Tertiary Foredeep
Assessment Unit 11080101

Ukraine

★ Dnepropetrovsk

★ Donetsk

★ Rostov on Don

Russia

Sea of Azov

Black Sea

Georgia

35

40

45

0   100   200   300 KILOMETERS

Tertiary Foredeep Assessment Unit 11080101

Azov-Kuban Basin Geologic Province 1108

USGS PROVINCE: Azov-Kuban Basin (1108) **GEOLOGIST:** G.F. Ulmishek

TOTAL PETROLEUM SYSTEM: Azov-Kuban Mesozoic-Cenozoic (110801)

ASSESSMENT UNIT: Tertiary Foredeep (11080101)

DESCRIPTION: Assessment unit encompasses a foredeep in front of the Great Caucasus and extends westward into the Taman and Kerch Peninsulas and adjacent offshore areas. The unit contains about 85 oil and gas fields mainly in Tertiary reservoirs.

SOURCE ROCKS: The principal source rocks are probably Maykop series (Oligocene-lower Miocene) marine black shales. Source rocks may also be present in the Lower-Middle Jurassic and Lower Cretaceous sections at great depths.

MATURATION: Maykop shales are in the oil window over most of the foredeep area and probably dip into the gas window on the Taman and Kerch Peninsulas where shale tectonics and mud volcanoes are common. Maturity was reached in late Miocene-Pliocene time during deposition of thick orogenic clastics. Older source rocks should be overmature with respect to oil generation.

MIGRATION: Migration of oil and gas into known fields is very young and probably occurred during Pliocene-Quaternary time.

RESERVOIR ROCKS: Main reservoir rocks are Tertiary shallow-marine sandstones, but turbidite reservoirs are also known. Most of future discoveries are expected in these turbidite reservoirs and in Cretaceous to Lower Tertiary carbonates and sandstones at great depths.

TRAPS: Both structural and stratigraphic traps are known. The largest fields are in structural traps related to shale diapirism.

SEALS: Known productive reservoirs are sealed by various intraformational shales and some shallow reservoirs are sealed by tar. Maykop shales present a regional seal for deep future discoveries.

REFERENCES:
Bayrak, I.K., 1982, Petroleum productivity of marginal foredeeps of the North Caucasus (Neftegazonosnost mezozoya kraevykh progibov Predkavkazya): Moscow, Nauka, 84 p.
Krylov, N.A., ed., 1987, Tectonics and petroleum productivity of the North Caucasus (Tektonika i neftegazonosnost Severnogo Kavkaza): Moscow, Nauka, 96 p.
Letavin, A.I., ed., 1988, Mesozoic-Cenozoic sequences of the North Caucasus (Mezozoysko-kaynozoyskiye kompleksy Predkavkazya): Moscow, Nauka, 94 p.
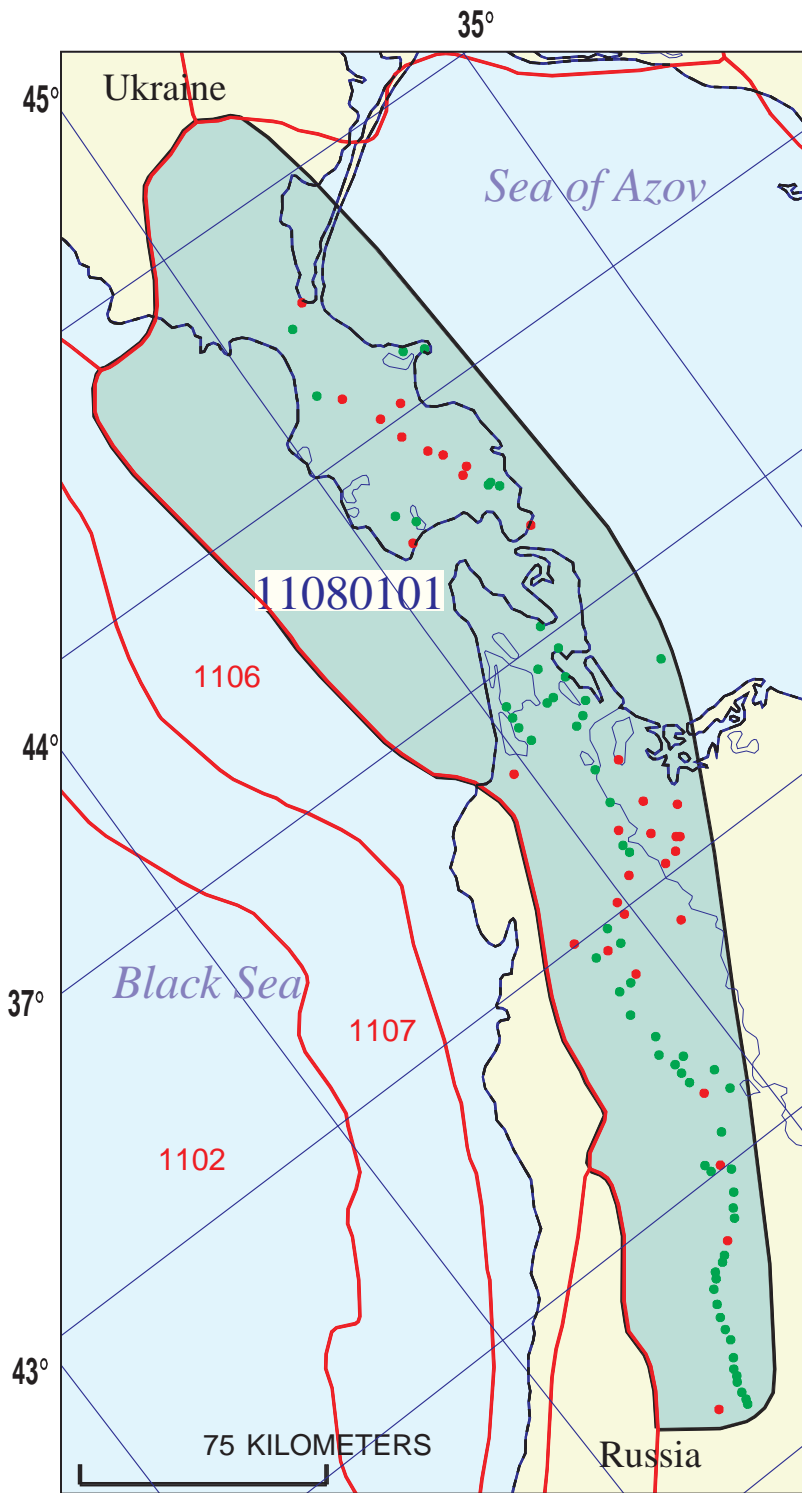
Tertiary Foredeep
Assessment Unit - 11080101

EXPLANATION

— Hydrography

— Shoreline

1108 — Geologic province code and boundary

- - - Country boundary

• Gas field centerpoint

• Oil field centerpoint

11080101 —— Assessment unit code and boundary

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

Date:……………………….. 6/4/99

Assessment Geologist:…….. G.F. Ulmishek

Region:……………………. Former Soviet Union   Number: 1

Province:…………………… Azov-Kuban Basin   Number: 1108

Priority or Boutique………… Priority

Total Petroleum System:…… Azov-Kuban Mesozoic-Cenozoic   Number: 110801

Assessment Unit:………….. Tertiary Foredeep   Number: 11080101

* Notes from Assessor   Fields not grown. Reserve data are available on 34 of 85 fields listed in
the Petroconsultants' file. Inert gas is nitrogen.

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum field size?……….   2   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: 18   Gas: 10

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

Median size (grown) of discovered oil fields (mmboe):

     1st 3rd 9.5   2nd 3rd 25   3rd 3rd 6

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

     1st 3rd 27   2nd 3rd 40   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) 3   median no. 30   max no. 60

Gas fields:………………………………min. no. (>0) 5   median no. 35   max no. 70

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 2   median size 5   max. size 200

Gas in gas fields (bcfg):……………………min. size 12   median size 45   max. size 1200

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS
(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)…………………….....………	500	1500	3500
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	50
Sulfur content of oil (%)………………….....….	0.1	0.2	0.5
Drilling Depth (m) ………………...………….…….	1200	2500	4500
Depth (m) of water (if applicable)…………....…..	0	10	20

Gas Fields:	minimum	median	maximum
Inert gas content (%)………………….......……	0	2	4
CO_2 content (%)…………………….………......…	0.5	3	6
Hydrogen-sulfide content (%)………………...……			
Drilling Depth (m)…………………….……………	2000	3500	6000
Depth (m) of water (if applicable)………………….	0	10	20

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

1.   Ukraine   represents   40   areal % of the total assessment unit
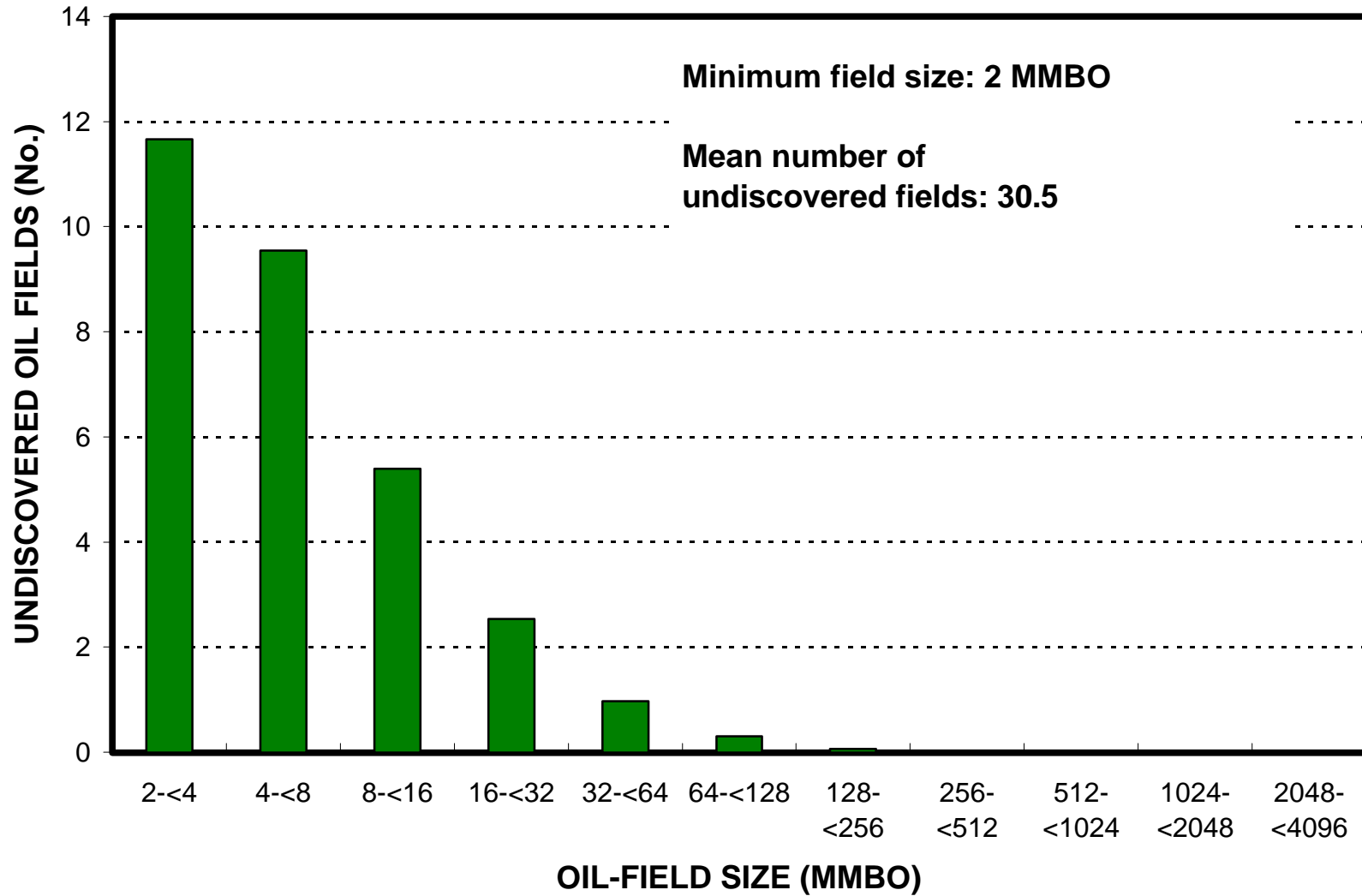
Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):………..……			
Volume % in parcel (areal % x richness factor):…		15	
Portion of volume % that is offshore (0-100%)……		33	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):………..……			
Volume % in parcel (areal % x richness factor):…		25	
Portion of volume % that is offshore (0-100%)……		65	

2.   Russia   represents   60   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%)……		6	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):………..……			
Volume % in parcel (areal % x richness factor):…		75	
Portion of volume % that is offshore (0-100%)……		13	

Tertiary Foredeep, AU 11080101
Undiscovered Field-Size Distribution

Minimum field size: 2 MMBO

Mean number of
undiscovered fields: 30.5

UNDISCOVERED OIL FIELDS (No.)

OIL-FIELD SIZE (MMBO)

**Tertiary Foredeep, AU 11080101
Undiscovered Field-Size Distribution**

Minimum field size: 12 BCFG

Mean number of
undiscovered fields: 35.8

UNDISCOVERED GAS FIELDS (No.)

GAS-FIELD SIZE (BCFG)

12-<24   24-<48   48-<96   96-<192   192-<384   384-<768   768-<1536   1536-<3072   3072-<6144   6144-<12288