

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

IDENTIFICATION INFORMATION

Assessment Geologist:	<u>D.K. Higley-Feldman</u>	Date:	<u>27-Oct-10</u>
Region:	<u>North America</u>	Number:	<u>5</u>
Province:	<u>Anadarko Basin</u>	Number:	<u>5058</u>
Total Petroleum System:	<u>Woodford Composite</u>	Number:	<u>505801</u>
Assessment Unit:	<u>Woodford Shale Oil</u>	Number:	<u>50580162</u>
Based on Data as of:	<u></u>		
Notes from Assessor:	<u>Misener Sandstone excluded</u>		
	<u>Niobrara Continuous Oil, Assessment Unit 50330361 used as analog</u>		

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum total recovery per cell? 0.003 (mmbo for oil A.U.; bcfg for gas A.U.)

Number of tested cells: 21

Number of tested cells with total recovery per cell \geq minimum: 8

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

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

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

Assessment-Unit Probabilities:

<u>Attribute</u>	<u>Probability of occurrence (0-1.0)</u>
1. CHARGE: Adequate petroleum charge for an untested cell with total recovery \geq minimum.	<u>1.0</u>
2. ROCKS: Adequate reservoirs, traps, seals for an untested cell with total recovery \geq minimum.	<u>1.0</u>
3. TIMING: Favorable geologic timing for an untested cell with total recovery \geq 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 12,654,000 minimum 12,000,000 mode 12,662,000 maximum 13,300,000

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

calculated mean 138 minimum 10 mode 85 maximum 320

uncertainty of mean: minimum 100 maximum 200

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

calculated mean 100 minimum 100 mode 100 maximum 100

**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 7 minimum 0.25 mode 5 maximum 15

Geologic evidence for estimates: Current production and EURs GE 20 MMCF are in Woodford isopach thicknesses greater than 80 ft, and within the areas that are thermally mature for oil and gas. Deep basin may have slightly less gas potential due to decreased permeabilities, but associated deep structures may have increased fracturing. At Ro of about 5% in the Bertha Rogers deep well, there is still potential for deep gas. Woodford accumulations in the northeastern third of the AU are smaller, source rocks are in the oil generation window, and Woodford is generally thinner. SE Texas has a thick Woodford section, three Woodford wells, one is non-commingled and GT 0.02 bcfg; area is in the gas generation window.

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 0.06 minimum 0.003 median 0.03 maximum 1.5

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>2500</u>	<u>5000</u>	<u>7500</u>
NGL/gas ratio (bnl/mmcfg)	<u>15</u>	<u>30</u>	<u>45</u>
<u>Gas assessment unit:</u>			
Liquids/gas ratio (bliq/mmcfg)	<u> </u>	<u> </u>	<u> </u>

SELECTED ANCILLARY DATA FOR UNTESTED CELLS

(values are inherently variable)

<u>Oil assessment unit:</u>	minimum	mode	maximum
API gravity of oil (degrees)	<u>30</u>	<u>40</u>	<u>55</u>
Sulfur content of oil (%)	<u>0.01</u>	<u>0.1</u>	<u>0.3</u>
Depth (m) of water (if applicable)	<u> </u>	<u> </u>	<u> </u>

Drilling depth (m)

minimum	F75	mode	F25	maximum
<u>1500</u>	<u> </u>	<u>3000</u>	<u> </u>	<u>5500</u>

Gas assessment unit:

	minimum	mode	maximum
Inert-gas content (%)	<u> </u>	<u> </u>	<u> </u>
CO ₂ content (%)	<u> </u>	<u> </u>	<u> </u>
Hydrogen sulfide content (%)	<u> </u>	<u> </u>	<u> </u>
Heating value (BTU)	<u> </u>	<u> </u>	<u> </u>
Depth (m) of water (if applicable)	<u> </u>	<u> </u>	<u> </u>

Drilling depth (m)

minimum	F75	mode	F25	maximum
<u> </u>				

Success ratios:

	calculated mean	minimum	mode	maximum
Future success ratio (%)	<u>57</u>	<u>40</u>	<u>55</u>	<u>75</u>

Historic success ratio, tested cells (%) 38

Completion practices:

1. Typical well-completion practices (conventional, open hole, open cavity, other)	<u>open-hole</u>
2. Fraction of wells drilled that are typically stimulated	<u>100</u>
3. Predominant type of stimulation (none, frac, acid, other)	<u>frac</u>
4. Fraction of wells drilled that are horizontal	<u>10</u>

Assessment Unit (name, no.)
Woodford Shale Oil, 50580162

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>1.89</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	<u> </u>	<u>2.00</u>	<u> </u>
<u>Gas in gas assessment unit:</u>			
Volume % in entity	<u> </u>	<u> </u>	<u> </u>
2. <u>Private Lands</u>	represents	<u>96.36</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	<u> </u>	<u>97.00</u>	<u> </u>
<u>Gas in gas assessment unit:</u>			
Volume % in entity	<u> </u>	<u> </u>	<u> </u>
3. <u>Tribal Lands</u>	represents	<u>0.02</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	<u> </u>	<u>0.00</u>	<u> </u>
<u>Gas in gas assessment unit:</u>			
Volume % in entity	<u> </u>	<u> </u>	<u> </u>
4. <u>Other Lands</u>	represents	<u> </u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	<u> </u>	<u> </u>	<u> </u>
<u>Gas in gas assessment unit:</u>			
Volume % in entity	<u> </u>	<u> </u>	<u> </u>
5. <u>KS State Lands</u>	represents	<u>0.00</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	<u> </u>	<u>0.00</u>	<u> </u>
<u>Gas in gas assessment unit:</u>			
Volume % in entity	<u> </u>	<u> </u>	<u> </u>
6. <u>OK State Lands</u>	represents	<u>1.69</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	<u> </u>	<u>1.00</u>	<u> </u>
<u>Gas in gas assessment unit:</u>			
Volume % in entity	<u> </u>	<u> </u>	<u> </u>

Assessment Unit (name, no.)
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7.	<u>TX State Lands</u>	represents	<u>0.04</u>	area % of the AU
	<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
	Volume % in entity	<u> </u>	<u>0.00</u>	<u> </u>
	<u>Gas in gas assessment unit:</u>			
	Volume % in entity	<u> </u>	<u> </u>	<u> </u>
8.	<u> </u>	represents	<u> </u>	area % of the AU
	<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
	Volume % in entity	<u> </u>	<u> </u>	<u> </u>
	<u>Gas in gas assessment unit:</u>			
	Volume % in entity	<u> </u>	<u> </u>	<u> </u>
9.	<u> </u>	represents	<u> </u>	area % of the AU
	<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
	Volume % in entity	<u> </u>	<u> </u>	<u> </u>
	<u>Gas in gas assessment unit:</u>			
	Volume % in entity	<u> </u>	<u> </u>	<u> </u>
10.	<u> </u>	represents	<u> </u>	area % of the AU
	<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
	Volume % in entity	<u> </u>	<u> </u>	<u> </u>
	<u>Gas in gas assessment unit:</u>			
	Volume % in entity	<u> </u>	<u> </u>	<u> </u>
11.	<u> </u>	represents	<u> </u>	area % of the AU
	<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
	Volume % in entity	<u> </u>	<u> </u>	<u> </u>
	<u>Gas in gas assessment unit:</u>			
	Volume % in entity	<u> </u>	<u> </u>	<u> </u>
12.	<u> </u>	represents	<u> </u>	area % of the AU
	<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
	Volume % in entity	<u> </u>	<u> </u>	<u> </u>
	<u>Gas in gas assessment unit:</u>			
	Volume % in entity	<u> </u>	<u> </u>	<u> </u>

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	_____	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	_____		_____	_____
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	<u>0.02</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>0.02</u>	_____
<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	<u>0.66</u>	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	<u>0.87</u>	_____
<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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13. <u>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	_____	_____	_____
14. <u>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	_____	_____	_____
15. <u>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	_____	_____	_____
16. <u>Department of Defense (DOD)</u>	represents	1.07	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	1.00	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
17. <u>Bureau of Reclamation (BOR)</u>	represents	0.11	area % of the AU
<u>Oil in oil assessment unit:</u>	minimum	mode	maximum
Volume % in entity	_____	0.11	_____
<u>Gas in gas assessment unit:</u>			
Volume % in entity	_____	_____	_____
18. <u>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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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	_____	_____	_____
