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World Energy Assessment Project Fact Sheet

Assessment of Undiscovered Oil and Gas Resources of the Burgos Basin Province, Northeastern Mexico, 2003

Using a geology-based assessment methodology, the U.S. Geological Survey estimated a mean of 12.9 trillion cubic feet of undiscovered nonassociated gas, a mean of 6.2 billion barrels of undiscovered oil (with 7.4 trillion cubic feet of associated gas), and a mean of 0.52 billion barrels of undiscovered natural gas liquids in the Burgos Basin Province of northeastern Mexico.

Introduction

The U.S. Geological Survey (USGS) recently completed an assessment of the undiscovered oil and gas potential of the Burgos Basin Province of northeastern Mexico (fig. 1) in order to understand the potential contribution of Mexican resources to North American gas supply. The USGS Burgos Basin Province, as defined for this assessment, is bounded on the north by the U.S.-Mexico border, on the west by the Tamaulipas, Peyote-Picachos, and El Burro-Salado uplifts, on the south by the Tampico-Mislanta Basin, and on the east by the Mexican Ridges and part of the Perdido fold belt in the deep-water Gulf of Mexico. The assessment of the Burgos Basin Province is based on the geologic elements of the 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). By using this geologic framework, the USGS defined one composite TPS and five Assessment Units (AU) within the TPS, and quantitatively estimated the undiscovered oil and gas resources within the five AUs (table 1).

Resource Summary

The USGS assessed undiscovered conventional oil and gas resources in the Burgos Basin Province, exclusive of reserve growth. The USGS estimated a mean of 12.9 trillion cubic feet of nonassociated gas (TCFG), a mean of 6.2 billion barrels of oil (with 7.4 TCF of associated gas), and a mean total of 0.52 billion barrels of natural gas liquids for the five AUs (table 1).

The undiscovered nonassociated gas resource (gas in undiscovered gas fields) is assessed to be nearly all onshore in four assessment units; Upper Jurassic-Cretaceous Reservoirs AU, Wilcox Lobo Sandstones AU, Wilcox-Eocene Sandstones AU, and the Frio-Vicksburg Sandstones AU. About half (6.6 TCFG) of the total mean undiscovered nonassociated gas (12.9 TCFG) is estimated to be in the Frio-Vicksburg Sandstones AU (table 1). The Wilcox-Eocene Sandstones AU is estimated to contain a mean of about 3.9 TCFG, and the Wilcox Lobo Sandstones AU about 1.6 TCFG (table 1). The remainder of the nonassociated gas is in the Upper Jurassic-Cretaceous Reservoirs AU and the Eocene-Miocene Sandstones AU.

The mean total volumes of undiscovered oil and associated gas (gas in undiscovered oil fields) were nearly

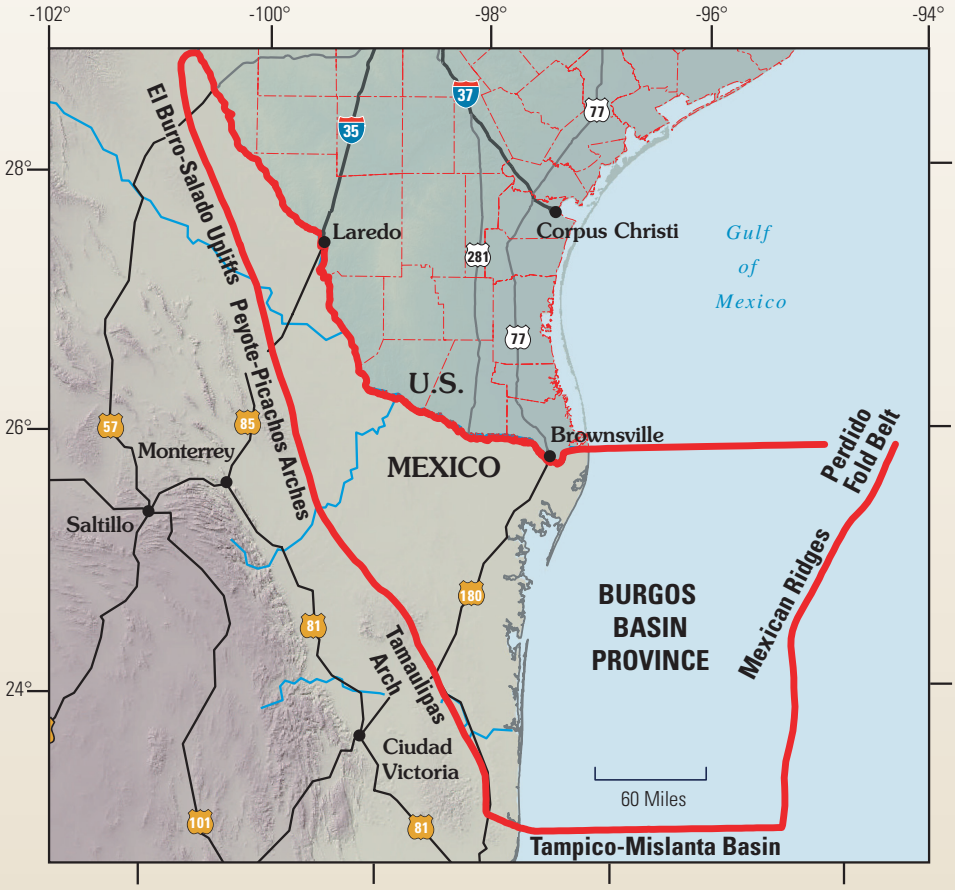

Figure 1. *Burgos Basin Province of northeastern Mexico.*

all in the offshore part of the Eocene-Miocene Sandstones AU (table 1). The geologic model for the Eocene-Miocene Sandstones AU in part was based on recent discoveries along the Perdido fold belt in deep water on the U.S. side of the border. These discoveries are reputed to be in Eocene sandstone reservoirs possibly charged with Upper Jurassic- or Cretaceous-sourced oil and gas. Traps are associated with compressional structures of the Perdido fold belt. A similar geologic model is envisioned for the assessment of undiscovered oil and gas resources in the Mexican Ridges of the Burgos Basin Province immediately south of the Perdido fold belt. This assessment of oil and associated gas resource in the Eocene-Miocene Sandstones AU is highly uncertain given the lack of data in this part of the Burgos Basin Province.

For Further Information

Supporting geologic studies of the Composite Total Petroleum System and Assessment Units, and the methodology used in the Burgos Basin Province assessment, are being prepared. Assessment results are available at the USGS Central Energy Team website: http://energy.cr.usgs.gov/oilgas/.

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Table 1. *Burgos 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. Gray shading indicates not applicable]

Total Petroleum Systems (TPS) and Assessment Units (AU)	Field type	Total undiscovered resources: Oil (MMBO) F95	Oil (MMBO) F50	Oil (MMBO) F5	Oil (MMBO) Mean	Gas (BCFG) F95	Gas (BCFG) F50	Gas (BCFG) F5	Gas (BCFG) Mean	NGL (MMBNGL) F95	NGL (MMBNGL) F50	NGL (MMBNGL) F5	NGL (MMBNGL) Mean
Conventional Oil and Gas Resources													
Upper Jurassic-Cretaceous-Tertiary Composite TPS													
Upper Jurassic-Cretaceous Reservoirs AU	*Oil*	10.33	49.90	141.32	59.23	11.67	58.12	174.91	71.00	0.33	1.70	5.43	2.13
	Gas					80.21	522.17	1,449.22	612.61	1.97	13.07	39.45	15.91
Wilcox Lobo Sandstones AU	*Oil*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas					465.12	1,495.36	3,160.85	1,614.14	8.65	29.01	67.13	32.31
Wilcox-Eocene Sandstones AU	*Oil*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas					1,356.81	3,902.91	6,758.20	3,964.65	37.90	113.56	220.49	119.22
Frio-Vicksburg Sandstones AU	*Oil*	10.39	36.51	80.09	39.83	11.53	42.58	101.87	47.79	0.22	0.83	2.14	0.96
	Gas					2,183.85	6,535.29	11,286.35	6,608.61	61.12	189.19	368.33	198.74
Eocene-Miocene Sandstones AU	*Oil*	476.30	5,247.96	14,424.65	6,065.46	554.99	6,096.22	18,115.73	7,275.68	10.69	117.51	375.47	145.30
	Gas					16.70	81.98	224.97	96.36	0.31	1.59	4.69	1.93
Total Conventional Resources	*Oil*	**497.01**	**5,334.37**	**14,646.06**	**6,164.51**	**578.19**	**6,196.92**	**18,392.51**	**7,394.47**	**11.24**	**120.03**	**383.04**	**148.39**
	Gas					**4,102.69**	**12,537.71**	**22,879.59**	**12,896.37**	**109.95**	**346.42**	**700.09**	**368.09**
Total Undiscovered Oil and Gas Resources		**497.01**	**5,334.37**	**14,646.06**	**6,164.51**	**4,680.88**	**18,734.64**	**41,272.10**	**20,290.84**	**121.19**	**466.45**	**1,083.13**	**516.48**