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North and West Margins Subsalt Pinnacle Reefs Assessment Unit 10160101

North and West Margins Subsalt Pinnacle Reefs Assessment Unit 10160101

North Caspian Basin Geologic Province 1016

Geologic Summary

Detailed map of this assessment unit

Assessment Input Data

Assessment Results

- Assessment Unit Summary
- 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: North and West Margins Subsalt Pinnacle Reefs (10160101)

DESCRIPTION: The assessment unit includes prospects in pinnacle reefs and atolls along the northern and western basin margins. Only one such reef has been discovered in the unit, but it contains the giant Karachaganak gas condensate field. The prospects occur at great depths and are difficult to identify and map by seismic surveys.

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: Apparently hydrocarbons migrated laterally from source rocks into the adjacent barrier and pinnacle reefs.

RESERVOIR ROCKS: Reservoir rocks are various reef carbonates such as fore-reef, reef-core, lagoonal, and other interconnected facies. The complexity of facies and diagenetic history produced strong variations of reservoir properties.

TRAPS: Pinnacle reefs form high capacity traps.

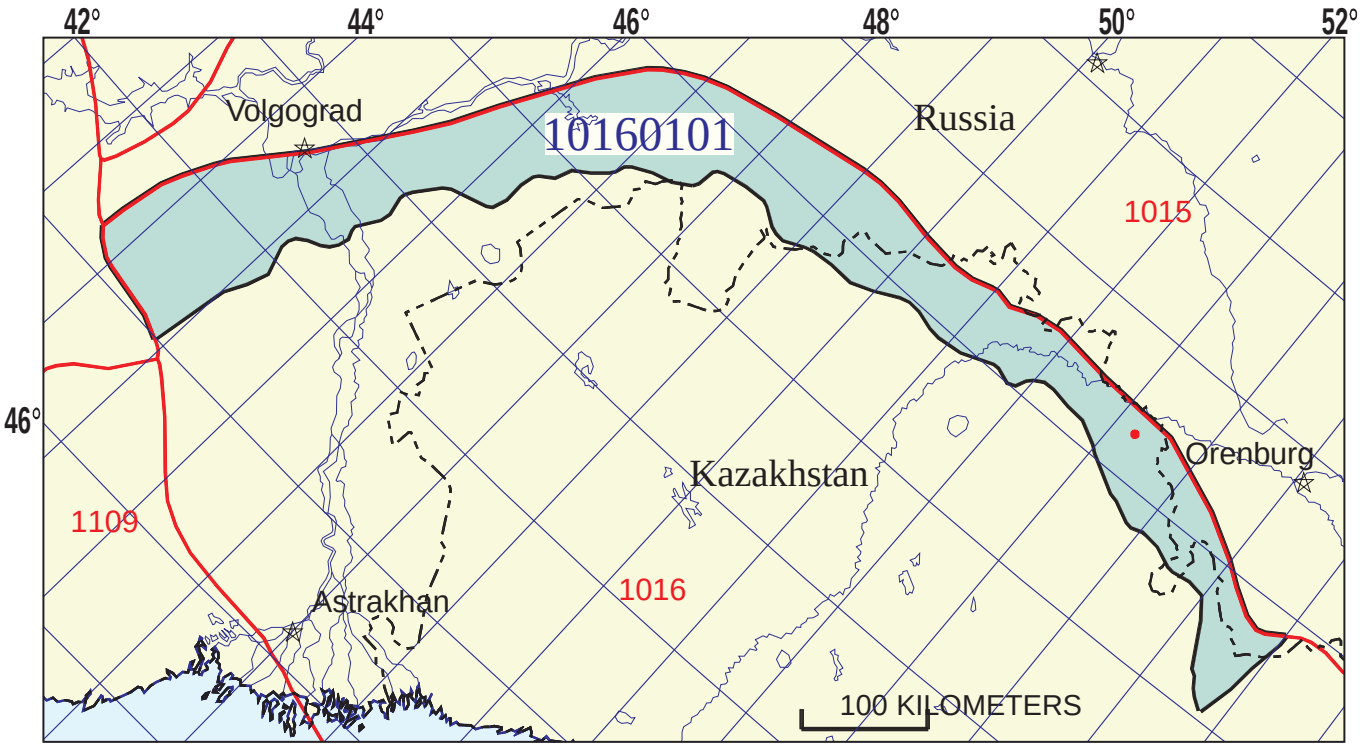
SEAL: Thick Kungurian salt forms the regional seal that directly caps the reservoirs.

REFERENCES:

Shershukov, I.V., 1986, Dependence of reservoir properties of porous carbonate rocks on depositional facies in the Karachaganak field: Sovetskaya Geologiya, no. 12, p. 39-41.

Solovyev, B.A., 1992, Stages of evolution and petroleum productivity of the sedimentary cover of the North Caspian basin: Geologiya Nefti i Gaza, no. 8, p. 13-18.

Solovyev, B.A., Nemtsov, N.I., Shaydakov, V.A., Filin, S.I., and Bembeev, V.E., 1992, Exploration potential of the Karasal monocline in the North Caspian basin: Geologiya Nefti i Gaza, no. 3, p. 8-11.



North and West Margins Subsalt Pinnacle Reefs Assessment Unit - 10160101

EXPLANATION

- Hydrography
- Shoreline
- 1016 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 10160101 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:……..	North and West Margins Subsalt Pinnacle Reefs	Number:	10160101
* 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: 1

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
NA	NA	NA

Median size (grown) of discovered gas fields (bcfg):

1st 3rd	2nd 3rd	3rd 3rd
NA	NA	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)

	min. no. (>0)	median no.	max no.
Oil fields:……	2	8	15
Gas fields:……	2	8	15

Size of Undiscovered Fields: What are the anticipated sizes (**grown**) of the above fields?:
(variations in the sizes of undiscovered fields)

	min. size	median size	max. size
Oil in oil fields (mmbo)……	20	150	1200
Gas in gas fields (bcfg):……	120	2000	50000

Assessment Unit (name, no.)
North and West Margins Subsalt Pinnacle Reefs, 10160101

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	1000	2000	3000
NGL/gas ratio (bngl/mmcfg)……	30	60	90

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	20	55	100
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 (%)……	0.2	1	2
Drilling Depth (m) ……	5000	5800	7000
Depth (m) of water (if applicable)……			

Gas Fields:	minimum	median	maximum
Inert gas content (%)……	0	1	2
CO_2 content (%)……	1	5	10
Hydrogen-sulfide content (%)……	0.2	3	5
Drilling Depth (m)……	5000	5800	7000
Depth (m) of water (if applicable)……			

Assessment Unit (name, no.)
North and West Margins Subsalt Pinnacle Reefs, 10160101

ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT TO COUNTRIES OR OTHER LAND PARCELS (uncertainty of fixed but unknown values)

1. Kazakhstan represents 20 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		0	
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):…		40	
Portion of volume % that is offshore (0-100%)……		0	

2. Russia represents 80 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):…		60	
Portion of volume % that is offshore (0-100%)……		0	

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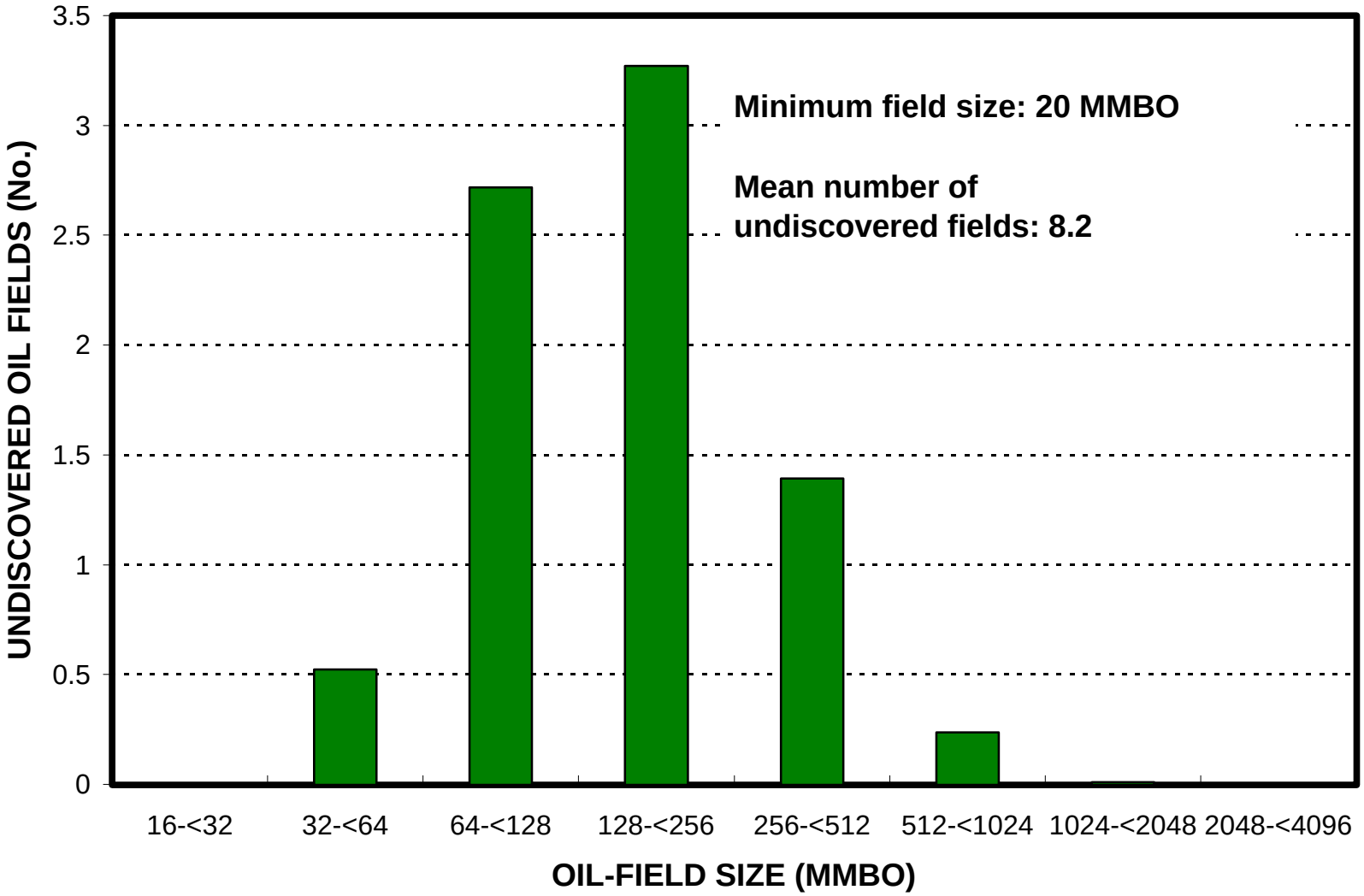
Undiscovered Field-Size Distribution



North and West Margins Subsalt Pinnacle Reefs, AU 10160101
Undiscovered Field-Size Distribution