

## National Assessment of Oil and Gas Fact Sheet

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

*Using a geology-based assessment methodology, the U.S. Geological Survey 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.*

## Introduction

The U.S. Geological Survey (USGS) has completed an assessment of the undiscovered oil and gas potential of the Black Warrior Basin Province (fig. 1), which includes parts of northeastern Mississippi and northwestern Alabama. This assessment is based on the geologic elements of each total petroleum system (TPS) defined in the province, including hydrocarbon source rocks (source-rock maturation, and hydrocarbon generation and migration), reservoir rocks (sequence stratigraphy and petrophysical properties), and hydrocarbon traps (trap formation and timing). 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 by a variety of basement-involved fault blocks, combination traps, and stratigraphic traps. The Pre-Mississippian Carbonates AU of the Chattanooga Shale/Floyd Shale-Paleozoic TPS is defined by gas

**Figure 1.** Map showing the location of the Black Warrior Basin Province.

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 gas (TCFG), a mean of 5.9 million barrels of oil (MMBO), and a mean of 7.6 million barrels of total natural gas liquids (MMBNGL). Most (83 percent, or 7 TCFG) of the potential undiscovered gas resource is continuous (unconventional) coal-bed gas in the Pottsville Coal TPS (table 1). Undiscovered conventional gas resources, estimated to be about 1.5 TCFG at the mean, are in the Chattanooga Shale/Floyd Shale-Paleozoic TPS, and undiscovered conventional oil resources, estimated to be about 5.9 million barrels (MMB) at the mean, are also within the Chattanooga Shale/Floyd Shale-Paleozoic TPS (table 1).

**Table 1. Black Warrior Basin Province assessment results.**

[MMBO, million barrels of oil; BCFG, billion cubic feet of gas; MMBNGL, million barrels of natural gas liquids. Results shown are fully risked estimates. For gas fields, all liquids are included under the NGL (natural gas liquids) category. F95 denotes a 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]

	Total Petroleum Systems (TPS) and Assessment Units (AU)	Field type	Total undiscovered resources											
			Oil (MMBO)				Gas (BCFG)				NGL (MMBNGL)			
			F95	F50	F5	Mean	F95	F50	F5	Mean	F95	F50	F5	Mean
Conventional Oil and Gas Resources	<b>Chattanooga Shale/ Floyd Shale-Paleozoic TPS</b>													
	Pre-Mississippian Carbonates AU	<b>Gas</b>					116.02	939.32	2,550.91	1,087.36	0.54	4.54	15.00	5.71
	Carboniferous Sandstones AU	<b>Oil</b>	1.82	5.30	12.04	5.91	2.31	7.24	17.78	8.26	0.01	0.04	0.11	0.05
		<b>Gas</b>					73.88	320.23	774.69	359.55	0.34	1.54	4.64	1.89
	<b>Total Conventional Resources</b>		<b>1.82</b>	<b>5.30</b>	<b>12.04</b>	<b>5.91</b>	<b>192.21</b>	<b>1,266.79</b>	<b>3,343.38</b>	<b>1,455.17</b>	<b>0.89</b>	<b>6.12</b>	<b>19.75</b>	<b>7.65</b>
Continuous Oil and Gas Resources	<b>Pottsville Coal TPS</b>													
	Black Warrior Basin AU	<b>CBG</b>					4,614.56	6,854.42	10,181.47	7,055.63	0.00	0.00	0.00	0.00
	<b>Total Continuous Resources</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>4,614.56</b>	<b>6,854.42</b>	<b>10,181.47</b>	<b>7,055.63</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
	<b>Total Undiscovered Oil and Gas Resources</b>		<b>1.82</b>	<b>5.30</b>	<b>12.04</b>	<b>5.91</b>	<b>4,806.77</b>	<b>8,121.21</b>	<b>13,524.85</b>	<b>8,510.80</b>	<b>0.89</b>	<b>6.12</b>	<b>19.75</b>	<b>7.65</b>

**Figure 2. Generalized stratigraphic section for the Black Warrior Basin showing stratigraphic intervals within the Pottsville Coal and the Chattanooga Shale/Floyd Shale-Paleozoic Total Petroleum Systems.**

### 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>.

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