

## National Assessment of Oil and Gas Fact Sheet

# 2005 Assessment of Undiscovered Oil and Gas Resources in Hanna, Laramie, Shirley Basins Province, Wyoming

*Application of a geology-based assessment methodology by the U.S. Geological Survey resulted in estimated means of 298 billion cubic feet of undiscovered natural gas, 94 million barrels of undiscovered oil, and 14 million barrels of undiscovered natural gas liquids in the Hanna, Laramie, Shirley Basins Province, Wyoming.*

## Introduction

The U.S. Geological Survey (USGS) recently completed an assessment of the undiscovered oil and gas potential of the Hanna, Laramie, Shirley Basins Province of the Rocky Mountain region (fig. 1) as part of a national oil and gas assessment effort. The assessment of the petroleum potential of the province was based on the general geologic elements used to define a total petroleum system (TPS)—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 this geologic framework, the USGS defined five TPSs containing seven assessment units (AUs) and quantitatively estimated the undiscovered resources for three of the seven AUs (table 1).

## Resource Summary

Assessment of the undiscovered oil and gas resources for the three AUs—Tensleep-Casper Oil and Gas AU, Mesozoic–Cenozoic Conventional Oil and Gas AU, and Niobrara Continuous Oil AU—resulted in estimated means of 298 billion cubic feet of nonassociated gas and associated gas in oil fields, 94 million barrels of oil, and 14 million barrels of natural gas liquids (table 1). All of



**Figure 1.** Map of the Hanna, Laramie, Shirley Basins Province (Province 5030) of the Rocky Mountain region (outlined in red).

the undiscovered gas is conventional. The Mesozoic–Cenozoic Conventional Oil and Gas AU contains an estimated mean of 207 billion cubic feet of gas, representing nearly 70 percent of the total mean undiscovered gas resource (298 billion cubic feet) for the province. Two continuous gas and two coal-bed gas AUs were not quantitatively assessed owing to a lack of data.

**Table 1. Hanna, Laramie, Shirley Basins Province assessment results.**

[MMBO, million barrels of oil; BCFG, billion cubic feet of gas; MBNGL, thousand barrels of natural gas liquids; MAS, minimum accumulation size assessed (MMBO or BCFG); Prob., probability (including both geologic and accessibility probabilities) of at least one accumulation equal to or greater than the MAS or, for continuous-type resources, at least one additional cell of equal to or greater than the minimum estimated ultimate recovery; Accum., accumulations. Results shown are fully risked estimates. For gas accumulations, all liquids are included as NGL (natural gas liquids). F95 represents a 95 percent chance of at least the amount tabulated; other fractiles are defined similarly. A single major commodity and its coproducts were assessed for continuous-type assessment units. Fractiles are additive under the assumption of perfect positive correlation. Totals reflect rounding to nearest whole number. Shading indicates not applicable]

Total petroleum system (TPS) and assessment units (AUs)	MAS	Prob. (0–1)	Total undiscovered resources											
			Oil (MMBO)				Gas (BCFG)				NGL (MBNGL)			
			F95	F50	F5	Mean	F95	F50	F5	Mean	F95	F50	F5	Mean
<b>Conventional oil and gas resources</b>														
<b>Phosphoria TPS</b>														
Tensleep-Casper Oil and Gas AU														
Oil accums.	0.5	1	6	19	39	20	6	18	42	20	190	650	1,590	740
Gas accums.	3.0						16	47	101	52	460	1,380	3,220	1,550
Total		1	6	19	39	20	22	66	143	72	650	2,030	4,810	2,290
<b>Mowry-Hanna Composite TPS</b>														
Mesozoic-Cenozoic Conventional Oil and Gas AU														
Oil accums.	0.5	1	7	31	79	36	17	75	208	89	1,620	7,320	21,610	8,910
Gas accums.	3.0						25	99	278	118	460	1,920	5,770	2,360
Total		1	7	31	79	36	42	174	486	207	2,080	9,240	27,380	11,270
<b>Total undiscovered conventional oil and gas resources</b>														
Oil accums.			13	50	119	56	23	94	250	110	1,810	7,970	23,200	9,650
Gas accums.							42	146	379	170	920	3,300	8,990	3,910
Total			13	50	119	56	64	240	629	279	2,730	11,270	32,190	13,560
<b>Continuous oil and gas resources</b>														
<b>Mowry-Hanna Composite TPS</b>														
Hanna Basin Continuous Gas AU—Not quantitatively assessed														
<b>Niobrara TPS</b>														
Niobrara Continuous Oil AU														
Oil accums.	0.5	1	14	33	76	38	6	16	43	19	0	0	0	0
Gas accums.	3.0													
Total		1	14	33	76	38	6	16	43	19	0	0	0	0
<b>Niobrara Biogenic Gas TPS</b>														
Niobrara Biogenic Gas AU—Not quantitatively assessed														
<b>Mesaverde-Hanna Coalbed Gas TPS</b>														
Medicine Bow–Ferris–Hanna Coalbed Gas AU—Not quantitatively assessed														
Mesaverde Coalbed Gas AU—Not quantitatively assessed														
<b>Total undiscovered continuous oil and gas resources</b>														
Oil accums.			14	33	76	38	6	16	43	19	0	0	0	0
Gas accums.														
Total			14	33	76	38	6	16	43	19	0	0	0	0
<b>Total undiscovered oil and gas resources</b>														
Oil accums.			28	83	195	94	29	110	292	129	1,810	7,970	23,200	9,650
Gas accums.							42	146	379	170	920	3,300	8,990	3,910
Total			28	83	195	94	70	256	671	298	2,730	11,270	32,190	13,560

## For Further Information

Geologic studies of total petroleum systems and assessment units, as well as reports on the methodology used in assessing resources, for the Hanna, Laramie, Shirley Basins Province of the Rocky Mountain region are available at the USGS Central Energy Team Web site: <http://energy.cr.usgs.gov/oilgas/noga/>.

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