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Northern and Western Areas Assessment Unit 11540101

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USGS PROVINCE: Amu-Darya Basin (1154) **GEOLOGIST:** G.F. Ulmishek

TOTAL PETROLEUM SYSTEM: Amu-Darya Jurassic-Cretaceous (115401)

ASSESSMENT UNIT: Northern and Western Areas (11540101)

DESCRIPTION: Unit encompasses Jurassic through Cenozoic rocks of several major structural units located north and west of the pinch-out zone of Upper Jurassic salt. Despite the structural and some stratigraphic diversity, the unit is characterized by the absence of high-quality regional seals and therefore possesses high vertical conductivity for migrating hydrocarbons. As a result, most fields contain multiple pools in different lithologies that range in age from Jurassic to Late Cretaceous.

SOURCE ROCKS: Most important source rocks are Lower-Middle Jurassic continental to marine coaly clastics (TOC as much as 2.5 percent) with some coals in the lower part. The source rock section is thin on marginal highs, but thickens to several hundred meters basinward.

MATURATION: The source rocks are in the gas window in inner areas of the basin and in the Kopet-Dag foredeep and are probably immature on the Karakum high and Bukhara step. Productivity of the latter areas should be related to updip vertical migration of gas.

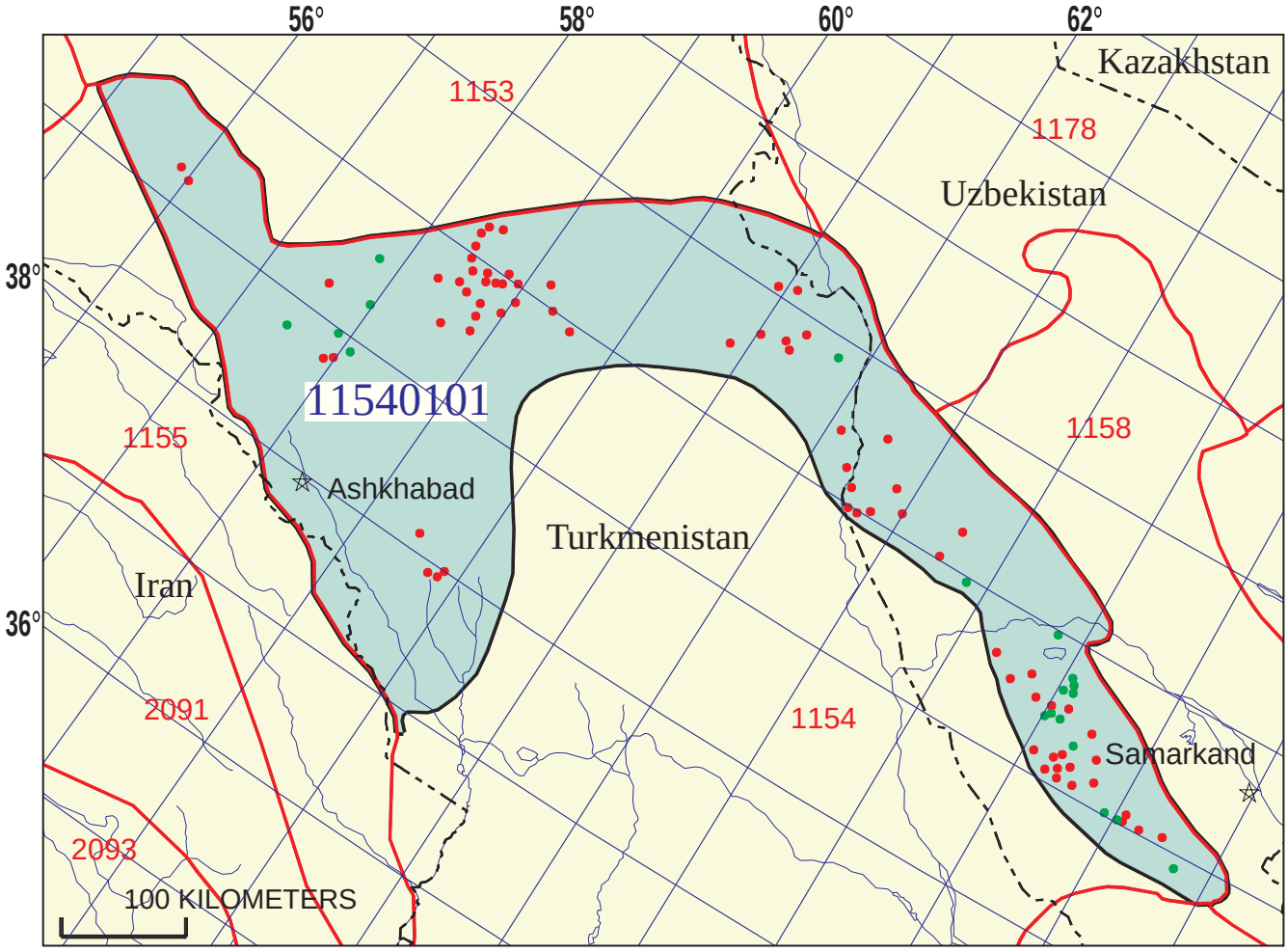
RESERVOIR ROCKS: Reservoir rocks are variable Middle Jurassic and Cretaceous clastics and Upper Jurassic to Neocomian carbonates.

TRAPS AND SEALS: Almost all reserves are in structural traps that are local commonly faulted anticlinal uplifts. Several traps in Oxfordian reefs are present in the northern part of the Chardzhou step. Hydrocarbon pools of the unit are sealed by shale beds of various thickness and extent.

REFERENCES:

Gabrielyants, G.A., ed., 1991, Regional geology of petroleum-productive areas of the USSR (Regionalnaya geologiya neftegazonosnykh territoriy SSSR): Moscow, Nedra, 285 p.

Maksimov, S.P., Kleschev, K.A., and Shein, V.S., eds., 1986, Geology and geodynamics of petroleum-productive areas of the southern USSR (Geologiya i geodinamika neftegazonosnykh territoriy yuga SSSR): Trudy VNIGNI, v. 255, Moscow, Nedra, 232 p.



Northern and Western Areas Assessment Unit - 11540101

EXPLANATION

- Hydrography
- Shoreline
- 1154 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 11540101 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:……..	7/27/99		
Assessment Geologist:……..	G.F. Ulmishek		
Region:……..	Former Soviet Union	Number:	1
Province:……..	Amu-Darya Basin	Number:	1154
Priority or Boutique……	Priority		
Total Petroleum System:……	Amu-Darya Jurassic-Cretaceous	Number:	115401
Assessment Unit:……..	Northern and Western Areas	Number:	11540101
* Notes from Assessor	Fifteen additional fields in Petroconsultants' database have no reserve data.		
	Field sizes not grown.		

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum field size?……. 3 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: 8 Gas: 51
Established (>13 fields) X Frontier (1-13 fields) _____ Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 10.8 2nd 3rd 9 3rd 3rd _____
Median size (grown) of discovered gas fields (bcfg):
1st 3rd 180 2nd 3rd 160 3rd 3rd 180

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)	1	median no.	10	max no.	20
Gas fields:……min. no. (>0)	20	median no.	105	max no.	220

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	3	median size	5	max. size	80
Gas in gas fields (bcfg):……min. size	18	median size	50	max. size	1500

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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)……	2000	4000	6000
NGL/gas ratio (bngl/mmcfg)……	30	60	90

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	10	15	25
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)……	28	35	45
Sulfur content of oil (%)……	0.1	1	2.5
Drilling Depth (m) ……	1000	1500	2500
Depth (m) of water (if applicable)……			

Gas Fields:	minimum	median	maximum
Inert gas content (%)……	0.2	2	5
CO_2 content (%)……	0.2	1	7
Hydrogen-sulfide content (%)……	0	0.3	3.2
Drilling Depth (m)……	1500	3000	5000
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. Uzbekistan represents 29 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		50	
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):…		50	
Portion of volume % that is offshore (0-100%)……		0	

2. Turkmenistan represents 70 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		50	
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):…		50	
Portion of volume % that is offshore (0-100%)……		0	

3. Iran represents 1 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):…		0	
Portion of volume % that is offshore (0-100%)……		0	

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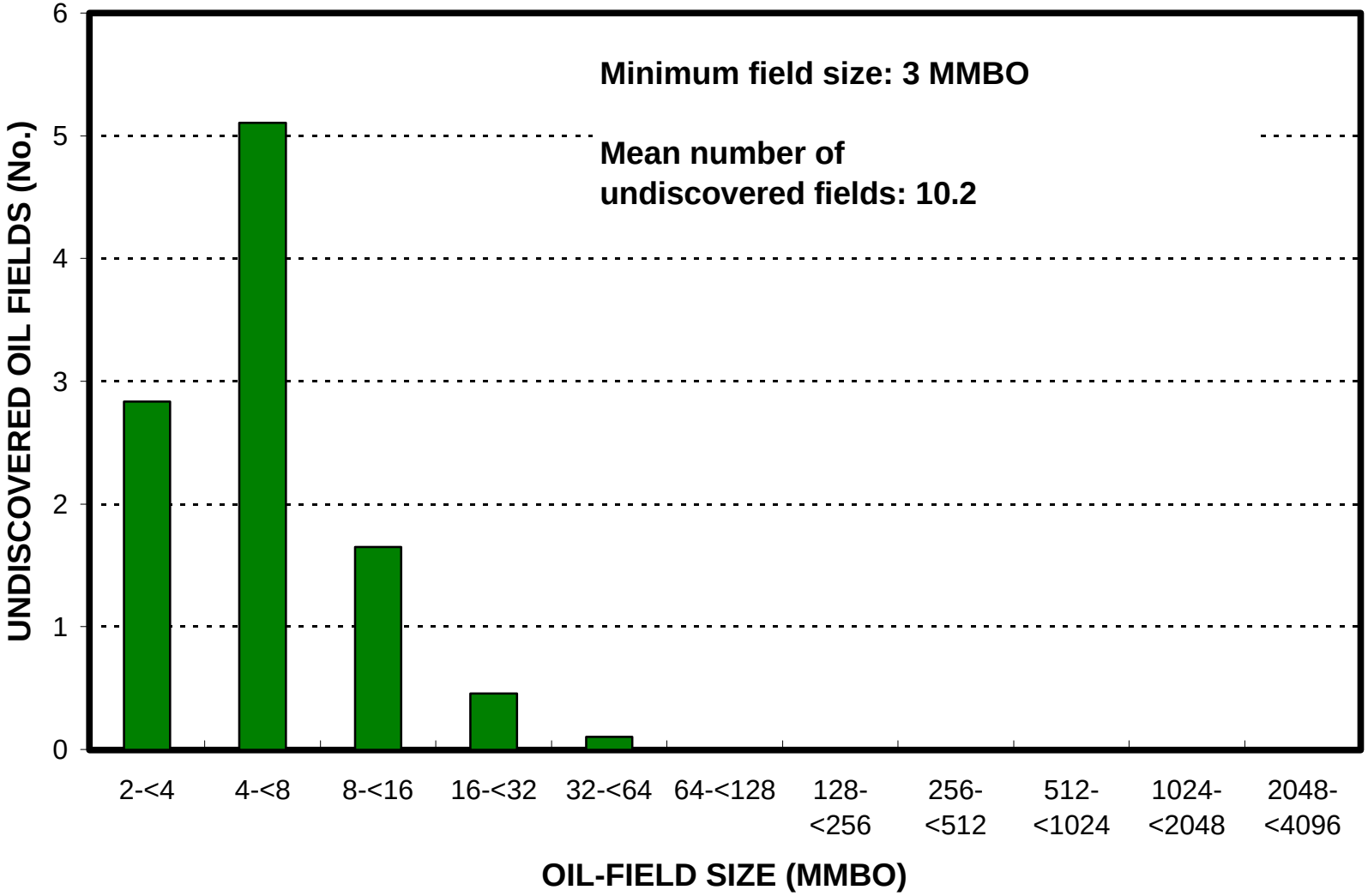
Undiscovered Field-Size Distribution



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Undiscovered Field-Size Distribution