Murgab Depression Subsalt Assessment Unit 11540104

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

Uzbekistan
Turkmenistan
Iran
Afghanistan

Murgab Depression Subsalt Assessment Unit 11540104
Amu-Darya Basin Geologic Province 1154
USGS PROVINCE: Amu-Darya Basin (1154)  GEOLOGIST: G.F. Ulmishek

TOTAL PETROLEUM SYSTEM: Amu-Darya Jurassic-Cretaceous (115401)

ASSESSMENT UNIT: Murgab Depression Subsalt (11540104)

DESCRIPTION: Unit encompasses Jurassic rocks of the central basin area in boundaries of Kimmeridgian-Tithonian salt formation. Known fields are located dominantly in northern marginal zones of the unit; the rest of its area is mostly undrilled.

SOURCE ROCKS: Two source rock sections are Lower-Middle Jurassic continental to paralic coaly clastics and Oxfordian anoxic marine shale. The clastic rocks are more than 1,500 m thick and contain as much as 2.5 percent of TOC with Type III kerogen and thin coals. Oxfordian shales are a few tens of meters thick and contain as much as 15 percent TOC and Type II kerogen.

MATURATION: Both Jurassic source rock suites are buried deep in the gas window and are at high stages of maturity.

RESERVOIR ROCKS: The main reservoir rocks are Oxfordian carbonates (including reef facies). Middle Jurassic sandstones are productive in several fields in the northern marginal areas.

TRAPS: All known and majority of expected fields are in reefs, structural traps, or combination of the two.

SEALS: The principal regional seal is the Kimmeridgian-Tithonian Gaurdak Formation composed of salt and anhydrite with local carbonate beds.

REFERENCES:
Murgab Depression Subsalt
Assessment Unit - 11540104

EXPLANATION

- Hydrography
- Shoreline
- 1154 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**

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**Date:** 7/27/99  
**Assessment Geologist:** G.F. Ulmishek  
**Region:** Former Soviet Union  
**Province:** Amu-Darya Basin  
**Priority or Boutique:** Priority  
**Total Petroleum System:** Amu-Darya Jurassic-Cretaceous  
**Assessment Unit:** Murgab Depression Subsalt

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### CHARACTERISTICS OF ASSESSMENT UNIT

<table>
<thead>
<tr>
<th>Oil (&lt;20,000 cfg/bo overall)</th>
<th>Gas (&gt;20,000 cfg/bo overall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas</td>
<td></td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Number of discovered fields exceeding minimum size:</th>
<th>Established (&gt;13 fields)</th>
<th>Frontier (1-13 fields)</th>
<th>Hypothetical (no fields)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil: 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas: 42</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 1104 2nd 3rd 434 3rd 3rd 175.5

**Assessment-Unit GEOLeGIC Probability** (Product of 1, 2, and 3): 1.0

**ACCESSIBILITY:** Adequate location to allow exploration for an undiscovered field  
≥ minimum size: 1.0

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### UNDISCOVERED FIELDS

**Number of Undiscovered Fields:** How many undiscovered fields exist that are ≥ minimum size?:  
(uncertainty of fixed but unknown values)

- Oil fields: 1 min. no. (>0) 1 median no. 3 max no. 6
- Gas fields: 10 min. no. (>0) 90 median no. 180 max no. 180

**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): 5 min. size 30 median size 30 max. size 200
- Gas in gas fields (bcfg): 30 min. size 250 median size max. size 120000

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Assessment Unit (name, no.)  
Murgab Depression Subsalt, 11540104
### 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><strong>Oil Fields:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas/oil ratio (cfg/bo)</td>
<td>5000</td>
<td>10000</td>
<td>15000</td>
</tr>
<tr>
<td>NGL/gas ratio (bngl/mmcfg)</td>
<td>30</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td><strong>Gas fields:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquids/gas ratio (bngl/mmcfg)</td>
<td>15</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>Oil/gas ratio (bo/mmcfg)</td>
<td></td>
<td></td>
<td></td>
</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><strong>Oil Fields:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>API gravity (degrees)</td>
<td>38</td>
<td>42</td>
<td>50</td>
</tr>
<tr>
<td>Sulfur content of oil (%)</td>
<td>0</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Drilling Depth (m)</td>
<td>2000</td>
<td>2500</td>
<td>3000</td>
</tr>
<tr>
<td>Depth (m) of water (if applicable)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gas Fields:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inert gas content (%)</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>CO₂ content (%)</td>
<td>0.2</td>
<td>0.7</td>
<td>2</td>
</tr>
<tr>
<td>Hydrogen-sulfide content (%)</td>
<td>0.5</td>
<td>2.5</td>
<td>4</td>
</tr>
<tr>
<td>Drilling Depth (m)</td>
<td>3500</td>
<td>4500</td>
<td>6000</td>
</tr>
<tr>
<td>Depth (m) of water (if applicable)</td>
<td></td>
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</table>
### ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT TO COUNTRIES OR OTHER LAND PARCELS

(uncertainty of fixed but unknown values)

1. **Turkmenistan** represents 85 areal % of the total assessment unit

   **Oil in Oil Fields:**
   - Minimum
   - Median: 50
   - Maximum
   - Portion of volume % that is offshore (0-100%): 0

   **Gas in Gas Fields:**
   - Minimum
   - Median: 89
   - Maximum
   - Portion of volume % that is offshore (0-100%): 0

2. **Uzbekistan** represents 10 areal % of the total assessment unit

   **Oil in Oil Fields:**
   - Minimum
   - Median: 50
   - Maximum
   - Portion of volume % that is offshore (0-100%): 0

   **Gas in Gas Fields:**
   - Minimum
   - Median: 3
   - Maximum
   - Portion of volume % that is offshore (0-100%): 0

3. **Afghanistan** represents 5 areal % of the total assessment unit

   **Oil in Oil Fields:**
   - Minimum
   - Median: 0
   - Maximum
   - Portion of volume % that is offshore (0-100%): 0

   **Gas in Gas Fields:**
   - Minimum
   - Median: 8
   - Maximum
   - Portion of volume % that is offshore (0-100%): 0
Murgab Depression Subsalt, AU 11540104
Undiscovered Field-Size Distribution

Minimum field size: 5 MMBO
Mean number of undiscovered fields: 3.1

Undiscovered Oil Fields (No.)

Oil-field size (MMBO)

Minimum field size: 5 MMBO
Mean number of undiscovered fields: 3.1

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Minimum field size: 5 MMBO
Mean number of undiscovered fields: 3.1
Murgab Depression Subsalt, AU 11540104
Undiscovered Field-Size Distribution

Minimum field size: 30 BCFG
Mean number of undiscovered fields: 91.6

GAS-FIELD SIZE (BCFG)

UNDISCOVERED GAS FIELDS (No.)