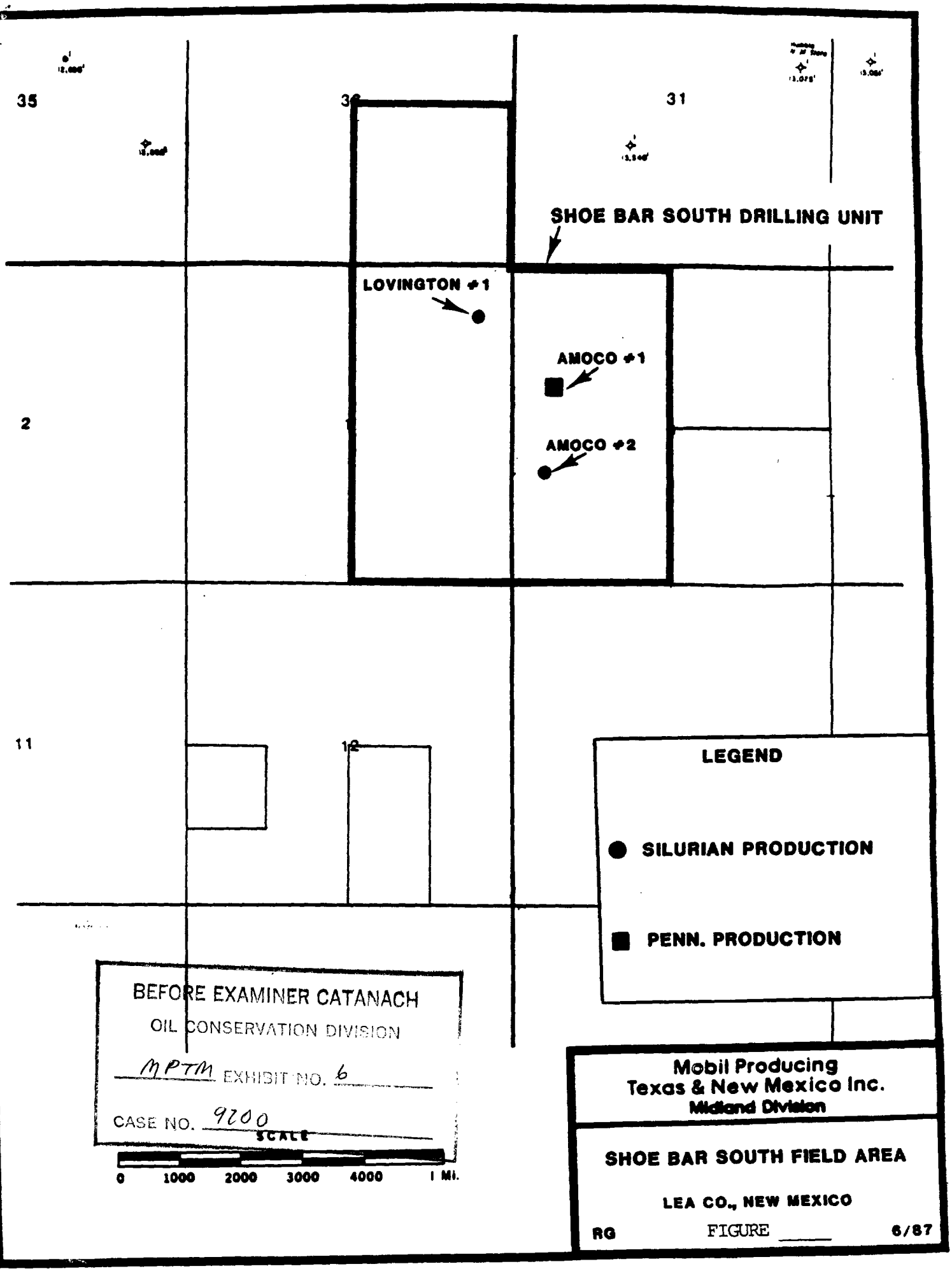
35
31
SHOE BAR SOUTH DRILLING UNIT
LOVINGTON #1
AMOCO #1
AMOCO #2
2
11
12
LEGEND
SILURIAN PRODUCTION
PENN. PRODUCTION
BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION
MPTM EXHIBIT NO. 6
CASE NO. 9200
SCALE
0 1000 2000 3000 4000 1 Mi.
Mobil Producing
Texas & New Mexico Inc.
Midland Division
SHOE BAR SOUTH FIELD AREA
LEA CO., NEW MEXICO
RG
FIGURE
6/87

RESERVOIR DATA
SOUTH SHOEBAR (UPPER PENN) FIELD
LEA COUNTY, NEW MEXICO

DISCOVERY AND DEVELOPMENT

Name of Discovery Well:	Lovington Deep Amoco State #1
Location:	Unit E, Sec. 6, T-17-S, R-36-E
Total Depth (Ellenburger Test)	15,272
Plug Back Total Depth	12,705
Completion Interval	10,746-10,794
Initial Potential Date	January 21, 1987
Initial Potential Test	326 BO, 3 BW, GOR-1227, TP - 900 PSIG
Production to August 1, 1987	62 MSTB
Number of Upper Penn Completions to Date	1

RESERVOIR DATA

Depth	11,800
Lithology	Limestone
Trapping Mechanism	Stratographic
Net Pay Thickness	25-35 ft.
Average Porosity	9%
Average Permeability, Oil	2.1 md (pressure buildup) analysis
Average Water Saturation	25%
Oil Originally in Place:	
STB/Ac.ft.	288 STB
STB/80 Ac. (h - 30')	690 MSTB
Original Reservoir Pressure	4043
Productive Acres in Reservoir	Undetermined
Reservoir Temperature	171°F

RESERVOIR FLUID DATA

Gravity, oil	42.6° API
Bubble Point Pressure	3234 psig
Viscosity, Oil @ BPP	0.2 cp
Solution Gas/Oil Ratio @ BPP	1525
Oil Formation Volume Factor @ BPP	1.82

BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION
MPTM EXHIBIT NO. 7
CASE NO 9200

A:M723344A.GMB

Example Calculation

Test Data:

Company MEPUS, Midland Division
Lease Lovington Deep Amoco State
Well No. 1
Field South Shoebar
State New Mexico

Test Date 1/27/87
Producing Formation Penn.
Hole Size (inches) 9
Cum. Prod. N_p (bbl) 2240
Stabilized Daily Prod. q (bbl) 320
Effective Prod. Life t (hr) $= 24\,N_p/q$ 168 hrs.

I. Calculation of kh (md-ft) and k (md):

$$kh = \frac{162.6\,q\mu B}{m}\ ;\ k = \frac{kh}{h}.$$

h 30 ft
q 320 B/D
μ .2 cp
B 1.8
m 298 psi/cycle

$$kh = \frac{162.6 \times (320) \times (.2) \times (1.8)}{(298)} = 62.9 \text{ md-ft};\quad k = \frac{(62.9)}{(30)} = 2.1 \text{ md.}$$

II. Calculation of Skin Effect, s; and Pressure Loss Due to Skin, Δp_{skin} (psi):

$$s = 1.151\left[\frac{p_{1\,hr} - p_{wf}}{m} - \log\left(\frac{k}{\phi\mu C r_w^2}\right) + 3.23\right]$$

$$\Delta p_{skin} = (m) \times 0.87\,(s).$$

k 2.1 md
ϕ .09
μ .2 cp
c 21×10^{-6} psi^{-1}
r_w .375 ft
$p_{1\,hr}$ 3380 psig
p_{wf} 3246 psig
m 298 psi/cycle

$$s = 1.151\left[\frac{(3380) - (3246)}{(298)} - \log\frac{(2.1)}{(.09)(.2)(21\times10^{-6})(.141)} + 3.23\right] = -4.5$$

$$\Delta p_{skin} = \left(\frac{}{298}\right) \times .87\,(-4.5) = -1168 \text{ psi.}$$

III. Calculation of Productivity Index (B/D-psi) and Flow Efficiency:

$$J_{(actual)} = \frac{q}{p^* - p_{wf}} \qquad J_{(ideal)} = \frac{q}{(p^* - p_{wf}) - \Delta p_{skin}}$$

Δp_{skin} -1168 psi
q 320 B/D
p^* 4043 psig
p_{wf} 3246 psig

$$J_{(actual)} = \frac{(320)}{(4043) - (3246)} = .402 \text{ B/D-psi.}$$

$$J_{(ideal)} = \frac{(320)}{(797) - (\quad)} = .163 \text{ B/D-psi.}$$

$$\text{Flow Efficiency} = \frac{J_{(actual)}}{J_{(ideal)}} = \frac{.402}{.163} = 2.47$$

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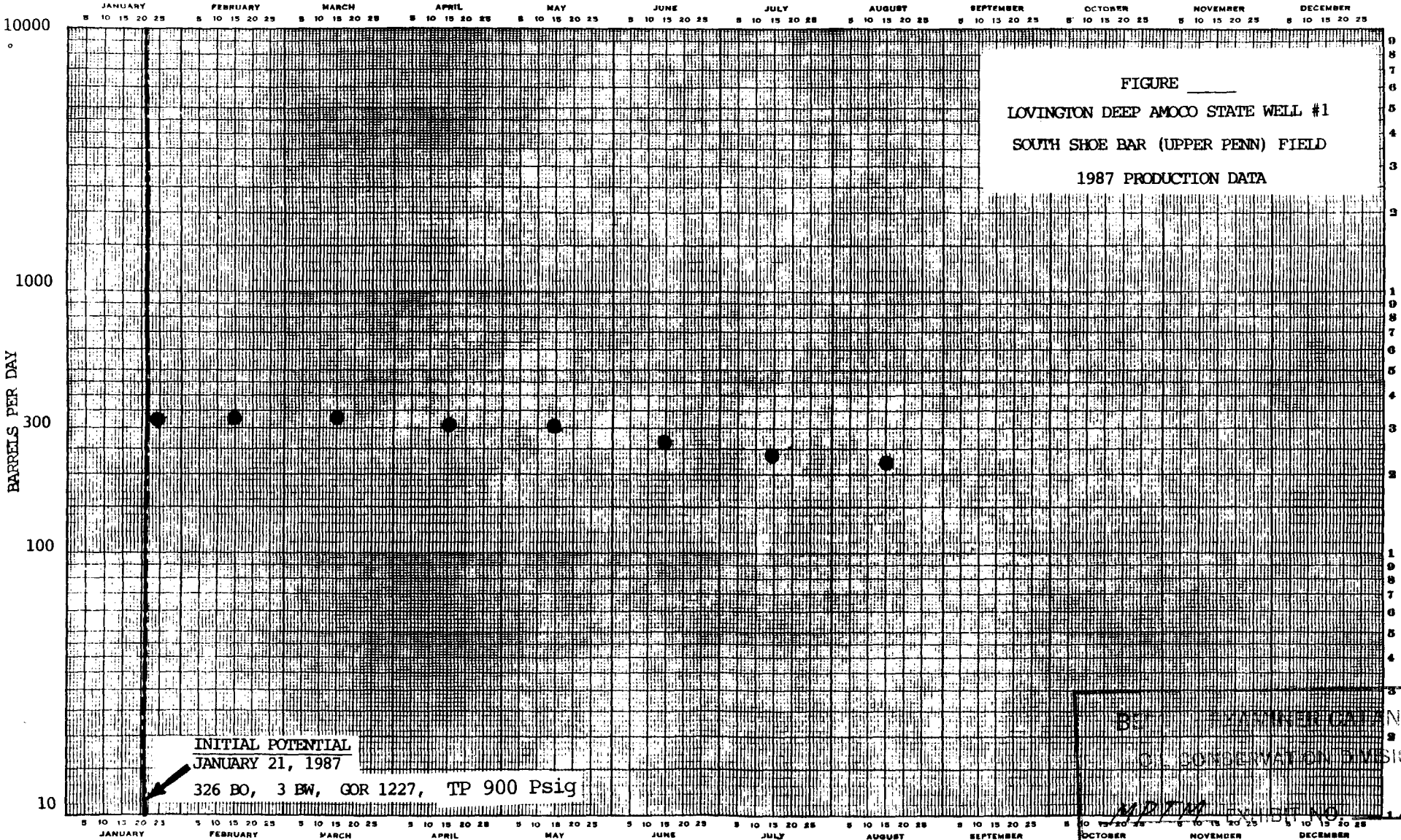
OIL CONSERVATION DIVISION
MPTM EXHIBIT NO. 8
CASE NO. 9206

Note:

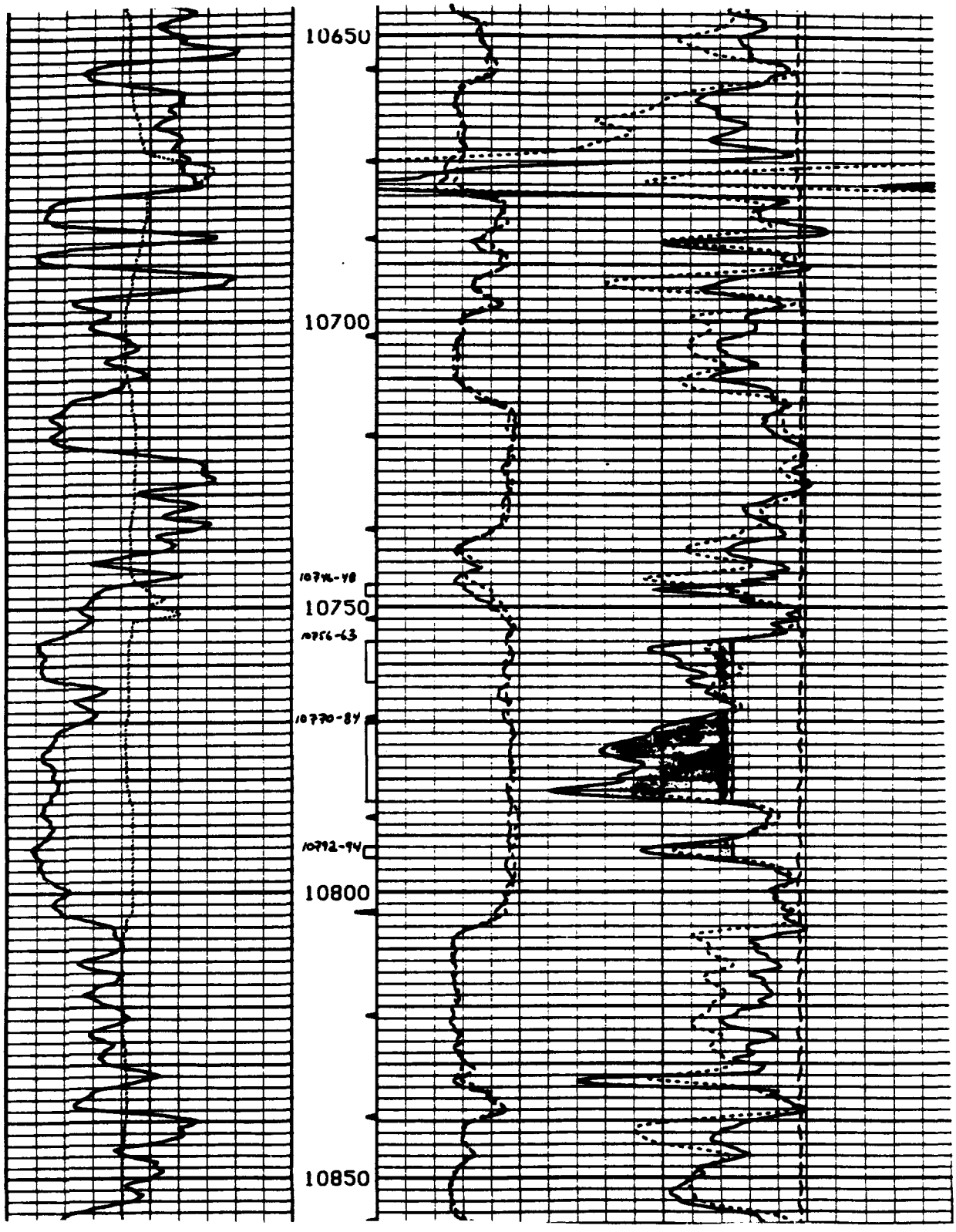
1. **Compressibility is obtained from**
   $c_t = S_o c_o + S_w c_w + c_f = .75\,(19 \times 10^{-6}) + .25\,(3 \times 10^{-6}) + 6 \times 10^{-6} = 21 \times 10^{-6}$.
   The value of c_o is obtained from PVT analysis, c_f from Fig. G.5; c_w is an average value for water.
2. **p^* is obtained by extrapolating** 1 **cycles to the right on Fig. 3.3.**
   $p^* = 3745 + 1m = 3745 + 2\left(\frac{}{298}\right) = 4043$ **psig.**

Radius of Investigation:

$$ri = \left[\frac{Kt}{\phi 948\, C_t \phi}\right]^{1/2}, \qquad ri = \left[\frac{(2.1 \text{ md})\ (94.5 \text{ hrs})}{(.2 \text{ cp})\ 948\ (21\times10^{-6}\ \text{psi}^{-1})\ (.09)}\right]^{1/2} = 744 \text{ ft.}$$



BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION
NMPM EXHIBIT NO. 9
CASE NO. 9200



BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION
MPTM EXHIBIT NO. 10
CASE NO. 9200

FIGURE _____

COMPLETION INTERVAL
LOVINGTON DEEP AMOCO STATE #1

SOUTH SHOE BAR (UPPER PENNSYLVIAN) FIELD