

National Assessment of Oil and Gas Fact Sheet

Assessment of Undiscovered Oil and Gas Resources of the Bend Arch-Fort Worth Basin Province of North-Central Texas and Southwestern Oklahoma, 2003

Using a geology-based assessment methodology, the U.S. Geological Survey estimated a mean of 26.7 trillion cubic feet (TCF) of undiscovered natural gas, a mean of 98.5 million barrels of undiscovered oil, and a mean of 1.1 billion barrels of undiscovered natural gas liquids in the Bend Arch-Fort Worth Basin Province. More than 98 percent, or 26.2 TCF, of the undiscovered natural gas resource is continuous gas in Mississippian-age Barnett Shale.

Resource Summary

The USGS assessment of undiscovered conventional oil and gas and undiscovered continuous (unconventional) gas within the Bend Arch-Fort Worth Basin Province resulted in estimated means of 26.7 trillion cubic feet of gas (TCFG), 98.5 million barrels of oil (MMBO), and a mean of 1.1 billion barrels of natural gas liquids (BBNGL) in the three TPSs that were assessed (table 1). Nearly all of the undiscovered gas resource (98 percent, or 26.2 TCFG) is considered to be

in continuous accumulations of non-associated gas trapped in strata of two of the three Mississippian-age Barnett Shale AUs — the Greater Newark East Frac-Barrier Continuous Barnett Shale Gas AU and the Extended Continuous Barnett Shale Gas AU — of the Barnett-Paleozoic TPS. The third AU within this TPS, the Hypothetical Basin-Arch Barnett Shale Oil AU, was not quantitatively assessed because of a lack of data.

The potentially giant continuous shale-gas resource (26.2 TCF) within the two AUs of the Barnett-Paleozoic TPS

Introduction

The U.S. Geological Survey (USGS) recently completed an assessment of the undiscovered oil and gas potential of the Bend Arch-Fort Worth Basin Province, north-central Texas and southwestern Oklahoma (fig. 1). The assessment is based on geologic elements of each Total Petroleum System (TPS) defined in the province, including characterization of hydrocarbon source rocks (source-rock maturation, hydrocarbon generation, and migration), reservoir rocks (sequence stratigraphy and petrophysical properties), and hydrocarbon traps (trap formation and timing). By using these criteria, the USGS defined 4 TPSs and 11 Assessment Units (AUs) within them and quantitatively estimated the undiscovered oil and gas resources within 8 of the 11 AUs, which represented 3 of the 4 TPSs (table 1). The TPSs cover a geographic area that includes the bounding structural elements of the Bend arch and Fort Worth Basin: Ouachita thrust front, the Hardeman Basin, Wichita uplift, Llano uplift, Muenster and Red River arches, Broken Bone graben, and easternmost part of the Eastern shelf of the Permian Basin (fig. 1).

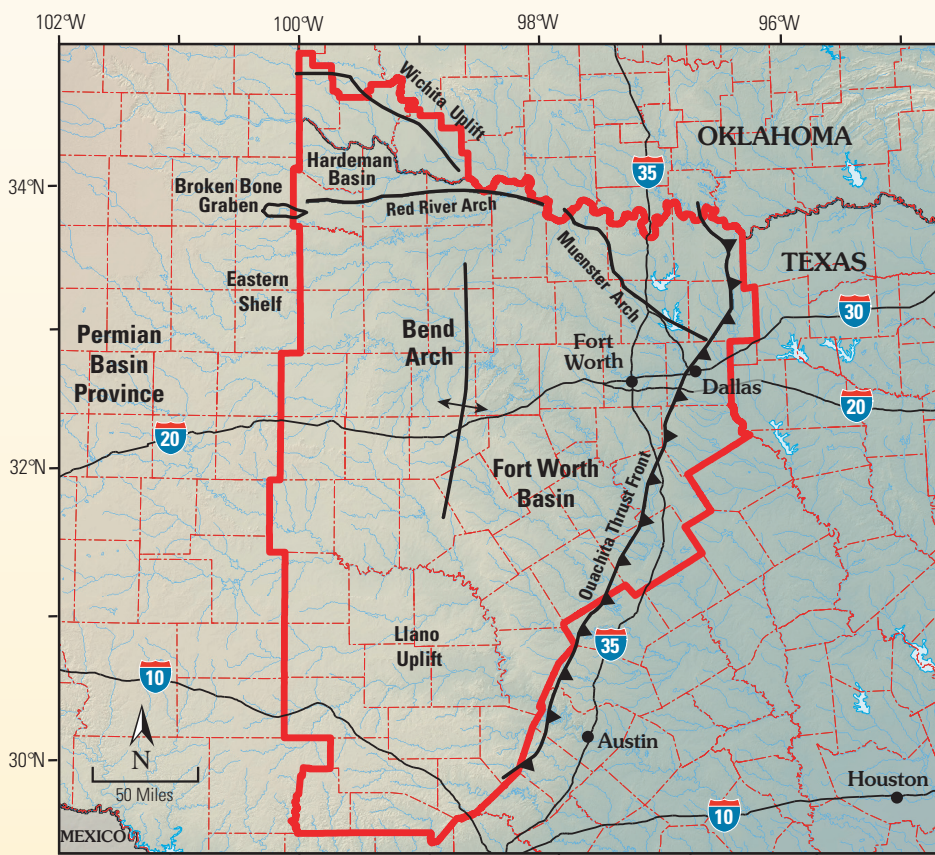


Figure 1. Bend Arch-Fort Worth Basin Province within the boundary outlined in red and primary structural elements of north-central Texas and the southwestern corner of Oklahoma.

had not been previously assessed and is included as an addition to reserves by the USGS (table 1). The remaining 467 billion cubic feet of gas (BCFG) of the estimated undiscovered gas resource in the Province is in conventional nonassociated gas accumulations (358.6 BCFG) and associated/dissolved gas in conventional oil accumulations (108.4 BCFG). The Barnett-Paleozoic TPS is estimated to contain a mean of 409.2 BCFG of conventional gas, or about 88 percent of all undiscovered conventional gas, and about 64.6 MMB of conventional oil, or about 65 percent of all undiscovered oil (table 1) in the Bend Arch-Fort Worth Basin Province.

Two smaller TPSs, the Barnett-Hardeman Basin TPS and the Pennsylvanian Bend-Broken Bone Graben TPS, are estimated to contain a total mean of about 12 percent (57.7 BCFG) of undiscovered conventional gas, and about 35 percent (33.9 MMB) of the undiscovered conventional oil (table 1) in the Province. Because of the lack of data, neither the Hypothetical Continuous Fractured Barnett Shale Oil AU of the Barnett-Hardeman Basin TPS, nor the Hypothetical Pennsylvanian-Lower Permian Coal-Bed Gas AU of the Pennsylvanian-Lower Permian Coal-Bed Gas TPS, was quantitatively assessed (table 1).

For Additional Information

Supporting geologic studies of Total Petroleum Systems and Assessment Units, and reports on the methodology used in the Bend Arch-Fort Worth Basin Province assessment are in progress. Assessment results are available at the USGS Central Energy Team website: <http://energy.cr.usgs.gov/oilgas/noga/>

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Table 1. Bend Arch-Fort Worth 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 coalbed gas. Gray shading indicates not applicable]

	Total Petroleum Systems (TPS) and Assessment Units (AU)	Field Type	Oil (MMBO)				Total undiscovered resources Gas (BCFG)				NGL (MMBNGL)			
			F95	F50	F5	Mean	F95	F50	F5	Mean	F95	F50	F5	Mean
Conventional Oil and Gas Resources	Barnett-Paleozoic TPS													
	Paleozoic Shelf and Bank Carbonates AU	<i>Oil</i>	7.69	19.85	38.90	21.21	11.30	30.96	66.52	33.92	0.63	1.81	4.22	2.03
		<i>Gas</i>					46.10	116.83	219.03	123.15	1.70	4.53	9.42	4.92
	Mississippian Chappel Pinnacle Reefs AU	<i>Oil</i>	2.52	5.39	9.89	5.70	2.52	5.83	11.52	6.27	0.11	0.28	0.61	0.31
		<i>Gas</i>					17.35	44.02	90.63	47.81	0.95	2.57	5.79	2.87
	Pennsylvanian/Permian Fluvial-Deltaic Sandstone and Conglomerate AU	<i>Oil</i>	11.58	35.76	69.80	37.66	16.23	51.87	111.71	56.44	1.06	3.53	8.26	3.95
		<i>Gas</i>					42.39	134.76	262.21	141.59	1.98	6.55	14.04	7.08
	Barnett-Hardeman Basin TPS													
	Mississippian Chappel Waulsortian Mounds AU	<i>Oil</i>	7.54	21.08	39.88	22.17	2.19	6.25	12.35	6.65	0.24	0.68	1.39	0.73
	Paleozoic Clastics and Carbonates AU	<i>Oil</i>	1.63	7.01	17.13	7.89	0.26	1.11	2.77	1.26	0.03	0.12	0.31	0.14
Pennsylvanian Bend-Broken Bone Graben TPS														
Fluvial Sandstone-Carbonate Bank AU	<i>Oil</i>	1.37	3.42	7.73	3.83	1.20	3.34	8.10	3.83	0.05	0.13	0.33	0.15	
	<i>Gas</i>					15.02	42.23	89.50	46.00	0.53	1.51	3.30	1.66	
	Total Conventional Resources		32.33	92.51	183.33	98.46	154.56	437.20	874.34	466.92	7.28	21.71	47.67	23.84
Continuous Oil and Gas Resources	Barnett-Paleozoic TPS													
	Greater Newark East Frac-Barrier Continuous Barnett Shale Gas AU	<i>Gas</i>					13,410.69	14,638.36	15,978.42	14,659.13	406.84	573.70	809.00	586.37
	Extended Continuous Barnett Shale Gas AU	<i>Gas</i>					8,305.14	11,361.66	15,543.04	11,569.73	282.01	445.28	703.09	462.79
	Hypothetical Basin-Arch Barnett Shale Oil AU	<i>Oil</i>					Not quantitatively assessed							
	Barnett-Hardeman Basin TPS													
	Hypothetical Continuous Fractured Barnett Shale Oil AU	<i>Oil</i>					Not quantitatively assessed							
	Pennsylvanian-Lower Permian Coal-Bed Gas TPS													
Hypothetical Pennsylvanian-Lower Permian Coal-Bed Gas AU	<i>CBG</i>					Not quantitatively assessed								
	Total Continuous Resources					21,715.83	26,000.02	31,521.46	26,228.86	688.85	1,018.98	1,512.09	1,049.16	
	TOTAL UNDISCOVERED OIL AND GAS RESOURCES		32.33	92.51	183.33	98.46	21,870.39	26,437.22	32,395.80	26,695.78	696.13	1,040.69	1,559.76	1,074.00