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Terek-Sunzha Subsalt Jurassic Assessment Unit 11090102

Geologic Summary

Detailed map of this assessment unit

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USGS PROVINCE: Middle Caspian Basin (1109) **GEOLOGIST:** G.F. Ulmishek

TOTAL PETROLEUM SYSTEM: Terek-Caspian (110901)

ASSESSMENT UNIT: Terek-Sunzha Subsalt Jurassic (11090102)

DESCRIPTION: This frontier assessment unit covers the western Cis-Caucasus foredeep (Terek-Sunzha area) and a part of adjacent foreland and stratigraphically includes Jurassic rocks underlying Kimmeridgian-Tithonian evaporite formation. The pinch-out zone of the salt defines the unit boundary. Only one gas discovery on the southern margin of the unit has been made.

SOURCE ROCKS: On analogy with the Amu-Darya basin (province 1154) source rocks are expected in both Upper Jurassic carbonate and Lower-Middle Jurassic sections.

MATURATION: Potential source rocks occur deep and are probably in the gas window.

MIGRATION: Mainly vertical migration is feasible.

RESERVOIR ROCKS: Potential reservoir rocks are Upper Jurassic carbonates underlying the salt formation. The analogy with the Amu-Darya basin suggests the potential for reef reservoirs on salt basin margins. The presence of reservoir rocks among Lower-Middle Jurassic clastics at great depths is improbable.

TRAPS: Seismic resolution is insufficient for structural mapping. High-amplitude thrust folds of the Terek-Sunzha zone are not traced downward across the detachment surface that is apparently located in salt. However, the presence of gentler structures related to compression from the Caucasus is probable. Reefs may present another trap type.

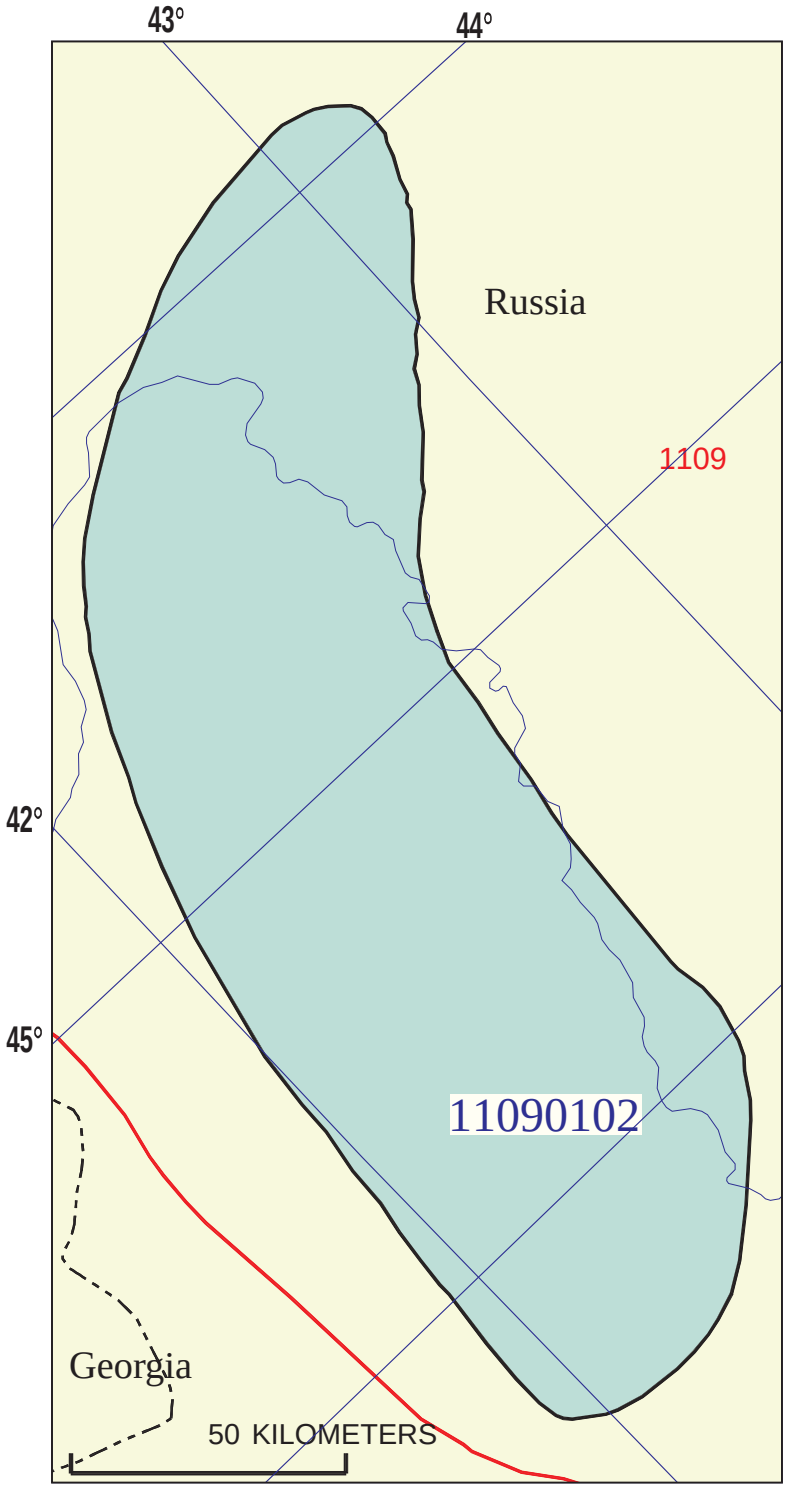
SEALS: The Kimmeridgian-Tithonian salt formation hundreds of meters thick is undeformed and presents a perfect regional seal.

MAIN REFERENCES:

Kosarev, V.S., 1982, Petroleum potential of Upper Jurassic rocks of the western Terek-Caspian depression: Geologiya Nefti I Gaza, no. 2, p. 17-23.

Sobornov, K.O., 1995, Geologic framework of the petroleum productive thrust belt of eastern Caucasus: Geologiya Nefti I Gaza, no. 10, p. 16-21.

Ulmishek, G.F., 1999, Petroleum geology and resources of the Middle Caspian basin (South Mangyshlak, Terek-Caspian, and Stavropol-Prikumsk petroleum systems): U.S. Geological Survey Open-File Report 99-50-B, 37 pages, 19 figures.



Terek-Sunzha Subsalt Jurassic Assessment Unit - 11090102

EXPLANATION

- Hydrography
- Shoreline
- 1109 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 11090102 Assessment unit code and boundary

Projection: Equidistant Conic. Central meridian: 100. Standard Parallel: 58 30

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

Date:……..	7/13/98		
Assessment Geologist:……..	G.F. Ulmishek		
Region:……..	Former Soviet Union	Number:	1
Province:……..	Middle Caspian Basin	Number:	1109
Priority or Boutique……	Priority		
Total Petroleum System:……	Terek-Caspian	Number:	110901
Assessment Unit:……..	Terek-Sunzha Subsalt Jurassic	Number:	11090102
* Notes from Assessor			

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum field size?……. 20 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: 0 Gas: 0

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

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

Median size (grown) of discovered gas fields (bcfg):
1st 3rd _____ 2nd 3rd _____ 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……	0.85
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):…….. 0.85

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)	2	median no.	5	max no.	12
Gas fields:……min. no. (>0)	12	median no.	20	max no.	35

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	20	median size	50	max. size	400
Gas in gas fields (bcfg):…… min. size	120	median size	400	max. size	6000

Assessment Unit (name, no.)
Terek-Sunzha Subsalt Jurassic, 11090102

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	3000	5000	7000
NGL/gas ratio (bngl/mmcfg)……	50	60	70

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	40	60	80
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)……	35	42	48
Sulfur content of oil (%)……	2	4	6
Drilling Depth (m) ……	3800	5000	6000
Depth (m) of water (if applicable)……	0	0	0

Gas Fields:	minimum	median	maximum
Inert gas content (%)……			
CO_2 content (%)……	2	5	12
Hydrogen-sulfide content (%)……	3	7	20
Drilling Depth (m)……	3800	5000	6000
Depth (m) of water (if applicable)……	0	0	0

Assessment Unit (name, no.)
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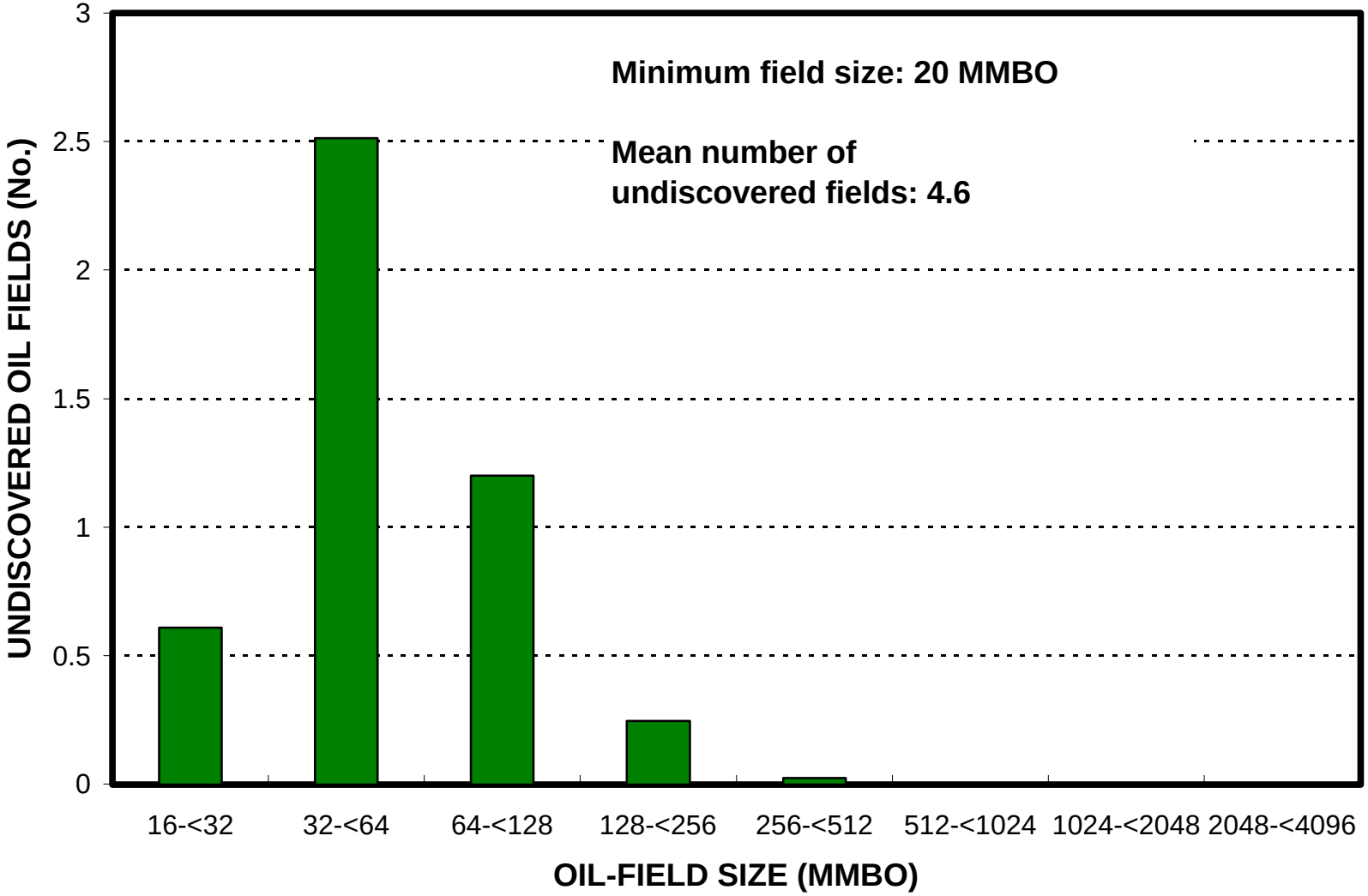
ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT TO COUNTRIES OR OTHER LAND PARCELS (uncertainty of fixed but unknown values)

1. Russia 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%)……		0	

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%)……		0	

Terek-Sunzha Subsalt Jurassic, AU 11090102
Undiscovered Field-Size Distribution



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Undiscovered Field-Size Distribution