

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Assessment of undiscovered conventionally recoverable petroleum resources
of the Middle Caspian basin, U.S.S.R.

by

Gregory F. Ulmishek and Wyman Harrison
U.S. Department of Energy
Argonne National Laboratory
Argonne, Illinois 60439

Open-File Report 82-296

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

1982

Assessment of undiscovered conventionally recoverable petroleum resources
of the Middle Caspian basin, U.S.S.R.

by

Gregory F. Ulmishek and Wyman Harrison
U.S. Department of Energy
Argonne National Laboratory
Argonne, Illinois 60439

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 remaining within the petroleum producing province. 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 publications relating to the assessment of undiscovered conventionally recoverable petroleum resources include the following:

Open-File Reports	81-986 - Persian Gulf 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 Siberia and Kara Sea basins

ACKNOWLEDGEMENTS

The resource assessment for this report was prepared in collaboration with the Resource Appraisal Group of the Branch of Oil and Gas Resources. The geologic investigation leading to the assessment was conducted by Gregory F. Ulmishek and Wyman Harrison, under contract to the U.S. Geological Survey.

INTRODUCTION

The location of the Middle Caspian basin and its fields is shown in figures 1 and 2. Estimates by the USGS of oil and gas resources in this basin are given in table 1 and figures 3 and 4. Data supplementary to these estimates are supplied in table 2.

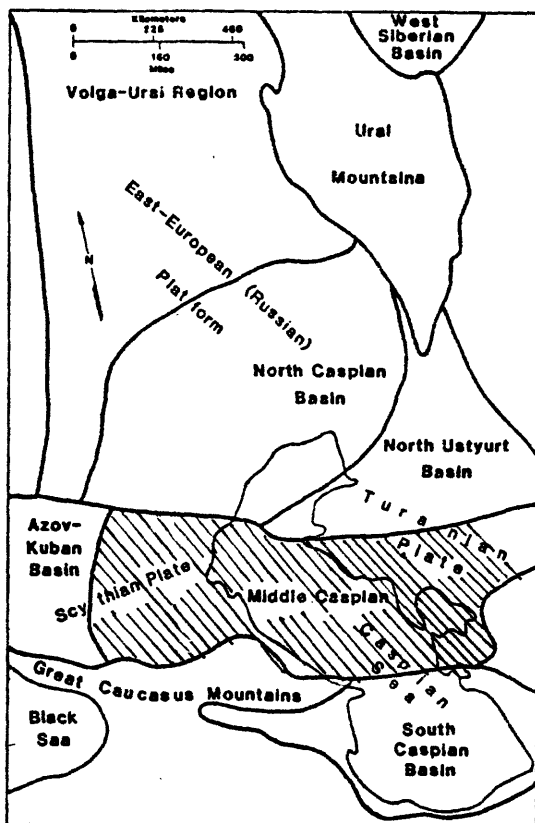


Figure 1.--Location map of Middle Caspian basin assessment region



Assessment region

Area in $\text{mi}^2 = 140,000$

Volume of sediments
in $\text{mi}^3 = 370,000$

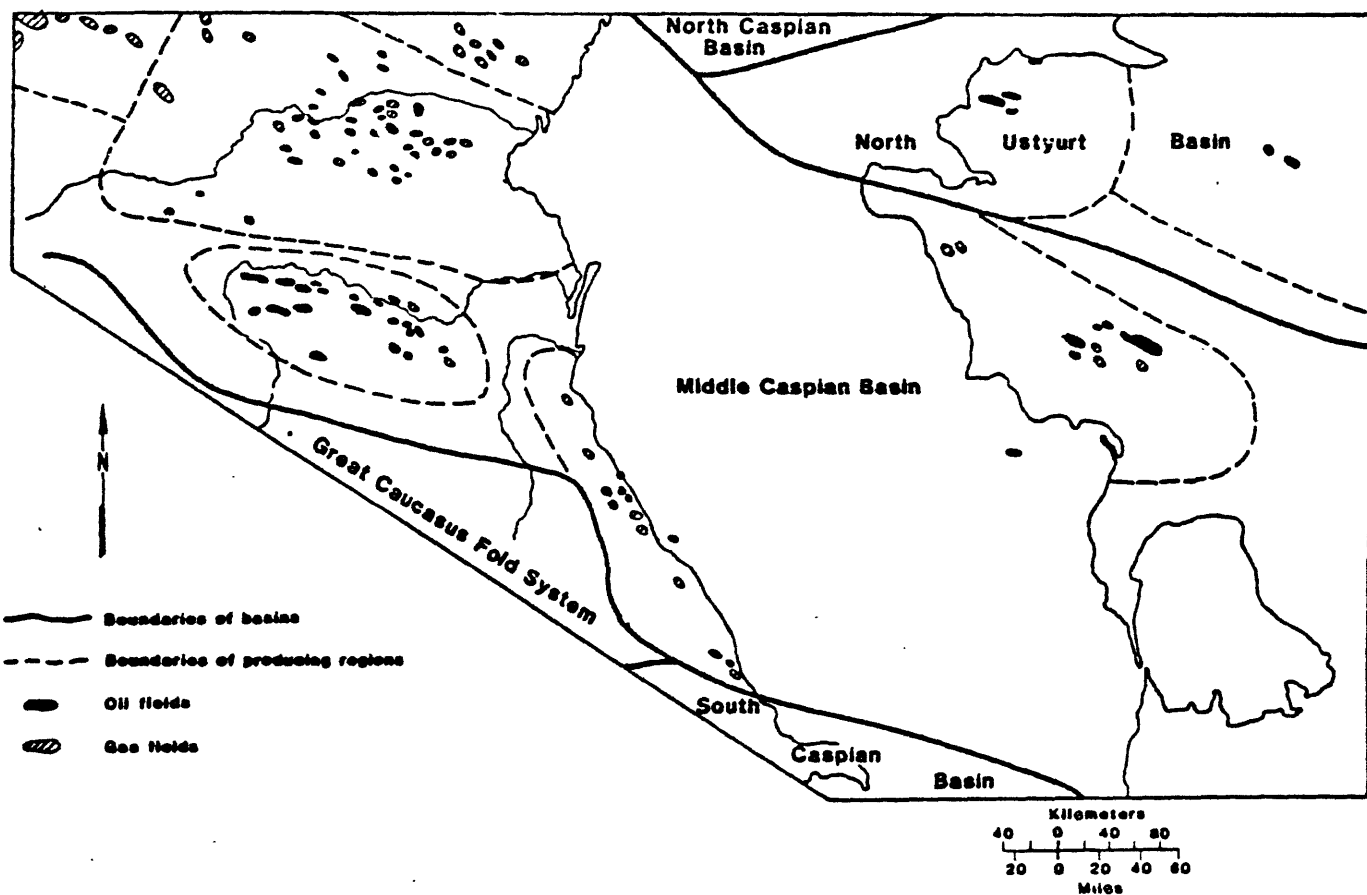


Figure 2.--Petroleum producing regions of the Middle Caspian basin and part of the adjacent North Ustyurt basin.

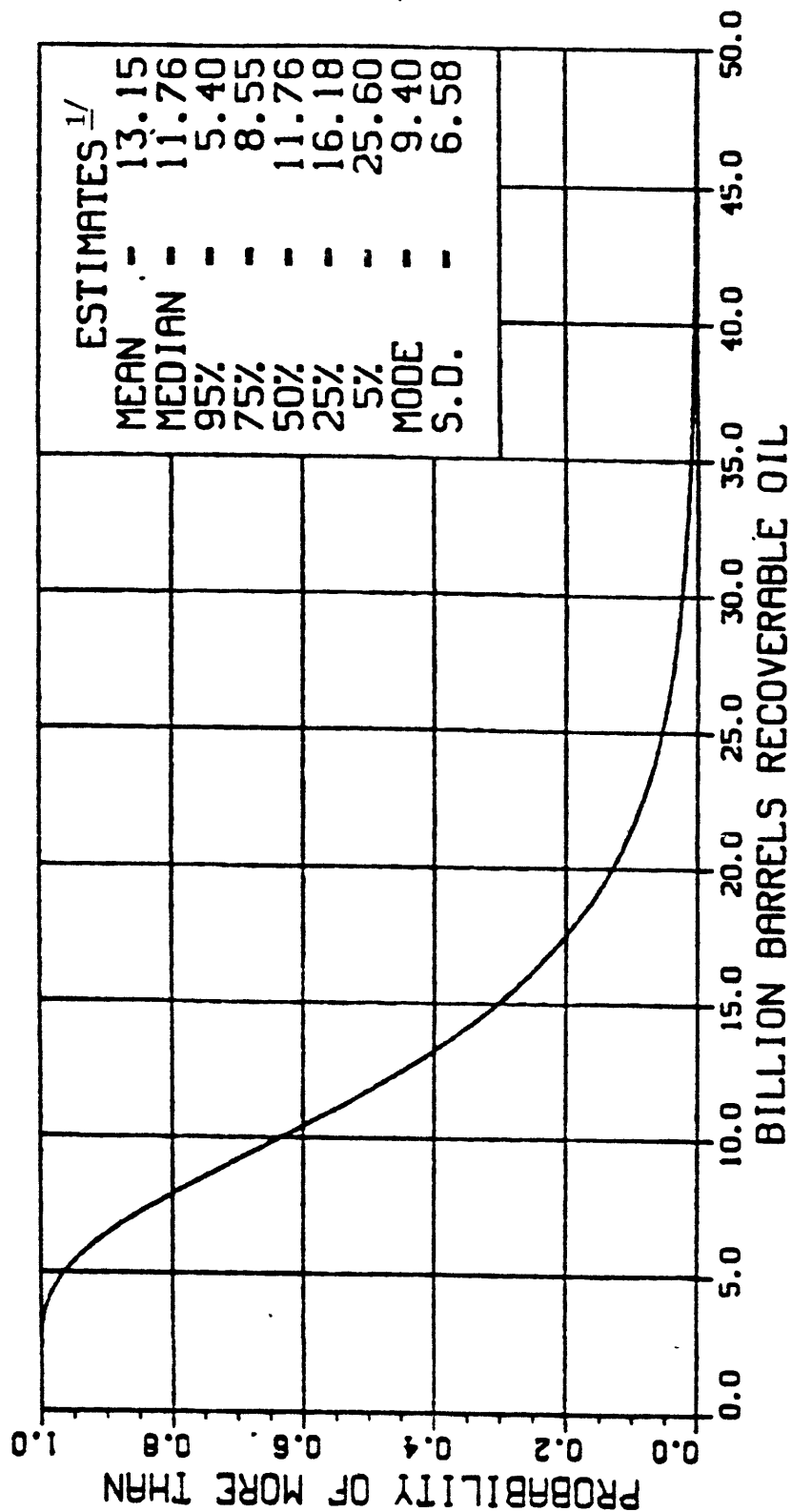
Table 1.--Assessment of undiscovered conventionally recoverable petroleum resources of the Middle Caspian basin, U.S.S.R.

Resource assessment by USGS as of 11/3/81; see also figures 2 and 3.

	Crude Oil in Billions of Barrels (BB)				Natural Gas in Trillions of Cubic Feet (Tcf) and Billions of Barrels of Oil Equiv- alent (BBOE) @ 6,000 cu ft/bbl.		
	<u>Low</u> F ₉₅ <u>1/</u>	<u>High</u> F ₅ <u>1/</u>	<u>Mean</u>		<u>Low</u> F ₉₅ <u>1/</u>	<u>High</u> F ₅ <u>1/</u>	<u>Mean</u>
=====							
Estimate	5.4	25.6	13.2	Tcf	25.5	123.0	62.8
				BBOE	4.2	20.5	10.5

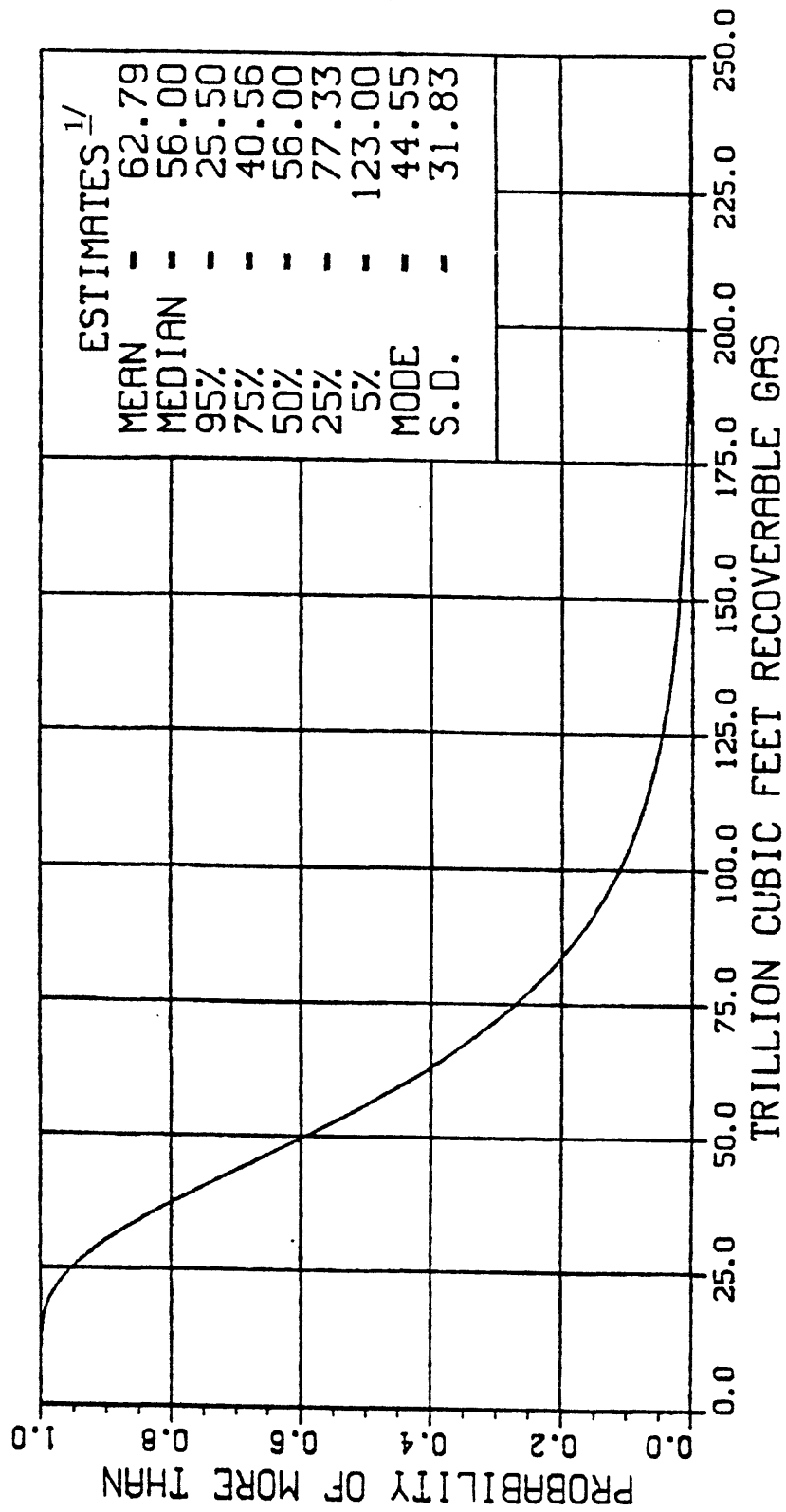
^{1/} F₉₅ denotes the 95th fractile; the probability of more than the amount F₉₅ is 95 percent. F₅ is defined similarly.

Figure 3.--Middle Caspian basin undiscovered recoverable oil. Assessment date - 11/3/81



^{1/} The numbers of significant figures reflect the precision of the statistical process rather than the accuracy of the estimate.

Figure 4.--Middle Caspian basin undiscovered recoverable total gas. Assessment date - 11/3/81



^{1/} The numbers of significant figures reflect the precision of the statistical process rather than the accuracy of the estimate.

Table 2.--Supplementary and comparative data supporting this resource assessment of the Middle Caspian basin, U.S.S.R.^{1/}

<u>Crude Oil</u> (BB)		<u>Natural Gas</u> (Tcf)	
Cumulative production to 1/1/81		Cumulative production to 1/1/81	
5.8		8.0	
Identified reserves to 1/1/81 ^{2/}		Identified reserves to 1/1/81	
Demonstrated	7.5	Demonstrated	6.0
Inferred	+ <u>3/</u>	Inferred	+ <u>3/</u>
Original recoverable resources (ultimate) in BBOE			
Cumulative	5.8		8.0
Identified reserves	7.5		6.0
Undiscovered			
resources (mean)	<u>13.2</u>		<u>62.8</u>
	26.5+		76.8+

BBOE = 12.8

Total oil and gas - 39.3+BBOE

Basin richness

<u>Original resources</u>	39.3 BBOE
Basin volume	370,000 mi ³

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

^{2/} Follows terminology outlined in USGS Circular 831. Demonstrated is equivalent to API Proved and Indicated Additional. Inferred represents anticipated field growth in existing fields.

^{3/} Quantity positive but data not available.

COMMENTS

- o Cumulative production and reserve estimates are approximate.
- o The major portion of the undiscovered resources is expected offshore where as yet only a few wells have been drilled. The discovery of giant fields offshore, and in some areas onshore, seems highly probable. An important discovery made recently in the Terek-Sunzha area supports this point of view.
- o In most areas, inferred reserves are probably small by comparison with identified reserves.
- o In the east-central Caspian Sea we anticipate that most oil and gas will be derived from Jurassic and Cretaceous rocks as well as from middle Miocene formations. The Triassic is prospective but is not expected to be significant due to the sporadic distribution of reservoir rocks and seals.
- o The major portion of undiscovered resources onshore, and a significant portion offshore, are associated with formations occurring deeper than 15,000 to 16,000 feet.
- o Although the relationship between oil and gas in discovered reserves indicates that the Middle Caspian is clearly an oil-prone basin, it is supposed that, owing to increasing depths of occurrence, the share of gas in undiscovered resources will be much larger than in discovered reserves.
- o Resource assessment does not include two plays with uncertain prospects: fore ranges of the Great Caucasus Mountains and the upper part of the folded but only slightly-metamorphosed basement.
- o About one-half of the discovered reserves are represented by highly paraffinic oils; this significantly complicates development of the fields. This type of occurrence is expected to continue in the future.