Foreland Slope and Foredeep
Assessment Unit 11090103

Volgograd

Kazakhstan

Russia

Uzbekistan

Georgia

Tbilisi

Azerbaijan

Yerevan

Baku

Turkmenistan

Caspian Sea

0   250   500   KILOMETERS

☐ Foreland Slope and Foredeep Assessment Unit 11090103

☐ Middle Caspian Basin Geologic Province 1109

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

PETROLEUM SYSTEM: Terek-Caspian (110901)

ASSESSMENT UNIT: Foreland Slope and Foredeep (11090103)

DESCRIPTION: This very lightly explored unit encompasses most of the foredeep and adjacent foreland slope east and northeast of the Caucasus thrust belt. Few structural prospects have been identified and prospective reservoirs mostly occur at great depths. Only several small fields have been found in the western part of the unit.

SOURCE ROCKS: Marine anoxic overpressured shales of the lower part of the Oligocene-lower Miocene Maykop series are the main source rocks. The shales contain as much as 4 to 5 percent TOC and Type II kerogen. The presence of additional source rocks in older strata, especially in the Eocene Kuma Formation, is possible, but these rocks are much less important.

MATURATION: Maturation of Maykop source rocks was achieved in late Miocene-Pliocene time during deposition of a very thick orogenic molasse formation in the foredeep. Presently, the source rocks in depressions of the foredeep occur in the lower part of oil window and in the gas window.

MIGRATION: Vertical migration dominates in the assessment unit. From overpressured Maykop source rocks, oil and gas apparently migrated downward into Cretaceous reservoirs. Lateral migration updip on the foreland slope is probable, especially in middle Miocene rocks, but has not been demonstrated by discoveries.

RESERVOIR ROCKS: Reservoir rocks in discovered fields (largely noncommercial) are Upper Cretaceous carbonates and Aptian-Albian sandstones.

TRAPS: Structural traps are few because platform-type, gentle anticlinal uplifts that are characteristic of the assessment unit are mostly open updip. The potential for stratigraphic traps in updip pinch-out zones of middle Miocene sandstones is good, but the prospects occur deep and has not been mapped and drilled.

SEALS: Thick (as much as 1600 m) Maykop plastic shales form a perfect regional seal.

MAIN REFERENCES:
Sokolov, B.A., Korchagina, Yu.I., Mirzoev, D.A., Sergeeva, V.N., Sobornov, K.O., and
        Fadeeva, N.P., 1990, Neftegazoobrazovaniye I neftegazonakopleniye v Vostochnom
        Predkavkazye (Oil and gas generation and accumulation in eastern North Caucasus):
        Moscow, Nauka, 204 p.
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.
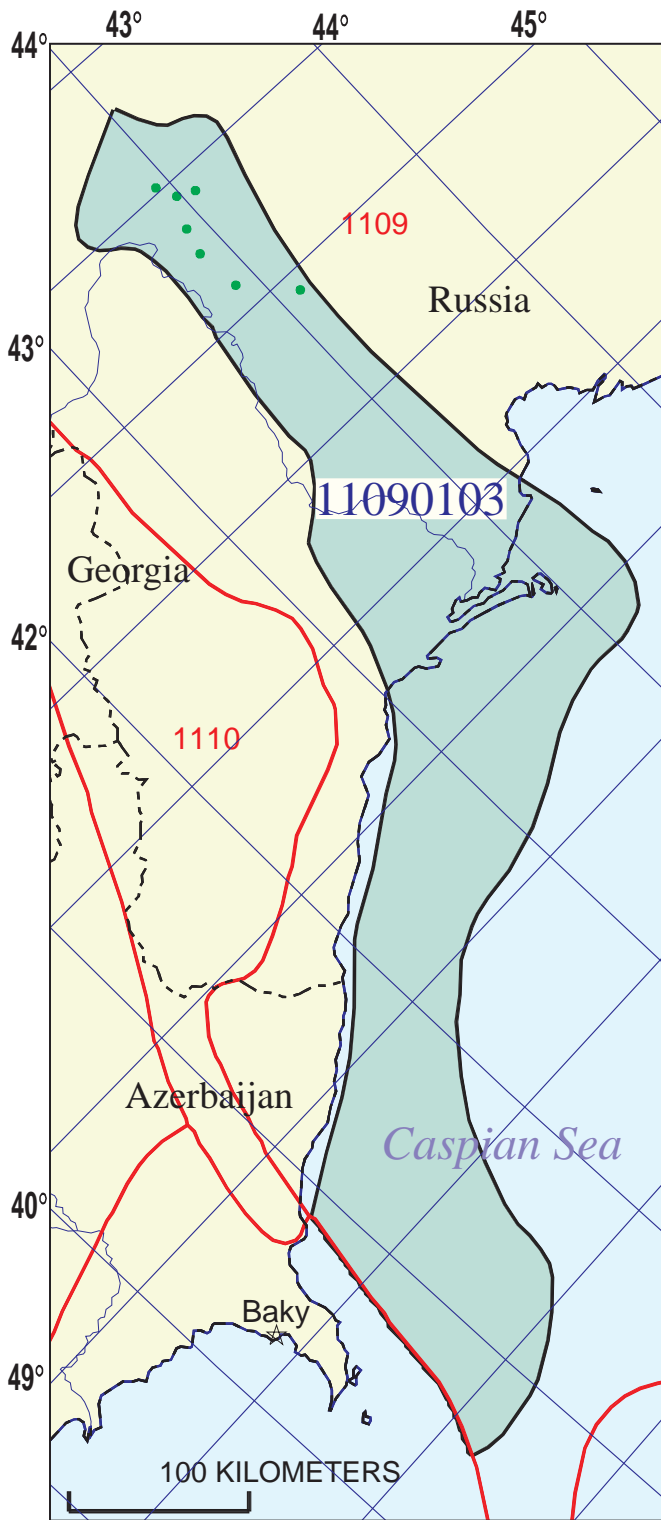
Foreland Slope and Foredeep
Assessment Unit - 11090103

EXPLANATION

— Hydrography

— Shoreline

1109 — Geologic province code and boundary

- - - Country boundary

• Gas field centerpoint

• Oil field centerpoint

11090103 —— 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:…………… Foreland Slope and Foredeep   Number: 11090103
*Notes from Assessor   No growth function applied.

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum field size?……….   7   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: 3   Gas: 0
    Established (>13 fields) _____ Frontier (1-13 fields) __X__ Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):
       1st 3rd   NA   2nd 3rd   NA   3rd 3rd   NA
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)   15   median no.   29   max no.   60
Gas fields:…………………………….min. no. (>0)   5   median no.   13   max no.   30

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   7   median size   12   max. size   100
Gas in gas fields (bcfg):…………………... min. size   42   median size   70   max. size   400
*At least 3 oil fields have been discovered in the unit, but data on their sizes are not available.

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	1500	2000
NGL/gas ratio (bngl/mmcfg)………………....…	50	60	70

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……………….....	15	20	30
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	32	40
Sulfur content of oil (%)……………………...…..	0	1	2
Drilling Depth (m) …………….…………..……...	1500	2800	7000
Depth (m) of water (if applicable)…………...……	0	250	700

Gas Fields:	minimum	median	maximum
Inert gas content (%)……………………......……			
CO_2 content (%)………………………….......……			
Hydrogen-sulfide content (%)………………..…..	0	0.1	0.2
Drilling Depth (m)……………………………………	1500	2800	7000
Depth (m) of water (if applicable)………………….	0	250	700

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

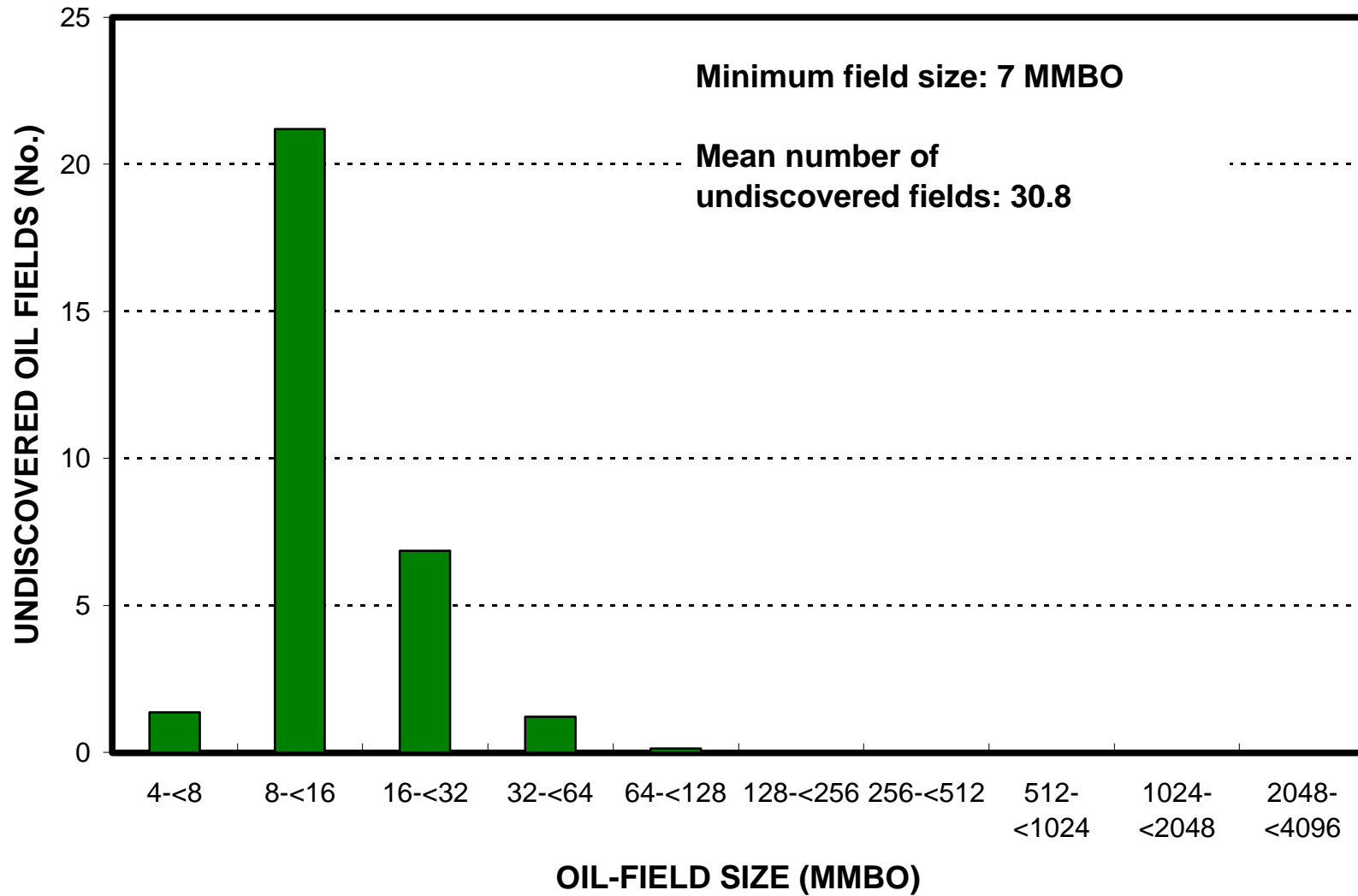1. Russia   represents   70   areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):………..……			
Volume % in parcel (areal % x richness factor):…		85	
Portion of volume % that is offshore (0-100%)……		30	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):………..……			
Volume % in parcel (areal % x richness factor):…		85	
Portion of volume % that is offshore (0-100%)……		30	

2. Azerbaijan   represents   30   areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):………..……			
Volume % in parcel (areal % x richness factor):…		15	
Portion of volume % that is offshore (0-100%)……		100	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):………..……			
Volume % in parcel (areal % x richness factor):…		15	
Portion of volume % that is offshore (0-100%)……		100	

Foreland Slope and Foredeep, AU 11090103
Undiscovered Field-Size Distribution

Minimum field size: 7 MMBO

Mean number of undiscovered fields: 30.8

UNDISCOVERED OIL FIELDS (No.)

OIL-FIELD SIZE (MMBO)

Foreland Slope and Foredeep, AU 11090103
Undiscovered Field-Size Distribution

Minimum field size: 42 BCFG

Mean number of
undiscovered fields: 14

UNDISCOVERED GAS FIELDS (No.)

GAS-FIELD SIZE (BCFG)