Reserve estimates are quite approximate owing to underdevelopment of fields, marked fluctuations in official estimates in recent years, and major differences of opinion on recoverability. Inferred reserves are estimated by assuming that the high side of published reserve estimates includes potential field growth.
- Large structures so dominate the pattern of oil occurrence that our lack of knowledge of existing structures and their tests seriously challenge the assessment. The entire area will require continued surveillance to maintain credible assessments.
- Many areas have single wells now plugged but tested at several thousand barrels per day.
- Major potential regions are in areas of presumed minimal exploration, S.W. Iraq, Rub al-Khali, N.W. Iran, S.E. Iran.
- Gas resources have scarcely been tested in the Middle East. The inferred estimate likely does not accommodate for all the potential, but it does emphasize a category of reserves that must be accounted for.
- Potential for inferred gas and oil on major structures is huge.
- Overall basin volumetrics excluded nonmarine facies of the west Rub al Khali.