Main Basin Platform Assessment Unit 10080102

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

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Main Basin Platform Assessment Unit 10080102
Timan-Pechora Basin Geologic Province 1008
USGS PROVINCE: Timan-Pechora Basin (1008) GEOLOGIST: S.J. Lindquist

TOTAL PETROLEUM SYSTEM: Domanik-Paleozoic (100801)

ASSESSMENT UNIT: Main Basin Platform (10080102) (established)

DESCRIPTION: Assessment unit incorporates the major portion of the province with the bulk of known production. It includes numerous stratigraphic trends (such as shelf-edge reefs), unconformity trends, and aulocogens with complex structural history. The onshore area has not yet been targeted for stratigraphic traps and the offshore area is sparsely explored.

SOURCE ROCKS: Main source rocks are oil-prone Upper Devonian (Frasnian) basinal siliceous shales, limestones, and marls (age equivalents of shelf edge reef reservoirs). Of lesser importance are Ordovician to Lower Devonian shales in the northeastern onshore part of the province and offshore Triassic source rocks to the north within the South Barents Basin.

MATURATION: Most Domanik maturation is probably Permo-Triassic in age, but local or regional generation as early as Early Carboniferous(?) and as late as Middle Jurassic also has been proposed.

MIGRATION: The source rock is present in close proximity to all known production. Early structural traps associated with Ordovician rifting underwent inversion and modification during later Paleozoic and Mesozoic orogenies (Hercynian and Early Cimmerian). Remigration and loss of hydrocarbons likely occurred.

RESERVOIR ROCKS: Most known Timan-Pechora reserves are in Middle Devonian siliciclastics, Upper Devonian to Carboniferous (Tournaisian) reefs, and Lower Permian reefs and carbonates. However, the entire stratigraphic section, from Ordovician to Triassic, has production.

TRAPS AND SEALS: Most known traps are anticlines formed by normal, reverse, and thrust faulting; simple fault traps also occur. Structural inversion has been important. The overprint of Hercynian and Early Cimmerian compression is more pronounced on the eastern side of the assessment unit. Stratigraphic traps are underexplored. Seals are regional and local Paleozoic and Mesozoic shales (many associated with source rock intervals) and limited Paleozoic evaporites.

REFERENCES:


Main Basin Platform
Assessment Unit - 10080102

EXPLANATION

- Hydrography
- Shoreline
- Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint

Assessment unit code and boundary

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
Province:……………………… Timan-Pechora Basin
Priority or Boutique……….. Priority
Total Petroleum System:…….. Domanik-Paleozoic
Assessment Unit:…………… Main Basin Platform

* Notes from Assessor No growth factor used. May be additional fields exceeding minimum size.

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: 152 Gas: 16

<table>
<thead>
<tr>
<th>Established (&gt;13 fields)</th>
<th>Frontier (1-13 fields)</th>
<th>Hypothetical (no fields)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 32.4 2nd 3rd 20.5 3rd 3rd 15.1

Median size (grown) of discovered gas fields (bcfg):
1st 3rd 108 2nd 3rd 2820 3rd 3rd 200

Assessment-Unit Probabilities:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Probability of occurrence (0-1.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CHARGE: Adequate petroleum charge for an undiscovered field ≥ minimum size</td>
<td>1.0</td>
</tr>
<tr>
<td>2. ROCKS: Adequate reservoirs, traps, and seals for an undiscovered field ≥ minimum size</td>
<td>1.0</td>
</tr>
<tr>
<td>3. TIMING OF GEOLOGIC EVENTS: Favorable timing for an undiscovered field ≥ minimum size</td>
<td>1.0</td>
</tr>
</tbody>
</table>

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) 50 median no. 100 max no. 200
Gas fields:………………………….min. no. (>0) 10 median no. 30 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 5 median size 20 max. size 1400
Gas in gas fields (bcfg):………………… min. size 30 median size 180 max. size 7000
AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS
(uncertainty of fixed but unknown values)

<table>
<thead>
<tr>
<th></th>
<th>minimum</th>
<th>median</th>
<th>maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Fields:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas/oil ratio (cfg/bo)</td>
<td>400</td>
<td>700</td>
<td>1000</td>
</tr>
<tr>
<td>NGL/gas ratio (bngl/mmcf)</td>
<td>30</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>Gas fields:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquids/gas ratio (bngl/mmcf)</td>
<td>20</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Oil/gas ratio (bo/mmcf)</td>
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</tr>
</tbody>
</table>

SELECTED ANCILLARY DATA FOR UNDISCOVERED FIELDS
(variations in the properties of undiscovered fields)

<table>
<thead>
<tr>
<th></th>
<th>minimum</th>
<th>median</th>
<th>maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Fields:</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>API gravity (degrees)</td>
<td>22</td>
<td>35</td>
<td>50</td>
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<tr>
<td>Sulfur content of oil (%)</td>
<td>0.1</td>
<td>0.7</td>
<td>2</td>
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<tr>
<td>Drilling Depth (m)</td>
<td>1200</td>
<td>2500</td>
<td>4000</td>
</tr>
<tr>
<td>Depth (m) of water (if applicable)</td>
<td>0</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Gas Fields:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inert gas content (%)</td>
<td>0.5</td>
<td>3</td>
<td>8</td>
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<tr>
<td>CO₂ content (%)</td>
<td>0.1</td>
<td>0.6</td>
<td>4</td>
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<tr>
<td>Hydrogen-sulfide content (%)</td>
<td>0</td>
<td>0.05</td>
<td>0.2</td>
</tr>
<tr>
<td>Drilling Depth (m)</td>
<td>1200</td>
<td>3000</td>
<td>4000</td>
</tr>
<tr>
<td>Depth (m) of water (if applicable)</td>
<td>0</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Country</td>
<td>Percentage of Total Assessment Unit</td>
<td>Oil in Oil Fields</td>
<td>Gas in Gas Fields</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------------</td>
<td>------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Russia</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Oil in Oil Fields:**
- Minimum
- Median: 100
- Maximum

**Gas in Gas Fields:**
- Minimum
- Median: 100
- Maximum
Main Basin Platform, AU 10080102
Undiscovered Field-Size Distribution

Minimum field size: 5 MMBO
Mean number of undiscovered fields: 105.6

OIL-FIELD SIZE (MMBO)

UNDISCOVERED OIL FIELDS (No.)

4-<8  8-<16  16-<32  32-<64  64-<128  128-<256  256-<512  512-<1024  1024-<2048  2048-<4096  4096-<8192
Main Basin Platform, AU 10080102
Undiscovered Field-Size Distribution

Minimum field size: 30 BCFG
Mean number of undiscovered fields: 32.2