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

IDENTIFICATION INFORMATION

Assessment Geologist:	D.K. Higley-Feldman	Date:	9/15/2004
Region:	North America	Number:	5
Province:	Raton Basin-Sierra Grande Uplift	Number:	5041
Total Petroleum System:	Upper Cretaceous-Tertiary Coalbed Gas	Number:	504101
Assessment Unit:	Raton Coalbed Gas	Number:	50410181
Based on Data as of:	IHS Energy (PI/Dwights) 2004 (data current through 1 January 2004)		
Notes from Assessor:	Comingled Raton and Vermejo production not included.		

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 A.U.; bcfg for gas A.U.)

Number of tested cells: 950

Number of tested cells with total recovery per cell ≥ minimum: 430

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

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

1st 3rd discovered 0.25 2nd 3rd 0.3 3rd 3rd 0.25

Assessment-Unit Probabilities:

Attribute	Probability of occurrence (0-1.0)
1. **CHARGE:** Adequate petroleum charge for an untested cell with total recovery ≥ minimum.	1.0
2. **ROCKS:** Adequate reservoirs, traps, seals for an untested cell with total recovery ≥ minimum.	1.0
3. **TIMING:** Favorable geologic timing for an untested cell with total recovery ≥ minimum.	1.0

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

NO. OF UNTESTED CELLS WITH POTENTIAL FOR ADDITIONS TO RESERVES

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

   calculated mean 1,312,000 minimum 1,246,000 mode 1,312,000 maximum 1,378,000

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

   calculated mean 147 minimum 80 mode 120 maximum 240

   uncertainty of mean: minimum 125 maximum 180

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

   calculated mean 89 minimum 86 mode 89 maximum 91

Assessment Unit (name, no.)
Raton Coalbed Gas, 50410181

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 ≥ minimum; uncertainty of a fixed value)

calculated mean 17 minimum 4 mode 13 maximum 34

Geologic evidence for estimates: Infill drilling of existing sweet spots, extension of drilling to east, west, and southeast, and possibility of few new sweet spots in south.

TOTAL RECOVERY PER CELL

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

calculated mean 0.46 minimum 0.02 median 0.25 maximum 8

AVERAGE COPRODUCT RATIOS FOR UNTESTED CELLS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

	minimum	mode	maximum
Oil assessment unit:			
Gas/oil ratio (cfg/bo)			
NGL/gas ratio (bngl/mmcfg)			
Gas assessment unit:			
Liquids/gas ratio (bliq/mmcfg)	0	0	0

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SELECTED ANCILLARY DATA FOR UNTESTED CELLS

(values are inherently variable)

Oil assessment unit:	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

Gas assessment unit:	minimum	mode	maximum
Inert-gas content (%)			
CO_2 content (%)	0.00	0.50	2.00
Hydrogen sulfide content (%)			
Heating value (BTU)	900	950	1000
Depth (m) of water (if applicable)			

Drilling depth (m)

minimum	F75	mode	F25	maximum
30	213	309	812	1500

Success ratios:	calculated mean	minimum	mode	maximum
Future success ratio (%)	45	20	45	70

Historic success ratio, tested cells (%) 45

Completion practices:

1. Typical well-completion practices (conventional, open hole, open cavity, other) Conventional
2. Fraction of wells drilled that are typically stimulated
3. Predominant type of stimulation (none, frac, acid, other) Possible cavitation
4. Fraction of wells drilled that are horizontal 0

Assessment Unit (name, no.)
Raton Coalbed Gas, 50410181

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

1. Colorado represents 59.14 area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity		60	

2. New Mexico represents 40.86 area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity		40	

3. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

4. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

5. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

6. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

Assessment Unit (name, no.)
Raton Coalbed Gas, 50410181

7. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

8. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

9. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

10. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

11. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

12. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

Assessment Unit (name, no.)
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ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO GENERAL LAND OWNERSHIPS
Surface Allocations (uncertainty of a fixed value)

1. Federal Lands represents 7.81 area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity		5.4	

2. Private Lands represents 89.23 area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity		90.4	

3. Tribal Lands represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

4. Other Lands represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

5. Colorado State Lands represents 2.54 area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity		4	

6. New Mexico State Lands represents 0.41 area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity		0.2	

Assessment Unit (name, no.)
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7. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

8. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

9. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

10. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

11. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

12. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

Assessment Unit (name, no.)
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ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO FEDERAL LAND SUBDIVISIONS
Surface Allocations (uncertainty of a fixed value)

1. Bureau of Land Management (BLM) represents 1.75 area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity		1.4	

2. BLM Wilderness Areas (BLMW) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

3. BLM Roadless Areas (BLMR) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

4. National Park Service (NPS) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

5. NPS Wilderness Areas (NPSW) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

6. NPS Protected Withdrawals (NPSP) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

Assessment Unit (name, no.)
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7. US Forest Service (FS) represents 6.06 area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity		4	

8. USFS Wilderness Areas (FSW) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

9. USFS Roadless Areas (FSR) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

10. USFS Protected Withdrawals (FSP) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

11. US Fish and Wildlife Service (FWS) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

12. USFWS Wilderness Areas (FWSW) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

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13. USFWS Protected Withdrawals (FWSP) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

14. Wilderness Study Areas (WS) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

15. Department of Energy (DOE) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

16. Department of Defense (DOD) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

17. Bureau of Reclamation (BOR) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

18. Tennessee Valley Authority (TVA) represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

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19. Other Federal _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

20. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

Assessment Unit (name, no.)
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ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO ECOSYSTEMS
Surface Allocations (uncertainty of a fixed value)

1. Arkansas Tablelands (ARTL) represents 6.03 area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity		6	

2. Southern Parks and Ranges (SPRA) represents 93.97 area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity		94	

3. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

4. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

5. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

6. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity			
Gas in gas assessment unit: Volume % in entity			

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7. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

8. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

9. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

10. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

11. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

12. _____ represents _____ area % of the AU

	minimum	mode	maximum
Oil in oil assessment unit: Volume % in entity	_____	_____	_____
Gas in gas assessment unit: Volume % in entity	_____	_____	_____

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