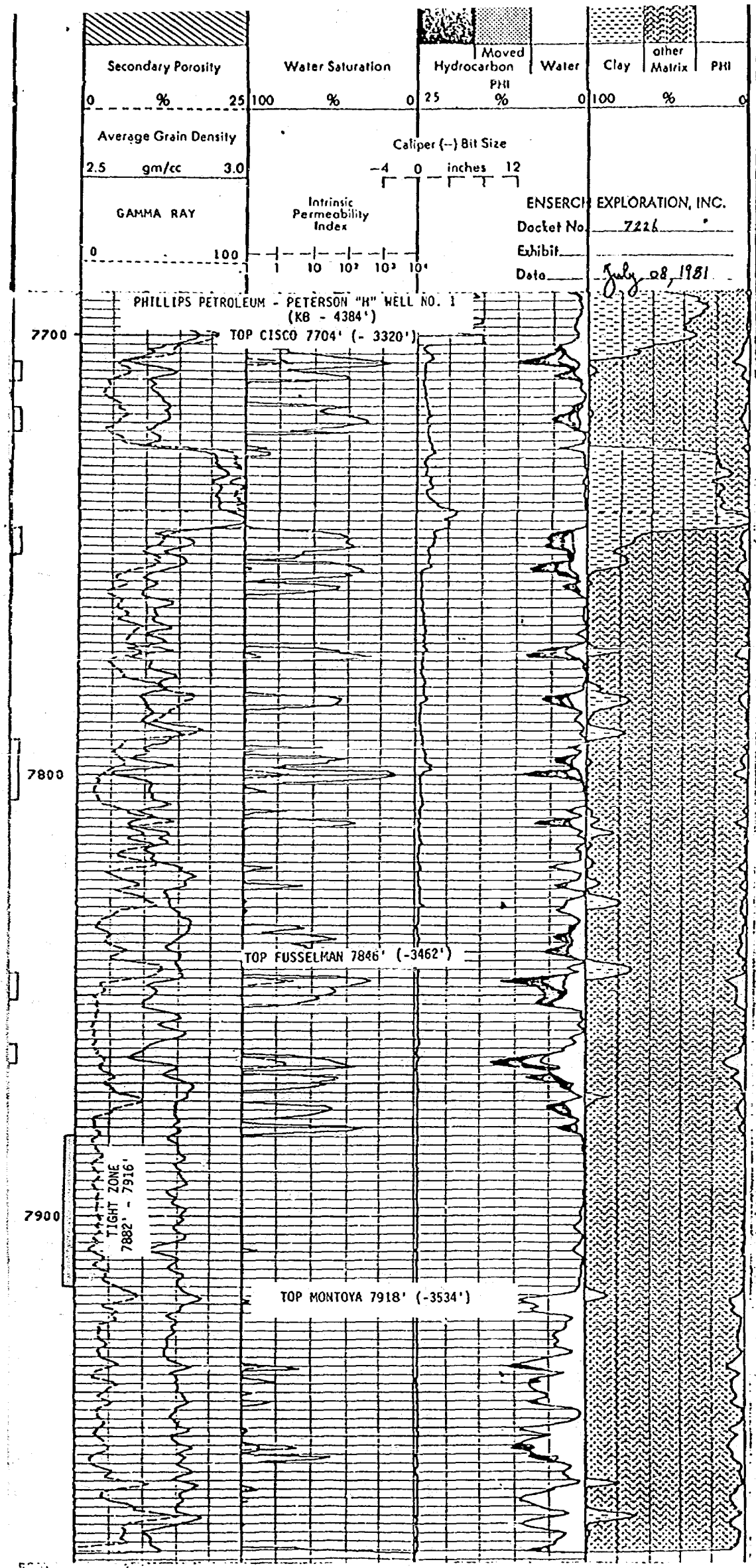
CASE 7226: (DE NOVO) ENSERCH EXPLORATION, INC. FOR SALT WATER DISPOSAL, ROOSEVELT COUNTY JULY 8, 1981

CASE NO.

7226

APPLICATION,
TRANSCRIPTS,
SMALL EXHIBITS,

ETC.



BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 10
Submitted by Pearson
Hearing Date 7-8-81

7700

TOP CISCO 7704' (-3320')

7800

TOP FUSSELMAN 7846' (-3462')

7900

TIGHT ZONE
7882' - 7916'

GR

TOP MONTOYA 7918' (-3534')

CNL

FDC

Δφ

Caliper

Tension

F.R. (GR)

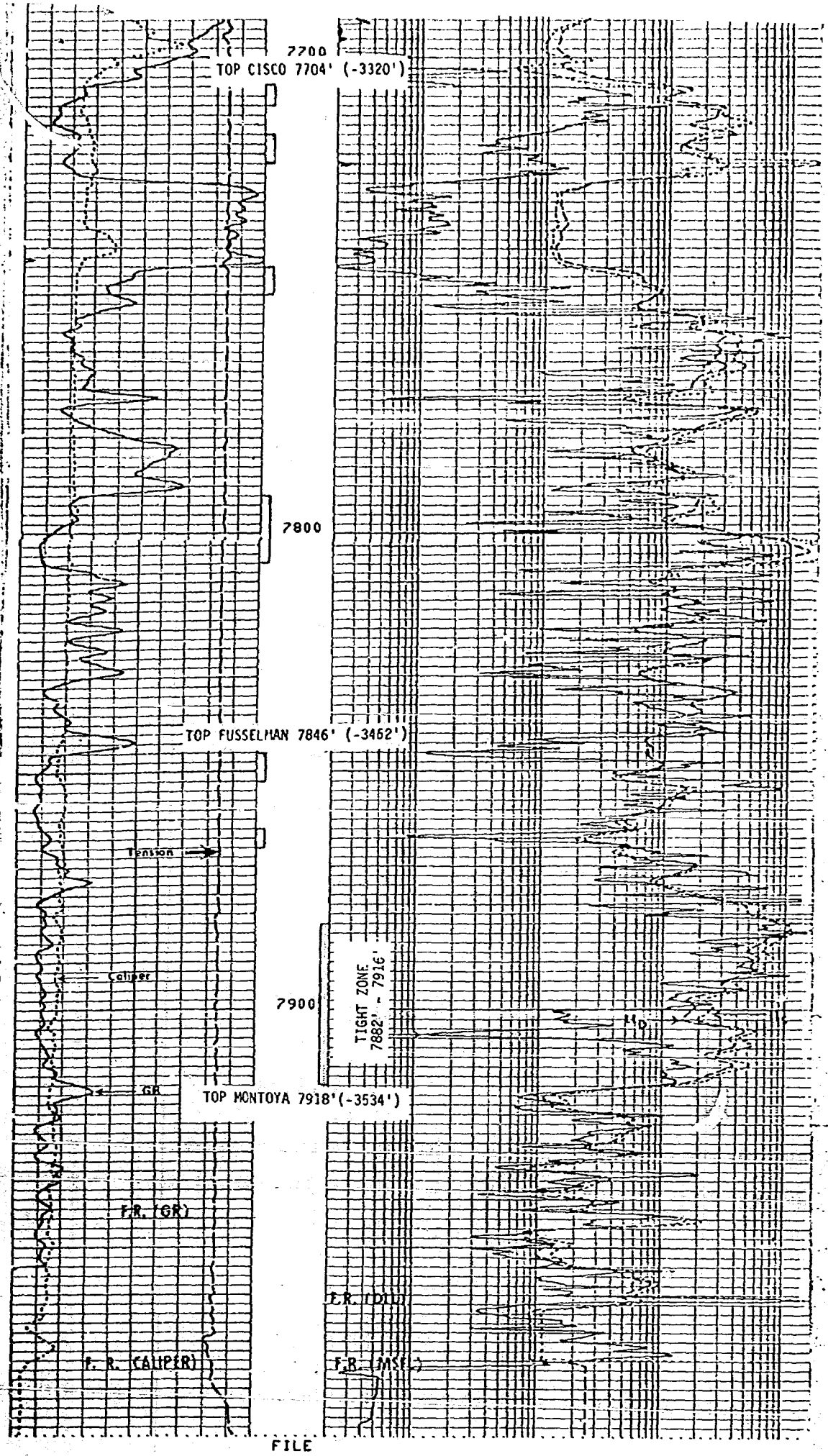
F.R. (CNL)

F.R. (CALIPER)

F.R. (FDC)

8000

GR (GAPI)	DRHO(G/C3)	TENS(LB)
100.0 200.0	-0.050 0.4500	11000. 1000.
CALI(IN)	DPHI( )	
6.000 16.00	0.3000 -0.100	
GR (GAPI)	NPHI( )	
0.0 100.0	0.3000 -0.100	



FILE

6

TENS(LB)		LLD (OHMM)	
11000.	1000.	2000.	200000
GR (GAPI)		MSFL(OHMM)	
100.0	200.0	0.2000	2000.
CALI(IN)		LLS (OHMM)	
6.000	16.00	0.2000	2000.
GR (GAPI)		LLD (OHMM)	
0.0	100.0	0.2000	2000.

OTIS SERVICES

WELL TEST ANALYSIS REPORT

COMPANY: ENSERCH EXPLORATION, INC.
WELL: NO. 1 LAMBIRTH
AREA: ROOSEVELT COUNTY, NEW MEXICO
TEST: PRESSURE BUILDUP
DATE: JUNE 22-25, 1978

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit 19
Date July 28, 1981

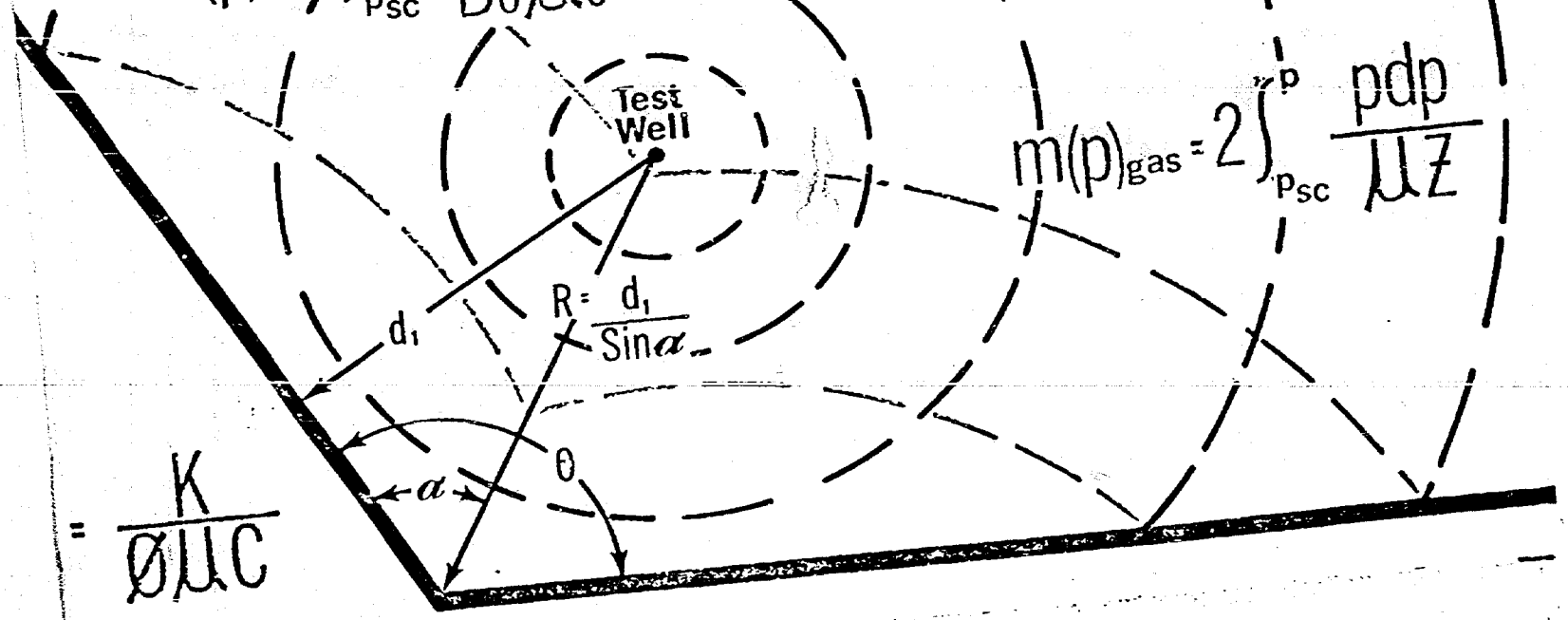
$P_D(t_D) = f(\theta, R, \alpha, t_D)$

$t_D = \frac{0.0002637\eta t}{r_w^2}$

$m(p)_{oil} = \int_{p_{sc}}^{p} \frac{K_o dp}{B_o \mu_o}$

$m(p)_{gas} = 2\int_{p_{sc}}^{p} \frac{pdp}{\mu z}$

$= \frac{K}{\phi \mu c}$



OTIS
P.O. BOX 34380 • DALLAS, TEXAS 75234
AREA CODE 214-242-5161

ROBERT L. FEHRMANN
Manager • Production Well Testing
July 17, 1978

Mr. Jon P. Stevenson
Enserch Exploration, Inc.
301 South Harwood
Dallas, Texas 75201

Dear Mr. Stevenson:

Please find enclosed a reservoir description resulting from an analysis of the 72-hour pressure buildup test conducted during June 22-25, 1978 in the No. 1 Lambirth Well, Fusselman oil reservoir, Roosevelt County, New Mexico.

Merging the reservoir description presented by this report with available subsurface information from geologic and seismic sources is recommended. This merger will provide the best overall reservoir description for use in economic and operational studies.

A high degree of confidence in the analysis prevails as a result of the combined use of a highly sensitive pressure gauge and a computerized regression analysis procedure. In fact the precision of the pressure matches obtained in the analysis far exceeds any of those proviously experienced by the analyst. The analysis results show that the reservoir description approximates an "open rectangle" shape with 2 parallel sides being impervious boundaries and a truncating boundary on one end performing as a constant pressure boundary. In view of Phillips No. 2-A Goldston well which tested water in the correlative reservoir interval approximately 2800 feet west of the subject well it is believed that the constant pressure boundary is an oil/water contact. A possible fourth boundary is indicated to form impervious closure on the rectangle at a significant distance from the test well, however, the actual existence of this boundary is uncertain since its effect on the pressure behavior (in the presence of the closer impediments) is within a statistical band of pressure "noise". A total test time of approximately twice the time of this test would be required for a complete investigation of the furthermost boundary. Summaries of the reservoir descriptions obtained by nonlinear regression analysis for each of the above boundary shapes are presented as follows:

		"Open-Rectangle"	"Closed-Rectangle"
(1)	gauge datum, ft	7,860	7,860
(2)	effective permeability-thickness, md-ft	25,714	25,369
(3)	effective permeability to oil, md	559	552
(4)	distances to parallel boundaries, ft		
	first, d1	446	510
	second, d2	636	784
(5)	distance to constant pressure boundary, ft, d3	2,120	2,166
(6)	distance to possible fourth boundary, ft, d4	-	4,139
(7)	radius investigated, ft	5,984	5,985
(8)	area investigated, ac	229	169
(9)	oil initially contained in area investigated, MMstb		
	by pressure response, N1	6.698	4.804
	by volumetric, N2	6.701	4.864
(10)	porosity-thickness, ft	6.13	6.07
(11)	calculated initial reservoir pressure, psia	2793.1	2794.6
(12)	measured initial reservoir pressure, psia	2795.7	2795.7
(13)	skin effect, (dimensionless)	-0.93	-0.93
(14)	completion efficiency, %	110.2	110.2

Differences between the above proved oil in-place volumes and reservoir areas calculated for each shape lead to a question of whether the reservoir will support 3 or more producing wells. Since the No. 3 well has already penetrated the Fusselman section and No. 4 well will soon commence drilling, additional pressure testing is not recommended until producing capabilities from correlative reservoir intervals have been evaluated in the No. 3 and 4 wells. After this is accomplished, the feasibility of a well testing program can be studied. The evidence of a possible nearby contact is sufficient to caution

against producing the well at rates which will cause water to prematurely finger into the wellbore. An approximate calculation of the critical oil rate (rate when water begins to finger toward the well) yields 2200 stb/d. Therefore, it appears that an oil rate of 500 to 600 stb/d or less will be safe.

Orientation of the reservoir shape is unknown. If tectonics permit, it seems logical that this high permeability reservoir is the product of percolating waters and therefore, one might suspect the major axis of the reservoir shape to subtend at some angle with the structure. In this manner a series of individual reservoir systems or solution channels could exist on a given structure.

Calculated initial reservoir pressures compare with the measured initial reservoir pressure as shown in the above table. The accuracy of the pressure gauge used for this test is approximately ± 1.0 psi (the instrument's ability to measure absolute pressure is the accuracy of a gauge and it is not to be confused with the term "sensitivity" which is the gauge's ability to detect a pressure change with time). The formation permeability in the vicinity of the wellbore is somewhat improved or altered as evidenced by the negative value of skin effect and a well completion efficiency greater than 100 %. An acid wash, perforations and an implosion on drilling the reservoir are all possible sources of the improved permeability region around the wellbore. A naturally fractured reservoir is not indicated by the analysis. Porosity-thickness values shown in the above table are "backed-out" from the hydraulic diffusivities (the diffusion constant is one of the parameters solved in the nonlinear regression analysis). Therefore, they represent dynamic averages of the reservoir area investigated.

A highly sensitive Hewlett-Packard pressure instrument was used to measure subsurface pressure responses during flow and shut-in. Bottom-hole fluid samples of the oil were obtained for PVT analyses by Core Lab, Inc., Dallas, Texas. Because the lab analyses were not available at the time of this study, the empirical PVT properties as summarized on Pages 43-44 were used. The bubble-point pressure determined from the PVT cell is 1536 psia at 155°F and it compares with a bubble-point of 1660 psia determined from fluid correlations using a gas-oil ratio of 602 scf/stb. Comparions of lab and empirical PVT properties available at the time of this study are summarized as follows:

Parameter	Lab	Correlations
P_b, psia	1536	1660
R_{sb}, scf/stb	843	602
B_{ob}, rb/stb	1.568	1.342
μ_{ob}, cp	0.343	0.366
c_o, $psi^{-1}x10^{-6}$	12.33	13.30

The above oil compressibilities are average values in the range from 3000 to 4000 psig. In view of the above comparisons it is not recommended to correct the values of oil in-place and boundary distances until the final lab PVT work is complete.

The test data were processed and analysed with the aid of OWASP (Otis Well Analysis Software Package), an integrated series of logic modules programed on a high speed computer. Information relevant to OWASP is provided in Appendix A.

Processing the test data included: (1) determining the effluent (reservoir barrels per day), (2) performing required superposition to account for the effects of flowing and shut-in conditions and (3) constructing various drawdown and buildup plots of the processed data. These steps are a portion of the OWASP logic.

Rigorous analysis of the pressure buildup test data in the presence of boundaries was performed by a nonlinear regression method. A linear regression procedure was applied to the buildup profile at shut-in times prior to the reflection of a nearest boundary. Appendix B provides discussions of both linear and nonlinear regression methods. The nonlinear method simultaneously evaluates several reservoir parameters by performing a large number of calculations programed on a high speed computer. Starting with the initial parameter estimates the nonlinear method performs systematic adjustments of the parameter values and makes comparisons between measured and calculated pressure data until convergence is achieved. The convergence criterions are statistical tolerances and they are set within the sensitivity band of the pressure gauge used during the test. Parameters solved by each regression run are effective permeability-thickness (kh), hydraulic diffusivity ($k/\phi\mu c$), initial reservoir pressure (p_i) and from one to four boundary distances. Rectangle and wedge shapes are used to form different boundary combinations.

Initial examinations of the pressure drawdown and pressure buildup plots were made. From these examinations it was found that the pressure profile measured during flow was

highly influenced by a relatively large band of pressure "noise" in the flow string and a minor leak in the lubricator grease seal at the surface (just before shut-in). Because of these variations and discontinuities in the pressure drawdown profile, it was necessary to use the buildup test as the primary target of the regression analysis. Semi-log and coordinate plots of the drawdown data are shown by Pages 49 and 50, respectively. Double-log, MDH (Miller, Dyes and Hutchinson) and superposed plots of the buildup data are presented on Pages 37, 38 and 39, respectively. An expanded buildup plot is shown on Page 40. Basic data relevant to the buildup plots are tabulated on Pages 42-48. Pages 51-53 show tabulated drawdown data. The double-log plot is used to determine where the middle-time straight line region should appear on the buildup plots. It is clear from examinations of these plots that more than one impediment influenced the pressure drawdown and buildup responses. This point is illustrated on the buildup plots of Pages 39 and 40. A subtle point which is unknown from examinations of the pressure profiles is that one of the reflected impediments is best described when it is a constant pressure boundary such as an oil/water contact. This problem is manifested by the regression analysis.

The regression analyses were performed systematically for various combinations of boundary shapes and boundary conditions. Attachment 1 summarizes highlights of these results and it shows how the aforementioned reservoir description was obtained. An examination of Attachment 1 clearly shows that better results are obtained when a third impediment is included as a constant pressure boundary. Criterions used to elicit the reservoir description from Attachment 1 are comparisons of the root-mean square deviation, (S_y), the ratio of oil volume calculated by the diffusion or expansion constant (N1) and the volumetric oil volume (N2), the calculated porosity-thickness (ϕh) and the calculated initial reservoir pressure. Additional criterions are certain statistical parameters produced from each nonlinear regression run such as the parameter correlation matrix, the standard error of estimate and the residuals of a pivotal-point diagonal matrix solution. When cross-comparisons of S_y's are made for different shapes the background pressure "noise band" is considered. For this test the "noise band" is calculated at $\pm$ 0.022 psi; therefore, the difference between the minimum S_y and the S_y of any other regression run must be greater than the width of the "noise band" before the results are considered inferior. For example the minimum S_y shown on Attachment 1 is $\pm$ 0.030 psi and the S_y of any other regression run must be greater than $\pm$ 0.052 psi before it is considered for deletion. On this basis and the aforementioned criterions the acceptable reservoir descriptions are Models 9 and 11 as formerly presented. The regression procedures for any one

configuration included integrity checks such as holding one parameter constant while others are allowed to vary and trying different initial parameter estimates. Models 7, 8 and 9 of Attachment 1 illustrate some of the checks. Conventional analysis of pressure data cannot yield the detailed reservoir description achieved in this study.

Pages 1-34 show detailed analysis results for the different reservoir systems summarized by Attachment 1. Linear regression analysis of the afterflow and middle-time regions of the buildup profile were performed. Pages 35 and 36 summarize the results of the middle-time region analysis. Attempts to analyse the afterflow region with a linear regression procedure were unseccessful. This result is attributed to the aforementioned surface leak which occurred just prior to shut-in.

The opportunity to work with you on this problem is appreciated.

Yours very truly,

John S. Rodgers

John S. Rodgers
Consulting Reservoir Engineer

JSR/vjh

DALLAS, TEXAS

PHILLIPS PETROLEUM COMPANY
LAMBERT NO. A-2
S. PETERSON FUSSELMAN FIELD
ROOSEVELT COUNTY, TEXAS

DATE : 3-28-79
FORMATION : FUSSELMAN
DRLG. FLUID: SALT GEL
LOCATION : 1980' FNL & 1980' FWL, SEC. 31, T-5-S, R-33-E

FILE NO : 3202-11088
ANALYSTS : MORSE
ELEVATION: 4396.8' GL

WHOLE CORE ANALYSIS

SAMPLE NUMBER	DEPTH	PERM. TO AIR (MD) MAXIMUM	PERM. TO AIR (MD) 90 DEG	POR. FLD	FLUID SATS. OIL	FLUID SATS. WTR	DESCRIPTION
	CORE NO. 1 7811.0-7819.0 CUT 8' REC 8'						
	7811.0-19.0						CONG,DNS
	CORE NO. 2 7819.0-7850.0 CUT 31' REC 29'						
	7819.0-23.0						CONG,SHY,DNS
1	7823.0-24.0	1.4	0.6	4.6	12.2	41.9	LM,CHT,F
2	7824.0-25.0	0.2	*	11.3	10.6	33.1	DOL,LMY,SHY,CHT,F
3	7825.0-26.0	33.	18.	13.5	12.7	33.1	DOL,CHT,V/F
4	7826.0-27.0	20.	9.9	13.0	22.0	24.4	DOL,SL/V,SL/F
5	7827.0-28.0	92.	17.	13.3	15.3	30.7	DOL,V/F
6	7828.0-29.0	0.1	*	9.7	17.0	35.8	LM,SHY,F
7	7829.0-30.0	0.1	*	9.9	14.4	38.8	DOL,SHY,V/F
8	7830.0-31.0	0.1	*	8.3	17.3	39.6	DOL,V/F
9	7831.0-32.0	0.3	*	12.5	14.1	43.3	DOL,F,SL/V
10	7832.0-33.0	48.	26.	10.0	15.1	35.9	DOL,F
11	7833.0-34.0	12.	10.	8.3	19.0	33.1	DOL,SL/F
12	7834.0-35.0	0.2	*	10.8	17.2	34.9	DOL,V,SL/F
13	7835.0-36.0	38.	25.	9.3	12.0	29.0	DOL,SHY,SL/V,SL/F
14	7836.0-37.0	32.	29.	10.1	16.0	23.9	DOL,CHT,SL/V
15	7837.0-38.0	15.	8.2	7.7	12.6	22.1	DOL,CHT,V/F
16	7838.0-39.0	12.	11.	8.8	18.9	21.0	DOL
17	7839.0-40.0	<0.1	*	5.7	13.6	30.2	DOL,CHT,V
18	7840.0-41.0	0.5	*	13.3	21.0	23.3	DOL,V/F,V
19	7841.0-42.0	0.4	*	11.5	16.7	25.1	DOL,V,F
20	7842.0-43.0	0.2	*	9.7	16.7	27.8	DOL,F

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit 16
Date July 08, 1981

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CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

PHILLIPS PETROLEUM COMPANY
LAMBERT NO. A-2

DATE : 3-28-79
FORMATION : FUSSELMAN

FILE NO : 3202-11088
ANALYSTS : MORSE

WHOLE CORE ANALYSIS

SAMPLE NUMBER	DEPTH	PERM. TO AIR (MD) MAXIMUM	PERM. TO AIR (MD) 90 DEG	POR. FLD	FLUID SATS. OIL	FLUID SATS. WTR	DESCRIPTION
21	7843.0-44.0	42.	35.	8.6	20.6	26.0	DOL,F
22	7844.0-45.0	566.	40.	8.1	8.7	35.6	DOL,V/F
23	7845.0-46.0	204.	4.3	4.1	22.1	51.2	DOL,V/F
24	7846.0-47.0	29.	15.	7.3	12.2	33.8	DOL,CHT,V/F,SL/V
25	7847.0-48.0	4.0	2.8	4.7	12.3	41.1	DOL,SL/V,F
	7848.0-50.0						LOST CORE

*' INDICATES PLUG PERM

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CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

ENSERCH EXPLORATION INC.
LAMBIRTH NO. 3
WILDCAT
ROOSEVELT COUNTY, NEW MEXICO

DATE: 7-5-78
FORMATION: AS NOTED
DRLG. FLUID: SALT GEL & 3.5% OIL
LOCATION: 1980 FNL & 1980 FEL, SEC. 31, T-5-S, R-33-E

FILE NO: 3202-10814
ENGINEER: DILLARD
ELEVATION: 4394 GL

* INDICATES PLUG PERM S INDICATES PRESERVED SAMPLE

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX.	FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
	WHOLE CORE ANALYSIS									
	CORE NO. 1 7760.0-7806.0 CUT 46' REC 45' FUSSELMAN									
	7760.0-63.0 LM, ANHY, DENSE, NO SHOW									
	7763.0-66.0 LM, ANHY, FOSS, DENSE, NO SHOW									
	7766.0-91.0 LM, ANHY, SL/SHY, DENSE, NO SHOW									
	7791.0-98.0 SH, CONG									
	7798.0-7805.0 DOL, SL/SHY, DENSE, NO SHOW									
	7805.0-7806.0 LOST CORE									
	CORE NO. 2 7806.0-7844.0 CUT 38' REC 38' FUSSELMAN									
1	7806.0-07.0	16.0	0.1		8.4	15.1	44.8			DOL, LMY, V/F
2	7807.0-08.0	1.6	<0.1		9.0	6.1	51.3			DOL, V/F
3	7808.0-09.0	0.4	0.3		10.5	12.1	50.3			DOL, F
4	7809.0-10.3	<0.1	<0.1		7.7	0.3	71.9			DOL, SL/F
5	7810.3-12.0	0.1	<0.1		7.2	0.4	61.0			DOL, SL/F
6	7812.0-13.3	0.1	*		14.8	1.7	70.9			DOL, V/F
7	7813.3-14.5	5.6	1.7		13.7	4.6	64.0			DOL, LMY, V/F, CHT
8	7814.5-16.5	<0.1	<0.1		6.6	3.0	66.7			DOL, V/F, CHT
9	7816.5-17.5	<0.1	*		5.7	2.9	72.0			DOL, SHY, F, STY
10	7817.5-18.8	0.4	*		15.5	12.0	33.6			DOL, SHY, F
11	7818.8-20.4	5.7	0.8		11.4	7.6	63.0			DOL, SHY, F, SL/V

ENSERCH EXPLORATION, INC.
Docket No. 7726
Exhibit 17
Date July 08, 1981

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Petroleum Reservoir Engineering
DALLAS, TEXAS

NSERCH EXPLORATION INC.
AMBIRTH NO. 3

DATE: 7-5-78
FORMATION: AS NOTED

FILE NO: 3202-10814
ENGINEER: DILLARD

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
12	7820.4-21.6	0.4	0.4		10.5	29.3	30.8		DOL;SHY;F;SL/V
13	7821.6-22.6	0.4	0.2		9.6	9.9	59.3		DOL;F
14	7822.6-24.0	14.0	0.6		12.2	16.7	44.1		DOL;SHY;F;STY
15	7824.0-25.7	0.2	0.1		9.6	23.0	27.8		DOL;F;SHR;STY
16	7825.7-26.7	0.9	0.6		12.0	23.6	29.8		DOL;LMY;SL/F
17	7826.7-28.2	5.7	3.2		11.0	15.5	38.7		DOL;F;V;
18	7828.2-29.8	1.1	0.5		12.0	20.9	48.3		DOL;F;SL/V;STY
19	7829.8-31.2	0.3	0.2		8.7	31.5	28.6		DOL;F;STY
20	7831.2-32.7	7.4	2.1		11.4	35.2	38.0		DOL;LMY;SHY;F;SL/V
21	7832.7-33.8	0.6	0.4		15.3	17.8	44.7		DOL;LMY;F;STY
22	7833.8-34.8	0.4	0.4		13.4	27.9	31.8		DOL;LMY;SHY;F;STY
23	7834.8-36.3	0.6	0.5		17.6	28.3	34.1		DOL;F
24	7836.3-38.0	0.4	0.3		15.4	19.6	46.3		DOL;LMY;SHY;F;STY
25	7838.0-39.0	0.4	0.2		13.0	12.0	49.9		DOL;LMY;F;STY
26	7839.0-40.8	0.5	0.4		12.2	19.2	39.1		DOL;LMY;F;FOSS;STY
27	7840.8-42.6	0.5	0.4		14.8	24.6	32.7		DOL;LMY;F;STY
28	7842.6-44.0	0.3	*		14.9	26.3	33.8		DOL;LMY;V/F
	CORE NO. 3 7844.0-7882.0 CUT 38' REC 22' FUSSELMAN								
29	7844.0-45.3	0.5	0.3		11.9	18.5	45.1		DOL;LMY;ANHY;SL/F STY
30	7845.3-46.7	0.6	0.6		18.3	24.2	38.9		DOL;LMY
31	7846.7-47.8	1.2	0.5		15.4	13.2	47.0		DOL;LMY;SL/F
32	7847.8-48.8	17.0	1.8		11.8	19.8	28.6		DOL;LMY;ANHY;F
33	7848.8-50.3	1.2	1.0		13.2	19.1	27.7		DOL;LMY;ANHY;SL/F
34	7850.3-51.9	1.0	0.6		19.5	32.6	33.3		DOL;LMY;SHY;ANHY SL/F
35	7851.9-53.3	0.5	0.5		17.9	11.5	46.0		DOL;LMY;ANHY;SL/F
36	7853.3-55.0	1.1	0.5		17.2	17.6	42.0		DOL;LMY;SHY;ANHY SL/F
37	7855.0-56.1	0.2	0.1		16.5	27.1	40.5		DOL;LMY;ANHY;SL/F

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CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

ENSERCH EXPLORATION INC.
LAMBIRTH NO. 3

DATE: 7-5-78
FORMATION: AS NOTED

FILE NO: 3202-10814
ENGINEER: DILLARD

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
38	7856.1-57.0	<0.1	*		7.2	5.4	58.9		DOL,LMY,SHY,ANHY SL/F
39	7857.0-58.0	<0.1	<0.1		7.6	3.3	66.5		DOL,LMY,SHY,ANHY SL/F,STY
40	7858.0-59.1	0.4	0.4		13.9	18.4	44.6		DOL,LMY,SHY,ANHY,STY SL/F
41	7859.1-60.9	2.2	1.2		12.7	23.2	33.5		DOL,LMY,SHY,ANHY,STY SL/F
42	7860.9-62.7	0.4	0.2		14.4	8.2	59.9		DOL,LMY,SL/F
43	7862.7-64.4	2.9	1.6		12.5	18.7	34.7		DOL,LMY,ANHY,F,STY
44	7864.4-66.0	10.0	9.6		16.3	16.9	39.9		DOL,LMY,SDY,ANHY,F STY

7866.0-82.0 LOST CORE

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omis[illegible] excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or [illegible] as to the productivity, proper operations, or profitableness of any oil, [illegible] well or sand in connection with which such report is used or relied upon.

VERTICAL SCALE: 5" = 100'

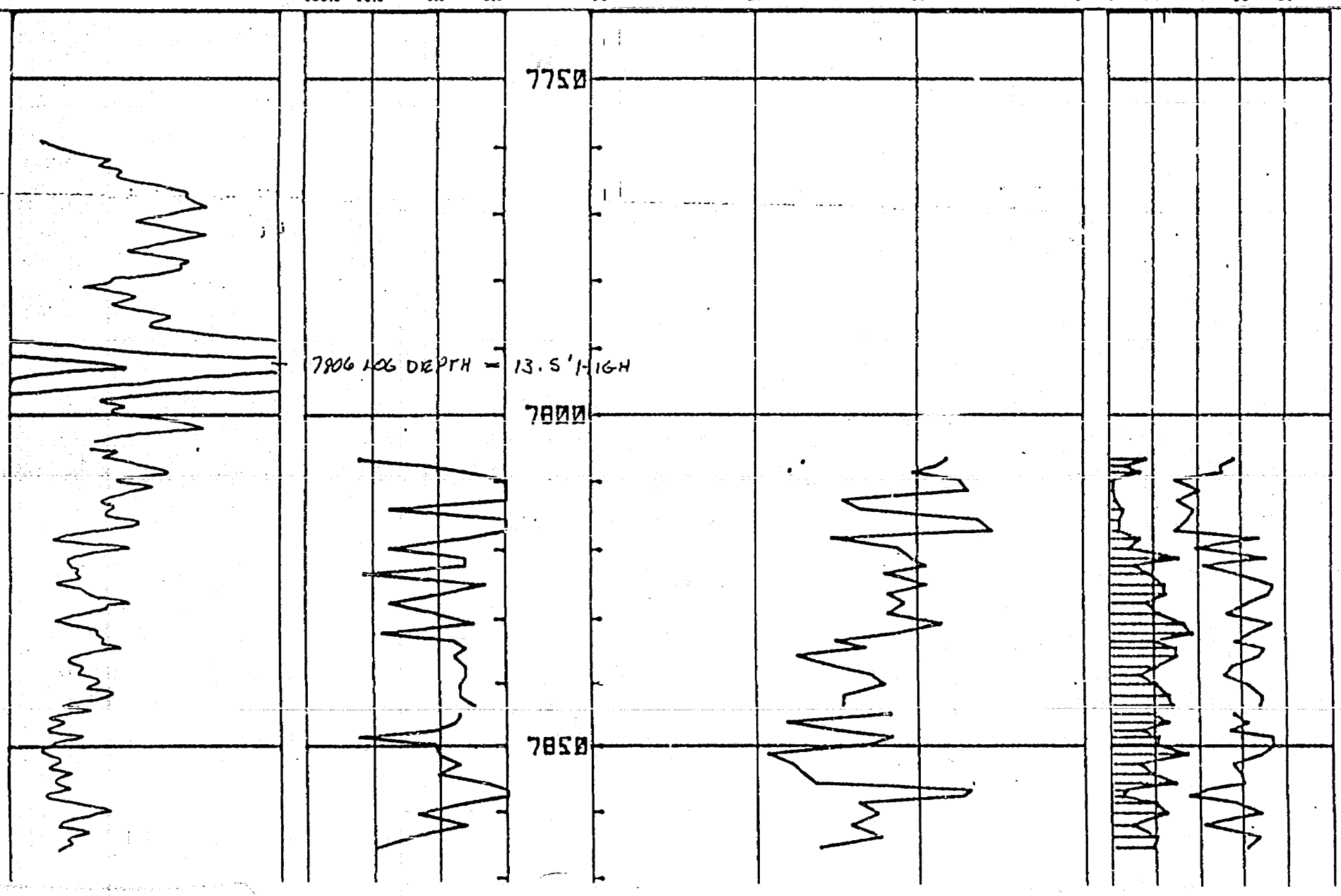
TOTAL WATER 0000
PERCENT PORE SPACE
80 60 40 20 0

GAMMA RAY
RADIATION INCREASE →

PERMEABILITY ___
MILLIDARCYS
100.0 10.0 1.0 0.1

POROSITY ___
PERCENT
30 20 10 0

OIL SATURATION ~~XXXX~~
PERCENT PORE SPACE
0 20 40 60 80



RESIDUE RESEARCH LABORATORY
2405 W. INDIANA
MIDLAND, TEXAS 79701

INSOLUBLE RESIDUE REPORT
FILE NO.

SECTION	TWN.	RGE.	BLOCK	SURVEY	ELEV.	STATE	COUNTY
32	5-S	33-E			NR	NEW MEXICO	ROOSEVELT

FOOTAGE	COMPANY	WELL	FARM
1880 FNL & 560 FWL	ENSERCH EXPL,	# 2	RADER

ISSUED FOR CONFIDENTIAL USE

SECTION EXAMINED:

7600-8000

TOPS AND CORRELATIONS:

Samples began in PENNSYLVANIAN ---------- 7600

B. PENNSYLVANIAN - T. MONTOYA ---------- 7880

T. CAMBRIAN ---------- 7980

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 15
Submitted by Brown
Hearing Date 7-8-81

SPECIAL NOTES:

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

WATER INJECTION CALCULATIONS
WATER ENROACHMENT
Enserch Exploration - G. Rader Well No. 2
Peterson, South Field

Proposed Injection Zone: Montoya
Perforations: 7902' - 7930'
(-3502', -3530')
Net Interval: 28'
Average Porosity: 7%
Irreducible Water Saturation: 20%
Displaceable Porosity: 5.6%

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 12
Submitted by ENSERCH
Hearing Date 7-8-81

Reservoir volume encroached by injected water:

$$W_i = (7758\ A\ h\ \phi_D)/B_w$$

Reservoir area encroached by injected water:

$$A = (B_w \times W_i)/(7758\ h\ \phi_D)$$

Volume of water produced from Peterson, S. Field (December 1980):

Enserch = 22,663 bbls	(731 bbls/day)
Phillips = 5,541 bbls	(179 bbls/day)
Total = 28,204 bbls/month	(910 bbls/day)

Anticipated daily injection volume (Enserch water production):

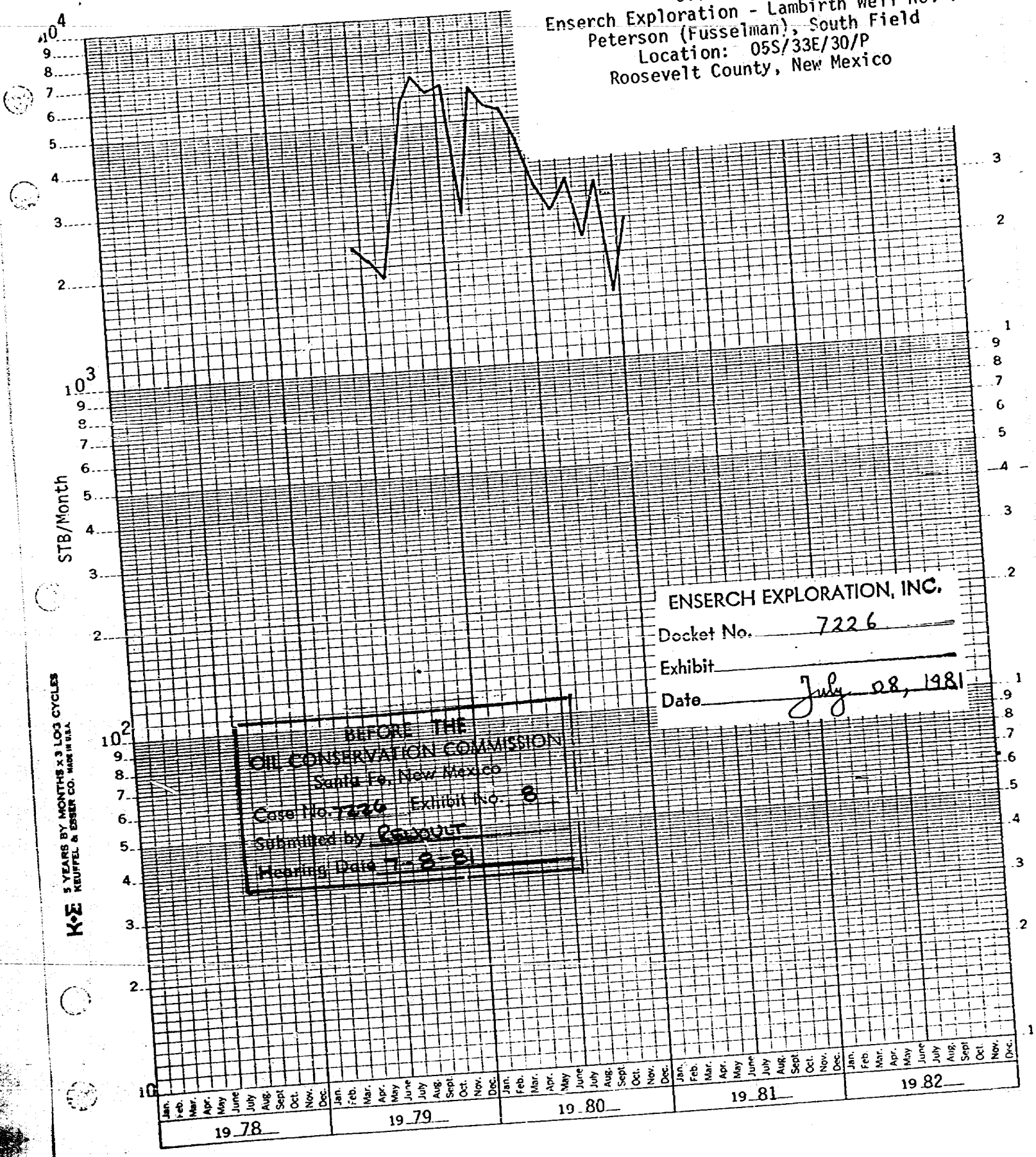
22,800 bbls/month (750 bbls/day)

Reservoir area encroached by injection water (750 bbls/day):

Year 1:	A =	22.5 acres	(550')
Year 2:	=	45.0 acres	(790') 660
Year 3:	=	67.5 acres	(970')
Year 4:	=	90.0 acres	(1120')
Year 5:	=	112.5 acres	(1150')
Year 6:	=	135.0 acres	(1370')
Year 7:	=	157.5 acres	(1480')
Year 8:	=	180.0 acres	(1580')
Year 9:	=	202.5 acres	(1675')
Year 10:	=	222.5 acres	(1760')

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08 / 1981

Oil Production
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field
Location: 05S/33E/30/P
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 28, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 8
Submitted by Enserch
Hearing Date 7-28-81

K·E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

PRODUCTION HISTORY
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field

Location: 05S/33E/30/P
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR	Water Cut
	Bbls	MCF	Bbls	SCF/Bbl	%
01/79					
02/79					
03/79					
04/79					
05/79					
06/79	2,244	1,031	1,120	459	33
07/79	2,112	871	804	412	30
08/79	1,879	1,056	494	562	21
09/79	3,345	771	1,859	230	36
10/79	5,912	2,493	1,261	421	18
11/79	6,891	2,262	1,257	328	15
12/79	6,228	2,172	348	348	5
01/80	6,250	1,767	1,380	282	18
02/80	2,724	1,840	1,014	675	27
03/80	6,242	1,971	1,399	316	18
04/80	5,541	2,035	1,370	367	20
05/80	5,279	2,122	1,722	402	21
06/80	4,376	2,221	1,262	508	22
07/80	3,120	1,537	1,689	493	35
08/80	2,723	1,589	2,470	584	48
09/80	3,260	1,789	2,434	549	43
10/80	2,274	1,800	1,089	792	32
11/80	3,142	2,460	3,194	783	50
12/80	1,527	1,669	1,507	1,093	50
Cum. Prod.	75,069	33,456	27,673	446	27
01/81	2,433	3,032	2,319	1,246	51
02/81	2,292	2,645	1,210	528	35
03/81	1,354	2,183	1,212	895	47

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

Oil Production
Phillips Petroleum - Lambirth "A" Well No. 4
Peterson (Fusselman), South Field
Location: 05S/33E/31/A
Roosevelt County, New Mexico

1750 Nadbl #2

STB/Month

10^4 9 8 7 6 5 4 3 2 10^3 9 8 7 6 5 4 3 2 10^2 9 8 7 6 5 4 3 2 10^1

5 4 3 2 1 9 8 7 6 5 4 3 2 1 9 8 7 6 5 4 3 2 1

Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

19 78 | 19 79 | 19 80 | 19 81 | 1982

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 9
Submitted by Penroc
Hearing Date 7-8-81

K•E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

PRODUCTION HISTORY
Phillips Petroleum - Lambirth "A" Well No. 4
Peterson (Fusselman), South Field

Location: 05S/33E/31/A
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR	Water Cut
	Bbls	MCF	Bbls	SCF/Bbl	%
01/79					
02/79					
03/79					
04/79					
05/79					
06/79					
07/79					
08/79					
09/79					
10/79	5,740	1,186	402	207	6
11/79	5,020	1,578	8,685	314	63
12/79	5,158	1,725	892	334	15
01/80	5,434	1,783	940	328	15
02/80	6,701	1,394	1,159	208	15
03/80	8,762	614	301	70	3
04/80	5,410	1,502	936	278	15
05/80	4,979	1,106	861	222	15
06/80	4,696	1,725	812	367	15
07/80	4,773	177	2,387	37	33
08/80	4,898	3,008		614	0
09/80	3,537	1,146		324	0
10/80	2,277	483		212	0
11/80	1,902	138		73	0
12/80	2,035	673		331	0
Cum. Prod.	71,332	18,238	17,375	256	20
01/81	1,752	972	--	550	0
02/81	4,419	1,236	4,247	280	49
03/81	3,292	80	3,116	25	49

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

$1.58

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 10
Submitted by RENOULT
Hearing Date 7-8-81

WATER PRODUCTION (IN BBLS)
Enserch Exploration - Peterson (Fusselman, Penn) South Field
Roosevelt County, New Mexico

Enserch Exploration	Lambirth #1		Lambirth #3		Lambirth #4		Lambirth #6		Lambirth #7		Lambirth #8		Lambirth #9		Lambirth #10		Cumulative Water Production		
	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Total
06/78	0																		
07/78	0																		
08/78	310																310		310
09/78	313																313		313
10/78	0																0		0
11/78	0		0		1,119												0	1,119	1,119
12/78	0		0		1,995												0	1,995	1,995
01/79	0		0		1,807												0	1,807	1,807
02/79	0		0		1,569												0	1,569	1,569
03/79	0		0		1,501		936										936	1,501	2,437
04/79	0		0		956		720										720	956	1,676
05/79	0		0		2,607		240										240	2,607	2,847
06/79	0		0		2,285		3,965		1,120								5,085	2,285	7,370
07/79	0		0		0		3,703		804								4,507	0	4,507
08/79	0		0		1,949		2,928		494								3,422	1,949	5,371
09/79	0		0		1,923		2,560		1,859								4,419	1,923	6,342
10/79	0		0		1,819		3,928		1,261		0						5,189	1,819	7,008
11/79	0		0		2,245		6,778		1,257		395						8,430	2,245	10,675
12/79	0		0		1,613		9,997		348		5,247						15,592	1,613	17,205
01/80	0		0		1,273		8,961		1,380		5,377		44				15,762	1,273	17,035
02/80	0		0		1,143		9,220		1,014		1,702		0				11,936	1,143	13,079
03/80	0		0		1,376		10,394		1,399		7,891		0				19,684	1,376	21,060
04/80	0		0		1,326		11,755		1,370		6,759		0				19,884	1,326	21,210
05/80	0		0		1,363		11,242		1,722		6,349		0				19,313	1,363	20,676
06/80	0		0		1,120		11,598		1,262		10,034		0				22,894	1,120	24,014
07/80	0		0		1,029		8,087		1,689		10,286		0				20,062	1,029	21,091
08/80	0		0		1,162				2,470		9,977		0		266		12,713	1,162	13,875
09/80	0		0		1,007				2,434		9,615		0		7,215		19,264	1,007	20,271
10/80	0		0		817				1,089		10,657		11		10,838		22,595	817	23,412
11/80	0		0		230				3,194		8,620		0		7,606		19,420	230	19,650
12/80	0		0		398				1,507		9,997		8		10,773		22,265	398	22,663
Cumulative Water Production	623		0		35,632		107,012		27,673		102,886		63		36,698		274,955	35,632	310,587

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

Application for Approval of
Salt Water Disposal Injection Well

Enserch Exploration - Gladys Rader Well No. 2
Peterson (South) Field
Roosevelt County, New Mexico

Well Location: 1880' FNL & 560' FWL
Section 32, Township 5-S
Range 33-E, Unit Letter E

Perforation: 7902'-7930' (-3503', -3531')
2 JSPF, 0.42" hole

Stimulation Treatment: Spotted 150 gallons of 15% MCA (@1.7 BPM and 1100 psi). Pumped 10,000 gallons of MOD 202 Acid. Dropped 40 RCN ball sealers (@ 7.5 BPM). Flushed with 32 barrels of 2% KCl water.

Injection Test: Date: 03/27/81
Test Data: 5BPM @ 2400 psi
4BPM @ 1500 psi
3BPM @ 600 psi
2BPM @ vacuum

Maximum Allowed Injection Pressure:

= 0.2 psi per foot of depth to the top of the injection zone.

= 0.2 x 7902 = 1580.4 psi

Maximum Allowed Injection Volume:

= 5976 bbls/day

Anticipated Daily Injection Volume:

= 750 bbls/day
= .52 bbls/minute

Anticipated Surface Injection Pressure:

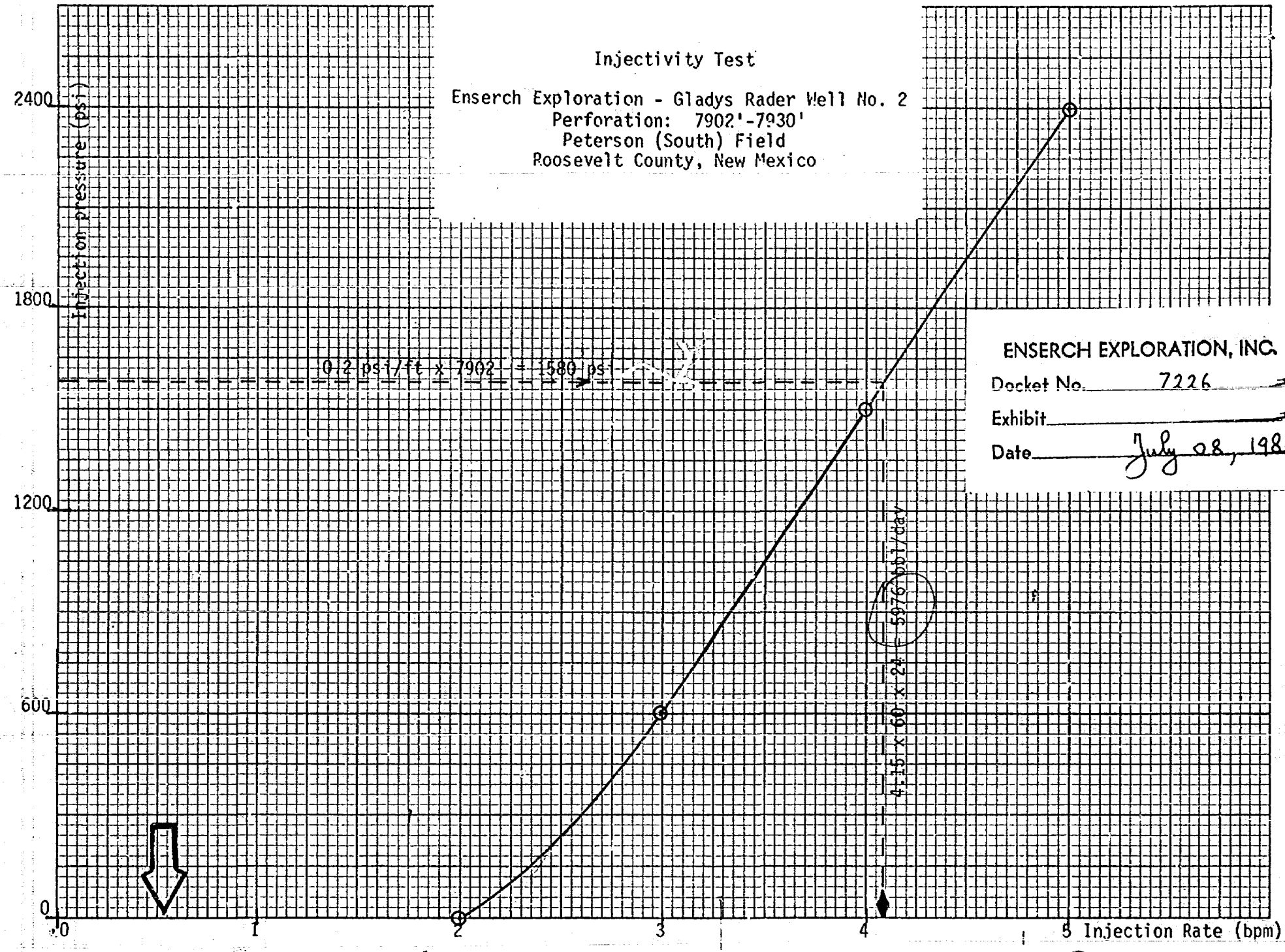
Under vacuum

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 11
Submitted by ENSERCH
Hearing Date 7-8-81

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

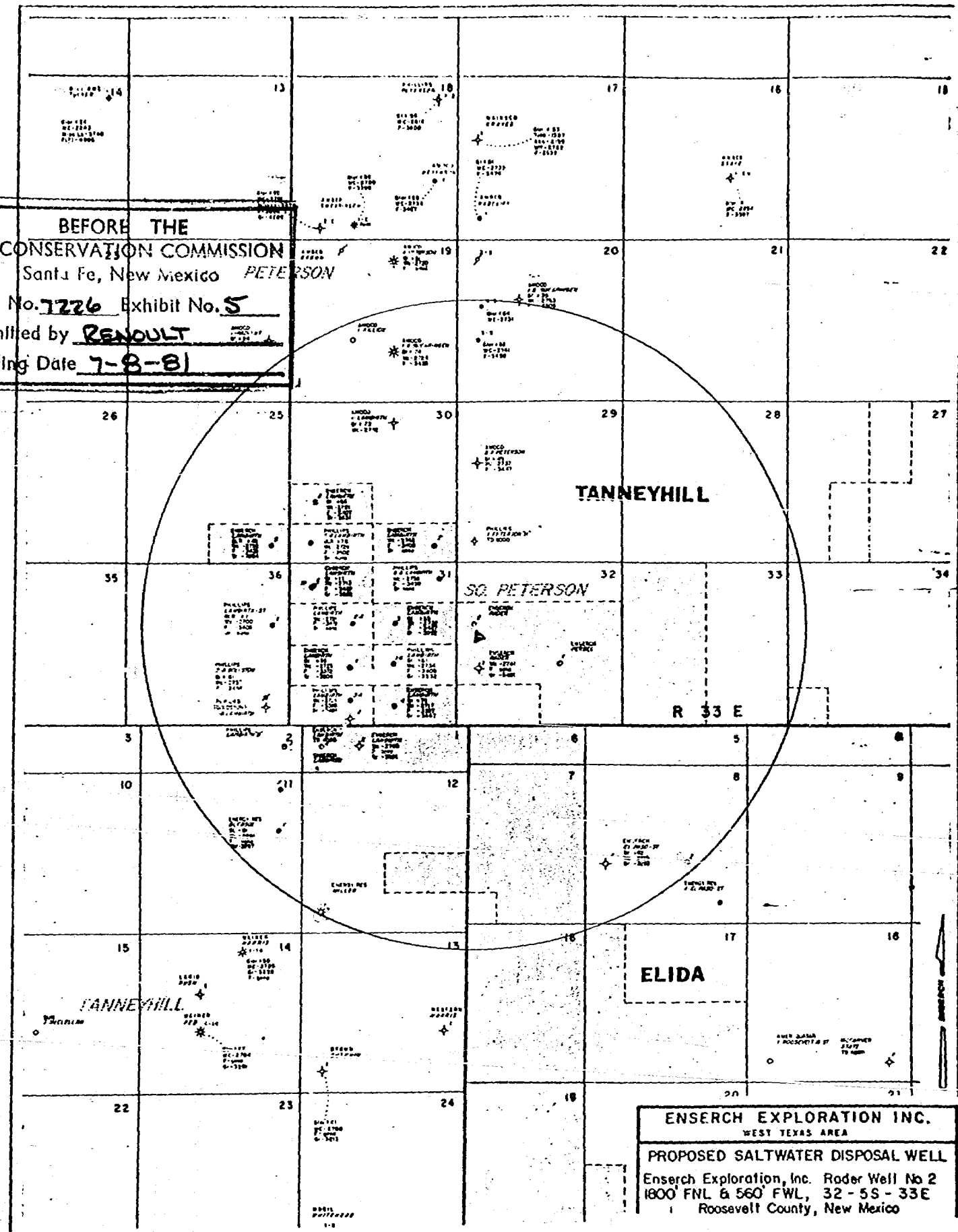
Injectivity Test

Enserch Exploration - Gladys Rader Well No. 2
Perforation: 7902'-7930'
Peterson (South) Field
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 5
Submitted by RENOULT
Hearing Date 7-8-81



ENSERCH EXPLORATION INC.
WEST TEXAS AREA

PROPOSED SALTWATER DISPOSAL WELL

Enserch Exploration, Inc. Roder Well No 2
1800' FNL & 560' FWL, 32 - 5S - 33E
Roosevelt County, New Mexico

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit

Docket No. 7226

Exhibit

Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 6
Submitted by RENOUT
Hearing Date 7226

LISTING OF WELLS TWO-MILE RADIUS FROM EE RADER NO. 2
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Enserch Rader No. 2	32	5S	33E	E		Salt water Disposal
Enserch Rader No. 1	32	5S	33E	L	1,650'	D&A
Phillips Lambirth "A" No. 4	31	5S	33E	A	1,750'	Fusselman
Enserch Lambirth No. 6	31	5S	33E	D	5,280'	P&A
Enserch Lambirth No. 10	31	5S	33E	D	5,350'	Fusselman
Phillips Lambirth "A" No. 2	31	5S	33E	F	3,800'	Fusselman
Enserch Lambirth No. 3	31	5S	33E	G	2,500'	Pennsylvanian
Phillips Lambirth "A" No. 1	31	5S	33E	J	2,900'	Fusselman
Enserch Lambirth No. 1	31	5S	33E	K	4,200	Fusselman
Phillips Lambirth "A" No. 3	31	5S	33E	M	4,650'	Fusselman

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Page 2
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Enserch Lambirth No. 4	31	5S	33E	O	3,650	Pennsylvanian
Amoco Lambirth No. 1	30	5S	33E	B	7,050'	P&A
Enserch Lambirth No. 8	30	5S	33E	L	6,550'	Fusselman
Phillips Lambirth "A" No. 5	30	5S	33E	M	5,850'	Pennsylvanian
Enserch Lambirth No. 7	30	5S	33E	P	2,750'	Fusselman
Amoco Peterson No. 1-B	29	5S	33E	E	5,280'	P&A
Phillips Peterson No. 1-H	29	5S	33E	M	2,600'	P&A
Amoco Swearingen No. 4-B	20	5S	33E	E	14,000'	Pennsylvanian
Amoco Swearingen No. 3-B	20	5S	33E	L	9,300'	Pennsylvanian
Amoco Swearingen No. 1-A	19	5S	33E	J	9,300'	Pennsylvanian
Enserch Lambirth No. 9	25	5S	32E	P	6,900'	Fusselman

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2

Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Phillips Lambirth State #1	36	5S	32E	H	6,400'	Fusselman
Phillips Goldston "A" No. 2	36	5S	32E	P	7,000'	P&A
Goldston Lambirth "A" No. 1	36	5S	32E	P	7,150'	P&A
Phillips Lambirth "B" No. 1	2	6S	33E	A	7,250'	Pennsylvanian
Enserch Lambirth No. 2	1	6S	33E	D	6,250'	P&A
Enserch Lambirth No. 5	1	6S	33E	C	5,400'	P&A
Enserch El Paso State No. 1	8	6S	34E	L	8,800'	P&A
Energy Reserves Bledsoe No. 2	11	6S	33E	A	8,200'	Pennsylvanian
Energy Reserves Bledsoe No. 1	1	6S	33E	H	9,200'	Pennsylvanian
Energy Reserves Miller No. 1	12	6S	33E	M	14,000'	Granite Wash

Oil Production
Phillips Petroleum - Lambirth "A" Well No. 1
Peterson (Fusselman), South Field
Location: 05S/33E/31/J
Roosevelt County, New Mexico

STB/Month

10^4 9 8 7 6 5 4 3 2 10^3 9 8 7 6 5 4 3 2 10^2 9 8 7 6 5 4 3 2 10

Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

19 78 | 19 79 | 1980 | 19 81 | 19 82

K+E 5 YEARS BY MONTHS X 3 LOG CYCLES KEUFFEL & ESSER CO. MADE IN U.S.A.

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 7
Submitted by ENSERCH
Hearing Date 7-8-81

PRODUCTION HISTORY
Phillips Petroleum - Lambirth "A" Well No. 1
Peterson (Fusselman), South Field

Location: 05S/33E/31/J
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR	Water Cut
	Bbls	MCF	Bbls	SCF/Bbl	%
01/79	3,700	3,411		922	0
02/79	6,650	6,131		922	0
03/79	2,585	980	191	379	8
04/79	2,184	646	149	296	2
05/79	7,115	1,883	5,222	265	44
06/79	6,536	2,776	5,104	425	46
07/79	6,105	2,865	5,066	469	44
08/79	6,332	5,976	8,257	944	64
09/79	4,718	3,536	8,689	749	64
10/79	4,965	3,317	2,286	668	37
11/79	3,908	967	2,610	247	37
12/79	4,462	1,174	802	263	37
01/80	1,371	354	734	258	37
02/80	1,255	205	960	163	37
03/80	1,641	456	2,370	278	37
04/80	4,052	886	2,182	219	37
05/80	3,730	651	2,058	174	37
06/80	3,518	1,017	2,092	289	37
07/80	3,576	9,622	9,638	2,691	72
08/80	3,668	3,034	3,138	827	72
09/80	1,195	698	2,019	584	72
10/80	769	295	2,300	384	72
11/80	876	114	2,545	130	72
12/80	969	578		596	
Cum. Prod.	85,880	51,572	68,412	600	44
01/81	431	431	1,132	1,000	72
02/81	1,924	151	2,728	78	59
03/81	last prod. 02/81				

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

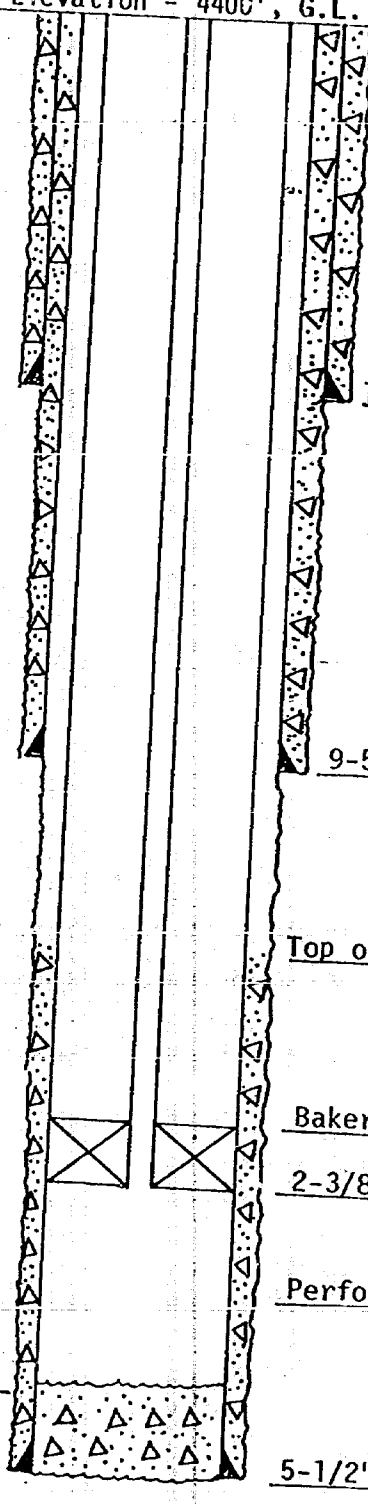
Enserch Exploration, Inc.

Rader No. 2 Well

1880' FNL & 560' FWL, Sec. 32-T5S-R33E

Roosevelt County, New Mexico

K.B. Elevation = 4400', G.L. = 4385'



13-3/8" csg. @ 356', cmt. circ

9-5/8" csg. @ 1981', cmt. circ.

Top of cmt. @ 6850'

Baker Model "D" pkr. @ 7875'

2-3/8" tbg. @ 7876.53'

Perforations: 7902' - 7930'

PBTD @ 7940'

5-1/2" csg. @ 8000', cmt. w/350 sks.

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 4
Submitted by RENOULT
Hearing Date 7-8-81

ENSERCH EXPLORATION, INC.
Docket No. 7226
July 08, 1981

Rader Well No. 1

South Peterson Field

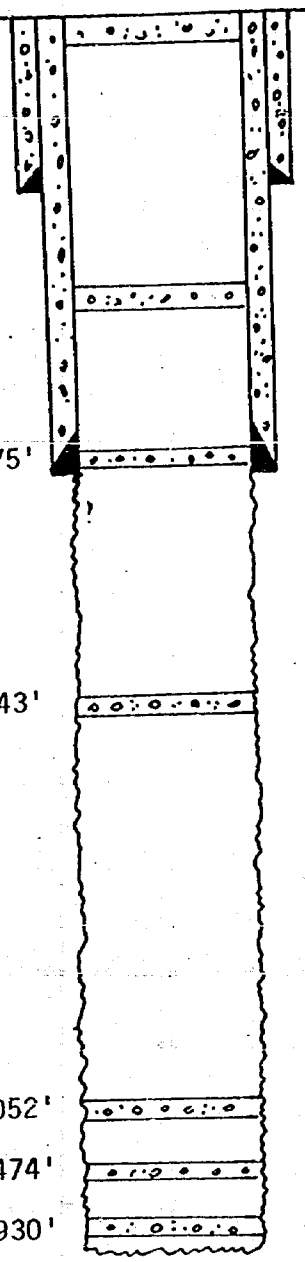
Roosevelt County, New Mexico

Prepared by: Date

KB Elevation 4393.5'

GL Elevation 4407.5'

Plug #7: 10 sx Class H Cmt. @ surface



374' 13-3/8" 48#/ft K55 ST&C 8rd csg.

Plug #6: 40 sx Class H Cmt. @ 1082'-982'

2025' 8-5/8", 24#/ft K55 ST&C 8rd csg.

Plug #5: 40 sx Class H Cmt. @ 2075'-1975'

Plug #4: 40 sx Class H Cmt. @ 4443'-4343'

ENSERCH EXPLORATION, INC.

Docket No. 7226

Exhibit

Date July 08, 1981

Plug #3: 40 sx Class H Cmt. @ 7152'-7052'

Plug #2: 40 sx Class H Cmt. @ 7574'-7474'

Plug #1: 50 sx Class H Cmt. @ 7880'-7930'

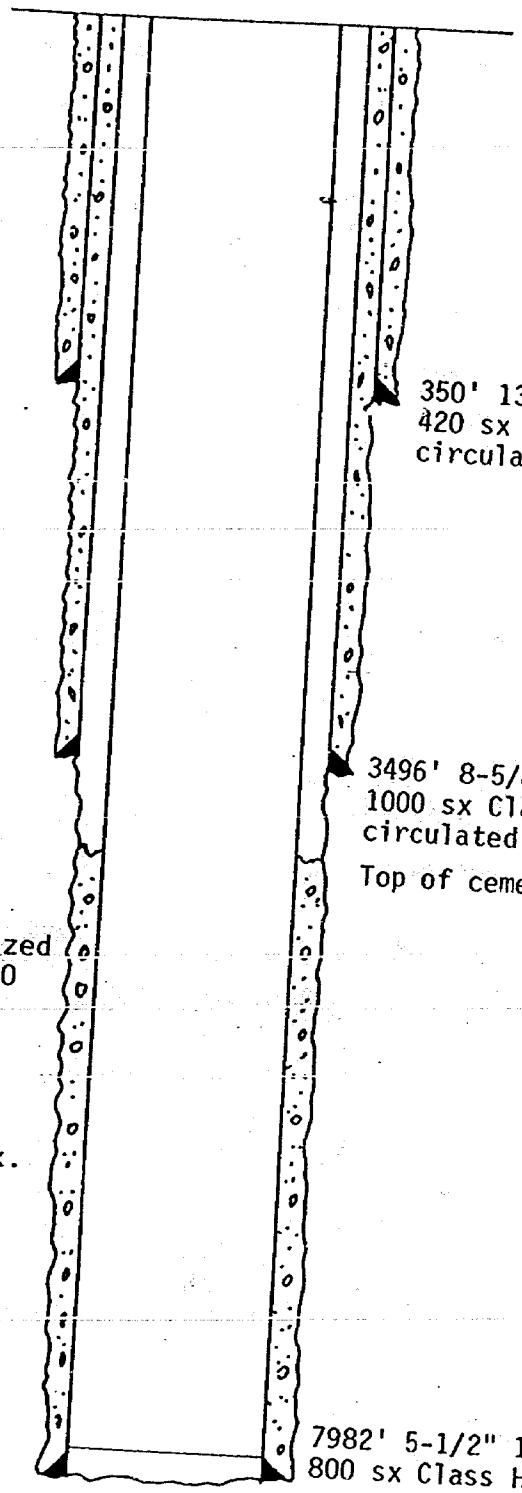
7920' TD open hole

Last Workover: Well was plugged on 7/7/79 before production string was run.

Prod. Rate Before: Prod. Rate After:

Nature of Workover:

PHILLIPS PETROLEUM COMPANY
Peterson "H" Well No. 1
South Peterson Field
Roosevelt County, New Mexico



K.B. Elevation - 4384'
G.L. Elevation - 4368'

350' 13-3/8" 48#/ft K-55
420 sx Class H + 2% $CaCl_2$
circulated 95 sx to surface

3496' 8-5/8" 24#/ft K-55
1000 sx Class H + 2% $CaCl_2$
circulated 225 sx to surface
Top of cement @ 5210'

Perfs 7332'-7341' (18 shots). Acidized w/5000 gals. 28% acid.

Perfs 7616'-7760' OA (110 shots). Acidized w/4500 gals. 15% NE HCl. Frac'd w/20,000 gals. gelled 15% NE HCl. Squeezed w/180 sx.

Perfs 7793'-7801' (32 shots). Acidized w/250 gals. 15% NE HCl. Squeezed w/80 sx.

Perfs 7792'-7806' (28 shots). Acidized w/750 gals. 15% NE HCl. Squeezed w/62 sx Class H.

Perfs 7846'-7852' (20 shots). Acidized w/500 gals. 15% NE HCl. Squeezed w/18 sx Class H.

7982' 5-1/2" 15.5#/ft K-55
800 sx Class H + 2% KCl

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 3
Submitted by RENOULT
Hearing Date 7-8-81

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

APPLICATION FOR APPROVAL OF SALT WATER DISPOSAL WELL
Enserch Exploration - Rader Well No. 2
Peterson (South) Field - Roosevelt County
New Mexico

Operator Well Name API Well I.D. No.	Location	Distance to Enserch Rader No. 2	Casing String Setting Depth	Cement (sacks)	Cement Top	Total Depth	Current Producing Interval (Subsea depth)	Current Producing Formation	KB
Enserch Rader No. 2	1880' FNL 560' FWL Section 32 T5S, R33E		13-3/8" @ 356' 9-5/8" @ 1981' 5-1/2" @ 8000'	250 914 350	Surface Surface 6850'	8000'	7902'-7930' (-3503, -3531)	Salt Water Disposal	4399'
Enserch Rader No. 1 30-041-20492	2100' FSL 660' FWL Section 32 T5S, R33E	1650'	13-3/8" @ 373' 8-5/8" @ 2025'	350 680	Surface Surface	7903'	D&A	D&A	4410'
Phillips Lambirth "A" No. 4 30-041-20506	560' FNL 560' FEL Section 31 T5S, R33E	1750'	13-3/8" @ 360' 8-5/8" @ 3500' 5-1/2" @ 8007'	420 580 1635	Surface Surface 4200'	8007'	7814'-7828' (-3423, -3437)	Fusselman	4391'
Enserch Lambirth No. 3 30-041-20454	1980' FNL 1980' FEL Section 31 T5S, R33E	2500'	13-3/8" @ 377' 8-5/8" @ 3297' 5-1/2" @ 8030'	350 2000 800	Surface Surface 6600'	8030'	7702'-7715' (-3295, -3308)	Pennsylvanian	4407'
Phillips Peterson No. 1-H 30-041-20535	660' FWL 510' FWL Section 29 T5S, R33E	2600'	13-3/8" @ 350' 8-5/8" @ 3496' 5-1/2" @ 7982'	325 775 800	Surface Surface 5210'	7991'			4384'
Enserch Lambirth No. 7 30-041-20482	660' FEL 510' FSL Section 30 T5S, R33E	2750'	13-3/8" @ 358' 8-5/8" @ 1991' 5-1/2" @ 7858'	300 750 450	Surface Surface 6630'	7882'	7826'-7829' (-3435, -3438)	Fusselman	4391'
Phillips Lambirth "A" No. 1 30-041-20471	1980' FEL 1980' FSL Section 31 T5S, R33E	2900'	13-3/8" @ 400' 8-5/8" @ 3500' 5-1/2" @ 7995'	420 1175 400	Surface Surface 5780'	8000'	7830'-7838' 7852'-7858' (-3408, -3416) (-3430, -3436)	Fusselman	4422'

PETERSON SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
WELL STATUS
(AS OF 01/1981)

Proposed Salt Water Disposal
Produced from Pennsylvanian
Produced from Fusselman

Scale: 1" = 2000'

TANNEYHILL

ENSERCH EXPLORATION, INC.

Docket No. 7226
Exhibit
Date July 08, 1981

SO. PETERSON

R 33

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 2
Submitted by Kendall
Hearing Date 7-8-81

ELIDA

Form C-108
Revised 3-1-68

NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION

OPERATOR: Enserch Exploration, Inc.		ADDRESS: P. O. Box 4815 Midland, Texas 79704	
LEASE NAME: Rader	WELL NO.: 2	FIELD: Undesignated	COUNTY: Roosevelt

LOCATION: UNIT LETTER E ; WELL IS LOCATED 1880 FEET FROM THE North LINE AND 560 FEET FROM THE West LINE, SECTION 32 TOWNSHIP 5-S RANGE 33E NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING	13-3/8"	356'	250 sacks	Circ.	
INTERMEDIATE	9-5/8"	1981'	914 sacks	Circ.	
LONG STRING	5-1/2"	8000'	350 sacks	6850'	Cement Bond Log
TUBING	2-3/8"	7876.53'	NAME, MODEL AND DEPTH OF TUBING PACKER: Baker Model "D" retainer Production packer @ 7875'		

NAME OF PROPOSED INJECTION FORMATION	TOP OF FORMATION	BOTTOM OF FORMATION
Montoya	7900'	7955'

IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?	PERFORATIONS OR OPEN HOLE?	PROPOSED INTERVAL(S) OF INJECTION
Tubing	Perforations	7902' - 7930'

IS THIS A NEW WELL DRILLED FOR DISPOSAL?	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED?	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE?
No	South Peterson (Fusselman and/or Penn.) Dev. Well	Yes

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH: 7848' - 7851' (8 holes) squeezed with 86 sacks, 7710'-7714' (10 holes) squeezed w/47 sacks

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA
250'	7858'	None

ANTICIPATED DAILY INJECTION VOLUME (BBLS.)	MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSIG)
750	750	2880	closed	gravity	vacuum

ANSWER YES OR NO WHETHER THE FOLLOWING WATERS ARE MINERALIZED TO SUCH A DEGREE AS TO BE UNFIT FOR DOMESTIC, STOCK, IRRIGATION, OR OTHER GENERAL USE —	WATER TO BE DISPOSED OF	NATURAL WATER IN DISPOSAL ZONE	ARE WATER ANALYSES ATTACHED?
	yes	yes	yes

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND): Richard Lambirth & Portales National Bank (O.D. Lambirth Trust) P. O. Drawer 888 Portales, N.M

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL

Phillips Petroleum Company

Phillip Bldg.

Odessa, Texas 79761

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 1
Submitted by RENOULT
Hearing Date 7-8-81

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING?	SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL
	yes	yes

ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B)	PLAT OF AREA	ELECTRICAL LOG	DIAGRAMMATIC SKETCH OF WELL
	yes	yes	yes

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Daniel Renoult (Signature) | District Petroleum Engineer (Title) | June 08, 1981 (Date)

NOTE: Should waivers from the surface owner and all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests. SEE RULE 701.

PETERSON SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
WELL STATUS
(AS OF 01/1981)

Proposed Salt Water Disposal

Produced from Pennsylvanian

Produced from Fusselman

Scale: 1" = 2000'

TANNEYHILL

ENSERCH EXPLORATION, INC.

Docket No. 7226

Exhibit

Date April 22nd, 1981

AMOCO
I-HAINLINE
GL + 24
WC - 2842

AMOCO
I-LAMBIRTH
GL + 73
WC - 2742

B I PETERSON
GL + 41
WC - 2737
F - 3447

ENSERCH
LAMBIRTH
GL +85
WC -2721
F -3407
Gr -3631

ENSERCH
LAMBIRTH
GLR +49
WC -2750
F -3436
Gr -3554

PHILLIPS
5-A LAMBIRTH
GLR +78
WC -2729
F -3502
Gr none

ENSERCH
LAMBIRTH
WC -2742
F -3409
Gr none

PHILLIPS
I PETERSON "A"
TD 8000

ENSERCH
LAMBIRTH
GL +11
WC -2713
F -3427
Gr -3662

PHILLIPS
4-A LAMBIRTH
WC -2758
F -3499
Gr none

SQ. PETERSON

PHILLIPS
LAMBIRTH-ST
GLR +1
WC -2700
F -3405
Gr none

PHILLIPS
LAMBIRTH
WC -2721
F -3419
Gr none

ENSERCH
LAMBIRTH
GL +89
WC -2732
F -3427
Gr -3692

ENSERCH
LAMBIRTH
GL +65
WC -2725
F -3372
Gr -3504

PHILLIPS
LAMBIRTH
GL +61
WC -2734
F -3405
Gr -3532

ENSERCH
RADER
WC -2741
F none
Gr -3481

ENSERCH
PERSEL

PHILLIPS
2-A GOLDSTON
GL + 61
WC - 2737
F - 3458

PHILLIPS
(GOLDSTON)
1-A LAMBIRTH

PHILLIPS
LAMBIRTH
WC -2711
F -3389
Gr -3491

ENSERCH
LAMBIRTH
GL +74
WC -2717
F -3367
Gr -3447

R 33

PHILLIPS
LAMBIRTH "B"

ENSERCH
LAMBIRTH
TD 4020

ENSERCH
LAMBIRTH
WC -2708
F none
Gr -3361

ENERGY RES
BLEDSOE
GL - 61
F none
GW-3257

ENERGY RES
MILLER

ENSERCH
EL PASO-ST
GL +42
Gr -3253

ENERGY RES.
1-EL PASO-ST

WEINER
HARRIS
1-14
Glor +58
WC-2705
Gr-3228
F-gone

ELIDA

Enserch Ex 2
7226

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd, 1981

APPLICATION FOR APPROVAL OF SALT WATER DISPOSAL WELL

Enserch Exploration - Rader Well No. 2
Peterson (South) Field - Roosevelt County
New Mexico

Operator Well Name API Well I.D. No.	Location	Distance to Enserch Rader No. 2	Casing String Setting Depth	Cement (sacks)	Cement Top	Total Depth	Current Producing Interval (Subsea depth)	Current Producing Formation	KB
Enserch Rader No. 2	1880' FNL 560' FWL Section 32 T5S, R33E		13-3/8" @ 356' 9-5/8" @ 1981' 5-1/2" @ 8000'	250 ~~970~~ 350	Surface Surface 6850'	8000'	7902'-7930' (-3503, -3531)	Salt Water Disposal	4399'
Enserch Rader No. 1 30-041-20492	2100' FSL 660' FWL Section 32 T5S, R33E	1650'	13-3/8" @ 373' 8-5/8" @ 2025'	350 680	Surface Surface	7903'	D&A	D&A	4410'
Phillips Lambirth "A" No. 4 30-041-20506	560' FNL 560' FEL Section 31 T5S, R33E	1750'	13-3/8" @ 360' 8-5/8" @ 3500' 5-1/2" @ 8007'	420 580 1635	Surface Surface 4200'	8007'	7814'-7828' ~~(-3381, -3396)~~ (-3423, -3437)	Fusselman	~~4433'~~ 4391'
Enserch Lambirth No. 3 30-041-20454	1980' FNL 1980' FEL Section 31 T5S, R33E	2500'	13-3/8" @ 377' 8-5/8" @ 3297' 5-1/2" @ 8030'	350 2000 800	Surface Surface 6600'	8030'	7702'-7715' (-3295, -3308)	Pennsylvanian	4407'
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7226 Exs 4

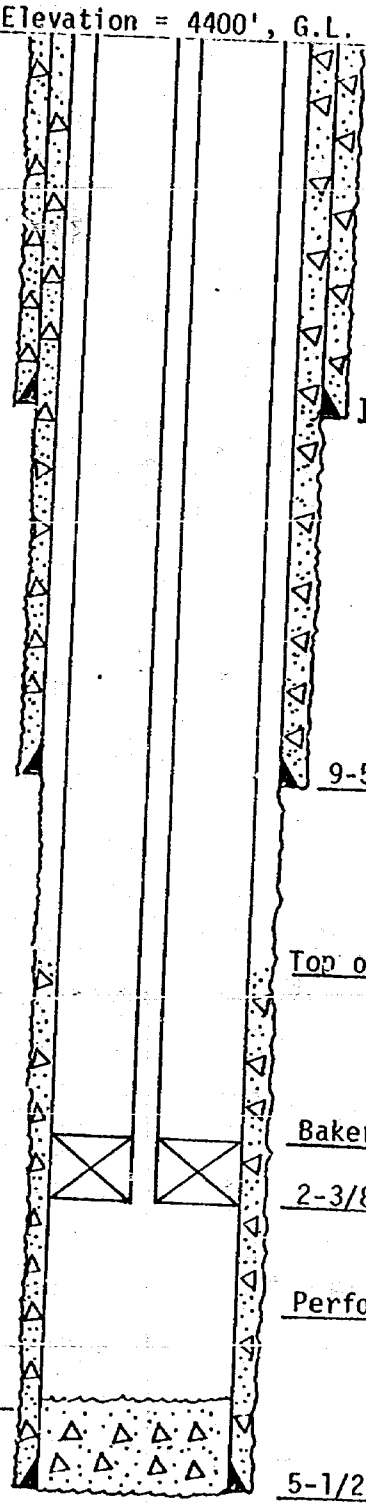
Enserch Exploration, Inc.

Rader No. 2 Well

1880' FNL & 560' FWL, Sec. 32-T5S-R33E

Roosevelt County, New Mexico

K.B. Elevation = 4400', G.L. = 4385'



13-3/8" csg. @ 356', cmt. circ

9-5/8" csg. @ 1981', cmt. circ.

Top of cmt. @ 6850'

Baker Model "D" pkr. @ 7875'

2-3/8" tbg. @ 7876.53'

Perforations: 7902' - 7930'

PBTD @ 7940'

5-1/2" csg. @ 8000', cmt. w/350 sks.

ENSERCH EXPLORATION, INC.

7226

April 22nd 1981

Ens Ex 5

7226

ENSERCH EXPLORATION, INC.

Rader Well No. 1

South Peterson Field

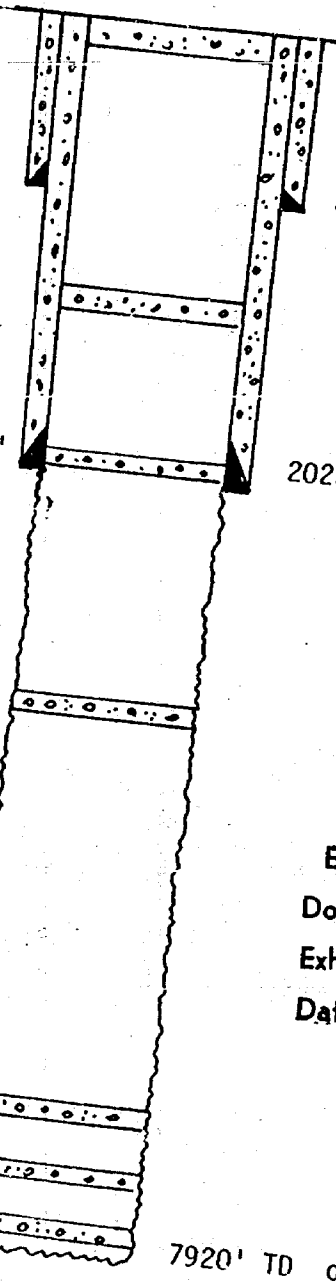
Roosevelt County, New Mexico

Prepared by: Date

Plug #7: 10 sx Class H Cmt. @ surface

KB Elevation 4393.5'

GL Elevation 4407.5'



374' 13-3/8" 48#/ft K55 ST&C 8rd csg.

Plug #6: 40 sx Class H Cmt. @ 1082'-982'

Plug #5: 40 sx Class H Cmt. @ 2075'-1975'

2025' 8-5/8", 24#/ft K55 ST&C 8rd csg.

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ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

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Plug #2: 40 sx Class H Cmt. @ 7574'-7474'

Plug #1: 50 sx Class H Cmt. @ 7880'-7930'

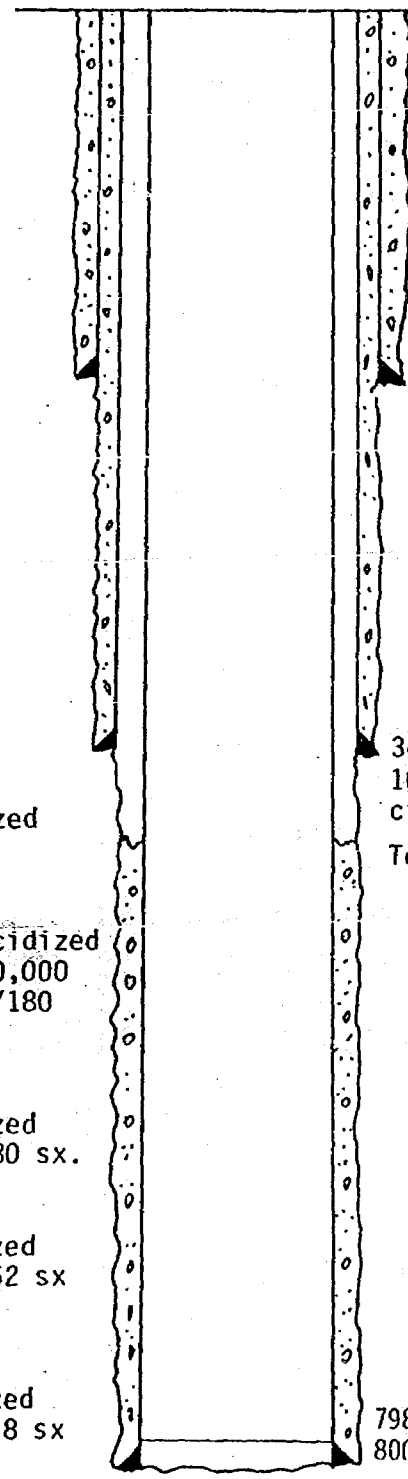
7920' TD open hole

Last Workover: Well was plugged on 7/7/79 before production string was run.

Prod. Rate Before: Prod. Rate After:

Nature of Workover:

PHILLIPS PETROLEUM COMPANY
Peterson "H" Well No. 1
South Peterson Field
Roosevelt County, New Mexico



K.B. Elevation - 4384'
G.L. Elevation - 4368'

350' 13-3/8" 48#/ft K-55
420 sx Class H + 2% $CaCl_2$
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3496' 8-5/8" 24#/ft K-55
1000 sx Class H + 2% $CaCl_2$
circulated 225 sx to surface

Top of cement @ 5210'

Perfs 7332'-7341' (18 shots). Acidized w/5000 gals. 28% acid.

Perfs 7616'-7760' OA (110 shots). Acidized w/4500 gals. 15% NE HCl. Frac'd w/20,000 gals. gelled 15% NE HCl. Squeezed w/180 sx.

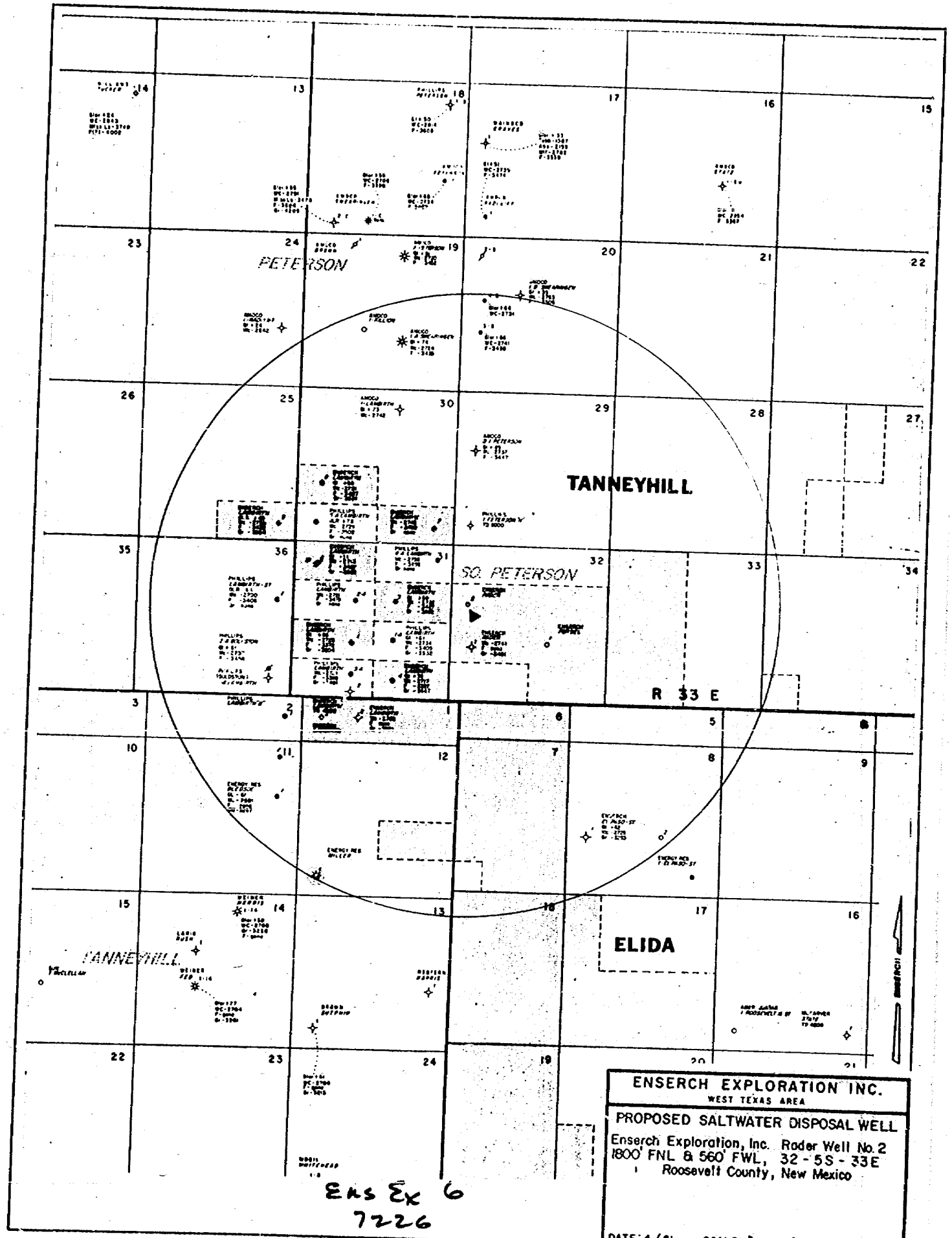
Perfs 7793'-7801' (32 shots). Acidized w/250 gals. 15% NE HCl. Squeezed w/80 sx.

Perfs 7792'-7806' (28 shots). Acidized w/750 gals. 15% NE HCl. Squeezed w/62 sx Class H.

Perfs 7846'-7852' (20 shots). Acidized w/500 gals. 15% NE HCl. Squeezed w/18 sx Class H.

7982' 5-1/2" 15.5#/ft K-55
800 sx Class H + 2% KCl

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981



ENSERCH EXPLORATION INC.
WEST TEXAS AREA

PROPOSED SALTWATER DISPOSAL WELL

Enserch Exploration, Inc. Rader Well No. 2
1800' FNL & 560' FWL, 32 - 5S - 33E
Roosevelt County, New Mexico

DATE: 4/81 SCALE: 1" = 4000' BY: D. Renoult

Ens Ex 6
7226

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Enserch Rader No. 2	32	5S	33E	E		Salt water Disposal
Enserch Rader No. 1	32	5S	33E	L	1,650'	D&A
Phillips Lambirth "A" No. 4	31	5S	33E	A	1,750'	Fusselman
Enserch Lambirth No. 6	31	5S	33E	D	5,280'	P&A
Enserch Lambirth No. 10	31	5S	33E	D	5,350'	Fusselman
Phillips Lambirth "A" No. 2	31	5S	33E	F	3,800'	Fusselman
Enserch Lambirth No. 3	31	5S	33E	G	2,500'	Pennsylvanian
Phillips Lambirth "A" No. 1	31	5S	33E	J	2,900'	Fusselman
Enserch Lambirth No. 1	31	5S	33E	K	4,200	Fusselman
Phillips Lambirth "A" No. 3	31	5S	33E	M	4,650'	Fusselman

Sus Ex 7
7226

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Page 2
Peterson, South Field
Roosevelt County, New Mexico

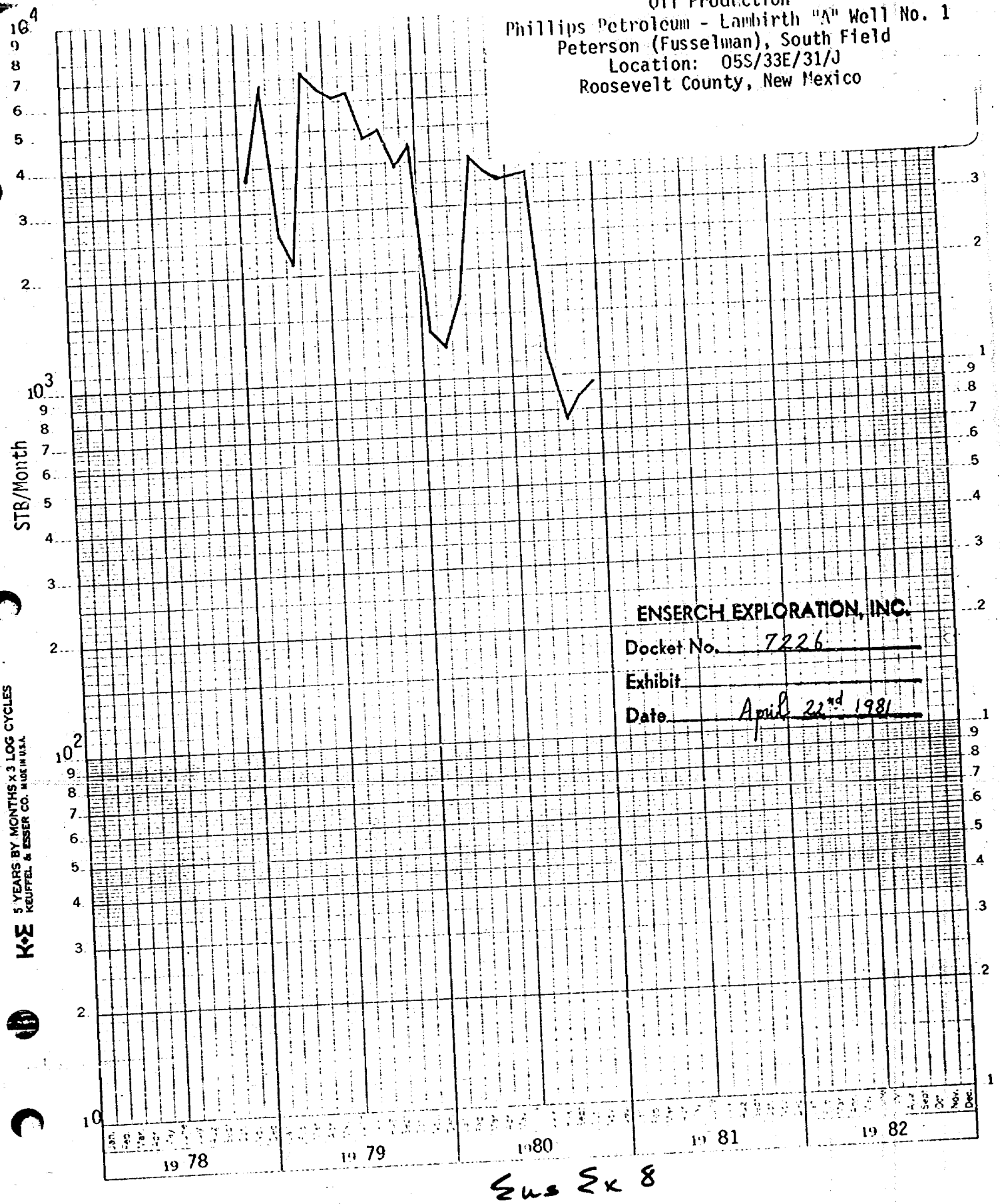
OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Enserch Lambirth No. 4	31	5S	33E	O	3,650	Pennsylvanian
Amoco Lambirth No. 1	30	5S	33E	B	7,050'	P&A
Enserch Lambirth No. 8	30	5S	33E	L	6,550'	Fusselman
Phillips Lambirth "A" No. 5	30	5S	33E	M	5,850'	Pennsylvanian
Enserch Lambirth No. 7	30	5S	33E	P	2,750'	Fusselman
Amoco Peterson No. 1-B	29	5S	33E	E	5,280'	P&A
Phillips Peterson No. 1-H	29	5S	33E	M	2,600'	P&A
Amoco Swearingen No. 4-B	20	5S	33E	E	14,000'	Pennsylvanian
Amoco Swearingen No. 3-B	20	5S	33E	L	9,300'	Pennsylvanian
Amoco Swearingen No. 1-A	19	5S	33E	J	9,300'	Pennsylvanian
Enserch Lambirth No. 9	25	5S	32E	P	6,900'	Fusselman

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2

Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Phillips Lambirth State #1	36	5S	32E	H	6,400'	Fusselman
Phillips Goldston "A" No. 2	36	5S	32E	P	7,000'	P&A
Goldston Lambirth "A" No. 1	36	5S	32E	P	7,150'	P&A
Phillips Lambirth "B" No. 1	2	6S	33E	A	7,250'	Pennsylvanian
Enserch Lambirth No. 2	1	6S	33E	D	6,250'	P&A
Enserch Lambirth No. 5	1	6S	33E	C	5,400'	P&A
Enserch El Paso State No. 1	8	6S	34E	L	8,800'	P&A
Energy Reserves Bledsoe No. 2	11	6S	33E	A	8,200'	Pennsylvanian
Energy Reserves Bledsoe No. 1	1	6S	33E	H	9,200'	Pennsylvanian
Energy Reserves Miller No. 1	12	6S	33E	M	14,000'	Granite Wash

Oil Production
Phillips Petroleum - Lambirth "A" Well No. 1
Peterson (Fusselman), South Field
Location: 05S/33E/31/J
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

K+E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. M 105 IN U.S.A.

Enus Ex 8
7226

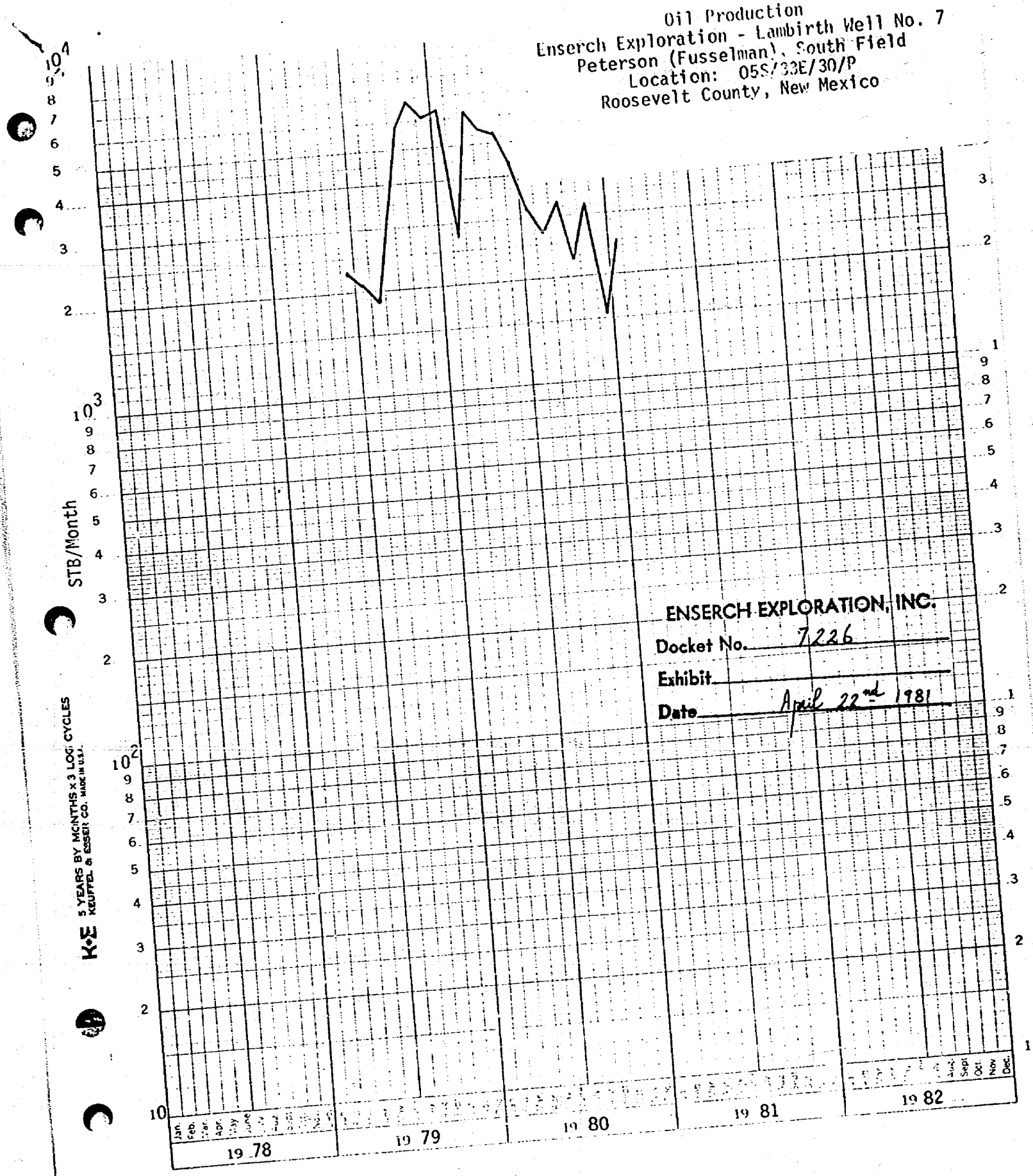
PRODUCTION HISTORY
Phillips Petroleum - Lambirth "A" Well No. 1
Peterson (Fusselman), South Field

Location: 05S/33E/31/J
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR
	Bbls	MCF	Bbls	SCF/Bbl
01/79	3,700	3,411		922
02/79	6,650	6,131		922
03/79	2,585	980		379
04/79	2,184	646	191	296
05/79	7,115	1,883	149	265
06/79	6,536	2,776	5,222	425
07/79	6,105	2,865	5,104	469
08/79	6,332	5,976	5,066	944
09/79	4,718	3,536	8,257	749
10/79	4,965	3,317	8,689	668
11/79	3,908	967	2,286	247
12/79	4,462	1,174	2,610	263
01/80	1,371	354	802	258
02/80	1,255	205	734	163
03/80	1,641	456	960	278
04/80	4,052	886	2,370	219
05/80	3,730	651	2,182	174
06/80	3,518	1,017	2,058	289
07/80	3,576	9,622	2,092	2,691
08/80	3,668	3,034	9,638	827
09/80	1,195	698	3,138	584
10/80	769	295	2,019	384
11/80	876	114	2,300	130
12/80	969	578	2,545	596
Cum. Prod.	85,880	51,572	68,412	600

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

Oil Production
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field
Location: 05S/33E/30/P
Roosevelt County, New Mexico



K+E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

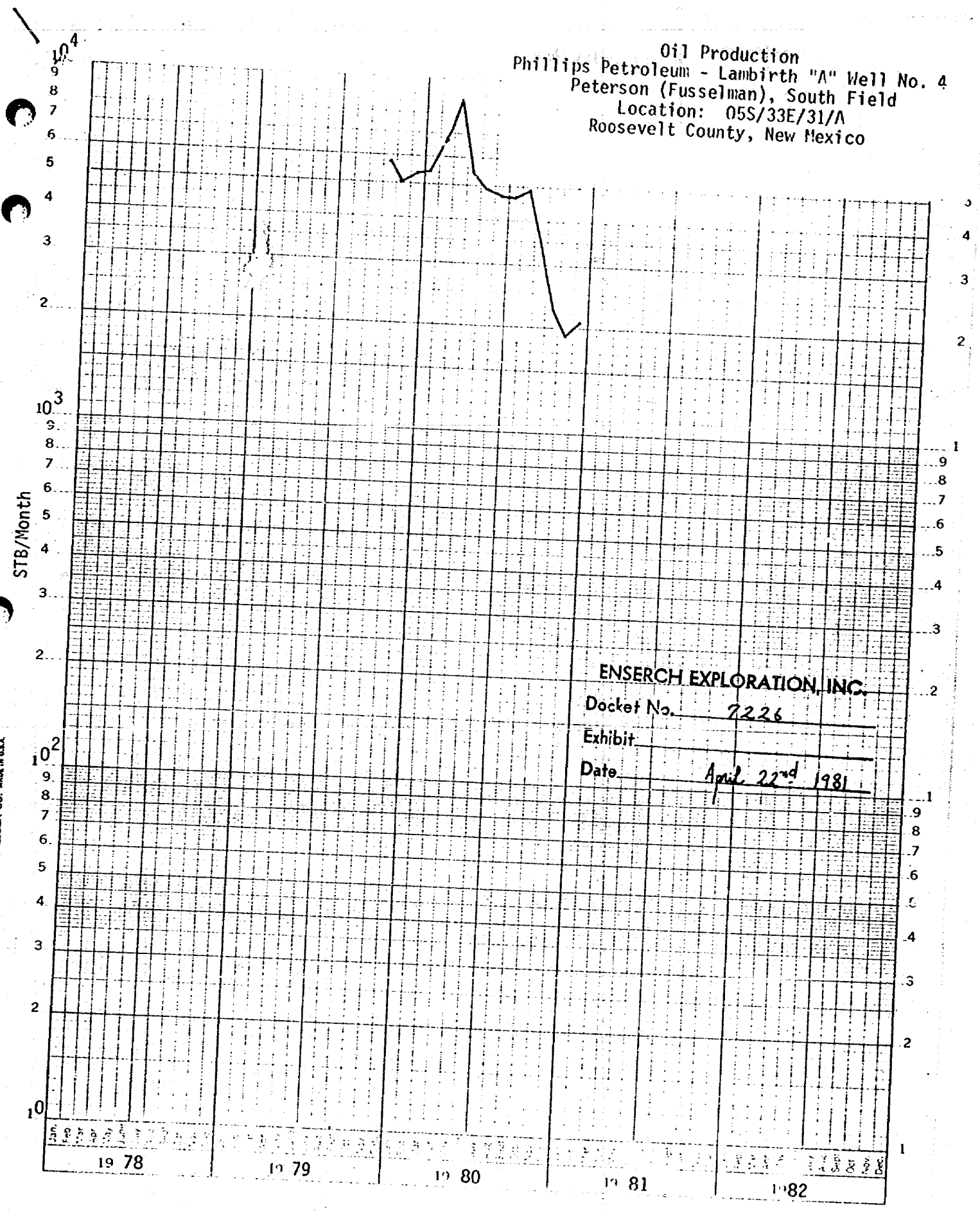
PRODUCTION HISTORY
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field

Location: 05S/33E/30/P
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR
	Bbls	MCF	Bbls	SCF/Bbl
01/79				
02/79				
03/79				
04/79				
05/79				
06/79	2,244	1,031	1,120	459
07/79	2,112	871	804	412
08/79	1,879	1,056	494	562
09/79	3,345	771	1,859	230
10/79	5,912	2,493	1,261	421
11/79	6,891	2,262	1,257	328
12/79	6,228	2,172	348	348
01/80	6,250	1,767	1,380	282
02/80	2,724	1,840	1,014	675
03/80	6,242	1,971	1,399	316
04/80	5,541	2,035	1,370	367
05/80	5,279	2,122	1,722	402
06/80	4,376	2,221	1,262	508
07/80	3,120	1,537	1,689	493
08/80	2,723	1,589	2,470	584
09/80	3,260	1,789	2,434	549
10/80	2,274	1,800	1,089	792
11/80	3,142	2,460	3,194	783
12/80	1,527	1,669	1,507	1,093
Cum. Prod.	75,069	33,456	27,673	446

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

Oil Production
Phillips Petroleum - Lambirth "A" Well No. 4
Peterson (Fusselman), South Field
Location: 05S/33E/31/A
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

K+E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

PRODUCTION HISTORY
Phillips Petroleum - Lambirth "A" Well No. 4
Peterson (Fusselman), South Field

Location: 05S/33E/31/A
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR
	Bbls	MCF	Bbls	SCF/Bbl
01/79				
02/79				
03/79				
04/79				
05/79				
06/79				
07/79				
08/79				
09/79				
10/79	5,740	1,186	402	207
11/79	5,020	1,578	8,685	314
12/79	5,158	1,725	892	334
01/80	5,434	1,783	940	328
02/80	6,701	1,394	1,159	208
03/30	8,762	614	301	70
04/80	5,410	1,502	936	278
05/80	4,979	1,106	861	222
06/80	4,696	1,725	812	367
07/80	4,773	177	2,387	37
08/80	4,898	3,008		614
09/80	3,537	1,146		324
10/80	2,277	483		212
11/80	1,902	138		73
12/80	2,035	673		331
Cum. Prod.	71,332	18,238	17,375	256

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

WATER PRODUCTION (IN BBLS)
Enserch Exploration - Peterson (Fusselman, Penn) South Field
Roosevelt County, New Mexico

Enserch Exploration	Lambirth #1		Lambirth #3		Lambirth #4		Lambirth #6		Lambirth #7		Lambirth #8		Lambirth #9		Lambirth #10		Cumulative Water Production		
	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Total
06/78	0																		
07/78	0																		
08/78	310																310		310
09/78	313																313		313
10/78	0																0		0
11/78	0		0		1,119												0	1,119	1,119
12/78	0		0		1,995												0	1,995	1,995
01/79	0		0		1,807												0	1,807	1,807
02/79	0		0		1,569												0	1,569	1,569
03/79	0		0		1,501		936										936	1,501	2,437
04/79	0		0		956		720										720	956	1,676
05/79	0		0		2,607		240										240	2,607	2,847
06/79	0		0		2,285		3,965		1,120								5,085	2,285	7,370
07/79	0		0		0		3,703		804								4,507	0	4,507
08/79	0		0		1,949		2,928		494								3,422	1,949	5,371
09/79	0		0		1,923		2,560		1,859								4,419	1,923	6,342
10/79	0		0		1,819		3,928		1,261		0						5,169	1,819	7,008
11/79	0		0		2,245		6,778		1,257		395						8,430	2,245	10,675
12/79	0		0		1,613		9,997		348		5,247						15,592	1,613	17,205
01/80	0		0		1,273		8,961		1,380		5,377		44				15,762	1,273	17,035
02/80	0		0		1,143		9,220		1,014		1,702		0				11,936	1,143	13,079
03/80	0		0		1,376		10,394		1,399		7,891		0				19,684	1,376	21,060
04/80	0		0		1,326		11,755		1,370		6,759		0				19,884	1,326	21,210
05/80	0		0		1,363		11,242		1,722		6,349		0				19,313	1,363	20,676
06/80	0		0		1,120		11,598		1,262		10,034		0				22,894	1,120	24,014
07/80	0		0		1,029		8,087		1,689		10,286		0				20,062	1,029	21,091
08/80	0		0		1,162				2,470		9,977		0		266		12,713	1,162	13,075
09/80	0		0		1,007				2,434		9,615		0		7,215		19,264	1,007	20,271
10/80	0		0		817				1,069		10,657		11		10,838		22,595	817	23,412
11/80	0		0		230				3,194		8,020		0		7,606		19,420	230	19,650
12/80	0		0		398				1,507		9,997		8		10,773		22,265	398	22,663
Cumulative Water Production	623		0		35,632		107,012		27,673		102,886		63		36,698		274,955	35,632	310,587

Exs 9
& 7226

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd, 1981

WATER PRODUCTION (IN BBLS)
Phillips Petroleum-Peterson (Fusselman, Penn), South Field
Roosevelt County, New Mexico

Phillips Petroleum	Lambirth State No. 1		Lambirth "A" No. 1		Lambirth "A" No. 2		Lambirth "A" No. 3		Lambirth "A" No. 4		Lambirth "A" No. 5		Lambirth "B" No. 1		Cumulative Water Production		
	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Total
06/78																	
07/78																	
08/78																	
09/78																	
10/78																	
11/78																	
12/78																	
01/79			0												0		0
02/79			0												0		0
03/79			980												980		980
04/79			191		0										191		191
05/79			149		0										149		149
06/79			5,222		0										5,222		5,222
07/79			5,104		0										5,104		5,104
08/79			5,066		0		387								5,453		5,453
09/79			8,257		0		1,230								9,487		9,487
10/79			8,689		0		1,348		402						10,439		10,439
11/79			2,286		0		1,179		8,685						12,150		12,150
12/79			2,610		0		1,212		892						4,714		4,714
01/80			802		0		0		940						1,742		1,742
02/80			734		0		0		1,159						1,893		1,893
03/80	1,261		960		0		0		301						2,522		2,522
04/80	26		2,370		0		0		936						3,332		3,332
05/80	24		2,182		0		0		851		2,077				3,067	2,077	5,144
06/80	0		2,058		0		0		812		1,651				2,870	1,651	4,521
07/80	0		2,092		0		1,580		2,367		767				6,059	767	6,826
08/80	1,418		9,636		2,826		24		0		918		7		13,904	925	14,829
09/80	1,877		3,138		0		16		0		816		61		5,031	877	5,908
10/80	2,294		2,019		0		12		0		651		46		4,325	697	5,022
11/80	558		2,300		0		10		0		629		0		2,868	629	3,497
12/80	2,286		2,545		0		13		0		668		29		4,844	697	5,541
Cum. Water Prod.	9,744		69,390		2,826		7,011		17,375		8,177		143		106,346	8,320	114,666

SLS 2x10
7226

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd, 1981

P. O. BOX 1468
MONAHANS, TEXAS 79756
PHONE 943-3234 OR 563-1040

Martin Water Laboratories, Inc

709 W. INDIANA
MIDLAND, TEXAS 79701
PHONE 683-4621

RESULT OF WATER ANALYSES

JUL 9 1979

LABORATORY NO. 679309

TO: Mr. Jerry Nash
P.O.Box 4815, Midland, Texas

SAMPLE RECEIVED 6-29-79

RESULTS REPORTED 7-5-79

COMPANY Enserch Exploration, Inc. LEASE Lambirth

FIELD OR POOL South Peterson

SECTION ___ BLOCK ___ SURVEY ___ COUNTY Roosevalt STATE New Mexico

SOURCE OF SAMPLE AND DATE TAKEN:

NO. 1 Produced (Penn) water - taken from Lambirth #4. 6-27-79

NO. 2 Produced (Fusselman) water - taken from Lambirth #6. 6-27-79

NO. 3 Produced (Fusselman) water - taken from Lambirth #7. 6-27-79

NO. 4

REMARKS:

CHEMICAL AND PHYSICAL PROPERTIES	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0698	1.0717	1.0721	
pH When Sampled				
pH When Received	6.7	6.7	6.7	
Bicarbonate as HCO_3	476	566	637	
Supersaturation as $CaCO_3$				
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$	23,400	16,300	17,800	
Calcium as Ca	7,040	4,560	5,120	
Magnesium as Mg	1,402	1,191	1,215	
Sodium and/or Potassium	30,268	34,682	33,902	
Sulfate as SO_4	662	1,066	821	
Chloride as Cl	62,497	63,917	63,917	
Iron as Fe	81.1	56.6	97.5	
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	102,352	105,982	105,612	
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen, Winkler				
Hydrogen Sulfide	0.0	0.0	0.0	
Resistivity, ohms/m at 77° F.	0.093	0.091	0.091	
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks: ~~We are not familiar with the objectives herein; but if a differentiation is desired, we see only a very slightly higher calcium and magnesium and lower sodium and sulfate in the Pennsylvanian water as compared to the Fusselman. This is considered a relatively minor difference; but if conclusive evidence as to the stability of the characteristics can be acquired, then it would be possible to differentiate the waters.~~

Form No. 3

ENSERCH EXPLORATION, INC.

Docket No. 7226

Exhibit

Date April 22nd 1981

By

Waylan C. Martin, M. A.

Ens Ex 11
7226

Application for Approval of
Salt Water Disposal Injection Well

Enserch Exploration - Gladys Rader Well No. 2
Peterson (South) Field
Roosevelt County, New Mexico

Well Location: 1880' FNL & 560' FWL
Section 32, Township 5-S
Range 33-E, Unit Letter E

Perforation: 7902'-7930' (-3503', -3531')
2 JSPF, 0.42" hole

Stimulation Treatment: Spotted 150 gallons of 15% MCA (@1.7 BPM and 1100 psi). Pumped 10,000 gallons of MOD 202 Acid. Dropped 40 RCN ball sealers (@ 7.5 BPM). Flushed with 32 barrels of 2% KCl water.

Injection Test: Date: 03/27/81
Test Data: 5BPM @ 2400 psi
4BPM @ 1500 psi
3BPM @ 600 psi
2BPM @ vacuum

Maximum Allowed Injection Pressure:

= 0.2 psi per foot of depth to the top of the injection zone.

= 0.2 x 7902 = 1580.4 psi

Maximum Allowed Injection Volume:

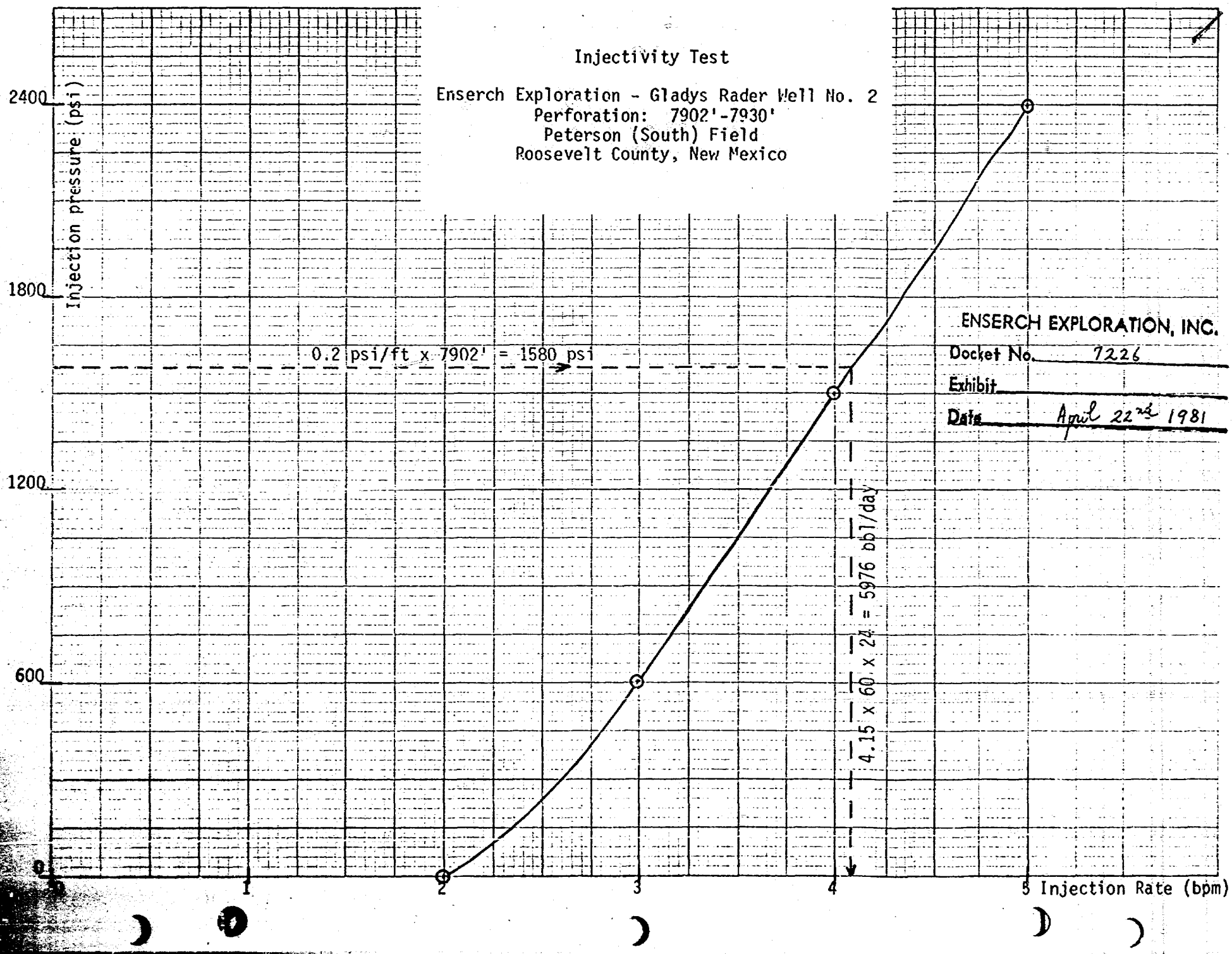
= 5976 bbls/day

En Ex 12
7226

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

Injectivity Test

Enserch Exploration - Gladys Rader Well No. 2
Perforation: 7902'-7930'
Peterson (South) Field
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

WATER INJECTION CALCULATIONS
WATER ENCROACHMENT
Enserch Exploration - G. Rader Well No. 2
Peterson, South Field

Proposed Injection Zone: Montoya
Perforations: 7902'-7930'
(-3502',-3530')
Net Interval: 28'
Average Porosity: 7%
Irreducible Water Saturation: 20%
Displaceable Porosity: 5.6%

Reservoir volume encroached by injected water:

$$W_i = (7758\ A\ h\ \phi_D)/B_w$$

Reservoir area encroached by injected water:

$$A = (B_w \times W_i)/(7758\ h\ \phi_D)$$

Volume of water produced from Peterson, S. Field (December 1980):

Enserch	= 22,663 bbls	(731 bbls/day)
Phillips	= 5,541 bbls	(179 bbls/day)
Total	= 28,204 bbls/month	(910 bbls/day)

Anticipated daily injection volume:

51,150 bbls/month (1,650 bbls/day)

Reservoir area encroached by injection water (1,650 bbls/day):

Year 1:	A = 49.5 acres	(828')
Year 2:	= 99.0 acres	(1,170')
Year 3:	= 148.5 acres	(1,656')
Year 4:	= 198.0 acres	(2,343')
Year 5:	= 247.5 acres	(3,132')

Enserch Ex 13
7226

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

RESIDUE RESEARCH LABORATORY
2405 W. INDIANA
MIDLAND, TEXAS 79701

INSOLUBLE RESIDUE REPORT
FILE NO.

SECTION	TWN.	RGE.	BLOCK	SURVEY	ELEV.	STATE	COUNTY
32	5-S	33-E			NR	NEW MEXICO	ROOSEVELT

FOOTAGE: 1880 FNL & 560 FWL

ISSUED FOR CONFIDENTIAL USE

COMPANY	WELL	FARM
ENSERCH EXPL.	# 2	RADER

SECTION EXAMINED:

7600-8000

TOPS AND CORRELATIONS:

Samples began in PENNSYLVANIAN ---------- 7600

B. PENNSYLVANIAN - T. MONTOYA ---------- 7880

T. CAMBRIAN ---------- 7980

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Enserch EXHIBIT NO. 15
CASE NO. 7226

SPECIAL NOTES:

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

Form C-108
Revised 3-1-68

NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION

OPERATOR		ADDRESS	
Enserch Exploration, Inc.		P. O. Box 4815 Midland, Texas 79704	
LEASE NAME	**WELL NO.**	**FIELD**	**COUNTY**
Rader	2	Undesignated	Roosevelt

LOCATION

UNIT LETTER E ; WELL IS LOCATED 1880 FEET FROM THE North LINE AND 560 FEET FROM THE West LINE, SECTION 32 TOWNSHIP 5-S RANGE 33E NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING	13-3/8"	356'	250 sacks	Circ.	
INTERMEDIATE	9-5/8"	1981'	914 sacks	Circ.	
LONG STRING	5-1/2"	8000'	350 sacks	6850'	Cement Bond Log
TUBING	2-3/8"	7876.53'	NAME, MODEL AND DEPTH OF TUBING PACKER: Baker Model "D" retainer Production packer @ 7875'		

NAME OF PROPOSED INJECTION FORMATION	TOP OF FORMATION	BOTTOM OF FORMATION
Montoya	7900'	7955'

IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?	PERFORATIONS OR OPEN HOLE?	PROPOSED INTERVAL(S) OF INJECTION
Tubing	Perforations	7902' - 7930'

IS THIS A NEW WELL DRILLED FOR DISPOSAL?	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED?	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE?
No	South Peterson (Fusselman and/or Penn.) Dev. Well	Yes

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH

7848' - 7851' (8 holes) squeezed with 86 sacks, 7710' - 7714' (10 holes) squeezed w/47 sacks

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA
250'	7858'	None

ANTICIPATED DAILY INJECTION VOLUME (BBLS.)	MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSIG)
1650	745	5976	closed	pressure	1580 psi (max)

ANSWER YES OR NO WHETHER THE FOLLOWING WATERS ARE MINERALIZED TO SUCH A DEGREE AS TO BE UNFIT FOR DOMESTIC, STOCK, IRRIGATION, OR OTHER GENERAL USE —	WATER TO BE DISPOSED OF	NATURAL WATER IN DISPOSAL ZONE	ARE WATER ANALYSES ATTACHED?
	yes	yes	yes

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND)

Richard Lambirth & Portales National Bank (O.D. Lambirth Trust) P.O. Drawer 888 Portales, N.M. 88130

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL

Phillips Petroleum Company

Phillip Bldg.

Odessa, Texas 79761

Enserch Ex 1

7226

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING?	SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL	
	yes	yes	
ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B)	**PLAT OF AREA**	**ELECTRICAL LOG**	**DIAGRAMMATIC SKETCH OF WELL**
	yes	yes	yes

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Leonard Kesh (Signature) | District Production Manager (Title) | April 13, 1981 (Date)

NOTE: Should waivers from the surface owner and all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests. SEE RULE 701.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 7226 DE NOVO
Order No. R-6685-A

APPLICATION OF ENSERCH EXPLORATION,
INC. FOR SALT WATER DISPOSAL,
ROOSEVELT COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on July 8, 1981, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 29th day of July, 1981, the Commission, a quorum being present, having considered the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Enserch Exploration, Inc., seeks an order to utilize its Rader Well No. 2, located in Unit E of Section 32, Township 5 South, Range 33 East, NMPM, South Peterson Field, Roosevelt County, New Mexico, to dispose of produced salt water into the Montoya formation, with injection into the perforated interval from approximately 7902 feet to 7930 feet.

(3) That the matter came on for hearing at 9 a.m. on April 22, 1981, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter and, pursuant to this hearing, Order No. R-6685 was issued on May 20, 1981, which denied the application of Enserch.

(4) That on June 16, 1981, application for Hearing De Novo was made by Enserch Exploration, Inc. and the matter was set for hearing before the Commission.

(5) That the matter came on for hearing de novo on July 9, 1981.

(6) That the evidence adduced at said hearing indicates that Division Order No. R-6685 entered May 20, 1981, should be affirmed.

IT IS THEREFORE ORDERED:

(1) That Division Order No. R-6685, entered May 20, 1981, is hereby affirmed.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

ALEX J. ARMIJO, Member

EMERY C. ARNOLD, Member

JOE D. RAMEY, Member & Secretary

S E A L

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STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
8 July 1981

COMMISSION HEARING

IN THE MATTER OF:

Application of Enserch Exploration, Inc., for salt water disposal, Roosevelt County, New Mexico. CASE 7226

BEFORE: Commissioner Ramey
Commissioner Arnold

TRANSCRIPT OF HEARING

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MR. RAMEY: The hearing will come to order.

We'll consider first Case 7226.

MR. PEARCH: The application of Enserch Exploration, Incorporated, for salt water disposal, Roosevelt County, New Mexico.

MR. RAMEY: Ask for appearances.

MR. CARR: May it please the Commission, my name is William F. Carr, with the law firm of Campbell, Byrd, and Black, P.A., Santa Fe, New Mexico, appearing on behalf of Enserch Exploration, Inc.

I have two witnesses.

MR. KELLAHIN: I'm Tom Kellahin of Kellahin and Kellahin, Santa Fe, appearing on behalf of Phillips Petroleum Company, in association with Mr. Joe Peacock, attorney for Phillips, and I have two witnesses.

(Witnesses sworn.)

MR. CARR: At this time I would call Daniel Renoult.

DANIEL C. RENOULT

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Will you state your name and place of residence?

A. My name is Daniel C. Renoult and I work with Enserch Exploration, Inc., in Midland, Texas.

Q. And you are employed by Enserch in what capacity?

A. District Petroleum Engineer.

Q. Have you previously testified before this Commission or one of its examiners and had your credentials as a petroleum engineer accepted and made a matter of record?

A. Yes, sir.

Q. Are you familiar with the application filed by Enserch in this case?

A. Yes, sir.

Q. Are you familiar with the subject wells and the pools that are involved in this application?

A. Yes, sir.

MR. CARR: Are the witness' qualifications

acceptable?

MR. RAMEY: They are.

Q. Mr. Renoult, will you briefly state what Enserch seeks with this application?

A. Enserch is applying to dispose of salt water in the Montoya formation in the Enserch Rader Well No. 2, located in Section 32 of Township 5 S, Range 33 E, in Roosevelt County, New Mexico.

Q. Have you prepared certain exhibits for introduction in this case?

A. Yes, sir.

Q. Will you please refer to what has been marked for identification as Enserch Exhibit Number One, explain to the Commission what it is and what it shows?

A. Exhibit Number One is the application of Enserch to dispose of salt water in the Rader Well No. 2. This well is a dry hole. The Fusselman and Peterson lime formations were tested in the subject well and proved to be unproductive.

The well is currently perforated from 7800 feet -- from 7848 to 7851.

Q. Mr. Renoult, did you recommend the disposal of produced waters in this well?

A. Yes, sir.

Q. And in what zone did you recommend the injection?

A. Montoya formation.

Q. What was your recommendation based upon?

A. The recommendation is based on injectivity test in the Montoya formation.

Q. Is this a continuous zone throughout the area?

A. Yes, sir.

Q. And is the Montoya a producing interval in any of the pools or in any of the wells in the area?

A. No, sir.

Q. How much would this zone take, how much water?

A. Based on maximum gradient of point two psi per foot, we would be allowed to dispose of 5926 barrels of water per day; however, we anticipate to dispose only 750 barrels per day in the subject well.

Q. Mr. Renoult, how much water did Enserch originally anticipate disposing in this well?

A. We applied in April, 1981, for 1650 barrels of water per day.

Q. And what accounts for the reduction in the amount of water you're proposing to inject?

A. The previous volume was taking into account the water produced by Phillips Petroleum in the subject field and we revised our volume considering only the water produced by Enserch Exploration, Inc.

Q. So this 750 barrel per day figure reflects only water produced from Enserch wells in the area?

A. Yes, sir.

Q. Did you check the area for other wells to determine if they were suitable for salt water disposal?

A. Yes, sir.

Q. And which wells did you look at?

A. I looked at the offset wells in the subject area, and also I know that there is one well in Section 18 which is used a salt water disposal well. This well is the Amoco Swearingen "C" No. 2. Amoco is disposing water in the Fusselman formation in this specific well.

Q. What field is that in?

A. Peterson.

Q. Are you aware of any other well in the area in which produced waters are being injected?

A. Not in the vicinity of the proposed location.

MR. CARR: May it please the Commission, the application we originally filed in this case indicated

that there were other wells in the area being used as salt water disposal. Other than this one well that Mr. Renoult has just testified to, Enserch is aware of no other disposal wells, and we want to be certain that the application is not misleading in that regard.

Q. Mr. Renoult, will you now -- are you aware of any efforts that were undertaken at any time jointly by Phillips and Enserch to consider disposal of produced waters in this area?

A. Enserch was considering disposing of water in the Enserch Lambirth Well No. 5 in Section 1. The Glorieta formation proved to be tight in this subject well and --

MR. KELLAHIN: I'm sorry, Mr. Renoult, what formation?

A. The Glorieta. And Enserch didn't go further into considering disposing of water in the subject well.

Q. Are you aware of any efforts to dispose of produced waters in the Lambirth No. 2 Well?

A. The Lambirth No. 2 Well is a dry hole and based on the unsuccessful attempt in No. 5, we didn't consider disposing water in this well.

MR. RAMEY: Where is this well you're

talking about?

A. It's in Section 1. It's approximately --

MR. RAMEY: I found the No. 5 in Section 1 but where is the No. 2? Is that just to the west of --

MR. CARR: Immediately below the No. 4 in the southeast of the southwest quarter, I believe.

MR. RAMEY: Okay.

A. The surface location of the No. 2 is in Section 1 and the bottom hole location is in Section 31. It's approximately 5000 feet from the proposed Enserch Rader Well No. 2, the dry hole indicated in Section 31.

MR. CARR: It is immediately below the 3-A in the southeast of the southwest of Section 31.

Q. Mr. Renoult, will you now refer to what has been marked for identification as Enserch Exhibit Number Two and review the data contained thereon?

A. Exhibit Number Two is a plat showing Enserch acreage shaded in gray of the subject area. The half mile radius from the proposed Enserch Rader Well No. 2 is indicated on this exhibit.

The proposed Enserch Rader Well No. 2 is currently perforated through the Montoya dolomite from 7902 to 7930, -3503 feet to -3531 feet subsea.

The Enserch Rader Well No. 1, located

1650 feet to the south is a dry hole. This well was drilled and abandoned in July, 1979.

The Phillips Petroleum Lambirth "A" Well No. 4, located 1750 feet to the northwest of the proposed location, is completed through the Fusselman formation from 7814 to 7828. This corresponds to a subsea depth of -3423 feet to -3437 feet subsea.

The lowermost perforation in the Phillips Lambirth "A" Well No. 4 is 66 feet high to the uppermost perforation in the Enserch Rader Well No. 2.

The third offset well within the half mile radius is the Enserch Lambirth Well No. 3. This well is located 2500 feet west of the proposed Rader Well No. 2.

This well was recompleted from the Fusselman formation to the Penn formation in October, 1978.

Also, just outside the half mile radius is the Phillips Petroleum Peterson "H" Well No. 1, located approximately 2600 feet north of the subject Rader No. 2.

This well is a dry hole.

Q. And this exhibit is color coded to indicate the producing zone in each of the wells producing in the area, is that correct?

A. Yes, sir. The green dot indicates the wells which produce from the Penn and the blue dot the wells

which produce from the Fusselman formation.

One well in this field produces from both formations, the Enserch Lambirth Well No. 3.

Q. Mr. Renoult, I would direct your attention to what has been marked Enserch Exhibit Number Three, and ask that you explain to the Commission what this is and what it shows.

A. Exhibit Number Three provides information about the completion and current producing formations of the nearest offset wells to the proposed Enserch Rader Well No. 2.

The Enserch Rader Well No. 2 is currently perforated through the Montoya lime from 7902 to 7930, -3503 feet subsea to -3500 feet -- to -3531 feet subsea.

The other wells located within the half mile radius are also listed on this exhibit.

The Enserch Rader No. 1, the Phillips Petroleum Lambirth "A" Well NO. 4, and the Enserch Lambirth Well No. 3.

The Phillips Petroleum Lambirth "A" Well No. 4, located 1750 feet from the proposed location, is completed through the Fusselman formation from 7814 feet to 7828 feet, -3423 feet to -3437 feet subsea.

As indicated previously, the lowermost perforation in the Lambirth "A" Well No. 4 is 66 feet high to

the uppermost perforation in the Enserch Rader Well No. 2.

Finally, on this exhibit, are three wells just outside of the half mile radius, the Phillips Peterson "H" Well No. 1, the Enserch Lambirth Well No. 7, and the Phillips Petroleum Lambirth "A" Well No. 1.

Q And, Mr. Renoult, this exhibit presents data required by Oil Conservation Division memorandum 377, is that correct?

A. Yes, sir, it does.

Q Will you now refer to what has been marked as your Exhibit Number Four and review this for the Commission?

A Okay. Exhibit Number Four is composed of three pages. This exhibit gives the well schematic of the proposed Enserch Rader Well No. 2, the Enserch Rader Well No. 1, and the Phillips Petroleum Peterson "H" No. 1.

The proposed salt water disposal Enserch Rader Well No. 2 was tested through the Fusselman and Peterson lime and proved unproductive. These two intervals were subsequently block squeezed. The well is currently perforated through the Montoya formation from 7902 feet to 7930 feet.

The second schematic pertains to the Enserch Rader Well No. 1. This well is a dry hole and was abandoned in July, 1979.

The third schematic pertains to the Phillips Petroleum Peterson "H" Well No. 1. This well is a dry hole and was extensively tested to the Fusselman and Penn formations. This well is located 2600 feet north from the proposed Enserch Rader Well No. 2.

Q Now, Mr. Renoult, directing your attention to the subject well, is this well -- has this well been cased and cemented so as to prevent contamination of oil, gas, and water resources in the area?

A Yes, sir.

Q Will you now refer to your Exhibit Number Five and explain what it is and what it shows?

A Exhibit Number Five is a plat showing Enserch acreage shaded in gray in the subject area. The two mile radius circle from the proposed salt water disposal Enserch Rader Well No. 2 is indicated on this exhibit.

Within this two mile radius there is not one single well which produced from the Montoya formation where Enserch is planning to dispose of salt water. As a matter of fact, to my knowledge there is not one single well within the county which is producing from the Montoya formation.

Q Will you now refer to Enserch Exhibit Number Six and explain what this is?

A Exhibit Number Six is a table listing

all wells located within a two mile radius from the proposed salt water disposal Enserch Rader Well No. 2.

This table gives the distance to the subject Rader Well No. 2 and the current producing formation in each well.

Q And what is the closest well to the proposed injection well?

A The closest producing well to the Rader No. 2 is Phillips Petroleum Lambirth "A" Well No. 4, located 1750 feet from the Rader No. 2.

Q Mr. Renoult, will you now refer to your Exhibits Seven, Eight, and Nine, identify each of these, and explain what they show?

A Exhibits Number Seven, Eight, and Nine give the production history of the Phillips Petroleum Lambirth "A" Well NO. 1, Phillips Petroleum Lambirth "A" Well No. 4, --

MR. CARR: Just for the record, Exhibit Number Seven is the data on the Lambirth "A" Well No. 1. Exhibit Number Eight is the data on the Lambirth Well No. 7, Enserch Exploration Company Lambirth Well No. 7, and Exhibit Number Nine is the Phillips Petroleum Lambirth "A" Well No. 4.

A Exhibit Number Seven pertains to the Phillips Petroleum Lambirth "A" Well No. 1. This well is located approximately a half mile from the Enserch Rader Well

No. 2. As of December 31st, 1980, the cumulative Fusselman oil production was equal to 85,880 barrels of oil and its cumulative water production was equal to 68,412 barrels of water.

Production declined sharply during the past six months and no oil production was reported in March, 1981.

Page number two of Exhibit Number Seven is a tabulation of the oil, gas, and water production for the subject well. This table shows that for the months of September and October, 1979, water cut from the Phillips Petroleum Lambirth "A" Well No. 1 was equal to 64 percent. For the next nine months from November, 1979, to July, 1980, water cut decreased and was equal to a constant 37 percent during all this period. From August, 1980, till January, 1981, the water cut increased and was equal to a constant 72 percent for the six month period.

Finally, in February, 1981, the water cut decreased to 59 percent.

Exhibit Number Eight gives the oil production from the Enserch Exploration Lambirth Well No. 7. As of December 31st, 1980, the total cumulative oil production for this well was equal to 75,069 barrels of oil and the total cumulative water production as of December 31st, 1980, was

equal to 27,673 barrels of water.

Exhibit Number Nine gives the oil production from the Phillips Petroleum Lambirth "A" Well No. 4. This well is located approximately 1750 feet from the subject Enserch Exploration Rader Well No. 2.

As of December 31st, 1980, its cumulative Fusselman oil production was reported to 70,332 barrels of oil. Its cumulative water production was equal to 17,375 barrels.

Page two of Exhibit Number Nine is a table giving the oil, gas, water production of the subject well. This table indicates that water production and water cut reported for this well are very erratic. For six months, between June, 1980, and December, 1979, water cut was constant and equal to 15 percent. From July, 1980, to January, 1981, water cut for this well was equal to zero percent. From February and March, 1981, water cut for this well increased and it was equal to 49 percent.

Q Mr. Renoult, what is the source of the data you included on these tables?

A The oil, gas, and water production included on Exhibits Number Seven, Eight, and Nine were obtained through the Commission records, monthly production schedules.

Q Mr. Renoult, directing your attention to Exhibit Number Nine, I believe it indicates that this --

that the Lambirth "A" Well No. 4 is producing from the Peterson-Fusselman South Field, is that correct?

A. Yes, sir.

Q. Now, what is the drive mechanism in that field? Do you know?

A. Water drive.

Q. Now how would you account for the fact that the well has produced apparently no water since August of 1980? Is that a common thing in a water drive reservoir?

A. No, sir, it's uncommon.

Q. Will you now refer to what has been marked for identification as Enserch Exhibit Number Ten and review this for the Commission?

A. Exhibit Number Ten is a table giving the water production from the Enserch Exploration wells in the Peterson South Fusselman and Pennsylvanian Field. As of December 31st, 1980, total Enserch water production was equal to 310,587 barrels of water, of which 89 percent were produced from the Fusselman formation.

During the month of December, 1980, Enserch Exploration produced 22,663 barrels of water. This corresponds to a daily volume of 731 barrels per day.

Enserch is paying $1.58 to transport and dispose water in the Jenkins and Southland Salt Water

Disposal Wells in Lea County. This corresponds to a total expenditure of $35,807 paid by Enserch Exploration to dispose of water during the month of December, 1980.

Q. So that is a monthly figure, $35,000 a month?

A. Yes, sir, for the month of December, 1980.

Q. Is that figure representative or close, closely approximate the cost for other months?

A. Yes, sir.

During 1980 water production from the Enserch Exploration wells located in the Peterson-Fusselman and Penn Field was fairly constant and equal to 650 barrels per day average.

In its application Enserch is requesting to dispose of approximately 750 barrels per day.

Q. Now, Mr. Renoult, I believe earlier that you testified that there was a disposal well disposing into the Fusselman in the Peterson Field, is that correct?

A. Yes, sir. I referred to the Amoco Production Company Swearingen "C" Well No. 2.

Q. Does Enserch have access to that well? Are you able to produce -- or dispose of produced waters in that well?

A. No, we don't have access to this well.

Q. Does Amoco use that only for disposal of waters produced by Amoco?

A. The water produced from the Phillips Petroleum wells is being disposed in the Amoco well.

Q. But that is in a separate pool from that which is involved in this case?

A. Yes, sir, the Peterson-Penn Field.

Q. About how close to the subject field is this Amoco disposal well?

A. The Amoco Company well is located in Section 18 on Exhibit Number Five. That's approximately fourteen seven feet northwest from our proposed Enserch Exploration Rader Well No. 2.

Q. Now, Mr. Renoult, the water that you propose to dispose of, it's primarily produced from what formation?

A. 89 percent is produced from the Fusselman and approximately 11 percent is produced from the Penn formation.

Q. And you're proposing to inject into the Montoya?

A. Yes, sir.

Q. Is that also a formation that is water

saturated or contains water?

A. Yes, sir.

Q. Will you now refer to Enserch Exhibit Number Eleven, identify this, and explain what it shows?

A. Exhibit Number Eleven provides details of a stimulation treatment and injectivity test performed on the proposed salt water disposal Enserch Rader Well No. 2.

The Enserch Rader Well No. 2 is perforated through the MOntoya formation from 7902 feet to 7930 feet. This well was stimulated with 10,000 gallons of MOD 202 acid. An injection test was conducted on March the 27th of 1981. Five barrels per minute were injected under a surface pressure of 2400 psi. Two barrels per minute were injected under vacuum.

This would correspond to a volume of 2880 barrels per day injected under vacuum.

Results of this injection test are graphed on page number two of Exhibit Number Eleven. Based on a maximum allowed injection gradient of .2 psi per foot, the maximum allowed injection volume would be equal to 5976 barrels per day.

In comparison, during the month of December, 1980, Enserch produced 731 barrels of water per day. This volume of water could be injected under vacuum.

Enserch is requesting to dispose of only 750 barrels per day. This is approximately four times less than the maximum volume of water which could be injected under vacuum in the subject well. This is approximately nine times smaller than the maximum volume allowed to be injected based on the maximum gradient of .2 psi per foot, as specified by State regulations.

Q. Now, Mr. Renoult, in your injection test you used surface pressure, is that correct?

A. Yes, sir.

Q. And why did you use surface, not bottom hole pressure?

A. I used surface -- surface pressures because we measured the surface injection pressures, and because it is specified by the regulations of the State of New Mexico.

Q. Is that -- are you referring to OCD Memo 377?

A. Yes, sir.

Q. Now, you are requesting permission to inject 750 barrels a day. Do you anticipate that this amount will increase in time?

A. Some slight fluctuation from the volume of 750 barrels per day might be anticipated; however, in 1980

the average production was equal to only 631 barrels per day. So we have a safety margin build-up in our request.

Q. Will you now refer to what has been marked Enserch Exhibit Number Twelve and review this for the Commission? Twelve is water injection calculations.

A. Exhibit Number Twelve provides water encroachment calculations based on injection volume proposed for the Enserch Rader Well No. 2.

28 feet of net pay with an average porosity of 7 percent in the Montoya formation in the Enserch Rader Well No. 2.

Water encroachment calculations were conducted based on a regular propogation (sic). Based on an injection volume of 750 barrels of water per day it was calculated that after ten years only 222.5 acres would be encroached by water. This corresponds to a radius of only 1760 feet from the Rader Well No. 2.

This indicates that it would take ten years of constant injection at a rate of 750 barrels per day to reach the vicinity of the Phillips Petroleum Lambirth "A" Well No. 4. The Phillips Petroleum Lambirth "A" Well No. 4 is located approximately 1750 feet away from the proposed Enserch Rader Well No. 2.

Q. And at this time, Mr. Renoult, I'd like

you to, if you need to, to refer back to Exhibit Number Nine and I'd ask you if you've made any estimates as to what the economic life of the Lambirth "A" Well No. 4 might be? Exhibit Number Nine being your oil production graph and table on the Lambirth "A" Well No. 4.

A. I estimated the Phillips Petroleum Lambirth "A" Well No. 4 has a remaining life of approximately five years. This well should be dead by the end of 1986, based on the current production, current oil production and water production.

Q. In making these calculations, what did you estimate the remaining producable reserves to be in that well?

A. The remaining producable reserves from the Phillips Petroleum Lambirth "A" Well No. 4 are equal to approximately 29,000 barrels of oil.

Q. And how does -- what is the source of that figure?

A. This is based on the current decline exhibited by the Phillips Lambirth "A" No. 4, and this is based also on the testimony given by Phillips Petroleum on April 22nd, 1981.

Q. Now, Mr. Renoult, what cutoff were you using to determine that the well had actually reached the end

of its economic life?

A. I used a cutoff of approximately one barrel per day.

Q. Now, the Lambirth "A" No. 4 -- the Lambirth "A" No. 4 Well is producing from what formation?

A. Fusselman formation.

Q. And you are proposing to inject into what formation?

A. The Montoya formation.

Q. So this testimony is only directed to that situation where water might escape into the other formation, into the Fusselman formation, correct?

A. Yes, sir.

Q. And these calculations are based only on 750 barrels per day, is that correct?

A. Yes, sir.

Q. And you do not anticipate needing to exceed that 750 barrels per day.

A. No, sir. The field is well developed and we don't expect -- anticipate any drastic increase in the water production. In 1980 the average water production was equal to 631 barrels per day.

Q. Now, Mr. Renoult, have you made a study to determine whether or not the water injected into the Montoya

will in fact stay in that formation?

A. Yes, sir.

Q. And in making this study what did you examine and what data did you review?

A. I looked at the logs from the proposed well,from the offset wells, and I looked at core data available in the Peterson Field.

Q. Are the results of your study contained in an exhibit?

A. Yes, sir.

Q. Is that Exhibit Number Thirteen?

Mr. Renoult, the question was were the results of your study contained in what has been marked Exhibit Thirteen?

A. Yes, sir.

Q. Will you refer to that exhibit and explain to the Commission what it is and what it shows?

A. Exhibit Number Thirteen is composed of a suite of logs run in the Phillips Petroleum Lambirth "A" Well No. 4, located 1750 feet northwest of the proposed salt water disposal well. The log on the left side of this exhibit is a resistivity Dual Laterolog microstatically focussed. The scale on this log is logarithmic from .2 to 2000 ohm meter parameter.

The log on the middle of the exhibit, is a porosity FDC/CNL, limestone matrix of 2.71 gram per cc, was used. The scale on this log is from -10 percent porosity in the right to +30 percent porosity on the left.

The third log on the right of the exhibit is a computer Cyberlook log derived by Schlumberger.

From the two previous resistivity and porosity logs the Cyberlook parameters provided by Phillips Petroleum are listed in the heading of this log. The water resistivity of .045 ohm_meter parameter was used and a matrix gram density of 2.701 gram per cc was used.

The Phillips Petroleum Lambirth "A" Well No. 4 is producing from the Peterson Fusselman Field. This well is perforated from 7814 feet to 7828 feet. This corresponds to a subsea depth of -3423 feet to -3437 feet.

The lowermost perforation in the Lambirth "A" Well No. 4 is 66 feet high to the uppermost perforation in the proposed Rader Well No. 2.

This suite of logs shows that a 10 foot tight streak with high shale content and no porosity is present in the Phillips Petroleum Lambirth "A" Well No. 4 from 7830 feet to 7840 feet.

MR. KELLAHIN: Would you give those figures again?

A. From 7830 feet to 7840 feet. This shaley, tight barrier is shaded in gray on this exhibit.

This suite of logs shows that in the Phillips Petroleum Lambirth "A" Well No. 4 a 10-foot clean, tight streak with no porosity is present from 7840 feet to 7850 feet. This tight barrier is evidenced on the FDC/CNL log on the Cyberlook log. Shading of this clean, tight barrier was inadvertently omitted on this exhibit.

Below this 20-foot tight barrier from 7830 feet to 7850 feet the Fusselman formation is water-bearing with an average water saturation of approximately 20 percent.

From 7904 feet to 7934 feet the Fusselman formation is cherty and tight and exhibits limited porosity. This 30-foot barrier is shaded in gray on this exhibit.

In the Phillips Petroleum Lambirth "A" Well No. 4 the top of the Montoya was encountered at a depth of 7934 feet, -3543 feet subsea. The MOntoya in this well is highly porous and water-bearing, as evidenced by an average porosity of approximately 15 percent and a water saturation of approximately 70 percent.

In summary, the top of the Montoya formation in the Phillips Petroleum Lambirth "A" Well No. 4 is located 106 feet below the lowermost Fusselman perforation in this well. MOreover, the producing Fusselman formation in

this well is separate from the Montoya formation by two impervious barriers having a thickness of 20 feet and 30 feet each.

Q. In your opinion, would these tight streaks work as a barrier to prevent the vertical migration of injection fluids into the Fusselman formation?

A. Yes, sir, they do.

Q. So in other words, these tight streaks constitute barriers between the Montoya and the Fusselman?

A. Yes, sir.

Q. Have you examined the logs of other wells in the area to see if tight streaks appear in other wells in the area?

A. Yes, sir.

Q. And which wells have you examined?

A. I looked at the Rader Well No. 2, Rader Well No. 1, Peterson "H" Well No. 1.

Q. And in examining the logs on these wells did they also reveal tight streaks separating the two formations?

A. Yes, sir, they do.

Q. In your opinion are these tight streaks fractured?

A. No, sir, they are not.

Q. Now, can you tell this from examining

the logs?

A. The open hole logs provided on Exhibit Number Thirteen don't show any large fractures in the Fusselman and MOntoya formations. There is no washed-out present within these two formations.

Q. Now would you be able to tell by looking at the logs if there were fractures or would it just show you if there were fractures capable of transmitting fluids?

A. Well, the logs would not tell me if the fractures would be capable of transmitting fluids.

Q. In other words, if you have a washout on the log that merely shows you that you have a fracture that is capable of transmitting a fluid.

A. If I had a washout on a log it indicates that we are dealing with some fracture of large magnitude, which might be able to transmit fluids, and we don't have any large washouts on these Lambirth "A" Well No. 4.

Q. Mr. Renoult, in determining whether or not a formation is fractured, is there better evidence to look to than logs?

A. Yes, sir.

Q. And what would -- have you examined any other data to try and determine whether or not the formation is fractured?

A. Yes, sir. I looked at some other information.

Q. And what was that?

A. Core data.

Q. You've reviewed cores on what wells?

A. On --

Q. Reviewed core analyses on what wells?

A. On the two wells, the Lambirth "A" Well No. 2 and Enserch Exploration Lambirth Well No. 3.

Q. Based on your review of these core analyses and also on your review of the logs, what conclusions can you reach about whether or not this formation will transmit fluids?

A. Reviewing the logs and reviewing core data available from these two wells, I conclude that the Fusselman formation doesn't exhibit fractures capable of transmitting water, particularly from the Montoya to the Fusselman.

Q. Mr. Renoult, were Exhibits One through Thirteen prepared either by you or under your direction and supervision?

A. Yes, sir.

Q. Can you testify as to their accuracy?

A. Yes, sir.

MR. CARR: At this time we would offer into evidence Enserch Exhibits One through Thirteen.

MR. RAMEY: Enserch Exhibits One through Thirteen will be admitted.

Q Mr. Renoult, in your opinion will granting this application result in a reduction in producing costs and therefor the recovery of additional hydrocarbons from the wells in the area of the proposed disposal well?

A Yes, sir, I do.

Q In your opinion will granting this application impair the correlative rights of any other operator?

A Excuse me?

Q In your opinion will granting this application impair correlative rights of any other operator?

A No, sir.

Q Will granting this application be in the best interest of conservation, the prevention of waste, and the protection of correlative rights?

A Yes, sir.

MR. CARR: That concludes my direct examination of Mr. Renoult.

MR. RAMEY: We'll have a fifteen minute recess.

(Thereupon a recess was taken.)

MR. RAMEY: The hearing will come to order. Are there any questions of Mr. Renoult?

MR. KELLAHIN: Yes, sir, Mr. Ramey, I have some.

MR. RAMEY: Mr. Kellahin.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Renoult, your background is in petroleum engineering, is it not, sir?

A. I got BS degree in mechanical engineering and MS degree from University of Texas at Austin in petroleum engineering.

Q. You were Enserch's petroleum engineer witness at the Examiner Hearing of this case, were you not?

A. Yes, sir, I was.

Q. And that was on April 22nd of 1981.

A. Yes sir.

Q. And for that exhibit -- for that case you prepared certain exhibits, did you not?

A. Yes, sir, I did.

Q. Subsequent to that hearing, Mr. Renoult, have you made any additional studies or examinations of data pertaining to the subject matter in this case?

A. Yes, sir, I did.

Q. And what did you study?

A. I reviewed the logs, the core data, production histories of all of the wells in the project area. I reviewed all the data I had available which would -- which was relevant to the subject case.

Q. All right. You reviewed in preparation for this hearing the information you had available in the April '81 hearing.

A. Yes, sir, I did.

Q. You don't have any new test data or information between the two hearings, do you?

A. Yes, sir, I do.

Q. And what is that?

A. I've got the production history from --

Q. All right, you updated your production history on some of the wells.

A. Yes, sir, I did.

Q. All right, apart from updating the production history, what, if any, new data do you have that you used?

A. I reviewed the core data and I reviewed the logs, also.

Q. The review of the core data, is that something you did prior to the first hearing in this case?

A. I looked again at what was entered last time and --

Q. All right, so basically the core information was available to you before and you simply reviewed it again.

A. Yes, sir.

Q. All right. Is there anything else that may have looked at that you did not look at prior to the first hearing?

A. Nothing I can think of at the time.

Q. All right. Let's see if we can't keep this in some kind of order, Mr. Renoult, and I will ask you some questions based upon the order of your exhibits, the way you talked about them.

A. Okay.

Q. And if you'll turn to Exhibit Number One, which is your Form C-108, let me ask you some questions about that.

Now, your Exhibit Number One is the application for salt water disposal in the proposed Rader No.

2 disposal well, is it not?

A. Yes, sir.

Q. And the information contained on this exhibit is the same as at the Examiner Hearing, isn't it?

A. No, sir.

Q. All right. All right, the change, I'm sorry, the change is that you've reduced the anticipated daily injection volume from 1650 to 750.

A. That's one change.

Q. Okay, and what are the other changes?

A. I reduced -- I increased the minimum from 745 to 750 barrels per day.

Q. Uh-huh.

A. And I decreased the maximum from 5976 barrels per day to 2880 barrels per day.

Q. Okay. If I understood your direct testimony correctly, Mr. Renoult despite the indication on this exhibit of a maximum daily injection volume of 2880, it is your desire to have an order that would preclude you from an injection above a rate of 750 barrels a day.

A. We need --

Q. Is that correct?

A. We need to inject approximately 750 barrels of water per day.

Q. All right. You wouldn't have any problem with an order entered that approved the disposal so long as the maximum daily disposal rate would not exceed 750 barrels.

A. No, sir.

Q. All right. So I can ignore this maximum 2880 on the application.

A. Yes, sir.

Q. All right, sir. Let's look at Exhibits Two and Three at the same time, if you will, please, Mr. Renoult.

First of all, I need you to help me with Exhibit Number Two. As I understand your testimony, Mr. Renoult, there are some five wells that produce from the Fusselman that Enserch operates, and there appear to be five wells that Phillips operates in this field that produce from the Fusselman. Am I correct in saying that each operator has five wells and there are a total of ten producing Fusselman wells in this pool?

A. Yes, sir.

Q. All right. Now, let me direct your attention to Section 31 to the northeast quarter, and to the Enserch Lambirth No. 3 Well.

A. Yes, sir.

Q. My copy of the exhibit indicates that

that is a dual Pennsylvanian-Fusselman producer?

A. No, sir. This indicstes that this well was initially completed in the Fusselman. This well produced for two months from the Fusselman and was recompleted higher in the Penn, so --

Q. All right, so this well should be colored in the green, right?

A. Well, this well produced from the Penn, in the Fusselman at one time, and was recompleted higher, so we had at one time or the other this well produced from both zones. I mean --

Q. It no longer produces from the Fusselman. It's plugged back up and produces out of the Penn now.

A. Yes, sir, correct, yeah.

Q. All right. Directing your attention to Section 31, to the northeast quarter of the northeast quarter, there is the Phillips Lambirth 4-A Well, Mr. Renoult. There is a number indicated there that says "f" and then a --3499. Is that the top of the Fusselman, the subsea depth for the Fusselman?

A. It should be the top of the Fusselman; however, I -- the purpose of this exhibit was to show where the wells were located with respect to the Rader No. 2, and I did not review the tops of all the wells which the area has.

This exhibit was submitted just to show the respective locations with respect to Rader No. 2, and which zone was producing.

Q All right, sir. So what's your understanding of the meaning of f -3499?

A I would suspect that it should be the top of the Fusselman; however, I did not review this specific, the tops indicated on this exhibit.

Q All right, let's look at Exhibit Number Three.

A Yes sir.

Q This is your tabulation of wells within the half mile radius of the proposed disposal well?

A Three wells are within half mile radius, the Enserch Rader No. 1, the Phillips Petroleum Lambirth "A" No. 4, and the Enserch Lambirth Well No. 3 are within the half mile radius.

The Phillips Petroleum Peterson No. 1-H, the Enserch Exploration Lambirth No. 7, the Phillips Petroleum Lambirth "A" Well No. 1 are slightly past the half mile radius.

Q All right, what's the purpose of the exhibit, Mr. Renoult?

A The purpose of this exhibit was to provide information regarding the completion of each well and the current producing formation of the nearest of said wells

to the proposed Rader No. 2.

Q. Did you make this tabulation?

A. Yes, sir, I did.

Q. And this is the same information you supplied at the Examiner Hearing, is it not, Mr. Renoult?

A. It's not exactly the same exhibit. I mean it's not a copy. It's not a carbon copy from the first exhibit. I made, I believe three corrections on this exhibit.

For the Enserch Rader Well No. 2 I scratch 970 sacks of cement. This was replaced by 914.

And I changed -- I corrected the KB for the Phillips Lambirth No. 4. This was scratched and replaced by 4391. So there is a slight difference and the corrections were made directly on this exhibit and --

Q. Let me direct your attention to the Phillips Lambirth "A" No. 4 Well, which is the third well in the tabulation, and go over to the current producing interval, and looking at the subsea depth, it says -3423 to -3437.

A. Yes, sir.

Q. Is that the producing interval for the Fusselman formations in this well?

A. That is subsea depth for the uppermost perforation in the Lambirth "A" 4 and the subsea depth of the lowermost perforation in the Fusselman in the Lambirth "A" 4.

Q All right, and comparing Exhibits Two and Three I find you picked the top of the Fusselman to be below the perforation for the Fusselman in the Lambirth "A" No. 4 Well.

A No, sir, I didn't pick the tops which are indicated on Exhibit Number Two. This was submitted just to show the respective locations of the wells and which zones they're producing from. It happened that the tops were on this exhibit but I did not figure the tops.

Q All right. In looking at Exhibit Number Three, then, Mr. Renoult, you made some reference to the subsea depth of the proposed disposal well in the Montoya. What was the subsea depth for those perforations in the disposal well?

A The Enserch Rader Well No. 2 is perforated from 7902 to 7930, which corresponds to -3503 feet to -3531 feet subsea.

Q -3530 was the starting point?

A No, -3503.

Q I'm sorry. And the difference, then, is the 66 feet you came up with in your testimony.

A The 66 feet is the difference between the uppermost perforation in the Rader No. 2, -3503, and lowermost perforation in the Phillips Lambirth "A" No. 4, 3437

which gives 66 feet subsea.

Q. All right. You indicated in your direct testimony that you examined the Montoya formation in the proposed disposal well as a candidate for a disposal formation. Did you examine any other formation in the disposal well to see if it would be an acceptable disposal formation?

A. Yes, sir, I looked at the formations from TD to the surface and the Montoya is the only formation where Enserch would dispose water in the Enserch Rader Well No. 2.

Q. Did you test the Wolfcamp formation in that well?

A. No, the Wolfcamp formation is tight in the Enerch Exploration Rader Well No. 2.

Q. It doesn't have any Wolfcamp production indicated on the logs for that well?

You said it was tight. I'm not sure what you mean by that.

A. I mean there is a low porosity and low permeability.

Q. You said that the only other disposal well in the entire area that you were aware of was one operated by Amoco up in Section 18, several sections north of this field, is that not correct, Mr. Renoult?

A. Yes, sir.

Q. And that disposal well is disposing of produced water into the Pennsylvanian formation, is it not?

A. Yes, sir. Into the Fusselman formation.

Q. Into the Fusselman formation?

A. Yes, sir.

Q. Have you examined the logs on that well to determine that it's actually being disposed of in the Fusselman formation?

A. No, I looked at Form C-103 filed with the Oil Conservation Division.

Q. All right, but you didn't examine the logs of the well to determine exactly what formation it's being disposed in.

A. No, sir, I relied on the information on Form C-103.

Q. That's the Peterson-Fusselman Field, or Pool, that's separate so far as the Commission is concerned from the South Peterson-Fusselman Pool, Field, that we're discussing, is it not?

A. Yes, sir, it's a different pool.

Q. All right. Now you said that the Montoya formation in this area doesn't produce any hydrocarbons.

A. Yes, sir, to the best of my knowledge.

Q. It's a water bearing formation throughout the county, I believe that's what you said.

A. No, I said there is no hydrocarbon production from the Montoya over the -- over the county. I don't kno the formation is water-bearing all over the county.

Q. Well, what's in it?

A. May be tight.

Q. Well, it's not tight because you said it has porosity and it's suitable as a disposal formation.

A. I mean it might be tight in some other parts of the county.

Q. All right.

A. Not tight in our own well.

Q. All right. Insofar as this well goes, is that formation, the Montoya formation in the disposal well water-bearing?

A. Yes, sir.

Q. And the Fusselman formation in this area is also water-bearing, is it not?

A. The Fusselman formation is oil productive and also water-bearing.

Q. The oil is a thin -- thin column of oil at the top of the Fusselman formation with the balance of it being filled with water, is that not true?

A. Some wells have more column than some others. Some wells have up to 30 or 40 feet of oil column in the Fusselman within the South Peterson Field.

Q. Would you turn to Exhibit Number Six, Mr. Renoult?

You've measured the distance between the proposed disposal well and the Phillips Lambirth "A" No. 4 Well at 1750 feet.

A. Yes, sir.

Q. This Enserch Lambirth No. 6 and Enserch Lambirth No. 10 appear on Exhibit Number Two and Exhibit Number Six, and they appear to be very close to each other, Mr. Renoult. What's the reason for that? You've located the Lambirth Well No. 6, it's in Section 31, and on Exhibit Two it shows Well No. 10 with a well spot almost on top of that well location for No. 6.

A. Yes, sir.

Q. Explain to me what happened.

A. When the Enserch Lambirth Well No. 6 was drilled and completed, Enserch experienced some completion difficulties and --

Q. You had a water flow you couldn't shut off, isn't that right?

A. Yes, we had some water problems in the

Q. You attempted to recomplete it and shut off the water and you couldn't do it.

A. Yes, sir.

Q. And you had to drill the No. 10 as a replacement well.

A. Yes, sir.

Q. All right. Let's go to Exhibits Seven, Eight, and Nine, which in my packet is all stapled together, Mr. Renoult, and if you'll turn to that exhibit -- I think it's Number Nine -- that has the tabulation of the oil and water production for the Lambirth "A" No. 4 Well, is that the second part of Exhibit Number Nine?

A. Yes, sir, page number two.

Q. All right, page two to Exhibit Nine. When you were updating this production information, I missed that. What has been the production since December of '80 for that well?

A. The well production?

Q. Yes, sir.

A. For the month of January 1981, I don't have the well information on this table.

For the month of February, 1981, the Water production was equal to 4247 barrels.

For the month of March, 1981, the water production was equal to 3116 barrels.

Q. All right. Since presenting this exhibit then at the Examiner Hearing we have some new production history for the Lambirth 4-A Well.

A. Yes, sir.

Q. And that shows that the water now is again being produced out of this well in 1981.

A. Yes, sir.

Q. How many of the ten wells in the Fusselman Field are not producing any water now, Mr. Renoult?

A. As far as Enserch Exploration, Inc., is concerned, the Lambirth Well No. 1 is producing no water from the Fusselman.

The Lambirth Well No. 9 is producing no water from the Fusselman.

As far as Phillips Petroleum is concerned, the Lambirth "A" No. 2 is producing no water in the Fusselman, to speak of, Between 04-1979 and 12-1980 this well produced water just for one month.

The Lambirth "A" No. 3 was producing a very small amount of water in December, 1980.

The volume of water produced from the Fusselman was equal to 13 barrels during the month of December

1980.

The Lambirth "A" No. 4 during the month of December, 1980, was producing no water.

So I guess I covered the ten wells.

Q. All right, so excluding the Phillips Lambirth "A" No. 4 Well, which does produce water now, I counted four of the ten wells that don't produce any water or produce very little water. Is that true?

A. That seems correct.

Q. All right, despite the fact that this is a water-drive reservoir, we do have some of the Fusselman wells in here that don't produce water.

A. Yes, sir.

Q. Now if you'll direct your attention to Exhibit Number Eleven, you've indicated that the Montoya formation in the disposal well will take water on a vacuum. Do you know what the original reservoir pressure was, bottom hole pressure in the Fusselman formation is, Mr. Renoult?

A. I don't have this exact figure available but if I recall we used mud weight equal to approximately 10.5 pounds per gallon to drill for this formation.

So the formation -- the bottom hole pressure was probably higher.

Q. Was approximately what, then?

A. Well, there is no way of knowing. It was higher than 10.5 pounds per gallon --

Q. No, I'm sorry. In the producing Fusselman wells, though, do you have any bottom hole pressure information for the Fusselman reservoir as to what the original bottom hole pressure was?

A. In which well?

Q. In any of the Fusselman wells.

A. Well, I don't have any bottom hole pressures available here.

Q. You've not made any bottom hole calculation, taken any bottom hole pressures or made any calculations based on bottom hole pressures?

A. Yes, we ran some pressure build-ups.

Q. If you had any zero psi wellhead injection pressures at the surface --

A. Yes, sir.

Q. -- what would be the bottom hole pressure due to the hydrostatic head of the water in the Montoya?

A. Well, this would depend on quite a few parameters. This would depend, for one thing, on the density of fluid column we have, and also, this would depend on the friction, frictional losses we have under dynamic conditions when --

Q Let me ask you to assume the calculations you've made here on your Exhibit Number Eleven and can you tell me what the hydrostatic head is on the water at the formation, how many pounds is it?

A From Exhibit Number Eleven I can't compute the flowing injection pressure at the Montoya depth.

Q So you haven't made any calculations or studies to determine whether the disposal water even under vacuum due to the hydrostatic head at the formation will cause the formation to fracture and migrate water into the Fusselman.

A If we look at page number two of Exhibit Number Eleven, we see a linear, approximately linear increase of injection pressure versus injection weight, which seems to indicate that we didn't fracture the formation when we are disposing water into the Fusselman -- into the MOntoya formation.

Q Let me ask you this: You testified on Exhibit Number Thirteen with regards to some geological information from which you concluded that there were at least two tight stringers that geologically separated the lower perforations in the Fusselman well, the Phillips 4-A Well, from the Montoya disposal formation. You indicated the two tight streaks in that exhibit.

A. Yes, sir.

Q. That was your geological explanation for how they might be separated. Have you made any engineering study or data or calculations to support that the Montoya is separate and distinct accumulations of fluids from the Fusselman?

A. The fact that the Fusselman is separated from the Montoya by two streaks with a thickness of 20 feet at the top, the top streak, and a thickness of 30 feet for the bottom barrier, indicates that we are dealing with two different reservoirs.

Q. I understand what you're saying about your examination of the logs and the two tight streaks.

What I've asked you is whether you've made any reservoir calculations or any indications to show that there are reservoir pressure differences between the Fusselman and the Montoya; anything to establish that the Montoya and the Fusselman are separate and distinct reservoirs not in communication with each other?

A. I don't have any pressure data available to differentiate the pressure the Fusselman with the pressure in the Montoya in the subject well.

Q. All right, have you made any analysis of the water produced from the Fusselman and the water produced

from the Montoya to determine whether that would give you some indication of two distinct, separate reservoirs?

A. The water produced from the Fusselman and the water produced from the Penn formation are compatible.

Q. Tell me something about the Montoya and the Fusselman, Mr. Renoult, does the Commission recognize those two formations to be separate and distinct reservoirs?

A. I don't know what the Commission recognizes as far as these two formations are concerned.

Q. You talked about some of the geology in the Fusselman and the Montoya. Would you describe for us what the geological difference is between the two formations?

MR. CARR: At this time, may it please the Commission, we will call another witness who will testify as to -- is a geologist and will testify as to the difference between the Fusselman and the Montoya.

Mr. Renoult, I don't believe, is really qualified to answer these. I don't really object to Mr. Kellahin's question but I do think it might be wise to pursue with Mr. Brown, who we will call as our next witness.

MR. KELLAHIN: That's fine with me Mr. Ramey. I'm curious as to what Mr. Renoult based the separation on and let me continue with that, Mr. Renoult.

Q. Let's turn to Exhibit Number Twelve, Mr.

Renoult. This is your water encroachment calculation which I believe is one of the exhibits that you revised since the Examiner Hearing, is it not?

A. Yes, sir.

Q. At the Examiner Hearing you used a similar calculation but it was based upon an anticipated daily disposal rate of the 1650 barrels, I think it was.

A. Yes, sir.

Q. All right, and you've revised this exhibit to demonstrate what happens when you dispose of 750 barrels a day.

A. Yes, sir.

Q. All right. Have you calculated the distance between the disposal well and the nearest line of the Phillips' lease in Section 31?

A. The distance is 660 feet between the Rader No. 2 and the west line of Section 32, or the east line of Section 31.

Q. All right, so the well is 660 out of the corner. I'm sorry, it's 660 from the west line. Looking at Exhibit Number Twelve, assuming for the sake of argument all the things are done correctly on this exhibit, by the second year of your disposal at 750 barrels a day, you're going to be encroaching on Phillips' lease.

A. Yes, sir.

Q. All right. Do you have any proposal for the Commission to determine how they may establish a procedure whereby we could monitor the disposal in the Montoya in this well to insure that the water will not encroach on the Phillips leases?

A. No, sir.

Q. Now, this calculation supposes that the first barrel of water injected in the disposal well is going to take X number of years to reach a given point, doesn't it?

A. Yes, sir.

Q. All right. You still have formation water in the Montoya formation, don't you?

A. Yes, sir.

Q. And as you dispose of one barrel of water in the Montoya you're going to have to displace one barrel of Montoya formation water somewhere else.

A. Yes, sir.

Q. Where's it going to go?

A. It's going to be pushed farther.

Q. Can you guarantee us that it's not going to be pushed up into the Fusselman formation in the Phillips wells?

A. As evidenced on Exhibit Number Fourteen --

Q. All right.

A. -- there are --

Q. We'll talk about that one in a minute, but apart from that, no way you can guarantee that that water is going to remain confined in the Montoya based upon what you know now.

A. The two tight barriers are the main evidence of the separation between the Montoya formation where Enserch is going to inject water and the Fusselman formation which is productive in the Lambirth "A" Well No. 4.

Q. All right. Let's -- let's look at that exhibit. You want to unfold yours for me?

All right, Mr. Renoult, Exhibit Number Thirteen is essentially the same exhibit you used at the Examiner Hearing, except now that you've shaded in the two tight sections, right?

A. Yes, sir.

Q. All right and you told us today that the upper tight section -- well, these are all three logs of the same Phillips 4-A Well, aren't they?

A. Yes, they are.

Q. All right. The upper tight section in that Phillips well is a thickness of 20 feet?

A. Yes, sir.

Q. And the lower tight section is a distance of 30 feet.

A. Yes, a thickness of 30 feet.

Q. All right, and those are the tight sections which you believe constitute barriers to keep the disposal water out of the producing Phillips well.

A. There are nine tight zones present in the Lambirth "A" No. 4 Well.

Q. Let me direct your attention to page 44 of the transcript of the Examiner Hearing, Mr. Renoult. In response to a question was it your testimony under oath that this suite of logs shows that in the Phillips Lambirth No. 4 a 10 foot tight streak with no porosity is present from 7840 to 7850. This is clearly evidenced on the CNL log and the Cyberlook, and the other tight streak from 7850 to 7924.

In the Examiner case we had two tight sections each of which were 10 feet in thickness. Now the tight sections are 20 feet by 30.

A. The first streak shown in page 44 is a streak from 7840 to 50, which is the one I referred as a clean tight streak.

Above this streak we have another 10-foot barrier, which I referred as dirty, shaley, impervious barrier. This barrier is present from 7830 to 7840.

The third barrier -- I mean the bottom tight barrier present from 7904 to 7934 on this exhibit Number Thirteen.

Q. I can't follow you, Mr. Renoult. Let's start over.

I'm looking at the exhibits and I find the top of the Fusselman below the top of the perforations. Now that's not right, is it?

On Exhibit Number Thirteen there's a line indicating top of Fusselman, approximately 7840 feet; gives a subsea of -3449. Yet when you look at the log the perforations are up above that.

A. Yes, sir.

Q. And we've all agreed they're Fusselman perforations.

A. Yes.

Q. Where's the top of the Fusselman?

A. The Lambirth "A" Well No. 4 is producing based on the data filed with the Commission, from the Fusselman formation from 7814 to 7828.

On this specific exhibit I did not pick the top of the Fusselman formation and the top of the Montoya formation.

Q. At the Examiner Hearing we had a tight

streak from 7840 to 7850. Will you take my red pen and mark on my exhibit where 7840 to 7850 is going to be?

A. Okay.

Q. Would you write 7840? All right, sir, and the -- your testimony at the Examiner Hearing was that the second or lower tight streak in this well was between 7924 to 7934. Would you locate that for me?

A. It should have been from 7904 to 7934. I recognize that the transcript is indicating a different depth but what I meant was 7904 to 7934.

Q. All right, would you put that one in for me, 7904?

A. Okay.

Q. Want to color that in for me?

A. You want me to color from 7904 to 7934?

Q. Yes, sir, if that's your testimony as to what the tight streak is.

A. Okay.

Q. You said you examined the cores from the three wells involved, Mr. Renoult?

A. I looked at the cores from Phillips Lambirth "A" No. 2 and the Enserch Lambirth Well No. 3.

Q. Do you have copies of that core inform-ation? Or the analysis?

A. Yes, sir.

Q. Well, may I see them?

A. Yes, sir.

MR. KELLAHIN: Mr. Carr, do you want to mark these as Enserch exhibits or would you like me to mark them as Phillips exhibits?

MR. CARR: I don't care. We'll be happy to mark them as Enserch.

MR. KELLAHIN: You've already got your stamp on them is what I'm saying.

MR. CARR: Well, they're not Commission stamps and we'll be glad to mark them as Enserch exhibits. They will have to be Enserch Exhibits Sixteen and Seventeen.

MR. KELLAHIN: Okay.

MR. CARR: Sixteen being the "A" 2, right?

MR. KELLAHIN: Yes, sir.

Q. Mr. Renoult, do you happen to have for your own information extra copies of Exhibits Sixteen and Seventeen to refer to?

A. Yes, sir.

Q. All right, sir. I show you what has been marked as Enserch Exhibits Sixteen and Seventeen and ask you if these are the two core analyses that you refer to in your

testimony on direct with regards to those cores you had examined?

A. Yes, sir.

MR. KELLAHIN: If the Examiner please, we would move the introduction of Enserch Exhibits Sixteen and Seventeen.

MR. CARR: We certainly have no objection.

MR. RAMEY: They will be admitted.

Q. All right, Mr. Renoult, you've indicated on your examination of the logs that you didn't believe the Montoya and the Fusselman formations were fracture communicated, and you said you based part of that analysis on your examination of the core information from the Lambirth No. 3 and Lambirth "A" 2 Wells, is that not correct?

A. That's correct.

Q. Let me show you Exhibit Number Sixteen for the Lambirth "A" 2 Well. Under the far right column, would you indicate for me what VF means?

A. VF means a vertical fracture.

Q. VF appears -- would you take Exhibit Number Sixteen, Mr. Renoult, and correlate it to those tight sections that you find in the Lambirth 4-A Well and tell me if the core analysis shows that formation to be fractured where you say it's tight.

MR. CARR: I'm going to object to that.

We're being asked to have Mr. Renoult correlate a log from the Lambirth No. 2-A Well, a core into the log on the Lambirth No. 4. We submit that that isn't possible and that it's asking Mr. Renoult to do something that cannot be done, and we therefor object to that.

MR. KELLAHIN: My only point, Mr. Ramey, is this witness has testified that based upon the core data he's examined the Montoya formation is not fractured or in fracture communication with the Fusselman. I think that's directly contrary to the core analysis which I've shown him and I want to give this witness every opportunity to explain how he can reach a conclusion that is different than what the exhibits seem to indicate.

MR. CARR: Well, we appreciate the opportunity that Mr. Kellahin has so graciously extended. We would, however, submit that if the exhibit which we have been willing to admit at his -- or offer at his request indicates something that he can certainly draw it from that exhibit and not ask that we try and correlate from one well to another.

I think if Mr. Kellahin has questions concerning Exhibit Sixteen he should proceed with those, but not ask that it be cast in an erroneous posture by trying to correlate it with -- with another well.

MR. RAMEY: It would appear to me that

the witness would have to put the information on the log for Lambirth A-2 and then correlate that information into the Lambirth A-4. Unless he does that, why --

MR. KELLAHIN: My question was premised on the assumption that based upon his answers he had done that.

MR. RAMEY: That's right. I think we'll have to --

MR. KELLAHIN: Let me ask the question again.

MR. RAMEY: We'll have to assume that he's got some -- some kind of testimony that he has either done that or he hasn't done that, and there is no indication here that he has done that, I would think, Mr. Kellahin.

MR. KELLAHIN: Okay, let me try again.

MR. RAMEY Okay, try again.

Q. Mr. Renoult, have you made an analysis or a correlation between the core data in the Lambirth No. 3 and the Lambirth A-2 with the log of the Lambirth 4-A Well?

A. I've made an analysis of the core data off Exhibit Number Sixteen. I have not made a correlation between the core data off the Lambirth A No. 2 and the Phillips Petroleum Lambirth "A" Well No. 4.

Q. Which one of these core analyses, Sixteen or Seventeen, have you studied?

A. Both of them.

Q. All right. And based upon this study you concluded that there were no fractures communicating the Montoya and the Fusselman?

A. No, I concluded that in the core from the Lambirth "A" No. 2 and the core from the Enserch Exploration Lambirth No. 3 there is substantial evidence indicating that there will not be vertical migration of water from the Montoya to the producing Fusselman.

Q. Based upon your analysis of this core information there wouldn't be vertical migration of water from the Montoya to the Fusselman?

A. Yes, sir.

Q. How can you examine this core information and conclude that fractures will or will not communicate with water?

A. Exhibit Number Sixteen gives the complete core information from the Phillips Petroleum Lambirth "A" Well No. 2. This well was cored from 7819 to 7850. This core indicates that out of 25 samples analyzed, 10 samples, or 40 percent of the total core, the permeability to air under surface conditions lower than .5 millidarcy. Most of the samples contained impervious chert and shale.

This core analysis indicates that under

bottom hole conditions, ones considering the effect of more than 7800 feet of overburden, this permeability to air will be greatly reduced. Permeability to water under bottom hole conditions will even be smaller than permeability to air. This indicates that because of a chert and shale inclusions present into the Fusselman, vertical fractures in this rock do not exhibit any permeability to allow vertical transmissibility and migration of water from the Montoya to the producing Fusselman formation.

Q. Mr. Renoult, this core information is related to the Fusselman formation, is it not?

A. Yes, sir.

Q. And that formation is above the Montoya.

A. Yes, sir.

Q. And is geologically younger than the Montoya.

A. Should be.

Q. All right. And is it not correct that if there is a fracture system in the Montoya -- in the Fusselman, evidenced by the core, you would also have fracture caused in the Montoya?

A. That's not necessarily correct.

Q. In what ways would it not be correct?

A. It would depend on the origin of frac-

tures between the two formations and some fractures might be sealed in one formation and might be open in another formation.

Q. But you haven't run any pressure differential tests between the two formations to determine whether or not these fractures would communicate or not.

A. No, sir. I have the core data available.

Q. What's the spacing for the South Peterson Fusselman Pool which we're talking about?

A. 80-acre spacing.

Q. And it's 80-acre oil production spacing, is it not?

A. Yes, sir.

Q. Are you aware of what the standard oil well proration unit is for an oil well in New Mexico?

A. I believe it's 40-acre spacing.

Q. Do you know why the spacing in this pool is 80 acres and not 40?

A. I suspect because some wells can drain more than 40 acres.

Q. You talked about the price of trucking this water away, and I believe you said it was $1.58 a barrel to truck the water away?

A. Yes, sir.

Q. What's the price you're getting for the

oil?

A. We're getting a price in the vicinity of $35.00 per barrel.

Q. This project is still economic even if you have to continue to truck away water.

A. It's not economic to spend $35,000 per month when we have a well where we could dispose water.

Q. My point is you're not going to have to abandon this field and these five wells at this point --

A. No, sir.

Q. -- if the Commission doesn't allow you to dispose of water in this well?

A. No, sir.

Q. And based upon the current prices for the trucking of the water and the value of the oil, you can continue for some time to truck that water away and still have an economic project.

A. Yes, sir.

Q. Now, Mr. Renoult, have you reached any other opinions or conclusions that were in addition to or different than the opinions and conclusions you presented to Examiner Nutter at the hearing in April?

A. My conclusions are still the same. We still need the Rader Well No. 2 to dispose water produced in

the South Peterson Field.

MR. KELLAHIN: I have nothing further.

MR. RAMEY: Any other questions of Mr. Renoult? Mr. Carr?

MR. CARR: I have a few on redirect.

REDIRECT EXAMINATION

BY MR. CARR

Q. Mr. Renoult, I would direct your attention to Enserch Exhibit Number Two, and in particular on that exhibit to the Enserch Lambirth Well No. 3, which according to the color coding has produced from both the Fusselman and the Pennsylvanian.

A. Yes, sir.

Q. Is that well currently producing from the Fusselman?

A. No, sir, this well is currently producing from the Pennsylvanian.

Q. And to your knowledge does Enserch have any future plans for producing this well in the Fusselman?

A. Yes, sir. We will recomplete this well into the Fusselman once the Penn is depleted.

Q. Now I would like to direct your attention to your Exhibit Number Six.

A. Yes, sir.

Q. I believe you testified that you encountered problems in completing the Lambirth No. 6 Well, is that correct?

A. Yes, sir.

Q. And that well is located in close proximity to the Lambirth No. 10.

A. Yes, sir.

Q. Did you have problems with that well other than just water encroachment?

A. Water encroachment, water production was the main problem in the Lambirth No. 6.

Q. Did you also encounter mechanical problems?

A. Yes, sir.

Q. Do you happen to know what they were?

A. The cement bond to the formation was not good and, if I recall, we dropped the casing in this well when this well was being completed.

Q. All right. Mr. Renoult, will you now refer to Enserch Exhibit Number Ten?

As I understand it, this is an exhibit of water produced from Enserch wells, is that correct?

A. Yes, sir.

Q. How do you get the figures on water

production?

A. We test the wells with some tank batteries and we measure.

Q. How frequently do you measure the water?

A. Once a month.

Q. Are these actual figures or do you prorate the water production on these wells?

A. No, actual figures.

Q. Now I direct you to Exhibit Number Eleven. I believe you indicated you had no calculations based on bottom hole pressures.

Exhibit Number Eleven.

A. No, I do not have any bottom hole pressure for the Gladys Rader Well No. 2.

Q. In your opinion would it be possible to fracture this reservoir based on injection of water under vacuum?

MR. KELLAHIN: I'm going to object to that question. The man has already admitted in cross examination that he has not made that study or those calculations. Mr. Carr has failed to lay a proper foundation there.

Q. Mr. Renoult, are you familiar with the Oil Conservation Division rule that imposes the .2 of a pound

per foot of depth limit on the injection of produced fluids?

A. Yes, sir.

Q. Are you familiar with as to how that figure is obtained by the Commission?

A. Yes, sir.

Q. Could you basically summarize how that figure is obtained?

A. You must figure the difference between .7 psi per foot of depth and an aid of .5 psi per foot. This figure was derived to prevent fracturing formations.

MR. KELLAHIN: Mr. Ramey I'm going to object to that answer and ask that it be stricken. The whole point of the discussion is that this man has testified that he did not know what the virgin pressure was in the formation; that he had not calculated the bottom hole pressure of the hydrostatic head of the water column in the disposal well; and it's simply taking the Commission information and making a calculation.

I believe that there's no proper foundation laid for this man to reach an expert opinion upon whether the Montoya, surrounding strata of the Montoya will be fractured by the disposal of water as he suggested.

MR. CARR: I believe this witness ca-

testify that he is familiar with the rule. He can testify that he -- as to how he interprets that rule and whether or not injecting into any formation under that pressure limitation would tend to fracture it, and that's what we're attempting to show.

MR. RAMEY: Overrule the objection.

Q Mr. Renoult, I believe you have testified that you understand how the Commission obtained this -- set this .2 of a pound per square foot of depth figure.

Have you concluded your answer on that point?

A Yes, sir.

Q In your opinion how would you evaluate this injection pressure?

MR. KELLAHIN: I'm sorry, what was the question?

Q In your opinion how would you characterize this injection pressure?

A The .2 psi per foot is a safe gradient in order to prevent fracturing formation when a well is converted into a salt water disposal, and my -- my testimony showed that we are planning to inject less than 2880 barrels per day and we are planning to inject only 750 barrels per day under vacuum. Consequently, we will be below the guidelines

imposed by the Commission.

MR. KELLAHIN: For purposes of the record, Mr. Ramey, I'd like you to note my continuing objection to this line of questioning and opinions elicited from this witness from this testimony.

MR. RAMEY: We will so note, Mr. Kellahin. I want you to understand that we're taking the answers for what they're worth.

MR. KELLAHIN: That's always the case.

Mr. Ramey.

Q. Mr. Renoult, are you aware of any instance where you could inject within this pressure limitation and fracture the formation?

A. Excuse me?

Q. Are you aware of any situation where you could inject water under this fracture limitation or this pressure limitation imposed by the Commission and fracture any formation?

A. No, sir.

Q. Mr. Renoult, I believe in testifying from your Exhibit Number Twelve you told Mr. Kellahin that at a certain point in time injected water would be encroaching onto the Phillips lease, is that correct?

A. Yes, sir.

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MR. KELLAHIN: That's always the case, Mr. Ramey.

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A. No, sir.

Q. Mr. Renoult, I believe in testifying from your Exhibit Number Twelve you told Mr. Kellahin that at a certain point in time injected water would be encroaching onto the Phillips lease, is that correct?

A. Yes, sir.

Q. And in what formation would that water be injected --- in what formation would that water encroachment occur?

A. Water encroachment will occur in the Montoya formation where we're injecting the water.

Q. Now in regard to your Exhibit Number Thirteen, as it is presently shaded and as you testified today, does this correctly depict the location of the tight streaks that you testified to?

A. Yes, sir. There are two tight streaks, one from 7830 feet down to 7850 feet, with a 20-foot barrier, and we have a second tight streak from 7904 feet to 7934 feet, with a 30-foot impervious barrier.

Q. Mr. Renoult, will you now look at your Exhibit Number Sixteen, which is the core analysis on the Lambirth No. 2-A Well?

I believe you testified that the symbol VF in the column to the far right indicates vertical fracture, is that correct?

A. Yes sir.

Q. Would this symbol note whether or not the fracture was able to transmit fluids?

A. Absolutely not.

Q. I'd like you to look, for example, at

interval indicated on the core, I think it's after number eight, it's 7830 feet. I believe that also indicates a vertical fracture at that point, is that correct?

A. Yes, sir.

Q. What is the permeability at that depth?

A. Okay, the permeability of sample number eight, which was retrieved from 7830 to 7831, is equal to .1 millidarcy. This permeability is a permeability to air under surface conditions and doesn't take into account the effect of the overburden and doesn't take into account that --

Q. If you took this under downhole conditions, would you anticipate that to be, the permeability to be greater or not?

A. Definitely smaller.

Q. So it would be tighter?

A. Yes, sir.

Q. Now this is permeability to air. If this was permeability to water, how would that affect it?

A. It would be even smaller.

Q. Is this vertical or horizontal permeability or does it make any difference?

A. (Cannot understand the witness at this point.)

Q. How does horizontal permeability compare

to vertical permeability generally?

A. Vertical permeability is generally smaller than horizontal permeability.

Q. So do you anticipate -- is this .1 millidarcy a conservative figure as to permeability?

A. That's a very conservative figure, as far as vertical permeability to water, and reservoir conditions is concerned.

Q. If this vertical fracture indicated was capable of transmitting fluids in that core at that point would you anticipate the permeability to go up? Would that -- would that permeability figure --

MR. KELLAHIN: I'm going to object to that question. The witness has already testified that he did not take the core analysis and determine whether the fractures would communicate water or not.

Q. Was that your testimony, Mr. Renoult?

A. No, sir.

Q. Would you state what you testified on that point? Can you look at this core and tell if in fact there is vertical transmissibility of fluids?

MR. KELLAHIN: I think the witness has already answered that question, Mr. RAmey.

MR. CARR: And I believe the witness is --

MR. KELLAHIN: He said that he did not know or could not do it.

MR. CARR: We would request the permission of the Commission to let the witness answer the question. He is here and can answer it just as well as Mr. Kellahin re[illegible]counting what he thinks he said.

MR. KELLAHIN: Mr. Ramey, Mr. Carr asked [illegible] question, he got the wrong answer that he didn't want [illegible]sked him the question again and got a different answer. [illegible]ness is inconsistent under oath.

MR. CARR: And he is under oath and can [illegible]hat. I think the record will show whether or not [illegible]nconsistent and I think since he's here he can [illegible]is matter and that Mr. Kellahin would be well [illegible]t the witness proceed and answer the question [illegible]haracterizing the testimony as he understood it.

MR. KELLAHIN: Please note my objection.

MR. RAMEY: I'll let the witness answer the question and note your objection, Mr. Kellahin.

Q. Mr. Renoult, from this core analysis can you tell if fluids can be transmitted vertically in the core?

A. Out of this core 40 percent of the footage has a permeability smaller than .5 millidarcy. This

indicates, once we take into account the different corrections I've been talking about, that this formation is not capable of permitting the water to migrate within the Fusselman formation.

Q. Mr. Renoult, I believe you testified that you were getting $35.00 a barrel for the oil.

A. Yes sir, approximately.

Q. And that if you had to continue trucking oil that the project would still remain economic.

A. Yes, sir.

Q. If you increased the cost of the project would that tend to advance the economic limit on the wells in the area?

A. This will decrease the remaining producing life of the field.

Q. If the costs are higher, would that tend to result in ultimately hydrocarbons being left in the ground that otherwise would be produced?

A. Yes, sir.

MR. CARR: I have nothing further of Mr. Renoult, on redirect.

MR. RAMEY: Any other questions of Mr. Renoult?

MR. KELLAHIN: Yes, sir.

RECROSS EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Renoult, have you made any calculations to determine what the dollar amount is of the reduced economic life of the project by the continued trucking of the disposed water?

A. I have not made any calculations but based on the price of 1.58 with respect to $35.00 a barrel, this should reduce our reserve by approximately 4.5 percent.

Q. Have you examined any other formation or wells in the area to determine whether they're acceptable disposal formations, other than the Montoya formation in this proposed well?

A. Yes, sir. Enserch has tested the Glorieta formation in the Enserch Lambirth Well No. 5.

Q. Just a minute, now. You've tested the Glorieta in the No. 5 Well, and when did you conduct that test?

A. This test was conducted a few years ago.

Q. And the No. 5 Well is in Section 30? I'm sorry, Section 1.

A. Also Enserch tested the Granite Wash.

Q. I'm sorry, I didn't hear you.

A. Enserch tested the Granite Wash in this same well and both formations proved to be tight and couldn't be considered for injection of formation fluids.

Q. Okay. Apart from the proposed well then, and the No. 5 Well in Section 1, those are the only two wells that you've tested for disposal purposes?

A. All the other Enserch wells are currently producing oil, with the exception of the Enserch Rader Well No. 1, which was P&A in July of 1979, and which doesn't offer any intervals where water could be disposed of.

Q. Thank you, Mr. Renoult.

MR. RAMEY: Any other questions of Mr. Renoult?

CROSS EXAMINATION

BY MR. RAMEY:

Q. Mr. Renoult, you testified that the Fusselman was a water drive reservoir? I think.

A. Yes, sir.

Q. Are all the wells producing from above your first tight streak that you've shown on your Exhibit Thirteen? From the Fusselman, that is?

A. I don't think that all the wells are producing from above the first tight streak, and I'm not really

sure, but I don't think so.

Q. Is this an edge water drive or is this a bottom water drive?

A. Edge water drive.

Q. Edge water drive, so at some place in the reservoir you have water above the tight streak that is moving into the, say, the perforated interval on the well that's exhibited on your Exhibit Thirteen?

A. Yes, sir.

Q. Thank you.

MR. RAMEY: Any other questions? The witness may be excused.

Let's recess till 1:15.

(Thereupon the noon recess was taken.)

MR. RAMEY: The hearing will come to order.

MR. CARR: At this time I'd call Mr. Tom Brown.

THOMAS E. BROWN

being called as a witness and being duly sworn upon his oath, testified as follows to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Would you state your full name and place of residence?

A. Thomas E. Brown, and I reside in Midland, Texas.

Q. By whom are you employed and in what capacity?

A. I'm employed as an area staff geologist by Enserch Exploration Corporation.

Q. Have you previously testified before this Commission or one of its examiners and had your credentials as a geologist accepted and made a matter of record?

A. Yes.

Q. Are you familiar with the application of Enserch in this case?

A. Yes.

Q. Are you familiar with the subject disposal well and the subject area?

A. Yes.

MR. CARR: Are the witness' qualifications acceptable?

MR. RAMEY: They are acceptable.

Q Have you made a study of the proposed injection well?

A Yes, I have.

Q In making this study what did you review?

A I reviewed the samples and log correlations of other known picks in the field to establish the formation in which we wanted to inject the salt water.

Q Did you review the log of the subject well?

A Yes, I did.

Q And other wells in the area?

A Yes, I have.

Q Will you refer to what has been marked for identification as Applicant's Exhibit Fourteen, identify this for the Commission, and explain what it shows?

A Exhibit Fourteen is a structural cross section hung on a -3200 subsea depth. It goes from the north part of the field, from the Enserch No. 7 Lambirth, through the Phillips Petroleum Company Lambirth "A" No. 4, and through the Enserch Exploration Gladys Rader No. 2, and on the south end it ends with the Enserch Exploration Gladys Rader No. 1

Well.

All the logs are porosity logs, which are compensated neutron formation density logs. The scale is 5 inches per loo foot vertically it's a full sized log.

The correlations you see on there, such as the top of the Peterson lime, Fusselman, Montoya, and the Basement, are the correlations which we carried through the field.

In the Gladys Rader No. 2 the top of the Montoya that I carried through the field is at 7900 foot, and that top has been eroded in the Gladys Rader No. 1, and where this top is picked in the Phillips Lambirth "A" No. 4 is based on a log to log correlation.

Q This is a structural cross section not a stratigraphic cross section, is that correct?

A That's correct.

Q Exactly why did you pick the 3200-foot datum?

A Well, if I'd of picked a shallower one it obviously wouldn't have been on the logs, or the section would have had to be many feet high, so you have to pick a datum that will show up within the interval. So actually all the logs in the area in question would fall between about -32 and about -3500, so I had to pick a datum that was up out

of the correlations is all; it was an arbitrary figure.

Q. Does this show the Montoya perforations in the subject well?

A. Yes, it does.

Q. And where do they lie in respect to the Fusselman zone?

A. Below the Fusselman.

Q. I believe you have some shaded area traversing the exhibit. What do they indicate?

A. These are tight areas on the porosity log as best you can just correlate them log to log. They correspond in part to Exhibit Thirteen, I believe, of Daniel Renoult in his section involving the Phillips Lambirth "A" No. 4.

Q. Based on this exhibit does it appear to you that water injected in the perforations in the subject well would be able to migrate into the Fuseelman?

A. Based on this section alone, no.

Q. Generally speaking, how is the Montoya zone distinguished from the Fusselman zone?

A. In this particular area it is very difficult to distinguish between the two and generally the sole means of determining whether or not you're in the Fusselman or the Montoya formation, since they're both dolomite

is done with insoluble residue studies. While in character and looking under a microscope there's not very much difference, the insoluble resides left when you dissolve these things in hydrochloric acid, the trace minerals that are left are definitely different.

Q. Now do insoluble residues in any way constitute a barrier between zones?

A. No, they do not.

Q. What do they show? Do they tie to the age of the reservoir, or what?

A. They show certain trace minerals associated with formation. The source of those minerals is -- probably has long since been obliterated by biogenetic changes within the rock.

Q. Would you now refer to what has been marked for identification as Enserch Exhibit Number Fifteen and identify this and explain what it shows?

A. Exhibit Number Fifteen is a sample study that was done on the samples in the lower part of the Enserch Exploration No. 2 Rader. Actually the section examined was from 7600 to 8000 feet. They were done by Charlie Timberlake in the Midland area.

Q. Is this a report that -- is this type of report commonly used by the industry?

A. Yes.

Q. And what does it show?

A. These are tops based on sample analysis and insoluble residue studies.

Q. Would you compare this data with the data on your structural cross section?

A. Charlie Timberlake picks the top of the Montoya at 7880, which is some 20 foot high to where I picked it, in the -- in the well.

Now the fact it doesn't correlate one to one is not surprising because samples get mixed slightly in the well and it's difficult to determine exactly the depth from which that sample came for certain, but you should be within like 10 or 20 foot of being correct, and this is caused by the variation from the time you drill a sample until it reaches the surface.

Q. Now what conclusions can you draw from this data?

A. That the perforations in which we want to dispose of water are in the Montoya formation.

Q. Were Exhibits Fourteen and Fifteen either prepared by you or under your direction and supervision? Or at your request?

A. Yes.

MR. CARR: At this time we would offer Enserch Exhibits Fourteen and Fifteen.

MR. RAMEY: Exhibits Fourteen and Fifteen will be admitted.

MR. CARR: I have nothing further of Mr. Brown on direct.

MR. RAMEY: Any questions of Mr. Brown? Mr. Kellahin.

MR. KELLAHIN: Yes, sir.

CROSS EXAMINATION

BY MR. KELLAHIN

Q. Mr. Brown, Exhibits Fourteen and Fifteen except for the shaded area on the cross section, are identical to the exhibits you testified to at the Examiner Hearing, are they not?

A. Yes, I don't believe there's any change.

Q. I forgot exactly what you said, Mr. Brown. What conclusions did you draw for Mr. Carr just now with regards to your examination of this cross section?

A. That the perforated interval in which we wish to dispose of water in the Gladys Rader No. 2 is in the Montoya formation.

Q. That's the only conclusion you've drawn?

A. That's correct.

Q. Am I correct in understanding that you have not concluded that the disposal of water in the Montoya would remain confined to the Montoya?

A. I have not concluded that except for the fact that we do see shale on the -- on the top of the section and by the porosity log we've got a tight stringer that correlates across the two wells and we're below that point.

Q. Your testimony that you gave at the Examiner hearing, I assume, is still the same insofar as your answer to the following questions: On page fifteen I asked you, based upon your own information and study do you have an opinion as to whether that water will remain confined to the Montoya? Your answer then was, I do not know.

A. I don't know.

Q. Is this still your answer? All right. I'm curious about Exhibit Number Fifteen, Mr. Brown. The examination of the insoluble residues by the Residue Research Laboratory indicates a top of the Montoya at 7880 in the proposed disposal well.

A. That's correct.

Q. And you have picked 7900. You're 20 feet lower than theirs.

A. That's correct.

Q. All right. If you took that projection by the Research Laboratory on over to the Lambirth "A" No. 4 Well, where would their information place the top of the Montoya?

A. I don't know since I've never seen an insoluble residue study done on that well.

Q. Can we conclude that --

A. That's just based -- where I put it is based on a log to log correlation, as I said earlier.

Q. All right is -- is there anything on your log on the Gladys Rader No. 2 that would identify the 7800 marker for the top of the Montoya used by the laboratory?

A. No.

Q. So based upon your study you can't reach an opinion as to where the laboratory top of the Montoya would appear in the Phillips Lambirth "A" No. 4 Well?

A. No, I couldn't say where he would pick it in that.

Q. You wouldn't know whether it was above or below the top of the Montoya as you've depicted it for that well?

A. No, I would not know.

Q. What's the purpose of Exhibit Number Fifteen, then, Mr. Brown, if it's not to show that different

geologists can disagree upon where the top of the Montoya is?

A. The purpose of it is Charlie Timberlake is considered an expert, so I use his determination as a means of saying where it was.

Q. All right. Mr. Timberlake's study of the residues begins at 7600 feet. Has he reported to you or given you any indication as to where he thinks the top and the bottom of the Fusselman are?

A. No. Of course I know the top, by log calculations and my correlations in here, is eroded in the Gladys Rader No. 2 and a lot of this material is probably detrital. I didn't ask him to determine the top and bottom of the Fusselman, only I asked -- he didn't have the log, incidentally, he only had a well and the samples and I said, where is the Montoya in this well based on those samples, and that was the study he gave me back.

Q. Based upon your correlation of the logs, though, you do find the Montoya present in the Phillips Lambirth "A" 4 Well, don't you?

A. Based on a log to log correlation.

Q. So this is not a situation where you would be disposing of water in a formation that is not present in an offsetting producing well.

In other words, the Montoya doesn't pinch

out before it gets to the Lambirth No. A-4 Well, does it?

A. I don't believe it does.

Q. So if you dispose of water in the Montoya at the very lease you're going to have water in the Montoya within the Montoya as defined in the producing Phillips well.

A. At some time.

Q. Have you made a study of any other formation as an alternative formation for the disposal of the produced water in this area?

A. I have not.

Q. And am I correct in understanding that this evidence of insoluble residues from which the top of the Montoya is picked is not an indication of an impermeable barrier between the two formations?

A. That's correct.

Q. All right.

MR. KELLAHIN: Nothing further. Thank you.

MR. RAMEY: Any other questions of Mr. Brown? Mr. Carr.

REDIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Brown, I believe you just testified that Enserch is proposing to inject water into the Montoya and that zone is present in the Phillips well, No. 4 Well, is that correct?

A. I believe it's present.

Q. Do you know whether or not the Phillips is producing anything from the Montoya, the Phillips well?

A. As I depict it here?

Q. Yes.

A. No. They are not.

Q. Do the insoluble residue studies indicate that you have two separate formations?

A. Not really. They only indicate that where we have perforated is in the Montoya.

Q. All right.

MR. CARR: I have nothing further.

MR. KELLAHIN: I have a question, Mr. Brown.

RECROSS EXAMINATION

BY MR. KELLAHIN:

Q. Not only does the Montoya not produce

in the Phillips well, it doesn't in any other well in the area, does it?

A. Again, to my knowledge, I don't think it produces anywhere in the entire county.

Q. It's not productive of hydrocarbons, all it's got in it is water.

A. Everywhere that I've ever seen it that's the case.

MR. KELLAHIN: Nothing further.

MR. RAMEY: Any other questions? Mr. Brown, you may be excused.

MR. CARR: That concludes our direct presentation.

MR. RAMEY: Mr. Kellahin, you may proceed.

JERRY N. BLEVINS

being called as a witness and being duly sworn upon his oath testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. All right, Mr. Blevins, would you state your name and occupation?

A. My name is Jerry N. Blevins. I'm an

Associate Reservoir Engineer for Phillips Petroleum Company.

Q. Mr. Blevins have you previously testified as petroleum engineer before the Division and had your qualifications accepted and made a matter of record?

A. Yes, sir.

Q. Would you describe for the Commission how long you've been employed by Phillips?

A. For the past four years I've been employed, the last year being in Odessa.

Q. During that period of employment what, if any, time have you devoted to studying or working in the South Peterson Fusselman Pool?

A. Well, during the last year it was a major part of my time was spent in the South Peterson Pool.

Q. Does that study of this pool include the study of logs and other geologic information?

A. Yes, sir.

Q. As well as engineering, petroleum engineering data from the pool?

A. Yes, sir.

Q. And did you previously testify in the Examiner Hearing in this case?

A. Yes, sir.

MR. KELLAHIN: We tender Mr. Blevins

as an expert petroleum engineer.

MR. RAMEY: So qualified.

Q. Mr. Blevins, I'd like to direct your attention to Phillips' Exhibit Number One and have you identify that for me.

A. This is a plat of the Peterson South Pool in Roosevelt County, New Mexico. The green shade is Phillips acreage, which we currently have or have proposed a well to be drilled.

The pink colored circles are Fusselman completions. The blue colored circles are Penn completions. The purple arrow points to the Rader Well No. 2.

Q. All right, sir. It's been previously testified today that there are some 10 Fusselman oil producing wells in this pool, is that correct?

A. Yes, sir.

Q. And of those wells how many does Phillips operate?

A. Five.

Q. And do any of those wells make water?

A. Yes, sir.

Q. And what is Phillips currently doing with the water production Mr. Blevins?

A. We either haul it off to a disposal

system or part of our water is accepted up in the Amoco well in the Peterson Field, depening on their capability of handling it or not, depending on how much water we have to haul away.

Q. What does it currently cost you to -- per barrel to truck your water away?

A. For 1980 the average was $1.14 per barrel. The trucking to Amoco's well is much more cheap and the trucking to a disposal system approaches $2.06 a barrel, but on an average it was $1.14 a barrel.

Q. What is the current oil price per barrel being received by Phillips for the sale of the produced oil?

A. Our last price was $31.00 a barrel.

Q. In your opinion, Mr. Blevins, is it currently economic for Phillips to continue to truck away the water from the producing Russelman well?

A. Yes, sir.

Q. Do you have any opinion, Mr. Blevins, as to at what point it will no longer be economic to continue to truck away the produced water?

A. My calculations say when the water percent reaches above 90 percent of the total production.

Q. Are you familiar with the Enserch operations within this field?

A. Somewhat.

Q. Are you familiar with the, generally, with the volumes of water produced from their wells and the oil produced from those wells?

A. Yes, sir.

Q. In your opinion are their water needs significantly different from those of Phillips with regards to the disposal of the produced water?

A. They produce twice as much water as we do, so they might be in a little more bind than what we are.

Q. Based upon your knowledge and study of the area, Mr. Blevins, do you have an opinion as to whether or not it is still economic for Enserch to continue to truck away the water?

A. It should be.

Q. Would you give us some percentages, Mr. Blevins, what percentage of the oil is produced by Phillips and what percentage of the water is produced by Phillips?

A. Tom, that's on Exhibit Four.

Q. All right. let's wait and pick it up later.

A. Right.

Q. Okay. Is there anything else you want to direct our attention to with re ards to Exhibit Number One before we leave that?

A. No, sir.

Q. All right, let's go to Exhibit Number Two.

All right, sir, would you describe for us what Exhibit Number Two is?

A. This is a north/south cross section going from the north, our Peterson"H" No. 1 to the far left, the Lambirth "A" No. 4, our Fusselman producer, the Enserch Rader No. 2, the proposed injection well, and the Lambirth "A" No. 1, a Fusselman producer.

The blue shaded area is the Penn zone and the pink shaded area is the Fusselman zone. The perforations are marked at the bottom of each log by number. You'll notice in the Peterson "H" about 7330 to 40 a small green section, which is our proposed injection interval to come up later before the Commission, and the green section on the Rader No. 2 is their proposed injection system.

Q. All right let me ask you about the Peterson "H" No. 1. What do you propose to do with the green identified section in that well?

A. We are proposing to inject water into it.

Q. And where is that well? That's the dry hole --

A. That's the dry hole --

Q. -- on Exhibit Number One in Section 29?

A. Yes sir.

Q. All right.

MR. RAMEY: Excuse me, I don't understand, where is the injection -- oh.

Q. Now, this is Phillips' proposed disposal formation, is it not?

A. Yes, sir.

Q. All right. And what is that formation you propose to dispose water into?

A. The Wolfcamp. Have you tested the Wolfcamp with regards to its acceptability as a disposal formation?

A. Yes, sir.

Q. And what have you found?

A. That it would take water under pressure. We will propose to install a pumping system to inject the water into the formation.

Q. All right. Now let's go over to the third well from the left on the cross section and I believe you've identified that as Enserch' proposed disposal well?

A. Yes, sir.

Q. And what is indicated by the green line

at the bottom of that log?

A. That's their proposed injection interval.

Q. All right sir. The well in between, then, is the Phillips Lambirth "A" No. 4?

A. Yes, sir.

Q. And what is that well in relation to the disposal well? This is your closest producing well, isn't it?

A. Yes, it is, sir.

Q. All right. Mr. Blevins, what is Phillips' position with regards, then, to Enserch's application to inject produced waters into the Gladys Rader No. 2?

A. We feel that there are no barriers between what they call the Montoya and our Fusselman; therefor they cannot contain the water that they inject and it would water out our wells or possibly their wells and we are opposing it on that basis.

Q. Are you aware of any way, Mr. Blevins, that we might recommend a procedure or a method of monitoring the proposed disposal well to insure that the disposed water does not migrate onto Phillips' leases?

A. Not without undue cost.

Q. Have you made any calculations of the remaining producable reserves that can be produced by the

Phillips 4-A Well out of the Fusselman?

A. Our estimate is about 25,000 barrels.

Q And based upon the current oil prices for oil, have you converted that to current dollar amount?

A It's about $750,000 gross.

Q In the event the proposed disposal well is approved, what, if any, impact will that have upon the remaining producable reserves from the Phillips 4-A Well?

A If the water breaks through it will knock out any remaining reserves we have.

Q Based upon your examination of the logs in the various wells depicted on Exhibit Number Two, Mr. Blevins, do you find any evidence of barriers that might be impermeable so thereby the Montoya could be isolated from the Fusselman?

A. Not due to the fracturing.

Q All right explain to me what you mean by "not due to the fracturing".

A. Well, even with tight streaks in the area, the fracturing of the Fusselman itself would just override any tight streaks that you would have. You could have tight streaks that would be permeable due to the fractures themselves.

Q All right, sir, is there anything else

about Exhibit Number Two you want to talk about?

A. No, sir.

Q. All right, let's go to Exhibit Number Three.

All right, Mr. Blevins, would you identify for us Exhibit Number Three?

A. Exhibit Number Three is a structure map of the Fusselman zone in the Peterson South Field, with again the pink dots representing Fusselman completion: the blue dots representing Penn completions. The purple arrow again shows the Rader No. 2 Well.

Q. What's the purpose of the exhibit, Mr. Blevins?

A. The purpose of this exhibit is to show that the waters, if communicated with the Fusselman would migrate to a producer that is up structure, and the closest two Fusselman producers are our Lambirth "A" No. 4 and our Lambirth "A" No. 1. These wells would, due to drawdown on the pressures, would have the greatest chance of watering out of the wells in the area.

Q. Those two wells are structurally higher than the proposed disposal well?

A. Yes, sir.

Q. All right. Anything else about Exhibit

Number Three?

A. No, sir.

Q. Let me direct your attention to Exhibit Number Four, Mr. Blevins. Would you identify that exhibit for us?

A. This is the April production as it was turned in to the NMOCD and calculated back to daily averages for each of the wells in the respective zones.

The first numbers you will see will be the oil barrels/and then the barrels of water.

The Fusselman completions throughout there indicate wells producing water; some wells not producing water with the oil.

Enserch Exploration No. 3 is 312 Mcf of gas a day. It's the only gas well in the field.

Based on calculations made, Enserch averages 395 days -- excuse me, 395 barrels per day out of the Fusselman; Phillips has 230 barrels per day.

Enserch has 657 barrels of water and Phillips has 231 barrels of water.

Out of the Penn Enserch makes 32 barrels of oil and 19 barrels of water. Phillips, out of the Penn makes 37 barrels of oil and 72 barrels of water.

Total water production, Enserch has

676 barrels a day from March and Phillips has 303 barrels, so roughly, they produce twice the amount of water that we do.

Q. What's the conclusion, if any, from the exhibit, Mr. Blevins?

A. That the wells do make water and that they're within reason of what a water drive reservoir would handle.

Q. All right. Mr. Ramey asked a question before lunch concerning whether or not all the Fusselman wells in this pool were producing above the uppermost tight streak that Mr. Renoult identified in the Lambirth 4-A Well. What, if any knowledge do you have about the production perforations of the various Fusselman wells in relation to that tight streak?

A. Well, first of all, the tight streak is not continuous throughout the field and therefor it's very possible that we have production below the tight streak, if it was correlated, but since it's not correlated throughout the field, it's -- it's very difficult to say whether we're below or above it.

Q. All right, sir, anything else about Exhibit Number Four?

A. No. There is one other thing.

We both have five wells in the Fusselman

and we both have two wells in the Penn.

Q. All right, sir, if you'll turn to Exhibit Number Five, Mr. Blevins. Would you identify that for us, that exhibit?

A. This is the monthly production of the Peterson South Field, both the Fusselman and the Penn, both the first set is the total of the Fusselman wells by month as turned in to the Commission, and then each well individually broken down.

Then we have the Penn wells turned in total and then broken down by each well.

If you will look through there as previously testified earlier today, you can see the Lambirth No. 1 of Enserch does not make water; the Enserch Lambirth No. 10, I mean No. 9 makes very little water; our Lambirth "A" 2 has made little water considering -- except for the last two months. Our Lambirth No. 3 makes very little water, and so I would say even in a water drive reservoir it's very likely we're not -- we're producing water free in some of the wells.

Q. For example, when you turn to the tabulation of production for the Lambirth 4-A Well, that's the eighth page of the exhibit.

A. Uh-huh.

Q. You've updated the production for all

the wells in the pool through what date?

A. Through the end of March.

Q. And what does that indicate with regards to the water production on the Lambirth 4-A Well?

A. In February we produced 3116 barrels of water; in March we produced 4247 barrels of water, or approximately a one to one ratio with the oil.

Q. What, if any, significance could you attribute to the absence of water production in any of the offset Fusselman wells?

A. Basically, on well testing would be one way. The high productivity of the well would make well testing very hard. You might not catch water one month where you would the next. The water is -- could be erratic, like the production data indicates. It could come in and go back out, depending on the fractures, as far as logging up to production.

Q. Okay. Let's go to Exhibit Number Six please. All right, sir, what's Exhibit Number Six?

A. This is a core record, core description, by our geologist on our Lambirth "A" No. 2 Well. We cored the Fusselman and this is a description of what the rock looked like when it came out of the hole.

You'll notice at 7823 to 26 we have a finely crystalline, vugular fractured porosity in that inter-

val. 7826 to 31 we have large vertical fractures. 7831 to 49 we have many thin vertical fractures. This core would indicate that the formation itself is fractured.

Q With regards to the core information, can you identify for us at which point in the exhibit the footage correlates to what Mr. Renoult picks as the tight section in that well?

A. I would have to do that from the logs.

Q. Generally speaking, would this represent fracture existing through any of the two tight sections that Mr. Renoult has identified?

A. Yes, sir. The average fracture, based on the deposits of the Fusselman, the uplifting that would cause these fractures would have fractured everything down to the Granite that was the uplifting force.

Q. Do you recall Mr. Renoult's testimony before the noon hour that the measurement of the fractures when recreated at the formation pressures would diminish the impact of those fractures on the formation? Do you concur with that opinion?

A. Under pressures it would collapse the fractures a little bit, yes, sir.

Q. All right. How would you compare that to Mr. Renoult's testimony with regards to the atmospheric

pressure at the surface and the existance of those fractures?

A. No -- yeah, the fractures are going to be there anyway, and when they measured the cores and stuff, they're encapsulated in a rubber sleeve, and air is passed through the cores under a high pressure 1000 pounds or so. It's not anywhere near the bottom hole pressure here but it's still more than atmospheric pressure. So there is some confining restraints on these when all this is done.

Q. In your opinion will the existance of the fractures in the formation under formation pressure be significant in order that water or other fluids might migrate through those fractures?

A. Yes, sir.

Q. All right, sir, let's turn to Exhibit Number Seven. Would you identify Exhibit Number Seven for us, Mr. Blevins?

A. Exhibit Number Seven is the CORE Laboratory report prepared for us on our Lambirth "A" No. 2. We cored the Fusselman and if you'll look to the back page of the exhibit you'll see that "X" marked the cored interval, and on the other side is where we perforated the well.

This core indicates that we have permeabilities that vary from 566 millidarcies down to less than .1 millidarcy. Porosities run from about 4.6 to oh, 12, 13

percent porosity.

This core indicates over on the far righthand side the description that the well is very fractured or slightly fractured throughout the entire core.

With the permeability variations ranged like it is, I'd say sometimes they measured the permeabilities of the fractures themselves, in fact.

Q. This is the same exhibit that Mr. Renoult referred to this morning, is it not?

A. The first --

Q. The same --

A. -- two sheets are.

Q. The same core analysis?

A. Yes, sir, same core analysis.

Q. Do you agree, then, or disagree with the conclusions that Mr. Renoult concluded from an examination of this exhibit?

A. No, sir, I don't.

Q. You don't agree with him?

A. No, sir.

Q. Would you generally describe for us the reservoir parameters for the Fusselman formation? What would you expect for the porosity and permeability?

A. Well, the porosity is going to run about

10, 12, 16 percent in a normal completion.

The permeabilities, based on the core, run approximately 30 to 35 millidarices. Permeabilities based on pressure build-up analysis are in the range of 4 or 500 millidarcies.

Q You are aware, are you not, that the spacing for this pool is on 80 acres?

A Yes, sir.

Q To what do you attribute the fact that this pool is spaced wider than the normal 40-acre spacing?

A. The high conductivity of the formation.

Q And what causes the high conductivity in the formation?

A. The fracture system.

Q Would you refer to Exhibit Number Eight? And identify that for us?

A. This is CORE Laboratory work on the Lambirth "A" No. 3 Well in South Peterson Field. Again on the last page you see an "X" marking the cored interval and on the opposite side perforations where we have completed the well.

The descriptions of the cores, basically, say slightly fractured reservoir with permeabilities less than .1 millidarcy.

The porosities in this interval were also extremely low, 2, 4 percent, which is not normally seen.

Q. This is also the first page of the same exhibit that Mr. Renoult referred to this morning, is it not?

A. Yes, sir, and the bad well that this is can be pretty well justified with the production history that we have in earlier exhibits.

Q. All right, draw that analysis for me, would you, please?

A. The low permeability is not a very productive well. The cumulative production on this well is extremely low as compared to the rest of the wells. Our Lambirth "A" 2, which you saw the tremendous permeabilities has cumed 120,000 barrels of oil.

Our Lambirth No. 3 Well has only cumed 23,000 barrels of oil. So the core data indicates that this, this well is much more tighter or not as consistent with the extreme fractured nature as No. 2 is.

Q. I'm not sure I understood you. The No. 3 Well, Exhibit Number Eight, doesn't evidence the extent of fracturing as the "A" No. 2 Well?

A. Yes, sir, No. 2 is much more fractured than No. 3.

Q. And how does the production compare

between the No. 3 and the A-2 well?

A. A-2 is about six times greater than the A-3.

Q. Based upon that study you conclude that the production is significantly affected because of the fracturing?

A. Yes, sir.

Q. You have examined core analysis for three of the wells involved in this pool. In your opinion is the fracturing limited to those three wells or is it typical of the Fusselman formation?

A. No, sir, it would be typical of the Fusselman formation.

Q. Based upon your studies as an engineer, Mr. Blevins, would you recommend to your management that the Montoya formation in the proposed disposal well be used as a disposal interval for produced water?

A. No, sir.

Q. And why not?

A. Because you couldn't tell where the water was going. It could flood out some of our wells very rapidly.

Q. I direct your attention to Exhibit Number Nine, and what is Exhibit Number Nine?

A. Exhibit Number Nine is the CORE Laboratory report on Enserch Exploration's Lambirth No. 3 in South Peterson Field.

Again the descriptions over at the far right side show that this is a very fractured system completely throughout the whole core analysis. It goes from slightly fractured to fractured to very fractured.

Again you can note that even in very fractured intervals such as 7812 to 13.3, the permeability to air is .1 millidarcy and it's fractured over on the other side, so it can be tight and still be fractured.

Q. Okay. Mr. Blevins, you were present in the hearing room when Mr. Renoult testified this morning that Enserch had amended its application to request that instead of approval to dispose of 1650 barrels of produced water a day, that they were willing for a maximum of 750 barrels of water per day be set. In your opinion would that significantly reduce Phillips objection in this case?

A. No sir.

Q. Why not?

A. Because it's still going to have a possibility of ruining our A-4 Well and if we lose those reserves we're talking a lot of money.

Q. Based upon your studies, Mr. Blevins, do

you have an opinion as to what the original bottom hole pressure was in the Fusselman formation?

A. Our measured bottom hole pressures in our Lambirth "A" 2 originally were 2707 pounds. Bottom hole pressure last time we measured was, in 4 of '80 was 2702 pounds.

Q. Have you made a study of the amount of pressure as a result of the hydrostatic head of the water in the disposal well to determine what that pressure would be in the formation?

A. Into the Montoya?

Q. Into the Montoya in the disposal well?

A. It would be approaching above 3000 pounds.

Q. Do you have an opinion as to what the pressure differential or the pressure increase would be as a result of the disposal pressure versus the virgin reservoir pressure in the Fusselman?

A. In communication situations it would go back into the Fusselman due to the difference in the pressures.

Q. So despite the existence of the Commission guideline of 0.2 psi per foot of depth and the disposal of water under vacuum, in your opinion there would be

adverse consequences for the disposal of water into the Montoya formation?

A. Yes, sir.

Q. Would you refer to Exhibit Number Ten and identify that?

A. This is a pressure build-up analysis on the Lambirth "A" No. 2. It's just a rough estimate, basically because we had P* in six minutes. The first point at 2689 was the original shut-in bottom hole pressure. Six minutes later we reached a constant pressure that has - that lasted over 40 minutes, and it's at 2697.

Based on that I made a reservoir calculation of the flow conductivity of the formation. You'll see based on the slope of 4 psi per cycle, which is in my calculations, we came up with KH of 7962 millidarcy feet. The flow capacity of the well with a 20-foot section would be approximately 400 millidarcies.

Q. What's the significance of that, Mr Blevins?

A. This would indicate that even with the core permeabilities measured of being 30 and 40, that the capacity of the well to flow is in the range of 400, or 10 times that much overall the total formation. It's a way of getting a true permeability measurement from the reservoir itself.

Q. And what does that mean, then?

A. That means that the system is fractured.

Q. All right, sir, let's turn to Exhibit Number Eleven. Would you identify Exhibit Number Eleven for us?

A. Exhibit Number Eleven is the injectivity test we ran on the Peterson "H" No. 1 in the Wolfcamp zone.

On here we've shown the wellhead injection pressure, the wellhead injection pressure minus the tubing --

Q. Excuse me, now this -- I've lost track. The Peterson "H" No. 1 Well is what?

A. That's our proposed --

Q. Disposal well.

A. -- disposal well, yes.

Q. In the Wolfcamp?

A. In the Wolfcamp.

Q. Up in Section 29?

A. Yes sir.

Q. All right.

MR. CARR: I'm going to object to this line of testimony. Phillips has already testified that they have other plans for the disposal of water. We do believe, however, going into injectivity tests and detailed data on

their plans for the Wolfcamp are not properly matters -- properly before the Commission in this hearing, but should properly be raised in their case which is scheduled for two weeks from today on this application.

MR. KELLAHIN: Mr. Ramey, the purpose of this exhibit is to demontrate that there are other formations available in the area that may be used as disposal formations for the produced Fusselman water that don't pose the tremendous risk upon the Fusselman producing wells that disposal into the Montoya formation would constitute and we believe that it's relevant to show that the other formations are available.

MR. RAMEY: I'll overrule the objection.

Q. Would you please continue with your testimony?

A. Yes. On this we have four curves. The wellhead injection pressure, which was the pressures at which we were injecting water into the formation, from that I subtracted the friction due to tubing while we were injecting, and which is the second curve as you go down.

The third curve is the instantaneous wellhead shutdown pressure. This is when you shut down the pumps what the pressure is at the moment you shut down.

The last curve is five minute shutdown pressures. This is what the formation heals back to as far as

the pressure of the formation in just a static column.

You'll see that we're injecting at 1400 pounds of pressure or above on our wellhead. Our instantaneous wellhead curve will show you what the formation or the parting pressure would look like if it would level out. Since it's continuing going up with the wellhead injection pressure, we will never part that formation, so it is confined into the Wolfcamp.

Q. Would you refer to Exhibit Number Twelve, please, and identify that?

A. Exhibit Number Twelve is an example of an injectivity test run down 2-3/8ths inch tubing at 7900 feet with 9 pound brine.

You'll see a wellhead injection pressure curve with a vacuum with 600 pounds, 1500 pounds, and 2400 pounds.

If you take out the tubing friction due to these wells, you'll see that the bottom line, or the static column injection pressure of this is a -549 pounds on the average. This means that that formation will take water at approximately 1174 foot below the surface, so you have a static colum of water that's from 7900 back to 1174, or 6726 feet of water, and from that point on that formation will take water, and that formation has been parted. It's -- it's continual.

This line will stay constant no matter what kind of injection pressure you have on the wellhead.

Q. In your opinion, Mr. Blevins, would approval of Enserch's application constitute an unreasonable risk to the correlative rights of Phillips Petroleum Company?

A. Yes, sir, it would.

Q. In your opinion would approval of the application constitute the premature watering out of the Phillips' wells currently being produced from the Fusselman?

A. They would prematurely extort our oil.

Q. In your opinion is the Montoya formation in communication with the Fusselman formation?

A. Due to the fracturing, yes, sir.

Q. Were Exhibits One through Twelve prepared by you directly or compiled under your direction and supervision?

A. Yes, sir, they were.

MR. KELLAHIN: That concludes our direct examination of Mr. Blevins. We move the admission of Exhibits One through Twelve.

MR. RAMEY: Exhibits One through Twelve will be admitted.

Any questions of Mr. Blevins?

MR. CARR: I have a few.

MR. RAMEY: Mr. Carr.

CROSS EXAMINATION

BY MR. CARR:

Q. Mr. Blevins, I believe you testified that it was costing you approximately $1.14 a barrel to remove the water from the -- that of wells in this general area, is that correct?

A. On the average for 1980, yes, sir.

Q. If a disposal well was available in the area, would this result in an economical savings to all operators in the area if they were permitted to inject produced waters?

A. It should.

Q. Would the existance of a satisfactory disposal well lower the cost of producing hydrocarbons -- oil from the pools in the area?

A. Yes, sir.

Q. If you are operating wells with lower costs can you operate them generally for a longer period of time?

A. Yes, sir.

Q. And if you operate them for a longer period of time won't you be able to actually recover more

hydrocarbons?

A. Possibly.

Q. I'd like for you to look briefly at your Exhibit Number Two. It's the cross section.

Now correct me if I'm wrong. I believe you testified that you saw no barriers between the Fusselman and the Montoya, is that correct?

A. Yes, sir, that's correct.

Q. Do you see the Montoya at all on this exhibit or do you show it all?

A. No, sir.

Q. So as far as you re concerned, there is no Montoya on this exhibit -- on this exhibit is that correct?

A. No Montoya in the field as far as I'm concerned.

Q. Okay. Can you see tight streaks in this area?

A. Yes, sir.

Q. Okay. But you're of the opinion that these do not constitute barriers?

A. Not due to the fractures.

Q. Okay, and that -- is it your testimony that the reason that there are no barriers here is because of

the fractured nature of the formation, not because of the tightness of the formation?

A. The fractures play the greatest part in that, yes, sir.

Q. Now I believe you testified that you estimated in your Lambirth "A" No. 4 Well approximately 25,000 barrels of estimated reserves?

A. Yes, sir.

Q. Do you have any estimate as to how long it would take you to produce those reserves?

A. 4-1/2 or 5 years.

Q. Now if there was no water encroachment under -- any water injected got into the Fusselman but did not reach this well for, say, 10 years, would that adversely affect your ability to produce those 25,000 barrels?

A. I'm not sure I follow that.

Q. If you have no water problems for, say, 10 years, would that impair your ability to produce those estimated reserves in the Lambirth 4-A?

A. No, sir if we had no water problem.

Q. Now I believe you testified that, at some length, that there were fractures in the reservoir. Do you have any evidence which shows -- which shows that any of these fractures tend to transmit fluids?

A. Yes, sir.

If you will look at my Exhibit Number Ten, the pressure build-up on the Lambirth "A" No. 2.

Q. And what does that show?

A. With the build-up as fast as it is, we have a calculation at the bottom that says KH is equal to 7962 millidarcy feet. Our H in the well is approximately 20 feet. That means the K is 398.3 millidarcies or approximately 400 millidarcies.

The core indicates this is 30 to 40 millidarcies throughout the interval. This is 10 times what the core permeability indicates.

The transmissibility of the fluids through this formation is as much greater capacity than what the core indicates; therefor, it is a fractured system and we are able to produce a lot more oil and water due to that fact.

Q. Does this test show vertical or horizontal permeability?

A. It shows total permeability of the reservoir.

Q. And what is the interval depth that this is designed to reflect.

A. The interval depth?

Q. I mean you're -- you've certainly taken

an interval in a core or something.

A. For this?

Q. Yes.

A. No, sir. I measured -- I ran bottom hole pressure down to the bottom of the perforations in the "A" 2. You can see those clearly marked on Exhibit Seven, I believe. They're at 7832 to 38. By measuring the bottom hole pressure and the build-up, you're able to get a permeability measurement.

Q. I'd like to direct your attention to your Exhibit Number Six. I'd ask you who prepared this exhibit?

A. Our geologist at Phillips Petroleum.

Q. I believe on the column that is headed depth, it says that Mr. Drisko -- has Mr. Drisko's name, is that correct?

A. Yes, sir.

Q. Did he prepare this exhibit?

A. Yes, sir.

Q. All right. Will he be testifying in this proceeding today?

MR. KELLAHIN: Yes, sir.

Q. I would now like to direct your attention to your Exhibit Number Seven. Does this show horizontal or vertical permeability?

A. Vertical.

Q. To determine what the vertical permeability is through this area, how do you -- how do you read this exhibit? Do you take the permeability column and read down that column?

A. Do I? No, sir.

Q. Is that how you would --

A. I look at the depth. I look at my log, and I look at the permeability that I see across from the depth.

Q. Okay, so if we go down to the depth of, say, 7828 to 7829.

A. Yes, sir.

Q. What is the permeability at that interval?

A. .1 millidarcies.

Q. And then go down another foot and what is it?

A. .1 millidarcies.

Q. And another foot?

A. .1 millidarcies.

Q. So you have a 3-foot area there where the permeability of -- according to these calculations is .1 millidarcy.

A. That's right, and I've got a very good description over here on the opposite side that says fractured, very fractured, very fractured.

Q. Okay, now, when you read this, when you take a core analysis, if those fractures, the very fractured intervals, if they were actually conducting, transmitting fluids, wouldn't those permeability figures be higher?

A. That depends.

Q. Well now, ---

A. It doesn't say what direction these fractures were running. That's a look, they look at the core. That's what this is. This is a visual description of this core. This is an actual measurement.

When we have a fractured system I'm not going to say whether it's vertical fractures or horizontal fractures. You could have them both.

Q. But you can say that in this interval there is a 3-foot streak with permeability based on this calculation of .1 millidarcy.

A. Yes, sir, there is.

Q. Okay. Now I believe you also testified that even though there was some confining pressure on the core, that it wasn't equal to reservoir conditions.

A. Yes, sir, that's true.

Q. And in the reservoir you would expect the permeability at this interval to be less, is that correct?

A. Yes, sir, I would.

Q. And would you also expect it to be less if it was permeability against water as opposed to permeability against oil?

A. Yes, sir, I sure would.

Q. So that actually this figure might be even reduced if we were actually dealing with reservoir conditions?

A. Yes, sir, it would.

Q. So we have a streak 3 feet in width with a -- that would -- is it fair to characterize that streak as tight?

A. That's tight but like I said when I told you that the fractures played the most important role in this area, there's still fractures.

Q. Does the --

A. It's tight due to vertical --

Q. Is there --

A. -- doesn't mean it's tight due to horizontal.

Q. Is there anything here that shows you whether or not you are -- that the core is capable of con-

ducting fluids vertically?

A. No, sir, that's why I did Number --

Q. Fine, thank you.

A. -- Seven.

Q. Now if we look at your second core analysis, marked as your Exhibit Number Eight.

A. Yes, sir.

Q. Does this not indicate that you have a tight zone?

A. Yes, sir, it's tight.

Q. Is there -- do you believe that either of these cores would be typical of the reservoir as a whole?

A. Number Two probably more than Number Three.

Q. It would be Exhibit Number Seven more than Number Eight?

A. Yes, sir. And that again is based on the total production of the wells.

Q. Now I'd like to direct your attention to your Exhibit Number Nine.

A. Yes, sir.

Q. This core analysis is again to air, I guess, yes, is that correct?

A. Sir?

Q. This is permeability to air.

A. Yes, sir.

Q. Okay. If we go down to a depth of 7807 feet and we go from that depth down to 7812 feet, don't we have a permeability throughout that stringer of less than .1 millidarcy?

A. 7807 to 7812?

Q. Uh-huh.

A. You're reading the 90 degree. Over here is -- we have -- the first one I see is .4. I have a 1.6, a .4, less than .1, a .1, so I can't say that it's not, you know, it's greater than .1.

Q. If you start at 7808 -- let me see maybe I just can't line this up, 7809, and you go down from there to 7812, don't we again have a 3-foot stringer - interval there with less than .1 millidarcy permeability?

A. From 7809 to 7812?

Q. Yes, sir.

A. Yes sir it's measured at .1.

Q. And again this would be probably less, there would be less permeability under reservoir conditions?

A. Yes, sir.

Q. Did you actually examine any of the cores when they were taken?

A. No, sir.

Q. I believe you testified in regard to the water production in these wells that it was erratic, is that correct?

A. Yes, sir.

Q. Is that typical for a water drive reservoir? I just don't know.

A. It's hard to say. Is is for this reservoir, apparently.

Q. Now I believe you testified that you were of the opinion that injection of water as proposed by Enserch could ruin the "A" 4 Well.

A. Yes sir or any other well in the field.

Q. And this is based on the assumption, of course, that there is communication between the Montoya and the Fusselman.

A. With the fractures there would be.

Q. You're basing it on that assumption?

A. Yes, sir.

Q. And even if there was communication you would still testify that it would ruin your "A" 4 Well no matter how long it would take for water to migrate to the formation?

A. Yes, sir, it would wipe it out.

Q. And even if it could be shown that the water wouldn't reach the well until after it passed its economic limit.

A. You're going to be injecting water into a well here, it's going to move the water over here that's already there.

If you're going to -- there would be a one to one ratio there.

Q. Well, if you're going to inject water into a well in one section there's an immediate one to one ratio in all the wells that are in that same horizon?

A. There has to be.

Q. Immediately?

A. For you to move a volume of water here it's got to move a volume of water here.

Q. Doesn't it take some time for there to be that kind of response?

A. It can't. You couldn't put the water in if it wasn't moving something out of the way.

Q. But would it cross a large area immediately or would it take some time for there to be response at a distant interval?

A. You couldn't measure it right away. It

would happen but you couldn't measure it.

Q But if there was no measured response for an extended period of time you would still believe that you would be endangered by an injection --

A Yes, sir, we would.

Q -- of water in an offsetting property?

MR. CARR: I don't have any other questions of Mr. Blevins on cross.

MR. RAMEY: Any other questions of Mr. Blevins, Mr. Kellahin?

MR. KELLAHIN: Yes, sir.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q I direct your attention back to the core analysis that Mr. Carr spent some time on, Mr. Blevins.

Let's take, for example, the Number Seven Exhibit, which is the analysis on the Lambirth "A" 2 Well.

Mr. Carr directed your attention to entries six, seven, and eight on that exhibit.

A Yes.

Q Which indicated permeability of less than .1 of a millidarcy. What is indicated by the asterisk

in the next column?

A. That's the plug permeability is too great to measure.

Q. I don't understand what that means.

A. It's greater than their equipment will handle, which when they turn the core sideways.

Q. The permeability is too great to measure?

A. Too great for them to measure.

Q. And what causes that to happen?

A. Fractures.

Q. So despite the fact that the permeability may be low in the first column because of the highly fractured nature of the formation there is communication through that zone?

A. Yes, sir.

Q. Now let me ask you to turn to the attachment to Exhibit Number Seven, which is a section of the log, and there was some discussion with regards to washout and whether that was evidence of fracture indication on a log. Would you direct your attention to that and identify that for us?

A. Yes, sir. Over the cored interval you can see, based on the first two sheets that were fractured throughout the coring, there's nothing in this interval that

I would call a washout. The last 20 feet is a very well drilled hole, actually, and so from a caliper you couldn't see fractures that you would call a washout. There is not really a washout on that example.

Q I believe it was Mr. Renoult's testimony this morning that -- correct me if I'm wrong -- was that if the log indicated no washout in other words, you had to see an evidence of washout on the log to have evidence of the fracture? Did I get that right?

A I believe that's what he said.

Q All right. In your opinion would evidence, lack of evidence of washout on the log demonstrate a lack of a fracture through that section?

A No, sir, the washout has nothing to do with it.

Q And that's actually what Exhibit Number Seven shows, doesn't it?

A Yes, sir.

MR. KELLAHIN: Nothing further.

MR. RAMEY: Any other questions of Mr. Blevins? He may be excused.

PHILLIP B. DRISKO

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Drisko, would you please state your name and occupation for the record?

A. Phillip B. Drisko. I'm a Senior Development Geologist for Phillips Petroleum. Odessa, Texas.

Q. Mr. Drisko, you spell your last name D-R-I-S-K-O?

A. D-R-I-S-K-O.

Q. All right, sir, and you've previously testified before the Texas Railroad Commission as a geologist and had your qualifications accepted and made a matter of record there?

A. I have.

Q. And you've previously testified as a geologist before the Oil Conservation Division of New Mexico and had your qualifications accepted?

A. I have.

Q. Mr. Drisko, have you made a study of the logs and core analyses in the Fusselman Pool that we're

discussing here today?

A. I have, sir.

MR. KELLAHIN: We tender Mr. Drisko as an expert petroleum geologist.

MR. RAMEY: He is so qualified.

Q. Mr. Drisko, I'm going to had you a number of exhibits so that you'll have them before you, and if I can unbury Mr. Renoult's Exhibit Number Fourteen, we have one around here somewhere, Fourteen is a cross section.

Mr. Drisko, I hand you what has been introduced as Phillips Exhibit Number Six and ask you if you were the geologist that wrote that core analysis based upon actual identification and study of the cores for that well?

A. I did. I saw the core. I made this core description.

Q. All right, sir and have you also examined the core analysis for the Lambirth "A" 2, Exhibit Number Seven?

A. I saw the core and I did it.

Q. All right, sir, with regards to the Lambirth "A" No. 3, which is Exhibit Number Eight, did you also see the core and review the analysis?

A. I did.

Q. And with regards to Exhibit Number Nine -- say again?

A. I did see this core and I made the core description personally.

Q. All right, sir, and with regards to Exhibit Number Nine, which is the analysis of the core for the Lambirth No. 3, have you also personally examined that?

A. No, I did not.

Q. All right, have you seen this exhibit before?

A. Yes, I have seen it.

Q. All right, now I show you what has been introduced as Enserch Exhibit Number Thirteen to this hearing and direct your attention to what Mr. Renoult has identified by the blue shading as two separate tight streaks with regards to the Lambirth "A" 4 well.

My question for you, Mr. Drisko, is whether in your opinion as a geologist, based upon your studies of the core information for the Fusselman and your examination of the logs for this well, in your opinion whether those particular two tight streaks constitute an impermeable barrier isolating the Montoya from the Fusselman?

A. Judging from my cores that I have cut in the -- in the wells, which were all of them highly fractured, I would think that that fracturing would go further down into the formation, all the way through it, I would think.

Q. Based upon your studies of this area, Mr. Drisko, in your opinion is the fracture system limited to the four wells in which core analyses were made or is it typical of the Fusselman formation?

A. It would be typical in this -- in this area.

Q. Mr. Drisko, as a geologist are you aware of any impermeable barrier between the Montoya and the Fusselman?

A. I am not. I -- I cannot tell any difference from the rocks as you -- as you drill them. They're all alike.

Q. In your opinion are either one or both of the tight sections indicated by Mr. Renoult in Exhibit Number Thirteen continuous and uniform across the Fusselman formation?

A. In my opinion they should not carry all the way across. The formation out there is erratic porosity-wise and -- and with your fracturing present, that also helps out for this situation.

Q. Let me direct your attention to one of the core analyses. Let's take Exhibit Number Seven, if you will, and I want to ask you some questions with regards to Mr. Carr's concern with the entries six, seven, and eight,

which indicates a low permeability, and have you describe for me the significance, if any, of the asterisk on that exhibit.

A. You will notice that the asterisk is back at the last here. It was -- it was made from a plug permeability. If the formation is so fractured, broken up, that they cannot get a seal on that core, they will go in there, take out a little tiny piece of it, a plug, and run that plug.

And now that will only give you the -- the permeability from that tiny -- from that tiny plug, matrix permeability.

Q. In your opinion as a geologist, Mr. Drisko, would approval of Enserch's application constitute an unreasonable risk to the correlative rights of Phillips Petroleum Company?

A. There would be a very great risk.

Q. In your opinion would approval of the application constitute premature watering out of the Phillips wells producing currently in the Fusselman?

A. Very possibly.

Q. Are you aware of any alternative formations which might be utilized for the disposal of produced Fusselman waters in this area?

A. There is a very good possibility up in -- up into the Wolfcamp, which we are now involved in to seek

approval.

Q. Based upon your studies as a geologist, Mr. Drisko, would you recommend that the Commission either grant or deny this application?

A. Deny it, I would recommend.

MR. KELLAHIN: That concludes my examination of Mr. Drisko.

MR. RAMEY: Any questions of Mr. Drisko? Mr. Carr.

CROSS EXAMINATION

BY MR. CARR:

Q. Mr. Drisko, did you personally examine the core on the Lambirth "A" No. 2 Well?

A. I did.

Q. Could you describe the fractures in that core, how they appeared?

A. Some of them were fairly large. Some of them fairly thin. There was no definite pattern to them, and some of them had some crystal facies on the -- on the fracture plane or facies.

Q. Could these crystals -- these crystals on the facies actually work to seal the fractures?

A. They could if they were wholly filled

in but if they were sealed up, I could not see the fracture.

Q. Could you see anything in the fractures themselves that would show that they were transmitting fluids through the reservoir?

A. That is an engineering question. If it was transmitting fluid, I do not know.

Q. When you go down and take these little plugs in the core --

A. I do not take them.

Q. When one does, and they analyze just those plugs, the data that you get from those could show tight streaks in the core, could they not?

A. They could but they would not indicate fracturing if it is there. They can take the plug without showing the fractures.

Q. Now, I believe you testified that you believe injection of water in the proposed well posed a real threat of watering out the offsetting Phillips wells.

A. I said there is a -- there is a very high chance of it, risk.

Q. And you're familiar with the projected economic life of the offsetting wells, are you not?

A. I have been told that by the engineers but I'm not an engineer.

Q. Is it an engineering question to ask you whether or not the water would get there within the economic life of the well?

A. Yes, it is.

Q. What were you basing that comment, then, on that there might be premature watering out of the well?

A. If we -- if we do have water coming in on us and there is fracturing pushing it, we could have water pushing water. That's just common sense; it is not engineering.

Q. It wouldn't occur any faster in a fractured reservoir than it would in a homogeneous one, would it?

A. Yes, because you've got far greater porosity, permeability hollowing, hollowing the fractures than you do if you have -- have no fractures.

Q. And that depends on the extent of the fracturing and the distance of them, does it not?

A. That is true.

Q. Based on your review of the cores do you have an opinion as to whether or not there is an overall general difference as to the permeability on the east side as opposed to the west side of the Fusselman in this area?

A. I -- permeability of -- of what, matrix permeability or the fracture permeability? There is a differences in permeability into the different wells as we know.

Q. Well, matrix permeability.

A. Matrix permeability, also. It will vary.

Q. Are you aware of any overall variance in that across the field?

A. No great, that I am aware of.

MR. CARR: I have nothing further.

MR. RAMEY: Any other questions of Mr. Drisko? He may be excused.

MR. KELLAHIN: That concludes our case, Mr. Ramey.

MR. CARR: Mr. Ramey, I would like the permission to recall Mr. Renoult for a very brief rebuttal testimony.

DANIEL C. RENOULT

being recalled and being previously sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Renoult, will you refer to what was previously marked and admitted as Enserch Exhibit Number Seventeen and explain -- this is the exhibit you testified

to this morning on Mr. Kellahin's cross. I'd ask you to look at this and indicate if you believe it is possible for there to be vertical permeability in this core.

MR. KELLAHIN I'm going to object to this question as a improper rebuttal. The man addressed this question under redirect this morning. I think we're covering the same ground. We have to stop at some point.

MR. CARR: I would submit that ---

MR. KELLAHIN: At some point this hearing has got to come to an end.

MR. CARR: This exhibit was admitted at the request of Mr. Kellahin this morning as one of two core analyses. There's been no direct examination on this and before we just leave it hanging in the record we request permission to ask several short questions concerning it.

MR. RAMEY: Well, I'll let the witness answer.

A. Exhibit Number Seventeen is a core analysis of the Fusselman formation in the Enserch Exploration Lambirth Well No. 3. This well is located only 2500 feet west of the Rader Well No. 2. This well was cored from 7806 feet down to 7866 feet. This core indicates that out of 44 samples analyzed 25 samples or 57 percent of the total footage is tight and has a permeability to air under surface conditions

smaller than .5 millidarcy.

Most of the samples contain impervious chert, shale, and silt, as indicated in the description of the core.

Here again this core analysis indicates that under bottom hole conditions once we consider the effect of over 7800 feet of overburden, this permeability to air will be drastically reduced. Permeability to water under bottom hole conditions will even be smaller than permeability to air.

This core indicates that because of the chert and shale inclusions 57 percent of the core do not exhibit any permeability to allow for vertical transmissibility and migration of water from the Montoya to the Fusselman formation.

Q. Mr. Renoult, did you -- you were present when Phillips offered its Exhibit Number Ine which was core analysis on the Lambirth No. 3, were you not?

A. Yes, sir, I was present.

Q. Does this core analysis exhibit similar characteristics to those you've just discussed in regard to the Enserch Exhibit Number Seventeen?

A. Yes, sir. The core retrieved from the Enserch Lambirth No. 3 shows a 40 percent vertical footage has permeability smaller than .5 millidarcy. The core de-

scription shows also that most of the core contains chert, silt, and shale.

Q. Mr. Renoult, were you present when Mr. Blevins presented Phillips Exhibit Number Ten, which was calculations showing permeability in this reservoir in the Fusselman?

A. Yes, sir, I was.

Q. In your opinion does this test show natural reservoir -- permeability under natural reservoir conditions?

A. This test shows the permeability of the perforated section. The perforated section has been acidized consequently, we cannot extrapolate this data to the entire reservoir.

The area of permeability is the result of a successful stimulation job made in the Fusselman formation.

Q. Now I refer you to what has been marked as Enserch Exhibit Eighteen, and ask you to explain to the Commission what it is and what it shows.

A. Exhibit Number Eighteen is a three page exhibit composed of the logs from the Phillips Petroleum Peterson "H" Well No. 1, located approximately 2600 feet north of the subject Rader Well No. 2.

The first page of Exhibit Number Eighteen

is the coriband computer log derived by Schlumberger using a formation density compensated neutron log attached on page number two and the data from a dual laterolog microstatically focussed log attached on page number three.

In this well the Fusselman formation was encountered at a depth of 7846 feet. The Montoya formation was encountered at a depth of 7918 feet. This computer processed coriband log shows that from 7882 feet down to 7916 feet the Fusselman formation is extremely clean and tight. The permeability index derived by Schlumberger is smaller than .1, as indicated on the second column of this processed log.

Within this 34 foot barrier the Fusselman exhibits approximately zero percent porosity and no permeability.

Q. Well now, Mr. Renoult, you've got a tight zone. Is that what you're testifying to?

A. Yes, sir.

Q. If this zone is fractured, would that mean it was able to conduct fluids? Would that enable fluids to pass through this zone if it were fractured?

A. No sir, this zone has no permeability. Consequently, there is no way that we can have some vertical migration of fluids from the Montoya to the Fusselman.

Q. And so this exhibit is being offered

to show that there is a tight zone in the Fusselman in this other well?

A. Yes, sir.

Q. Will you now refer to what's been marked for identification as Enerch Exhibit Number Nineteen and explain this to the Commission?

A. Exhibit Number Nineteen describes a 72-hour pressure build-up analysis conducted by Otis Services from June 22nd to June the 25th of 1978 in the Enserch Exploration, Inc., Lambirth Well No. 1.

MR. KELLAHIN: If the Commission please, I'd like to interject an objection at this point.

I asked Mr. Renoult on several occasions this morning and specifically and directly if he had any engineering data concerning this pool and specifically with regards to any reservoir pressure information or any kind of pressure information, and he testified explicitly that he did not.

We object that he now attempts to introduce some kind of pressure build-up test in response now in rebuttal, in light of the fact that he specifically testified under oath that that information wasn't available.

MR. CARR: I would suggest to the Commission that the record will reflect that Mr. Renoult stated

that he did have pressure data and had reviewed it and I would submit that he didn't offer any at that time but he did state he had it and he did review it in making his recommendations.

MR. KELLAHIN: I'll be happy to have the tape played back because I specifically asked him if any of his studies in engineering had anything to do with pressure information and he said the only things he was basing the separation of the Montoya and the Fusselman on were the two tight sections in the geological information and the analysis of the core information, and he committed to that under oath. And now we're into an entirely new ballgame here and it's going to take us the rest of the day to fight about it.

I think it's improper and it's untimely and ought to be denied.

MR. RAMEY: Did you by chance ask about the Montoya, Mr. Kellahin? Or did you ask about the Fusselman?

MR. KELLAHIN: Our testimony was directed to the Montoya and Fusselman with regards to the separation. I asked him if he had any pressure information that would indicate the separation. It goes to both formations.

MR. RAMEY: I don't seem to recall you asking him if he had any Montoya pressures. I just recall that you asked for the Fusselman pressures.

MR. CARR: We would submit that we made no representation this morning that we did not have any of the data which is presented in this report.

We also would not mind the Commission ruling that if when the tape is transcribed such a representation was ever made by Mr. Renoult that this -- that this will not be considered, will not be admitted.

I would say to ask Mrs. Boyd to read back the tape is a little bit ridiculous at this point.

I'm not trying to present something that we earlier represented to the Commission or to Mr. Kellahin that we did not have available, and it's not my intention to do that, and if the tape so indicates, we certainly would -- would consider ourselves bound by that earlier representation.

MR. RAMEY: All right, let's approach it that way, that after the transcript magically appears, why I'll pick it out and if he did state there was no pressure information available for the Fusselman, then I won't allow the testimony.

Is that suitable to you, Mr. Kellahin?

MR. KELLAHIN: Yes, sir.

MR. RAMEY: Please proceed, Mr. Carr.

Q Mr. Renoult, will you refer to this exhibit and explain what it shows?

A. Exhibit Number Eighteen is a pressure build up from the Enserch Exploration Lambirth Well No. 1. This well completed in the Fusselman formation, has a cumulative production equal to 292,126 barrels of oil as of March 31st, 1981.

MR. KELLAHIN: Excuse me, Mr. Ramey, would Mr. Carr please lay a proper foundation for the introduction of this exhibit? I notice that it is not prepared by Mr. Renoult. It was prepared by a John S. Rodgers, a consulting reservoir engineer, who I don't know if he's present here to testify concerning this report or not. This is rank hearsay.

MR. CARR: I will be happy to lay a foundation.

As to --

MR. RAMEY: Will you please do so.

MR. CARR: In regard to the hearsay comment, I would submit that under New Mexico Rules of Evidence that hearsay may be admitted and that you may consider the extent to which it is hearsay in evaluating the evidence.

Q. Mr. Renoult, will you identify Exhibit Number Nineteen? Will you just identify what it is?

A. This is a pressure build-up analysis connoted by Otis Engineering.

Q. And it was prepared by Otis Engineering?

A. Yes, sir.

Q. By whom with Otis Engineering was it prepared?

A. Mr. John S. Rodgers, Consulting Reservoir Engineer.

Q. Is Otis Engineering employed by Enserch Exploration, Inc., to perform this study?

A. Otis was contracted by Enserch to conduct this study.

Q. Was data supplied to Otis by Enserch upon which this study was made? Or was it independently collected?

A. The data was collected by Otis Engineering.

Q. Is this a common procedure used by companies in the oil and gas business to evaluate data on wells and reservoir characteristics and things of that nature?

A. Yes sir.

Q. These are independent consultants?

A. Yes, sir.

Q. Have you reviewed this report?

A. Yes, sir.

Q. And what conclusions did Mr. Rodgers reach?

MR. KELLAHIN: Objection, Mr. Ramey. Counsel has failed to lay a proper foundation for the use of this exhibit by this witness. Mr. Pearce and I and Mr. Carr all know this is not an acceptable procedure for using this witness to talk about some report that he did not prepare. It was prepared by an independent consultant with this company and Mr. Rodgers is not here and I strenuously object that this cannot be used in this case.

MR. CARR: We submit that the report is admissable; that Mr. Renoult is not testifying as to any of the conclusions being -- as being his own. It is simply a report prepared by an expert who is a consultant and this is a -- Mr. Kellahin well knows that this is the type of evidence that is frequently admitted in these hearings and it is proper for you to consider it.

MR. KELLAHIN: This Commission is bound by the Rules of Civil Procedure dictated for a hearing before a judge alone, and if you'll refer to your rules you see that very language cited, and you cannot use this report in this fashion.

You and I well know that it's wrong to admit it.

MR. CARR: To the extent that this should not be admitted on those grounds no data on any core analysis

without the individuals who actually ran the data could not be admitted.

MR. KELLAHIN: That was already admitted without objection over counsel and I stand on this. It shouldn't be a part of this record Mr. Ramey.

I don't know what it is, but I'm not going to have it.

MR. RAMEY: Objection overruled. Please proceed, Mr. Carr.

Q Mr. Renoult, will you please explain Exhibit Nineteen?

A. Exhibit Number Nineteen is a report prepared by Otis Engineering regarding the 72-hour pressure build-up analysis conducted three years ago in the Enserch Exploration, Inc., Lambirth Well No. 1.

This report indicated as evidenced on page number four of this report that a naturally fractured reservoir is not indicated by the analysis.

Otis Engineering used a highly sensitive Hewlitt-Packard pressure instrument to measure subsurface pressure responses during flow and shut-in periods.

Otis indicated that a rigorous analysis of the pressure build-up test data in the presence of boundaries was performed by a nonlinear regression method. A linear

regression procedure was applied to the buildup profile at shut-in times prior to the reflection of a nearest boundary.

Otis indicated a high degree of confidence in the analysis prevails as a result of the combined use of a highly sensitive pressure gauge and a computerized regression analysis procedure. In fact, the precision of the pressure matches obtained in the analysis far exceeds any of those previously experienced by the analyst.

Otis indicated also that a series of individual reservoir systems or solution channels could exist on a given structure.

Q. Mr. Renoult, in your opinion would the proposed injection in the Rader No. 2 Well possibly cause any Phillips well in the area to water out prior to their project there reaching an economic limit?

A. Excuse me?

Q. Would injection of wate· as you propose possibly water out any Phillips well in the area prior to the time that they reached their economic limit?

A. No, sir.

MR. CARR: At this time, Mr. Examiner, I would offer Exhibits Eighteen and Nineteen into evidence.

MR. KELLAHIN: If the Commission please, we object to the admission of Exhibit Number Nineteen pursuant

to Commission Rule 1212. We have been denied a full and complete opportunity to cross examine the witness, Mr. John S. Rodgers, who prepared this analysis and who is not present here today to be cross examined.

MR. CARR: May it please the Commission, we will, following your ruling, tender Mr. Renoult for cross examination. We submit that the evidence is proper and should be admitted.

MR. RAMEY Exhibits Eighteen and Nineteen will be admitted.

Any questions of Mr. Renoult? If not, he may be excused.

Anything further, Mr. Carr?

MR. CARR No, Mr. Ramey, I do not.

MR. RAMEY: Mr. Kellahin?

MR. KELLAHIN: No, sir, I have nothing on surrebuttal, if we're at that point.

MR. RAMEY: Any statements?

MR. KELLAHIN: Yes, sir, Mr. Ramey.

We have been through almost the identical case that we went through with Mr. Nutter some months ago and I think the applicant has had a full and complete opportunity to provide any kind of evidence he has in order to determine that the water disposed of in the Montoya formation is going

to remain confined in the Montoya formation.

As one of the elements of proof in order for this application to be denied, it's emphatic that they must show that that water is going to not migrate up into the producing Fusselman formation.

We asked Mr. Renoult on several occasions, I think it's conclusive on the record that there is absolutely no engineering data to establish that the Montoya and the Fusselman are separate and distinct reservoirs not in communication with each other. Complete lack of evidence on that part.

Typically you would see reservoir calculations based upon pressure, demonstrate a pressure difference between the two formations that would conclusively show that the disposal of water in the Montoya would not damage the production in the Fusselman, but we have none of that.

With regards to the geologic testimony, all the geologists admit that the only distinction between the Montoya and the Fusselman is the existence of these insoluble residues and neither Mr. Brown or Mr. Drisko testified that they would constitute an impermeable barrier between the Montoya and the Fusselman.

The only evidence of separation we have here is the existence of two tight streaks as evidenced in the

Lambirth 4-A Well of Phillips, testified to by Mr. Renoult. In his testimony before Mr. Nutter he testified as to two separate 10-foot tight sections. Those sections have grown in the last few months and now they're 20 feet and 30 feet respectively.

Apart from that, however, evidence is still the same. There is substantial evidence that there is an existence of fractures in the Fusselman. We know as common sense and as basic elementary geology that if the Fusselman is fractured, the Montoya is going to be fractured. The geological witnesses have testified to that.

The risk is absolutely overwhelming. If you allow the disposal of produced water into the Montoya at this close proximity to the Phillips leases, Mr. Renoult testified they were something like 700 feet, 660, from one of Phillips leases, with this quantity of water, injection of one barrel in means the displacement of one barrel in that formation. Substantial risk. There's no reason to do that. They have not given us any compelling economic reason to do that. They still show that while it may reduce the ultimate life of the project it's not going to shut it down. It's still economic.

They've also testified that they haven't fully and completely examined every other alternative. As

we've showed you, Phillips has found an alternative, one up in the Wolfcamp that displaces no kind of hazard to the Fusselman formation production.

Enserch has not done that. They have simply locked on to the Montoya as a suitable zone and we find that it's unreasonable risk to place upon us.

I think it's imperative that if an operator wants to impose this risk upon another operator, he ought to come forward with some way to monitor the encroachment of that water. The geological testimony has shown thatthe MOntoya formation is water bearing and it is in existence under the closest Phillips well.

Everybody admits that there is no way absolutely the Commission could enter an order that would establish a method of monitoring. That water is going to come in and we're not going to know it. That oil zone, that column is pretty fragile, it's very small, you can see what happens when water encroaches. The Enserch No. 6 Well, when they had water encroachment they tried to plug it back and it still happened and they had to drill a replacement well.

We're going to lose somewhere between $750,000 to a million dollars worth of production if you allow this to happen. We believe that there's no compelling reason to change or deviate from the Examiner's order, and we request

that you deny the application.

MR. RAMEY: Thank you, Mr. Kellahin. Mr. Carr?

MR. CARR: May it please the Commission, Enserch Exploration, Inc., has appeared before you seeking authority to inject produced waters in its Rader No. 2 Well. Enserch has complied with all the provisions of Commission Rule 1701 and with Memo 377 and we submit to you we are entitled to the order.

Phillips has objected here today in opposition to this case. They are opposing the application. They have, however, presented no evidence that would show that vertical fractures in natural reservoir conditions actually can conduct fluids from the Montoya into the Fusselman.

The evidence presented by Enserch shows quite the contrary. We have a couple of zones with very tight permeability between the Montoya and the Fusselman. We have two separate formations.

The insoluble residue testimony was not directed to show a barrier. It was simply directed to show that there are different lithologic ages in terms of when these deposits were laid down and consequently, we do have two separate formations.

We have presented evidence which shows

that even though there are fractures in the reservoir that the fractures are not conducting or permitting fluids to move through them.

We have presented evidence showing that a substantial savings will result. It's true that we won't have to shut the field in if we don't have a disposal well. But it is, however, also true that as we increase the cost of the production in this field and keep it up for an extended period of time, the wells in the field will reach their economic limit at an earlier date, they will be shut-in at an earlier date, and hydrocarbons will be left in the ground that otherwise could be produced. The time to adjust this problem is now; not at the time the wells are being shut-in, and that's the reason Enserch is appearing before you at this time.

The application, if granted therefor will prevent waste. It will result in the production of additional hydrocarbons.

The application will not impair the correlative rights of Phillips. We've heard an impassioned plea that we're going to lose a million dollars worth of oil, but the fact of the matter is that testimony on both sides here today shows that the well immediately offsetting the proposed injection well, the closest Phillips well, has an estimated potential reserves of another 25,000 barrels. The

testimony of Phillips own witness indicates that that will be produced in approximately five years. The well will reach its economic limit in five years.

Mr. Renoult testified today that injecting 750 barrels of water per day in this proposed disposal well will not cause the Phillips well to be watered out for ten years. They've got a five year margin of protection, but for some reason they're frantic because they're not going to have this additional five years and are attempting to run up the costs of Enserch in developing the Fusselman in this area.

We submit to you that there is no possible way that their correlative rights are going to be impaired; that the application will prevent waste; that we have complied with all of the requirements of your rules and memorandums governing applications of this nature, and that the application should be granted.

MR. RAMEY: Thank you, Mr. Carr.

Does anyone have anything further to add in this case?

If not, we'll take the case under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

RECEIVED
AUG 17 1981
OIL CONSERVATION DIVISION
SANTA FE

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION COMMISSION

IN THE MATTER OF THE APPLICATION OF ENSERCH EXPLORATION, INC. FOR SALT WATER DISPOSAL, ROOSEVELT COUNTY, NEW MEXICO.

Case No. 7226
Order No. R-6685-A

APPLICATION FOR REHEARING

Comes now ENSERCH EXPLORATION, INC., by and through its undersigned attorneys, and hereby makes application to the Oil Conservation Commission for rehearing in respect to all matters determined by Order No. R-6685 as affirmed by Order No. R-6685-A, entered by the Commission in this case on July 29, 1981, and in support thereof, states:

1. Enserch Exploration, Inc. operates a number of wells in the South Peterson Field, Roosevelt County, New Mexico, including the Rader Well No. 2 located in Unit E of Section 32, Township 5 South, Range 33 East, N.M.P.M., South Peterson Field, Roosevelt County, New Mexico.

2. Enserch operated wells in the South Peterson Field produce substantial volumes of water in conjunction with the production of oil and gas.

3. The water produced by Enserch operated wells in the South Peterson Field must be disposed of by trucking said water a substantial distance to disposal wells at considerable cost to Enserch.

4. On April 10, 1981, Enserch filed an application with the Oil Conservation Division seeking an order authorizing it to dispose of produced waters from the South Peterson Field in the above-referenced Rader Well No. 2 in the Montoya formation through perforations from approximately 7902 feet to 7930 feet.

5. On April 22, 1981, this matter came on for hearing before an examiner of the Oil Conservation Division and on May 20, 1981, the Oil Conservation Division entered its Order No. R-6685 denying the application of Enserch.

6. At the time of the hearing, Phillips Petroleum Company appeared in opposition to the application, alleging that disposal into the Montoya formation could result in water migrating into the Fusselman formation, thereby watering out its Lambirth "A" Well No. 4 which offsets the proposed injection well.

7. On June 16, 1981, Enserch filed an application for hearing de novo with the Oil Conservation Commission.

8. On July 8, 1981, this matter came on for hearing before the Oil Conservation Commission and on July 29, 1981, the Commission entered Order No. R-6685-A affirming Order No. R-6685.

9. At the de novo hearing, Phillips again appeared in opposition to the application of Enserch.

10. Enserch is adversely affected by said Commission Order No. R-6685 as affirmed by Order No. R-6685-A and believes it to be erroneous and invalid for the following reasons:

a. Finding No. 10 of Order R-6685 as affirmed by Order R-6685-A is not supported by substantial evidence. To the contrary, the evidence established that two tight zones separated the injection interval in the Enserch Rader No. 2 Well from the producing interval in the Phillips Lambirth "A" Well No. 4, thereby preventing any possible water invasion into the Phillips well.

b. Finding No. 11 of Order R-6685 as affirmed by Order R-6685-A is not supported by substantial evidence. To the contrary, the evidence established that no water invasion would occur, therefore preventing any possibility of oil and gas being

wasted or the correlative rights of Phillips being impaired by injection of water into the Enserch Rader No. 2 Well.

c. The subject Orders are invalid and void for Finding 11 of Order R-6685 as affirmed by Order R-6685-A which states, "That such water invasion could result in premature abandonment by the Phillips production, thereby causing loss of otherwise recoverable hydrocarbons and waste of oil and gas, as well as impairment of correlative rights." is not the equivalent of, nor a proper substitute for, the statutorily required findings that the order will prevent the waste of hydrocarbons and protect the correlative rights of all property owners in the pool. Since these findings on waste and correlative rights are basic jurisdictional findings in all Oil Conservation Commission orders, they are necessary prerequisites to a valid Commission order.

d. Even if the waste and correlative rights findings were sufficient, the Order is invalid in that it contains insufficient findings to disclose, explain, support, or indicate the reasoning of the Commission in reaching these ultimate findings.

e. Finding No. 11 of Order R-6685 as affirmed by Order R-6685-A is inconsistent with the statutory directive to the Oil Conservation Commission to protect the correlative rights of the owners of each property in a pool for it fails to take into account the effect that denial of this application will have on the ability of Enserch to produce its reserves in the South Peterson Field. The evidence established that denial of the application will increase production costs in the South Peterson Field which will result in the premature abandonment of wells in the field and will result in the waste of oil and gas that otherwise would have been produced.

f. Finding No. 13 of said Order No. R-6685 as affirmed by Order R-6685-A is erroneous for the evidence established that Enserch had tested a number of other zones in other wells in the South Peterson Field in an effort to find other possible means of water disposal in the subject area.

g. Said Order is erroneous, invalid, void and inconsistent with the duties imposed upon the Commission by the oil and gas statutes of the State of New Mexico in that the effect of said Order will be to cause waste and violate the correlative rights of Enserch and other mineral interest owners in the pool.

WHEREFORE, Applicant prays that the Oil Conservation Commission enter its order granting this application for rehearing, superceding Order Nos. R-6685 and R-6685-A, and after notice and hearing as required by law and the rules of the Commission, enter its order granting the application of Enserch Exploration, Inc. in this case.

Respectfully submitted,

CAMPBELL, BYRD & BLACK, P.A.

By _____
William F. Carr
Post Office Box 2208
Santa Fe, New Mexico 87501
Attorneys for Enserch
Exploration, Inc.

Certificate of Service

I hereby certify that a copy of the foregoing application for rehearing was mailed to W. Thomas Kellahin, attorney for Phillips Petroleum Company on this 17th day of August, 1981.

_____
William F. Carr

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

July 30, 1981

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Re: CASE NO. 7226
ORDER NO. R-6685-A

Mr. William F. Carr
Campbell, Byrd & Black
Attorneys at Law
Post Office Box 2208
Santa Fe, New Mexico

Applicant:

Enserch Exploration, Inc.

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCC x
Artesia OCC x
Aztec OCC

Other Thomas Kellahin, Joe Peacock

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
22 April 1981

EXAMINER HEARING

IN THE MATTER OF:

Application of Enserch Exploration, Inc., for salt water disposal, Roosevelt County, New Mexico.

CASE 7226

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

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MR. NUTTER: The hearing will come to order, please.

We'll call now Case Number 7226.

MR. PADILLA: Application of Enserch Exploration, Inc., for salt water disposal, Roosevelt County, New Mexico.

MR. CARR: May it please the Examiner, my name is William F. Carr, with the law firm Campbell, Byrd, and Black, P. A., Santa Fe, New Mexico, appearing on behalf of the applicant.

We have two witnesses who need to be sworn.

MR. NUTTER: I'll call for other appearances.

MR. KELLAHIN: I'm Tom Kellahin, of Santa Fe, New Mexico, appearing on behalf of Phillips Petroleum Company.

MR. NUTTER: Would you proceed, Mr. Carr?

MR. PADILLA: I'll swear all the witnesses at this time.

(Witnesses sworn.)

MR. CARR: At this time I'd call Tom

Brown.

THOMAS E. BROWN

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Will you state your full name and place of residence?

A. Thomas E. Brown, Midland, Texas.

Q. Mr. Brown, by whom are you employed and in what capacity?

A. I'm employed by Enserch Exploration, Incorporated, as an area staff geologist.

Q. Have you previously testified before this Commission and had your credentials as a geologist accepted and made a matter of record?

A. Yes, I have.

Q. Have you made a study of the area which is the subject of this application today?

A. Yes.

Q. Are you familiar with the application which was filed in this case?

A. Yes.

MR. CARR: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are.

Q. Mr. Brown, will you briefly state what Enserch seeks with this application?

A. Form C-108, we are applying -- make application to dispose of salt water by injection in the Gladys Rader No. 2 Well.

Q. And is that Form C-108 what has been marked as Enserch Exhibit Number One?

A. Yes.

Q. Will you please refer to this exhibit and point out any of the relevant matters contained thereon?

A. The well in question, the Enserch Exploration, Incorporated, Gladys Rader No. 2, was drilled as a development well in the Peterson South Fusselman and/or Penn Field.

After drilling analysis and testing, it was being noncommercial, and then we propose to make it as a water disposal well in the Montoya formation through perforations 7902 through 7930.

Q. Has this form previously been supplied to Phillips?

A. Yes.

Q. Will you now refer to what has been marked for identification as Enserch Exhibit Number Two and explain to the Examiner what this is and what it shows?

A. Exhibit Number Two is a base map, one inch equals 2000 feet. The producing wells in the field are all marked on here with the green wells, which produce from the Pennsylvanian and the blue, light blue on here, are wells which produce from the Fusselman formation. The gray stippled background on here are leases owned or operated by Enserch Exploration, and the circle that's on the map is a half mile radius of the Gladys Rader No. 2.

MR. NUTTER: Mr. Brown, before you go further, I was looking at the color code here. Now up here in the legend a dark green is Pennsylvanian and a light blue is Fusselman, yet I look at the map and I see some very light green. Would that be, the three light green wells in the south and one up here in the north, are they the same green that's in the legend?

A. They're supposed to be, yes.

MR. NUTTER: Okay, then the -- all of the wells are colored in dark blue with the exception of Well No. 3, which is shown a light blue and green, and the legend is light blue. Are all these dark blue wells Fusselman

wells?

A. That's correct.

MR. NUTTER: So there's just a variation in the color code slightly.

A. Yes. There's a problem with No. 3.

MR. NUTTER: Any shade of blue is Fusselman. Any shade of green is Pennsylvanian, then?

A. That's correct. The Enserch No. 3 Lambirth produced from Fusselman and was plugged back to Cisco. That's why it shows dual color.

Q. Mr. Brown, will you now refer to what has been marked Enserch Exhibit Number Three, which is your A-A' cross section, and review this for Mr. Nutter?

A. This cross section is a north/south cross section that goes from the Enserch Lambirth No. 7 Well through the Phillips Petroleum Company Lambirth "A" No. 4, on south to the well in question, which is the Enserch Exploration Company Gladys Rader No. 2, and one location further south to the Gladys Rader No. 1.

This is a structural cross section. It's 500 -- 5 inches per 100 foot vertically, and horizontally is 1 inch equals 100 feet. It's a structural cross section and the datum is -3200 foot right here. The well shows all the producing formations within the field on the cross section.

What I'm testifying here is that in this Gladys Rader No. 2 the perforations at 7902 to 7930 are in the Montoya formation as we've correlated it through the field.

Q. Mr. Brown, are these perforations below the Fusselman?

A. Yes, they are.

Q. Do you have anything further to testify to from this exhibit?

A. No.

Q. Does Enserch plan to call an engineering witness to further expand on this application?

A. Yes.

MR. CARR: At this time, Mr. Nutter, we would offer Enserch Exhibits One through Three.

MR. NUTTER: Enserch Exhibits One through Three will be admitted in evidence.

MR. CARR: I have nothing further of Mr. Brown on direct.

MR. NUTTER: Are there any questions of Mr. Brown?

MR. KELLAHIN: Yes, sir.

MR. NUTTER: Mr. Kellahin.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Brown, let me direct your attention back to your Exhibit Number One. Mr. Carr asked you some questions with regards to Exhibit Number One. Mr. Brown, did you prepare or compile the information from which this exhibit was prepared?

A. No, I did not.

Q. What was your participation, if any, in the preparation of the information that's on this exhibit?

A. I helped them with the formation they were proposing to inject with water.

Q. You helped them in what way, Mr. Brown?

A. On which formation they were dumping into.

Q. And upon what did you make that recommendation? What did you study to reach that recommendation?

A. The samples on the Gladys Rader No. 2 Well.

Q. What do you mean by samples? Core samples?

A. Analysis of the samples while drilling.

Q. The core samples while drilling of the well?

A. The drilling cuttings.

Q. Drilling cuttings. Did you also examine the log on that No. 2 Well?

A. Yes, I did.

Q. Did you examine any other well in the area as a potential well for salt water disposal?

A. I did not.

Q. All right, sir.

In examining the No. 2 Well to determine whether it was suitable for disposal purposes, what kind of parameters were you giving in terms of the volume of water that had to be disposed of in that formation, the rates, that kind of thing, whether it was --

A. I did not get any of those rates.

Q. You were not given that information?

A. No, I didn't give it. You asked which -- which parameters I gave as to its suitability and I did not give any parameters, only the formation.

Q. Did anyone give you any parameters with regards to the amounts of water to be disposed of in a given formation?

A. I know what they are, yes, I was given that.

Q. And what are they?

A. The average daily volume proposed is 1650 barrels a day.

Q. And what would be the maximum disposal rate on a daily basis?

A. It would be possible to go 5976 barrels.

MR. CARR: May it please the Examiner, we have another witness who is going to testify as to daily volumes that will be injected, and if Mr. Kellahin wants to pursue this further, it might be adviseable to wait for him? He has a lot more information on the subject.

MR. KELLAHIN: Well, my questioning goes to the point, Mr. Examiner, of what information this geologist had to determine whether or not the Montoya was going to be able to accept a given amount of water, and that was my only question.

A. Only the engineering data that -- that was submitted by the company.

Q. Okay, and it was your recommendation to use the Montoya as the disposal formation for water produced from the South Peterson Fusselman Pool?

A. Yes.

Q. All right, sir.

A. Since it's nonproductive in the area.

Q. The MOntoya is nonproductive in this

particular well?

A. To my knowledge it may not be productive in the whole county.

Q. All right. The perforations in the -- the top perforations in the Montoya in the proposed disposal well, looking across the room, appear to fall perhaps a foot or so just below the base of the Fusselman. Could you go to the cross section and indicate for us exactly where that top perforation is in relation to the base of the Fusselman?

A. The natural top as picked on here is -- is 7900, and the top of the perforation is 7902.

Q. 7902. Now, your cross section shows us that there are offset wells of Phillips that produce from the Fusselman.

A. Yes, it shows that.

Q. All right. Have you made an examination of what the direction of water flow in the Montoya will be if this well is used as a disposal well?

A. No.

Q. You've not studied to determine whether it will follow a structure or anything? You don't know where the water's going to go in relation to its disposal in the Montoya?

A. No.

Q. Would it be your opinion that the water disposed of in the Montoya would remain confined in the Montoya?

A. From evidence submitted by our engineering department, I would say yes.

Q. Based upon your own information and study, do you have an opinion as to whether that water will remain confined to the Montoya?

A. I don't know.

Q. So you can't tell us whether or not it will or will not remain confined to the Montoya?

A. No, I cannot. That evidence can only be determined by engineering evidence.

Q. Would a geologist in making his determination study core data of any wells in the area?

A. Normally, but we don't have any available of that interval.

Q. Has Phillips, or any of Phillips' employees supplied you with core data from any of the wells from which you can make that determination?

A. Not that I'm aware of.

Q. Would it be important to you as a geologist if one of these wells in the area that produced from the Fusselman showed significant fracturing into the

Montoya?

A. I suppose so, but I wouldn't know how to prove it.

Q. Well, wouldn't the fracture communication between the Fusselman and the Montoya cause water to migrate out of the Montoya into the Fusselman?

A. I don't have any evidence of that.

Q. If that evidence did exist showing that fracture existed in these wells, would it not cause that water to migrate into the Fusselman?

A. If it was there and it was open, of course it would.

Q. Now if there is a fracture system occurring between the Fusselman and the Montoya that would cause water to migrate out of the disposal interval, the Montoya, it could result in the premature abandonment of production from the Fusselman wells, could it not, Mr. Brown?

A. I would think that would determine several things. One, if the fractures would ever reach high enough to get the water up to where it's producing from, and two, it would determine if there's already water at that point, that I don't see how it would affect it.

Q. If the Division should approve this well as a disposal well in the Montoya, are you aware as a geologist

of any way that the Division could establish a method of monitoring the offset producing Fusselman wells to insure that the disposal water is not migrating on to the Fusselman acreage being produced by those Fusselman wells?

A. I don't -- that would, I would assume that would be engineering information. Normally that wouldn't come to my attention.

Q. Now in examining the No. 2 Well, Mr. Brown, have you examined any other formation penetrated by that well to determine whether it's an acceptable formation for disposal of water?

A. I personally have not, although you see on the cross section we attempted to -- to produce in both the top of the Peterson formation and in the Fusselman formation, and we were not able to have enough porosity and permeability to do anything in those zones, so those zones are fairly tight, so I can just tell by the tests that they would not be acceptable for water.

Q. Have you made any studies to determine whether the Wolfcamp formation would be an acceptable disposal formation in this well?

A. No, I have not.

Q. And what about the Glorieta formation?

A. In regards to the Glorieta formation,

if you'll look on the map, which was Exhibit Number Two, and you can see about 3/4 of a mile southwest of the Enserch No. 5 Lambirth?

Q. No, sir, I haven't found it yet.

A. It will be in Section 1.

Q. All right, sir.

A. Township 6 South, 33 East, that particular well we tried every porous formation from down in the Penn all the way upward, and weren't finding anything that would take any water.

Q. That well is substantially to the south of the proposed well, is it not?

A. 3/4 of a mile southwest.

Q. Have you run any injectivity tests in any formation in the proposed disposal well to determine whether it will accept water or not?

A. Only the two pays, the Penn and Fusselman. And they would not.

Q. You've attempted to inject --

A. No.

Q. You've attempted to --

A. They wouldn't, they were so tight they wouldn't give up anything, so they wouldn't be acceptable as water.

Q. Based upon your analysis of the Fusselman in this well, you didn't even attempt an injectivity test in the Fusselman, is that what you told me?

A. That's correct.

Q. All right. That disposal well, in fact, was perforated in the Fusselman, was it not?

A. Yes, it was.

Q. It would appear to be several feet of perforations in the Fusselman in the upper end of the Fusselman formation?

A. That's correct.

Q. Would you locate those perforations for us, Mr. Brown?

A. We perforated the interval 7848 to 49, 50, and 51 with two jet shots per foot.

Q. Are there any other wells in this pool, Mr. Brown, that are being used currently for salt water disposal?

A. I think not.

Q. Enserch's application indicates in paragraph three that other wells in the pool are currently being used for salt water disposal.

A. I'm not aware of it.

Q. Is that statement true? You don't know

or there aren't any.

A. I'm not aware of it. I didn't know we said that.

Q. Your No. 1 Well, which is the last well on the right of the cross section, Mr. Brown, that was a dry hole, was it?

A. That's correct.

Q. It was drilled to -- through what formations?

A. It was drilled from surface into the Granite.

Q. Did you test the Montoya in that well?

A. Yes, we did.

Q. Have you studied to determine whether or not that well might be used as a disposal well?

A. The interval we perfed wouldn't take anything; it's too tight.

MR. NUTTER: You don't mean perforated, do you?

A. No, we tested it.

MR. NUTTER: You -- drill stem test is what you mean.

A. Yes, we ran a DST on there and all we got was 60 feet of drilling mud. It was real tight.

Q. That test was run through the interval which would have found either Fusselman or Montoya?

A. We -- we think it's Montoya.

Q. It appears from your cross section that you show the Fusselman to have wedged out or pinched out at that location where you perforated?

A. We feel it's been eroded off that high.

Q. Mr. Brown, you've indicated to us that you don't know whether or not this water -- where this water is going to go in the Montoya, whether or not it will be -- remain confined in the Montoya, is that true?

A. That's correct.

Q. All right. Now let me ask you about your cross section. You picked a datum of 3200 feet. What is the marker that you hung the structural cross section on? What -- is there some common point --

A. -3200 feet, where that goes in each well.

Q. Yeah, what --

A. It's a structural datum. It's not a correlation mark.

Q. All right. What at 32 -- well, what did you hang the cross section on so that you know that you've correlated them properly?

Is there some marker there through this

area that you put these --

A. The structures are hung on -3200 feet. That occurs in every well penetrating this depth in the field. You just merely subtract the surface elevation to get your subsea datum from that point. So this is structurally the way they are.

Q. As opposed to a stratigraphic cross section?

A. That's correct.

Q. All right. If you'll stay there for a moment, Mr. Brown, you drew the line that shows the base of the Fusselman and the top of the Montoya through those wells, did you not, sir?

A. Yes, I did. Through two wells.

Q. Through the proposed disposal well and Phillips "A" No. 4 Well?

A. That's correct.

Q. What caused you to draw the top of the Montoya at that location? Can you describe for us on each of the logs what you saw that caused you to do that?

A. This is based upon our top of the Montoya as we've correlated it through the field. I have no samples on the Phillips well.

Q. Have you discussed with Phillips the

pick of the top of the Montoya --

A. No, I have not.

Q. -- in their well? You don't known whether or not that correlates to their pick, then?

A. No.

Q. All right, sir.

A. I would assume that it would be, it would vary.

Q. All right, sir.

A. Most people, the only separation between the Fusselman and the Montoya is generally determined by insoluble residues of the samples, and I did not have the samples. I didn't have --

MR. NUTTER: In what, please?

A. The insoluble residues.

MR. NUTTER: Oh.

Q. There's not any kind of a shale barrier or anything between the Fusselman and the Montoya?

A. It's not consistent.

Q. Say again?

A. It's not consistent throughout the field.

Q. I don't know what you mean.

A. It's not a pick that's in every well,

so you can't go by a shale marker.

Q. All right, the insoluble residues --

A. The insoluble residues will show up Montoya, primarily because of the amount of sand that's present in it.

MR. NUTTER: Do you believe this insoluble residue creates any kind of a vertical barrier towards migration from Montoya into the Fusselman?

A. I really don't have any evidence one way or the other.

MR. NUTTER: It wouldn't be, you don't know that it would be like an impermeable shale overlying the top of the Montoya, then.

A. No, because most of the residue left is quartz and not shale.

Q. Mr. Brown, have you made a study or reached any conclusion about any factors which would cause you to conclude that the Montoya is physically separated from the Fusselman as it crosses through those two wells?

A. I personally have not.

MR. KELLAHIN: I have nothing further of the witness.

MR. NUTTER: Are there any other questions of the witness?

MR. CARR: I have just a couple.

REDIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Brown, in making a study of this area did you find any evidence which would cause you to conclude that there were vertical fractures between the Montoya and the Fusselman?

A. No.

Q. Are you aware of any plans in the general area for salt water disposal wells other than that of Enserch?

A. No.

MR. CARR: I have nothing further of Mr. Brown.

MR. NUTTER: Are there any other questions? The witness may be excused.

MR. CARR: At this time I would call Mr. Renoult.

DANIEL C. RENOULT

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Will you state your full name?

A. My name is Daniel C. Renoult.

Q. Would you please spell that?

A. R-E-N-O-U-L-T.

Q. Mr. Renoult, where do you reside?

A. Midland, Texas.

Q. By whom are you employed?

A. Enserch Exploration, Inc.,

Q. And in what capacity?

A. District Petroleum Engineer.

Q. Will you summarize for the Examiner your educational background?

A. I obtained a BS degree in mechanical engineering in 1974 in France, and an MS degree in petroleum engineering in 1975, University of Texas, Austin.

Q. Since that time by whom have you been employed?

A. Enserch Exploration since 1976.

Q. Are you familiar with the application that was filed in this case?

A. Yes, sir.

Q. And are you familiar with the subject

area?

A. Yes, sir.

MR. CARR: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, sir.

Q. Mr. Renoult, will you please refer to what has been marked for identification as Enserch Exhibit Number Four, and review this for Mr. Nutter?

A. Exhibit Number Four provides information about the completion and current producing formations of the nearest offset wells to the proposed Rader Well No. 2.

The Enserch Rader Well No. 2 is currently perforated through the Montoya lime from 7902 to 7930, -3503 to -3531 subsea.

Three other wells located within the half mile radius are listed on this exhibit, the Enserch Rader No. 1, the Phillips Petroleum Lambirth "A" Well No. 4, and the Enserch Lambirth No. 3.

The Phillips Petroleum "A" No. 4, located 1750 feet northwest of the Rader No. 2 is completed through the Fusselman from 7814 to 7828, -3423 feet to -3437 feet subsea. This is 60 feet high subseawise to the perforations in the Enserch Rader Well No. 2.

Finally, on this exhibit three wells

just outside the half mile radius are listed, the Phillips Petroleum Peterson "H" Well NO. 1, the Enserch Lambirth No. 7, and the Phillips Petroleum Lambirth "A" No. 1.

The Phillips Petroleum Peterson "H" No. 1, located 2600 feet north of the Rader No. 2, the dry hole, Phillips Petroleum plans to dispose of water in this well.

Q. Now, Mr. Renoult, this is a tabular summary of all wells within a one half mile radius of the subject well, is that correct?

A. Approximately half mile radius. Three wells are slightly outside of the half mile radius.

Q. And on this table you have presented all that data required by Oil Conservation Division Memo No. 3-77, is that correct?

A. Yes, sir.

Q. Will you please refer to what has been marked as Applicant's Exhibit Number Five and review this for the Examiner?

A. Exhibit Number Five is a well schematic of the proposed Enserch Rader Well No. 2, the Enserch Rader Well No. 1, and the Phillips Petroleum Peterson "H" Well No. 1.

The proposed salt water disposal Enserch Rader No. 2 was tested through the Fusselman and Peter-

son lime and proved unproductive. These two intervals were subsequently squeezed. The well is currently perforated through the Montoya from 7902 to 7930, where Enserch plans to inject water.

The second schematic pertains to the Enserch Rader Well No. 1. This was a dry hole and was abandoned in July, 1979.

The third schematic pertains to the Phillips Petroleum Peterson "H" Well No. 1. This was a dry hole and was extensively tested through the Fusselman and Pennsylvanian. This well is located 2600 feet north from the subject Rader No. 2. Phillips Petroleum plans to dispose of ; ater in this well in the Wolfcamp formation from 7332 to 7341.

MR. NUTTER: How do you know that, Mr. Renoult?

A. I received a letter from Phillips Petroleum informing Enserch that they are planning to dispose water in this well.

MR. NUTTER: I see. They notified you themselves, then.

A. Yes, sir.

Q. Now, Mr. Renoult, referring then to the schematic of the subject well, in your opinion will the pro-

posed completion result in this well being cased and cemented so as to prevent contamination of oil, gas, and water resources in the area?

A. Yes, sir.

Q. Will you now refer to what has been marked Enserch Exhibit Number Six and review this?

A. Exhibit Number Six is a plat showing Enserch acreage shaded in gray in the subject area with two mile radius from the proposed salt water disposal Enserch Rader No. 2 is evidenced on this plat.

Within this two mile radius there is not one single well which produced from the Montoya formation where Enserch is planning to dispose salt water. Within this two mile radius only one well is completed below the Montoya, the Energy Reserves Miller Well No. 1, evidenced by the yellow dot, which was tested through the Granite Wash formation.

MR. NUTTER: Granite Wash, huh?

A. Yes, sir.

MR. NUTTER: Is it still producing, do you know?

A. This well was just tested a few weeks ago.

MR. NUTTER: And it, the symbol there is a gas well, so it would be a gas well in the Granite Wash?

A. Yes, sir.

MR. NUTTER: Okay. Go ahead.

Q. Will you now refer to Exhibit Number Seven and review that for Mr. Nutter?

A. Exhibit Number Seven is a table listing all the wells located within the two mile radius from the proposed salt water disposal Enserch Rader No. 2.

This table gives the distance to the subject Rader Well No. 2 and the current producing formation.

Q. Now refer to Exhibit Number Eight and review this.

A. Exhibit Number Eight is the oil production history from the wells currently producing from the Fusselman and directly offsetting the Enserch Rader Well No. 2.

Production history is presented under graphical and tabular form, for the oil and gas and water.

The first graph and table pertains to the Phillips Petroleum Lambirth "A" Well No. 1. This well is located approximately a half mile from the Enserch Rader Well No. 2. As of December 31st, 1980, its cumulative Fusselman oil production was equal to 85,880 barrels of oil, and its cumulative water production was equal to 68,412 barrels of water.

The second graph and table pertains to

Enserch Lambirth No. 7. As of December 31st, 1980, this well produced 75,069 barrels of oil from the Fusselman and 27,673 barrels of water from the Fusselman.

The third, and last, graph and table pertain to Phillips Petroleum Lambirth "A" No. 4. This well is located approximately 1750 feet northwest of the subject well.

As of December 31st, 1980, its cumulative Fusselman oil production was equal to 71,332 barrels and its cumulative water production was equal to 17,325 barrels of water.

Q. Mr. Renoult, would you now refer to Enserch Exhibit Number Nine and review that for the Examiner?

A. Exhibit Number Nine is a table giving the water production from the Enserch Exploration wells in the Peterson South Fusselman and Pennsylvanian Field.

As of December 31st, 1980, total cumulative Enserch water production was equal to 310,587 barrels of water, of which 89 percent was produced from the Fusselman. During the month of December, 1980, Enserch produced 22,663 barrels of water. This corresponds to 731 barrels of water per day.

Enserch is currently paying $1.58 per barrel to transport and dispose of water in the Jenkins and

Southland salt water disposal well. This corresponds to a total expenditure of $35,807 to dispose water during the month of December, 1980.

Q. Mr. Renoult, will you now refer to Exhibit Number Ten?

A. Exhibit Number Ten is a tabulation of the water production of the Phillips Petroleum Wells in the Peterson South Fusselman and Pennsylvanian Field as of December 31st, 1980.

Phillips Petroleum cumulative water production was equal to 114,666 barrels of water, of which 93 percent were produced from the Fusselman.

This data combined with the results of Exhibit Number Nine indicate that the strong water drive is present in the Petterson Fusselman Field.

Q. Mr. Renoult, will you now refer to what has been marked as Enserch Exhibit Number Eleven and review this for Mr. Nutter?

A. Exhibit Number Eleven is a table giving the total solids content of the Penn water and Fusselman water in three different wells.

The total solids content of Penn water was equal to 102,352 milligrams per liter.

The total solids content from the

Fusselman water was equal to 105,982 milligrams per liter in the Lambirth No. 6.

And 105,612 milligrams per liter in the Lambirth No. 7.

This is considered a relatively minor difference in total solids contained between the Penn and the Fusselman water. The water samples were analyzed by Martin Water Lab from Midland.

Q. All right, Mr. Renoult, now will you review Exhibit Number Twelve for Mr. Nutter?

A. Exhibit Number Twelve is the terms of a stimulation treatment and injectivity first performed on the proposed salt water disposal Enserch Rader Well No. 2.

The well is perforated through the Montoya from 7902 to 7930, -3503 to -3531 subsea. This is 66 feet lower than the offset Phillips Petroleum Lambirth "A" Well No. 4, which is producing from the Fusselman horizon.

The Rader Well No. 2 was stimulated with 10,000 gallons of MOD 202 acid. An injection test was performed on March 27, 1981. Five barrels per minute were injected at 2400 psi; 2 barrels per minute were injected under vacuum. The results are exposed under graphical form on page two of this exhibit.

Based on the maximum allowed injection

requirement of 0.2 psi per foot, the maximum allowed injection volume is equal to 5976 barrels per day.

In comparison, during the month of December, 1980, Enserch and Phillips Petroleum produced 910 barrels of water per day from the Peterson South Field.

MR. NUTTER: That's both companies put together?

A. Yes, sir.

MR. NUTTER: Fine.

A. This volume could be injected under vacuum in the proposed salt water disposal Enserch Rader Well No. 2.

Q. Mr. Renoult, will you now refer to Exhibit Number Thirteen and review this for Mr. Nutter?

A. Exhibit Number Thirteen provides water encroachment calculations based on injection volume proposed for the Enserch Well No. 2.

2800 feet of net pay with an average porosity of 7 percent are present in the Montoya formation in the Enserch Rader No. 2.

Water encroachment calculations were conducted based on a continuous injection volume of 1650 barrels a day. The well is calculated that after three years only 148.5 acres would be encroached by injection of

water. This responds to a radius of only 1656 feet from the Enserch Rader Well No. 2.

This volume of 1650 barrels per day would be taken on vacuum.

It is also underlined that during the month of December, 1980, the full, total volume of water produced from the Peterson South Field was equal to only 910 barrels per day.

Q. Mr. Renoult, I believe you testified as to the rates that this particular well would take under vacuum. Is it your -- is it the intention of Enserch to inject water under pressure or just by gravity?

A. This will be based on the volume we have to inject in this well. If we inject -- if the volume is less than 2 barrels per minute, the water will be injected under vacuum.

Q. Do present production rates indicate that you could dispose of all water produced by injecting under vacuum?

A. Yes, sir.

Q. If you were, if you ever had to inject under pressure, would a pressure limitation of 0.2 per pound per foot of depth to the top of the perforations in this well be a satisfactory limitation for the purposes of Enserch?

A. Definitely.

Q. Mr. Renoult, in your opinion will granting this application be in the best interest of conservation, the prevention of waste, and the protection of correlative rights?

A. Yes, sir.

Q. Were Exhibits Four through Thirteen prepared either by you or under your direction and supervision?

A. Four through Thirteen, yes, sir.

MR. CARR: At this time, Mr. Nutter, we would offer Applicant's Exhibits Four through Thirteen.

MR. NUTTER: Exhibits Four through Thirteen will be admitted in evidence.

MR. CARR: And I have nothing further of Mr. Renoult on direct.

MR. NUTTER: Are there any questions of the witness?

MR. KELLAHIN: Yes, sir.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Renoult, let's turn to your Exhibit Number Seven, please.

The third well entered on your tabulation

is the Phillips Lambirth "A" No. 4 Well, Mr. Renoult?

It appears from the tabulation, Mr. Renoult, that that is the closest well that continues to produce from the Fusselman, closest in terms of distance from the proposed disposal, is that true?

A. Yes, sir.

Q. It shows a distance of 1750 feet, does it not?

A. Yes, sir.

Q. I believe in your testimony just now you indicated a radius for the -- a certain quantity of water disposed of in this disposal well that would reach a distance of 1656 feet, or approximately 100 feet short of that Phillips well.

Would you give me the information again upon which you made that calculation? What kind of volume were you talking about to reach that radius? You said that's the radius for 148.5 acres.

A. Exhibit --

MR. NUTTER: That's given on Exhibit Thirteen, is that correct?

MR. KELLAHIN: I think so. Yes.

MR. CARR: That's right.

A. This radius is based on the continuous

volume of 1650 barrels per day and based on the footage encountered in the Enserch Rader No. 2 and the porosity present in this well.

Q. Just a minute, let me make sure I understand your Exhibit Thirteen in relation to where it is in terms of the closest Phillips well.

In the third year of disposal having used a continual rate of disposal of 1650 barrels a day, by the third year you will have reached 1656 feet, is that correct?

A. Yes, sir.

Q. Am I reading that correctly?

A. Yes, sir.

Q. All right. You're going to dispose of 1650 barrels a day. What are you currently removing from your wells in terms of volumes of water per day?

A. As of December, 1980, Enserch was producing 731 barrels per day from the Peterson South Field.

Q. Upon what do you base your need for disposal at 1650 per day as opposed to what you're currently producing at 730-something a day?

A. Yes, you mean that Enserch would dispose water from the Phillips wells which are located in the Peterson South Field, and also assuming that water production might increase in the next few years or -- and months.

Q. All right, sir. If we take those assumptions to predict what perhaps will happen, then by the fourth year of your disposal at that particular rate, your radius of disposal is now 2343 feet, is it not, sir?

A. Yes, sir.

Q. And that will water out the Phillips 4-A Well, will it not?

A. Which formation?

Q. I assume in the Fusselman.

A. Well, we are injecting the water in the Montoya.

Q. How you going to keep the water confined to the Montoya, Mr. Renoult?

A. We are injecting water in the Montoya so the water will not go into the Fusselman formation.

Q. On what do you base the assumption that the water will remain confined in the Montoya?

A. It is a different formation supported by some tight stringers from the Fusselman, and also we are 66 feet lower subsea to the lowermost perf in the Lambirth "A" 4.

Q. Are you basing your opinion that the water will remain confined in the Montoya based upon the information Mr. Brown as a geologist has supplied to you?

A. No.

Q. You've independently examined the geology and determined that the water is going to remain confined in the Montoya?

A. I personally looked at the logs from the Enserch Rader Well No. 2 and Phillips Petroleum Lambirth "A" Well NO. 4.

Q. Did you find the same insoluble residue that Mr. Brown testified to as being the separation between the base of the Fusselman and the top of the Montoya?

A. I did not look at the residue; I look at logs only.

Q. Do the logs indicate any kind of shale barrier or any other impermeable barrier separating the Fusselman from the Montoya?

A. Yes, sir.

Q. They do?

A. Yes, sir.

Q. Can you show me on the cross section Number Three where that appears?

A. The Lambirth Petroleum -- the Phillips Petroleum Lambirth "A" Well No. 4, we have two tight stringers between the interval which is before the Fusselman and the Montoya. We have a tight stringer from 7924 to 7934, which

is the top of the Montoya.

Q. And, Mr. Renoult, let me stop you for a moment and give you this red pen so that we can have a record of where you're indicating these tight areas to be on Exhibit Number Three, please.

A. I prefer to go on my own exhibit, so --

Q. Do you have another exhibit?

A. I have marked the tight sections.

MR. CARR: May it please the Commission, or the Examiner, at this time we have an additional exhibit that can offer. It might be easier for Mr. Renoult to work from. We'll be happy to mark it as Enserch Exhibit Fourteen.

I don't know how Mr. Kellahin would like to present it or you would like us to present it. We can wait until he finishes cross, but obviously, it is becoming important at this time.

MR. NUTTER: Would you care for him to go ahead and give some direct testimony as to this exhibit, Mr. Kellahin? It might save some time on cross or maybe even elongate the cross for you.

Q. Let me try it this way, Mr. Renoult.

I asked you awhile ago if you relied upon Mr. Brown's opinion that the base of the Fusselman and the top of the Montoya were separated by these insoluble

residues. You said that you did not, that independently you've made your own study of the logs and you have determined that there is some reason that the Montoya, water disposed of in the Montoya, will remain confined in the Montoya. Do you have something to tell us that would demonstrate that?

A. No, I said I did not look at the residue in some of the wells, because I am not familiar with residues, but I look at the open hole logs in the Enserch Rader No. 2 and the Phillips Petroleum Lambirth "A" Well No. 4.

Q. All right, if you'll refer to what you've marked as Exhibit Number Fourteen and demonstrate for us upon what you have reached the conclusion that the water will remain separate from the Fusselman.

All right, sir, are we all ready? Mr. Renoult, would you go to what you have labeled as your Enserch Exhibit Number Fourteen and identify for us what you're talking about in terms of these tight areas?

A. Exhibit Number Fourteen is composed of a suite of logs. One is the Phillips Petroleum Lambirth "A" No. 4, which is located 1750 feet northwest of the proposed salt water disposal well.

The well on the left side of this exhibit, a resistivity duolateral log Micro (Reporter unable to understand). The scale on this log is .2 to 2000, ohm-meter

formula. Limestone matrix of 2.71 was used on this log. The scale on this log is from -10 percent porosity, plus 30 percent porosity.

The third log on the right of the exhibit the computer cyberlook log derived by Schlumberger on the two pages resistivity and porosity logs. The cyberlook parameters are listed in the heading. A water resistivity of .045 ohm-meter was used and the matrix current density of 2.71 gram was used.

The Phillips Petroleum Lambirth "A" Well NO. 4 is perforated from 7814 to 7828. This corresponds to -3423 to -3437 subsea. The lowermost perforations in the Lambirth No. 4 is 66 feet high to the uppermost perforation in the Enserch Rader Well No. 2.

This suite of logs shows that in the Phillips Petroleum Lambirth No. 4 a 10 foot tight streak with no porosity is present from 7840 to 7850. This is clearly evidenced in the CNL log and the cyberlook. The other tight streak from 7850 to 7924, the Fusselman is water bearing with an average water circulation of approximately 70 percent and the Fusselman exhibits some porosity as evidenced the FDCNL and cyberlook from 7924 to 7934. The Fusselman is tight and exhibits no porosity as evidenced by the FDCNL log and the cyberlook.

The Phillips Petroleum Lambirth "A" Well No. 4, the top of the Montoya was picked at a depth of 7934 feet. The Montoya in this well is highly porous and water bearing, as evidenced by an average water saturation of 70 percent, as indicated on the cyberlook.

Q. All right, Mr. Renoult, would you take my red pen now and mark on the -- whichever you want, Exhibit Number Fourteen or Exhibit Number Three, and show me where the, first of all, the first 10 foot tight streak is.

A. Okay, the first 10 foot is from --

Q. Yes, sir, would you just simply go to the board. You testified to it, but show me visually and mark on the log where it is.

A. 7848 --

Q. I won't be able to see it from here, Mr. Renoult, would you use the red pen, please?

A. Right here, 7840 - 7850, and the second tight streak is from 7924 to 7934, and below 7934 we have the Montoya formation.

Q. All right, Mr. Renoult, have you examined the logs of any other wells to determine whether those tight streaks extend beyond the wellbore in this well?

A. I like at the logs from the Rader No. 2 and Lambirth "A" No. 4.

Q. And what do those logs show you?

A. These logs show that the tight streak on top of the Montoya is present.

Q. In which wells?

A. Lambirth --

Q. In the proposed disposal well?

A. Yes, sir.

Q. That was one of them?

A. Within the Well --Rader Well No. 2.

Q. And what other well did you say?

A. The Lambirth "A" 4.

Q. The "A" 4, the proposed disposal well, was there any other wells that you found that tight sand?

A. I have not looked at any other wells as far as provision of the tight space.

Q. From what I understand of your study, Mr. Renoult, you haven't studied enough information to determine whether or not there is a sealing zone, or sand, or shale, isolating the proposed disposal well from the offset wells that produce from the Fusselman to the west.

MR. CARR: Is that a question?

Q. Yes, that's a question. Is that not true, Mr. Renoult?

A. Not true.

Q. It's not true. Did you examine the Phillips Lambirth "A" No. 1 Well to determine whether that tight section is present in that well?

A. I examined the wells which are located within the half mile radius as far as the production history is concerned, as far as the logs are concerned.

Q. On what exhibit is this half mile radius depicted, Mr. Renoult?

Is that on Exhibit Number Two?

A. Yes, sir.

Q. All right, it's just outside that radius, but according to your Exhibit Number Thirteen, by the fourth year of disposal you're going to exceed that radius.

A. If we inject continuous volume equal to 1650 barrels per day.

Q. Okay. Other than the comparison of the log information from the No. 4-A Well and the No. 2 Well, do you have any other information or have you made any other studies to determine that the water disposed of in the Montoya will remain confined in the Montoya?

A. I also presented on my Exhibit Number Fourteen, I indicated two tight streaks present in the Lambirth -- Phillips Petroleum Lambirth "A" Well No. 4, which is the only well that was in the half mile radius, and also I indicated

that Enserch is planning to dispose water in the Montoya 66 feet lower subseawise to the lowermost perf present in the Lambirth "A" No. 4.

Q One of these exhibits, I thought, had some calculations on the injectivity. Did you make some injectivity tests? Oh, here they are.

I found the exhibit, Mr. Renoult, it's Number Twelve.

Explain to me something about these injection tests that were run in March 27th of this year. Now, the test data shows that 2400 psi, is that a surface pressure or is that a bottom hole pressure?

A. That is surface pressure.

Q. Okay.

A. I didn't conduct the test myself.

Q. As an engineer, wouldn't it be important to you to know what the bottom hole pressure is instead of the surface pressure? To determine whether or not you're fracturing the formation even by gravity injection?

A. We are not going to fracture the formation by gravity if they're weighed in vacuum.

Q. Do you propose that your application is limited only to the disposal of water under vacuum and that you will not use pressure injection?

A. I used the maximum allowable injection gradient of 0.2 psi per foot to comply with the words of the New Mexico Commission.

Q. All right, sir, and using that as the criteria at this depth, what would be the bottom hole pressure?

A. I don't have this available.

Q. I beg your pardon?

A. I don't have this available at this time.

Q. Okay. Have you made any studies or calculations to determine what the fracture gradient is of the Fusselman in relation to the Montoya?

A. No, sir.

Q. So we don't know how much water we can dispose of in this well that will prevent the Montoya and the Fusselman from being fractured and the water migrating up into the producing Fusselman.

A. That's not what I said. I said I have not made any fracture study of the Fusselman. We are not planning to dispose water any different from the Montoya formation.

Q. Yes, sir, and you have not made any studies to determine whether you will fracture the confining strata around the Montoya formation.

A. Below 2 barrels per minute the water

would be in vacuum. We would not fracture the Montoya formation and I use a maximum allowed injection gradient of 0.2 psi per foot as indicated by the words of the Commission.

Q. Are you telling me it's impossible to fracture this formation when your disposal is less than the rates the water will enter the formation on a vacuum?

A. Yes, sir.

Q. You cannot fracture the formation if the water is going in on a vacuum?

A. Yes, sir.

Q. Exhibit Number Thirteen, Mr. Renoult, shows the parameters you used at the top of that exhibit from which you determined the radius of whatever it's called, the radiuses on the bottom of the exhibit that will show the area occupied by the water disposal? The parameters are on the top of Thirteen?

A. Yes, sir.

Q. Those are the ones used in the calculations?

A. Yes, sir.

Q. Are these the same parameters used by Enserch in their application for special pool rules for the South Peterson Fusselman Pool back in July of '78?

A. I don't know which application you are

talking about.

Q. All right, sir, I'll show you a copy of the Division Order entered in case R-5771 in Case 6270 by Enserch Exploration, which indicated that one well in the Fusselman is of a highly permeable nature and is capable of draining a radius in excess of 40 acres, and they grant permission to use 80-acre proration units.

Did you examine the data from which that case was presented to determine if the parameters used in this case are the same parameters?

MR. NUTTER: Wait a minute, Mr. Kellahin.

MR. KELLAHIN: Yes, sir.

MR. NUTTER: Now this -- the parameters here for the Montoya formation, and that case, you said, was for the Fusselman formation, I believe, so the parameters probably wouldn't be the same, anyway.

MR. KELLAHIN: Well, that was my question. Have you made an examination to determine if there is any difference between the parameters in the Montoya or the Fusselman?

A. I was not aware of these parameters until two seconds ago; however, I believe since we're dealing with two different formations the parameters are different.

Q. I'm concerned about how far the water

is going to move, Mr. Renoult, and I don't want to belabor the point, but if Mr. Brown's insoluble residue barrier is not there, then we've got to rely upon this 10 foot tight streak you're relying on, I want to find out when the water migrates up into what you admit is the Fusselman, how far that water is going to go, and we've not made that study, have we?

A. I never said the water would migrate into the Fusselman. I said the water would migrate into the Montoya formation.

Q. And the only thing separating the Montoya from the Fusselman is that 10 foot tight streak you have found on the 4-A Well?

A. No, sir, It's two tight stringers, 10 foot tight stringers plus existence or potential of water in the Montoya and in the Fusselman.

MR. KELLAHIN: I have nothing further. Thank you.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Renoult, now you, on your cyberlook logs you indicated the location of those tight streaks as being at 7840 to 50 and 7924 to 34.

A. Yes, sir.

Q. Now are those tight streaks also evidenced on Exhibit Three on the log of the Rader No. 2 Well and --

A. Yes.

Q. -- what depth would they be on that well?

A. The Rader No. 2, the tight streak at the top of the Montoya is present from 7884 to 7900.

Q. Now that's the one that's the equivalent to --

A. The lowermost --

Q. The lowermost on your cyberlook.

A. Yes, sir.

Q. In the -- in the Lambirth A-4. How about the upper one in the Lambirth A-4?

A. The uppermost one is the one --

Q. Okay.

A. -- Well No. 2.

Q. Okay. Thank you.

MR. NUTTER: Are there any other questions of Mr. Renoult at this time?

MR. CARR: I have one.

MR. NUTTER: Go ahead.

REDIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Renoult, I believe in answering certain of Mr. Kellahin's questions you indicated that on Exhibit Number Twelve you were estimating how much water could be injected at certain surface pressures, is that correct? Not bottom hole pressures?

A. That's correct.

Q. I'll hand you a copy of a memorandum and ask if you have seen that memorandum before?

A. Yes, I've seen it.

Q. Would you identify it, please?

A. Memorandum No. 3-77, dated August 24th, 1977.

Q. And what is the subject of that application -- or that memo?

A. The subject of this memorandum is the application for approval for secondary recovery or salt water injection wells.

Q. Now would you refer to paragraph one -- numbered paragraph one of that memo and tell me if it talks in terms of surface or bottom hole pressures?

A. The paragraph one says no surface injection pressure greater than 0.2 psi per foot of depth to

top of the injection zone will be permitted unless there is strong evidence the strata confining the injection has a pressure volume which should support a higher pressure.

Q. Now is that talking about the surface or bottom hole pressure?

A. Surface pressure.

Q. And your Exhibit Twelve was based on also likewise surface pressures?

A. Yes, sir.

MR. CARR: I have nothing further of Mr. Renoult.

MR. NUTTER: Are there any other questions of the witness?

MR. KELLAHIN: I have one further question of Mr. Renoult.

RECROSS EXAMINATION

BY MR. KELLAHIN:

Q. These tight streaks you've indicated on the log, will the log indicate whether or not fracturing of those tight streaks has occurred? Can you tell by looking at the log whether there is fracturing of those tight streaks?

A. These two logs don't indicate fracturing They are just a resistivity log and an FDCNL porosity log.

Q. They don't measure fracturing. You wouldn't know? You can't tell by looking at the log whether fracturing has occurred or not?

A. They indicate that there is no washout present in the Rader No. 2 and there is no washout present in Lambirth No. 4, which indicates there was no fractures present within the tight streaks.

Q. So you're telling me that those logs will show you that there's fracturing occurring?

A. These logs are showing more than likely there is no fracturing present in these two wells.

Q. What would the logs show you if there was fracturing? What happens to the logs?

A. It would be washed out.

Q. Have you examined any cores analysis of any of the wells?

A. No, sir.

Q. Have you made a study or any injectivity tests of any other formations besides the Montoya?

A. No, sir.

MR. KELLAHIN: I have no further questions.

MR. NUTTER: If there are no further questions, are there any questions of the witness? If there

are no further questions of the witness, he may be excused, and we'll recess until 1:30.

(Thereupon the noon recess was taken.)

MR. NUTTER: Have you finished your direct case?

MR. CARR: Mr. Nutter, I would like to offer Enserch Exhibit Number Fourteen into evidence, and also, if I failed to do so earlier, I would like to offer Exhibits One through Three.

MR. NUTTER: Exhibits One through Three and Exhibit Fourteen will be admitted.

MR. CARR: That concludes our direct case.

MR. NUTTER: Mr. Kellahin, did you have any witnesses?

MR. KELLAHIN: Yes, sir.

If the Examiner please, it would substantially shorten our geologic presentation concerning the general geologic characteristics of the Fusselman pool if the Examiner would take administrative notice of Case 6270, from which Order R-5771 was entered on July 17th, 1978.

The record of that case indicates the general characteristics of the Fusselman from a geological point of view, and with the consent of Mr. Carr,we would request that you take note of that record.

MR. CARR: Mr. Nutter, I really, I think I'm going to object to this. I think that if there is testimony concerning the Fusselman that is relevant to this case, it should be presented here today.

MR. NUTTER: Rather than get into a long, drawn out discussion of the Fusselman, Mr. Kellahin, if the testimony that you show -- that you present shows that migration of water is going to be from the Montoya into the Fusselman, then the Fusselman formation could be affected, I think, and --

MR. KELLAHIN: My point is that there is evidence in the Commission records presented by Enserch themselves about the highly fractured nature of the Fusselman formation and the ability of the oil to move a great distance, highly permeable formation, as their own testimony, and I think it's appropriate even over objection for the Examiner to take notice of that record considering it's Enserch's own case that they put on.

MR. NUTTER: I think we will take administrative notice of the data in the case. That was Case

6270, Mr. Kellahin?

MR. KELLAHIN: Yes, sir.

MR. NUTTER: We will take administrative notice of the material in Case Number 6270 relating to the Fusselman; however, that will be treated only to the extent, and considered only to the extent that Mr. Kellahin and his witnesses show that there would be communication from the Montoya into the Fusselman.

JERRY L. BLEVINS

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Blevins, would you please tell us your name and occupation?

A. Jerry Lynn Blevins. I'm Associate Reservoir Engineer for Phillips Petroleum Company in Odessa, Texas.

Q. Mr. Blevins, have you previously testified before the Division as a petroleum engineer?

A. No, sir.

Q. Would you tell the Examiner when and

where you obtained your engineering degree?

I graduated from Texas Tech University in May of 1977 with a Bachelor of Science in petroleum engineering.

Q. Subsequent to graduation, Mr. Blevins, where have you worked or been employed in the capacity of a petroleum engineer?

A. I've been employed by Phillips Petroleum for the last four years.

Q. During that period of employment, what, if any, time has been devoted to a study or work in the South Peterson Fussel Pool?

A. The last year.

Q. Generally summarize for us your activities in the pool?

A. I'm assigned to study the reservoir. I propose the perforations and the treatments there after a well has been drilled or any subsequent recompletion of the wells for any reason.

Q. Does that study include the study of logs and other geologic information?

A. Yes, sir.

Q. Does that study also include the producing characteristics of the different wells in the Fusselman formation?

A. Yes, sir.

MR. KELLAHIN: We tender Mr. Blevins as an expert petroleum engineer.

MR. NUTTER: Mr. Blevins is qualified.

Mr. Kellahin, will Mr. Blevins testimony be directed in any way towards Enserch's Exhibits Three or Fourteen? Can I put them away or will we need them again?

MR. KELLAHIN: You may want to refer to the one exhibit that locates the 10 foot tight --

MR. NUTTER: We'll keep them out, then.

MR. KELLAHIN: -- streak in that 4-A Well.

Q. Mr. Blevins, let me direct your attention to Exhibit Number One, which is simply a plat, and have you identify that for me.

A. Yes, sir, this is a plat of Peterson South Field in Roosevelt County, New Mexico, Range 32 and 33 East, Township 5 and 6 South.

The red colored circles are current Fusselman completions. The blue colored circles are current Penn completions. The green colored on the map is Phillips acreage which we now have a well or a proposed well located.

The purple arrow on this is in reference to Enserch's Rader No. 2 Well.

Q. All right, sir. Currently how many wells by both operators, Phillips and Enserch, are producing from the Fusselman formation?

A. There is ten total wells, five each.

Q. Do any of the Phillips wells produce water with the oil?

A. Yes, sir.

Q. And what procedures have you established for handling the water production from the wells in the Fusselman?

A. As far as after we've produced the water?

Q. Yeah, what do you do with the water?

A. We have trucking facilities come up and haul the water down to a disposal well which we pay for. We also are partners with Amoco Corporation in a field north of here, which we can use its disposal capabilities if they have the capacity.

Q. Are the waters produced from the Fusselman South Peterson Pool trucked regardless of whether it's disposed by Amoco or otherwise?

A. Yes, sir.

Q. All right. And what does it cost you per barrel of water to dispose currently of that water?

A. Our estimation is $2.06.

Q. And what currently are you receiving per barrel of oil for your oil price?

A. Our last price showed $38.00 per barrel.

Q. Is it currently economic for you to continue to truck that water away from the lease?

A. Yes, sir.

Q. Do you have any opinion, Mr. Blevins, to at what point it would no longer become economic to continue to truck this water production away?

A. Somewhere above 90 percent.

Q. 90 percent what?

A. Water.

Q. So long as the water production from a well remains less than 90 percent water it would be economic to continue to truck the water away?

A. Yes, sir.

Q. All right, sir. Are you familiar with the Enserch operations in this pool?

A. Yes, sir.

Q. Are their water needs significantly different with regards to disposal than Phillips' disposal needs?

A. They do produce more water than we do.

Q. And have you made any calculations in a general way of what the total volumes are between the operators of the production oil and water from the Fusselman formation?

A. As far as what we produce?

Q. In reference to what they produce.

A. Okay.

Q. Do you have that in a percentage number somewhere?

A. They make about 56 percent of the production, no, 54 percent, and we make 46 percent.

Q. Of the oil production?

A. Of the oil production. Their ~~The~~ water is approximately 73 percent, and ours is 27 percent.

Q. Have -- have you made a study to determine whether or not Phillips for its own use will undertake the use of a disposal well in the area?

A. We're looking at our Peterson "H" No. 1.

Q. And that's the well located in the southwest quarter of Section 29?

A. Yes, sir.

Q. And describe for us generally, Mr. Blevins, what you have determined by examining that well.

A. Well, drilled as a Fusselman producer,

we found no adequate production in the Fusselman. Subsequently, we tried to produce out of the Penn; again no production.

We perforated the Wolfcamp in hopes of establishing production, which also failed.

Currently we decided that a disposal well would be in order, since there's no record of any higher production in the area. We looked at all three zones which we had previously perforated and --

Q. What three zones are those, Mr. Blevins?

A. The Fusselman, the Penn, and the Wolfcamp.

Q. Okay.

A. The Fusselman we didn't inject into, or did not attempt to inject into due to the high fracture reservoir that the Fusselman is.

We also didn't in the Penn, due to the lack of areal extent.

In the Wolfcamp we found by running an injectivity test that we were able to inject and could inject profitably by establishing a production -- a disposal well there.

Q. Into the Wolfcamp formation?

A. Into the Wolfcamp.

Q. Can you give us a general idea of the

types of volumes and pressures, if any, that would be required for disposal into the Wolfcamp formation?

MR. CARR: I will object to this line of questioning. I believe it's irrelevant to the matter before you whether or not they plan eventually to inject into the Wolfcamp, it is not before this Commission.

MR. KELLAHIN: The point is, Mr. Nutter, that there is available, or at least I attempt to show from this witness that there is other formations in the area available which can be used for salt water disposal that do not present the high degree of risk that injection into the Montoya formation would pose.

I think it's very important to show that there is an alternative solution to the problem as perceived by Enserch.

MR. NUTTER: I think the witness can answer the question regarding injectivity rates into the Wolfcamp.

A. Well, our injectivity rates show that we could inject approximately 1000 -- no, 575 barrels a day at a 1000 pounds of pressure at surface.

Q. Would that injection pressure be low enough so that you should not fracture or part the confining strata around the Wolfcamp formation?

A. Yes, sir.

Q. Now, Mr. Blevins, let me direct your attention to Phillips' Exhibit Number Two and have you identify that for us.

A. This is a north/south cross section of the Peterson South Field comprising of our Peterson "H", our Lambirth "A" 4, our Lambirth "A" 1, and Enserch's Gladys Rader No. 2.

On it we have chosen our datum at -2700 feet and shown the Wolfcamp, which includes the Todd zone, the Three Brothers, the Pennsylvanian and the Fusselman. The Pennsylvanian is highlighted in blue; the Fusselman is highlighted in pink.

Q. What is Phillips' position with regards to Enserch's application to inject produced salt water into this proposed disposal well?

A. We do not believe they can confine the water injection into the Montoya due to no barriers between the Fusselman and the Montoya.

Q. In the event that the injected water is not confined to the Montoya, what, if any, risk does that impose upon any of Phillips' wells in the Fusselman?

A. Severe risk, since we have the only two Fusselman wells that offset their proposed injection, with

our A-4 and our A-1.

Q. Have you made any estimate of the remaining producable reserves to be produced by the Phillips No. 4-A Well in the Fusselman formation?

A. Approximately 25,000 barrels of oil.

Q. Have you converted that into current dollar amount?

A. Approximately $1,000,000 gross.

Q. In the event disposal is approved in this Enserch well, what, if any, impact with that have upon the No. 4-A Well to produce the remaining reserves?

A. Well, if the water comes up the fractures, as we expect it will, it would wipe out any reserves that we have; therefor, we wouldn't be able to produce this.

Q. Now, let me direct your attention specifically to your Exhibit Number Two, and have you identify for me, first of all, whether or not you find evidence of these insoluble residues that Mr. Brown's testified to.

A. From a log, no, sir.

Q. I see. What, if any, impermeable barriers separate the Fusselman and the -- the base of the Fusselman from the top of the Montoya, as defined by Enserch?

A. I've found no barriers.

Q. What, if any, impermeable barriers

exist between the perforations in the Enserch well, from which they intend to dispose, and those perforations in the offsetting Phillips wells in the Fusselman?

A. There's no barriers there. There's no way to stop it.

Q. All right. Now, Mr. Renoult testified that in examining the logs on the Phillips Lambirth "A" No. 4 Well, that he found evidence of two instances in the Fusselman where there appeared to be intervals of approximately 10 feet in which there were tight streaks, I think he said, characterized it.

A. Yes, sir.

Q. Do you find those indications on your logs?

A. They're tighter than the rest but --

Q. All right, let me ask you this. In your opinion would those tight sections constitute impermeable barriers separating the water to be injected in the Montoya from the production in the Fusselman perforations?

A. No, sir.

Q. Why not?

A. Basically because they're -- they are a porous media. Even on their exhibit, on our computer log, you can see on the bottom there we have possible hydrocarbon

production.

Q. You're referring to Enserch's Exhibit Fourteen?

A. Fourteen, yes, sir.

Q. And that information in Exhibit Fourteen was supplied to Enserch by Phillips?

A. We do have an exchange of logs with them, yes, sir.

Q. But my point is, you've examined those particular --

A. Yes, sir.

Q. -- logs that make up that exhibit?

A. Yes, sir.

Q. All right, and what is your conclusion based upon your examination of those same logs?

A. That there is no barrier that would definitely shut off any water between the Montoya and the Fusselman.

Q. What on those logs indicates support for that position?

A. Well, basically, the curves in tract four, which is at the far right side of the computer log, in the interval, the bottom interval, where the supposed barrier is, you note the blue --

Q. Let's put that on the wall --

A. Okay.

Q. -- so I can figure out what you're talking about.

Now, Mr. Blevins, I've put on the wall Enserch Exhibit Number Fourteen, and I'll ask you to go to that exhibit and identify those areas where Mr. Renoult has concluded that there is some type of barrier existing in the 4-A Well.

A. The upper zone is definitely the most tight zone. A small amount of porosity is noted by this line coming in. This is hydrocarbon porosity. It runs from zero to 25 percent. So there is at least 1, possibly 2 percent porosity in this area.

MR. NUTTER: Now you're talking about the extreme south Fusselman formation on that log?

A. Yes, sir, this is the one that they said was the second barrier.

MR. NUTTER: No, I believe that's his uppermost barrier.

A. The uppermost barrier, yes, sir. And the lower barrier, we'll see a little more porosity with a movable hydrocarbon, according to the process log, with flag indications of possible production in this interval that they

call the barrier.

MR. NUTTER: Now describe in the transcript that she's going to prepare where those flags indicators are, the location of them on the exhibit.

A. The flag indicators are --

Q. Mr. Blevins, let me do this. I'll give you my red pen and ask you to circle the areas in which you find that information contained.

A. The flag intervals are from approximately 7936 to 7943 in the lower supposed barrier.

In the above, the upper barrier, we have flag indications running from 7806 to 78 -- 7840. Again, this last flag barrier -- last flag indication of hydrocarbons is at the top of their so-called barrier.

Q. Mr. Renoult indicated in his testimony that we talked some about fracturing. Let me ask you, Mr. Blevins, can you look at those logs and determine whether there is or is not fracturing occurring by examination of the information contained on those logs?

A. No, sir.

Q. You may return to your seat, Mr. Blevins.

Mr. Blevins, let's turn to Exhibit Number Three.

MR. NUTTER: Before we leave Exhibit

Two, Mr. Kellahin, --

MR. KELLAHIN: Yes, sir.

MR. NUTTER: -- would you have him identify what the little green marks are? I see them on a couple of wells there.

A. Okay, the green marks in the Gladys Rader No. 2 is the perforated interval in the Montoya.

MR. NUTTER: Where they propose to inject, is that it?

A. Yes, sir. Our green mark is where we are proposing to inject into our Wolfcamp.

MR. NUTTER: I thought that's what the case was.

Q. Do you have anything else you want to tell us before we leave Number Two?

A. I don't believe so.

Q. All right, sir, let's go on to Number Three, then. Would you identify Exhibit Number Three for us?

A. Yes, sir. This is a structure map based on the top of the Fusselman, which is approximately 7900 feet in depth. We have again the Fusselman wells that are currently completed in Fusselman marked in pink, and the Penn completions marked in blue with a purple arrow indicating the Rader No. 2 Well.

Q. Mr. Blevins, do you have an opinion as to what direction, if any, the water will migrate if it's disposed of in this well?

A. The water will naturally migrate to the wells that are producing offsetting it in an upward direction. That means this well would go to the southeast, the south, the southwest, the west, and the northwest.

Q. Is there any indication on your structure map that structure would cause the water injected to migrate in some other direction or be precluded from entering into the Phillips wells?

A. No, sir.

Q. You don't see any structural barriers or --

A. No barriers.

Q. -- anything like that?

A. No, sir.

Q. All right, sir, let's go then to Exhibit Number Four and have you identify that for us.

A. Number Four is a core analysis on our Lambirth "A" No. 2. This would indicate --

Q. Let me get oriented here, Mr. Blevins. Where is the Phillips "A" No. 2 Well?

A. It's in Section 31, Township 5 South,

33 East, Unit F.

Q. All right, sir.

A. Okay. This well was cored from 7810 to 7859. In the lower portion of the core we find in a highlight on your deal, a vugular fractured porosity, dolomite, with large vertical fractures, many thin vertical fractures, which would indicate that it's pretty well fractured throughout the Fusselman.

Q. This core analysis was made on the Lambirth "A" 2 Well. In your opinion, Mr. Blevins, is the fractured nature of the Fusselman limited to the "A" No. 2 Well, or is this typical of the pool?

A. It should be typical of the pool.

Q. What, if any, significance are the fracturings?

A. Providing no barrier between the Montoya and the Fusselman, the water would channel into the fracture, thereby killing the wells off to the linear extent of the fractures, not necessarily the ones offsetting their disposal well, but ones maybe more toward the middle of the field.

Q. All right, sir, do you have anything else you would like to direct our attention to on Exhibit Number Four?

A. No, sir.

Q. All right, sir, let's go to Exhibit Number Five and if you'll identify that for me.

A. This again is a plat with Fusselman colored in pink, ten completions colored in blue. This is the January actual daily rates of the production based on what was turned in to the State of New Mexico.

Q. All right, sir, and let's turn to Exhibit Number Six, then, and have you identify that for us.

A. This is a composite of the production based on the wells since June of 1978, which Enserch first completed their Lambirth No. 1. Subsequent completions are added on and completions in the Penn are further into the state.

This is just tabular data of the production that's turned in to the State.

Q. Now, Mr. Blevins, I'd like to direct your attention to Enserch Exhibit Number Twelve. which is their injection calculations on the proposed disposal well.

Mr. Blevins, I'd like to have you give us an explanation about the injectivity test and how they're determined in relation to surface tests and true bottom hole pressure test, to determine, first of all, the parting pressure of the formation versus fracturing, and that sort of discussion. Would you explain using Exhibit Number Twelve as a basis, how

the injectivity test is run.

A. Well, basically, when you run an injectivity test you pump in water at a particular rate and report its instantaneous shut-in pressure. From this you can plot up production to see where the formation will have its parting pressure. In this regard you can stay below the parting pressure when you inject water into the formation.

Based on what I know of them, this test on Exhibit Twelve did not account for the friction in the tubing, based on a curve going up like it does. They didn't account for tubing in their wellhead measurements. It's very possible that even at the two barrels per minute on the vacuum they would have pressures greater than parting pressure bottom hole.

Q. In your opinion can we reach parting pressures in the formation even is water is disposed of on a vacuum basis, as is suggested here?

A. Yes, sir.

Q. Mr. Blevins, based upon your studies, of this area and the information you've examined and compiled, do you find any evidence to indicate that the Montoya is a separate and distinct reservoir not in communication with the Fusselman that is now being produced in the South Peterson Fusselman Pool?

A. No, sir.

Q. Do you find any permeable barriers that would keep water disposed of in the Montoya formation, as proposed by Enserch, confined to that formation and not allow it to migrate up into the Fusselman?

A. No, sir.

Q. Do you have a recommendation to the Examiner as to how he may handle this application so as not to violate the correlative rights of Phillips Petroleum Company or cause waste with regards to the oil being produced from the Fusselman?

A. Due to the economic nature of it out there, we can still truck our water until we find a suitable disposal well other than one that could possibly water out the wells in the field.

MR. KELLAHIN: I have no further questions of Mr. Blevins. We'd move the introduction of Phillips Exhibits One through Six.

MR. NUTTER: Phillips Exhibits One through Six will be admitted in evidence.

Are there any questions of the witness?

MR. CARR: A few.

MR. NUTTER: Mr. Carr.

CROSS EXAMINATION

BY MR. CARR:

Q. Mr. Blevins, I believe you stated that you felt it was still economic to truck water in this area, is that correct?

A. Yes, sir.

Q. Wouldn't you effect a substantial savings, however, if you could find a suitable disposal well?

A. Yes, sir.

Q. You have been looking, I believe from your testimony, at your No. 1 "H" Well in Section 29 as a possible disposal well.

A. Yes, sir.

Q. Have you looked at any other Wolfcamp wells in the area to see if the conclusions that you have reached based on this one well would hold up if applied to the general area?

A. As far as what?

Q. As far as injecting into the Wolfcamp?

A. As far as the linear extent, we've looked into the wells surrounding our well.

Q. How far did you go in checking the Wolfcamp?

A. Out into the A-4, in the Enserch No. 7, and in the Enserch No. 3.

Q. You didn't look at any of the Enserch wells in the south half of Section 31, did you?

A. The south half of 31?

Q. The south half of Section 31?

A. No, sir.

Q. And if there were some contrary evidence that could come from these wells, you wouldn't be aware of it?

A. Yes, sir, I wouldn't be aware of it.

Q. Yes, sir, you wouldn't be, is that the answer?

A. I wouldn't be aware of it.

Q. Now I believe, looking at your Exhibit Two, I believe it is, the cross section.

A. Yes, sir.

Q. You indicated that looking at this you could not see the barriers that Mr. Renoult saw this morning, is that correct?

A. That is correct.

Q. What is the scale of this log?

A. This is a reduced copy of what we have. This is a reduced copy of the 5 inch equal to 100 feet.

Q. So the scale on this log is 5 inches

100 feet.

A. It's just been reduced, so it's not by any means -- we have the original logs which we studied. This was just shot down for the Examiner's convenience.

Q. I believe you mentioned again insoluble residues. That was a subject discussed this morning, and I believe it was your testimony, and correct me, I may not have heard this, that you cannot see these from the log, is that right?

A. From the logs I can't see insoluble residues.

Q. Do insoluble residues constitute barriers or do they just show what is in one lithologic zone as opposed to another?

A. I'm not a chemist so I don't really know, sir.

Q. Would you know whether or not they -- they could become a barrier or not?

A. I have been told that they only are used in reference of age.

Q. All right, thank you.

Now I believe you indicated in your testimony that you did not see the tight streaks that Mr. Renoult made reference to.

A. Yes, sir.

MR. KELLAHIN: No, I don't believe that was his testimony.

MR. CARR: Well, he's certainly free to say so.

Q. What was your testimony on that point?

A. I disagreed with his opinion.

Q. All right.

A. If that means I don't see them, well --

Q. Okay. In your opinion, and correct me if I'm wrong, was that the top barrier was not an impermeable streak, is that correct?

A. The top barrier. What do you mean? Which one do you mean by "top"? The one at the top of the Fusselman?

Q. That's right. I believe you indicated there was one that had 2 percent porosity. That's the one I meant I'm interested in.

A. That's the one at the top.

Q. At the top of the Fusselman.

A. Yes, sir.

Q. And you don't consider 2 percent porosity an impermeable streak?

A. Not in a fractured reservoir, sir.

Q. Well now is that because of the permeability of that or the porosity, I mean the porosity, or was it because of the fracture?

A. I'm not following you.

Q. Well, would an unfractured streak, 2 percent porosity, would that be an impermeable barrier, if it were not fractured?

A. Not necessarily.

Q. You would anticipate that a 2 percent, a stringer, 2 percent porosity, would conduct fluids vertically to the reservoir absent fracturing?

A. Possibly.

Q. And that's your testimony?

A. Yes, sir.

Q. Do you have any idea as to what the permeability might be in this tight streak?

A. Based on the previous testimony given in earlier cases, the PI's were calculated between 35 and 50 on some of the wells, which is a good indication of your permeability feet. Very small net feet would mean very high porosity. Enserch themselves estimated 4 millidarcies of permeability would drain 80 acres.

Q. Do you know what the permeability would be in these tight streaks?

A. We have core analysis that would have permeability for the general area.

Q. But do you know as confined to just those streaks?

A. Just those particular streaks, I would have to see if we cored through them.

Q. Do you have that data with you?

A. I do have some core data but I don't know if they go through those streaks.

Q. Did you testify that there were possible hydrocarbons in those tight streaks in your well?

A. In the lower zone the logs indicate that there is possible hydrocarbons present.

Q. Did you perforate those to see if you could produce any of those possible hydrocarbons?

A. No, sir.

Q. Now, I'd like to have you look for a minute at your Exhibit Number Four, which is the core analysis.

A. Yes, sir.

Q. Now, this indicates I believe, that there are large vertical fractures.

A. Yes, sir.

Q. And these are in the Fusselman.

A. Yes, sir.

Q. In this well.

A. Yes, sir.

Q. What is the drive mechanism in the Fusselman, do you know? Is it a water drive or gas drive?

A. Just a second. I'll find out.

Q. All right. What is the drive mechanism in the Fusselman?

MR. KELLAHIN: If you don't know, tell him you don't know.

A. Okay. Honestly I can't say for sure which one is driving it.

Q. Did you make -- you made a reservoir study of this, of the Fusselman, did you say that?

A. I studied the possibility of injecting water into the Fusselman.

Q. And you don't know what the drive mechanism is?

A. No, sir.

Q. Now, this is a core analysis on the Lambirth "A" No. 2 Well?

A. Yes, sir.

Q. Is this well producing any water?

A. It has produced it erratically, and in the current production there is no water.

Q. So it currently is producing no water, although you -- this exhibit indicates that there are large vertical fractures.

A. Yes, sir.

Q. Do you have anything that would show that these vertical fractures are actually a conduit for fluids to migrate to the reservoir?

Because Exhibit Number Four shows the fractures.

A. Yes.

Q. In this particular core.

A. Yes, sir.

Q. Do you have any evidence that would show that fluids are migrating through these fractures?

A. Yes, sir, these are a high PI on the wells. We've drained --

Q. But still producing no water?

A. Not this -- not the current month that this exam was -- this example was given.

Q. Now I believe you indicated that this core analysis was typical, or you thought it would be typical, of the reservoir as a whole.

A. Yes, sir.

Q. What makes you think that?

A. Basically it was all uplifted by the same movement. There's no indication that it should be any different. The stress forces should have been the same throughout the whole reservoir.

Q. When this core was actually taken, were you present?

A. No, sir.

Q. Do you know how it was obtained, whether a diamond bit or a regular normal cone type?

A. No, sir, I don't.

Q. Do you have any idea how much weight was on the drill string at the time it was taken?

A. No, sir.

Q. How much torque was required to turn it?

A. No, sir.

Q. Have you personally examined the core?

A. No, sir.

Q. So you don't know that they are clean breaks or if they're rounded in the core, that would give us some idea as to the time that the fractures occurred?

A. No, sir.

Q. Is it possible to fracture a core while taking it?

A. Yes, sir.

Q. And if that were the case, it wouldn't necessarily apply reservoir wide, would it?

A. No, sir.

Q. Now, I'd like for you to look for a moment at your Exhibit -- whatever the contour map, structure map, is.

A. All right.

Q. This is a structure map on the Fusselman, I believe.

A. Yes, sir.

Q. And based on your interpretation of the Fusselman, fluid injected into the Fusselman at the proposed injection well location would migrate toward other producing wells.

A. Yes, sir, due to the high permeability.

Q. But this presumes, of course, that fluids are put in the Fusselman, not a separate reservoir.

A. This presumes that there is a barrier between the Montoya and the Fusselman, they wouldn't do it.

Q. They wouldn't do it.

A. Without the barrier they will migrate into the Fusselman and therefor channel into the other wells.

Q. This presumes that fluids are injected into the Fusselman -- get into the Fusselman.

A. They get into the Fusselman, yes, sir. They can be injected anywhere without a barrier and get there.

Q. Looking at resistivity logs, could you tell that the formation across the area -- if the formation across the area was fractured or not?

A. No, sir, you can't tell fractures from this.

Q. If the formation was fractured wouldn't you find a lower resistivity than you would anticipate otherwise?

A. Not necessarily.

Q. In your Lambirth "A" No. 2 Well, are you aware of whether or not there was an oil/water contact in this well?

A. No, sir.

MR. CARR: I have nothing further of Mr. Blevins on cross.

MR. KELLAHIN: I have just one question, Mr. Nutter.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Blevins, directing your attention to your Exhibit Number Six, if you'll turn to that portion of

Exhibit Number Six that shows the tabulation of production from the Lambirth "A" No. 4 Well, please.

A. Yes, sir.

Q. I believe it was your testimony that that well is not currently making any water. Has it produced water out of the Fusselman in the past?

A. Yes, sir, erratically.

Q. Is there -- do you have an explanation as to what has been the cause for the sporadic rates of water production during the life of this well?

A. To the best of my knowledge the only way the water would come and go like this is due to the fractured systems.

MR. KELLAHIN: I have nothing further.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Well, it hasn't really been sporadic, has it, Mr. Blevins? It looks like it continued to produce from first production until the seventh month of 1980, and then it just completely ceased altogether, didn't it?

A. Well, sir, if you will look at November of '79, we made 8685 barrels of water there.

Q. Yeah.

A. In December we made 892 barrels of water.

Q. Well, I realize it hasn't been uniformly producing water.

A. Okay.

Q. It just suddenly went from 2387 barrels in July of '80 to nothing in August, and hasn't produced any water since.

A. Okay, that's --

Q. Any workover on the well or anything?

A. No, sir. Basically this is done by our EDP system, our production report system. All our water is gathered into a common storage tank by Lambirth "A" No. 1. We have two 500 -- or two 300 gallon -- 300 barrel tanks there, and all the water is gathered into them.

Based on well tests, which our pumper gets for us --

Q. You prorate the water.

A. We prorate the water back based on this note. With the high volumes of fluids that all these wells produced, his equipment is not apt to handle it extremely well. Therefor, we have the water coming and going essentially from all our wells, and this would not be an accurate test as far as what's going on in the field.

Q. Likewise, I wonder on the -- you've been

talking quite a bit about your Lambirth "A" No. 2 Well. I notice that it produced water only one month in its whole life, apparently, is that correct?

A. Again this is due to well tests, sir, and it's so far out there we don't send our well tester out there except for the required once a year testing, which would -- unless we ask for a special test, and again, it might be producing water and it would not be allocated water back.

Q. Well, it must have been allocated some water that one month.

A. The one month we asked for a special test.

Q. And you didn't use that test figure, then, on subsequent reports?

A. Yes, sir, we didn't -- we didn't like what we saw with the whole setup and so we asked for another test.

Q. And then the next test showed it was making no water?

A. No water again, sir.

Q. I see. Now, you were talking about the tubing pressure would have to be added to the vacuum pressure and could cause a fracturing system, or a fracturing of the reservoir even on a vacuum. Would you go into that a little

further, please?

A. Okay. It's not added in. It would have to be taken out of the pressures on their curve. The pressure due to the friction of water in the tubing is what's causing this curve to migrate up like it is.

If you remove the tubing pressure from this curve, you would more than likely find that the line is straight, so that any one rate you're putting it in at the same amount of pressure due to the formation being parted already.

Q. Well --

A. If they would have shown instantaneous shut-in pressures behind this, you would have had a more accurate curve, or if they would have measured the bottom hole pressures, you would have had a more accurate curve, and you would have seen -- you would have seen where it had parted while they were injecting the water.

But the rates that they're giving with these pressures are real fine, except for it's not the pressures you need. Their instantaneous shutdown pressures are the pressures that you're going to be injecting against that would tell you where the reservoir will part.

Q. Well, I would think that your tubing friction would be at a minimum when you're injecting at the

lowest rate, however, would it not?

A. Yes, sir.

Q. And if their lowest rate on their injectivity tests, which took it on the vacuum, the tubing pressure would be the lowest.

A. Yes, sir.

Q. And how would you be able to take a vacuum and add enough tubing friction to that to cause the reservoir to part?

A. The reservoir could have parted by the time they put it on a vacuum. Once it parts it could have gone in on a vacuum. If you open a channel wider than what it was, it may all be going in at a vacuum at the surface, but that doesn't mean that it's going in at a vacuum in the bottom hole, because you have a hydrostatic head there first.

Q. You're assuming that the first test was at a high rate?

A. No, sir, no matter which way they went. Either way they've -- they've opened it, and once it's open you won't see that amount of pressure that's actually forcing the water into the reservoir. It can be a vacuum at the surface and yet with a hydrostatic head added onto it, you could be pumping in at a greater pressure than what the parting pressure would be.

Q. Do you know where the Division arrived at this 0.2 of a foot -- of a pound per foot of depth for the maximum pressures?

A. No, sir. That's in your laws.

Q. Yes, sir.

A. But I don't know where it came from.

Q. It was arrived at -- I'll testify here, if I may -- it was arrived at just taking an arbitrary figure of 0.7 of a pound per foot of depth as overburden pressure.

A. Yes, sir.

Q. And then we took a maximum weighted hydrostatic head of super saturated solution, being 0.5 of a pound per foot of depth.

A. Yes, sir.

Q. Subtracted that from the weight of the reservoir and the resistance of the reservoir fracturing and came up with the difference of only 0.2 of a pound.

So it's an extremely conservative figure, I think.

A. Okay.

Q. And it's been incomprehensible to me how you could fracture a reservoir on a vacuum and that's why I've been so enlightened here today.

A. No, sir, I'm not saying that you're

fracturing. You are parting a fracture to begin with. If you part the fracture it's going to go in just as easy or easier than what it did. You're opening a space wider than what it normally was.

Q. You're assuming you had a fracture to begin with or a created fracture?

A. Either way, the fracture to begin with is more than likely what's there.

Q. Okay.

A. Without a core analysis I wouldn't know for sure.

Q. Okay.

MR. NUTTER: Are there any other questions of Mr. Blevins?

MR. KELLAHIN: No, sir.

MR. NUTTER: He may be excused. Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: Yes, one more witness. He hasn't been sworn yet.

(Mr. Drisko sworn.)

PHILLIP B. DRISKO

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. All right, sir, would you please state your name and occupation?

A. Phillip B. Drisko. I'm a development geologist for Phillips Petroleum, Odessa.

Q. Mr. Drisko, have you previously testified as a petroleum geologist before the Railroad Commission of Texas?

A. Yes, sir.

Q. And have you previously testified before the Oil Conservation Division of New Mexico as a geologist?

A. No, sir.

Q. When and where did you obtain your degree in geology?

A. Wichita University, 1952, BS.

Q. How long have you been employed as a petroleum geologist for Phillips Petroleum Company?

A. 28-1/2 years.

MR. KELLAHIN: we tender Mr. Drisko as

an expert petroleum geologist.

MR. NUTTER: Mr. Drisko is qualified.

Q. Mr. Drisko, I'd like to direct your attention to Phillips' Exhibit Number Four, which is the core analysis on the Lambirth 2-A Well, and ask you, Mr. Drisko, did you conduct that core analysis or make the examination initially from which that document is prepared?

A. A core description is a term I did.

Q. All right, sir. You -- you made the study of the core information and made that compilation?

A. I saw the core. I made the --

Q. All right, sir.

A. -- core description.

Q. Okay.

MR. NUTTER: Now you're referring to the exhibit that you have.

MR. KELLAHIN: Yes, sir.

MR. NUTTER: The core analysis that you have as an exhibit in here?

MR. KELLAHIN: It's Exhibit Number Four, Mr. Nutter, and it refers to the core analysis on the A-2 Well.

MR. NUTTER: Okay.

Q. Now let me ask you, in your opinion as a geologist, does that core analysis -- is that typical or

confined only to the A-2 Well or is that typical of the Fusselman formation in this pool?

A. It would be to me typical of the -- of the formation in the field, I would say so, sir.

Q. Now I'd like to direct your attention, Mr. Drisko, to the question of whether or not there is an impermeable barrier that exists between the, what we call Montoya, or what Enserch call the Montoya, and what we have referred to in this hearing as the Fusselman.

First of all let me ask you this, Mr. Drisko. You, as a geologist, can you -- do you make the distinction between the Fusselman and the Montoya? Is that a readily separable formation?

A. From the cuttings, examined them, compiled my -- to me it is not possible to define Fusselman from the Montoya. Where we got into this onto your insoluble residues, is a -- is a way to determine different formations, which is taken with a certain grain of salt.

Q. All right, sir, if in examining the cuttings, and you find the presence of this insoluble residue, in your opinion as a geologist would that constitute an impermeable barrier between the Fusselman and the Montoya?

A. The insoluble residues is not in the formation. It is -- it's a way of determining the rock form-

confined only to the A-2 Well or is that typical of the Fusselman formation in this pool?

A. It would be to me typical of the -- of the formation in the field, I would say so, sir.

Q. Now I'd like to direct your attention, Mr. Drisko, to the question of whether or not there is an impermeable barrier that exists between the, what we call Montoya, or what Enserch calls the Montoya, and what we have referred to in this hearing as the Fusselman.

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A. From the cuttings, examined them, compiled my -- to me it is not possible to define Fusselman from the Montoya. Where we got into this onto your insoluble residues, is a -- is a way to determine different formations, which is taken with a certain grain of salt.

Q. All right, sir, if in examining the cuttings, and you find the presence of this insoluble residue, in your opinion as a geologist would that constitute an impermeable barrier between the Fusselman and the Montoya?

A. The insoluble residues is not in the formation. It is -- it's a way of determining the rock form-

ation or the age of it.

Q. All right, sir, and it would just be determination of the age and it would not be evidence of a barrier?

A. No, it would not create a barrier.

Q. All right, let me direct your attention to the comments made by Mr. Renoult concerning the presence in the proposed disposal well -- remember he testified that there is a portion lower down near what he calls the top of the Montoya that constitutes a tight streak, and then he also testified in the Phillips "A" 2 Well that there was two tight sections that appeared, one was lower and the other one was higher. With regards to those particular tight streaks, do you have an opinion as to whether or not those tight streaks constitute an impermeable barrier between the two?

A. If there was a large vertical fracturing up here, there is a -- there is a chance that it would be also -- also into the -- those zones throughout the formation.

Q. The existence of the large vertical fractures is neither speculation or supposition on your part. You've actually examined the cores of one of the wells and saw the --

A. I saw this core on the A-2.

Q. Now with regards to the core analysis,

Mr. Drisko, are the fractures indicated in your analysis created by the actual making of the core or do they demonstrate actual fractures in the formation?

A. They were very typical of fractures in the formation in that there was some hard crystalline facies along the fractures.

Q. In your opinion as a geologist, Mr. Drisko, would approval of Enserch's application constitute an unreasonable risk to the correlative rights of Phillips Petroleum Company?

A. It would definitely create some risk, I think.

Q. In your opinion would the approval of the application constitute the premature watering out of any of the Phillips wells producing currently from the Fusselman?

A. It could.

Q. Based upon your study, Mr. Drisko, would you recommend that the Examiner grant this application?

A. No.

Q. All right, sir, no further questions.

MR. NUTTER: ARe there any questions of Mr. Drisko?

MR. CARR: I have one.

CROSS EXAMINATION

BY MR. CARR:

Q. Mr. Drisko, you stated, I believe, that there were crystalline facies along these fractures?

A. Yes, sir.

Q. Couldn't those crystals tend to seal them off?

A. If they were sealed off they would not be fractured as you took it out of the hole.

Q. If they were fractured in the formation and then these crystals formed, they could seal them.

A. They could seal them, but in this one they were not sealed off.

Q. Was there evidence of any fluid migration through those fractures?

A. That is something I couldn't tell.

MR. CARR: I have no further questions. Thank you.

MR. NUTTER: Are there any further questions of the witness?

MR. KELLAHIN: That concludes Phillips' presentation.

MR. NUTTER: You may be excused, Mr.

Do you have a rebuttal witness, Bill?

MR. CARR: I'd like to call Mr. Brown for one very brief presentation.

THOMAS E. BROWN

being recalled as a witness, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Brown, I would like you to refer to what has been marked for identification as Enserch Exhibit Number Fifteen, identify this, and explain what it is and what it shows.

A. Exhibit Number Fifteen is an insoluble residue report from the Residue Research Laboratory in Midland, Texas. The reason this was made, it's very difficult to determine samplewise whether you're in Fusselman or Montoya, on just visual examination.

One fairly effective means of determining the difference is to run your insoluble residues and see the various mineral suites in the two formations.

Charlie Timberlake at Residue Research Laboratory ran these samples independently, hadn't seen the

log, it wasn't released at the time. He ran the samples and he determined that the top of the Montoya was in fact at 7880, which actually is 20 foot high to where I picked it in the samples, where I have it marked on Exhibit Three. It was in a shale and I wouldn't know one way or the other, so I just picked the first dolomite below that point of the mark there, but he in fact picked it at that point, and I don't know if the samples were lagged enough to vary that 20 foot or not, but it would be pretty close.

Q. In your opinion are the Montoya and the Fusselman separate formations?

A. Yes.

MR. CARR: I have no further questions of Mr. Brown.

MR. NUTTER: Any questions?

CROSS EXAMINATION

BY MR. KELLAHIN:

Q. This study of the top of the Montoya shows it to be 20 feet closer to the producing perforations in the Phillips wells than you indicated.

A. That's correct, which also puts 20 more foot from the top of our proposed injection interval from the top instead of 2 feet.

Q. And we spent 40 minutes this morning talking about the reasons you believe they're separate.

A. Yes.

Q. Is that right? You haven't changed those reasons, have you?

A. No.

MR. CARR: I would like to offer Enserch Exhibit Number Fifteen.

MR. NUTTER: Enserch Exhibit Fifteen will be admitted in evidence.

Mr. Kellahin, before we get into final statements, this morning, I believe it was when Mr. Brown was on the stand, you asked him if he had made any study as to any type of monitor well or monitor activities to be taken --

MR. KELLAHIN: Yes, sir.

MR. NUTTER: -- to be sure that the water wasn't in effect going to drown out the Phillips well.

MR. KELLAHIN: And Mr. Brown's answer was that he was not aware of any way that that could be done.

MR. NUTTER: That it could be done.

MR. KELLAHIN: That's right.

MR. NUTTER: Right. I'll call for final statements now.

Mr. Carr, you can go last.

MR. KELLAHIN: Very briefly, Mr. Nutter, I think the granting of this application poses a very substantial risk on the producing Fusselman wells in the area.

The applicant has failed to demonstrate a justification to allow that kind of risk to take place. They have testified that it costs them $1.58 to haul the water away. Phillips' testimony is the current rate paid for the oil in the area is $38.00 a barrel; that it's still economic for them to do so.

There's been no testimony from the applicant that his property will have to be abandoned if he's required to continue to truck his disposed water. There are no overwhelming considerations to justify the substantial risk imposed.

To the contrary, we've demonstrated that Phillips, as a purdent operator, is examining formations to use as disposal intervals and has found the Wolfcamp formation substantially higher and it will not pose a risk to the Fusselman.

We think that it would be prudent upon Enserch as an operator to make that examination themselves. Their witnesses have testified that they have examined no other formation than the Montoya.

We believe that their case at this point

fails to support the necessary evidence required for its granting, and that it therefor ought to be denied.

MR. NUTTER: Mr. Carr?

MR. CARR: Mr. Nutter, Enserch Exploration, Inc., has appeared before you today seeking approval to dispose of produced salt waters in their Rader No. 2 Well in the Montoya formation.

We submit that we have complied with all the requirements of Rule 701 and also, all the requirements of your Memo 3-77, and therefor should be entitled to inject water into this formation.

We have been opposed by Phillips, who has presented testimony contending that there are vertical fractures in this area that would permit water injected to migrate into the Fusselman, a separate formation, and therefor damage their wells.

The only evidence they have on vertical fracturing is a core analysis on one individual well. It is a well in which no water is being produced in a water drive reservoir, and although their witness could not testify to that, you ruled earlier that you would refer to the record in the prior case and in that record it clearly establishes that we're dealing with a water drive reservoir.

If there are fractures in the Lambirth

No. 2-A Well, it would seem logical in a water drive reservoir that these large fractures would be permitting water to move into that well and water, therefor, would be being produced. Are being produced.

We have come before you. We've made, I think, a substantial showing that we can affect substantial savings by being able to inject into the Montoya formation. We have shown you that there are two impermeable zones segregating the injection interval from the producing Fusselman formation. We submit that these zones may have only 2 percent porosity and we leave it to your discretion to determine whether or not those qualify as tight zones which would prevent the migration of water absent fracing into the shallower formation.

We submit we've complied with all the requirements that should entitle us to this application, and pray that the application be granted.

MR. NUTTER: Thank you, Mr. Carr.

I'll direct this question to you, Mr. Carr, or one of your witnesses, or anybody with your company, the Lambirth "A" No. 3 is currently producing from the Pennsylvanian, I think. Did it formerly produce from the Fusselman?

The well that's directly west of the

subject well?

MR. CARR: Uh-huh.

MR. KERSH: Right, it wasn't commercial.

MR. NUTTER: Well, your Exhibit Number Two shows it colored green and blue both, so I didn't know if it was a dual completion in the Fusselman and Pennsylvanian or if it was formerly in the Fusselman and now in the Pennsylvanian.

MR. BROWN: It was formerly Fusselman and now it's Pennsylvanian.

MR. NUTTER: Did it water out in the Pennsylvanian -- in the Fusselman?

MR. BROWN: No.

MR. NUTTER: Just quit producing.

MR. BROWN: Uh-huh.

MR. NUTTER: Does anyone have anything further they wish to offer in Case Number 7226?

We'll take the case under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

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I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7226 heard by me on 4/22 19 81.

, Examiner
Oil Conservation Division

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
22 April 1981

EXAMINER HEARING

IN THE MATTER OF:

Application of Enserch Exploration, Inc., for salt water disposal, Roosevelt County, New Mexico.

CASE 7226

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

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MR. NUTTER: The hearing will come to order, please.

We'll call now Case Number 7226.

MR. PADILLA: Application of Enserch Exploration, Inc., for salt water disposal, Roosevelt County, New Mexico.

MR. CARR: May it please the Examiner, my name is William F. Carr, with the law firm Campbell, Byrd, and Black, P. A., Santa Fe, New Mexico, appearing on behalf of the applicant.

We have two witnesses who need to be sworn.

MR. NUTTER: I'll call for other appearances.

MR. KELLAHIN: I'm Tom Kellahin, of Santa Fe, New Mexico, appearing on behalf of Phillips Petroleum Company.

MR. NUTTER: Would you proceed, Mr. Carr?

MR. PADILLA: I'll swear all the witnesses at this time.

(Witnesses sworn.)

MR. CARR: At this time I'd call Tom

Brown.

THOMAS E. BROWN

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Will you state your full name and place of residence?

A. Thomas E. Brown, Midland, Texas.

Q. Mr. Brown, by whom are you employed and in what capacity?

A. I'm employed by Enserch Exploration, Incorporated, as an area staff geologist.

Q. Have you previously testified before this Commission and had your credentials as a geologist accepted and made a matter of record?

A. Yes, I have.

Q. Have you made a study of the area which is the subject of this application today?

A. Yes.

Q. Are you familiar with the application which was filed in this case?

A. Yes.

MR. CARR: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are.

Q. Mr. Brown, will you briefly state what Enserch seeks with this application?

A. Form C-108, we are applying -- make application to dispose of salt water by injection in the Gladys Rader No. 2 Well.

Q. And is that Form C-108 what has been marked as Enserch Exhibit Number One?

A. Yes.

Q. Will you please refer to this exhibit and point out any of the relevant matters contained thereon?

A. The well in question, the Enserch Exploration, Incorporated, Gladys Rader No. 2, was drilled as a development well in the Peterson South Fusselman and/or Penn Field.

After drilling analysis and testing, it was being noncommercial, and then we propose to make it as a water disposal well in the Montoya formation through perforations 7902 through 7930.

Q. Has this form previously been supplied to Phillips?

A. Yes.

Q. Will you now refer to what has been marked for identification as Enserch Exhibit Number Two and explain to the Examiner what this is and what it shows?

A. Exhibit Number Two is a base map, one inch equals 2000 feet. The producing wells in the field are all marked on here with the green wells, which produce from the Pennsylvanian and the blue, light blue on here, are wells which produce from the Fusselman formation. The gray stippled background on here are leases owned or operated by Enserch Exploration, and the circle that's on the map is a half mile radius of the Gladys Rader No. 2.

MR. NUTTER: Mr. Brown, before you go further, I was looking at the color code here. Now up here in the legend a dark green is Pennsylvanian and a light blue is Fusselman, yet I look at the map and I see some very light green. Would that be, the three light green wells in the south and one up here in the north, are they the same green that's in the legend?

A. They're supposed to be, yes.

MR. NUTTER: Okay, then the -- all of the wells are colored in dark blue with the exception of Well No. 3, which is shown a light blue and green, and the legend is light blue. Are all these dark blue wells Fusselman

wells?

A. That's correct.

MR. NUTTER: So there's just a variation in the color code slightly.

A. Yes. There's a problem with No. 3.

MR. NUTTER: Any shade of blue is Fusselman. Any shade of green is Pennsylvanian, then?

A. That's correct. The Enserch No. 3 Lambirth produced from Fusselman and was plugged back to Cisco. That's why it shows dual color.

Q. Mr. Brown, will you now refer to what has been marked Enserch Exhibit Number Three, which is your A-A' cross section, and review this for Mr. Nutter?

A. This cross section is a north/south cross section that goes from the Enserch Lambirth No. 7 Well through the Phillips Petroleum Company Lambirth "A" No. 4, on south to the well in question, which is the Enserch Exploration Company Gladys Rader No. 2, and one location further south to the Gladys Rader No. 1.

This is a structural cross section. It's 500 -- 5 inches per 100 foot vertically, and horizontally is 1 inch equals 100 feet. It's a structural cross section and the datum is -3200 foot right here. The well shows all the producing formations within the field on the cross section

What I'm testifying here is that in this Gladys Rader No. 2 the perforations at 7902 to 7930 are in the Montoya formation as we've correlated it through the field.

Q. Mr. Brown, are these perforations below the Fusselman?

A. Yes, they are.

Q. Do you have anything further to testify to from this exhibit?

A. No.

Q. Does Enserch plan to call an engineering witness to further expand on this application?

A. Yes.

MR. CARR: At this time, Mr. Nutter, we would offer Enserch Exhibits One through Three.

MR. NUTTER: Enserch Exhibits One through Three will be admitted in evidence.

MR. CARR: I have nothing further of Mr. Brown on direct.

MR. NUTTER: Are there any questions of Mr. Brown?

MR. KELLAHIN: Yes, sir.

MR. NUTTER: Mr. Kellahin.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Brown, let me direct your attention back to your Exhibit Number One. Mr. Carr asked you some questions with regards to Exhibit Number One. Mr. Brown, did you prepare or compile the information from which this exhibit was prepared?

A. No, I did not.

Q. What was your participation, if any, in the preparation of the information that's on this exhibit?

A. I helped them with the formation they were proposing to inject with water.

Q. You helped them in what way, Mr. Brown?

A. On which formation they were dumping into.

Q. And upon what did you make that recommendation? What did you study to reach that recommendation?

A. The samples on the Gladys Rader No. 2 Well.

Q. What do you mean by samples? Core samples?

A. Analysis of the samples while drilling.

Q. The core samples while drilling of the well?

A. The drilling cuttings.

Q. Drilling cuttings. Did you also examine the log on that No. 2 Well?

A. Yes, I did.

Q. Did you examine any other well in the area as a potential well for salt water disposal?

A. I did not.

Q. All right, sir.

In examining the No. 2 Well to determine whether it was suitable for disposal purposes, what kind of parameters were you giving in terms of the volume of water that had to be disposed of in that formation, the rates, that kind of thing, whether it was --

A. I did not get any of those rates.

Q. You were not given that information?

A. No, I didn't give it. You asked which -- which parameters I gave as to its suitability and I did not give any parameters, only the formation.

Q. Did anyone give you any parameters with regards to the amounts of water to be disposed of in a given formation?

A. I know what they are, yes, I was given that.

Q. And what are they?

A. The average daily volume proposed is 1650 barrels a day.

Q. And what would be the maximum disposal rate on a daily basis?

A. It would be possible to go 5976 barrels.

MR. CARR: May it please the Examiner, we have another witness who is going to testify as to daily volumes that will be injected, and if Mr. Kellahin wants to pursue this further, it might be adviseable to wait for him? He has a lot more information on the subject.

MR. KELLAHIN: Well, my questioning goes to the point, Mr. Examiner, of what information this geologist had to determine whether or not the Montoya was going to be able to accept a given amount of water, and that was my only question.

A. Only the engineering data that -- that was submitted by the company.

Q. Okay, and it was your recommendation to use the Montoya as the disposal formation for water produced from the South Peterson Fusselman Pool?

A. Yes.

Q. All right, sir.

A. Since it's nonproductive in the area.

Q. The MOntoya is nonproductive in this

particular well?

A. To my knowledge it may not be productive in the whole county.

Q. All right. The perforations in the -- the top perforations in the Montoya in the proposed disposal well, looking across the room, appear to fall perhaps a foot or so just below the base of the Fusselman. Could you go to the cross section and indicate for us exactly where that top perforation is in relation to the base of the Fusselman?

A. The natural top as picked on here is -- is 7900, and the top of the perforation is 7902.

Q. 7902. Now, your cross section shows us that there are offset wells of Phillips that produce from the Fusselman.

A. Yes, it shows that.

Q. All right. Have you made an examination of what the direction of water flow in the Montoya will be if this well is used as a disposal well?

A. No.

Q. You've not studied to determine whether it will follow a structure or anything? You don't know where the water's going to go in relation to its disposal in the Montoya?

A. No.

Q. Would it be your opinion that the water disposed of in the Montoya would remain confined in the Montoya?

A. From evidence submitted by our engineering department, I would say yes.

Q. Based upon your own information and study, do you have an opinion as to whether that water will remain confined to the Montoya?

A. I don't know.

Q. So you can't tell us whether or not it will or will not remain confined to the Montoya?

A. No, I cannot. That evidence can only be determined by engineering evidence.

Q. Would a geologist in making his determination study core data of any wells in the area?

A. Normally, but we don't have any available of that interval.

Q. Has Phillips, or any of Phillips' employees supplied you with core data from any of the wells from which you can make that determination?

A. Not that I'm aware of.

Q. Would it be important to you as a geologist if one of these wells in the area that produced from the Fusselman showed significant fracturing into the

Montoya?

A. I suppose so, but I wouldn't know how to prove it.

Q. Well, wouldn't the fracture communication between the Fusselman and the Montoya cause water to migrate of the Montoya into the Fusselman?

A. I don't have any evidence of that.

Q. If that evidence did exist showing that fracture existed in these wells, would it not cause that water to migrate into the Fusselman?

A. If it was there and it was open, of course it would.

Q. Now if there is a fracture system occurring between the Fusselman and the Montoya that would cause water to migrate out of the disposal interval, the Montoya, it could result in the premature abandonment of production from the Fusselman wells, could it not, Mr. Brown?

A. I would think that would determine several things. One, if the fractures would ever reach high enough to get the water up to where it's producing from, and two, it would determine if there's already water at that point, that I don't see how it would affect it.

Q. If the Division should approve this well as a disposal well in the Montoya, are you aware as a geologist

of any way that the Division could establish a method of monitoring the offset producing Fusselman wells to insure that the disposal water is not migrating on to the Fusselman acreage being produced by those Fusselman wells?

A. I don't -- that would, I would assume that would be engineering information. Normally that wouldn't come to my attention.

Q. Now in examining the No. 2 Well, Mr. Brown, have you examined any other formation penetrated by that well to determine whether it's an acceptable formation for disposal of water?

A. I personally have not, although you see on the cross section we attempted to -- to produce in both the top of the Peterson formation and in the Fusselman formation, and we were not able to have enough porosity and permeability to do anything in those zones, so those zones are fairly tight, so I can just tell by the tests that they would not be acceptable for water.

Q. Have you made any studies to determine whether the Wolfcamp formation would be an acceptable disposal formation in this well?

A. No, I have not.

Q. And what about the Glorieta formation?

A. In regards to the Glorieta formation,

if you'll look on the map, which was Exhibit Number Two, and you can see about 3/4 of a mile southwest of the Enserch No. 5 Lambirth?

Q. No sir, I haven't found it yet.

A. It will be in Section 1.

Q. All right, sir.

A. Township 6 South, 33 East, that particular well we tried every porous formation from down in the Penn all the way upward, and weren't finding anything that would take any water.

Q. That well is substantially to the south of the proposed well, is it not?

A. 3/4 of a mile southwest.

Q. Have you run any injectivity tests in any formation in the proposed disposal well to determine whether it will accept water or not?

A. Only the two pays, the Penn and Fusselman. And they would not.

Q. You've attempted to inject --

A. No.

Q. You've attempted to --

A. They wouldn't, they were so tight they wouldn't give up anything, so they wouldn't be acceptable as water.

Q. Based upon your analysis of the Fusselman in this well, you didn't even attempt an injectivity test in the Fusselman, is that what you told me?

A. That's correct.

Q. All right. That disposal well, in fact, was perforated in the Fusselman, was it not?

A. Yes, it was.

Q. It would appear to be several feet of perforations in the Fusselman in the upper end of the Fusselman formation?

A. That's correct.

Q. Would you locate those perforations for us, Mr. Brown?

A. We perforated the interval 7848 to 49, 50, and 51 with two jet shots per foot.

Q. Are there any other wells in this pool, Mr. Brown, that are being used currently for salt water disposal?

A. I think not.

Q. Enserch's application indicates in paragraph three that other wells in the pool are currently being used for salt water disposal.

A. I'm not aware of it.

Q. Is that statement true? You don't know

or there aren't any.

A. I'm not aware of it. I didn't know we said that.

Q. Your No. 1 Well, which is the last well on the right of the cross section, Mr. Brown, that was a dry hole, was it?

A. That's correct.

Q. It was drilled to -- through what formations?

A. It was drilled from surface into the Granite.

Q. Did you test the Montoya in that well?

A. Yes, we did.

Q. Have you studied to determine whether or not that well might be used as a disposal well?

A. The interval we perfed wouldn't take anything; it's too tight.

MR. NUTTER: You don't mean perforated, do you?

A. No, we tested it.

MR. NUTTER: You -- drill stem test is what you mean.

A. Yes, we ran a DST on there and all we got was 60 foot of drilling mud. It was real tight.

Q. That test was run through the interval which would have found either Fusselman or Montoya?

A. We -- we think it's Montoya.

Q. It appears from your cross section that you show the Fusselman to have wedged out or pinched out at that location where you perforated?

A. We feel it's been eroded off that high.

Q. Mr. Brown, you've indicated to us that you don't know whether or not this water -- where this water is going to go in the Montoya, whether or not it will be -- remain confined in the Montoya, is that true?

A. That's correct.

Q. All right. Now let me ask you about your cross section. You picked a datum of 3200 feet. What is the marker that you hung the structural cross section on? What -- is there some common point --

A. --3200 feet, where that goes in each well.

Q. Yeah, what --

A. It's a structural datum. It's not a correlation mark.

Q. All right. What at 32 -- well, what did you hang the cross section on so that you know that you've correlated them properly?

Is there some marker there through this

area that you put these --

A. The structures are hung on -3200 feet. That occurs in every well penetrating this depth in the field. You just merely subtract the surface elevation to get your subsea datum from that point. So this is structurally the way they are.

Q. As opposed to a stratigraphic cross section?

A. That's correct.

Q. All right. If you'll stay there for a moment, Mr. Brown, you drew the line that shows the base of the Fusselman and the top of the Montoya through those wells, did you not, sir?

A. Yes, I did. Through two wells.

Q. Through the proposed disposal well and Phillips "A" No. 4 Well?

A. That's correct.

Q. What caused you to draw the top of the Montoya at that location? Can you describe for us on each of the logs what you saw that caused you to do that?

A. This is based upon our top of the Montoya as we've correlated it through the field. I have no samples on the Phillips well.

Q. Have you discussed with Phillips the

pick of the top of the Montoya --

A. No, I have not.

Q. -- in their well? You don't know whether or not that correlates to their pick, then?

A. No.

Q. All right, sir.

A. I would assume that it would be, it would vary.

Q. All right, sir.

A. Most people, the only separation between the Fusselman and the Montoya is generally determined by insoluble residues of the samples, and I did not have the samples. I didn't have --

MR. NUTTER: In what, please?

A. The insoluble residues.

MR. NUTTER: Oh.

Q. There's not any kind of a shale barrier or anything between the Fusselman and the Montoya?

A. It's not consistent.

Q. Say again?

A. It's not consistent throughout the field.

Q. I don't know what you mean.

A. It's not a pick that's in every well,

so you can't go by a shale marker.

Q. All right, the insoluble residues --

A. The insoluble residues will show up Montoya, primarily because of the amount of sand that's present in it.

MR. NUTTER: Do you believe this insoluble residue creates any kind of a vertical barrier towards migration from Montoya into the Fusselman?

A. I really don't have any evidence one way or the other.

MR. NUTTER: It wouldn't be, you don't know that it would be like an impermeable shale overlying the top of the Montoya, then.

A. No, because most of the residue left is quartz and not shale.

Q. Mr. Brown, have you made a study or reached any conclusion about any factors which would cause you to conclude that the Montoya is physically separated from the Fusselman as it crosses through those two wells?

A. I personally have not.

MR. KELLAHIN: I have nothing further of the witness.

MR. NUTTER: Are there any other questions of the witness?

MR. CARR: I have just a couple.

REDIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Brown, in making a study of this area did you find any evidence which would cause you to conclude that there were vertical fractures between the Montoya and the Fusselman?

A. No.

Q. Are you aware of any plans in the general area for salt water disposal wells other than that of Enserch?

A. No.

MR. CARR: I have nothing further of Mr. Brown.

MR. NUTTER: Are there any other questions? The witness may be excused.

MR. CARR: At this time I would call Mr. Renoult.

DANIEL C. RENOULT

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Will you state your full name?

A. My name is Daniel C. Renoult.

Q. Would you please spell that?

A. R-E-N-O-U-L-T.

Q. Mr. Renoult, where do you reside?

A. Midland, Texas.

Q. By whom are you employed?

A. Enserch Exploration, Inc.,

Q. And in what capacity?

A. District Petroleum Engineer.

Q. Will you summarize for the Examiner your educational background?

A. I obtained a BS degree in mechanical engineering in 1974 in France, and an MS degree in petroleum engineering in 1975, University of Texas, Austin.

Q. Since that time by whom have you been employed?

A. Enserch Exploration since 1976.

Q. Are you familiar with the application that was filed in this case?

A. Yes, sir.

Q. And are you familiar with the subject

area?

A. Yes, sir.

MR. CARR: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, sir.

Q. Mr. Renoult, will you please refer to what has been marked for identification as Enserch Exhibit Number Four, and review this for Mr. Nutter?

A. Exhibit Number Four provides information about the completion and current producing formations of the nearest offset wells to the proposed Rader Well No. 2.

The Enserch Rader Well No. 2 is currently perforated through the Montoya lime from 7902 to 7930, -3503 to -3531 subsea.

Three other wells located within the half mile radius are listed on this exhibit, the Enserch Rader No. 1, the Phillips Petroleum Lambirth "A" Well No. 4, and the Enserch Lambirth No. 3.

The Phillips Petroleum "A" No. 4, located 1750 feet northwest of the Rader No. 2 is completed through the Fusselman from 7814 to 7828, -3423 feet to -3437 feet subsea. This is 60 feet high subsea-wise to the perforations in the Enserch Rader Well No. 2.

Finally, on this exhibit three wells

just outside the half mile radius are listed, the Phillips Petroleum Peterson "H" Well NO. 1, the Enserch Lambirth No. 7, and the Phillips Petroleum Lambirth "A" No. 1.

The Phillips Petroleum Peterson "H" No. 1, located 2600 feet north of the Rader No. 2, the dry hole, Phillips Petroleum plans to dispose of water in this well.

Q. Now, Mr. Renoult, this is a tabular summary of all wells within a one half mile radius of the subject well, is that correct?

A. Approximately half mile radius. Three wells are slightly outside of the half mile radius.

Q. And on this table you have presented all that data required by Oil Conservation Division Memo No. 3-77, is that correct?

A. Yes, sir.

Q. Will you please refer to what has been marked as Applicant's Exhibit Number Five and review this for the Examiner?

A. Exhibit Number Five is a well schematic of the proposed Enserch Rader Well No. 2, the Enserch Rader Well No. 1, and the Phillips Petroleum Peterson "H" Well No. 1.

The proposed salt water disposal Enserch Rader No. 2 was tested through the Fusselman and Peter-

son lime and proved unproductive. These two intervals were subsequently squeezed. The well is currently perforated through the Montoya from 7902 to 7930, where Enserch plans to inject water.

The second schematic pertains to the Enserch Rader Well No. 1. This was a dry hole and was abandoned in July, 1979.

The third schematic pertains to the Phillips Petroleum Peterson "H" Well No. 1. This was a dry hole and was extensively tested through the Fusselman and Pennsylvanian. This well is located 2600 feet north from the subject Rader No. 2. Phillips Petroleum plans to dispose of ater in this well in the Wolfcamp formation from 7332 to 7341.

MR. NUTTER: How do you know that, Mr. Renoult?

A. I received a letter from Phillips Petroleum informing Enserch that they are planning to dispose water in this well.

MR. NUTTER: I see. They notified you themselves, then.

A. Yes, sir.

Q. Now, Mr. Renoult, referring then to the schematic of the subject well, in your opinion will the pro-

posed completion result in this well being cased and cemented so as to prevent contamination of oil, gas, and water resources in the area?

A. Yes, sir.

Q. Will you now refer to what has been marked Enserch Exhibit Number Six and review this?

A. Exhibit Number Six is a plat showing Enserch acreage shaded in gray in the subject area with two mile radius from the proposed salt water disposal Enserch Rader No. 2 is evidenced on this plat.

Within this two mile radius there is not one single well which produced from the Montoya formation where Enserch is planning to dispose salt water. Within this two mile radius only one well is completed below the Montoya, the Energy Reserves Miller Well No. 1, evidenced by the yellow dot, which was tested through the Granite Wash formation.

MR. NUTTER: Granite Wash, huh?

A. Yes, sir.

MR. NUTTER: Is it still producing, do you know?

A. This well was just tested a few weeks ago.

MR. NUTTER: And it the symbol there is a gas well, so it would be a gas well in the Granite Wash?

A. Yes, sir.

MR. NUTTER: Okay. Go ahead.

Q. Will you now refer to Exhibit Number Seven and review that for Mr. Nutter?

A. Exhibit Number Seven is a table listing all the wells located within the two mile radius from the proposed salt water disposal Enserch Rader No. 2.

This table gives the distance to the subject Rader Well No. 2 and the current producing formation.

Q. Now refer to Exhibit Number Eight and review this.

A. Exhibit Number Eight is the oil production history from the wells currently producing from the Fusselman and directly offsetting the Enserch Rader Well No. 2.

Production history is presented under graphical and tabular form, for the oil and gas and water.

The first graph and table pertains to the Phillips Petroleum Lambirth "A" Well No. 1. This well is located approximately a half mile from the Enserch Rader Well No. 2. As of December 31st, 1980, its cumulative Fusselman oil production was equal to 85,880 barrels of oil, and its cumulative water production was equal to 68,412 barrels of water.

The second graph and table pertains to

Enserch Lambirth No. 7. As of December 31st, 1980, this well produced 75,069 barrels of oil from the Fusselman and 27,673 barrels of water from the Fusselman.

The third, and last, graph and table pertain to Phillips Petroleum Lambirth "A" No. 4. This well is located approximately 1750 feet northwest of the subject well.

As of December 31st, 1980, its cumulative Fusselman oil production was equal to 71,332 barrels and its cumulative water production was equal to 17,325 barrels of water.

Q. Mr. Renoult, would you now refer to Enserch Exhibit Number Nine and review that for the Examiner?

A. Exhibit Number Nine is a table giving the water production from the Enserch Exploration wells in the Peterson South Fusselman and Pennsylvanian Field.

As of December 31st, 1980, total cumulative Enserch water production was equal to 310,587 barrels of water, of which 89 percent was produced from the Fusselman. During the month of December, 1980, Enserch produced 22,663 barrels of water. This corresponds to 731 barrels of water per day.

Enserch is currently paying $1.58 per barrel to transport and dispose of water in the Jenkins and

Southland salt water disposal well. This corresponds to a total expenditure of $35,807 to dispose water during the month of December, 1980.

Q. Mr. Renoult, will you now refer to Exhibit Number Ten?

A. Exhibit Number Ten is a tabulation of the water production of the Phillips Petroleum Wells in the Peterson South Fusselman and Pennsylvanian Field as of December 31st, 1980.

Phillips Petroleum cumulative water production was equal to 114,666 barrels of water, of which 93 percent were produced from the Fusselman.

This data combined with the results of Exhibit Number Nine indicate that the strong water drive is present in the Petterson Fusselman Field.

Q. Mr. Renoult, will you now refer to what has been marked as Enserch Exhibit Number Eleven and review this for Mr. Nutter?

A. Exhibit Number Eleven is a table giving the total solids content of the Penn water and Fusselman water in three different wells.

The total solids content of Penn water was equal to 102,352 milligrams per liter.

The total solids content from the

Fusselman water was equal to 105,982 milligrams per liter in the Lambirth No. 6.

And 105,612 milligrams per liter in the Lambirth No. 7.

This is considered a relatively minor difference in total solids contained between the Penn and the Fusselman water. The water samples were analyzed by Martin Water Lab from Midland.

Q All right Mr. Renoult, now will you review Exhibit Number Twelve for Mr. Nutter?

A. Exhibit Number Twelve is the terms of a stimulation treatment and injectivity first performed on the proposed salt water disposal Enserch Rader Well No. 2.

The well is perforated through the Montoya from 7902 to 7930, -3503 to -3531 subsea. This is 66 feet lower than the offset Phillips Petroleum Lambirth "A" Well No. 4, which is producing from the Fusselman horizon.

The Rader Well No. 2 was stimulated with 10,000 gallons of MOD 202 acid. An injection test was performed on March 27, 1981. Five barrels per minute were injected at 2400 psi; 2 barrels per minute were injected under vacuum. The results are exposed under graphical form on page two of this exhibit.

Based on the maximum allowed injection

requirement of 0.2 psi per foot, the maximum allowed injection volume is equal to 5976 barrels per day.

In comparison, during the month of December, 1980, Enserch and Phillips Petroleum produced 910 barrels of water per day from the Peterson South Field.

MR. NUTTER: That's both companies put together?

A. Yes, sir.

MR. NUTTER: Fine.

A. This volume could be injected under vacuum in the proposed salt water disposal Enserch Rader Well No. 2.

Q. Mr. Renoult, will you now refer to Exhibit Number Thirteen and review this for Mr. Nutter?

A. Exhibit Number Thirteen provides water encroachment calculations based on injection volume proposed for the Enserch Well No. 2.

2800 feet of net pay with an average porosity of 7 percent are present in the Montoya formation in the Enserch Rader No. 2.

Water encroachment calculations were conducted based on a continuous injection volume of 1650 barrels a day. The well is calculated that after three years only 148.5 acres would be encroached by injection of

water. This responds to a radius of only 1656 feet from the Enserch Rader Well No. 2.

This volume of 1650 barrels per day would be taken on vacuum.

It is also underlined that during the month of December, 1980, the full, total volume of water produced from the Peterson South Field was equal to only 910 barrels per day.

Q. Mr. Renoult, I believe you testified as to the rates that this particular well would take under vacuum. Is it your -- is it the intention of Enserch to inject water under pressure or just by gravity?

A. This will be based on the volume we have to inject in this well. If we inject -- if the volume is less than 2 barrels per minute, the water will be injected under vacuum.

Q. Do present production rates indicate that you could dispose of all water produced by injecting under vacuum?

A. Yes, sir.

Q. If you were, if you ever had to inject under pressure, would a pressure limitation of 0.2 per pound per foot of depth to the top of the perforations in this well be a satisfactory limitation for the purposes of Enserch?

A. Definitely.

Q. Mr. Renoult, in your opinion will granting this application be in the best interest of conservation, the prevention of waste, and the protection of correlative rights?

A. Yes, sir.

Q. Were Exhibits Four through Thirteen prepared either by you or under your direction and supervision?

A. Four through Thirteen, yes, sir.

MR. CARR: At this time, Mr. Nutter, we would offer Applicant's Exhibits Four through Thirteen.

MR. NUTTER: Exhibits Four through Thirteen will be admitted in evidence.

MR. CARR: And I have nothing further of Mr. Renoult on direct.

MR. NUTTER: Are there any questions of the witness?

MR. KELLAHIN: Yes, sir.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Renoult, let's turn to your Exhibit Number Seven, please.

The third well entered on your tabulation

is the Phillips Lambirth "A" No. 4 Well, Mr. Renoult?

It appears from the tabulation, Mr. Renoult, that that is the closest well that continues to produce from the Fusselman, closest in terms of distance from the proposed disposal, is that true?

A. Yes, sir.

Q. It shows a distance of 1730 feet, does it not?

A. Yes, sir.

Q. I believe in your testimony just now you indicated a radius for the -- a certain quantity of water disposed of in this disposal well that would reach a distance of 1656 feet, or approximately 100 feet short of that Phillips well.

Would you give me the information again upon which you made that calculation? What kind of volume were you talking about to reach that radius? You said that's the radius for 148.5 acres.

A. Exhibit --

MR. NUTTER: That's given on Exhibit Thirteen, is that correct?

MR. KELLAHIN: I think so. Yes.

MR. CARR: That's right.

A. This radius is based on the continuous

volume of 1650 barrels per day and based on the footage encountered in the Enserch Rader No. 2 and the porosity present in this well.

Q. Just a minute, let me make sure I understand your Exhibit Thirteen in relation to where it is in terms of the closest Phillips well.

In the third year of disposal having used a continual rate of disposal of 1650 barrels a day, by the third year you will have reached 1656 feet, is that correct?

A. Yes, sir.

Q. Am I reading that correctly?

A. Yes, sir.

Q. All right. You're going to dispose of 1650 barrels a day. What are you currently removing from your wells in terms of volumes of water per day?

A. As of December, 1980, Enserch was producing 731 barrels per day from the Peterson South Field.

Q. Upon what do you base your need for disposal at 1650 per day as opposed to what you're currently producing at 730-something a day?

A. Yes, you mean that Enserch would dispose water from the Phillips wells which are located in the Peterson South Field, and also assuming that water production might increase in the next few years or -- and months.

Q. All right, sir. If we take those assumptions to predict what perhaps will happen, then by the fourth year of your disposal at that particular rate, your radius of disposal is now 2343 feet, is it not, sir?

A. Yes, sir.

Q. And that will water out the Phillips 4-A Well, will it not?

A. Which formation?

Q. I assume in the Fusselman.

A. Well, we are injecting the water in the Montoya.

Q. How you going to keep the water confined to the Montoya, Mr. Renoult?

A. We are injecting water in the Montoya so the water will not go into the Fusselman formation.

Q. On what do you base the assumption that the water will remain confined in the Montoya?

A. It is a different formation supported by some tight stringers from the Fusselman, and also we are 66 feet lower subsea to the lowermost perf in the Lambirth "A" 4.

Q. Are you basing your opinion that the water will remain confined in the Montoya based upon the information Mr. Brown as a geologist has supplied to you?

A. No.

Q. You've independently examined the geology and determined that the water is going to remain confined in the Montoya?

A. I personally looked at the logs from the Enserch Rader Well No. 2 and Phillips Petroleum Lambirth "A" Well NO. 4.

Q. Did you find the same insoluble residue that Mr. Brown testified to as being the separation between the base of the Fusselman and the top of the Montoya?

A. I did not look at the residue; I look at logs only.

Q. Do the logs indicate any kind of shale barrier or any other impermeable barrier separating the Fusselman from the Montoya?

A. Yes, sir.

Q. They do?

A. Yes, sir.

Q. Can you show me on the cross section Number Three where that appears?

A. The Lambirth Petroleum -- the Phillips Petroleum Lambirth "A" Well No. 4, we have two tight stringers between the interval which is before the Fusselman and the Montoya. We have a tight stringer from 7924 to 7934, which

is the top of the Montoya.

Q. And, Mr. Renoult, let me stop you for a moment and give you this red pen so that we can have a record of where you're indicating these tight areas to be on Exhibit Number Three, please.

A. I prefer to go on my own exhibit, so --

Q. Do you have another exhibit?

A. I have marked the tight sections.

MR. CARR: May it please the Commission, or the Examiner, at this time we have an additional exhibit that can offer. It might be easier for Mr. Renoult to work from. We'll be happy to mark it as Enserch Exhibit Fourteen.

I don't know how Mr. Kellahin would like to present it or you would like us to present it. We can wait until he finishes cross, but obviously, it is becoming important at this time.

MR. NUTTER: Would you care for him to go ahead and give some direct testimony as to this exhibit, Mr. Kellahin? It might save some time on cross or maybe even elongate the cross for you.

Q. Let me try it this way, Mr. Renoult.

I asked you awhile ago if you relied upon Mr. Brown's opinion that the base of the Fusselman and the top of the Montoya were separated by these insoluble

residues. You said that you did not, that independently you've made your own study of the logs and you have determined that there is some reason that the Montoya, water disposed of in the Montoya, will remain confined in the Montoya. Do you have something to tell us that would demonstrate that?

A. No, I said I did not look at the residue in some of the wells, because I am not familiar with residues, but I look at the open hole logs in the Enserch Rader No. 2 and the Phillips Petroleum Lambirth "A" Well No. 4.

Q. All right, if you'll refer to what you've marked as Exhibit Number Fourteen and demonstrate for us upon what you have reached the conclusion that the water will remain separate from the Fusselman.

All right, sir, are we all ready? Mr. Renoult, would you go to what you have labeled as your Enserch Exhibit Number Fourteen and identify for us what you're talking about in terms of these tight areas?

A. Exhibit Number Fourteen is composed of a suite of logs. One is the Phillips Petroleum Lambirth "A" No. 4, which is located 1750 feet northwest of the proposed salt water disposal well.

The well on the left side of this exhibit, a resistivity duolateral log Micro (Reporter unable to understand). The scale on this log is .2 to 2000, ohm-meter

formula. Limestone matrix of 2.71 was used on this log. The scale on this log is from -10 percent porosity, plus 30 percent porosity.

The third log on the right of the exhibit the computer cyberlook log derived by Schlumberger on the two pages resistivity and porosity logs. The cyberlook parameters are listed in the heading. A water resistivity of .045 ohm-meter was used and the matrix current density of 2.71 gram was used.

The Phillips Petroleum Lambirth "A" Well NO. 4 is perforated from 7814 to 7828. This corresponds to -3423 to -3437 subsea. The lowermost perforations in the Lambirth No. 4 is 66 feet high to the uppermo perforation in the Enserch Rader Well No. 2.

This suite of logs shows that in the Phillips Petroleum Lambirth No. 4 a 10 foot tight streak with no porosity is present from 7840 to 7850. This is clearly evidenced in the CNL log and the cyberlook. The other tight streak from 7850 to 7924, the Fusselman is water bearing with an average water circulation of approximately 70 percent and the Fusselman exhibits some porosity as evidenced the FDCNL and cyberlook from 7924 to 7934. The Fusselman is tight and exhibits no porosity as evidenced by the FDCNL log and the cyberlook.

The Phillips Petroleum Lambirth "A" Well No. 4, the top of the Montoya was picked at a depth of 7934 feet. The Montoya in this well is highly porous and water bearing, as evidenced by an average water saturation of 70 percent, as indicated on the cyberlook.

Q. All right, Mr. Renoult, would you take my red pen now and mark on the -- whichever you want, Exhibit Number Fourteen or Exhibit Number Three, and show me where the, first of all, the first 10 foot tight streak is.

A. Okay, the first 10 foot is from --

Q. Yes, sir, would you just simply go to the board. You testified to it, but show me visually and mark on the log where it is.

A. 7848 --

Q. I won't be able to see it from here, Mr. Renoult, would you use the red pen, please?

A. Right here, 7840 - 7850, and the second tight streak is from 7924 to 7934, and below 7934 we have the Montoya formation.

Q. All right, Mr. Renoult, have you examined the logs of any other wells to determine whether those tight streaks extend beyond the wellbore in this well?

A. I like at the logs from the Rader No. 2 and Lambirth "A" No. 4.

Q. And what do those logs show you?

A. These logs show that the tight streak on top of the Montoya is present.

Q. In which wells?

A. Lambirth --

Q. In the proposed disposal well?

A. Yes, sir.

Q. That was one of them?

A. Within the Well --Rader Well No. 2.

Q. And what other well did you say?

A. The Lambirth "A" 4.

Q. The "A" 4, the proposed disposal well, was there any other wells that you found that tight sand?

A. I have not looked at any other wells as far as provision of the tight space.

Q. From what I understand of your study, Mr. Renoult, you haven't studied enough information to determine whether or not there is a sealing zone, or sand, or shale, isolating the proposed disposal well from the offset wells that produce from the Fusselman to the west.

MR. CARR: Is that a question?

Q. Yes, that's a question. Is that not true, Mr. Renoult?

A. Not true.

Q. It's not true. Did you examine the Phillips Lambirth "A" No. 1 Well to determine whether that tight section is present in that well?

A. I examined the wells which are located within the half mile radius as far as the production history is concerned, as far as the logs are concerned.

Q. On what exhibit is this half mile radius depicted, Mr. Renoult?

Is that on Exhibit Number Two?

A. Yes, sir.

Q. All right, it's just outside that radius, but according to your Exhibit Number Thirteen, by the fourth year of disposal you're going to exceed that radius.

A. If we inject continuous volume equal to 1650 barrels per day.

Q. Okay. Other than the comparison of the log information from the No. 4-A Well and the No. 2 Well, do you have any other information or have you made any other studies to determine that the water disposed of in the Montoya will remain confined in the Montoya?

A. I also presented on my Exhibit Number Fourteen, I indicated two tight streaks present in the Lambirth -- Phillips Petroleum Lambirth "A" Well No. 4, which is the only well that was in the half mile radius, and also I indicated

that Enserch is planning to dispose water in the Montoya 66 feet lower subseawise to the lowermost perf present in the Lambirth "A" No. 4.

Q One of these exhibits, I thought, had some calculations on the injectivity. Did you make some injectivity tests? Oh, here they are.

I found the exhibit, Mr. Renoult, it's Number Twelve.

Explain to me something about these injection tests that were run in March 27th of this year. Now, the test data shows that 2400 psi, is that a surface pressure or is that a bottom hole pressure?

A. That is surface pressure.

Q. Okay.

A. I didn't conduct the test myself.

Q. As an engineer, wouldn't it be important to you to know what the bottom hole pressure is instead of the surface pressure? To determine whether or not you're fracturing the formation even by gravity injection?

A. We are not going to fracture the formation by gravity if they're weighed in vacuum.

Q. Do you propose that your application is limited only to the disposal of water under vacuum and that you will not use pressure injection?

A. I used the maximum allowable injection gradient of 0.2 psi per foot to comply with the words of the New Mexico Commission.

Q. All right, sir. and using that as the criteria at this depth, what would be the bottom hole pressure?

A. I don't have this available.

Q. I beg your pardon?

A. I don't have this available at this time.

Q. Okay. Have you made any studies or calculations to determine what the fracture gradient is of the Fusselman in relation to the Montoya?

A. No, sir.

Q. So we don't know how much water we can dispose of in this well that will prevent the Montoya and the Fusselman from being fractured and the water migrating up into the producing Fusselman.

A. That's not what I said. I said I have not made any fracture study of the Fusselman. We are not planning to dispose water any different from the Montoya formation.

Q. Yes, sir, and you have not made any studies to determine whether you will fracture the confining strata around the Montoya formation.

A. Below 2 barrels per minute the water

would be in vacuum. We would not fracture the Montoya formation and I use a maximum allowed injection gradient of 0.2 psi per foot as indicated by the words of the Commission.

Q. Are you telling me it's impossible to fracture this formation when your disposal is less than the rates the water will enter the formation on a vacuum?

A. Yes, sir.

Q. You cannot fracture the formation if the water is going in on a vacuum?

A. Yes, sir.

Q. Exhibit Number Thirteen, Mr. Renoult, shows the parameters you used at the top of that exhibit from which you determined the radius of whatever it's called, the radiuses on the bottom of the exhibit that will show the area occupied by the water disposal? The parameters are on the top of Thirteen?

A. Yes, sir.

Q. Those are the ones used in the calculations?

A. Yes, sir.

Q. Are these the same parameters used by Enserch in their application for special pool rules for the South Peterson Fusselman Pool back in July of '78?

A. I don't know which application you are

talking about.

Q. All right, sir, I'll show you a copy of the Division Order entered in case R-5771 in Case 6270 by Enserch Exploration, which indicated that one well in the Fusselman is of a highly permeable nature and is capable of draining a radius in excess of 40 acres, and they grant permission to use 80-acre proration units.

Did you examine the data from which that case was presented to determine if the parameters used in this case are the same parameters?

MR. NUTTER: Wait a minute, Mr. Kellahin.

MR. KELLAHIN: Yes, sir.

MR. NUTTER: Now this -- the parameters here for the Montoya formation, and that case, you said, was for the Fusselman formation, I believe, so the parameters probably wouldn't be the same, anyway.

MR. KELLAHIN: Well, that was my question. Have you made an examination to determine if there is any difference between the parameters in the Montoya or the Fusselman?

A. I was not aware of these parameters until two seconds ago; however, I believe since we're dealing with two different formations the parameters are different.

Q. I'm concerned about how far the water

is going to move, Mr. Renoult, and I don't want to belabor the point, but if Mr. Brown's insoluble residue barrier is not there, then we've got to rely upon this 10 foot tight streak you're relying on, I want to find out when the water migrates up into what you admit is the Fusselman, how far that water is going to go, and we've not made that study, have we?

A. I never said the water would migrate into the Montoya formation. I said the water would migrate into the Fusselman.

Q. And the only thing separating the Montoya from the Fusselman is that 10 foot tight streak you have found on the 4-A Well?

A. No, sir. It's two tight stringers, 10 foot tight stringers plus existence or potential of water in the Montoya and in the Fusselman.

MR. KELLAHIN: I have nothing further. Thank you.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Renoult, now you, on your cyberlook logs you indicated the location of those tight streaks as being at 7840 to 50 and 7924 to 34.

A. Yes, sir.

Q. Now are those tight streaks also evidenced on Exhibit Three on the log of the Rader No. 2 Well and --

A. Yes.

Q. -- what depth would they be on that well?

A. The Rader No. 2, the tight streak at the top of the Montoya is present from 7884 to 7900.

Q. Now that's the one that's the equivalent to --

A. The lowermost --

Q. The lowermost on your cyberlook.

A. Yes, sir.

Q. In the -- in the Lambirth A-4. How about the upper one in the Lambirth A-4?

A. The uppermost one is the one --

Q. Okay.

A. -- Well No. 2.

Q. Okay. Thank you.

MR. NUTTER: Are there any other questions of Mr. Renoult at this time?

MR. CARR: I have one.

MR. NUTTER: Go ahead.

REDIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Renoult, I believe in answering certain of Mr. Kellahin's questions you indicated that on Exhibit Number Twelve you were estimating how much water could be injected at certain surface pressures, is that correct? Not bottom hole pressures?

A. That's correct.

Q. I'll hand you a copy of a memorandum and ask if you have seen that memorandum before?

A. Yes, I've seen it.

Q. Would you identify it, please?

A. Memorandum No. 3-77, dated August 24th, 1977.

Q. And what is the subject of that application -- or that memo?

A. The subject of this memorandum is the application for approval for secondary recovery or salt water injection wells.

Q. Now would you refer to paragraph one -- numbered paragraph one of that memo and tell me if it talks in terms of surface or bottom hole pressures?

A. The paragraph one says no surface injection pressure greater than 0.2 psi per foot of depth to

top of the injection zone will be permitted unless there is strong evidence the strata confining the injection has a pressure volume which should support a higher pressure.

Q. Now is that talking about the surface or bottom hole pressure?

A. Surface pressure.

Q. And your Exhibit Twelve was based on also likewise surface pressures?

A. Yes, sir.

MR. CARR: I have nothing further of Mr. Renoult.

MR. NUTTER: Are there any other questions of the witness?

MR. KELLAHIN: I have one further question of Mr. Renoult.

RECROSS EXAMINATION

BY MR. KELLAHIN:

Q. These tight streaks you've indicated on the log, will the log indicate whether or not fracturing of those tight streaks has occurred? Can you tell by looking at the log whether there is fracturing of those tight streaks?

A. These two logs don't indicate fracturing. They are just a resistivity log and an FDCNL porosity log.

Q. They don't measure fracturing. You wouldn't know? You can't tell by looking at the log whether fracturing has occurred or not?

A. They indicate that there is no washout present in the Rader No. 2 and there is no washout present in Lambirth No. 4, which indicates there was no fractures present within the tight streaks.

Q. So you're telling me that those logs will show you that there's fracturing occurring?

A. These logs are showing more than likely there is no fracturing present in these two wells.

Q. What would the logs show you if there was fracturing? What happens to the logs?

A. It would be washed out.

Q. Have you examined any cores analysis of any of the wells?

A. No, sir.

Q. Have you made a study or any injectivity tests of any other formations besides the Montoya?

A. No, sir.

MR. KELLAHIN: I have no further questions.

MR. NUTTER: If there are no further questions, are there any questions of the witness? If there

are no further questions of the witness, he may be excused, and we'll recess until 1:30.

(Thereupon the noon recess was taken.)

MR. NUTTER: Have you finished your direct case?

MR. CARR: Mr. Nutter, I would like to offer Enserch Exhibit Number Fourteen into evidence, and also, if I failed to do so earlier, I would like to offer Exhibits One through Three.

MR. NUTTER: Exhibits One through Three and Exhibit Fourteen will be admitted.

MR. CARR: That concludes our direct case.

MR. NUTTER: Mr. Kellahin, did you have any witnesses?

MR. KELLAHIN: Yes, sir.

If the Examiner please, it would substantially shorten our geologic presentation concerning the general geologic characteristics of the Fusselman pool if the Examiner would take administrative notice of Case 6270, from which Order R-5771 was entered on July 17th, 1978.

The record of that case indicates the general characteristics of the Fusselman from a geological point of view, and with the consent of Mr. Carr,we would request that you take note of that record.

MR. CARR: Mr. Nutter, I really, I think I'm going to object to this. I think that if there is testimony concerning the Fusselman that is relevant to this case, it should be presented here today.

MR. NUTTER: Rather than get into a long, drawn out discussion of the Fusselman, Mr. Kellahin, if the testimony that you show -- that you present shows that migration of water is going to be from the Montoya into the Fusselman, then the Fusselman formation would be affected, I think, and --

MR. KELLAHIN: My point is that there is evidence in the Commission records presented by Enserch themselves about the highly fractured nature of the Fusselman formation and the ability of the oil to move a great distance, highly permeable formation, as their own testimony, and I think it's appropriate even over objection for the Examiner to take notice of that record considering it's Enserch's own case that they put on.

MR. NUTTER: I think we will take administrative notice of the data in the case. That was Case

6270, Mr. Kellahin?

MR. KELLAHIN: Yes, sir.

MR. NUTTER: We will take administrative notice of the material in Case Number 6270 relating to the Fusselman; however, that will be treated only to the extent, and considered only to the extent that Mr. Kellahin and his witnesses show that there would be communication from the Montoya into the Fusselman.

JERRY L. BLEVINS

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Blevins, would you please tell us your name and occupation?

A. Jerry Lynn Blevins. I'm Associate Reservoir Engineer for Phillips Petroleum Company in Odessa, Texas.

Q. Mr. Blevins, have you previously testified before the Division as a petroleum engineer?

A. No, sir.

Q. Would you tell the Examiner when and

where you obtained your engineering degree?

I graduated from Texas Tech University in May of 1977 with a Bachelor of Science in petroleum engineering.

Q Subsequent to graduation, Mr. Blevins, where have you worked or been employed in the capacity of a petroleum engineer?

A. I've been employed by Phillips Petroleum for the last four years.

Q During that period of employment, what, if any, time has been devoted to a study or work in the South Peterson Fussel Pool?

A. The last year.

Q Generally summarize for us your activities in the pool?

A. I'm assigned to study the reservoir. I propose the perforations and the treatments there after a well has been drilled or any subsequent recompletion of the wells for any reason.

Q Does that study include the study of logs and other geologic information?

A. Yes, sir.

Q Does that study also include the producing characteristics of the different wells in the Fusselman formation?

A. Yes, sir.

MR. KELLAHIN: We tender Mr. Blevins as an expert petroleum engineer.

MR. NUTTER: Mr. Blevins is qualified.

Mr. Kellahin, will Mr. Blevins testimony be directed in any way towards Enserch's Exhibits Three or Fourteen? Can I put them away or will we need them again?

MR. KELLAHIN: You may want to refer to the one exhibit that locates the 10 foot tight --

MR. NUTTER: We'll keep them out, then.

MR. KELLAHIN: -- streak in that 4-A Well.

Q. Mr. Blevins, let me direct your attention to Exhibit Number One, which is simply a plat, and have you identify that for me.

A. Yes, sir, this is a plat of Peterson South Field in Roosevelt County, New Mexico, Range 32 and 33 East, Township 5 and 6 South.

The red colored circles are current Fusselman completions. The blue colored circles are current Penn completions. The green colored on the map is Phillips acreage which we now have a well or a proposed well located.

The purple arrow on this is in reference to Enserch's Rader No. 2 Well.

Q All right, sir. Currently how many wells by both operators, Phillips and Enserch, are producing from the Fusselman formation?

A There is ten total wells, five each.

Q Do any of the Phillips wells produce water with the oil?

A Yes, sir.

Q And what procedures have you established for handling the water production from the wells in the Fusselman?

A As far as after we've produced the water?

Q Yeah, what do you do with the water?

A We have trucking facilities come up and haul the water down to a disposal well which we pay for. We also are partners with Amoco Corporation in a field north of here, which we can use its disposal capabilities if they have the capacity.

Q Are the waters produced from the Fusselman South Peterson Pool trucked regardless of whether it's disposed by Amoco or otherwise?

A Yes, sir.

Q All right. And what does it cost you per barrel of water to dispose currently of that water?

A. Our estimation is $2.06.

Q. And what currently are you receiving per barrel of oil for your oil price?

A. Our last price showed $38.00 per barrel.

Q. Is it currently economic for you to continue to truck that water away from the lease?

A. Yes, sir.

Q. Do you have any opinion, Mr. Blevins, to at what point it would no longer become economic to continue to truck this water production away?

A. Somewhere above 90 percent.

Q. 90 percent what?

A. Water.

Q. So long as the water production from a well remains less than 90 percent water it would be economic to continue to truck the water away?

A. Yes, sir.

Q. All right, sir. Are you familiar with the Enserch operations in this pool?

A. Yes, sir.

Q. Are their water needs significantly different with regards to disposal than Phillips' disposal needs?

A. They do produce more water than we do.

Q. And have you made any calculations in a general way of what the total volumes are between the operators of the production oil and water from the Fusselman formation?

A. As far as what we produce?

Q. In reference to what they produce.

A. Okay.

Q. Do you have that in a percentage number somewhere?

A. They make about 56 percent of the production, no, 54 percent, and we make 46 percent.

Q. Of the oil production?

A. Of the oil production. The water is approximately 73 percent, and ours is 27 percent.

Q. Have -- have you made a study to determine whether or not Phillips for its own use will undertake the use of a disposal well in the area?

A. We're looking at our Peterson "H" No. 1.

Q. And that's the well located in the southwest quarter of Section 29?

A. Yes, sir.

Q. And describe for us generally, Mr. Blevins, what you have determined by examining that well.

A. Well, drilled as a Fusselman producer,

we found no adequate production in the Fusselman. Subsequently, we tried to produce out of the Penn; again no production.

We perforated the Wolfcamp in hopes of establishing production, which also failed.

Currently we decided that a disposal well would be in order, since there's no record of any higher production in the area. We looked at all three zones which we had previously perforated and --

Q. What three zones are those, Mr. Blevins?

A. The Fusselman, the Penn, and the Wolfcamp.

Q. Okay.

A. The Fusselman we didn't inject into, or did not attempt to inject into due to the high fracture reservoir that the Fusselman is.

We also didn't in the Penn, due to the lack of areal extent.

In the Wolfcamp we found by running an injectivity test that we were able to inject and could inject profitably by establishing a production -- a disposal well there.

Q. Into the Wolfcamp formation?

A. Into the Wolfcamp.

Q. Can you give us a general idea of the

types of volumes and pressures, if any, that would be required for disposal into the Wolfcamp formation?

MR. CARR: I will object to this line of questioning. I believe it's irrelevant to the matter before you whether or not they plan eventually to inject into the Wolfcamp, it is not before this Commission.

MR. KELLAHIN: The point is, Mr. Nutter, that there is available, or at least I attempt to show from this witness that there is other formations in the area available which can be used for salt water disposal that do not present the high degree of risk that injection into the Montoya formation would pose.

I think it's very important to show that there is an alternative solution to the problem as perceived by En serch.

MR. NUTTER: I think the witness can answer the question regarding injectivity rates into the Wolfcamp.

A. Well, our injectivity rates show that we could inject approximately 1000 -- no, 575 barrels a day at a 1000 pounds of pressure at surface.

Q. Would that injection pressure be low enough so that you would not fracture or part the confining strata around the Wolfcamp formation?

A. Yes, sir.

Q. Now, Mr. Blevins, let me direct your attention to Phillips' Exhibit Number Two and have you identify that for us.

A. This is a north/south cross section of the Peterson South Field comprising of our Peterson "H", our Lambirth "A" 4, our Lambirth "A" 1, and Enserch's Gladys Rader No. 2.

On it we have chosen our datum at -2700 feet and shown the Wolfcamp, which includes the Todd zone, the Three Brothers, the Pennsylvanian and the Fusselman. The Pennsylvanian is highlighted in blue; the Fusselman is highlighted in pink.

Q. What is Phillips' position with regards to Enserch's application to inject produced salt water into this proposed disposal well?

A. We do not believe they can confine the water injection into the Montoya due to no barriers between the Fusselman and the Montoya.

Q. In the event that the injected water is not confined to the Montoya, what, if any, risk does that impose upon any of Phillips' wells in the Fusselman?

A. Severe risk, since we have the only two Fusselman wells that offset their proposed injection, with

our A-4 and our A-1.

Q. Have you made any estimate of the remaining producable reserves to be produced by the Phillips No. 4-A Well in the Fusselman formation?

A. Approximately 25,000 barrels of oil.

Q. Have you converted that into current dollar amount?

A. Approximately $1,000,000 gross.

Q. In the event disposal is approved in this Enserch well, what, if any, impact with that have upon the No. 4-A Well to produce the remaining reserves?

A. Well, if the water comes up the fractures, as we expect it will, it would wipe out any reserves that we have; therefor, we wouldn't be able to produce this.

Q. Now, let me direct your attention specifically to your Exhibit Number Two, and have you identify for me, first of all, whether or not you find evidence of these insoluble residues that Mr. Brown's testified to.

A. From a log, no, sir.

Q. I see. What, if any, impermeable barriers separate the Fusselman and the -- the base of the Fusselman from the top of the Montoya, as defined by Enserch?

A. I've found no barriers.

Q. What, if any, impermeable barriers

exist between the perforations in the Enserch well, from which they intend to dispose, and those perforations in the offsetting Phillips wells in the Fusselman?

A. There's no barriers there. There's no way to stop it.

Q. All right. Now, Mr. Renoult testified that in examining the logs on the Phillips Lambirth "A" No. 4 Well, that he found evidence of two instances in the Fusselman where there appeared to be intervals of approximately 10 feet in which there were tight streaks, I think he said, characterized it.

A. Yes, sir.

Q. Do you find those indications on your logs?

A. They're tighter than the rest but --

Q. All right, let me ask you this. In your opinion would those tight sections constitute impermeable barriers separating the water to be injected in the Montoya from the production in the Fusselman perforations?

A. No, sir.

Q. Why not?

A. Basically because they're -- they are a porous media. Even on their exhibit, on our computer log, you can see on the bottom there we have possible hydrocarbon

production.

Q. You're referring to Enserch's Exhibit Fourteen?

A. Fourteen, yes, sir.

Q. And that information in Exhibit Fourteen was supplied to Enserch by Phillips?

A. We do have an exchange of logs with them, yes, sir.

Q. But my point is, you've examined those particular --

A. Yes, sir.

Q. -- logs that make up that exhibit?

A. Yes, sir.

Q. All right, and what is your conclusion based upon your examination of those same logs?

A. That there is no barrier that would definitely shut off any water between the Montoya and the Fusselman.

Q. What on those logs indicates support for that position?

A. Well, basically, the curves in tract four, which is at the far right side of the computer log, in the interval, the bottom interval, where the supposed barrier is, you note the blue --

Q. Let's put that on the wall --

A. Okay.

Q. -- so I can figure out what you're talking about.

Now, Mr. Blevins, I've put on the wall Enserch Exhibit Number Fourteen, and I'll ask you to go to that exhibit and identify those areas where Mr. Renoult has concluded that there is some type of barrier existing in the 4-A Well.

A. The upper zone is definitely the most tight zone. A small amount of porosity is noted by this line coming in. This is hydrocarbon porosity. It runs from zero to 25 percent. So there is at least 1, possibly 2 percent porosity in this area.

MR. NUTTER: Now you're talking about the extreme south Fusselman formation on that log?

A. Yes, sir, this is the one that they said was the second barrier.

MR. NUTTER: No, I believe that's his uppermost barrier.

A. The uppermost barrier, yes, sir. And the lower barrier, we'll see a little more porosity with a movable hydrocarbon, according to the process log, with flag indications of possible production in this interval that they

call the barrier.

MR. NUTTER: Now describe in the transcript that she's going to prepare where those flags indicators are, the location of them on the exhibit.

A. The flag indicators are --

Q. Mr. Blevins, let me do this. I'll give you my red pen and ask you to circle the areas in which you find that information contained.

A. The flag intervals are from approximately 7936 to 7943 in the lower supposed barrier.

In the above, the upper barrier, we have flag indications running from 7806 to 78 -- 7840. Again, this last flag barrier -- last flag indication of hydrocarbons is at the top of their so-called barrier.

Q. Mr. Renoult indicated in his testimony that we talked some about fracturing. Let me ask you, Mr. Blevins, can you look at those logs and determine whether there is or is not fracturing occurring by examination of the information contained on those logs?

A. No, sir.

Q. You may return to your seat, Mr. Blevins.

Mr. Blevins, let's turn to Exhibit Number Three.

MR. NUTTER: Before we leave Exhibit

Two, Mr. Kellahin, --

MR. KELLAHIN: Yes, sir.

MR. NUTTER: -- would you have him identify what the little green marks are? I see them on a couple of wells there.

A. Okay, the green marks in the Gladys Rader No. 2 is the perforated interval in the Montoya.

MR. NUTTER: Where they propose to inject, is that it?

A. Yes, sir. Our green mark is where we are proposing to inject into our Wolfcamp.

MR. NUTTER: I thought that's what the case was.

Q. Do you have anything else you want to tell us before we leave Number Two?

A. I don't believe so.

Q. All right, sir, let's go on to Number Three, then. Would you identify Exhibit Number Three for us?

A. Yes, sir. This is a structure map based on the top of the Fusselman, which is approximately 7900 feet in depth. We have again the Fusselman wells that are currently completed in Fusselman marked in pink, and the Penn completions marked in blue with a purple arrow indicating the Rader No. 2 Well.

Q. Mr. Blevins, do you have an opinion as to what direction, if any, the water will migrate if it's disposed of in this well?

A. The water will naturally migrate to the wells that are producing offsetting it in an upward direction. That means this well would go to the southeast, the south, the southwest, the west, and the northwest.

Q. Is there any indication on your structure map that structure would cause the water injected to migrate in some other direction or be precluded from entering into the Phillips wells?

A. No, sir.

Q. You don't see any structural barriers or --

A. No barriers.

Q. -- anything like that?

A. No, sir.

Q. All right, sir, let's go then to Exhibit Number Four and have you identify that for us.

A. Number Four is a core analysis on our Lambirth "A" No. 2. This would indicate --

Q. Let me get oriented here, Mr. Blevins. Where is the Phillips "A" No. 2 Well?

A. It's in Section 31, Township 5 South,

33 East, Unit F.

Q. All right, sir.

A. Okay. This well was cored from 7810 to 7859. In the lower portion of the core we find in a highlight on your deal, a vugular fractured porosity, dolomite, with large vertical fractures, many thin vertical fractures, which would indicate that it's pretty well fractured throughout the Fusselman.

Q. This core analysis was made on the Lambirth "A" 2 Well. In your opinion, Mr. Blevins, is the fractured nature of the Fusselman limited to the "A" No. 2 Well, or is this typical of the pool?

A. It should be typical of the pool.

Q. What, if any, significance are the fracturings?

A. Providing no barrier between the Montoya and the Fusselman, the water would channel into the fracture, thereby killing the wells off to the linear extent of the fractures, not necessarily the ones offsetting their disposal well, but ones maybe more toward the middle of the field.

Q. All right, sir, do you have anything else you would like to direct our attention to on Exhibit Number Four?

A. No, sir.

Q. All right, sir, let's go to Exhibit Number Five and if you'll identify that for me.

A. This again is a plat with Fusselman colored in pink, ten completions colored in blue. This is the January actual daily rates of the production based on what was turned in to the State of New Mexico.

Q. All right, sir, and let's turn to Exhibit Number Six, then, and have you identify that for us.

A. This is a composite of the production based on the wells since June of 1978, which Enserch first completed their Lambirth No. 1. Subsequent completions are added on and completions in the Penn are further into the state.

This is just tabular data of the production that's turned in to the State.

Q. Now, Mr. Blevins, I'd like to direct your attention to Enserch Exhibit Number Twelve which is their injection calculations on the proposed disposal well.

Mr. Blevins, I'd like to have you give us an explanation about the injectivity test and how they're determined in relation to surface tests and true bottom hole pressure test, to determine, first of all, the parting pressure of the formation versus fracturing, and that sort of discussion. Would you explain using Exhibit Number Twelve as a basis, how

the injectivity test is run.

A. Well, basically, when you run an injectivity test you pump in water at a particular rate and report its instantaneous shut-in pressure. From this you can plot up production to see where the formation will have its parting pressure. In this regard you can stay below the parting pressure when you inject water into the formation.

Based on what I know of them this test on Exhibit Twelve did not account for the friction in the tubing, based on a curve going up like it does. They didn't account for tubing in their wellhead measurements. It's very possible that even at the two barrels per minute on the vacuum they would have pressures greater than parting pressure bottom hole.

Q. In your opinion can we reach parting pressures in the formation even is water is disposed of on a vacuum basis, as is suggested here?

A. Yes, sir.

Q. Mr. Blevins, based upon your studies, of this area and the information you've examined and compiled, do you find any evidence to indicate that the Montoya is a separate and distinct reservoir not in communication with the Fusselman that is now being produced in the South Peterson Fusselman Pool?

A. No, sir.

Q. Do you find any permeable barriers that would keep water disposed of in the Montoya formation, as proposed by Enserch, confined to that formation and not allow it to migrate up into the Fusselman?

A. No, sir.

Q. Do you have a recommendation to the Examiner as to how he may handle this application so as not to violate the correlative rights of Phillips Petroleum Company or cause waste with regards to the oil being produced from the Fusselman?

A. Due to the economic nature of it out there, we can still truck our water until we find a suitable disposal well other than one that could possibly water out the wells in the field.

MR. KELLAHIN: I have no further questions of Mr. Blevins. We'd move the introduction of Phillips' Exhibits One through Six.

MR. NUTTER: Phillips Exhibits One through Six will be admitted in evidence.

Are there any questions of the witness?

MR. CARR: A few.

MR. NUTTER: Mr. Carr.

CROSS EXAMINATION

BY MR. CARR:

Q. Mr. Blevins, I believe you stated that you felt it was still economic to truck water in this area, is that correct?

A. Yes, sir.

Q. Wouldn't you effect a substantial savings, however, if you could find a suitable disposal well?

A. Yes, sir.

Q. You have been looking, I believe from your testimony, at your No. 1 "H" Well in Section 29 as a possible disposal well.

A. Yes, sir.

Q. Have you looked at any other Wolfcamp wells in the area to see if the conclusions that you have reached based on this one well would hold up if applied to the general area?

A. As far as what?

Q. As far as injecting into the Wolfcamp?

A. As far as the linear extent, we've looked into the wells surrounding our well.

Q. How far did you go in checking the Wolfcamp?

A. Out into the A-4, in the Enserch No. 7, and in the Enserch No. 3.

Q. You didn't look at any of the Enserch wells in the south half of Section 31, did you?

A. The south half of 31?

Q. The south half of Section 31?

A. No, sir.

Q. And if there were some contrary evidence that could come from these wells, you wouldn't be aware of it?

A. Yes, sir, I wouldn't be aware of it.

Q. Yes, sir, you wouldn't be, is that the answer?

A. I wouldn't be aware of it.

Q. Now I believe, looking at your Exhibit Two, I believe it is, the cross section.

A. Yes, sir.

Q. You indicated that looking at this you could not see the barriers that Mr. Renoult saw this morning, is that correct?

A. That is correct.

Q. What is the scale of this log?

A. This is a reduced copy of what we have. This is a reduced copy of the 5 inch equal to 100 feet.

Q. So the scale on this log is 5 inches

100 feet.

A. It's just been reduced, so it's not by any means -- we have the original logs which we studied. This was just shot down for the Examiner's convenience.

Q. I believe you mentioned again insoluble residues. That was a subject discussed this morning, and I believe it was your testimony, and correct me, I may not have heard this, that you cannot see these from the log, is that right?

A. From the logs I can't see insoluble residues.

Q. Do insoluble residues constitute barriers or do they just show what is in one lithologic zone as opposed to another?

A. I'm not a chemist so I don't really know, sir.

Q. Would you know whether or not they -- they could become a barrier or not?

A. I have been told that they only are used in reference of age.

Q. All right, thank you.

Now I believe you indicated in your testimony that you did not see the tight streaks that Mr. Renoult made reference to.

A. Yes, sir.

MR. KELLAHIN: No, I don't believe that was his testimony.

MR. CARR: Well, he's certainly free to say so.

Q. What was your testimony on that point?

A. I disagreed with his opinion.

Q. All right.

A. If that means I don't see them, well --

Q. Okay. In your opinion, and correct me if I'm wrong, was that the top barrier was not an impermeable streak, is that correct?

A. The top barrier. What do you mean? Which one do you mean by "top"? The one at the top of the Fusselman?

Q. That's right. I believe you indicated there was one that had 2 percent porosity. That's the one I meant I'm interested in.

A. That's the one at the top.

Q. At the top of the Fusselman.

A. Yes, sir.

Q. And you don't consider 2 percent porosity an impermeable streak?

A. Not in a fractured reservoir, sir.

Q. Well now is that because of the permeability of that or the porosity, I mean the porosity, or was it because of the fracture?

A. I'm not following you.

Q. Well, would an unfractured streak, 2 percent porosity, would that be an impermeable barrier, if it were not fractured?

A. Not necessarily.

Q. You would anticipate that a 2 percent, a stringer, 2 percent porosity, would conduct fluids vertically to the reservoir absent fracturing?

A. Possibly.

Q. And that's your testimony?

A. Yes, sir.

Q. Do you have any idea as to what the permeability might be in this tight streak?

A. Based on the previous testimony given in earlier cases, the PI's were calculated between 35 and 50 on some of the wells, which is a good indication of your permeability feet. Very small net feet would mean very high porosity. Enserch themselves estimated 4 millidarcies of permeability would drain 80 acres.

Q. Do you know what the permeability would be in these tight streaks?

A. We have core analysis that would have permeability for the general area.

Q. But do you know as confined to just those streaks?

A. Just those particular streaks, I would have to see if we cored through them.

Q. Do you have that data with you?

A. I do have some core data but I don't know if they go through those streaks.

Q. Did you testify that there were possible hydrocarbons in those tight streaks in your well?

A. In the lower zone the logs indicate that there is possible hydrocarbons present.

Q. Did you perforate those to see if you could produce any of those possible hydrocarbons?

A. No, sir.

Q. Now, I'd like to have you look for a minute at your Exhibit Number Four, which is the core analysis.

A. Yes, sir.

Q. Now, this indicates I believe, that there are large vertical fractures.

A. Yes, sir.

Q. And these are in the Fusselman.

A. Yes, sir.

Q. In this well.

A. Yes, sir.

Q. What is the drive mechanism in the Fusselman, do you know? Is it a water drive or gas drive?

A. Just a second. I'll find out.

Q. All right. What is the drive mechanism in the Fusselman?

MR. KELLAHIN: If you don't know, tell him you don't know.

A. Okay. Honestly I can't say for sure which one is driving it.

Q. Did you make -- you made a reservoir study of this, of the Fusselman, did you say that?

A. I studied the possibility of injecting water into the Fusselman.

Q. And you don't know what the drive mechanism is?

A. No, sir.

Q. Now, this is a core analysis on the Lambirth "A" No. 2 Well?

A. Yes, sir.

Q. Is this well producing any water?

A. It has produced it erratically, and in the current production there is no water.

Q. So it currently is producing no water, although you -- this exhibit indicates that there are large vertical fractures.

A. Yes, sir.

Q. Do you have anything that would show that these vertical fractures are actually a conduit for fluids to migrate to the reservoir?

Because Exhibit Number Four shows the fractures.

A. Yes.

Q. In this particular core.

A. Yes, sir.

Q. Do you have any evidence that would show that fluids are migrating through these fractures?

A. Yes, sir, these are a high PI on the wells. We've drained --

Q. But still producing no water?

A. Not this -- not the current month that this exam was -- this example was given.

Q. Now I believe you indicated that this core analysis was typical, or you thought it would be typical, of the reservoir as a whole.

A. Yes, sir.

Q. What makes you think that?

A. Basically it was all uplifted by the same movement. There's no indication that it should be any different. The stress forces should have been the same throughout the whole reservoir.

Q. When this core was actually taken, were you present?

A. No, sir.

Q. Do you know how it was obtained, whether a diamond bit or a regular normal cone type?

A. No, sir, I don't.

Q. Do you have any idea how much weight was on the drill string at the time it was taken?

A. No, sir.

Q. How much torque was required to turn it?

A. No, sir.

Q. Have you personally examined the core?

A. No, sir.

Q. So you don't know that they are clean breaks or if they're rounded in the core, that would give us some idea as to the time that the fractures occurred?

A. No, sir.

Q. Is it possible to fracture a core while taking it?

A. Yes, sir.

Q And if that were the case, it wouldn't necessarily apply reservoir wide, would it?

A No, sir.

Q Now, I'd like for you to look for a moment at your Exhibit -- whatever the contour map, structure map, is.

A All right.

Q This is a structure map on the Fusselman, I believe.

A Yes, sir.

Q And based on your interpretation of the Fusselman, fluid injected into the Fusselman at the proposed injection well location would migrate toward other producing wells.

A Yes, sir, due to the high permeability.

Q But this presumes, of course, that fluids are put in the Fusselman, not a separate reservoir.

A This presumes that there is a barrier between the Montoya and the Fusselman, they wouldn't do it.

Q They wouldn't do it.

A Without the barrier they will migrate into the Fusselman and therefor channel into the other wells.

Q This presumes that fluids are injected into the Fusselman -- get into the Fusselman.

A. They get into the Fusselman, yes, sir. They can be injected anywhere without a barrier and get there.

Q. Looking at resistivity logs, could you tell that the formation across the area -- if the formation across the area was fractured or not?

A. No, sir, you can't tell fractures from this.

Q. If the formation was fractured wouldn't you find a lower resistivity than you would anticipate otherwise?

A. Not necessarily.

Q. In your Lambirth "A" No. 2 Well, are you aware of whether or not there was an oil/water contact in this well?

A. No, sir.

MR. CARR: I have nothing further of Mr. Blevins on cross.

MR. KELLAHIN: I have just one question, Mr. Nutter.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Blevins, directing your attention to your Exhibit Number Six, if you'll turn to that portion of

Exhibit Number Six that shows the tabulation of production from the Lambirth "A" No. 4 Well, please.

A. Yes, sir.

Q. I believe it was your testimony that that well is not currently making any water. Has it produced water out of the Fusselman in the past?

A. Yes, sir, erratically.

Q. Is there -- do you have an explanation as to what has been the cause for the sporadic rates of water production during the life of this well?

A. To the best of my knowledge the only way the water would come and go like this is due to the fractured systems.

MR. KELLAHIN: I have nothing further.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Well, it hasn't really been sporadic, has it, Mr. Blevins? It looks like it continued to produce from first production until the seventh month of 1980, and then it just completely ceased altogether, didn't it?

A. Well, sir, if you will look at November of '79, we made 8685 barrels of water there.

Q. Yeah.

A. In December we made 892 barrels of water.

Q. Well, I realize it hasn't been uniformly producing water.

A. Okay.

Q. It just suddenly went from 2387 barrels in July of '80 to nothing in August, and hasn't produced any water since.

A. Okay, that's --

Q. Any workover on the well or anything?

A. No, sir. Basically this is done by our EDP system, our production report system. All our water is gathered into a common storage tank by Lambirth "A" No. 1. We have two 500 -- or two 300 gallon -- 300 barrel tanks there, and all the water is gathered into them.

Based on well tests, which our pumper gets for us --

Q. You prorate the water.

A. We prorate the water back based on this note. With the high volumes of fluids that all these wells produced, his equipment is not apt to handle it extremely well. Therefor, we have the water coming and going essentially from all our wells, and this would not be an accurate test as far as what's going on in the field.

Likewise, I wonder on the -- you've been

t

talking quite a bit about your Lambirth "A" No. 2 Well. I notice that it produced water only one month in its whole life, apparently, is that correct?

A. Again this is due to well tests, sir, and it's so far out there we don't send our well tester out there except for the required once a year testing, which would -- unless we ask for a special test, and again, it might be producing water and it would not be allocated water back.

Q. Well, it must have been allocated some water that one month.

A. The one month we asked for a special test.

Q. And you didn't use that test figure, then, on subsequent reports?

A. Yes, sir, we didn't -- we didn't like what we saw with the whole setup and so we asked for another test.

Q. And then the next test showed it was making no water?

A. No water again, sir.

Q. I see. Now, you were talking about the tubing pressure would have to be added to the vacuum pressure and could cause a fracturing system, or a fracturing of the reservoir even on a vacuum. Would you go into that a little

further, please?

A. Okay. It's not added in. It would have to be taken out of the pressures on their curve. The pressure due to the friction of water in the tubing is what's causing this curve to migrate up like it is.

If you remove the tubing pressure from this curve, you would more than likely find that the line is straight, so that any one rate you're putting it in at the same amount of pressure due to the formation being parted already.

Q. Well --

A. If they would have shown instantaneous shut-in pressures behind this, you would have had a more accurate curve, or if they would have measured the bottom hole pressures, you would have had a more accurate curve, and you would have seen -- you would have seen where it had parted while they were injecting the water.

But the rates that they're giving with these pressures are real fine, except for it's not the pressures you need. Their instantaneous shutdown pressures are the pressures that you're going to be injecting against that would tell you where the reservoir will part.

Q. Well, I would think that your tubing friction would be at a minimum when you're injecting at the

lowest rate, however, would it not?

A. Yes, sir.

Q. And if their lowest rate on their injectivity tests, which took it on the vacuum, the tubing pressure would be the lowest.

A. Yes, sir.

Q. And how would you be able to take a vacuum and add enough tubing friction to that to cause the reservoir to part?

A. The reservoir could have parted by the time they put it on a vacuum. Once it parts it could have gone in on a vacuum. If you open a channel wider than what it was, it may all be going in at a vacuum at the surface, but that doesn't mean that it's going in at a vacuum in the bottom hole, because you have a hydrostatic head there first.

Q. You're assuming that the first test was at a high rate?

A. No, sir, no matter which way they went. Either way they've -- they've opened it, and once it's open you won't see that amount of pressure that's actually forcing the water into the reservoir. It can be a vacuum at the surface and yet with a hydrostatic head added onto it, you could be pumping in at a greater pressure than what the parting pressure would be.

Q Do you know where the Division arrived at this 0.2 of a foot -- of a pound per foot of depth for the maximum pressures?

A No, sir. That's in your laws.

Q Yes, sir.

A But I don't know where it came from.

Q It was arrived at -- I'll testify here, if I may -- it was arrived at just taking an arbitrary figure of 0.7 of a pound per foot of depth as overburden pressure.

A Yes, sir.

Q And then we took a maximum weighted hydrostatic head of super saturated solution, being 0.5 of a pound per foot of depth.

A Yes, sir.

Q Subtracted that from the weight of the reservoir and the resistance of the reservoir fracturing and came up with the difference of only 0.2 of a pound.

So it's an extremely conservative figure, I think.

A Okay.

Q And it's been incomprehensible to me how you could fracture a reservoir on a vacuum and that's why I've been so enlightened here today.

A No, sir. I'm not saying that you're

fracturing. You are parting a fracture to begin with. If you part the fracture it's going to go in just as easy or easier than what it did. You're opening a space wider than what it normally was.

Q You're assuming you had a fracture to begin with or a created fracture?

A Either way, the fracture to begin with is more than likely what's there.

Q Okay.

A Without a core analysis I wouldn't know for sure.

Q Okay.

MR. NUTTER: Are there any other questions of Mr. Blevins?

MR. KELLAHIN: No, sir.

MR. NUTTER: He may be excused. Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: Yes, one more witness. He hasn't been sworn yet.

(Mr. Drisko sworn.)

PHILLIP B. DRISKO

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q All right, sir, would you please state your name and occupation?

A Phillip B. Drisko. I'm a development geologist for Phillips Petroleum, Odessa.

Q Mr. Drisko, have you previously testified as a petroleum geologist before the Railroad Commission of Texas?

A Yes, sir.

Q And have you previously testified before the Oil Conservation Division of New Mexico as a geologist?

A No, sir.

Q When and where did you obtain your degree in geology?

A Wichita University, 1952, BS.

Q How long have you been employed as a petroleum geologist for Phillips Petroleum Company?

A 28-1/2 years.

MR. KELLAHIN: We tender Mr. Drisko as

an expert petroleum geologist.

MR. NUTTER: Mr. Drisko is qualified.

Q. Mr. Drisko, I'd like to direct your attention to Phillips' Exhibit Number Four, which is the core analysis on the Lambirth 2-A Well, and ask you, Mr. Drisko, did you conduct that core analysis or make the examination initially from which that document is prepared?

A. A core description is a term I did.

Q. All right, sir. You -- you made the study of the core information and made that compilation?

A. I saw the core. I made the --

Q. All right, sir.

A. -- core description.

Q. Okay.

MR. NUTTER: Now you're referring to the exhibit that you have.

MR. KELLAHIN: Yes, sir.

MR. NUTTER: The core analysis that you have as an exhibit in here?

MR. KELLAHIN: It's Exhibit Number Four, Mr. Nutter, and it refers to the core analysis on the A-2 Well.

MR. NUTTER: Okay.

Q. Now let me ask you, in your opinion as a geologist, does that core analysis -- is that typical or

confined only to the A-2 Well or is that typical of the Fusselman formation in this pool?

A. It would be to me typical of the -- of the formation in the field. I would say so, sir.

Q. Now I'd like to direct your attention, Mr. Drisko, to the question of whether or not there is an impermeable barrier that exists between the, what we call Montoya, or what Enserch calls the Montoya, and what we have referred to in this hearing as the Fusselman.

First of all let me ask you this, Mr. Drisko. You, as a geologist, can you -- do you make the distinction between the Fusselman and the Montoya? Is that a readily separable formation?

A. From the cuttings, examined them, compiled my -- to me it is not possible to define Fusselman from the Montoya. Where we got into this onto your insolubie residues, is a -- is a way to determine different formations, which is taken with a certain grain of salt.

Q. All right, sir, if in examining the cuttings, and you find the presence of this insoluble residue, in your opinion as a geologist would that constitute an impermeable barrier between the Fusselman and the Montoya?

A. The insoluble residues is not in the formation. It is -- it's a way of determining the rock form-

ation or the age of it.

Q. All right, sir, and it would just be determination of the age and it would not be evidence of a barrier?

A. No, it would not create a barrier.

Q. All right, let me direct your attention to the comments made by Mr. Renoult concerning the presence in the proposed disposal well -- remember he testified that there is a portion lower down near what he calls the top of the Montoya that constitutes a tight streak, and then he also testified in the Phillips "A" 2 Well that there was two tight sections that appeared, one was lower and the other one was higher. With regards to those particular tight streaks, do you have an opinion as to whether or not those tight streaks constitute an impermeable barrier between the two?

A. If there was a large vertical fracturing up here, there is a -- there is a chance that it would be also -- also into the -- those zones throughout the formation.

Q. The existence of the large vertical fractures is neither speculation or supposition on your part. You've actually examined the cores of one of the wells and saw the --

A. I saw this core on the A-2.

Q. Now with regards to the core analysis,

Mr. Drisko, are the fractures indicated in your analysis created by the actual making of the core or do they demonstrate actual fractures in the formation?

A. They were very typical of fractures in the formation in that there was some hard crystalline facies along the fractures.

Q. In your opinion as a geologist, Mr. Drisko, would approval of Enserch's application constitute an unreasonable risk to the correlative rights of Phillips Petroleum Company?

A. It would definitely create some risk, I think.

Q. In your opinion would the approval of the application constitute the premature watering out of any of the Phillips wells producing currently from the Fusselman?

A. It could.

Q. Based upon your study, Mr. Drisko, would you recommend that the Examiner grant this application?

A. No.

Q. All right, sir, no further questions.

MR. NUTTER: ARe there any questions of Mr. Drisko?

MR. CARR: I have one.

CROSS EXAMINATION

BY MR. CARR:

Q. Mr. Drisko, you stated, I believe, that there were crystalline facies along these fractures?

A. Yes, sir.

Q. Couldn't those crystals tend to seal them off?

A. If they were sealed off they would not be fractured as you took it out of the hole.

Q. If they were fractured in the formation and then these crystals formed, they could seal them.

A. They could seal them, but in this one they were not sealed off.

Q. Was there evidence of any fluid migration through those fractures?

A. That is something I couldn't tell.

MR. CARR: I have no further questions. Thank you.

MR. NUTTER: Are there any further questions of the witness?

MR. KELLAHIN: That concludes Phillips' presentation.

MR. NUTTER: You may be excused, Mr.

Drisko.

Do you have a rebuttal witness, Bill?

MR. CARR: I'd like to call Mr. Brown for one very brief presentation.

THOMAS E. BROWN

being recalled as a witness, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q Mr. Brown, I would like you to refer to what has been marked for identification as Enserch Exhibit Number Fifteen, identify this, and explain what it is and what it shows.

A Exhibit Number Fifteen is an insoluble residue report from the Residue Research Laboratory in Midland, Texas. The reason this was made, it's very difficult to determine samplewise whether you're in Fusselman or Montoya, on just visual examination.

One fairly effective means of determining the difference is to run your insoluble residues and see the various mineral suites in the two formations.

Charlie Timberlake at Residue Research Laboratory ran these samples independently, hadn't seen the

log, it wasn't released at the time. He ran the samples and he determined that the top of the Montoya was in fact at 7880, which actually is 20 foot high to where I picked it in the samples, where I have it marked on Exhibit Three. It was in a shale and I wouldn't know one way or the other, so I just picked the first dolomite below that point of the mark there, but he in fact picked it at that point, and I don't know if the samples were lagged enough to vary that 20 foot or not, but it would be pretty close.

Q. In your opinion are the Montoya and the Fusselman separate formations?

A. Yes.

MR. CARR: I have no further questions of Mr. Brown.

MR. NUTTER: Any questions?

CROSS EXAMINATION

BY MR. KELLAHIN:

Q. This study of the top of the Montoya shows it to be 20 feet closer to the producing perforations in the Phillips wells than you indicated.

A. That's correct, which also puts 20 more foot from the top of our proposed injection interval from the top instead of 2 feet.

Q. And we spent 40 minutes this morning talking about the reasons you believe they're separate.

A. Yes.

Q. Is that right? You haven't changed those reasons, have you?

A. No.

MR. CARR: I would like to offer Enserch Exhibit Number Fifteen.

MR. NUTTER: Enserch Exhibit Fifteen will be admitted in evidence.

Mr. Kellahin, before we get into final statements, this morning, I believe it was when Mr. Brown was on the stand, you asked him if he had made any study as to any type of monitor well or monitor activities to be taken --

MR. KELLAHIN: Yes, sir.

MR. NUTTER: -- to be sure that the water wasn't in effect going to drown out the Phillips well.

MR. KELLAHIN: And Mr. Brown's answer was that he was not aware of any way that that could be done.

MR. NUTTER: That it could be done.

MR. KELLAHIN: That's right.

MR. NUTTER: Right. I'll call for final statements now.

Mr. Carr, you can go last.

MR. KELLAHIN: Very briefly, Mr. Nutter, I think the granting of this application poses a very substantial risk on the producing Fusselman wells in the area.

The applicant has failed to demonstrate a justification to allow that kind of risk to take place. They have testified that it costs them $1.58 to haul the water away. Phillips' testimony is the current rate paid for the oil in the area is $38.00 a barrel; that it's still economic for them to do so.

There's been no testimony from the applicant that his property will have to be abandoned if he's required to continue to truck his disposed water. There are no overwhelming considerations to justify the substantial risk imposed.

To the contrary, we've demonstrated that Phillips, as a purdent operator, is examining formations to use as disposal intervals and has found the Wolfcamp formation substantially higher and it will not pose a risk to the Fusselman.

We think that it would be prudent upon Enserch as an operator to make that examination themselves. Their witnesses have testified that they have examined no other formation than the Montoya.

We believe that their case at this point

fails to support the necessary evidence required for its granting, and that it therefor ought to be denied.

MR. NUTTER: Mr. Carr?

MR. CARR: Mr. Nutter, Enserch Exploration, Inc., has appeared before you today seeking approval to dispose of produced salt waters in their Rader No. 2 Well in the Montoya formation.

We submit that we have complied with all the requirements of Rule 701 and also, all the requirements of your Memo 3-77, and therefor should be entitled to inject water into this formation.

We have been opposed by Phillips, who has presented testimony contending that there are vertical fractures in this area that would permit water injected to migrate into the Fusselman, a separate formation, and therefor damage their wells.

The only evidence they have on vertical fracturing is a core analysis on one individual well. It is a well in which no water is being produced in a water drive reservoir, and although their witness could not testify to that, you ruled earlier that you would refer to the record in the prior case and in that record it clearly establishes that we're dealing with a water drive reservoir.

If there are fractures in the Lambirth

No. 2-A Well, it would seem logical in a water drive reservoir that these large fractures would be permitting water to move into that well and water, therefor, would be being produced. Are being produced.

We have come before you. We've made, I think, a substantial showing that we can affect substantial savings by being able to inject into the Montoya formation. We have shown you that there are two impermeable zones segregating the injection interval from the producing Fusselman formation. We submit that these zones may have only 2 percent porosity and we leave it to your discretion to determine whether or not those qualify as tight zones which would prevent the migration of water absent fracing into the shallower formation.

We submit we've complied with all the requirements that should entitle us to this application, and pray that the application be granted.

MR. NUTTER: Thank you, Mr. Carr.

I'll direct this question to you, Mr. Carr, or one of your witnesses, or anybody with your company, the Lambirth "A" No. 3 is currently producing from the Pennsylvanian, I think. Did it formerly produce from the Fusselman?

The well that's directly west of the

subject well?

MR. CARR: Uh-huh.

MR. KERSH: Right, it wasn't commercial.

MR. NUTTER: Well, your Exhibit Number Two shows it colored green and blue both, so I didn't know if it was a dual completion in the Fusselman and Pennsylvanian or if it was formerly in the Fusselman and now in the Pennsylvanian.

MR. BROWN: It was formerly Fusselman and now it's Pennsylvanian.

MR. NUTTER: Did it water out in the Pennsylvanian -- in the Fusselman?

MR. BROWN: No.

MR. NUTTER Just quit producing.

MR. BROWN: Uh-huh.

MR. NUTTER: Does anyone have anything further they wish to offer in Case Number 7226?

We'll take the case under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7226, heard by me on 4/22, 19 81.

_____, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

Form C-108
Revised 3-1-68

NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION

OPERATOR: Enserch Exploration, Inc.		ADDRESS: P. O. Box 4815 Midland, Texas 79704	
LEASE NAME: Rader	WELL NO.: 2	FIELD: Undesignated	COUNTY: Roosevelt

LOCATION: UNIT LETTER E ; WELL IS LOCATED 1880 FEET FROM THE North LINE AND 560 FEET FROM THE West LINE, SECTION 32 TOWNSHIP 5-S RANGE 33E NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING	13-3/8"	356'	250 sacks	Circ.	
INTERMEDIATE	9-5/8"	1981'	914 sacks	Circ.	
LONG STRING	5-1/2"	8000'	350 sacks	6850'	Cement Bond Log
TUBING	2-3/8"	7876.53'	NAME, MODEL AND DEPTH OF TUBING PACKER: Baker Model "D" retainer Production packer @ 7875'		

NAME OF PROPOSED INJECTION FORMATION	TOP OF FORMATION	BOTTOM OF FORMATION
Montoya	7900'	7955'

IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?	PERFORATIONS OR OPEN HOLE?	PROPOSED INTERVAL(S) OF INJECTION
Tubing	Perforations	7902' - 7930'

IS THIS A NEW WELL DRILLED FOR DISPOSAL?	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED?	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE?
No	South Peterson (Fusselman and/or Penn.) Dev. Well	Yes

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH: 7848' - 7851' (8 holes) squeezed with 86 sacks, 7710'-7714' (10 holes) squeezed w/47 sacks

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA
250'	7858'	None

ANTICIPATED DAILY INJECTION VOLUME (BBLS.) MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSIG)
750 750	2880	closed	gravity	vacuum

ANSWER YES OR NO WHETHER THE FOLLOWING WATERS ARE MINERALIZED TO SUCH A DEGREE AS TO BE UNFIT FOR DOMESTIC, STOCK, IRRIGATION, OR OTHER GENERAL USE —	WATER TO BE DISPOSED OF	NATURAL WATER IN DISPOSAL ZONE	ARE WATER ANALYSES ATTACHED?
	yes	yes	yes

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND): Richard Lambirth & Portales National Bank (O.D. Lambirth Trust) P. O. Drawer 888 Portales, N.M

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL:

Phillips Petroleum Company
Phillip Bldg.
Odessa, Texas 79761

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 1
Submitted by RENOULT
Hearing Date 7-8-81

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING?	SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL	
	yes	yes	
ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B)	PLAT OF AREA	ELECTRICAL LOG	DIAGRAMMATIC SKETCH OF WELL
	yes	yes	yes

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Daniel R Renoult — District Petroleum Engineer — June 08, 1981
(Signature) (Title) (Date)

NOTE: Should waivers from the surface owner and all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests. SEE RULE 701.

PETERSON-SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
WELL STATUS
(AS OF 01/1981)

Proposed Salt Water Disposal

Produced from Pennsylvanian

Produced from Fusselman

Scale: 1" = 2000'

TANNEYHILL

ENSERCH EXPLORATION, INC.

Docket No. 7226

Exhibit

Date July 08, 1981

SO. PETERSON

R 33

ELIDA

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 2
Submitted by ENSERCH
Hearing Date 7-8-81

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 3
Submitted by RENOULT
Hearing Date 7-8-81

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

APPLICATION FOR APPROVAL OF SALT WATER DISPOSAL WELL
Enserch Exploration - Rader Well No. 2
Peterson (South) Field - Roosevelt County
New Mexico

Operator Well Name API Well I.D. No.	Location	Distance to Enserch Rader No. 2	Casing String Setting Depth	Cement (sacks)	Cement Top	Total Depth	Current Producing Interval (Subsea depth)	Current Producing Formation	KB
Enserch Rader No. 2	1880' FNL 560' FWL Section 32 T5S, R33E		13-3/8" @ 356' 9-5/8" @ 1981' 5-1/2" @ 8000'	250 914 350	Surface Surface 6850'	8090'	7902'-7930' (-3503, -3531)	Salt Water Disposal	4399'
Enserch Rader No. 1 30-041-20492	2100' FSL 660' FWL Section 32 T5S, R33E	1650'	13-3/8" @ 373' 8-5/8" @ 2025'	350 680	Surface Surface	7903'	D&A	D&A	4410'
Phillips Lambirth "A" No. 4 30-041-20506	560' FNL 560' FEL Section 31 T5S, R33E	1750'	13-3/8" @ 360' 8-5/8" @ 3500' 5-1/2" @ 8007'	420 580 1635	Surface Surface 4200'	8007'	7814'-7828' (-3423, -3437)	Fusselman	4391'
Enserch Lambirth No. 3 30-041-20454	1980' FNL 1980' FEL Section 31 T5S, R33E	2500'	13-3/8" @ 377' 8-5/8" @ 3297' 5-1/2" @ 8030'	350 2000 800	Surface Surface 6600'	8030'	7702'-7715' (-3295, -3308)	Pennsylvanian	4407'
Phillips Peterson No. 1-H 30-041-20535	660' FWL 510' FWL Section 29 T5S, R33E	2600'	13-3/8" @ 350' 8-5/8" @ 3496' 5-1/2" @ 7982'	325 775 800	Surface Surface 5210'	7991'			4384'
Enserch Lambirth No. 7 30-041-20482	660' FEL 510' FSL Section 30 T5S, R33E	2750'	13-3/8" @ 358' 8-5/8" @ 1991' 5-1/2" @ 7858'	300 750 450	Surface Surface 6630'	7882'	7826'-7829' (-3435, -3438)	Fusselman	4391'
Phillips Lambirth "A" No. 1 30-041-20471	1980' FEL 1980' FSL Section 31 T5S, R33E	2900'	13-3/8" @ 400' 8-5/8" @ 3500' 5-1/2" @ 7995'	420 1175 400	Surface Surface 5780'	8000'	7830'-7838' 7852'-7858' (-3408, -3416) (-3430, -3436)	Fusselman	4422'

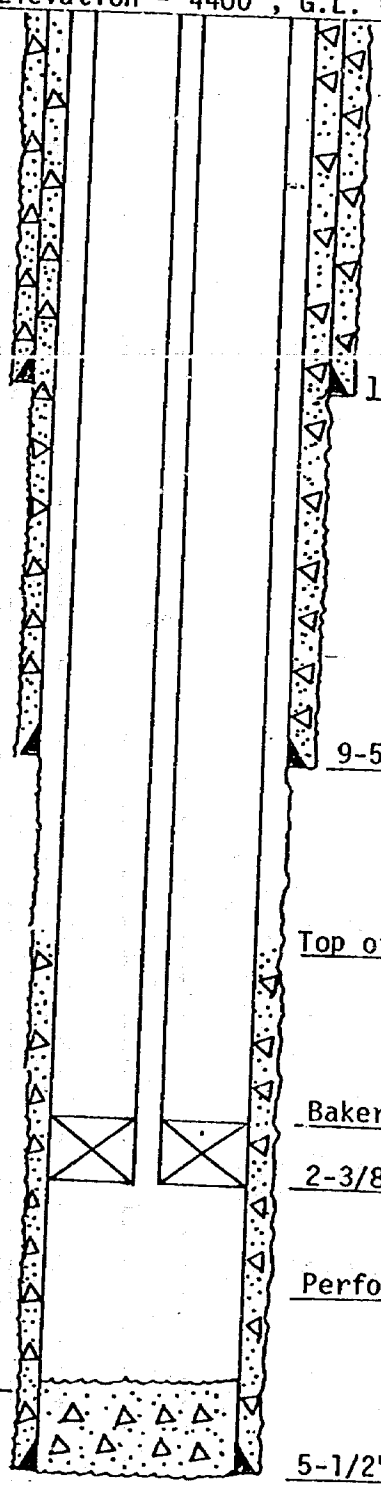
Enserch Exploration, Inc.

Rader No. 2 Well

1880' FNL & 560' FWL, Sec. 32-T5S-R33E

Roosevelt County, New Mexico

K.B. Elevation = 4400', G.L. = 4385'



13-3/8" csg. @ 356', cmt. circ.

9-5/8" csg. @ 1981', cmt. circ.

Top of cmt. @ 6850'

Baker Model "D" pkr. @ 7875'

2-3/8" tbg. @ 7876.53'

Perforations: 7902' - 7930'

PBTD @ 7940'

5-1/2" csg. @ 8000', cmt. w/350 sks.

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 4
Submitted by RENOULT
Hearing Date 7-8-81

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

Rader Well No. 1

South Peterson Field

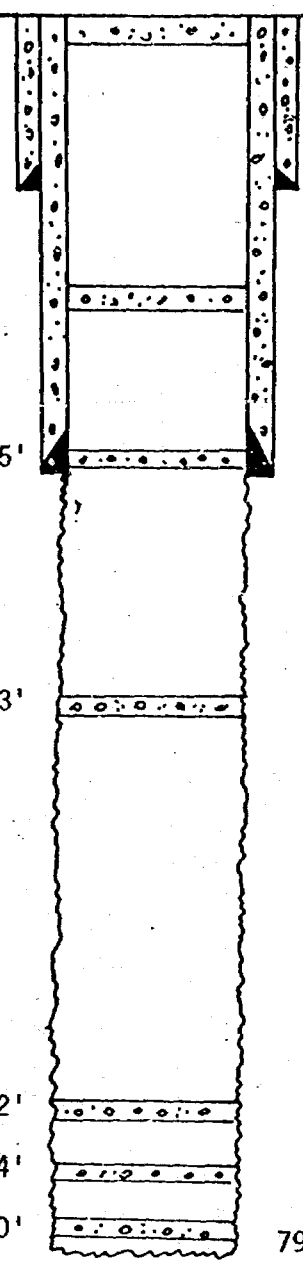
Roosevelt County, New Mexico

Prepared by: Date

Plug #7: 10 sx Class H Cmt. @ surface

KB Elevation 4393.5'

GL Elevation 4407.5'



374' 13-3/8" 48#/ft K55 ST&C 8rd csg.

Plug #6: 40 sx Class H Cmt. @ 1082'-982'

Plug #5: 40 sx Class H Cmt. @ 2075'-1975'

2025' 8-5/8", 24#/ft K55 ST&C 8rd csg.

Plug #4: 40 sx Class H Cmt. @ 4443'-4343'

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

Plug #3: 40 sx Class H Cmt. @ 7152'-7052'

Plug #2: 40 sx Class H Cmt. @ 7574'-7474'

Plug #1: 50 sx Class H Cmt. @ 7880'-7930'

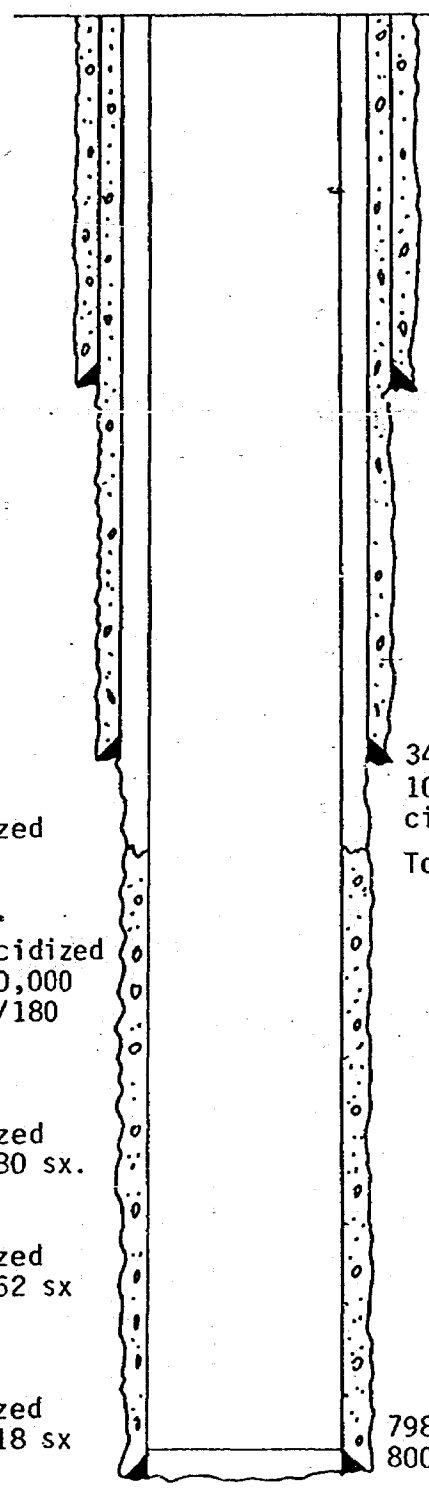
7920' TD open hole

Last Workover: Well was plugged on 7/7/79 before production string was run.

Prod. Rate Before: Prod. Rate After:

Nature of Workover:

PHILLIPS PETROLEUM COMPANY
Peterson "H" Well No. 1
South Peterson Field
Roosevelt County, New Mexico



K.B. Elevation - 4384'
G.L. Elevation - 4368'

350' 13-3/8" 48#/ft K-55
420 sx Class H + 2% $CaCl_2$
circulated 95 sx to surface

3496' 8-5/8" 24#/ft K-55
1000 sx Class H + 2% $CaCl_2$
circulated 225 sx to surface

Top of cement @ 5210'

Perfs 7332'-7341' (18 shots). Acidized w/5000 gals. 28% acid.

Perfs 7616'-7760' OA (110 shots). Acidized w/4500 gals. 15% NE HCl. Frac'd w/20,000 gals. gelled 15% NE HCl. Squeezed w/180 sx.

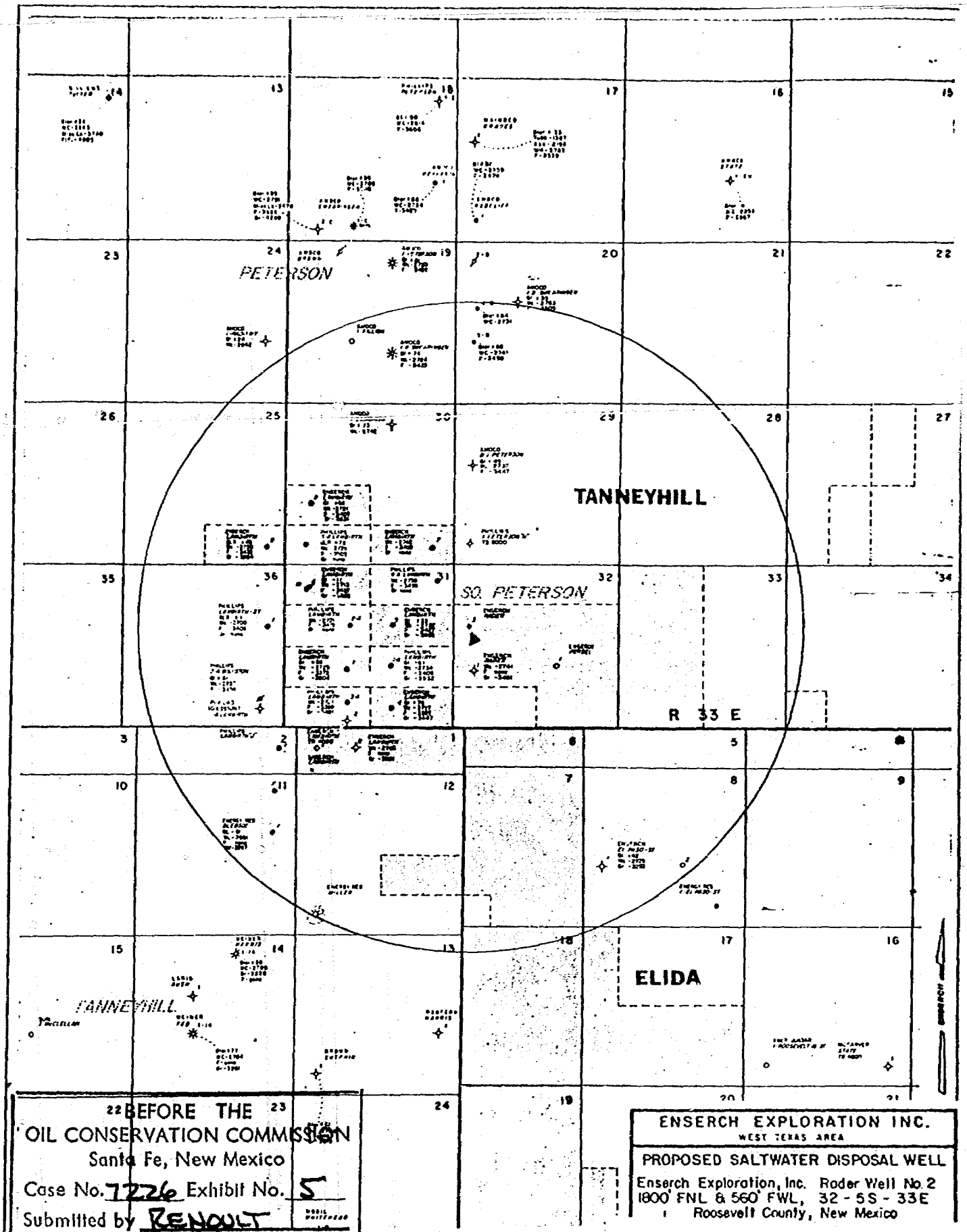
Perfs 7793'-7801' (32 shots). Acidized w/250 gals. 15% NE HCl. Squeezed w/80 sx.

Perfs 7792'-7806' (28 shots). Acidized w/750 gals. 15% NE HCl. Squeezed w/62 sx Class H.

Perfs 7846'-7852' (20 shots). Acidized w/500 gals. 15% NE HCl. Squeezed w/18 sx Class H.

7982' 5-1/2" 15.5#/ft K-55
800 sx Class H + 2% KCl

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981



BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 5
Submitted by RENOULT
Hearing Date 7-8-81

ENSERCH EXPLORATION INC.
WEST TEXAS AREA

PROPOSED SALTWATER DISPOSAL WELL

Enserch Exploration, Inc. Roder Well No. 2
1800' FNL & 560' FWL, 32 - 5S - 33E
Roosevelt County, New Mexico

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit

Docket No. 7226

Exhibit

Date July 08, 1981

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Enserch Rader No. 2	32	5S	33E	E		Salt water Disposal
Enserch Rader No. 1	32	5S	33E	L	1,650'	D&A
Phillips Lambirth "A" No. 4	31	5S	33E	A	1,750'	Fusselman
Enserch Lambirth No. 6	31	5S	33E	D	5,280'	P&A
Enserch Lambirth No. 10	31	5S	33E	D	5,350'	Fusselman
Phillips Lambirth "A" No. 2	31	5S	33E	F	3,800'	Fusselman
Enserch Lambirth No. 3	31	5S	33E	G	2,500'	Pennsylvanian
Phillips Lambirth "A" No. 1	31	5S	33E	J	2,900'	Fusselman
Enserch Lambirth No. 1	31	5S	33E	K	4,200	Fusselman
Phillips Lambirth "A" No. 3	31	5S	33E	M	4,650'	Fusselman

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 6
Submitted by RENOULT
Hearing Date 7-8-81

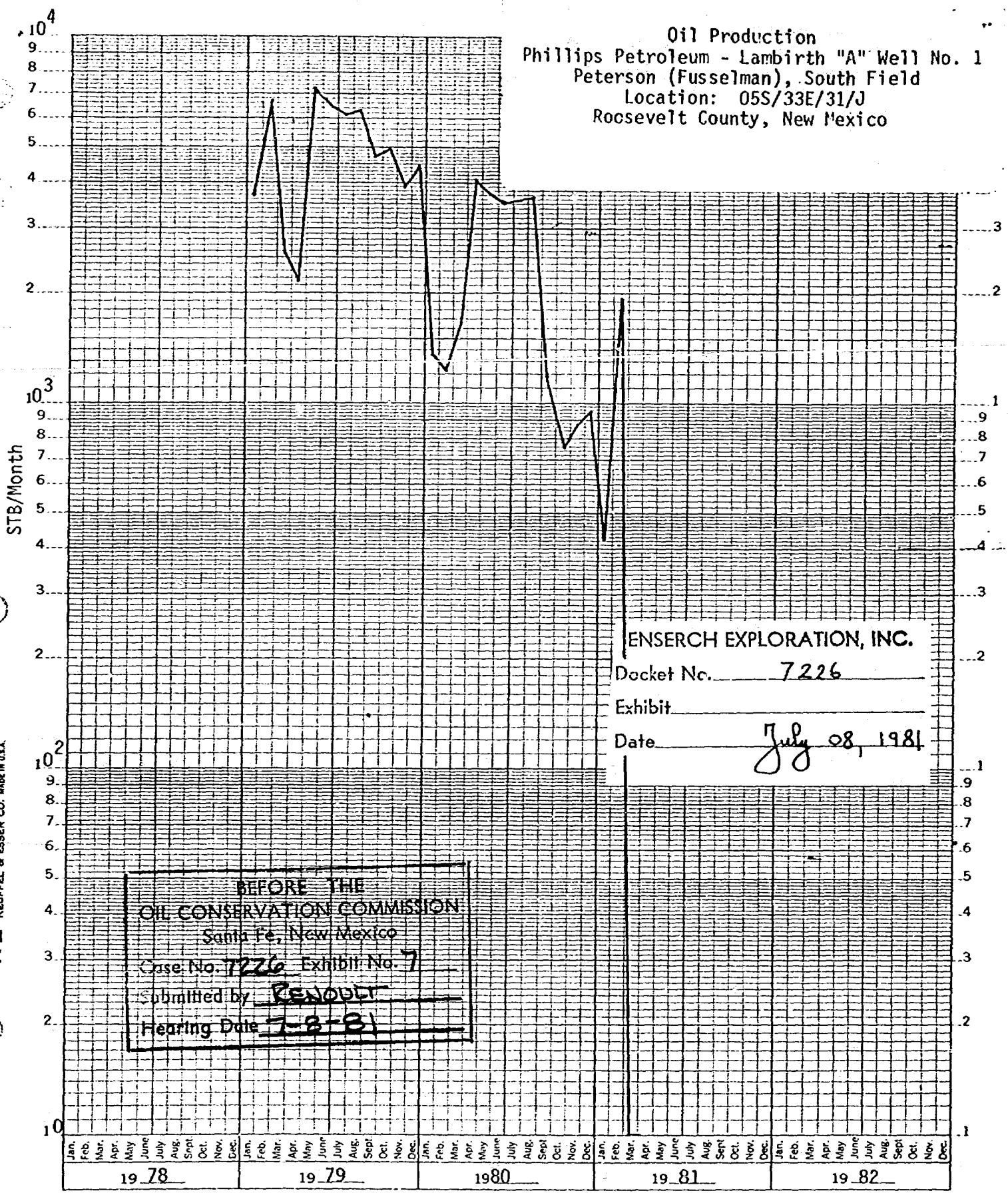
LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Page 2
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Enserch Lambirth No. 4	31	5S	33E	O	3,650	Pennsylvanian
Amoco Lambirth No. 1	30	5S	33E	B	7,050'	P&A
Enserch Lambirth No. 8	30	5S	33E	L	6,550'	Fusselman
Phillips Lambirth "A" No. 5	30	5S	33E	M	5,850'	Pennsylvanian
Enserch Lambirth No. 7	30	5S	33E	P	2,750'	Fusselman
Amoco Peterson No. 1-B	29	5S	33E	E	5,280'	P&A
Phillips Peterson No. 1-H	29	5S	33E	M	2,600'	P&A
Amoco Swearingen No. 4-B	20	5S	33E	E	14,000'	Pennsylvanian
Amoco Swearingen No. 3-B	20	5S	33E	L	9,300'	Pennsylvanian
Amoco Swearingen No. 1-A	19	5S	33E	J	9,300'	Pennsylvanian
Enserch Lambirth No. 9	25	5S	32E	P	6,900'	Fusselman

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Page 3
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Phillips Lambirth State #1	36	5S	32E	H	6,400'	Fusselman
Phillips Goldston "A" No. 2	36	5S	32E	P	7,000'	P&A
Goldston Lambirth "A" No. 1	36	5S	32E	P	7,150'	P&A
Phillips Lambirth "B" No. 1	2	6S	33E	A	7,250'	Pennsylvanian
Enserch Lambirth No. 2	1	6S	33E	D	6,250'	P&A
Enserch Lambirth No. 5	1	6S	33E	C	5,400'	P&A
Enserch El Paso State No. 1	8	6S	34E	L	8,800'	P&A
Energy Reserves Bledsoe No. 2	11	6S	33E	A	8,200'	Pennsylvanian
Energy Reserves Bledsoe No. 1	1	6S	33E	H	9,200'	Pennsylvanian
Energy Reserves Miller No. 1	12	6S	33E	M	14,000'	Granite Wash

Oil Production
Phillips Petroleum - Lambirth "A" Well No. 1
Peterson (Fusselman), South Field
Location: 05S/33E/31/J
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 7
Submitted by ENSERCH
Hearing Date 7-8-81

K·E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

PRODUCTION HISTORY
Phillips Petroleum - Lambirth "A" Well No. 1
Peterson (Fusselman), South Field

Location: 05S/33E/31/J
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR	Water Cut
	Bbls	MCF	Bbls	SCF/Bbl	%
01/79	3,700	3,411		922	0
02/79	6,650	6,131		922	0
03/79	2,585	980		379	0
04/79	2,184	646	191	296	8
05/79	7,115	1,883	149	265	2
06/79	6,536	2,776	5,222	425	44
07/79	6,105	2,865	5,104	469	46
08/79	6,332	5,976	5,066	944	44
09/79	4,718	3,536	8,257	749	64
10/79	4,965	3,317	8,689	668	64
11/79	3,908	967	2,286	247	37
12/79	4,462	1,174	2,610	263	37
01/80	1,371	354	802	258	37
02/80	1,255	205	734	163	37
03/80	1,641	456	960	278	37
04/80	4,052	886	2,370	219	37
05/80	3,730	651	2,182	174	37
06/80	3,518	1,017	2,058	289	37
07/80	3,576	9,622	2,092	2,691	37
08/80	3,668	3,034	9,638	827	72
09/80	1,195	698	3,138	584	72
10/80	769	295	2,019	384	72
11/80	876	114	2,300	130	72
12/80	969	578	2,545	596	72
Cum. Prod.	85,880	51,572	68,412	600	44
01/81	431	431	1,132	1,000	72
02/81	1,924	151	2,728	78	59
03/81	last prod. 02/81				

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

Oil Production
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field
Location: 05S/33E/30/P
Roosevelt County, New Mexico

STB/Month

10^4 9 8 7 6 5 4 3 2 — 10^3 9 8 7 6 5 4 3 2 — 10^2 9 8 7 6 5 4 3 2 10

1 9 8 7 6 5 4 3 2 1 9 8 7 6 5 4 3 2 1

Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

19 78 | 19 79 | 19 80 | 19 81 | 19 82

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 8
Submitted by RENOULT
Hearing Date 7-8-81

K·E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

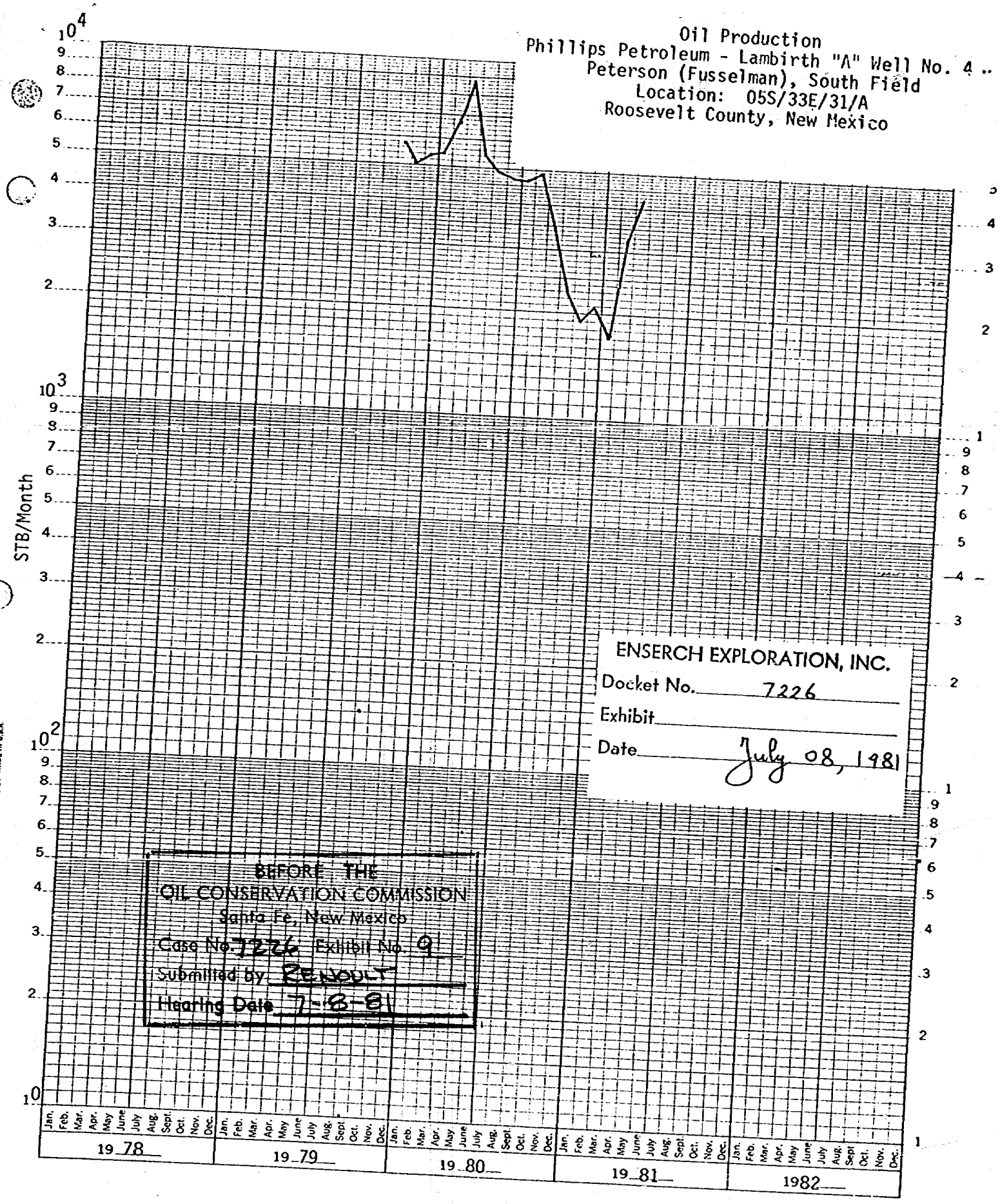
PRODUCTION HISTORY
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field

Location: 05S/33E/30/P
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR	Water Cut
	Bbls	MCF	Bbls	SCF/Bbl	%
01/79					
02/79					
03/79					
04/79					
05/79					
06/79	2,244	1,031	1,120	459	33
07/79	2,112	871	804	412	30
08/79	1,879	1,056	494	562	21
09/79	3,345	771	1,859	230	36
10/79	5,912	2,493	1,261	421	18
11/79	6,891	2,262	1,257	328	15
12/79	6,228	2,172	348	348	5
01/80	6,250	1,767	1,380	282	18
02/80	2,724	1,840	1,014	675	27
03/80	6,242	1,971	1,399	316	18
04/80	5,541	2,035	1,370	367	20
05/80	5,279	2,122	1,722	402	21
06/80	4,376	2,221	1,262	508	22
07/80	3,120	1,537	1,689	493	35
08/80	2,723	1,589	2,470	584	48
09/80	3,260	1,789	2,434	549	43
10/80	2,274	1,800	1,089	792	32
11/80	3,142	2,460	3,194	783	50
12/80	1,527	1,669	1,507	1,093	50
Cum. Prod.	75,069	33,456	27,673	446	27
01/81	2,433	3,032	2,319	1,246	51
02/81	2,292	2,645	1,210	528	35
03/81	1,354	2,183	1,212	895	47

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

Oil Production
Phillips Petroleum - Lambirth "A" Well No. 4
Peterson (Fusselman), South Field
Location: 05S/33E/31/A
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 9
Submitted by RENOULT
Hearing Date 7-8-81

K-E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

PRODUCTION HISTORY
Phillips Petroleum - Lambirth "A" Well No. 4
Peterson (Fusselman), South Field

Location: 05S/33E/31/A
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR	Water Cut
	Bbls	MCF	Bbls	SCF/Bbl	%
01/79					
02/79					
03/79					
04/79					
05/79					
06/79					
07/79					
08/79					
09/79			402	207	6
10/79	5,740	1,186	8,685	314	63
11/79	5,020	1,578	892	334	15
12/79	5,158	1,725	940	328	15
01/80	5,434	1,783	1,159	208	15
02/80	6,701	1,394	301	70	3
03/80	8,762	614	936	278	15
04/80	5,410	1,502	861	222	15
05/80	4,979	1,106	812	367	15
06/80	4,696	1,725	2,387	37	33
07/80	4,773	177		614	0
08/80	4,898	3,008		324	0
09/80	3,537	1,146		212	0
10/80	2,277	483		73	0
11/80	1,902	138		331	0
12/80	2,035	673			
Cum. Prod.	71,332	18,238	17,375	256	20
01/81	1,752	972	--	550	0
02/81	4,419	1,236	4,247	280	49
03/81	3,292	80	3,116	25	49

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 10
Submitted by RENDULT
Hearing Date 7-8-81

WATER PRODUCTION (IN BBLS)
Enserch Exploration - Peterson (Fusselman, Penn) South Field
Roosevelt County, New Mexico

Enserch Exploration	Lambirth #1		Lambirth #3		Lambirth #4		Lambirth #6		Lambirth #7		Lambirth #8		Lambirth #9		Lambirth #10		Cumulative Water Productio		
	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Total
06/78	0																		
07/78	0																		
08/78	310																310		310
09/78	313																313		313
10/78	0																0		0
11/78	0		0		1,119												0	1,119	1,119
12/78	0		0		1,995												0	1,995	1,995
01/79	0		0		1,807												0	1,807	1,807
02/79	0		0		1,569												0	1,569	1,569
03/79	0		0		1,501		936										936	1,501	2,437
04/79	0		0		956		720										720	956	1,676
05/79	0		0		2,607		240										240	2,607	2,847
06/79	0		0		2,285		3,965		1,120								5,085	2,285	7,370
07/79	0		0		0		3,703		804								4,507	0	4,507
08/79	0		0		1,949		2,928		494								3,422	1,949	5,371
09/79	0		0		1,923		2,560		1,859								4,419	1,923	6,342
10/79	0		0		1,819		3,928		1,261		0						5,189	1,819	7,008
11/79	0		0		2,245		6,778		1,257		395						8,430	2,245	10,675
12/79	0		0		1,613		9,997		348		5,247						15,592	1,613	17,205
01/80	0		0		1,273		8,961		1,380		5,377		44				15,762	1,273	17,035
02/80	0		0		1,143		9,220		1,014		1,702		0				11,936	1,143	13,079
03/80	0		0		1,376		10,394		1,399		7,891		0				19,684	1,376	21,060
04/80	0		0		1,326		11,755		1,370		6,759		0				19,884	1,326	21,210
05/80	0		0		1,363		11,242		1,722		6,349		0				19,313	1,363	20,676
06/80	0		0		1,120		11,598		1,262		10,034		0				22,894	1,120	24,014
07/80	0		0		1,029		8,087		1,689		10,286		0				20,062	1,029	21,091
08/80	0		0		1,162				2,470		9,977		0		266		12,713	1,162	13,875
09/80	0		0		1,007				2,434		9,615		0		7,215		19,264	1,007	20,271
10/80	0		0		817				1,089		10,657		11		10,838		22,595	817	23,412
11/80	0		0		230				3,194		8,620		0		7,606		19,420	230	19,650
12/80	0		0		398				1,507		9,997		8		10,773		22,265	398	22,663
Cumulative Water Production	623		0		35,632		107,012		27,673		102,886		63		36,698		274,955	35,632	310,587

89% 11% 100%

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

DALLAS, TEXAS

PHILLIPS PETROLEUM COMPANY
LAMBERT NO. A-2
S. PETERSON FUSSELMAN FIELD
ROOSEVELT COUNTY, TEXAS

DATE : 3-26-79
FORMATION : FUSSELMAN
DRLG. FLUID: SALT GEL
LOCATION : 1980' FNL & 1980' FWL, SEC. 31, T-5-S, R-33-E

FILE NO : 3202-11088
ANALYSTS : MORSE
ELEVATION: 4396.8' GL

WHOLE CORE ANALYSIS

SAMPLE NUMBER	DEPTH	PERM. TO AIR (MD) MAXIMUM	PERM. TO AIR (MD) 90 DEG	POR. FLD	FLUID SATS. OIL	FLUID SATS. WTR	DESCRIPTION
	CORE NO. 1 7811.0-7819.0 CUT 8' REC 8'						
	7811.0-19.0						CONG,DNS
	CORE NO. 2 7819.0-7850.0 CUT 31' REC 29'						
	7819.0-23.0						CONG,SHY,DNS
1	7823.0-24.0	1.4	0.6	4.6	12.2	41.9	LM,CHT,F
2	7824.0-25.0	0.2	*	11.3	10.6	33.1	DOL,LMY,SHY,CHT,F
3	7825.0-26.0	33.	18.	13.5	12.7	33.1	DOL,CHT,V/F
4	7826.0-27.0	20.	9.9	13.0	22.0	24.4	DOL,SL/V,SL/F
5	7827.0-28.0	92.	17.	13.3	15.3	30.7	DOL,V/F
6	7828.0-29.0	0.1	*	9.7	17.0	35.8	LM,SHY,F
7	7829.0-30.0	0.1	*	9.9	14.4	38.8	DOL,SHY,V/F
8	7830.0-31.0	0.1	*	8.3	17.3	39.6	DOL,V/F
9	7831.0-32.0	0.3	*	12.5	14.1	43.3	DOL,F,SL/V
10	7832.0-33.0	48.	26.	10.0	15.1	35.9	DOL,F
11	7833.0-34.0	12.	10.	8.3	19.0	33.1	DOL,SL/F
12	7834.0-35.0	0.2	*	10.9	17.2	34.9	DOL,V,SL/F
13	7835.0-36.0	38.	25.	9.3	12.0	29.0	DOL,SHY,SL/V,SL/F
14	7836.0-37.0	32.	29.	10.1	16.0	23.9	DOL,CHT,SL/V
15	7837.0-38.0	15.	8.2	7.7	12.6	22.1	DOL,CHT,V/F
16	7838.0-39.0	12.	11.	8.8	18.9	21.0	DOL
17	7839.0-40.0	<0.1	*	5.7	13.6	30.2	DOL,CHT,V
18	7840.0-41.0	0.5	*	13.3	21.0	23.3	DOL,V/F,V
19	7841.0-42.0	0.4	*	11.5	16.7	25.1	DOL,V,F
20	7842.0-43.0	0.2	*	9.7	16.7	27.8	DOL,F

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit 16
Date July 08, 1981

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

PHILLIPS PETROLEUM COMPANY
LAMBERT NO. A-2

DATE : 3-28-79
FORMATION : FUSSELMAN

FILE NO : 3202-11088
ANALYSTS : MORSE

WHOLE CORE ANALYSIS

SAMPLE NUMBER	DEPTH	PERM. TO AIR (MD) MAXIMUM	PERM. TO AIR (MD) 90 DEG	POR. FLD	FLUID SATS. OIL	FLUID SATS. WTR	DESCRIPTION
21	7843.0-44.0	42.	35.	8.6	20.6	26.0	DOL,F
22	7844.0-45.0	566.	40.	8.1	8.7	35.6	DOL,V/F
23	7845.0-46.0	204.	4.3	4.1	22.1	51.2	DOL,V/F
24	7846.0-47.0	29.	15.	7.3	12.2	33.8	DOL,CHT,V/F,SL/V
25	7847.0-48.0	4.0	2.8	4.7	12.3	41.1	DOL,SL/V,F
	7848.0-50.0						LOST CORE

*· INDICATES PLUG PERM

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or

RESIDUE RESEARCH LABORATORY
2405 W. INDIANA
MIDLAND, TEXAS 79701

INSOLUBLE RESIDUE REPORT
FILE NO.

SECTION	TWN.	RGE.	BLOCK	SURVEY	ELEV.	STATE	COUNTY
32	5-S	33-E			NR	NEW MEXICO	ROOSEVELT

FOOTAGE: 1880 FNL & 560 FWL

ISSUED FOR CONFIDENTIAL USE

COMPANY	WELL	FARM
ENSERCH EXPL.	# 2	RADER

SECTION EXAMINED:

7600-8000

TOPS AND CORRELATIONS:

Samples began in PENNSYLVANIAN ---------- 7600

B. PENNSYLVANIAN - T. MONTOYA ---------- 7880

T. CAMBRIAN ---------- 7980

SPECIAL NOTES:

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 15
Submitted by Brown
Hearing Date 7-8-81

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

Application for Approval of
Salt Water Disposal Injection Well

Enserch Exploration - Gladys Rader Well No. 2
Peterson (South) Field
Roosevelt County, New Mexico

Well Location: 1880' FNL & 560' FWL
Section 32, Township 5-S
Range 33-E, Unit Letter E

Perforation: 7902'-7930' (-3503', -3531')
2 JSPF, 0.42" hole

Stimulation Treatment: Spotted 150 gallons of 15% MCA (@1.7 BPM and 1100 psi). Pumped 10,000 gallons of MOD 202 Acid. Dropped 40 RCN ball sealers (@ 7.5 BPM). Flushed with 32 barrels of 2% KCl water.

Injection Test: Date: 03/27/81
Test Data: 5BPM @ 2400 psi
4BPM @ 1500 psi
3BPM @ 600 psi
2BPM @ vacuum

Maximum Allowed Injection Pressure:

= 0.2 psi per foot of depth to the top of the injection zone.
= 0.2 x 7902 = 1580.4 psi

Maximum Allowed Injection Volume:

= 5976 bbls/day

Anticipated Daily Injection Volume:

= 750 bbls/day
= .52 bbls/minute

Anticipated Surface Injection Pressure:

Under vacuum

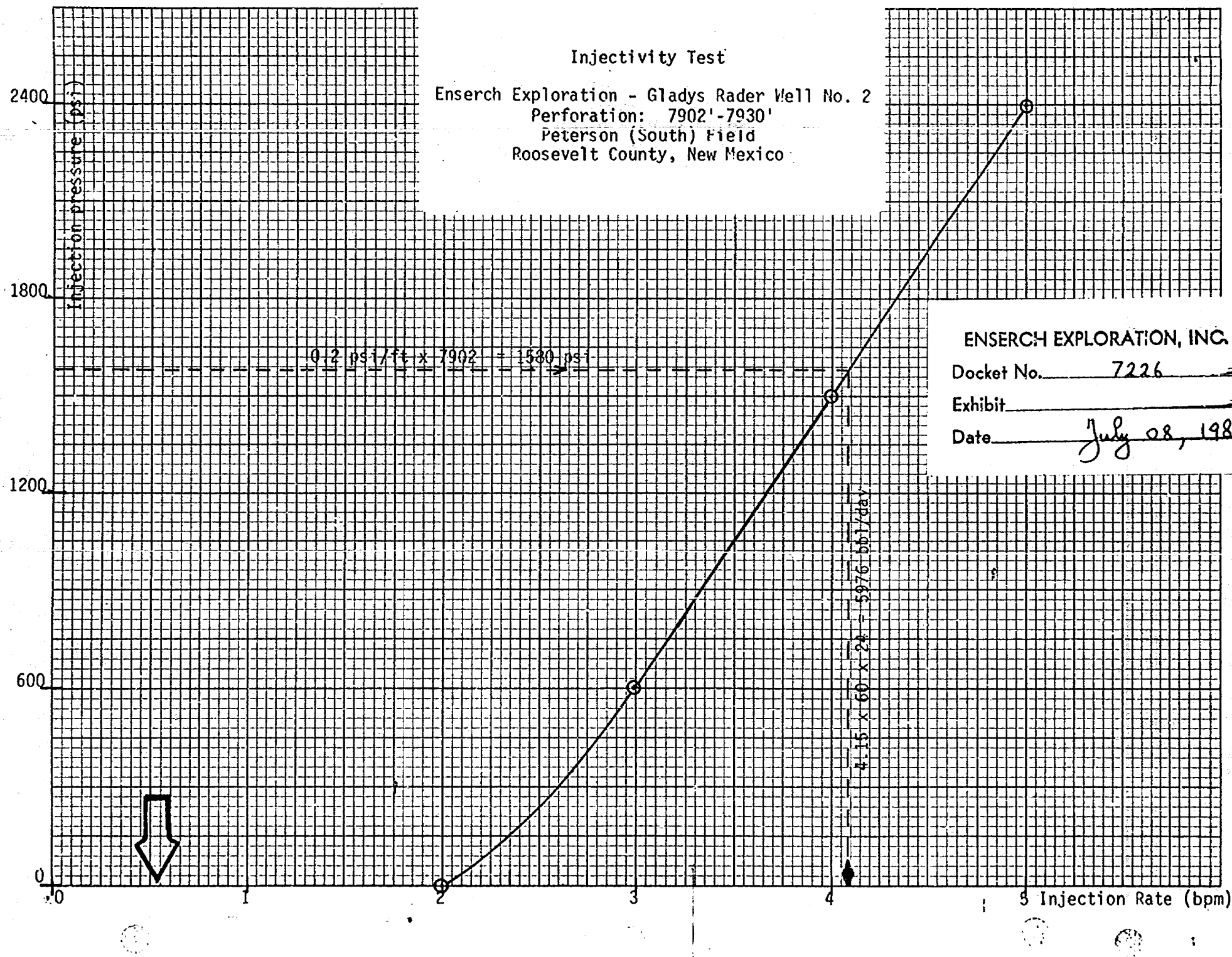
BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 11
Submitted by RENOULT
Hearing Date 7-8-81

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

Injectivity Test

Enserch Exploration - Gladys Rader Well No. 2
Perforation: 7902'-7930'
Peterson (South) Field
Roosevelt County, New Mexico

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981



WATER INJECTION CALCULATIONS
WATER ENROACHMENT
Enserch Exploration - G. Rader Well No. 2
Peterson, South Field

Proposed Injection Zone: Montoya
Perforations: 7902' - 7930'
(-3502', -3530')
Net Interval: 28'
Average Porosity: 7%
Irreducible Water Saturation: 20%
Displaceable Porosity: 5.6%

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 12
Submitted by BENOULT
Hearing Date 7-8-81

Reservoir volume encroached by injected water:

$$W_i = (7758\ A\ h\ \phi_D)/B_w$$

Reservoir area encroached by injected water:

$$A = (B_w \times W_i)/(7758\ h\ \phi_D)$$

Volume of water produced from Peterson, S. Field (December 1980):

Enserch = 22,663 bbls		(731 bbls/day)
Phillips = 5,541 bbls		(179 bbls/day)
Total = 28,204 bbls/month		(910 bbls/day)

Anticipated daily injection volume (Enserch water production):

22,800 bbls/month (750 bbls/day)

Reservoir area encroached by injection water (750 bbls/day):

Year 1:	A =	22.5 acres	(550')
Year 2:	=	45.0 acres	(790')
Year 3:	=	67.5 acres	(970')
Year 4:	=	90.0 acres	(1120')
Year 5:	=	112.5 acres	(1150')
Year 6:	=	135.0 acres	(1370')
Year 7:	=	157.5 acres	(1480')
Year 8:	=	180.0 acres	(1580')
Year 9:	=	202.5 acres	(1675')
Year 10:	=	222.5 acres	(1760')

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08 / 1981

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

ENSERCH EXPLORATION INC.
LAMBIRTH NO. 3
WILDCAT
ROOSEVELT COUNTY, NEW MEXICO

DATE: 7-5-78
FORMATION: AS NOTED
DRLG. FLUID: SALT GEL & 3.5% OIL
LOCATION: 1980 FNL & 1980 FEL, SEC. 31, T-5-S, R-33-E

FILE NO: 3202-10814
ENGINEER: DILLARD
ELEVATION: 4394 GL

* INDICATES PLUG PERM S INDICATES PRESERVED SAMPLE

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
	WHOLE CORE ANALYSIS								
	CORE NO. 1 7760.0-7806.0 CUT 46' REC 45' FUSSELMAN								
	7760.0-63.0 LM, ANHY, DENSE, NO SHOW								
	7763.0-66.0 LM, ANHY, FOSS, DENSE, NO SHOW								
	7766.0-91.0 LM, ANHY, SL/SHY, DENSE, NO SHOW								
	7791.0-98.0 SH, CONG								
	7798.0-7805.0 DOL, SL/SHY, DENSE, NO SHOW								
	7805.0-7806.0 LOST CORE	CORE NO. 2 7806.0-7844.0 CUT 38' REC 38' FUSSELMAN							
1	7806.0-07.0	16.0	0.1		8.4	15.1	44.8		DOL, LMY, V/F
2	7807.0-08.0	1.6	<0.1		9.0	6.1	51.3		DOL, V/F
3	7808.0-09.0	0.4	0.3		10.5	12.1	50.3		DOL, F
4	7809.0-10.3	<0.1	<0.1		7.7	0.3	71.9		DOL, SL/F
5	7810.3-12.0	0.1	<0.1		7.2	0.4	61.0		DOL, SL/F
6	7812.0-13.3	0.1	*		14.8	1.7	70.9		DOL, V/F
7	7813.3-14.5	5.6	1.7		13.7	4.6	64.0		DOL, LMY, V/F, CHT
8	7814.5-16.5	<0.1	<0.1		6.6	3.0	66.7		DOL, V/F, CHT
9	7816.5-17.5	<0.1	*		5.7	2.9	72.0		DOL, SHY, F, STY
10	7817.5-18.8	0.4	*		15.5	12.0	33.6		DOL, SHY, F
11	7818.8-20.4	5.7	0.8		11.4	7.6	63.0		DOL, SHY, F, SL/V

ENSERCH EXPLORATION, INC.
Docket No. 7726
Exhibit 17
Date July 08, 1981

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CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

ENSERCH EXPLORATION INC.
LAMBIRTH NO. 3

DATE: 7-5-78
FORMATION: AS NOTED

FILE NO: 3202-10814
ENGINEER: DILLARD

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
12	7820.4-21.6	0.4	0.4		10.5	29.3	30.8		DOL,SHY,F,SL/V
13	7821.6-22.6	0.4	0.2		9.6	9.9	59.3		DOL,F
14	7822.6-24.0	14.0	0.6		12.2	16.7	44.1		DOL,SHY,F,STY
15	7824.0-25.7	0.2	0.1		9.6	23.0	27.8		DOL,F,SHR,STY
16	7825.7-26.7	0.9	0.6		12.0	23.6	29.8		DOL,LMY,SL/F
17	7826.7-28.2	5.7	3.2		11.0	15.5	38.7		DOL,F,V,
18	7828.2-29.8	1.1	0.5		12.0	20.9	48.3		DOL,F,SL/V,STY
19	7829.8-31.2	0.3	0.2		8.7	31.5	28.6		DOL,F,STY
20	7831.2-32.7	7.4	2.1		11.4	35.2	38.0		DOL,LMY,SHY,F,SL/V
21	7832.7-33.8	0.6	0.4		15.3	17.8	44.7		DOL,LMY,F,STY
22	7833.8-34.8	0.4	0.4		13.4	27.9	31.8		DOL,LMY,SHY,F,STY
23	7834.8-36.3	0.6	0.5		17.6	28.3	34.1		DOL,F
24	7836.3-38.0	0.4	0.3		15.4	19.6	46.3		DOL,LMY,SHY,F,STY
25	7838.0-39.0	0.4	0.2		13.0	12.0	49.9		DOL,LMY,F,STY
26	7839.0-40.8	0.5	0.4		12.2	19.2	39.1		DOL,LMY,F,FOSS,STY
27	7840.8-42.6	0.5	0.4		14.8	24.6	32.7		DOL,LMY,F,STY
28	7842.6-44.0	0.3	*		14.9	26.3	33.8		DOL,LMY,V/F
	CORE NO. 3 7844.0-7882.0 CUT 38' REC 22' FUSSELMAN								
29	7844.0-45.3	0.5	0.3		11.9	18.5	45.1		DOL,LMY,ANHY,SL/F STY
30	7845.3-46.7	0.6	0.6		18.3	24.2	38.9		DOL,LMY
31	7846.7-47.8	1.2	0.5		15.4	13.2	47.0		DOL,LMY,SL/F
32	7847.8-48.8	17.0	1.8		11.8	19.8	28.6		DOL,LMY,ANHY,F
33	7848.8-50.3	1.2	1.0		13.2	19.1	27.7		DOL,LMY,ANHY,SL/F
34	7850.3-51.9	1.0	0.6		19.5	32.6	33.3		DOL,LMY,SHY,ANHY SL/F
35	7851.9-53.3	0.5	0.5		17.9	11.5	46.0		DOL,LMY,ANHY,SL/F
36	7853.3-55.0	1.1	0.5		17.2	17.6	42.0		DOL,LMY,SHY,ANHY SL/F
37	7855.0-56.1	0.2	0.1		16.5	27.1	40.5		DOL,LMY,ANHY,SL/F

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CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

NSERCH EXPLORATION INC.
AMBIRTH NO. 3

DATE: 7-5-78
FORMATION: AS NOTED

FILE NO: 3202-10814
ENGINEER: DILLARD

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
38	7856.1-57.0	<0.1	*		7.2	5.4	58.9		DOL,LMY,SHY,ANHY SL/F
39	7857.0-58.0	<0.1	<0.1		7.6	3.3	66.5		DOL,LMY,SHY,ANHY SL/F,STY
40	7858.0-59.1	0.4	0.4		13.9	18.4	44.6		DOL,LMY,SHY,ANHY,STY SL/F
41	7859.1-60.9	2.2	1.2		12.7	23.2	33.5		DOL,LMY,SHY,ANHY,STY SL/F
42	7860.9-62.7	0.4	0.2		14.4	8.2	59.9		DOL,LMY,SL/F
43	7862.7-64.4	2.9	1.6		12.5	18.7	34.7		DOL,LMY,ANHY,F,STY
44	7864.4-66.0	10.0	9.6		16.3	16.9	39.9		DOL,LMY,SDY,ANHY,F STY
	7866.0-82.0 LOST CORE								

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VERTICAL SCALE: 5" = 100'

GAMMA RAY
RADIATION INCREASE

PERMEABILITY
MILLIDARCYS
100.0 10.0 1.0 0.1

POROSITY
PERCENT
30 20 10 0

TOTAL WATER 0000
PERCENT PORE SPACE
80 60 40 20 0

OIL SATURATION XXXX
PERCENT PORE SPACE
0 20 40 60 80

7750

7806 LOG DEPTH = 13.5' HIGH

7800

7850

DEPTH

FORMATION CHARACTERISTICS

Secondary Porosity

0 % 25

Average Grain Density

2.5 gm/cc 3.0

GAMMA RAY

0 100

PRODUCTION CHARACTERISTICS

Water Saturation

100 % 0

Intrinsic Permeability Index

1 10 10^2 10^3 10^4

POROSITY AND FLUIDS ANALYSIS BY VOLUME

Moved Hydrocarbon | Water

PHI

25 % 0

Caliper (—) Bit Size

-4 0 inches 12

FORMATION ANALYSIS BY VOLUME

Clay | other Matrix | PHI

100 % 0

ENSERCH EXPLORATION, INC.

Docket No. 7224

Exhibit

Date July 08, 1981

PHILLIPS PETROLEUM - PETERSON "H" WELL NO. 1
(KB - 4384')

TOP CISCO 7704' (- 3320')

7700

7800

TOP FUSSELMAN 7846' (-3462')

7900

TIGHT ZONE
7882' - 7916'

TOP MONTOYA 7918' (-3534')

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7224 Exhibit No. 18
Submitted by ENSERCH
Hearing Date 7-8-81

PHILLIPS PETROLEUM - PETERSON "H" WELL NO.1
(KB - 4384')

7700

TOP CISCO 7704' (-3320')

7800

TOP FUSSELMAN 7846' (-3462')

7900

TIGHT ZONE
7882' - 7916'

GR TOP MONTOYA 7918' (-3534')

CNL

FDC

AP

Caliper

Tension

F.R. (GR)

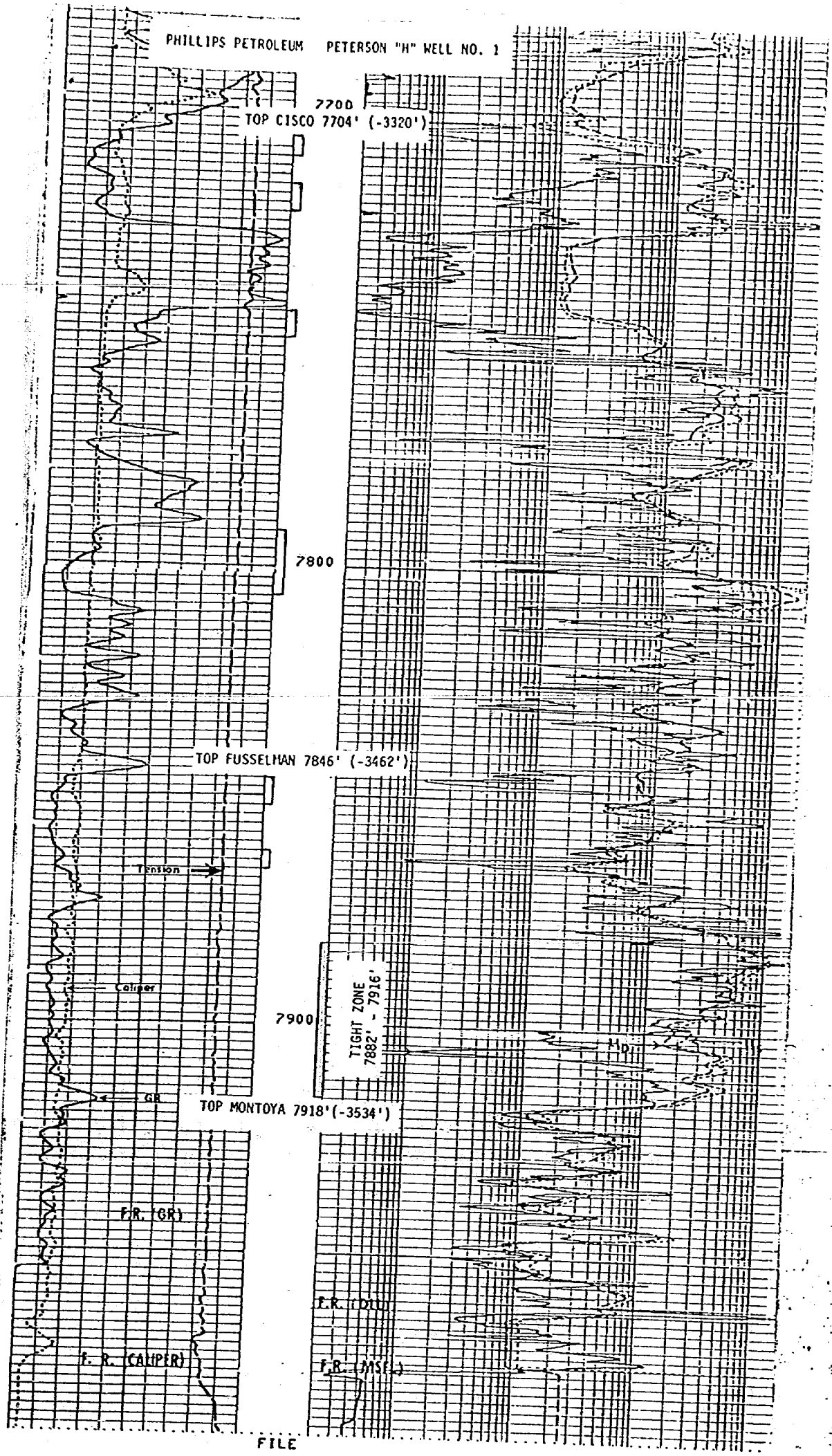
F.R. (CNL)

F.R. (CALIPER)

F.R. (FDC)

8000

GR (GAPI)		DRHO(G/C3)		TENS(LB)	
100.0	200.0	-0.050	0.4500	11000.	1000.
CALI(IN.)		DPHI( )			
6.000	16.00	0.3000			-0.100
GR (GAPI)		NPHI( )			
0.0	100.0	0.3000			-0.100



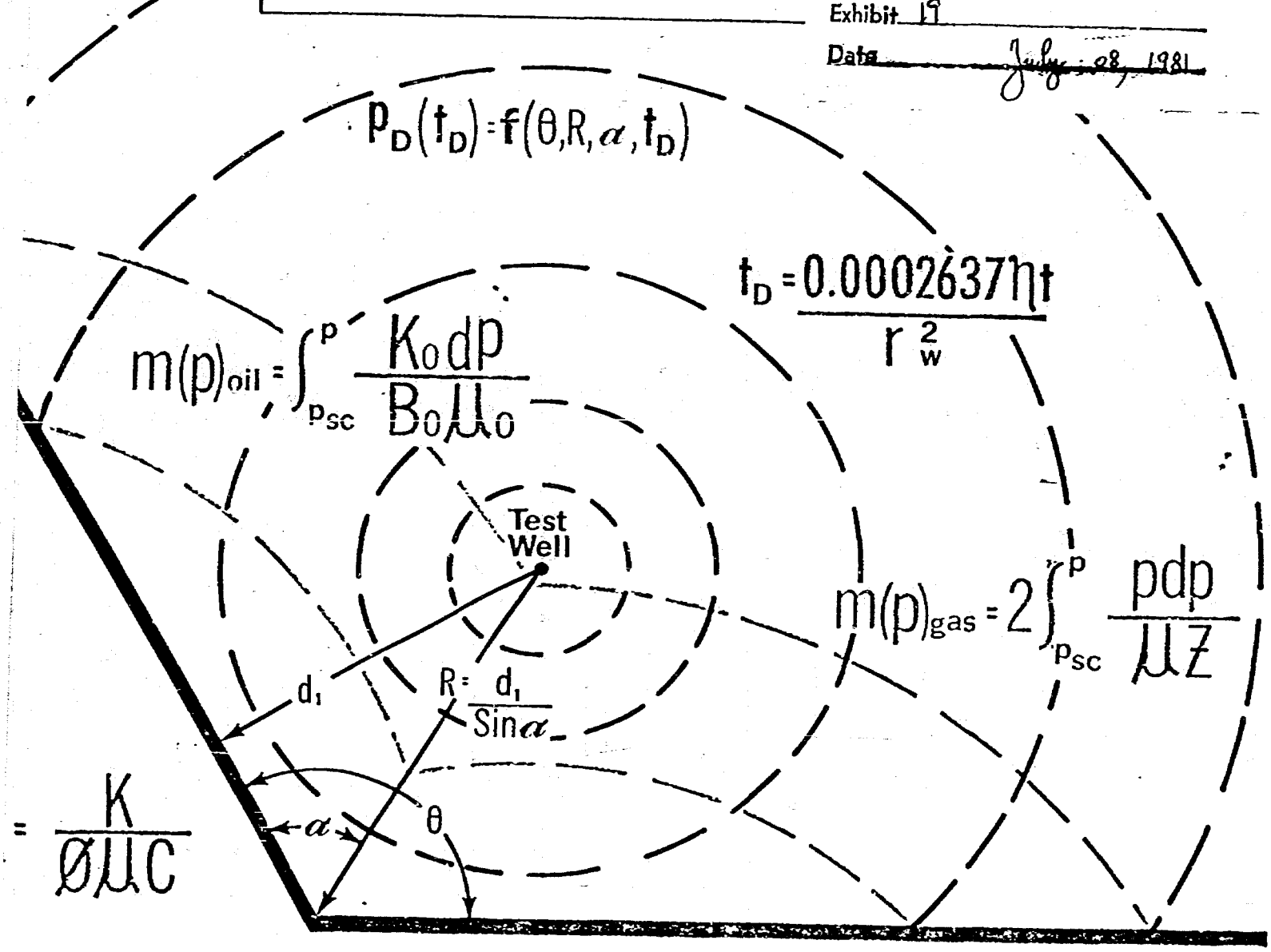
TENS(LB)		LLD (OHMM)
11000. 1000.		2000. 200000
GR (GAPI)		MSFL (OHMM)
100.0 200.0		0.2000 2000.
CALI(IN)		LLS (OHMM)
6.000 16.00		0.2000 2000.
GR (GAPI)		LLD (OHMM)
0.0 100.0		0.2000 2000.

OTIS SERVICES

WELL TEST ANALYSIS REPORT

COMPANY: ENSERCH EXPLORATION, INC.
WELL: NO. 1 LAMBIRTH
AREA: ROOSEVELT COUNTY, NEW MEXICO
TEST: PRESSURE BUILDUP
DATE: JUNE 22-25, 1978

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit 19
Date July 28, 1981



OTIS
P.O. BOX 34380 • DALLAS, TEXAS 75234
AREA CODE 214-242-5161

ROBERT L. FEHRMANN
Manager • Production Well Testing
July 17, 1978

Mr. Jon P. Stevenson
Enserch Exploration, Inc.
301 South Harwood
Dallas, Texas 75201

Dear Mr. Stevenson:

Please find enclosed a reservoir description resulting from an analysis of the 72-hour pressure buildup test conducted during June 22-25, 1978 in the No. 1 Lambirth Well, Fusselman oil reservoir, Roosevelt County, New Mexico.

Merging the reservoir description presented by this report with available subsurface information from geologic and seismic sources is recommended. This merger will provide the best overall reservoir description for use in economic and operational studies.

A high degree of confidence in the analysis prevails as a result of the combined use of a highly sensitive pressure gauge and a computerized regression analysis procedure. In fact the precision of the pressure matches obtained in the analysis far exceeds any of those proviously experienced by the analyst. The analysis results show that the reservoir description approximates an "open rectangle" shape with 2 parallel sides being impervious boundaries and a truncating boundary on one end performing as a constant pressure boundary. In view of Phillips No. 2-A Goldston well which tested water in the correlative reservoir interval approximately 2800 feet west of the subject well it is believed that the constant pressure boundary is an oil/water contact. A possible fourth boundary is indicated to form impervious closure on the rectangle at a significant distance from the test well, however, the actual existence of this boundary is uncertain since its effect on the pressure behavior (in the presence of the closer impediments) is within a statistical band of pressure "noise". A total test time of approximately twice the time of this test would be required for a complete investigation of the furthermost boundary. Summaries of the reservoir descriptions obtained by nonlinear regression analysis for each of the above boundary shapes are presented as follows:

		"Open-Rectangle"	"Closed-Rectangle"
(1)	gauge datum, ft	7,860	7,860
(2)	effective permeability-thickness, md-ft	25,714	25,369
(3)	effective permeability to oil, md	559	552
(4)	distances to parallel boundaries, ft		
	first, d1	446	510
	second, d2	636	784
(5)	distance to constant pressure boundary, ft, d3	2,120	2,166
(6)	distance to possible fourth boundary, ft, d4	-	4,139
(7)	radius investigated, ft	5,984	5,985
(8)	area investigated, ac	229	169
(9)	oil initially contained in area investigated, MMstb		
	by pressure response, N1	6.698	4.804
	by volumetric, N2	6.701	4.864
(10)	porosity-thickness, ft	6.13	6.07
(11)	calculated initial reservoir pressure, psia	2793.1	2794.6
(12)	measured initial reservoir pressure, psia	2795.7	2795.7
(13)	skin effect, (dimensionless)	-0.93	-0.93
(14)	completion efficiency, %	110.2	110.2

Differences between the above proved oil in-place volumes and reservoir areas calculated for each shape lead to a question of whether the reservoir will support 3 or more producing wells. Since the No. 3 well has already penetrated the Fusselman section and No. 4 well will soon commence drilling, additional pressure testing is not recommended until producing capabilities from correlative reservoir intervals have been evaluated in the No. 3 and 4 wells. After this is accomplished, the feasibility of a well testing program can be studied. The evidence of a possible nearby contact is sufficient to caution

against producing the well at rates which will cause water to prematurely finger into the wellbore. An approximate calculation of the critical oil rate (rate when water begins to finger toward the well) yields 2200 stb/d. Therefore, it appears that an oil rate of 500 to 600 stb/d or less will be safe.

Orientation of the reservoir shape is unknown. If tectonics permit, it seems logical that this high permeability reservoir is the product of percolating waters and therefore, one might suspect the major axis of the reservoir shape to subtend at some angle with the structure. In this manner a series of individual reservoir systems or solution channels could exist on a given structure.

Calculated initial reservoir pressures compare with the measured initial reservoir pressure as shown in the above table. The accuracy of the pressure gauge used for this test is approximately ± 1.0 psi (the instrument's ability to measure absolute pressure is the accuracy of a gauge and it is not to be confused with the term "sensitivity" which is the gauge's ability to detect a pressure change with time). The formation permeability in the vicinity of the wellbore is somewhat improved or altered as evidenced by the negative value of skin effect and a well completion efficiency greater than 100 %. An acid wash, perforations and an implosion on drilling the reservoir are all possible sources of the improved permeability region around the wellbore. A naturally fractured reservoir is not indicated by the analysis. Porosity-thickness values shown in the above table are "backed-out" from the hydraulic diffusivities (the diffusion constant is one of the parameters solved in the nonlinear regression analysis). Therefore, they represent dynamic averages of the reservoir area investigated.

A highly sensitive Hewlett-Packard pressure instrument was used to measure subsurface pressure responses during flow and shut-in. Bottom-hole fluid samples of the oil were obtained for PVT analyses by Core Lab, Inc., Dallas, Texas. Because the lab analyses were not available at the time of this study, the empirical PVT properties as summarized on Pages 43-44 were used. The bubble-point pressure determined from the PVT cell is 1536 psia at 155°F and it compares with a bubble-point of 1660 psia determined from fluid correlations using a gas-oil ratio of 602 scf/stb. Comparions of lab and empirical PVT properties available at the time of this study are summarized as follows:

Parameter	Lab	Correlations
p_b, psia	1536	1660
R_{sb}, scf/stb	843	602
B_{ob}, rb/stb	1.568	1.342
μ_{ob}, cp	0.343	0.366
c_o, $psi^{-1}x10^{-6}$	12.33	13.30

The above oil compressibilities are average values in the range from 3000 to 4000 psig. In view of the above comparisons it is not recommended to correct the values of oil in-place and boundary distances until the final lab PVT work is complete.

The test data were processed and analysed with the aid of OWASP (Otis Well Analysis Software Package), an integrated series of logic modules programed on a high speed computer. Information relevant to OWASP is provided in Appendix A.

Processing the test data included: (1) determining the effluent (reservoir barrels per day), (2) performing required superposition to account for the effects of flowing and shut-in conditions and (3) constructing various drawdown and buildup plots of the processed data. These steps are a portion of the OWASP logic.

Rigorous analysis of the pressure buildup test data in the presence of boundaries was performed by a nonlinear regression method. A linear regression procedure was applied to the buildup profile at shut-in times prior to the reflection of a nearest boundary. Appendix B provides discussions of both linear and nonlinear regression methods. The nonlinear method simultaneously evaluates several reservoir parameters by performing a large number of calculations programed on a high speed computer. Starting with the initial parameter estimates the nonlinear method performs systematic adjustments of the parameter values and makes comparisons between measured and calculated pressure data until convergence is achieved. The convergence criterions are statistical tolerances and they are set within the sensitivity band of the pressure gauge used during the test. Parameters solved by each regression run are effective permeability-thickness (kh), hydraulic diffusivity ($k/\phi\mu c$), initial reservoir pressure (p_i) and from one to four boundary distances. Rectangle and wedge shapes are used to form different boundary combinations.

Initial examinations of the pressure drawdown and pressure buildup plots were made. From these examinations it was found that the pressure profile measured during flow was

highly influenced by a relatively large band of pressure "noise" in the flow string and a minor leak in the lubricator grease seal at the surface (just before shut-in). Because of these variations and discontinuities in the pressure drawdown profile, it was necessary to use the buildup test as the primary target of the regression analysis. Semi-log and coordinate plots of the drawdown data are shown by Pages 49 and 50, respectively. Double-log, MDH (Miller, Dyes and Hutchinson) and superposed plots of the buildup data are presented on Pages 37, 38 and 39, respectively. An expanded buildup plot is shown on Page 40. Basic data relevant to the buildup plots are tabulated on Pages 42-48. Pages 51-53 show tabulated drawdown data. The double-log plot is used to determine where the middle-time straight line region should appear on the buildup plots. It is clear from examinations of these plots that more than one impediment influenced the pressure drawdown and buildup responses. This point is illustrated on the buildup plots of Pages 39 and 40. A subtle point which is unknown from examinations of the pressure profiles is that one of the reflected impediments is best described when it is a constant pressure boundary such as an oil/water contact. This problem is manifested by the regression analysis.

The regression analyses were performed systematically for various combinations of boundary shapes and boundary conditions. Attachment 1 summarizes highlights of these results and it shows how the aforementioned reservoir description was obtained. An examination of Attachment 1 clearly shows that better results are obtained when a third impediment is included as a constant pressure boundary. Criterions used to elicit the reservoir description from Attachment 1 are comparisons of the root-mean square deviation, (S_y), the ratio of oil volume calculated by the diffusion or expansion constant (N1) and the volumetric oil volume (N2), the calculated porosity-thickness (ϕh) and the calculated initial reservoir pressure. Additional criterions are certain statistical parameters produced from each nonlinear regression run such as the parameter correlation matrix, the standard error of estimate and the residuals of a pivotal-point diagonal matrix solution. When cross-comparisons of S_y's are made for different shapes the background pressure "noise band" is considered. For this test the "noise band" is calculated at $\pm$ 0.022 psi; therefore, the difference between the minimum S_y and the S_y of any other regression run must be greater than the width of the "noise band" before the results are considered inferior. For example the minimum S_y shown on Attachment 1 is $\pm$ 0.030 psi and the S_y of any other regression run must be greater than $\pm$ 0.052 psi before it is considered for deletion. On this basis and the aforementioned criterions the acceptable reservoir descriptions are Models 9 and 11 as formerly presented. The regression procedures for any one

configuration included integrity checks such as holding one parameter constant while others are allowed to vary and trying different initial parameter estimates. Models 7, 8 and 9 of Attachment 1 illustrate some of the checks. Conventional analysis of pressure data cannot yield the detailed reservoir description achieved in this study.

Pages 1-34 show detailed analysis results for the different reservoir systems summarized by Attachment 1. Linear regression analysis of the afterflow and middle-time regions of the buildup profile were performed. Pages 35 and 36 summarize the results of the middle-time region analysis. Attempts to analyse the afterflow region with a linear regression procedure were unseccessful. This result is attributed to the aforementioned surface leak which occurred just prior to shut-in.

The opportunity to work with you on this problem is appreciated.

Yours very truly,

John S. Rodgers

John S. Rodgers
Consulting Reservoir Engineer

JSR/vjh

Form C-108
Revised 3-1-68

NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION

OPERATOR: Enserch Exploration, Inc.		ADDRESS: P. O. Box 4815 Midland, Texas 79704	
LEASE NAME: Rader	WELL NO.: 2	FIELD: Undesignated	COUNTY: Roosevelt

LOCATION: UNIT LETTER E ; WELL IS LOCATED 1880 FEET FROM THE North LINE AND 560 FEET FROM THE West LINE, SECTION 32 TOWNSHIP 5-S RANGE 33E NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING	13-3/8"	356'	250 sacks	Circ.	
INTERMEDIATE	9-5/8"	1981'	914 sacks	Circ.	
LONG STRING	5-1/2"	8000'	350 sacks	6850'	Cement Bond Log
TUBING	2-3/8"	7876.53'	NAME, MODEL AND DEPTH OF TUBING PACKER: Baker Model "D" retainer Production packer @ 7875'		

NAME OF PROPOSED INJECTION FORMATION: Montoya	TOP OF FORMATION: 7900'	BOTTOM OF FORMATION: 7955'
IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?: Tubing	PERFORATIONS OR OPEN HOLE?: Perforations	PROPOSED INTERVAL(S) OF INJECTION: 7902' - 7930'

IS THIS A NEW WELL DRILLED FOR DISPOSAL?: No	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED?: South Peterson (Fusselman and/or Penn.) Dev. Well	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE?: Yes

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH: 7848' - 7851' (8 holes) squeezed with 86 sacks, 7710'-7714' (10 holes) squeezed w/47 sacks

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA: 250'	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA: 7858'	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA: None

ANTICIPATED DAILY INJECTION VOLUME (BBLS.)	MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSID)
750	750	2880	closed	gravity	vacuum

ANSWER YES OR NO WHETHER THE FOLLOWING WATERS ARE MINERALIZED TO SUCH A DEGREE AS TO BE UNFIT FOR DOMESTIC, STOCK, IRRIGATION, OR OTHER GENERAL USE —	WATER TO BE DISPOSED OF	NATURAL WATER IN DISPOSAL ZONE	ARE WATER ANALYSES ATTACHED?
	yes	yes	yes

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND): Richard Lambirth & Portales National Bank (O.D. Lambirth Trust) P. O. Drawer 888 Portales, N.M

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL

Phillips Petroleum Company
Phillip Bldg.
Odessa, Texas 79761

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 1
Submitted by RENOULT
Hearing Date 7-8-81

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING?	SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL
	yes	yes

ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B)	PLAT OF AREA	ELECTRICAL LOG	DIAGRAMMATIC SKETCH OF WELL
	yes	yes	yes

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Daniel R Renoult — District Petroleum Engineer — June 08, 1981

(Signature) (Title) (Date)

NOTE: Should waivers from the surface owner and all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests. SEE RULE 701.

PETERSON SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
WELL STATUS
(AS OF 01/1981)

Proposed Salt Water Disposal
Produced from Pennsylvanian
Produced from Fusselman

Scale: 1" = 2000'

TANNEYHILL

ENSERCH EXPLORATION, INC.

Docket No. 7226
Exhibit
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 2
Submitted by BENOULT
Hearing Date 7-8-81

SQ PETERSON

R 33

ELIDA

Clone Tie Tight for Injection + Create Well

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 3
Submitted by BENNETT
Hearing Date 7-8-81

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

APPLICATION FOR APPROVAL OF SALT WATER DISPOSAL WELL

Enserch Exploration - Rader Well No. 2
Peterson (South) Field - Roosevelt County
New Mexico

Operator Well Name API Well I.D. No.	Location	Distance to Enserch Rader No. 2	Casing String Setting Depth	Cement (sacks)	Cement Top	Total Depth	Current Producing Interval (Subsea depth)	Current Producing Formation	KB
Enserch Rader No. 2	1880' FNL 560' FWL Section 32 T5S, R33E		13-3/8" @ 356' 9-5/8" @ 1981' 5-1/2" @ 8000'	250 914 350	Surface Surface 6850'	8000'	7902'-7930' (-3503, -3531)	Salt Water Disposal	4399'
Enserch Rader No. 1 30-041-20492	2100' FSL 660' FWL Section 32 T5S, R33E	1650'	13-3/8" @ 373' 8-5/8" @ 2025'	350 680	Surface Surface	7903'	D&A	D&A	4410'
Phillips Lambirth "A" No. 4 30-041-20506	560' FNL 560' FEL Section 31 T5S, R33E	1750'	13-3/8" @ 360' 8-5/8" @ 3500' 5-1/2" @ 8007'	420 580 1635	Surface Surface 4200'	8007'	7814'-7828' (-3423, -3437)	Fusselman	4391'
Enserch Lambirth No. 3 30-041-20454	1980' FNL 1980' FEL Section 31 T5S, R33E	2500'	13-3/8" @ 377' 8-5/8" @ 3297' 5-1/2" @ 8030'	350 2000 800	Surface Surface 6600'	8030'	7702'-7715' (-3295, -3308)	Pennsylvanian	4407'
Phillips Peterson No. 1-H 30-041-20535	660' FWL 510' FWL Section 29 T5S, R33E	2600'	13-3/8" @ 350' 8-5/8" @ 3496' 5-1/2" @ 7982'	325 775 800	Surface Surface 5210'	7991'			4384'
Enserch Lambirth No. 7 30-041-20482	660' FEL 510' FSL Section 30 T5S, R33E	2750'	13-3/8" @ 358' 8-5/8" @ 1991' 5-1/2" @ 7858'	300 750 450	Surface Surface 6630'	7882'	7826'-7829' (-3435, -3438)	Fusselman	4391'
Phillips Lambirth "A" No. 1 30-041-20471	1980' FEL 1980' FSL Section 31 T5S, R33E	2900'	13-3/8" @ 400' 8-5/8" @ 3500' 5-1/2" @ 7995'	420 1175 400	Surface Surface 5780'	8000'	7830'-7838' 7852'-7858' (-3408, -3416) (-3430, -3436)	Fusselman	4422'

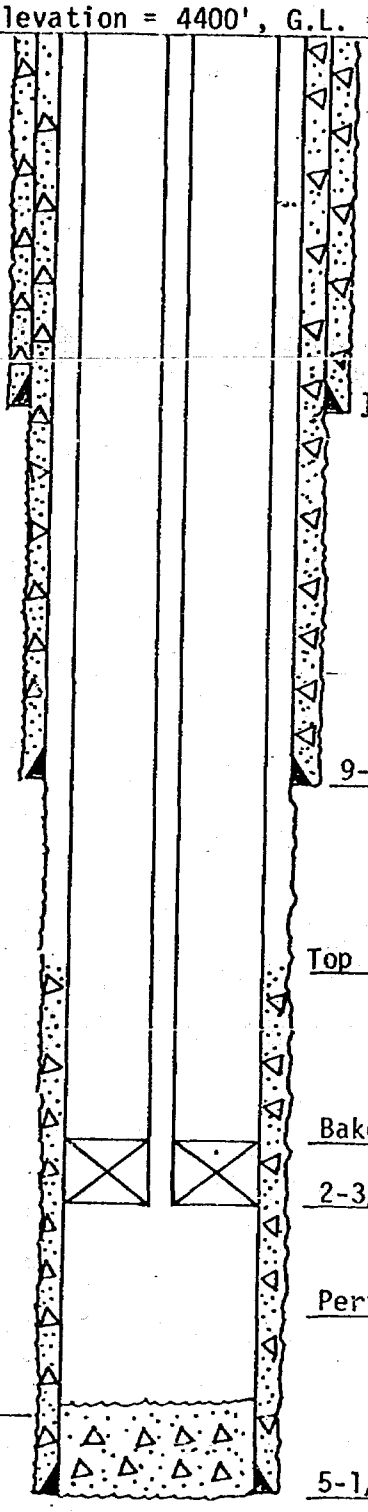
Enserch Exploration, Inc.

Rader No. 2 Well

1880' FNL & 560' FWL, Sec. 32-T5S-R33E

Roosevelt County, New Mexico

K.B. Elevation = 4400', G.L. = 4385'



13-3/8" csg. @ 356', cmt. circ.

9-5/8" csg. @ 1981', cmt. circ.

Top of cmt. @ 6850'

Baker Model "D" pkr. @ 7875'

2-3/8" tbg. @ 7876.53'

Perforations: 7902' - 7930'

PBTD @ 7940'

5-1/2" csg. @ 8000', cmt. w/350 sks.

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 4
Submitted by ENSERCH
Hearing Date 7-8-81

ENSERCH EXPLORATION, INC.
Case No. 7226
Exhibit
Date July 08, 1981

Rader Well No. 1

South Peterson Field

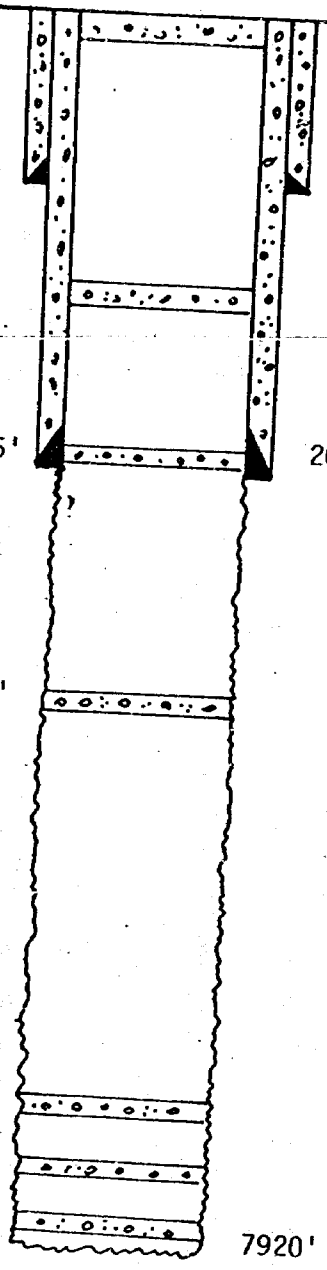
Roosevelt County, New Mexico

Prepared by: Date

Plug #7: 10 sx Class H Cmt. @ surface

KB Elevation 4393.5'

GL Elevation 4407.5'



374' 13-3/8" 48#/ft K55 ST&C 8rd csg.

Plug #6: 40 sx Class H Cmt. @ 1082'-982'

Plug #5: 40 sx Class H Cmt. @ 2075'-1975'

2025' 8-5/8", 24#/ft K55 ST&C 8rd csg.

Plug #4: 40 sx Class H Cmt. @ 4443'-4343'

ENSERCH EXPLORATION, INC.

Docket No. 7226

Exhibit

Date July 08, 1981

Plug #3: 40 sx Class H Cmt. @ 7152'-7052'

Plug #2: 40 sx Class H Cmt. @ 7574'-7474'

Plug #1: 50 sx Class H Cmt. @ 7880'-7930'

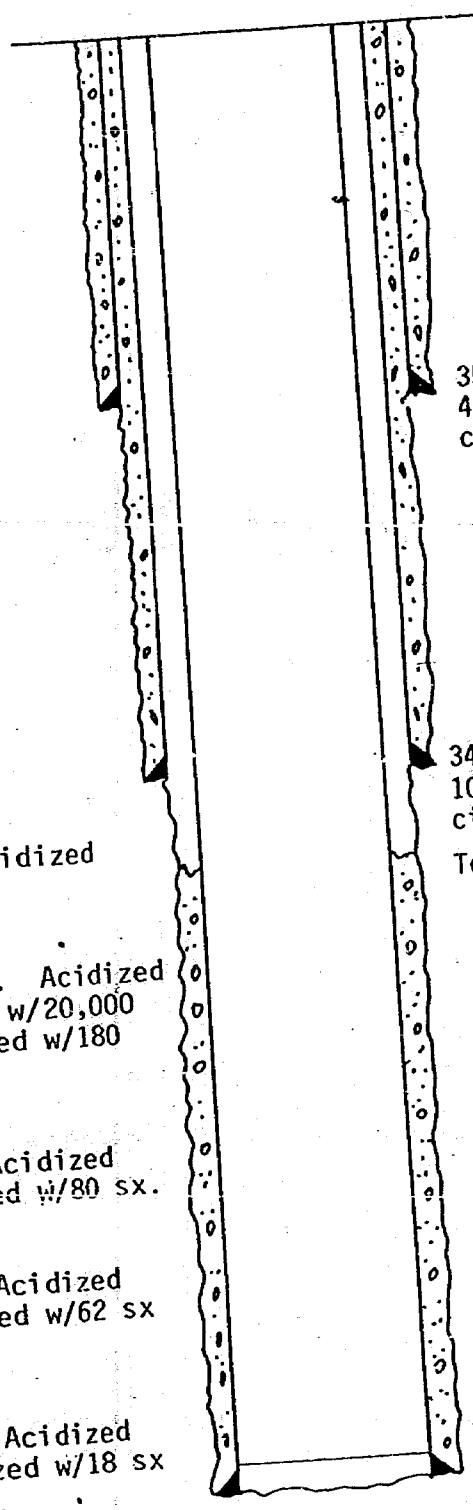
7920' TD open hole

Last Workover: Well was plugged on 7/7/79 before production string was run.

Prod. Rate Before: Prod. Rate After:

Nature of Workover:

PHILLIPS PETROLEUM COMPANY
Peterson "H" Well No. 1
South Peterson Field
Roosevelt County, New Mexico



K.B. Elevation - 4384'
G.L. Elevation - 4368'

350' 13-3/8" 48#/ft K-55
420 sx Class H + 2% $CaCl_2$
circulated 95 sx to surface

3496' 8-5/8" 24#/ft K-55
1000 sx Class H + 2% $CaCl_2$
circulated 225 sx to surface

Top of cement @ 5210'

Perfs 7332'-7341' (18 shots). Acidized w/5000 gals. 28% acid.

Perfs 7616'-7760' OA (110 shots). Acidized w/4500 gals. 15% NE HCl. Frac'd w/20,000 gals. gelled 15% NE HCl. Squeezed w/180 sx.

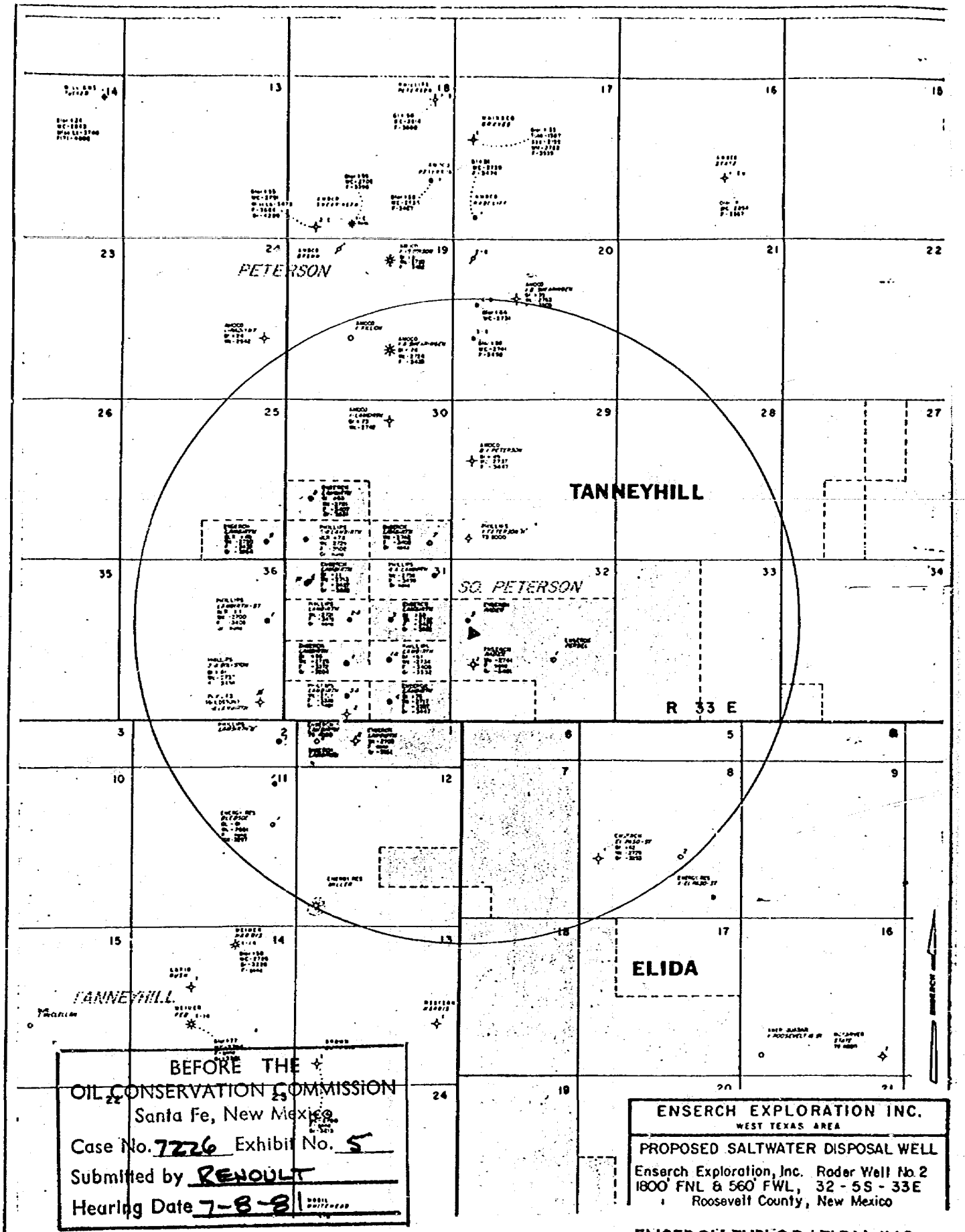
Perfs 7793'-7801' (32 shots). Acidized w/250 gals. 15% NE HCl. Squeezed w/80 sx.

Perfs 7792'-7806' (28 shots). Acidized w/750 gals. 15% NE HCl. Squeezed w/62 sx Class H.

Perfs 7846'-7852' (20 shots). Acidized w/500 gals. 15% NE HCl. Squeezed w/18 sx Class H.

7982' 5-1/2" 15.5#/ft K-55
800 sx Class H + 2% KCl

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981



BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 5
Submitted by RENOULT
Hearing Date 7-8-81

ENSERCH EXPLORATION INC.
WEST TEXAS AREA

PROPOSED SALTWATER DISPOSAL WELL
Enserch Exploration, Inc. Roder Well No. 2
1800' FNL & 560' FWL, 32 - 5S - 33E
Roosevelt County, New Mexico

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit

Docket No. 7226

Exhibit

Date July 08, 1981

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Enserch Rader No. 2	32	5S	33E	E		Salt water Disposal
Enserch Rader No. 1	32	5S	33E	L	1,650'	D&A
Phillips Lambirth "A" No. 4	31	5S	33E	A	1,750'	Fusselman
Enserch Lambirth No. 6	31	5S	33E	D	5,280'	P&A
Enserch Lambirth No. 10	31	5S	33E	D	5,350'	Fusselman
Phillips Lambirth "A" No. 2	31	5S	33E	F	3,800'	Fusselman
Enserch Lambirth No. 3	31	5S	33E	G	2,500'	Pennsylvanian
Phillips Lambirth "A" No. 1	31	5S	33E	J	2,900'	Fusselman
Enserch Lambirth No. 1	31	5S	33E	K	4,200	Fusselman
Phillips Lambirth "A" No. 3	31	5S	33E	M	4,650'	Fusselman

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 6
Submitted by RENOULT
Hearing Date 7-8-81

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Page 2
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Enserch Lambirth No. 4	31	5S	33E	O	3,650	Pennsylvanian
Amoco Lambirth No. 1	30	5S	33E	B	7,050'	P&A
Enserch Lambirth No. 8	30	5S	33E	L	6,550'	Fusselman
Phillips Lambirth "A" No. 5	30	5S	33E	M	5,850'	Pennsylvanian
Enserch Lambirth No. 7	30	5S	33E	P	2,750'	Fusselman
Amoco Peterson No. 1-B	29	5S	33E	E	5,280'	P&A
Phillips Peterson No. 1-H	29	5S	33E	M	2,600'	P&A
Amoco Swearingen No. 4-B	20	5S	33E	E	14,000'	Pennsylvanian
Amoco Swearingen No. 3-B	20	5S	33E	L	9,300'	Pennsylvanian
Amoco Swearingen No. 1-A	19	5S	33E	J	9,300'	Pennsylvanian
Enserch Lambirth No. 9	25	5S	32E	P	6,900'	Fusselman

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Page 3
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Phillips Lambirth State #1	36	5S	32E	H	6,400'	Fusselman
Phillips Goldston "A" No. 2	36	5S	32E	P	7,000'	P&A
Goldston Lambirth "A" No. 1	36	5S	32E	P	7,150'	P&A
Phillips Lambirth "B" No. 1	2	6S	33E	A	7,250'	Pennsylvanian
Enserch Lambirth No. 2	1	6S	33E	D	6,250'	P&A
Enserch Lambirth No. 5	1	6S	33E	C	5,400'	P&A
Enserch El Paso State No. 1	8	6S	34E	L	8,800'	P&A
Energy Reserves Bledsoe No. 2	11	6S	33E	A	8,200'	Pennsylvanian
Energy Reserves Bledsoe No. 1	1	6S	33E	H	9,200'	Pennsylvanian
Energy Reserves Miller No. 1	12	6S	33E	M	14,000'	Granite Wash

Oil Production
Phillips Petroleum - Lambirth "A" Well No. 1
Peterson (Fusselman), South Field
Location: 05S/33E/31/J
Roosevelt County, New Mexico

STB/Month

10^4 9 8 7 6 5 4 3 2 10^3 9 8 7 6 5 4 3 2 10^2 9 8 7 6 5 4 3 2 1

Jan. Feb. Mar. Apr. May June July Aug. Sept Oct. Nov. Dec.

19 78 | 19 79 | 1980 | 19 81 | 19 82

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit 7
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 7
Submitted by ENSERCH
Hearing Date 7-8-81

K&E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

PRODUCTION HISTORY
Phillips Petroleum - Lambirth "A" Well No. 1
Peterson (Fusselman), South Field

Location: 05S/33E/31/J
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR	Water Cut
	Bbls	MCF	Bbls	SCF/Bbl	%
01/79	3,700	3,411		922	0
02/79	6,650	6,131		922	0
03/79	2,585	980		379	0
04/79	2,184	646	191	296	8
05/79	7,115	1,883	149	265	2
06/79	6,536	2,776	5,222	425	44
07/79	6,105	2,865	5,104	469	46
08/79	6,332	5,976	5,066	944	44
09/79	4,718	3,536	8,257	749	64
10/79	4,965	3,317	8,689	668	64
11/79	3,908	967	2,286	247	37
12/79	4,462	1,174	2,610	263	37
01/80	1,371	354	802	258	37
02/80	1,255	205	734	163	37
03/80	1,641	456	960	278	37
04/80	4,052	886	2,370	219	37
05/80	3,730	651	2,182	174	37
06/80	3,518	1,017	2,058	289	37
07/80	3,576	9,622	2,092	2,691	37
08/80	3,668	3,034	9,638	827	72
09/80	1,195	698	3,138	584	72
10/80	769	295	2,019	384	72
11/80	876	114	2,300	130	72
12/80	969	578	2,545	596	72
Cum. Prod.	85,880	51,572	68,412	600	44
01/81	431	431	1,132	1,000	72
02/81	1,924	151	2,728	78	59
03/81	last prod. 02/81				

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

Oil Production
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field
Location: 05S/33E/30/P
Roosevelt County, New Mexico

STB/Month

10^4 9 8 7 6 5 4 3 2 — 10^3 9 8 7 6 5 4 3 2 — 10^2 9 8 7 6 5 4 3 2 — 10

1 .9 .8 .7 .6 .5 .4 .3 .2 — 1 .9 .8 .7 .6 .5 .4 .3 .2 — 1 .9 .8 .7 .6 .5 .4 .3 .2 — .1

Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

19 78 | 19 79 | 19 80 | 19 81 | 19 82

K+E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit 8
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 8
Submitted by ENSERCH
Hearing Date 7-8-81

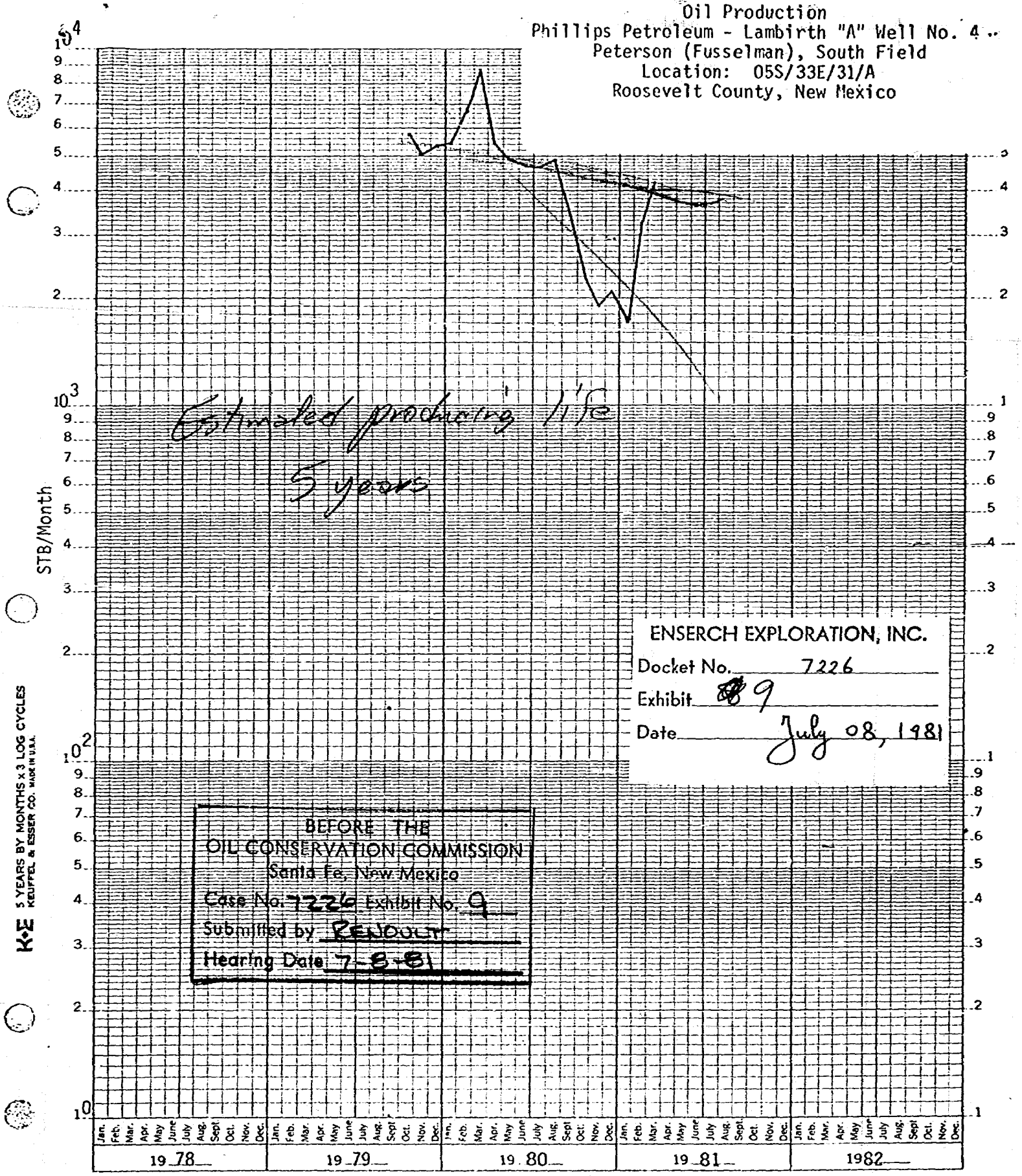
PRODUCTION HISTORY
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field

Location: 05S/33E/30/P
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR	Water Cut
	Bbls	MCF	Bbls	SCF/Bbl	%
01/79					
02/79					
03/79					
04/79					
05/79					
06/79	2,244	1,031	1,120	459	33
07/79	2,112	871	804	412	30
08/79	1,879	1,056	494	562	21
09/79	3,345	771	1,859	230	36
10/79	5,912	2,493	1,261	421	18
11/79	6,891	2,262	1,257	328	15
12/79	6,228	2,172	348	348	5
01/80	6,250	1,767	1,380	282	18
02/80	2,724	1,840	1,014	675	27
03/80	6,242	1,971	1,399	316	18
04/80	5,541	2,035	1,370	367	20
05/80	5,279	2,122	1,722	402	21
06/80	4,376	2,221	1,262	508	22
07/80	3,120	1,537	1,689	493	35
08/80	2,723	1,589	2,470	584	48
09/80	3,260	1,789	2,434	549	43
10/80	2,274	1,800	1,089	792	32
11/80	3,142	2,460	3,194	783	50
12/80	1,527	1,669	1,507	1,093	50
Cum. Prod.	75,069	33,456	27,673	446	27
01/81	2,433	3,032	2,319	1,246	51
02/81	2,292	2,645	1,210	528	35
03/81	1,354	2,183	1,212	895	47

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

Oil Production
Phillips Petroleum - Lambirth "A" Well No. 4
Peterson (Fusselman), South Field
Location: 05S/33E/31/A
Roosevelt County, New Mexico



K+E 5 YEARS BY MONTHS x 3 LOG CYCLES KEUFFEL & ESSER CO. MADE IN U.S.A.

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit #9
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 9
Submitted by RENOUF
Hearing Date 7-8-81

PRODUCTION HISTORY
Phillips Petroleum - Lambirth "A" Well No. 4
Peterson (Fusselman), South Field

Location: 05S/33E/31/A
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR	Water Cut
	Bbls	MCF	Bbls	SCF/Bbl	%
01/79					
02/79					
03/79					
04/79					
05/79					
06/79					
07/79					
08/79					
09/79					
10/79	5,740	1,186	402	207	6
11/79	5,020	1,578	8,685	314	63
12/79	5,158	1,725	892	334	15
01/80	5,434	1,783	940	328	15
02/80	6,701	1,394	1,159	208	15
03/80	8,762	614	301	70	3
04/80	5,410	1,502	936	278	15
05/80	4,979	1,106	861	222	15
06/80	4,696	1,725	812	367	15
07/80	4,773	177	2,387	37	33
08/80	4,898	3,008		614	0
09/80	3,537	1,146		324	0
10/80	2,277	483		212	0
11/80	1,902	138		73	0
12/80	2,035	673		331	0
Cum. Prod.	71,332	18,238	17,375	256	20
01/81	1,752	972	--	550	0
02/81	4,419	1,236	4,247	280	49
03/81	3,292	80	3,116	25	49

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 10
Submitted by BENOULT
Hearing Date 7-8-81

WATER PRODUCTION (IN BBLS)
Enserch Exploration - Peterson (Fusselman, Penn) South Field
Roosevelt County, New Mexico

Enserch Exploration	Lambirth #1		Lambirth #3		Lambirth #4		Lambirth #6		Lambirth #7		Lambirth #8		Lambirth #9		Lambirth #10		Cumulative Water Production		
	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Total
06/78	0																		
07/78	0																		
08/78	310																310		310
09/78	313																313		313
10/78	0																0		0
11/78	0		0		1,119												0	1,119	1,119
12/78	0		0		1,995												0	1,995	1,995
01/79	0		0		1,807												0	1,807	1,807
02/79	0		0		1,569												0	1,569	1,569
03/79	0		0		1,501		936										936	1,501	2,437
04/79	0		0		956		720										720	956	1,676
05/79	0		0		2,607		240										240	2,607	2,847
06/79	0		0		2,285		3,965		1,120								5,085	2,285	7,370
07/79	0		0		0		3,703		804								4,507	0	4,507
08/79	0		0		1,949		2,928		494								3,422	1,949	5,371
09/79	0		0		1,923		2,560		1,859								4,419	1,923	6,342
10/79	0		0		1,819		3,928		1,261		0						5,189	1,819	7,008
11/79	0		0		2,245		6,778		1,257		395						8,430	2,245	10,675
12/79	0		0		1,613		9,997		348		5,247						15,592	1,613	17,205
01/80	0		0		1,273		8,961		1,380		5,377		44				15,762	1,273	17,035
02/80	0		0		1,143		9,220		1,014		1,702		0				11,936	1,143	13,079
03/80	0		0		1,376		10,394		1,399		7,891		0				19,684	1,376	21,060
04/80	0		0		1,326		11,755		1,370		6,759		0				19,884	1,326	21,210
05/80	0		0		1,353		11,242		1,722		6,349		0				19,313	1,363	20,676
06/80	0		0		1,120		11,598		1,262		10,034		0				22,894	1,120	24,014
07/80	0		0		1,029		8,087		1,689		10,286		0				20,062	1,029	21,091
08/80	0		0		1,162				2,470		9,977		0		266		12,713	1,162	13,875
09/80	0		0		1,007				2,434		9,615		0		7,215		19,264	1,007	20,271
10/80	0		0		817				1,089		10,657		11		10,838		22,595	817	23,412
11/80	0		0		230				3,194		8,620		0		7,606		19,420	230	19,650
12/80	0		0		398				1,507		9,997		8		10,773		22,265	398	22,663
Cumulative Water Production	623		0		35,632		107,012		27,673		102,886		63		36,698		274,955	35,632	310,587

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

Application for Approval of
Salt Water Disposal Injection Well

Enserch Exploration - Gladys Rader Well No. 2
Peterson (South) Field
Roosevelt County, New Mexico

Well Location: 1880' FNL & 560' FWL
Section 32, Township 5-S
Range 33-E, Unit Letter E

Perforation: 7902'-7930' (-3503', -3531')
2 JSPF, 0.42" hole

Stimulation Treatment: Spotted 150 gallons of 15% MCA (@1.7 BPM and 1100 psi). Pumped 10,000 gallons of MOD 202 Acid. Dropped 40 RCN ball sealers (@ 7.5 BPM). Flushed with 32 barrels of 2% KCl water.

Injection Test: Date: 03/27/81
Test Data: 5BPM @ 2400 psi
4BPM @ 1500 psi
3BPM @ 600 psi
2BPM @ vacuum

2BPM @ vacuum

Maximum Allowed Injection Pressure:

= 0.2 psi per foot of depth to the top of the injection zone.
= 0.2 x 7902 = 1580.4 psi

Maximum Allowed Injection Volume:

= 5976 bbls/day

Anticipated Daily Injection Volume:

= 750 bbls/day
= .52 bbls/minute

Anticipated Surface Injection Pressure:

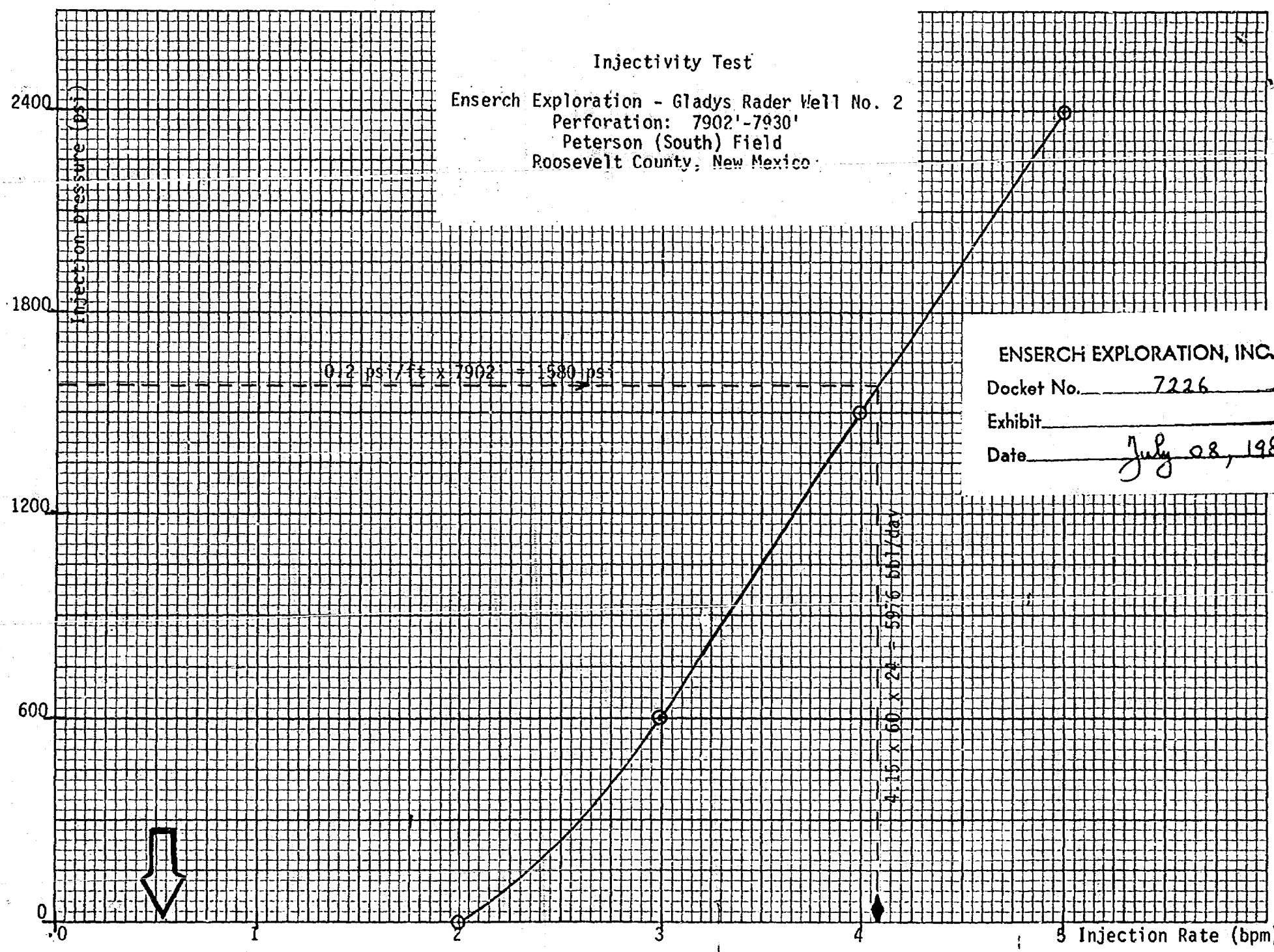
Under vacuum

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 11
Submitted by ENSOULT
Hearing Date 7-8-81

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

Injectivity Test

Enserch Exploration - Gladys Rader Well No. 2
Perforation: 7902'-7930'
Peterson (South) Field
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

WATER INJECTION CALCULATIONS
WATER ENROACHMENT
Enserch Exploration - G. Rader Well No. 2
Peterson, South Field

Proposed Injection Zone: Montoya
Perforations: 7902' - 7930'
(-3502', -3530')
Net Interval: 28'
Average Porosity: 7%
Irreducible Water Saturation: 20%
Displaceable Porosity: 5.6%

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 12
Submitted by Benoit
Hearing Date 7-8-81

Reservoir volume encroached by injected water:

$$W_i = (7758\ A\ h\ \phi_D)/B_W$$

Reservoir area encroached by injected water:

$$A = (B_W \times W_i)/(7758\ h\ \phi_D)$$

Volume of water produced from Peterson, S. Field (December 1980):

Enserch = 22,663 bbls	(731 bbls/day)
Phillips = 5,541 bbls	(179 bbls/day)
Total = 28,204 bbls/month	(910 bbls/day)

Anticipated daily injection volume (Enserch water production):

22,800 bbls/month (750 bbls/day)

Reservoir area encroached by injection water (750 bbls/day):

Year 1:	A =	22.5 acres	(550')
Year 2:	=	45.0 acres	(790')
Year 3:	=	67.5 acres	(970')
Year 4:	=	90.0 acres	(1120')
Year 5:	=	112.5 acres	(1150')
Year 6:	=	135.0 acres	(1370')
Year 7:	=	157.5 acres	(1480')
Year 8:	=	180.0 acres	(1580')
Year 9:	=	202.5 acres	(1675')
Year 10:	=	222.5 acres	(1760')

Phillips Lambirth #4 -1750' west

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08 / 1981

RESIDUE RESEARCH LABORATORY
2405 W INDIANA
MIDLAND, TEXAS 79701

INSOLUBLE RESIDUE REPORT
FILE NO.

SECTION	TWN.	RGE.	BLOCK	SURVEY	ELEV.	STATE	COUNTY
32	5-S	33-E			NR	NEW MEXICO	ROOSEVELT

FOOTAGE: 1880 FNL & 560 FWL

ISSUED FOR CONFIDENTIAL USE

COMPANY	WELL	FARM
ENSERCH EXPL,	# 2	RADER

SECTION EXAMINED:

7600-8000

TOPS AND CORRELATIONS:

Samples began in PENNSYLVANIAN ---------- 7600
B. PENNSYLVANIAN - T. MONTOYA ---------- 7880
T. CAMBRIAN ---------- 7980

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 15
Submitted by BROWN
Hearing Date 7-8-81

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date July 08, 1981

DEPTH

FORMATION CHARACTERISTICS

Secondary Porosity

0 % 25

Average Grain Density

2.5 gm/cc 3.0

GAMMA RAY

0 100

PRODUCTION CHARACTERISTICS

Water Saturation

100 % 0

Intrinsic Permeability Index

1 10 10^2 10^3 10^4

POROSITY AND FLUIDS ANALYSIS BY VOLUME

Moved Hydrocarbon | Water

PHI

25 % 0

Caliper (--) Bit Size

-4 0 inches 12

FORMATION ANALYSIS BY VOLUME

Clay | other Matrix | PHI

100 % 0

ENSERCH EXPLORATION, INC.

Docket No. 7226

Exhibit

Date July 08, 1981

PHILLIPS PETROLEUM - PETERSON "H" WELL NO. 1
(KB - 4384')

TOP CISCO 7704' (- 3320')

7700

7800

TOP FUSSELMAN 7846' (-3462')

7900

TIGHT ZONE
7882' - 7916'

TOP MONTOYA 7918' (-3534')

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

Case No. 7226 Exhibit No. 18

Submitted by ENSERCH

Hearing Date 7-8-81

PHILLIPS PETROLEUM - PETERSON "H" WELL NO.1
(KB - 4384')

7700

TOP CISCO 7704' (-3320')

7800

TOP FUSSELMAN 7846' (-3462')

7900

TIGHT ZONE
7882' - 7916'

GR TOP MONTOYA 7918' (-3534')

Caliper

F.R. (GR)

F.R. (CALIPER)

CNL

FDC

Δρ

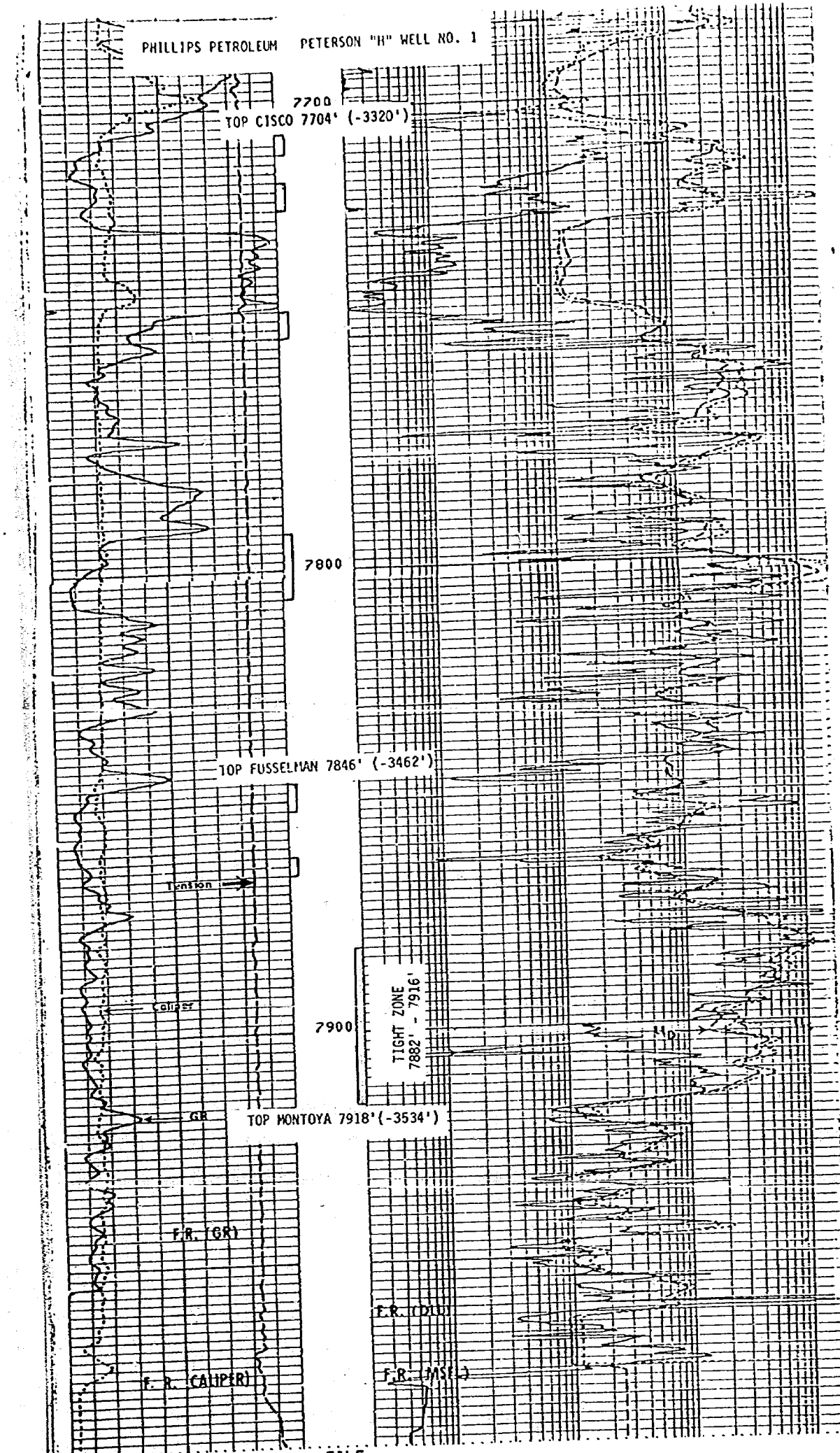
Tension

F.R. (CNL)

F.R. (FDC)

8000

GR (GAPI)		DRHO(G/C3)	TENS(LB)
100.0	200.0	-0.050 0.4500	11000. 1000.
CALI(IN..)		DPHI( )	
6.000	16.00	0.3000	-0.100
GR (GAPI)		NPHI( )	
0.0	100.0	0.3000	-0.100



6

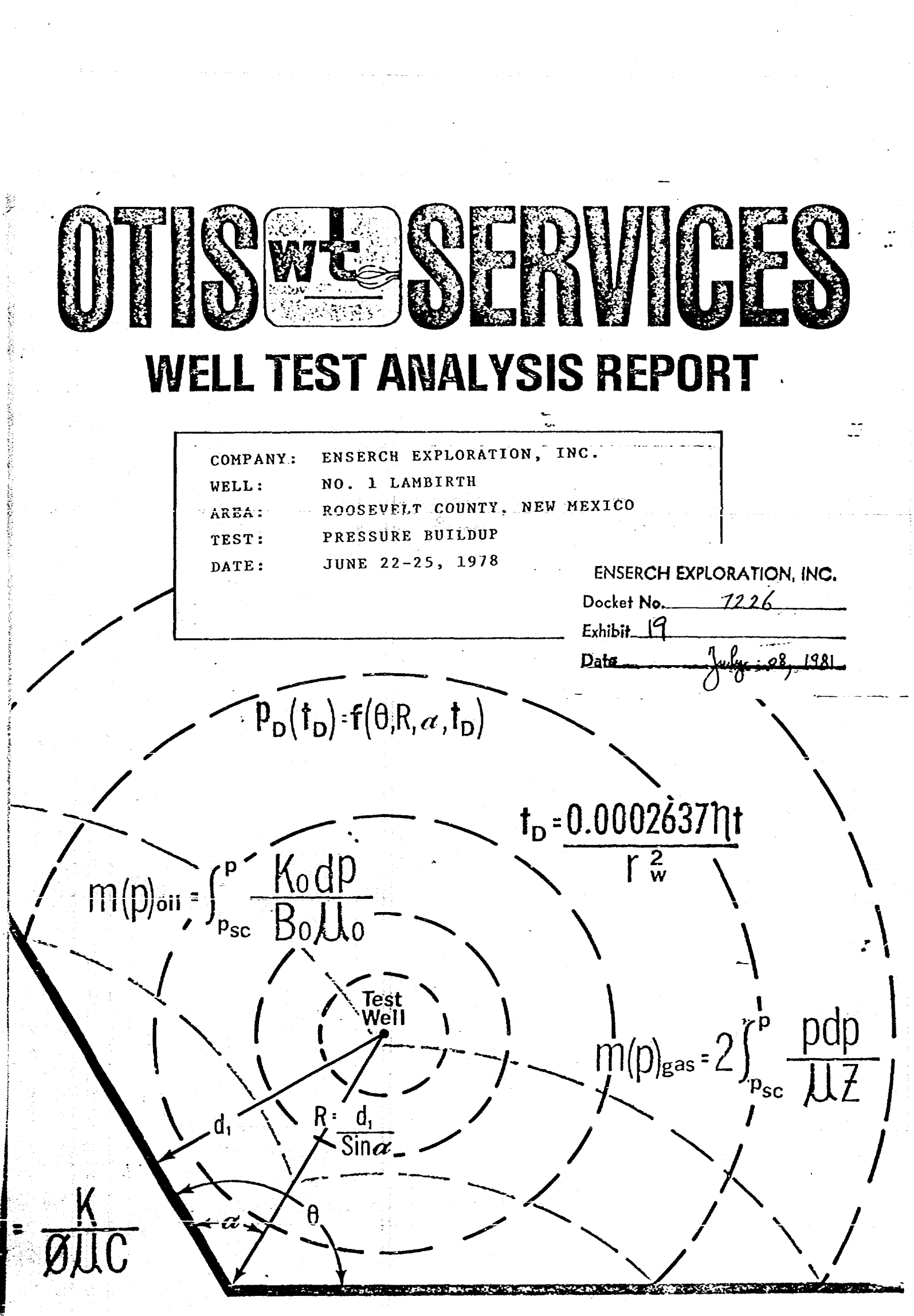
TENS(LB) 11000. 1000.		LLD (OHMM) 2000. 200000
GR (GAPI) 100.0 200.0		MSFL(OHMM) 0.2000 2000.
CALI(IN...) 6.000 16.00		LLS (OHMM) 0.2000 2000.
GR (GAPI) 0.0 100.0		LLD (OHMM) 0.2000 2000.

OTIS SERVICES

WELL TEST ANALYSIS REPORT

COMPANY: ENSERCH EXPLORATION, INC.
WELL: NO. 1 LAMBIRTH
AREA: ROOSEVELT COUNTY, NEW MEXICO
TEST: PRESSURE BUILDUP
DATE: JUNE 22-25, 1978

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit 19
Date July 28, 1981



OTIS
P.O. BOX 34380 • DALLAS, TEXAS 75234
AREA CODE 214-242-5161

ROBERT L. FEHRMANN
Manager • Production Well Testing

July 17, 1978

Mr. Jon P. Stevenson
Enserch Exploration, Inc.
301 South Harwood
Dallas, Texas 75201

Dear Mr. Stevenson:

Please find enclosed a reservoir description resulting from an analysis of the 72-hour pressure buildup test conducted during June 22-25, 1978 in the No. 1 Lambirth Well, Fusselman oil reservoir, Roosevelt County, New Mexico.

Merging the reservoir description presented by this report with available subsurface information from geologic and seismic sources is recommended. This merger will provide the best overall reservoir description for use in economic and operational studies.

A high degree of confidence in the analysis prevails as a result of the combined use of a highly sensitive pressure gauge and a computerized regression analysis procedure. In fact the precision of the pressure matches obtained in the analysis far exceeds any of those proviously experienced by the analyst. The analysis results show that the reservoir description approximates an "open rectangle" shape with 2 parallel sides being impervious boundaries and a truncating boundary on one end performing as a constant pressure boundary. In view of Phillips No. 2-A Goldston well which tested water in the correlative reservoir interval approximately 2800 feet west of the subject well it is believed that the constant pressure boundary is an oil/water contact. A possible fourth boundary is indicated to form impervious closure on the rectangle at a significant distance from the test well, however, the actual existence of this boundary is uncertain since its effect on the pressure behavior (in the presence of the closer impediments) is within a statistical band of pressure "noise". A total test time of approximately twice the time of this test would be required for a complete investigation of the furthermost boundary. Summaries of the reservoir descriptions obtained by nonlinear regression analysis for each of the above boundary shapes are presented as follows:

		"Open-Rectangle"	"Closed-Rectangle"
(1)	gauge datum, ft	7,860	7,860
(2)	effective permeability-thickness, md-ft	25,714	25,369
(3)	effective permeability to oil, md	559	552
(4)	distances to parallel boundaries, ft		
	first, d1	446	510
	second, d2	636	784
(5)	distance to constant pressure boundary, ft, d3	2,120	2,166
(6)	distance to possible fourth boundary, ft, d4	-	4,139
(7)	radius investigated, ft	5,984	5,985
(8)	area investigated, ac	229	169
(9)	oil initially contained in area investigated, MMstb		
	by pressure response, N1	6.698	4.804
	by volumetric, N2	6.701	4.864
(10)	porosity-thickness, ft	6.13	6.07
(11)	calculated initial reservoir pressure, psia	2793.1	2794.6
(12)	measured initial reservoir pressure, psia	2795.7	2795.7
(13)	skin effect, (dimensionless)	-0.93	-0.93
(14)	completion efficiency, %	110.2	110.2

Differences between the above proved oil in-place volumes and reservoir areas calculated for each shape lead to a question of whether the reservoir will support 3 or more producing wells. Since the No. 3 well has already penetrated the Fusselman section and No. 4 well will soon commence drilling, additional pressure testing is not recommended until producing capabilities from correlative reservoir intervals have been evaluated in the No. 3 and 4 wells. After this is accomplished, the feasibility of a well testing program can be studied. The evidence of a possible nearby contact is sufficient to caution

against producing the well at rates which will cause water to prematurely finger into the wellbore. An approximate calculation of the critical oil rate (rate when water begins to finger toward the well) yields 2200 stb/d. Therefore, it appears that an oil rate of 500 to 600 stb/d or less will be safe.

Orientation of the reservoir shape is unknown. If tectonics permit, it seems logical that this high permeability reservoir is the product of percolating waters and therefore, one might suspect the major axis of the reservoir shape to subtend at some angle with the structure. In this manner a series of individual reservoir systems or solution channels could exist on a given structure.

Calculated initial reservoir pressures compare with the measured initial reservoir pressure as shown in the above table. The accuracy of the pressure gauge used for this test is approximately ± 1.0 psi (the instrument's ability to measure absolute pressure is the accuracy of a gauge and it is not to be confused with the term "sensitivity" which is the gauge's ability to detect a pressure change with time). The formation permeability in the vicinity of the wellbore is somewhat improved or altered as evidenced by the negative value of skin effect and a well completion efficiency greater than 100 %. An acid wash, perforations and an implosion on drilling the reservoir are all possible sources of the improved permeability region around the wellbore. A naturally fractured reservoir is not indicated by the analysis. Porosity-thickness values shown in the above table are "backed-out" from the hydraulic diffusivities (the diffusion constant is one of the parameters solved in the nonlinear regression analysis). Therefore, they represent dynamic averages of the reservoir area investigated.

A highly sensitive Hewlett-Packard pressure instrument was used to measure subsurface pressure responses during flow and shut-in. Bottom-hole fluid samples of the oil were obtained for PVT analyses by Core Lab, Inc., Dallas, Texas. Because the lab analyses were not available at the time of this study, the empirical PVT properties as summarized on Pages 43-44 were used. The bubble-point pressure determined from the PVT cell is 1536 psia at 155°F and it compares with a bubble-point of 1660 psia determined from fluid correlations using a gas-oil ratio of 602 scf/stb. Comparions of lab and empirical PVT properties available at the time of this study are summarized as follows:

Parameter	Lab	Correlations
p_b, psia	1536	1660
R_{sb}, scf/stb	843	602
B_{ob}, rb/stb	1.568	1.342
μ_{ob}, cp	0.343	0.366
c_o, $psi^{-1}x10^{-6}$	12.33	13.30

The above oil compressibilities are average values in the range from 3000 to 4000 psig. In view of the above comparisons it is not recommended to correct the values of oil in-place and boundary distances until the final lab PVT work is complete.

The test data were processed and analysed with the aid of OWASP (Otis Well Analysis Software Package), an integrated series of logic modules programed on a high speed computer. Information relevant to OWASP is provided in Appendix A.

Processing the test data included: (1) determining the effluent (reservoir barrels per day), (2) performing required superposition to account for the effects of flowing and shut-in conditions and (3) constructing various drawdown and buildup plots of the processed data. These steps are a portion of the OWASP logic.

Rigorous analysis of the pressure buildup test data in the presence of boundaries was performed by a nonlinear regression method. A linear regression procedure was applied to the buildup profile at shut-in times prior to the reflection of a nearest boundary. Appendix B provides discussions of both linear and nonlinear regression methods. The nonlinear method simultaneously evaluates several reservoir parameters by performing a large number of calculations programed on a high speed computer. Starting with the initial parameter estimates the nonlinear method performs systematic adjustments of the parameter values and makes comparisons between measured and calculated pressure data until convergence is achieved. The convergence criterions are statistical tolerances and they are set within the sensitivity band of the pressure gauge used during the test. Parameters solved by each regression run are effective permeability-thickness (kh), hydraulic diffusivity ($k/\phi\mu c$), initial reservoir pressure (p_i) and from one to four boundary distances. Rectangle and wedge shapes are used to form different boundary combinations.

Initial examinations of the pressure drawdown and pressure buildup plots were made. From these examinations it was found that the pressure profile measured during flow was

highly influenced by a relatively large band of pressure "noise" in the flow string and a minor leak in the lubricator grease seal at the surface (just before shut-in). Because of these variations and discontinuities in the pressure drawdown profile, it was necessary to use the buildup test as the primary target of the regression analysis. Semi-log and coordinate plots of the drawdown data are shown by Pages 49 and 50, respectively. Double-log, MDH (Miller, Dyes and Hutchinson) and superposed plots of the buildup data are presented on Pages 37, 38 and 39, respectively. An expanded buildup plot is shown on Page 40. Basic data relevant to the buildup plots are tabulated on Pages 42-48. Pages 51-53 show tabulated drawdown data. The double-log plot is used to determine where the middle-time straight line region should appear on the buildup plots. It is clear from examinations of these plots that more than one impediment influenced the pressure drawdown and buildup responses. This point is illustrated on the buildup plots of Pages 39 and 40. A subtle point which is unknown from examinations of the pressure profiles is that one of the reflected impediments is best described when it is a constant pressure boundary such as an oil/water contact. This problem is manifested by the regression analysis.

The regression analyses were performed systematically for various combinations of boundary shapes and boundary conditions. Attachment 1 summarizes highlights of these results and it shows how the aforementioned reservoir description was obtained. An examination of Attachment 1 clearly shows that better results are obtained when a third impediment is included as a constant pressure boundary. Criterions used to elicit the reservoir description from Attachment 1 are comparisons of the root-mean square deviation, (S_y), the ratio of oil volume calculated by the diffusion or expansion constant (N1) and the volumetric oil volume (N2), the calculated porosity-thickness (ϕh) and the calculated initial reservoir pressure. Additional criterions are certain statistical parameters produced from each nonlinear regression run such as the parameter correlation matrix, the standard error of estimate and the residuals of a pivotal-point diagonal matrix solution. When cross-comparisons of S_y's are made for different shapes the background pressure "noise band" is considered. For this test the "noise band" is calculated at $\pm$ 0.022 psi; therefore, the difference between the minimum S_y and the S_y of any other regression run must be greater than the width of the "noise band" before the results are considered inferior. For example the minimum S_y shown on Attachment 1 is $\pm$ 0.030 psi and the S_y of any other regression run must be greater than $\pm$ 0.052 psi before it is considered for deletion. On this basis and the aforementioned criterions the acceptable reservoir descriptions are Models 9 and 11 as formerly presented. The regression procedures for any one

configuration included integrity checks such as holding one parameter constant while others are allowed to vary and trying different initial parameter estimates. Models 7, 8 and 9 of Attachment 1 illustrate some of the checks. Conventional analysis of pressure data cannot yield the detailed reservoir description achieved in this study.

Pages 1-34 show detailed analysis results for the different reservoir systems summarized by Attachment 1. Linear regression analysis of the afterflow and middle-time regions of the buildup profile were performed. Pages 35 and 36 summarize the results of the middle-time region analysis. Attempts to analyse the afterflow region with a linear regression procedure were unseccessful. This result is attributed to the aforementioned surface leak which occurred just prior to shut-in.

The opportunity to work with you on this problem is appreciated.

Yours very truly,

John S. Rodgers

John S. Rodgers
Consulting Reservoir Engineer

JSR/vjh

DALLAS, TEXAS

PHILLIPS PETROLEUM COMPANY — DATE : 3-28-79 — FILE NO : 3202-11088
AMBERT NO. A-2 — FORMATION : FUSSELMAN — ANALYSTS : HORSE
. PETERSON FUSSELMAN FIELD — DRLG. FLUID: SALT GEL — ELEVATION: 4396.8' GL
OOSEVELT COUNTY, TEXAS — LOCATION : 1980' FNL & 1980' FWL, SEC. 31, T-5-S, R-33-E

WHOLE CORE ANALYSIS

SAMPLE NUMBER	DEPTH	PERM. TO AIR (MD) MAXIMUM	PERM. TO AIR (MD) 90 DEG	POR. FLD	FLUID SATS. OIL	FLUID SATS. WTR	DESCRIPTION
	CORE NO. 1 7811.0-7819.0 CUT 8' REC 8'						
	7811.0-19.0						CONG,DNS
	CORE NO. 2 7819.0-7850.0 CUT 31' REC 29'						
	7819.0-23.0						CONG,SHY,DNS
1	7823.0-24.0	1.4	0.6	4.6	12.2	41.9	LM,CHT,F
2	7824.0-25.0	0.2	*	11.3	10.6	33.1	DOL,LMY,SHY,CHT,F
3	7825.0-26.0	33.	18.	13.5	12.7	33.1	DOL,CHT,V/F
4	7826.0-27.0	20.	9.9	13.0	22.0	24.4	DOL,SL/V,SL/F
5	7827.0-28.0	92.	17.	13.3	15.3	30.7	DOL,V/F
6	7828.0-29.0	0.1	*	9.7	17.0	35.8	LM,SHY,F
7	7829.0-30.0	0.1	*	9.9	14.4	38.8	DOL,SHY,V/F
8	7830.0-31.0	0.1	*	8.3	17.3	39.6	DOL,V/F
9	7831.0-32.0	0.3	*	12.5	14.1	43.3	DOL,F,SL/V
10	7832.0-33.0	46.	26.	10.0	15.1	35.9	DOL,F
11	7833.0-34.0	12.	10.	8.3	19.0	33.1	DOL,SL/F
12	7834.0-35.0	0.2	*	10.8	17.2	34.9	DOL,V,SL/F
13	7835.0-36.0	38.	25.	9.3	12.0	29.0	DOL,SHY,SL/V,SL/F
14	7836.0-37.0	32.	29.	10.1	16.0	23.9	DOL,CHT,SL/V
15	7837.0-38.0	15.	8.2	7.7	12.6	22.1	DOL,CHT,V/F
16	7838.0-39.0	12.	11.	8.8	18.9	21.0	DOL
17	7839.0-40.0	<0.1	*	5.7	13.6	30.2	DOL,CHT,V
18	7840.0-41.0	0.5	*	13.3	21.0	23.3	DOL,V/F,V
19	7841.0-42.0	0.4	*	11.5	16.7	25.1	DOL,V,F
20	7842.0-43.0	0.2	*	9.7	16.7	27.8	DOL,F

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit 16
Date July 08, 1981

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

PHILLIPS PETROLEUM COMPANY
LAMBERT NO. A-2

DATE : 3-28-79
FORMATION : FUSSELMAN

FILE NO : 3202-11088
ANALYSTS : MORSE

WHOLE CORE ANALYSIS

SAMPLE NUMBER	DEPTH	PERM. TO AIR (MD) MAXIMUM	PERM. TO AIR (MD) 90 DEG	POR. FLD	FLUID SATS. OIL	FLUID SATS. WTR	DESCRIPTION
21	7843.0-44.0	42.	35.	8.6	20.6	26.0	DOL,F
22	7844.0-45.0	566.	40.	8.1	8.7	35.6	DOL,V/F
23	7845.0-46.0	204.	4.3	4.1	22.1	51.2	DOL,V/F
24	7846.0-47.0	29.	15.	7.3	12.2	33.8	DOL,CHT,V/F,SL/V
25	7847.0-48.0	4.0	2.8	4.7	12.3	41.1	DOL,SL/V,F
	7848.0-50.0						LOST CORE

*: INDICATES PLUG PERM

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitableness of any oil, gas or other mineral well or sand in connection with which

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

ENSERCH EXPLORATION INC.
LAMBIRTH NO. 3
WILDCAT
ROOSEVELT COUNTY, NEW MEXICO

DATE: 7-5-78
FORMATION: AS NOTED
DRLG. FLUID: SALT GEL & 3.5% OIL
LOCATION: 1980 FNL & 1980 FEL, SEC. 31, T-5-S, R-33-E

FILE NO: 3202-10814
ENGINEER: DILLARD
ELEVATION: 4394 GL

* INDICATES PLUG PERM S INDICATES PRESERVED SAMPLE

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX.	FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
	WHOLE CORE ANALYSIS									
	CORE NO. 1 7760.0-7806.0 CUT 46' REC 45' FUSSELMAN									
	7760.0-63.0 LM,ANHY,DENSE,NO SHOW									
	7763.0-66.0 LM,ANHY,FOSS,DENSE,NO SHOW									
	7766.0-91.0 LM,ANHY,SL/SHY,DENSE,NO SHOW									
	7791.0-98.0 SH,CONG									
	7798.0-7805.0 DOL,SL/SHY,DENSE,NO SHOW									
	7805.0-7806.0 LOST CORE CORE NO. 2 7806.0-7844.0 CUT 38' REC 38' FUSSELMAN									
1	7806.0-07.0	16.0	0.1		8.4	15.1	44.8			DOL,LMY,V/F
2	7807.0-08.0	1.6	<0.1		9.0	6.1	51.3			DOL,V/F
3	7808.0-09.0	0.4	0.3		10.5	12.1	50.3			DOL,F
4	7809.0-10.3	<0.1	<0.1		7.7	0.3	71.9			DOL,SL/F
5	7810.3-12.0	0.1	<0.1		7.2	0.4	61.0			DOL,SL/F
6	7812.0-13.3	0.1	*		14.8	1.7	70.9			DOL,V/F
7	7813.3-14.5	5.6	1.7		13.7	4.6	64.0			DOL,LMY,V/F,CHT
8	7814.5-16.5	<0.1	<0.1		6.6	3.0	66.7			DOL,V/F,CHT
9	7816.5-17.5	<0.1	*		5.7	2.9	72.0			DOL,SHY,F,STY
10	7817.5-18.8	0.4	*		15.5	12.0	33.6			DOL,SHY,F
11	7818.8-20.4	5.7	0.8		11.4	7.6	63.0			DOL,SHY,F,SL/V

ENSERCH EXPLORATION, INC.
Docket No. 7726
Exhibit 17
Date July 08, 1981

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CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

ERCH EXPLORATION INC.
BIRTH NO. 3

DATE: 7-5-78
FORMATION: AS NOTED

FILE NO: 3202-10814
ENGINEER: DILLARD

	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
12	7820.4-21.6	0.4	0.4		10.5	29.3	30.8		DOL,SHY,F,SL/V
13	7821.6-22.6	0.4	0.2		9.6	9.9	59.3		DOL,F
14	7822.6-24.0	14.0	0.6		12.2	16.7	41.1		DOL,SHY,F,STY
15	7824.0-25.7	0.2	0.1		9.6	23.0	27.8		DOL,F,SHR,STY
16	7825.7-26.7	0.9	0.6		12.0	23.6	29.8		DOL,LMY,SL/F
17	7826.7-28.2	5.7	3.2		11.0	15.5	38.7		DOL,F,V,
18	7828.2-29.8	1.1	0.5		12.0	20.9	48.3		DOL,F,SL/V,STY
19	7829.8-31.2	0.3	0.2		8.7	31.5	28.6		DOL,F,STY
20	7831.2-32.7	7.4	2.1		11.4	35.2	38.0		DOL,LMY,SHY,F,SL/V
21	7832.7-33.8	0.6	0.4		15.3	17.8	44.7		DOL,LMY,F,STY
22	7833.8-34.8	0.4	0.4		13.4	27.9	31.8		DOL,LMY,SHY,F,STY
23	7834.8-36.3	0.6	0.5		17.6	28.3	34.1		DOL,F
24	7836.3-38.0	0.4	0.3		15.4	19.6	46.3		DOL,LMY,SHY,F,STY
25	7838.0-39.0	0.4	0.2		13.0	12.0	49.9		DOL,LMY,F,STY
26	7839.0-40.8	0.5	0.4		12.2	19.2	39.1		DOL,LMY,F,FOSS,STY
27	7840.8-42.6	0.5	0.4		14.8	24.6	32.7		DOL,LMY,F,STY
28	7842.6-44.0	0.3	*		14.9	26.3	33.8		DOL,LMY,V/F
	CORE NO. 3 7844.0-7882.0 CUT 38' REC 22' FUSSELMAN								
29	7844.0-45.3	0.5	0.3		11.9	18.5	45.1		DOL,LMY,ANHY,SL/F STY
30	7845.3-46.7	0.6	0.6		18.3	24.2	38.9		DOL,LMY
31	7846.7-47.8	1.2	0.5		15.4	13.2	47.0		DOL,LMY,SL/F
32	7847.8-48.8	17.0	1.8		11.8	19.8	28.6		DOL,LMY,ANHY,F
33	7848.8-50.3	1.2	1.0		13.2	19.1	27.7		DOL,LMY,ANHY,SL/F
34	7850.3-51.9	1.0	0.6		19.5	32.6	33.3		DOL,LMY,SHY,ANHY SL/F
35	7851.9-53.3	0.5	0.5		17.9	11.5	46.0		DOL,LMY,ANHY,SL/F
36	7853.3-55.0	1.1	0.5		17.2	17.6	42.0		DOL,LMY,SHY,ANHY SL/F
37	7855.0-56.1	0.2	0.1		16.5	27.1	40.5		DOL,LMY,ANHY,SL/F

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

NSERCH EXPLORATION INC.
AMBIRTH NO. 3

DATE: 7-5-78
FORMATION: AS NOTED

FILE NO: 3202-10814
ENGINEER: DILLARD

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	PERM. TO AIR MD. 90 DEG	PERM. TO AIR MD. VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	FLUID SATS. WTR.	GR. DEN.	DESCRIPTION
38	7856.1-57.0	<0.1	*		7.2	5.4	58.9		DOL,LMY,SHY,ANHY SL/F
39	7857.0-58.0	<0.1	<0.1		7.6	3.3	66.5		DOL,LMY,SHY,ANHY SL/F,STY
40	7858.0-59.1	0.4	0.4		13.9	18.4	44.6		DOL,LMY,SHY,ANHY,STY SL/F
41	7859.1-60.9	2.2	1.2		12.7	23.2	33.5		DOL,LMY,SHY,ANHY,STY SL/F
42	7860.9-62.7	0.4	0.2		14.4	8.2	59.9		DOL,LMY,SL/F
43	7862.7-64.4	2.9	1.6		12.5	18.7	34.7		DOL,LMY,ANHY,F,STY
44	7864.4-66.0	10.0	9.6		16.3	16.9	39.9		DOL,LMY,SDY,ANHY,F STY

7866.0-82.0 LOST CORE

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or

VERTICAL SCALE: 5" = 100'

TOTAL WATER 0000
PERCENT PORE SPACE
80 60 40 20 0

GAMMA RAY
RADIATION INCREASE

PERMEABILITY
MILLIDARCYS
100.0 10.0 1.0 0.1

POROSITY
PERCENT
30 20 10 0

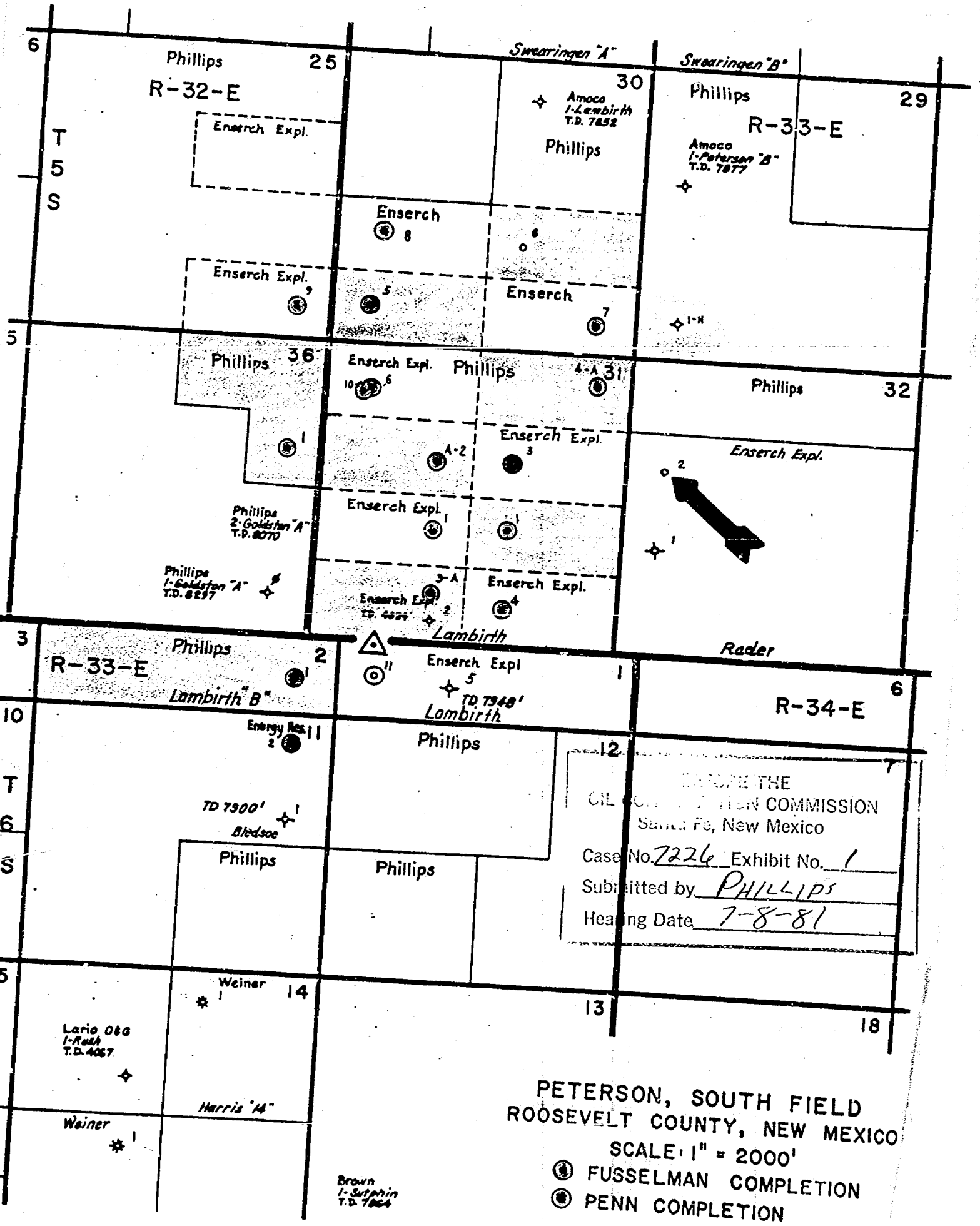
OIL SATURATION XXXX
PERCENT PORE SPACE
0 20 40 60 80

7750

7806 LOG DEPTH = 13.5' HIGH

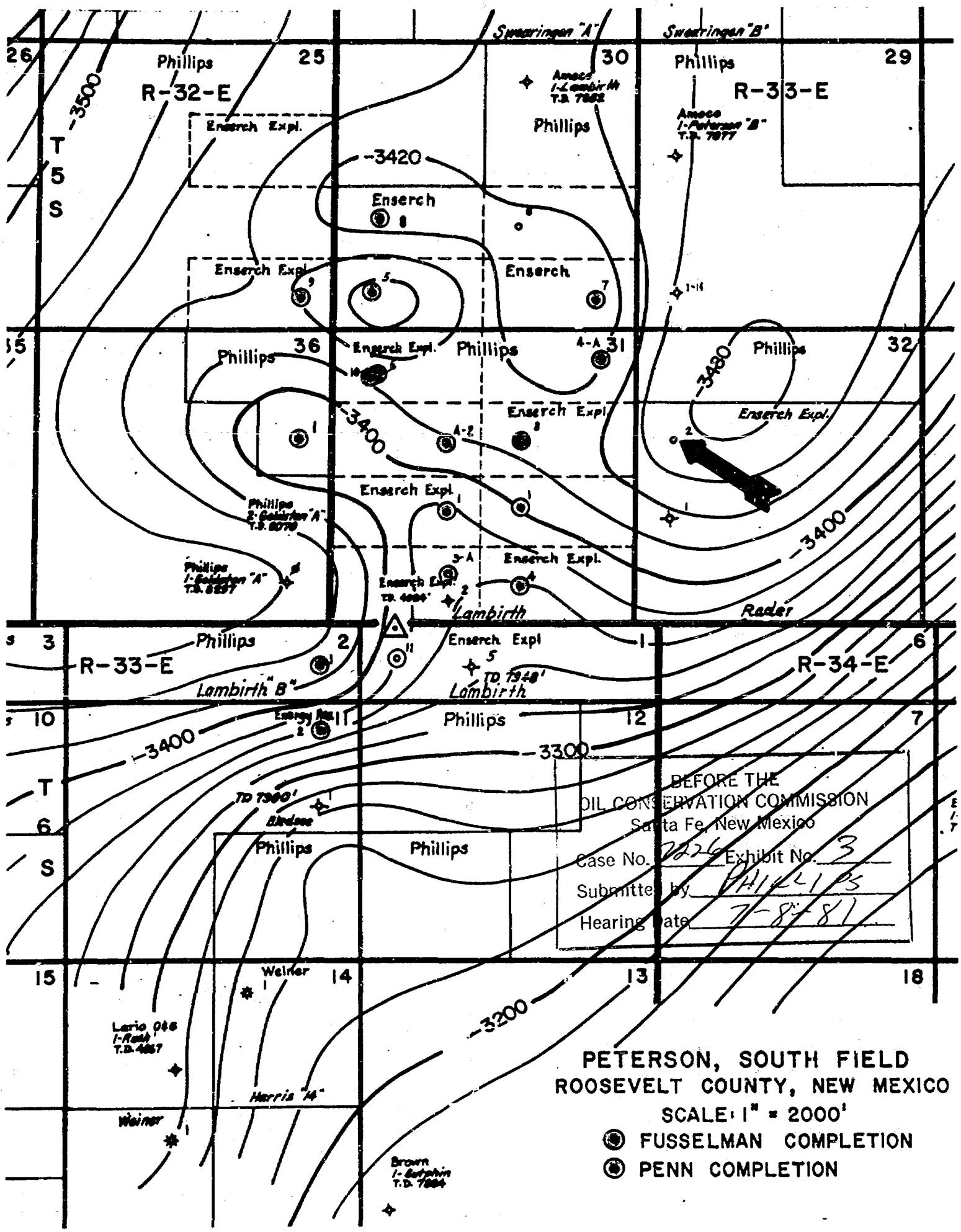
7800

7850

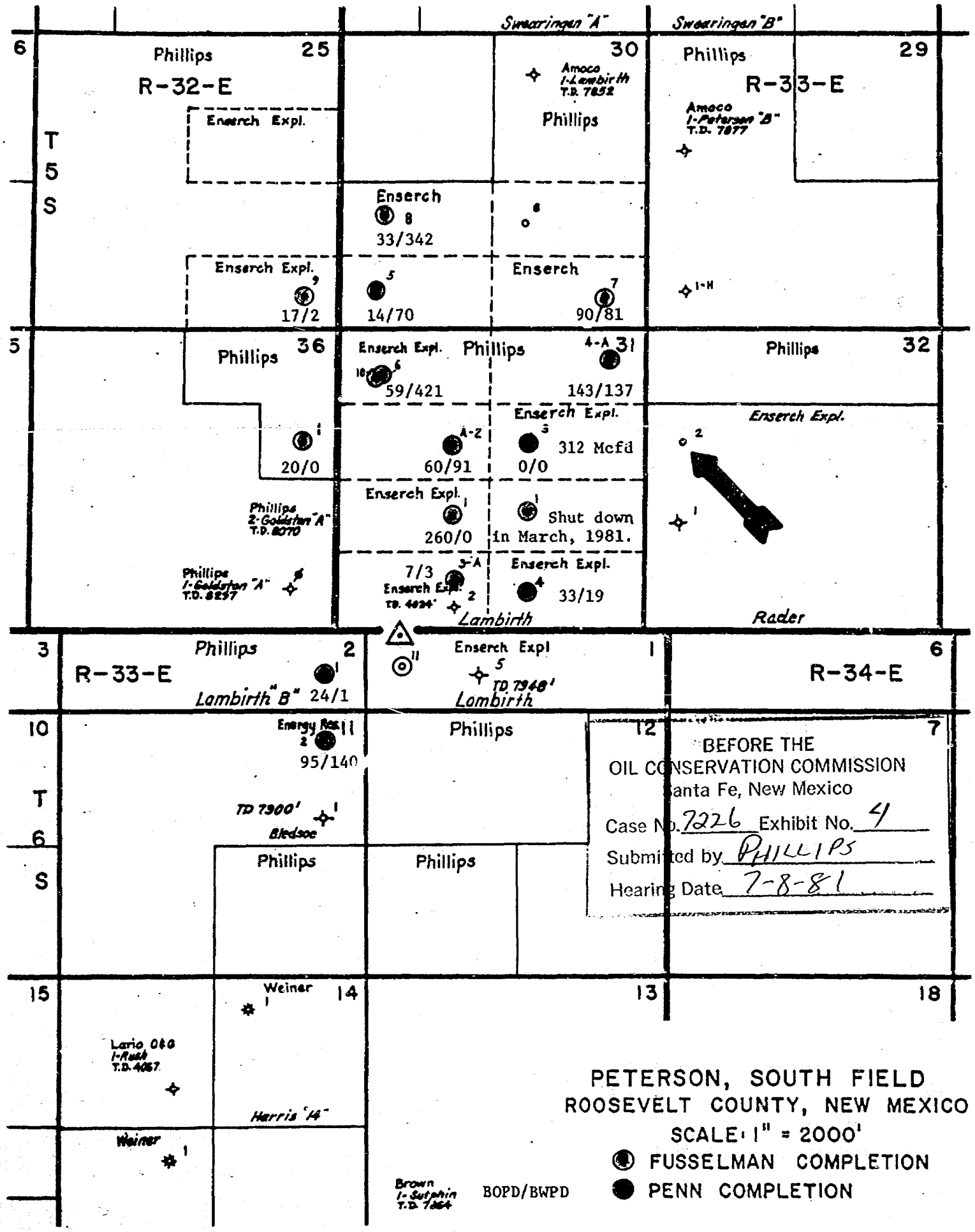


PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'

◉ FUSSELMAN COMPLETION
◉ PENN COMPLETION



PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'
◉ FUSSELMAN COMPLETION
◉ PENN COMPLETION



BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 4
Submitted by PHILLIPS
Hearing Date 7-8-81

PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'

- FUSSELMAN COMPLETION
- PENN COMPLETION

04-10-81

PETERSON, SOUTH FUSSELMAN FIELD, ROOSEVELT CO., N.M.
TOTAL FIELD PRODUCTION BY MONTHS

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
6/78	1	4952		3033	612
7	1	7077		7722	1102
8	1	1297	310	1324	1021
9	1	584	313	2445	4187
10	1	324		223	688
11	2	8221		13606	1655
12	2	8517		17334	2035
1/79	3	13033		24968	1915
2	3	15867		12530	790
3	3	14530	936	7258	500
4	4	14141	211	7533	533
5	4	24560	389	14046	572
6	5	29233	10307	16452	563
7	5	28084	9611	17723	631
8	6	29608	8875	17543	593
9	6	29480	13906	12260	415
10	8	39042	15628	23142	593
11	8	37581	20580	20742	552
12	8	39909	21360	21375	536
1/80	8	35970	17460	20730	584
2	9	33871	13829	16172	495
3	10	37549	20945	22056	587
4	10	35713	23216	18727	524
5	10	33891	22380	17120	505
6	10	32830	25764	21140	644
7	10	32372	26121	20717	640
8	10	30897	26617	19740	639
9	10	27852	24295	14341	515
10	10	25264	26920	12741	504
11	10	19905	22288	7378	371
12	10	24794	27109	12478	503
1/81	10	23045	24588	13270	576
2/81	10	20226	27308	7865	389
3/81	10	19353	27525	12338	448

779572

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 5
Submitted by PHILLIPS
Hearing Date 7-8-81

20449 ENSERCH-1 LAMBIRTH, K-31-5S-33E TOP FUSS 7800 (-3372) RKB 4428
PERFS 7808-52 IP/F 638 BOPD, 0BW, GOR 1098 1/4"CH FTP 585#
(-3380,-3424)
DST #5 7820-50 IFP 711-1519, ISIP 2755, FFP 1409-2191, FSIP 2760
BOMB 7846 (-3418)

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
6/78	1	4952	-	3033	612
7	1	7007	-	7722	1102
8	1	1297	310	1324	1021
9	1	584	313	2445	4187
10	1	324	-	223	688
11	1	8047		3400	423
12	1	8286		4231	511
1/79	1	9111		5686	624
2	1	9217		6399	694
3	1	10305		6278	609
4	1	9426		6074	644
5	1	8861		7158	808
6	1	9036		6039	668
7	1	10163		7225	711
8	1	11378		7540	663
9	1	9607		5518	574
10	1	10109		6870	680
11	1	9847		6222	632
12	1	10229		5972	584
1/80	1	10847		4860	470
2	1	11321		5061	447
3	1	5484		3097	565
4	1	9358		5104	545
5	1	9432		5295	561
6	1	9818		5543	565
7	1	10690		6173	577
8	1	10619		6675	629
9	1	9392		5157	549
10	1	11093		5015	452
11	1	8057		2878	357
12	1	12678		5464	431
1/81	1	10858		4238	390
2/81	1	7666		3066	400
3/81	1	8058		4653	577

293,157

20454 ENSERCH 3 LAMBIRTH, G-31-5S-33E TOP FUSSELMAN 7828 (-3421) RKB
PERF 7940-44 A/W 200 GALS 10% MCA 1000 GALS MOD-202 SQUEEZED
PERF 7840-49 A/W 200 GALS 10% MCA 1500 GALS MOD-202 IP/P 25 BOPD 12 BW
GOR 2360
CORED 7760-7866

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
11/78	1	174		10206	58655
12	1	231		13103	56723

1/79	1	222	15867	71473	
PD TO PENN		627			

20479 ENSERCH-6-LAMBIRTH D-31-5S-33E TOP FUSS 7828 (-3427) RKB 4401
PERF 7828-40 A/W 2000 GALS MOD 202 SQUEEZED
PERF 7830-35 A/W 250 GALS MSA
IPF 204 BOPD 68 BWPD GOR 1549 50.1 GTY FTP 90#

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
3/79	1	1640	936	-	-
4	1	930	720	-	-
5	1	342	240	-	-
6	1	3863	3965	1340	347
7	1	2627	3703	429	163
8	1	1914	2928	901	471
9	1	2756	2560	660	239
10	1	3052	3928	2373	778
11	1	2954	6778	2158	731
12	1	3205	9997	2072	647
1/80	1	2256	8961	1686	747
2	1	2303	9220	1756	762
3	1	1659	10394	1879	1133
4	1	1847	11755	1941	1051
5	1	1667	11242	2121	1272
6	1	1520	11598	2200	1447
7	1	1070	8087	609	569
		35605			

REPLACED BY #10 LAMBIRTH.

20482 ENSERCH-7 LAMBIRTH P-30-5S-33E TOP FUSS 77976'(-3406') RKB 4391'
PERF 7826-29 A/W 150 GALS 5%HCL MP 2100 SIP VAC @4BPM
IPP 117 BOPD 73 BWPD GOR 1179
DST #1 7804-49 FUSS PFP 953 ISIP 2787 FFP 1564 FSIP 2787

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
6/79	1	2244	1120	1031	459
7	1	2114	804	871	412
8	1	1879	494	1056	562
9	1	3345	1859	771	230
10	1	5913	1261	2493	422
11	1	6893	1257	2262	328
12	1	6228	1402	2172	349
1/80	1	6250	1380	1767	283
2	1	2724	1014	1840	675
3	1	6242	1399	1971	316
4	1	5541	1370	2035	367
5	1	5279	1722	2122	402
6	1	4376	1262	2221	508

7	1	3120	1689	1537	493
8	1	2723	2470	1589	584
9	1	3260	2434	1789	549
10	1	2274	1089	1800	792
11	1	3142	3194	2460	783
12	1	1527	1507	1669	1093
1/81	1	2433	2319	3032	1246
2/81	1	2292	1210	2645	1154
3/81	1	1354	1212	2183	1612

81153

20500 ENSERCH-8 LAMBIRTH L-30-5S-33E TOP FUSS 7805(-3408), CISCO 7674 (3277). PERFD 7816-29' A/W 500 GALS MOD 101 @ 1/2 BPM MP 3100 ISIP 200 RKB 4397' IPF 358 BOPD 0 BW 190 MCF/D 16/64"CK FTP 165 GOR 531. DST #1 7661-7711'PENN PFP 208-208 ISIP 2409 FFP 342-239 FSIP 2419 DST #2 7794-7838 FUSS PFP 250-269 ISIP 2713 ISIP 2704 FFP 609-1402 FSIP 2704
2/80 SQZD PERFS W/INJECTROL & CEMENT

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
10/79	1	771	-	-	-
11	1	1532	395	-	-
12	1	2996	5247	-	-
1/80	1	1409	5377	1066	757
2	1	337	1702	360	1068
3	1	1438	7891	807	561
4	1	1246	6759	545	437
5	1	935	6349	608	650
6	1	1379	10034	756	548
7	1	1610	10286	745	463
8	1	1345	9977	902	671
9	1	1270	9615	675	531
10	1	1182	10657	720	609
11	1	985	8620	480	487
12	1	1064	9977	519	488
1/81	1	974	9915	537	551
2/81	1	845	9091	71	084
3/81	1	814	8560	112	138

22132

0523 ENSERCH-9 LAMBIRTH P-25-5S-32E FUSS 7822 (-3439) RKB 4383

PERF 7824-38 A/W 3 BBLS MIN P 1600 10 MIN SIP 300
IPP 82 BOPD 2 BWPD 95 MCF/D GOR 1158
DSI#1 7804-30 GTS 5" REV OUT 55BO IFP 310-417 ISIP 2126 FFP 476-1257
FSIP 1569

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
2/80	1	1199	44	156	130
3	1	1416	-	781	552
4	1	1020	-	498	488
5	1	1209	-	607	502
6	1	1262	-	786	623
7	1	905	-	774	855
8	1	974	-	939	964
9	1	836	-	700	837
10	1	756	-	744	984
11	1	629	-	444	706
12	1	681	8	498	731
1/81	1	623	24	520	835
2/81	1	502	20	605	1205
3/81	1	521	52	593	1138
		12533			

20536 ENSERCH-10 LAMBIRTH D-31-5S-33E FUSS 7781 (-3381) RKB 4400
PERF 7813-7832 A/W 5750 GAL
IP/P 153 BOPD 203 BW GTY 49.2 GOR 765 8/22

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
8/80	1	287	266	219	763
9	1	2791	7215	2226	798
10	1	2329	-	2205	947
11	1	1316	7606	511	388
12	1	2048	10773	1340	654
1/81	1	2008	9661	900	448
2/81	1	1519	8838	742	488
3/81	1	1484	10536	1127	759
		13782			

0471 PPCO-1-LAMBIRTH"A" J-31-5S-33E FUSS 7827(-3405) CISCO 7723

(-3301) PERF 7830-38', 52-58 A/W 500 GALS 10% ACETIC RKB 4422
IPF 707 BOPD 0 BW GOR 670 ON 1/2" CH FTP 100

MO/YR	NO. WELLS	BOPM	BWPM	MCF/M	GOR	
1/79	1	3700	-	3411	922	
2	1	6650	-	6131	922	
3	1	2585	-	980	379	
4	1	2184	191	646	296	
5	1	7115	149	1883	265	
6	1	6536	5222	2776	425	
7	1	6193	5104	2865	467	
8	1	6332	5066	5976	944	
9	1	4716	8257	3536	749	
10	1	4965	8689	3317	668	
11	1	3908	2286	967	247	
12	1	4462	2610	1174	263	
1/80	1	1371	802	354	258	
2	1	1255	734	205	163	
3	1	1641	960	456	278	
4	1	4052	2370	886	219	
5	1	3730	2182	651	175	
6	1	3518	2058	1017	289	
7	1	3576	2092	9622	2691	
8	1	3668	9636	3034	827	
9	1	1195	3138	698	584	
10	1	769	2019	295	384	
11	1	876	2300	114	130	
12	1	969	2545	578	596	
1/81	1	431	1132	431	1000	
2/81	1	1924	2728	151	078	LAST PROD. DATE 2/81
		118235				

20481 PPCO-2 LAMBIRTH "A" F-31-5S-33E FUSS 7832(-3419)-RKB-4413
PERF 7832-38 A/W 500 GAL 15% ISDP 2100
IPF 410 BOPD 0 BW GOR 1671 11/64"CH FTP 675
CORED 7819-7849

MO/YR	NO. WELLS	BOPM	BWPM	MCF/M.	GOR
4/79	1	1601	-	813	508
5	1	8242	-	5005	607
6	1	7554	-	5266	697
7	1	7075	-	6333	895
8	1	7316	-	1669	228
9	1	6544	-	957	146
10	1	5740	-	4895	853
11	1	5020	-	5357	1067
12	1	5158	-	5857	1136
1/80	1	7324	-	8159	1114
2	1	6701	-	4732	706
3	1	8762	-	10502	1199
4	1	5410	-	5103	943
5	1	4979	-	3751	753

6	1	4696	-	5853	1246
7	1	4773	-	86	18
8	1	4898	2826	2478	506
9	1	4254	-	1517	357
10	1	3265	-	763	234
11	1	2391	-	191	80
12	1	5448	-	891	364
1/81	1	2969	-	1813	611
2/81	1	1477	2238	127	086
3/81	1	1870	2833	1828	978

120467

20446 PPCO-3 LAMBIRTH "A" N-31-5S-33E FUSS 7808(-3367) RKB 4441
PERF 7814-46 A/W 1000 GALS 15% ISDP 2200 A/W 1200 GALS 28% 1300 GALS 15% MP 1300 ISDP VAC, A/W 10000 GALS 28% MP 3700 ISDP 2850
IPP 128 BOPD 56 BWPD GOR 1487

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M.	GOR
8/79	1	789	401	16554	20981
9	1	2510	1230	818	326
10	1	2752	1348	2008	730
11	1	2407	1179	2198	913
12	1	2473	1212	2403	972
1/80	1	1079	-	1055	978
2	1	1330	-	824	620
3	1	1738	-	1828	1052
4	1	1074	-	889	828
5	1	989	-	654	661
6	1	932	-	1020	1094
7	1	948	1580	967	1020
8	1	972	24	881	906
9	1	638	16	403	632
10	1	489	12	203	415
11	1	405	10	57	141
12	1	517	13	335	648
1/81	1	445	11	482	1083
2/81	1	179	67	15	084
3/81	1	226	85	226	1000

22892

20506 PPCO-4 LAMBIRTH "A" A-31-5S-33E FUSS 7814(-3423) RKB 4391

PERF 7814-28 A/W 1500 GALS 15% MP 4600 ISDP 2200
IPF 608 BOPD 57 BWPD FTP 200 ON 24/64"CO

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M.	GOR
10/79	1	5740	402	1186	207
11	1	5020	8685	1578	314
12	1	5158	892	1725	334
1/80	1	5434	940	1783	328
2	1	6701	1159	1394	208
3	1	8762	501	614	70
4	1	5410	936	1502	278
5	1	4979	861	1106	222
6	1	4696	812	1725	367
7	1	4773	2387	177	37
8	1	4898	-	3008	614
9	1	3537	-	1146	324
10	1	2277	-	483	212
11	1	1902	-	138	73
12	1	2035	-	673	331
1/81	1	1752	-	972	555
2/81	1	3242	3116	80	025
3/81	1	4419	4247	1236	280

80735

20514 PPCO-1 LAMBIRTH STATE H-36-5S-32E FUSS 7795 (-3379) RKB 4416
PERF 7796-7806 A/W 2500 GAL 15% NA HCL
IP/P 31 BOPD, NO WTR. GTY 47.2 GOR 297 3-24-80

MO/YR	NO.WELLS	BOPM.	BWPM.	MCF/M.	GOR
3/80	1	407	-	121	297
4	1	755	26	224	297
5	1	692	24	205	296
6	1	633	-	19	30
7	1	907	-	27	30
8	1	513	1418	15	29
9	1	679	1877	30	44
10	1	830	2294	513	618
11	1	202	558	125	619
12	1	827	2286	511	618
1/81	1	552	1526	345	625
2/81	1	580	-	363	626
3/81	1	607	-	380	626

8184

20535 PPCO-1 PETERSON "H" M-29-5S-33E FUSS 7846 (-3462) RKB 4384'
PERF 7606-60 A/W 2500 GAL 15% NE HCL
PERF 7616-60 A/W 20000 GAL 15% GELLED NE HCL
PERF 7793-7801 A/W 250 GAL 15% NE HCL

MO/YR	NO.WELLS	BOPM.	BWPM.	MCF/M.	GOR

PETERSON, SOUTH PENN FIELD, ROOSEVELT CO., N.M.
TOTAL FIELD PRODUCTION BY MONTHS

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
9/78	1	4678	2002	6364	1360
10	1	4188	2137	5730	1368
11	1	1706	1119	858	503
12	1	3447	1995	1539	446
1/79	1	2660	1807	2638	992
2	2	2693	1569	16381	6083
3	2	2552	1501	18828	7378
4	2	1831	956	18756	10244
5	2	3871	2607	20816	5377
6	2	3218	2285	16480	5121
7	2	3073	2265	19316	6286
8	2	2619	1949	15114	5771
9	2	2796	1923	18207	6512
10	2	2583	1819	18235	7060
11	2	2544	2245	16149	6348
12	2	3069	1674	20883	6804
1/80	2	2255	1273	18699	8292
2	2	1911	1143	16223	8489
3	2	1488	1278	19800	13310
4	2	1776	1326	22439	12635
5	3	2775	2077	18774	6765
6	3	1513	2771	14704	9718
7	3	1290	1796	22238	17239
8	4	2873	2087	24855	8651
9	4	3558	1884	21936	6165
10	4	3073	1514	22539	7335
11	4	813	859	10816	13304
12	4	2200	1095	14653	6660
1/81	4	2435	643	26528	10894
2/81	4	2054	2329	19153	9325
3/81	4	5108	7130	24999	4894

82660

20525 PPCO-5 LAMBIRTH "A" M-30-5S-33E FUSS 7865 (-3473) RKB 4392'
PERF 7664-7748 A/W 1500 GAL 15% NA HCL
IP/P 66 BOPD + 120 BW. GTY 41 DEG. GOR 1600. 5/4/80

MO/YR	NO.WELLS	BOPM	BWPM.	MCF/M.	GOR
5/80	1	1143	2077	2057	1800
6	1	644	1651	16	25
7	1	299	767	10	33
8	1	612	918	20	33
9	1	544	816	18	33
10	1	434	651	309	712
11	1	419	629	84	200
12	1	445	668	300	674
1/81	1	223	335	14	63
2/81	1	353	1839	1	003
3/81	1	419	2183	9	021

5535

20454 ENSERCH-3-LAMBIRTH G-31-5S-33E PENN 7699 (-3291) RKB 4408'
PERF 7702-15
CAOF 16000 MCF/D 24/64"CH SITP 1876 GTY .757

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M.	GOR
2/79	1	298	-	14273	47896
3	1	350	-	16348	46709
4	1	383	-	16788	43833
5	1	380	-	16788	44182
6	1	241	-	12423	51548
7	1	374	-	13971	37356
8	1	320	-	11482	35881
9	1	675	-	14404	21434
10	1	542	-	13564	25026
11	1	407	-	11907	29256
12	1	546	-	16811	30789
1/80	1	505	-	15385	30465
2	1	653	-	12772	19559
3	1	255	-	13455	52765
4	1	302	-	15929	52745
5	1	131	-	9965	76069
6	1	78	-	7620	97692
7	1	102	-	15169	148716
8	1	280	-	15590	55679

9	1	229	"	11522	50314
10	1	29	"	12878	444069
11	1	"	"	8799	"
12	1	"	"	9114	"
1/81	1	"	"	11720	"
2/81	1	"	"	8942	"
3/81	1	"	"	9672	"
		7077			

20457 ENSERCH-4 LAMBIRTH O-31-5S-33E PENN 7696(-3263) FUSS 7801(3368)
PERF 7809-14 FUSS SWBO 100% WTR SQ RKB 4433
PERF 7696-7705 PENN A/W 2100 GALS MOD 202
IPF 204 BOPD 58 BWPD FTP 350 ON 18/64"CH
CORED 7650-7732, 7766-7864
DST#1 7690-7732 PFP 160-379 ISIP 2630 FFP 435-882 FSIP 2641

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M.	GOR
9/78	1	4678	2002	6364	1360
10	1	4188	2137	5730	1368
11	1	1706	1119	858	503
12	1	3447	1995	1539	446
1/79	1	2660	1807	2638	992
2	1	2395	1569	2108	880
3	1	2202	1501	2480	1126
4	1	1448	956	1968	1359
5	1	3491	2607	4028	1154
6	1	2977	2285	4057	1363
7	1	2699	2265	5345	1980
8	1	2299	1949	3632	1580
9	1	2124	1923	3803	1790
10	1	2041	1819	4671	2289
11	1	2137	2245	4242	1985
12	1	2523	1674	4072	1614
1/80	1	1750	1273	3314	1894
2	1	1258	1143	3451	2743
3	1	1243	1376	6345	5105
4	1	1474	1326	6510	4417
5	1	1501	1363	6752	4498
6	1	791	1120	7068	8936
7	1	889	1029	7059	7940
8	1	986	1162	7628	7736
9	1	817	1007	7047	8625
10	1	1141	817	6852	6005
11	1	394	230	1933	4906
12	1	834	398	4473	5362
1/81	1	1132	275	5430	4797
2/81	1	977	457	4334	4436
3/81	1	1003	574	7080	7059

59205

20543 PPCO-1-LAMBIRTH-B A-2-6S-33E CISCO 7692(-3248) FUSS 7870 (-3426)
PERF 7664-7828 PENN A/W 750 GAL 15% RKB 4444'
PERF 7872-7882 FUSS A/W 11750 GAL 15%
IPF 268 BOPD 2 BWPD FTP 200 ON 32/64" CK. GOR 1625 GTY 51.5 8/26

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
8/80	1	995	7	1617	1625
9	1	1968	61	3349	1702
10	1	1469	46	2500	1702
11	1	0	0	0	-
12	1	921	29	766	832
1/81	1	1080	33	9364	8670
2/81	1	724	33	5876	8116
3/81	1	731	33	8089	11066

7888

LT00#518 JES JOB NO. = 8259, TIME = 090658, DATE = 81.176
DDNAME = MYDATA ENDED ON OTHWSPR1
LINES = 000660, PAGES = 000001, FORMS = 14381

COLUMNAR CORE RECORD

Form 2069 4-53

DEPTH	DESCRIPTION AND REMARKS (X: Interval of estimated last core)
	Phillips Petroleum Company
	#2 Lambirth-A, Roosevelt County,
	New Mexico.
P. B. Drisko	
3-28-79	
	Core #1: 7810-7819', recovered 9'. Fusselman.
7810-13	Shale, dark, green, mottled, hard, with tan to red finely crystalline, hard dolomite and light chert pebble inclusions. No show.
7813-15	Dolomite, tan to red, finely crystalline, mottled, hard, with much green shale and white to grey chert inclusions. No show.
7815-17.5	Dolomite, tan to red, finely crystalline, mottled, hard, shaley, with white and grey chert inclusions. No show.
7817.5-18	Shale, very dark green, mottled, with tan dolomite inclusions.
7818-19	Dolomite, tan to red, finely crystalline, mottled, shaley, hard, with many grey to white chert pebble inclusions. No show.
	Core #2: 7819-7850'. recovered 30'. Fusselman.
7819-23	Dolomite, tan-pink, finely crystalline, mottled, shaley, hard with grey-white chert inclusions.
7823-26	Dolomite, brown, finely crystalline, clean with fair crystalline-vugular-fractured porosity. Heavy stain, good odor. Scattered bleeding gas and oil.
7826-31	Dolomite, same as above with large vertical fractures. Heavy stain. Fair bleeding gas and oil.
7831-49	Dolomite, brown, finely crystalline, clean with good crystalline vugular porosity. Many thin vertical fractures. Fair bleeding gas, oil and water.
7849-59	Lost.

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 6
Submitted by PHILLIPS
Hearing Date 1-8-81

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

PHILLIPS PETROLEUM COMPANY
LAMBERT NO. A-2
S. PETERSON FUSSELMAN FIELD
ROOSEVELT COUNTY, TEXAS

DATE : 3-28-79
FORMATION : FUSSELMAN
DRLG. FLUID: SALT GEL
LOCATION : 1980' FNL & 1980' FWL, SEC. 31, T-5-S, R-33-E

FILE NO : 3202-11088
ANALYSTS : MORSE
ELEVATION: 4396.8' GL

WHOLE CORE ANALYSIS

SAMPLE NUMBER	DEPTH	PERM. TO AIR (MD) MAXIMUM	PERM. TO AIR (MD) 90 DEG	POR. FLD	FLUID SATS. OIL	FLUID SATS. WTR	DESCRIPTION
	CORE NO. 1 7811.0-7819.0 CUT 8' REC 8'						
	7811.0-19.0						CONG,DNS
	CORE NO. 2 7819.0-7850.0 CUT 31' REC 29'						
	7819.0-23.0						CONG,SHY,DNS
1	7823.0-24.0	1.4	0.6	4.6	12.2	41.9	LM,CHT,F
2	7824.0-25.0	0.2	*	11.3	10.6	33.1	DOL,LMY,SHY,CHT,F
3	7825.0-26.0	33.	18.	13.5	12.7	33.1	DOL,CHT,V/F
4	7826.0-27.0	20.	9.9	13.0	22.0	24.4	DOL,SL/V,SL/F
5	7827.0-28.0	92.	17.	13.3	15.3	30.7	DOL,V/F
6	7828.0-29.0	0.1	*	9.7	17.0	35.8	LM,SHY,F
7	7829.0-30.0	0.1	*	9.9	14.4	38.8	DOL,SHY,V/F
8	7830.0-31.0	0.1	*	8.3	17.3	39.6	DOL,V/F
9	7831.0-32.0	0.3	*	12.5	14.1	43.3	DOL,F,SL/V
10	7832.0-33.0	48.	26.	10.0	15.1	35.9	DOL,F
11	7833.0-34.0	12.	10.	8.3	19.0	33.1	DOL,SL/F
12	7834.0-35.0	0.2	*	10.8	17.2	34.9	DOL,V,SL/F
13	7835.0-36.0	38.	25.	9.3	12.0	29.0	DOL,SHY,SL/V,SL/F
14	7836.0-37.0	32.	29.	10.1	16.0	23.9	DOL,CHT,SL/V
15	7837.0-38.0	15.	8.2	7.7	12.6	22.1	DOL,CHT,V/F
16	7838.0-39.0	12.	11.	8.8	18.9	21.0	DOL
17	7839.0-40.0	<0.1	*	5.7	13.6	30.2	DOL,CHT,V
18	7840.0-41.0	0.5	*	13.3	21.0	23.3	DOL,V/F,V
19	7841.0-42.0	0.4	*	11.5	16.7	25.1	DOL,V,F
20	7842.0-43.0	0.2	*	9.7	16.7	27.8	DOL,F

* Too high to measure

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 7
Submitted by PHILLIPS
Hearing Date 7-8-81

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

PHILLIPS PETROLEUM COMPANY
LAMBERT NO. A-2

DATE : 3-28-79
FORMATION : FUSSELMAN

FILE NO : 3202-11088
ANALYSTS : MORSE

WHOLE CORE ANALYSIS

SAMPLE NUMBER	DEPTH	PERM. TO AIR (MD) MAXIMUM	PERM. TO AIR (MD) 90 DEG	POR. FLD	FLUID SATS. OIL	FLUID SATS. WTR	DESCRIPTION
21	7843.0-44.0	42.	35.	8.6	20.6	26.0	DOL,F
22	7844.0-45.0	566.	40.	8.1	8.7	35.6	DOL,V/F
23	7845.0-46.0	204.	4.3	4.1	22.1	51.2	DOL,V/F
24	7846.0-47.0	29.	15.	7.3	12.2	33.8	DOL,CHT,V/F,SL/V
25	7847.0-48.0	4.0	2.8	4.7	12.3	41.1	DOL,SL/V,F
	7848.0-50.0						LOST CORE

*' INDICATES PLUG PERM

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Schlumberger

COMPENSATED NEUTRON-FORMATION DENSITY

COUNTY ROOSEVELT
FIELD SOUTH PETERSON
LOCATION LAMBIRTH A #2
WELL
COMPANY PHILLIPS PETROLEUM

COMPANY PHILLIPS PETROLEUM COMPANY

WELL LAMBIRTH A #2

FIELD SOUTH PETERSON

COUNTY ROOSEVELT STATE NEW MEXICO

LOCATION 1980' FNL & 1980' FWL
SEC 31, T-5-S, R-33-E

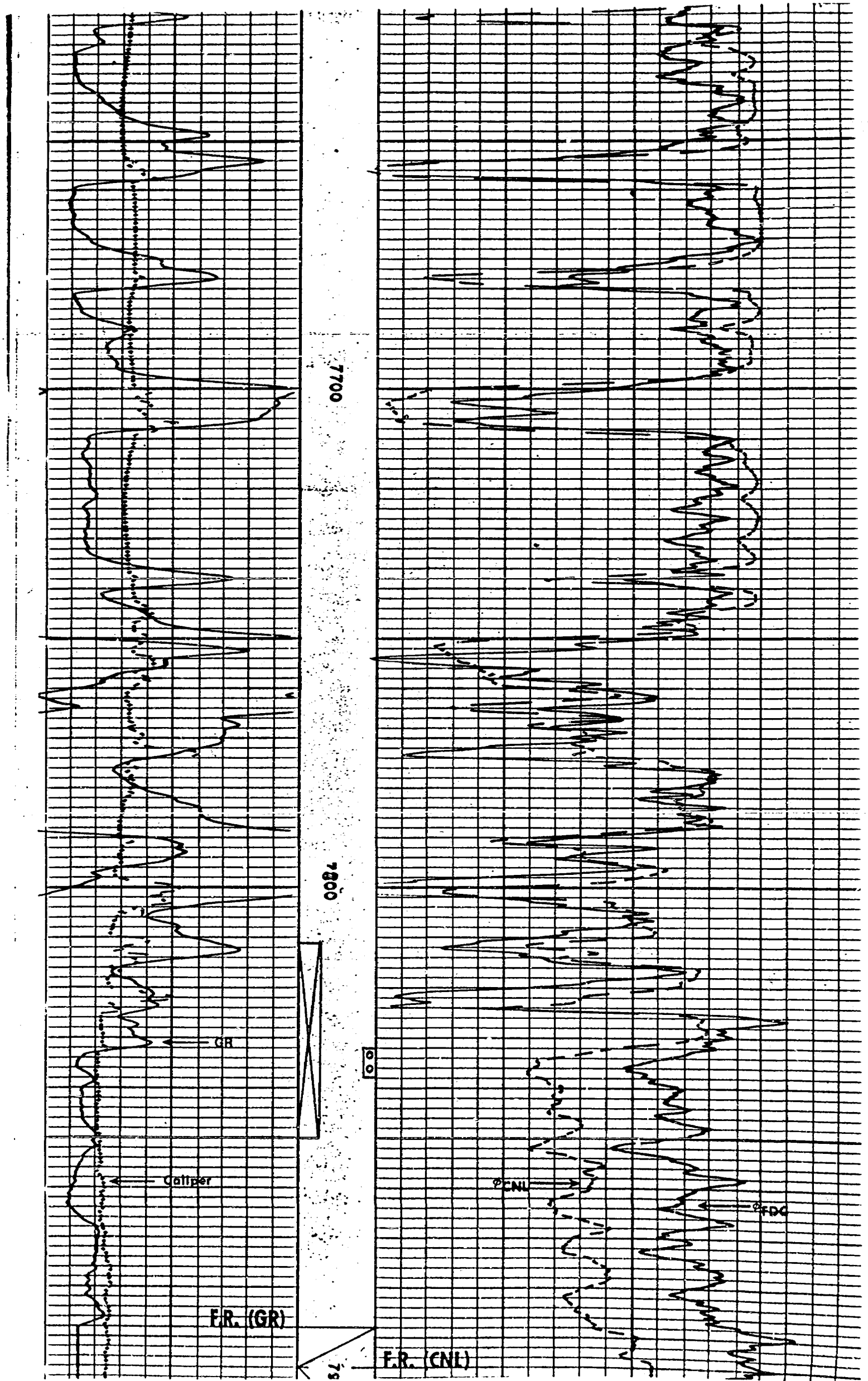
API SERIAL NO.	SEC.	TWP.	RANGE

Other Services:
DLL/MSFL

Permanent Datum: G.L. ; Elev.: 4397
Log Measured From K.B. , 16 Ft. Above Perm. Datum
Drilling Measured From K.B.

Elev.: K.B. 4413
D.F. 4412
G.L. 4397

Date	3-30-79			
Run No.	ONE			
Depth—Driller	7920			
Depth—Logger	7914			
Btm. Log Interval	7912			
Top Log Interval	SURF			
Casing—Driller	8 5/8@3500	@	@	@
Casing—Logger	3503			
Bit Size	7 7/8			
Type Fluid in Hole	SALT GEL			
Dens. | Visc.	10.2 | 40			
pH | Fluid Loss	9.5 | 9.4ml	ml	ml	ml
Source of Sample	CIRC			
Rm @ Meas. Temp.	.086 @72 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	.065 @72 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	.13 @71 °F	@ °F	@ °F	@ °F
Source: Rmf | Rmc	M | M			
Rm @ BHT	.045 @143 °F	@ °F	@ °F	@ °F
TIME Circulation Stopped	0900			
TIME Logger on Bottom	2100			
Max. Rec. Temp.	143 °F	°F	°F	°F
Equip. | Location	7732 | LVLD			
Recorded By	TERRY			


7700
7800
GR
Caliper
F.R. (GR)
F.R. (CNL)
ϕ_{CNL}
ϕ_{FDC}

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

PHILLIPS PETROLEUM CO.
LAMBIRTH (A) NO. 3
PETERSON FUSSELMAN SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO

DATE : 5-25-79
FORMATION : FUSSELMAN
DRLG. FLUID: SALT GEL
LOCATION : 760' FSL & 1980' FWL, SEC. 31, T-5-S, R-33-E

FILE NO : 3202-11139
ANALYSTS : BASS
ELEVATION: 4424' GL

WHOLE CORE ANALYSIS

SAMPLE NUMBER	DEPTH	PERM. TO AIR (MD) MAXIMUM	PERM. TO AIR (MD) 90 DEG	POR. FLD	FLUID SATS. OIL	FLUID SATS. WTR	DESCRIPTION
	CORE NO. 1 7660.0-7710.0 CUT 50' REC 50'						
	7660.0-10.0						CONG,SH MATRIX,FOSS,DNS
	7710.0-70.0						DRILLED
	CORE NO. 2 7770.0-7819.0 CUT 49' REC 47'						
	7770.0-02.0						LM,SL/SHY,FOSS,DNS
	7802.0-03.0						DOL,SL/SHY,DNS
1	7803.0-04.0	<0.1	<0.1	4.3	36.7	29.1	DOL,LMY,SL/F,STY
2	7804.0-05.0	<0.1	<0.1	2.0	26.5	50.0	DOL,SL/F,STY
	7805.0-07.0						DOL,SL/SHY,DNS
3	7807.0-08.0	<0.1	<0.1	2.7	30.3	30.3	DOL,SL/F,STY
4	7808.0-09.0	<0.1	<0.1	2.4	15.0	50.8	DOL,SL/F,STY
5	7809.0-10.0	<0.1	*	12.9	18.6	44.9	DOL,SHY,SL/F,STY
6	7810.0-11.0	<0.1	*	8.5	22.3	33.9	DOL,SL/F
	7811.0-17.0						LM,SL/SHY,DNS
	7817.0-19.0						LOST CORE
	7819.0-20.0						NOT SUBMITTED FOR ANALYSIS
	CORE NO. 3 7820.0-7824.0 CUT 4' REC 4'						
	7820.0-24.0						CHT,CONG,LM MATRIX,DNS

* INDICATES PLUG PERM

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 8
Submitted by PHILLIPS
Hearing Date 7-8-81

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Schlumberger

SIMULTANEOUS COMPENSATED NEUTRON-FORMATION DENSITY

COMPANY PHILLIPS PETROLEUM COMPANY

WELL LAMBIRTH #A-3

FIELD SOUTH PETERSON

COUNTY ROOSEVELT STATE NEW MEXICO

LOCATION 760' FSL & 1980' FWL

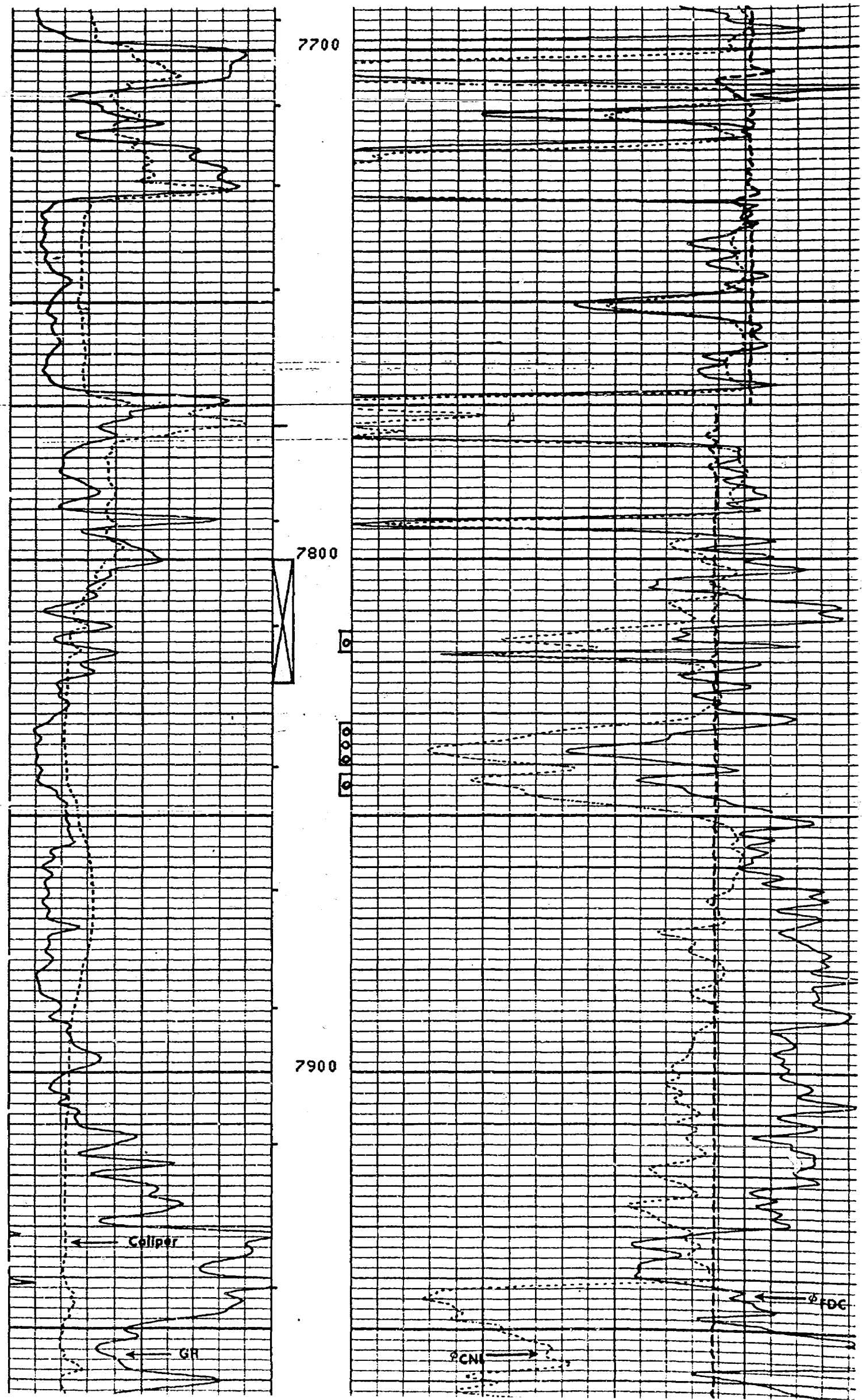
API SERIAL NO.	SEC.	TWP.	RANGE
	31	5-S	33-E

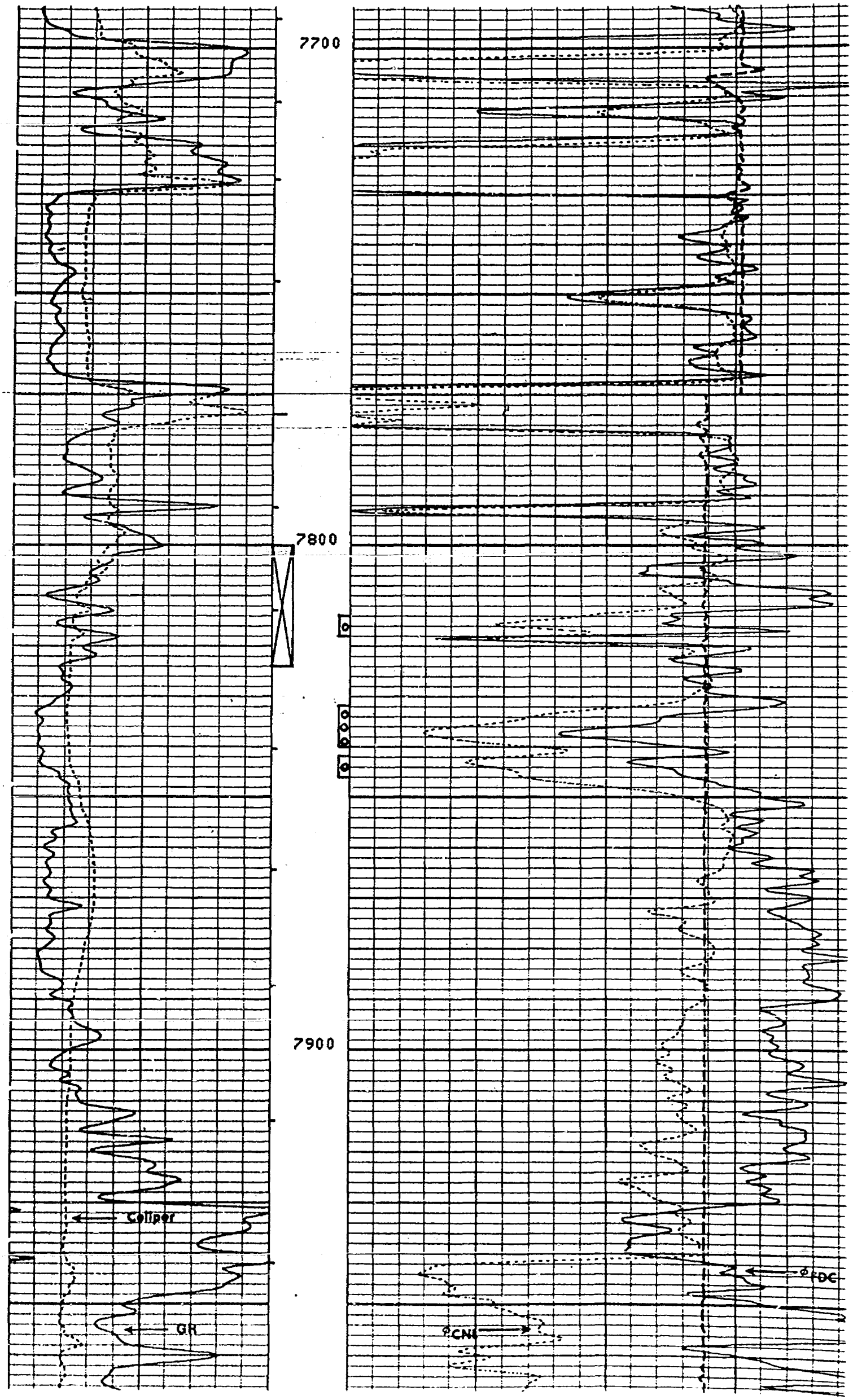
Other Services:
DLL/MSFL
PDC
CYBERLOOK

Permanent Datum: G.L. ; Elev.: 4425
Log Measured From RKB, 16 Ft. Above Perm. Datum
Drilling Measured From RKB

Elev. K.B. 4441
D.F.
G.L. 4425

Date	5-30-79	6-1-79		
Run No.	ONE	8000		
Depth—Driller	7866	8004		
Depth—Logger	7845	8003		
Btm. Log Interval	7844	SURF	@	@
Top Log Interval	5880	8 5/8 @3500		
Casing—Driller	8 5/8 @ 3500	3492		
Casing—Logger		7.875		
Bit Size	7.875	SALT MUD		
Type Fluid in Hole	SALT MUD	10.1 | 39	mi	
Dens. | Visc.	10 | 41	9.5 | 5.2 ml		
pH | Fluid Loss	9.5 | 13.2ml	@ °F	@ °F	@
Source of Sample	CIRC	@ °F	@ °F	@
Rm @ Meas. Temp.	.074 @ 68 °F	@ °F	@ °F	@
Rmf @ Meas. Temp.	.055 @ 68 °F	@ °F	@ °F	@
Rmc @ Meas. Temp.	.11 @ 68 °F	C	@ °F	@
Source: Rmf | Rmc	M	.038 @140 °F		
Rm @ BHT	.04 @ 138 °F			
TIME Circulation Stopped	0600			
TIME Logger on Bottom	1100	°F 140	°F	°F
Max. Rec. Temp.	138			


7700
7800
7900
Caliper
GR
ϕ_{FDC}
ϕ_{CNL}


7700
7800
7900
Calliper
GR
φFDC
φCNL

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

ENSERCH EXPLORATION INC.
LAMBIRTH NO. 3
WILDCAT
ROOSEVELT COUNTY, NEW MEXICO

DATE: 7-5-78
FORMATION: AS NOTED
DRLG. FLUID: SALT GEL & 3.5% OIL
LOCATION: 1980 FNL & 1980 FEL, SEC. 31, T-5-S, R-33-E

FILE NO: 3202-10814
ENGINEER: DILLARD
ELEVATION: 4394 GL

* INDICATES PLUG PERM S INDICATES PRESERVED SAMPLE

WHOLE CORE ANALYSIS

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
	CORE NO. 1 7760.0-7806.0 CUT 46' REC 45' FUSSELMAN								
	7760.0-63.0 LM,ANHY,DENSE,NO SHOW								
	7763.0-66.0 LM,ANHY,FOSS,DENSE,NO SHOW								
	7766.0-91.0 LM,ANHY,SL/SHY,DENSE,NO SHOW								
	7791.0-98.0 SH,CONG								
	7798.0-7805.0 DOL,SL/SHY,DENSE,NO SHOW								
	7805.0-7806.0 LOST CORE	CORE NO. 2 7806.0-7844.0 CUT 38' REC 38' FUSSELMAN							
1	7806.0-07.0	16.0	0.1		8.4	15.1	44.8		DOL,LMY,V/F
2	7807.0-08.0	1.6	<0.1		9.0	6.1	51.3		DOL,V/F
3	7808.0-09.0	0.4	0.3		10.5	12.1	50.3		DOL,F
4	7809.0-10.3	<0.1	<0.1		7.7	0.3	71.9		DOL,SL/F
5	7810.3-12.0	0.1	<0.1		7.2	0.4	61.0		DOL,SL/F
6	7812.0-13.3	0.1	*		14.8	1.7	70.9		DOL,V/F
7	7813.3-14.5	5.6	1.7		13.7	4.6	64.0		DOL,LMY,V/F,CHT
8	7814.5-16.5	<0.1	<0.1		6.6	3.0	66.7		DOL,V/F,CHT
9	7816.5-17.5	<0.1	*		5.7	2.9	72.0		DOL,SHY,F,STY
10	7817.5-18.8	0.4	*		15.5	12.0	33.6		DOL,SHY,F
11	7818.8-20.4	5.7	0.8		11.4	7.6	63.0		DOL,SHY,F,SL/V

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 9
Submitted by PHILLIPS
Hearing Date 7-8-81

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CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

ENSERCH EXPLORATION INC.
LAMBIRTH NO. 3

DATE: 7-5-78
FORMATION: AS NOTED

FILE NO: 3202-10814
ENGINEER: DILLARD

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
12	7820.4-21.6	0.4	0.4		10.5	29.3	30.8		DOL,SHY,F,SL/V
13	7821.6-22.6	0.4	0.2		9.6	9.9	59.3		DOL,F
14	7822.6-24.0	14.0	0.6		12.2	16.7	44.1		DOL,SHY,F,STY
15	7824.0-25.7	0.2	0.1		9.6	23.0	27.8		DOL,F,SHR,STY
16	7825.7-26.7	0.9	0.6		12.0	23.6	29.8		DOL,LMY,SL/F
17	7826.7-28.2	5.7	3.2		11.0	15.5	38.7		DOL,F,V,
18	7828.2-29.8	1.1	0.5		12.0	20.9	48.3		DOL,F,SL/V,STY
19	7829.8-31.2	0.3	0.2		8.7	31.5	28.6		DOL,F,STY
20	7831.2-32.7	7.4	2.1		11.4	35.2	38.0		DOL,LMY,SHY,F,SL/V
21	7832.7-33.8	0.6	0.4		15.3	17.8	44.7		DOL,LMY,F,STY
22	7833.8-34.8	0.4	0.4		13.4	27.9	31.8		DOL,LMY,SHY,F,STY
23	7834.8-36.3	0.6	0.5		17.6	28.3	34.1		DOL,F
24	7836.3-38.0	0.4	0.3		15.4	19.6	46.3		DOL,LMY,SHY,F,STY
25	7838.0-39.0	0.4	0.2		13.0	12.0	49.9		DOL,LMY,F,STY
26	7839.0-40.8	0.5	0.4		12.2	19.2	39.1		DOL,LMY,F,FOSS,STY
27	7840.8-42.6	0.5	0.4		14.8	24.6	32.7		DOL,LMY,F,STY
28	7842.6-44.0	0.3	*		14.9	26.3	33.8		DOL,LMY,V/F
	CORE NO. 3	7844.0-7882.0	CUT 38'	REC 22'	FUSSELMAN				
29	7844.0-45.3	0.5	0.3		11.9	18.5	45.1		DOL,LMY,ANHY,SL/F STY
30	7845.3-46.7	0.6	0.6		18.3	24.2	38.9		DOL,LMY
31	7846.7-47.8	1.2	0.5		15.4	13.2	47.0		DOL,LMY,SL/F
32	7847.8-48.8	17.0	1.8		11.8	19.8	28.6		DOL,LMY,ANHY,F
33	7848.8-50.3	1.2	1.0		13.2	19.1	27.7		DOL,LMY,ANHY,SL/F
34	7850.3-51.9	1.0	0.6		19.5	32.6	33.3		DOL,LMY,SHY,ANHY SL/F
35	7851.9-53.3	0.5	0.5		17.9	11.5	46.0		DOL,LMY,ANHY,SL/F
36	7853.3-55.0	1.1	0.5		17.2	17.6	42.0		DOL,LMY,SHY,ANHY SL/F
37	7855.0-56.1	0.2	0.1		16.5	27.1	40.5		DOL,LMY,ANHY,SL/F

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CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

ENSERCH EXPLORATION INC.
LAMBIRTH NO. 3

DATE: 7-5-78
FORMATION: AS NOTED

FILE NO: 3202-10814
ENGINEER: DILLARD

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
38	7856.1-57.0	<0.1	*		7.2	5.4	58.9		DOL,LMY,SHY,ANHY SL/F
39	7857.0-58.0	<0.1	<0.1		7.6	3.3	66.5		DOL,LMY,SHY,ANHY SL/F,STY
40	7858.0-59.1	0.4	0.4		13.9	18.4	44.6		DOL,LMY,SHY,ANHY,STY SL/F
41	7859.1-60.9	2.2	1.2		12.7	23.2	33.5		DOL,LMY,SHY,ANHY,STY SL/F
42	7860.9-62.7	0.4	0.2		14.4	8.2	59.9		DOL,LMY,SL/F
43	7862.7-64.4	2.9	1.6		12.5	18.7	34.7		DOL,LMY,ANHY,F,STY
44	7864.4-66.0	10.0	9.6		16.3	16.9	39.9		DOL,LMY,SDY,ANHY,F STY

7866.0-82.0 LOST CORE

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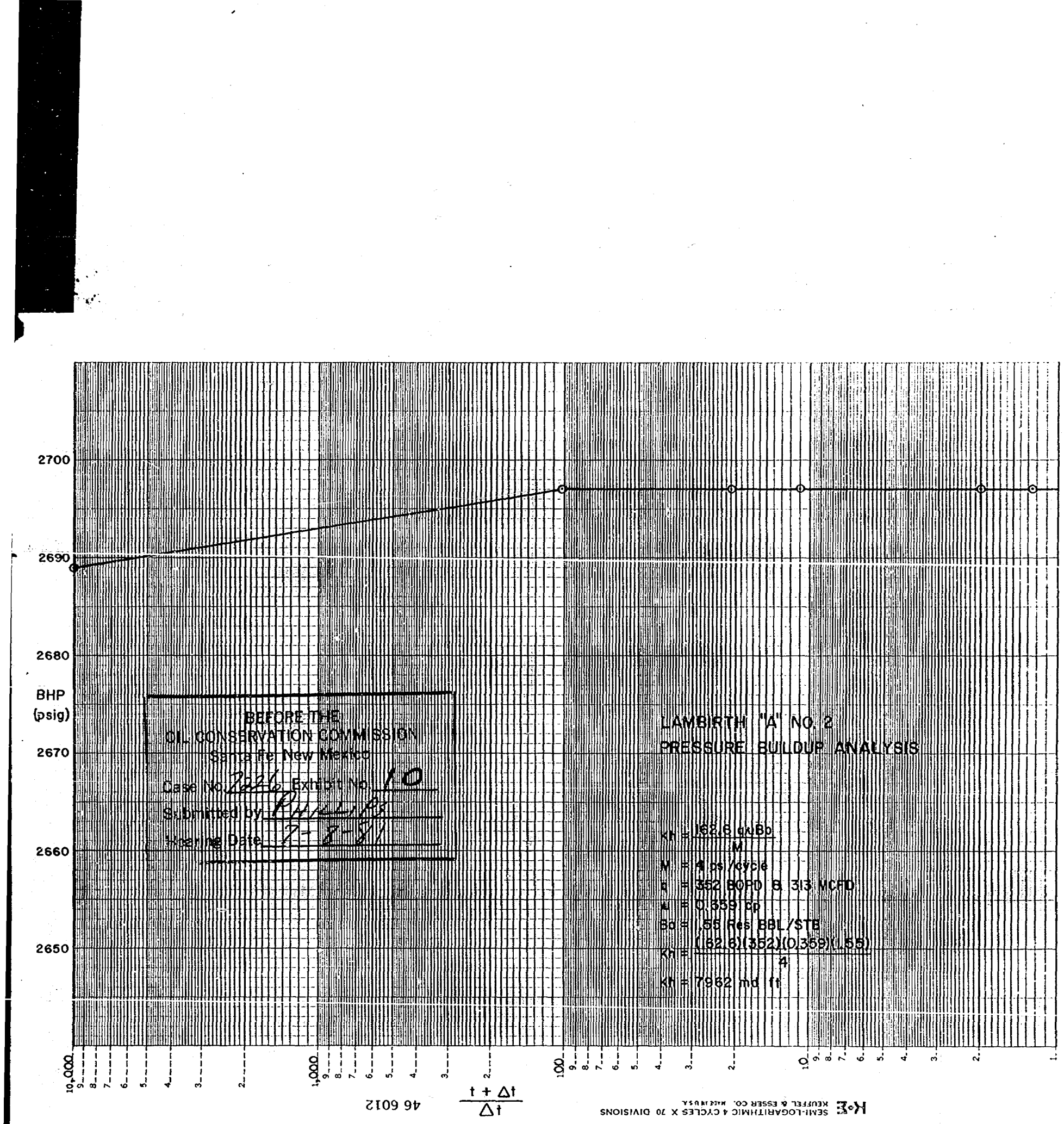
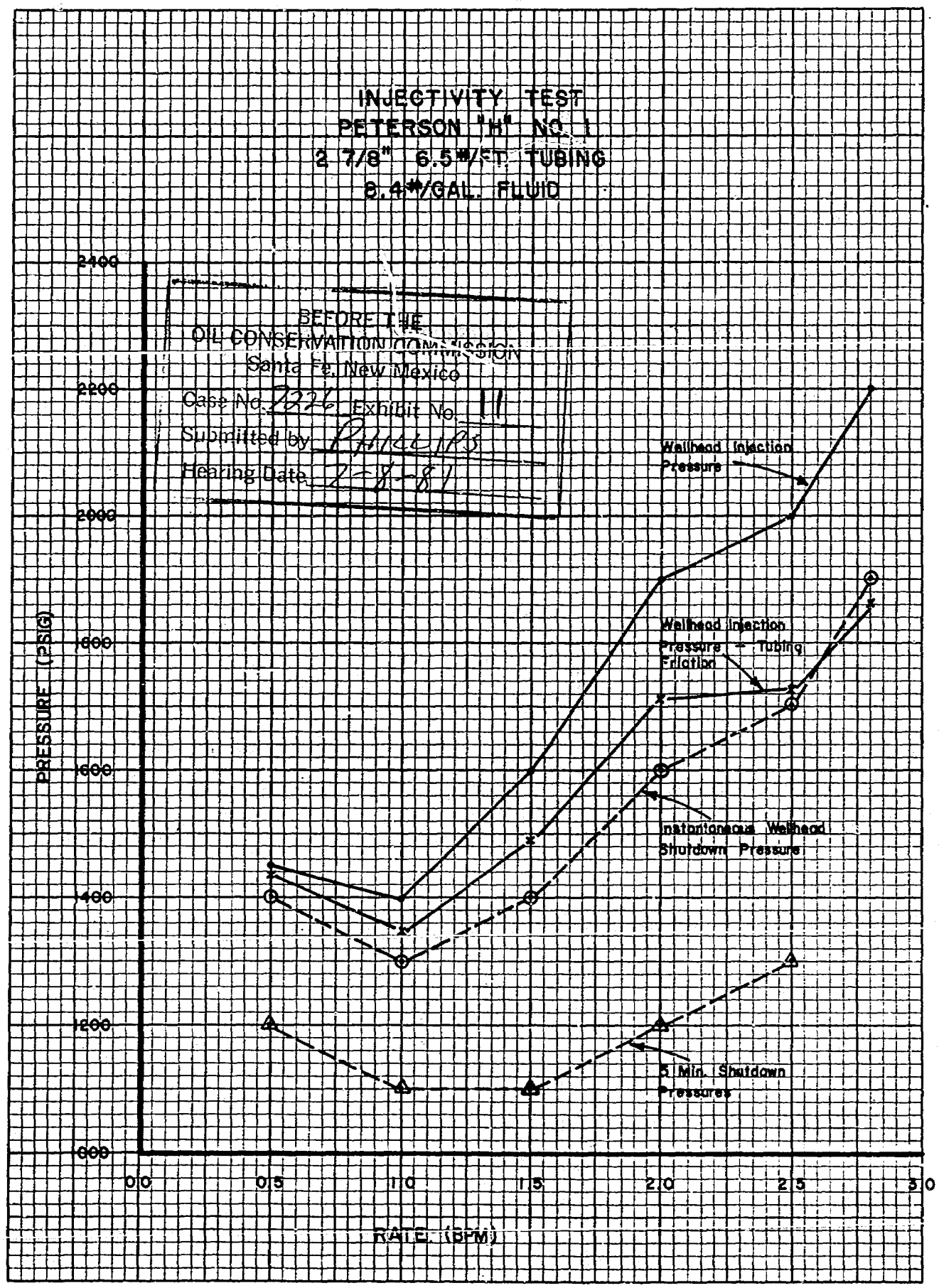

2700
2690
2680
BHP
(psig)
2670
2660
2650
BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 2226 Exhibit No. 10
Submitted by
Hearing Date
LAMBIRTH "A" NO. 2
PRESSURE BUILDUP ANALYSIS
Kh = 162.6 qμBo / M
M = 4 ps/cycle
q = 352 BOPD & 313 MCFD
μ = 0.359 cp
Bo = .55 Res BBL/STB
Kh = (162.6)(352)(0.359)(1.55) / 4
Kh = 7962 md ft
10,000
1,000
100
10
t + Δt / Δt
SEMI-LOGARITHMIC 4 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 6012



46 0782

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

EXAMPLE INJECTIVITY TEST

2 3/8" 4.7#/ft. tubing @ 7900'
9# brine (.467 psi/ft.)

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 14
Submitted by Phillips
Hearing Date 7-8-81

Wellhead injection Pressure

Static Column injection Pressure

-549 avg. — 1174' equal depth

PRESSURE (PSI)

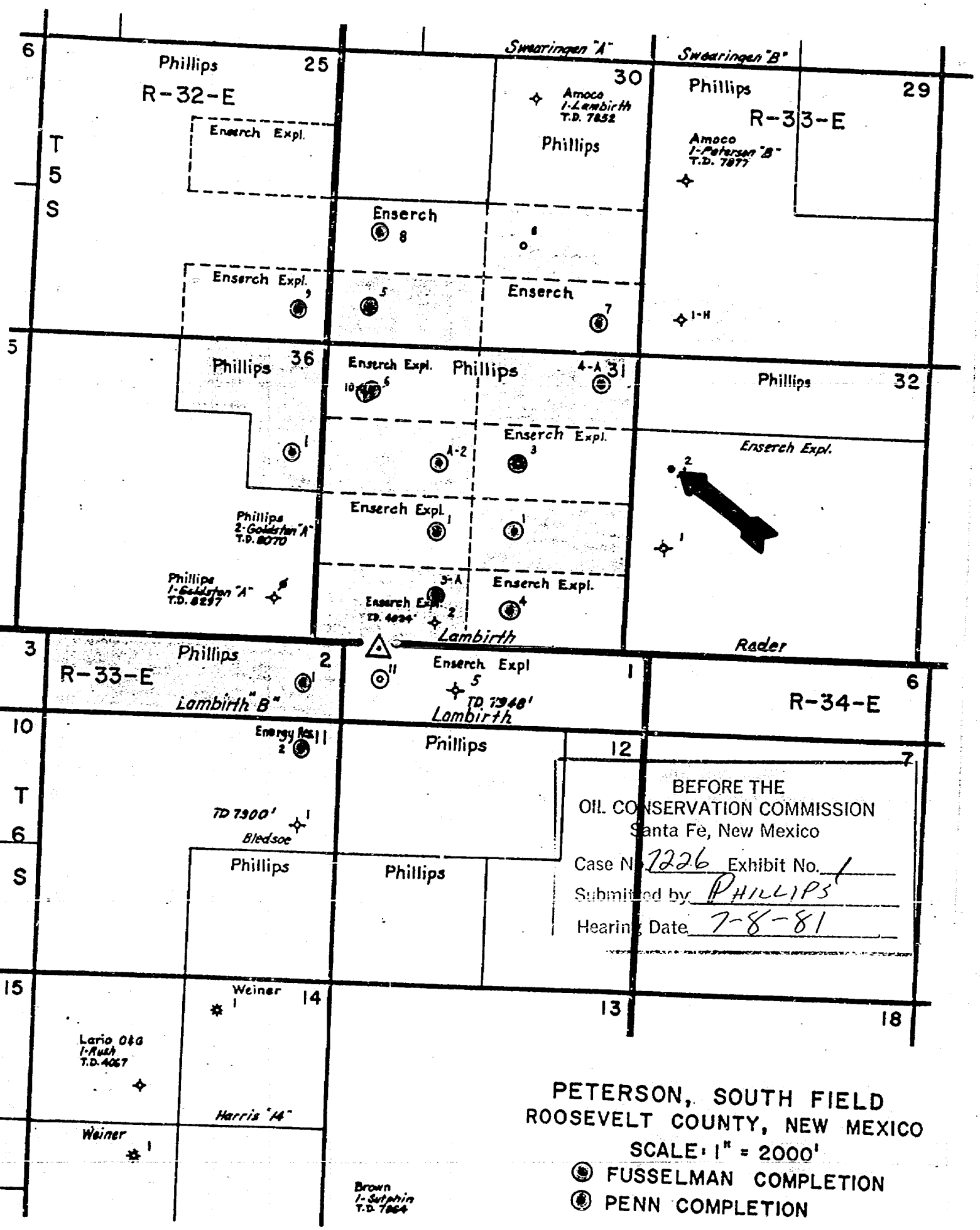
2400
2000
1600
1200
800
400
0
-400
-800

0 1 2 3 4 5

RATE (BPM)

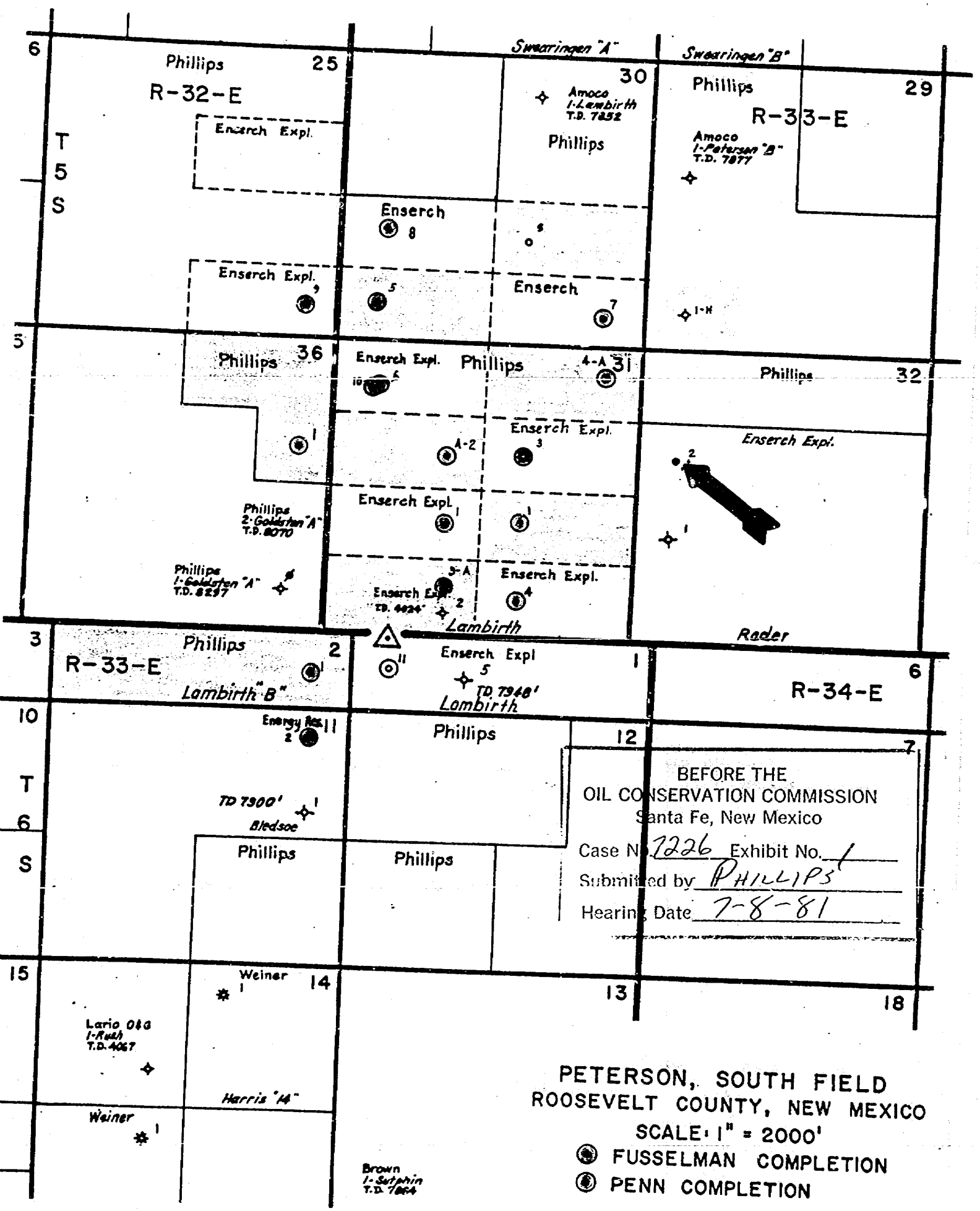
46 0782

KEUFFEL & ESSER CO. MADE IN U.S.A. 10 X 10 TO THE INCH • 7 X 10 INCHES



PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'

◉ FUSSELMAN COMPLETION
◉ PENN COMPLETION



BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

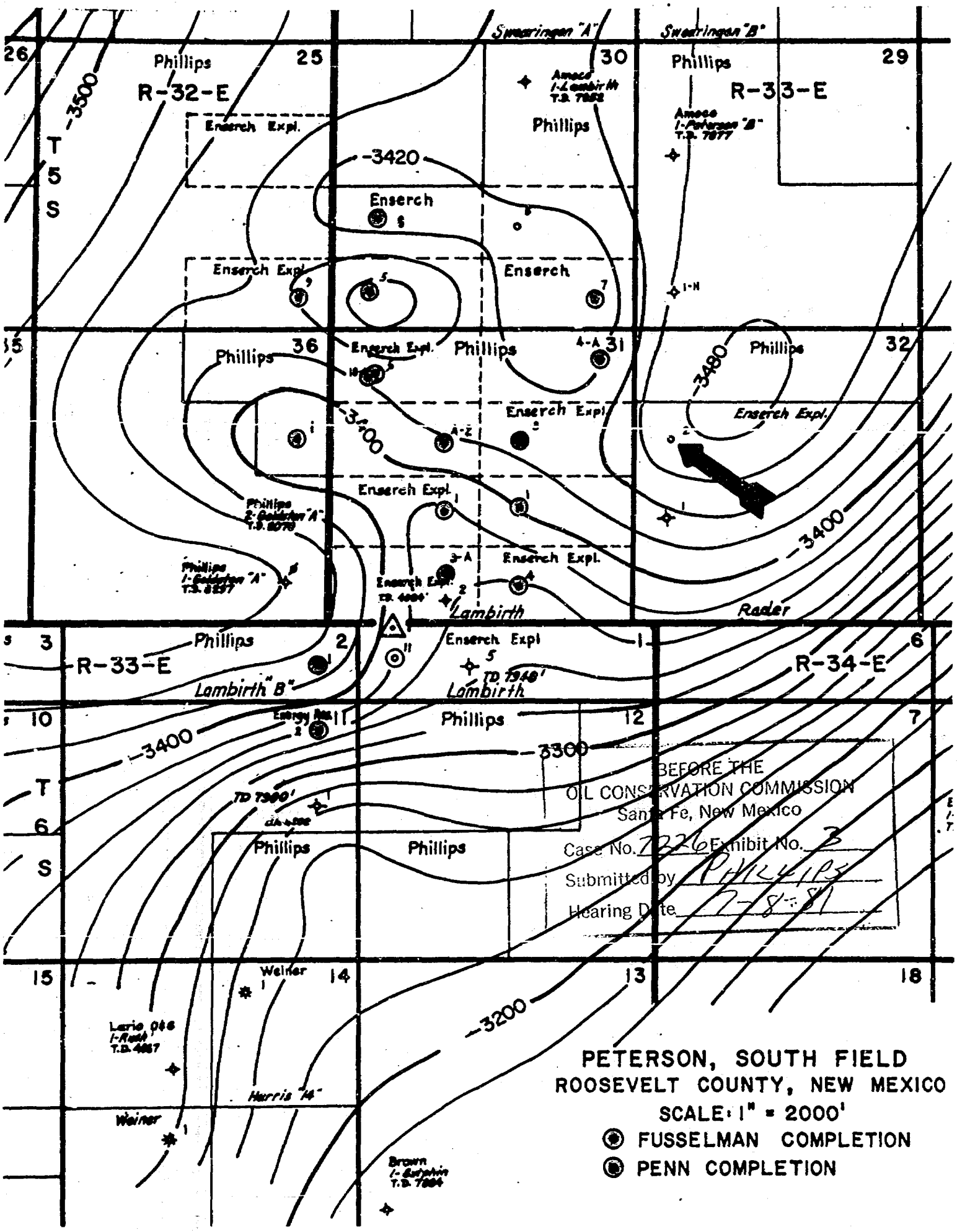
Case No. 7226 Exhibit No. 1

Submitted by PHILLIPS

Hearing Date 7-8-81

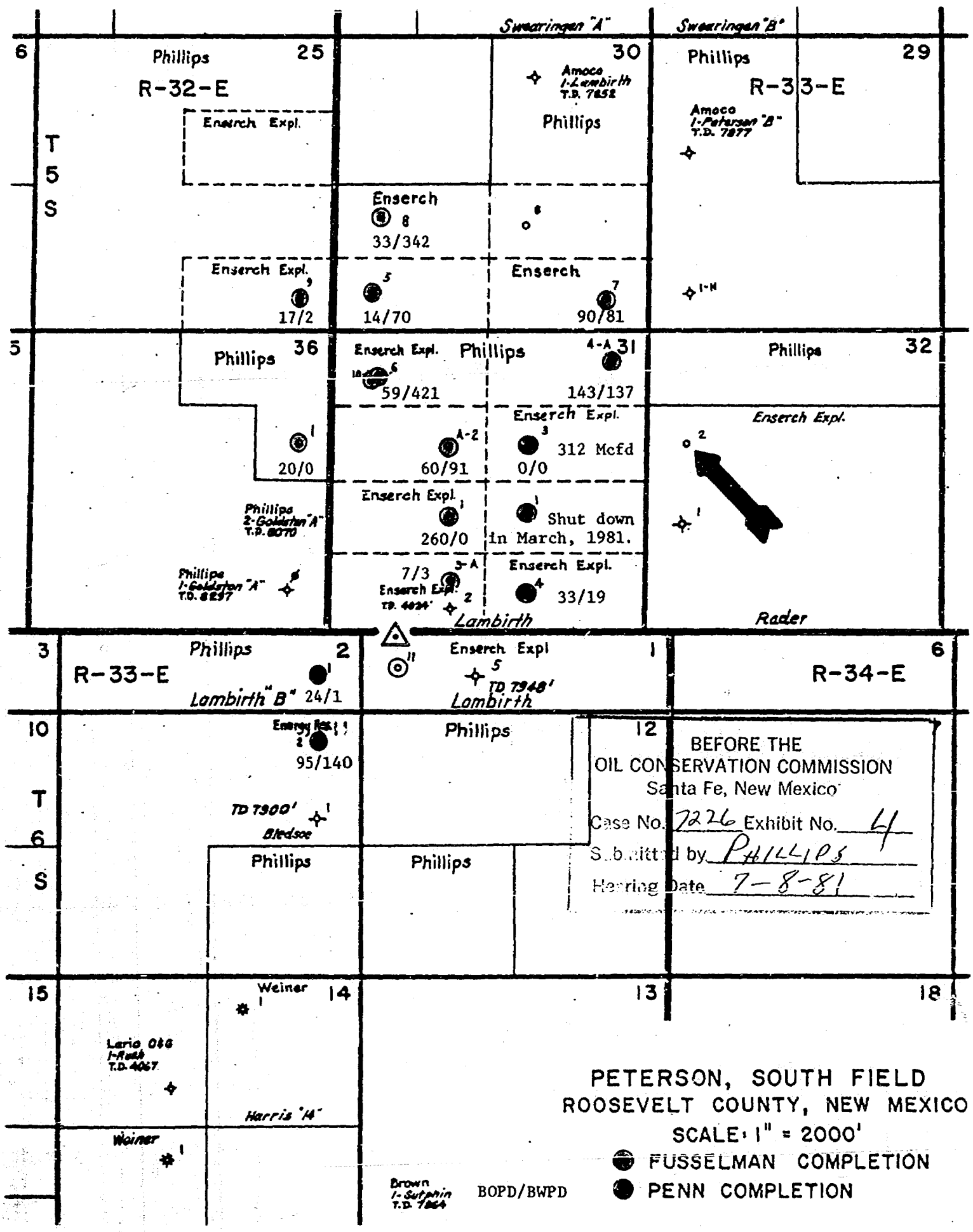
PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'

FUSSELMAN COMPLETION
PENN COMPLETION



BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7236 Exhibit No. 3
Submitted by PHILLIPS
Hearing Date 7-8-81

PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'
FUSSELMAN COMPLETION
PENN COMPLETION



BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 4
Submitted by PHILLIPS
Hearing Date 7-8-81

PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'
FUSSELMAN COMPLETION
PENN COMPLETION

04-10-81

PETERSON, SOUTH FUSSELMAN FIELD, ROOSEVELT CO., N.M.
TOTAL FIELD PRODUCTION BY MONTHS

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
6/78	1	4952		3033	612
7	1	7077		7722	1102
8	1	1297	310	1324	1021
9	1	584	313	2445	4187
10	1	324		223	688
11	2	8221		13606	1655
12	2	8517		17334	2035
1/79	3	13033		24964	1915
2	3	15867		12530	790
3	3	14530	936	7258	500
4	4	14141	911	7533	533
5	4	24560	389	14046	572
6	5	29233	10307	16452	563
7	5	28084	9611	17723	631
8	6	29608	8875	17543	593
9	6	29480	13906	12260	415
10	8	39042	15628	23142	593
11	8	37581	20580	20742	552
12	8	39909	21360	21375	536
1/80	8	35970	17460	20730	584
2	9	33871	13829	16172	495
3	10	37549	20945	22056	587
4	10	35713	23216	18727	524
5	10	33891	22380	17120	505
6	10	32830	25764	21140	644
7	10	32372	26121	20717	640
8	10	30897	26617	19740	639
9	10	27852	24295	14341	515
10	10	25264	26920	12741	504
11	10	19905	22288	7378	371
12	10	24794	27109	12478	503
1/81	10	23045	24588	13270	576
2/81	10	20226	27308	7865	389
3/81	10	19353	27525	12338	448

779572

20449 ENSERCH-1 LAMBIRTH, K-31-5S-33E TOP FUSS 7800 (-3372) RKB 4428
PERFS 7808-52 IP/F 638 80PD, 0BW, GOR 1098 1/4"CH FTP 585#
(-3380,-3424)
DST #5 7820-50 IFP 711-1519, ISIP 2755, FFP 1409-2191, FSIP 2760
BOMB 7846 (-3418)

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 5
Submitted by PHILLIPS
Hearing Date 7-8-81

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
6/78	1	4952	-	3033	612
7	1	7007	-	7722	1102
8	1	1297	310	1324	1021
9	1	584	313	2445	4187
10	1	324	-	223	688
11	1	8047		3400	423
12	1	8286		4231	511
1/79	1	9111		5686	624
2	1	9217		6399	694
3	1	10305		6278	609
4	1	9426		6074	644
5	1	8861		7158	808
6	1	9036		6039	668
7	1	10163		7225	711
8	1	11378		7540	663
9	1	9607		5518	574
10	1	10109		6870	680
11	1	9847		6222	632
12	1	10229		5972	584
1/80	1	10847		4860	470
2	1	11321		5061	447
3	1	5484		3097	565
4	1	9358		5104	545
5	1	9432		5295	561
6	1	9818		5543	565
7	1	10690		6173	577
8	1	10619		6675	629
9	1	9392		5157	549
10	1	11093		5015	452
11	1	8057		2878	357
12	1	12678		5464	431
1/81	1	10858		4238	390
2/81	1	7666		3066	400
3/81	1	8058		4653	577

293,157

20454 ENSERCH 3 LAMBIRTH, G-31-5S-33E TOP FUSSELMAN 7828 (-3421) RKB
PERF 7940-44 A/W 200 GALS 10% MCA 1000 GALS MOD-202 SQUEEZED
PERF 7840-49 A/W 200 GALS 10% MCA 1500 GALS MOD-202 IP/P 25 BOPD 12 BW
GOR 2360
CORED 7760-7866

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
11/78	1	174		10206	58655
12	1	231		13103	56723

1/79	1	222	15867	71473
PB TO PENN		-627		

20479 ENSERCH-6-LAMBIRTH D-31-5S-33E TOP FUSS 7828 (-3427) RKB 4401
PERF 7828-40 A/W 2000 GALS MOD 202 SQUEEZED
PERF 7830-35 A/W 250 GALS MSA
IPF 204 BOPD 68 BWPD GOR 1549 50.1 GTY FTP 90#

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
3/79	1	1640	936	-	-
4	1	930	720	-	-
5	1	342	240	-	-
6	1	3863	3965	1340	347
7	1	2627	3703	429	163
8	1	1914	2928	901	471
9	1	1756	2560	660	239
10	1	3052	3928	2373	778
11	1	2954	6778	2158	731
12	1	3205	9997	2072	647
1/80	1	2256	8961	1686	747
2	1	2303	9220	1756	762
3	1	1659	10394	1879	1133
4	1	1847	11755	1941	1051
5	1	1667	11242	2121	1272
6	1	1520	11598	2200	1447
7	1	1070	8087	609	569
		35605			

REPLACED BY #10 LAMBIRTH.

20482 ENSERCH-7 LAMBIRTH P-30-5S-33E TOP FUSS 7797'(-3406') RKB 4391'
PERF 7826-29 A/W 150 GALS 5%HCL MP 2100 SIP VAC @4BPM
IPP 117 BOPD 73 BWPD GOR 1179
DST #1 7804-49 FUSS PFP 953 ISIP 2787 FFP 1564 FSIP 2787

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
6/79	1	2244	1120	1031	459
7	1	2114	804	871	412
8	1	1879	494	1056	562
9	1	3345	1859	771	230
10	1	5913	1261	2493	422
11	1	6893	1257	2262	328
12	1	6228	1402	2172	349
1/80	1	6250	1380	1767	283
2	1	2724	1014	1840	675
3	1	6242	1399	1971	316
4	1	5541	1370	2035	367
5	1	5279	1722	2122	402
6	1	4376	1262	2221	508

7	1	3120	1689	1537	493
8	1	2723	2470	1589	584
9	1	3260	2434	1789	549
10	1	2274	1089	1800	792
11	1	3142	3194	2460	783
12	1	1527	1507	1669	1093
1/81	1	[illegible]	[illegible]	[illegible]	1246
2/81	1	2292	1210	2645	1154
3/81	1	1354	1212	2183	1612

81153

20500 ENSERCH-8 LAMBIRTH L-30-5S-33E TOP FUSS 7805(-3408), CISCO 7674 (3277). PERFD 7816-29' A/W 500 GALS MOD 101 @ 1/2 BPM MP 3100 ISIP 200 RKB 4397' IPF 358 BOPD 0 BW 190 MCF/D 16/64"CK FTP 165 GOR 531.
DST #1 7661-7711'PENN PFP 208-208 ISIP 2409 FFP 342-239 FSIP 2419
DST #2 7794-7838 FUSS PFP 250-269 ISIP 2713 ISIP 2704 FFP 609-1402 FSIP 2704
2/80 SQZD PERFS W/INJECTROL & CEMENT

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
10/79	1	771	-	-	-
11	1	1532	395	-	-
12	1	2996	5247	-	-
1/80	1	1409	5377	1066	757
2	1	337	1702	360	1068
3	1	1438	7891	807	561
4	1	1246	6759	545	437
5	1	935	6349	608	650
6	1	1379	10034	756	548
7	1	1610	10286	745	463
8	1	1345	9977	902	671
9	1	1270	9615	675	531
10	1	1182	10657	720	609
11	1	985	8620	460	467
12	1	1064	9977	519	488
1/81	1	974	9915	537	551
2/81	1	845	9091	71	084
3/81	1	814	8560	112	138

22132

0523 ENSERCH-9 LAMBIRTH P-25-5S-32E FUSS 7822 (-3439) RKB 4383

PERF 7824-38 A/W 3 BBLS MIN P 1600 10 MIN SIP 300
IPP 82 BOPD 2 BWPD 95 MCF/D GOR 1158
DST#1 7804-30 GTS 5" REV OUT 5580 IFP 310-417 ISIP 2126 FFP 476-1257
FSIP 1569

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
2/80	1	1199	44	156	130
3	1	1416	-	781	552
4	1	1020	-	498	488
5	1	1209	-	607	502
6	1	1262	-	786	623
7	1	905	-	774	855
8	1	974	-	939	964
9	1	836	-	700	837
10	1	756	-	744	984
11	1	629	-	444	706
12	1	681	8	498	731
1/81	1	623	24	520	835
2/81	1	502	20	605	1205
3/81	1	521	52	593	1138
		12533			

20536 ENSERCH-10 LAMBIRTH D-31-5S-33E FUSS 7781 (-3381) RKB 4400
PERF 7813-7832 A/W-5750 GAL
IP/P 153 BOPD 203 BW GTY 49.2 GOR 765 8/22

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
8/80	1	287	266	219	763
9	1	2791	7215	2226	798
10	1	2329	-	2205	947
11	1	1316	7606	511	388
12	1	2048	10773	1340	654
1/81	1	2008	9661	900	448
2/81	1	1519	8838	742	488
3/81	1	1484	10536	1127	759
		13782			

20471 PPCO-1-LAMBIRTH"A" J-31-5S-33E FUSS 7827(-3405) CISCO 7723

(-3301) PERF 7830-38', 52-58 A/W 500 GALS 10% ACETIC RKB 4422
IPF 707 BOPD 0 BW GOR 670 ON 1/2" CH FTP 100

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR	
1/79	1	3700	-	3411	922	
2	1	6650	-	6131	922	
3	1	2585	-	980	379	
4	1	2184	191	646	296	
5	1	7115	149	1883	265	
6	1	6536	5222	2776	425	
7	1	6105	5104	2865	469	
8	1	6332	5066	5976	944	
9	1	4718	8257	3536	749	
10	1	4965	8689	3317	668	
11	1	3908	2286	967	247	
12	1	4462	2610	1174	263	
1/80	1	1371	802	354	258	
2	1	1255	734	205	163	
3	1	1641	960	456	278	
4	1	4052	2370	886	219	
5	1	3730	2182	651	175	
6	1	3518	2058	1017	289	
7	1	3576	2092	9622	2691	
8	1	3668	9636	3034	827	
9	1	1195	3138	698	584	
10	1	769	2019	295	384	
11	1	876	2300	114	130	
12	1	969	2545	578	596	
1/81	1	431	1132	431	1000	
2/81	1	1924	2728	151	078	LAST PROD. DATE 2/81
		116235				

20481 PPCO-2 LAMBIRTH "A" F-31-5S-33E FUSS 7832(-3419)-RKB-4413
PERF 7832-38 A/W 500 GAL 15% ISDP 2100
IPF 410 BOPD 0 BW GOR 1671 11/64"CH FTP 675
CORED 7819-7849

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M.	GOR
4/79	1	1601	-	813	508
5	1	8242	-	5005	607
6	1	7554	-	5266	697
7	1	7075	-	6333	895
8	1	7316	-	1669	228
9	1	6544	-	957	146
10	1	5740	-	4895	853
11	1	5020	-	5357	1067
12	1	5158	-	5857	1136
1/80	1	7324	-	8159	1114
2	1	6701	-	4732	706
3	1	8762	-	10502	1199
4	1	5410	-	5103	943
5	1	4979	-	3751	753

6	1	4696	-	5853	1246
7	1	4773	-	86	18
8	1	4898	2826	2478	506
9	1	4254	-	1517	357
10	1	3265	-	763	234
11	1	2391	-	191	80
12	1	2448	-	891	364
1/81	1	2969	-	1813	611
2/81	1	1477	2238	127	086
3/81	1	1870	2833	1828	978

120467

20446 PPCO-3 LAMBIRTH "A" N-31-5S-33E FUSS 7808(-3367) RKB 4441
PERF 7814-46 A/W 1000 GALS 15% ISDP 2200 A/W 1200 GALS 28% 1300 GALS 15% MP 1300 ISDP VAC, A/W 10000 GALS 28% MP 3700 ISDP 2850
IPP 128 BOPD 56 BWPD GOR 1487

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M.	GOR
8/79	1	789	401	16554	20981
9	1	2510	1230	818	326
10	1	2752	1348	2008	730
11	1	2407	1179	2198	913
12	1	2473	1212	2403	972
1/80	1	1079	-	1055	978
2	1	1330	-	824	620
3	1	1738	-	1828	1052
4	1	1074	-	889	828
5	1	989	-	654	661
6	1	932	-	1020	1094
7	1	948	1580	967	1020
8	1	972	24	881	906
9	1	638	16	403	632
10	1	489	12	203	415
11	1	405	10	57	141
12	1	517	13	335	648
1/81	1	445	11	482	1083
2/81	1	179	67	15	084
3/81	1	226	85	226	1000

22892

20506 PPCO-4 LAMBIRTH "A" A-31-5S-33E FUSS 7814(-3423) RKB 4391

PERF 7814-28 A/W 1500 GALS 15% MP 4600 ISDP 2200
IPF 608 BOPD 57 BWPD FTP 200 ON 24/64"CO

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M.	GOR
10/79	1	5740	402	1186	207
11	1	5020	6685	1578	314
12	1	5158	892	1725	334
1/80	1	5434	940	1783	328
2	1	6701	1159	1394	208
3	1	8762	301	614	70
4	1	5410	936	1502	278
5	1	4979	861	1106	222
6	1	4696	812	1725	367
7	1	4773	2387	177	37
8	1	4898	-	3008	614
9	1	3537	-	1146	324
10	1	2277	-	483	212
11	1	1902	-	138	73
12	1	2035	-	673	331
1/81	1	1752	-	972	555
2/81	1	3242	3116	80	025
3/81	1	4419	4247	1236	280
		80735			

20514 PPCO-1 LAMBIRTH STATE H-36-5S-32E FUSS 7795 (-3379) RKB 4416
PERF 7796-7806 A/W 2500 GAL 15% NA HCL
IP/P 31 BOPD, NO WTR. GTY 47.2 GOR 297 3-24-80

MO/YR	NO.WELLS	BOPM.	BWPM.	MCF/M.	GOR
3/80	1	407	-	121	297
4	1	755	26	224	297
5	1	692	24	205	296
6	1	633	-	19	30
7	1	907	-	27	30
8	1	513	1418	15	29
9	1	679	1877	30	44
10	1	830	2294	513	618
11	1	202	556	125	619
12	1	827	2286	511	618
1/81	1	552	1526	345	625
2/81	1	580	-	363	626
3/81	1	607	-	380	626

8184

20535 PPCO-1 PETERSON "H" M-29-SS-33E FUSS 7846 (-3462) RKB 4384'
PERF 7606-60 A/W 2500 GAL 15% NE HCL
PERF 7616-60 A/W 20000 GAL 15% GELLED NE HCL
PERF 7793-7801 A/W 250 GAL 15% NE HCL

MO/YR	NO.WELLS	BOPM.	BWPM.	MCF/M.	GOR

PETERSON, SOUTH PENN FIELD, ROOSEVELT CO., N.M.
TOTAL FIELD PRODUCTION BY MONTHS

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
9/78	1	4678	2002	6364	1360
10	1	4186	2137	5730	1368
11	1	1706	1119	858	503
12	1	3447	1995	1539	446
1/79	1	2660	1807	2638	992
2	2	2693	1569	16381	6083
3	2	2552	1501	18828	7378
4	2	1831	956	18756	10244
5	2	3871	2607	20816	5377
6	2	3218	2285	16480	5121
7	2	3073	2265	19316	6286
8	2	2619	1949	15114	5771
9	2	2796	1923	13207	6512
10	2	2583	1819	18235	7060
11	2	2544	2245	16149	6348
12	2	3069	1674	20883	6804
1/80	2	2255	1273	18699	8292
2	2	1911	1143	16223	8489
3	2	1498	1376	19800	13218
4	2	1776	1326	22439	12635
5	3	2775	2077	18774	6765
6	3	1513	2771	14704	9718
7	3	1290	1796	22238	17239
8	4	2873	2087	24855	8651
9	4	3558	1884	21936	6165
10	4	3073	1514	22539	7335
11	4	813	859	10816	13304
12	4	2200	1095	14653	6660
1/81	4	2435	643	26528	10894
2/81	4	2054	2329	19153	9325
3/81	4	5108	7130	24999	4894

82660

20525 PPCO-5 LAMBIRTH "A" M-30-5S-33E FUSS 7865 (-3473) RKB 4392'
PERF 7664-7748 A/W 1500 GAL 15% NA HCL
IP/P 66 BUPD + 120 BW. GTY 41 DEG. GOR 1800. 5/4/80

MO/YR	NO.WELLS	BOPM	BWPM.	MCF/M.	GOR
5/80	1	1143	2077	2057	1800
6	1	644	1651	16	25
7	1	299	767	10	33
8	1	612	918	20	33
9	1	544	816	18	33
10	1	434	651	309	712
11	1	419	629	84	200
12	1	445	668	300	674
1/81	1	223	335	14	63
2/81	1	353	1839	1	003
3/81	1	419	2183	9	021

5535

20454 ENSERCH-3-LAMBIRTH G-31-5S-33E PENN 7699 (-3291) RKB 4408'
PERF 7702-15
CACF 16000 MCF/D 24/64"CH SITP 1876 GTY .757

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M.	GOR
2/79	1	298	-	14273	47896
3	1	350	-	16348	46709
4	1	383	-	16788	43833
5	1	380	-	16788	44182
6	1	241	-	12423	51548
7	1	374	-	13971	37356
8	1	320	-	11482	35881
9	1	672	-	14404	21434
10	1	542	-	13564	25026
11	1	407	-	11907	29256
12	1	546	-	16811	30789
1/80	1	505	-	15385	30465
2	1	653	-	12772	19559
3	1	255	-	13455	52765
4	1	302	-	15929	52745
5	1	131	-	9965	76069
6	1	78	-	7620	97692
7	1	102	-	15169	148716
8	1	280	-	15590	55679

10	1	229	-	11522	50314
11	1	29	-	12878	444069
12	1	-	-	8799	-
1/81	1	-	-	9114	-
2/81	1	-	-	11720	-
3/81	1	-	-	8942	-

7077

20457 ENSERCH-4 LAMBIRTH O-31-5S-33E PENN 7696(-3263) FUSS 7801(3368)
PERF 7809-14 FUSS SWBD 100% WTR SQ RKB 4433
PERF 7696-770S PENN A/W 2100 GALS MOD 202
IPF 204 BOPD 58 BWPD FTP 350 ON 18/64"CH
CORED 7650-7732, 7766-7864
DST#1 7690-7732 PFP 160-379 ISIP 2630 FFP 435-882 FSIP 2641

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M.	GOR
9/78	1	4678	2002	6364	1360
10	1	4188	2137	5730	1368
11	1	1706	1119	858	503
12	1	3447	1995	1539	446
1/79	1	2660	1807	2638	992
2	1	2395	1569	2108	880
3	1	2202	1501	2480	1126
4	1	1448	956	1968	1359
5	1	3491	2607	4028	1154
6	1	2977	2285	4057	1363
7	1	2699	2265	5345	1980
8	1	2299	1949	3632	1580
9	1	2124	1923	3803	1790
10	1	2041	1819	4671	2289
11	1	2137	2245	4242	1985
12	1	2523	1674	4072	1614
1/80	1	1750	1273	3314	1894
2	1	1258	1143	3451	2743
3	1	1243	1376	6345	5105
4	1	1474	1326	6510	4417
5	1	1501	1363	6752	4498
6	1	791	1120	7068	8936
7	1	889	1029	7059	7940
8	1	986	1162	7628	7736
9	1	817	1007	7047	8625
10	1	1141	817	6852	6005
11	1	394	230	1933	4906
12	1	834	398	4473	5362
1/81	1	1132	275	5430	4797
2/81	1	977	457	4334	4436
3/81	1	1003	574	7080	7059

59205

20543 PPCO-1-LAMBIRTH-B A-2-6S-33E CISCO 7692(-3248) FUSS 7870 (-3426)
PERF 7664-7828 PENN A/W 750 GAL 15% RKB 4444'
PERF 7872-7882 FUSS A/W 11750 GAL 15%
IPF 268 BOPD 2 BWPD FTP 200 ON 32/64" CK. GOR 1625 GTY 51.5 8/26

MO/YR	NO.WELLS	BOPM	BWPM	MCF/M	GOR
8/80	1	995	7	1617	1625
9	1	1968	61	3349	1702
10	1	1469	46	2500	1702
11	1	0	0	0	-
12	1	921	29	766	832
1/81	1	1080	33	9364	8670
2/81	1	724	33	5876	8116
3/81	1	731	33	8089	11066

7888

LT00#518 JES JOB NO. = 8259, TIME = 090658, DATE = 81.176
DDNAME = MYDATA ENDED ON OTHWSPR1
LINES = 000660, PAGES = 000001, FORMS = 14381

COLUMNAR CORE RECORD

Form 2069 4-53

DEPTH	DESCRIPTION AND REMARKS (X: Interval of estimated last core)
	Phillips Petroleum Company
	#2 Lambirth-A, Roosevelt County,
	New Mexico.
P. B. Drisko	
3-28-79	
	Core #1: 7810-7819', recovered 9'. Fusselman.
7810-13	Shale, dark, green, mottled, hard, with tan to red finely crystalline, hard dolomite and light chert pebble inclusions. No show.
7813-15	Dolomite, tan to red, finely crystalline, mottled, hard, with much green shale and white to grey chert inclusions. No show.
7815-17.5	Dolomite, tan to red, finely crystalline, mottled, hard, shaley, with white and grey chert inclusions. No show.
7817.5-18	Shale, very dark green, mottled, with tan dolomite inclusions.
7818-19	Dolomite, tan to red, finely crystalline, mottled, shaley, hard, with many grey to white chert pebble inclusions. No show.
	Core #2: 7819-7850'. recovered 30'. Fusselman.
7819-23	Dolomite, tan-pink, finely crystalline, mottled, shaley, hard with grey-white chert inclusions.
7823-26	Dolomite, brown, finely crystalline, clean with fair crystalline-vugular-fractured porosity. Heavy stain, good odor. Scattered bleeding gas and oil.
7826-31	Dolomite, same as above with large vertical fractures. Heavy stain. Fair bleeding gas and oil.
7831-49	Dolomite, brown, finely crystalline, clean with good crystalline vugular porosity. Many thin vertical fractures. Fair bleeding gas, oil and water.
7849-59	Lost.

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7276 Exhibit No. 6
Submitted by PHILLIPS
Hearing Date 7-8-81

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

PHILLIPS PETROLEUM COMPANY
LAMBERT NO. A-2
S. PETERSON FUSSELMAN FIELD
ROOSEVELT COUNTY, TEXAS

DATE : 3-28-79
FORMATION : FUSSELMAN
DRLG. FLUID: SALT GEL
LOCATION : 1980' FNL & 1980' FWL, SEC. 31, T-5-S, R-33-E

FILE NO : 3202-11088
ANALYSTS : MORSE
ELEVATION: 4396.8' GL

WHOLE CORE ANALYSIS

SAMPLE NUMBER	DEPTH	PERM. TO AIR (MD) MAXIMUM	PERM. TO AIR (MD) 90 DEG	POR. FLD	FLUID SATS. OIL	FLUID SATS. WTR	DESCRIPTION
	CORE NO. 1 7811.0-7819.0 CUT 8' REC 8'						
	7811.0-19.0						CONG,DNS
	CORE NO. 2 7819.0-7850.0 CUT 31' REC 29'						
	7819.0-23.0						CONG,SHY,DNS
1	7823.0-24.0	1.4	0.6	4.6	12.2	41.9	LM,CHT,F
2	7824.0-25.0	0.2	*	11.3	10.6	33.1	DOL,LMY,SHY,CHT,F
3	7825.0-26.0	33.	18.	13.5	12.7	33.1	DOL,CHT,V/F
4	7826.0-27.0	20.	9.9	13.0	22.0	24.4	DOL,SL/V,SL/F
5	7827.0-28.0	92.	17.	13.3	15.3	30.7	DOL,V/F
6	7828.0-29.0	0.1	*	9.7	17.0	35.8	LM,SHY,F
7	7829.0-30.0	0.1	*	9.9	14.4	38.8	DOL,SHY,V/F
8	7830.0-31.0	0.1	*	8.3	17.3	39.6	DOL,V/F
9	7831.0-32.0	0.3	*	12.5	14.1	43.3	DOL,F,SL/V
10	7832.0-33.0	48.	26.	10.0	15.1	35.9	DOL,F
11	7833.0-34.0	12.	10.	8.3	19.0	33.1	DOL,SL/F
12	7834.0-35.0	0.2	*	10.8	17.2	34.9	DOL,V,SL/F
13	7835.0-36.0	38.	25.	9.3	12.0	29.0	DOL,SHY,SL/V,SL/F
14	7836.0-37.0	32.	29.	10.1	16.0	23.9	DOL,CHT,SL/V
15	7837.0-38.0	15.	8.2	7.7	12.6	22.1	DOL,CHT,V/F
16	7838.0-39.0	12.	11.	8.8	18.9	21.0	DOL
17	7839.0-40.0	<0.1	*	5.7	13.6	30.2	DOL,CHT,V
18	7840.0-41.0	0.5	*	13.3	21.0	23.3	DOL,V/F,V
19	7841.0-42.0	0.4	*	11.5	16.7	25.1	DOL,V,F
20	7842.0-43.0	0.2	*	9.7	16.7	27.8	DOL,F

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 7
Submitted by PHILLIPS
Hearing Date 7-8-81

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

PHILLIPS PETROLEUM COMPANY
LAMBERT NO. A-2

DATE : 3-28-79
FORMATION : FUSSELMAN

FILE NO : 3202-11088
ANALYSTS : MORSE

WHOLE CORE ANALYSIS

SAMPLE NUMBER	DEPTH	PERM. TO AIR (MD) MAXIMUM	PERM. TO AIR (MD) 90 DEG	POR. FLD	FLUID SATS. OIL	FLUID SATS. WTR	DESCRIPTION
21	7843.0-44.0	42.	35.	8.6	20.6	26.0	DOL,F
22	7844.0-45.0	566.	40.	8.1	8.7	35.6	DOL,V/F
23	7845.0-46.0	204.	4.3	4.1	22.1	51.2	DOL,V/F
24	7846.0-47.0	29.	15.	7.3	12.2	33.8	DOL,CHT,V/F,SL/V
25	7847.0-48.0	4.0	2.8	4.7	12.3	41.1	DOL,SL/V,F
	7848.0-50.0						LOST CORE

*· INDICATES PLUG PERM

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

Schlumberger

COMPENSATED NEUTRON-FORMATION DENSITY

COMPANY PHILLIPS PETROLEUM COMPANY

WELL LAMBIRTH A #2

FIELD SOUTH PETERSON

COUNTY ROOSEVELT STATE NEW MEXICO

LOCATION 1980' FNL & 1980' FWL
SEC 31, T-5-S, R-33-E

API SERIAL NO.	SEC.	TWP.	RANGE

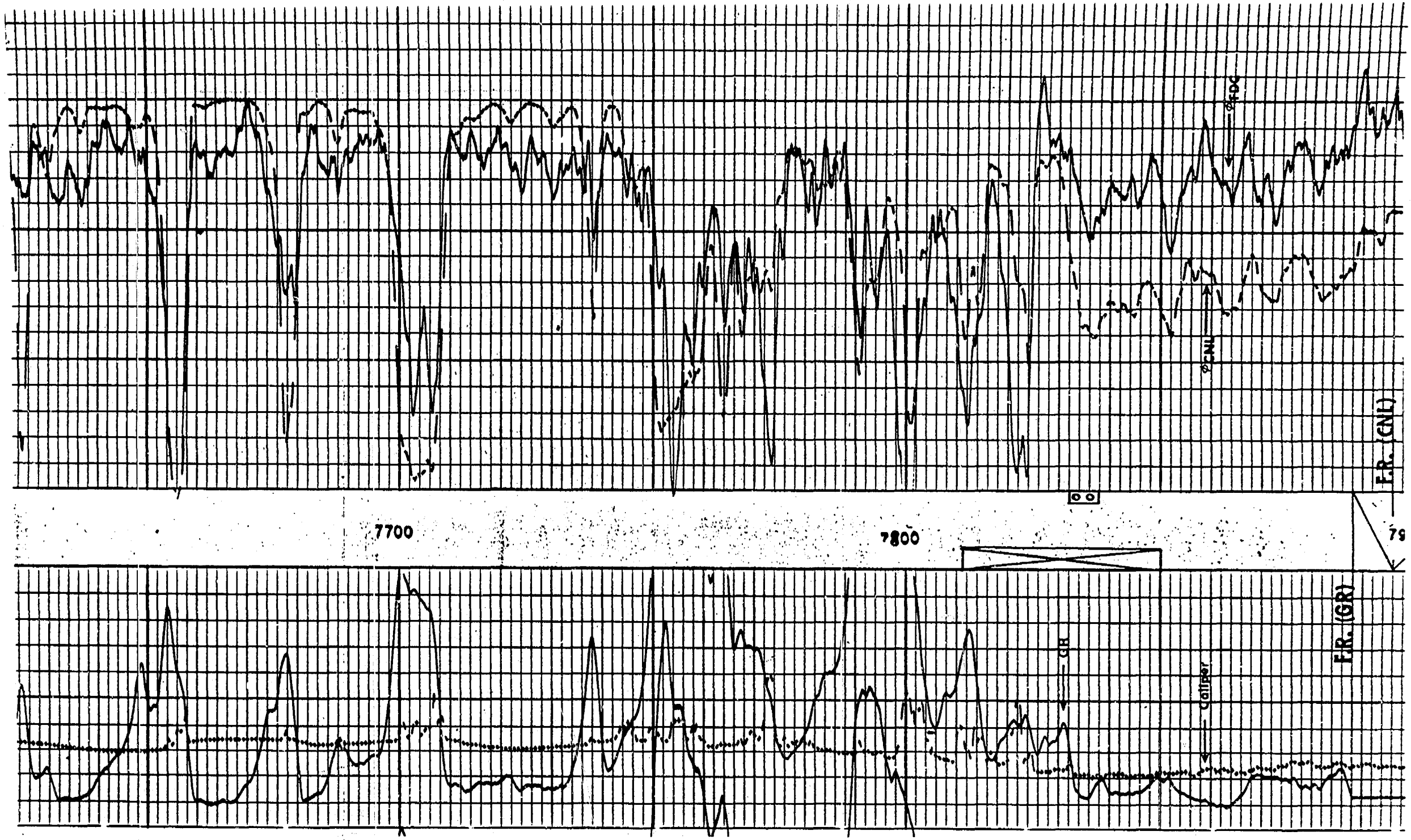
Other Services:
DLL/MSFL

COUNTY ROOSEVELT
FIELD SOUTH PETERSON
LOCATION LAMBIRTH A #2
WELL PHILLIPS PETROLEUM
COMPANY

Permanent Datum: G.L. ; Elev.: 4397
Log Measured From K.B. , 16 Ft. Above Perm. Datum
Drilling Measured From K.B.

Elev.: K.B. 4413
D.F. 4412
G.L. 4397

Date	3-30-79			
Run No.	ONE			
Depth—Driller	7920			
Depth—Logger	7914			
Btm. Log Interval	7912			
Top Log Interval	SURF			
Casing—Driller	8 5/8@3500	@	@	@
Casing—Logger	3503			
Bit Size	7 7/8			
Type Fluid in Hole	SALT GEL			
Dens. | Visc.	10.2 | 40			
pH | Fluid Loss	9.5 | 9.4 ml	ml	ml	ml
Source of Sample	CIRC			
Rm @ Meas. Temp.	.086 @ 72 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	.065 @ 72 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	.13 @ 71 °F	@ °F	@ °F	@ °F
Source: Rmf | Rmc	M | M			
Rm @ BHT	.045 @ 143 °F	@ °F	@ °F	@ °F
TIME Circulation Stopped	0900			
TIME Logger on Bottom	2100			
Max. Rec. Temp.	143 °F	°F	°F	°F
Equip. | Location	7732 | LVLD			
Recorded By	TERRY			


ØFDC
ØCNL
F.R. (CNL)
7700
7800
79
GR
Caliper
F.R. (GR)

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

PHILLIPS PETROLEUM CO.
LAMBIRTH (A) NO. 3
PETERSON FUSSELMAN SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO

DATE : 5-25-79
FORMATION : FUSSELMAN
DRLG. FLUID : SALT GEL
LOCATION : 760' FSL & 1980' FWL, SEC. 31, T-5-S, R-33-E

FILE NO : 3202-11139
ANALYSTS : BASS
ELEVATION : 4424' GL

WHOLE CORE ANALYSIS

SAMPLE NUMBER	DEPTH	PERM. TO AIR (MD) MAXIMUM	PERM. TO AIR (MD) 90 DEG	POR. FLD	FLUID SATS. OIL	FLUID SATS. WTR	DESCRIPTION
	CORE NO. 1 7660.0-7710.0 CUT 50' REC 50'						
	7660.0-10.0						CONG,SH MATRIX,FOSS,DNS
	7710.0-70.0						DRILLED
	CORE NO. 2 7770.0-7819.0 CUT 49' REC 47'						
	7770.0-02.0						LM,SL/SHY,FOSS,DNS
	7802.0-03.0						DOL,SL/SHY,DNS
1	7803.0-04.0	<0.1	<0.1	4.3	36.7	29.1	DOL,LMY,SL/F,STY
2	7804.0-05.0	<0.1	<0.1	2.0	26.5	50.0	DOL,SL/F,STY
	7805.0-07.0						DOL,SL/SHY,DNS
3	7807.0-08.0	<0.1	<0.1	2.7	30.3	30.3	DOL,SL/F,STY
4	7808.0-09.0	<0.1	<0.1	2.4	15.0	50.8	DOL,SL/F,STY
5	7809.0-10.0	<0.1	*	12.9	18.6	44.9	DOL,SHY,SL/F,STY
6	7810.0-11.0	<0.1	*	8.5	22.3	33.9	DOL,SL/F
	7811.0-17.0						LM,SL/SHY,DNS
	7817.0-19.0						LOST CORE
	7819.0-20.0						NOT SUBMITTED FOR ANALYSIS
	CORE NO. 3 7820.0-7824.0 CUT 4' REC 4'						
	7820.0-24.0						CHT,CONG,LM MATRIX,DNS

* INDICATES PLUG PERM

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 8
Submitted by PHILLIPS
Hearing Date 7-8-81

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

Schlumberger

SIMULTANEOUS COMPENSATED NEUTRON-FORMATION DENSITY

COMPANY PHILLIPS PETROLEUM COMPANY

WELL LAMBIRTH #A-3

FIELD SOUTH PETERSON

COUNTY ROOSEVELT STATE NEW MEXICO

COUNTY ROOSEVELT
FIELD SOUTH PETERSON
LOCATION LAMBIRTH #A-3
WELL
COMPANY PHILLIPS PETROLEUM

LOCATION 760' FSL & 1980' FWL

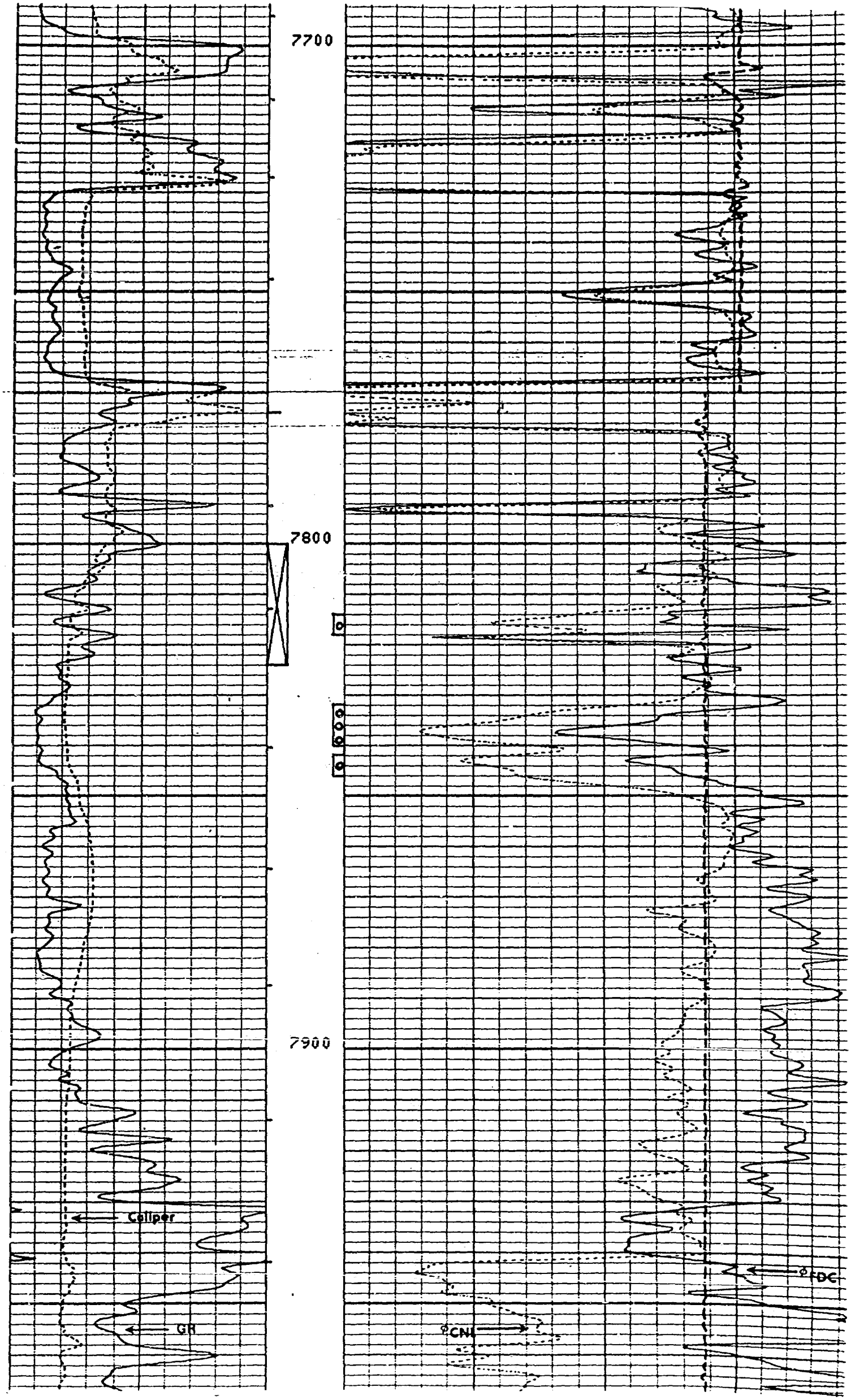
API SERIAL NO.	SEC.	TWP.	RANGE
	31	5-S	33-E

Other Services:
DLL/MSFL
PDC
CYBERLOOK

Permanent Datum: G.L. ; Elev.: 4425
Log Measured From RKB , 16 Ft. Above Perm. Datum
Drilling Measured From RKB

Elev. RK.B. 4441
D.F.
G.L. 4425

Date	5-30-79			6-1-79							
Run No.	ONE			8000							
Depth—Driller	7866			8004							
Depth—Logger	7845			8003							
Btm. Log Interval	7844			SURF							
Top Log Interval	5880			8 5/8 @3500			@			@	
Casing—Driller	8 5/8 @ 3500			3492							
Casing—Logger				7.875							
Bit Size	7.875			SALT MUD							
Type Fluid in Hole	SALT MUD			10.1	39						
Dens. / Visc.	10	41		9.5	5.2 ml			ml			
pH / Fluid Loss	9.5	13.2ml									
Source of Sample	CIRC				@ °F		@ °F			@	
Rm @ Meas. Temp.	.074 @ 68 °F				@ °F		@ °F			@	
Rmf @ Meas. Temp.	.055 @ 68 °F				@ °F		@ °F			@	
Rmc @ Meas. Temp.	.11 @ 68 °F										
Source: Rmf / Rmc	M	C					@ °F			@	
Rm @ BHT	.04 @ 138 °F			.038 @140 °F							
TIME Circulation Stopped	0600										
TIME Logger on Bottom	1100										
Max. Rec. Temp.	138 °F			140 °F				°F			


7700
7800
7900
Caliper
GR
ϕFDC
ϕCNL

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

ENSERCH EXPLORATION INC.
LAMBIRTH NO. 3
WILDCAT
ROOSEVELT COUNTY, NEW MEXICO

DATE: 7-5-78
FORMATION: AS NOTED
DRLG. FLUID: SALT GEL & 3.5% OIL
LOCATION: 1980 FNL & 1980 FEL, SEC. 31, T-5-S, R-33-E

FILE NO: 3202-10814
ENGINEER: DILLARD
ELEVATION: 4394 GL

* INDICATES PLUG PERM S INDICATES PRESERVED SAMPLE

WHOLE CORE ANALYSIS

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7226 Exhibit No. 9
Submitted by PHILLIPS
Hearing Date 7-8-81

CORE NO. 1 7760.0-7806.0 CUT 46' REC 45' FUSSELMAN

7760.0-63.0 LM,ANHY,DENSE,NO SHOW

7763.0-66.0 LM,ANHY,FOSS,DENSE,NO SHOW

7766.0-91.0 LM,ANHY,SL/SHY,DENSE,NO SHOW

7791.0-98.0 SH,CONG

7798.0-7805.0 DOL,SL/SHY,DENSE,NO SHOW

7805.0-7806.0 LOST CORE CORE NO. 2 7806.0-7844.0 CUT 38' REC 38' FUSSELMAN

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
1	7806.0-07.0	16.0	0.1		8.4	15.1	44.8		DOL,LMY,V/F
2	7807.0-08.0	1.6	<0.1		9.0	6.1	51.3		DOL,V/F
3	7808.0-09.0	0.4	0.3		10.5	12.1	50.3		DOL,F
4	7809.0-10.3	<0.1	<0.1		7.7	0.3	71.9		DOL,SL/F
5	7810.3-12.0	0.1	<0.1		7.2	0.4	61.0		DOL,SL/F
6	7812.0-13.3	0.1	*		14.8	1.7	70.9		DOL,V/F
7	7813.3-14.5	5.6	1.7		13.7	4.6	64.0		DOL,LMY,V/F,CHT
8	7814.5-16.5	<0.1	<0.1		6.6	3.0	66.7		DOL,V/F,CHT
9	7816.5-17.5	<0.1	*		5.7	2.9	72.0		DOL,SHY,F,STY
10	7817.5-18.8	0.4	*		15.5	12.0	33.6		DOL,SHY,F
11	7818.8-20.4	5.7	0.8		11.4	7.6	63.0		DOL,SHY,F,SL/V

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CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

ENSERCH EXPLORATION INC.
LAMBIRTH NO. 3

DATE: 7-5-78
FORMATION: AS NOTED

FILE NO: 3202-10814
ENGINEER: DILLARD

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX. FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
12	7820.4-21.6	0.4	0.4		10.5	29.3	30.8		DOL,SHY,F,SL/V
13	7821.6-22.6	0.4	0.2		9.6	9.9	59.3		DOL,F
14	7822.6-24.0	14.0	0.6		12.2	16.7	44.1		DOL,SHY,F,STY
15	7824.0-25.7	0.2	0.1		9.6	23.0	27.8		DOL,F,SHR,STY
16	7825.7-26.7	0.9	0.6		12.0	23.6	29.8		DOL,LMY,SL/F
17	7826.7-28.2	5.7	3.2		11.0	15.5	38.7		DOL,F,V,
18	7828.2-29.8	1.1	0.5		12.0	20.9	48.3		DOL,F,SL/V,STY
19	7829.8-31.2	0.3	0.2		8.7	31.5	28.6		DOL,F,STY
20	7831.2-32.7	7.4	2.1		11.4	35.2	38.0		DOL,LMY,SHY,F,SL/V
21	7832.7-33.8	0.6	0.4		15.3	17.8	44.7		DOL,LMY,F,STY
22	7833.8-34.8	0.4	0.4		13.4	27.9	31.8		DOL,LMY,SHY,F,STY
23	7834.8-36.3	0.6	0.5		17.6	28.3	34.1		DOL,F
24	7836.3-38.0	0.4	0.3		15.4	19.6	46.3		DOL,LMY,SHY,F,STY
25	7838.0-39.0	0.4	0.2		13.0	12.0	49.9		DOL,LMY,F,STY
26	7839.0-40.8	0.5	0.4		12.2	19.2	39.1		DOL,LMY,F,FOSS,STY
27	7840.8-42.6	0.5	0.4		14.8	24.6	32.7		DOL,LMY,F,STY
28	7842.6-44.0	0.3	*		14.9	26.3	33.8		DOL,LMY,V/F
	CORE NO. 3	7844.0-7882.0	CUT 38'	REC 22'	FUSSELMAN				
29	7844.0-45.3	0.5	0.3		11.9	18.5	45.1		DOL,LMY,ANHY,SL/F STY
30	7845.3-46.7	0.6	0.6		18.3	24.2	38.9		DOL,LMY
31	7846.7-47.8	1.2	0.5		15.4	13.2	47.0		DOL,LMY,SL/F
32	7847.8-48.8	17.0	1.8		11.8	19.8	28.6		DOL,LMY,ANHY,F
33	7848.8-50.3	1.2	1.0		13.2	19.1	27.7		DOL,LMY,ANHY,SL/F
34	7850.3-51.9	1.0	0.6		19.5	32.6	33.3		DOL,LMY,SHY,ANHY SL/F
35	7851.9-53.3	0.5	0.5		17.9	11.5	46.0		DOL,LMY,ANHY,SL/F
36	7853.3-55.0	1.1	0.5		17.2	17.6	42.0		DOL,LMY,SHY,ANHY SL/F
37	7855.0-56.1	0.2	0.1		16.5	27.1	40.5		DOL,LMY,ANHY,SL/F

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CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

ENSERCH EXPLORATION INC.
LAMBIRTH NO. 3

DATE: 7-5-78
FORMATION: AS NOTED

FILE NO: 3202-10814
ENGINEER: DILLARD

SMP. NO.	DEPTH	PERM. TO AIR MD. MAXIMUM	90 DEG	VERT.	POROSITY GEX.	FLD.	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
38	7856.1-57.0	<0.1	*		7.2		5.4	58.9		DOL,LMY,SHY,ANHY SL/F
39	7857.0-58.0	<0.1	<0.1		7.6		3.3	66.5		DOL,LMY,SHY,ANHY SL/F,STY
40	7858.0-59.1	0.4	0.4		13.9		18.4	44.6		DOL,LMY,SHY,ANHY,STY SL/F
41	7859.1-60.9	2.2	1.2		12.7		23.2	33.5		DOL,LMY,SHY,ANHY,STY SL/F
42	7860.9-62.7	0.4	0.2		14.4		8.2	59.9		DOL,LMY,SL/F
43	7862.7-64.4	2.9	1.6		12.5		18.7	34.7		DOL,LMY,ANHY,F,STY
44	7864.4-66.0	10.0	9.6		16.3		16.9	39.9		DOL,LMY,SDY,ANHY,F STY
	7866.0-82.0 LOST CORE									

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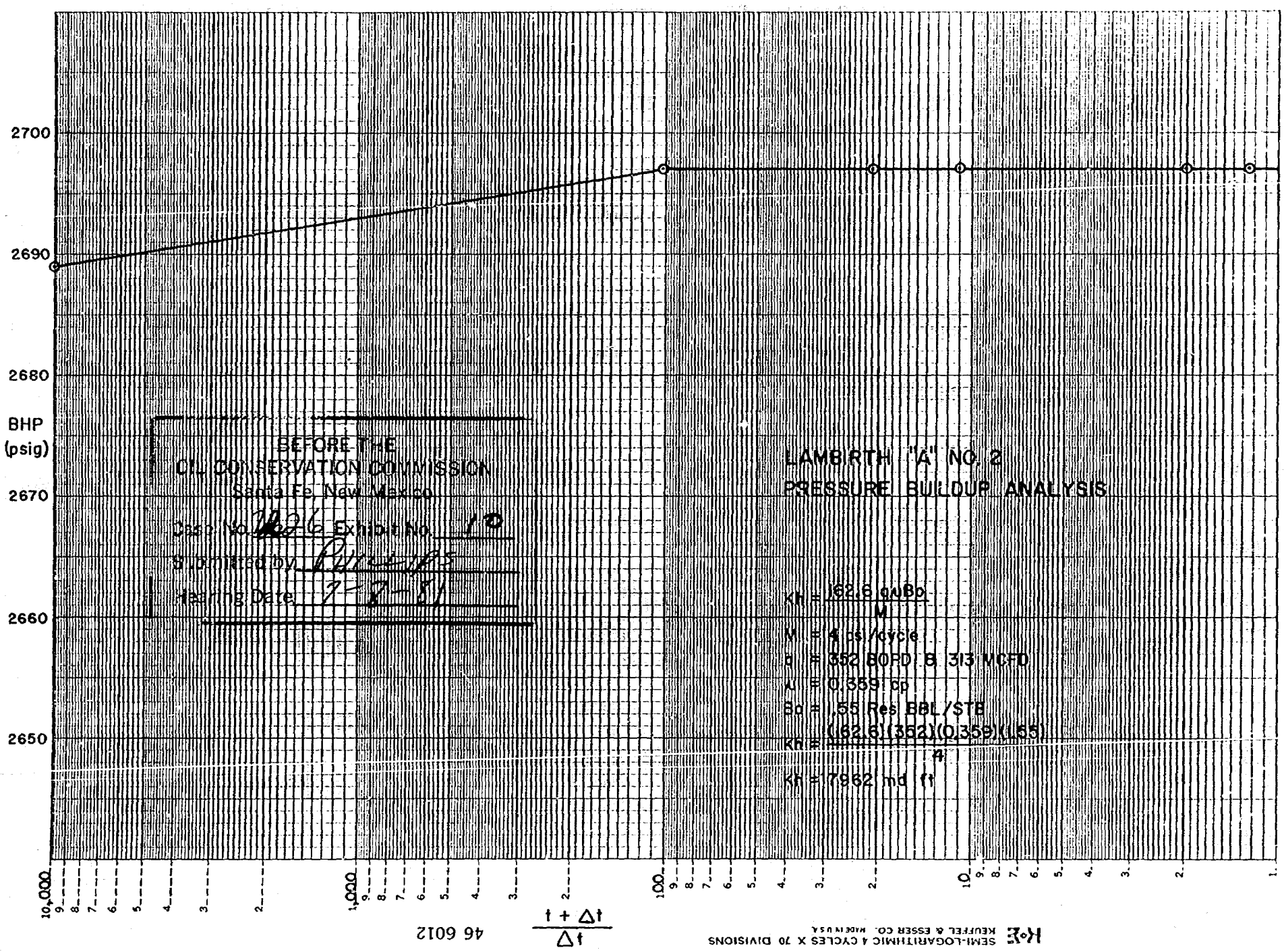

2700
2690
2680
BHP
(psig)
2670
2660
2650
BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 4926 Exhibit No. 10
Submitted by Pure Petr.
Hearing Date 7-12-61
LAMBIRTH "A" NO. 2
PRESSURE BUILDUP ANALYSIS
KH = 162.6 qμBo / M
M = 4 cs/cycle
q = 352 BOPD & 313 MCFD
μ = 0.359 cp
Bo = 1.55 Res BBL/STB
KH = (162.6)(352)(0.359)(1.55) / 4
KH = 7962 md ft
10,000
1,000
100
10
t + Δt / Δt
46 6012
KEUFFEL & ESSER CO. MADE IN U.S.A.
SEMI-LOGARITHMIC 4 CYCLES X 70 DIVISIONS

INJECTIVITY TEST
PETERSON "H" NO. 1
2 7/8" 6.5#/FT TUBING
8.4#/GAL. FLUID

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 7221 Exhibit No. 11
Submitted by Phillips
Hearing Date 9-8-81

PRESSURE (PSIG)

2400
2200
2000
1800
1600
1400
1200
1000

Wellhead Injection Pressure

Wellhead Injection Pressure - Tubing Friction

Instantaneous Wellhead Shutdown Pressure

5 Min. Shutdown Pressures

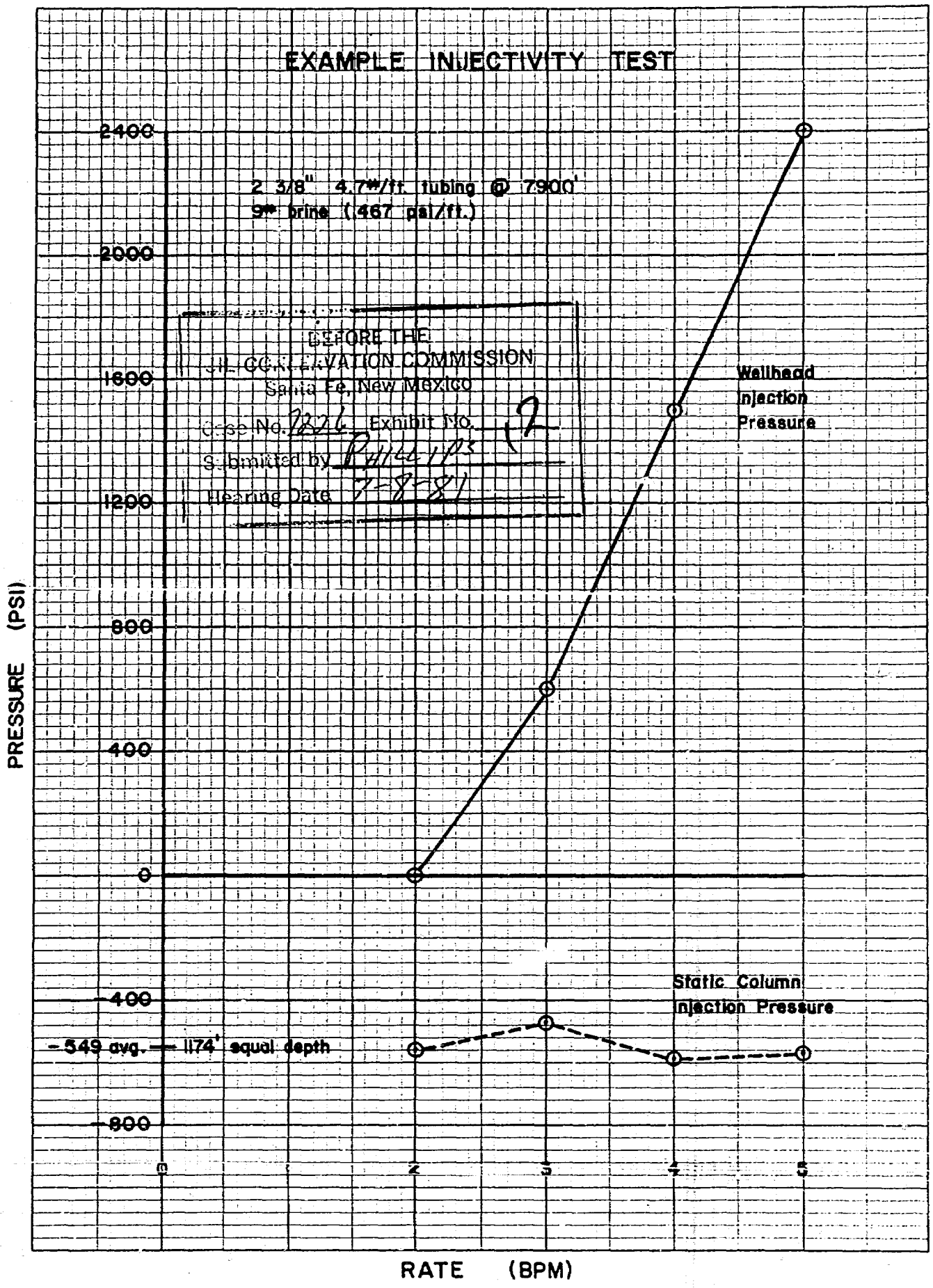
0.0 0.5 1.0 1.5 2.0 2.5 3.0

RATE (BPM)

46 0782
K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0782

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.



Docket No. 20-81

Dockets Nos. 22-81 and 23-81 are tentatively set for July 15 and 29, 1981. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - THURSDAY - JULY 2, 1981

9 A.M. - OIL CONSERVATION DIVISION CONFERENCE ROOM, STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Richard L. Stamets, Examiner, or Daniel S. Nutter, Alternate Examiner:

CASE 7283: Application of Harvey E. Yates Company for amendment of Division Order No. R-6382, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Division Order No. R-6382 to provide that said order authorizing the McDonald Unit Agreement shall have an effective date of June 1, 1981.

CASE 7284: Application of Energy Reserves Group, Inc. for an unorthodox gas well location, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox Cisco location of its Miller Well No. 1 located 660 feet from the South and West lines of Section 12, Township 6 South, Range 33 East, the S/2 of said Section 12 to be dedicated to the well.

CASE 7285: Application of J. C. Williamson for two non-standard gas proration units and two unorthodox locations, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for two non-standard 320-acre Wolfcamp gas proration units in Section 10, Township 23 South, Range 34 East, the first comprising the NW/4, W/2 NE/4, and N/2 SW/4, and the second comprising the E/2 NE/4, S/2 SW/4, and SE/4. Applicant further seeks approval for two unorthodox locations, the first for a well drilled 1560 feet from the North line and 1830 feet from the West line of said Section 10, and the second for a well to be drilled 1980 feet from the South and East lines of the section.

CASE 7286: Application of Supron Energy Corporation for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Basin-Dakota and Blanco Mesaverde production in the wellbore of its Jicarilla F Well No. 6 located in the SW/4 of Section 34, Township 26 North, Range 4 West.

CASE 7287: Application of Benson-Montin-Greer Drilling Corporation for compulsory pooling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the West Puerto Chiquito-Mancos Oil Pool underlying a previously approved 640-acre non-standard proration unit comprising the W/2 of Section 17 and the W/2 of Section 20, Township 26 North, Range 1 West, to be dedicated to a well to be drilled thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7288: Application of Southern Union Exploration Company of Texas for contraction of the West Puerto Chiquito-Mancos Oil Pool, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks the contraction of the West Puerto Chiquito-Mancos Oil Pool by the deletion of Section 36, Township 24 North, Range 1 West, therefrom.

CASE 7251: (Continued from June 3, 1981, Examiner Hearing)

Application of Southern Union Exploration Company of Texas for compulsory pooling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the West Puerto Chiquito-Mancos Oil Pool underlying all of Section 36, Township 24 North, Range 1 West, to be dedicated to its Mobil Federal Well No. 1 drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7289: Application of Exxon Corporation for a salt water disposal well, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Queen formation at a depth of 2638 feet to 2774 feet in its Strange Federal Well No. 3 in Unit J of Section 25, Township 7 South, Range 31 East, Tomahawk-San Andres Pool.

CASE 7290: Application of Yates Petroleum Corporation for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Abo formation underlying the NE/4 of Section 26, Township 5 South, Range 24 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7291: Application of ARCO Oil and Gas Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Silurian and Fusselman formations underlying the N/2 of Section 6, Township 25 South, Range 37 East, Custer Field, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7292: Application of ARCO Oil and Gas Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Devonian thru Ellenburger formations underlying the S/2 of Section 6, Township 25 South, Range 37 East, Custer Field, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7293: Application of ARCO Oil and Gas Company for an amendment to Order No. R-6649, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an amendment to Division Order No. R-6649 which authorized compulsory pooling in Section 33, Township 22 South, Range 36 East, Langlie Field, to extend to February 1, 1982, the commencement of drilling required in said order.

CASE 7294: Application of ARCO Oil and Gas Company for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Seven Rivers-Queen formation at a depth of 2996 feet to 3186 feet in its R. S. Crosby Well No. A-2 located in Unit L of Section 28, Township 25 South, Range 37 East, Langlie Mattix Pool.

CASE 7248: (Continued from June 3, 1981, Examiner Hearing)

Application of Inexco Oil Company for pool creation, special pool rules, and an oil discovery allowable, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new Wolfcamp oil pool for its Federal 10 State Com. Well No. 1 located in Unit L of Section 10, Township 21 South, Range 26 East, and the promulgation of special rules therefor, including provisions for 160-acre spacing. Applicant further seeks the assignment of approximately 42,290 barrels of discovery allowable to the aforesaid well.

CASE 7280: (Continued from June 17, 1981, Examiner Hearing)

Application of Northwest Pipeline Corporation for a dual completion and downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks authority to dually complete its Rosa Unit Well No. 77 located in Unit L of Section 33, Township 31 North, Range 5 West, to produce gas from the Mesaverde formation and commingled Gallup and Dakota production through separate strings of tubing.

CASE 7295: Application of Gulf Oil Corporation for rescission of Division Order No. R-2429-C, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the rescission of Division Order No. R-2429-C which authorized 320-acre spacing units in the White City-Pennsylvanian Gas Pool. Applicant seeks the reinstatement of 640-acre spacing units in said pool with provision for 320-acre infill drilling and appropriate findings relative thereto.

CASE 7296: Application of J. Gregory Merrion and Robert L. Bayless for amendment of pool rules, contraction of the Otero-Gallup Pool, and extension of the Devils Fork-Gallup Associated Pool, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of the Devils Fork-Gallup Associated Pool Rules to provide for 160-acre spacing rather than 80 acres. Applicant further seeks the contraction of the Otero-Gallup Pool by the deletion of the following acreage: E/2 and NE/4 SW/4 of Section 2, Township 24 North, Range 6 West, and the E/2 of Section 35, Township 25 North, Range 6 West. Applicant seeks the extension of the Devils Fork-Gallup Associated Pool to include the following acreage: In Township 24 North, Range 6 West: All of Sections 2 and 3; S/2 and NE/4 of Section 4; S/2 of Section 5; S/2 of Section 6; and N/2 of Section 11. In Township 25 North, Range 6 West: SE/4 of Section 33; S/2 of Section 34; and all of Section 35.

CASE 7297: (This case will be dismissed.)

Application of Amoco Production Company for an NGPA determination, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a new onshore reservoir determination in the Morrow formation for its Alley Unit Well No. 1 in Unit E of Section 1, Township 19 South, Range 25 East.

CASE 7298: (This case will be dismissed.)

Application of Amoco Production Company for an NGPA determination, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a new onshore reservoir determination in the Morrow formation for its Lancaster Springs Com Well No. 1 in Unit I of Section 1, Township 22 South, Range 26 East.

CASE 7299: (This case will be dismissed.)

Application of Amoco Production Company for an NGPA determination, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a new onshore reservoir determination in the Morrow formation for its State IL Com Well No. 1 in Unit G of Section 3, Township 19 South, Range 24 East.

CASE 7300: Application of Dome Petroleum Corporation for designation of a tight formation, Sandoval County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Chacra formation underlying portions of Townships 21 and 22 North, Ranges 5, 6, and 7 West, containing 73,018 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271.701-705.

CASE 7301: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating, redesignating, and extending vertical and horizontal limits of certain pools in Chaves, Eddy, Lea, and Roosevelt Counties, New Mexico:

(a) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Morrow production and designated as the East Lusk-Morrow Gas Pool. The discovery well is Grace Petroleum Corporation West Tonto Federal Com Well No. 1 located in Unit L of Section 24, Township 19 South, Range 32 East, NMPM. Said pool would comprise:

TOWNSHIP 19 SOUTH, RANGE 32 EAST, NMPM
Section 24: W/2

(b) CREATE a new pool in Roosevelt County, New Mexico, classified as an oil pool for Mississippian production and designated as the Peterson-Mississippian Pool. The discovery well is Enserch Exploration, Inc. Finley Well No. 1 located in Unit A of Section 6, Township 5 South, Range 33 East, NMPM. Said pool would comprise:

TOWNSHIP 4 SOUTH, RANGE 33 EAST, NMPM
Section 28: SW/4
Section 29: S/2
Section 32: W/2

TOWNSHIP 5 SOUTH, RANGE 33 EAST, NMPM
Section 5: NW/4
Section 6: NE/4

(c) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Wolfcamp production and designated as the Salado Draw-Wolfcamp Gas Pool. The discovery well is Amoco Production Company State GR Well No. 1 located in Unit G of Section 17, Township 26 South, Range 33 East, NMPM. Said pool would comprise:

TOWNSHIP 26 SOUTH, RANGE 33 EAST, NMPM
Section 17: E/2

(d) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Strawn production and designated as the Talco-Strawn Gas Pool. The discovery well is American Trading and Producing Corporation Talco Unit Well No. 1 located in Unit H of Section 11, Township 26 South, Range 35 East, NMPM. Said pool would comprise:

TOWNSHIP 26 SOUTH, RANGE 35 EAST, NMPM
Section 11: E/2

(e) REDESIGNATE the Lusk-Seven Rivers Pool in Lea County, New Mexico, to the North Lusk-Seven Rivers Pool described as:

TOWNSHIP 19 SOUTH, RANGE 32 EAST, NMPM
Section 3: All

(f) EXTEND the vertical limits of the Lusk-Yates Pool in Eddy and Lea Counties, New Mexico, to include the Seven Rivers formation and redesignate pool as the Lusk Yates-Seven Rivers Pool described as:

TOWNSHIP 19 SOUTH, RANGE 31 EAST, NMPM
Section 24: All

TOWNSHIP 19 SOUTH, RANGE 32 EAST, NMPM
Section 19: W/2 and W/2 NE/4

(g) EXTEND the Angell Ranch Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 27 EAST, NMPM
Section 11: S/2
Section 14: All

TOWNSHIP 19 SOUTH, RANGE 28 EAST, NMPM
Section 32: S/2

(h) EXTEND the Antelope Ridge-Atoka Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 34 EAST, NMPM
Section 2: W/2 and NE/4
Section 11: W/2

(i) EXTEND the Atoka-Yeso Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 26 EAST, NMPM
Section 26: NW/4 SW/4
Section 33: S/2 SE/4

TOWNSHIP 19 SOUTH, RANGE 26 EAST, NMPM
Section 4: NW/4 NE/4

(j) EXTEND the Boyd-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 24 EAST, NMPM
Section 34: S/2

TOWNSHIP 18 SOUTH, RANGE 25 EAST, NMPM
Section 34: E/2

TOWNSHIP 19 SOUTH, RANGE 24 EAST, NMPM
Section 3: All
Section 10: N/2
Section 11: W/2

(k) EXTEND the Bull's Eye-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 28 EAST, NMPM
Section 12: N/2 SE/4

TOWNSHIP 8 SOUTH, RANGE 29 EAST, NMPM
Section 7: N/2 SW/4

(l) EXTEND the South Culebra Bluff-Bone Springs Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM
Section 27: N/2 NE/4

(m) EXTEND the Dublin Ranch-Atoka Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 28 EAST, NMPM
Section 33: N/2

(n) EXTEND the East Eagle Creek Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 26 EAST, NMPM
Section 30: N/2

(o) EXTEND the Southwest Eunice-San Andres Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
Section 17: NE/4

(p) EXTEND the Gem-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 33 EAST, NMPM
Section 31: E/2

(q) EXTEND the Gladiola-Wolfcamp Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 12 SOUTH, RANGE 38 EAST, NMPM
Section 20: NE/4
Section 21: N/2

(r) EXTEND the Grayburg Jackson Seven Rivers-Queen-Grayburg-San Andres Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 31 EAST, NMPM
Section 1: W/2 SW/4

(s) EXTEND the North Illinois Camp-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM
Section 16: E/2

(t) EXTEND the Langlie Mattix Seven Rivers-Queen-Grayburg Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
Section 31: SW/4

(u) EXTEND the North Loving-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM
Section 7: S/2

(v) EXTEND the West Nadine-Blinebry Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 38 EAST, NMPM
Section 5: E/2
Section 8: NE/4

(w) EXTEND the East Red Lake Queen-Grayburg Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 16 SOUTH, RANGE 28 EAST, NMPM
Section 25: W/2 NE/4 and NW/4 SE/4

(x) EXTEND the Richard Knob Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 25 EAST, NMPM
Section 9: N/2

(y) EXTEND the West Sawyer-San Andres Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 9 SOUTH, RANGE 37 EAST, NMPM
Section 16: S/2

(z) EXTEND the Scharb-Wolfcamp Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 35 EAST, NMPM
Section 5: E/2

(aa) EXTEND the Tomahawk-San Andres Pool in Roosevelt County, New Mexico, to include therein:

TOWNSHIP 7 SOUTH, RANGE 32 EAST, NMPM
Section 19: NW/4

(bb) EXTEND the Wantz-Abo Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
Section 11: SW/4
Section 14: NW/4

****

Docket No. 21-81

DOCKET: COMMISSION HEARING - WEDNESDAY - JULY 8, 1981

OIL CONSERVATION COMMISSION - 9 A.M. - ROOM 205
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

CASE 7226: (DE NOVO)

Application of Enserch Exploration, Inc. for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Montoya formation in the interval from 7902 feet to 7930 feet in its Rader Well No. 2 in Unit E of Section 32, Township 5 South, Range 33 East.

Upon application of Enserch Exploration, Inc. this case will be heard De Novo pursuant to the provisions of Rule 1220.

CASE 7275: (Continued from June 17, 1981, Examiner Hearing)

Application of S. P. Yates for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp-Pennsylvanian formations underlying the N/2 of Section 21, Township 19 South, Range 27 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7270: (Continued from June 17, 1981, Examiner Hearing)

Application of Southland Royalty Company for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp and Pennsylvanian formations underlying the N/2 of Section 21, Township 19 South, Range 27 East, to be dedicated to its Pecos River Federal 21-A Com Well No. 1 drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CAMPBELL, BYRD & BLACK, P.A.
LAWYERS

JACK M. CAMPBELL
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June 16, 1981

RECEIVED
JUN 16 1981
OIL CONSERVATION DIVISION
SANTA FE

Mr. Joe D. Ramey
Director
Oil Conservation Division
New Mexico Department of
Energy and Minerals
Post Office Box 2088
Santa Fe, New Mexico 87501

Re: Case No. 7226; Order No. R-6658: Application of Enserch Exploration, Inc. for Salt Water Disposal, Roosevelt County, New Mexico

Dear Mr. Ramey:

Enclosed for filing in the above-referenced case is the application of Enserch Exploration, Inc. for Hearing De Novo.

We would appreciate this matter being set for hearing at the earliest possible date.

Very truly yours,

William F. Carr

WFC:lr

Enclosures

cc: Ms. Laura Catching
Mr. Daniel C. Renoult
Mr. W. Thomas Kellahin

BEFORE THE

OIL CONSERVATION DIVISION

NEW MEXICO DEPARTMENT OF ENERGY AND MINERALS

RECEIVED
JUN 10 1981
OIL CONSERVATION DIVISION
SANTA FE

IN THE MATTER OF THE APPLICATION OF ENSERCH EXPLORATION, INC. FOR SALT WATER DISPOSAL, ROOSEVELT COUNTY, NEW MEXICO.

Case 7226
Order No. R-6658

APPLICATION FOR HEARING DE NOVO

Comes now ENSERCH EXPLORATION, INC., by and through its undersigned attorneys, Campbell, Byrd & Black, P.A., and pursuant to Commission Rule 1220 hereby applies to the Commission for a Hearing De Novo in the above-captioned cause.

Respectfully submitted,

CAMPBELL, BYRD & BLACK, P.A.

By William F. Carr

William F. Carr
Post Office Box 2208
Santa Fe, New Mexico 87501
Attorneys for Enserch
Exploration, Inc.

BEFORE THE

OIL CONSERVATION DIVISION

NEW MEXICO DEPARTMENT OF ENERGY AND MINERALS

RECEIVED
JUN 16 1981
OIL CONSERVATION DIVISION
SANTA FE

IN THE MATTER OF THE APPLICATION OF ENSERCH EXPLORATION, INC. FOR SALT WATER DISPOSAL, ROOSEVELT COUNTY, NEW MEXICO.

Case 7226
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Respectfully submitted,

CAMPBELL, BYRD & BLACK, P.A.

By_____
William F. Carr
Post Office Box 2208
Santa Fe, New Mexico 87501
Attorneys for Enserch Exploration, Inc.

BEFORE THE

OIL CONSERVATION DIVISION

NEW MEXICO DEPARTMENT OF ENERGY AND MINERALS

RECEIVED
JUN 16 1981
OIL CONSERVATION DIVISION
SANTA FE

IN THE MATTER OF THE APPLICATION OF ENSERCH EXPLORATION, INC. FOR SALT WATER DISPOSAL, ROOSEVELT COUNTY, NEW MEXICO.

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Respectfully submitted,

CAMPBELL, BYRD & BLACK, P.A.

By_____
William F. Carr
Post Office Box 2208
Santa Fe, New Mexico 87501
Attorneys for Enserch Exploration, Inc.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 7226 DE NOVO
Order No. R-6685-A

APPLICATION OF ENSERCH EXPLORATION INC. FOR SALT WATER DISPOSAL, ROOSEVELT COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on July 8, 1981, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this _____ day of _____, 1981, the Commission, a quorum being present, having considered the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Enserch Exploration Inc., seeks an Order to utilize its Rader well No. 2, located in Unit E, of Section 32, Township 5 South, Range 33 East, NMPM, South Peterson Field, Roosevelt County, New Mexico, to dispose of produced salt water into the Montoya formation, with injection into the perforated interval from approximately 7902 feet to 7930 feet.

(3) That the matter came on for hearing at 9 a.m. on April 22, 1981, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter and, pursuant to this hearing, Order No. R-6685 was issued on May 20, 1981, which denied the application of Enserch.

(4) That on June 16, 1981, application for Hearing De Novo was made by Ensearch Exploration, Inc., and the matter was set for hearing before the Commission.

(5) That the matter came on for hearing de novo on July 8, 1981.

(6) That the evidence adduced at said hearing indicates that Division Order No. R-6685 entered May 20, 1981, should be affirmed.

IT IS THEREFORE ORDERED:

(1) That Division Order No. R-6685, entered May 20, 1981, is hereby affirmed.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

ALEX J. ARMIJO, Member

EMERY C. ARNOLD, Member

JOE D. RAMEY, Member & Secretary

S E A L

fd/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
8 July 1981

COMMISSION HEARING

IN THE MATTER OF:

Application of Enserch Exploration, Inc., for salt water disposal, Roosevelt County, New Mexico. CASE 7226

BEFORE: Commissioner Ramey
Commissioner Arnold

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: W. Perry Pearce, Esq.
Ernest L. Padilla, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: William F. Carr, Esq.
CAMPBELL, BYRD, & BLACK P.A.
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Santa Fe, New Mexico 87501

For Phillips Petroleum: W. Thomas Kellahin, Esq.
KELLAHIN & KELLAHIN
500 Don Gaspar
Santa Fe, New Mexico 87501

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MR. RAMEY: The hearing will come to order.

We'll consider first Case 7226.

MR. PEARCH: The application of Enserch Exploration, Incorporated, for salt water disposal, Roosevelt County, New Mexico.

MR. RAMEY: Ask for appearances.

MR. CARR: May it please the Commission, my name is William F. Carr, with the law firm of Campbell, Byrd, and Black, P.A., Santa Fe, New Mexico, appearing on behalf of Enserch Exploration, Inc.

I have two witnesses.

MR. KELLAHIN: I'm Tom Kellahin of Kellahin and Kellahin, Santa Fe, appearing on behalf of Phillips Petroleum Company, in association with Mr. Joe Peacock, attorney for Phillips, and I have two witnesses.

(Witnesses sworn.)

MR. CARR: At this time I would call Daniel Renoult.

DANIEL C. RENOULT

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Will you state your name and place of residence?

A. My name is Daniel C. Renoult and I work with Enserch Exploration, Inc., in Midland, Texas.

Q. And you are employed by Enserch in what capacity?

A. District Petroleum Engineer.

Q. Have you previously testified before this Commission or one of its examiners and had your credentials as a petroleum engineer accepted and made a matter of record?

A. Yes, sir.

Q. Are you familiar with the application filed by Enserch in this case?

A. Yes, sir.

Q. Are you familiar with the subject wells and the pools that are involved in this application?

A. Yes, sir.

MR. CARR: Are the witness' qualifications

acceptable?

MR. RAMEY: They are.

Q. Mr. Renoult, will you briefly state what Enserch seeks with this application?

A. Enserch is applying to dispose of salt water in the Montoya formation in the Enserch Rader Well No. 2, located in Section 32 of Township 5 S, Range 33 E, in Roosevelt County, New Mexico.

Q. Have you prepared certain exhibits for introduction in this case?

A. Yes, sir.

Q. Will you please refer to what has been marked for identification as Enserch Exhibit Number One, explain to the Commission what it is and what it shows?

A. Exhibit Number One is the application of Enserch to dispose of salt water in the Rader Well No. 2. This well is a dry hole. The Fusselman and Peterson lime formations were tested in the subject well and proved to be unproductive.

The well is currently perforated from 7800 feet -- from 7848 to 7851.

Q. Mr. Renoult, did you recommend the disposal of produced waters in this well?

A. Yes, sir.

Q. And in what zone did you recommend the injection?

A. Montoya formation.

Q. What was your recommendation based upon?

A. The recommendation is based on injectivity test in the Montoya formation.

Q. Is this a continuous zone throughout the area?

A. Yes, sir.

Q. And is the Montoya a producing interval in any of the pools or in any of the wells in the area?

A. No, sir.

Q. How much would this zone take, how much water?

A. Based on maximum gradient of point two psi per foot, we would be allowed to dispose of 5926 barrels of water per day; however, we anticipate to dispose only 750 barrels per day in the subject well.

Q. Mr. Renoult, how much water did Enserch originally anticipate disposing in this well?

A. We applied in April, 1981, for 1650 barrels of water per day.

Q. And what accounts for the reduction in the amount of water you're proposing to inject?

A. The previous volume was taking into account the water produced by Phillips Petroleum in the subject field and we revised our volume considering only the water produced by Enserch Exploration, Inc.

Q. So this 750 barrel per day figure reflects only water produced from Enserch wells in the area?

A. Yes, sir.

Q. Did you check the area for other wells to determine if they were suitable for salt water disposal?

A. Yes, sir.

Q. And which wells did you look at?

A. I looked at the offset wells in the subject area, and also I know that there is one well in Section 18 which is used a salt water disposal well. This well is the Amoco Swearingen "C" No. 2. Amoco is disposing water in the Fusselman formation in this specific well.

Q. What field is that in?

A. Peterson.

Q. Are you aware of any other well in the area in which produced waters are being injected?

A. Not in the vicinity of the proposed location.

MR. CARR: May it please the Commission, the application we originally filed in this case indicated

that there were other wells in the area being used as salt water disposal. Other than this one well that Mr. Renoult has just testified to, Enserch is aware of no other disposal wells, and we want to be certain that the application is not misleading in that regard.

Q. Mr. Renoult, will you now -- are you aware of any efforts that were undertaken at any time jointly by Phillips and Enserch to consider disposal of produced waters in this area?

A. Enserch was considering disposing of water in the Enserch Lambirth Well No. 5 in Section 1. The Glorieta formation proved to be tight in this subject well and --

MR. KELLAHIN: I'm sorry, Mr. Renoult, what formation?

A. The Glorieta. And Enserch didn't go further into considering disposing of water in the subject well.

Q. Are you aware of any efforts to dispose of produced waters in the Lambirth No. 2 Well?

A. The Lambirth No. 2 Well is a dry hole and based on the unsuccessful attempt in No. 5, we didn't consider disposing water in this well.

MR. RAMEY: Where is this well you're

talking about?

A. It's in Section 1. It's approximately --

MR. RAMEY: I found the No. 5 in Section 1 but where is the No. 2? Is that just to the west of --

MR. CARR: Immediately below the No. 4 in the southeast of the southwest quarter, I believe.

MR. RAMEY: Okay.

A. The surface location of the No. 2 is in Section 1 and the bottom hole location is in Section 31. It's approximately 5000 feet from the proposed Enserch Rader Well No. 2, the dry hole indicated in Section 31.

MR. CARR: It is immediately below the 3-A in the southeast of the southwest of Section 31.

Q. Mr. Renoult, will you now refer to what has been marked for identification as Enserch Exhibit Number Two and review the data contained thereon?

A. Exhibit Number Two is a plat showing Enserch acreage shaded in gray of the subject area. The half mile radius from the proposed Enserch Rader Well No. 2 is indicated on this exhibit.

The proposed Enserch Rader Well No. 2 is currently perforated through the Montoya dolomite from 7902 to 7930, -3503 feet to -3531 feet subsea.

The Enserch Rader Well No. 1, located

talking about?

A. It's in Section 1. It's approximately --

MR. RAMEY: I found the No. 5 in Section 1 but where is the No. 2? Is that just to the west of --

MR. CARR: Immediately below the No. 4 in the southeast of the southwest quarter, I believe.

MR. RAMEY: Okay.

A. The surface location of the No. 2 is in Section 1 and the bottom hole location is in Section 31. It's approximately 5000 feet from the proposed Enserch Rader Well No. 2, the dry hole indicated in Section 31.

MR. CARR: It is immediately below the 3-A in the southeast of the southwest of Section 31.

Q. Mr. Renoult, will you now refer to what has been marked for identification as Enserch Exhibit Number Two and review the data contained thereon?

A. Exhibit Number Two is a plat showing Enserch acreage shaded in gray of the subject area. The half mile radius from the proposed Enserch Rader Well No. 2 is indicated on this exhibit.

The proposed Enserch Rader Well No. 2 is currently perforated through the Montoya dolomite from 7902 to 7930, -3503 feet to -3531 feet subsea.

The Enserch Rader Well No. 1, located

1650 feet to the south is a dry hole. This well was drilled and abandoned in July, 1979.

The Phillips Petroleum Lambirth "A" Well No. 4, located 1750 feet to the northwest of the proposed location, is completed through the Fusselman formation from 7814 to 7828. This corresponds to a subsea depth of -3423 feet to -3437 feet subsea.

The lowermost perforation in the Phillips Lambirth "A" Well No. 4 is 66 feet high to the uppermost perforation in the Enserch Rader Well No. 2.

The third offset well within the half mile radius is the Enserch Lambirth Well No. 3. This well is located 2500 feet west of the proposed Rader Well No. 2.

This well was recompleted from the Fusselman formation to the Penn formation in October, 1978.

Also, just outside the half mile radius is the Phillips Petroleum Peterson "H" Well No. 1, located approximately 2600 feet north of the subject Rader No. 2.

This well is a dry hole.

Q. And this exhibit is color coded to indicate the producing zone in each of the wells producing in the area, is that correct?

A. Yes, sir. The green dot indicates the wells which produce from the Penn and the blue dot the wells

which produce from the Fusselman formation.

One well in this field produces from both formations, the Enserch Lambirth Well No. 3.

Q. Mr. Renoult, I would direct your attention to what has been marked Enserch Exhibit Number Three, and ask that you explain to the Commission what this is and what it shows.

A. Exhibit Number Three provides information about the completion and current producing formations of the nearest offset wells to the proposed Enserch Rader Well No. 2.

The Enserch Rader Well No. 2 is currently perforated through the Montoya lime from 7902 to 7930, -3503 feet subsea to -3500 feet -- to -3531 feet subsea.

The other wells located within the half mile radius are also listed on this exhibit.

The Enserch Rader No. 1, the Phillips Petroleum Lambirth "A" Well NO. 4, and the Enserch Lambirth Well No. 3.

The Phillips Petroleum Lambirth "A" Well No. 4, located 1750 feet from the proposed location, is completed through the Fusselman formation from 7814 feet to 7828 feet, -3423 feet to -3437 feet subsea.

As indicated previously, the lowermost perforation in the Lambirth "A" Well No. 4 is 66 feet high to

the uppermost perforation in the Enserch Rader Well No. 2.

Finally, on this exhibit, are three wells just outside of the half mile radius, the Phillips Peterson "H" Well No. 1, the Enserch Lambirth Well No. 7, and the Phillips Petroleum Lambirth "A" Well No. 1.

Q. And, Mr. Renoult, this exhibit presents data required by Oil Conservation Division memorandum 377, is that correct?

A. Yes, sir, it does.

Q. Will you now refer to what has been marked as your Exhibit Number Four and review this for the Commission?

A. Okay. Exhibit Number Four is composed of three pages. This exhibit gives the well schematic of the proposed Enserch Rader Well No. 2, the Enserch Rader Well No. 1, and the Phillips Petroleum Peterson "H" No. 1.

The proposed salt water disposal Enserch Rader Well No. 2 was tested through the Fusselman and Peterson lime and proved unproductive. These two intervals were subsequently block squeezed. The well is currently perforated through the Montoya formation from 7902 feet to 7930 feet.

The second schematic pertains to the Enserch Rader Well No. 1. This well is a dry hole and was abandoned in July, 1979.

The third schematic pertains to the Phillips Petroleum Peterson "H" Well No. 1. This well is a dry hole and was extensively tested to the Fusselman and Penn formations. This well is located 2600 feet north from the proposed Enserch Rader Well No. 2.

Q. Now, Mr. Renoult, directing your attention to the subject well, is this well -- has this well been cased and cemented so as to prevent contamination of oil, gas, and water resources in the area?

A. Yes, sir.

Q. Will you now refer to your Exhibit Number Five and explain what it is and what it shows?

A. Exhibit Number Five is a plat showing Enserch acreage shaded in gray in the subject area. The two mile radius circle from the proposed salt water disposal Enserch Rader Well No. 2 is indicated on this exhibit.

Within this two mile radius there is not one single well which produced from the Montoya formation where Enserch is planning to dispose of salt water. As a matter of fact, to my knowledge there is not one single well within the county which is producing from the Montoya formation.

Q. Will you now refer to Enserch Exhibit Number Six and explain what this is?

A. Exhibit Number Six is a table listing

all wells located within a two mile radius from the proposed salt water disposal Enserch Rader Well No. 2.

This table gives the distance to the subject Rader Well No. 2 and the current producing formation in each well.

Q. And what is the closest well to the proposed injection well?

A. The closest producing well to the Rader No. 2 is Phillips Petroleum Lambirth "A" Well No. 4, located 1750 feet from the Rader No. 2.

Q. Mr. Renoult, will you now refer to your Exhibits Seven, Eight, and Nine, identify each of these, and explain what they show?

A. Exhibits Number Seven, Eight, and Nine give the production history of the Phillips Petroleum Lambirth "A" Well NO. 1, Phillips Petroleum Lambirth "A" Well No. 4, --

MR. CARR: Just for the record, Exhibit Number Seven is the data on the Lambirth "A" Well No. 1. Exhibit Number Eight is the data on the Lambirth Well No. 7, Enserch Exploration Company Lambirth Well No. 7, and Exhibit Number Nine is the Phillips Petroleum Lambirth "A" Well No. 4.

A. Exhibit Number Seven pertains to the Phillips Petroleum Lambirth "A" Well No. 1. This well is located approximately a half mile from the Enserch Rader Well

No. 2. As of December 31st, 1980, the cumulative Fusselman oil production was equal to 85,880 barrels of oil and its cumulative water production was equal to 68,412 barrels of water.

Production declined sharply during the past six months and no oil production was reported in March, 1981.

Page number two of Exhibit Number Seven is a tabulation of the oil, gas, and water production for the subject well. This table shows that for the months of September and October, 1979, water cut from the Phillips Petroleum Lambirth "A" Well No. 1 was equal to 64 percent. For the next nine months from November, 1979, to July, 1980, water cut decreased and was equal to a constant 37 percent during all this period. From August, 1980, till January, 1981, the water cut increased and was equal to a constant 72 percent for the six month period.

Finally, in February, 1981, the water cut decreased to 59 percent.

Exhibit Number Eight gives the oil production from the Enserch Exploration Lambirth Well No. 7. As of December 31st, 1980, the total cumulative oil production for this well was equal to 75,069 barrels of oil and the total cumulative water production as of December 31st, 1980, was

equal to 27,673 barrels of water.

Exhibit Number Nine gives the oil production from the Phillips Petroleum Lambirth "A" Well No. 4. This well is located approximately 1750 feet from the subject Enserch Exploration Rader Well No. 2.

As of December 31st, 1980, its cumulative Fusselman oil production was reported to 70,332 barrels of oil. Its cumulative water production was equal to 17,375 barrels.

Page two of Exhibit Number Nine is a table giving the oil, gas, water production of the subject well. This table indicates that water production and water cut reported for this well are very erratic. For six months, between June, 1980, and December, 1979, water cut was constant and equal to 15 percent. From July, 1980, to January, 1981, water cut for this well was equal to zero percent. From February and March, 1981, water cut for this well increased and it was equal to 49 percent.

Q. Mr. Renoult, what is the source of the data you included on these tables?

A. The oil, gas, and water production included on Exhibits Number Seven, Eight, and Nine were obtained through the Commission records, monthly production schedules.

Q. Mr. Renoult, directing your attention to Exhibit Number Nine, I believe it indicates that this --

that the Lambirth "A" Well No. 4 is producing from the Peterson-Fusselman South Field, is that correct?

A. Yes, sir.

Q. Now, what is the drive mechanism in that field? Do you know?

A. Water drive.

Q. Now how would you account for the fact that the well has produced apparently no water since August of 1980? Is that a common thing in a water drive reservoir?

A. No, sir, it's uncommon.

Q. Will you now refer to what has been marked for identification as Enserch Exhibit Number Ten and review this for the Commission?

A. Exhibit Number Ten is a table giving the water production from the Enserch Exploration wells in the Peterson South Fusselman and Pennsylvanian Field. As of December 31st, 1980, total Enserch water production was equal to 310,587 barrels of water, of which 89 percent were produced from the Fusselman formation.

During the month of December, 1980, Enserch Exploration produced 22,663 barrels of water. This corresponds to a daily volume of 731 barrels per day.

Enserch is paying $1.58 to transport and dispose water in the Jenkins and Southland Salt Water

Disposal Wells in Lea County. This corresponds to a total expenditure of $35,807 paid by Enserch Exploration to dispose of water during the month of December, 1980.

Q. So that is a monthly figure, $35,000 a month?

A. Yes, sir, for the month of December, 1980.

Q. Is that figure representative or close, closely approximate the cost for other months?

A. Yes, sir.

During 1980 water production from the Enserch Exploration wells located in the Peterson-Fusselman and Penn Field was fairly constant and equal to 650 barrels per day average.

In its application Enserch is requesting to dispose of approximately 750 barrels per day.

Q. Now, Mr. Renoult, I believe earlier that you testified that there was a disposal well disposing into the Fusselman in the Peterson Field, is that correct?

A. Yes, sir. I referred to the Amoco Production Company Swearingen "C" Well No. 2.

Q. Does Enserch have access to that well? Are you able to produce -- or dispose of produced waters in that well?

A. No, we don't have access to this well.

Q. Does Amoco use that only for disposal of waters produced by Amoco?

A. The water produced from the Phillips Petroleum wells is being disposed in the Amoco well.

Q. But that is in a separate pool from that which is involved in this case?

A. Yes, sir, the Peterson-Penn Field.

Q. About how close to the subject field is this Amoco disposal well?

A. The Amoco Company well is located in Section 18 on Exhibit Number Five. That's approximately fourteen seven feet northwest from our proposed Enserch Exploration Rader Well No. 2.

Q. Now, Mr. Renoult, the water that you propose to dispose of, it's primarily produced from what formation?

A. 89 percent is produced from the Fusselman and approximately 11 percent is produced from the Penn formation.

Q. And you're proposing to inject into the Montoya?

A. Yes, sir.

Q. Is that also a formation that is water

saturated or contains water?

A. Yes, sir.

Q. Will you now refer to Enserch Exhibit Number Eleven, identify this, and explain what it shows?

A. Exhibit Number Eleven provides details of a stimulation treatment and injectivity test performed on the proposed salt water disposal Enserch Rader Well No. 2.

The Enserch Rader Well No. 2 is perforated through the MOntoya formation from 7902 feet to 7930 feet. This well was stimulated with 10,000 gallons of MOD 202 acid. An injection test was conducted on March the 27th of 1981. Five barrels per minute were injected under a surface pressure of 2400 psi. Two barrels per minute were injected under vacuum.

This would correspond to a volume of 2880 barrels per day injected under vacuum.

Results of this injection test are graphed on page number two of Exhibit Number Eleven. Based on a maximum allowed injection gradient of .2 psi per foot, the maximum allowed injection volume would be equal to 5976 barrels per day.

In comparison, during the month of December, 1980, Enserch produced 731 barrels of water per day. This volume of water could be injected under vacuum.

Enserch is requesting to dispose of only 750 barrels per day. This is approximately four times less than the maximum volume of water which could be injected under vacuum in the subject well. This is approximately nine times smaller than the maximum volume allowed to be injected based on the maximum gradient of .2 psi per foot, as specified by State regulations.

Q. Now, Mr. Renoult, in your injection test you used surface pressure, is that correct?

A. Yes, sir.

Q. And why did you use surface, not bottom hole pressure?

A. I used surface -- surface pressures because we measured the surface injection pressures, and because it is specified by the regulations of the State of New Mexico.

Q. Is that -- are you referring to OCD Memo 377?

A. Yes, sir.

Q. Now, you are requesting permission to inject 750 barrels a day. Do you anticipate that this amount will increase in time?

A. Some slight fluctuation from the volume of 750 barrels per day might be anticipated; however, in 1980

the average production was equal to only 631 barrels per day. So we have a safety margin build-up in our request.

Q. Will you now refer to what has been marked Enserch Exhibit Number Twelve and review this for the Commission? Twelve is water injection calculations.

A. Exhibit Number Twelve provides water encroachment calculations based on injection volume proposed for the Enserch Rader Well No. 2.

28 feet of net pay with an average porosity of 7 percent in the Montoya formation in the Enserch Rader Well No. 2.

Water encroachment calculations were conducted based on a regular propogation (sic). Based on an injection volume of 750 barrels of water per day it was calculated that after ten years only 222.5 acres would be encroached by water. This corresponds to a radius of only 1760 feet from the Rader Well No. 2.

This indicates that it would take ten years of constant injection at a rate of 750 barrels per day to reach the vicinity of the Phillips Petroleum Lambirth "A" Well No. 4. The Phillips Petroleum Lambirth "A" Well No. 4 is located approximately 1750 feet away from the proposed Enserch Rader Well No. 2.

Q. And at this time, Mr. Renoult, I'd like

you to, if you need to, to refer back to Exhibit Number Nine and I'd ask you if you've made any estimates as to what the economic life of the Lambirth "A" Well No. 4 might be? Exhibit Number Nine being your oil production graph and table on the Lambirth "A" Well No. 4.

A. I estimated the Phillips Petroleum Lambirth "A" Well No. 4 has a remaining life of approximately five years. This well should be dead by the end of 1986, based on the current production, current oil production and water production.

Q. In making these calculations, what did you estimate the remaining producable reserves to be in that well?

A. The remaining producable reserves from the Phillips Petroleum Lambirth "A" Well No. 4 are equal to approximately 29,000 barrels of oil.

Q. And how does -- what is the source of that figure?

A. This is based on the current decline exhibited by the Phillips Lambirth "A" No. 4, and this is based also on the testimony given by Phillips Petroleum on April 22nd, 1981.

Q. Now, Mr. Renoult, what cutoff were you using to determine that the well had actually reached the end

of its economic life?

A. I used a cutoff of approximately one barrel per day.

Q. Now, the Lambirth "A" No. 4 -- the Lambirth "A" No. 4 Well is producing from what formation?

A. Fusselman formation.

Q. And you are proposing to inject into what formation?

A. The Montoya formation.

Q. So this testimony is only directed to that situation where water might escape into the other formation, into the Fusselman formation, correct?

A. Yes, sir.

Q. And these calculations are based only on 750 barrels per day, is that correct?

A. Yes, sir.

Q. And you do not anticipate needing to exceed that 750 barrels per day.

A. No, sir. The field is well developed and we don't expect -- anticipate any drastic increase in the water production. In 1980 the average water production was equal to 631 barrels per day.

Q. Now, Mr. Renoult, have you made a study to determine whether or not the water injected into the Montoya

will in fact stay in that formation?

A. Yes, sir.

Q. And in making this study what did you examine and what data did you review?

A. I looked at the logs from the proposed well,from the offset wells, and I looked at core data available in the Peterson Field.

Q. Are the results of your study contained in an exhibit?

A. Yes, sir.

Q. Is that Exhibit Number Thirteen?

Mr. Renoult, the question was were the results of your study contained in what has been marked Exhibit Thirteen?

A. Yes, sir.

Q. Will you refer to that exhibit and explain to the Commission what it is and what it shows?

A. Exhibit Number Thirteen is composed of a suite of logs run in the Phillips Petroleum Lambirth "A" Well No. 4, located 1750 feet northwest of the proposed salt water disposal well. The log on the left side of this exhibit is a resistivity Dual Laterolog microstatically focussed. The scale on this log is logarithmic from .2 to 2000 ohm-meter parameter.

The log on the middle of the exhibit, is a porosity FDC/CNL, limestone matrix of 2.71 gram per cc, was used. The scale on this log is from -10 percent porosity in the right to +30 percent porosity on the left.

The third log on the right of the exhibit is a computer Cyberlook log derived by Schlumberger.

From the two previous resistivity and porosity logs the Cyberlook parameters provided by Phillips Petroleum are listed in the heading of this log. The water resistivity of .045 ohm-meter parameter was used and a matrix gram density of 2.701 gram per cc was used.

The Phillips Petroleum Lambirth "A" Well No. 4 is producing from the Peterson Fusselman Field. This well is perforated from 7814 feet to 7828 feet. This corresponds to a subsea depth of -3423 feet to -3437 feet.

The lowermost perforation in the Lambirth "A" Well No. 4 is 66 feet high to the uppermost perforation in the proposed Rader Well No. 2.

This suite of logs shows that a 10 foot tight streak with high shale content and no porosity is present in the Phillips Petroleum Lambirth "A" Well No. 4 from 7830 feet to 7840 feet.

MR. KELLAHIN: Would you give those figures again?

A. From 7830 feet to 7840 feet. This shaley, tight barrier is shaded in gray on this exhibit.

This suite of logs shows that in the Phillips Petroleum Lambirth "A" Well No. 4 a 10-foot clean, tight streak with no porosity is present from 7840 feet to 7850 feet. This tight barrier is evidenced on the FDC/CNL log on the Cyberlook log. Shading of this clean, tight barrier was inadvertently omitted on this exhibit.

Below this 20-foot tight barrier from 7830 feet to 7850 feet the Fusselman formation is water-bearing with an average water saturation of approximately 20 percent.

From 7904 feet to 7934 feet the Fusselman formation is cherty and tight and exhibits limited porosity. This 30-foot barrier is shaded in gray on this exhibit.

In the Phillips Petroleum Lambirth "A" Well No. 4 the top of the Montoya was encountered at a depth of 7934 feet, -3543 feet subsea. The MOntoya in this well is highly porous and water-bearing, as evidenced by an average porosity of approximately 15 percent and a water saturation of approximately 70 percent.

In summary, the top of the Montoya formation in the Phillips Petroleum Lambirth "A" Well No. 4 is located 106 feet below the lowermost Fusselman perforation in this well. MOrecver, the producing Fusselman formation in

this well is separate from the Montoya formation by two impervious barriers having a thickness of 20 feet and 30 feet each.

Q. In your opinion, would these tight streaks work as a barrier to prevent the vertical migration of injection fluids into the Fusselman formation?

A. Yes, sir, they do.

Q. So in other words, these tight streaks constitute barriers between the Montoya and the Fusselman?

A. Yes, sir.

Q. Have you examined the logs of other wells in the area to see if tight streaks appear in other wells in the area?

A. Yes, sir.

Q. And which wells have you examined?

A. I looked at the Rader Well No. 2, Rader Well No. 1, Peterson "H" Well No. 1.

Q. And in examining the logs on these wells did they also reveal tight streaks separating the two formations?

A. Yes, sir, they do.

Q. In your opinion are these tight streaks fractured?

A. No, sir, they are not.

Q. Now, can you tell this from examining

the logs?

A. The open hole logs provided on Exhibit Number Thirteen don't show any large fractures in the Fusselman and MOntoya formations. There is no washed-out present within these two formations.

Q. Now would you be able to tell by looking at the logs if there were fractures or would it just show you if there were fractures capable of transmitting fluids?

A. Well, the logs would not tell me if the fractures would be capable of transmitting fluids.

Q. In other words, if you have a washout on the log that merely shows you that you have a fracture that is capable of transmitting a fluid.

A. If I had a washout on a log it indicates that we are dealing with some fracture of large magnitude, which might be able to transmit fluids, and we don't have any large washouts on these Lambirth "A" Well No. 4.

Q. Mr. Renoult, in determining whether or not a formation is fractured, is there better evidence to look to than logs?

A. Yes, sir.

Q. And what would -- have you examined any other data to try and determine whether or not the formation is fractured?

A. Yes, sir. I looked at some other information.

Q. And what was that?

A. Core data.

Q. You've reviewed cores on what wells?

A. On --

Q. Reviewed core analyses on what wells?

A. On the two wells, the Lambirth "A" Well No. 2 and Enserch Exploration Lambirth Well No. 3.

Q. Based on your review of these core analyses and also on your review of the logs, what conclusions can you reach about whether or not this formation will transmit fluids?

A. Reviewing the logs and reviewing core data available from these two wells, I conclude that the Fusselman formation doesn't exhibit fractures capable of transmitting water, particularly from the Montoya to the Fusselman.

Q. Mr. Renoult, were Exhibits One through Thirteen prepared either by you or under your direction and supervision?

A. Yes, sir.

Q. Can you testify as to their accuracy?

A. Yes, sir.

MR. CARR: At this time we would offer into evidence Enserch Exhibits One through Thirteen.

MR. RAMEY: Enserch Exhibits One through Thirteen will be admitted.

Q. Mr. Renoult, in your opinion will granting this application result in a reduction in producing costs and therefor the recovery of additional hydrocarbons from the wells in the area of the proposed disposal well?

A. Yes, sir, I do.

Q. In your opinion will granting this application impair the correlative rights of any other operator?

A. Excuse me?

Q. In your opinion will granting this application impair correlative rights of any other operator?

A. No, sir.

Q. Will granting this application be in the best interest of conservation, the prevention of waste, and the protection of correlative rights?

A. Yes, sir.

MR. CARR: That concludes my direct examination of Mr. Renoult,

MR. RAMEY: We'll have a fifteen minute recess.

(Thereupon a recess was taken.)

MR. RAMEY: The hearing will come to order. Are there any questions of Mr. Renoult?

MR. KELLAHIN: Yes, sir, Mr. Ramey, I have some.

MR. RAMEY: Mr. Kellahin.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Renoult, your background is in petroleum engineering, is it not, sir?

A. I got BS degree in mechanical engineering and MS degree from University of Texas at Austin in petroleum engineering.

Q. You were Enserch's petroleum engineer witness at the Examiner Hearing of this case, were you not?

A. Yes, sir, I was.

Q. And that was on April 22nd of 1981.

A. Yes sir.

Q. And for that exhibit -- for that case you prepared certain exhibits, did you not?

A. Yes, sir, I did.

Q. Subsequent to that hearing, Mr. Renoult, have you made any additional studies or examinations of data pertaining to the subject matter in this case?

A. Yes, sir, I did.

Q. And what did you study?

A. I reviewed the logs, the core data, production histories of all of the wells in the project area. I reviewed all the data I had available which would -- which was relevant to the subject case.

Q. All right. You reviewed in preparation for this hearing the information you had available in the April '81 hearing.

A. Yes, sir, I did.

Q. You don't have any new test data or information between the two hearings, do you?

A. Yes, sir, I do.

Q. And what is that?

A. I've got the production history from --

Q. All right, you updated your production history on some of the wells.

A. Yes, sir, I did.

Q. All right, apart from updating the production history, what, if any, new data do you have that you used?

A. I reviewed the core data and I reviewed the logs, also.

Q. The review of the core data, is that something you did prior to the first hearing in this case?

A. I looked again at what was entered last time and --

Q. All right, so basically the core information was available to you before and you simply reviewed it again.

A. Yes, sir.

Q. All right. Is there anything else that may have looked at that you did not look at prior to the first hearing?

A. Nothing I can think of at the time.

Q. All right. Let's see if we can't keep this in some kind of order, Mr. Renoult, and I will ask you some questions based upon the order of your exhibits, the way you talked about them.

A. Okay.

Q. And if you'll turn to Exhibit Number One, which is your Form C-108, let me ask you some questions about that.

Now, your Exhibit Number One is the application for salt water disposal in the proposed Rader No.

2 disposal well, is it not?

A. Yes, sir.

Q. And the information contained on this exhibit is the same as at the Examiner Hearing, isn't it?

A. No, sir.

Q. All right. All right, the change, I'm sorry, the change is that you've reduced the anticipated daily injection volume from 1650 to 750.

A. That's one change.

Q. Okay, and what are the other changes?

A. I reduced -- I increased the minimum from 745 to 750 barrels per day.

Q. Uh-huh.

A. And I decreased the maximum from 5976 barrels per day to 2880 barrels per day.

Q. Okay. If I understood your direct testimony correctly, Mr. Renoult, despite the indication on this exhibit of a maximum daily injection volume of 2880, it is your desire to have an order that would preclude you from an injection above a rate of 750 barrels a day.

A. We need --

Q. Is that correct?

A. We need to inject approximately 750 barrels of water per day.

Q. All right. You wouldn't have any problem with an order entered that approved the disposal so long as the maximum daily disposal rate would not exceed 750 barrels.

A. No, sir.

Q. All right. So I can ignore this maximum 2880 on the application.

A. Yes, sir.

Q. All right, sir. Let's look at Exhibits Two and Three at the same time, if ycu will, please, Mr. Renoult.

First of all, I need you to help me with Exhibit Number Two. As I understand your testimony, Mr. Renoult, there are some five wells that produce from the Fusselman that Enserch operates, and there appear to be five wells that Phillips operates in this field that produce from the Fusselman. Am I correct in saying that each operator has five wells and there are a total of ten producing Fusselman wells in this pool?

A. Yes, sir.

Q. All right. Now, let me direct your attention to Section 31, to the northeast quarter, and to the Enserch Lambirth No. 3 Well.

A. Yes, sir.

Q. My copy of the exhibit indicates that

that is a dual Pennsylvanian-Fusselman producer?

A. No, sir. This indicstes that this well was initially completed in the Fusselman. This well produced for two months from the Fusselman and was recompleted higher in the Penn, so --

Q. All right, so this well should be colored in the green, right?

A. Well, this well produced from the Penn, in the Fusselman at one time, and was recompleted higher, so we had at one time or the other this well produced from both zones. I mean --

Q. It no longer produces from the Fusselman. It's plugged back up and produces out of the Penn now.

A. Yes, sir, correct, yeah.

Q. All right. Directing your attention to Section 31, to the northeast quarter of the northeast quarter, there is the Phillips Lambirth 4-A Well, Mr. Renoult. There is a number indicated there that says "f" and then a -3499. Is that the top of the Fusselman, the subsea depth for the Fusselman?

A. It should be the top of the Fusselman; however, I -- the purpose of this exhibit was to show where the wells were located with respect to the Rader No. 2, and I did not review the tops of all the wells which the area has.

This exhibit was submitted just to show the respective locations with respect to Rader No. 2, and which zone was producing.

Q. All right, sir. So what's your understanding of the meaning of f -3499?

A. I would suspect that it should be the top of the Fusselman; however, I did not review this specific, the tops indicated on this exhibit.

Q. All right, let's look at Exhibit Number Three.

A. Yes, sir.

Q. This is your tabulation of wells within the half mile radius of the proposed disposal well?

A. Three wells are within half mile radius, the Enserch Rader No. 1, the Phillips Petroleum Lambirth "A" No. 4, and the Enserch Lambirth Well No. 3 are within the half mile radius.

The Phillips Petroleum Peterson No. 1-H, the Enserch Exploration Lambirth No. 7, the Phillips Petroleum Lambirth "A" Well No. 1 are slightly past the half mile radius.

Q. All right, what's the purpose of the exhibit, Mr. Renoult?

A. The purpose of this exhibit was to provide information regarding the completion of each well and the current producing formation of the nearest of said wells

to the proposed Rader No. 2.

Q. Did you make this tabulation?

A. Yes, sir, I did.

Q. And this is the same information you supplied at the Examiner Hearing, is it not, Mr. Renoult?

A. It's not exactly the same exhibit. I mean it's not a copy. It's not a carbon copy from the first exhibit. I made, I believe three corrections on this exhibit.

For the Enserch Rader Well No. 2 I scratch 970 sacks of cement. This was replaced by 914.

And I changed -- I corrected the KB for the Phillips Lambirth No. 4. This was scratched and replaced by 4391. So there is a slight difference and the corrections were made directly on this exhibit and --

Q. Let me direct your attention to the Phillips Lambirth "A" No. 4 Well, which is the third well in the tabulation, and go over to the current producing interval, and looking at the subsea depth, it says -3423 to -3437.

A. Yes, sir.

Q. Is that the producing interval for the Fusselman formations in this well?

A. That is subsea depth for the uppermost perforation in the Lambirth "A" 4 and the subsea depth of the lowermost perforation in the Fusselman in the Lambirth "A" 4.

Q. All right, and comparing Exhibits Two and Three I find you picked the top of the Fusselman to be below the perforation for the Fusselman in the Lambirth "A" No. 4 Well.

A. No, sir, I didn't pick the tops which are indicated on Exhibit Number Two. This was submitted just to show the respective locations of the wells and which zones they're producing from. It happened that the tops were on this exhibit but I did not figure the tops.

Q. All right. In looking at Exhibit Number Three, then, Mr. Renoult, you made some reference to the subsea depth of the proposed disposal well in the Montoya. What was the subsea depth for those perforations in the disposal well?

A. The Enserch Rader Well No. 2 is perforated from 7902 to 7930, which corresponds to -3503 feet to -3531 feet subsea.

Q. -3530 was the starting point?

A. No, -3503.

Q. I'm sorry. And the difference, then, is the 66 feet you came up with in your testimony.

A. The 66 feet is the difference between the uppermost perforation in the Rader No. 2, -3503, and lowermost perforation in the Phillips Lambirth "A" No. 4, 3437,

which gives 66 feet subsea.

Q. All right. You indicated in your direct testimony that you examined the Montoya formation in the proposed disposal well as a candidate for a disposal formation. Did you examine any other formation in the disposal well to see if it would be an acceptable disposal formation?

A. Yes, sir, I looked at the formations from TD to the surface and the Montoya is the only formation where Enserch would dispose water in the Enserch Rader Well No. 2.

Q. Did you test the Wolfcamp formation in that well?

A. No, the Wolfcamp formation is tight in the Enerch Exploration Rader Well No. 2.

Q. It doesn't have any Wolfcamp production indicated on the logs for that well?

You said it was tight. I'm not sure what you mean by that.

A. I mean there is a low porosity and low permeability.

Q. You said that the only other disposal well in the entire area that you were aware of was one operated by Amoco up in Section 18, several sections north of this field, is that not correct, Mr. Renoult?

A. Yes, sir.

Q. And that disposal well is disposing of produced water into the Pennsylvanian formation, is it not?

A. Yes, sir. Into the Fusselman formation.

Q. Into the Fusselman formation?

A. Yes, sir.

Q. Have you examined the logs on that well to determine that it's actually being disposed of in the Fusselman formation?

A. No, I looked at Form C-103 filed with the Oil Conservation Division.

Q. All right, but you didn't examine the logs of the well to determine exactly what formation it's being disposed in.

A. No, sir, I relied on the information on Form C-103.

Q. That's the Peterson-Fusselman Field, or Pool, that's separate so far as the Commission is concerned from the South Peterson-Fusselman Pool, Field, that we're discussing, is it not?

A. Yes, sir, it's a different pool.

Q. All right. Now you said that the Montoya formation in this area doesn't produce any hydrocarbons.

A. Yes, sir, to the best of my knowledge.

Q. It's a water bearing formation throughout the county, I believe that's what you said.

A. No, I said there is no hydrocarbon production from the Montoya over the -- over the county. I don't know the formation is water-bearing all over the county.

Q. Well, what's in it?

A. May be tight.

Q. Well, it's not tight because you said it has porosity and it's suitable as a disposal formation.

A. I mean it might be tight in some other parts of the county.

Q. All right.

A. Not tight in our own well,

Q. All right. Insofar as this well goes, is that formation, the Montoya formation in the disposal well water-bearing?

A. Yes, sir.

Q. And the Fusselman formation in this area is also water-bearing, is it not?

A. The Fusselman formation is oil productive and also water-bearing.

Q. The oil is a thin -- thin column of oil at the top of the Fusselman formation with the balance of it being filled with water, is that not true?

A. Some wells have more column than some others. Some wells have up to 30 or 40 feet of oil column in the Fusselman within the South Peterson Field.

Q. Would you turn to Exhibit Number Six, Mr. Renoult?

You've measured the distance between the proposed disposal well and the Phillips Lambirth "A" No. 4 Well at 1750 feet.

A. Yes, sir.

Q. This Enserch Lambirth No. 6 and Enserch Lambirth No. 10 appear on Exhibit Number Two and Exhibit Number Six, and they appear to be very close to each other, Mr. Renoult. What's the reason for that? You've located the Lambirth Well No. 6, it's in Section 31, and on Exhibit Two is shows Well No. 10 with a well spot almost on top of that well location for No. 6.

A. Yes, sir.

Q. Explain to me what happened.

A. When the Enserch Lambirth Well No. 6 was drilled and completed, Enserch experienced some completion difficulties and --

Q. You had a water flow you couldn't shut off, isn't that right?

A. Yes, we had some water problems in the

Enserch Well No. 6.

Q. You attempted to recomplete it and shut off the water and you couldn't do it.

A. Yes, sir.

Q. And you had to drill the No. 10 as a replacement well.

A. Yes, sir.

Q. All right. Let's go to Exhibits Seven, Eight, and Nine, which in my packet is all stapled together, Mr. Renoult, and if you'll turn to that exhibit -- I think it's Number Nine -- that has the tabulation of the oil and water production for the Lambirth "A" No. 4 Well, is that the second part of Exhibit Number Nine?

A. Yes, sir, page number two.

Q. All right, page two to Exhibit Nine. When you were updating this production information, I missed that. What has been the production since December of '80 for that well?

A. The well production?

Q. Yes, sir.

A. For the month of January, 1981, I don't have the well information on this table.

For the month of February, 1981, the Water production was equal to 4247 barrels.

For the month of March, 1981, the water production was equal to 3116 barrels.

Q. All right. Since presenting this exhibit then at the Examiner Hearing we have some new production history for the Lambirth 4-A Well.

A. Yes, sir.

Q. And that shows that the water now is again being produced out of this well in 1981.

A. Yes, sir.

Q. How many of the ten wells in the Fusselman Field are not producing any water now, Mr. Renoult?

A. As far as Enserch Exploration, Inc., is concerned, the Lambirth Well No. 1 is producing no water from the Fusselman.

The Lambirth Well No. 9 is producing no water from the Fusselman.

As far as Phillips Petroleum is concerned, the Lambirth "A" No. 2 is producing no water in the Fusselman, to speak of, Between 04-1979 and 12-1980 this well produced water just for one month.

The Lambirth "A" No. 3 was producing a very small amount of water in December, 1980.

The volume of water produced from the Fusselman was equal to 13 barrels during the month of December,

1980.

The Lambirth "A" No. 4 during the month of December, 1980, was producing no water.

So I guess I covered the ten wells.

Q. All right, so excluding the Phillips Lambirth "A" No. 4 Well, which does produce water now, I counted four of the ten wells that don't produce any water or produce very little water. Is that true?

A. That seems correct.

Q. All right, despite the fact that this is a water drive reservoir, we do have some of the Fusselman wells in here that don't produce water.

A. Yes, sir.

Q. Now if you'll direct your attention to Exhibit Number Eleven, you've indicated that the Montoya formation in the disposal well will take water on a vacuum. Do you know what the original reservoir pressure was, bottom hole pressure in the Fusselman formation is, Mr. Renoult?

A. I don't have this exact figure available but if I recall we used mud weight equal to approximately 10.5 pounds per gallon to drill for this formation.

So the formation -- the bottom hole pressure was probably higher.

Q. Was approximately what, then?

A. Well, there is no way of knowing. It was higher than 10.5 pounds per gallon --

Q. No, I'm sorry. In the producing Fusselman wells, though, do you have any bottom hole pressure information for the Fusselman reservoir as to what the original bottom hole pressure was?

A. In which well?

Q. In any of the Fusselman wells.

A. Well, I don't have any bottom hole pressures available here.

Q. You've not made any bottom hole calculation, taken any bottom hole pressures or made any calculations based on bottom hole pressures?

A. Yes, we ran some pressure build-ups.

Q. If you had any zero psi wellhead injection pressures at the surface --

A. Yes, sir.

Q. -- what would be the bottom hole pressure due to the hydrostatic head of the water in the Montoya?

A. Well, this would depend on quite a few parameters. This would depend, for one thing, on the density of fluid column we have, and also, this would depend on the friction, frictional losses we have under dynamic conditions when --

Q. Let me ask you to assume the calculations you've made here on your Exhibit Number Eleven, and can you tell me what the hydrostatic head is on the water at the formation, how many pounds is it?

A. From Exhibit Number Eleven I can't compute the flowing injection pressure at the Montoya depth.

Q. So you haven't made any calculations or studies to determine whether the disposal water even under vacuum due to the hydrostatic head at the formation will cause the formation to fracture and migrate water into the Fusselman.

A. If we look at page number two of Exhibit Number Eleven, we see a linear, approximately linear increase of injection pressure versus injection weight, which seems to indicate that we didn't fracture the formation when we are disposing water into the Fusselman -- into the MOntoya formation.

Q. Let me ask you this: You testified on Exhibit Number Thirteen with regards to some geological information from which you concluded that there were at least two tight stringers that geologically separated the lower perforations in the Fusselman well, the Phillips 4-A Well, from the Montoya disposal formation. You indicated the two tight streaks in that exhibit.

A. Yes, sir.

Q. That was your geological explanation for how they might be separated. Have you made any engineering study or data or calculations to support that the Montoya is separate and distinct accumulations of fluids from the Fusselman?

A. The fact that the Fusselman is separated from the Montoya by two streaks with a thickness of 20 feet at the top, the top streak, and a thickness of 30 feet for the bottom barrier, indicates that we are dealing with two different reservoirs.

Q. I understand what you're saying about your examination of the logs and the two tight streaks.

What I've asked you is whether you've made any reservoir calculations or any indications to show that there are reservoir pressure differences between the Fusselman and the Montoya; anything to establish that the Montoya and the Fusselman are separate and distinct reservoirs not in communication with each other?

A. I don't have any pressure data available to differentiate the pressure the Fusselman with the pressure in the Montoya in the subject well.

Q. All right, have you made any analysis of the water produced from the Fusselman and the water produced

from the Montoya to determine whether that would give you some indication of two distinct, separate reservoirs?

A. The water produced from the Fusselman and the water produced from the Penn formation are compatible.

Q. Tell me something about the Montoya and the Fusselman, Mr. Renoult, does the Commission recognize those two formations to be separate and distinct reservoirs?

A. I don't know what the Commission recognizes as far as these two formations are concerned.

Q. You talked about some of the geology in the Fusselman and the Montoya. Would you describe for us what the geological difference is between the two formations?

MR. CARR: At this time, may it please the Commission, we will call another witness who will testify as to -- is a geologist and will testify as to the difference between the Fusselman and the Montoya.

Mr. Renoult, I don't believe, is really qualified to answer these. I don't really object to Mr. Kellahin's question but I do think it might be wise to pursue with Mr. Brown, who we will call as our next witness.

MR. KELLAHIN: That's fine with me, Mr. Ramey. I'm curious as to what Mr. Renoult based the separation on and let me continue with that, Mr. Renoult.

Q. Let's turn to Exhibit Number Twelve, Mr.

Renoult. This is your water encroachment calculation which I believe is one of the exhibits that you revised since the Examiner Hearing, is it not?

A. Yes, sir.

Q. At the Examiner Hearing you used a similar calculation but it was based upon an anticipated daily disposal rate of the 1650 barrels, I think it was.

A. Yes, sir.

Q. All right, and you've revised this exhibit to demonstrate what happens when you dispose of 750 barrels a day.

A. Yes, sir.

Q. All right. Have you calculated the distance between the disposal well and the nearest line of the Phillips' lease in Section 31?

A. The distance is 660 feet between the Rader No. 2 and the west line of Section 32, or the east line of Section 31.

Q. All right, so the well is 660 out of the corner. I'm sorry, it's 660 from the west line. Looking at Exhibit Number Twelve, assuming for the sake of argument all the things are done correctly on this exhibit, by the second year of your disposal at 750 barrels a day, you're going to be encroaching on Phillips' lease.

A. Yes, sir.

Q. All right. Do you have any proposal for the Commission to determine how they may establish a procedure whereby we could monitor the disposal in the Montoya in this well to insure that the water will not encroach on the Phillips leases?

A. No, sir.

Q. Now, this calculation supposes that the first barrel of water injected in the disposal well is going to take X number of years to reach a given point, doesn't it?

A. Yes, sir.

Q. All right. You still have formation water in the Montoya formation, don't you?

A. Yes, sir.

Q. And as you dispose of one barrel of water in the Montoya you're going to have to displace one barrel of Montoya formation water somewhere else.

A. Yes, sir.

Q. Where's it going to go?

A. It's going to be pushed farther.

Q. Can you guarantee us that it's not going to be pushed up into the Fusselman formation in the Phillips wells?

A. As evidenced on Exhibit Number Fourteen --

Q. All right.

A. -- there are --

Q. We'll talk about that one in a minute, but apart from that, no way you can guarantee that that water is going to remain confined in the Montoya based upon what you know now.

A. The two tight barriers are the main evidence of the separation between the Montoya formation where Enserch is going to inject water and the Fusselman formation, which is productive in the Lambirth "A" Well No. 4.

Q. All right. Let's -- let's look at that exhibit. You want to unfold yours for me?

All right, Mr. Renoult, Exhibit Number Thirteen is essentially the same exhibit you used at the Examiner Hearing, except now that you've shaded in the two tight sections, right?

A. Yes, sir.

Q. All right, and you told us today that the upper tight section -- well, these are all three logs of the same Phillips 4-A Well, aren't they?

A. Yes, they are.

Q. All right. The upper tight section in that Phillips well is a thickness of 20 feet?

A. Yes, sir.

Q. And the lower tight section is a distance of 30 feet.

A. Yes, a thickness of 30 feet.

Q. All right, and those are the tight sections which you believe constitute barriers to keep the disposal water out of the producing Phillips well.

A. There are nine tight zones present in the Lambirth "A" No. 4 Well.

Q. Let me direct your attention to page 44 of the transcript of the Examiner Hearing, Mr. Renoult. In response to a question was it your testimony under oath that this suite of logs shows that in the Phillips Lambirth No. 4 a 10 foot tight streak with no porosity is present from 7840 to 7850. This is clearly evidenced on the CNL log and the Cyberlook, and the other tight streak from 7850 to 7924.

In the Examiner case we had two tight sections each of which were 10 feet in thickness. Now the tight sections are 20 feet by 30.

A. The first streak shown in page 44 is a streak from 7840 to 50, which is the one I referred as a clean tight streak.

Above this streak we have another 10-foot barrier, which I referred as dirty, shaley, impervious barrier. This barrier is present from 7830 to 7840.

The third barrier -- I mean the bottom tight barrier present from 7904 to 7934 on this exhibit Number Thirteen.

Q. I can't follow you, Mr. Renoult. Let's start over.

I'm looking at the exhibits and I find the top of the Fusselman below the top of the perforations. Now that's not right, is it?

On Exhibit Number Thirteen there's a line indicating top of Fusselman, approximately 7840 feet; gives a subsea of -3449. Yet when you look at the log the perforations are up above that.

A. Yes, sir.

Q. And we've all agreed they're Fusselman perforations.

A. Yes.

Q. Where's the top of the Fusselman?

A. The Lambirth "A" Well No. 4 is producing based on the data filed with the Commission, from the Fusselman formation from 7814 to 7828.

On this specific exhibit I did not pick the top of the Fusselman formation and the top of the Montoya formation.

Q. At the Examiner Hearing we had a tight

streak from 7840 to 7850. Will you take my red pen and mark on my exhibit where 7840 to 7850 is going to be?

A. Okay.

Q. Would you write 7840? All right, sir, and the -- your testimony at the Examiner Hearing was that the second or lower tight streak in this well was between 7924 to 7934. Would you locate that for me?

A. It should have been from 7904 to 7934. I recognize that the transcript is indicating a different depth but what I meant was 7904 to 7934.

Q. All right, would you put that one in for me, 7904?

A. Okay.

Q. Want to color that in for me?

A. You want me to color from 7904 to 7934?

Q. Yes, sir, if that's your testimony as to what the tight streak is.

A. Okay.

Q. You said you examined the cores from the three wells involved, Mr. Renoult?

A. I looked at the cores from Phillips Lambirth "A" No. 2 and the Enserch Lambirth Well No. 3.

Q. Do you have copies of that core inform-ation? Or the analysis?

A. Yes, sir.

Q. Well, may I see them?

A. Yes, sir.

MR. KELLAHIN: Mr. Carr, do you want to mark these as Enserch exhibits or would you like me to mark them as Phillips exhibits?

MR. CARR: I don't care. We'll be happy to mark them as Enserch.

MR. KELLAHIN: You've already got your stamp on them is what I'm saying.

MR. CARR: Well, they're not Commission stamps and we'll be glad to mark them as Enserch exhibits. They will have to be Enserch Exhibits Sixteen and Seventeen.

MR. KELLAHIN: Okay.

MR. CARR: Sixteen being the "A" 2, right?

MR. KELLAHIN: Yes, sir.

Q. Mr. Renoult, do you happen to have for your own information extra copies of Exhibits Sixteen and Seventeen to refer to?

A. Yes, sir.

Q. All right, sir. I show you what has been marked as Enserch Exhibits Sixteen and Seventeen and ask you if these are the two core analyses that you refer to in your

testimony on direct with regards to those cores you had examined?

A. Yes, sir.

MR. KELLAHIN: If the Examiner please, we would move the introduction of Enserch Exhibits Sixteen and Seventeen.

MR. CARR: We certainly have no objection.

MR. RAMEY: They will be admitted.

Q. All right, Mr. Renoult, you've indicated on your examination of the logs that you didn't believe the Montoya and the Fusselman formations were fracture communicated, and you said you based part of that analysis on your examination of the core information from the Lambirth No. 3 and Lambirth "A" 2 Wells, is that not correct?

A. That's correct.

Q. Let me show you Exhibit Number Sixteen for the Lambirth "A" 2 Well. Under the far right column, would you indicate for me what VF means?

A. VF means a vertical fracture.

Q. VF appears -- would you take Exhibit Number Sixteen, Mr. Renoult, and correlate it to those tight sections that you find in the Lambirth 4-A Well and tell me if the core analysis shows that formation to be fractured you say it's tight.

MR. CARR: I'm going to object to that.

We're being asked to have Mr. Renoult correlate a log from the Lambirth No. 2-A Well, a core into the log on the Lambirth No. 4. We submit that that isn't possible and that it's asking Mr. Renoult to do something that cannot be done, and we therefor object to that.

MR. KELLAHIN: My only point, Mr. Ramey, is this witness has testified that based upon the core data he's examined the Montoya formation is not fractured or in fracture communication with the Fusselman. I think that's directly contrary to the core analysis which I've shown him and I want to give this witness every opportunity to explain how he can reach a conclusion that is different than what the exhibits seem to indicate.

MR. CARR: Well, we appreciate the opportunity that Mr. Kellahin has so graciously extended. We would, however, submit that if the exhibit which we have been willing to admit at his -- or offer at his request indicates something that he can certainly draw it from that exhibit and not ask that we try and correlate from one well to another.

I think if Mr. Kellahin has questions concerning Exhibit Sixteen he should proceed with those, but [illegible] that it be cast in an erroneous posture by trying to [illegible]late it with -- with another well.

MR. RAMEY: It would appear to me that

the witness would have to put the information on the log for Lambirth A-2 and then correlate that information into the Lambirth A-4. Unless he does that, why --

MR. KELLAHIN: My question was premised on the assumption that based upon his answers he had done that.

MR. RAMEY: That's right. I think we'll have to --

MR. KELLAHIN: Let me ask the question again.

MR. RAMEY: We'll have to assume that he's got some -- some kind of testimony that he has either done that or he hasn't done that, and there is no indication here that he has done that, I would think, Mr. Kellahin.

MR. KELLAHIN: Okay, let me try again.

MR. RAMEY: Okay, try again.

Q. Mr. Renoult, have you made an analysis or a correlation between the core data in the Lambirth No. 3 and the Lambirth A-2 with the log of the Lambirth 4-A Well?

A. I've made an analysis of the core data off Exhibit Number Sixteen. I have not made a correlation between the core data off the Lambirth A No. 2 and the Phillips Petroleum Lambirth "A" Well No. 4.

Q. Which one of these core analyses, Fifteen or Seventeen, have you studied?

A. Both of them.

Q. All right. And based upon this study you concluded that there were no fractures communicating the Montoya and the Fusselman?

A. No, I concluded that in the core from the Lambirth "A" No. 2 and the core from the Enserch Exploration Lambirth No. 3 there is substantial evidence indicating that there will not be vertical migration of water from the Montoya to the producing Fusselman.

Q. Based upon your analysis of this core information there wouldn't be vertical migration of water from the Montoya to the Fusselman?

A. Yes, sir.

Q. How can you examine this core information and conclude that fractures will or will not communicate with water?

A. Exhibit Number Sixteen gives the complete core information from the Phillips Petroleum Lambirth "A" Well No. 2. This well was cored from 7819 to 7850. This core indicates that out of 25 samples analyzed, 10 samples, or 40 percent of the total core, the permeability to air under surface conditions lower than .5 millidarcy. Most of the samples contained impervious chert and shale.

This core analysis indicates that under

bottom hole conditions, ones considering the effect of more than 7800 feet of overburden, this permeability to air will be greatly reduced. Permeability to water under bottom hole conditions will even be smaller than permeability to air. This indicates that because of a chert and shale inclusions present into the Fusselman, vertical fractures in this rock do not exhibit any permeability to allow vertical transmissibility and migration of water from the Montoya to the producing Fusselman formation.

Q. Mr. Renoult, this core information is related to the Fusselman formation, is it not?

A. Yes, sir.

Q. And that formation is above the Montoya.

A. Yes, sir.

Q. And is geologically younger than the Montoya.

A. Should be.

Q. All right. And is it not correct that if there is a fracture system in the Montoya -- in the Fusselman, evidenced by the core, you would also have fracture caused in the Montoya?

A. That's not necessarily correct.

Q. In what ways would it not be correct?

A. It would depend on the origin of frac-

tures between the two formations and some fractures might be sealed in one formation and might be open in another formation.

Q. But you haven't run any pressure differential tests between the two formations to determine whether or not these fractures would communicate or not.

A. No, sir, I have the core data available.

Q. What's the spacing for the South Peterson Fusselman Pool which we're talking about?

A. 80-acre spacing.

Q. And it's 80-acre oil production spacing, is it not?

A. Yes, sir.

Q. Are you aware of what the standard oil well proration unit is for an oil well in New Mexico?

A. I believe it's 40-acre spacing.

Q. Do you know why the spacing in this pool is 80 acres and not 40?

A. I suspect because some wells can drain more than 40 acres.

Q. You talked about the price of trucking this water away, and I believe you said it was $1.58 a barrel to truck the water away?

A. Yes, sir.

Q. What's the price you're getting for the

oil?

A. We're getting a price in the vicinity of $35.00 per barrel.

Q. This project is still economic even if you have to continue to truck away water.

A. It's not economic to spend $35,000 per month when we have a well where we could dispose water.

Q. My point is you're not going to have to abandon this field and these five wells at this point --

A. No, sir.

Q. -- if the Commission doesn't allow you to dispose of water in this well?

A. No, sir.

Q. And based upon the current prices for the trucking of the water and the value of the oil, you can continue for some time to truck that water away and still have an economic project.

A. Yes, sir.

Q. Now, Mr. Renoult, have you reached any other opinions or conclusions that were in addition to or different than the opinions and conclusions you presented to Examiner Nutter at the hearing in April?

A. My conclusions are still the same. We still need the Rader Well No. 2 to dispose water produced in

the South Peterson Field.

MR. KELLAHIN: I have nothing further.

MR. RAMEY: Any other questions of Mr. Renoult? Mr. Carr?

MR. CARR: I have a few on redirect.

REDIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Renoult, I would direct your attention to Enserch Exhibit Number Two, and in particular on that exhibit to the Enserch Lambirth Well No. 3, which according to the color coding has produced from both the Fusselman and the Pennsylvanian.

A. Yes, sir.

Q. Is that well currently producing from the Fusselman?

A. No, sir, this well is currently producing from the Pennsylvanian.

Q. And to your knowledge does Enserch have any future plans for producing this well in the Fusselman?

A. Yes, sir. We will recomplete this well into the Fusselman once the Penn is depleted.

Q. Now I would like to direct your attention to your Exhibit Number Six.

A. Yes, sir.

Q. I believe you testified that you encountered problems in completing the Lambirth No. 6 Well, is that correct?

A. Yes, sir.

Q. And that well is located in close proximity to the Lambirth No. 10.

A. Yes, sir.

Q. Did you have problems with that well other than just water encroachment?

A. Water encroachment, water production was the main problem in the Lambirth No. 6.

Q. Did you also encounter mechanical problems?

A. Yes, sir.

Q. Do you happen to know what they were?

A. The cement bond to the formation was not good and, if I recall, we dropped the casing in this well when this well was being completed.

Q. All right. Mr. Renoult, will you now [illegible] Enserch Exhibit Number Ten?

As I understand it, this is an exhibit [illegible]roduced from Enserch wells, is that correct?

A. Yes, sir.

Q. How do you get the figures on water

production?

A. We test the wells with some tank batteries and we measure.

Q. How frequently do you measure the water?

A. Once a month.

Q. Are these actual figures or do you prorate the water production on these wells?

A. No, actual figures.

Q. Now I direct you to Exhibit Number Eleven. I believe you indicated you had no calculations based on bottom hole pressures.

Exhibit Number Eleven.

A. No, I do not have any bottom hole pressure for the Gladys Rader Well No. 2.

Q. In your opinion would it be possible to fracture this reservoir based on injection of water under vacuum?

MR. KELLAHIN: I'm going to object to that question. The man has already admitted in cross examination that he has not made that study or those calculations. Mr. Carr has failed to lay a proper foundation there.

Q. Mr. Renoult, are you familiar with the Oil Conservation Division rule that imposes the .2 of a pound

per foot of depth limit on the injection of produced fluids?

A. Yes, sir.

Q. Are you familiar with as to how that figure is obtained by the Commission?

A. Yes, sir.

Q. Could you basically summarize how that figure is obtained?

A. You must figure the difference between .7 psi per foot of depth and an aid of .5 psi per foot. This figure was derived to prevent fracturing formations.

MR. KELLAHIN: Mr. Ramey, I'm going to object to that answer and ask that it be stricken. The whole point of the discussion is that this man has testified that he did not know what the virgin pressure was in the formation; that he had not calculated the bottom hole pressure of the hydrostatic head of the water column in the disposal well; and it's simply taking the Commission information and making a calculation.

I believe that there's no proper foundation laid for this man to reach an expert opinion upon whether the Montoya, surrounding strata of the Montoya will be fractured by the disposal of water as he suggested.

MR. CARR: I believe this witness can

testify that he is familiar with the rule. He can testify that he -- as to how he interprets that rule and whether or not injecting into any formation under that pressure limitation would tend to fracture it, and that's what we're attempting to show.

MR. RAMEY: Overrule the objection.

Q. Mr. Renoult, I believe you have testified that you understand how the Commission obtained this -- set this .2 of a pound per square foot of depth figure.

Have you concluded your answer on that point?

A. Yes, sir.

Q. In your opinion how would you evaluate this injection pressure?

MR. KELLAHIN: I'm sorry, what was the question?

Q. In your opinion how would you characterize this injection pressure?

A. The .2 psi per foot is a safe gradient in order to prevent fracturing formation when a well is converted into a salt water disposal, and my -- my testimony showed that we are planning to inject less than 2880 barrels per day and we are planning to inject only 750 barrels per day under vacuum. Consequently, we will be below the guidelines

imposed by the Commission.

MR. KELLAHIN: For purposes of the record, Mr. Ramey, I'd like you to note my continuing objection to this line of questioning and opinions elicited from this witness from this testimony.

MR. RAMEY: We will so note, Mr. Kellahin. I want you to understand that we're taking the answers for what they're worth.

MR. KELLAHIN: That's always the case, Mr. Ramey.

Q. Mr. Renoult, are you aware of any instance where you could inject within this pressure limitation and fracture the formation?

A. Excuse me?

Q. Are you aware of any situation where you could inject water under this fracture limitation or this pressure limitation imposed by the Commission and fracture any formation?

A. No, sir.

Q. Mr. Renoult, I believe in testifying from your Exhibit Number Twelve you told Mr. Kellahin that at a certain point in time injected water would be encroaching onto the Phillips lease, is that correct?

A. Yes, sir.

Q. And in what formation would that water be injected --in what formation would that water encroachment occur?

A. Water encroachment will occur in the Montoya formation where we're injecting the water.

Q. Now in regard to your Exhibit Number Thirteen, as it is presently shaded and as you testified today, does this correctly depict the location of the tight streaks that you testified to?

A. Yes, sir. There are two tight streaks, one from 7830 feet down to 7850 feet, with a 20-foot barrier, and we have a second tight streak from 7904 feet to 7934 feet, with a 30-foot impervious barrier.

Q. Mr. Renoult, will you now look at your Exhibit Number Sixteen, which is the core analysis on the Lambirth No. 2-A Well?

I believe you testified that the symbol VF in the column to the far right indicates vertical fracture, is that correct?

A. Yes, sir.

Q. Would this symbol note whether or not the fracture was able to transmit fluids?

A. Absolutely not.

Q. I'd like you to look, for example, at

interval indicated on the core, I think it's after number eight, it's 7830 feet. I believe that also indicates a vertical fracture at that point, is that correct?

A. Yes, sir.

Q. What is the permeability at that depth?

A. Okay, the permeability of sample number eight, which was retrieved from 7830 to 7831, is equal to .1 millidarcy. This permeability is a permeability to air under surface conditions and doesn't take into account the effect of the overburden and doesn't take into account that --

Q. If you took this under downhole conditions, would you anticipate that to be, the permeability to be greater or not?

A. Definitely smaller.

Q. So it would be tighter?

A. Yes, sir.

Q. Now this is permeability to air. If this was permeability to water, how would that affect it?

A. It would be even smaller.

Q. Is this vertical or horizontal permeability or does it make any difference?

A. (Cannot understand the witness at this point.)

Q. How does horizontal permeability compare

to vertical permeability generally?

A. Vertical permeability is generally smaller than horizontal permeability.

Q. So do you anticipate -- is this .1 millidarcy a conservative figure as to permeability?

A. That's a very conservative figure, as far as vertical permeability to water, and reservoir conditions is concerned.

Q. If this vertical fracture indicated was capable of transmitting fluids in that core at that point, would you anticipate the permeability to go up? Would that -- would that permeability figure --

MR. KELLAHIN: I'm going to object to that question. The witness has already testified that he did not take the core analysis and determine whether the fractures would communicate water or not.

Q. Was that your testimony, Mr. Renoult?

A. No, sir.

Q. Would you state what you testified on that point? Can you look at this core and tell if in fact there is vertical transmissibility of fluids?

MR. KELLAHIN: I think the witness has already answered that question, Mr. RAmey.

MR. CARR: And I believe the witness is --

MR. KELLAHIN: He said that he did not know or could not do it.

MR. CARR: We would request the permission of the Commission to let the witness answer the question. He is here and can answer it just as well as Mr. Kellahin recounting what he thinks he said.

MR. KELLAHIN: Mr. Ramey, Mr. Carr asked him the question, he got the wrong answer that he didn't want, and he asked him the question again and got a different answer. The witness is inconsistent under oath.

MR. CARR: And he is under oath and can correct that. I think the record will show whether or not he's been inconsistent and I think since he's here he can testify on this matter and that Mr. Kellahin would be well advised to let the witness proceed and answer the question instead of characterizing the testimony as he understood it.

MR. KELLAHIN: Please note my objection.

MR. RAMEY: I'll let the witness answer the question and note your objection, Mr. Kellahin.

Q. Mr. Renoult, from this core analysis can you tell if fluids can be transmitted vertically in the core?

A. Out of this core 40 percent of the footage has a permeability smaller than .5 millidarcy. This

indicates, once we take into account the different corrections I've been talking about, that this formation is not capable of permitting the water to migrate within the Fusselman formation.

Q. Mr. Renoult, I believe you testified that you were getting $35.00 a barrel for the oil.

A. Yes, sir, approximately.

Q. And that if you had to continue trucking oil that the project would still remain economic.

A. Yes, sir.

Q. If you increased the cost of the project would that tend to advance the economic limit on the wells in the area?

A. This will decrease the remaining producing life of the field.

Q. If the costs are higher, would that tend to result in ultimately hydrocarbons being left in the ground that otherwise would be produced?

A. Yes, sir.

MR. CARR: I have nothing further of Mr. Renoult, on redirect.

MR. RAMEY: Any other questions of Mr. Renoult?

MR. KELLAHIN: Yes, sir.

RECROSS EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Rencult, have you made any calculations to determine what the dollar amount is of the reduced economic life of the project by the continued trucking of the disposed water?

A. I have not made any calculations but based on the price of 1.58 with respect to $35.00 a barrel, this should reduce our reserve by approximately 4.5 percent.

Q. Have you examined any other formation or wells in the area to determine whether they're acceptable disposal formations, other than the Montoya formation in this proposed well?

A. Yes, sir. Enserch has tested the Glorieta formation in the Enserch Lambirth Well No. 5.

Q. Just a minute, now. You've tested the Glorieta in the No. 5 Well, and when did you conduct that test?

A. This test was conducted a few years ago.

Q. And the No. 5 Well is in Section 30? I'm sorry, Section 1.

A. Also Enserch tested the Granite Wash.

Q. I'm sorry, I didn't hear you.

A. Enserch tested the Granite Wash in this same well and both formations proved to be tight and couldn't be considered for injection of formation fluids.

Q. Okay. Apart from the proposed well, then, and the No. 5 Well in Section 1, those are the only two wells that you've tested for disposal purposes?

A. All the other Enserch wells are currently producing oil, with the exception of the Enserch Rader Well No. 1, which was P&A in July of 1979, and which doesn't offer any intervals where water could be disposed of.

Q. Thank you, Mr. Renoult.

MR. RAMEY: Any other questions of Mr. Renoult?

CROSS EXAMINATION

BY MR, RAMEY:

Q. Mr. Renoult, you testified that the Fusselman was a water drive reservoir? I think.

A. Yes, sir.

Q. Are all the wells producing from above your first tight streak that you've shown on your Exhibit Thirteen? From the Fusselman, that is?

A. I don't think that all the wells are producing from above the first tight streak, and I'm not really

sure, but I don't think so.

Q. Is this an edge water drive or is this a bottom water drive?

A. Edge water drive.

Q. Edge water drive, so at some place in the reservoir you have water above the tight streak that is moving into the, say, the perforated interval on the well that's exhibited on your Exhibit Thirteen?

A. Yes, sir.

Q. Thank you.

MR. RAMEY: Any other questions? The witness may be excused.

Let's recess till 1:15.

(Thereupon the noon recess was taken.)

MR. RAMEY: The hearing will come to order.

MR. CARR: At this time I'd call Mr. Tom Brown.

THOMAS E. BROWN

being called as a witness and being duly sworn upon his oath, testified as follows to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Would you state your full name and place of residence?

A. Thomas E. Brown, and I reside in Midland, Texas.

Q. By whom are you employed and in what capacity?

A. I'm employed as an area staff geologist by Enserch Exploration Corporation.

Q. Have you previously testified before this Commission or one of its examiners and had your credentials as a geologist accepted and made a matter of record?

A. Yes.

Q. Are you familiar with the application of Enserch in this case?

A. Yes.

Q. Are you familiar with the subject disposal well and the subject area?

A. Yes.

MR. CARR: Are the witness' qualifications acceptable?

MR. RAMEY: They are acceptable.

Q. Have you made a study of the proposed injection well?

A. Yes, I have.

Q. In making this study what did you review?

A. I reviewed the samples and log correlations of other known picks in the field to establish the formation in which we wanted to inject the salt water.

Q. Did you review the log of the subject well?

A. Yes, I did.

Q. And other wells in the area?

A. Yes, I have.

Q. Will you refer to what has been marked for identification as Applicant's Exhibit Fourteen, identify this for the Commission, and explain what it shows?

A. Exhibit Fourteen is a structural cross section hung on a -3200 subsea depth. It goes from the north part of the field, from the Enserch No. 7 Lambirth, through the Phillips Petroleum Company Lambirth "A" No. 4, and through the Enserch Exploration Gladys Rader No. 2, and on the south end it ends with the Enserch Exploration Gladys Rader No. 1

Well.

All the logs are porosity logs, which are compensated neutron formation density logs. The scale is 5 inches per loo foot vertically, it's a full sized log.

The correlations you see on there, such as the top of the Peterson lime, Fusselman, Montoya, and the Basement, are the correlations which we carried through the field.

In the Gladys Rader No. 2 the top of the Montoya that I carried through the field is at 7900 foot, and that top has been eroded in the Gladys Rader No. 1, and where this top is picked in the Phillips Lambirth "A" No. 4 is based on a log to log correlation.

Q. This is a structural cross section not a stratigraphic cross section, is that correct?

A. That's correct.

Q. Exactly why did you pick the 3200-foot datum?

A. Well, if I'd of picked a shallower one it obviously wouldn't have been on the logs, or the section would have had to be many feet high, so you have to pick a datum that will show up within the interval. So actually all the logs in the area in question would fall between about -32 and about -3500, so I had to pick a datum that was up out

of the correlations is all; it was an arbitrary figure.

Q. Does this show the Montoya perforations in the subject well?

A. Yes, it does.

Q. And where do they lie in respect to the Fusselman zone?

A. Below the Fusselman.

Q. I believe you have some shaded area traversing the exhibit. What do they indicate?

A. These are tight areas on the porosity log as best you can just correlate them log to log. They correspond in part to Exhibit Thirteen, I believe, of Daniel Renoult in his section involving the Phillips Lambirth "A" No. 4.

Q. Based on this exhibit does it appear to you that water injected in the perforations in the subject well would be able to migrate into the Fuseelman?

A. Based on this section alone, no.

Q. Generally speaking, how is the Montoya zone distinguished from the Fusselman zone?

A. In this particular area it is very difficult to distinguish between the two and generally the sole means of determining whether or not you're in the Fusselman or the Montoya formation, since they're both dolomite,

is done with insoluble residue studies. While in character and looking under a microscope there's not very much difference, the insoluble resides left when you dissolve these things in hydrochloric acid, the trace minerals that are left are definitely different.

Q. Now do insoluble residues in any way constitute a barrier between zones?

A. No, they do not.

Q. What do they show? Do they tie to the age of the reservoir, or what?

A. They show certain trace minerals associated with formation. The source of those minerals is -- probably has long since been obliterated by biogenetic changes within the rock.

Q. Would you now refer to what has been marked for identification as Enserch Exhibit Number Fifteen and identify this and explain what it shows?

A. Exhibit Number Fifteen is a sample study that was done on the samples in the lower part of the Enserch Exploration No. 2 Rader. Actually the section examined was from 7600 to 8000 feet. They were done by Charlie Timberlake in the Midland area.

Q. Is this a report that -- is this type of report commonly used by the industry?

A. Yes.

Q. And what does it show?

A. These are tops based on sample analysis and insoluble residue studies.

Q. Would you compare this data with the data on your structural cross section?

A. Charlie Timberlake picks the top of the Montoya at 7880, which is some 20 foot high to where I picked it, in the -- in the well.

Now the fact it doesn't correlate one to one is not surprising because samples get mixed slightly in the well and it's difficult to determine exactly the depth from which that sample came for certain, but you should be within like 10 or 20 foot of being correct, and this is caused by the variation from the time you drill a sample until it reaches the surface.

Q. Now what conclusions can you draw from this data?

A. That the perforations in which we want to dispose of water are in the Montoya formation.

Q. Were Exhibits Fourteen and Fifteen either prepared by you or under your direction and supervision? Or at your request?

A. Yes.

MR. CARR: At this time we would offer Enserch Exhibits Fourteen and Fifteen.

MR. RAMEY: Exhibits Fourteen and Fifteen will be admitted.

MR. CARR; I have nothing further of Mr. Brown on direct.

MR. RAMEY: Any questions of Mr. Brown? Mr. Kellahin.

MR. KELLAHIN: Yes, sir.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Brown, Exhibits Fourteen and Fifteen, except for the shaded area on the cross section, are identical to the exhibits you testified to at the Examiner Hearing, are they not?

A. Yes, I don't believe there's any change.

Q. I forgot exactly what you said, Mr. Brown. What conclusions did you draw for Mr. Carr just now with regards to your examination of this cross section?

A. That the perforated interval in which we wish to dispose of water in the Gladys Rader No. 2 is in the Montoya formation.

Q. That's the only conclusion you've drawn?

A. That's correct.

Q. Am I correct in understanding that you have not concluded that the disposal of water in the Montoya would remain confined to the Montoya?

A. I have not concluded that except for the fact that we do see shale on the -- on the top of the section and by the porosity log we've got a tight stringer that correlates across the two wells and we're below that point.

Q. Your testimony that you gave at the Examiner hearing, I assume, is still the same insofar as your answer to the following questions: On page fifteen I asked you, based upon your own information and study do you have an opinion as to whether that water will remain confined to the Montoya? Your answer then was, I do not know.

A. I don't know.

Q. Is this still your answer? All right. I'm curious about Exhibit Number Fifteen, Mr. Brown. The examination of the insoluble residues by the Residue Research Laboratory indicates a top of the Montoya at 7880 in the proposed disposal well.

A. That's correct.

Q. And you have picked 7900. You're 20 feet lower than theirs.

A. That's correct.

Q. All right. If you took that projection by the Research Laboratory on over to the Lambirth "A" No. 4 Well, where would their information place the top of the Montoya?

A. I don't know since I've never seen an insoluble residue study done on that well.

Q. Can we conclude that --

A. That's just based -- where I put it is based on a log to log correlation, as I said earlier.

Q. All right, is -- is there anything on your log on the Gladys Rader No. 2 that would identify the 7800 marker for the top of the Montoya used by the laboratory?

A. No.

Q. So based upon your study you can't reach an opinion as to where the laboratory top of the Montoya would appear in the Phillips Lambirth "A" No. 4 Well?

A. No, I couldn't say where he would pick it in that.

Q. You wouldn't know whether it was above or below the top of the Montoya as you've depicted it for that well?

A. No, I would not know.

Q. What's the purpose of Exhibit Number Fifteen, then, Mr. Brown, if it's not to show that different

geologists can disagree upon where the top of the Montoya is?

A. The purpose of it is Charlie Timberlake is considered an expert, so I use his determination as a means of saying where it was.

Q. All right. Mr. Timberlake's study of the residues begins at 7600 feet. Has he reported to you or given you any indication as to where he thinks the top and the bottom of the Fusselman are?

A. No. Of course I know the top,by log calculations and my correlations in here, is eroded in the Gladys Rader No. 2 and a lot of this material is probably detrital. I didn't ask him to determine the top and bottom of the Fusselman, only I asked -- he didn't have the log, incidentally, he only had a well and the samples and I said, where is the Montoya in this well based on those samples, and that was the study he gave me back.

Q. Based upon your correlation of the logs, though, you do find the Montoya present in the Phillips Lambirth "A" 4 Well, don't you?

A. Based on a log to log correlation.

Q. So this is not a situation where you would be disposing of water in a formation that is not present in an offsetting producing well.

In other words, the Montoya doesn't pinch

out before it gets to the Lambirth No. A-4 Well, does it?

A. I don't believe it does.

Q. So if you dispose of water in the Montoya at the very lease you're going to have water in the Montoya within the Montoya as defined in the producing Phillips well.

A. At some time.

Q. Have you made a study of any other formation as an alternative formation for the disposal of the produced water in this area?

A. I have not.

Q. And am I correct in understanding that this evidence of insoluble residues from which the top of the Montoya is picked is not an indication of an impermeable barrier between the two formations?

A. That's correct.

Q. All right.

MR. KELLAHIN: Nothing further. Thank you.

MR. RAMEY: Any other questions of Mr. Brown? Mr. Carr.

REDIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Brown, I believe you just testified that Enserch is proposing to inject water into the Montoya and that zone is present in the Phillips well, No. 4 Well, is that correct?

A. I believe it's present.

Q. Do you know whether or not the Phillips is producing anything from the Montoya, the Phillips well?

A. As I depict it here?

Q. Yes.

A. No. They are not.

Q. Do the insoluble residue studies indicate that you have two separate formations?

A. Not really. They only indicate that where we have perforated is in the Montoya.

Q. All right.

MR. CARR: I have nothing further.

MR. KELLAHIN: I have a question, Mr. Brown.

RECROSS EXAMINATION

BY MR. KELLAHIN:

Q. Not only does the Montoya not produce

in the Phillips well, it doesn't in any other well in the area, does it?

A. Again, to my knowledge, I don't think it produces anywhere in the entire county.

Q. It's not productive of hydrocarbons, all it's got in it is water.

A. Everywhere that I've ever seen it that's the case.

MR. KELLAHIN: Nothing further.

MR. RAMEY: Any other questions? Mr. Brown, you may be excused.

MR. CARR: That concludes our direct presentation.

MR. RAMEY: Mr. Kellahin, you may proceed.

JERRY N. BLEVINS

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. All right, Mr. Blevins, would you state your name and occupation?

A. My name is Jerry N. Blevins. I'm an

Associate Reservoir Engineer for Phillips Petroleum Company.

Q. Mr. Blevins, have you previously testified as petroleum engineer before the Division and had your qualifications accepted and made a matter of record?

A. Yes, sir.

Q. Would you describe for the Commission how long you've been employed by Phillips?

A. For the past four years I've been employed, the last year being in Odessa.

Q. During that period of employment what, if any, time have you devoted to studying or working in the South Peterson Fusselman Pool?

A. Well, during the last year it was a major part of my time was spent in the South Peterson Pool.

Q. Does that study of this pool include the study of logs and other geologic information?

A. Yes, sir.

Q. As well as engineering, petroleum engineering data from the pool?

A. Yes, sir.

Q. And did you previously testify in the Examiner Hearing in this case?

A. Yes, sir.

MR. KELLAHIN: We tender Mr. Blevins

as an expert petroleum engineer.

MR. RAMEY: So qualified.

Q. Mr. Blevins, I'd like to direct your attention to Phillips' Exhibit Number One and have you identify that for me.

A. This is a plat of the Peterson South Pool in Roosevelt County, New Mexico. The green shade is Phillips acreage, which we currently have or have proposed a well to be drilled.

The pink colored circles are Fusselman completions. The blue colored circles are Penn completions. The purple arrow points to the Rader Well No. 2.

Q. All right, sir. It's been previously testified today that there are some 10 Fusselman oil producing wells in this pool, is that correct?

A. Yes, sir.

Q. And of those wells how many does Phillips operate?

A. Five.

Q. And do any of those wells make water?

A. Yes, sir.

Q. And what is Phillips currently doing with the water production, Mr. Blevins?

A. We either haul it off to a disposal

system or part of our water is accepted up in the Amoco well in the Peterson Field, depening on their capability of handling it or not, depending on how much water we have to haul away.

Q. What does it currently cost you to -- per barrel to truck your water away?

A. For 1980 the average was $1.14 per barrel. The trucking to Amoco's well is much more cheap and the trucking to a disposal system approaches $2.06 a barrel, but on an average it was $1.14 a barrel.

Q. What is the current oil price per barrel being received by Phillips for the sale of the produced oil?

A. Our last price was $31.00 a barrel.

Q. In your opinion, Mr. Blevins, is it currently economic for Phillips to continue to truck away the water from the producing Fussèlman well?

A. Yes, sir.

Q. Do you have any opinion, Mr. Blevins, as to at what point it will no longer be economic to continue to truck away the produced water?

A. My calculations say when the water percent reaches above 90 percent of the total production.

Q. Are you familiar with the Enserch operations within this field?

A. Somewhat.

Q. Are you familiar with the, generally, with the volumes of water produced from their wells and the oil produced from those wells?

A. Yes, sir.

Q. In your opinion are their water needs significantly different from those of Phillips with regards to the disposal of the produced water?

A. They produce twice as much water as we do, so they might be in a little more bind than what we are.

Q. Based upon your knowledge and study of the area, Mr. Blevins, do you have an opinion as to whether or not it is still economic for Enserch to continue to truck away the water?

A. It should be.

Q. Would you give us some percentages, Mr. Blevins, what percentage of the oil is produced by Phillips and what percentage of the water is produced by Phillips?

A. Tom, that's on Exhibit Four.

Q. All right, let's wait and pick it up later.

A. Right.

Q. Okay. Is there anything else you want to direct our attention to with regards to Exhibit Number One before we leave that?

A. No, sir.

Q. All right, let's go to Exhibit Number Two.

All right, sir, would you describe for us what Exhibit Number Two is?

A. This is a north/south cross section going from the north, our Peterson"H" No. 1 to the far left, the Lambirth "A" No. 4, our Fusselman producer, the Enserch Rader No. 2, the proposed injection well, and the Lambirth "A" No. 1, a Fusselman producer.

The blue shaded area is the Penn zone and the pink shaded area is the Fusselman zone. The perforations are marked at the bottom of each log by number. You'll notice in the Peterson "H" about 7330 to 40 a small green section, which is our proposed injection interval to come up later before the Commission, and the green section on the Rader No. 2 is their proposed injection system.

Q. All right, let me ask you about the Peterson "H" No. 1. What do you propose to do with the green identified section in that well?

A. We are proposing to inject water into it.

Q. And where is that well? That's the dry hole --

A. That's the dry hole --

Q. -- on Exhibit Number One in Section 29?

A. Yes, sir.

Q. All right.

MR. RAMEY: Excuse me, I don't understand, where is the injection -- oh.

Q. Now, this is Phillips' proposed disposal formation, is it not?

A. Yes, sir.

Q. All right. And what is that formation you propose to dispose water into?

A. The Wolfcamp. Have you tested the Wolfcamp with regards to its acceptability as a disposal formation?

A. Yes, sir.

Q. And what have you found?

A. That it would take water under pressure. We will propose to install a pumping system to inject the water into the formation.

Q. All right. Now let's go over to the third well from the left on the cross section and I believe you've identified that as Enserch' proposed disposal well?

A. Yes, sir.

Q. And what is indicated by the green line

at the bottom of that log?

A. That's their proposed injection interval.

Q. All right, sir. The well in between, then, is the Phillips Lambirth "A" No. 4?

A. Yes, sir.

Q. And what is that well in relation to the disposal well? This is your closest producing well, isn't it?

A. Yes, it is, sir.

Q. All right. Mr. Blevins, what is Phillips' position with regards, then, to Enserch's application to inject produced waters into the Gladys Rader No. 2?

A. We feel that there are no barriers between what they call the Montoya and our Fusselman; therefor they cannot contain the water that they inject and it would water out our wells or possibly their wells and we are opposing it on that basis.

Q. Are you aware of any way, Mr. Blevins, that we might recommend a procedure or a method of monitoring the proposed disposal well to insure that the disposed water does not migrate onto Phillips' leases?

A. Not without undue cost.

Q. Have you made any calculations of the remaining producable reserves that can be produced by the

Phillips 4-A Well out of the Fusselman?

A. Our estimate is about 25,000 barrels.

Q. And based upon the current oil prices for oil, have you converted that to current dollar amount?

A. It's about $750,000 gross.

Q. In the event the proposed disposal well is approved, what, if any, impact will that have upon the remaining producable reserves from the Phillips 4-A Well?

A. If the water breaks through it will knock out any remaining reserves we have.

Q. Based upon your examination of the logs in the various wells depicted on Exhibit Number Two, Mr. Blevins, do you find any evidence of barriers that might be impermeable so thereby the Montoya could be isolated from the Fusselman?

A. Not due to the fracturing.

Q. All right explain to me what you mean by "not due to the fracturing".

A. Well, even with tight streaks in the area, the fracturing of the Fusselman itself would just over-ride any tight streaks that you would have. You could have tight streaks that would be permeable due to the fractures themselves.

Q. All right, sir, is there anything else

about Exhibit Number Two you want to talk about?

A. No, sir.

Q. All right, let's go to Exhibit Number Three.

All right, Mr. Blevins, would you identify for us Exhibit Number Three?

A. Exhibit Number Three is a structure map of the Fusselman zone in the Peterson South Field, with again the pink dots representing Fusselman completion; the blue dots representing Penn completions. The purple arrow again shows the Rader No. 2 Well.

Q. What's the purpose of the exhibit, Mr. Blevins?

A. The purpose of this exhibit is to show that the waters, if communicated with the Fusselman, would migrate to a producer that is up structure, and the closest two Fusselman producers are our Lambirth "A" No. 4 and our Lambirth "A" No. 1. These wells would, due to drawdown on the pressures, would have the greatest chance of watering out of the wells in the area.

Q. Those two wells are structurally higher than the proposed disposal well?

A. Yes, sir.

Q. All right. Anything else about Exhibit

Number Three?

A. No, sir.

Q. Let me direct your attention to Exhibit Number Four, Mr. Blevins. Would you identify that exhibit for us?

A. This is the April production as it was turned in to the NMOCD and calculated back to daily averages for each of the wells in the respective zones.

The first numbers you will see will be the oil barrels/and then the barrels of water.

The Fusselman completions throughout there indicate wells producing water; some wells not producing water with the oil.

Enserch Exploration No. 3 is 312 Mcf of gas a day. It's the only gas well in the field.

Based on calculations made, Enserch averages 395 days -- excuse me, 395 barrels per day out of the Fusselman; Phillips has 230 barrels per day.

Enserch has 657 barrels of water and Phillips has 231 barrels of water.

Out of the Penn Enserch makes 32 barrels of oil and 19 barrels of water. Phillips, out of the Penn, makes 37 barrels of oil and 72 barrels of water.

Total water production, Enserch has

676 barrels a day from March and Phillips has 303 barrels, so roughly, they produce twice the amount of water that we do.

Q. What's the conclusion, if any, from the exhibit, Mr. Blevins?

A. That the wells do make water and that they're within reason of what a water drive reservoir would handle.

Q. All right. Mr. Ramey asked a question before lunch concerning whether or not all the Fusselman wells in this pool were producing above the uppermost tight streak that Mr. Renoult identified in the Lambirth 4-A Well. What, if any, knowledge do you have about the production perforations of the various Fusselman wells in relation to that tight streak?

A. Well, ffrst of all, the tight streak is not continuous throughout the field and therefor it's very possible that we have production below the tight streak, if it was correlated, but since it's not correlated throughout the field, it's -- it's very difficult to say whether we're below or above it.

Q. All right, sir, anything else about Exhibit Number Four?

A. No. There is one other thing.

We both have five wells in the Fusselman

and we both have two wells in the Penn.

Q. All right, sir, if you'll turn to Exhibit Number Five, Mr. Blevins. Would you identify that for us, that exhibit?

A. This is the monthly production of the Peterson South Field, both the Fusselman and the Penn, both the first set is the total of the Fusselman wells by month as turned in to the Commission, and then each well individually broken down.

Then we have the Penn wells turned in total and then broken down by each well.

If you will look through there as previously testified earlier today, you can see the Lambirth No. 1 of Enserch does not make water; the Enserch Lambirth No. 10, I mean No. 9 makes very little water; our Lambirth "A" 2 has made little water considering -- except for the last two months. Our Lambirth No. 3 makes very little water, and so I would say even in a water drive reservoir it's very likely we're not -- we're producing water free in some of the wells.

Q. For example, when you turn to the tabulation of production for the Lambirth 4-A Well, that's the eighth page of the exhibit.

A. Uh-huh.

Q. You've updated the production for all

the wells in the pool through what date?

A. Through the end of March.

Q. And what does that indicate with regards to the water production on the Lambirth 4-A Well?

A. In February we produced 3116 barrels of water; in March we produced 4247 barrels of water, or approximately a one to one ratio with the oil.

Q. What, if any, significance could you attribute to the absence of water production in any of the offset Fusselman wells?

A. Basically, on well testing would be one way. The high productivity of the well would make well testing very hard. You might not catch water one month where you would the next. The water is -- could be erratic, like the production data indicates. It could come in and go back out, depending on the fractures, as far as logging up to production.

Q. Okay. Let's go to Exhibit Number Six, please. All right, sir, what's Exhibit Number Six?

A. This is a core record, core description, by our geologist on our Lambirth "A" No. 2 Well. We cored the Fusselman and this is a description of what the rock looked like when it came out of the hole.

You'll notice at 7823 to 26 we have a finely crystalline, vugular fractured porosity in that inter-

val. 7826 to 31 we have large vertical fractures. 7831 to 49 we have many thin vertical fractures. This core would indicate that the formation itself is fractured.

Q. With regards to the core information, can you identify for us at which point in the exhibit the footage correlates to what Mr. Renoult picks as the tight section in that well?

A. I would have to do that from the logs.

Q. Generally speaking, would this represent fracture existing through any of the two tight sections that Mr. Renoult has identified?

A. Yes, sir. The average fracture, based on the deposits of the Fusselman, the uplifting that would cause these fractures would have fractured everything down to the Granite that was the uplifting force.

Q. Do you recall Mr. Renoult's testimony before the noon hour that the measurement of the fractures when recreated at the formation pressures would diminish the impact of those fractures on the formation? Do you concur with that opinion?

A. Under pressures it would collapse the fractures a little bit, yes, sir.

Q. All right. How would you compare that to Mr. Renoult's testimony with regards to the atmospheric

pressure at the surface and the existance of those fractures?

A. No -- yeah, the fractures are going to be there anyway, and when they measured the cores and stuff, they're encapsulated in a rubber sleeve, and air is passed through the cores under a high pressure, 1000 pounds or so. It's not anywhere near the bottom hole pressure here but it's still more than atmospheric pressure. So there is some confining restraints on these when all this is done.

Q. In your opinion will the existance of the fractures in the formation under formation pressure be significant in order that water or other fluids might migrate through those fractures?

A. Yes, sir.

Q. All right, sir, let's turn to Exhibit Number Seven. Would you identify Exhibit Number Seven for us, Mr. Blevins?

A. Exhibit Number Seven is the CORE Laboratory report prepared for us on our Lambirth "A" No. 2. We cored the Fusselman and if you'll look to the back page of the exhibit you'll see that "X" marked the cored interval, and on the other side is where we perforated the well.

This core indicates that we have permeabilities that vary from 566 millidarcies down to less than .1 millidarcy. Porosities run from about 4.6 to, oh, 12, 13

percent porosity.

This core indicates over on the far righthand side the description that the well is very fractured or slightly fractured throughout the entire core.

With the permeability variations ranged likeit is, I'd say sometimes they measured the permeabilities of the fractures themselves, in fact.

Q. This is the same exhibit that Mr. Renoult referred to this morning, is it not?

A. The first --

Q. The same --

A. -- two sheets are.

Q. The same core analysis?

A. Yes, sir, same core analysis.

Q. Do you agree, then, or disagree with the conclusions that Mr. Renoult concluded from an examination of this exhibit?

A. No, sir, I don't.

Q. You don't agree with him?

A. No, sir.

Q. Would you generally describe for us the reservoir parameters for the Fusselman formation? What would you expect for the porosity and permeability?

A. Well, the porosity is going to run about

10, 12, 16 percent in a normal completion.

The permeabilities, based on the core, run approximately 30 to 35 millidarices. Permeabilities based on pressure build-up analysis are in the range of 4 or 500 millidarcies.

Q. You are aware, are you not, that the spacing for this pool is on 80 acres?

A. Yes, sir.

Q. To what do you attribute the fact that this pool is spaced wider than the normal 40-acre spacing?

A. The high conductivity of the formation.

Q. And what causes the high conductivity in the formation?

A. The fracture system.

Q. Would you refer to Exhibit Number Eight? And identify that for us?

A. This is CORE Laboratory work on the Lambirth "A" No. 3 Well in South Peterson Field. Again on the last page you see an "X" marking the cored interval and on the opposite side perforations where we have completed the well.

The descriptions of the cores, basically, say slightly fractured reservoir with permeabilities less than .1 millidarcy.

The porosities in this interval were also extremely low, 2, 4 percent, which is not normally seen.

Q. This is also the first page of the same exhibit that Mr. Renoult referred to this morning, is it not?

A. Yes, sir, and the bad well that this is can be pretty well justified with the production history that we have in earlier exhibits.

Q. All right, draw that analysis for me, would you, please?

A. The low permeability is not a very productive well. The cumulative production on this well is extremely low as compared to the rest of the wells. Our Lambirth "A" 2, which you saw the tremendous permeabilities has cumed 120,000 barrels of oil.

Our Lambirth No. 3 Well has only cumed 23,000 barrels of oil. So the core data indicates that this, this well is much more tighter or not as consistent with the extreme fractured nature as No. 2 is.

Q. I'm not sure I understood you. The No. 3 Well, Exhibit Number Eight, doesn't evidence the extent of fracturing as the "A" No. 2 Well?

A. Yes, sir, No. 2 is much more fractured than No. 3.

Q. And how does the production compare

between the No. 3 and the A-2 well?

A. A-2 is about six times greater than the A-3.

Q. Based upon that study you conclude that the production is significantly affected because of the fracturing?

A. Yes, sir.

Q. You have examined core analysis for three of the wells involved in this pool. In your opinion is the fracturing limited to those three wells or is it typical of the Fusselman formation?

A. No, sir, it would be typical of the Fusselman formation.

Q. Based upon your studies as an engineer, Mr. Blevins, would you recommend to your management that the Montoya formation in the proposed disposal well be used as a disposal interval for produced water?

A. No, sir.

Q. And why not?

A. Because you couldn't tell where the water was going. It could flood out some of our wells very rapidly.

Q. I direct your attention to Exhibit Number Nine, and what is Exhibit Number Nine?

A. Exhibit Number Nine is the CORE Laboratory report on Enserch Exploration's Lambirth No. 3 in South Peterson Field.

Again the descriptions over at the far right side show that this is a very fractured system completely throughout the whole core analysis. It goes from slightly fractured to fractured to very fractured.

Again you can note that even in very fractured intervals, such as 7812 to 13.3, the permeability to air is .1 millidarcy and it's fractured over on the other side, so it can be tight and still be fractured.

Q. Okay. Mr. Blevins, you were present in the hearing room when Mr. Renoult testified this morning that Enserch had amended its application to request that instead of approval to dispose of 1650 barrels of produced water a day, that they were willing for a maximum of 750 barrels of water per day be set. In your opinion would that significantly reduce Phillips objection in this case?

A. No sir.

Q. Why not?

A. Because it's still going to have a possibility of ruining our A-4 Well and if we lose those reserves we're talking a lot of money.

Q. Based upon your studies, Mr. Blevins, do

you have an opinion as to what the original bottom hole pressure was in the Fusselman formation?

A. Our measured bottom hole pressures in our Lambirth "A" 2 originally were 2707 pounds. Bottom hole pressure last time we measured was, in 4 of '80 was 2702 pounds.

Q. Have you made a study of the amount of pressure as a result of the hydrostatic head of the water in the disposal well to determine what that pressure would be in the formation?

A. Into the Montoya?

Q. Into the Montoya in the disposal well?

A. It would be approaching above 3000 pounds.

Q. Do you have an opinion as to what the pressure differential or the pressure increase would be as a result of the disposal pressure versus the virgin reservoir pressure in the Fusselman?

A. In communication situations it would go back into the Fusselman due to the difference in the pressures.

Q. So despite the existence of the Commission guideline of 0.2 psi per foot of depth and the disposal of water under vacuum, in your opinion there would be

adverse consequences for the disposal of water into the Montoya formation?

A. Yes, sir.

Q. Would you refer to Exhibit Number Ten and identify that?

A. This is a pressure build-up analysis on the Lambirth "A" No. 2. It's just a rough estimate, basically because we had P* in six minutes. The first point at 2689 was the original shut-in bottom hole pressure. Six minutes later we reached a constant pressure that has -- that lasted over 40 minutes, and it's at 2697.

Based on that I made a reservoir calculation of the flow conductivity of the formation. You'll see based on the slope of 4 psi per cycle, which is in my calculations, we came up with KH of 7962 millidarcy feet. The flow capacity of the well with a 20-foot section would be approximately 400 millidarcies.

Q. What's the significance of that, Mr. Blevins?

A. This would indicate that even with the core permeabilities measured of being 30 and 40, that the capacity of the well to flow is in the range of 400, or 10 times that much overall the total formation. It's a way of getting a true permeability measurement from the reservoir itself.

Q. And what does that mean, then?

A. That means that the system is fractured.

Q. All right, sir, let's turn to Exhibit Number Eleven. Would you identify Exhibit Number Eleven for us?

A. Exhibit Number Eleven is the injectivity test we ran on the Peterson "H" No. 1 in the Wolfcamp zone.

On here we've shown the wellhead injection pressure, the wellhead injection pressure minus the tubing --

Q. Excuse me, now this -- I've lost track. The Peterson "H" No. 1 Well is what?

A. That's our proposed --

Q. Disposal well.

A. -- disposal well, yes.

Q. In the Wolfcamp?

A. In the Wolfcamp.

Q. Up in Section 29?

A. Yes, sir.

Q. All right.

MR. CARR: I'm going to object to this line of testimony. Phillips has already testified that they have other plans for the disposal of water. We do believe, however, going into injectivity tests and detailed data on

their plans for the Wolfcamp are not properly matters -- properly before the Commission in this hearing, but should properly be raised in their case which is scheduled for two weeks from today on this application.

MR. KELLAHIN: Mr. Ramey, the purpose of this exhibit is to demontrate that there are other formations available in the area that may be used as disposal formations for the produced Fusselman water that don't pose the tremendous risk upon the Fusselman producing wells that disposal into the Montoya formation would constitute. and we believe that it's relevant to show that the other formations are available.

MR. RAMEY: I'll overrule the objection.

Q. Would you please continue with your testimony?

A. Yes. On this we have four curves. The wellhead injection pressure, which was the pressures at which we were injecting water into the formation, from that I subtracted the friction due to tubing while we were injecting, and which is the second curve as you go down.

The third curve is the instantaneous wellhead shutdown pressure. This is when you shut down the pumps what the pressure is at the moment you shut down.

The last curve is five minute shutdown pressures. This is what the formation heals back to as far as

the pressure of the formation in just a static column.

You'll see that we're injecting at 1400 pounds of pressure or above on our wellhead. Our instantaneous wellhead curve will show you what the formation or the parting pressure would look like if it would level out. Since it's continuing going up with the wellhead injection pressure, we will never part that formation, so it is confined into the Wolfcamp.

Q. Would you refer to Exhibit Number Twelve, please, and identify that?

A. Exhibit Number Twelve is an example of an injectivity test run down 2-3/8ths inch tubing at 7900 feet with 9 pound brine.

You'll see a wellhead injection pressure curve with a vacuum with 600 pounds, 1500 pounds, and 2400 pounds.

If you take out the tubing friction due to these wells, you'll see that the bottom line, or the static column injection pressure of this is a -549 pounds on the average. This means that that formation will take water at approximately 1174 foot below the surface, so you have a static colum of water that's from 7900 back to 1174, or 6726 feet of water, and from that point on that formation will take water, and that formation has been parted. It's -- it's continual.

This line will stay constant no matter what kind of injection pressure you have on the wellhead.

Q. In your opinion, Mr. Blevins, would approval of Enserch's application constitute an unreasonable risk to the correlative rights of Phillips Petroleum Company?

A. Yes, sir, it would.

Q. In your opinion would approval of the application constitute the premature watering out of the Phillips' wells currently being produced from the Fusselman?

A. They would prematurely extort our oil.

Q. In your opinion is the Montoya formation in communication with the Fusselman formation?

A. Due to the fracturing, yes, sir.

Q. Were Exhibits One through Twelve prepared by you directly or compiled under your direction and supervision?

A. Yes, sir, they were.

MR. KELLAHIN: That concludes our direct examination of Mr. Blevins. We move the admission of Exhibits One through Twelve.

MR. RAMEY: Exhibits One through Twelve will be admitted.

Any questions of Mr. Blevins?

MR. CARR: I have a few.

MR. RAMEY: Mr. Carr.

CROSS EXAMINATION

BY MR. CARR:

Q. Mr. Blevins, I believe you testified that it was costing you approximately $1.14 a barrel to remove the water from the -- that of wells in this general area, is that correct?

A. On the average for 1980, yes, sir.

Q. If a disposal well was available in the area, would this result in an economical savings to all operators in the area if they were permitted to inject produced waters?

A. It should.

Q. Would the existance of a satisfactory disposal well lower the cost of producing hydrocarbons -- oil from the pools in the area?

A. Yes, sir.

Q. If you are operating wells with lower costs can you operate them generally for a longer period of time?

A. Yes, sir.

Q. And if you operate them for a longer period of time won't you be able to actually recover more

hydrocarbons?

A. Possibly.

Q. I'd like for you to look briefly at your Exhibit Number Two. It's the cross section.

Now correct me if I'm wrong. I believe you testified that you saw no barriers between the Fusselman and the Montoya, is that correct?

A. Yes, sir, that's correct.

Q. Do you see the Montoya at all on this exhibit or do you show it all?

A. No, sir.

Q. So as far as you're concerned, there is no Montoya on this exhibit -- on this exhibit is that correct?

A. No Montoya in the field as far as I'm concerned.

Q. Okay. Can you see tight streaks in this area?

A. Yes, sir.

Q. Okay. But you're of the opinion that these do not constitute barriers?

A. Not due to the fractures.

Q. Okay, and that -- is it your testimony that the reason that there are no barriers here is because of

the fractured nature of the formation, not because of the tightness of the formation?

A. The fractures play the greatest part in that, yes, sir.

Q. Now I believe you testified that you estimated in your Lambirth "A" No. 4 Well approximately 25,000 barrels of estimated reserves?

A. Yes, sir.

Q. Do you have any estimate as to how long it would take you to produce those resrves?

A. 4-1/2 or 5 years.

Q. Now if there was no water encroachment under -- any water injected got into the Fusselman but did not reach this well for, say, 10 years, would that adversely affect your ability to produce those 25,000 barrels?

A. I'm not sure I follow that.

Q. If you have no water problems for, say, 10 years, would that impair your ability to produce those estimated reserves in the Lambirth 4-A?

A. No, sir, if we had no water problem.

Q. Now I believe you testified that, at some length, that there were fractures in the reservoir. Do you have any evidence which shows -- which shows that any of these fractures tend to transmit fluids?

A. Yes, sir.

If you will look at my Exhibit Number Ten, the pressure build-up on the Lambirth "A" No. 2.

Q. And what does that show?

A. With the build-up as fast as it is, we have a calculation at the bottom that says KH is equal to 7962 millidarcy feet. Our H in the well is approximately 20 feet. That means the K is 398.1 millidarcies or approximately 400 millidarcies.

The core indicates this is 30 to 40 millidarcies throughout the interval. This is 10 times what the core permeability indicates.

The transmissibility of the fluids through this formation is as much greater capacity than what the core indicates; therefor, it is a fractured system and we are able to produce a lot more oil and water due to that fact.

Q. Does this test show vertical or horizontal permeability?

A. It shows total permeability of the reservoir.

Q. And what is the interval depth that this is designed to reflect.

A. The interval depth?

Q. I mean you're -- you've certainly taken

an interval in a core or something.

A. For this?

Q. Yes.

A. No, sir. I measured -- I ran bottom hole pressure down to the bottom of the perforations in the "A" 2. You can see those clearly marked on Exhibit Seven, I believe. They're at 7832 to 38. By measuring the bottom hole pressure and the build-up, you're able to get a permeability measurement.

Q. I'd like to direct your attention to your Exhibit Number Six. I'd ask you who prepared this exhibit?

A. Our geologist at Phillips Petroleum.

Q. I believe on the column that is headed depth, it says that Mr. Drisko -- has Mr. Drisko's name, is that correct?

A. Yes, sir.

Q. Did he prepare this exhibit?

A. Yes, sir.

Q. All right. Will he be testifying in this proceeding today?

MR. KELLAHIN: Yes, sir.

Q. I would now like to direct your attention to your Exhibit Number Seven. Does this show horizontal or vertical permeability?

A. Vertical.

Q. To determine what the vertical permeability is through this area, how do you -- how do you read this exhibit? Do you take the permeability column and read down that column?

A. Do I? No, sir.

Q. Is that how you would --

A. I look at the depth. I look at my log, and I look at the permeability that I see across from the depth.

Q. Okay, so if we go down to the depth of, say, 7828 to 7829.

A. Yes, sir.

Q. What is the permeability at that interval?

A. .1 millidarcies.

Q. And then go down another foot and what is it?

A. .1 millidarcies.

Q. And another foot?

A. .1 millidarcies.

Q. So you have a 3-foot area there where the permeability of -- according to these calculations is .1 millidarcy.

A. That's right, and I've got a very good description over here on the opposite side that says fractured, very fractured, very fractured.

Q. Okay, now, when you read this, when you take a core analysis, if those fractures, the very fractured intervals, if they were actually conducting, transmitting fluids, wouldn't those permeability figures be higher?

A. That depends.

Q. Well now, --

A. It doesn't say what direction these fractures were running. That's a look, they look at the core. That's what this is. This is a visual description of this core. This is an actual measurement.

When we have a fractured system I'm not going to say whether it's vertical fractures or horizontal fractures. You could have them both.

Q. But you can say that in this interval there is a 3-foot streak with permeability based on this calculation of .1 millidarcy.

A. Yes, sir, there is.

Q. Okay. Now I believe you also testified that even though there was some confining pressure on the core, that it wasn't equal to reservoir conditions.

A. Yes, sir, that's true.

Q. And in the reservoir you would expect the permeability at this interval to be less, is that correct?

A. Yes, sir, I would.

Q. And would you also expect it to be less if it was permeability against water as opposed to permeability against oil?

A. Yes, sir, I sure would.

Q. So that actually this figure might be even reduced if we were actually dealing with reservoir conditions?

A. Yes, sir, it would.

Q. So we have a streak 3 feet in width with a -- that would -- is it fair to characterize that streak as tight?

A. That's tight, but like I said when I told you that the fractures played the most important role in this area, there's still fractures.

Q. Does the --

A. It's tight due to vertical --

Q. Is there --

A. -- doesn't mean it's tight due to horizontal.

Q. Is there anything here that shows you whether or not you are -- that the core is capable of con-

ducting fluids vertically?

A. No, sir, that's why I did Number --

Q. Fine, thank you.

A. -- Seven.

Q. Now if we look at your second core analysis, marked as your Exhibit Number Eight.

A. Yes, sir.

Q. Does this not indicate that you have a tight zone?

A. Yes, sir, it's tight.

Q. Is there -- do you believe that either of these cores would be typical of the reservoir as a whole?

A. Number Two probably more than Number Three.

Q. It would be Exhibit Number Seven more than Number Eight?

A. Yes, sir. And that again is based on the total production of the wells.

Q. Now I'd like to direct your attention to your Exhibit Number Nine.

A. Yes, sir.

Q. This core analysis is again to air, I guess, yes, is that correct?

A. Sir?

Q. This is permeability to air.

A. Yes, sir.

Q. Okay. If we go down to a depth of 7807 feet and we go from that depth down to 7812 feet, don't we have a permeability throughout that stringer of less than .1 millidarcy?

A. 7807 to 7812?

Q. Uh-huh.

A. You're reading the 90 degree. Over here is -- we have -- the first one I see is .4. I have a 1.6, a .4, less than .1, a .1, so I can't say that it's not, you know, it's greater than .1.

Q. If you start at 7808 -- let me see, maybe I just can't line this up, 7809, and you go down from there to 7812, don't we again have a 3-foot stringer -- interval there with less than .1 millidarcy permeability?

A. From 7809 to 7812?

Q. Yes, sir.

A. Yes, sir, it's measured at .1.

Q. And again this would be probably less, there would be less permeability under reservoir conditions?

A. Yes, sir.

Q. Did you actually examine any of the cores when they were taken?

A. No, sir.

Q. I believe you testified in regard to the water production in these wells that it was erratic, is that correct?

A. Yes, sir.

Q. Is that typical for a water drive reservoir? I just don't know.

A. It's hard to say. Is is for this reservoir, apparently.

Q. Now I believe you testified that you were of the opinion that injection of water as proposed by Enserch could ruin the "A" 4 Well.

A. Yes, sir, or any other well in the field.

Q. And this is based on the assumption, of course, that there is communication between the Montoya and the Fusselman.

A. With the fractures there would be.

Q. You're basing it on that assumption?

A. Yes, sir.

Q. And even if there was communication you would still testify that it would ruin your "A" 4 Well no matter how long it would take for water to migrate to the formation?

A. Yes, sir, it would wipe it out.

Q. And even if it could be shown that the water wouldn't reach the well until after it passed its economic limit.

A. You're going to be injecting water into a well here, it's going to move the water over here that's already there.

If you're going to -- there would be a one to one ratio there.

Q. Well, if you're going to inject water into a well in one section there's an immediate one to one ratio in all the wells that are in that same horizon?

A. There has to be.

Q. Immediately?

A. For you to move a volume of water here it's got to move a volume of water here.

Q. Doesn't it take some time for there to be that kind of response?

A. It can't. You couldn't put the water in if it wasn't moving something out of the way.

Q. But would it cross a large area immediately or would it take some time for there to be response at a distant interval?

A. You couldn't measure it right away. It

would happen but you couldn't measure it.

Q. But if there was no measured response for an extended period of time you would still believe that you would be endangered by an injection --

A. Yes, sir, we would.

Q. -- of water in an offsetting property?

MR. CARR: I don't have any other questions of Mr. Blevins on cross.

MR. RAMEY: Any other questions of Mr. Blevins, Mr. Kellahin?

MR. KELLAHIN: Yes, sir.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q. I direct your attention back to the core analysis that Mr. Carr spent some time on, Mr. Blevins.

Let's take, for example, the Number Seven Exhibit, which is the analysis on the Lambirth "A" 2 Well.

Mr. Carr directed your attention to entries six, seven, and eight on that exhibit.

A. Yes.

Q. Which indicated permeability of less than .1 of a millidarcy. What is indicated by the asterisk

in the next column?

A. That's the plug permeability is too great to measure.

Q. I don't understand what that means.

A. It's greater than their equipment will handle, which when they turn the core sideways.

Q. The permeability is too great to measure?

A. Too great for them to measure.

Q. And what causes that to happen?

A. Fractures.

Q. So despite the fact that the permeability may be low in the first column because of the highly fractured nature of the formation there is communication through that zone?

A. Yes, sir.

Q. Now let me ask you to turn to the attachment to Exhibit Number Seven, which is a section of the log, and there was some discussion with regards to washout and whether that was evidence of fracture indication on a log. Would you direct your attention to that and identify that for us?

A. Yes, sir. Over the cored interval you can see, based on the first two sheets that were fractured throughout the coring, there's nothing in this interval that

I would call a washout. The last 20 feet is a very well drilled hole, actually, and so from a caliper you couldn't see fractures that you would call a washout. There is not really a washout on that example.

Q. I believe it was Mr. Renoult's testimony this morning that -- correct me if I'm wrong -- was that if the log indicated no washout, in other words, you had to see an evidence of washout on the log to have evidence of the fracture? Did I get that right?

A. I believe that's what he said.

Q. All right. In your opinion would evidence, lack of evidence of washout on the log demonstrate a lack of a fracture through that section?

A. No, sir, the washout has nothing to do with it.

Q. And that's actually what Exhibit Number Seven shows, doesn't it?

A. Yes, sir.

MR. KELLAHIN: Nothing further.

MR. RAMEY: Any other questions of Mr. Blevins? He may be excused.

PHILLIP B. DRISKO

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Drisko, would you please state your name and occupation for the record?

A. Phillip B. Drisko. I'm a Senior Development Geologist for Phillips Petroleum, Odessa, Texas.

Q. Mr. Drisko, you spell your last name D-R-I-S-K-O?

A. D-R-I-S-K-O.

Q. All right, sir, and you've previously testified before the Texas Railroad Commission as a geologist and had your qualifications accepted and made a matter of record there?

A. I have.

Q. And you've previously testified as a geologist before the Oil Conservation Division of New Mexico and had your qualifications accepted?

A. I have.

Q. Mr. Drisko, have you made a study of the logs and core analyses in the Fusselman Pool that we're

discussing here today?

A. I have, sir.

MR. KELLAHIN: We tender Mr. Drisko as an expert petroleum geologist.

MR. RAMEY: He is so qualified.

Q. Mr. Drisko, I'm going to had you a number of exhibits so that you'll have them before you, and if I can unbury Mr. Renoult's Exhibit Number Fourteen, we have one around here somewhere, Fourteen is a cross section.

Mr. Drisko, I hand you what has been introduced as Phillips Exhibit Number Six and ask you if you were the geologist that wrote that core analysis based upon actual identification and study of the cores for that well?

A. I did. I saw the core. I made this core description.

Q. All right, sir and have you also examined the core analysis for the Lambirth "A" 2, Exhibit Number Seven?

A. I saw the core and I did it.

Q. All right, sir, with regards to the Lambirth "A" No. 3, which is Exhibit Number Eight, did you also see the core and review the analysis?

A. I did.

Q. And with regards to Exhibit Number Nine -- say again?

A. I did see this core and I made the core description personally.

Q. All right, sir, and with regards to Exhibit Number Nine, which is the analysis of the core for the Lambirth No. 3, have you also personally examined that?

A. No, I did not.

Q. All right, have you seen this exhibit before?

A. Yes, I have seen it.

Q. All right, now I show you what has been introduced as Enserch Exhibit Number Thirteen to this hearing and direct your attention to what Mr. Renoult has identified by the blue shading as two separate tight streaks with regards to the Lambirth "A" 4 well.

My question for you, Mr. Drisko, is whether in your opinion as a geologist, based upon your studies of the core information for the Fusselman and your examination of the logs for this well, in your opinion whether those particular two tight streaks constitute an impermeable barrier isolating the Montoya from the Fusselman?

A. Judging from my cores that I have cut in the -- in the wells, which were all of them highly fractured, I would think that that fracturing would go further down into the formation, all the way through it, I would think.

Q. Based upon your studies of this area, Mr. Drisko, in your opinion is the fracture system limited to the four wells in which core analyses were made or is it typical of the Fusselman formation?

A. It would be typical in this -- in this area.

Q. Mr. Drisko, as a geologist are you aware of any impermeable barrier between the Montoya and the Fusselman?

A. I am not. I -- I cannot tell any difference from the rocks as you -- as you drill them. They're all alike.

Q. In your opinion are either one or both of the tight sections indicated by Mr. Renoult in Exhibit Number Thirteen continuous and uniform across the Fusselman formation?

A. In my opinion they should not carry all the way across. The formation out there is erratic porosity-wise and -- and with your fracturing present, that also helps out for this situation.

Q. Let me direct your attention to one of the core analyses. Let's take Exhibit Number Seven, if you will, and I want to ask you some questions with regards to Mr. Carr's concern with the entries six, seven, and eight,

which indicates a low permeability, and have you describe for me the significance, if any, of the asterisk on that exhibit.

A. You will notice that the asterisk is back at the last here. It was -- it was made from a plug permeability. If the formation is so fractured, broken up, that they cannot get a seal on that core, they will go in there, take out a little tiny piece of it, a plug, and run that plug.

And now that will only give you the -- the permeability from that tiny -- from that tiny plug, matrix permeability.

Q. In your opinion as a geologist, Mr. Drisko, would approval of Enserch's application constitute an unreasonable risk to the correlative rights of Phillips Petroleum Company?

A. There would be a very great risk.

Q. In your opinion would approval of the application constitute premature watering out of the Phillips wells producing currently in the Fusselman?

A. Very possibly.

Q. Are you aware of any alternative formations which might be utilized for the disposal of produced Fusselman waters in this area?

A. There is a very good possibility up in -- up into the Wolfcamp, which we are now involved in to seek

approval.

Q. Based upon your studies as a geologist, Mr. Drisko, would you recommend that the Commission either grant or deny this application?

A. Deny it, I would recommend.

MR. KELLAHIN: That concludes my examination of Mr. Drisko.

MR. RAMEY: Any questions of Mr. Drisko? Mr. Carr.

CROSS EXAMINATION

BY MR. CARR:

Q. Mr. Drisko, did you personally examine the core on the Lambirth "A" No. 2 Well?

A. I did.

Q. Could you describe the fractures in that core, how they appeared?

A. Some of them were fairly large. Some of them fairly thin. There was no definite pattern to them, and some of them had some crystal facies on the -- on the fracture plane or facies.

Q. Could these crystals -- these crystals on the facies actually work to seal the fractures?

A. They could if they were wholly filled

in but if they were sealed up, I could not see the fracture.

Q. Could you see anything in the fractures themselves that would show that they were transmitting fluids through the reservoir?

A. That is an engineering question. If it was transmitting fluid, I do not know.

Q. When you go down and take these little plugs in the core --

A. I do not take them.

Q. When one does, and they analyze just those plugs, the data that you get from those could show tight streaks in the core, could they not?

A. They could but they would not indicate fracturing if it is there. They can take the plug without showing the fractures.

Q. Now, I believe you testified that you believe injection of water in the proposed well posed a real threat of watering out the offsetting Phillips wells.

A. I said there is a -- there is a very high chance of it, risk.

Q. And you're familiar with the projected economic life of the offsetting wells, are you not?

A. I have been told that by the engineers but I'm not an engineer.

Q. Is it an engineering question to ask you whether or not the water would get there within the economic life of the well?

A. Yes, it is.

Q. What were you basing that comment, then, on that there might be premature watering out of the well?

A. If we -- if we do have water coming in on us and there is fracturing pushing it, we could have water pushing water. That's just common sense; it is not engineering.

Q. It wouldn't occur any faster in a fractured reservoir than it would in a homogeneous one, would it?

A. Yes, because you've got far greater porosity, permeability hollowing, hollowing the fractures than you do if you have -- have no fractures.

Q. And that depends on the extent of the fracturing and the distance of them, does it not?

A. That is true.

Q. Based on your review of the cores, do you have an opinion as to whether or not there is an overall general difference as to the permeability on the east side as opposed to the west side of the Fusselman in this area?

A. I -- permeability of -- of what, matrix permeability or the fracture permeability? There is a differences in permeability into the different wells as we know.

Q. Well, matrix permeability.

A. Matrix permeability, also. It will vary.

Q. Are you aware of any overall variance in that across the field?

A. No great, that I am aware of.

MR. CARR: I have nothing further.

MR. RAMEY: Any other questions of Mr. Drisko? He may be excused.

MR. KELLAHIN: That concludes our case, Mr. Ramey.

MR. CARR: Mr. Ramey, I would like the permission to recall Mr. Renoult for a very brief rebuttal testimony.

DANIEL C. RENOULT

being recalled and being previously sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Renoult, will you refer to what was previously marked and admitted as Enserch Exhibit Number Seventeen and explain -- this is the exhibit you testified

to this morning on Mr. Kellahin's cross. I'd ask you to look at this and indicate if you believe it is possible for there to be vertical permeability in this core.

MR. KELLAHIN I'm going to object to this question as a improper rebuttal. The man addressed this question under redirect this morning. I think we're covering the same ground. We have to stop at some point.

MR. CARR: I would submit that --

MR. KELLAHIN: At some point this hearing has got to come to an end.

MR. CARR: This exhibit was admitted at the request of Mr. Kellahin this morning as one of two core analyses. There's been no direct examination on this and before we just leave it hanging in the record we request permission to ask several short questions concerning it.

MR. RAMEY: Well, I'll let the witness answer.

A. Exhibit Number Seventeen is a core analysis of the Fusselman formation in the Enserch Exploration Lambirth Well No. 3. This well is located only 2500 feet west of the Rader Well No. 2. This well was cored from 7806 feet down to 7866 feet. This core indicates that out of 44 samples analyzed 25 samples or 57 percent of the total footage is tight and has a permeability to air under surface conditions

smaller than .5 millidarcy.

Most of the samples contain impervious chert, shale, and silt, as indicated in the description of the core.

Here again, this core analysis indicates that under bottom hole conditions once we consider the effect of over 7800 feet of overburden, this permeability to air will be drastically reduced. Permeability to water under bottom hole conditions will even be smaller than permeability to air.

This core indicates that because of the chert and shale inclusions 57 percent of the core do not exhibit any permeability to allow for vertical transmissibility and migration of water from the Montoya to the Fusselman formation.

Q. Mr. Renoult, did you -- you were present when Phillips offered its Exhibit Number Ine, which was core analysis on the Lambirth No. 3, were you not?

A. Yes, sir, I was present.

Q. Does this core analysis exhibit similar characteristics to those you've just discussed in regard to the Enserch Exhibit Number Seventeen?

A. Yes, sir. The core retrieved from the Enserch Lambirth No. 3 shows a 40 percent vertical footage has permeability smaller than .5 millidarcy. The core de-

scription shows also that most of the core contains chert, silt, and shale.

Q. Mr. Renoult, were you present when Mr. Blevins presented Phillips Exhibit Number Ten, which was calculations showing permeability in this reservoir in the Fusselman?

A. Yes, sir, I was.

Q. In your opinion does this test show natural reservoir -- permeability under natural reservoir conditions?

A. This test shows the permeability of the perforated section. The perforated section has been acidized consequently, we cannot extrapolate this data to the entire reservoir.

The area of permeability is the result of a successful stimulation job made in the Fusselman formation.

Q. Now I refer you to what has been marked as Enserch Exhibit Eighteen, and ask you to explain to the Commission what it is and what it shows.

A. Exhibit Number Eighteen is a three page exhibit composed of the logs from the Phillips Petroleum Peterson "H" Well No. 1, located approximately 2600 feet north of the subject Rader Well No. 2.

The first page of Exhibit Number Eighteen

is the coriband computer log derived by Schlumberger using a formation density compensated neutron log attached on page number two and the data from a dual laterolog microstatically focussed log attached on page number three.

In this well the Fusselman formation was encountered at a depth of 7846 feet. The Montoya formation was encountered at a depth of 7918 feet. This computer processed coriband log shows that from 7882 feet down to 7916 feet the Fusselman formation is extremely clean and tight. The permeability index derived by Schlumberger is smaller than .1, as indicated on the second column of this processed log.

Within this 34 foot barrier the Fusselman exhibits approximately zero percent porosity and no permeability.

Q. Well now, Mr. Renoult, you've got a tight zone. Is that what you're testifying to?

A. Yes, sir.

Q. If this zone is fractured, would that mean it was able to conduct fluids? Would that enable fluids to pass through this zone if it were fractured?

A. No, sir, this zone has no permeability. Consequently, there is no way that we can have some vertical migration of fluids from the Montoya to the Fusselman.

Q. And so this exhibit is being offered

to show that there is a tight zone in the Fusselman in this other well?

A. Yes, sir.

Q. Will you now refer to what's been marked for identification as Enerch Exhibit Number Nineteen and explain this to the Commission?

A. Exhibit Number Nineteen describes a 72-hour pressure build-up analysis conducted by Otis Services from June 22nd to June the 25th of 1978 in the Enserch Exploration, Inc., Lambirth Well No. 1.

MR. KELLAHIN: If the Commission please, I'd like to interject an objection at this point.

I asked Mr. Renoult on several occasions this morning and specifically and directly if he had any engineering data concerning this pool and specifically with regards to any reservoir pressure information or any kind of pressure information, and he testified explicitly that he did not.

We object that he now attempts to introduce some kind of pressure build-up test in response now in rebuttal, in light of the fact that he specifically testified under oath that that information wasn't available.

MR. CARR: I would suggest to the Commission that the record will reflect that Mr. Renoult stated

that he did have pressure data and had reviewed it and I would submit that he didn't offer any at that time but he did state he had it and he did review it in making his recommendations.

MR. KELLAHIN: I'll be happy to have the tape played back because I specifically asked him if any of his studies in engineering had anything to do with pressure information and he said the only things he was basing the separation of the Montoya and the Fusselman on were the two tight sections in the geological information and the analysis of the core information, and he committed to that under oath. And now we're into an entirely new ballgame here and it's going to take us the rest of the day to fight about it.

I think it's improper and it's untimely and ought to be denied.

MR. RAMEY: Did you by chance ask about the Montoya, Mr. Kellahin? Or did you ask about the Fusselman?

MR. KELLAHIN: Our testimony was directed to the Montoya and Fusselman with regards to the separation. I asked him if he had any pressure information that would indicate the separation. It goes to both formations.

MR. RAMEY: I don't seem to recall you asking him if he had any Montoya pressures. I just recall that you asked for the Fusselman pressures.

MR. CARR: We would submit that we made no representation this morning that we did not have any of the data which is presented in this report.

We also would not mind the Commission ruling that if when the tape is transcribed such a representation was ever made by Mr. Renoult that this -- that this will not be considered, will not be admitted.

I would say to ask Mrs. Boyd to read back the tape is a little bit ridiculous at this point.

I'm not trying to present something that we earlier repressented to the Commission or to Mr. Kellahin that we did not have available, and it's not my intention to do that, and if the tape so indicates, we certainly would -- would consider ourselves bound by that earlier representation.

MR. RAMEY: All right, let's approach it that way, that after the transcript magically appears, why I'll pick it out and if he did state there was no pressure information available for the Fusselman, then I won't allow the testimony.

Is that suitable to you, Mr. Kellahin?

MR. KELLAHIN: Yes, sir.

MR. RAMEY: Please proceed, Mr. Carr.

Q. Mr. Renoult, will you refer to this exhibit and explain what it shows?

A. Exhibit Number Eighteen is a pressure build up from the Enserch Exploration Lambirth Well No. 1. This well completed in the Fusselman formation, has a cumulative production equal to 292,126 barrels of oil as of March 31st, 1981.

MR. KELLAHIN: Excuse me, Mr. Ramey, would Mr. Carr please lay a proper foundation for the introduction of this exhibit? I notice that it is not prepared by Mr. Renoult. It was prepared by a John S. Rodgers, a consulting reservoir engineer, who I don't know if he's present here to testify concerning this report or not. This is rank hearsay.

MR. CARR: I will be happy to lay a foundation.

As to --

MR. RAMEY: Will you please do so.

MR. CARR: In regard to the hearsay comment, I would submit that under New Mexico Rules of Evidence that hearsay may be admitted and that you may consider the extent to which it is hearsay in evaluating the evidence.

Q. Mr. Renoult, will you identify Exhibit Number Nineteen? Will you just identify what it is?

A. This is a pressure build-up analysis connoted by Otis Engineering.

Q. And it was prepared by Otis Engineering?

A. Yes, sir.

Q. By whom with Otis Engineering was it prepared?

A. Mr. John S. Rodgers, Consulting Reservoir Engineer.

Q. Is Otis Engineering employed by Enserch Exploration, Inc., to perform this study?

A. Otis was contracted by Enserch to conduct this study.

Q. Was data supplied to Otis by Enserch upon which this study was made? Or was it independently collected?

A. The data was collected by Otis Engineering.

Q. Is this a common procedure used by companies in the oil and gas business to evaluate data on wells and reservoir characteristics and things of that nature?

A. Yes, sir.

Q. These are independent consultants?

A. Yes, sir.

Q. Have you reviewed this report?

A. Yes, sir.

Q. And what conclusions did Mr. Rodgers reach?

MR. KELLAHIN: Objection, Mr. Ramey. Counsel has failed to lay a proper foundation for the use of this exhibit by this witness. Mr. Pearce and I and Mr. Carr all know this is not an acceptable procedure for using this witness to talk about some report that he did not prepare. It was prepared by an independent consultant with this company and Mr. Rodgers is not here and I strenuously object that this cannot be used in this case.

MR. CARR: We submit that the report is admissable; that Mr. Renoult is not testifying as to any of the conclusions being -- as being his own. It is simply a report prepared by an expert who is a consultant and this is a -- Mr. Kellahin well knows that this is the type of evidence that is frequently admitted in these hearings and it is proper for you to consider it.

MR. KELLAHIN: This Commission is bound by the Rules of Civil Procedure dictated for a hearing before a judge alone, and if you'll refer to your rules you see that very language cited, and you cannot use this report in this fashion.

You and I well know that it's wrong to admit it.

MR. CARR: To the extent that this should not be admitted on those grounds, no data on any core analysis

without the individuals who actually ran the data could not be admitted.

MR. KELLAHIN: That was already admitted without objection over counsel and I stand on this. It shouldn't be a part of this record, Mr. Ramey.

I don't know what it is, but I'm not going to have it.

MR. RAMEY: Objection overruled. Please proceed, Mr. Carr.

Q. Mr. Renoult, will you please explain Exhibit Nineteen?

A. Exhibit Number Nineteen is a report prepared by Otis Engineering regarding the 72-hour pressure build-up analysis conducted three years ago in the Enserch Exploration, Inc., Lambirth Well No. 1.

This report indicated as evidenced on page number four of this report that a naturally fractured reservoir is not indicated by the analysis.

Otis Engineering used a highly sensitive Hewlitt-Packard pressure instrument to measure subsurface pressure responses during flow and shut-in periods.

Otis indicated that a rigorous analysis of the pressure build-up test data in the presence of boundaries was performed by a nonlinear regression method. A linear

regression procedure was applied to the buildup profile at shut-in times prior to the reflection of a nearest boundary.

Otis indicated a high degree of confidence in the analysis prevails as a result of the combined use of a highly sensitive pressure gauge and a computerized regression analysis procedure. In fact, the precision of the pressure matches obtained in the analysis far exceeds any of those previously experienced by the analyst.

Otis indicated also that a series of individual reservoir systems or solution channels could exist on a given structure.

Q. Mr. Renoult, in your opinion would the proposed injection in the Rader No. 2 Well possibly cause any Phillips well in the area to water out prior to their project there reaching an economic limit?

A. Excuse me?

Q. Would injection of water as you propose possibly water out any Phillips well in the area prior to the time that they reached their economic limit?

A. No, sir.

MR. CARR: At this time, Mr. Examiner, I would offer Exhibits Eighteen and Nineteen into evidence.

MR. KELLAHIN: If the Commission please, we object to the admission of Exhibit Number Nineteen pursuant

to Commission Rule 1212. We have been denied a full and complete opportunity to cross examine the witness, Mr. John S. Rodgers, who prepared this analysis and who is not present here today to be cross examined.

MR. CARR: May it please the Commission, we will, following your ruling, tender Mr. Renoult for cross examination. We submit that the evidence is proper and should be admitted.

MR. RAMEY: Exhibits Eighteen and Nineteen will be admitted.

Any questions of Mr. Renoult? If not, he may be excused.

Anything further, Mr. Carr?

MR. CARR: No, Mr. Ramey, I do not.

MR. RAMEY: Mr. Kellahin?

MR. KELLAHIN: No, sir, I have nothing on surrebuttal, if we're at that point.

MR. RAMEY: Any statements?

MR. KELLAHIN: Yes, sir, Mr. Ramey.

We have been through almost the identical case that we went through with Mr. Nutter some months ago and I think the applicant has had a full and complete opportunity to provide any kind of evidence he has in order to determine that the water disposed of in the Montoya formation is going

to remain confined in the Montoya formation.

As one of the elements of proof in order for this application to be denied, it's emphatic that they must show that that water is going to not migrate up into the producing Fusselman formation.

We asked Mr. Renoult on several occasions, I think it's conclusive on the record that there is absolutely no engineering data to establish that the Montoya and the Fusselman are separate and distinct reservoirs not in communication with each other. Complete lack of evidence on that part.

Typically you would see reservoir calculations based upon pressure, demonstrate a pressure difference between the two formations that would conclusively show that the disposal of water in the Montoya would not damage the production in the Fusselman, but we have none of that.

With regards to the geologic testimony, all the geologists admit that the only distinction between the Montoya and the Fusselman is the existence of these insoluble residues and neither Mr. Brown or Mr. Drisko testified that they would constitute an impermeable barrier between the Montoya and the Fusselman.

The only evidence of separation we have here is the existence of two tight streaks as evidenced in the

Lambirth 4-A Well of Phillips, testified to by Mr. Renoult. In his testimony before Mr. Nutter he testified as to two separate 10--foot tight sections. Those sections have grown in the last few months and now they're 20 feet and 30 feet respectively.

Apart from that, however, evidence is still the same. There is substantial evidence that there is an existence of fractures in the Fusselman. We know as common sense and as basic elementary geology that if the Fusselman is fractured, the Montoya is going to be fractured. The geological witnesses have testified to that.

The risk is absolutely overwhelming. If you allow the disposal of produced water into the Montoya at this close proximity to the Phillips leases, Mr. Renoult testified they were something like 700 feet, 660, from one of Phillips leases, with this quantity of water, injection of one barrel in means the displacement of one barrel in that formation. Substantial risk. There's no reason to do that. They have not given us any compelling economic reason to do that. They still show that while it may reduce the ultimate life of the project it's not going to shut it down. It's still economic.

They've also testified that they haven't fully and completely examined every other alternative. As

we've showed you, Phillips has found an alternative, one up in the Wolfcamp that displaces no kind of hazard to the Fusselman formation production.

Enserch has not done that. They have simply locked on to the Montoya as a suitable zone and we find that it's unreasonable risk to place upon us.

I think it's imperative that if an operator wants to impose this risk upon another operator, he ought to come forward with some way to monitor the encroachment of that water. The geological testimony has shown thatthe MOntoya formation is water bearing and it is in existence under the closest Phillips well.

Everybody admits that there is no way absolutely the Commission could enter an order that would establish a method of monitoring. That water is going to come in and we're not going to know it. That oil zone, that column is pretty fragile, it's very small, you can see what happens when water encroaches. The Enserch No. 6 Well, when they had water encroachment they tried to plug it back and it still happened and they had to drill a replacement well.

We're going to lose somewhere between $750,000 to a million dollars worth of production if you allow this to happen. We believe that there's no compelling reason to change or deviate from the Examiner's order, and we request

that you deny the application.

MR. RAMEY: Thank you, Mr. Kellahin. Mr. Carr?

MR. CARR: May it please the Commission, Enserch Exploration, Inc., has appeared before you seeking authority to inject produced waters in its Rader No. 2 Well. Enserch has complied with all the provisions of Commission Rule 1701 and with Memo 377 and we submit to you we are entitled to the order.

Phillips has objected here today in opposition to this case. They are opposing the application. They have, however, presented no evidence that would show that vertical fractures in natural reservoir conditions actually can conduct fluids from the Montoya into the Fusselman.

The evidence presented by Enserch shows quite the contrary. We have a couple of zones with very tight permeability between the Montoya and the Fusselman. We have two separate formations.

The insoluble residue testimony was not directed to show a barrier. It was simply directed to show that there are different lithologic ages in terms of when these deposits were laid down and consequently, we do have two separate formations.

We have presented evidence which shows

that even though there are fractures in the reservoir that the fractures are not conducting or permitting fluids to move through them.

We have presented evidence showing that a substantial savings will result. It's true that we won't have to shut the field in if we don't have a disposal well. But it is, however, also true that as we increase the cost of the production in this field and keep it up for an extended period of time, the wells in the field will reach their economic limit at an earlier date, they will be shut-in at an earlier date, and hydrocarbons will be left in the ground that otherwise could be produced. The time to adjust this problem is now; not at the time the wells are being shut-in, and that's the reason Enserch is appearing before you at this time.

The application, if granted, therefor will prevent waste. It will result in the production of additional hydrocarbons.

The application will not impair the correlative rights of Phillips. We've heard an impassioned plea that we're going to lose a million dollars worth of oil, but the fact of the matter is that testimony on both sides here today shows that the well immediately offsetting the proposed injection well, the closest Phillips well, has an estimated potential reserves of another 25,000 barrels. The

testimony of Phillips own witness indicates that that will be produced in approximately five years. The well will reach its economic limit in five years.

Mr. Renoult testified today that injecting 750 barrels of water per day in this proposed disposal well will not cause the Phillips well to be watered out for ten years. They've got a five year margin of protection, but for some reason they're frantic because they're not going to have this additional five years and are attempting to run up the costs of Enserch in developing the Fusselman in this area.

We submit to you that there is no possible way that their correlative rights are going to be impaired; that the application will prevent waste; that we have complied with all of the requirements of your rules and memorandums governing applications of this nature, and that the application should be granted.

MR. RAMEY: Thank you, Mr. Carr.

Does anyone have anything further to add in this case?

If not, we'll take the case under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 7226
Order No. R-6685

APPLICATION OF ENSERCH EXPLORATION,
INC. FOR SALT WATER DISPOSAL,
ROOSEVELT COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on April 22, 1981, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 20th day of May, 1981, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Enserch Exploration, Inc., is the owner and operator of the Rader Well No. 2, located in Unit E of Section 32, Township 5 South, Range 33 East, NMPM, South Peterson Field, Roosevelt County, New Mexico.

(3) That the applicant proposes to utilize said well to dispose of produced salt water into the Montoya formation, with injection into the perforated interval from approximately 7902 feet to 7930 feet.

(4) That said Montoya formation immediately underlies the Fusselman formation, and Phillips Petroleum Company, which operates a well producing from the Fusselman formation at a location some 1731 feet Northwest of said Rader Well No. 2, appeared at the hearing and objected to applicant's proposed disposal of water into said Fusselman formation.

(5) That the basis for the Phillips objection is the alleged possibility of disposal water breaking out of the Montoya formation and migrating into the Fusselman producing zone, thereby posing a threat to the oil production from the aforesaid Phillips producing well, its Lambirth "A" Well No. 4.

(6) That the Enserch interpretation of the logs of said Lambirth "A" Well No. 4 below the productive interval of 7814 feet to 7828 feet indicates the presence of two zones of only slight permeability, the first being at a depth from 7840 feet to 7850 feet and the second being at a depth of 7924 feet to 7934 feet.

(7) That while Enserch alleges that these "tight" zones would provide vertical separation between the Phillips producing interval and the Enserch disposal zone, Phillips contends that there is no physical separation between the base of its producing interval in the Fusselman formation and the top of the Enserch disposal interval in the Montoya formation, inasmuch as there are vertical fractures in the Fusselman through which water injected into the upper Montoya could migrate to the upper Fusselman and endanger its producing well, the Lambirth "A" Well No. 4.

(8) That there is evidence of vertical fracturing in the Fusselman formation in this area.

(9) That while the extent of said fracturing is not known, the vertical fractures may well extend through the "tight" zones Enserch relies upon to keep the disposal zone and the productive zone separated.

(10) That should said fractures extend through the "tight" zones, said zone's efficacy as an efficient barrier would be diminished and the Phillips production could be subject to water invasion.

(11) That such water invasion could result in premature abandonment by the Phillips production, thereby causing loss of otherwise recoverable hydrocarbons and waste of oil and gas, as well as impairment of correlative rights.

(12) That there is no means presently available whereby the migration of injected water could be monitored and a determination made of imminent water invasion in the Phillips well prior to its actual occurrence, at which time it could be too late to prevent loss of hydrocarbons.

(13) That Enserch has not investigated all other possible means of water disposal in the subject area.

(14) That the application should be denied.

IT IS THEREFORE ORDERED:

(1) That the application of Enserch Exploration, Inc., for salt water disposal into the Montoya formation in the perforated interval from 7902 feet to 7930 feet in its Rader Well No. 2, located in Unit E of Section 32, Township 5 South, Range 33 East, NMPM, South Peterson Field, Roosevelt County, New Mexico, is hereby denied.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

fd/

NEW MEXICO OIL CONSERVATION COMMISSION

COMMISSION HEARING

SANTA FE, NEW MEXICO

Hearing Date JULY 8, 1981 Time: 9:00 A.M.

NAME	REPRESENTING	LOCATION
W. T. Kellahin	Kellahin & Kellahin	Santa Fe
William F. Carr	Campbell, Byrd & Black	Santa Fe
Curt Parsons	Southland Royalty Co.	Midland
A. L. James	Southland Royalty Co	Midland
Ed Jones	SOUTHLAND ROYALTY CO.	MIDLAND
Howard Moeck	Enserch Exploration Inc.	Dallas
DANIEL C. RENOULT	ENSERCH EXPLORATION, INC.	MIDLAND, TX.
THOMAS E. BROWN	" " "	" "
Jerry L. Blevins	Phillips Petroleum	Odessa, Tx
PHILIP B. URISKO	PHILLIPS PETROLEUM	ODESSA, TX
D. M. Mueller	Phillips. Pet. Co.	Odessa, Tx
Bob Fuller	Bryan Co	Santa Fe
Jay V Peacock	Phillips Pet. Co	Odessa
Dan Fickes	Enserch Exploration, Inc.	Midland
Ard Blevins	Lowe Land & Ditches	Artesia
Randy G Patterson	Yates Petroleum	Artesia
JIM LAMI	NEW MEXICO STATE LAND OFFICE	SANTA FE

NEW MEXICO OIL CONSERVATION COMMISSION

COMMISSION HEARING

SANTA FE, NEW MEXICO

Hearing Date JULY 8, 1981 Time: 9:00 A.M.

NAME	REPRESENTING	LOCATION
Dennis Sledge	Southland Royalty Company	Midland, Tex
Leonard KERSTH	EASERCH Exploration	" "
Ray Beck	Yates	Artesia

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

May 22, 1981

Re: CASE NO. 7226
ORDER NO. R-6685

Mr. William F. Carr
Campbell, Byrd & Black
Attorneys at Law
Post Office Box 2208
Santa Fe, New Mexico

Applicant:

Enserch Exploration, Inc.

Dear Sir:

Enclosed herewith are two copies of the above-referenced Division order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other Thomas Kellahin

NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION

OPERATOR: Enserch Exploration, Inc.		ADDRESS: P. O. Box 4815 Midland, Texas 79704	
LEASE NAME: Rader	WELL NO.: 2	FIELD: Undesignated	COUNTY: Roosevelt

LOCATION: UNIT LETTER E ; WELL IS LOCATED 1880 FEET FROM THE North LINE AND 560 FEET FROM THE West LINE, SECTION 32 TOWNSHIP 5-S RANGE 33E NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING	13-3/8"	356'	250 sacks	Circ.	
INTERMEDIATE	9-5/8"	1981'	914 sacks	Circ.	
LONG STRING	5-1/2"	8000'	350 sacks	6850'	Cement Bond Log
TUBING	2-3/8"	7876.53'	NAME, MODEL AND DEPTH OF TUBING PACKER: Baker Model "D" retainer Production packer @ 7875'		

NAME OF PROPOSED INJECTION FORMATION	TOP OF FORMATION	BOTTOM OF FORMATION
Montoya	7900'	7955'

IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?	PERFORATIONS OR OPEN HOLE?	PROPOSED INTERVAL(S) OF INJECTION
Tubing	Perforations	7902' - 7930'

IS THIS A NEW WELL DRILLED FOR DISPOSAL?	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED?	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE?
No	South Peterson (Fusselman and/or Penn.) Dev. Well	Yes

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH

7848' - 7851' (8 holes) squeezed with 86 sacks, 7710'-7714' (10 holes) squeezed w/47 sacks

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA
250'	7858'	None

ANTICIPATED DAILY INJECTION VOLUME (BBLS.)	MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSIG)
1650	745	5976	closed	pressure	1580 psi (max)

ANSWER YES OR NO WHETHER THE FOLLOWING WATERS ARE MINERALIZED TO SUCH A DEGREE AS TO BE UNFIT FOR DOMESTIC, STOCK, IRRIGATION, OR OTHER GENERAL USE —	WATER TO BE DISPOSED OF	NATURAL WATER IN DISPOSAL ZONE	ARE WATER ANALYSES ATTACHED?
	yes	yes	yes

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND)

Richard Lambirth & Portales National Bank (O.D. Lambirth Trust) P.O. Drawer 888 Portales, N.M. 88130

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL

Phillips Petroleum Company

Phillip Bldg.

Odessa, Texas 79761

Exs Ex 1 CA 7226

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING?	SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL	
	yes	yes	
ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B)	PLAT OF AREA	ELECTRICAL LOG	DIAGRAMMATIC SKETCH OF WELL
	yes	yes	yes

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Leonard Kirk (Signature) — District Production Manager (Title) — April 13, 1981 (Date)

NOTE: Should waivers from the surface owner and all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests. SEE RULE 701.

PETERSON SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
WELL STATUS
(AS OF 01/1981)

Proposed Salt Water Disposal
Produced from Pennsylvanian
Produced from Fusselman

Scale: 1" = 2000'

TANNEYHILL

ENSERCH EXPLORATION, INC.

Docket No. 7226
Exhibit
Date April 22nd, 1981

AMOCO
I-HAIRGROVE
GL + 74
Wc - 2842

AMOCO
I-LAMBIRTH
GL + 73
Wc - 2742

B I PETERSON
GL + 43
Wc - 2737
F - 3447

ENSERCH
LAMBIRTH
GL +65
Wc - 2721
F - 3407
Gr - 3631

ENSERCH
LAMBIRTH
GLR + 49
Wc - 2750
F - 3438
Gr - 3554

PHILLIPS
5-A LAMBIRTH
GLR + 78
Wc - 2729
F - 3502
Gr none

ENSERCH
LAMBIRTH
Wc - 2748
F - 3409
Gr none

PHILLIPS
I PETERSON "H"
TD 8000

ENSERCH
LAMBIRTH
GL +65
Wc - 2713
F - 3427
Gr - 3668

PHILLIPS
4-A LAMBIRTH
Wc - 2758
F - 3499
Gr none

PHILLIPS
LAMBIRTH-ST
GLR + 1
Wc - 2700
F - 3405
Gr none

PHILLIPS
LAMBIRTH
Wc - 2726
F - 3419
Gr none

ENSERCH
LAMBIRTH
GL +59
Wc - 2732
F - 3427
Gr - 3698

1120

ENSERCH
RADER

ENSERCH
RADER
Wc - 2741
F none
Gr - 3481

ENSERCH
PERSEL

SO PETERSON

ENSERCH
LAMBIRTH
GL +65
Wc - 2725
F - 3372
Gr - 3504

PHILLIPS
LAMBIRTH
GL +61
Wc - 2734
F - 3405
Gr - 3532

PHILLIPS
2-A GOLDSTON
GL + 61
Wc - 2737
F - 3458

PHILLIPS
(GOLDSTON)
A LAMBIRTH

PHILLIPS
LAMBIRTH
Wc - 2741
F - 3369
Gr - 3491

ENSERCH
LAMBIRTH
GL +74
Wc - 2717
F - 3367
Gr - 3447

PHILLIPS
LAMBIRTH "B"

ENSERCH
LAMBIRTH
TD 4920

ENSERCH
LAMBIRTH

ENSERCH
LAMBIRTH
Wc - 2708
F none
Gr - 3361

ENERGY RES
BLEDSOE
GL - 61
Wc - 2691
F none
GW-3257

ENERGY RES
MILLER

PPCo Lambirth A 4
560' FNL & 560' FEL
Enserch Rader #2
1800' FNL & 560' FWL

ENSERCH
EL PASO-ST
GL +42
Wc - 2715
Gr - 3553

ENERGY RES.
1-EL PASO-ST

1880
560

1800
560

520
560

ENS 2
7226

1320

1240

1120

18

WEINER
HARRIS
1-14
Glor +58
WC - 2705
Gr - 3228
F - gone

25
30
36
31
32
1
6
12
13
14
R 33

ELIDA

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
ENSERCH EXHIBIT NO. 4
CASE NO. 7226

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd, 1981

APPLICATION FOR APPROVAL OF SALT WATER DISPOSAL WELL

Enserch Exploration - Rader Well No. 2
Peterson (South) Field - Roosevelt County
New Mexico

Operator Well Name API Well I.D. No.	Location	Distance to Enserch Rader No. 2	Casing String Setting Depth	Cement (sacks)	Cement Top	Total Depth	Current Producing Interval (Subsea depth)	Current Producing Formation	KB
Enserch Rader No. 2	1880' FNL 560' FWL Section 32 T5S, R33E		13-3/8" @ 356' 9-5/8" @ 1981' 5-1/2" @ 8000'	250 914 ~~970~~ 350	Surface Surface 6850'	8000'	7902'-7930' (-3503, -3531)	Salt Water Disposal	4399'
Enserch Rader No. 1 30-041-20492	2100' FSL 660' FWL Section 32 T5S, R33E	1650'	13-3/8" @ 373' 8-5/8" @ 2025'	350 680	Surface Surface	7903'	D&A	D&A	4410'
Phillips Lambirth "A" No. 4 30-041-20506	560' FNL 560' FEL Section 31 T5S, R33E	1750'	13-3/8" @ 360' 8-5/8" @ 3500' 5-1/2" @ 8007'	420 580 1635	Surface Surface 4200'	8007'	7814'-7828' ~~(-3381, -3395)~~ (-3423) (-3437)	Fusselman 40' high to Rader #2	~~4439'~~ 4391'
Enserch Lambirth No. 3 30-041-20454	1980' FNL 1980' FEL Section 31 T5S, R33E	2500'	13-3/8" @ 377' 8-5/8" @ 3297' 5-1/2" @ 8030'	350 2000 800	Surface Surface 6600'	8030'	7702'-7715' (-3295, -3308)	Pennsylvanian	4407'
Phillips Peterson No. 1-H 30-041-20535	660' FWL 510' FWL Section 29 T5S, R33E	2600'	13-3/8" @ 350' 8-5/8" @ 3496' 5-1/2" @ 7982'	325 775 800	Surface Surface 5210'	7991'	PPCo plans to dispose of salt in this well - Renauld 7332-7341 wolfcamp		4384'
Enserch Lambirth No. 7 30-041-20482	660' FEL 510' FSL Section 30 T5S, R33E	2750'	13-3/8" @ 358' 8-5/8" @ 1991' 5-1/2" @ 7858'	300 750 450	Surface Surface 6630'	7882'	7826'-7829' (-3435, -3438)	Fusselman	4391'
Phillips Lambirth "A" No. 1 30-041-20471	1980' FNL 1980' FSL Section 31 T5S, R33E	2900'	13-3/8" @ 400' 8-5/8" @ 3500' 5-1/2" @ 7995'	420 1175 400	Surface Surface 5780'	8000'	7830'-7838' 7852'-7858' (-3408, -3416) (-3430, -3436)	Fusselman	4422'

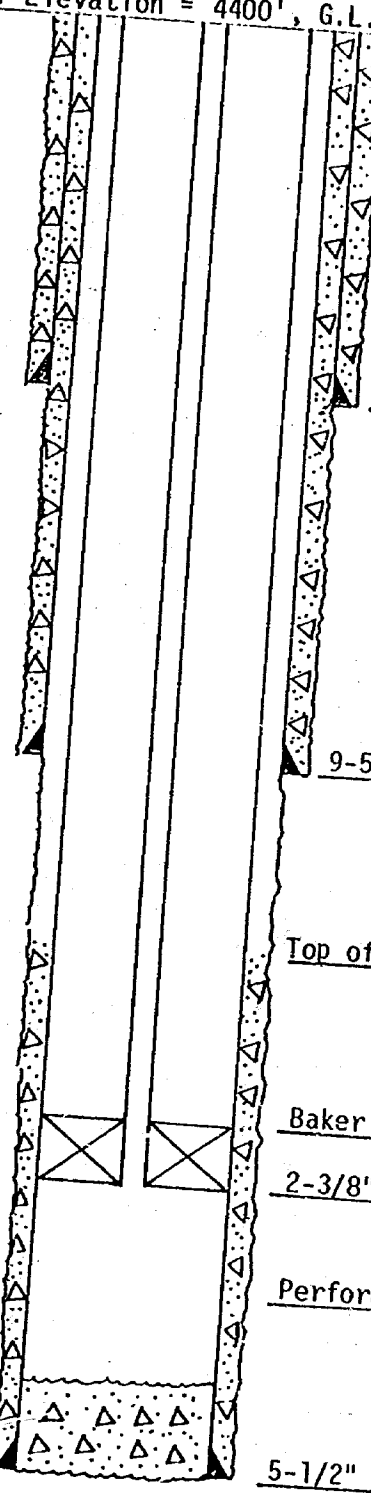
Enserch Exploration, Inc.

Rader No. 2 Well

1880' FNL & 560' FWL, Sec. 32-T5S-R33E

Roosevelt County, New Mexico

K.B. Elevation = 4400', G.L. = 4385'



13-3/8" csg. @ 356', cmt. circ

9-5/8" csg. @ 1981', cmt. circ.

Top of cmt. @ 6850'

Baker Model "D" pkr. @ 7875'

2-3/8" tbg. @ 7876.53'

Perforations: 7902' - 7930'

PBTD @ 7940'

5-1/2" csg. @ 8000', cmt. w/350 sks.

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
ENSERCH EXHIBIT NO. 5
CASE NO. 7226

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

ENSERCH EXPLORATION, INC.

Rader Well No. 1

South Peterson Field

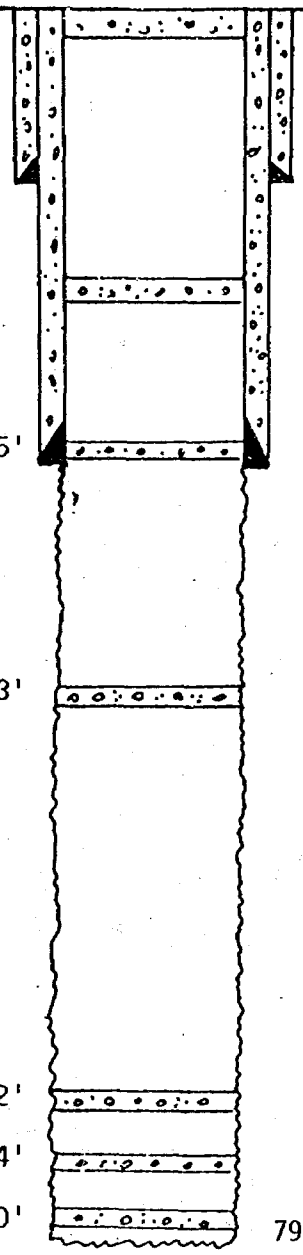
Roosevelt County, New Mexico

Prepared by: _____ Date _____

Plug #7: 10 sx Class H Cmt. @ surface

KB Elevation 4393.5'

GL Elevation 4407.5'



374' 13-3/8" 48#/ft K55 ST&C 8rd csg.

Plug #6: 40 sx Class H Cmt. @ 1082'-982'

Plug #5: 40 sx Class H Cmt. @ 2075'-1975'

2025' 8-5/8", 24#/ft K55 ST&C 8rd csg.

Plug #4: 40 sx Class H Cmt. @ 4443'-4343'

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit _____
Date April 22nd 1981

Plug #3: 40 sx Class H Cmt. @ 7152'-7052'

Plug #2: 40 sx Class H Cmt. @ 7574'-7474'

Plug #1: 50 sx Class H Cmt. @ 7880'-7930'

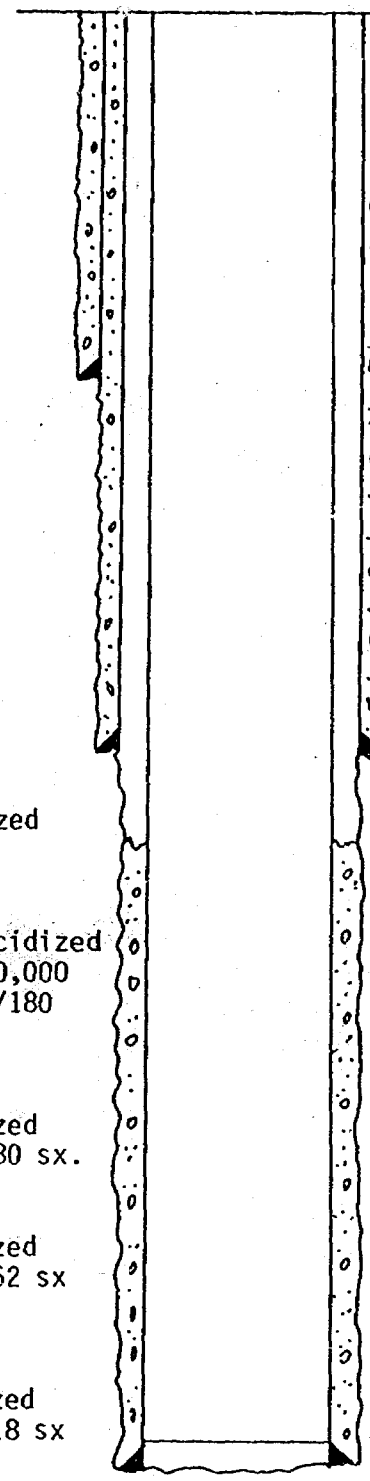
7920' TD open hole

Last Workover: Well was plugged on 7/7/79 before production string was run.

Prod. Rate Before: _____ Prod. Rate After: _____

Nature of Workover: _____

PHILLIPS PETROLEUM COMPANY
Peterson "H" Well No. 1
South Peterson Field
Roosevelt County, New Mexico



K.B. Elevation - 4384'
G.L. Elevation - 4368'

350' 13-3/8" 48#/ft K-55
420 sx Class H + 2% $CaCl_2$
circulated 95 sx to surface

3496' 8-5/8" 24#/ft K-55
1000 sx Class H + 2% $CaCl_2$
circulated 225 sx to surface

Top of cement @ 5210'

Perfs 7332'-7341' (18 shots). Acidized w/5000 gals. 28% acid.

Perfs 7616'-7760' OA (110 shots). Acidized w/4500 gals. 15% NE HCl. Frac'd w/20,000 gals. gelled 15% NE HCl. Squeezed w/180 sx.

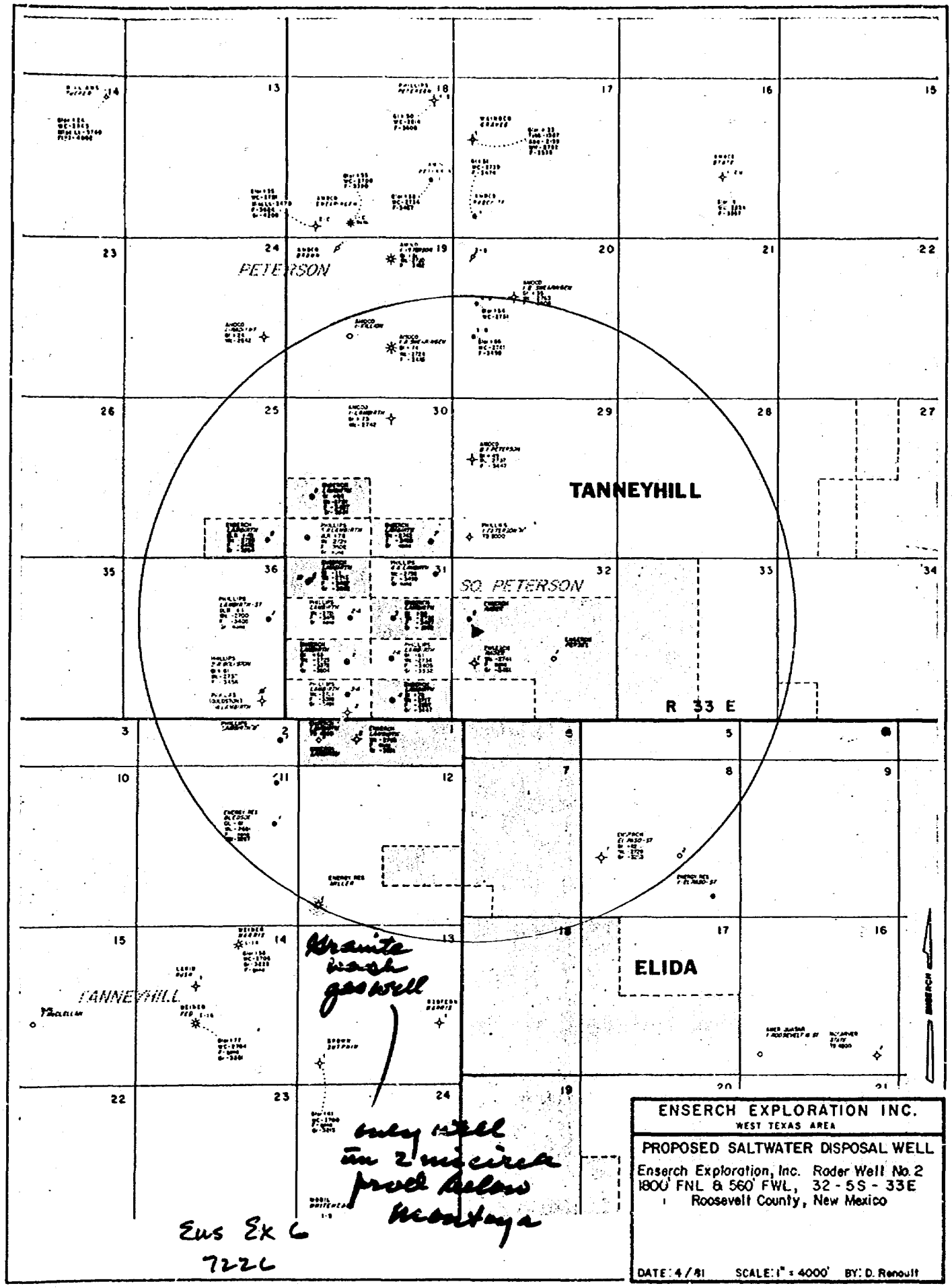
Perfs 7793'-7801' (32 shots). Acidized w/250 gals. 15% NE HCl. Squeezed w/80 sx.

Perfs 7792'-7806' (28 shots). Acidized w/750 gals. 15% NE HCl. Squeezed w/62 sx Class H.

Perfs 7846'-7852' (20 shots). Acidized w/500 gals. 15% NE HCl. Squeezed w/18 sx Class H.

7982' 5-1/2" 15.5#/ft K-55
800 sx Class H + 2% KCl

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981


PETERSON
TANNEYHILL
SO. PETERSON
R 33 E
ELIDA
TANNEYHILL
Granite wash gas well
only well in 2 mi circle prod below Mesaya
Enserch Exploration Inc.
WEST TEXAS AREA
PROPOSED SALTWATER DISPOSAL WELL
Enserch Exploration, Inc. Roder Well No. 2
1800' FNL & 560' FWL, 32 - 5S - 33E
Roosevelt County, New Mexico
DATE: 4/81 SCALE: 1" = 4000' BY: D. Renoult

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
ENSERCH EXHIBIT NO. 6
CASE NO. 7226

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Enserch Rader No. 2	32	5S	33E	E		Salt water Disposal
Enserch Rader No. 1	32	5S	33E	L	1,650'	D&A
Phillips Lambirth "A" No. 4	31	5S	33E	A	1,750'	Fusselman
Enserch Lambirth No. 6	31	5S	33E	D	5,280'	P&A
Enserch Lambirth No. 10	31	5S	33E	D	5,350'	Fusselman
Phillips Lambirth "A" No. 2	31	5S	33E	F	3,800'	Fusselman
Enserch Lambirth No. 3	31	5S	33E	G	2,500'	Pennsylvanian
Phillips Lambirth "A" No. 1	31	5S	33E	J	2,900'	Fusselman
Enserch Lambirth No. 1	31	5S	33E	K	4,200	Fusselman
Phillips Lambirth "A" No. 3	31	5S	33E	M	4,650'	Fusselman

Ens Ex 7
7226

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Page 2
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Enserch Lambirth No. 4	31	5S	33E	O	3,650	Pennsylvanian
Amoco Lambirth No. 1	30	5S	33E	B	7,050'	P&A
Enserch Lambirth No. 8	30	5S	33E	L	6,550'	Fusselman
Phillips Lambirth "A" No. 5	30	5S	33E	M	5,850'	Pennsylvanian
Enserch Lambirth No. 7	30	5S	33E	P	2,750'	Fusselman
Amoco Peterson No. 1-B	29	5S	33E	E	5,280'	P&A
Phillips Peterson No. 1-H	29	5S	33E	M	2,600'	P&A
Amoco Swearingen No. 4-B	20	5S	33E	E	14,000'	Pennsylvanian
Amoco Swearingen No. 3-B	20	5S	33E	L	9,300'	Pennsylvanian
Amoco Swearingen No. 1-A	19	5S	33E	J	9,300'	Pennsylvanian
Enserch Lambirth No. 9	25	5S	32E	P	6,900'	Fusselman

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Page 3
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Phillips Lambirth State #1	36	5S	32E	H	6,400'	Fusselman
Phillips Goldston "A" No. 2	36	5S	32E	P	7,000'	P&A
Goldston Lambirth "A" No. 1	36	5S	32E	P	7,150'	P&A
Phillips Lambirth "B" No. 1	2	6S	33E	A	7,250'	Pennsylvanian
Enserch Lambirth No. 2	1	6S	33E	D	6,250'	P&A
Enserch Lambirth No. 5	1	6S	33E	C	5,400'	P&A
Enserch El Paso State No. 1	8	6S	34E	L	8,800'	P&A
Energy Reserves Bledsoe No. 2	11	6S	33E	A	8,200'	Pennsylvanian
Energy Reserves Bledsoe No. 1	1	6S	33E	H	9,200'	Pennsylvanian
Energy Reserves Miller No. 1	12	6S	33E	M	14,000'	Granite Wash

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
EXXON EXHIBIT NO. 7
CASE NO. 7226

Oil Production
Phillips Petroleum - Lambirth "A" Well No. 1
Peterson (Fusselman), South Field
Location: 05S/33E/31/J
Roosevelt County, New Mexico

STB/Month

10^4 9 8 7 6 5 4 3 2 10^3 9 8 7 6 5 4 3 2 10^2 9 8 7 6 5 4 3 2 10

3 2 1 .9 .8 .7 .6 .5 .4 .3 .2 .1

Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

19 78 | 19 79 | 19 80 | 19 81 | 19 82

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Enserch EXHIBIT NO. 8
CASE NO. 7226

K-E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

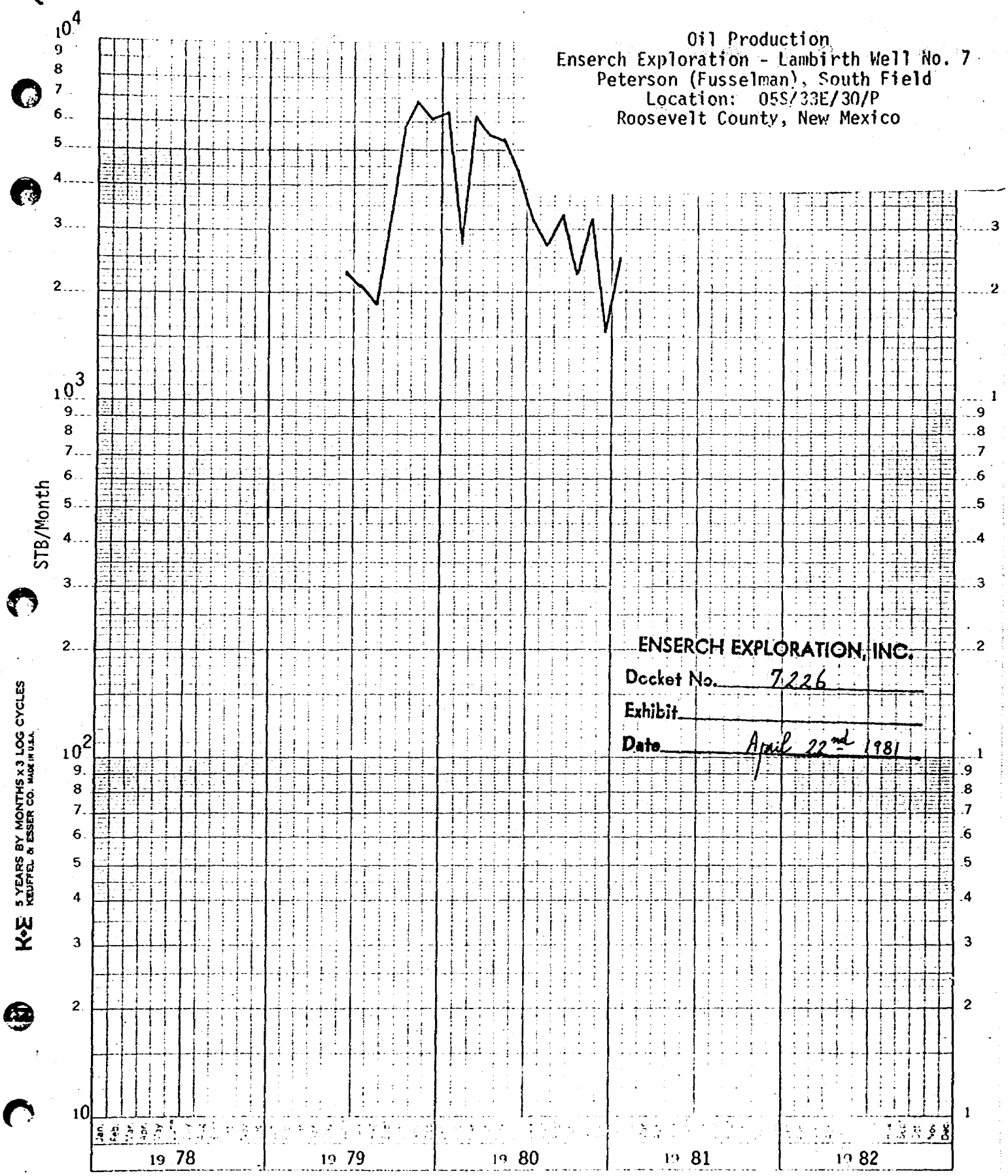
PRODUCTION HISTORY
Phillips Petroleum - Lambirth "A" Well No. 1
Peterson (Fusselman), South Field

Location: 05S/33E/31/J
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR
	Bbls	MCF	Bbls	SCF/Bbl
01/79	3,700	3,411		922
02/79	6,650	6,131		922
03/79	2,585	980		379
04/79	2,184	646	191	296
05/79	7,115	1,883	149	265
06/79	6,536	2,776	5,222	425
07/79	6,105	2,865	5,104	469
08/79	6,332	5,976	5,066	944
09/79	4,718	3,536	8,257	749
10/79	4,965	3,317	8,689	668
11/79	3,908	967	2,286	247
12/79	4,462	1,174	2,610	263
01/80	1,371	354	902	258
02/80	1,255	205	734	163
03/80	1,641	456	960	278
04/80	4,052	886	2,370	219
05/80	3,730	651	2,182	174
06/80	3,518	1,017	2,058	289
07/80	3,576	9,622	2,092	2,691
08/80	3,668	3,034	9,638	827
09/80	1,195	698	3,138	584
10/80	769	295	2,019	384
11/80	876	114	2,300	130
12/80	969	578	2,545	596
Cum. Prod.	85,880	51,572	68,412	600

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

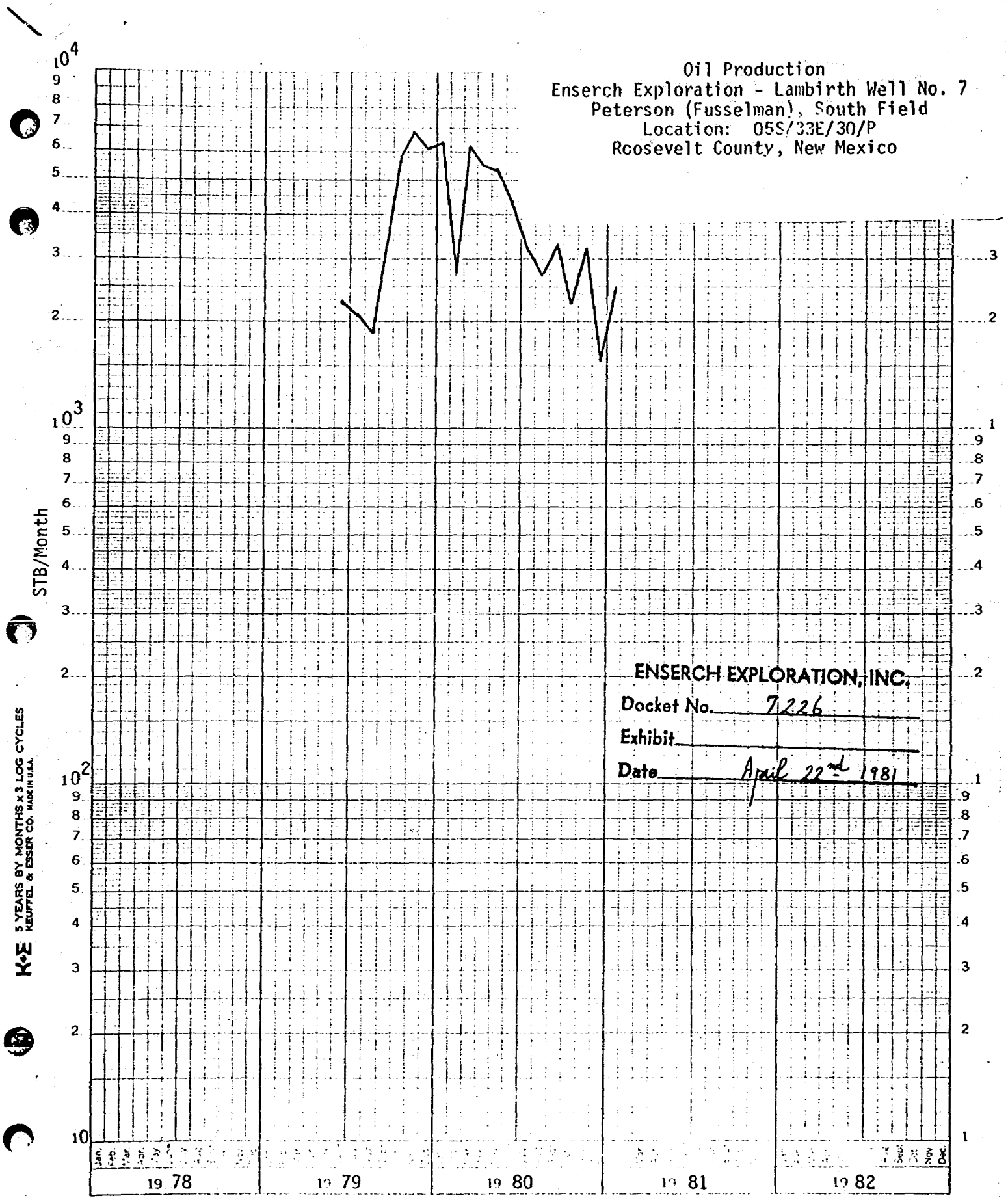
Oil Production
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field
Location: 05S/33E/30/P
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

K•E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

Oil Production
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field
Location: 05S/33E/30/P
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

K+E 5 YEARS BY MONTHS x 3 LOG CYCLES KEUFFEL & ESSER CO. MADE IN U.S.A.

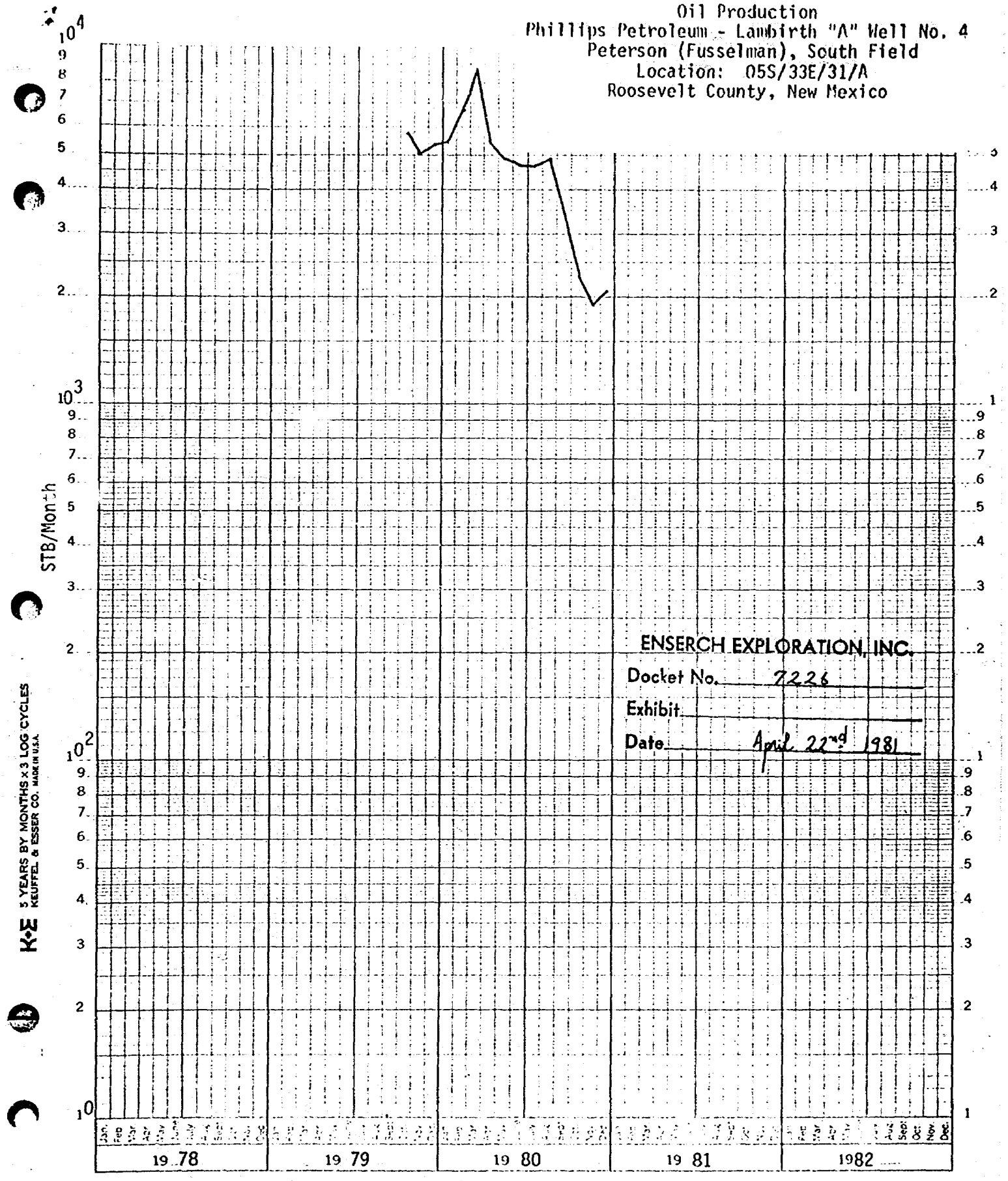
PRODUCTION HISTORY
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field

Location: 05S/33E/30/P
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR
	Bbls	MCF	Bbls	SCF/Bbl
01/79				
02/79				
03/79				
04/79				
05/79				
06/79	2,244	1,031	1,120	459
07/79	2,112	871	804	412
08/79	1,879	1,056	494	562
09/79	3,345	771	1,859	230
10/79	5,912	2,493	1,261	421
11/79	6,891	2,262	1,257	328
12/79	6,228	2,172	348	348
01/80	6,250	1,767	1,380	282
02/80	2,724	1,840	1,014	675
03/80	6,242	1,971	1,399	316
04/80	5,541	2,035	1,370	367
05/80	5,279	2,122	1,722	402
06/80	4,376	2,221	1,262	508
07/80	3,120	1,537	1,689	493
08/80	2,723	1,589	2,470	584
09/80	3,260	1,789	2,434	549
10/80	2,274	1,800	1,089	792
11/80	3,142	2,460	3,194	783
12/80	1,527	1,669	1,507	1,093
Cum. Prod.	75,069	33,456	27,673	446

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

Oil Production
Phillips Petroleum - Lambirth "A" Well No. 4
Peterson (Fusselman), South Field
Location: 05S/33E/31/A
Roosevelt County, New Mexico



K•E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

PRODUCTION HISTORY
Phillips Petroleum - Lambirth "A" Well No. 4
Peterson (Fusselman), South Field

Location: 05S/33E/31/A
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR
	Bbls	MCF	Bbls	SCF/Bbl
01/79				
02/79				
03/79				
04/79				
05/79				
06/79				
07/79				
08/79				
09/79				
10/79	5,740	1,186	402	207
11/79	5,020	1,578	8,685	314
12/79	5,158	1,725	892	334
01/80	5,434	1,783	940	328
02/80	6,701	1,394	1,159	208
03/80	8,762	614	301	70
04/80	5,410	1,502	936	278
05/80	4,979	1,106	861	222
06/80	4,696	1,725	812	367
07/80	4,773	177	2,387	37
08/80	4,898	3,008		614
09/80	3,537	1,146		324
10/80	2,277	483		212
11/80	1,902	138		73
12/80	2,035	673		331
Cum. Prod.	71,332	18,238	17,375	256

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

WATER PRODUCTION (IN BBLS)
Enserch Exploration - Peterson (Fusselman, Penn) South Field
Roosevelt County, New Mexico

Enserch Exploration	Lambirth #1		Lambirth #3		Lambirth #4		Lambirth #6		Lambirth #7		Lambirth #8		Lambirth #9		Lambirth #10		Cumulative Water Production		
	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Total
06/78	0																		
07/78	0																		
08/78	310																310		310
09/78	313																313		313
10/78	0																0		0
11/78	0		0		1,119												0	1,119	1,119
12/78	0		0		1,995												0	1,995	1,995
01/79	0		0		1,807												0	1,807	1,807
02/79	0		0		1,569												0	1,569	1,569
03/79	0		0		1,501		936										936	1,501	2,437
04/79	0		0		956		720										720	956	1,676
05/79	0		0		2,607		240										240	2,607	2,847
06/79	0		0		2,285		3,965		1,120								5,085	2,285	7,370
07/79	0		0		0		3,703		804								4,507	0	4,507
08/79	0		0		1,949		2,928		494								3,422	1,949	5,371
09/79	0		0		1,923		2,560		1,859								4,419	1,923	6,342
10/79	0		0		1,819		3,928		1,261		0						5,189	1,819	7,008
11/79	0		0		2,245		6,778		1,257		395						8,430	2,245	10,675
12/79	0		0		1,613		9,997		348		5,247						15,592	1,613	17,205
01/80	0		0		1,273		8,961		1,380		5,377		44				15,762	1,273	17,035
02/80	0		0		1,143		9,220		1,014		1,702		0				11,936	1,143	13,079
03/80	0		0		1,376		10,394		1,399		7,891		0				19,684	1,376	21,060
04/80	0		0		1,326		11,755		1,370		6,759		0				19,884	1,326	21,210
05/80	0		0		1,363		11,242		1,722		6,349		0				19,313	1,363	20,676
06/80	0		0		1,120		11,598		1,262		10,034		0				22,894	1,120	24,014
07/80	0		0		1,029		8,087		1,689		10,286		0				20,062	1,029	21,091
08/80	0		0		1,162				2,470		9,977		0		266		12,713	1,162	13,875
09/80	0		0		1,007				2,434		9,615		0		7,215		19,264	1,007	20,271
10/80	0		0		817				1,089		10,657		11		10,838		22,595	817	23,412
11/80	0		0		230				3,194		8,620		0		7,606		19,420	230	19,650
12/80	0		0		398				1,507		9,997		8		10,773		22,265	398	22,663
Cumulative Water Production	623		0		35,632		107,012		27,673		102,886		63		36,698		274,955	35,632	310,587

= 231 BBLS/day

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ENSERCH EXPLORATION, INC.
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currently paying $1.58/bbl trans & disposal of wtr. Cost $36,807 in Dec

WATER PRODUCTION (IN BBLS)
Phillips Petroleum-Peterson (Fusselman, Penn), South Field
Roosevelt County, New Mexico

Phillips Petroleum	Lambirth State No. 1		Lambirth "A" No. 1		Lambirth "A" No. 2		Lambirth "A" No. 3		Lambirth "A" No. 4		Lambirth "A" No. 5		Lambirth "B" No. 1		Cumulative Water Production		
	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Total
06/78																	
07/78																	
08/78																	
09/78																	
10/78																	
11/78																	
12/78																	
01/79			0												0		0
02/79			0												0		0
03/79			980												980		980
04/79			191		0										191		191
05/79			149		0										149		149
06/79			5,222		0										5,222		5,222
07/79			5,104		0										5,104		5,104
08/79			5,066		0		387								5,453		5,453
09/79			8,257		0		1,230								9,487		9,487
10/79			8,689		0		1,348		402						10,439		10,439
11/79			2,286		0		1,179		8,685						12,150		12,150
12/79			2,610		0		1,212		892						4,714		4,714
01/80			802		0		0		940						1,742		1,742
02/80			734		0		0		1,159						1,893		1,893
03/80	1,261		960		0		0		301						2,522		2,522
04/80	26		2,370		0		0		936						3,332		3,332
05/80	24		2,182		0		0		861		2,077				3,067	2,077	5,144
06/80	0		2,058		0		0		812		1,651				2,870	1,651	4,521
07/80	0		2,092		0		1,580		2,387		767				6,059	767	6,826
08/80	1,418		9,636		2,826		24		0		918		7		13,904	925	14,829
09/80	1,877		3,138		0		16		0		816		61		5,031	877	5,903
10/80	2,294		2,019		0		12		0		651		46		4,325	697	5,022
11/80	558		2,300		0		10		0		629		0		2,868	629	3,497
12/80	2,286		2,545		0		13		0		668		29		4,844	697	5,541
Cum. Water Prod.	9,744		69,390		2,826		7,011		17,375		8,177		143		106,346	8,320	114,666

ENSERCH EXPLORATION, INC.
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Date April 22nd, 1981

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P. O. BOX 1468
MONAHANS, TEXAS 79756
PHONE 943-3234 OR 563-1040

Martin Water Laboratories, Inc

709 W. INDIANA
MIDLAND, TEXAS 79701
PHONE 683-4521

RESULT OF WATER ANALYSES

JUL 9 1979

LABORATORY NO. 679309

TO: Mr. Jerry Nash
P.O.Box 4315, Midland, Texas

SAMPLE RECEIVED 6-28-79

RESULTS REPORTED 7-5-79

COMPANY Enserch Exploration, Inc. LEASE Lambirth

FIELD OR POOL South Peterson

SECTION ___ BLOCK ___ SURVEY ___ COUNTY Roosevelt STATE New Mexico

SOURCE OF SAMPLE AND DATE TAKEN:

NO. 1 Produced (Penn) water - taken from Lambirth #4. 6-27-79

NO. 2 Produced (Fusselman) water - taken from Lambirth #6. 6-27-79

NO. 3 Produced (Fusselman) water - taken from Lambirth #7. 6-27-79

NO. 4

REMARKS:

CHEMICAL AND PHYSICAL PROPERTIES	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0698	1.0717	1.0721	
pH When Sampled				
pH When Received	6.7	6.7	6.7	
Bicarbonate as HCO_3	476	566	637	
Supersaturation as $CaCO_3$				
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$	23,400	16,300	17,800	
Calcium as Ca	7,040	4,560	5,120	
Magnesium as Mg	1,409	1,191	1,215	
Sodium and/or Potassium	30,263	34,682	33,902	
Sulfate as SO_4	662	1,066	821	
Chloride as Cl	62,497	63,917	63,917	
Iron as Fe	81.1	56.6	97.5	
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	102,352	105,982	105,612	
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen, Winkler				
Hydrogen Sulfide	0.0	0.0	0.0	
Resistivity, ohms/m at 77° F.	0.093	0.091	0.091	
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks: We are not familiar with the objectives herein; but if a differentiation is desired, we see only a very slightly higher calcium and magnesium and lower sodium and sulfate in the Pennsylvanian water as compared to the Fusselman. This is considered a relatively minor difference; but if conclusive evidence as to the stability of the characteristics can be acquired, then it would be possible to differentiate the waters.

Form No. 3

ENSERCH EXPLORATION, INC.

Docket No. 7226

Exhibit

Date April 22nd 1981

By

Waylan C. Martin, M. A.

Ens Ex 11

7226

Application for Approval of
Salt Water Disposal Injection Well

Enserch Exploration - Gladys Rader Well No. 2
Peterson (South) Field
Roosevelt County, New Mexico

Well Location: 1880' FNL & 560' FWL
Section 32, Township 5-S
Range 33-E, Unit Letter E

Perforation: 7902'-7930' (-3503', -3531')
2 JSPF, 0.42" hole

Stimulation Treatment: Spotted 150 gallons of 15% MCA (@1.7 BPM and 1100 psi). Pumped 10,000 gallons of MOD 202 Acid. Dropped 40 RCN ball sealers (@ 7.5 BPM). Flushed with 32 barrels of 2% KCl water.

Injection Test: Date: 03/27/81
Test Data: 5BPM @ 2400 psi
4BPM @ 1500 psi
3BPM @ 600 psi
2BPM @ vacuum

Maximum Allowed Injection Pressure:

= 0.2 psi per foot of depth to the top of the injection zone.

= 0.2 x 7902 = 1580.4 psi

Maximum Allowed Injection Volume:

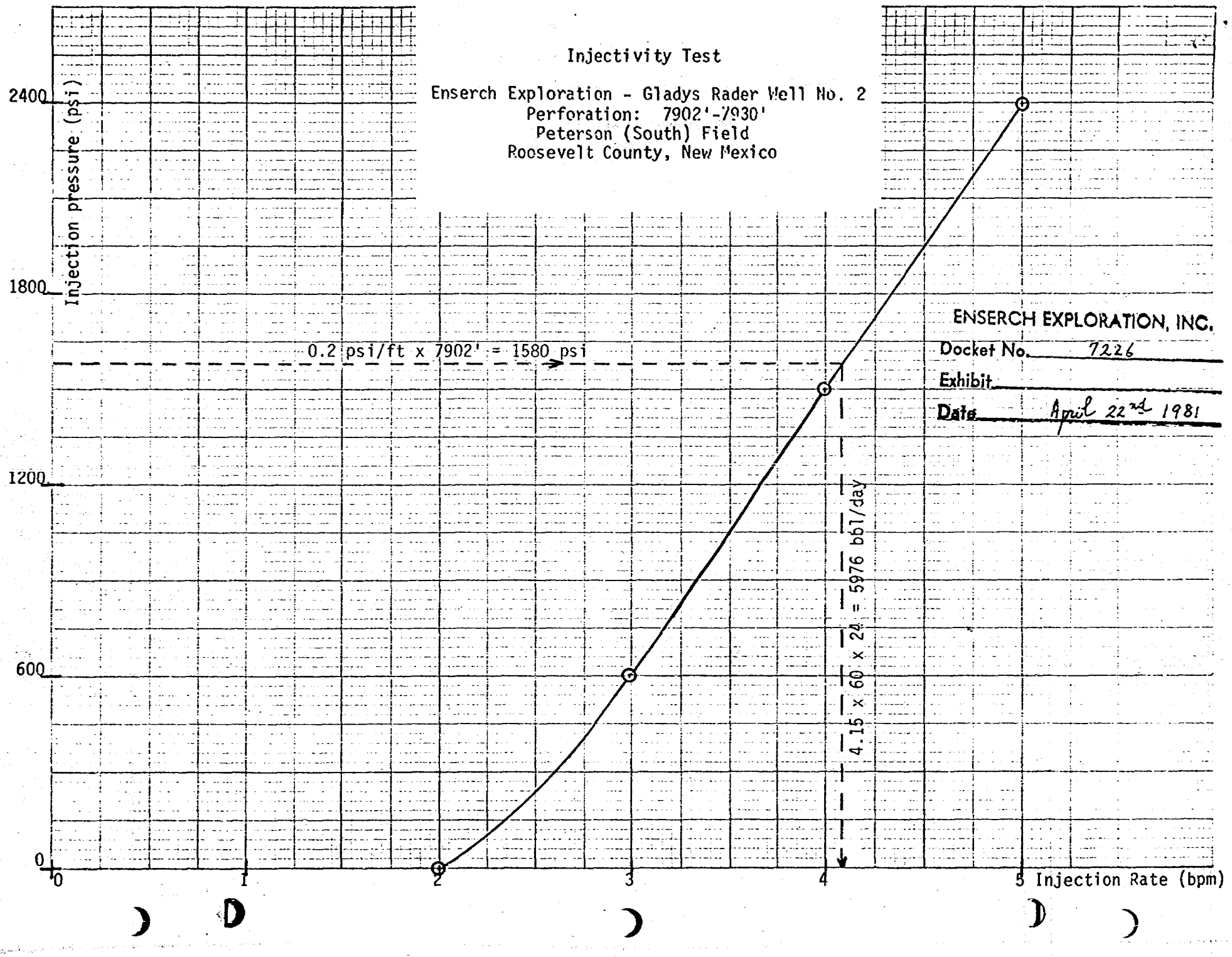
= 5976 bbls/day

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
ENSERCH EXHIBIT NO. 12
CASE NO. 7226

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

Injectivity Test

Enserch Exploration - Gladys Rader Well No. 2
Perforation: 7902'-7930'
Peterson (South) Field
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

WATER INJECTION CALCULATIONS
WATER ENCROACHMENT
Enserch Exploration - G. Rader Well No. 2
Peterson, South Field

Proposed Injection Zone: Montoya
Perforations: 7902'-7930'
(-3502',-3530')
Net Interval: 28'
Average Porosity: 7%
Irreducible Water Saturation: 20%
Displaceable Porosity: 5.6%

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
ENSERCH EXHIBIT NO. 13
CASE NO. 7226

2 BPM = 120 BPHW

$\frac{120}{24} / \frac{480}{240} / \frac{240}{30}$ Bbls/day

Reservoir volume encroached by injected water:

$$W_i = (7758\ A\ h\ \phi_D)/B_w$$

Reservoir area encroached by injected water:

$$A = (B_w \times W_i)/(7758\ h\ \phi_D)$$

Volume of water produced from Peterson, S. Field (December 1980):

Enserch	= 22,663 bbls	(731 bbls/day)
Phillips	= 5,541 bbls	(179 bbls/day)
Total	= 28,204 bbls/month	(910 bbls/day)

Anticipated daily injection volume:

51,150 bbls/month (1,650 bbls/day)

Reservoir area encroached by injection water (1,650 bbls/day):

Year 1:	A = 49.5 acres	(828')
Year 2:	= 99.0 acres	(1,170')
Year 3:	= 148.5 acres	(1,656')
Year 4:	= 198.0 acres	(2,343')
Year 5:	= 247.5 acres	(3,132')

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

RESIDUE RESEARCH LABORATORY
2405 W. INDIANA
MIDLAND, TEXAS 79701

INSOLUDLE RESIDUE REPORT
FILE NO.

SECTION	TWN.	RGE.	BLOCK	SURVEY	ELEV.	STATE	COUNTY
32	5-S	33-E			NR	NEW MEXICO	ROOSEVELT

FOOTAGE: 1880 FNL & 560 FWL

ISSUED FOR CONFIDENTIAL USE

COMPANY	WELL	FARM
ENSERCH EXPL,	# 2	RADER

SECTION EXAMINED:

7600-8000

TOPS AND CORRELATIONS:

Samples began in PENNSYLVANIAN ---------- 7600
B. PENNSYLVANIAN - T. MONTOYA ---------- 7880
T. CAMBRIAN ---------- 7980

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Enserch EXHIBIT NO. 15
CASE NO. 7226

SPECIAL NOTES:

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

Form C-108
Revised 3-1-68

NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION

OPERATOR	ADDRESS
Enserch Exploration, Inc.	P. O. Box 4815 Midland, Texas 79704

LEASE NAME	WELL NO.	FIELD	COUNTY
Rader	2	Undesignated	Roosevelt

LOCATION

UNIT LETTER E ; WELL IS LOCATED 1880 FEET FROM THE North LINE AND 560 FEET FROM THE West LINE, SECTION 32 TOWNSHIP 5-S RANGE 33E NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING	13-3/8"	356'	250 sacks	Circ.	
INTERMEDIATE	9-5/8"	1981'	914 sacks	Circ.	
LONG STRING	5-1/2"	8000'	350 sacks	6850'	Cement Bond Log
TUBING	2-3/8"	7876.53'	NAME, MODEL AND DEPTH OF TUBING PACKER: Baker Model "D" retainer Production packer @ 7875'		

NAME OF PROPOSED INJECTION FORMATION	TOP OF FORMATION	BOTTOM OF FORMATION
Montoya	7900'	7955'

IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?	PERFORATIONS OR OPEN HOLE?	PROPOSED INTERVAL(S) OF INJECTION
Tubing	Perforations	7902' - 7930'

IS THIS A NEW WELL DRILLED FOR DISPOSAL?	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED?	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE?
No	South Peterson (Fusselman and/or Penn.) Dev. Well	Yes

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH

7848' - 7851' (8 holes) squeezed with 86 sacks, 7710'-7714' (10 holes) squeezed w/47 sacks

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA
250'	7858'	None

ANTICIPATED DAILY INJECTION VOLUME (BBLS.)	MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSIG)
1650	745	5976	closed	pressure	1580 psi (max)

ANSWER YES OR NO WHETHER THE FOLLOWING WATERS ARE MINERALIZED TO SUCH A DEGREE AS TO BE UNFIT FOR DOMESTIC, STOCK, IRRIGATION, OR OTHER GENERAL USE —	WATER TO BE DISPOSED OF	NATURAL WATER IN DISPOSAL ZONE	ARE WATER ANALYSES ATTACHED?
	yes	yes	yes

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND)

88130

Richard Lambirth & Portales National Bank (O.D. Lambirth Trust) P.O. Drawer 888 Portales, N.M.

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL

Phillips Petroleum Company

Phillip Bldg.

Odessa, Texas 79761

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING?	SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL	
	yes	yes	
ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B)	PLAT OF AREA	ELECTRICAL LOG	DIAGRAMMATIC SKETCH OF WELL
	yes	yes	yes

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Leonard Kosh (Signature) District Production Manager (Title) April 13, 1981 (Date)

NOTE: Should waivers from the surface owner and all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests. SEE RULE 701.

EnsEx 1
Ap 7226

PETERSON SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
WELL STATUS
(AS OF 01/1981)

Proposed Salt Water Disposal
Produced from Pennsylvanian
Produced from Fusselman

Scale: 1" = 2000'

TANNEYHILL

ENSERCH EXPLORATION, INC.

Docket No. 7226
Exhibit
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AMOCO
FRAIRTHF
GL + 74
Wc - 2842

AMOCO
I-A SWEARINGEN
GL + 74
Wc - 2774
F - 3453

AMOCO
I-LAMBIRTH
GL + 73
Wc - 2742

B I PETERSON
GL + 80
Wc - 2737
F - 3447

PHILLIPS
I PETERSON "H"
TD 8000

ENSERCH
LAMBIRTH
GL + 65
Wc - 2721
F - 3407
Gr - 3631

ENSERCH
LAMBIRTH
GLR + 49
Wc - 2750
F - 3438
Gr - 3654

PHILLIPS
5-A LAMBIRTH
GLR + 78
Wc - 2729
F - 3502
Gr none

ENSERCH
LAMBIRTH
Wc - 2742
F - 3409
Gr none

ENSERCH
LAMBIRTH
GL + 66
Wc - 2713
F - 3427
Gr - 3682

PHILLIPS
4-A LAMBIRTH
Wc - 2758
F - 3499
Gr none

PHILLIPS
LAMBIRTH-ST
GLR + 1
Wc - 2700
F - 3405
Gr none

PHILLIPS
LAMBIRTH
Wc - 2721
F - 3419
Gr none

ENSERCH
LAMBIRTH
GL + 59
Wc - 2732
F - 3427
Gr - 3692

PHILLIPS
2-A GOLDSTON
GL + 61
Wc - 2737
F - 3458

PHILLIPS
(GOLDSTON)
1-A LAMBIRTH

ENSERCH
LAMBIRTH
GL + 65
Wc - 2725
F - 3372
Gr - 3504

PHILLIPS
LAMBIRTH
GL + 61
Wc - 2734
F - 3405
Gr - 3532

PHILLIPS
LAMBIRTH
Wc - 2741
F - 3389
Gr - 3491

ENSERCH
LAMBIRTH
GL + 74
Wc - 2717
F - 3367
Gr - 3447

ENSERCH
RADER
Wc - 2741
F base
Gr - 3481

ENSERCH
PERSEL

SO. PETERSON

PHILLIPS
LAMBIRTH "B"

ENSERCH
LAMBIRTH
TD 4020

ENSERCH
LAMBIRTH

ENSERCH
LAMBIRTH
Wc - 2708
F base
Gr - 3361

ENERGY RES
BLEDSOE
GL - 61
Wc - 2691
F none
GW-3257

ENERGY RES
MILLER

ENSERCH
EL PASO-ST
GL + 42
Wc - 2729
Gr - 3653

ENERGY RES.
1-EL PASO-ST

WEIHER
HARRIS
1-14
Glor + 58
WC - 2705
Gr - 3228
F - gone

ELIDA

R 33

Exs & X 2
7226

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd, 1981

APPLICATION FOR APPROVAL OF SALT WATER DISPOSAL WELL

Enserch Exploration - Rader Well No. 2
Peterson (South) Field - Roosevelt County
New Mexico

Operator Well Name API Well I.D. No.	Location	Distance to Enserch Rader No. 2	Casing String Setting Depth	Cement (sacks)	Cement Top	Total Depth	Current Producing Interval (Subsea depth)	Current Producing Formation	KB
Enserch Rader No. 2	1880' FNL 560' FWL Section 32 T5S, R33E		13-3/8" @ 356' 9-5/8" @ 1981' 5-1/2" @ 8000'	250 914 ~~970~~ 350	Surface Surface 6850'	8000'	7902'-7930' (-3503, -3531)	Salt Water Disposal	4399'
Enserch Rader No. 1 30-041-20492	2100' FSL 660' FWL Section 32 T5S, R33E	1650'	13-3/8" @ 373' 8-5/8" @ 2025'	350 680	Surface Surface	7903'	D&A	D&A	4410'
Phillips Lambirth "A" No. 4 30-041-20506	560' FNL 560' FEL Section 31 T5S, R33E	1750'	13-3/8" @ 360' 8-5/8" @ 3500' 5-1/2" @ 8007'	420 580 1635	Surface Surface 4200'	8007'	7814'-7828' ~~(-3381, -3395)~~ (-3423, -3437)	Fusselman	~~4433'~~ 4391
Enserch Lambirth No. 3 30-041-20454	1980' FNL 1980' FEL Section 31 T5S, R33E	2500'	13-3/8" @ 377' 8-5/8" @ 3297' 5-1/2" @ 8030'	350 2000 800	Surface Surface 6600'	8030'	7702'-7715' (-3295, -3308)	Pennsylvanian	4407'
Phillips Peterson No. 1-H 30-041-20535	660' FWL 510' FWL Section 29 T5S, R33E	2600'	13-3/8" @ 350' 8-5/8" @ 3496' 5-1/2" @ 7982'	325 775 800	Surface Surface 5210'	7991'			4384'
Enserch Lambirth No. 7 30-041-20482	660' FEL 510' FSL Section 30 T5S, R33E	2750'	13-3/8" @ 358' 8-5/8" @ 1991' 5-1/2" @ 7858'	300 750 450	Surface Surface 6630'	7882'	7826'-7829' (-3435, -3438)	Fusselman	4391'
Phillips Lambirth "A" No. 1 30-041-20471	1980' FNL 1980' FSL Section 31 T5S, R33E	2900'	13-3/8" @ 400' 8-5/8" @ 3500' 5-1/2" @ 7995'	420 1175 400	Surface Surface 5780'	8000'	7830'-7836' 7852'-7858' (-3408, -3416) (-3430, -3436)	Fusselman	4422'

Exs 3 & 4
7226

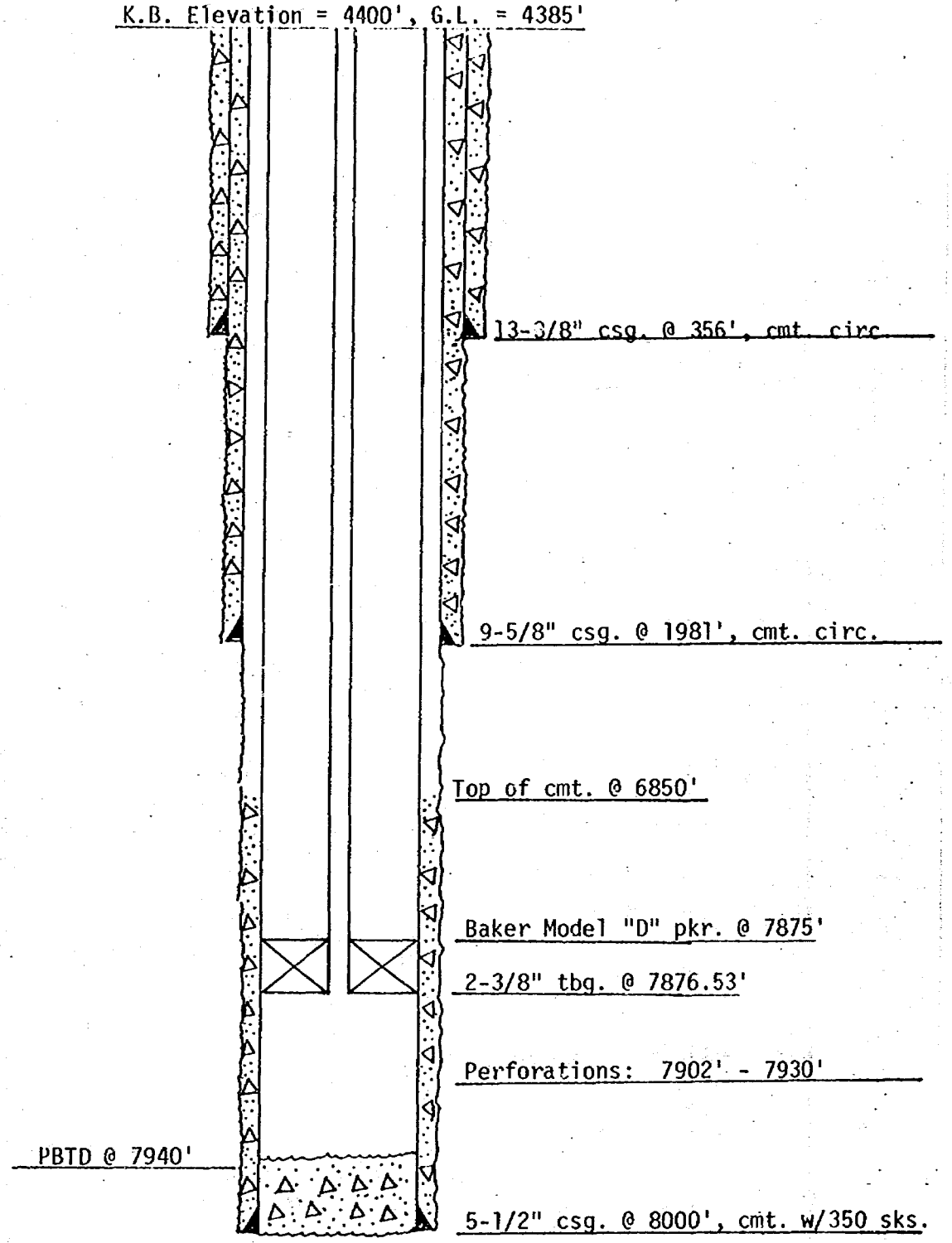
Enserch Exploration, Inc.

Rader No. 2 Well

1880' FNL & 560' FWL, Sec. 32-T5S-R33E

Roosevelt County, New Mexico

K.B. Elevation = 4400', G.L. = 4385'



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

Enserch Ex 5
Case 7226

ENSERCH EXPLORATION, INC.

Rader Well No. 1

South Peterson Field

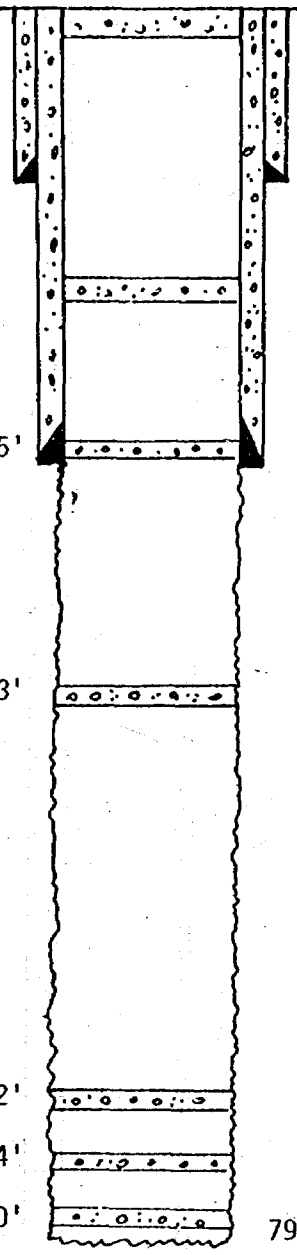
Roosevelt County, New Mexico

Prepared by: _____ Date _____

Plug #7: 10 sx Class H Cmt. @ surface

KB Elevation 4393.5'

GL Elevation 4407.5'



374' 13-3/8" 48#/ft K55 ST&C 8rd csg.

Plug #6: 40 sx Class H Cmt. @ 1082'-982'

Plug #5: 40 sx Class H Cmt. @ 2075'-1975'

2025' 8-5/8", 24#/ft K55 ST&C 8rd csg.

Plug #4: 40 sx Class H Cmt. @ 4443'-4343'

ENSERCH EXPLORATION, INC.
Docket No. 7226
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Plug #3: 40 sx Class H Cmt. @ 7152'-7052'

Plug #2: 40 sx Class H Cmt. @ 7574'-7474'

Plug #1: 50 sx Class H Cmt. @ 7880'-7930'

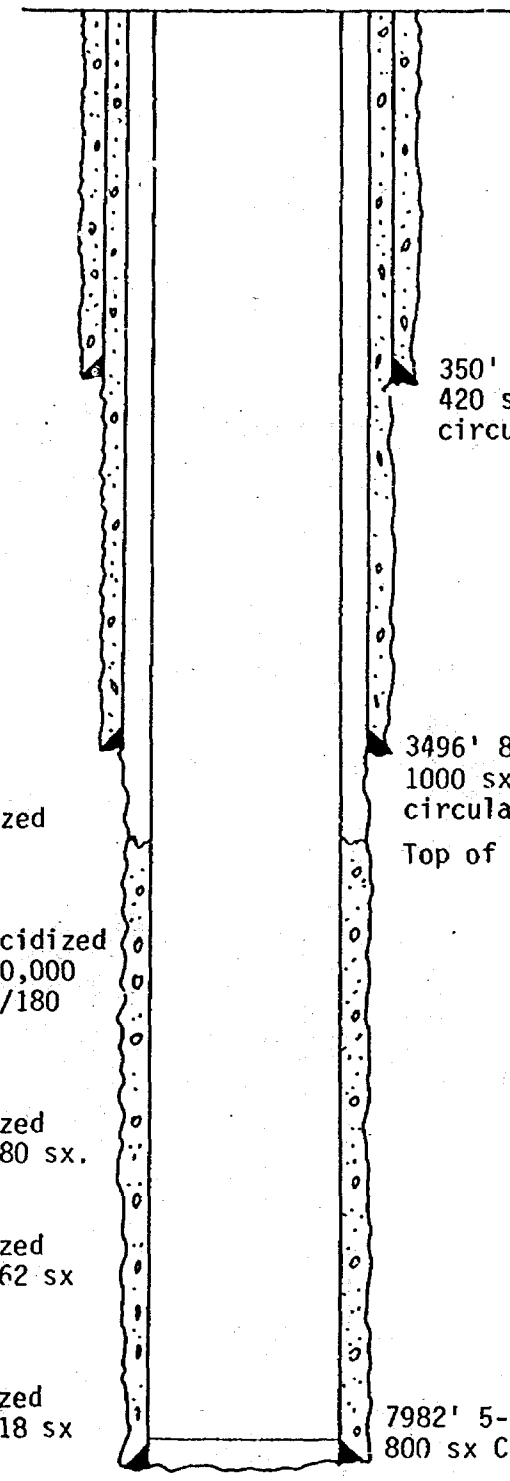
7920' TD open hole

Last Workover: Well was plugged on 7/7/79 before production string was run.

Prod. Rate Before: _____ Prod. Rate After: _____

Nature of Workover: _____

PHILLIPS PETROLEUM COMPANY
Peterson "H" Well No. 1
South Peterson Field
Roosevelt County, New Mexico



K.B. Elevation - 4384'
G.L. Elevation - 4368'

350' 13-3/8" 48#/ft K-55
420 sx Class H + 2% $CaCl_2$
circulated 95 sx to surface

3496' 8-5/8" 24#/ft K-55
1000 sx Class H + 2% $CaCl_2$
circulated 225 sx to surface

Top of cement @ 5210'

Perfs 7332'-7341' (18 shots). Acidized w/5000 gals. 28% acid.

Perfs 7616'-7760' OA (110 shots). Acidized w/4500 gals. 15% NE HCl. Frac'd w/20,000 gals. gelled 15% NE HCl. Squeezed w/180 sx.

Perfs 7793'-7801' (32 shots). Acidized w/250 gals. 15% NE HCl. Squeezed w/80 sx.

Perfs 7792'-7806' (28 shots). Acidized w/750 gals. 15% NE HCl. Squeezed w/62 sx Class H.

Perfs 7846'-7852' (20 shots). Acidized w/500 gals. 15% NE HCl. Squeezed w/18 sx Class H.

7982' 5-1/2" 15.5#/ft K-55
800 sx Class H + 2% KCl

ENSERCH EXPLORATION, INC.
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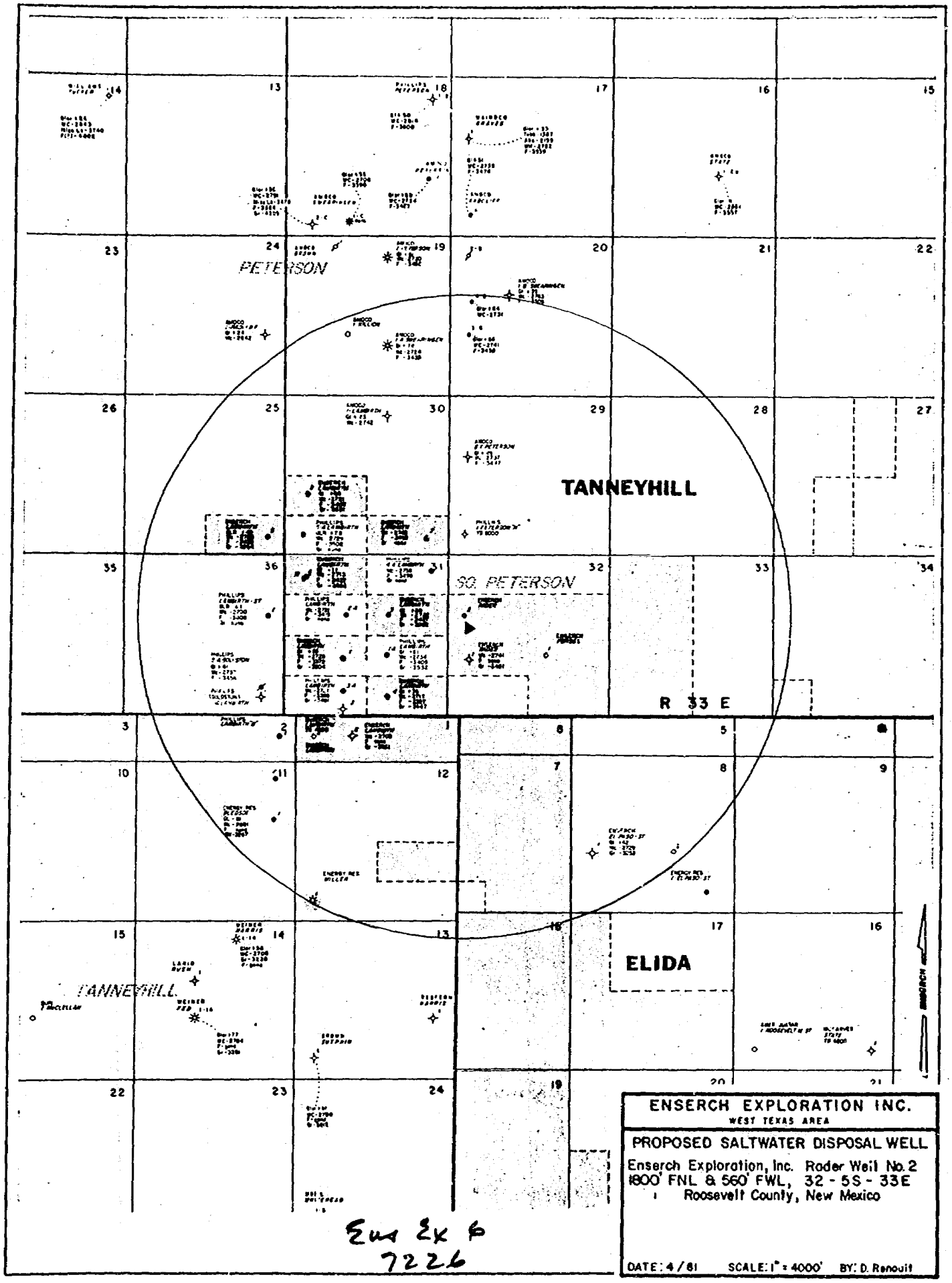

ENSERCH EXPLORATION INC.
WEST TEXAS AREA

PROPOSED SALTWATER DISPOSAL WELL

Enserch Exploration, Inc. Rader Well No. 2
1800' FNL & 560' FWL, 32 - 5S - 33E
Roosevelt County, New Mexico

DATE: 4/81 SCALE: 1" = 4000' BY: D. Renoult

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ENSERCH EXPLORATION, INC.
Docket No. 7226
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Date April 22nd 1981

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Enserch Rader No. 2	32	5S	33E	E		Salt water Disposal
Enserch Rader No. 1	32	5S	33E	L	1,650'	D&A
Phillips Lambirth "A" No. 4	31	5S	33E	A	1,750'	Fusselman
Enserch Lambirth No. 6	31	5S	33E	D	5,280'	P&A
Enserch Lambirth No. 10	31	5S	33E	D	5,350'	Fusselman
Phillips Lambirth "A" No. 2	31	5S	33E	F	3,800'	Fusselman
Enserch Lambirth No. 3	31	5S	33E	G	2,500'	Pennsylvanian
Phillips Lambirth "A" No. 1	31	5S	33E	J	2,900'	Fusselman
Enserch Lambirth No. 1	31	5S	33E	K	4,200	Fusselman
Phillips Lambirth "A" No. 3	31	5S	33E	M	4,650'	Fusselman

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LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Page 2
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Enserch Lambirth No. 4	31	5S	33E	O	3,650	Pennsylvanian
Amoco Lambirth No. 1	30	5S	33E	B	7,050'	P&A
Enserch Lambirth No. 8	30	5S	33E	L	6,550'	Fusselman
Phillips Lambirth "A" No. 5	30	5S	33E	M	5,850'	Pennsylvanian
Enserch Lambirth No. 7	30	5S	33E	P	2,750'	Fusselman
Amoco Peterson No. 1-B	29	5S	33E	E	5,280'	P&A
Phillips Peterson No. 1-H	29	5S	33E	M	2,600'	P&A
Amoco Swearingen No. 4-B	20	5S	33E	E	14,000'	Pennsylvanian
Amoco Swearingen No. 3-B	20	5S	33E	L	9,300'	Pennsylvanian
Amoco Swearingen No. 1-A	19	5S	33E	J	9,300'	Pennsylvanian
Enserch Lambirth No. 9	25	5S	32E	P	6,900'	Fusselman

LISTING OF WELLS TWO-MILE RADIUS FROM EEI RADER NO. 2
Page 3
Peterson, South Field
Roosevelt County, New Mexico

OPERATOR Well Name	Section	Township	Range	Letter	Distance to Rader Well #2	Current Producing Formation
Phillips Lambirth State #1	36	5S	32E	H	6,400'	Fusselman
Phillips Goldston "A" No. 2	36	5S	32E	P	7,000'	P&A
Goldston Lambirth "A" No. 1	36	5S	32E	P	7,150'	P&A
Phillips Lambirth "B" No. 1	2	6S	33E	A	7,250'	Pennsylvanian
Enserch Lambirth No. 2	1	6S	33E	D	6,250'	P&A
Enserch Lambirth No. 5	1	6S	33E	C	5,400'	P&A
Enserch El Paso State No. 1	8	6S	34E	L	8,800'	P&A
Energy Reserves Bledsoe No. 2	11	6S	33E	A	8,200'	Pennsylvanian
Energy Reserves Bledsoe No. 1	1	6S	33E	H	9,200'	Pennsylvanian
Energy Reserves Miller No. 1	12	6S	33E	M	14,000'	Granite Wash

Oil Production
Phillips Petroleum - Lambirth "A" Well No. 1
Peterson (Fusselman), South Field
Location: 05S/33E/31/J
Roosevelt County, New Mexico

STB/Month

10^4 9 8 7 6 5 4 3 2 10^3 9 8 7 6 5 4 3 2 10^2 9 8 7 6 5 4 3 2 1

1 9 8 7 6 5 4 3 2 1 9 8 7 6 5 4 3 2 1

Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec

19 78 | 19 79 | 1980 | 19 81 | 19 82

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

K·E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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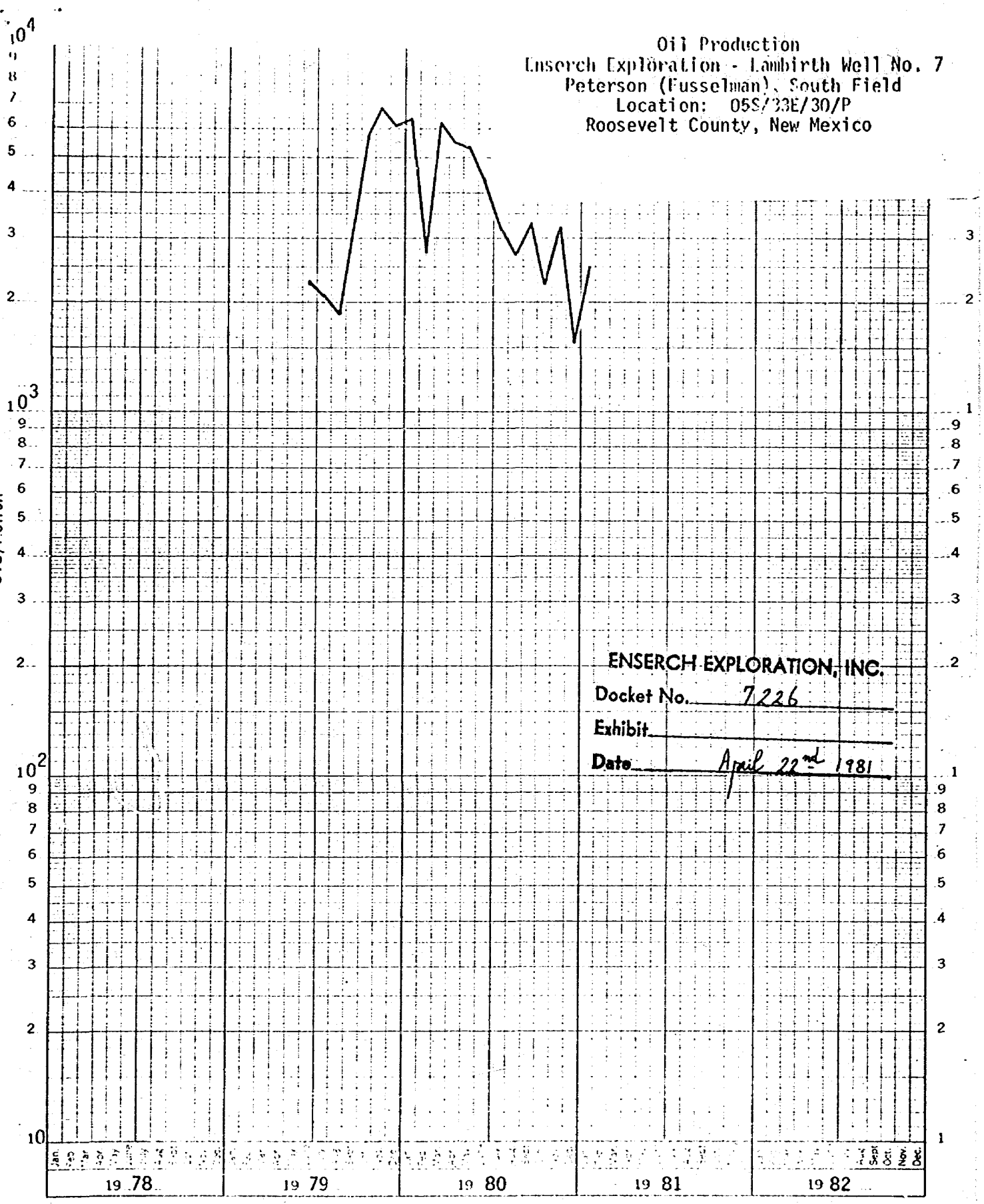
PRODUCTION HISTORY
Phillips Petroleum - Lambirth "A" Well No. 1
Peterson (Fusselman), South Field

Location: 05S/33E/31/J
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR
	Bbls	MCF	Bbls	SCF/Bbl
01/79	3,700	3,411		922
02/79	6,650	6,131		922
03/79	2,585	980		379
04/79	2,184	646	191	296
05/79	7,115	1,883	149	265
06/79	6,536	2,776	5,222	425
07/79	6,105	2,865	5,104	469
08/79	6,332	5,976	5,066	944
09/79	4,718	3,536	8,257	749
10/79	4,965	3,317	8,689	668
11/79	3,908	967	2,286	247
12/79	4,462	1,174	2,610	263
01/80	1,371	354	802	258
02/80	1,255	205	734	163
03/80	1,641	456	960	278
04/80	4,052	886	2,370	219
05/80	3,730	651	2,182	174
06/80	3,518	1,017	2,058	289
07/80	3,576	9,622	2,092	2,691
08/80	3,668	3,034	9,638	827
09/80	1,195	698	3,138	584
10/80	769	295	2,019	384
11/80	876	114	2,300	130
12/80	969	578	2,545	596
Cum. Prod.	85,880	51,572	68,412	600

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

Oil Production
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field
Location: 05S/33E/30/P
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

K+E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

PRODUCTION HISTORY
Enserch Exploration - Lambirth Well No. 7
Peterson (Fusselman), South Field

Location: 05S/33E/30/P
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR
	Bbls	MCF	Bbls	SCF/Bbl
01/79				
02/79				
03/79				
04/79				
05/79				
06/79	2,244	1,031	1,120	459
07/79	2,112	871	804	412
08/79	1,879	1,056	494	562
09/79	3,345	771	1,859	230
10/79	5,912	2,493	1,261	421
11/79	6,891	2,262	1,257	328
12/79	6,228	2,172	348	348
01/80	6,250	1,767	1,380	282
02/80	2,724	1,840	1,014	675
03/80	6,242	1,971	1,399	316
04/80	5,541	2,035	1,370	367
05/80	5,279	2,122	1,722	402
06/80	4,376	2,221	1,262	508
07/80	3,120	1,537	1,689	493
08/80	2,723	1,589	2,470	584
09/80	3,260	1,789	2,434	549
10/80	2,274	1,800	1,089	792
11/80	3,142	2,460	3,194	783
12/80	1,527	1,669	1,507	1,093
Cum. Prod.	75,069	33,456	27,673	446

ENSERCH EXPLORATION, INC.
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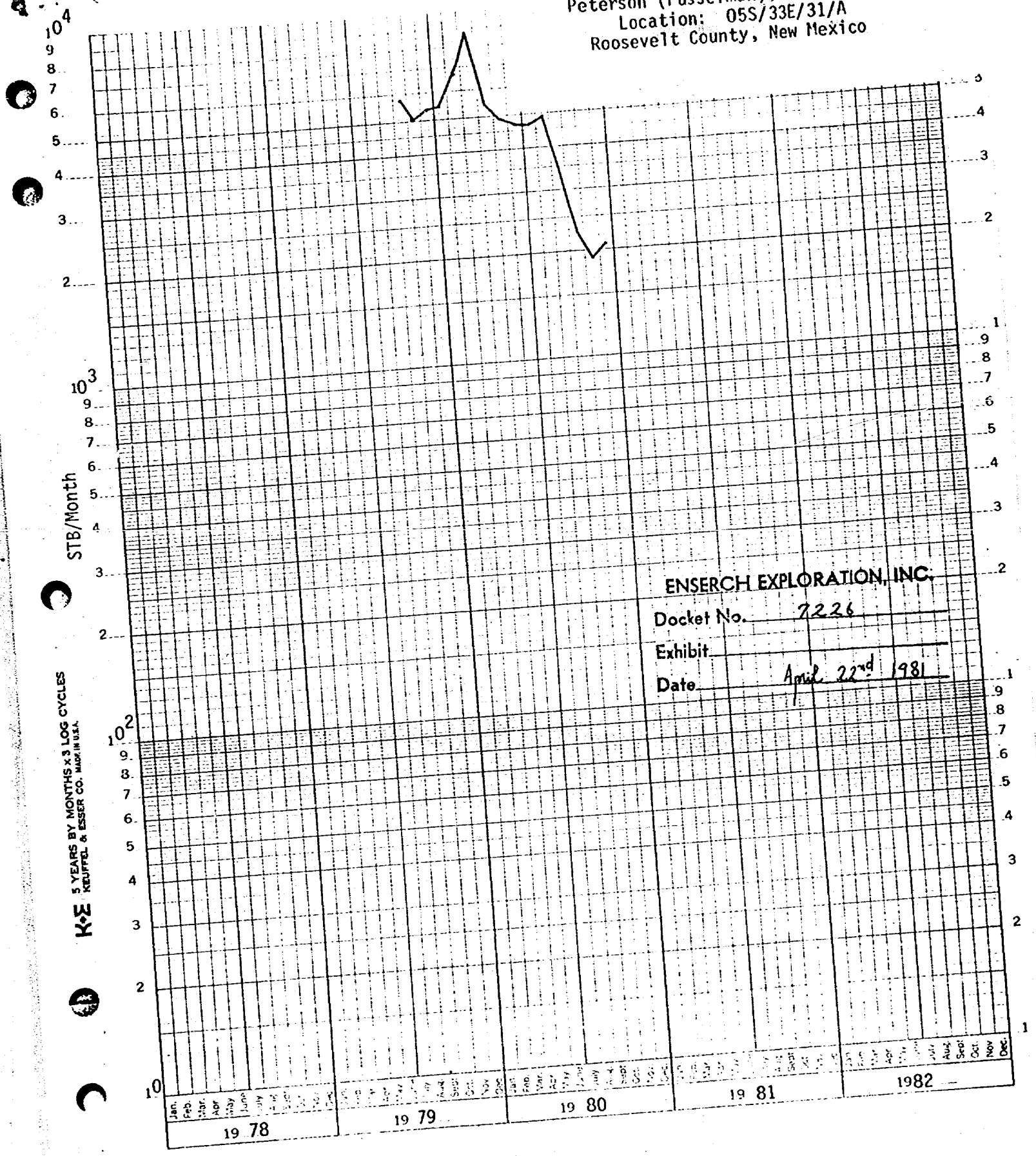
Date April 22nd 1981

Oil Production
Phillips Petroleum - Lambirth "A" Well No. 4
Peterson (Fusselman), South Field
Location: 05S/33E/31/A
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

K+E 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

PRODUCTION HISTORY
Phillips Petroleum - Lambirth "A" Well No. 4
Peterson (Fusselman), South Field

Location: 05S/33E/31/A
Roosevelt County, New Mexico

Date	Oil	Gas	Water	GOR
	Bbls	MCF	Bbls	SCF/Bbl
01/79				
02/79				
03/79				
04/79				
05/79				
06/79				
07/79				
08/79				
09/79				
10/79	5,740	1,186	402	207
11/79	5,020	1,578	8,685	314
12/79	5,158	1,725	892	334
01/80	5,434	1,783	940	328
02/80	6,701	1,394	1,159	208
03/80	8,762	614	301	70
04/80	5,410	1,502	936	278
05/80	4,979	1,106	861	222
06/80	4,696	1,725	812	367
07/80	4,773	177	2,387	37
08/80	4,898	3,008		614
09/80	3,537	1,146		324
10/80	2,277	483		212
11/80	1,902	138		73
12/80	2,035	673		331
Cum. Prod.	71,332	18,238	17,375	256

ENSERCH EXPLORATION, INC.
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Date April 22nd 1981

WATER PRODUCTION (IN BBLS)
Enserch Exploration - Peterson (Fusselman, Penn) South Field
Roosevelt County, New Mexico

Enserch Exploration	Lambirth #1		Lambirth #3		Lambirth #4		Lambirth #6		Lambirth #7		Lambirth #8		Lambirth #9		Lambirth #10		Cumulative Water Production		
	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Total
06/78	0																		
07/78	0																		
08/78	310																310		310
09/78	313																313		313
10/78	0																0		0
11/78	0		0		1,119												0	1,119	1,119
12/78	0		0		1,995												0	1,995	1,995
01/79	0		0		1,807												0	1,807	1,807
02/79	0		0		1,569												0	1,569	1,569
03/79	0		0		1,501		936										936	1,501	2,437
04/79	0		0		956		720										720	956	1,676
05/79	0		0		2,607		240										240	2,607	2,847
06/79	0		0		2,285		3,965		1,120								5,085	2,285	7,370
07/79	0		0		0		3,703		804								4,507	0	4,507
08/79	0		0		1,949		2,928		494								3,422	1,949	5,371
09/79	0		0		1,923		2,560		1,859								4,419	1,923	6,342
10/79	0		0		1,819		3,928		1,261		0						5,189	1,819	7,008
11/79	0		0		2,245		6,778		1,257		395						8,430	2,245	10,675
12/79	0		0		1,613		9,997		348		5,247						15,592	1,613	17,205
01/80	0		0		1,273		8,961		1,380		5,377		44				15,762	1,273	17,035
02/80	0		0		1,143		9,220		1,014		1,702		0				11,936	1,143	13,079
03/80	0		0		1,376		10,394		1,399		7,891		0				19,684	1,376	21,060
04/80	0		0		1,326		11,755		1,370		6,759		0				19,884	1,326	21,210
05/80	0		0		1,363		11,242		1,722		6,349		0				19,313	1,363	20,676
06/80	0		0		1,120		11,598		1,262		10,034		0				22,894	1,120	24,014
07/80	0		0		1,029		8,087		1,689		10,286		0				20,062	1,029	21,091
08/80	0		0		1,162				2,470		9,977		0		266		12,713	1,162	13,875
09/80	0		0		1,007				2,434		9,615		0		7,215		19,264	1,007	20,271
10/80	0		0		817				1,089		10,657		11		10,838		22,595	817	23,412
11/80	0		0		230				3,194		8,620		0		7,606		19,420	230	19,650
12/80	0		0		398				1,507		9,997		8		10,773		22,265	398	22,663
Cumulative Water Production	623		0		35,632		107,012		27,673		102,886		63		36,698		274,955	35,632	310,587

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd, 1981

WATER PRODUCTION (IN BBLS)
Enserch Exploration - Peterson (Fusselman, Penn) South Field
Roosevelt County, New Mexico

Enserch Exploration	Lambirth #1		Lambirth #3		Lambirth #4		Lambirth #6		Lambirth #7		Lambirth #8		Lambirth #9		Lambirth #10		Cumulative Water Production		
	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Total
06/78	0																		
07/78	0																		
08/78	310																310		310
09/78	313																313		313
10/78	0																0		0
11/78	0		0		1,119												0	1,119	1,119
12/78	0		0		1,995												0	1,995	1,995
01/79	0		0		1,807												0	1,807	1,807
02/79	0		0		1,569												0	1,569	1,569
03/79	0		0		1,501		936										936	1,501	2,437
04/79	0		0		956		720										720	956	1,676
05/79	0		0		2,607		240										240	2,607	2,847
06/79	0		0		2,285		3,965		1,120								5,085	2,285	7,370
07/79	0		0		0		3,703		804								4,507	0	4,507
08/79	0		0		1,949		2,928		494								3,422	1,949	5,371
09/79	0		0		1,923		2,560		1,859								4,419	1,923	6,342
10/79	0		0		1,819		3,928		1,261		0						5,189	1,819	7,008
11/79	0		0		2,245		6,778		1,257		395						8,430	2,245	10,675
12/79	0		0		1,613		9,997		348		5,247						15,592	1,613	17,205
01/80	0		0		1,273		8,961		1,380		5,377		44				15,762	1,273	17,035
02/80	0		0		1,143		9,220		1,014		1,702		0				11,936	1,143	13,079
03/80	0		0		1,376		10,394		1,399		7,891		0				19,684	1,376	21,060
04/80	0		0		1,326		11,755		1,370		6,759		0				19,884	1,326	21,210
05/80	0		0		1,363		11,242		1,722		6,349		0				19,313	1,363	20,676
06/80	0		0		1,120		11,598		1,262		10,034		0				22,894	1,120	24,014
07/80	0		0		1,029		8,087		1,689		10,286		0				20,062	1,029	21,091
08/80	0		0		1,162				2,470		9,977		0		266		12,713	1,162	13,875
09/80	0		0		1,007				2,434		9,615		0		7,215		19,264	1,007	20,271
10/80	0		0		817				1,089		10,657		11		10,838		22,595	817	23,412
11/80	0		0		230				3,194		8,620		0		7,606		19,420	230	19,650
12/80	0		0		398				1,507		9,997		8		10,773		22,265	398	22,663
Cumulative Water Production	623		0		35,632		107,012		27,673		102,886		63		36,698		274,955	35,632	310,587

Enserch Exploration, Inc.
Docket No. 7226
Exhibit
Date April 22nd, 1981

Enserch Exploration, Inc.
Ex 9
Ca 7226

WATER PRODUCTION (IN BBLS)
Phillips Petroleum-Peterson (Fusselman, Penn), South Field
Roosevelt County, New Mexico

Phillips Petroleum	Lambirth State No. 1		Lambirth "A" No. 1		Lambirth "A" No. 2		Lambirth "A" No. 3		Lambirth "A" No. 4		Lambirth "A" No. 5		Lambirth "B" No. 1		Cumulative Water Production		
	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Fuss	Penn	Total
06/78																	
07/78																	
08/78																	
09/78																	
10/78																	
11/78																	
12/78																	
01/79			0												0		0
02/79			0												0		0
03/79			980												980		980
04/79			191		0										191		191
05/79			149		0										149		149
06/79			5,222		0										5,222		5,222
07/79			5,104		0										5,104		5,104
08/79			5,066		0		387								5,453		5,453
09/79			8,257		0		1,230								9,487		9,487
10/79			8,689		0		1,348		402						10,439		10,439
11/79			2,286		0		1,179		8,685						12,150		12,150
12/79			2,610		0		1,212		892						4,714		4,714
01/80			802		0		0		940						1,742		1,742
02/80			734		0		0		1,159						1,893		1,893
03/80	1,261		960		0		0		301						2,522		2,522
04/80	26		2,370		0		0		936						3,332		3,332
05/80	24		2,182		0		0		861			2,077			3,067	2,077	5,144
06/80	0		2,058		0		0		812			1,651			2,870	1,651	4,521
07/80	0		2,092		0		1,580		2,387			767			6,059	767	6,826
08/80	1,418		9,636		2,826		24		0			918		7	13,904	925	14,829
09/80	1,877		3,138		0		16		0			816		61	5,031	877	5,908
10/80	2,294		2,019		0		12		0			651		46	4,325	697	5,022
11/80	558		2,300		0		10		0			629		0	2,868	629	3,497
12/80	2,286		2,545		0		13		0			668		29	4,844	697	5,541
Cum. Water Prod.	9,744		69,390		2,826		7,011		17,375			8,177		143	106,346	8,320	114,666

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd, 1981

ENS Ex 10
7226

P. O. BOX 1468
MONAHANS, TEXAS 79756
PHONE 943-3234 OR 683-1040

Martin Water Laboratories, Inc

709 W. INDIANA
MIDLAND, TEXAS 79701
PHONE 683-4621

RESULT OF WATER ANALYSES

JUL 9 1980

LABORATORY NO. 679309

TO: Mr. Jerry Nash
P.O.Box 4315, Midland, Texas

SAMPLE RECEIVED 6-28-79

RESULTS REPORTED 7-5-79

COMPANY Enserch Exploration, Inc. LEASE Lambirth

FIELD OR POOL South Peterson

SECTION ___ BLOCK ___ SURVEY ___ COUNTY Roosevelt STATE New Mexico

SOURCE OF SAMPLE AND DATE TAKEN:

NO. 1 Produced (Penn) water - taken from Lambirth #4. 6-27-79

NO. 2 Produced (Fusselman) water - taken from Lambirth #6. 6-27-79

NO. 3 Produced (Fusselman) water - taken from Lambirth #7. 6-27-79

NO. 4

REMARKS:

CHEMICAL AND PHYSICAL PROPERTIES	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0698	1.0717	1.0721	
pH When Sampled				
pH When Received	6.7	6.7	6.7	
Bicarbonate as HCO_3	476	566	637	
Supersaturation as $CaCO_3$				
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$	23,400	16,300	17,800	
Calcium as Ca	7,040	4,560	5,120	
Magnesium as Mg	1,409	1,191	1,215	
Sodium and/or Potassium	30,268	34,682	33,902	
Sulfate as SO_4	662	1,066	821	
Chloride as Cl	62,497	63,917	63,917	
Iron as Fe	81.1	56.6	97.5	
Barium as Ba				
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	102,352	105,982	105,612	
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen, Winkler				
Hydrogen Sulfide	0.0	0.0	0.0	
Resistivity, ohms/m at 77° F.	0.093	0.091	0.091	
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks: We are not familiar with the objectives herein; but if a differentiation is desired, we see only a very slightly higher calcium and magnesium and lower sodium and sulfate in the Pennsylvanian water as compared to the Fusselman. This is considered a relatively minor difference; but if conclusive evidence as to the stability of the characteristics can be acquired, then it would be possible to differentiate the waters.

Form No. 3

ENSERCH EXPLORATION, INC.

By _____

Waylan C. Martin, M. A.

Docket No. 7226

Exhibit _____

Date April 22nd 1981

Ens Ex 11
7226

Application for Approval of
Salt Water Disposal Injection Well

Enserch Exploration - Gladys Rader Well No. 2
Peterson (South) Field
Roosevelt County, New Mexico

Well Location: 1880' FNL & 560' FWL
Section 32, Township 5-S
Range 33-E, Unit Letter E

Perforation: 7902'-7930' (-3503', -3531')
2 JSPF, 0.42" hole

Stimulation Treatment: Spotted 150 gallons of 15% MCA (@1.7 BPM and 1100 psi). Pumped 10,000 gallons of MOD 202 Acid. Dropped 40 RCN ball sealers (@ 7.5 BPM). Flushed with 32 barrels of 2% KCl water.

Injection Test: Date: 03/27/81
Test Data: 5BPM @ 2400 psi
4BPM @ 1500 psi
3BPM @ 600 psi
2BPM @ vacuum

Maximum Allowed Injection Pressure:

= 0.2 psi per foot of depth to the top of the injection zone.
= 0.2 x 7902 = 1580.4 psi

Maximum Allowed Injection Volume:

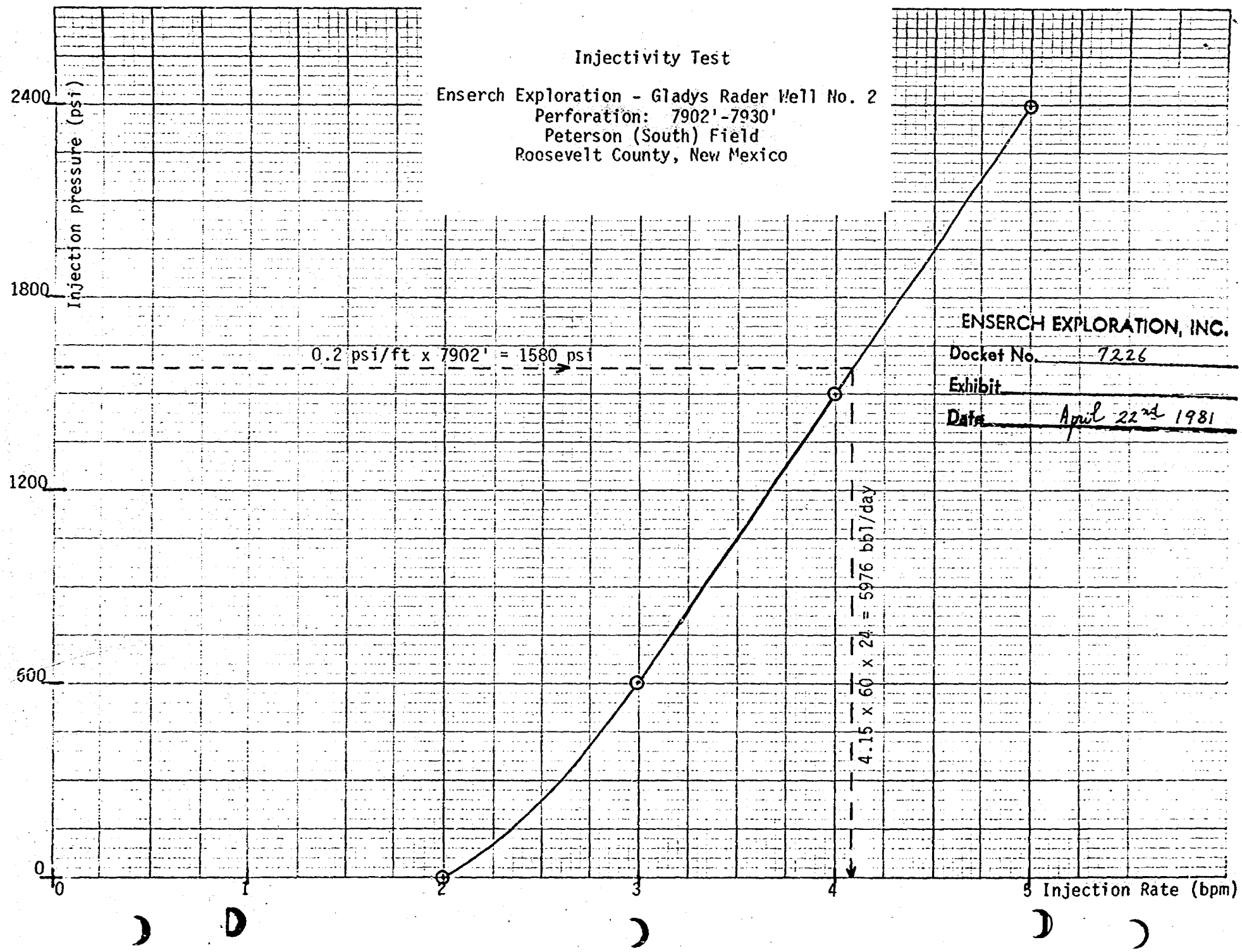
= 5976 bbls/day

Enserch Exploration, Inc.
Docket No. 7226
Exhibit
Date April 22nd 1981

Enserch Ex 12
Case 7226

Injectivity Test

Enserch Exploration - Gladys Rader Well No. 2
Perforation: 7902'-7930'
Peterson (South) Field
Roosevelt County, New Mexico



ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

WATER INJECTION CALCULATIONS
WATER ENCROACHMENT
Enserch Exploration - G. Rader Well No. 2
Peterson, South Field

Proposed Injection Zone: Montoya
Perforations: 7902'-7930'
(-3502',-3530')
Net Interval: 28'
Average Porosity: 7%
Irreducible Water Saturation: 20%
Displaceable Porosity: 5.6%

Reservoir volume encroached by injected water:

$$W_i = (7758\ A\ h\ \phi_D)/B_w$$

Reservoir area encroached by injected water:

$$A = (B_w \times W_i)/(7758\ h\ \phi_D)$$

Volume of water produced from Peterson, S. Field (December 1980):

Enserch	= 22,663 bbls	(731 bbls/day)
Phillips	= 5,541 bbls	(179 bbls/day)
Total	= 28,204 bbls/month	(910 bbls/day)

Anticipated daily injection volume:

51,150 bbls/month (1,650 bbls/day)

Reservoir area encroached by injection water (1,650 bbls/day):

Year 1:	A = 49.5 acres	(828')
Year 2:	= 99.0 acres	(1,170')
Year 3:	= 148.5 acres	(1,656')
Year 4:	= 198.0 acres	(2,343')
Year 5:	= 247.5 acres	(3,132')

Enserch Ex 13
Ca 7226

ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981

RESIDUE RESEARCH LABORATORY
2405 W. INDIANA
MIDLAND, TEXAS 79701

INSOLUBLE RESIDUE REPORT
FILE NO.

SECTION	TWN.	RGE.	BLOCK	SURVEY	ELEV.	STATE	COUNTY
32	5-S	33-E			NR	NEW MEXICO	ROOSEVELT

FOOTAGE: 1880 FNL & 560 FWL

ISSUED FOR CONFIDENTIAL USE

COMPANY	WELL	FARM
ENSERCH EXPL.	# 2	RADER

SECTION EXAMINED:

7600-8000

TOPS AND CORRELATIONS:

Samples began in PENNSYLVANIAN ---------- 7600

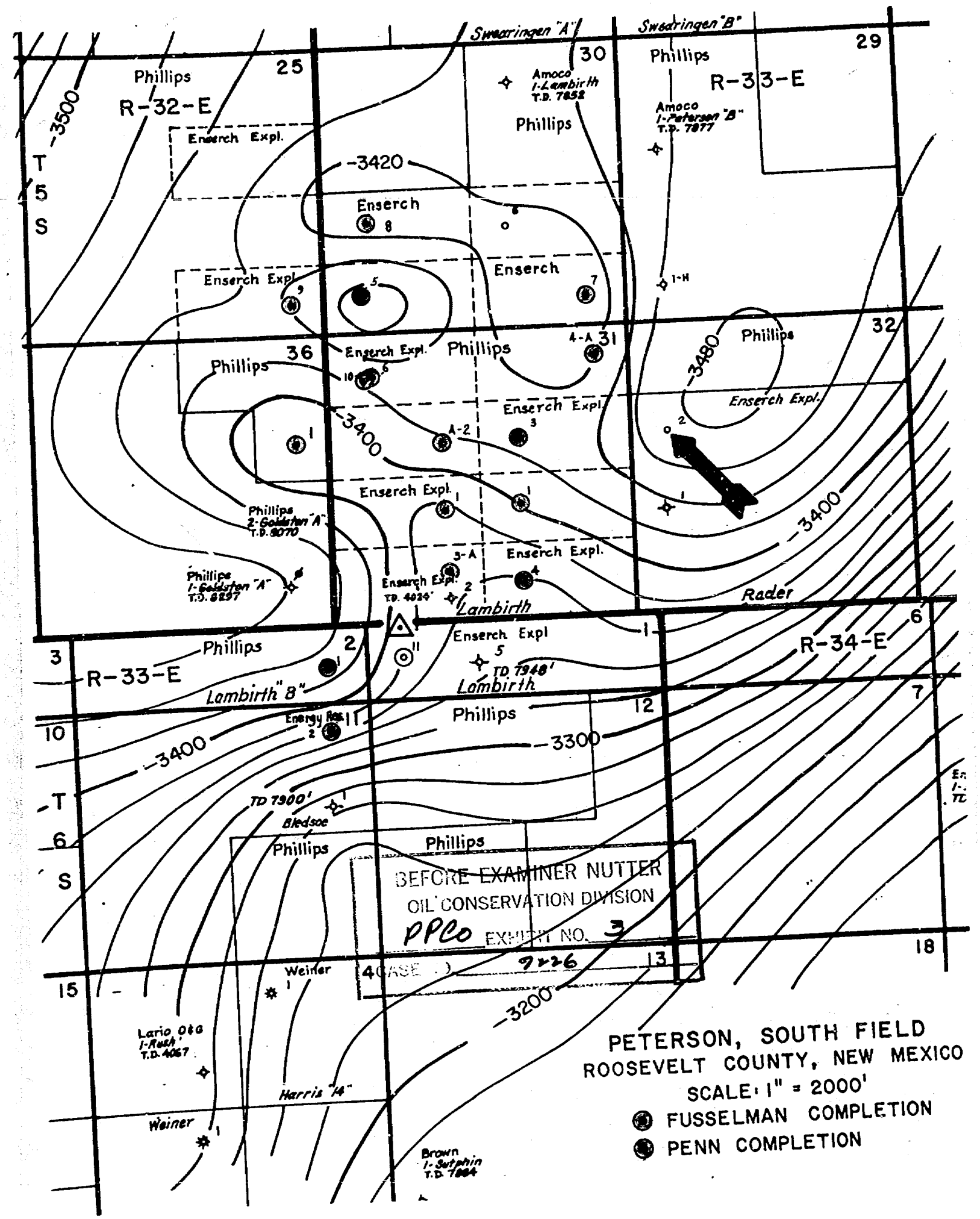
B. PENNSYLVANIAN - T. MONTOYA ---------- 7880

T. CAMBRIAN ---------- 7980

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Enserch EXHIBIT NO. 15
CASE NO. 7226

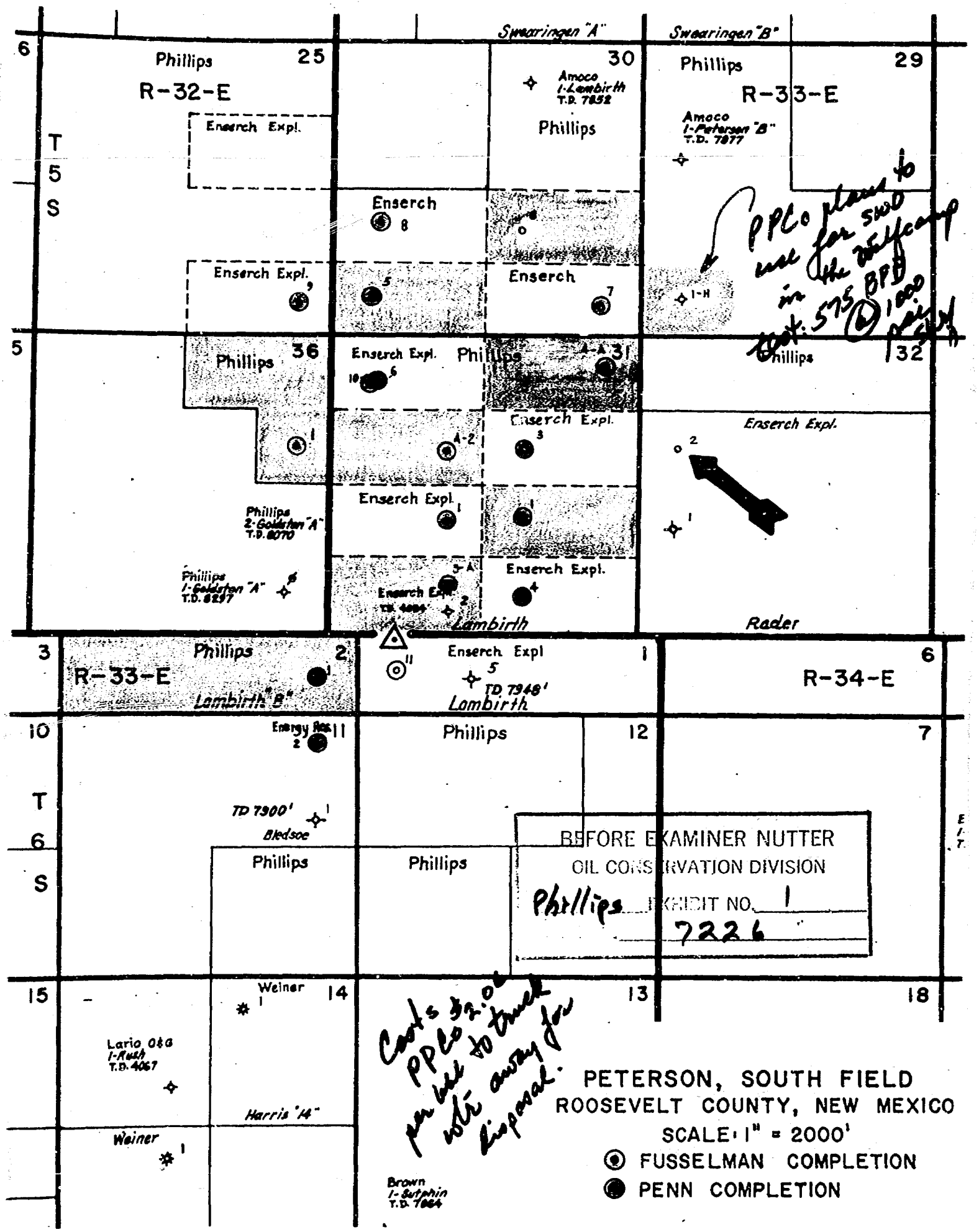
SPECIAL NOTES:

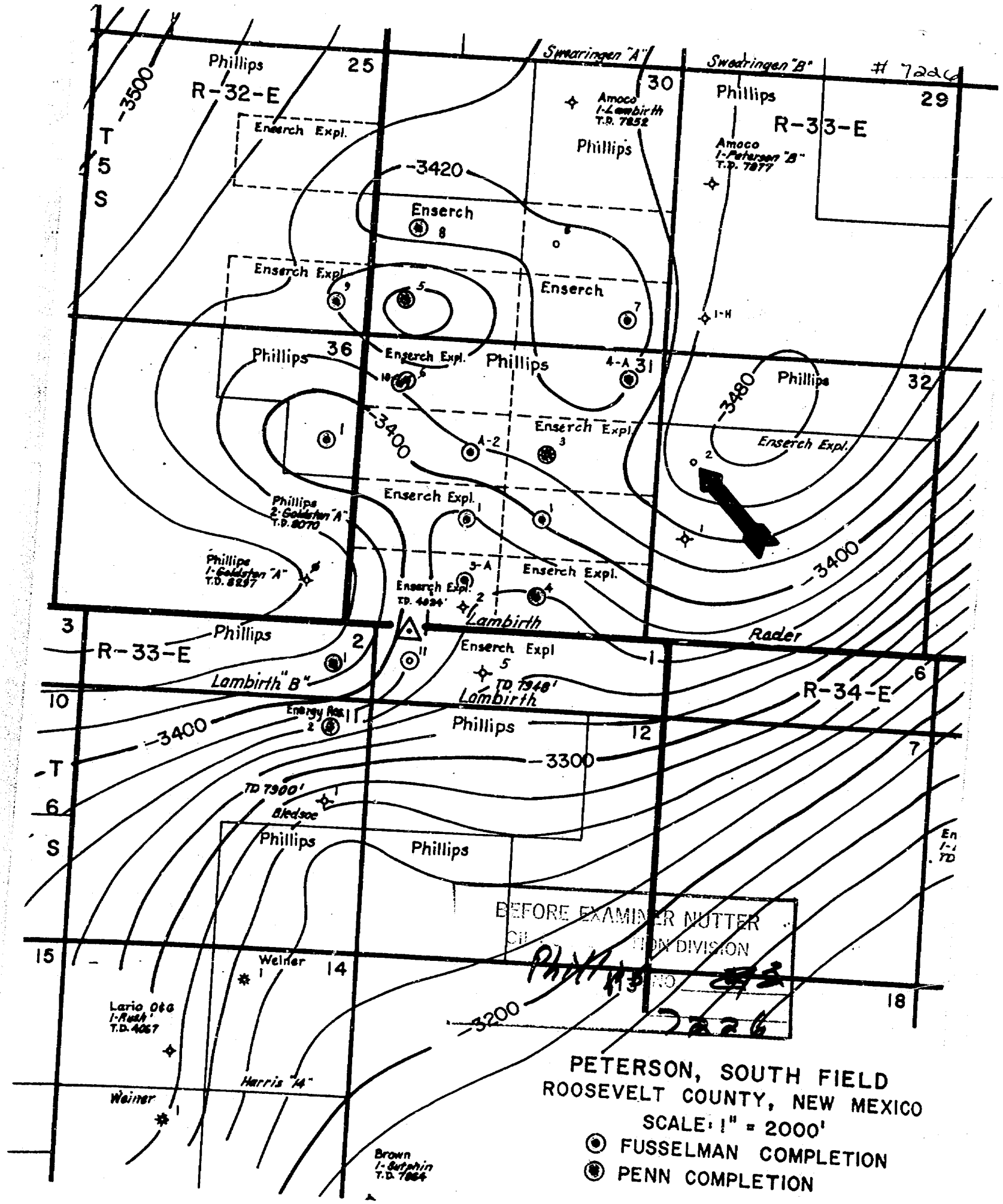
ENSERCH EXPLORATION, INC.
Docket No. 7226
Exhibit
Date April 22nd 1981



PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'

● FUSSELMAN COMPLETION
● PENN COMPLETION


Swearingen "A"
Swearingen "B"
6
Phillips
25
R-32-E
Enserch Expl.
T
5
S
Amoco
1-Lambirth
T.D. 7852
30
Phillips
Phillips
29
R-33-E
Amoco
1-Peterson "B"
T.D. 7877
Enserch
8
Enserch Expl.
9
5
Enserch
7
1-H
PPCo plans to use for SWD in the Wolfcamp at 575 BPD @ 1000 psi
5
Phillips
36
Enserch Expl.
10
6
Phillips
A-A
31
Phillips
32
1
A-2
3
Enserch Expl.
Enserch Expl.
Phillips
2-Goldston "A"
T.D. 8070
1
1
Phillips
1-Goldston "A"
T.D. 8257
6
3-A
Enserch Expl.
T.D. 4084
2
4
Enserch Expl.
Lambirth
Rader
3
Phillips
2
R-33-E
Lambirth "B"
11
Enserch Expl
5
T.D. 7948'
Lambirth
1
6
R-34-E
10
Energy Res
2
11
Phillips
12
7
T
6
S
TD 7900'
Bledsoe
1
Phillips
Phillips
BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Phillips EXHIBIT NO. 1
7226
15
Weiner
14
1
13
18
Lario O&G
1-Ruth
T.D. 4067
Harris "14"
Weiner
1
Coats $2.00 PPCo will truck water away for disposal.
Brown
1-Sutphin
T.D. 7864
PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'
FUSSELMAN COMPLETION
PENN COMPLETION



PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'

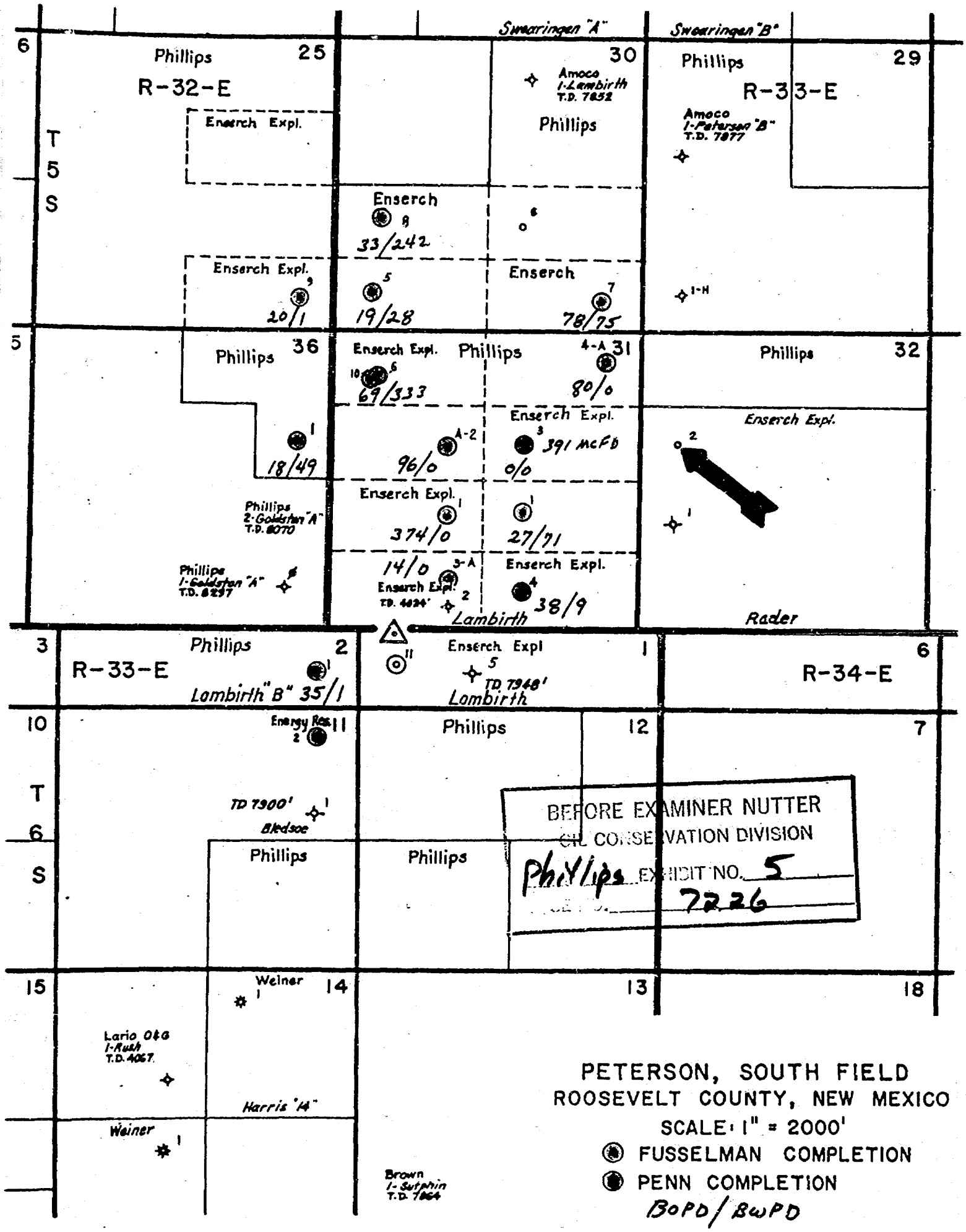
◉ FUSSELMAN COMPLETION
◉ PENN COMPLETION

Form 2069 4-53

COLUMNAR CORE RECORD

DEPTH	DESCRIPTION AND REMARKS (X: Interval of estimated last core)
	Phillips Petroleum Company #2 Lambirth-A, Roosevelt County, New Mexico. (K-31)
P. B. Drisko 3-28-79	
	Core #1: 7810-7819', recovered 9'. Fusselman.
7810-13	Shale, dark, green, mottled, hard, with tan to red finely crystalline, hard dolomite and light chert pebble inclusions. No show.
7813-15	Dolomite, tan to red, finely crystalline, mottled, hard, with much green shale and white to grey chert inclusions. No show.
7815-17.5	Dolomite, tan to red, finely crystalline, mottled, hard, shaley, with white and grey chert inclusions. No show.
7817.5-18	Shale, very dark green, mottled, with tan dolomite inclusions.
7818-19	Dolomite, tan to red, finely crystalline, mottled, shaley, hard, with many grey to white chert pebble inclusions. No show.
	Core #2: 7819-7850'. recovered 30'. Fusselman.
7819-23	Dolomite, tan-pink, finely crystalline, mottled, shaley, hard with grey-white chert inclusions.
7823-26	Dolomite, brown, finely crystalline, clean with fair crystalline-vugular-fractured porosity. Heavy stain, good odor. Scattered bleeding gas and oil.
7826-31	Dolomite, same as above with large vertical fractures. Heavy stain. Fair bleeding gas and oil.
7831-49	Dolomite, brown, finely crystalline, clean with good crystalline vugular porosity. Many thin vertical fractures. Fair bleeding gas, oil and water.
7849-59	Lost.

EXHIBIT
Phillips - 4
CASE NO. 7226



BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Phillips EXHIBIT NO. 5
CASE NO. 7226

PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'
◉ FUSSELMAN COMPLETION
● PENN COMPLETION
BOPD/BWPD

04-10-81

PETERSON, SOUTH FUSSELMAN FIELD, ROOSEVELT CO., N.M.
TOTAL FIELD PRODUCTION BY MONTHS

MO/YR	NO. WELLS	BOPM	BWPM	MCF/M	GOR
6/79	1	4952		3033	612
7	1	7077		7722	1102
8	1	6297	310	1324	1021
9	1	534	313	2445	4187
10	1	324		223	688
11	2	6221		13606	1655
12	2	3517		17334	2035
1/80	3	13033		24964	1915
2	2	15867		12530	790
3	3	14536	536	7258	500
4	4	14141	911	7533	533
5	4	24560	589	14046	572
6	5	22933	10507	10452	563
7	5	33064	8611	17723	531
8	5	23508	9875	17543	593
9	6	29480	13906	12250	415
10	8	39042	15628	23142	593
11	8	37581	20980	20742	552
12	8	39909	21360	21375	536
1/81	8	35970	17460	20730	584
2	9	33871	13829	15172	405
3	10	37540	20945	22056	587
4	10	35713	23216	16727	524
5	10	33991	22380	17120	505
6	10	32830	25764	21140	644
7	10	32372	26121	20717	640
8	10	30997	26517	19740	639
9	10	27352	24295	14341	525
10	10	25264	25520	12741	504
11	10	19005	22220	7378	371
12	10	24754	27109	12479	503
1/81	10	23045	24584	13270	576

739993

20460 *ENSERCH-1 LAMBIRTH, K-31-5S-33E TUD FUSS 7800 (-3372) RKB 4428
OSDFS 7808-52 IDFE 638 8000, OBS, GOR 1098 174°24 FID 5658
(-3380,-3424)
DST #3 7820-58 IFP 711-1519, ISIP 2755, FFP 1409-2191, FSIP 2760
OSDFS 7845 (-3416)

MO/YR	NO. WELLS	BOPM	BWPM	MCF/M	GOR
6/79	1	4952	-	3033	612
7	1	7077	-	7722	1102
8	1	1297	310	1324	1021
9	1	534	313	2445	4187

BO/BW

ENSERCH
Fusselman (5) 56.36% 433934/287079 72.89%
Penn (2) 85.17% 64302/42372 82.98%

Phillips
(5) 43.64% 335989/106788 27.11%
(2) 14.83% 11196/8688 17.02%

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
EXHIBIT NO. 6
CASE NO. 7226

10	1	324	-	223	688
11	1	6047		3400	423
12	1	8285		4231	511
1779	1	9111		5585	624
2	1	9217		5339	604
3	1	10305		5278	609
4	1	9425		6074	644
5	1	8851		7158	808
6	1	9036		6059	664
7	1	10163		7225	711
8	1	11378		7540	663
9	1	9507		5518	574
10	1	10160		6870	676
11	1	9867		6222	632
12	1	10229		5972	584
1780	1	10847		4860	470
2	1	11321		5061	447
3	1	5484		3047	555
4	1	9358		5100	545
5	1	9432		5245	561
6	1	9218		5543	565
7	1	10549		6173	577
8	1	10519		6675	629
9	1	9342		5157	545
10	1	11053		5015	452
11	1	8057		2878	357
12	1	12678		5464	431
1781	1	10858		4258	390
		277433			

20454 ENSERCH 3 LAMBIRTH, S-31-5S-33E IDP FUSSELMAN 7828 (-3421) RKB 4406
PERF 7940-54 A/A 200 GALS 10% HCA 1000 GALS 40D-20Z SQUEEZED
PERF 7840-49 A/A 200 GALS 10% HCA 1500 GALS 40D-20Z TP2 25 BDD 12 BW
GOR 2550
COMP 7750-7854

20/YR	NO. WELLS	BOPD	BWPD	MCF/M	GOR
1778	1	174		10206	58655
12	1	231		13163	55723
1779	1	222		15867	71473
9 MO PROD		157			

20479 ENSERCH-6-LAMBIRTH D-31-5S-33E IDP FUSS 7826 (-3427) RKB 4401
PERF 7828-40 A/A 2000 GALS 40D 20Z SQUEEZED
PERF 7830-35 A/A 250 GALS 15%
IPF 204 BOPD 68 BWPD GOR 1549 50.1 GTY FTP 900

20/YR	NO. WELLS	BOPD	BWPD	MCF/M	GOR
1779	1	1540	935	-	-
9	1	930	720	-	-

5	1	342	240	-	-
6	1	3863	3965	1340	347
7	1	2627	3703	429	163
8	1	1418	2929	901	471
9	1	2756	2560	661	239
10	1	3052	3923	2373	774
11	1	2954	3778	2158	731
12	1	3205	4947	2072	647
1/00	1	2250	3981	1686	797
2	1	2303	4220	1756	762
3	1	1659	10394	1879	1133
4	1	1647	11755	1941	1051
5	1	1967	11242	2121	1272
6	1	1520	11598	2206	1447
7	1	1870	9087	809	569

45505

REPLACED BY 810 LAMBIRTH.

20500 **ENSERCH-7 LAMBIRTH** 32-30-55-33E 100 FUSS 7705(-3408') GKB 4391'
3595 7826-34 47% 145 GALS 5%KCl 90 2100 SIP 950 #8ppg
140 117 BLDG 73 8.8PG 60% 1170
TST #1 7806-49 FUSS 950 953 ISIP 2787 FBP 1564 FSIP 2787

MO/YR	NO. WELLS	BOPD	MMCFPD	ACFT/A	BOE
3/79	1	2244	1120	1031	454
7	1	2118	804	571	412
8	1	1879	494	1056	552
9	1	3345	1350	771	630
10	1	5413	1291	2493	422
11	1	6893	1257	3262	328
12	1	6228	1402	2172	343
1/80	1	5250	1380	1767	283
2	1	2724	1018	1546	575
3	1	5212	1399	1471	310
4	1	5541	1370	3635	367
5	1	5279	1722	2132	402
6	1	4374	1252	2221	509
7	1	3129	1549	1537	493
8	1	2795	2476	1589	594
9	1	3260	2434	1783	549
10	1	2274	1969	1806	792
11	1	3142	3156	2460	793
12	1	1527	1507	1669	1095
1/81	1	2435	2319	3032	1249

77507

20500 **ENSERCH-8 LAMBIRTH** SL-30-55-33E 100 FUSS 7605(-3408), CISCO 7674
(3277). PERFD 7815-20' 47% 500 GALS 90D 101 @ 1/2 BPM W/ 3100 ISIP 200
SEC 4397' TBG 365 8.8PG @ 6M 150 MCF/D 1070MCF FTP 155 60K 531.

DST #1 7661-7711' PENN DFD 208-208 ISIP 2409 FFP 342-239 FSIP 2419
DST #2 7794-7834 FUSS DFD 258-268 ISIP 2713 FSIP 2704 FFP 609-1402
FSIP 2704
2/80 SQZD PERFS W/INJECTROL & CEMENT

MO/YR	NO. WELLS	COND	WATER	MCF/M	GOR
10/79	1	771	-	-	-
11	1	1532	395	-	-
12	1	2995	5241	-	-
1/80	1	1409	5377	1066	757
2	1	337	1702	360	1068
3	1	1038	7861	807	541
4	1	1246	6759	545	437
5	1	935	6349	606	650
6	1	1579	10934	756	543
7	1	1610	10235	745	463
8	1	1345	9977	902	671
9	1	1279	9615	675	531
10	1	1132	10657	720	599
11	1	935	8520	460	457
12	1	1064	9977	514	486
1/81	1	974	9915	537	551

20473

20523 ENSERCH-9 LAMBIRTH D-25-5S-32E FUSS 7822 (-3439) DKB 4393
DEPF 7824-34 W/ 3 SPFS PUMP D 1600 10 MIN SID 300
IPD BO 1000 2 BWPD 95 MCF/D GOR 1158
DST#1 7803-30 GTS 5M REV OUT 3560 IFP 310-417 ISIP 2126 FFP 476-1257
FSIP 1593

MO/YR	NO. WELLS	COND	WATER	MCF/M	GOR
2/80	1	1199	44	156	130
3	1	1415	-	781	552
4	1	1021	-	498	488
5	1	1209	-	607	502
6	1	1262	-	786	623
7	1	985	-	771	853
8	1	974	-	939	964
9	1	935	-	700	837
10	1	765	-	744	984
11	1	629	-	444	706
12	1	581	8	496	731
1/81	1	623	24	520	835

11518

20535 ENSERCH-10 LAMBIRTH D-11-5S-32E FUSS 7741 (-3361) DKB 4400
DEPF 7813-7832 W/4-5750 GAL
IPD 153 BOPD 263 BW, GTY 43.2 GOR 769 8/32

MO/YR	NO. WELLS	BOPM	BWPM	MCF/M	GOR
8/80	1	297	265	219	763
9	1	2791	7219	2226	796
10	1	2329	-	2205	947
11	1	1316	7605	511	388
12	1	2048	10773	1340	654
1/81	1	2008	9661	900	448
		10779			

20471 PPCO-1-LAMBIRTH"A" J-31-5S-33E FUSS 7827(-3405) CISCO 7723
(-3301) BSSF 7830-35', 52-56 A/A 500 GALS 10% ACETIC PKR 4422
IPF 707 BOPD & 0% BSW GTS 570 0% 1/2" CH FTP 100

MO/YR	NO. WELLS	BOPM	BWPM	MCF/M	GOR
1/80	1	3760	-	3411	922
2	1	5400	-	6131	422
3	1	2585	-	989	374
4	1	2134	141	646	296
5	1	7115	149	1683	265
6	1	6536	3222	2776	425
7	1	6195	5104	2865	469
8	1	5332	5056	5076	944
9	1	4716	3257	3536	749
10	1	8465	6580	3317	658
11	1	7302	2226	547	247
12	1	6452	2610	1174	263
1/80	1	1571	802	354	255
2	1	1250	734	205	163
3	1	1541	960	458	278
4	1	6952	2370	888	215
5	1	3730	2182	651	175
6	1	3518	2058	1017	289
7	1	3576	2092	3622	2691
8	1	3965	3636	3034	827
9	1	1195	3138	596	594
10	1	769	2019	295	384
11	1	375	2300	114	130
12	1	964	2545	576	596
1/81	1	431	1132	431	1000
		115311			

20481 DRCO-2 LAMBIRTH "A" F-31-5S-33E FUSS 7832(-3419) PKR 4413
OPEN 7832-38, A/ 500 GAL 15% ISIP 2100
IPF 410 BOPD & 0% BSW GTD 1471 11/64"CH FTP 575
CABLO 7814-7849

MO/YR NO. WELLS BOPM BWPM MCF/M GOR

4/19	1	1691	-	813	506
5	1	8242	-	5005	607
6	1	7554	-	5266	697
7	1	7075	-	6333	895
8	1	7315	-	1668	228
9	1	6544	-	957	146
10	1	5740	# -	4595	853
11	1	5020	-	5357	1067
12	1	5156	-	5857	1135
1/30	1	7034	-	8159	1114
2	1	5701	-	4732	706
3	1	6762	-	10502	1109
4	1	5416	-	5105	943
5	1	4379	-	3751	753
6	1	4595	-	5853	1245
7	1	4773	-	96	18
8	1	4498	2826	2478	526
9	1	4254	-	1517	357
10	1	3265	-	763	234
11	1	2391	-	191	80
12	1	2446	-	691	354
1/31	1	2999	-	1613	511

117120

2946 (PPCO-3 LAMBIRTH "A") N-31-55-35E FUSS 790R(-3357) RKB 4441
[illegible] 7914-43 A/S 1000 GALS 15% 1500 2200 A/A 1200 GALS 23% 1300 GALS
15% 35 1300 1500 VAC. A/S 10000 GALS 29% 30 3700 1500 2850
IPP 128 BOPD 35 BWPD 30% 1367

24HR/YR	NO. SALES	BOPD	GWPD	MCF/D	GOR
8/19	1	789	401	16554	20981
9	1	2519	1230	818	326
10	1	2752	1348	2008	730
11	1	2407	1179	2195	913
12	1	2173	1212	2403	972
1/30	1	1079	-	1055	976
2	1	1330	-	824	620
3	1	1736	-	1828	1052
4	1	1674	-	889	526
5	1	989	-	554	561
6	1	932	-	1020	1094
7	1	943	1580	967	1020
8	1	672	24	581	906
9	1	636	16	403	634
10	1	489	12	203	415
11	1	405	10	57	141
12	1	517	13	339	644
1/31	1	345	11	482	1083

22487

20506 CPPCO-4 LAMBIRTH "A" 3A-31-5S-33E FUSS 7814(-3423) PKB 4391
PERF 7814-25 4/% 1500 GALS 15% MS 4600 ISIP 2200
TRT FOR BLDJ ST PUMP FTP 200 ON 24/64"CH

MO/YR	NO. WELLS	PROD.	WATER	MCF/D.	GOR
10/79	1	5740	402	1136	207
11	1	5020	8685	1578	314
12	1	5158	899	1725	334
1/80	1	5434	540	1783	328
2	1	6701	1159	1394	208
3	1	9752	301	614	70
4	1	5410	936	1502	278
5	1	4479	861	1106	222
6	1	4595	812	1725	367
7	1	4773	2367	177	37
8	1	4496	-	3008	614
9	1	3537	-	1146	324
10	1	2277	-	483	212
11	1	1902	-	138	73
12	1	2235	-	673	331
1/81	1	1752	-	972	555
		73074			

20516 PPCO-1 LAMBIRTH STATE H-36-5S-32E FUSS 7795 (-3379) PKB 4416
PERF 7795-7800 4/% 2500 GAL 15% NE HCL
TRT# 31 PUMP, NO STR. SIX 47.2 GOR 297 3-24-80

MO/YR	NO. WELLS	PROD.	WATER	MCF/D.	GOR
3/80	1	407	-	121	297
4	1	755	25	224	297
5	1	692	24	205	296
6	1	535	-	16	30
7	1	907	-	27	30
8	1	513	1418	15	29
9	1	679	1877	30	44
10	1	330	2294	515	515
11	1	202	558	125	619
12	1	327	2286	511	618
1/81	1	552	1526	345	625
		6497			

20535 PPCO-1 PETERSON "H" 2-20-5S-33E FUSS 7945 (-3452) PKB 4384'
PERF 7805-30 4/% 2500 GAL 15% NE HCL
PERF 7515-60 4/% 20000 GAL 15% GELLED NE HCL
PERF 7793-7801 4/% 250 GAL 15% NE HCL

MO/YR	NO. WELLS	PROD.	WATER	MCF/D.	GOR

PETERSON, SOUTH PENN FIELD, ROOSEVELT CO., N.M.
TOTAL FIELD PRODUCTION BY MONTHS

MO/YR	NO. WELLS	BOPD	BBLS	MCF/D	GOR
9/76	1	4678	2002	6364	1360
10	1	4188	2137	5730	1368
11	1	1706	1119	858	503
12	1	3447	1495	1539	446
1/77	1	2560	1607	2638	992
2	2	2693	1569	16381	6053
3	2	2582	1501	19828	7378
4	2	1431	956	18756	10244
5	2	3371	2607	20816	5377
6	2	3215	2295	16458	5121
7	2	3673	2265	19316	6285
8	2	2615	1449	15114	5771
9	2	2706	1923	18207	6512
10	2	2585	1519	18235	7060
11	2	2544	2245	16149	6348
12	2	3064	1674	20683	6304
1/78	2	2255	1275	18699	8292
2	2	1911	1143	16225	8489
3	2	1496	1379	19809	13212
4	2	1775	1325	22439	12535
5	3	2775	2077	18774	6765
6	3	1515	2771	14704	9718
7	3	1298	1796	22238	17239
8	4	2873	2027	24855	8651
9	4	3358	1884	21935	6535
10	4	3073	1914	22534	7335
11	4	813	859	10815	13304
12	4	2200	1695	14853	6753
1/79	4	2435	643	25526	10484
		75493			

20525 PPCO-5 LAMBIRTH "AA" C-30-5S-33E FUSS 7465 (-3473) PKR 4392'
PERF 7564-7748 A/- 1500 GAL 15% HA HCL
IP/P 65 BOPD + 120 BW. GTY 41 DEG. GOR 1900. 5/4/30

MO/YR	NO. WELLS	BOPD	BBLS.	MCF/D.	GOR
5/80	1	1143	2077	2057	1800
6	1	544	1651	16	25
7	1	290	767	10	33
8	1	512	918	20	33
9	1	544	616	18	33
10	1	431	651	484	712
11	1	416	521	84	200

12	1	445	868	309	574
1/81	1	223	335	14	63
		4763			

20454 ENSERCH-3-LAMBIRTH G-31-5S-33E PENN 7654 (-3291) SXB 4408'
DEPE 7702-15
CAOF 15000 MCF/D 23/64"CH SITP 1875 GTY .757

MO/YR	NO. WELLS	PROD	APPV	MCF/M.	GOR
2/79	1	296	-	14273	47896
3	1	350	-	16346	46709
4	1	383	-	16788	43833
5	1	330	-	16788	44182
6	1	291	-	12423	51543
7	1	374	-	13971	37356
8	1	320	-	11482	35861
9	1	376	-	14406	21434
10	1	542	-	13564	25026
11	1	407	-	11907	29256
12	1	546	-	16811	30789
1/80	1	505	-	15385	30465
2	1	555	-	12772	19359
3	1	255	-	13455	52755
4	1	362	-	15924	52745
5	1	131	-	8965	75059
6	1	78	-	7620	97692
7	1	102	-	15159	148716
8	1	238	-	15506	65579
9	1	429	-	11522	26314
10	1	29	-	12878	444069
11	1	-	-	8795	-
12	1	-	-	9114	-
1/81	1	-	-	11720	-
		7577			

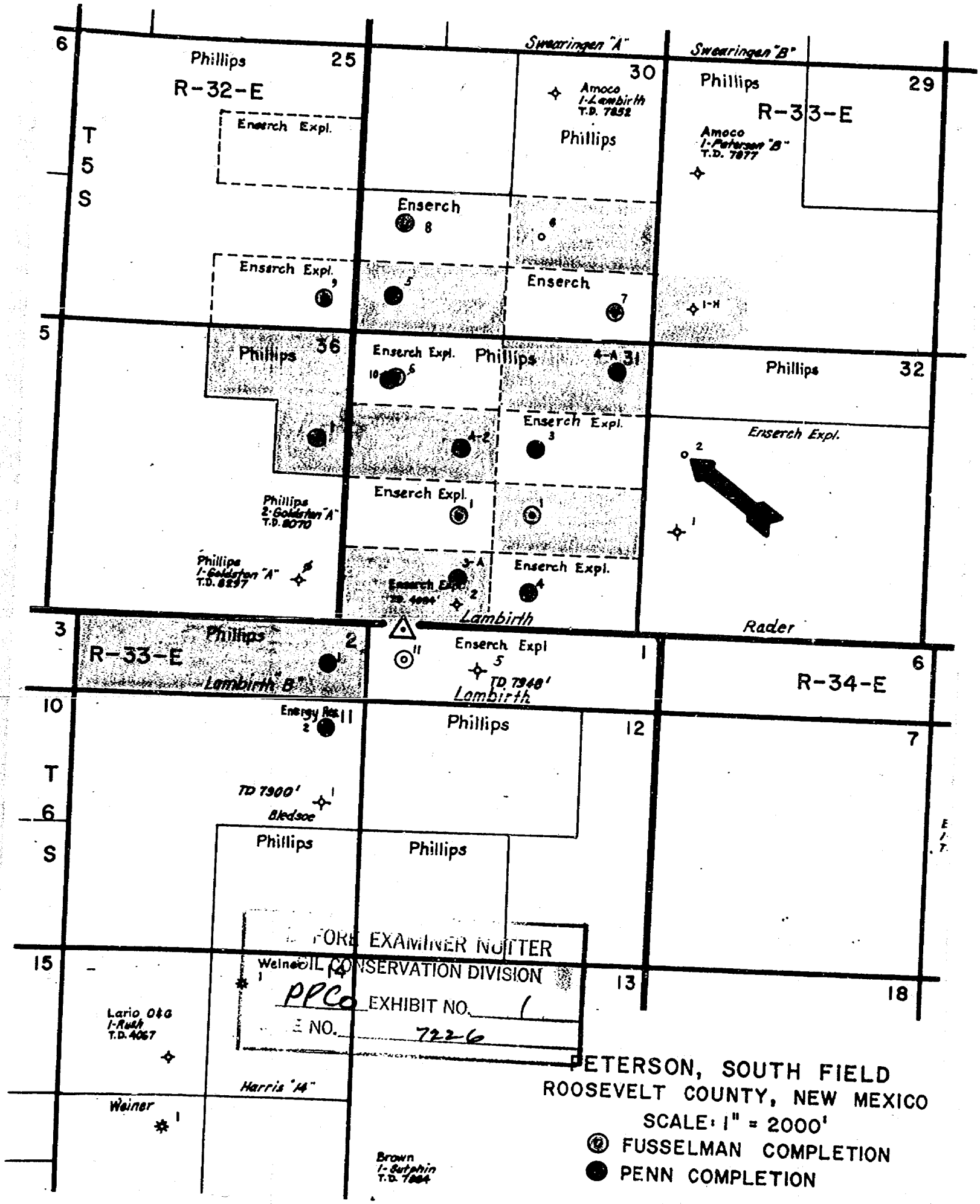
20157 ENSERCH-4 LAMBIRTH G-31-5S-33E PENN 7696(-3253) FUSS 7801(3368)
DEPE 7800-14 FUSS-SWBD 4062 X10 SG PKR 4433
DEPE 7696-7705 PENN A/A 2100 GALS MUD 202
IOF 204 BLOD 58 PROD FTP 350 ON 18/64"CH
COBED 7650-7732, 7766-7854
OSTST 7690-7732 REC 180-370 ISIP 2630 FFP 435-882 FSIP 2641

MO/YR	NO. WELLS	PROD	APPV	MCF/M.	GOR
9/78	1	4078	2002	5364	1350
10	1	4128	2137	5730	1368
11	1	1705	1119	958	503
12	1	3447	1945	1539	445
1/79	1	2560	1807	2638	992
2	1	2355	1562	2109	880

3	1	2282	1501	2480	1126
4	1	1448	956	1968	1359
5	1	3491	2607	4028	1154
6	1	2977	2285	4057	1363
7	1	3534	2205	5345	1930
8	1	2209	1940	3532	1590
9	1	2124	1923	3803	1790
10	1	2041	1819	4671	2289
11	1	2137	2245	4242	1935
12	1	3523	1674	4072	1614
1/69	1	1750	1273	3314	1894
2	1	1258	1147	3451	2743
3	1	1243	1376	6345	5105
4	1	1474	1326	6510	4417
5	1	1201	1363	5752	4498
6	1	701	1120	7068	9936
7	1	899	1023	7059	7940
8	1	930	1152	7529	7736
9	1	817	1007	7047	8625
10	1	1141	817	5852	6005
11	1	1324	330	1933	4905
12	1	1334	399	4473	5562
1/71	1	1132	275	5430	4797
		57225			

20543 PPCO-1-LAMBIRTH-B 8-2-63-33E CISCO 7692(-3245) FUSS 7670 (-3426)
PERF 7554-7828 OFNN A/: 750 GAL 15% BKR 4444'
PERF 7812-7882 FUSS A/: 1150 GAL 15%
TBG 2⅞ EUE 2 3250 F10 200 BBL 32/64" CK. 600 1025 01 31.5 8/26

MO/YR	WELLS	WOPD	WWPD	MCFPD	GOR
8/69	1	995	7	1617	1625
9	1	1568	61	3349	1702
10	1	1469	46	2500	1702
11	1	0	0	0	-
12	1	421	29	765	832
1/61	1	1080	53	9360	8670
		5433			



BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
PPCo EXHIBIT NO. 1
CASE NO. 7226

PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'

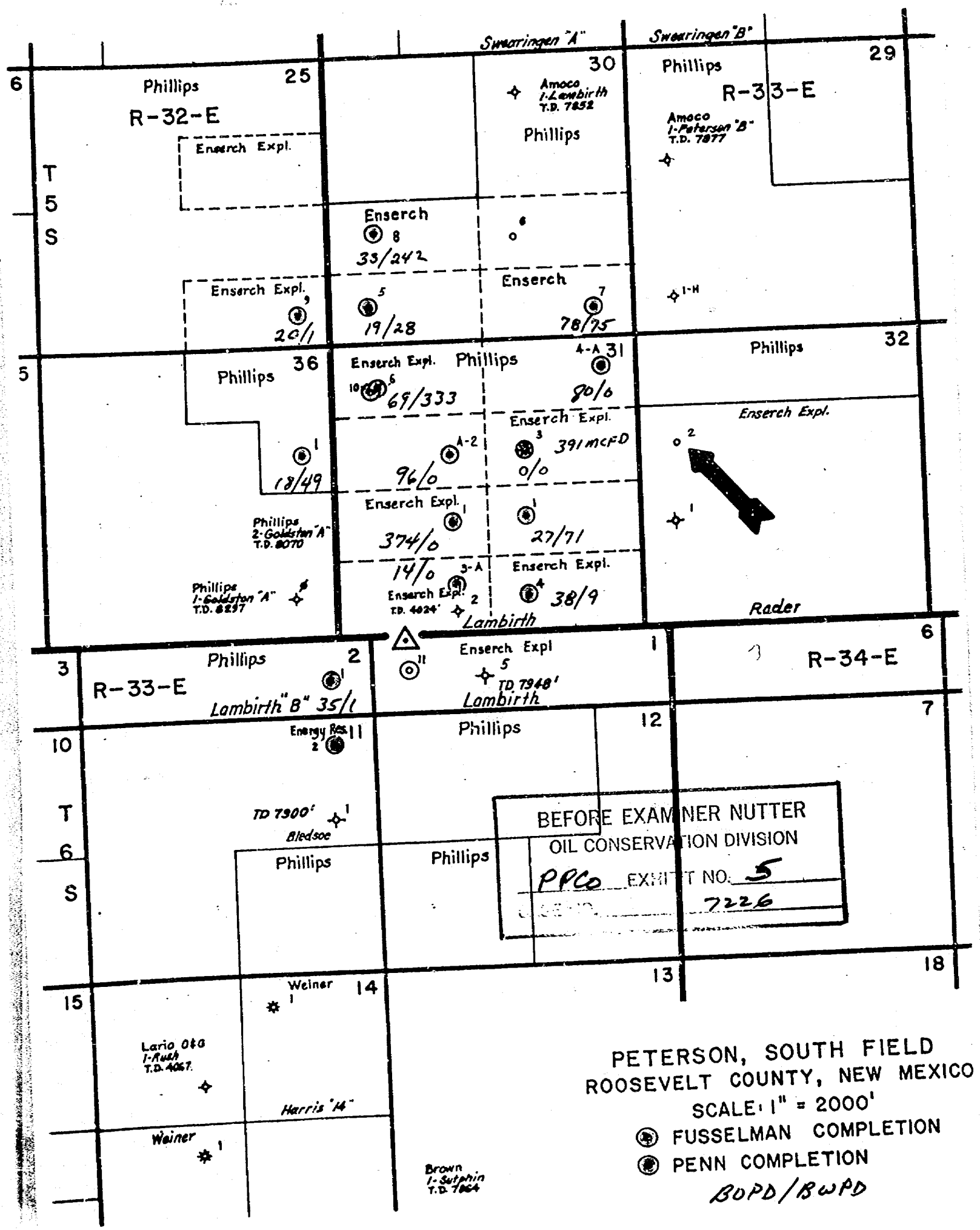
(F) FUSSELMAN COMPLETION
● PENN COMPLETION

Form 2069 4-53

COLUMNAR CORE RECORD

DEPTH	DESCRIPTION AND REMARKS (X: Interval of estimated last core)
	Phillips Petroleum Company
	#2 Lambirth-A, Roosevelt County,
	New Mexico.
P. B. Drisko	
3-28-79	
	Core #1: 7810-7819', recovered 9'. Fusselman.
7810-13	Shale, dark, green, mottled, hard, with tan to red finely crystalline, hard dolomite and light chert pebble inclusions. No show.
7813-15	Dolomite, tan to red, finely crystalline, mottled, hard, with much green shale and white to grey chert inclusions. No show.
7815-17.5	Dolomite, tan to red, finely crystalline, mottled, hard, shaley, with white and grey chert inclusions. No show.
7817.5-18	Shale, very dark green, mottled, with tan dolomite inclusions.
7818-19	Dolomite, tan to red, finely crystalline, mottled, shaley, hard, with many grey to white chert pebble inclusions. No show.
	Core #2: 7819-7850'. recovered 30'. Fusselman.
7819-23	Dolomite, tan-pink, finely crystalline, mottled, shaley, hard with grey-white chert inclusions.
7823-26	Dolomite, brown, finely crystalline, clean with fair crystalline-vugular-fractured porosity. Heavy stain, good odor. Scattered bleeding gas and oil.
7826-31	Dolomite, same as above with large vertical fractures. Heavy stain. Fair bleeding gas and oil.
7831-49	Dolomite, brown, finely crystalline, clean with good crystalline vugular porosity. Many thin vertical fractures. Fair bleeding gas, oil and water.
7849-59	Lost.

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
PPCo EXHIBIT NO. 4
CASE NO. 7226



PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'
⊛ FUSSELMAN COMPLETION
◉ PENN COMPLETION
BOPD/BWPD

04-10-81

PETERSON, SOUTH FUSSELMAN FIELD, ROOSEVELT CO., N.M.
TOTAL FIELD PRODUCTION BY MONTHS

MO/YR	NO.WELLS	BOPM	BWPM	MCFM	GOR
6/78	1	4952		3033	612
7	1	7077		7722	1102
8	1	1297	310	1324	1021
9	1	584	313	2445	4187
10	1	324		223	688
11	2	6221		13606	1655
12	2	3517		17334	2035
1/79	3	13283		24854	1915
2	2	13467		12530	790
3	3	14530	936	7258	500
4	4	14141	911	7533	533
5	4	24560	589	14046	572
6	5	24233	10307	16852	695
7	5	24269	9611	17723	731
8	5	24538	9875	17543	715
9	5	29480	13506	12250	415
10	8	39042	15626	23142	593
11	8	37581	20580	20742	552
12	8	39969	21360	21375	535
1/80	8	35970	17450	20730	584
2	9	33871	13829	15172	495
3	10	37540	20945	22056	587
4	10	35713	23216	16727	524
5	10	33941	22390	17120	505
6	10	32230	25764	21140	544
7	10	32372	26121	20717	540
8	10	30997	26517	19740	639
9	10	27352	24295	14341	515
10	10	25264	25520	12741	504
11	10	19945	22220	7372	371
12	10	24784	27109	12479	505
1/81	10	23045	24583	13270	576
		739093			

20440 SENSERCH-1 LAMBIRTH; K-31-5S-33E TUD FUSS 7800 (-3572) RKB 4428
PERFS 7808-52-IDZF 638-BOPD, 0BW, GIP 1098 17/64"CH FTP 5858
(-3380,-3424)
DST #3 7820-50 IFP 711-1519, ISIP 2755, FFP 1409-2191, FSIP 2760
BOPM 7815 (-3416)

MO/YR	NO.WELLS	BOPM	BWPM	MCFM	GOR
6/78	1	4952	-	3033	612
7	1	7077	-	7722	1102
8	1	1297	310	1324	1021
9	1	584	313	2445	4187

BO/BW

	Ensearch		Phillips	
	56.36%	72.89%	43.64%	27.11%
Fusselman (5)	433934/	287079	(5) 335989/	106788
	85.17%	82.98%	14.83%	17.02%
Penn (2)	64302/	42372	(2) 11196/	8688

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
PPCo EXHIBIT NO. 6
CASE NO. 7226

10	1	324	-	223	686
11	1	6047		3400	423
12	1	8285		4231	511
1/79	1	9111		5555	624
2	1	9217		5340	594
3	1	10305		5278	609
4	1	9425		6074	644
5	1	8851		7158	808
6	1	9036		6059	654
7	1	10163		7225	711
8	1	11378		7530	553
9	1	9507		5518	574
10	1	10160		6870	680
11	1	9867		6222	632
12	1	10220		5072	584
1/80	1	10847		4860	470
2	1	11321		5061	447
3	1	9384		3947	555
4	1	9358		5196	545
5	1	8459		5295	561
6	1	9818		5543	565
7	1	10540		6173	577
8	1	10519		6675	529
9	1	9342		5157	549
10	1	11033		5015	452
11	1	8957		2978	357
12	1	12578		5464	431
1/81	1	10858		4238	390
		277433			

20454 ENSERCH 3 LAMBIRTH; C-31-5S-33E IDP FUSSELMAN 7828 (-3421) RKB 4406
PERF 7840-44 A/4 200 GALS 10% MCA 1000 GALS MOD-202 SQUEEZED
PERF 7840-49 A/4 200 GALS 10% MCA 1500 GALS MOD-202 IPP 25 BOPD 12 BW
GOR 2560
COMPL 7760-7849

MO/YR	NO. WELLS	CUM	RWM	MCF/M	GOR
11/79	1	174		10206	58665
12	1	231		13103	56723
1/79	1	222		15867	71473
3 MO PROD		627			

20479 ENSERCH-6-LAMBIRTH D-31-5S-33E IDP FUSS 7828 (-3427) RKB 4401
PERF 7828-40 A/4 2000 GALS MOD 202 SQUEEZED
PERF 7830-35 A/4 250 GALS MSA
IDP 201 BOPD 63 BWPD GOR 1549 50.1 GTY FTP 90#

MO/YR	NO. WELLS	CUM	RWM	MCF/M	GOR
3/79	1	1540	934	-	-
4	1	930	720	-	-

5	1	342	240	-	-
6	1	3653	3965	1340	347
7	1	2527	3793	429	163
8	1	1914	2928	901	471
9	1	2756	2560	660	239
10	1	3652	3923	2373	774
11	1	2554	3778	2155	731
12	1	3205	3947	2072	647
1/00	1	2256	3961	1686	737
2	1	2303	4220	1756	762
3	1	1656	10394	1479	1133
4	1	1647	11755	1941	1051
5	1	1967	11242	2121	1272
6	1	1529	11598	2200	1447
7	1	1070	6087	509	569

35605

REPLACED BY #10 LAMBIRTH.

20480 ENSERCH-7 LAMBIRTH, D-30-55-33E 100 FUSS 7705'(-3408') GR 4391'
DUAL 7826-29' 17# 155 GALS 35%CL 30 2100 SIP VAC 24HRS
TOP 117 BLDG 73 SAND 60% 1179
DST #1 7804-43' FUSS REC 953 ISIP 2747 FBP 1564 FSIP 2787

YR	WELLS	SAND	SHALE	ACRES	GOR
5/75	1	2244	1120	1031	454
7	1	2114	804	571	412
8	1	1479	444	1056	552
9	1	3345	1350	771	630
10	1	5913	1201	2493	422
11	1	5595	1257	2262	328
12	1	6223	1402	2172	345
1/76	1	5250	1340	1767	285
2	1	2724	1013	1540	575
3	1	6212	1399	1471	510
4	1	5041	1376	2035	367
5	1	4279	1722	2132	402
6	1	4374	1262	2221	508
7	1	3120	1539	1537	493
8	1	2723	2476	1589	584
9	1	3250	2434	1783	549
10	1	2274	1089	1300	792
11	1	3142	3194	2460	733
12	1	1527	1507	1669	1095
1/77	1	2413	2310	3032	1245

77507

20500 ENSERCH-8 LAMBIRTH, D-30-55-33E 100 FUSS 7605(-3408), CISCO 7674
(3277), DUAL 7815-20' 42# 500 GALS 28% 101 & 172 BPM 30 3100 ISIP 200
BPM 4397' IHP 365 [illegible] 150 [illegible] FSIP 155 60K 531.

DST #1 7661-7711 PENN DFD 208-208 ISIP 2409 FFP 342-239 FSIP 2419
DST #2 7794-7834 PUSS DFD 250-269 ISIP 2713 FSIP 2704 FFP 609-1402
FSIP 2704
2/80 5020 GELFS W/INJECTROL & CEMENT

MO/YR	NO.WELLS	GOR	WOR	WCF/B	GOR
10/79	1	771	-	-	-
11	1	1532	395	-	-
12	1	2995	5207	-	-
1/80	1	1409	5377	1066	757
2	1	337	1702	360	1068
3	1	1438	7861	807	561
4	1	1246	6759	545	437
5	1	935	6343	606	650
6	1	1374	10034	756	548
7	1	1610	10236	745	463
8	1	1315	8977	902	671
9	1	1279	9615	675	531
10	1	1132	10057	720	599
11	1	935	8520	460	457
12	1	1054	9377	514	496
1/81	1	974	9415	537	551

20473

20523 ENSERCH-9 LAMBIRTH D-25-5S-32E FUSS 7822 (-3439) DKB 4393
DSDF 7824-34 47. 3 BBLS MIN P 1600 10 MIN SIP 300
IHP #2 4000 2 FBDP 95 WCF/B GOR 1158
DST#1 7804-30 GTS 5M 3FV OIL 35#0 IFP 310-417 ISIP 2126 FFP 476-1257
FSIP 1593

MO/YR	NO.WELLS	GOR	WOR	WCF/B	GOR
2/80	1	1199	44	156	130
3	1	1416	-	781	552
4	1	1021	-	495	485
5	1	1209	-	507	502
6	1	1252	-	795	623
7	1	905	-	771	853
8	1	874	-	939	964
9	1	935	-	709	837
10	1	755	-	746	984
11	1	839	-	464	706
12	1	981	9	496	731
1/81	1	923	24	520	835

11519

20536 ENSERCH-10 LAMBIRTH D-11-5S-32E FUSS 7791 (-3361) DKB 4400
PBDF 7813-7832 A/W-5750 GAL
FP/W 153 6000 203 P. GTY A.G.F WOR 165 8/82

MO/YR	NO. WELLS	PROD	WTR	MCF/M	GOR
8/80	1	287	285	21M	753
9	1	2701	7215	2226	796
10	1	2329	-	2295	987
11	1	1316	7605	511	388
12	1	2936	10773	1340	654
1/81	1	2064	4651	900	436
		10779			

20471 PPCO-1-LAMBIRTH"A" J-31-SS-33E PUSS 7827(-3455) CISCO 7723
(-3501) CSDF 7930-35', 32-56 6/4 500 GALS 10% ACETIC PKR 4422
IPF 767 BOPD & 4% BSW 570 MCF 1/2" CK FTP 100

MO/YR	NO. WELLS	PROD	WTR	MCF/M	GOR
1/70	1	3770	-	3411	922
2	1	5700	-	4131	722
3	1	2552	-	980	379
4	1	2134	151	648	296
5	1	7115	149	1883	265
6	1	5536	3222	2776	425
7	1	6105	3104	2865	469
8	1	5432	5056	5976	944
9	1	4716	4257	3536	749
10	1	5452	3569	3317	650
11	1	3906	2246	967	247
12	1	5452	2610	1174	263
1/80	1	1571	802	354	255
2	1	1455	734	205	163
3	1	1591	900	455	278
4	1	4052	2370	894	215
5	1	3730	2169	651	175
6	1	3514	2059	1017	289
7	1	3575	2942	9262	2591
8	1	3465	3506	3034	827
9	1	1195	3138	595	594
10	1	754	2019	295	384
11	1	870	2300	114	130
12	1	984	2545	576	596
1/81	1	441	1139	431	1000
		116511			

20481 PPCO-2-LAMBIRTH"A" F-31-SS-33E FUSS 7842(-3417) 2x6 4413
SQZ 7852-35 6/4 500 GAL 15% ISOP 2100
IPF 410 BOPD & 4% BSW 1571 11/64"CK FTP 575
CISCO 7519-7869

MO/YR	NO. WELLS	PROD	WTR	MCF/M	GOR

4/79	1	1691	-	813	506
5	1	8232	-	5095	607
6	1	7554	-	5266	697
7	1	7075	-	5333	895
8	1	7315	-	1669	228
9	1	6044	-	957	146
10	1	5740	0	4895	853
11	1	5020	-	5357	1067
12	1	5158	-	5657	1136
1/80	1	7334	-	8159	1114
2	1	5701	-	4732	796
3	1	6752	-	10502	1199
4	1	5416	-	5103	943
5	1	4979	-	3751	753
6	1	4595	-	5853	1243
7	1	4773	-	85	19
8	1	4498	2826	2478	506
9	1	4254	-	1517	357
10	1	3265	-	763	234
11	1	2321	-	191	83
12	1	2844	-	691	354
1/81	1	2938	-	1513	511
		117129			

20145 PPCO-3 LAMBIRTH "A" SW-31-5S-33E FUSS 7908(-3357) RKB 4441
2808 7814-40 3/4 1000 GALS 15% 1500 2200 3/4 1200 GALS 23% 1300 GALS
15% 40 1300 1500 VAC. 3/4 10000 GALS 25% 40 3700 1500 2850
IBP 128 0930 26 BBLS 30M 1467

MO/YR	NO. BBLS	PROD.	WTR	MCF/D.	GOR
8/79	1	789	401	16551	20981
9	1	2515	1250	8218	3266
10	1	2752	1348	2008	730
11	1	2407	1179	2196	913
12	1	2473	1212	2403	972
1/80	1	1079	-	1055	978
2	1	1336	-	824	620
3	1	1736	-	1828	1052
4	1	1674	-	554	326
5	1	989	-	554	561
6	1	932	-	1020	1094
7	1	948	1520	967	1020
8	1	972	24	681	906
9	1	636	15	403	634
10	1	499	12	203	415
11	1	405	10	57	141
12	1	517	13	535	646
1/81	1	445	11	482	1083
		22487			

20506 PDCO-4 LAMBIRTH "A" A-31-5S-33E FUSS 7814(-3423) PKB 4391
DEPF 7814-35 3/? 1500 GALS 15% MS 4600 LSD 2200
IPF 608 BOPD 37 BWPD FTP 200 ON 24/64"CO

MO/YR	NO.WELLS	PROD.	WTR.	MCF/M.	GOR
10/79	1	5749	402	1136	207
11	1	5029	8685	1578	314
12	1	5156	893	1725	334
1/80	1	5434	940	1783	328
2	1	6701	1159	1394	208
3	1	9752	301	614	70
4	1	5410	936	1502	278
5	1	4375	851	1106	252
6	1	4535	813	1755	387
7	1	4773	2367	177	37
8	1	4498	-	3008	614
9	1	3537	-	1146	324
10	1	2277	-	483	212
11	1	1902	-	135	71
12	1	2035	-	673	331
1/81	1	1752	-	972	555
		77074			

20514 PDCO-1 LAMBIRTH STATE A-36-5S-32E FUSS 7795 (-3381) RKB 4416
DEPF 7795-7806 4/? 2500 GAL 15% HA HCL
IPF/M 31 BOPD, NO WTR. GIV 47.2 GOR 297 3-24-80

MO/YR	NO.WELLS	PROD.	WTR.	MCF/M.	GOR
3/80	1	407	-	121	297
4	1	755	65	224	297
5	1	692	24	205	296
6	1	535	-	19	36
7	1	507	-	27	53
8	1	515	1418	15	29
9	1	479	1877	20	41
10	1	530	2294	513	616
11	1	202	558	125	619
12	1	527	2246	511	618
1/81	1	552	1525	345	625
		6497			

20535 PDCO-1 PETERSON "H" A-20-5S-33E FUSS 7846 (-3452) RKB 4394'
DEPF 7605-50 4/? 2500 GAL 15% NE HCL
DEPF 7616-50 4/? 20000 GAL 15% GELLED NE HCL
DEPF 7793-7801 4/? 250 GAL 15% NE HCL

MO/YR	NO.WELLS	PROD.	WTR.	MCF/M.	GOR

PETERSON, SOUTH PENN FIELD, ROOSEVELT CO., N.M.
TOTAL FIELD PRODUCTION BY MONTHS

MO/YR	NO. WELLS	BOPM	BWPM	MCF/M	GOR
9/76	1	4676	2002	5364	1360
10	1	4198	2137	5730	1369
11	1	1706	1119	858	503
12	1	3447	1905	1539	446
1/77	1	2560	1807	2638	992
2	2	2673	1569	16381	6053
3	2	2952	1501	19828	7378
4	2	1831	956	18756	10244
5	2	3371	2607	20816	5377
6	2	3218	2295	15480	5121
7	2	3973	2265	19316	6285
8	2	2615	1949	15114	5771
9	2	2796	1923	18207	6512
10	2	2596	1819	18235	7060
11	2	2544	2245	16149	6348
12	2	3084	1674	20583	6704
1/78	2	2260	1273	18699	8292
2	2	1911	1143	16223	8489
3	2	1495	1376	19809	13218
4	2	1775	1325	22439	12635
5	3	2175	2077	18774	5765
6	3	1515	2771	14704	9718
7	3	1290	1796	22238	17239
8	4	2873	2827	24855	8651
9	4	3554	1684	21935	6165
10	4	3073	1514	22539	7335
11	4	615	659	10815	13304
12	4	2400	1095	14653	6550
1/79	4	2435	643	26526	10894
		75498			

20525 PPCO-5 LAMBIRTH "A" 3-T-30-5S-33E FUSS 7465 (-3473) PKR 4392'
PERF 7554-7748 A/ 1500 GAL 15% NA HCL
TBG/P 65 3020 & 120 S.N. GTY 41 DEG. GOR 1500. 5/4/80

MO/YR	NO. WELLS	BOPM	BWPM.	MCF/M.	GOR
5/80	1	1143	2077	2057	1800
6	1	544	1651	16	25
7	1	299	767	10	33
8	1	512	918	20	33
9	1	544	616	18	33
10	1	434	651	309	712
11	1	418	529	84	200

12	1	445	658	300	674
1/81	1	223	335	14	53
		4753			

20454 ENSERCH-3-LAMBIRTH 6-31-55-35E PENN 7654 (-3291) PBTD 4408'
DEPE 7702-15
CODE 15000 MCF/D 24/64"CH SITP 1876 GTY .757

MO/YR	NO.WELLS	BOPD	BWPD	MCF/M.	GOR
2/79	1	296	-	14273	47896
3	1	350	-	16396	46709
4	1	393	-	16783	43833
5	1	380	-	16788	44182
6	1	291	-	12425	51543
7	1	374	-	13971	37356
8	1	320	-	11482	35891
9	1	372	-	14406	21434
10	1	342	-	13564	25026
11	1	407	-	11907	29255
12	1	346	-	16411	30789
1/80	1	505	-	15385	30465
2	1	693	-	12772	19559
3	1	255	-	13455	52755
4	1	302	-	15324	52745
5	1	131	-	9965	75069
6	1	75	-	7520	97692
7	1	102	-	15169	148716
8	1	238	-	15590	55575
9	1	229	-	11522	50314
10	1	29	-	12678	444069
11	1	-	-	8799	-
12	1	-	-	911.	-
1/81	1	-	-	11720	-
		7577			

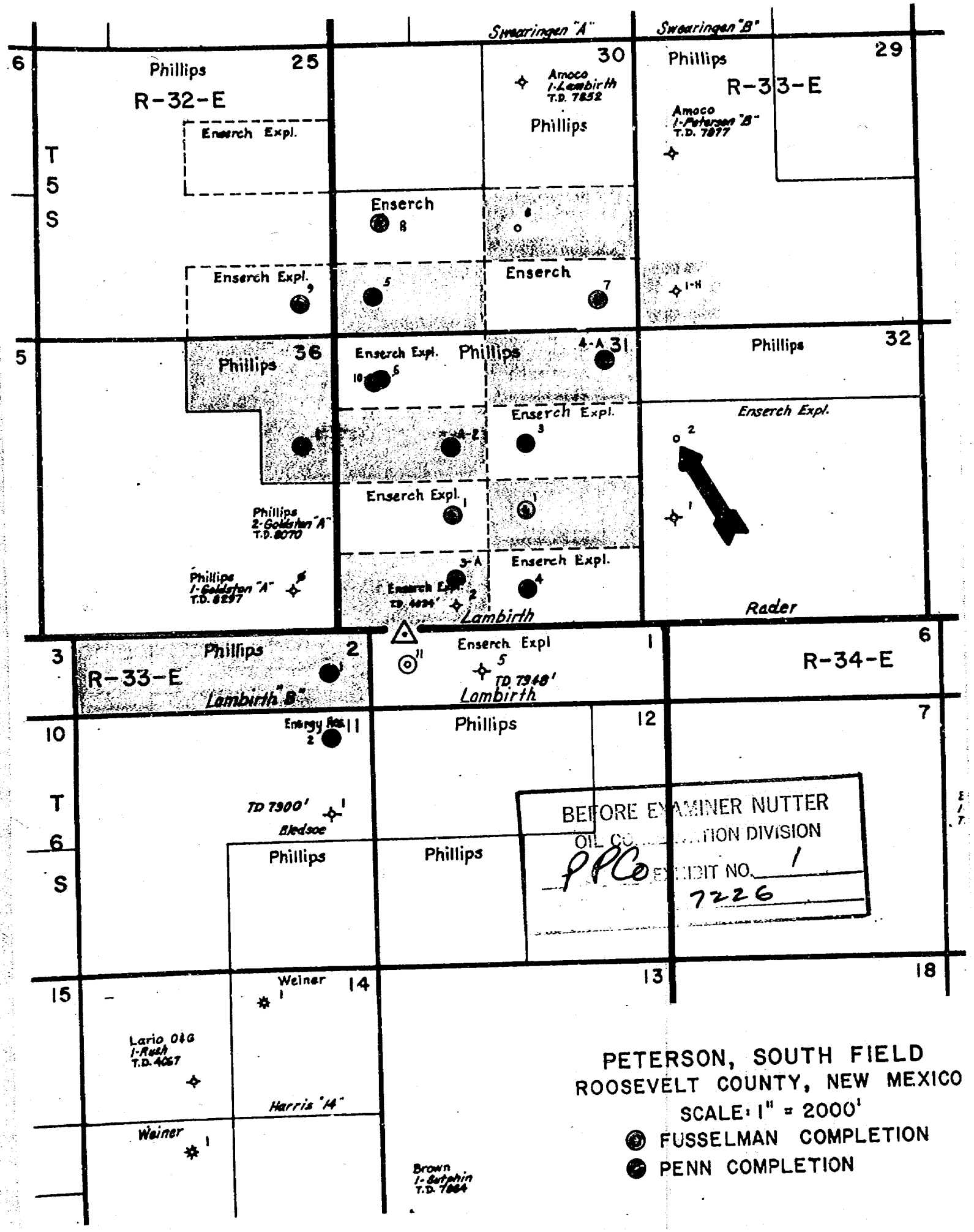
20457 ENSERCH-4 LAMBIRTH 6-31-55-35E PENN 7696(-3263) PBSS 7801(3368)
DEPE 7809-14 PBSS-SWBD 100% ATD SC DK9 4433
DEPE 7596-7705 PENN A/W 2100 GALS MUD 202
1/F 264 BLOD SR BAOD FTD 350 ON 18/64"CH
CORED 7650-7732, 7756-7764
DST#1 7690-7732 OPN 180-370 ISIP 2630 FFP 435-882 FSIP 2641

MO/YR	NO.WELLS	BOPD	BWPD	MCF/D.	GOR
9/78	1	4673	2002	5364	1350 3
10	1	4188	2137	5730	1368
11	1	1705	1119	958	503
12	1	3147	1995	1539	445
1/79	1	2564	1807	2538	992
2	1	2386	1560	2108	850

3	1	2202	1501	2480	1126
4	1	1448	956	1968	1359
5	1	3491	2607	4028	1154
6	1	2977	2285	4057	1363
7	1	3534	2265	5345	1930
8	1	2294	1949	3532	1580
9	1	2124	1923	3803	1790
10	1	2941	1819	4671	2289
11	1	2137	2245	4242	1945
12	1	2523	1674	4072	1614
1/60	1	1750	1273	3314	1694
2	1	1258	1143	3451	2743
3	1	1243	1376	6345	5105
4	1	1474	1326	6510	4417
5	1	1501	1363	6752	4498
6	1	791	1120	7068	2936
7	1	889	1022	7059	7440
8	1	986	1152	7528	7736
9	1	817	1007	7047	8025
10	1	1141	817	6852	6005
11	1	834	230	1953	4305
12	1	434	398	4473	5562
1/61	1	1132	275	5430	4747
		57625			

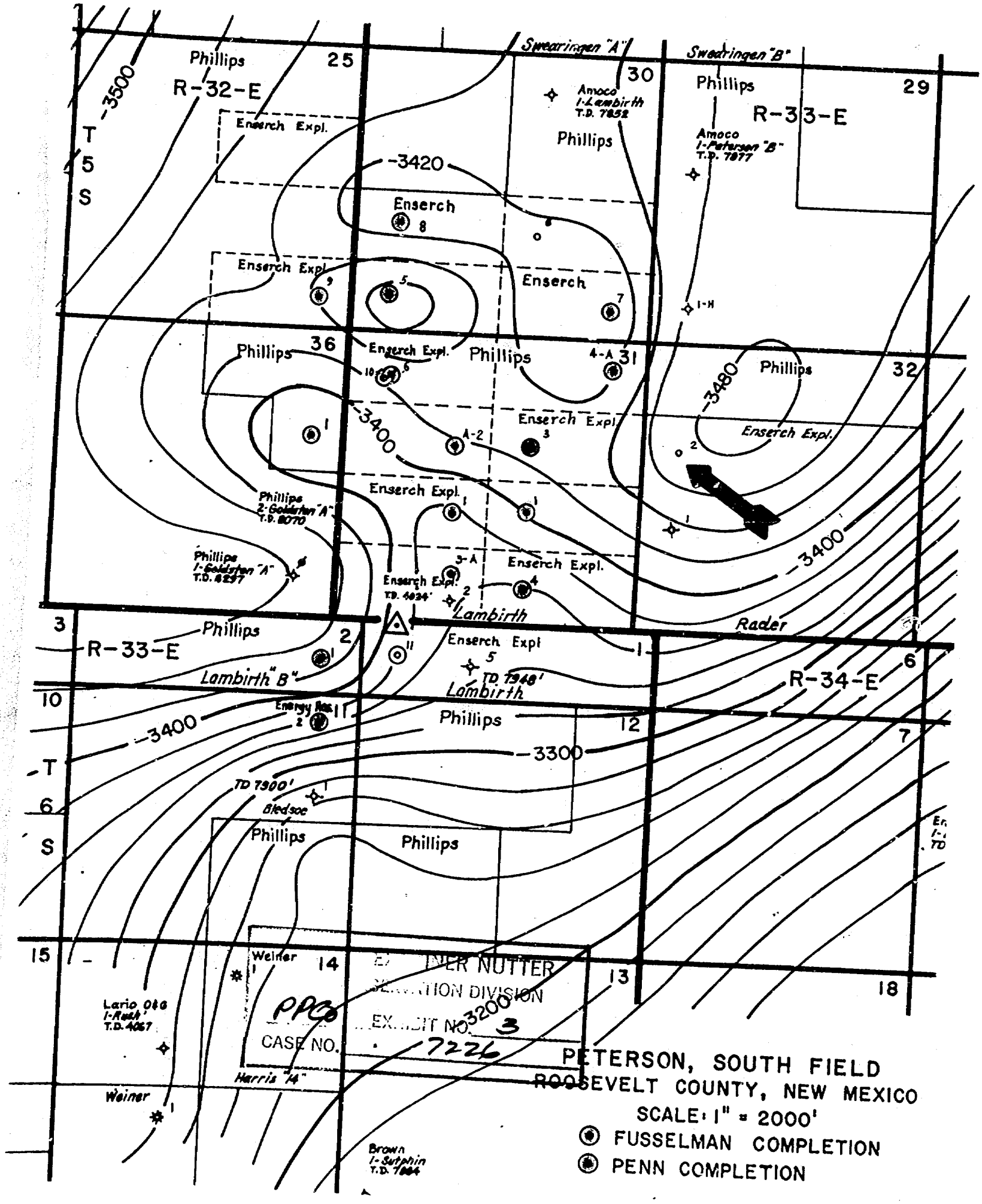
20543 PPCO-1-LAMBIRTH-B 4-2-6S-33E CISCO 7692(-3249) FUSS 7870 (-3425)
DEPF 7664-7928 DENN A/ 750 GAL 15% OKS 4443'
DEPF 7672-7832 FUSS A/ 11750 GAL 15%
IPF 258 BOPD & 4720 FTP 20# DU 32/64" GR. 60 1025 61) 31.5 8/26

MO/YR	No. WELLS	GOR	WPCT	MCF/D	GOR
3/60	1	995	7	1617	1625
4	1	1968	61	3349	1702
10	1	1465	46	2506	1702
11	1	0	0	0	-
12	1	921	29	766	832
1/61	1	1080	37	9364	8670
		6433			



BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
PPCo EXHIBIT NO. 1
7226

PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'
FUSSELMAN COMPLETION
PENN COMPLETION

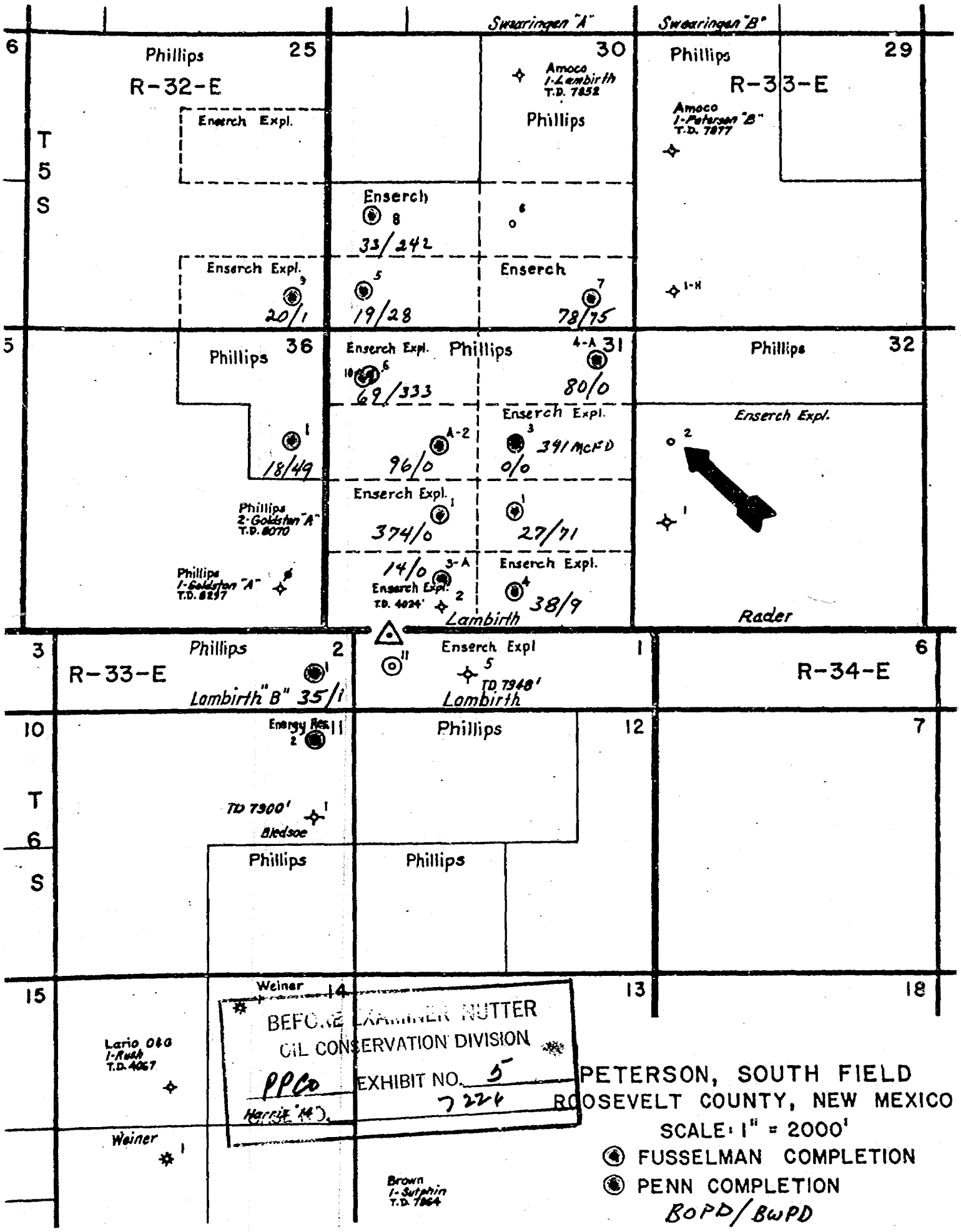

Swearingen "A"
Swearingen "B"
Phillips
25
30
29
R-32-E
R-33-E
T
5
S
-3500
-3420
-3400
-3480
Amoco
1-Lambirth
T.D. 7852
Amoco
1-Peterson "B"
T.D. 7877
Enserch Expl.
Enserch
Phillips
36
31
32
Phillips
2-Goldston "A"
T.D. 8070
Phillips
1-Goldston "A"
T.D. 8257
Enserch Expl.
T.D. 4034'
Lambirth
Rader
3
2
1
R-33-E
Phillips
Lambirth "B"
Enserch Expl
T.D. 7948'
Lambirth
R-34-E
6
10
11
12
7
-3400
-3300
T
6
S
TD 7900'
Bledsoe
Phillips
Phillips
15
14
13
18
Weiner
Lario Oil & Gas
1-Ruth
T.D. 4057
Harris "14"
Weiner
Brown
1-Sutphin
T.D. 7864
PPC
CASE NO. 7226
EXHIBIT NO. 3
PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'
FUSSELMAN COMPLETION
PENN COMPLETION

COLUMNAR CORE RECORD

Form 2069 4-53

DEPTH	DESCRIPTION AND REMARKS (X: interval of estimated last core)
	Phillips Petroleum Company
	#2 Lambirth-A, Roosevelt County,
	New Mexico.
P. B. Drisko	
3-28-79	
	Core #1: 7810-7819', recovered 9'. Fusselman.
7810-13	Shale, dark, green, mottled, hard, with tan to red finely crystalline, hard dolomite and light chert pebble inclusions. No show.
7813-15	Dolomite, tan to red, finely crystalline, mottled, hard, with much green shale and white to grey chert inclusions. No show.
7815-17.5	Dolomite, tan to red, finely crystalline, mottled, hard, shaley, with white and grey chert inclusions. No show.
7817.5-18	Shale, very dark green, mottled, with tan dolomite inclusions.
7818-19	Dolomite, tan to red, finely crystalline, mottled, shaley, hard, with many grey to white chert pebble inclusions. No show.
	Core #2: 7819-7850'. recovered 30'. Fusselman.
7819-23	Dolomite, tan-pink, finely crystalline, mottled, shaley, hard with grey-white chert inclusions.
7823-26	Dolomite, brown, finely crystalline, clean with fair crystalline-vugular-fractured porosity. Heavy stain, good odor. Scattered bleeding gas and oil.
7826-31	Dolomite, same as above with large vertical fractures. Heavy stain. Fair bleeding gas and oil.
7831-49	Dolomite, brown, finely crystalline, clean with good crystalline vugular porosity. Many thin vertical fractures. Fair bleeding gas, oil and water.
7849-59	Lost.

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
PPCo EXHIBIT NO. 4
CASE NO. 7226



BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
PPCo EXHIBIT NO. 5
Harris '14' 7224

PETERSON, SOUTH FIELD
ROOSEVELT COUNTY, NEW MEXICO
SCALE: 1" = 2000'
FUSSELMAN COMPLETION
PENN COMPLETION
BOPD/BWPD

04-10-81

PETERSON, SOUTH FUSSELMAN FIELD, ROOSEVELT CO., N.M.
TOTAL FIELD PRODUCTION BY MONTHS

MO/YR	NO. WELLS	OOPM	OWPM	MCF/M	GOR
5/78	1	4952		3033	612
7	1	7077		7722	1102
8	1	12347	310	1324	1021
9	1	5334	313	2445	4187
10	1	324		223	686
11	2	8221		13606	1655
12	2	8517		17334	2035
1/79	2	13053		24964	1913
2	2	13867		12530	730
3	3	14530	936	7258	500
4	3	14141	911	7533	533
5	3	24500	989	14046	572
6	3	22223	10407	10452	553
7	3	20361	9611	17723	871
8	3	24505	9875	17543	593
9	3	29450	13906	12260	415
10	3	33342	15624	23142	593
11	3	37581	20380	20742	552
12	3	39509	21350	21375	536
1/80	3	35870	17460	20730	584
2	3	33871	13829	15172	455
3	10	37540	20945	22956	587
4	10	35713	23216	16727	524
5	10	33961	22380	17120	505
6	10	32830	25764	21140	544
7	10	32373	26121	20717	640
8	10	30997	26517	19740	639
9	10	27352	24295	14341	525
10	10	25264	25520	12741	504
11	10	19905	22226	7378	371
12	10	24754	27109	12478	503
1/81	10	23045	24584	13270	576
		739913			

BO/BW

ENSERCH

Fusselman (5) 56.36% 433934/287079 72.89%

Penn (2) 85.17% 64302/42372 82.98%

Phillips

43.64% (5) 335989/106788 27.11%

14.83% (2) 11196/8688 17.02%

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
PPCO EXHIBIT NO. 6
CASE NO. 7226

28440 ENSERCH-1 LAMBIRTH, SK-31-5S-33E TOP FUSS 7800 (-3372) RKB 4428
OPEN 7808-52 IDLE 639 BOPD, GRA, GOR 1098 174"CH FIP 5658
(-3380,-3424)
DST #5 7820-50 IFP 711-1519, ISIP 2755, FFP 1409-2191, FSIP 2760
30MM 7815 (-3415)

MO/YR	NO. WELLS	OOPM	OWPM	MCF/M	GOR
5/78	1	4952	-	3033	612
7	1	7077	-	7722	1102
8	1	12347	310	1324	1021
9	1	5334	313	2445	4187

10	1	324	-	223	686
11	1	6047		3400	423
12	1	8255		4231	511
1/79	1	9111		5586	624
2	1	9217		5399	604
3	1	10305		6278	609
4	1	9425		6074	644
5	1	8851		7158	808
6	1	8036		6059	754
7	1	10153		7225	711
8	1	11378		7540	663
9	1	9507		5518	574
10	1	10109		5876	686
11	1	9387		6229	632
12	1	10223		5972	584
1/80	1	10847		4860	470
2	1	11321		5061	447
3	1	5484		3097	565
4	1	4353		5104	540
5	1	4457		5245	561
6	1	4418		5543	555
7	1	10549		6173	577
8	1	10519		6575	529
9	1	9342		5157	549
10	1	11033		5015	452
11	1	8057		2978	357
12	1	12578		5464	431
1/81	1	10529		4238	390
		277433			

20454 ENSERCH 3 LAMBIRTH, G-31-5S-33E IDP RUSSELMAN 7828 (-3421) RKB 4406
PERF 7830-44 A/W 200 GALS 10% MCA 1000 GALS MOD-202 SQUEEZED
PERF 7840-49 A/W 200 GALS 10% MCA 1500 GALS MOD-202 IFP 25 MOD 12 AM
SQZ 2550
CUM'D 7760-7854

MO/YR	NO. WELLS	GOR'S	AVG	MCF/M	GOR
11/78	1	174		10206	58655
12	1	231		13103	56723
1/79	1	222		15867	71473
3 MO PROD		627			

20479 ENSERCH-6-LAMBIRTH D-31-5S-33E IDP RUSS 7826 (-3427) RKB 4401
PERF 7828-40 A/W 2000 GALS MOD 202 SQUEEZED
PERF 7830-35 A/W 250 GALS MSA
IFP 204 MCFD ON 8/20 GOR 1549 50.1 GTY FTP 90#

MO/YR	NO. WELLS	GOR'S	AVG	MCF/M	GOR
8/79	1	1530	935	-	-
9	1	930	720	-	-

5	1	342	240	-	-
6	1	3863	3965	1340	347
7	1	2527	3793	429	163
8	1	3414	2928	961	471
9	1	2756	2560	660	239
10	1	3052	3923	2373	774
11	1	2954	5778	2158	731
12	1	3205	4997	2072	647
1/00	1	2256	3961	1686	747
2	1	2303	4220	1756	762
3	1	1659	10394	1879	1133
4	1	1647	11755	1941	1051
5	1	1567	11242	2121	1272
6	1	1529	11598	2200	1447
7	1	1070	6087	505	569

35605

REPLACED BY #10 LAMBIRTH.

20482 ENSERCH-7 LAMBIRTH 32-30-5S-35E IDP FUSS 7795'(-3466') GR 4391'
SURF 1926-29 FW 100 GALS SAPCL MD 2100 SID VAC #APP
IBP 117 BLDD 73 BWPD 60K 1179
DST #1 7804-49 FUSS PFD 953 ISIP 2787 FFP 1564 FSIP 2787

MO/YR	NO. WELLS	MCFD	BWPD	MCF/A	GOR
9/00	1	2294	1120	1031	454
7	1	2114	804	871	412
8	1	1679	494	1056	552
9	1	3345	1850	771	230
10	1	5413	1291	2493	422
11	1	6893	1257	3252	328
12	1	6228	1402	2172	349
1/00	1	6250	1380	1767	283
2	1	2724	1014	1840	675
3	1	6242	1399	1471	316
4	1	5541	1370	2035	367
5	1	5279	1722	2122	402
6	1	4374	1252	2221	509
7	1	3129	1540	1537	495
8	1	2723	2470	1589	584
9	1	3260	2434	1783	549
10	1	2274	1089	1800	792
11	1	3142	5196	2460	793
12	1	1527	1507	1669	1093
1/01	1	2435	2319	3032	1249

77507

20500 ENSERCH-8 LAMBIRTH 32-30-5S-35E IDP FUSS 7695(-3408), CISCO 7674 (3217). PERFD 7612-29'(34')w 500 GALS MOD 101 & 172 BPH MD 3100 ISIP 200 SIP 4397' IHP 35[illegible] FBHP 0 GR 190 MCF/D 1676MCA FFP 155 GOR 531.

DST #1 7661-7711'PENN DFD 208-208 ISIP 2408 FFP 342-239 FSIP 2419
DST #2 7793-7834 FUSS DFD 250-269 ISIP 2713 ISIP 2704 FFP 609-1402
FSIP 2704
2700 SAND BEADS W/INJECTROL & CEMENT

MO/YR	NO. WELLS	BOPD	MCFPD	BCF/M	GOR
10/79	1	771	-	-	-
11	1	1532	395	-	-
12	1	2995	5247	-	-
1/80	1	1409	5377	1066	757
2	1	337	1702	350	1058
3	1	1478	7861	807	541
4	1	1240	6759	545	437
5	1	935	6345	608	650
6	1	1374	10034	756	543
7	1	1410	10236	795	463
8	1	1395	9977	902	671
9	1	1270	9615	875	531
10	1	1192	10057	720	599
11	1	933	8520	450	457
12	1	1064	9977	514	486
1/81	1	974	9615	537	551
		20473			

20523 ENSERCH-9 LAMBIRTH D-25-5S-32E FUSS 7822 (-3439) PKD 4393
DEPF 7824-34 4/4 3 BBLS PIP D 1600 10 MIN SIP 300
IPP 82 MCFD 2 BWPD 95 MCF/D GOR 1158
DST#1 7801-30 GTS 58 REV OUT 3560 IFP 319-417 ISIP 2125 FFP 476-1257
FSIP 1593

MO/YR	NO. WELLS	BOPD	MCFPD	BCF/M	GOR
2/80	1	1169	44	156	139
3	1	1416	-	781	552
4	1	1029	-	498	484
5	1	1209	-	607	502
6	1	1262	-	786	623
7	1	905	-	774	855
8	1	476	-	939	964
9	1	535	-	700	837
10	1	756	-	744	984
11	1	629	-	444	706
12	1	581	8	496	731
1/81	1	623	24	520	835
		11510			

20536 ENSERCH-10 LAMBIRTH D-11-5S-32E FUSS 7791 (-3361) PKD 4400
DEPF 7813-7832 A/W 5750 GAL
IPF 153 BOPD 203 MCF GTY 43.2 GOR 765 8/32

DST #1 7661-7711 PENN OFD 208-208 ISIP 2409 FFP 342-239 FSIP 2419
DST #2 7793-7834 PUSS OFD 250-269 ISIP 2713 ISIP 2704 FFP 609-1402
FSIP 2704
2/80 SQZD PERFS W/INJECTROL & CEMENT

MO/YR	NO. WELLS	BOPD	MMCF	MCF/B	GOR
10/79	1	771	-	-	-
11	1	1532	395	-	-
12	1	2995	5241	-	-
1/80	1	1409	5377	1066	757
2	1	337	1702	360	1068
3	1	1038	7891	807	561
4	1	1246	6759	545	437
5	1	935	6349	808	650
6	1	1674	10034	756	548
7	1	1610	10286	745	463
8	1	1335	8977	902	671
9	1	1270	9615	875	531
10	1	1182	10657	720	599
11	1	985	8630	850	867
12	1	1064	8977	814	836
1/81	1	974	8915	837	951
		20473			

20523 ENSERCH-9 LAMBIRTH D-25-5S-32E PUSS 7822 (-3439) DKB 4383
PERF 7824-34 W/ 3 HPF 4 1000 10 MIN SID 300
IOP #2 .000 2 BOPD 95 MCF/D GOR 1158
DST#1 7800-30 GIS 5M REV OIL 3580 IFP 310-417 ISIP 2126 FFP 476-1257
FSIP 1559

MO/YR	NO. WELLS	BOPD	MMCF	MCF/B	GOR
2/80	1	1199	44	156	130
3	1	1416	-	781	552
4	1	1020	-	495	485
5	1	1209	-	607	502
6	1	1262	-	796	623
7	1	905	-	771	853
8	1	974	-	939	964
9	1	836	-	709	837
10	1	756	-	744	984
11	1	629	-	441	706
12	1	681	2	498	731
1/81	1	623	24	520	835
		11510			

20536 ENSERCH-10 LAMBIRTH D-31-5S-32E PUSS 7781 (-3361) DKB 4400
PERF 7813-7832 A/W-5750 GAL
IOP 153 BOPD 303 BW GTY 49.2 GOR 765 8/82

MO/YR	NO. WELLS	BOPD	BWPD	MCF/D	GOR
8/80	1	287	266	219	763
9	1	2791	7216	2226	798
10	1	2329	-	2205	947
11	1	1316	7605	511	388
12	1	2646	10773	1540	654
1/81	1	2004	9561	920	448
		10779			

20641 PPCO-1-LAMBIRTH "A" J-31-5S-33E FUSS 7827(-3405) CISCO 7723 (-3301) BSDF 7930-38', 52-58 A/A 500 GALS 10% ACETIC RKB 4422 IHF 707 FOPD 0 MS GSO 570 ON 1/2" CH FTP 100

MO/YR	NO. WELLS	BOPD	BWPD	MCF/D	GOR
1/79	1	3766	-	3411	922
2	1	5250	-	5131	422
3	1	2585	-	988	374
4	1	2134	151	646	296
5	1	7115	149	1883	265
6	1	6536	5222	2776	425
7	1	5195	5104	2465	469
8	1	5432	5066	5976	944
9	1	4716	2257	3536	749
10	1	4955	6580	3317	668
11	1	3902	2266	967	247
12	1	4452	2610	1174	263
1/80	1	1671	802	384	255
2	1	1259	734	205	163
3	1	1941	960	458	278
4	1	4052	2370	888	219
5	1	3730	2182	651	175
6	1	3516	2058	1017	289
7	1	3576	6092	9632	2691
8	1	3066	3538	3034	527
9	1	1195	3138	598	584
10	1	754	2010	295	384
11	1	876	2390	114	130
12	1	969	2545	578	596
1/81	1	431	1132	431	1000
		115311			

20461 RRCO-2 LAMBIRTH "A" F-31-5S-33E FUSS 7832(-3419) RKB 4413 OPEN 7832-38 A/ 500 GAL 15% ISLD 2100 IHF 410 FOPD 0 MS GSO 1671 11/64"CH FTP 575 CUMED 7/79-7/80

MO/YR	NO. WELLS	BOPD	BWPD	MCF/D	GOR

4/19	1	1691	-	813	506
5	1	8242	-	5005	607
6	1	7754	-	5266	687
7	1	7075	-	6333	895
8	1	7315	-	1669	228
9	1	5564	-	357	146
10	1	5740	-	4595	853
11	1	5030	-	5357	1067
12	1	5158	-	5657	1135
1/80	1	7528	-	8159	1114
2	1	5701	-	4732	706
3	1	8762	-	10502	1109
4	1	5416	-	5103	943
5	1	4479	-	3751	753
6	1	4629	-	5853	1245
7	1	4773	-	90	19
8	1	4598	2826	2478	526
9	1	4254	-	1517	357
10	1	3260	-	763	234
11	1	2591	-	191	80
12	1	2486	-	651	554
1/81	1	2909	-	1513	511
		117120			

20446 (PPCO-3 LAMBIRTH "A") SW-SW-SE-SE-35-5S-35E FUSS 7908(-3357) RKB 4441
3528' 7/14-45 3/4 1000 GALS 15% 1500 2200 4/4 1200 GALS 23% 1300 GALS
15% 25 1300 1500 VAC. 4/4 10000 GALS 28% SD 3700 1500 2850
100 128 9650 35 8:00 3/4 1467

8/79	1	784	401	16554	20981
9	1	2510	1250	8112	320
10	1	2752	1348	2908	739
11	1	2497	1179	2135	913
12	1	2473	1212	2403	972
1/80	1	1079	-	1055	978
2	1	1330	-	124	420
3	1	1736	-	1828	1052
4	1	1674	-	884	328
5	1	989	-	554	561
6	1	932	-	1020	1094
7	1	943	1580	967	1020
8	1	872	24	581	906
9	1	638	16	403	632
10	1	429	12	203	415
11	1	409	10	57	141
12	1	517	13	535	644
1/81	1	445	11	482	1083
		22487			

20503 PPCO-4 LAMBIRTH "A" NA-31-5S-33E FUSS 7914(-3423) PKR 4391
PERF 7914-25 A/ 1500 GALS 15% MS 4600 ISIP 2200
ISIP 600 BLED 57 BBLS FTP 200 SN 24/64"CO

MO/YR	NO. WELLS	BOPD	MCFPD	MCF/M.	GOR
10/79	1	5745	402	1196	207
11	1	5025	8685	1578	314
12	1	5158	849	1725	334
1/80	1	5434	940	1783	328
2	1	5701	1159	1394	206
3	1	8752	301	614	70
4	1	5410	936	1502	276
5	1	4879	861	1105	222
6	1	4535	813	1725	367
7	1	4773	2367	177	37
8	1	6538	-	3004	514
9	1	3537	-	1146	324
10	1	2277	-	483	212
11	1	1902	-	138	73
12	1	2375	-	978	331
1/81	1	1752	-	972	555

73074

20514 PPCO-1 LAMBIRTH STATE N-36-5S-32E FUSS 7795 (-3370) RKB 4416
PERF 7745-7800 A/ 2500 GAL 15% MS HCL
IP/M 31 BOPD MCF TR. GTY 47.2 GLR 297 3-24-80

MO/YR	NO. WELLS	BOPD	MCFPD	MCF/M.	GOR
3/80	1	497	-	121	297
4	1	755	25	224	297
5	1	682	24	205	294
6	1	535	-	19	30
7	1	497	-	27	30
8	1	518	1419	15	24
9	1	579	1877	30	48
10	1	330	2256	515	512
11	1	202	558	125	618
12	1	327	2246	511	618
1/81	1	552	1526	345	625

6487

20535 PPCO-1 PETERSON "H" N-29-5S-33E FUSS 7946 (-3462) RKB 4484'
PERF 7605-50 A/ 2500 GAL 15% NE HCL
PERF 7516-60 A/ 20000 GAL 15% GELLED NE HCL
PERF 7793-7801 A/ 250 GAL 15% NE HCL

MO/YR	NO. WELLS	BOPD	MCFPD	MCF/M.	GOR

PETERSON, SOUTH PENN FIELD, ROOSEVELT CO., N.M.
TOTAL FIELD PRODUCTION BY MONTHS

MO/YR	NO. WELLS	BOPM	BOPD	MCF/M	GOR
9/78	1	4676	2002	6364	1360
10	1	4198	2137	5730	1364
11	1	1706	1119	858	503
12	1	3447	1405	1539	445
1/79	1	2560	1807	2638	392
2	2	2593	1569	16381	6053
3	2	2952	1501	19823	7378
4	2	1331	956	18756	10244
5	2	3371	2607	20616	5377
6	2	3215	2295	16480	5121
7	2	3073	2265	19316	6285
8	2	2819	1449	15114	5771
9	2	2726	1923	18207	6512
10	2	2985	1619	18235	7066
11	2	2544	2245	15149	5348
12	2	3084	1674	20383	6304
1/80	2	2255	1273	18699	8292
2	2	1911	1143	16225	8489
3	2	1405	1375	19809	13218
4	2	1775	1325	22434	12535
5	3	2775	2077	18774	6765
6	3	1513	2771	14704	9719
7	3	1498	1796	22236	17239
8	4	2873	2027	24855	8651
9	4	3358	1684	21936	9165
10	4	3073	1514	22534	7335
11	4	613	659	10815	13304
12	4	2200	1095	14653	9560
1/81	4	2635	843	25528	10854
		75193			

20525 PPCO-5 LAMBIRTH "A" 1-30-5S-33E FUSS 7465 (-3473) PKR 4392'
PERF 7584-7748 A/F 1500 GAL 15% NA HCL
TP/P 65 3000 # 120 B.W. GTY 41 056. GOR 1900. 5/4/30

MO/YR	NO. WELLS	BOPM	BOPD	MCF/M.	GOR
5/80	1	1143	2077	2057	1800
6	1	544	1051	16	25
7	1	240	767	10	33
8	1	512	918	20	33
9	1	544	816	18	33
10	1	431	851	309	712
11	1	416	529	84	200

12	1	445	868	300	674
1/81	1	223	335	14	63
		4753			

20454 ENSERCH-3-LAMBIRTH G-31-5S-33E PENN 7679 (-3291) DRR 4408'
DEPE 7702-15
COMP 15000 MCF/D 20/64"CH SITP 1876 GTY .757

MO/YR	NO. WELLS	AVDM	AVDY	MCF/M.	GOR
2/79	1	296	-	14273	47895
3	1	350	-	15346	46709
4	1	333	-	14786	43833
5	1	380	-	16788	43182
6	1	241	-	12423	51543
7	1	374	-	13971	37356
8	1	326	-	11482	35881
9	1	372	-	14404	21434
10	1	382	-	13564	25026
11	1	407	-	11907	29253
12	1	526	-	16811	30789
1/80	1	505	-	15585	30455
2	1	455	-	12772	19559
3	1	455	-	13455	52755
4	1	362	-	15024	52745
5	1	131	-	8465	75069
6	1	78	-	7520	97692
7	1	102	-	15169	142716
8	1	280	-	15590	55679
9	1	329	-	11522	50314
10	1	29	-	12678	444059
11	1	-	-	8799	-
12	1	-	-	9114	-
1/81	1	-	-	11729	-
		7377			

20457 ENSERCH-4 LAMBIRTH G-31-5S-33E PENN 7696(-3263) MISS 7801(3368)
DEPE 7800-14 MISS-SWBD 100% STP SC DRR 4433
DEPE 7696-7705 PENN A/V 2100 GALS MUD 202
INF 204 BLOD 58 BBLS FTP 350 ON 18/64"CH
CORED 7650-7732, 7765-7854
DST#1 7690-7732 OPD 180-370 ISIP 2630 FFP 435-982 FSIP 2541

MO/YR	NO. WELLS	AVDM	AVDY	MCF/M.	GOR
9/78	1	4678	2002	6364	135013
10	1	4188	2137	5750	1368
11	1	1795	1119	958	503
12	1	3447	1995	1539	445
1/79	1	2656	1807	2638	992
2	1	2335	1562	2109	680

3	1	2292	1501	2486	1125
4	1	1448	956	1968	1359
5	1	3491	2507	4028	1154
6	1	2977	2285	4057	1363
7	1	2536	2255	5345	1930
8	1	2294	1949	3432	1580
9	1	2124	1923	3803	1790
10	1	2041	1819	4671	2289
11	1	2137	2245	4242	1935
12	1	2525	1674	4072	1614
1/60	1	1750	1273	3314	1694
2	1	1258	1143	3451	2743
3	1	1243	1376	6345	5105
4	1	1474	1325	5510	4417
5	1	1501	1363	5752	4498
6	1	791	1120	7068	8935
7	1	599	1023	7059	7940
8	1	886	1152	7528	7736
9	1	817	1007	7047	8625
10	1	1181	817	5852	6005
11	1	524	250	1933	4305
12	1	634	348	4473	5052
1/61	1	1132	275	3450	3747

57625

20543 PPCO-1-LAMBIRTH-B A-2-6S-33E CISCO 7692(-3249) FUSS 7670 (-3426)
DEDF 7554-7828 PENN A/ 750 GAL 15% DKB 4444'
DEDF 7812-7882 FUSS A/ 11750 GAL 15%
IP 258 BOPD 2 BOPH FTP 200 PSI 32/64" CK. GOR 1625 GTY 31.5 8/26

MO/YR	NO. WELLS	GOR	WAH	MCF/M	GOR
3/60	1	985	7	1617	1925
9	1	1953	61	3349	1702
10	1	1469	46	2560	1702
11	1	0	0	0	-
12	1	921	29	766	832
1/61	1	1080	33	9364	8670

5433

Dockets Nos. 15-81 and 16-81 are tentatively set for May 6 and 20, 1981. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - WEDNESDAY - APRIL 22, 1981

9 A.M. - OIL CONSERVATION DIVISION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Daniel S. Nutter, Examiner, or Richard L. Stamets, Alternate Examiner:

CASE 7220: Application of McClellan Oil Corporation for a unit agreement, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Connor Unit Area, comprising 5,120 acres, more or less, of State and Federal lands in Township 13 South, Range 29 East.

CASE 7221: Application of Maddox Energy Corporation for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Flower Draw Unit Area, comprising 3,760 acres, more or less, of State lands in Townships 25 and 26 South, Range 28 East.

CASE 7222: Application of GMW Oil Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Starman Unit Area, comprising 2,803 acres, more or less, of State, Federal, and fee lands in Township 26 South, Range 35 East.

CASE 7211: (Continued from April 8, 1981, Examiner Hearing)

Application of Gulf Oil Corporation for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the North Rock Lake State Unit Area, comprising 2,880 acres, more or less, of State land in Township 22 South, Range 35 East.

CASE 7223: Application of Sun Oil Company for a dual completion and simultaneous dedication, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of a well to be drilled in Unit M of Section 1, Township 22 South, Range 37 East, to produce oil from the Wantz-Granite Wash Pool and gas from the Tubb formation and to simultaneously dedicate the SW/4 of said Section 1 to said well and to its Lynch Christmas Com Well No. 4 in Unit L.

CASE 7224: Application of S & I Oil Company for compulsory pooling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in all formations underlying the SW/4 SW/4 of Section 2, Township 29 North, Range 15 West, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7225: Application of Knox Industries, Inc. for an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox Morrow location of its Maddox Well No. 1 to be drilled 1980 feet from the South line and 660 feet from the West line of Section 12, Township 23 South, Range 34 East, Northeast Antelope Ridge Field, the S/2 of said Section 12 to be dedicated to the well.

CASE 7226: Application of Enserch Exploration, Inc. for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Montoya formation in the interval from 7902 feet to 7930 feet in its Rader Well No. 2 in Unit E of Section 32, Township 5 South, Range 33 East.

CASE 7227: Application of Alpha Twenty-One Production Company for an unorthodox gas well location and a non-standard proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 120-acre non-standard proration unit comprising the E/2 SW/4 and SW/4 SE/4 of Section 21, Township 21 South, Range 37 East, Hare-San Andres Gas Pool, to be dedicated to its Lansford Well No. 1 at an unorthodox location 660 feet from the South line and 1650 feet from the West line of said Section 21.

CASE 7228: Application of Yates Petroleum Corporation for an unorthodox gas well location and simultaneous dedication, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox Wolfcamp-Pennsylvanian location of its Rio Penasco "KD" Well No. 3 to be drilled 990 feet from the North line and 660 feet from the East line of Section 11, Township 19 South, Range 25 East, the N/2 of said Section 11 to be dedicated to said well and to applicant's Rio Penasco "MF" Federal Well No. 1 located in Unit F.

CASE 7229: Application of Yates Petroleum Corporation for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox Morrow-Pennsylvanian location of its Sharp "QS" Com. Well No. 1 to be drilled 660 feet from the South and East lines of Section 4, Township 17 South, Range 26 East, the S/2 of said Section 4 to be dedicated to the well.

CASE 7184: (Continued from March 11, 1981, Examiner Hearing)

Application of Harvey E. Yates Company for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Morrow formation underlying the E/2 of Section 13, Township 17 South, Range 28 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7230: Application of Caribou Four Corners, Inc. for compulsory pooling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Mesaverde and Gallup formations underlying the S/2 SW/4 of Section 7, Township 29 North, Range 14 West, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7231: Application of Caribou Four Corners, Inc. for compulsory pooling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Mesaverde and Gallup formations underlying the S/2 SE/4 of Section 11, Township 29 North, Range 15 West, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7232: Application of Caribou Four Corners, Inc. for compulsory pooling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Mesaverde and Gallup formations underlying the E/2 SW/4 of Section 12, Township 29 North, Range 15 West, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7233: Application of Bass Enterprises Production Co. for directional drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to directionally drill its Montieth Well No. 3, the surface location of which is 2130 feet from the South line and 1980 feet from the East line of Section 13, Township 16 South, Range 36 East, Northeast Lovington-Pennsylvanian Pool, and drill said well in an easterly direction to bottom it not closer than 510 feet to the outer boundary of the dedicated unit, being the N/2 SE/4 of said Section 13.

CASE 7234: Application of Getty Oil Company for a dual completion, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of its Farming E Well No. 1-E located in Unit I of Section 2, Township 24 North, Range 6 West, to produce oil from the Gallup formation thru the casing-tubing annulus and gas from the Dakota formation thru tubing.

CAMPBELL, BYRD & BLACK, P.A.
LAWYERS

JACK M. CAMPBELL
HARL D. BYRD
BRUCE D. BLACK
MICHAEL B. CAMPBELL
WILLIAM F. CARR
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JEFFERSON PLACE
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POST OFFICE BOX 2208
SANTA FE, NEW MEXICO 87501
TELEPHONE: (505) 988-4421
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April 10, 1981

Case 7226

Mr. Joe D. Ramey
Division Director
Oil Conservation Division
New Mexico Department of
Energy and Minerals
Post Office Box 2088
Santa Fe, New Mexico 87501

Re: Application of Enserch Exploration, Inc. for
Salt Water Disposal, Roosevelt County, New Mexico

Dear Mr. Ramey:

Enclosed in triplicate is the application of Enserch Exploration, Inc. in the above-referenced matter.

The applicant requests that this matter be included on the docket for the examiner hearing scheduled to be held on April 22, 1981.

Very truly yours,

William F. Carr

WFC:lr

Enclosures

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SANTA FE

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OIL CONSERVATION DIVISION
SANTA FE

BEFORE THE

OIL CONSERVATION DIVISION

NEW MEXICO DEPARTMENT OF ENERGY AND MINERALS

IN THE MATTER OF THE APPLICATION OF ENSERCH EXPLORATION, INC. FOR SALT WATER DISPOSAL, ROOSEVELT COUNTY, NEW MEXICO.

Case 7226

APPLICATION

Comes now, ENSERCH EXPLORATION, INC., by and through its undersigned attorneys and hereby applies to the Oil Conservation Division for approval of a salt water disposal well and in support thereof would show:

1. That applicant seeks authority to utilize its Rader No. 2 Well located 1889 feet from the East line and 560 feet from the West line of Section 32, Township 5 South, Range 33 East, N.M.P.M., Roosevelt County, New Mexico, to dispose of produced salt water into the Montoya formation through perforations from 7902 feet to 7930 feet.

2. That the Rader No. 2 Well is currently shut in.

3. That other wells in the pool are currently being used for salt water disposal.

4. That although there is production within a two mile radius of the subject well, the well can be converted and salt water injected so as not to impair correlative rights or to cause waste.

WHEREFORE, Applicant respectfully requests that this matter be set for hearing before one of the Division's duly

appointed examiners on April 22, 1981, and, that after notice and hearing as required by law, the Division enter its order approving the application.

Respectfully submitted,

CAMPBELL, BYRD AND BLACK, P.A.

By _____
William F. Carr
Post Office Box 2208
Santa Fe, New Mexico 87501
Attorneys for Applicant

RECEIVED
APR 10 1981
OIL CONSERVATION DIVISION
SANTA FE

BEFORE THE

OIL CONSERVATION DIVISION

NEW MEXICO DEPARTMENT OF ENERGY AND MINERALS

IN THE MATTER OF THE APPLICATION OF ENSERCH EXPLORATION, INC. FOR SALT WATER DISPOSAL, ROOSEVELT COUNTY, NEW MEXICO.

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Respectfully submitted,

CAMPBELL, BYRD AND BLACK, P.A.

By William F. Carr

William F. Carr
Post Office Box 2208
Santa Fe, New Mexico 87501
Attorneys for Applicant

BEFORE THE

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NEW MEXICO DEPARTMENT OF ENERGY AND MINERALS

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IN THE MATTER OF THE APPLICATION OF ENSERCH EXPLORATION, INC. FOR SALT WATER DISPOSAL, ROOSEVELT COUNTY, NEW MEXICO.

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appointed examiners on April 22, 1981, and, that after notice and hearing as required by law, the Division enter its order approving the application.

Respectfully submitted,

CAMPBELL, BYRD AND BLACK, P.A.

By William F. Carr

William F. Carr
Post Office Box 2208
Santa Fe, New Mexico 87501
Attorneys for Applicant

ROUGH

dr/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 7226

Order No. R- 6685

APPLICATION OF ENSERCH EXPLORATION,
INC. FOR SALT WATER DISPOSAL,
ROOSEVELT COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on April 22, 19 81, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter

NOW, on this _____ day of April, 19 81, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Enserch Exploration, Inc., is the owner and operator of the Rader Well No. 2, located in Unit E of Section 32, Township 5 South, Range 33 East, NMPM, South Peterson Field, Roosevelt County, New Mexico.

(3) That the applicant proposes to utilize said well to dispose of produced salt water into the Montoya formation, with injection into the perforated interval from approximately 7902 feet to 7930 feet.

(4) That said Montoya formation immediately underlies the Fusselman formation, and Phillips Petroleum Company, which operates a well producing from the Fusselman formation at a location some 1731 feet Northwest of said Rader Well No. 2, appeared at the hearing and objected to applicant's proposed disposal of water into said Fusselman formation.

(5) That the basis for the Phillips objection is the alleged possibility of disposal water breaking out of the Montoya formation and migrating into the Fusselman producing zone, thereby posing a threat to the oil production from the aforesaid Phillips producing well, its Lambirth "A" Well No. 4.

(6) That the Enserch interpretation of the logs of said Lambirth "A" Well No. 4 below the productive interval of 7814 feet to 7828 feet indicates the presence of two zones of only slight permeability, the first being at a depth from 7840 feet to 7850 feet and the second being at a depth of 7924 feet to 7934 feet.

(7) That while Enserch alleges that these "tight" zones would provide vertical separation between the Phillips producing interval and the Enserch disposal zone, Phillips contends that there is no physical separation between the base of ~~the~~ its producing interval in the Fusselman formation and the top of the Enserch disposal interval in the Montoya formation, ~~and~~ inasmuch ~~that~~ as there are vertical fractures in the Fusselman through which water injected into the upper Montoya could migrate to the Upper Fusselman and endanger its producing well, the Lambirth "A" Well No. 4.

(8) That there is evidence of vertical fracturing in the Fusselman formation in this area.

(9) That while the extent of said fracturing is not known, the vertical fractures may well extend through the "tight" zones Enserch relies upon to keep the disposal zone and the productive zone separated.

(10) That should said fractures extend through the "tight" zones, said zones efficacy as an efficient barrier would be diminished and the Phillips production could be subject to water invasion.

(11) That such water invasion could result in premature abandonment by the Phillips production, thereby causing loss of otherwise recoverable hydrocarbons and waste of oil and gas, as well as impairment of correlative rights.

(12) That there is no means presently available whereby the migration of injected water could be monitored and a determination made of imminent water invasion in the Phillips well prior to its actual occurence, at which time it could be too late to prevent loss of hydrocarbons.

(13) That Enserch has not investigated all other possible means of water disposal in the subject area.

(14) That the application should be denied.

IT IS THEREFORE ORDERED:

(1) That the application of Enserch Exploration, Inc., for salt water disposal into the Montoya formation in the perforated interval from 7902 feet to 7930 feet in its Rader Well No. 2, located in Unit E of Section 32, Township 5 South, Range 33 East, NMPM, South Peterson Field, Roosevelt County, New Mexico, is hereby denied.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

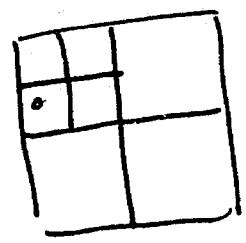
Memo

From

FLORENE DAVIDSON
ADMINISTRATIVE SECRETARY

To Called in by Bill Carr
4/1/81

Enserch Exploration
Salt Water Disposal
Rader # 2
1880/N + 560/W
32-55-33E
Roosevelt County
Montoya formation
thru perfs.
7902 — 7930



OIL CONSERVATION COMMISSION-SANTA FE