water drive

water drive

projected to Devonian

R 34 E

R 35 E

T 20 S

Pure | Gulf | Texaco | Cactus Drlg.

L.A. & B.G. Parks — Texaco — Cactus Drlg. — "Featherstone Fed." — Martha Featherstone

U D

-10900

-10800

"Quail-Federal" U.S.

State | U.S. Smelting | Gulf | Sinclair Ohio | U.S. | Sinclair "6025"

-10700

EL 3667 TD 14619 DEV-10803

EL 3677 TD 14492 DEV-10680

EL 3686 TD 14501 DEV-10630

EL 3676 TD 14947 DEV-11094

X

X'

"Fed Lea" U.S. — Sinclair

Drlg. & Expl.

EL 3667 TD 14472 DEV-10675

EL 3674 TD 14735 DEV-10611

EL 3683 TD 14476 DEV-10660

-11100

-11200

-11300

-10700

U.S. | U.S. | J.N. Smith

Gulf | Ohio, et al | Ohio | Ohio | Sinclair Ohio

presently drilling - not to Devonian

W.G. Ross Ohio | V.K. Ross Ohio

-10700

U.S.

Gulf | Pure | Pure | Cox & Hamon Ohio | Drlg. & Expl. | Sinclair Ohio | Ross

U D

Ohio

U.S. | U.S. | U.S.

Gulf | Pure | Pure | Drlg. & Expl. | Cox & Hamon Ohio | Ohio | Pan American

-10800

C.C. Bankhead | Drlg. & Expl.

-10900

U.S. | U.S.

E.A. Hanson | H. Aid, Est. | Cox & Hamon | Ohio

U.S | U.S. | State

LEGEND

- BOUNDARY OF LEA UNIT
- DUAL — BONE SPRINGS & DEVONIAN
- DUAL — BONE SPRINGS & PENN. (GAS)
- PROPOSED PARTICIPATING AREA

NOTE: CONTOURS DEPICTED HEREON ARE BASED ON ORIGINAL SEISMIC CONTOURS CORRECTED BY 265 FEET TO REFLECT THE INFORMATION OBTAINED FROM SEVEN WELLS.

CONTOURED ON TOP OF DEVONIAN
CONTOUR INTERVAL —— 100'

LEA UNIT AREA

LEA COUNTY, NEW MEXICO

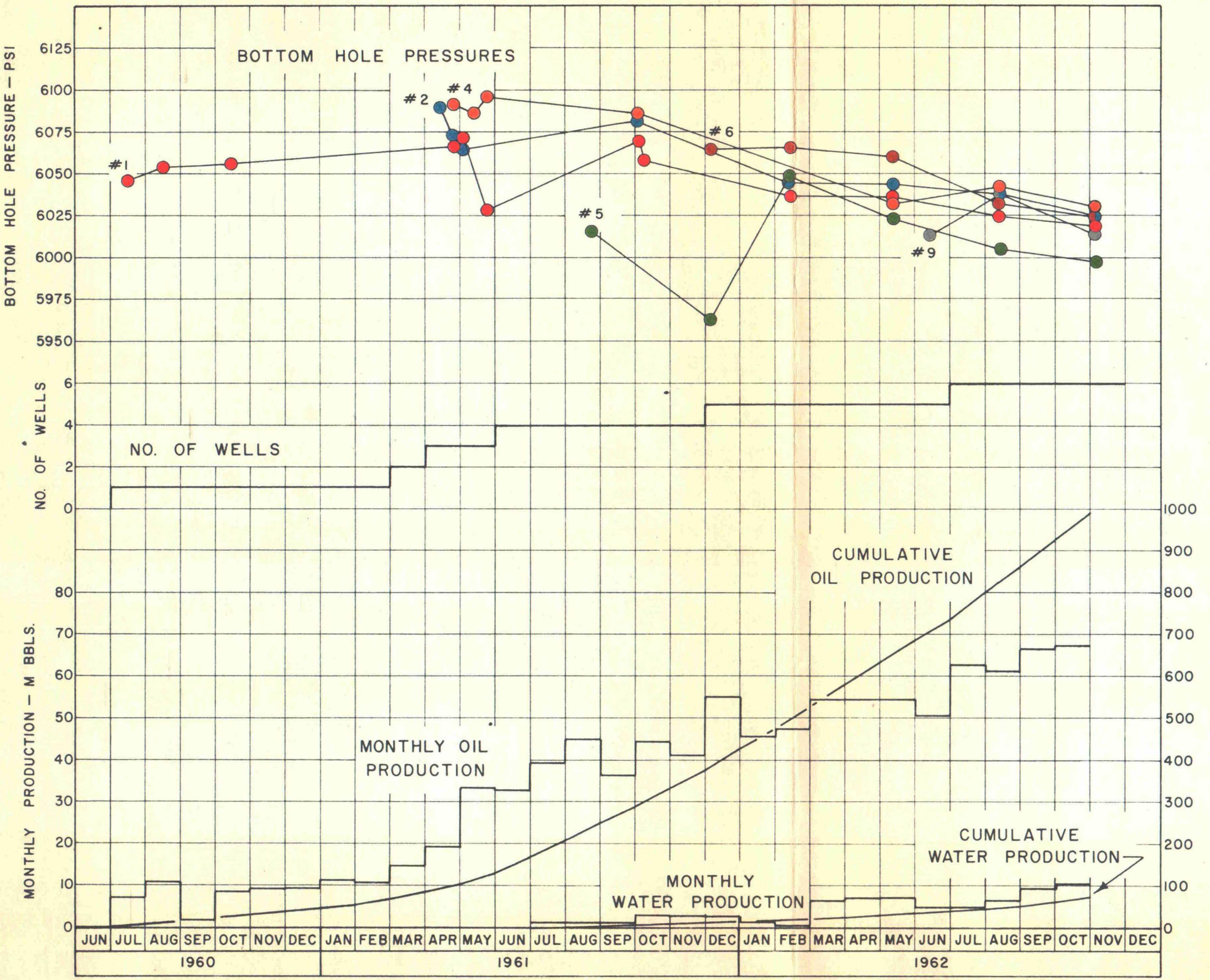
SCALE
1000 0 1000 2000
FEET

THE OHIO OIL COMPANY —— HOUSTON, TEXAS

NMOCC CASE NO. 2118 & 2459
OHIO EXHIBIT NO. 1
DATE 12-13-61

Ex 1

RBB



PRODUCTION HISTORY GRAPH

LEA DEVONIAN POOL

LEA COUNTY, NEW MEXICO

NMOCC CASE NO. 2118 & 2459

MARATHON EXHIBIT NO. 4

DATE 12-19-62

LEA DEVONIAN POOL

SHUT-IN BOTTOM HOLE PRESSURES

POOL DATUM -10,744'

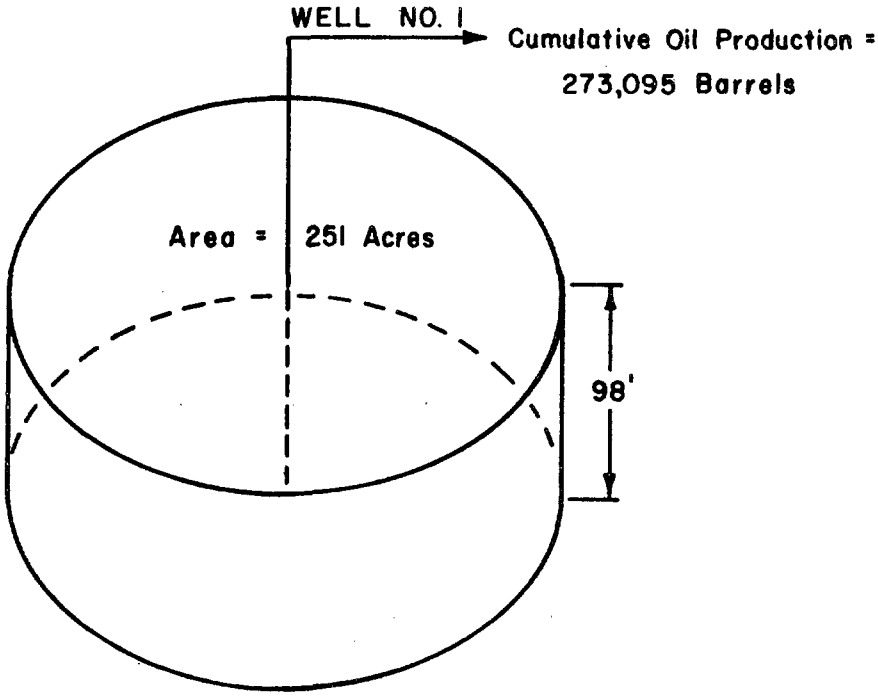
DATE	WELL NO. 1		WELL NO. 2		WELL NO. 4		WELL NO. 5		WELL NO. 6		WELL NO. 9	
	SI Time (Hours)	BHP (psi)	SI Time (Hours)	BHP (psi)	SI Time (Hours)	BHP (psi)	SI Time (Hours)	BHP (psi)	SI Time (Hours)	BHP (psi)	SI Time (Hours)	BHP (psi)
7-15-60	161	6046										
8-15-60	65	6054										
10-13-60	23	6057										
4-13-61			28	6089								
4-26-61					36	6091						
4-27-61	37	6065	36	6073								
5- 1-61	133	6072	71	6065								
5-12-61					456	6087						
5-23-61	648	6028			672	6096						
8-21-61							26	6016				
10-2-61	264	6069	53	6082	53	6085						
10-6-61	363	6058										
12-6-61							24	5963	93	6065		
2-13-62	24	6036	27	6044			24	6046	29	6065		
5- 2-62	46	6036	48	6044	47	6033	53	6033	27	6060		
7-11-62											22	6014
8- 2-62	23	6025	24	6038	26	6041	28	6005	26	6033	29	6038
11-7-62	24	6019	28	6024	27	6031	27	5997	25	6024	28	6015

NMOCC Case No. 2118 & 2459

Marathon Exhibit No. 5

Date 12-19-62

PRESSURE DECLINE CALCULATED FOR LEA UNIT NO. 1
FROM
JULY, 1960 TO NOVEMBER, 1962
BASED ON MAXIMUM RADIAL DRAINAGE OF 251 ACRES



$$\text{Pressure Decline} = \frac{N_p}{c_e N} \times \frac{B_o}{B_{oi}}$$

$$\text{Pressure Decline} = \frac{273{,}095}{(23.2 \times 10^{-6})(5.04 \times 10^{6})} \times \frac{1.241}{1.185}$$

$$\text{Pressure Decline} = \frac{338{,}911}{139}$$

$$\text{Pressure Decline} = 2438 \text{ psi}$$

Measured Pressure Decline from July, 1960
to November, 1962 = 27 psi

NMOCC Case No. 2118 & 2457
Marathon Exhibit No. 6
Date 12-18-62

The Material Balance for an oil reservoir producing when the reservoir pressure is above the bubble point pressure of the reservoir fluid is given by the following equation:

$$NB_{oi}\, c_e \Delta p = N_p B_o - W_e + B_w W_p$$

where:

N = original oil in place

N_p = cumulative oil production

B_o = oil formation volume factor

W_e = cumulative water influx

B_w = water formation volume factor

W_p = cumulative water production

Δp = reservoir pressure decline

B_{oi} = initial oil formation volume factor

c_e = effective fluid compressibility

$$c_e = \frac{S_o c_o + S_w c_w + c_f}{S_o}$$

S_o = oil saturation

c_o = oil compressibility

S_w = water saturation

c_o = water compressibility

c_f = formation or rock compressibility

For a volumetric reservoir $W_e = 0$ and $W_p = 0$ and the above equation reduces to:

$$NB_{oi}\, c_e \Delta p = N_p B_o$$

The reservoir pressure decline at any time is thus given by the following expression:

$$\Delta p = \frac{N_p}{c_e N} \times \frac{B_o}{B_{oi}}$$

Basic Data for Lea Unit No. 1:

Porosity (ϕ)	=	5.49%
Water Saturation (S_w)	=	43%
Net Pay (h)	=	98 feet
Area (A)	=	251 acres
Initial Formation Volume Factor (B_{oi})	=	1.185
Oil Compressibility (c_o)	=	9.99×10^{-6} vol/vol/psi
Water Compressibility (c_w)	=	3.00×10^{-6} vol/vol/psi
Rock Compressibility (c_f)	=	6.25×10^{-6} vol/vol/psi

Original Oil in Place in 251 Acres Surrounding Lea Unit No. 1

$$N = \frac{7758\ Ah\ \phi\ (1 - S_w)}{B_{oi}}$$

$$N = \frac{(7758)(251)(98)(0.0549)(0.57)}{1.185}$$

$$N = 5{,}040{,}000 \text{ bbls. of stock tank oil}$$

Effective Fluid Compressibility

$$c_e = \frac{S_o c_o + S_w c_w + c_f}{S_o}$$

$$c_e = \frac{[(0.57)(9.99) + (0.43)(3.0) + (6.25)]\ 10^{-6}}{(0.57)}$$

$$c_e = 23.2 \times 10^{-6} \text{ vol/vol/psi}$$

LEA DEVONIAN POOL

WELL COST DATA

	DRILLING COST $	COMPLETION COST $	DRILLING AND COMPLETION COST $	SURFACE EQUIPMENT COST $	GRAND TOTAL $
Well No. 1	396,096	261,315	657,411	39,740	697,151
Well No. 2	354,201	187,371	541,572	22,840	564,412
Well No. 4	366,761	148,545	515,306	5,981	521,287
Well No. 5	368,523	190,931	559,454	5,948	565,403
Well No. 6	305,286	185,667	490,953	12,113	503,066
TOTAL	1,790,867	973,829	2,764,696	86,622	2,851,319
Average Per Well	358,173	194,766	552,939	17,324	570,264
Average Per Well Excluding #1	348,693	178,129	526,821	11,721	538,542

Estimated Cost to Dual 25,000

Estimated Cost Per Devonian Well $ 501,821

Number of Devonian Wells to Date 7

Approximate Total Devonian Well Costs to Date $3,512,747

NMOCC Case No. 2118 & 2459
Marathon Exhibit No. 7
Date 12-18-62

LARGE FORMAT EXHIBIT HAS BEEN REMOVED AND IS LOCATED IN THE NEXT FILE

LARGE FORMAT
EXHIBIT HAS
BEEN REMOVED
AND IS LOCATED
IN THE NEXT FILE