BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
August 21, 1968

IN THE MATTER OF:	)	
	)	
Application of Continental Oil Company for a waterflood project, Lea County, New Mexico	)	Case No. 3841
	)	
	)	

BEFORE: D. S. NUTTER,
Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: Call Case 3841.

MR. HATCH: Application of Continental Oil Company for a waterflood project, Lea County, New Mexico.

MR. KELLAHIN: If the Examiner please, may the record show the same appearance and that the witness, Roger Porter, has been sworn and qualified.

(Whereupon, Applicant's Exhibits 1 through 8 marked for identification.)

* * * * * * *

J. ROGER PORTER, called as a witness, having been previously duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A J. Roger Porter.

Q You are the same Mr. Porter who has testified in the previous cases?

A Yes, I am.

Q Are you familiar with the application of Continental Oil Company in Case 3841?

A Yes, I am.

Q Briefly, what is proposed by Continental Oil Company in this case?

A Case 3841 is the application of Continental Oil Company for authority to install a pilot waterflood in the El Mar Pool by converting to salt water injection its Wilder Wells Nos. 24 and 27.

Q Now, referring to what has been marked as Exhibit No. 1, would you identify that exhibit?

A Exhibit No. 1 is a location plat showing the proposed injection wells, Wilder Wells Nos. 24 and 27 circled in red and the Wilder Lease outlined in red. The lease is described as all of Section 26 and all of Section 25 with the exception of the northeast quarter northeast quarter, all in Township 26 South, Range 32 East, Lea County, New Mexico. Well No. 24 is located 1980 feet from the south line and 660 feet from the west line of Section 26 and well No. 27 is located 1980 feet from the north line and 1980 feet from the west line of Section 26. The plat also shows the location of all of the existing wells within a radius of two miles from the injection wells and the ownership of the leases within this area. All of the producing wells shown on this plat are producing from the El Mar Delaware Pool.

Q Now, referring to what has been marked as Exhibit No. 2, would you identify that exhibit?

A Exhibit No. 2 is a form C-108 for Wilder No. 24. As

shown on the form, we intend to inject water through cement-lined two and three-eighths-inch tubing below a packer set at 4475 feet. The top and bottom of formation shown on the form reflect the top and bottom of the Bell Canyon member of the Delaware series. The specific interval into which we are proposing to inject is locally called the Ramsey Sand, which is the upper sand body in the Delaware series and is the primary producing interval in the El Mar Delaware Pool.

Q Referring to what has been marked as Exhibit No. 3, would you identify that exhibit?

A Exhibit No. 3 is a copy of the form C-108 for the Wilder No. 27. The information shown on Exhibit No. 3, is identical to that shown on Exhibit No. 2, except that depths are different for this well, and naturally differ from those shown on Exhibit No. 2.

Q Again, you are injecting into the Delaware formation?

A That is correct.

Q The Ramsey Delaware?

A Yes, sir.

Q Referring to what has been marked as Exhibit 4, would you describe it?

A Exhibit No. 4 is a schematic diagram of Wilder No. 24 and shows the size, setting depth and amount of cement

used in setting the casing. The injection interval is shown between 4497 feet to 4507 feet and the packer is shown to be set at 4475 feet. Injection is to be carried on through 2 3/8 inch cement-lined tubing.

Q Will the casing tubing annulus be filled with an inert fluid?

A Yes, it will.

Q You will be able to either leave it open or put a pressure gauge on it?

A Yes, sir.

Q Referring to what has been marked as Exhibit No. 5, would you discuss that exhibit?

A Exhibit No. 5 is a schematic diagram of Wilder No. 27 and shows the same type of information which I described in Exhibit No. 4. This diagram shows schematically the injection formation described on Exhibit No. 3.

Q Again, the casing tubing annulus will be filled with an inert fluid?

A Yes, sir, in the same manner as the other Wilder well, the Wilder No. 24.

Q Referring to what has been marked as Exhibit No. 6, would you identify that exhibit?

A Exhibit No. 6 is a copy of the radioactivity log on Wilder No. 24. We have indicated the top of the Delaware

formation, the top of the Delaware Sand, which is the top of the Ramsey Sand that I mentioned earlier, and the perforated interval.

Q Referring to what has been marked as Exhibit 7, describe what it shows?

A Exhibit No. 7 is a copy of the sonic log run on Wilder No. 27. It shows the same information which I described on Exhibit No. 6. Here again the injection interval is the Ramsey Sand, which is the upper sand body in the Delaware series.

Q Now, referring to Exhibit No. 8, would you identify that exhibit?

A Exhibit No. 8 is a copy of the water analysis from a sample taken from the treater at the El Mar Central Battery.

Q Is that water potable?

A No, it is not.

Q Is it comparable to the water that is found in the formation in which you propose to inject?

A It should be identical, since it was produced from the same formation.

Q Has Continental made an enginerring study of the waterflood feasibility of the El Mar Pool?

A We are in the process of completing a waterflood

feasibility study for this pool and have formed working interest owner and engineering committees to proceed toward unitization. The water injection pattern which will be ultimately used, has not yet been decided. The Wilder Wells Nos. 24 and 27, being located on the perimeter of the field, are ideally suited for injection of water. Currently the Wilder No. 27 is shut in, and the Wilder No. 24 is producing at a rate of 40 barrels of oil and 126 million cubic feet of gas per month, according to June, 1968 production in 30 days. Injection is being proposed at least a year earlier than would have been proposed except for the deadline which was created by Order No. R-3221, therefore, this injection program is partially to dispose of produced water and partially as a waterflood pilot project.

Q What is the source of the water you are going to dispose of here?

A The injection water will initially be produced water from the Bradley, Payne and Wilder leases, although produced water from nearby leases may also be disposed of in our injection wells as a means of accommodation.

Q You mean for other operators in the area?

A Yes, sir.

Q What volumes do you initially propose to inject in these wells?

A In each well, we expect a minimum of 150 barrels

a day and this could go up to possibly three hundred barrels of water a day.

Q In each well?

A Yes, sir.

Q Since the water to be injected is produced from this same formation, would there be any question of compatibility?

A We do not expect any.

Q This will be a closed system?

A Yes, sir.

Q Do you expect any detrimental effect as a result of your injection of water into the producing formation?

A No, sir.

Q In addition to disposing of salt water, what do you expect to learn in this pilot project?

A The Delaware Sand has long been considered a good waterflood project, but it is recognized that there are possible problems involved in waterflood operations. The sand is very fine and is somewhat unconsolidated. Most Delaware producing pools have encountered some sand problem, and in some areas, the problems have been quite severe. We do not know for certain that the formation will take water in the volumes which we hope to use ultimately, nor do we know

for certain that water injection will not increase the influx of sand in the producing well bores. Injection into Wilder's Nos. 24 and 27 will permit us to evaluate the transmissability of water through the formation and should give us some indication of the type of response which we could expect from a waterflood operation.

Q Were Exhibits 1 through 8 prepared by you or under your supervision?

A Yes, sir.

MR. KELLAHIN: At this time, I offer in evidence Exhibits 1 through 8, inclusive.

MR. NUTTER: Continental's Exhibit 1 through 8 will be admitted in evidence.

(Whereupon, Applicant's Exhibits 1 through 8 offered and admitted in evidence.)

MR. KELLAHIN: That completes our presentation.

CROSS EXAMINATION

BY MR. NUTTER:

Q What is the current rate of production on the Wilder lease per well per day, average?

A I cannot give you an accurate figure, but I believe it would be in the range of ten barrels to 15 barrels of oil a day..

Q They're marginal wells, but not down to the economic limit?

A That is correct, although some of them along the edge of the reservoir have depleted considerably more than others.

Q How about No. 24 and 27, what can they make?

A No. 27 is currently shut in and No. 24 is producing at a rate of 40 barrels of oil and 126 mcf gas, that was in June, 1968, production report.

Q Per month?

A Per month, yes, sir.

MR. NUTTER: Are there any other questions of the witness? He may be excused.

(Witness excused.)

MR. NUTTER: Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: That's all I have.

MR. NUTTER: Does anyone have anything else to offer in Case 3841? We will take the case under advisement.

I N D E X

EXHIBITS	MARKED	OFFERED AND ADMITTED
Applicant's 1 through 8	2	9

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Court Reporter in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me, and that the same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my hand and seal this 5th day of September, 1968.

Ada Dearnley
ADA DEARNLEY

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3841, heard by me on 8/21, 1968.

....., Examiner
New Mexico Oil Conservation Commission

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 2
CASE NO. 3841

Form C-108
Revised 1-1-65

NEW MEXICO OIL CONSERVATION COMMISSION

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

OPERATOR: Continental Oil Company		ADDRESS: Box 460 Hobbs, New Mexico	
LEASE NAME: Wilder	WELL NO.: 24	FIELD: El Mar	COUNTY: Lea

LOCATION: UNIT LETTER L ; WELL IS LOCATED 660 FEET FROM THE West LINE AND 1980 FEET FROM THE South LINE, SECTION 26 TOWNSHIP 26S RANGE 32E NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING	7 5/8"	363	175	Surface	Circ.
INTERMEDIATE					
LONG STRING	4 1/2"	4607	770	surface	Circ.
TUBING	2 3/8"	4475	NAME, MODEL AND DEPTH OF TUBING PACKER: Baker Tension Model AD or equivalent @ 4475'		

NAME OF PROPOSED INJECTION FORMATION: Delaware	TOP OF FORMATION: 4451'	BOTTOM OF FORMATION: Approx. 5570'
IS INJECTION THROUGH TUBING, CASING, OR ANNULUS? Tubing	PERFORATIONS OR OPEN HOLE? Perforations	PROPOSED INTERVAL(S) OF INJECTION: 4497'-4507'
IS THIS A NEW WELL DRILLED FOR DISPOSAL? No	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED? Producing Oil Well	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE? No

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH: None

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA: est. 300'	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA: None	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 (PSI)
150	300	Closed	Pressure	1500

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	No

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND): USA lessee: M. R. & Ellen Kate Madera, Box 94, Orla, Texas

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL: Texaco, Inc., Box 728, Hobbs, New Mexico

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING?	SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL	THE NEW MEXICO STATE ENGINEER
	No	No	No
ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B)	PLAT OF AREA	ELECTRICAL LOG	DIAGRAMMATIC SKETCH OF WELL
	Yes	No	No

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

R. C. Stamison — Assistant Division Manager — 7-19-68
(Signature) (Title) (Date)

NOTE: Should waivers from the State Engineer, 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.

EXHIBIT NO. 2

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
Appl. EXHIBIT NO. 3
CASE NO. 3841

Form C-108
Revised 1-1-65

NEW MEXICO OIL CONSERVATION COMMISSION

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

OPERATOR		ADDRESS	
Continental Oil Company		Box 460, Hobbs, New Mexico	
LEASE NAME	**WELL NO.**	**FIELD**	**COUNTY**
Wilder	No. 27	El Mar	Lea

LOCATION

UNIT LETTER F ; WELL IS LOCATED 1980' FEET FROM THE N LINE AND 1980' FEET FROM THE W LINE, SECTION 26 TOWNSHIP 26S RANGE 32E NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING	7 5/8	330'	125	surface	circ.
INTERMEDIATE					
LONG STRING	4 1/2	4582'	700	1090'	temperature survey
TUBING	2 3/8	4500'	NAME, MODEL AND DEPTH OF TUBING PACKER: Baker Tension Model AD or equivalent @ 4500'		

NAME OF PROPOSED INJECTION FORMATION	TOP OF FORMATION	BOTTOM OF FORMATION
Delaware	4479'	Approx. 5590'

IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?	PERFORATIONS OR OPEN HOLE?	PROPOSED INTERVAL(S) OF INJECTION
Tubing	perforations	4529-4535

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	Producing oil well	no

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH: None

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
est. 300'	None	None

ANTICIPATED DAILY INJECTION VOLUME (BBLS.) MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSI)
150	300	closed	Pressure	1500

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	No

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND): USA, lessee M. R. & Ellen Kate Madera, Box 94, Orla, Texas

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL: Texaco, Inc., Box 728, Hobbs, N.M.

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING?	SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL	THE NEW MEXICO STATE ENGINEER
	No	No	No
ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B)	**PLAT OF AREA**	**ELECTRICAL LOG**	**DIAGRAMMATIC SKETCH OF WELL**
	Yes	No	No

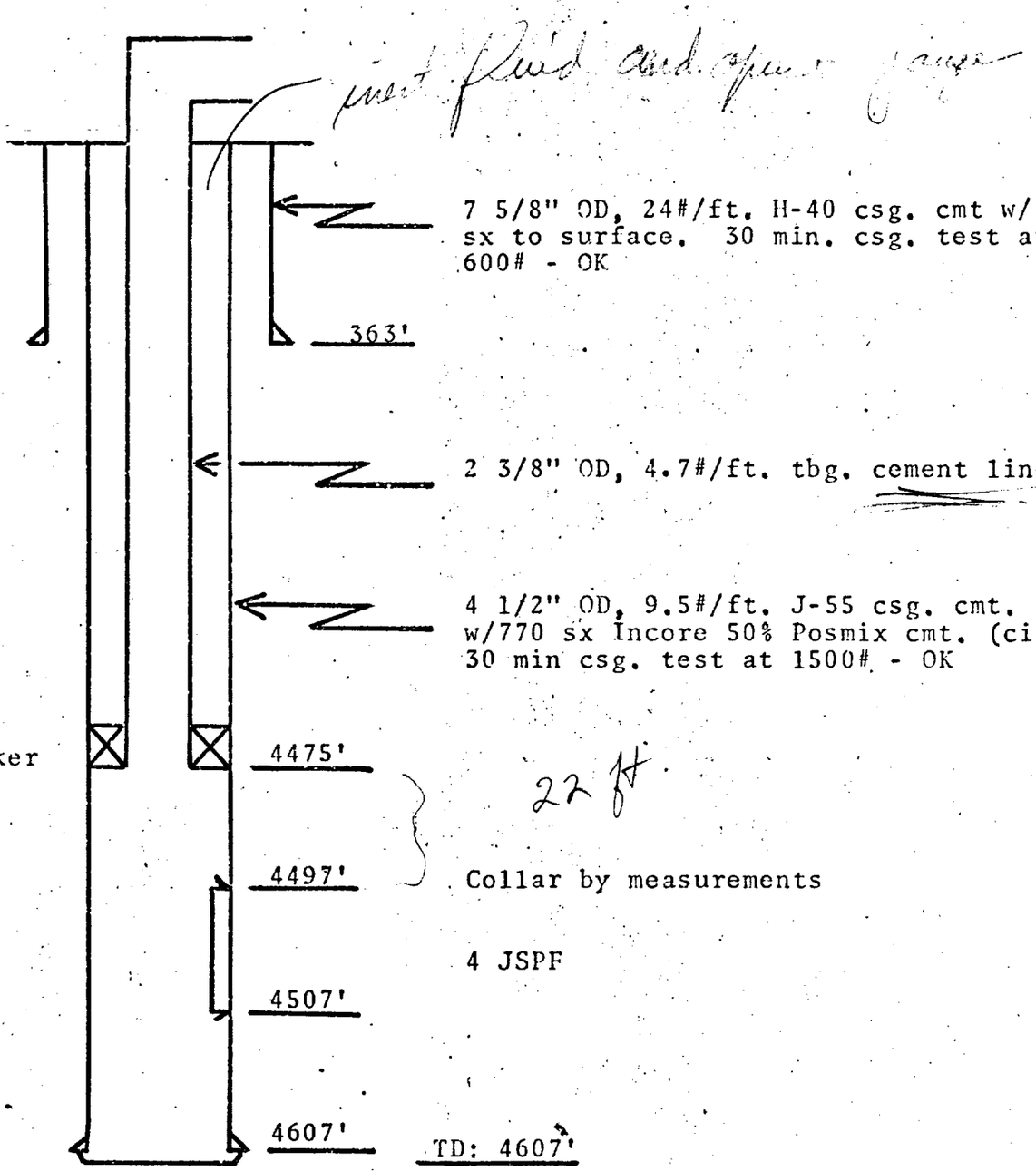
I hereby certify that the information above is true and complete to the best of my knowledge and belief.

(Signature)	(Title)	(Date)
	Assistant Division Manager	7-19-68

NOTE: Should waivers from the State Engineer, 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.

EXHIBIT No. 3

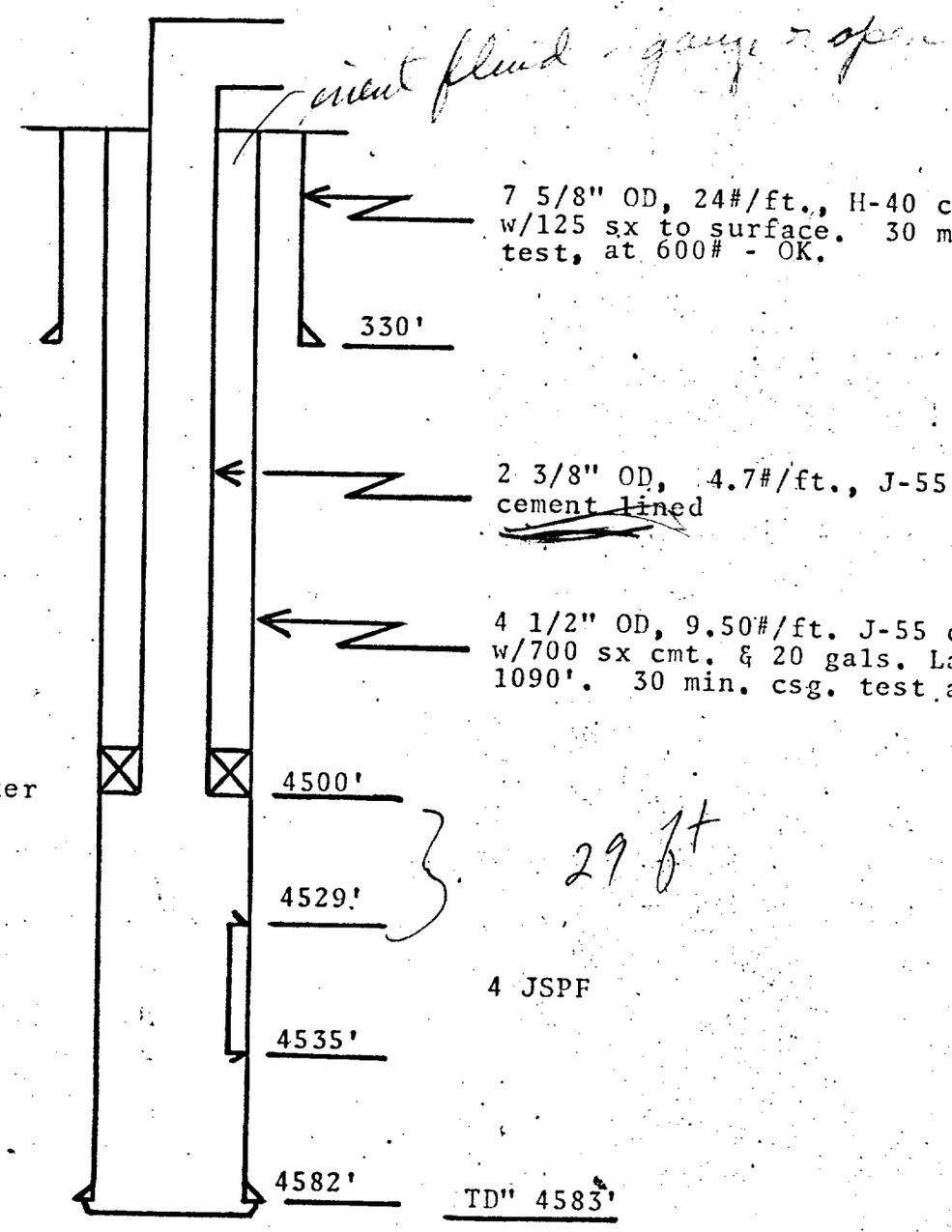
Wilder No. 24
660' FWL & 1980' FSL, Sec. 26, T-26S, R-37E
Elev. 3093' (11' above L.F.)



BEFORE EXAMINER NUTTER
OIL CONSERVATION
EXHIBIT NO. 4
CASE NO. 3641

EXHIBIT NO. 4

Wilder No. 27
1980' FN & FWL, Sec. 26, T-26S, R-37E
Elev. 3119.5' (11' above L. F.)



BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 5
CASE NO. 3841

EXHIBIT NO. 5

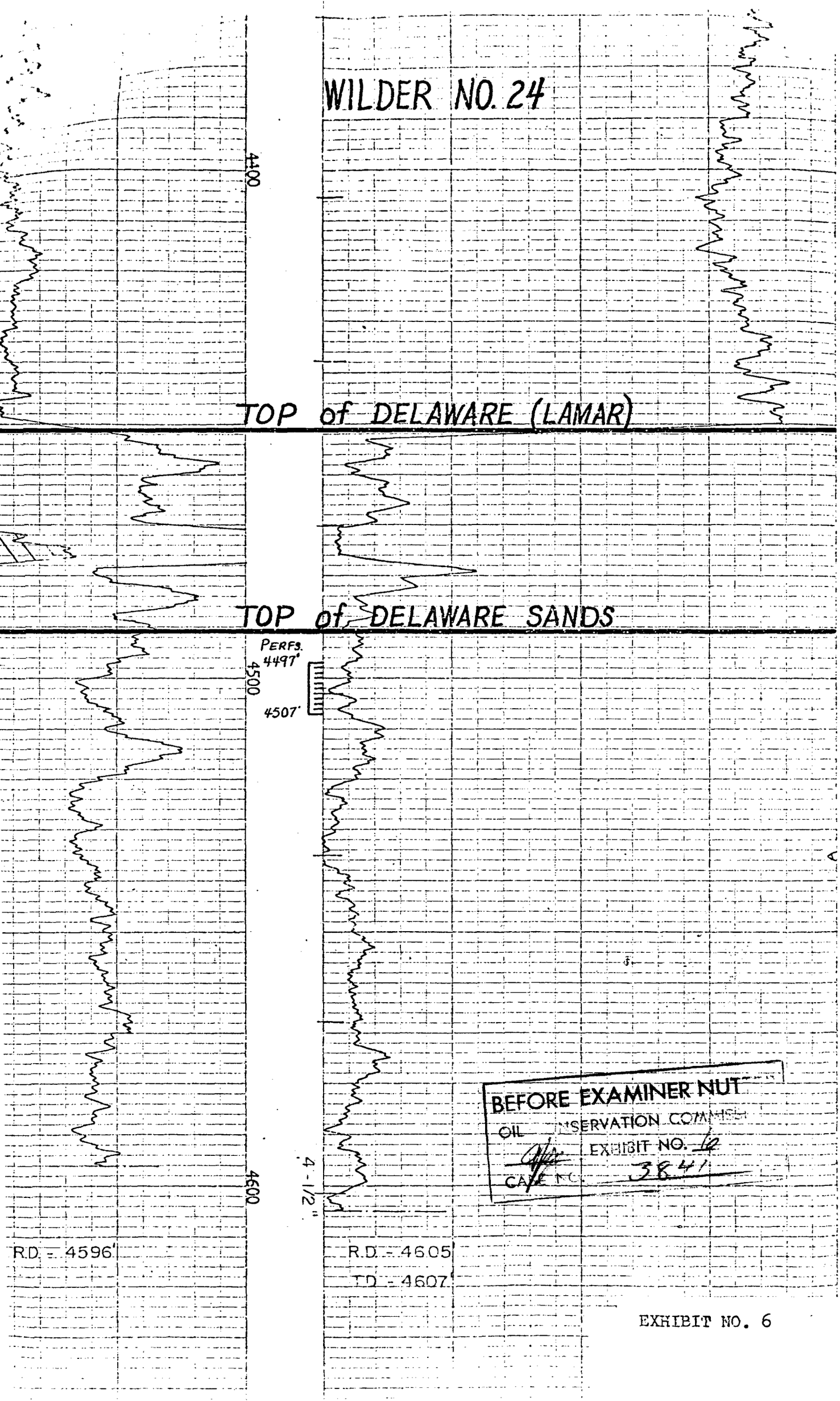

WILDER NO. 24
4400
TOP of DELAWARE (LAMAR)
TOP of DELAWARE SANDS
PERFS.
4497'
4500
4507'
4600
4-1/2"
R.D. = 4596'
R.D. = 4605'
T.D. = 4607'
BEFORE EXAMINER NUT
OIL CONSERVATION COMMISSION
EXHIBIT NO. 6
CASE NO. 3841

EXHIBIT NO. 6

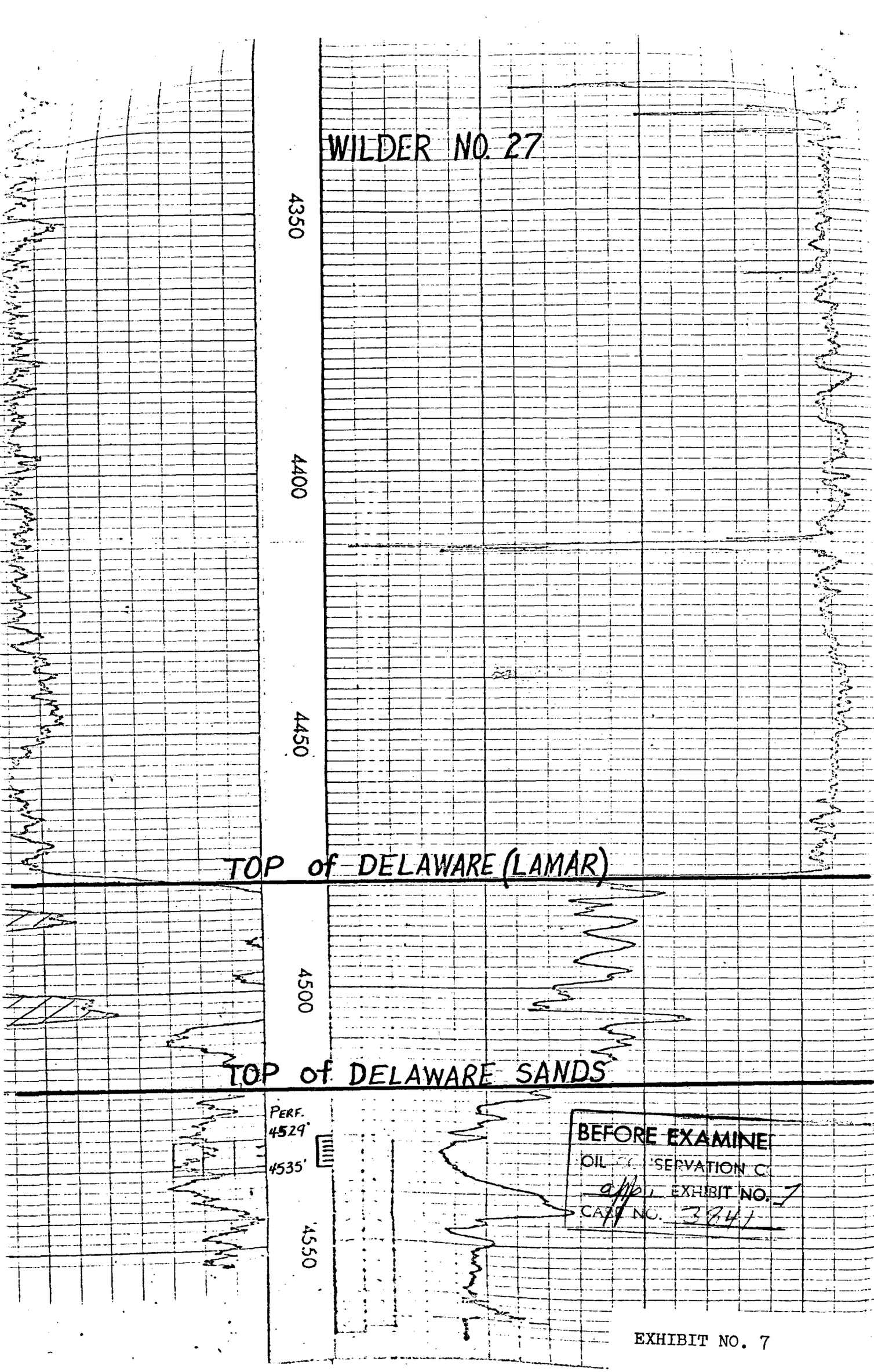

WILDER NO. 27
4350
4400
4450
TOP of DELAWARE (LAMAR)
4500
TOP of DELAWARE SANDS
PERF.
4529'
4535'
4550
BEFORE EXAMINER
OIL CONSERVATION C
EXHIBIT NO. 7
CASE NO. 3841

EXHIBIT NO. 7

TELEPHONE: HOBBS 393-6215

KE-TONE®

UNITED CHEMICAL CORPORATION

OF NEW MEXICO

601 NORTH LEECH P. O. BOX 1499

HOBBS, NEW MEXICO 88240

Company Continental Oil Company

Field El Mar Delaware Sand

Lease El Mar Sampling Date 6/24/68

Type of Sample Treater

WATER ANALYSIS

IONIC FORM	me/l *	mg/l *
Calcium (Ca^{++})	1357.28	27,200
Magnesium (Mg^{++})	386.86	4704
Sodium (Na^{+}) (cal.)	2890.34	66,449
Iron		138
Bicarbonate (HCO_3)	1.10	67
Carbonate (CO_3^{--})	NOT	FOUND
Hydroxide (OH^{-})	NOT	FOUND
Sulphate (SO_4^{--})	8.58	412
Chloride (Cl^{-})	4624.80	164,000
5.6 pH @ 68 °F		
Dissolved Solids on Evap. at 103° - 105° C		
Hardness as $CaCO_3$	1744.14	87,207
Carbonate Hardness, as $CaCO_3$ (temporary)	1.10	55
Non-Carbonate Hardness as $CaCO_3$ (permanent)	1743.04	87,152
Alkalinity as $CaCO_3$	1.10	55
Specific Gravity c 68° F	1.165	

* mg/l = milligrams per Liter

* me/l = milliequivalents per Liter

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
APPL. EXHIBIT NO. 8
CASE NO. 3844

EXHIBIT NO. 8

Makes Water Work

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

September 16, 1968

Mr. Jason Kellahin
Kellahin & Fox
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

Dear Sir:

Reference is made to Commission Order No. R-3486, recently entered in Case No. 3841, approving the Continental El Mar Wilder Waterflood Project.

Injection is to be through the two authorized water injection wells, each of which shall be equipped with a string of cement-lined tubing set in a packer which shall be located within 50 feet of the uppermost casing perforation. The casing-tubing annulus in each well shall be loaded with an inhibited fluid and shall be left open or equipped with a pressure gauge to facilitate detection of leakage in the casing, tubing, or packer.

As to allowable, our calculations indicate that when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 294 barrels per day when the Southeast New Mexico normal unit allowable is 42 barrels per day or less.

Please report any error in this calculated maximum allowable immediately, both to the Santa Fe office of the Commission and the appropriate district proration office.

In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions of Rule 701, it behooves him to promptly notify

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Mr. Jason Kellahin
Kellahin & Fox
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

September 16, 1968

both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. PORTER, Jr.,
Secretary-Director

COPY

ALP/DSN/ir

cc: Oil Conservation Commission
Hobbs, New Mexico

Mr. D. E. Gray
State Engineer Office
Santa Fe, New Mexico

GOVERNOR
DAVID F. CARGO
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

P. O. BOX 2088
SANTA FE

September 9, 1968

Mr. Jason Kellahin
Kellahin & Fox
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

Re: Case No. 3841
Order No. R-3486
Applicant:
Continental Oil Company

Dear Sir:

Enclosed herewith is a copy of the above-referenced Commission order recently entered in the subject case. Letter pertaining to conditions of approval and maximum allowable to follow.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Carbon copy of order also sent to:

Hobbs OCC x
Artesia OCC
Aztec OCC
State Engineer x

Other