

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

IDENTIFICATION INFORMATION

Assessment Geologist:	C.S. Swezey	Date:	17-Nov-04
Region:	North America	Number:	5
Province:	Michigan Basin	Number:	5063
Total Petroleum System:	Devonian Antrim	Number:	506305
Assessment Unit:	Devonian Antrim Continuous Gas	Number:	50630561
Based on Data as of:	EUR's based on IHS Energy (2003), well counts based on IHS Energy (2004)		
Notes from Assessor:			

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: 8387

Number of tested cells with total recovery per cell ≥ minimum: 6802

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	<u>0.4</u>	2nd 3rd	<u>0.5</u>	3rd 3rd	<u>0.3</u>
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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 ≥ 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 36,161,000 minimum 32,500,000 mode 36,183,000 maximum 39,800,000

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

calculated mean 86.67 minimum 20 mode 80 maximum 160

uncertainty of mean: minimum 60 maximum 120

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

calculated mean 97.9 minimum 96.9 mode 98.1 maximum 98.7

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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 3.5 minimum 2 mode 3.5 maximum 5

Geologic evidence for estimates:

Total AU area that is untested is 35,495,523 acres (mode)
Of the productive area, only about 32.4% has been tested

TOTAL RECOVERY PER CELL

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

calculated mean 0.52 minimum 0.02 median 0.4 maximum 4

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>0</u>	<u>0</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
_____	_____	_____	_____	_____

Gas assessment unit:

		minimum	mode	maximum
Inert-gas content (%)		0.00	1.30	50.00
CO ₂ content (%)		0.00	3.30	6.20
Hydrogen sulfide content (%)		0.00	0.00	0.01
Heating value (BTU)		490	940	1010
Depth (m) of water (if applicable)		0		282

Drilling depth (m)

minimum	F75	mode	F25	maximum
600	_____	975	_____	1350

Success ratios:

	calculated mean	minimum	mode	maximum
Future success ratio (%)	81	76	81	86

Historic success ratio, tested cells (%) _____ 81 _____

Completion practices:

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

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

1. <u>Michigan</u>	represents	<u>85.76</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>100.00</u>	_____
2. <u>Ohio</u>	represents	<u>3.02</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>0.00</u>	_____
3. <u>Indiana</u>	represents	<u>8.61</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>0.00</u>	_____
4. <u>Wisconsin</u>	represents	<u>2.61</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>	_____
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	_____	_____	_____

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>6.07</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>2</u>	_____
2. <u>Private 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	_____	_____	_____
3. <u>Tribal Lands</u>	represents	<u>0.38</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>	_____
4. <u>Other Lands</u>	represents	<u>71.41</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>88</u>	_____
5. <u>Offshore</u>	represents	<u>22.14</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	_____	_____	_____
6. <u>Lake Michigan</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>10</u>	_____

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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 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	0.03	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	_____	0	_____
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>5.60</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>1</u>	_____
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>0.03</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>	_____
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	<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>
<u>14. Wilderness Study Areas (WS)</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>
<u>15. Department of Energy (DOE)</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>
<u>16. Department of Defense (DOD)</u>	represents	<u> 0.41 </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> 1 </u>	<u> </u>
<u>17. Bureau of Reclamation (BOR)</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>
<u>18. Tennessee Valley Authority (TVA)</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>

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19. <u>Other Federal</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	_____		_____	_____
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>Central Loess Plains (CNLP)</u>	represents	<u>1.64</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>0.00</u>	_____
2. <u>Central Till Plains, Beech-Maple (CTPB)</u>	represents	<u>0.93</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>0.00</u>	_____
3. <u>Erie and Ontario Lake Plain (EOLP)</u>	represents	<u>6.15</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>0.00</u>	_____
4. <u>Northern Great Lakes (NGLK)</u>	represents	<u>26.27</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>100.00</u>	_____
5. <u>South Central Great Lakes (SCGL)</u>	represents	<u>41.81</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>0.00</u>	_____
6. <u>Southwestern Great Lakes Morainal (SWGL)</u>	represents	<u>1.06</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>	_____

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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	_____		_____	_____
