

DRAINAGE RADIUS CALCULATIONS

<u>CALCULATION</u>	<u>METHOD USED</u>
Economic Ultimate Recovery (EUR)	Decline Curve Analysis and Material Balanced
Net Pay (h), Porosity ( $\phi$ )	From Electric Logs
Water Saturation (Sw)	Used average of 30%
Formation Temperature (BHT)	From Scout Ticket
Gas Gravity (SpGr)	Used average of .6
Initial Bottom Hole Pressure (BHP)	From Scout Ticket
Perforated Interval	From Scout Ticket
Bottom Hole Pressure @ Abandonment (BHPab)	Used average observed of 750 psi
Gas Volume Factors (Bg & Bgab)	Calculated from BHP, BHT, and SpGr

$$\text{Drainage Area} = \text{EUR} / (43,560 \times h \times \phi \times (1 - \text{Sw}) \times (\text{Bgi} - \text{Bgab}))$$

$$\text{Drainage Radius} = (\text{Drainage Area} \times 43,560 / 3.14159)^{.5}$$

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MORROW VOLUMETRIC WORKSHEET  
 Included are all Morrow wells in T17S R29-31E

WELL LOCATION	COMPLETION DATE	GROSS PERFORATED INTERVAL	NET THICKNESS (FT)	AVERAGE POROSITY (%)	INITIAL RESERVOIR PRESSURE (PSI)	ESTIMATED ULTIMATE RECOVERY (BCF)	DEPLETED AREA @ EUR (ACRES)	CIRCULAR DRAINAGE RADIUS (FT)
7J-T17S-R29E	3-82	10,518-544	16	8	4,400	2.17	310	2,073
15P-T17S-R29E	9-72	10,770-790	20	10	1,413	2.95	270	1,935
17F-T17S-R29E	10-81	10,500-550	14	8	3,081	1.13	225	1,766
18G-T17S-R29E	6-80	10,604-630	20	11	2,448	2.44	325	2,123
19G-T17S-R29E	7-79	10,744-784	18	14	3,300	1.88	190	1,623
19N-T17S-R29E	5-79	10,679-722	8	7	3,222	0.68	258	1,891
20E-T17S-R29E	5-85	10,604-660	16	11	3,311	0.54	64	942
21P-T17S-R29E	12-70	10,748-774	26	9	2,823	3.72	400	2,355
22E-T17S-R29E	11-57	10,680-760	50	11	4,555	17.40	500	2,633
27E-T17S-R29E	4-77	10,911-929	18	9	4,900	0.16	14	440
28B-T17S-R29E	10-72	10,764-784	20	9	2,995	4.58	590	2,860
28K-T17S-R29E	6-73	10,709-722	13	10	2,871	0.70	132	1,353
30F-T17S-R29E	5-78	10,722-758	28	7	3,121	3.50	395	2,340
30N-T17S-R29E	3-77	10,665-677	12	10	4,537	3.66	460	2,526
31G-T17S-R29E	11-74	10,796-803	7	9	4,400	3.21	930	3,591
31N-T17S-R29E	10-72	10,817-830	13	10	4,366	6.13	860	3,453
33C-T17S-R29E	6-74	10,761-804	30	8	2,382	4.00	460	2,526
70-T17S-R30E	3-72	10,844-880	8	9	3,087	1.60	580	2,836
16F-T17S-R30E	11-63	11,102-143	18	7	4,570	0.24	29	634
18F-T17S-R30E	10-54	10,895-11,057	41	11	4,950	18.65	867	3,467
19C-T17S-R30E	1-88	10,891-960	19	9	1,832	0.63	62	927
20K-T17S-R30E	12-77	11,122-111	6	9	4,300	0.16	41	754
200-T17S-R30E	11-73	11,224-234	12	9	4,319	7.24	950	3,629
26J-T17S-R30E	9-78	11,035-076	6	10	3,320	0.14	55	873
29L-T17S-R30E	10-76	10,855-878	8	10	4,400	0.82	186	1,606
34G-T17S-R30E	2-82	11,398-434	36	11	4,392	7.10	380	2,295
36A-T17S-R30E	3-63	11,445-460	10	7	4,600	0.10	22	552
15N-T17S-R31E	6-54	11,970-12,098*	18	10	4,968	4.53	355	2,219
19N-T17S-R31E	6-65	11,142-218	15	9	4,980	0.62	65	949
21I-T17S-R31E	9-54	11,878-963 *	10	9	4,330	1.02	180	1,580
22D-T17S-R31E	2-54	11,962-982	15	8	4,970	0.91	110	1,234
34N-T17S-R31E	5-82	11,821-893	4	10	5,324	0.15	55	873
AVERAGE VALUES			17	9	3,827	3.21	323	1,902

\* DENOTES OPEN HOLE COMPLETION

ASSUMPTIONS USED IN ECONOMIC ANALYSIS

Dry Hole Cost (M\$)	431
Completed Well Cost (M\$)	725
Working Interest (%)	100
Net Revenue Interest (%)	75
Operating Cost (\$/Month)	1,500
Gas Price	Company Forecast
Start Date	11/90
Chance for a Successful Well (%)	40
Acreage Cost for 320 Acres @ \$200/acre (M\$)	64

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# MORROW DRILLING ECONOMICS EXHIBIT

40% CHANCE OF SUCCESS FOR A NEW WELL

INCLUDING CORPORATE OVERHEAD

