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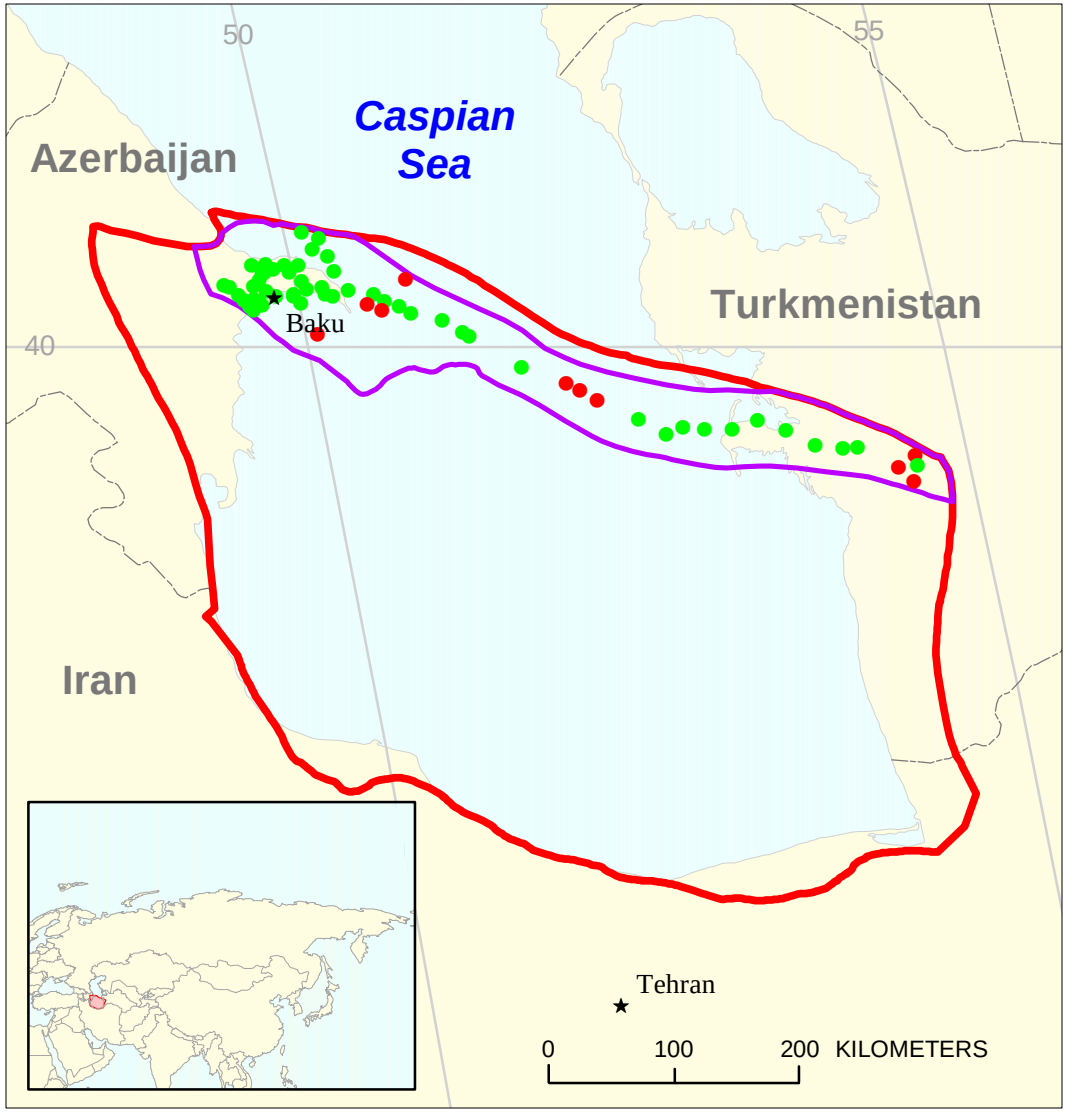
Apsheron-Pribalkhan Zone
Assessment Unit 11120101



Apsheron-Pribalkhan Zone Assessment Unit 11120101

South Caspian Basin Geologic Province 1112

Geologic Summary

Detailed map of this assessment unit

Exploration/Discovery-History Data

- Plots of Known Field Sizes
- Plots of Grown Resources
- Tables

Assessment Input Data

Assessment Results

- Assessment Unit Summary
- Detailed Assessment Results
- Undiscovered Field-Size Distributions

USGS PROVINCE: South Caspian Basin (1112) **GEOLOGIST:** L.S. Smith-Rouch

TOTAL PETROLEUM SYSTEM: Oligocene-Miocene Maykop/Diatom (111201)

ASSESSMENT UNIT: Apsheron-Pribalkhan Zone (11120101)

DESCRIPTION: The assessment unit encompasses the Apsheron-Pribalkhan zone of anticlinal faulted folds, which extends along the northern basin margin between the Apsheron and Cheleken peninsulas. The largest oil fields of the basin are located in this unit. Oil fields contain multiple stacked sandstone reservoirs. Main production is from the lower to middle Pliocene Productive series (in western areas) and its stratigraphic equivalent, the Red Color (Krasnotsvet) series (in eastern areas). Minor amounts of oil and gas are found in the lower Pleistocene Apsheronian Stage.

SOURCE ROCK: The source rocks are anoxic marine shales of Oligocene-lower Miocene Maykop series and the overlying middle to upper Miocene Diatom Formation. The source rocks contain primarily Type II kerogen and extend throughout the entire basin. Total organic carbon content in the rocks is as high as 10 percent and the Hydrogen Index values range from 150 to 500 mg hydrocarbons/g organic carbon.

MATURATION: The striking characteristic of the basin, including this assessment unit, is very low geothermal gradients of 14-16 ^{o}C/km which results in an extremely deep oil window that occurs between 8 and 12 km in basinal areas and somewhat shallower on the margins. Source rocks entered the oil window in the Pliocene and maturation continues at present.

MIGRATION: Geologic data suggest that two main stages of oil migration that charged the known reservoirs were in late middle Pliocene and early Pleistocene times. Both vertical and short-distance lateral migration was involved. Late Pleistocene to Quaternary faulting and erosion on crest of anticlines resulted in redistribution and local biodegradation of oil.

RESERVOIR ROCKS: Reservoir rocks are highly cyclic fluvial-deltaic mudstone to conglomerate lithologies in the lower to middle Pliocene Productive series. Sediment sources are dominantly the paleo-Volga river in the central and west sections and the east section is sourced from the paleo-Amu Darya river. The quartz-rich paleo-Volga deltaic sediments contain the best reservoir rocks; eastward, the quality of reservoir rocks deteriorates.

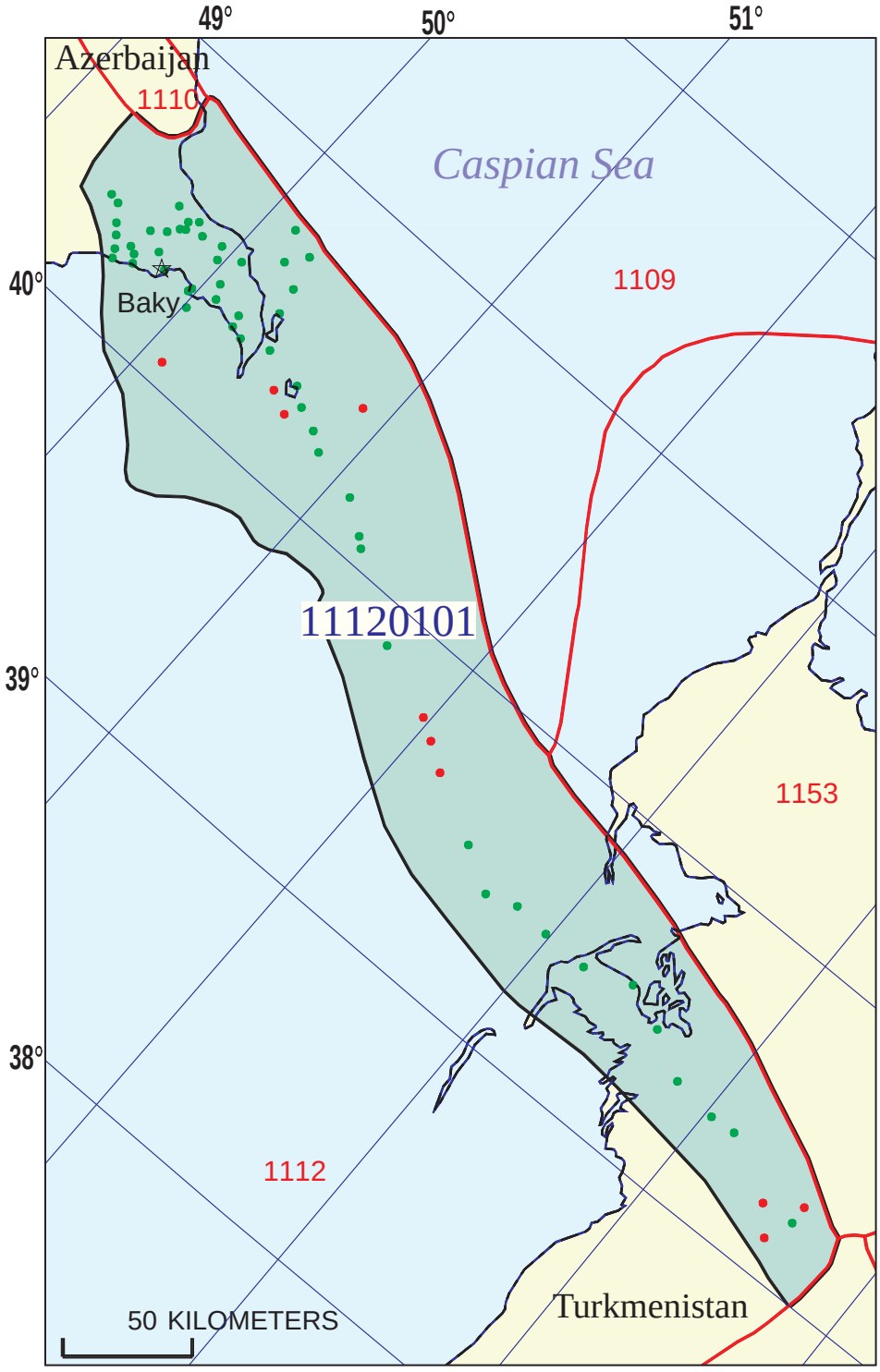
TRAPS AND SEALS: Traps are high-amplitude faulted compressional anticlines. Formation of the structures was strongly affected by plastic flow of undercompacted and overpressured Maykop series shales that compose cores of the anticlines at depths of 6-8 km. Incipient traps may have formed in the early middle Pliocene time but the bulk of tectonic movements and trap formation occurred between Apsheronian time and the present. The basin has extensive seals within the Productive Series and in the overlying Akchagylian and Apsheronian Stages. Locally, the seals are breached and hydrocarbons leak to the surface.

REFERENCES:

Abrams, M.A., and Narimanov, A. A., 1997, Geochemical evaluation of hydrocarbons and their potential sources in the western South Caspian depression, Republic of Azerbaijan: Marine and Petroleum Geology, v. 14, no. 4, p. 451-468.

Narimanov, A.A., 1993, Petroleum systems of the South Caspian Basin, *in* Dore, A.G., and others, eds, Basin Modeling–Advances and Applications: Norwegian Petroleum Society, Special Publication 3, p. 599-608.

Reynolds, A.D., Simmons, M.D., Bowman, M.B.J., Henton, J., Brayshaw, A.C., Alizade, A.A., Guliyev, I.S., Suleymanova, S.F., Ateava, E.Z., Mamedova, D.N.,and Koshkarly, R.O., 1998, Implications of outcrop geology for reservoirs in the Neogene Productive Series–Apsheron peninsula, Azerbaijan: American Association of Petroleum Geologists Bulletin, v. 82, no. 1, p. 25-49.



Apsheron-Pribalkhan Zone
Assessment Unit - 11120101

EXPLANATION

- Hydrography
- Shoreline
- 1112 — Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 11120101 — Assessment unit code and boundary

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

USGS science for a changing world

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

Date:……..	1/11/00		
Assessment Geologist:……..	G.F. Ulmishek		
Region:……..	Former Soviet Union	Number:	1
Province:……..	South Caspian Basin	Number:	1112
Priority or Boutique……	Priority		
Total Petroleum System:……	Oligocene-Miocene Maykop/Diatom	Number:	111201
Assessment Unit:……	Apsheron-Pribalkhan Zone	Number:	11120101
* Notes from Assessor	No growth factor used.		

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum field size?……. 5 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: 42 Gas: 7
Established (>13 fields) X Frontier (1-13 fields) _____ Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 243 2nd 3rd 142.5 3rd 3rd 63
Median size (grown) of discovered gas fields (bcfg):
1st 3rd 643 2nd 3rd 490 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……	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)	5	median no.	30	max no.	65
Gas fields:……min. no. (>0)	3	median no.	10	max no.	25

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	5	median size	40	max. size	3000
Gas in gas fields (bcfg):……min. size	30	median size	200	max. size	8000

Assessment Unit (name, no.)
Apsheron-Pribalkhan Zone, 11120101

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	600	1200	1800
NGL/gas ratio (bngl/mmcfg)……	30	60	90

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	10	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)……	25	37	50
Sulfur content of oil (%)……		0	
Drilling Depth (m) ……	1000	3300	5200
Depth (m) of water (if applicable)……	0	150	300

Gas Fields:	minimum	median	maximum
Inert gas content (%)……	0.5	0.8	1.5
CO_2 content (%)……	0.2	0.6	1.2
Hydrogen-sulfide content (%)……		0	
Drilling Depth (m)……	2500	3500	5500
Depth (m) of water (if applicable)……	0	150	300

Assessment Unit (name, no.)
Apsheron-Pribalkhan Zone, 11120101

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

1. Azerbaijan represents 50 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		75	
Portion of volume % that is offshore (0-100%)……		95	

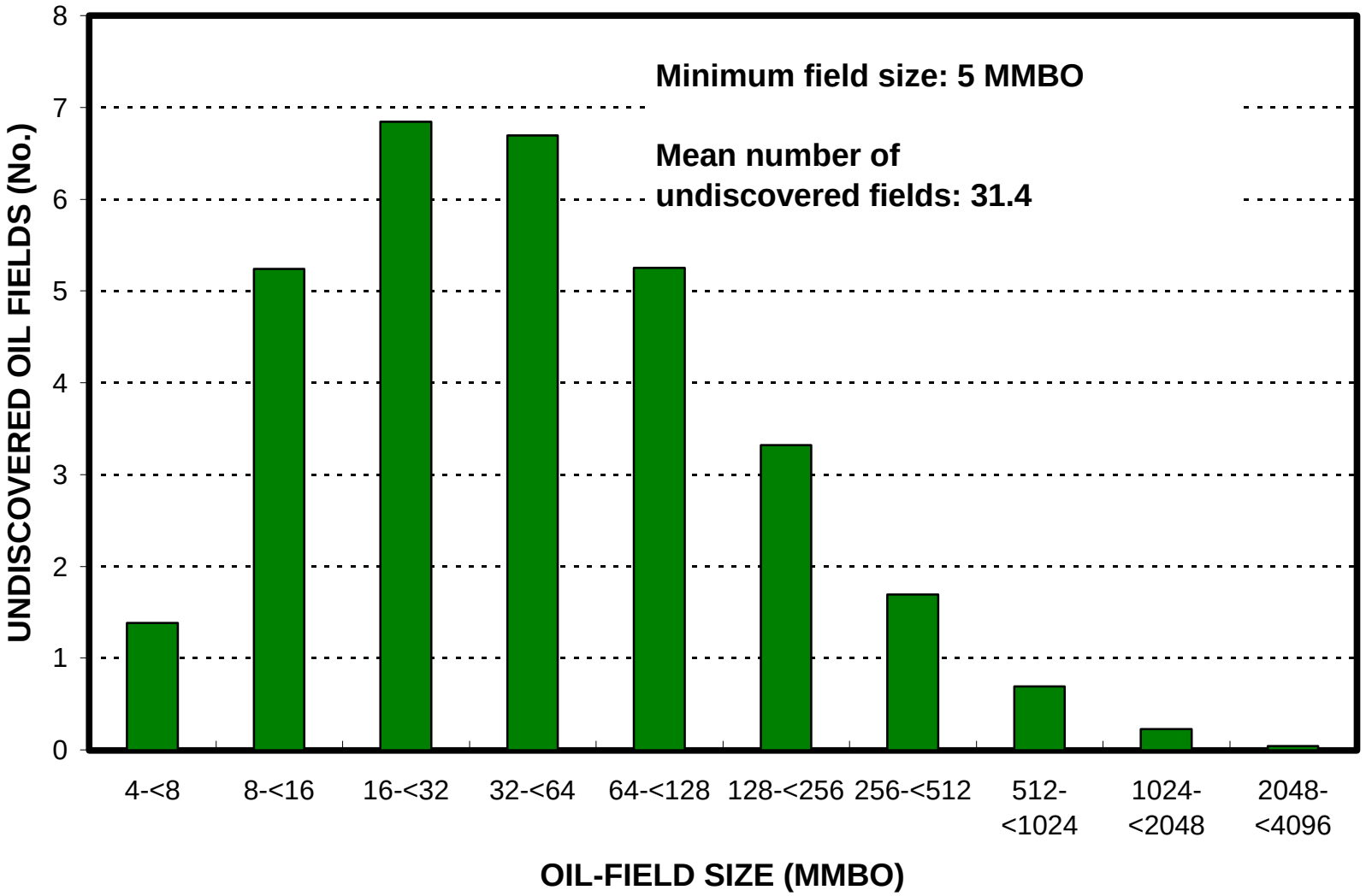
Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		40	
Portion of volume % that is offshore (0-100%)……		100	

2. Turkmenistan represents 50 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		25	
Portion of volume % that is offshore (0-100%)……		95	

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%)……		95	

Apsheron-Pribalkhan Zone, AU 11120101
Undiscovered Field-Size Distribution



Apsheron-Pribalkhan Zone, AU 11120101
Undiscovered Field-Size Distribution