BEFORE THE OIL CONSERVATION COMMISSION

OF THE

STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF
CONTINENTAL OIL COMPANY FOR APPROVAL
OF THE EAST E-K UNIT AGREEMENT EMBRACING
400 ACRES, MORE OR LESS, LOCATED IN
SECTION 22, TOWNSHIP 18 SOUTH, RANGE 34
EAST, NMPM, LEA COUNTY, NEW MEXICO, AND FOR
PERMISSION TO INSTALL AND OPERATE A WATERFLOOD
WITHIN THE BOUNDARIES OF SAID UNIT AREA

Case 4282

A P P L I C A T I O N

Comes now Applicant, Continental Oil Company, and respectfully requests approval of the East E-K Unit Agreement embracing 400.00 acres, more or less, described as:

NW/4, E/2 SW/4 and SE/4 Section 22, Township 18 South, Range 34 East, Lea County, New Mexico

and for permission to install and operate a waterflood within said unit, and in support thereof, Applicant would show:

1. That the East E-K Unit Agreement is attached hereto and marked Exhibit 1.
2. That approval of the Unit Agreement by the Commissioner of Public Lands was given July 9, 1969.
3. That the attached location plat marked Exhibit 2 shows the East E-K Unit, the proposed injection wells and surrounding area..
4. That engineering investigations indicate that water flooding the East E-K Unit Area will be physically and economically feasible.
5. That the formation to be unitized and waterflooded is the Upper Queen formation which is specifically indicated on the radioactivity log of the Continental Oil Company State X-22 No. 1 well attached hereto and marked Exhibit 3.
6. That the proposed injection wells are or will be completed in such a manner that injected water

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Date 12-5-69

will be confined to the unitized formation. The present and proposed status of all proposed injection wells is shown on the schematic diagrams attached hereto and marked Exhibits 4 and 5.

7. That applicant proposes to inject a total of approximately 1,000 barrels of water per day into the two proposed injection wells on a modified peripheral pattern. Said water will be obtained from the Ogallala formation from an outside supplier but will supplemented by produced water from the immediate area.

8. That the said waterflood will be installed and operated in conformance with Rule 701E.

9. That the Unit Area may be enlarged, which may necessitate a change of injection pattern, and that administrative procedures for changing injection wells should be provided.

10. That the proposed unitization and secondary recovery will result in the recovery of hydrocarbons which would not be recovered by primary methods and is therefore in the interest of conservation and the prevention of waste.

Wherefore, Applicant respectfully requests that this matter be set for hearing before the Commission's duly qualified Examiner and that upon hearing an order be entered approving the East E-K Unit Agreement, and granting permission to install and operate a waterflood within the Unit Area as described hereinabove.

Respectfully Submitted,

L. P. Thompson
Division Manager

VTL-JS

TYPE LOG

SCHLUMBERGER WELL SURVEYING CORPORATION

COMPANY CONTINENTAL OIL COMPANY

WELL STATE X-22 #1

FIELD QUEEN

LOCATION SEC. 22-18S-34E

COUNTY LEA

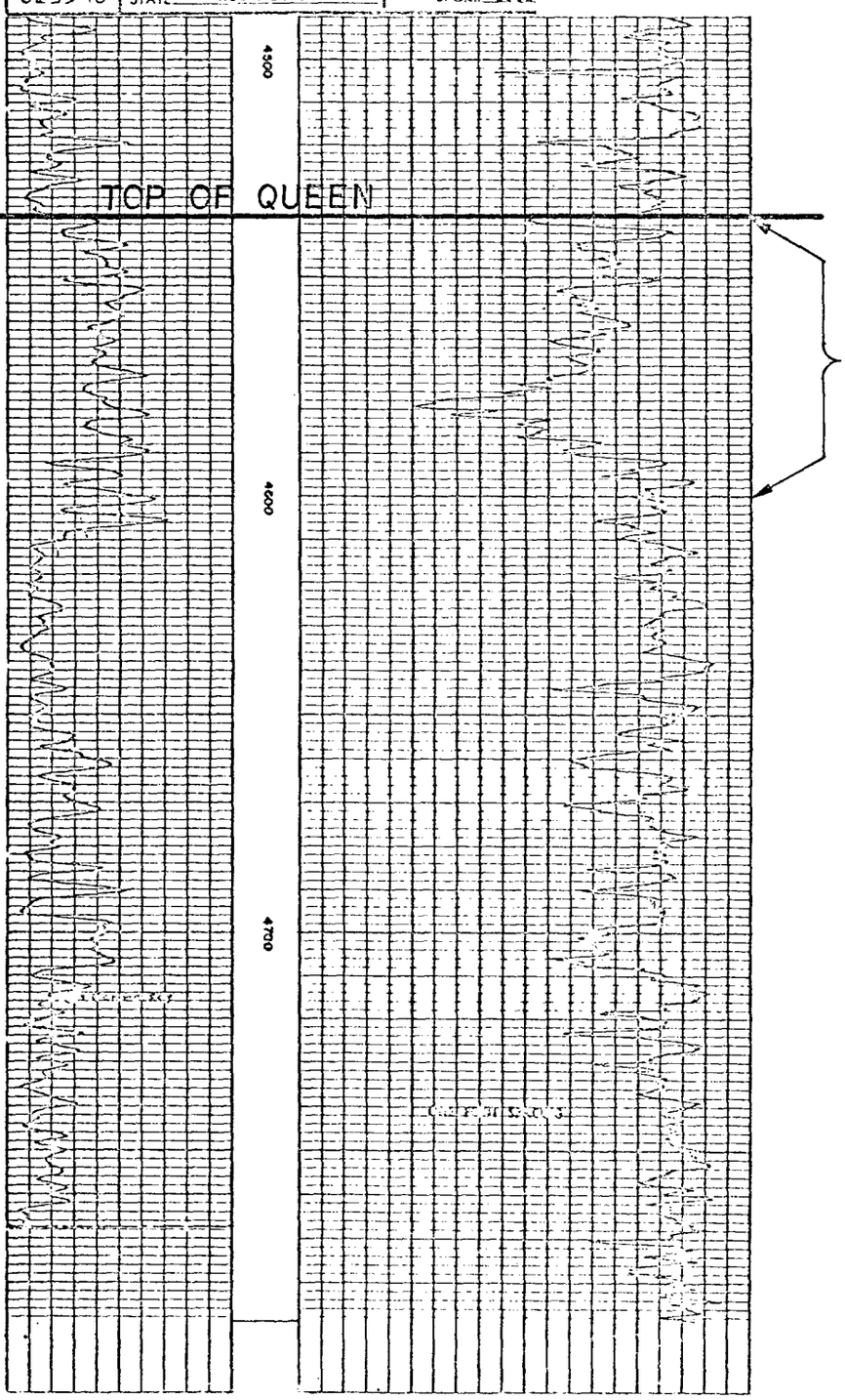
STATE NEW MEXICO

Other Surveys
LL-3, MLL

Location of Well
330' FSL
1980' FEL

Elevation: K.B. 4012
D.F. 4008
or G.L. 3993

COUNTY LEA
Field or LOCATION ANTELOPE-QUEEN
WELL STATE X-22 #1
COMPANY CONTINENTAL OIL



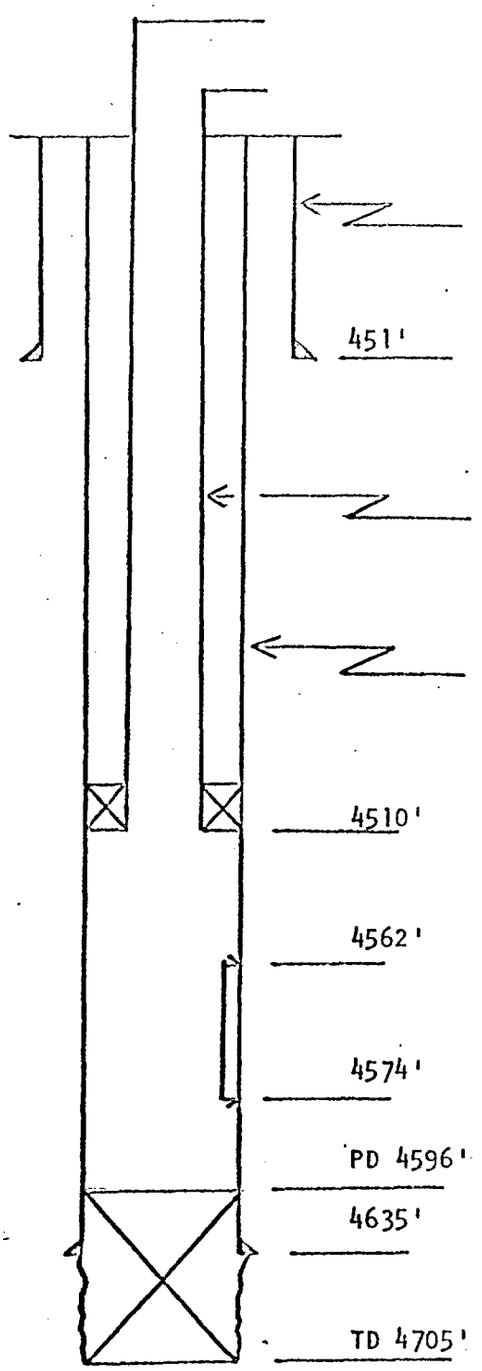
3

Case 4282

EAST E-K UNIT NO. 4
(formerly State V-22 No. 1)

Unit N - 330' FSL & 1980' FWL
Section 22 - 18S - 34E

Elev. 3987' BHF
4000' DF



8 5/8" OD casing set at 451' and cemented to surface w/225 sacks

2 3/8" OD EUE cement-lined tubing w/ret. packer to be set at ± 4510'

5 1/2" OD 14# casing set at 4635' and cemented to 1750' w/1500 sacks

QUEEN PERF. 4562-4574'
(Equiv. to 4568' - 4580' on sonic log)

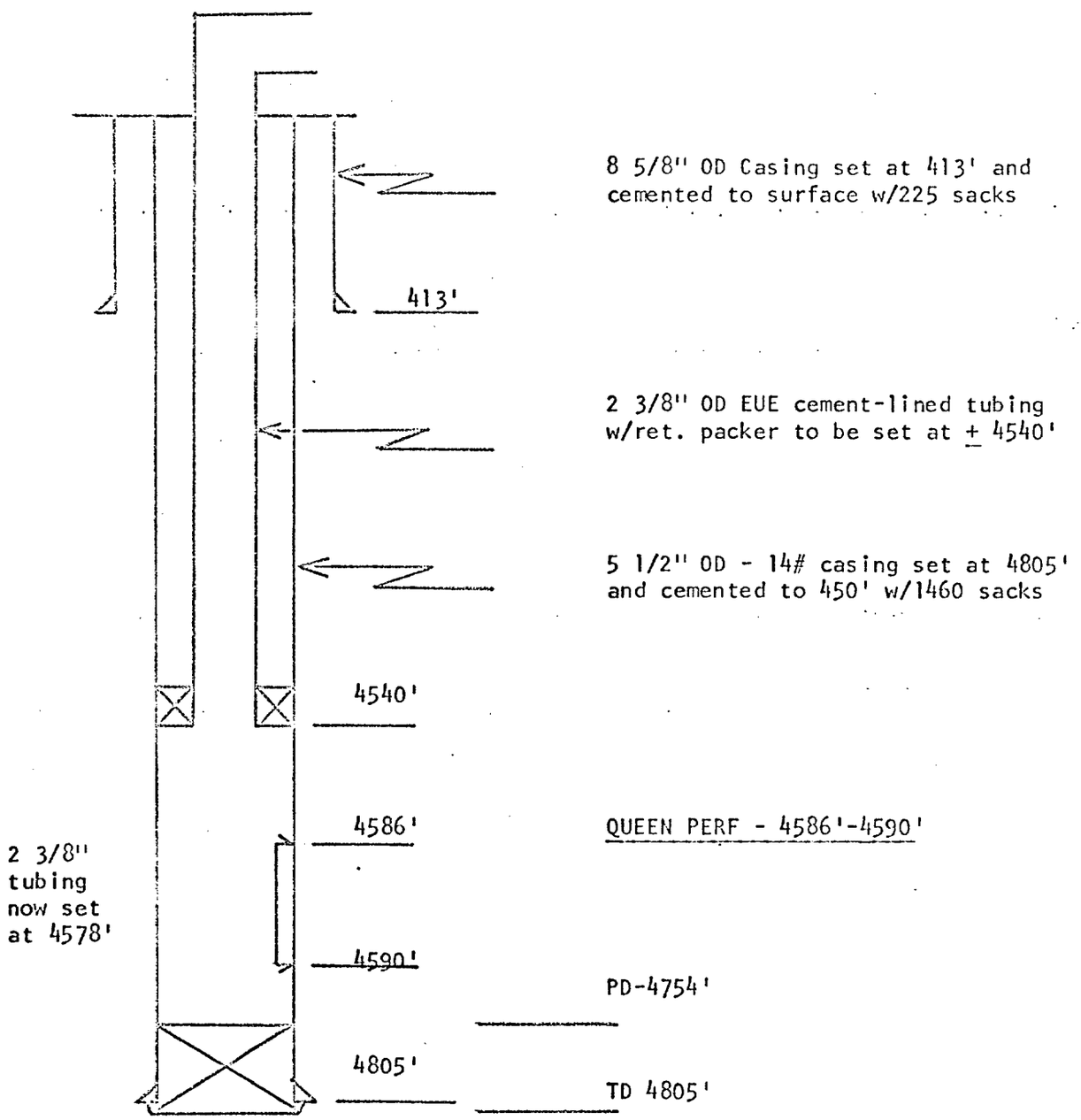
PROPOSED PROCEDURE

1. Pull rods and pump. Tag bottom with tubing and tally out. Clean out any fill found above 4574' to 4580' (electronically inspect tubing on rack)
2. Run 2 3/8" OD EUE cement-lined tubing with ret. packer to be set at ± 4510'.
3. Hook up well for injection.

11-19-69

Case 4282
Exhibit NO. 4

EAST E-K UNIT NO. 6
(formerly State X-22 No. 2)
Unit P - 660' FSL & 660' FEL Sec. 22-18S-34E
Elev. 4002' BHF
- 4015' DF



PROPOSED PROCEDURE

1. Pull rods and pump. Tag bottom with tubing and tally out. (Electronically inspect tubing on rack) Clean out any fill found above 4590' to 4600'.
2. Run 2 3/8" OD EUE cement-lined tubing with ret. packer to be set at ± 4540'
3. Hook-up well for injection.

11-19-69

Case 4282

Exhibit No. 5

CASE 4280: Application of J. M. Huber Corporation for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Lower Wolfcamp formation in the perforated interval from 10,358 feet to 10,419 feet in its Stoltz State Well No. 1 located in Unit M of Section 6, Township 15 South, Range 35 East, Morton-Wolfcamp Pool, Lea County, New Mexico.

CASE 4281: Application of Continental Oil Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion (conventional) of its SEMU Well No. 21 located in Unit O of Section 19, Township 20 South, Range 38 East, Lea County, New Mexico, in such a manner as to produce oil from an undesignated Blinebry oil pool and gas from an undesignated Drinkard gas pool through parallel strings of tubing.

CASE 4282: Application of Continental Oil Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the East E-K Unit Area by the injection of water into the upper Queen formation through two wells located in Units N and P of Section 22, Township 18 South, Range 34 East, East E-K Queen Pool, Lea County, New Mexico.

CASE 4283: Application of Continental Oil Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the East E-K Unit Area comprising 400 acres, more or less, of state lands described as the NW/4, E/2 SW/4 and SE/4 of Section 22, Township 18 South, Range 34 East, East E-K Queen Pool, Lea County, New Mexico.

CASE 4284: Application of Continental Oil Company for salt water disposal, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water in its Springs SWD Wells Nos. 1 and 2, located in Unit F of Section 3 and Unit A of Section 4, respectively, Township 21 South, Range 25 East, Springs-Upper Pennsylvanian Gas Pool, Eddy County, New Mexico. Disposal into Well No. 1 would be into the Bone Spring, Wolfcamp and Upper Pennsylvanian formations in the openhole interval from 2700 feet to 8350 feet. Disposal into Well No. 2 would be into the Upper Pennsylvanian formation in the perforated interval from 8300 feet to 8400 feet.

CASE 4265: (Readvertised):

Application of Union Oil Company of California for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Yates, San Andres and other formations in the open-hole interval from approximately 4450 feet to 6067 feet in its Midway State Well No. 3 located in Unit J, Section 12, Township 17 South, Range 36 East, Lovington Field, Lea County, New Mexico.

CASE 4285: Application of Southwestern Natural Gas Inc., for an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an exception to the special rules and regulations governing the North Osudo-Morrow Gas Pool to permit the drilling of a well at an unorthodox gas well location 1980 feet from the South line and 660 feet from the East line of Section 19, Township 20 South, Range 36 East, Lea County, New Mexico.

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
December 17, 1969

IN THE MATTER OF: Application of Continental Oil Company for a waterflood project, Lea County, New Mexico. and Application of Continental Oil Company for a unit agreement, Lea County, New Mexico.	CASE NO. 4282 CASE NO. 4283

BEFORE: Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

MR. NUTTER: Call Case 4282 and Case 4283.

MR. HATCH: Case 4282, Application of Continental Oil Company for a waterflood project, Lea County, New Mexico. Case 4283, Application of Continental Oil Company for a unit agreement, Lea County, New Mexico.

MR. NUTTER: Cases 4282 and 4283 will be consolidated for the purpose of hearing.

MR. KELLAHIN: If the Examiner please, Jason Kellahin appearing for the Applicant. The witness is Mr. V. T. Lyon. May the record show that he has been sworn?

MR. NUTTER: Mr. Lyon is still under oath.

(Witness sworn.)

(Whereupon, Applicant's Exhibits 1 through 9 were marked for identification.)

V. T. LYON,

called as a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Victor T. Lyon, L-y-o-n.

Q You are the same Mr. Lyon who testified in the preceding case?

A I am.

Q Mr. Lyon, are you familiar with the application of Continental Oil Company in Cases 4282 and 4283?

A Yes, sir.

Q What are proposed by the Applicant in these two cases?

A Cases 4282 and 4283 are the applications of Continental Oil Company for approval of the East E-K unit agreement and for authority to install a waterflood project within the boundaries of the East E-K unit.

Q Now, referring to what has been marked as Exhibit Number One, would you identify that exhibit?

A Yes, sir. Exhibit Number One is the unit agreement for the East E-K unit. This agreement is on the form prescribed by the Commissioner of Public Lands, as adapted for this particular situation. I would like to call the Examiner's attention to Section 2, Paragraph J on Page 3, where the unitized formation is described as the Upper Queen Formation, the same being that heretofore established underground reservoir encountered in the drilling by Continental Oil Company of its State X-22, Number One Well, between the depths of 4536 to 4600 feet.

Which said well is located in the southwest quart-

er of the southeast quarter of Section 22, 18 South, 34 East. Also Section 4 provides for the expansion of the unit area.

Section 13 describes the participation of the tracts within the unit area, and this refers to Exhibit C, which is the last page of the agreement, wherein it shows that participation is on the basis of ninety percent cumulative production of January 1, 1969, and ten percent acreage.

This unit consists of two tracts, as shown on Exhibit A. This is our State B-22 lease, consisting of the northwest quarter and the east half of the southwest quarter of Section 22, and our State X-22 lease, which consists of the southeast quarter of Section 22. This is a total acreage of four hundred forty acres.

Q Exhibit C shows the participation of these two tracts; is that correct?

A Yes, sir.

Q Has this proposed unit agreement received preliminary approval of the State Land Commissioner's office?

A Yes, sir. This has received the approval, the final approval, of the Examiner of Public Lands on July 9, 1969. The unit became effective on August 1 of 1969.

Q Now, referring to what has been marked as Exhibit Number 2, would you identify that exhibit?

A Exhibit Number 2 is a location and ownership plat. Excuse me. I think I made an incorrect statement awhile ago. I indicated that the acreage was four hundred forty acres, and it's four hundred acres.

Exhibit Number Two is a plat showing the proposed injection wells for the waterflood project by the red triangles, and an area two miles in radius surrounding these two wells. The East E-K unit is shown outlined in red, as I previously described it, and the two proposed injection wells are Wells Number Four, located in Unit N of Section 22, and Number 6, which is located in Unit P.

MR. NUTTER: Mr. Lyon, let me interrupt you. You're calling those Numbers 4 and 6, and I imagine that those are the unit numbers for those wells, aren't they?

THE WITNESS: That is correct.

MR. NUTTER: Those are not the old lease numbers?

THE WITNESS: This is correct.

MR. NUTTER: The Well Number 5 on here would be the well that is mentioned as the X-22, Number 1, in Paragraph J of the unit agreement?

THE WITNESS: This is true.

MR. NUTTER: Okay. I just wanted to clarify that.

THE WITNESS: The two systems of nomenclature are

are used in these exhibits. The schematic diagram lists the new as well as the old, I believe, and the logs have the original designation on them. And I'll try to cross refer to them, so as to avoid confusion.

Q (By Mr. Kellahin) Now, you were discussing Exhibit Number 2. Had you completed your discussion on injection wells?

A Yes, sir; I believe so.

Q Now, the location and ownership and producing formation of all the wells in the area are shown on the exhibit; is that correct?

A Yes, sir.

Q Now, referring to what has been marked as Exhibit Number 3, would you identify that exhibit?

A Exhibit Number 3 is the type log for the unit. This is the log that I referred to in the unit agreement, and it is designated hereon as State X-22, Number 1. It shows the top of the Queen formation at 4532, and the base of the unitized formation at 4600. This is what we refer to as the Upper Queen.

Q I believe the log shows it at 4536, not 32; isn't that correct?

A Let me count again. Yes, you're right. 4536.

Those heavy lines don't show up very well.

Q 4536?

A Yes, sir.

Q And that is the producing formation for the wells in this area; is that correct?

A Yes, sir; within the unit area.

Q Are there other producing Queen wells in the area?

A Yes, sir. There are other producing wells in the East E-K Queen's Pool. These are considered to be producing predominantly from the Penrose, or Lower Queen formation.

Q Now, referring to what has been marked as Exhibit Number 4, would you identify that exhibit?

A Exhibit Number 4 is a schematic diagram of the E-K Unit Number 4, which was formerly designated as the State E-K Unit Number 1. It shows the size and the setting depth and the amount of cement used in setting the casing strings 8 5/8 to 451, cemented to surface.

The 5 1/2 inch at 4635, and the cement came to 1750 feet. It shows that we propose to injection water through 2 3/8 inch cement-lined tubing, to be set at approximately 4510 on a retrievable packer.

Q Will the casing tubing anulus be filled?

A Yes, sir, with an inner fluid.

Q And will you use a pressure gauge at the surface?

A Yes, sir.

Q All right. Now, referring to what has been marked as Exhibit Number 5, would you identify that exhibit?

A Exhibit Number 5 is a schematic diagram for the East E-K Unit Number 6, which was formerly designated the State X-22 Number 2. It shows the same information for this well as was shown for Number 4 on Exhibit Number 4.

Q Now, again, will the casing tubing anulus be filled with an inner fluid?

A Yes, it will.

Q And a pressure gauge at the surface?

A Yes, sir.

Q Now, referring to what has been marked as Exhibit Number 6, would you identify that exhibit?

A Exhibit Number 6 is a copy of the sonic log for State B-22 Number 1, which is now the East E-K Unit Number 4. It shows the top of the Queen marked by the heavy line -- if I can count these -- it looks like at 4440 approximately, perforated -- excuse me, 4540; perforated interval is 4568 to 4580.

Q On Exhibit Number 7, what is that?

A Exhibit Number 7 is a copy of the sonic log State X-22 Number 2, now designated as East E-K Number 6. The top of the Queen is shown by the heavy line. It looks like at

approximately 4540 on it also, and the perforated interval is 4586 to 4590.

Q Now, referring to what has been marked as Exhibit Number 8, would you discuss that exhibit?

A Exhibit Number 8 is a structural map showing the structural configuration of the top of the Queen in this immediate area, and the location of the wells. I don't know whether -- my copy does not show the unit outlined. I had intended to outline it, but that plat also uses the old designations of the wells.

The State B-22 Number 1, which was now East E-K Unit Number 4 is shown in Unit N and the X-22 Number 2, which is now Number 6, is in Unit P of Section 22, and they are almost identically located on the structure. The pool occurs in a relatively featureless area of the Queens showing a southward dip. The reservoir occurs as a result of permeability pinch-out.

You will note that there are two dry holes in Section 27, one in Unit C and one in Unit B. The one in Unit B is formerly Continental Oil Company's White 27 Number 1, in which casing was set, and the well was tested to be water productive. The other well is an Ambassador Well, which drilled to the unitized formation, or to the Queen formation, and tested water. Production casing was never

set. It is our present intention to acquire rights to these two wells and to enlarge the unit to include the eighty-acre tracts on which they are located, and to use these two wells as injection wells.

In the event we are unable to do this, we'll use the wells which we have described in here, East E-K Unit Numbers 4 and 6. The two wells which we hope to acquire, when acquired and if acquired, will be redesignated as East E-K Unit Wells Numbers 7 and 8. Number 7, being the one in Unit B, and Number 8, being the one in Unit C.

Q Now, for that reason, do you need to have some procedure for changing the location of your injection wells?

A Yes, sir. We would like to avoid the expense and administrative burden both by the Commission and by Continental Oil Company for another hearing, should these wells be available to us.

Q Then, as I understand your testimony, you presently propose to inject into the two wells shown as injection wells your Number 4 and Number 6 on Exhibit 2, but if you acquire the rights to the other two wells to the south, you will utilize them instead; is that correct?

A Yes, sir. We believe that by so doing, that we will have a more efficient sweep of water by injecting into the aquifer.

Q Now, referring to what has been marked as Exhibit Number 9, would you identify that exhibit?

A Yes, sir. Exhibit Number 9 is a tabulation of reservoir data on this unit area, and after all the calculations indicating that an estimated recovery by water flooding of 455,000 barrels of oil. This is oil which would not be recovered by a primary means.

At the bottom of the exhibit is a tabulation of the production data for the wells during the month of October, 1969. The average production for the five produceable wells during that month was 9.3 barrels of oil, at 3.6 barrels of water per day.

Q What are you presently doing with that water?

A Currently, it is being hauled from the lease and injected into a disposal well.

Q Now, how much water do you propose to inject into your two injection wells?

A We anticipate injecting approximately five hundred barrels per well at an estimated maximum pressure of two thousand pounds.

Q And where will this water come from?

A It will be primarily fresh water from the Ogallala Formation. We have a temporary source of water available at

this time. We hope to secure a permanent source of water, but we anticipate that it also will be Ogallala water. This is the same water which is being injected into Mobil Oil Company's E-K Queen Project to the west, and there has been no report, to my knowledge, of any incompatibility with this water in the formation well.

Q Now, in your opinion, will the water flooding of the Queen formation in the East E-K unit be economically and physically feasible?

A In my opinion, it will be.

Q Will it recover additional oil that will not otherwise be recovered?

A Yes, it will.

Q In other words, then, the approval of this application would result in the prevention of waste and the protection of correlative rights; is that correct?

A Yes, sir. That is correct.

Q But in addition to application for approval of the unit agreement and the water flood project, you do ask the Commission to provide for an administrative procedure for changing the location of your injection wells; is that correct?

A Yes, sir.

Q Were Exhibits 1 through 9 prepared by you or under your supervision?

A Yes, they were.

MR. KELLAHIN: At this time, I would like to offer into evidence Exhibits 1 through 9, inclusive.

MR. NUTTER: Continental's Exhibits 1 through 9 will be admitted into evidence.

MR. KELLAHIN: That completes the testimony, Mr. Nutter.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Lyon, you mentioned that you would be injecting approximately five hundred barrels per day into each well, with a maximum pressure of about two thousand pounds; is that right?

A Yes, sir.

Q Or is that an initial pressure of two thousand?

A This is what we anticipate will be the maximum. It can be a little bit higher, but we're hopeful that it will be that.

Q Most of this will be Ogallala water, but this several hundred barrels a month that you're producing at the present time will be reinjected also?

A Yes, it will.

Q And as water production increases in the future, that'll be recycled?

A Yes, sir.

MR. NUTTER: Are there any further questions of Mr. Lyon? He may be excused.

Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: That's all, Mr. Nutter.

MR. NUTTER: Does anyone have anything to offer in Cases 4282 and 4283? We'll take the case under advisement and call Case 4284.

I N D E X

E X H I B I T S

	MARKED	ADMITTED
Applicant's Exhibits 1-9	2	13

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

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

David Bingham
COURT REPORTER

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 4282-83 heard by me on 12-17, 1969.

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

TYPE LOG

SCHLUMBERGER WELL SURVEYING CORPORATION

Sonic Log

COMPANY CONTINENTAL OIL COMPANY

WELL STATE X-22 #1

FIELD QUEEN

LOCATION SEC. 22-18S-34E

COUNTY LEA

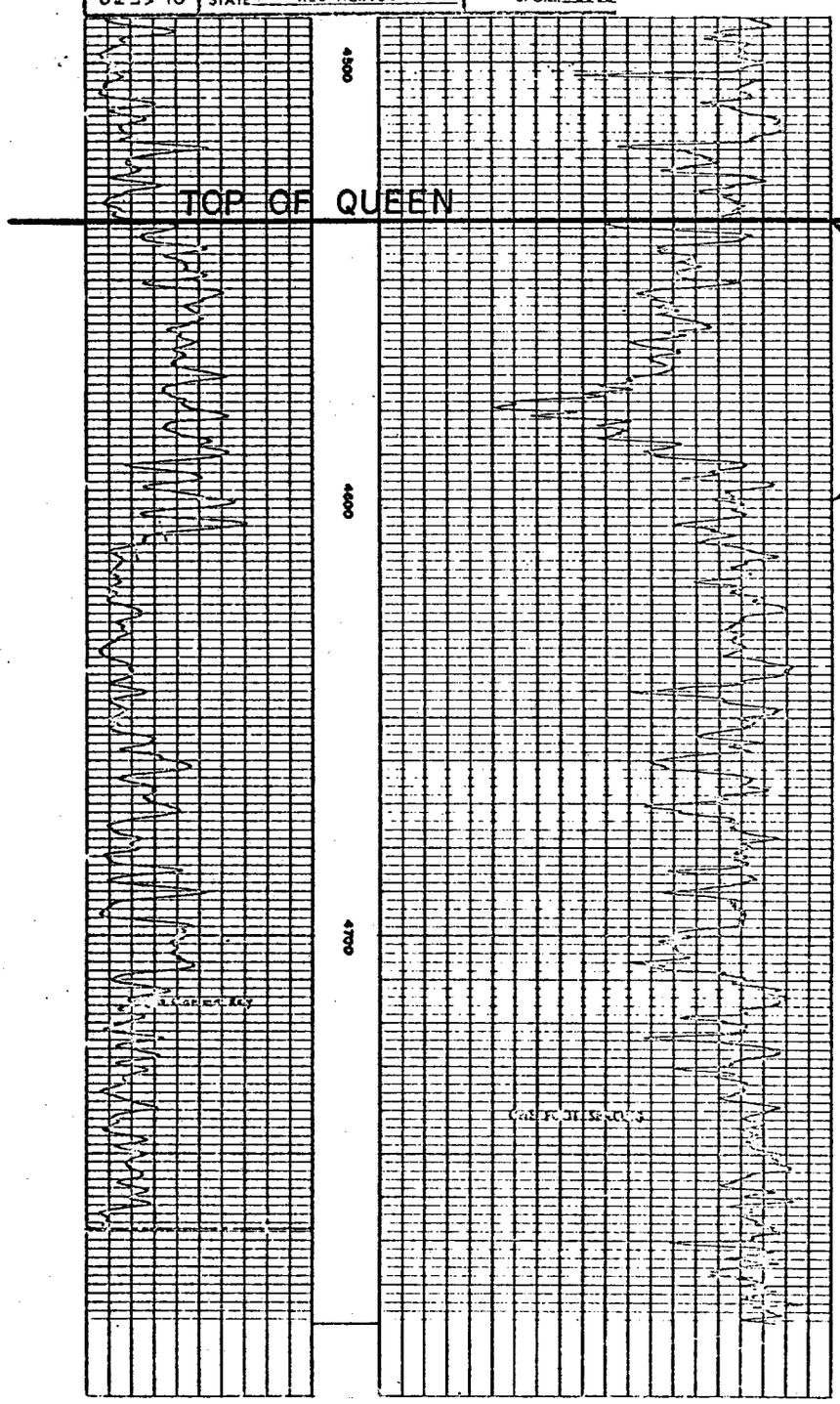
STATE NEW MEXICO

COUNTY LEA
FIELD or LOCATION ANTELOPE-QUEEN
WELL STATE X-22 #1
COMPANY CONTINENTAL OIL COMPANY

Other Surveys
LL-3, MLL

Location of Well
330' FSL
1980' FEL

Elevation: K.B.: 4012
D.F.: 4008
or G.L.: 3998



UNITIZED FORMATION
4536-46

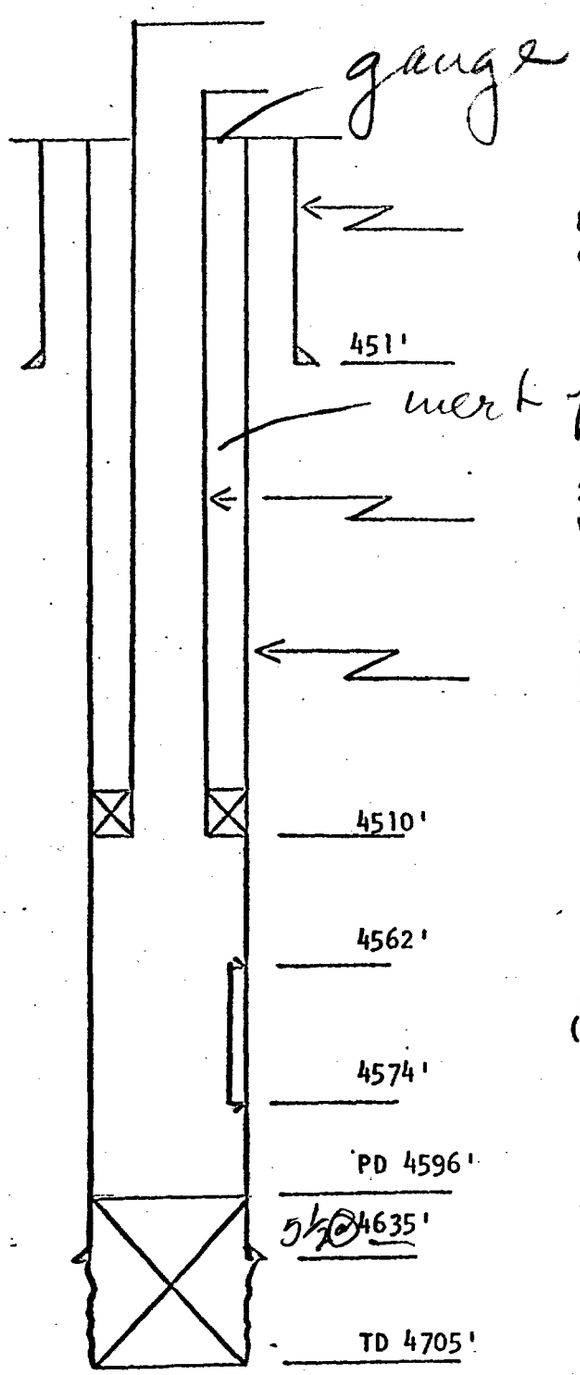
BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 3
CASE NO. 4282-4283

EXHIBIT 3

EAST E-K UNIT NO. 4
(formerly State V-22 No. 1)

Unit N - 330' FSL & 1980' FWL
Section 22 - 18S - 34E

Elev. 3987' BHF
4000' DF



8 5/8" OD casing set at 451' and cemented to surface w/225 sacks

2 3/8" OD EUE cement-lined tubing w/ret. packer to be set at ± 4510'

5 1/2" OD 14# casing set at 4635' and cemented to 1750' w/1500 sacks

QUEEN PERF. 4562-4574'
(Equiv. to 4568' - 4580' on sonic log)

will inject about 500 BWPD into the USDC w/ max. inj. press. 3,000 psi

PROPOSED PROCEDURE

1. Pull rods and pump. Tag bottom with tubing and tally out. Clean out any fill found above 4574' to 4580' (electronically inspect tubing on rack)
2. Run 2 3/8" OD EUE cement-lined tubing with ret. packer to be set at ± 4510'.
3. Hook up well for injection.

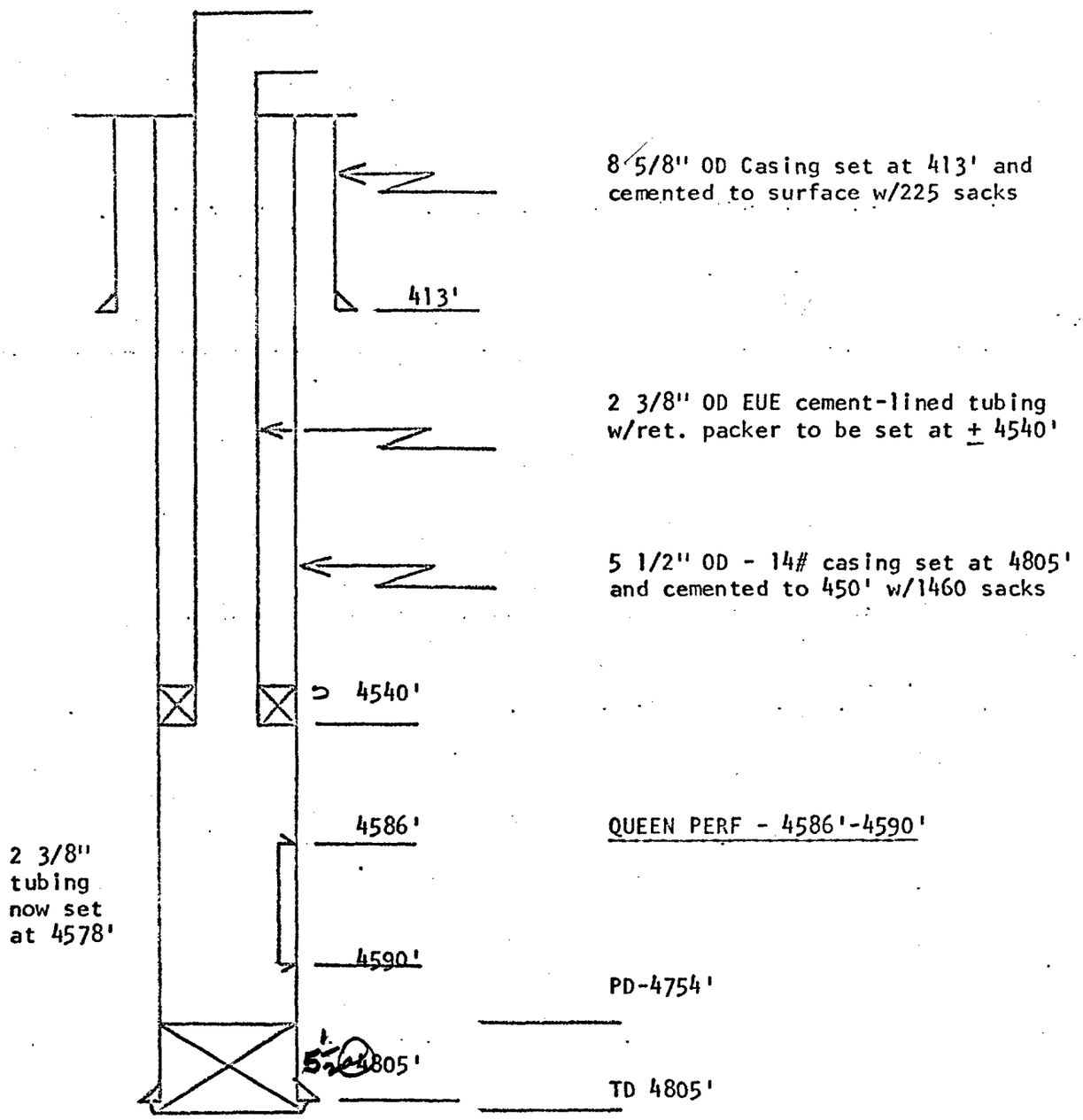
will use Ogallala wtr.

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 4
CASE NO. 4282, 4283

11-19-69

Exhibit NO. 4

EAST E-K UNIT NO. 6
(formerly State X-22 No. 2)
Unit P - 660' FSL & 660' FEL Sec. 22-18S-34E
Elev. 4002' BHF
- 4015' DF



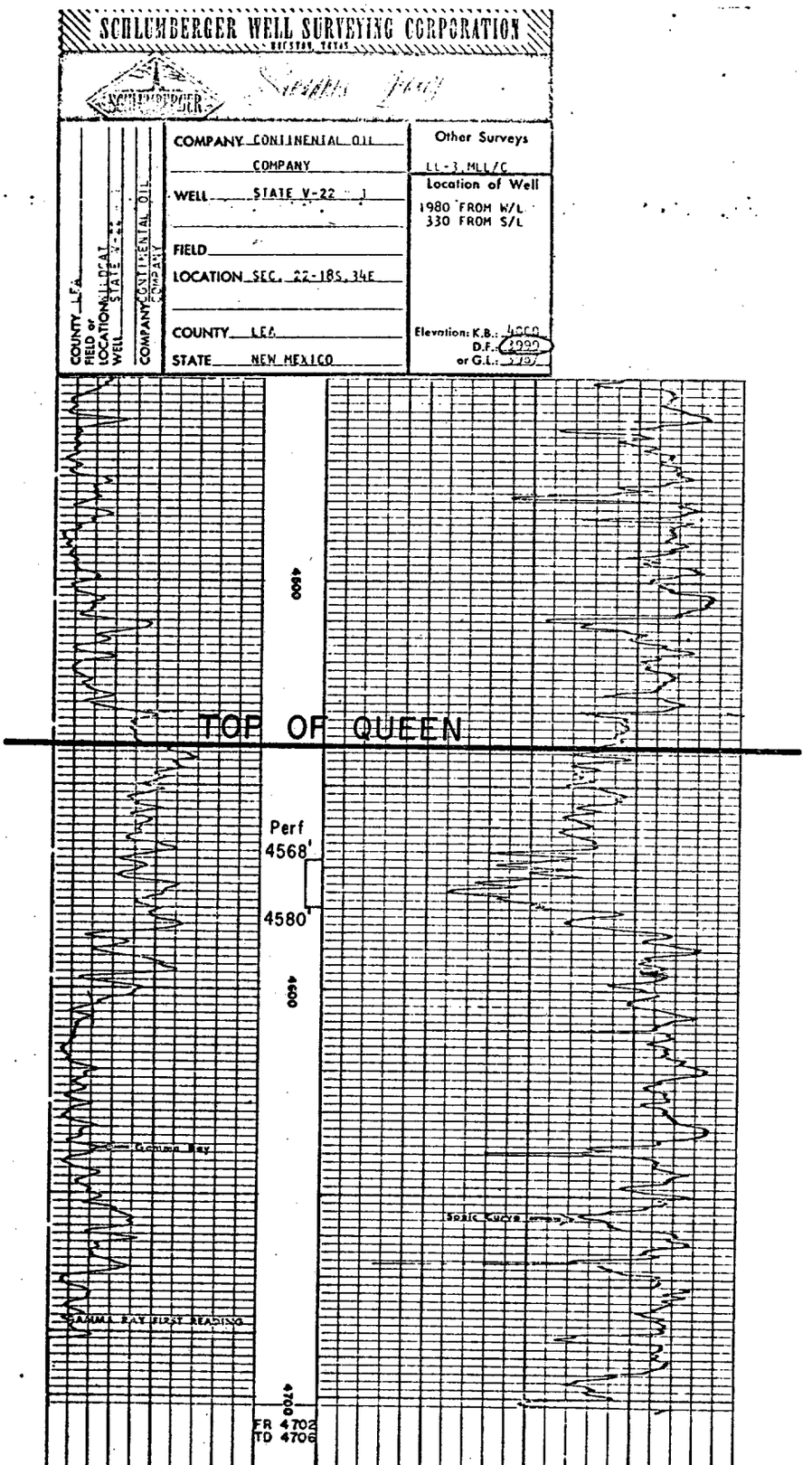
PROPOSED PROCEDURE

1. Pull rods and pump. Tag bottom with tubing and tally out. (Electronically inspect tubing on rack) Clean out any fill found above 4590' to 4600'.
2. Run 2 3/8" OD EUE cement-lined tubing with ret. packer to be set at ± 4540'
3. Hook-up well for injection.

11-19-69

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 5
CASE NO. 4282-4283

Exhibit No. 5



BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 6
CASE NO. 4282-4283

Exhibit No. 6

SCHLUMBERGER WELL SURVEYING CORPORATION

HOUSTON, TEXAS

SCHLUMBERGER

Scale Log

COMPANY CONTINENTAL OIL COMPANY

WELL STATE X-22 2

FIELD QUEEN

LOCATION SEC. 22-18S-34E

COUNTY LEA

STATE NEW MEXICO

Other Surveys

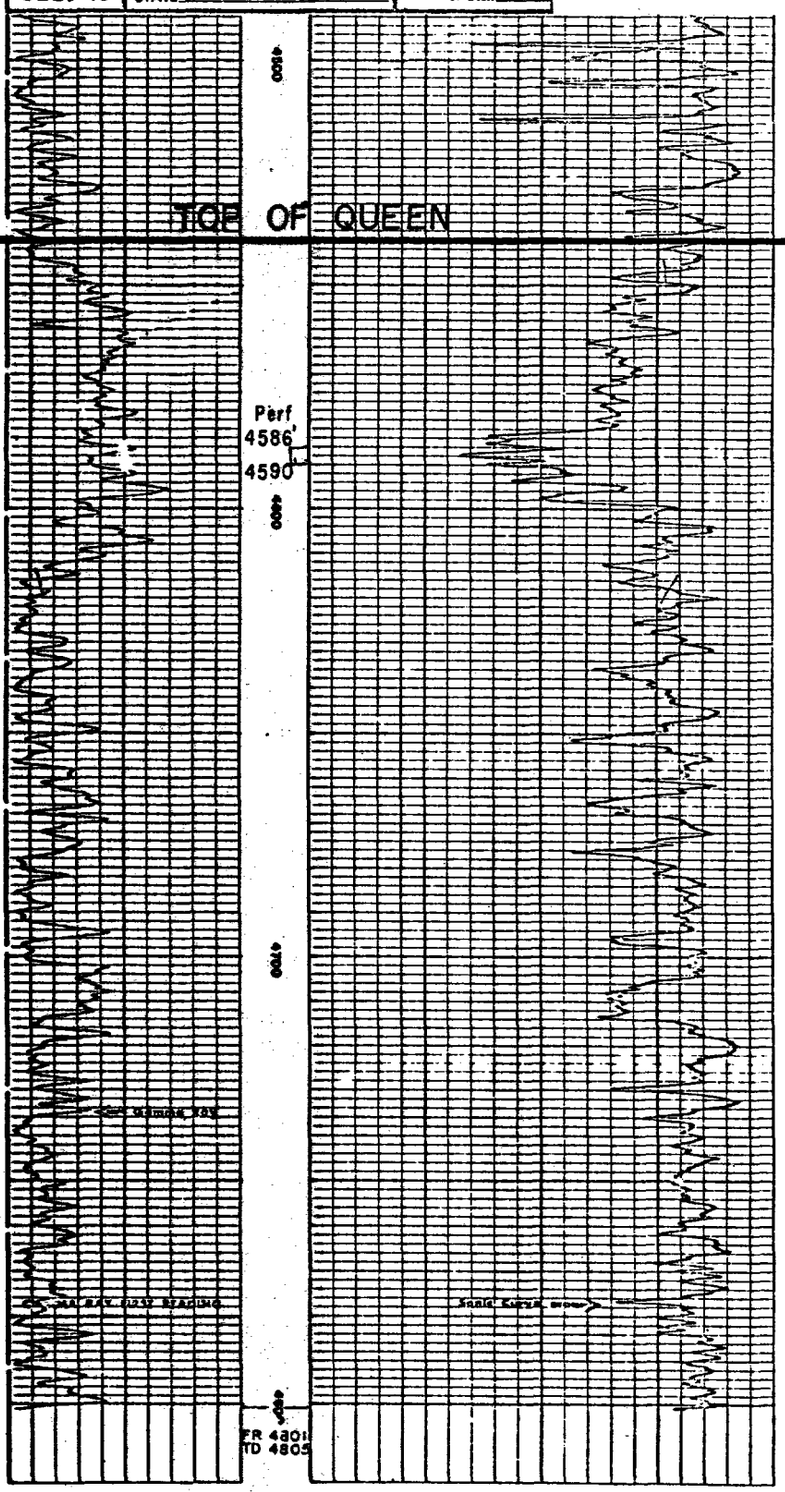
LL

Location of Well

660' FROM S/L
660' FROM E/L

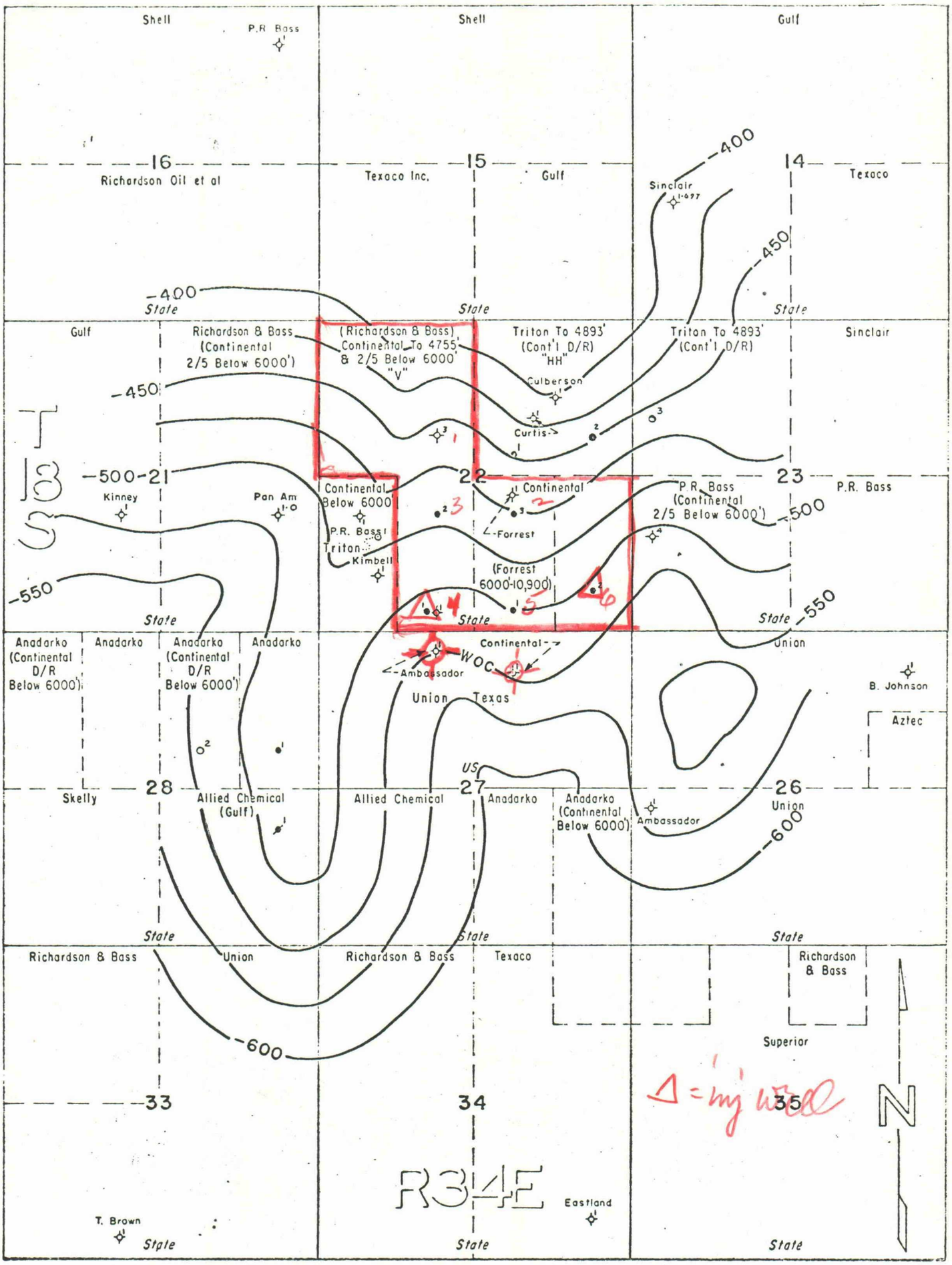
Elevation: K.B. 4014.5
D.F. 4013
or G.L. 4002.5

COUNTY LEA
FIELD or LOCATION ANTELOPE QUEEN
WELL STATE X 22 2
COMPANY CONTINENTAL OIL COMPANY



BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 7
1.4282-4283

Exhibit No. 7



CONTINENTAL OIL COMPANY

PRODUCTION DEPARTMENT — HOBBS DIVISION

EAST E-K QUEEN POOL

LEA COUNTY, NEW MEXICO

QUEEN STRUCTURE MAP

CONTOUR INTERVAL: 25'

SCALE 0 1000 2000

BTN 11-12-68

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 8
CASE NO. 4282 - 4289

Exhibit No. 8

EAST E-K UNIT

SECONDARY RESERVE CALCULATIONS

Connate Water Saturation (Log & Core Analysis)	29%
Initial Formation Volume Factor (Estimated)	1.25
Assumed Formation Volume Factor as of July 1, 1969	1.1
Reservoir Volume	2973 acre ft.
Floodable Volume	2195 acre ft.
Porosity	14.7%
Volumetric Sweep Efficiency (Assumed)	75%
Residual Oil Saturation After Flooding (Core Analysis)	20%

Estimate of Original Oil in Place

$$N = \frac{7758\ (2973)\ (.147)\ (1-.29)}{1.25}$$

1.925 million BO

Reservoir Oil Saturation as of July 1, 1969 (356,750 cum. prod.)

$$So = \left(1-\frac{356,750}{1.925}\right)\frac{1.1}{1.25}\ (1-.29) =$$

50.9%

Recoverable Reserves by Initiating Water Injection July 1, 1969

$$= \frac{7758\ (2195)\ (.147)\ (.509-.2)\ .75}{1.1} =$$

524,000 BO

Remaining Primary Reserves as of July 1, 1969

= 425,750-356,750 = 69,000 BO

Secondary Reserves

= 524,000-69,000 = 455,000 BO

PRODUCTION DATA FOR OCTOBER

Well No.	Oil	Water	Gas
2	446	0	196
3	601	156	196
4	89	267	196
5	312	134	262
6	Shut in.		

EXHIBIT NO. 9