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Foredeep Basins
Assessment Unit 10080103

Foredeep Basins Assessment Unit 10080103
Timan-Pechora Basin Geologic Province 1008

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: Timan-Pechora Basin (1008) **GEOLOGIST:** S.J. Lindquist

TOTAL PETROLEUM SYSTEM: Domanik-Paleozoic (100801)

ASSESSMENT UNIT: Foredeep Basins (10080103) (established)

DESCRIPTION: Assessment unit comprises structurally complex Uralian foredeep areas bordering the province eastern margin. It was highly impacted by compression associated with the Ural (Hercynian) and Pay Khoy (Early Cimmerian) thrust belts.

SOURCE ROCKS: Source rocks are Upper Devonian (Frasnian) (and lesser Lower Permian) basinal siliceous shales, limestones, and marls (age equivalents of shelf edge reef reservoirs). Siluro-Ordovician shales in the northern foredeeps are also possible gas sources.

MATURATION: Most Domanik maturation is probably Permo-Triassic in age, but some authors propose generation locally or regionally as early as Early Carboniferous(?) and as late as Middle Jurassic. The Devonian source rocks in this assessment unit are now generally at a gas-stage of maturity, and sour gas is anticipated. Some Permian source rocks similar in character to the Domanik now could be at an oil-stage of maturity in the foredeeps.

MIGRATION: Late Paleozoic (Hercynian) and Mesozoic (Early Cimmerian) thrusting modified any pre-existing structural traps, causing hydrocarbon remobilization and partial loss.

RESERVOIR ROCKS: Expected reservoirs are primarily Lower Permian reefs and associated carbonates. Untested are deeper Siluro-Ordovician siliciclastics.

TRAPS AND SEALS: Known and expected traps are anticlines formed by complex compressional faulting and folding. Generally only those with surface expression have been tested. Seals are regional and local Paleozoic and Mesozoic shales (many associated with source rocks); the upper Lower Permian shales are most important. There are also limited Paleozoic evaporite seals in the southernmost foredeep areas.

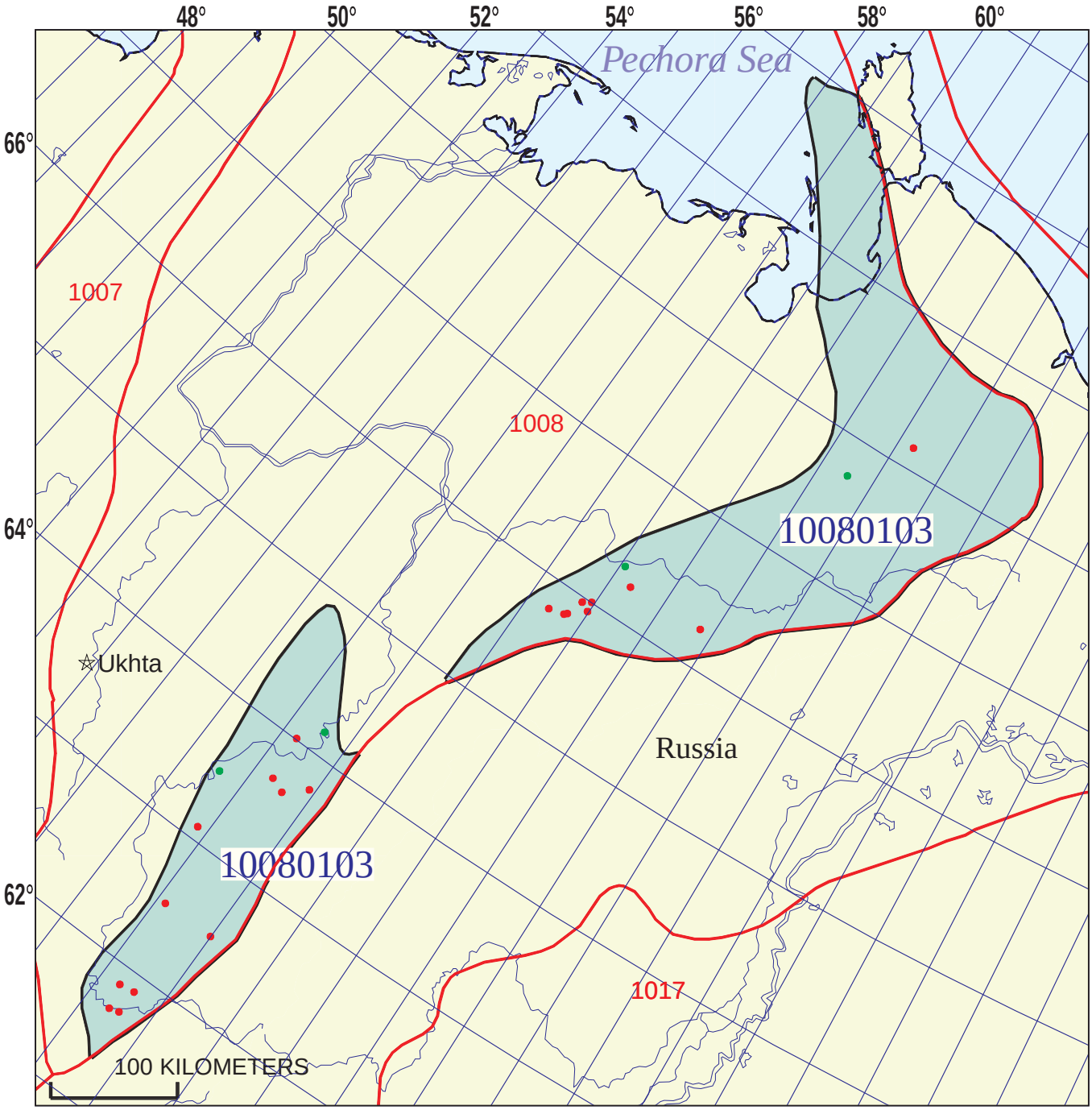
REFERENCES:

Abrams, M.A., Apanel, A.M., Timoshenko, O., and Kosenkova, N., 1999, Oil families and their potential sources in the northeastern Timan Pechora basin, Russia: American Association of Petroleum Geologists Bulletin, v. 83, no. 4, p. 553-577.

Lindquist, S.J., 1999, The Timan-Pechora basin province of northwest Arctic Russia—Domanik-Paleozoic total petroleum system: U.S. Geological Survey Open-File Report 99-50-G, 24 p., 15 figs., 2 tables.

Sobornov, Konstantin, and Rostovshchikov, Vladimir, 1996, Structure and hydrocarbon prospects of the North Urals thrust belt: Petroleum Geoscience, v. 2, p. 177-184.

Ulmishek, G.F., 1982, Petroleum geology and resource assessment of the Timan-Pechora basin, USSR, and the adjacent Barents-northern Kara shelf: Argonne, Ill., Argonne National Laboratory, Energy and Environmental Systems Division, Report ANL/EES-TM-199, 197 p.



Foredeep Basins
Assessment Unit - 10080103

EXPLANATION

- Hydrography
- Shoreline
- 1008 — Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 10080103 — 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:……..	3/30/99		
Assessment Geologist:……..	G.F. Ulmishek		
Region:……..	Former Soviet Union	Number:	1
Province:……..	Timan-Pechora Basin	Number:	1008
Priority or Boutique……	Priority		
Total Petroleum System:……	Domanik-Paleozoic	Number:	100801
Assessment Unit:……	Foredeep Basins	Number:	10080103
* Notes from Assessor	No growth factor used.		

CHARACTERISTICS OF ASSESSMENT UNIT

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

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: 3 Gas: 11
Established (>13 fields) X Frontier (1-13 fields) _____ 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 200 2nd 3rd 78 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)	2	median no.	8	max no.	20
Gas fields:……min. no. (>0)	15	median no.	55	max no.	105

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	15	max. size 400
Gas in gas fields (bcfg):……	min. size	30	median size	150	max. size 10000

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Foredeep Basins, 10080103

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	700	1000	1500
NGL/gas ratio (bngl/mmcfg)……	30	60	90

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	20	40	60
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	35	40
Sulfur content of oil (%)……	0.1	0.4	1
Drilling Depth (m) ……	3000	4000	5500
Depth (m) of water (if applicable)……	0	10	20

* Inert gas is nitrogen

Gas Fields:	minimum	median	maximum
Inert gas content (%)……	2	4	7
CO_2 content (%)……	0.5	3	6
Hydrogen-sulfide content (%)……	0	0.5	2
Drilling Depth (m)……	3000	4000	6000
Depth (m) of water (if applicable)……	0	10	20

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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. Russia represents 100 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%)……		10	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		100	
Portion of volume % that is offshore (0-100%)……		6	

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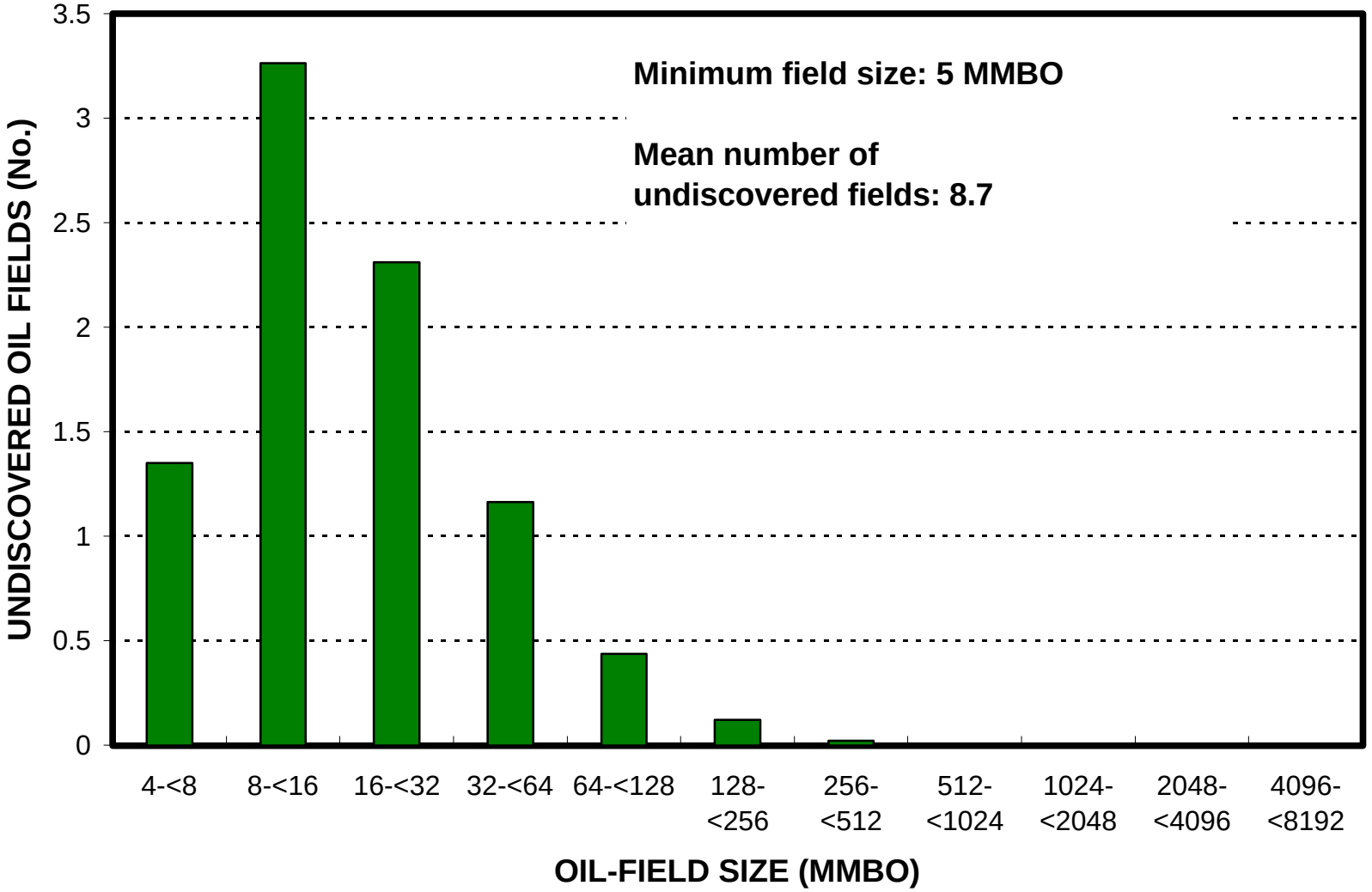
Undiscovered Field-Size Distribution



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Undiscovered Field-Size Distribution