

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

IDENTIFICATION INFORMATION

Assessment Geologist:	C.S. Swezey	Date:	9-Dec-04
Region:	North America	Number:	5
Province:	Michigan Basin	Number:	5063
Total Petroleum System:	Ordovician to Devonian Composite	Number:	506303
Assessment Unit:	Ordovician Collingwood Shale Gas	Number:	50630362
Based on Data as of:			
Notes from Assessor:	Not quantitatively assessed.		

CHARACTERISTICS OF ASSESSMENT UNIT

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

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

Number of tested cells: _____

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

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

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

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.	_____
2. ROCKS: Adequate reservoirs, traps, seals for an untested cell with total recovery ≥ minimum.	_____
3. TIMING: Favorable geologic timing for an untested cell with total recovery ≥ minimum.	_____

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

NO. OF UNTESTED CELLS WITH POTENTIAL FOR ADDITIONS TO RESERVES

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

calculated mean _____	minimum _____	mode _____	maximum _____
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2. Area per cell of untested cells having potential for additions to reserves (acres): (values are inherently variable)

calculated mean _____	minimum _____	mode _____	maximum _____
uncertainty of mean: minimum _____	maximum _____		

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

calculated mean _____	minimum _____	mode _____	maximum _____
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Assessment Unit (name, no.)

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 _____ minimum _____ mode _____ maximum _____

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

calculated mean _____ minimum _____ median _____ maximum _____

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)	_____	_____	_____
NGL/gas ratio (bnl/mmcf)	_____	_____	_____
<u>Gas assessment unit:</u>			
Liquids/gas ratio (bliq/mmcf)	_____	_____	_____

Assessment Unit (name, no.)

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 (%)	_____	_____	_____
Hydrogen sulfide content (%)	_____	_____	_____
Heating value (BTU)	_____	_____	_____
Depth (m) of water (if applicable)	_____	_____	_____

Drilling depth (m)

minimum	F75	mode	F25	maximum
_____	_____	_____	_____	_____

Success ratios:

calculated mean	minimum	mode	maximum
Future success ratio (%) _____	_____	_____	_____

Historic success ratio, tested cells (%) _____

Completion practices:

1. Typical well-completion practices (conventional, open hole, open cavity, other) _____
 2. Fraction of wells drilled that are typically stimulated _____
 3. Predominant type of stimulation (none, frac, acid, other) _____
 4. Fraction of wells drilled that are horizontal _____
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Assessment Unit (name, no.)

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

1. _____	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. _____	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	_____	_____	_____

Assessment Unit (name, no.)

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	_____	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>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	_____	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>Offshore</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. _____	_____	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	_____		_____	_____

Assessment Unit (name, no.)

7. _____ represents _____ area % of the AU

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

Gas in gas assessment unit:
Volume % in entity _____ _____ _____

8. _____ represents _____ area % of the AU

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

Gas in gas assessment unit:
Volume % in entity _____ _____ _____

9. _____ represents _____ area % of the AU

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

Gas in gas assessment unit:
Volume % in entity _____ _____ _____

10. _____ represents _____ area % of the AU

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

Gas in gas assessment unit:
Volume % in entity _____ _____ _____

11. _____ represents _____ area % of the AU

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

Gas in gas assessment unit:
Volume % in entity _____ _____ _____

12. _____ represents _____ area % of the AU

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

Gas in gas assessment unit:
Volume % in entity _____ _____ _____

Assessment Unit (name, no.)

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	_____		_____	_____

Assessment Unit (name, no.)

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	_____		_____	_____

Assessment Unit (name, no.)

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

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

Gas in gas assessment unit:
 Volume % in entity _____ _____ _____

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

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

Gas in gas assessment unit:
 Volume % in entity _____ _____ _____

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

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

Gas in gas assessment unit:
 Volume % in entity _____ _____ _____

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

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

Gas in gas assessment unit:
 Volume % in entity _____ _____ _____

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

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

Gas in gas assessment unit:
 Volume % in entity _____ _____ _____

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

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

Gas in gas assessment unit:
 Volume % in entity _____ _____ _____

Assessment Unit (name, no.)

19. Other Federal represents _____ area % of the AU

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

Gas in gas assessment unit:
Volume % in entity _____ _____ _____

20. _____ represents _____ area % of the AU

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

Gas in gas assessment unit:
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	_____	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. _____		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	_____		_____	_____

Assessment Unit (name, no.)

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	_____	_____	_____
