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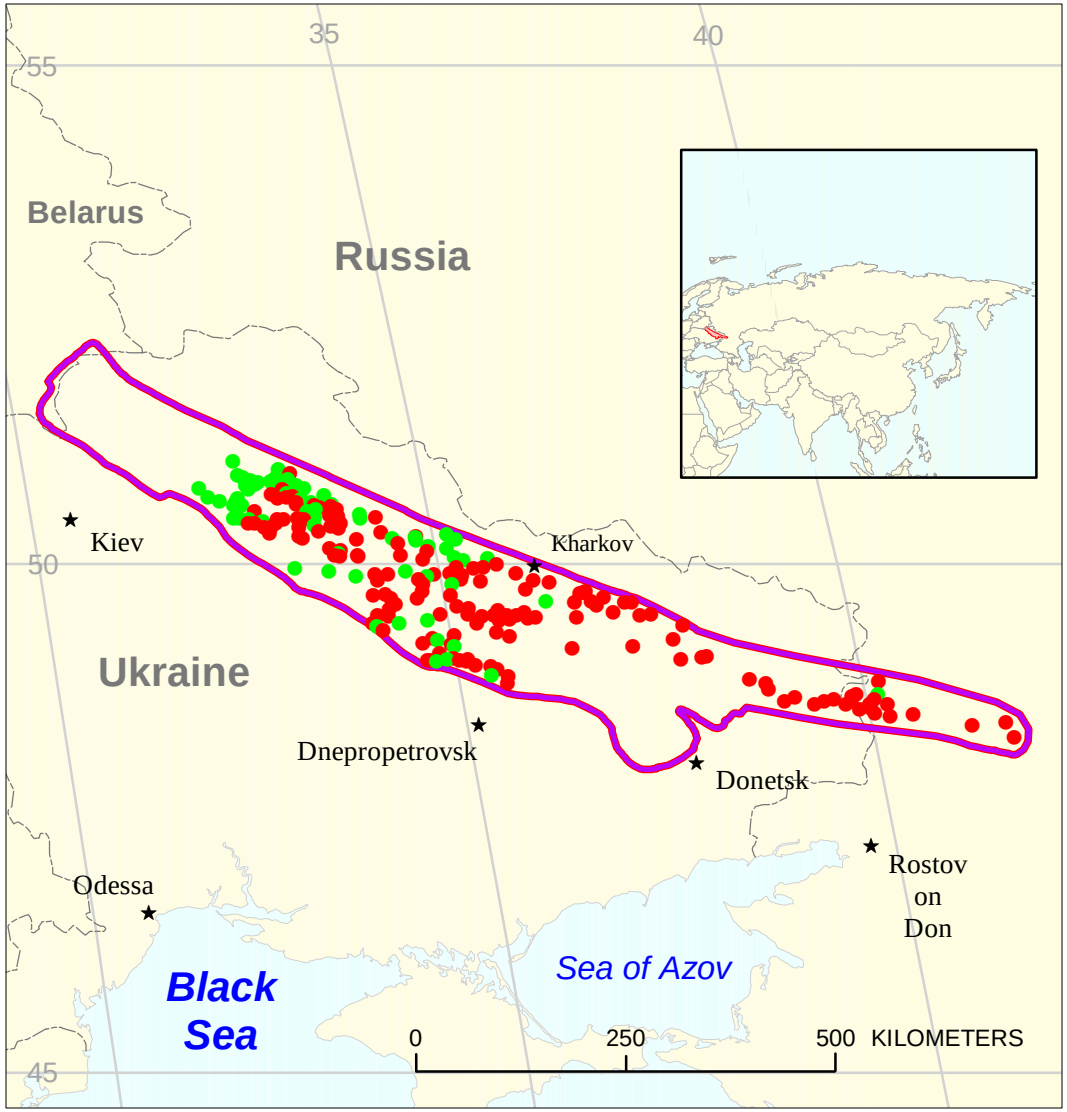
Carboniferous-Lower Permian Clastics Assessment Unit 10090101



Carboniferous-Lower Permian Clastics Assessment Unit 10090101

Dnieper-Donets Basin Geologic Province 1009

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: Dnieper-Donets Basin (1009) **GEOLOGIST:** G.F. Ulmishek

TOTAL PETROLEUM SYSTEM: Dnieper-Donets Paleozoic (100901)

ASSESSMENT UNIT: Carboniferous-Lower Permian Clastics (10090101)

DESCRIPTION: Assessment unit encompasses rocks of the postrift sag (Carboniferous-Lower Permian), and platform (Triassic-Tertiary) sequences over the entire basin area. The unit contains large hydrocarbon (mainly gas) reserves in more than 200 discovered fields.

SOURCE ROCKS: Two identified oil families demonstrate the presence of at least two source rock suites in the Upper Devonian and Lower Carboniferous sections. The latter are Visean organic-rich black shales and marls; Devonian source rocks occur deep and have not been penetrated by wells.

MATURATION: Source rocks are mature in the marginal areas and overmature throughout most of the basin. Maximum maturation was mainly reached by Late Permian time, but could have continued through early Mesozoic in the central part of the basin.

MIGRATION: Migration could have started as early as Early Carboniferous time, but an important stage of gas migration took place after deposition of Lower Permian salt.

RESERVOIR ROCKS: Carboniferous-Lower Permian sandstones contain almost all reserves. Most of undiscovered resources are expected in Lower Carboniferous rocks.

TRAPS: Structural traps are related either to plastic flow of Devonian salt (in deep areas) or to basement fault blocks (on basin margins). Stratigraphic traps are underexplored.

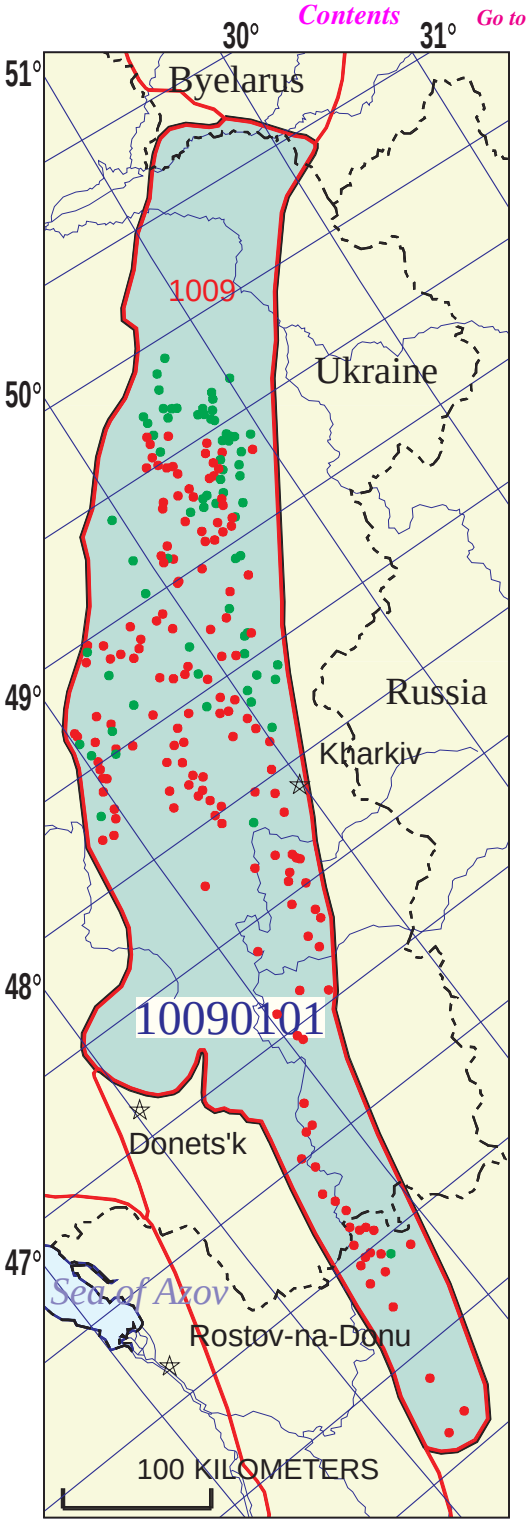
SEALS: Lower Permian salt directly seals reservoirs that contain more than half of reserves. Other seals are Carboniferous intraformational shales.

REFERENCES:

Gavrish, V.K., ed., 1989, Geology and petroleum productivity of the Dnieper-Donets basin—Deep framework and geotectonic development (Geologiya i neftegazonosnost Dneprovo-Donetskoy vpadiny. Glubinnoye stroeniye i geotektonicheskoye razvitiye): Kiev, Naukova Dumka, 204 p.

Shpak, P.F., ed., 1989, Geology and petroleum productivity of the Dnieper-Donets basin—Petroleum productivity (Geologiya i neftegazonosnost Dneprovo-Donetskoy vpadiny. Neftegazonosnost): Kiev, Naukova Dumka, 204 p.

Ulmishek, G.F., Bogino, V.A., Keller, M.B., and Poznyakevich, Z.L., 1994, Structure, stratigraphy, and petroleum geology of the Pripyat and Dnieper-Donets basins, *in* Byelarus and Ukraine, in Landon, S.M., ed., Interior rift basins: American Association of Petroleum Geologists Memoir 59, p. 125-156.



Carboniferous-Lower Permian Clastics Assessment Unit - 10090101

EXPLANATION

- Hydrography
- Shoreline
- 1009 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 10090101 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:……..	5/6/99		
Assessment Geologist:……..	G.F. Ulmishek		
Region:……..	Former Soviet Union	Number:	1
Province:……..	Dnieper-Donets Basin	Number:	1009
Priority or Boutique……..	Priority		
Total Petroleum System:……	Dnieper-Donets Paleozoic	Number:	100901
Assessment Unit:……..	Carboniferous-Lower Permian Clastics	Number:	10090101
* Notes from Assessor	Petroconsultants' database is incomplete.		

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: 12 Gas: 63
Established (>13 fields) X Frontier (1-13 fields) _____ Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 237.5 2nd 3rd 8.5 3rd 3rd _____
Median size (grown) of discovered gas fields (bcfg):
1st 3rd 400 2nd 3rd 100 3rd 3rd 60

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.	15	max no.	30
Gas fields:……min. no. (>0)	40	median no.	140	max no.	250

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	10	max. size	250
Gas in gas fields (bcfg):……min. size	18	median size	50	max. size	2500

Assessment Unit (name, no.)
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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)……	1000	2000	3000
NGL/gas ratio (bngl/mmcfg)……	30	60	90

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	10	30	50
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 (%)……	0.1	0.2	0.3
Drilling Depth (m) ……	2500	3500	4500
Depth (m) of water (if applicable)……			

Gas Fields:	minimum	median	maximum
Inert gas content (%)……	2	4	6
CO_2 content (%)……	0.5	1	1.5
Hydrogen-sulfide content (%)……	0	0.02	0.1
Drilling Depth (m)……	2500	4500	7000
Depth (m) of water (if applicable)……			

Assessment Unit (name, no.)
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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. Ukraine represents 93 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	

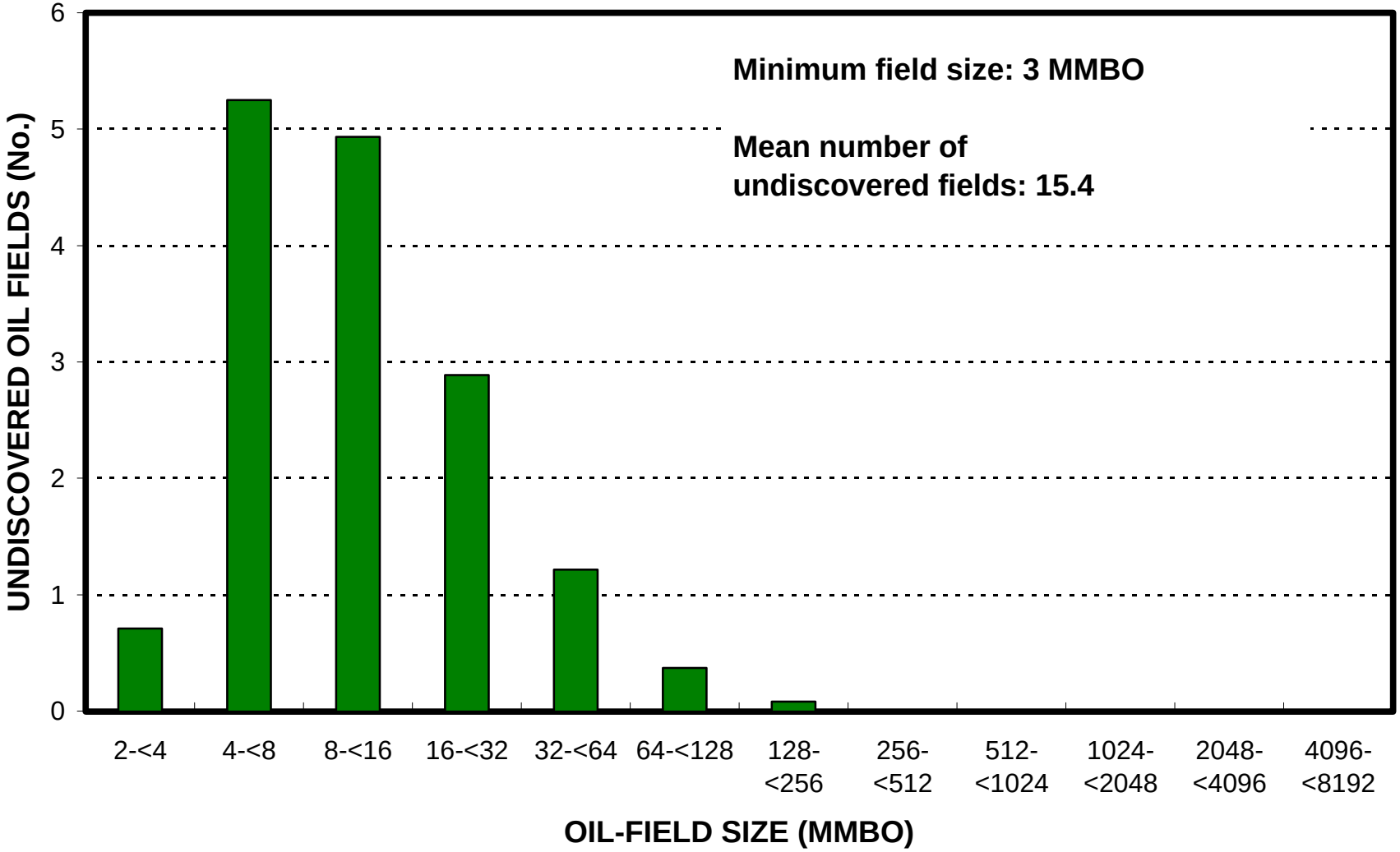
Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		98	
Portion of volume % that is offshore (0-100%)……		0	

2. Russia represents 7 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):…		2	
Portion of volume % that is offshore (0-100%)……		0	

Carboniferous-Lower Permian Clastics, AU 10090101
Undiscovered Field-Size Distribution



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Undiscovered Field-Size Distribution