

EXPLANATION OF DATA TABLES FOR HOPE BASIN ASSESSMENT PROVINCE

RESULTS

LOG-N PARAMS (PORE)	Key mathematic parameters that describe log-normal probability distributions for volume of hydrocarbon-bearing rock, in acre-feet, for each play as reported in the PORE module of GRASP .
mu	Natural logarithm of F50 value of log-normal distribution for volume of hydrocarbon-bearing rock, or “ μ ”, for the subject play. mu = $\ln F50$. [Note: distribution mean = $e^{(\mu + 0.5[\text{sig. sq.}])}$.]
sig. sq.	The variance of the log-normal distribution for volume of hydrocarbon-bearing rock, or “ σ^2 ”, for the subject play. sig. sq. = $\{\ln [0.5((F50/F16)+(F84/F50))]\}^2$.
N (MPRO)	Number of hydrocarbon pools calculated for the plays by the MPRO module of GRASP from inputs for probability distributions of prospect numbers and geologic chances of success (approximately the product of play and prospect chances of success). The maximum (Max) number of pools for each play was entered into the MONTE1 module of GRASP to fix the number of pools aggregated to calculate play resources.
Reserves	Sums of recoverable oil and gas volumes for pools within the play, including both proven and inferred reserve categories. A “prop” entry indicates that the reserve data are proprietary.
BCF	Billions of cubic feet of gas, recoverable, at standard (surface) conditions (here fixed at a temperature of 60° Fahrenheit or 520° Rankine, and 14.73 psi atmospheric pressure).
MMB	Millions of barrels of oil, recoverable, at standard (surface) conditions.
Undiscovered Potential	Risked, undiscovered, conventionally recoverable oil and gas resources of the play, here reported at Means of probability distributions.

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Mean Pool Sizes of Ranks 1 to 3 Unrisked (or conditional) mean volumes of recoverable oil and gas in the three largest pools in the play.

PLAY INPUT DATA

F100.....F00 Fractiles for values within probability distributions entered to **GRASP** for calculations of play resources. Four-point distributions (F100, F50, F02, F00) generally indicate that calculations were conducted using log-normal mathematics. Eight-point distributions generally indicate that calculations were conducted using Monte Carlo mathematics. Choice of mathematic approach was in most cases the option of the assessor.

Prospect Area Maximum area of prospect closure, or area within spill contour, in acres. Probability distributions for prospect areas were generally based on distributions assembled independently for each play from large numbers of prospects mapped with seismic reflection data.

Trap Fill Trap fill fraction, or fraction of prospect area in which the reservoir is predicted to be saturated by hydrocarbons.

Pool Area Areal extent of hydrocarbon-saturated part of prospect, in acres. Calculated using **PRASS**, or **SAMPLER** module of **GRASP**, to integrate input probability distributions for prospect areas and trap fill fractions.

Pay Thickness Thickness of hydrocarbon-productive part of reservoir within pool areas, in feet. Probability distributions for prospect areas, trap fill fractions, and pay thicknesses are integrated in the **PORE** module of **GRASP**, to calculate a probability distribution for volume of hydrocarbon-bearing rock, in feet, within the play as reported above under **LOG-N PARAMS (PORE)**.

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Oil Yield (Recov. B/Acre-Foot)	Oil, in barrels at standard (surface) conditions, recoverable from a volume of one acre-foot of oil-saturated reservoir in the subsurface. Oil yield probability distributions were generally calculated in a separate exercise using PRASS to integrate input probability distributions for porosities, oil saturations, oil shrinkage factors (or “Formation Volume Factors”), and oil recovery efficiencies.
Gas Yield (MMCF/Ac.-Ft.)	Gas, in millions of cubic feet at standard (surface) conditions, recoverable from a volume of one acre-foot of gas-saturated reservoir in the subsurface. Distributions were generally calculated in a separate exercise using PRASS to integrate input probability distributions for porosities, gas saturations, reservoir pressures, reservoir temperatures (in degrees Rankine), gas deviation (“Z”) factors, combustible fractions (that exclude noncombustibles such as carbon dioxide, nitrogen, etc.), and gas recovery efficiencies.
Solution Gas-Oil Ratio (CF/B)	Quantity of gas dissolved in oil in the reservoir that separates from the oil when brought to standard (surface) conditions, in cubic feet recovered per barrel of produced oil.
Gas Cond. (B/MMCF)	Quantity of liquids or condensate dissolved in gas in the reservoir that separates from the gas when brought to standard (surface) conditions, in barrels recovered per million cubic feet of produced gas.
Number of Prospects.....	Probability distributions for numbers of prospects in plays, generally ranging from minimum values (F99) representing the numbers of mapped prospects, to maximum values (F00) that include speculative estimates for the numbers of additional prospects that remain unidentified (generally stratigraphic prospects, geophysically indefinite prospects, or prospects expected in areas with no seismic coverage).

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Probabilities for Oil, Gas, or Mixed Pools

Oil (OPROB) Fraction of hydrocarbon pools that consist entirely of oil, with no free gas present. Typically, an undersaturated oil pool.

Gas (GPROB) Fraction of hydrocarbon pools consisting entirely of gas, with no free oil present.

Mixed (MXPROB) Fraction of hydrocarbon pools that contain both oil and gas as free phases, the gas usually present as a gas cap overlying the oil.

Fraction of Net Pay to Oil (OFRAC) When a hydrocarbon pool is modeled as a mixed case, with both oil and gas present, the fraction of pool volume that is saturated by oil in the subsurface.

Play Chance Success Probability that the play contains at least one pool of technically-recoverable hydrocarbons (that would flow into a conventional wellbore in a flow test or during production).

Prospect Chance Success The fraction of prospects within the play that are predicted to contain hydrocarbon pools, given the condition that at least one pool of technically-recoverable hydrocarbons occurs within the play.

Play Type (E-F-C)

Play classification scheme.

E **Established** play, in which significant numbers of fields have been discovered, providing the assessor with data for pool size distributions and reservoirs sufficient to allow the assessor to model the play with confidence.

F **Frontier** play, where exploration activities are at an early stage. Some wells have already been drilled to test the play concept but no commercial fields have been established.

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C **Conceptual** play, hypothesized by analysts based on the subsurface geologic knowledge of the area. Such plays remain hypothetical and the play concept has not been tested.

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				Log-N Params.							
				PORE		N (MPRO)		Reserves		Undiscovered Potential	
Play				Ac/Ft	Ac/Ft	No. Pools		Gas	Oil	Gas	Oil
No.	Area	UAI Code	Name	mu	sig. sq.	Mean	Max	(BCF)	(MMB)	(BCF)	(MMB)
1	Hope	UAHB0101	Late Sequence Play	12.843	1.1839	8.7	40	0	0	3341	90
2	Hope	UAHB0201	Early Sequence Play	12.100	1.0140	5.4	34	0	0	387	11
3	Hope	UAHB0301	Shallow Basal Sands Play	11.628	0.9317	5.9	48	0	0	333	9
4	Hope	UAHB0401	Deep Basal Sands Play	11.619	0.8951	0.2	6	0	0	4	0.1

		MEAN POOL SIZES OF RANKS 1 TO 3											
		Pool #1		Pool #2		Pool #3		INPUT DATA					
PLAY		Gas	Oil	Gas	Oil	Gas	Oil	Prospect Area (Acres)					
No.	Name	(BCF)	(MMB)	(BCF)	(MMB)	(BCF)	(MMB)	F100	F95	F75	F50	F25	F05
1	Late Sequence Play	1784	46	979	26	704	18	330	2600	6000	10000	19000	45000
2	Early Sequence Play	272	7	152	4	110	3	300	2500	5500	10000	19000	45000
3	Shallow Basal Sands Play	235	6	140	4	106	3	470	3300	7000	12000	21000	47000
4	Deep Basal Sands Play	30	1	15	0	10	0	470	3300	7000	12000	21000	47000

		INPUT DATA											
PLAY		Prospect Area (Acres)			Trap Fill (Dec. Frac.)								
No.	Name	F02	F01	F00	F100	F95	F75	F50	F25	F05	F02	F01	F00
1	Late Sequence Play		79000	150000	0.05	0.10	0.13	0.15	0.19	0.25		0.30	0.45
2	Early Sequence Play		83000	170000	0.05	0.10	0.13	0.15	0.19	0.25		0.30	0.45
3	Shallow Basal Sands Play		80000	150000	0.05	0.10	0.13	0.15	0.19	0.25		0.30	0.45
4	Deep Basal Sands Play		80000	150000	0.05	0.10	0.13	0.15	0.19	0.25		0.30	0.45

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PLAY		Pool Area (Acres)								Pay Thickness (Feet)					
No.	Name	F100	F95	F75	F50	F25	F05	F02	F01	F00	F100	F95	F75	F50	F25
1	Late Sequence Play	41			1609			12139		62489	42			235	
2	Early Sequence Play	47			1636			11666		57370	34			110	
3	Shallow Basal Sands Play	63			1869			12158		55499	18			60	
4	Deep Basal Sands Play	67			1854			11568		51050	18			60	

PLAY		Pay Thickness (Feet)				Oil Yield (Recov. B/Acre-Foot)							Gas Yield (MMCF/Ac.-Ft)				
No.	Name	F05	F02	F01	F00	F100	F95	F75	F50	F25	F05	F01	F00	F100	F95	F75	F50
1	Late Sequence Play		610		1322	20	71	127	192	289	520	786	1830	0.058	0.182	0.310	0.449
2	Early Sequence Play		210		355	31	68	97	125	161	231	298	500	0.023	0.075	0.129	0.189
3	Shallow Basal Sands Play		115		195	11	40	71	107	160	286	431	993	0.018	0.074	0.142	0.223
4	Deep Basal Sands Play		115		195	4	10	16	21	29	46	63	122	0.026	0.064	0.098	0.131

PLAY		Gas Yield (MMCF/Ac.-Ft)				Solution Gas Oil Ratio (CF/B)							Gas Cond. (B/MMCF)				
No.	Name	F25	F05	F01	F00	F100	F95	F75	F50	F25	F05	F01	F00	F100	F95	F75	F50
1	Late Sequence Play	0.651	1.110	1.614	3.471	37	105	170	235	330	570	740	1400	6	13	19	24
2	Early Sequence Play	0.276	0.477	0.700	1.535	44	122	202	285	405	670	949	1920	6	13	19	24
3	Shallow Basal Sands Play	0.350	0.671	1.061	2.701	83	192	285	369	485	720	949	1670	6	13	19	24
4	Deep Basal Sands Play	0.176	0.269	0.363	0.666	970	1080	1125	1180	1220	1290	1323	1430	6	13	19	24

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INPUT DATA													
PLAY		Gas Cond. (B/MMCF)				Number of Prospects in Play							
No.	Name	F25	F05	F01	F00	F99	F95	F75	F50	F25	F05	F01	F00
1	Late Sequence Play	31	46	60	110	60	64	71	75	80	88	95	110
2	Early Sequence Play	31	46	60	110	53	57	63	68	73	80	87	100
3	Shallow Basal Sands Play	31	46	60	110	87	95	108	120	130	150	164	200
4	Deep Basal Sands Play	31	46	60	110	8	9	10	10	11	13	14	16

INPUT DATA									
PLAY		Probabilities for Oil, Gas, or Mixed Pools			Fraction of Net	Play	Prospect	Play Type	
No.	Name	Oil (OPROB)	Gas (GPROB)	Mixed (MXPROB)	Pay to Oil (OFRAC)	Chance Success	Chance Success	E - F - C	
1	Late Sequence Play	0	0.9	0.1	0.05	0.50	0.23	C	
2	Early Sequence Play	0	0.9	0.1	0.05	0.40	0.20	C	
3	Shallow Basal Sands Play	0	0.9	0.1	0.05	0.30	0.16	C	
4	Deep Basal Sands Play	0	0.9	0.1	0.05	0.27	0.05	C	