

**SEVENTH APPROXIMATION
DATA FORM FOR CONVENTIONAL ASSESSMENT UNITS (Version 6, 9 April 2003)**

IDENTIFICATION INFORMATION

Assessment Geologist:	<u>L.O. Anna</u>	Date:	<u>31-May-06</u>
Region:	<u>North America</u>	Number:	<u>5</u>
Province:	<u>Powder River Basin</u>	Number:	<u>5033</u>
Total Petroleum System:	<u>Mowry</u>	Number:	<u>503302</u>
Assessment Unit:	<u>Muddy Sandstones</u>	Number:	<u>50330202</u>
Based on Data as of:	<u>IHS Energy (2006) and NRG (2005, data current through 2003), Wyoming Oil and</u>		
Notes from Assessor:	<u>NRG reservoir growth function, 30 years</u>		

CHARACTERISTICS OF ASSESSMENT UNIT

Oil (<20,000 cfg/bo overall) or Gas (≥20,000 cfg/bo overall): Oil

What is the minimum accumulation size? 0.5 mmbœ grown
(the smallest accumulation that has potential to be added to reserves)

No. of discovered accumulations exceeding minimum size: Oil: 60 Gas: 8
Established (>13 accums.) X Frontier (1-13 accums.) Hypothetical (no accums.)

Median size (grown) of discovered oil accumulations (mmbœ):
1st 3rd 2.36 2nd 3rd 2.9 3rd 3rd 1.03
Median size (grown) of discovered gas accumulations (bcfg):
1st 3rd 39.32 2nd 3rd 9.07 3rd 3rd

Assessment-Unit Probabilities:

<u>Attribute</u>	<u>Probability of occurrence (0-1.0)</u>
1. CHARGE: Adequate petroleum charge for an undiscovered accum. ≥ minimum size:	<u>1.0</u>
2. ROCKS: Adequate reservoirs, traps, and seals for an undiscovered accum. ≥ minimum size:	<u>1.0</u>
3. TIMING OF GEOLOGIC EVENTS: Favorable timing for an undiscovered accum. ≥ minimum size	<u>1.0</u>

Assessment-Unit GEOLOGIC Probability (Product of 1, 2, and 3): 1.0

UNDISCOVERED ACCUMULATIONS

No. of Undiscovered Accumulations: How many undiscovered accums. exist that are ≥ min. size?:
(uncertainty of fixed but unknown values)

Oil Accumulations:	minimum (>0) <u>2</u>	mode <u>10</u>	maximum <u>30</u>
Gas Accumulations:	minimum (>0) <u>2</u>	mode <u>6</u>	maximum <u>30</u>

Sizes of Undiscovered Accumulations: What are the sizes (**grown**) of the above accums?:
(variations in the sizes of undiscovered accumulations)

Oil in Oil Accumulations (mmbœ):	minimum <u>0.5</u>	median <u>1.5</u>	maximum <u>100</u>
Gas in Gas Accumulations (bcfg):	minimum <u>3</u>	median <u>10</u>	maximum <u>450</u>

AVERAGE RATIOS FOR UNDISCOVERED ACCUMS., TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

<u>Oil Accumulations:</u>	minimum	mode	maximum
Gas/oil ratio (cfg/bo)	1350	2700	5400
NGL/gas ratio (bngl/mmcf)	60	90	120
<u>Gas Accumulations:</u>	minimum	mode	maximum
Liquids/gas ratio (bliq/mmcf)	50	100	150
Oil/gas ratio (bo/mmcf)			

SELECTED ANCILLARY DATA FOR UNDISCOVERED ACCUMULATIONS

(variations in the properties of undiscovered accumulations)

<u>Oil Accumulations:</u>	minimum	mode	maximum
API gravity (degrees)	25	40	55
Sulfur content of oil (%)	0	0.1	0.35
Depth (m) of water (if applicable)			
Drilling Depth (m)	minimum F75	mode F25	maximum
	600	3600	4600

<u>Gas Accumulations:</u>	minimum	mode	maximum
Inert gas content (%)	0.1	0.5	5
CO ₂ content (%)	0.1	0.9	2.2
Hydrogen-sulfide content (%)	0	0	0
Depth (m) of water (if applicable)			
Drilling Depth (m)	minimum F75	mode F25	maximum
	1000	3900	4600

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ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO STATES
Surface Allocations (uncertainty of a fixed value)

1. <u>Montana</u>	represents	<u>29.09</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>5</u>	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	<u>5</u>	_____
2. <u>Wyoming</u>	represents	<u>70.91</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>95</u>	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	<u>95</u>	_____
3. _____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
4. _____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
5. _____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
6. _____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____

7.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
8.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
9.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
10.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
11.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
12.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____

ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO LAND ENTITIES
Surface Allocations (uncertainty of a fixed value)

1. <u>Federal Lands</u>	represents	<u>14.85</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>20</u>	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	<u>20</u>	_____
2. <u>Private Lands</u>	represents	<u>72.03</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>71</u>	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	<u>71</u>	_____
3. <u>Tribal Lands</u>	represents	<u>3.99</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>3</u>	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	<u>3</u>	_____
4. <u>Other Lands</u>	represents	<u>2.19</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>0</u>	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	<u>0</u>	_____
5. <u>MT State Lands</u>	represents	<u>1.85</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>1</u>	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	<u>1</u>	_____
6. <u>WY State Lands</u>	represents	<u>5.09</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>5</u>	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	<u>5</u>	_____

7.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
8.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
9.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
10.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
11.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
12.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____

ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO FEDERAL LAND SUBDIVISIONS
Surface Allocations (uncertainty of a fixed value)

1. <u>Bureau of Land Management (BLM)</u>	represents	<u>9.81</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>16</u>	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	<u>16</u>	_____
2. <u>BLM Wilderness Areas (BLMW)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
3. <u>BLM Roadless Areas (BLMR)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
4. <u>National Park Service (NPS)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
5. <u>NPS Wilderness Areas (NPSW)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
6. <u>NPS Protected Withdrawals (NPSP)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____

7. <u>US Forest Service (FS)</u>	represents	<u>1.74</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>3.8</u>	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	<u>3.8</u>	_____
8. <u>USFS Wilderness Areas (FSW)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
9. <u>USFS Roadless Areas (FSR)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
10. <u>USFS Protected Withdrawals (FSP)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
11. <u>US Fish and Wildlife Service (FWS)</u>	represents	<u>3.18</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>0.2</u>	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	<u>0.2</u>	_____
12. <u>USFWS Wilderness Areas (FWSW)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____

13. <u>USFWS Protected Withdrawals (FWSP)</u>	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
14. <u>Wilderness Study Areas (WS)</u>	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
15. <u>Department of Energy (DOE)</u>	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
16. <u>Department of Defense (DOD)</u>	_____	represents	0.03	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		0	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		0	_____
17. <u>Bureau of Reclamation (BOR)</u>	_____	represents	0.09	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		0	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		0	_____
18. <u>Tennessee Valley Authority (TVA)</u>	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____

19. Other Federal represents _____ area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____

20. _____ represents _____ area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____

ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO ECOSYSTEMS
Surface Allocations (uncertainty of a fixed value)

1.	<u>Bighorn Mountains (BHMT)</u>	represents	<u>2.48</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	_____	<u>0</u>	_____
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	_____	<u>0</u>	_____
2.	<u>Northern Parks and Ranges (NPRN)</u>	represents	<u>0.01</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	_____	<u>0</u>	_____
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	_____	<u>0</u>	_____
3.	<u>Northwestern Great Plains (NWGP)</u>	represents	<u>21.57</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	_____	<u>23</u>	_____
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	_____	<u>23</u>	_____
4.	<u>Powder River Basin (PRBA)</u>	represents	<u>75.94</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	_____	<u>77</u>	_____
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	_____	<u>77</u>	_____
5.	_____	represents	_____	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	_____	_____	_____
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	_____	_____	_____
6.	_____	represents	_____	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	_____	_____	_____
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	_____	_____	_____

7.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
8.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
9.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
10.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
11.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
12.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____