

**FORSPAN ASSESSMENT MODEL FOR CONTINUOUS
ACCUMULATIONS--BASIC INPUT DATA FORM (NOGA, Version 9, 2-10-03)**

IDENTIFICATION INFORMATION

Assessment Geologist:	T.M. Finn and R.C. Johnson	Date:	19-Feb-08
Region:	North America	Number:	5
Province:	Bighorn Basin	Number:	5034
Total Petroleum System:	Cretaceous-Tertiary Composite	Number:	503402
Assessment Unit:	Mesaverde Sandstone Continuous Gas	Number:	50340264
Based on Data as of:	IHS Energy (2007); Cardinal and others (1989); MGS (1985)		
Notes from Assessor:	Wind River Basin Mesaverde-Meeteetse Sandstone Gas (50350264) assessment unit used as analog.		

CHARACTERISTICS OF ASSESSMENT UNIT

Assessment-unit type: Oil (<20,000 cfg/bo) or Gas (≥20,000 cfg/bo), incl. disc. & pot. additions Gas

What is the minimum total recovery per cell? 0.02 (mmbo for oil AU; bcfg for gas AU)

Number of tested cells: 1

Number of tested cells with total recovery per cell ≥ minimum: 0

Established (discovered cells): _____ Hypothetical (no cells): X

Median total recovery per cell (for cells ≥ min.): (mmbo for oil AU; bcfg for gas AU)

1st 3rd discovered _____ 2nd 3rd _____ 3rd 3rd _____

Assessment-Unit Probabilities:

Attribute	Probability of occurrence (0-1.0)
1. CHARGE: Adequate petroleum charge for an untested cell with total recovery ≥ minimum.	<u>1.0</u>
2. ROCKS: Adequate reservoirs, traps, seals for an untested cell with total recovery ≥ minimum.	<u>1.0</u>
3. TIMING: Favorable geologic timing for an untested cell with total recovery ≥ minimum.	<u>1.0</u>
Assessment-Unit GEOLOGIC Probability (Product of 1, 2, and 3):	<u>1.0</u>

NO. OF UNTESTED CELLS WITH POTENTIAL FOR ADDITIONS TO RESERVES

1. Total assessment-unit area (acres): (uncertainty of a fixed value)

calculated mean 221,000 minimum 199,000 mode 221,000 maximum 243,000

2. Area per cell of untested cells having potential for additions to reserves (acres): (values are inherently variable)

calculated mean 83.3 minimum 20 mode 50 maximum 180

uncertainty of mean: minimum 60 maximum 100

3. Percentage of total assessment-unit area that is untested (%): (uncertainty of a fixed value)

calculated mean 100 minimum 100 mode 100 maximum 100

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**NO. OF UNTESTED CELLS WITH POTENTIAL FOR ADDITIONS TO RESERVES
(Continued)**

4. Percentage of untested assessment-unit area that has potential for additions to reserves (%):
(a necessary criterion is that total recovery per cell \geq minimum; uncertainty of a fixed value)

calculated mean 3.6 minimum 0.2 mode 2.1 maximum 8.5

Geologic evidence for estimates:

TOTAL RECOVERY PER CELL

Total recovery per cell for untested cells having potential for additions to reserves:
(values are inherently variable; mmbo for oil AU; bcfg for gas AU)

calculated mean 0.34 minimum 0.02 median 0.2 maximum 5

AVERAGE COPRODUCT RATIOS FOR UNTESTED CELLS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

<u>Oil assessment unit:</u>	minimum	mode	maximum
Gas/oil ratio (cfg/bo)	<u> </u>	<u> </u>	<u> </u>
NGL/gas ratio (bnl/mmcf)	<u> </u>	<u> </u>	<u> </u>
<u>Gas assessment unit:</u>			
Liquids/gas ratio (bliq/mmcf)	<u>0</u>	<u>3</u>	<u>6</u>

SELECTED ANCILLARY DATA FOR UNTESTED CELLS

(values are inherently variable)

<u>Oil assessment unit:</u>	minimum	mode	maximum
API gravity of oil (degrees)	_____	_____	_____
Sulfur content of oil (%)	_____	_____	_____
Depth (m) of water (if applicable)	_____	_____	_____

Drilling depth (m)

minimum	F75	mode	F25	maximum
_____	_____	_____	_____	_____

<u>Gas assessment unit:</u>	minimum	mode	maximum
Inert-gas content (%)	0.00	0.50	4.00
CO ₂ content (%)	0.00	0.25	1.00
Hydrogen sulfide content (%)	0.00	0.00	0.00
Heating value (BTU)	1000	1150	1300
Depth (m) of water (if applicable)	_____	_____	_____

Drilling depth (m)

minimum	F75	mode	F25	maximum
3800	_____	4270	_____	5340

<u>Success ratios:</u>	calculated mean	minimum	mode	maximum
Future success ratio (%)	30	10	30	50

Historic success ratio, tested cells (%) _____

Completion practices:

- | | |
|--|--------------|
| 1. Typical well-completion practices (conventional, open hole, open cavity, other) | conventional |
| 2. Fraction of wells drilled that are typically stimulated | 100 |
| 3. Predominant type of stimulation (none, frac, acid, other) | hydrofrac |
| 4. Fraction of wells drilled that are horizontal | 0 |
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ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO STATES
Surface Allocations (uncertainty of a fixed value)

1. <u>Wyoming</u>	represents	<u>100</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	<u>100</u>	_____
2. _____	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
3. _____	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
4. _____	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
5. _____	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
6. _____	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____

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7. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____

8. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____

9. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____

10. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____

11. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____

12. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____

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

1. <u>Federal Lands</u>		represents	<u>78.83</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in gas assessment unit:</u>				
Volume % in entity	_____		<u>92</u>	_____
2. <u>Private Lands</u>		represents	<u>15.64</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in gas assessment unit:</u>				
Volume % in entity	_____		<u>0</u>	_____
3. <u>Tribal Lands</u>		represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in gas assessment unit:</u>				
Volume % in entity	_____		_____	_____
4. <u>Other Lands</u>		represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in gas assessment unit:</u>				
Volume % in entity	_____		_____	_____
5. <u>WY State Lands</u>		represents	<u>5.52</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in gas assessment unit:</u>				
Volume % in entity	_____		<u>8</u>	_____
6. _____		represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in gas assessment unit:</u>				
Volume % in entity	_____		_____	_____

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7. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

Gas in gas assessment unit:

Volume % in entity	_____	_____	_____
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8. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

Gas in gas assessment unit:

Volume % in entity	_____	_____	_____
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9. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

Gas in gas assessment unit:

Volume % in entity	_____	_____	_____
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10. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

Gas in gas assessment unit:

Volume % in entity	_____	_____	_____
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11. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

Gas in gas assessment unit:

Volume % in entity	_____	_____	_____
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12. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

Gas in gas assessment unit:

Volume % in entity	_____	_____	_____
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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>78.83</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	<u>92</u>	_____
2. <u>BLM Wilderness Areas (BLMW)</u>	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
3. <u>BLM Roadless Areas (BLMR)</u>	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
4. <u>National Park Service (NPS)</u>	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
5. <u>NPS Wilderness Areas (NPSW)</u>	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
6. <u>NPS Protected Withdrawals (NPSP)</u>	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____

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

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

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19. Other Federal represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____

20. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____

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

1. <u>Bighorn Basin (BHBA)</u>	represents	<u>78.23</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	<u>83</u>	_____
2. <u>Yellowstone Highlands (YSHL)</u>	represents	<u>21.77</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	<u>17</u>	_____
3. _____	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
4. _____	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
5. _____	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
6. _____	represents	_____	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____

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7. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

Gas in gas assessment unit:
Volume % in entity _____

8. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

Gas in gas assessment unit:
Volume % in entity _____

9. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

Gas in gas assessment unit:
Volume % in entity _____

10. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

Gas in gas assessment unit:
Volume % in entity _____

11. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

Gas in gas assessment unit:
Volume % in entity _____

12. _____ represents _____ area % of the AU

<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____

Gas in gas assessment unit:
Volume % in entity _____
