

**National Assessment of Oil and Gas Fact Sheet**

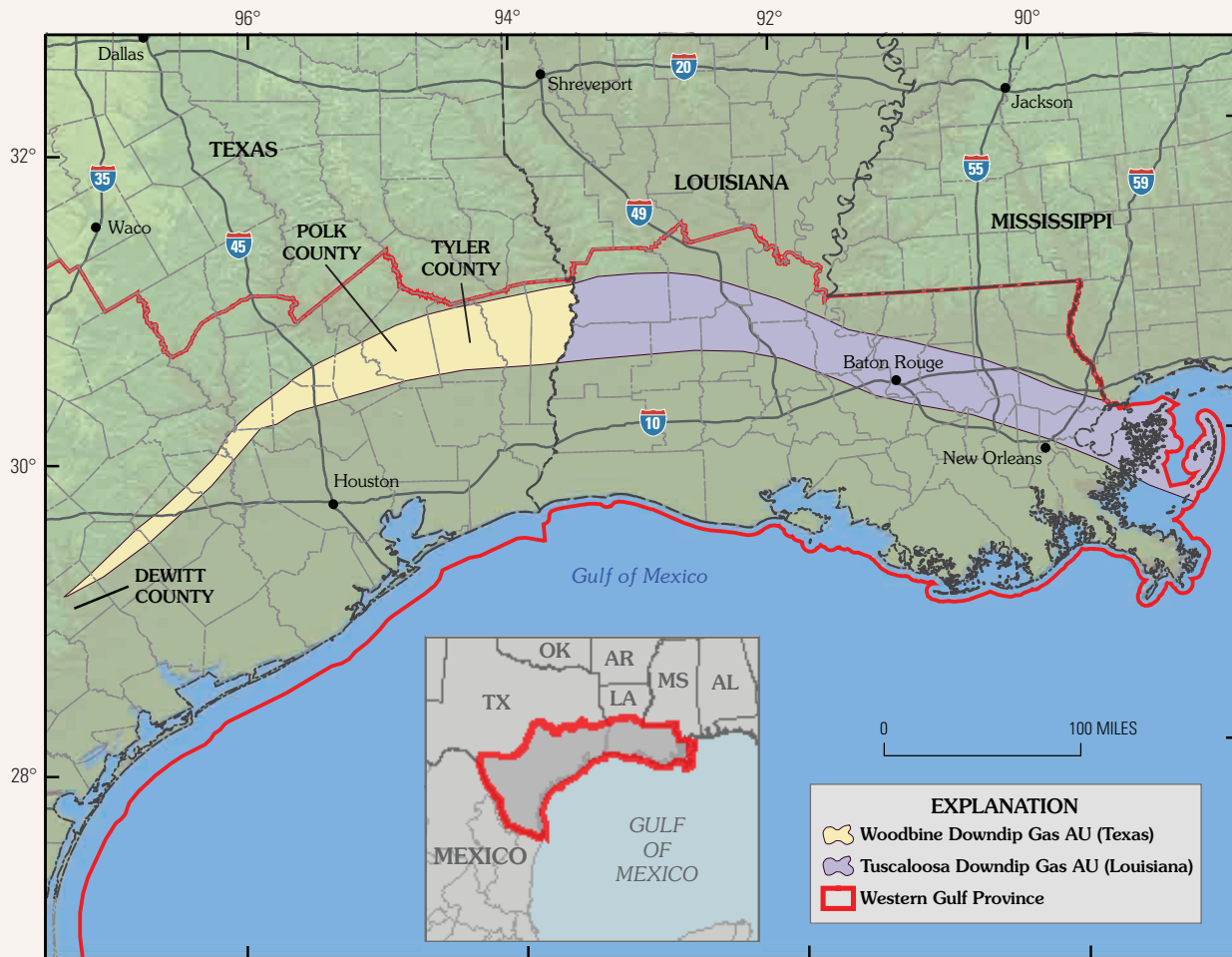
**Assessment of Undiscovered Gas Resources in the Upper Cretaceous Tuscaloosa and Woodbine Formations, Western Gulf Province of the Gulf Coast Region, Louisiana and Texas, 2007**

*Using a geology-based assessment methodology, the U.S. Geological Survey estimated a mean of 20.8 trillion cubic feet of undiscovered natural gas and a mean of 0.60 billion barrels of undiscovered natural gas liquids in the Western Gulf Province of the Gulf Coast Region, Louisiana and Texas.*

**Introduction**

The U.S. Geological Survey (USGS) completed an assessment of the undiscovered natural gas resources of the Upper Cretaceous Tuscaloosa and Woodbine Formations in the downdip trend of Louisiana and Texas, which is located in the Western Gulf Province of the Gulf Coast region (fig. 1). The downdip trend, as defined for this assessment, is bounded on the north by the Lower Cretaceous shelf edge, and the southern limit is drawn where depths to the top of the two formations are at about 25,000 ft. Laterally, the trend extends along the shelf edge eastward into Federal

waters of southeast Louisiana and westward to Dewitt County, Texas, where it pinches out (fig. 1). The assessment of undiscovered gas resources within the trend was based on the geologic elements and petroleum processes used to define a Total Petroleum System (TPS), which includes petroleum source rocks (source-rock maturation and petroleum generation and migration), reservoir and seal rocks (sequence stratigraphy and petrophysical properties), and petroleum traps (trap formation and timing). Using this petroleum-system framework, the USGS defined the Upper Cretaceous Tuscaloosa-Woodbine TPS and two assessment units (AU): the Tuscaloosa Downdip Gas AU and the Woodbine Downdip Gas AU.



**Figure 1.** Map of the Western Gulf Province of the Gulf Coast region showing distribution of the Tuscaloosa Downdip Gas and Woodbine Downdip Gas Assessment Units (AU) in the Upper Cretaceous Tuscaloosa-Woodbine Total Petroleum System.

## Geologic Model

The downdip Tuscaloosa Formation in Louisiana and the Woodbine Formation in Texas are laterally equivalent units composed of interbedded conglomerate, sandstone, and shale. In Louisiana, coarse clastics form the lower part of the Tuscaloosa, and the upper part is a marine shale that correlates with marine shales of the Eagle Ford Group that overlies the Woodbine in Texas. Major production of natural gas in the Tuscaloosa and Woodbine Formations is from gas fields localized in two areas: one near Baton Rouge, La. and the other in Polk and Tyler Counties, Texas (fig. 1). Large areas extending downdip from the known fields, as well as both east and west of the two producing areas, have few well penetrations and are considered to be underexplored.

In the Upper Cretaceous Tuscaloosa-Woodbine TPS, gas is produced from overpressured sandstone reservoirs that were deposited in deltas and prograding shelf-margin complexes basinward (southward) of the Lower Cretaceous shelf edge. Jurassic Louann Salt underlies a thick Lower Cretaceous carbonate section that is subjacent to the Tuscaloosa and Woodbine, and deformation of the salt into ridges and diapirs influenced where sediment accumulated in the trend. In areas of salt withdrawal between ridges, greater sediment deposition led to syndepositional growth faulting and the formation of rollover anticlines. The major traps that have been explored are growth faults associated with these anticlines and diapirs. In producing areas, the bulk of the gas in Tuscaloosa and Woodbine reservoirs formed in shales within these formations, and the gas migrated vertically into sandstone reservoirs where it accumulated adjacent to sealing (low-permeability) shales and growth faults. Geologic and petroleum-system models indicate that the controls on sediment deposition and on gas generation, migration, and accumulation may be similar in underexplored areas of the downdip trend. Thus large volumes of gas likely are present downdip as well as along strike of known producing areas, assuming the presence of adequate reservoirs, seals, and traps.

**Table 1.** Upper Cretaceous Tuscaloosa-Woodbine Total Petroleum System assessment results.

[MMB0, 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, assuming perfect positive correlation. Totals reflect rounding to nearest whole number. Gray shading indicates not applicable]

Conventional Oil and Gas Resources	Total Petroleum System (TPS) and Assessment Units (AU)	Field type	Total undiscovered resources														
			Oil (MMB0)				Gas (BCFG)				NGL (MMBNGL)						
			F95	F50	F5	Mean	F95	F50	F5	Mean	F95	F50	F5	Mean			
	Upper Cretaceous Tuscaloosa-Woodbine TPS																
	Tuscaloosa Downdip Gas AU	Oil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Gas					8,117	15,405	26,659	16,164	197	407	776	437			
	Woodbine Downdip Gas AU	Oil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Gas					1,640	4,261	8,771	4,622	54	149	336	166			
	<b>Total Conventional Resources</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,757</b>	<b>19,666</b>	<b>35,431</b>	<b>20,786</b>	<b>251</b>	<b>556</b>	<b>1,112</b>	<b>603</b>			

## Resource Summary

The USGS assessed undiscovered conventional gas resources in the Tuscaloosa Downdip Gas and Woodbine Downdip Gas AUs, exclusive of reserve growth, resulting in combined mean estimates of 20.8 trillion cubic feet of non-associated gas (TCFG) and 0.60 billion barrels of natural gas liquids (table 1). The Tuscaloosa Downdip Gas AU contains approximately 16.2 TCFG, representing about 78 percent of the total mean undiscovered nonassociated gas resource. The remaining 4.6 TCFG is in the Woodbine Downdip Gas AU. The assessment was based on 2000 IHS well and production data (IHS Energy Group, 2001a, b) and 1998 Nehring field data (NRG Associates, 2000). A reevaluation using 2003 IHS (IHS Energy Group, 2004a, b) and 2003 Nehring (NRG Associates, 2005) data indicates that 53 wells were drilled since 2000 and no new fields have been discovered since 1998; thus there is no change in the assessed resources of the trend.

## References

- IHS Energy Group, 2001a, PI/Dwights PLUS U.S. production data: Englewood, Colo., IHS Energy Group; database available from IHS Energy Group, 15 Inverness Way East, D205, Englewood, CO 80112, U.S.A.
- IHS Energy Group, 2001b, PI/Dwights PLUS U.S. well data: Englewood, Colo., IHS Energy Group; database available from IHS Energy Group, 15 Inverness Way East, D205, Englewood, CO 80112, U.S.A.

IHS Energy Group, 2004a, PI/Dwights PLUS U.S. production data: Englewood, Colo., IHS Energy Group; database available from IHS Energy Group, 15 Inverness Way East, D205, Englewood, CO 80112, U.S.A.

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NRG Associates, 2000, The significant oil and gas fields of the United States: Colorado Springs, Colo., NRG Associates, Inc.; database available from NRG Associates, Inc., P.O. Box 1955, Colorado Springs, CO 80901, U.S.A.

NRG Associates, 2005, The significant oil and gas fields of the United States: Colorado Springs, Colo., NRG Associates, Inc.; database available from NRG Associates, Inc., P.O. Box 1955, Colorado Springs, CO 80901, U.S.A.

## For Further Information

Reports on geologic studies of the total petroleum system and assessment unit and the methodology used in the Tuscaloosa-Woodbine assessment are in progress. Assessment results are available at the USGS Central Energy Team website: <http://energy.cr.usgs.gov/oilgas/noga/>

## Assessment Team

Janet K. Pitman (Task Leader; [jpitman@usgs.gov](mailto:jpitman@usgs.gov)), Russell F. Dubiel, Philip H. Nelson, Joyce Kibler, Ronald R. Charpentier, Troy A. Cook, Timothy R. Klett, Richard Pollastro, and Christopher J. Schenk.