Executive Summary—2002 Assessment of Undiscovered Oil and Gas Resources in the San Juan Basin Province, Exclusive of Paleozoic Rocks, New Mexico and Colorado

Click here to return to
Volume Title Page

By U.S. Geological Survey San Juan Basin Assessment Team

Chapter 1 of 7

Total Petroleum Systems and Geologic Assessment of Undiscovered Oil and Gas Resources in the San Juan Basin Province, Exclusive of Paleozoic Rocks, New Mexico and Colorado

Compiled by U.S. Geological Survey San Juan Basin Assessment Team

Digital Data Series 69–F

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
KEN SALAZAR, Secretary

U.S. Geological Survey
Marcia K. McNutt, Director

U.S. Geological Survey, Reston, Virginia 2013

For product and ordering information:
World Wide Web: *http://www.usgs.gov/pubprod*
Telephone: 1-888-ASK-USGS

For more information on the USGS—the Federal source for science about the Earth,
its natural and living resources, natural hazards, and the environment:
World Wide Web: *http://www.usgs.gov*
Telephone: 1-888-ASK-USGS

Suggested citation:
U.S. Geological Survey San Juan Basin Assessment Team, 2013, Executive summary—2002 Assessment of undiscovered oil and gas resources in the San Juan Basin Province, exclusive of Paleozoic rocks, New Mexico and Colorado, chap. 1 *of* U.S. Geological Survey San Juan Basin Assessment Team, Total petroleum systems and geologic assessment of undiscovered oil and gas resources in the San Juan Basin Province, exclusive of Paleozoic rocks, New Mexico and Colorado: U.S. Geological Survey Digital Data Series 69–F, p. 1–4.

Contents

Figure

Tables

Executive Summary—2002 Assessment of Undiscovered Oil and Gas Resources in the San Juan Basin Province, Exclusive of Paleozoic Rocks, New Mexico and Colorado

By U.S. Geological Survey San Juan Basin Assessment Team

Introduction

In 2002, the U.S. Geological Survey (USGS) estimated undiscovered oil and gas resources that have the potential for additions to reserves in the San Juan Basin Province (5022), New Mexico and Colorado (fig. 1). Paleozoic rocks were not appraised. The last oil and gas assessment for the province was in 1995 (Gautier and others, 1996).

There are several important differences between the 1995 and 2002 assessments. The area assessed is smaller than that in the 1995 assessment. This assessment of undiscovered hydrocarbon resources in the San Juan Basin Province also used a slightly different approach in the assessment, and hence a number of the plays defined in the 1995 assessment are addressed differently in this report. After 1995, the USGS has applied a total petroleum system (TPS) concept to oil and gas

Figure 1. Shaded relief map showing the location and boundary of the San Juan Basin Province (5022) (solid red line) assessed in this 2002 National Oil and Gas Assessment; green line circumscribes the Chama Basin.

basin assessments. The TPS approach incorporates knowledge of the source rocks, reservoir rocks, migration pathways, and time of generation and expulsion of hydrocarbons; thus the assessments are geologically based. Each TPS is subdivided into one or more assessment units, usually defined by a unique set of reservoir rocks, but which have in common the same source rock. Four TPSs and 14 assessment units were geologically evaluated, and for 13 units, the undiscovered oil and gas resources were quantitatively assessed.

Resources Assessed

The hydrocarbon commodities quantitatively assessed include oil, gas, and natural gas liquids. Two assessment categories were used, conventional and continuous. Conventional accumulations have high matrix permeabilities, defined seals and traps, defined gas-water or oil-water contacts, and high recovery factors. The assessment methodology for conventional accumulations incorporates a field number and field-size distribution approach, wherein the minimum, median, and maximum numbers of undiscovered accumulations and sizes of undiscovered accumulations are estimated. For inclusion in this study, a discrete accumulation is at least 0.5 million barrels of oil (MMBO) or 3 billion cubic feet of gas (BCFG) in size.

Continuous oil and gas accumulations include those types of accumulations where the source rocks and reservoir rocks are interbedded or are the same; the reservoir rocks are generally characterized by low permeability (except coal-bed methane plays) and may be abnormally pressured. There is no well-defined gas-water or oil-water contact. Included in the continuous category are low-permeability continuous-type accumulations (including basin-centered), shale oil and gas, and coal-bed gas.

Resource Summary

In this assessment, four TPSs were defined (table 1). These are, in ascending order, Todilto, Mancos-Menefee Composite, Lewis Shale, and Fruitland. There were six conventional assessment units (AU) and eight continuous AUs defined (table 1). Three assessment units—the Lewis Continuous Gas AU, Menefee Coalbed Gas AU, and Tertiary Conventional Gas AU—were not previously evaluated in prior USGS oil and gas assessments. The Menefee Coalbed Gas AU is hypothetical because the Menefee Formation has yet to produce coal-bed gas outside of the thermally mature basin center. The Tertiary Conventional Gas AU has production from several Tertiary formations. Several of the 1995 plays have been redefined, based on new thinking about the depositional systems and the geologic controls on oil and gas accumulation. Most of the boundary changes involved assessment units in the Mancos-Menefee Composite TPS or in the Fruitland TPS. These reconfigurations are discussed more fully in the accompanying chapters, and they make direct comparison to the 1995 assessment results difficult.

The assessment results are shown by TPS and AU in table 1. The USGS estimated a mean of 19.10 million barrels of oil, 50.585 trillion cubic feet of gas (TCFG), and 148.37 million barrels of natural gas liquids of undiscovered resources. All of the undiscovered oil resources are in conventional accumulations in the Todilto TPS and Mancos-Menefee Composite TPS. Over 99 percent of the total undiscovered gas resources are estimated to be in continuous accumulations, primarily in the Fruitland TPS, which accounts for 57.9 percent of this estimate. The Fruitland Formation alone accounts for 46.8 percent of the estimated undiscovered gas in continuous accumulations. Over 97 percent of the undiscovered natural gas liquids are in continuous reservoirs in the Mancos-Menefee Composite TPS, Lewis Shale TPS, and Fruitland TPS (table 1). A comparison of total undiscovered resources between the 1995 assessment and this 2002 assessment is shown in table 2.

Table 1. San Juan Basin Province, New Mexico and Colorado, 2002 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 only under the assumption of perfect positive correlation. TPS, Total Petroleum System; AU, Assessment Unit. Gray shading indicates not applicable or not assessed]

	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	**Fruitland TPS**													
	Tertiary Conventional Gas AU	***Gas***					25.76	74.40	152.91	79.98	0.23	0.73	1.83	0.84
	Mancos-Menefee Composite TPS													
	Mesaverde Updip Conventional Oil		not quantitatively assessed											
	Gallup Sandstone Conventional Oil and Gas AU	***Oil***	0.00	1.98	6.29	2.34	0.00	0.29	0.98	0.35	0.00	0.00	0.01	0.00
	Mancos Sandstone Conventional Oil and Gas AU	***Oil***	5.41	11.33	20.72	11.99	23.34	53.28	106.75	57.57	0.84	2.07	4.52	2.30
	Dakota-Greenhorn Conventional Oil and Gas AU	***Oil***	0.78	2.26	4.73	2.45	2.53	7.49	17.10	8.34	0.02	0.07	0.16	.08
		Gas					5.59	12.63	22.40	13.35	0.22	0.50	0.96	0.53
	Todilto TPS													
	Entrada Sandstone Conventional Oil	***Oil***	0.81	2.19	4.18	2.32	1.84	5.15	10.66	5.56	0.07	0.20	0.45	0.22
	Total Conventional Resources		**7.00**	**17.76**	**35.92**	**19.10**	**59.06**	**153.24**	**310.80**	**165.15**	**1.38**	**3.57**	**7.93**	**3.97**
Continuous Oil and Gas Resources	**Fruitland TPS**													
	Pictured Cliffs Continuous Gas	***Gas***					3,865.41	5,510.68	7,856.23	5,640.25	9.07	15.95	28.06	16.92
	Fruitland Fairway Coalbed Gas	***Gas***					3,081.06	3,937.16	5,031.14	3,981.14	0.00	0.00	0.00	0.00
	Basin Fruitland Coalbed Gas	***Gas***					17,342.26	19,543.12	22,023.27	19,594.74	0.00	0.00	0.00	0.00
	Lewis Shale TPS													
	Lewis Continuous Gas	***Gas***					8,315.22	10,105.95	12,282.31	10,177.24	18.08	29.25	47.32	30.53
	Mancos-Menefee Composite TPS													
	Mesaverde Central-Basin Continuous Gas	***Gas***					1,053.32	1,305.62	1,618.35	1,316.79	3.44	5.12	7.60	5.27
	Mancos Sandstone Continuous Gas	***Gas***					3,980.80	5,062.07	6,437.03	5,116.37	50.64	73.97	108.04	75.96
	Dakota-Greenhorn Continuous Gas	***Gas***					3,148.66	3,896.17	4,821.14	3,928.98	10.29	15.27	22.66	15.72
	Menefee Coalbed Gas	***Gas***					228.30	569.08	1,418.55	663.94	0.00	0.00	0.00	0.00
	Total Continuous Resources						**41,015.03**	**49,929.85**	**61,488.02**	**50,419.45**	**91.52**	**139.56**	**213.68**	**144.40**
	Total Undiscovered Oil and Gas Resources		**7.00**	**17.76**	**35.92**	**19.10**	**41,074.09**	**50,083.09**	**61,798.82**	**50,584.60**	**92.90**	**143.13**	**221.61**	**148.37**

Table 2. Comparison of undiscovered, oil, gas, and natural gas liquids between the 1995 and 2002 oil and gas assessments of the San Juan Basin Province, New Mexico and Colorado.

[MMBO, million barrels of oil; TCFG, trillion cubic feet of gas; MMBNGL, million barrels of natural gas liquids].

Total Mean Undiscovered Resources	
2002 USGS Assessment	**1995 USGS Assessment**
19.10 MMBO	280 MMBO
50.584 TCFG	29.23 TCFG
148.37 MMBNGL	18.51 MMBNGL

San Juan Basin Assessment Team

Members of the team are, in alphabetical order, Ronald R. Charpentier, Steven M. Condon, Troy Cook, Robert Crovelli, Russell F. Dubiel, Joseph R. Hatch, Timothy R. Klett, Jennie L. Ridgley (project chief), and Christopher J. Schenk.

Reference Cited

Gautier, D.L., Dolton, G.L., Takahashi, K.I., and Varnes, K.L., eds., 1996, 1995 National assessment of United States oil and gas resources—Results, methodology, and supporting data: U.S. Geological Survey Digital Data Series 30, Release 2, one CD-ROM.

Click here to return to
Volume Title Page