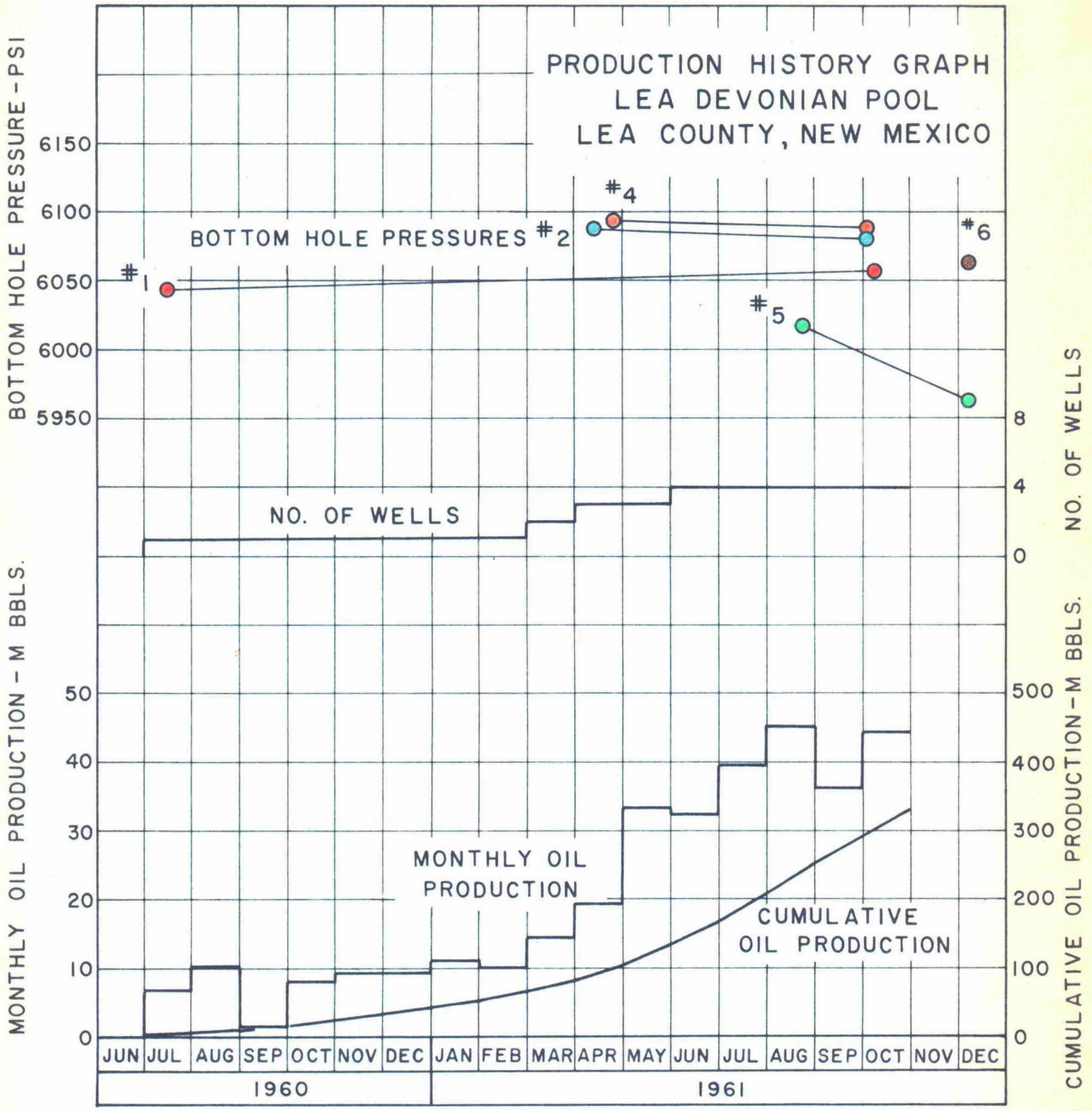



NMOCC CASE NO. 2118 & 2459

OHIO EXHIBIT NO. 3

DATE 12-13-61

## RECOVERABLE OIL RESERVES

## LEA DEVONIAN POOL

### Basic Data

| | | |
|---|---|---|
| Net Pay | = | 65 feet |
| Porosity | = | 5.49% (Core Analysis) |
| Water Saturation | = | 43% (Capillary Pressure Tests) |
| Formation Volume Factor | = | 1.185 (Fluid Analysis) |
| Recovery Factor | = | 50% (Estimated) |

### Volumetric Calculation

$$\frac{7758 \text{ Bbl/acre-ft.} \times \text{Porosity} \times (1\text{-Water Saturation}) \times \text{Net Pay} \times \text{Recovery Factor}}{\text{Formation Volume Factor}}$$

$$\frac{(7758)(0.0549)(0.57)(65)(0.50)}{1.185} = 6{,}658 \text{ bbls/acre}$$

NMOCC Case No. 2118 & 2459
Ohio Exhibit No. 9
Date 12-13-61

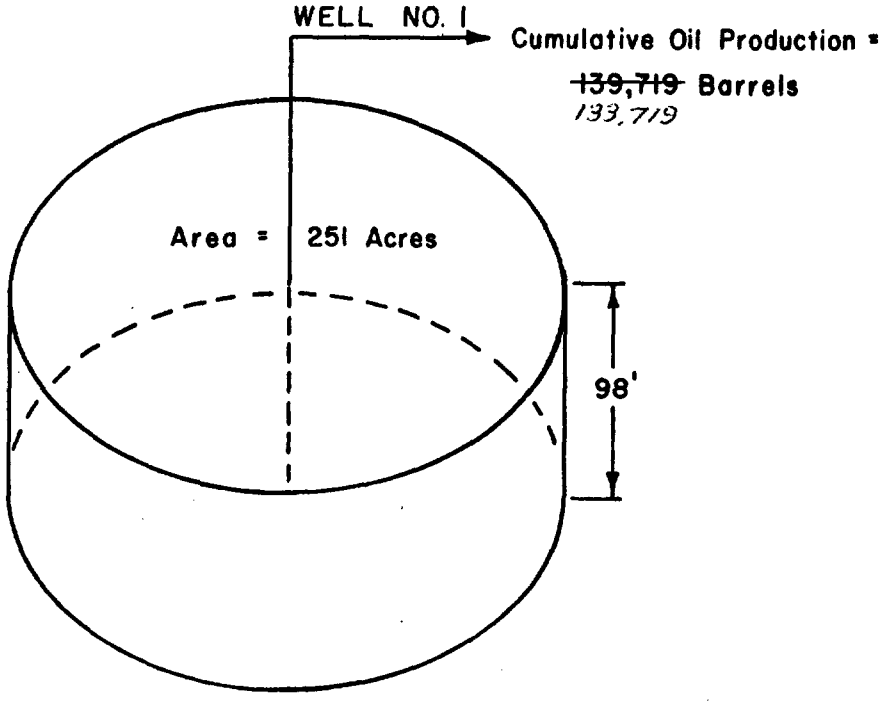
COMPARATIVE ECONOMICS
FOR DEVELOPMENT OF
LEA DEVONIAN POOL

40-ACRE SPACING VS. 80-ACRE SPACING VS. 160-ACRE SPACING

| | | |
|---|---|---|
| Proposed Participating Area | | 2280 Acres |
| Wells Required with 40-Acre Spacing | | 57 Wells |
| Wells Required with 80-Acre Spacing | | 29 Wells |
| Wells Required with 160-Acre Spacing | | 15 Wells |
| Investment @ $510,000 per Well — ? Real ? | | |
| For 40-Acre Spacing (57 Wells) | | $29,070,000 |
| For 80-Acre Spacing (29 Wells) | | $14,790,000 |
| For 160-Acre Spacing (15 Wells) | | $ 7,650,000 |
| Ultimate Reserves | | |
| Oil | | 15,180,240 bbls. |
| Gas @ 300 cu. ft. per bbl. | | 4,554,072 MCF |
| W.I. Net Operating Income Per Gross Bbl. of Oil Produced Including Income From Gas Produced With Oil | | |
| Value | | |
| Bbl. of oil | | $2.81 |
| 300 cu. ft. of gas | | .06 |
| Total Gross Value | | $2.87 |
| Costs | | |
| Severance & Ad valorem Taxes | $0.20 | |
| Royalty | 0.36 | |
| Lifting Costs | 0.25 | |
| | | $0.81 |
| Net Operating Income Per Gross Bbl. | | $2.06 |
| W.I. Total Net Operating Income | | |
| 15,180,240 x $2.06/bbl. | | $31,271,294 |
| Net Profit for 40-Acre Spacing | | $ 2,201,294 |
| Net Profit per Well | $38,619 | |
| Profit to Investment Ratio | | 0.08 to 1 |
| Net Profit for 80-Acre Spacing | | $16,481,294 |
| Net Profit per Well | $568,320 | |
| Profit to Investment Ratio | | 1.11 to 1 |
| Net Profit for 160-Acre Spacing | | $23,621,294 |
| Net Profit per Well | $1,574,753 | |
| Profit to Investment Ratio | | 3.09 to 1 |

NMOCC Case No. 2118 & 2459
Ohio Exhibit No. 10
Date 12-13-61

# PRESSURE DECLINE CALCULATED FOR LEA UNIT NO. 1 TO OCTOBER 1, 1961, BASED ON MAXIMUM RADIAL DRAINAGE OF 251 ACRES




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

$$\text{Pressure Decline} = \frac{133,719}{(23.2 \times 10^{-6})(5.04 \times 10^{6})} \times \frac{1.198}{1.185}$$

$$\text{Pressure Decline} = \frac{160,195}{139}$$

Pressure Decline = 1153 psi

Measured Pressure Change to October 1, 1961 = 12 psi increase

NMOCC Case No. 2118 & 2459
Ohio Exhibit No. 11
Date 12-13-61

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

$\Delta p$ = 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 ($\phi$) | = 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 ($c_o$) | = $9.99 \times 10^{-6}$ vol/vol/psi |
| Water Compressibility ($c_w$) | = $3.00 \times 10^{-6}$ vol/vol/psi |
| Rock Compressibility ($c_f$) | = $6.25 \times 10^{-6}$ vol/vol/psi |

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

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

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

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

Effective Fluid Compressibility

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

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

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

RELATIONSHIP OF TOTAL DAILY WITHDRAWALS
LEA DEVONIAN POOL

40-ACRE SPACING VS. 80-ACRE SPACING VS. 160-ACRE SPACING

Normal Unit Allowable = 34 BOPD

| Spacing (Acres) | 40 | 80 | 160 |
|---|---|---|---|
| Allowable Factor 14-15,000' | 9.33 | 10.33 | 15.50 |
| Top Well Allowable (BOPD) | 318 | 352 | 527 |
| No. of Wells | 57 | 29 | 15 |
| Top Field Allowable (BOPD) | 18,126 | 10,208 | 7,905 |

NMOCC Case No. 2118 & 2459
Ohio Exhibit No. 13
Date 12-13-61

R 34 E

R 35 E

T 20 S

Pure | Gulf | Texaco | Cactus Drlg.

L. A. & B. G. Parks — 1 — Texaco | Cactus Drlg.

"Featherstone Fed." — 6 — Martha Featherstone

2

"Quail-Federal" U.S.

State | U.S. | U.S.

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

U.S.

EL 3676 TD14947

"Fed. Lea" U.S

U.S Smelting — 11 — 12 — Drlg. & Expl. — 7 — Sinclair

J. N. Smith

U.S. | U.S.

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

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

U.S.

Gulf — 14 — Pure | Pure | 13 — Cox & Hamon | Drlg. & Expl. | Sinclair Ohio — 18 — Ross

Ohio

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

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

C.C. Bankhead | Drlg. & Expl.

U.S.

E. A. Hanson — 23 | H. Aid, Est. | 24 — Cox & Hamon | Ohio — 19

U.S. | U.S. | State

LEGEND

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

N

# MINIMUM RADIAL DRAINAGE
## LEA DEVONIAN POOL
# 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. 12

DATE 12-13-61

RBB

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

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