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East and Southeast Margins Subsalt Assessment Unit 10160103

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North Caspian Basin Geologic Province 1016

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- Detailed Assessment Results
- Undiscovered Field-Size Distributions

USGS PROVINCE: North Caspian Basin (1016) **GEOLOGIST:** G.F. Ulmishek

TOTAL PETROLEUM SYSTEM: Paleozoic North Caspian (101601)

ASSESSMENT UNIT: East and Southeast Margins Subsalt (10160103)

DESCRIPTION: The assessment unit includes subsalt carbonate and clastic reservoirs basinward from the Ural foldbelt and South Emba high and basin slope deposits to a depth of 7 km to the top of subsalt rocks. The stratigraphy somewhat varies along the margin, but the Serpukhovian-Moscovian carbonate formation is regionally present and contains the majority of discovered hydrocarbons.

SOURCE ROCKS: Source rocks are probably off-reef basinal black-shale facies contemporaneous with the pinnacle and barrier reefs and the back-reef carbonate platform. Geochemical characteristics of the source rocks are poorly known because of their deep occurrence.

MATURATION: Maturation mainly took place in Late Permian-Triassic time, during deposition of thick Hercynian orogenic clastics. Presently, source rocks probably occur in the lower part of oil window and in the gas window.

MIGRATION: Hydrocarbons migrated laterally from source rocks into the adjacent traps in organic-lean, shallow-water carbonate and clastic rocks of the basin margin.

RESERVOIR ROCKS: Main reservoir rocks are Serpukhovian-Moscovian carbonates of the back-reef platform and the platform-edge barrier reef. Only small amounts of hydrocarbons have been found in Visean and Lower Permian clastic reservoir rocks that possess significantly poorer reservoir properties than the carbonates.

TRAPS: Most of discovered oil and gas are in anticlinal traps formed by Hercynian compression from the Ural foldbelt. The presence of traps formed only by reef growth without a tectonic component is supposed, but has not been clearly demonstrated.

SEAL: Thick Kungurian salt forms the regional seal. This seal is separated from productive carbonate reservoirs by Upper Carboniferous-Lower Permian clastic rocks that directly cap the reservoirs.

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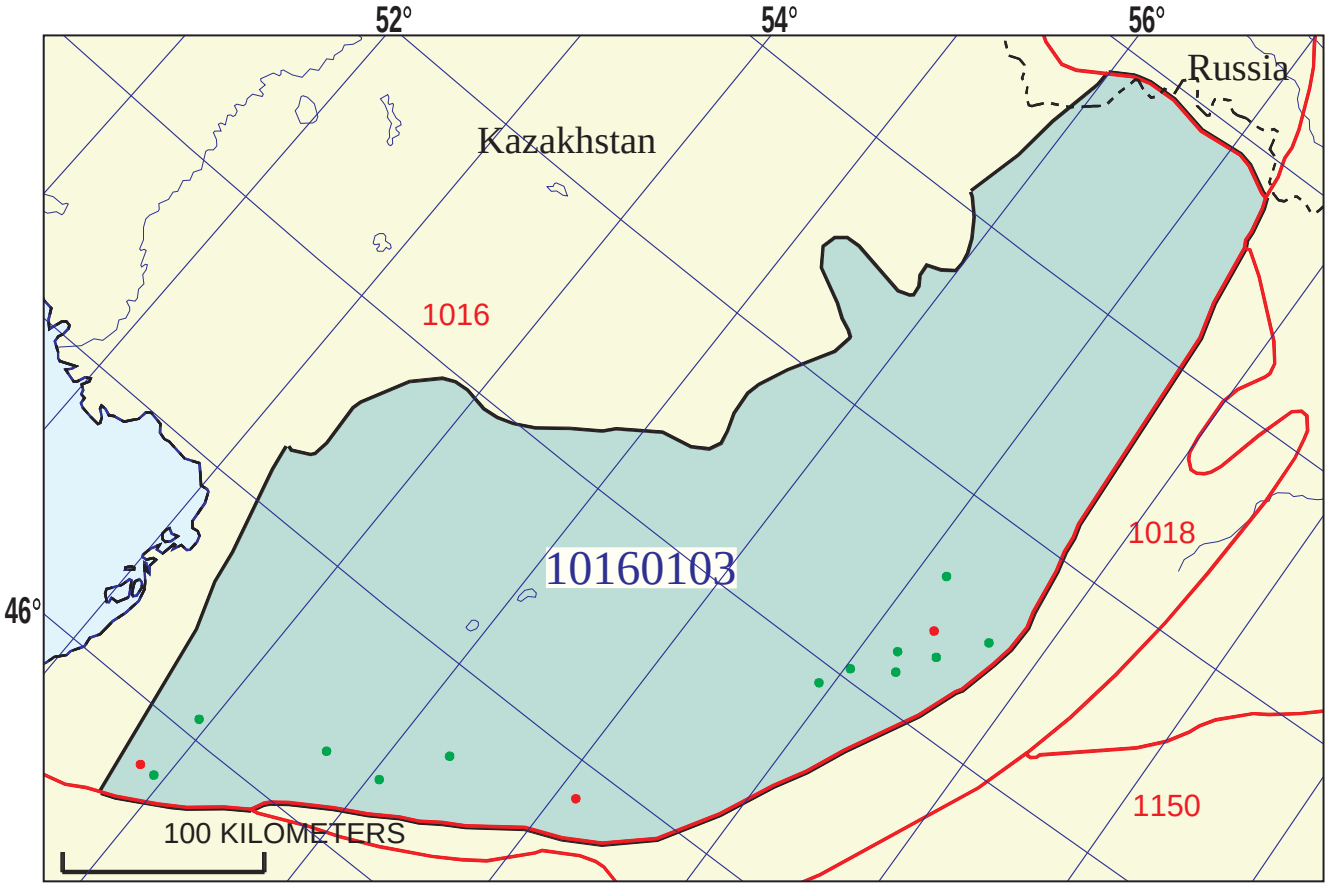

East ans Southeast Margins Subsalt Assessment Unit - 10160103

EXPLANATION

- Hydrography
- Shoreline
- 1016 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 10160103 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:……..	1/12/99		
Assessment Geologist:……..	G.F. Ulmishek		
Region:……..	Former Soviet Union	Number:	1
Province:……..	North Caspian Basin	Number:	1016
Priority or Boutique:……..	Priority		
Total Petroleum System:……	Paleozoic North Caspian	Number:	101601
Assessment Unit:……..	East and Southeast Margins Subsalt	Number:	10160103
* Notes from Assessor			

CHARACTERISTICS OF ASSESSMENT UNIT

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

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:…… Oil: 10 Gas: 2

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

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 25 2nd 3rd 20 3rd 3rd

Median size (grown) of discovered gas fields (bcfg):
1st 3rd NA 2nd 3rd NA 3rd 3rd NA

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)	10	median no.	40	max no.	80
Gas fields:……	min. no. (>0)	3	median no.	10	max no.	20

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	10	median size	25	max. size	1500
Gas in gas fields (bcfg):……	min. size	60	median size	120	max. size	5000

Assessment Unit (name, no.)
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AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	1500	2000	3000
NGL/gas ratio (bngl/mmcfg)……	30	60	90

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	35	50	65
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)……	30	40	50
Sulfur content of oil (%)……	0.5	0.8	1.1
Drilling Depth (m) ……	3000	4000	7000
Depth (m) of water (if applicable)……			

Gas Fields:	minimum	median	maximum
Inert gas content (%)……	0.5	1	2
CO_2 content (%)……	0.5	1	2
Hydrogen-sulfide content (%)……	1	2	4
Drilling Depth (m)……	3000	4000	6000
Depth (m) of water (if applicable)……			

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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. Kazakhstan 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	

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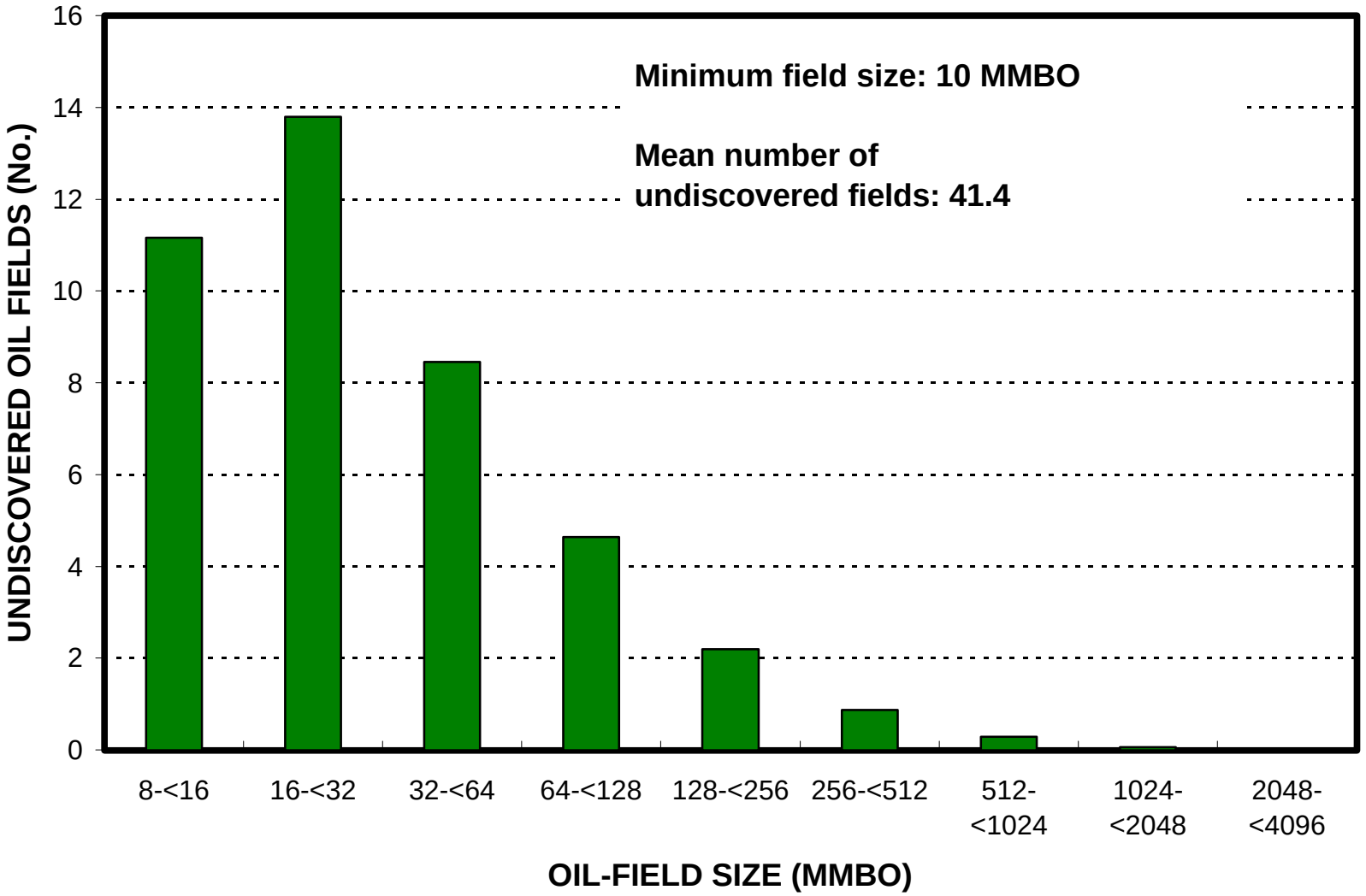
Undiscovered Field-Size Distribution



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Undiscovered Field-Size Distribution