

National Assessment of Oil and Gas Fact Sheet

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

Using a geology-based assessment methodology, the U.S. Geological Survey estimated a mean of 70.2 trillion cubic feet of undiscovered natural gas, a mean of 54 million barrels of undiscovered oil, and a mean of 872 million barrels of undiscovered natural gas liquids in the Appalachian Basin Province.

Introduction

The U.S. Geological Survey (USGS) recently completed an assessment of the undiscovered oil and gas potential of the Appalachian Basin Province (fig. 1). The USGS Appalachian Basin Province for this assessment includes parts of New York, Pennsylvania, Ohio, Maryland, West Virginia, Virginia, Kentucky, Tennessee, Georgia, and Alabama. The assessment of the Appalachian Basin Province 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 6 total petroleum systems (TPS) and 26 assessment units (AU) within these TPS, and quantitatively estimated the undiscovered oil and gas resources within 21 of the 26 AU (table 1).

Resource Summary

The USGS assessed undiscovered conventional oil and gas and undiscovered continuous (unconventional) gas. The USGS estimated a mean of 70.2 trillion cubic feet of gas (TCFG), a mean of 54 million barrels of oil (MMBO), and a mean of 872 million barrels of total natural gas liquids (MMBNGL). Most (94 percent, or 65.9 TCFG) of the undiscovered gas resource is continuous and distributed in three total petroleum systems: Utica-Lower Paleozoic TPS (26.8 TCFG); Devonian Shale-Middle and Upper Paleozoic TPS (30.7 TCFG), and Carboniferous Coal-bed Gas TPS (8.4 TCFG) (table 1). Coal-bed gas accounts for about 12.7 percent of the total undiscovered continuous gas in the Appalachian Basin Province. Several coal-bed gas assessment units were identified but not quantitatively assessed for this study (table 1). The remainder of the undiscovered gas is in conventional oil and gas accumulations (4.3 TCFG).



Figure 1. Appalachian Basin Province.

The USGS assessed a mean of 54 million barrels (MMB) of undiscovered oil in the Appalachian Basin Province. The Utica-Lower Paleozoic TPS is estimated to contain a mean of about 47 MMB of conventional oil, or about 86 percent of all undiscovered oil. The Devonian Shale-Middle and Upper Paleozoic TPS contains a mean of 7.5 MMBO, or about 14 percent of the undiscovered oil (table 1).

For Further Information

Supporting geologic studies of total petroleum systems and assessment units, and the methodology used in the Appalachian Basin Province assessment are in progress. Assessment results are available at the USGS Central Energy Team website at <http://energy.cr.usgs.gov/oilgas/noga>.

Appalachian Basin Province Assessment Team

Robert C. Milici (Task Leader; rmilici@usgs.gov); Robert T. Ryder, Christopher S. Swezey, Ronald R. Charpentier, Troy A. Cook, Robert A. Crovelli, Timothy R. Klett, Richard M. Pollastro, and Christopher J. Schenk.

Table 1. Appalachian 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 is Total Petroleum System. AU is Assessment Unit. CBG is 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	Conasauga-Rome/Conasauga TPS														
	Rome Trough AU	Gas					173.02	583.57	1,165.61	615.60	0.97	3.40	7.42	3.70	
	Sevier-Knox/Trenton TPS														
	Lower Paleozoic Carbonates AU	Not quantitatively assessed													
	Utica-Lower Paleozoic TPS														
	Lower Paleozoic Carbonates in Thrust Belt AU	Gas					38.61	253.95	725.60	301.90	0.37	2.46	7.55	3.02	
	Knox Unconformity AU	Oil	11.70	29.55	51.65	30.44	53.49	143.31	279.60	152.33	0.50	1.40	2.99	1.53	
		Gas					150.76	404.67	749.87	421.61	1.39	3.92	8.04	4.21	
	Black River-Trenton Hydrothermal Dolomite AU	Oil	3.14	13.96	37.19	16.29	14.55	67.73	195.06	81.48	0.14	0.66	2.03	0.82	
		Gas					575.13	1,740.48	3,388.28	1,837.22	5.37	16.92	36.10	18.33	
	Lockport Dolomite AU	Gas					60.23	191.77	403.71	207.49	0.56	1.86	4.30	2.08	
	Devonian Shale-Middle and Upper Paleozoic TPS														
	Oriskany Sandstone-Structural AU	Gas					120.07	357.92	735.78	386.46	0.67	2.09	4.71	2.31	
	Oriskany Sandstone-Stratigraphic AU	Gas					19.60	60.57	126.66	65.45	0.15	0.47	1.08	0.52	
	Greenbrier Limestone AU	Oil	0.78	2.25	4.74	2.45	1.11	3.30	7.48	3.67	0.04	0.13	0.31	0.15	
		Gas					30.67	112.86	255.29	124.82	0.28	1.10	2.72	1.25	
	Mississippian Sandstone AU	Oil	1.61	4.63	10.09	5.08	2.20	6.73	16.06	7.62	0.08	0.26	0.68	0.31	
		Gas					20.47	94.58	227.06	105.31	0.19	0.92	2.40	1.05	
	Total Conventional Resources			17.23	50.39	103.67	54.26	1,259.91	4,021.44	8,276.06	4,310.96	10.71	35.59	80.33	39.28
	Continuous Oil and Gas Resources	Utica-Lower Paleozoic TPS													
Clinton-Medina Basin Center AU		Gas					6,149.33	10,310.89	17,288.78	10,832.70	54.65	101.03	186.77	108.33	
Clinton-Medina Transitional Northeast AU		Gas					573.25	1,397.79	3,408.33	1,618.85	5.29	13.70	35.46	16.19	
Clinton-Medina Transitional AU		Gas					8,986.25	11,627.12	15,044.10	11,770.64	89.78	136.71	208.17	141.25	
Tuscarora Basin Center AU		Gas					949.07	2,274.63	5,451.60	2,619.59	3.50	8.91	22.71	10.48	
Devonian Shale-Middle and Upper Paleozoic TPS															
Greater Big Sandy AU		Gas					3,877.33	6,089.06	9,562.42	6,322.67	34.06	59.66	104.50	63.23	
Northwestern Ohio Shale AU		Gas					1,453.59	2,511.40	4,338.99	2,654.07	25.95	49.21	93.32	53.08	
Devonian Siltstone and Shale AU		Gas					829.34	1,253.46	1,894.48	1,293.61	17.35	29.48	50.08	31.05	
Marcellus Shale AU		Gas					821.83	1,736.12	3,667.59	1,925.18	4.50	10.21	23.14	11.55	
Catskill Sandstones and Siltstones AU		Gas					6,843.68	11,222.04	18,401.55	11,740.93	121.19	219.91	399.03	234.82	
Berea Sandstone AU		Gas					2,464.14	5,905.11	14,151.13	6,800.38	54.51	138.86	353.71	163.21	
Carboniferous Coal-bed Gas TPS															
Pocahontas Basin AU		CBG					2,929.57	3,552.81	4,308.64	3,577.32	0.00	0.00	0.00	0.00	
East Dunkard (Folded) AU		CBG					2,748.71	4,593.61	7,676.78	4,823.03	0.00	0.00	0.00	0.00	
West Dunkard (Unfolded) AU		CBG	Not quantitatively assessed												
Central Appalachian Shelf AU		CBG	Not quantitatively assessed												
Appalachian Anthracite and Semi-Anthracite AU		CBG	Not quantitatively assessed												
Pottsville Coal-bed Gas TPS															
Cahaba Basin AU		CBG	Not quantitatively assessed												
Total Continuous Resources			0.00	0.00	0.00	0.00	38,626.09	62,474.04	105,194.39	65,978.97	410.78	767.68	1,476.89	833.19	
Total Undiscovered Oil and Gas Resources			17.23	50.39	103.67	54.26	39,886.00	66,495.48	113,470.45	70,289.93	421.49	803.27	1,557.22	872.47	