Assessment of Undiscovered Oil and Gas Resources of the Black Warrior Basin Province, 2002

Introduction

The U.S. Geological Survey (USGS) has completed an assessment of the undiscovered oil and gas resources of the Black Warrior Basin Province (fig. 1), which includes parts of northeastern Mississippi and northwestern Alabama. This assessment is based on the geologic framework of the total petroleum system (TPS) defined in the province, including hydrocarbon source rocks (source-rock maturation, and hydrocarbon generation and migration); reservoir rocks (reservoir stratigraphic and petrophysical properties); and hydrocarbon traps (reservoir formation and trapping). Using this geologic framework, the USGS defined two total petroleum systems and three assessment units (AU) within the Black Warrior Basin Province and quantitatively estimated the undiscovered oil and gas resources within each AU (table 1).

Assessment Units

The total petroleum systems within the Black Warrior Basin Province are the Pottsville Coal TPS and the Chattanooga Shale/Floyd Shale-Paleozoic TPS (fig. 2). The Black Warrior Basin AU of the Pottsville Coal TPS defines potential coal-bed gas found primarily in the Alabama portion of the basin. The Carboniferous Sandstones AU of the Chattanooga Shale/Floyd Shale-Paleozoic TPS is defined by gas and oil trapped in Upper Mississippian deltaic and shallow-marine sandstone reservoirs that have been faulted and tilted by basement-involved fault blocks. The Pre-Mississippian Carbonates AU of the Chattanooga Shale/Floyd Shale-Paleozoic TPS is defined by gas trapped primarily in Cambrian and Ordovician platform-carbonate reservoirs by basement-controlled fault blocks.

Resource Summary

The USGS assessed undiscovered conventional oil and gas and undiscovered continuous (unconventional) gas. For the Black Warrior Basin Province, the USGS estimated a mean of 8.5 trillion cubic feet of undiscovered natural gas, a mean of 5.9 million barrels of undiscovered oil, and a mean of 7.6 million barrels of undiscovered natural gas liquids in the Black Warrior Basin Province.
Table 1. Black Warrior Basin Province assessment results.

<table>
<thead>
<tr>
<th>Geologic Unit</th>
<th>Total Petroleum System Oil (MMBO)</th>
<th>Gas (BCFG)</th>
<th>NGL (MMBNGL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pottsville Coal TPS</td>
<td>11,709,000</td>
<td>29,550</td>
<td>51,650</td>
</tr>
<tr>
<td>Chattanooga Shale/Floyd Shale-Paleozoic TPS</td>
<td>11,709,000</td>
<td>29,550</td>
<td>51,650</td>
</tr>
</tbody>
</table>

For gas fields, all liquids are included under the NGL (natural gas liquids) category. CBG denotes 95 percent chance of at least the amount tabulated. Other fractiles are defined similarly. Fractiles are additive under the assumption of perfect positive correlation. TPS, total petroleum system; AU, assessment unit; CBG, coal-bed gas. Shading indicates not applicable.

For Further Information

Supporting geologic studies of total petroleum systems and assessment units in the Black Warrior Basin Province are in progress. Details of the methodology used in this assessment and assessment results are available at the USGS Central Energy Team Website at: http://energy.cr.usgs.gov/oilgas/noga.