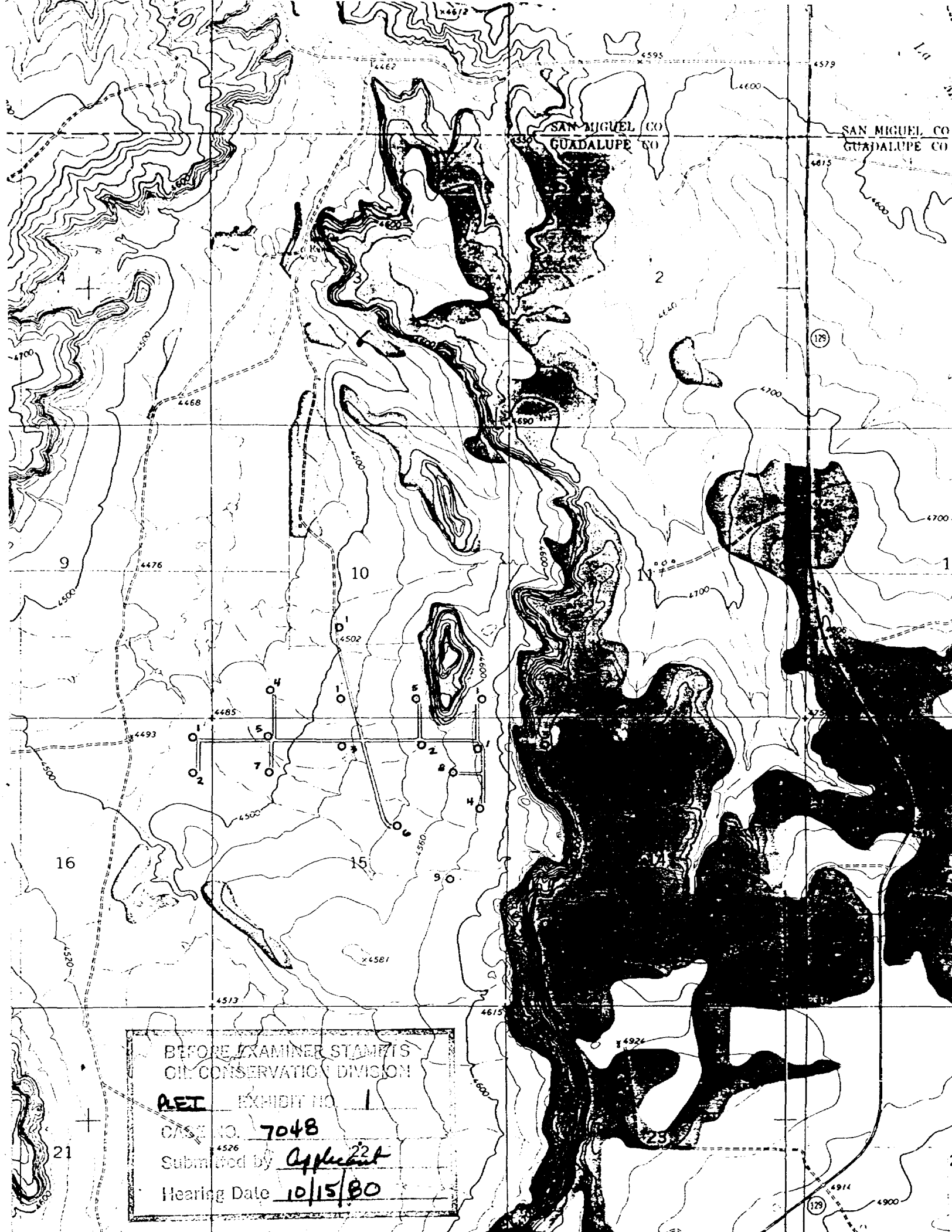


CASE NO.

7048

APPLICATION,
TRANSCRIPTS,
SMALL EXHIBITS,

ETC.



TYPE MAP	Topographic		
AREA	Portions of USGS Neafus Ranch, N. & Ortega Tank Maps		
HORIZON	Contoured on surface topography		
C.I.	20 feet	SCALE	1:24,000 (1" = 2000')
COUNTY	Guadalupe	STATE	New Mexico
DATE	October, 1980	Map shows wells drilled by PLEI.	

INJECTION WELL

Public Lands Exploration Co., Inc.

State No. 11 Well

Location: ~~353~~ FNL & 672 FEL

Section 15, T-11-N, R-25-E

Cement 16 sx. and circulate

Inhibited Water

39 ft. J-55 Csg.
8 5/8" 24#

390 ft. 2 3/8" J-55 Tbg.

380 ft. Packer
Baker Model HB-1
Single Grip

409 ft.

Perforations

460 ft.

Cement 150 sx. and circulate

510 ft. K-55 Csg.
4 1/2" 10.5#

TD 510'

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION

EXHIBIT NO. 5A

CASE NO. 7048

Submitted by Applicant

Hearing Date 10/15/80

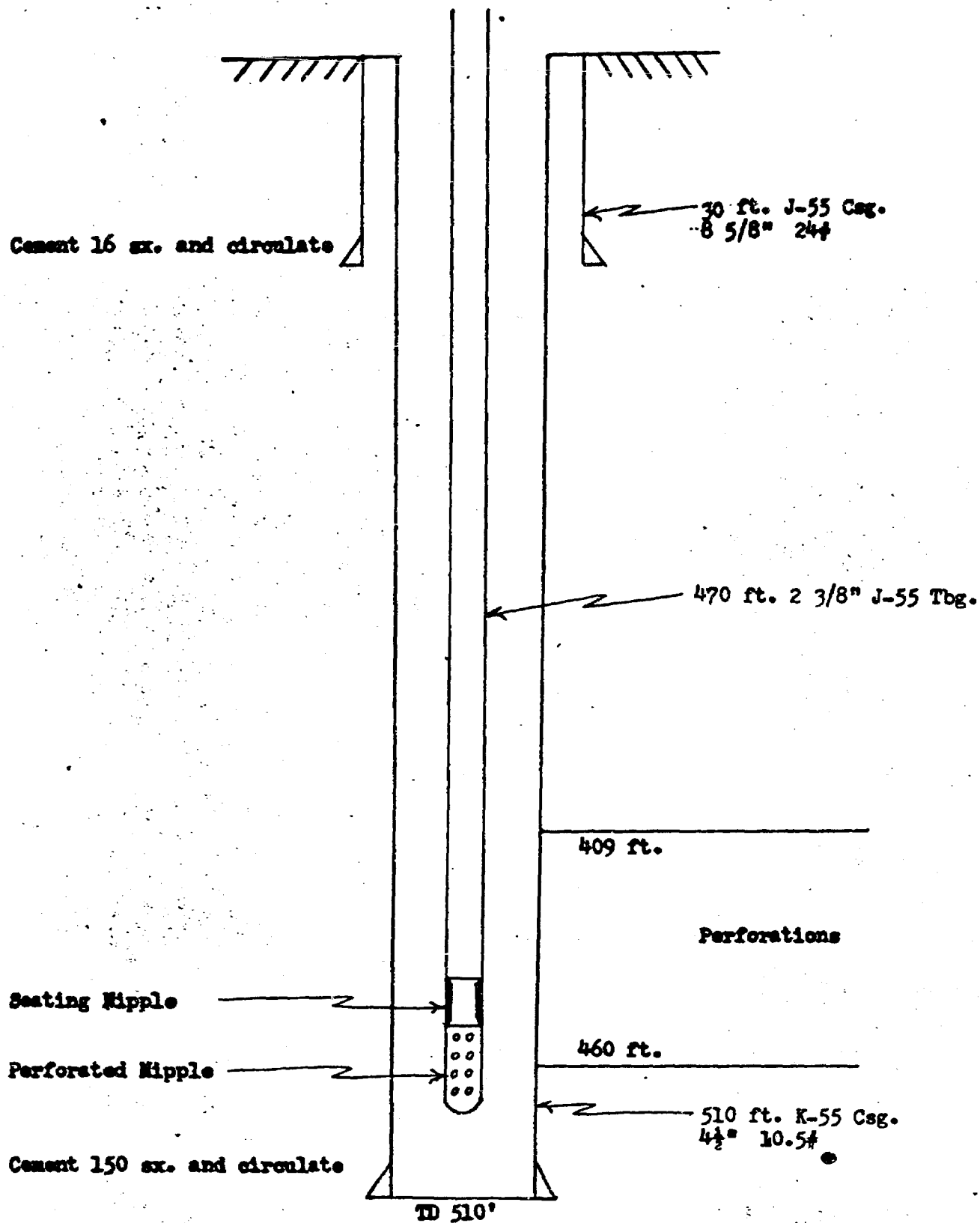
PROPOSED PRODUCER

Public Lands Exploration Co., Inc.

State No. 10 Well

Location: 353 FNL & 672 FEL

Section 15, T-11-N, R-25-E



PROPOSED PRODUCER

Public Lands Exploration Co., Inc.

State No. 12 Well

Location: 519 FNL & 832 FEL

Section 15, T-11-N, R-25-E

Cement 16 in. and circulate

30 ft. J-55 Csg.
8 5/8" 244

470 ft. 2 3/8" J-55 Tbg.

409 ft.

Perforations

Seating Nipple

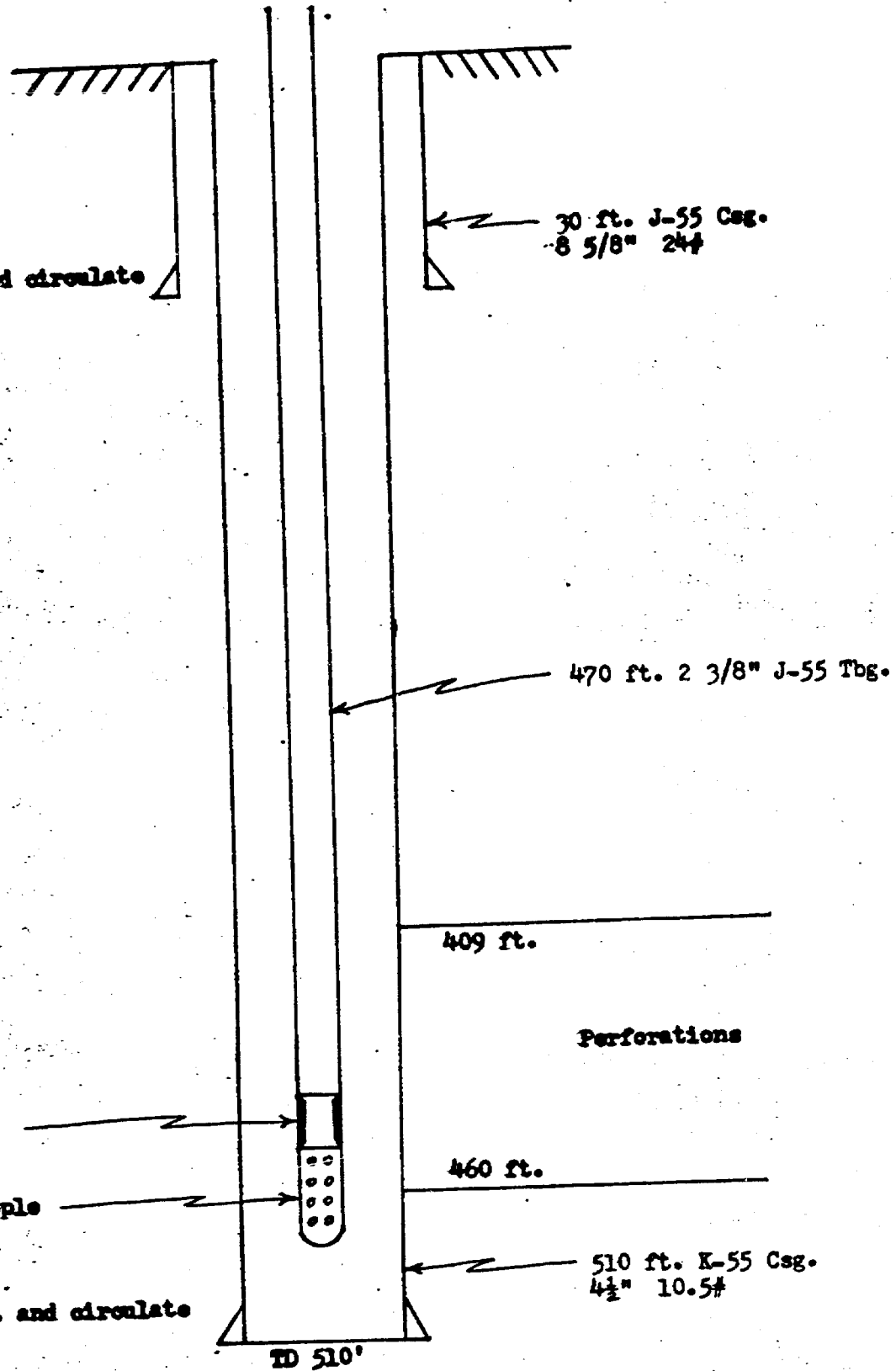
Perforated Nipple

460 ft.

Cement 150 in. and circulate

510 ft. K-55 Csg.
4 1/2" 10.5#

TD 510'



RE-ENTRY

Public Lands Exploration Co., Inc.

State No. 13 Well

Location: 519 FNL & 506 FEL

Section 15, T-11-N, R-25-E

Concent 16 ex. and circulate

Seating Nipple

Perforated Nipple

Concent 150 ex. and circulate

30 ft. J-55 Csg.
8 5/8" 24#

470 ft. 2 3/8" J-55 Tbg.

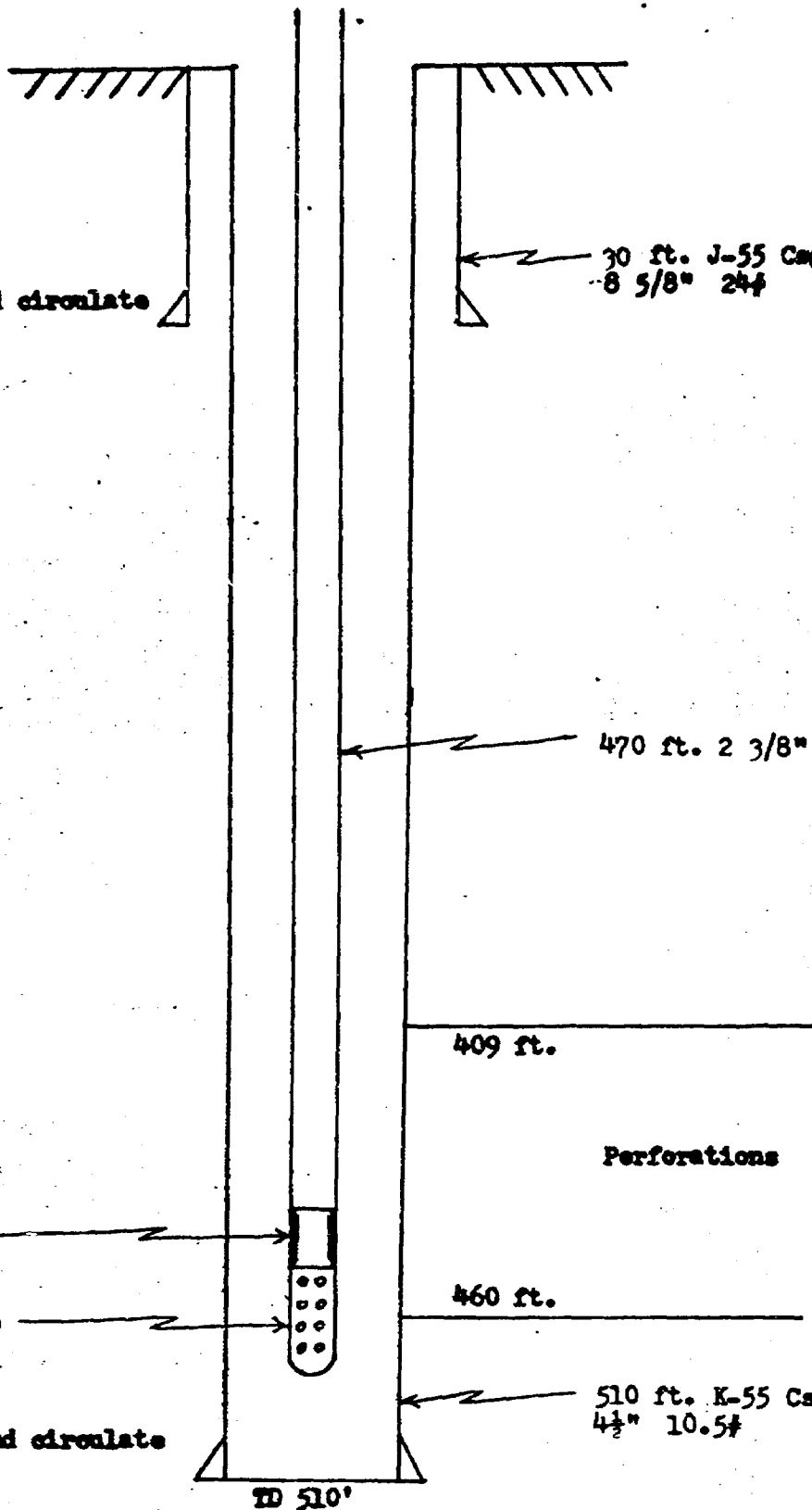
409 ft.

Perforations

460 ft.

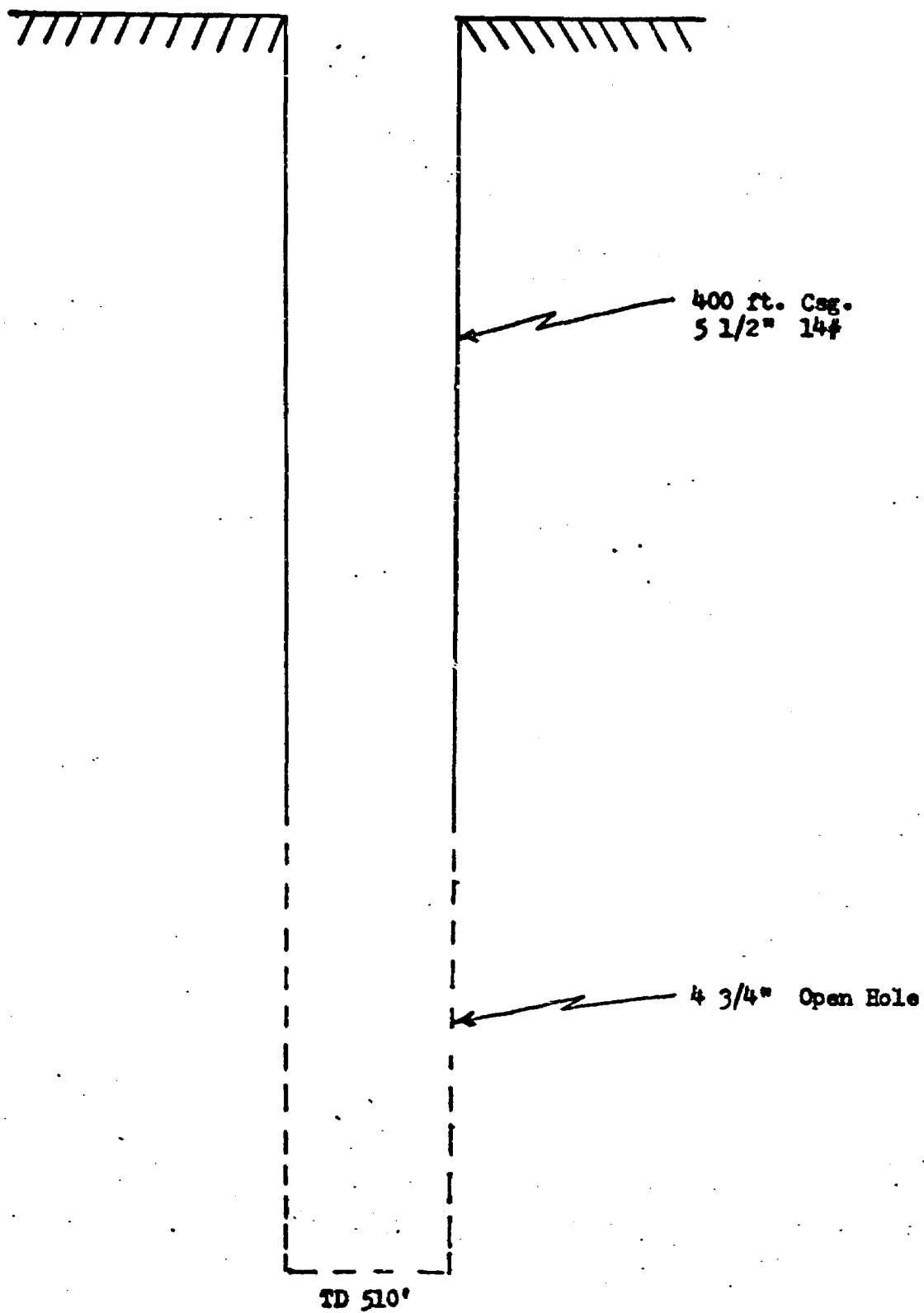
510 ft. K-55 Csg.
4 1/2" 10.5#

TD 510'



Public Lands Exploration Co., Inc.
State #14 Well

Location: 679 FNL & 672 FEL
Section 15, T-11-N, R-25-E



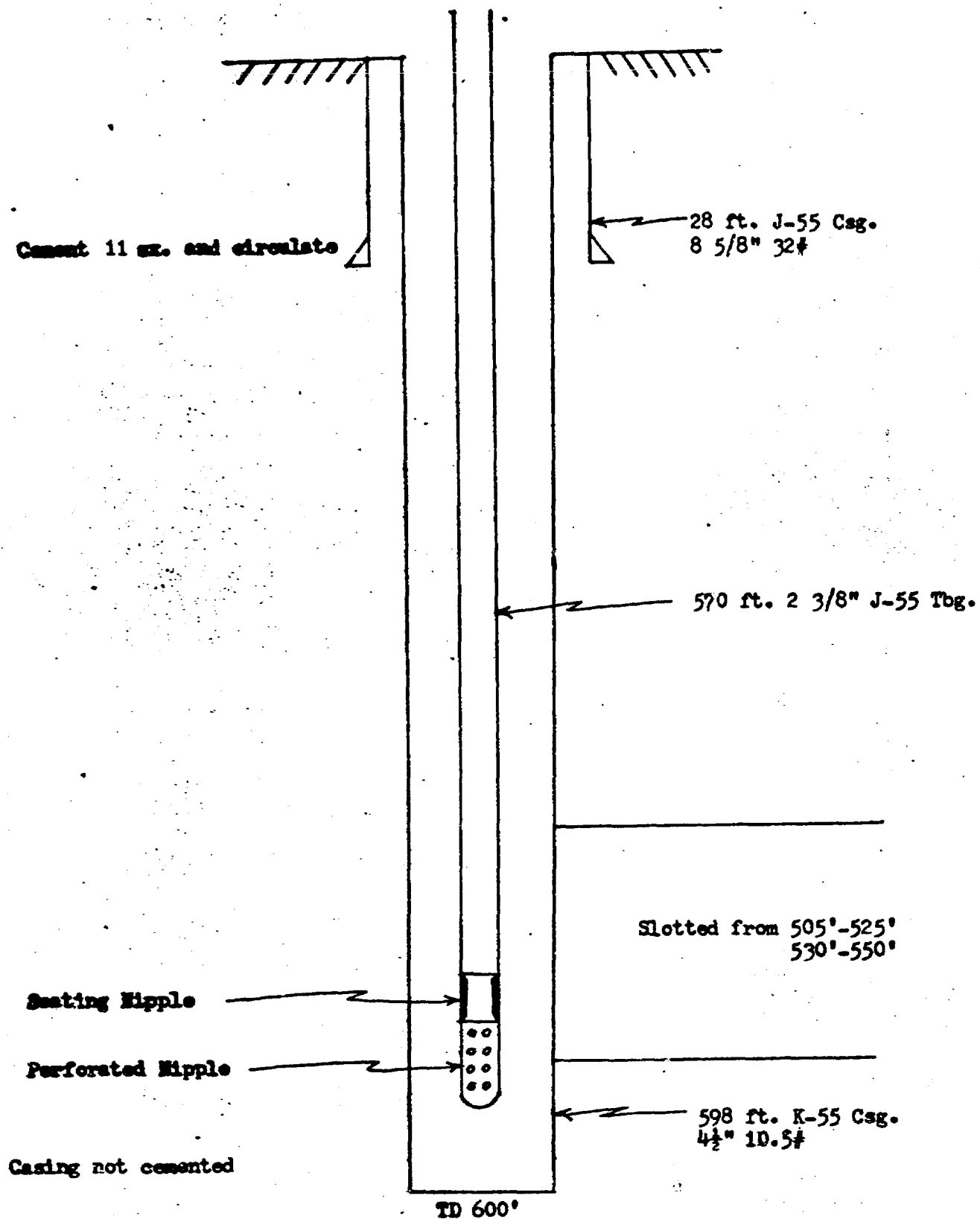
WATER SOURCE WELL

Public Lands Exploration Co., Inc.

State No. 4 Well

Location: 1650 FNL & 500 FEL

Section 15, T-11-N, R-25-E



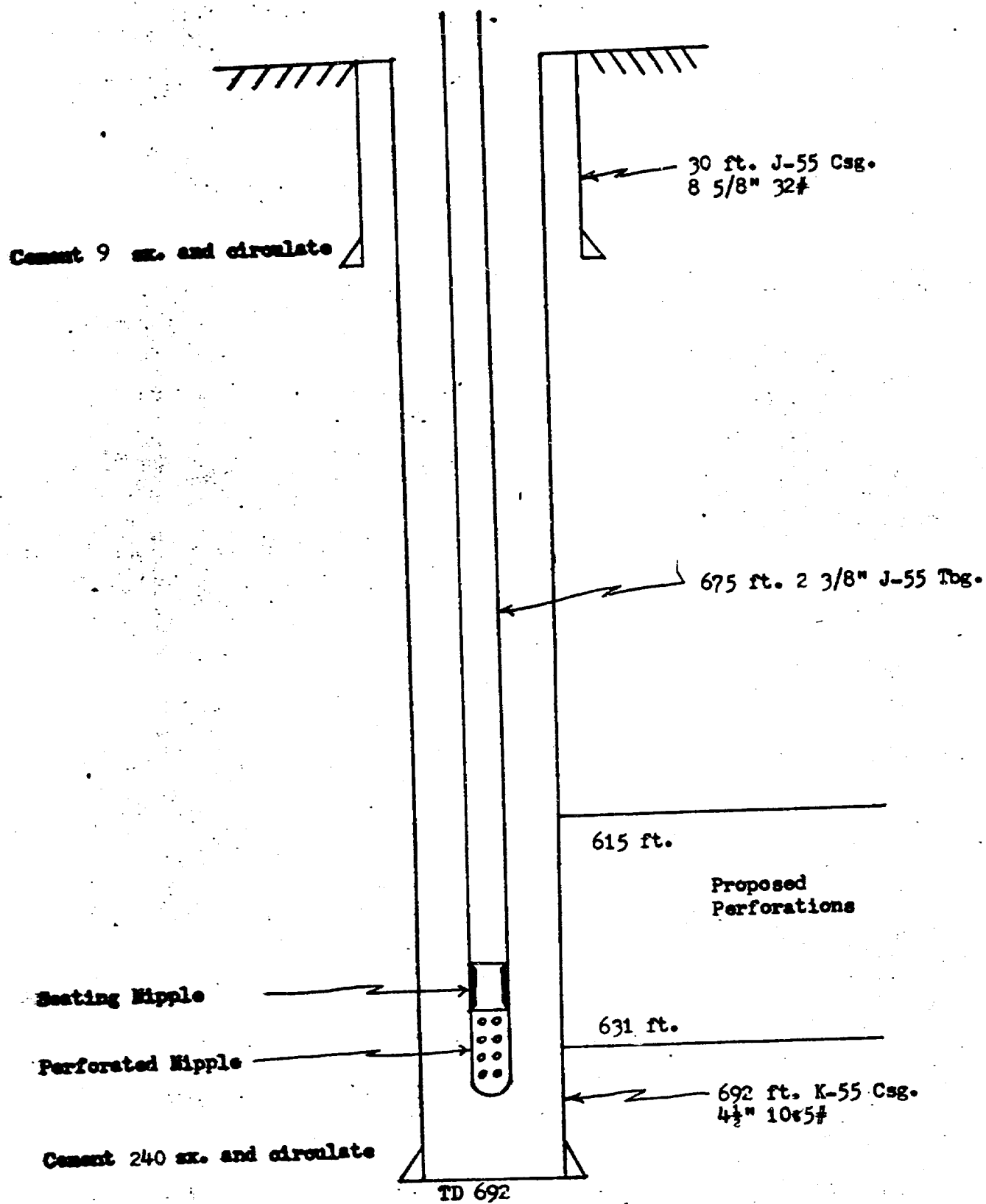
WATER SOURCE WELL

Public Lands Exploration Co., Inc.

Roberts No. 1 Well

Location: 330 FSL & 500 FEL

Section 10, T-11-N, R-25-E



PRODUCER

Public Lands Exploration Co., Inc.
State No. 3 Well
Location: 500' FNL & 2310' FWL
Section 15, T-11-N, R-25-E

Cement 10 sx and circulated

30 ft. J-55 Csg.
8 5/8" 32#

396 ft. 2 3/8" J-55 Tbg.

334 ft.

Proposed
Perforations

Seating Nipple

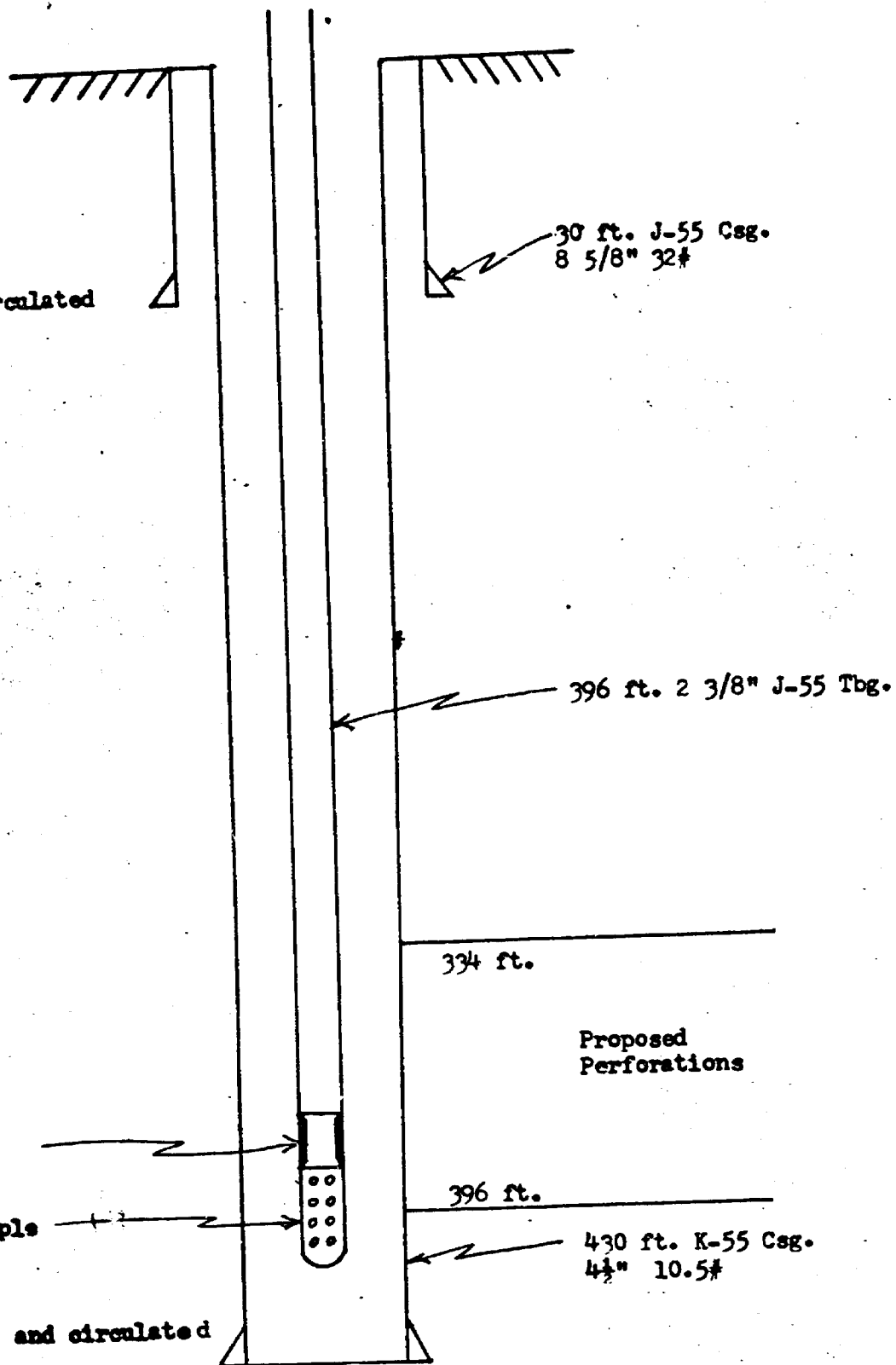
Perforated Nipple

396 ft.

430 ft. K-55 Csg.
4 1/2" 10.5#

Cement 150 sx. and circulated

TD 431'



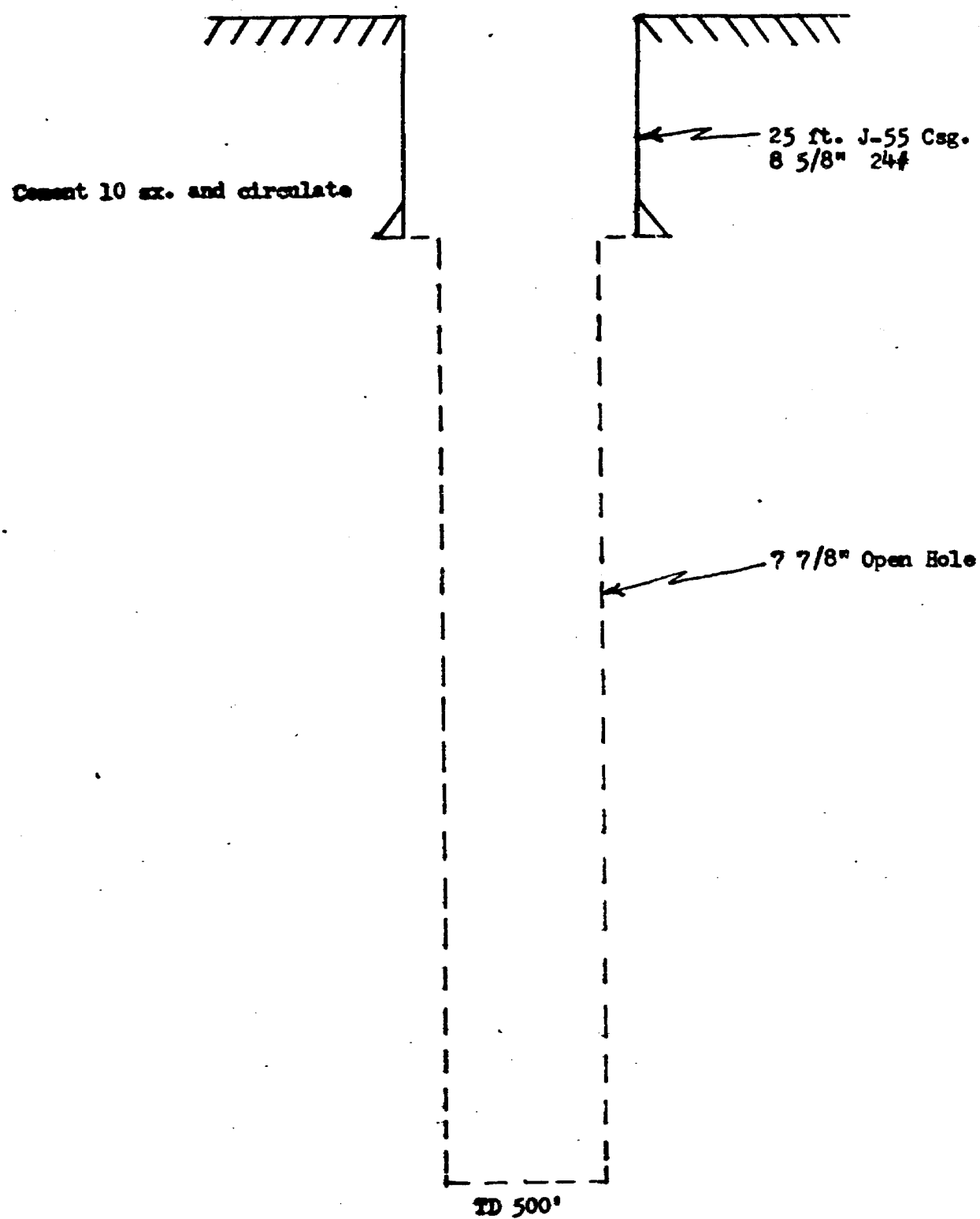
PROBABLE PRODUCER

Public Lands Exploration Co., Inc.

State No. 8 Well

Location: 1650 FNL & 990 FEL

Section 15, T-11-N, R-25-E



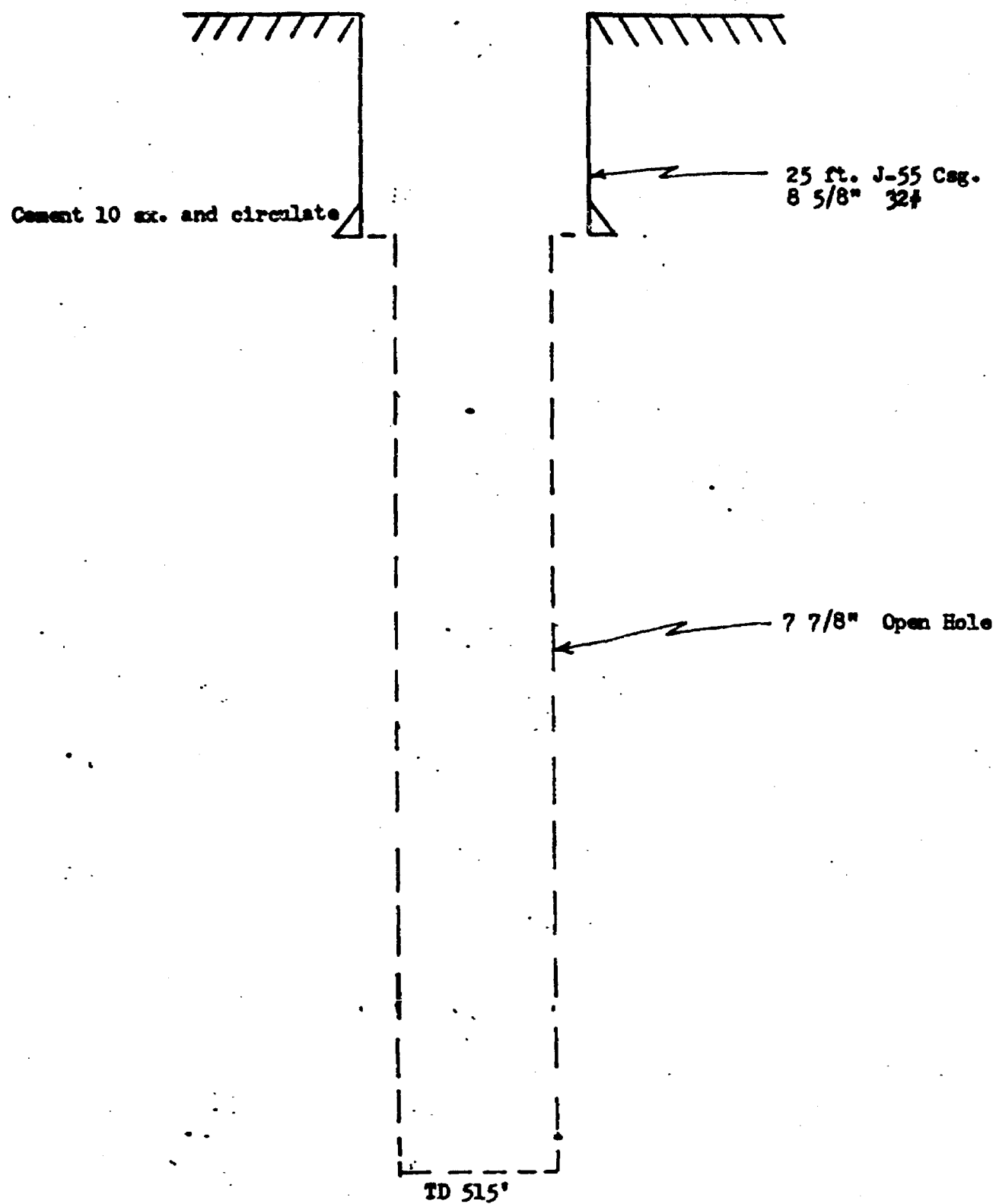
PROBABLE PRODUCER

Public Lands Exploration Co., Inc.

O'Connell No. 1 Well

Location: 330' FSL & 2310' FWL

Section 10, T-11-N, R-25-E



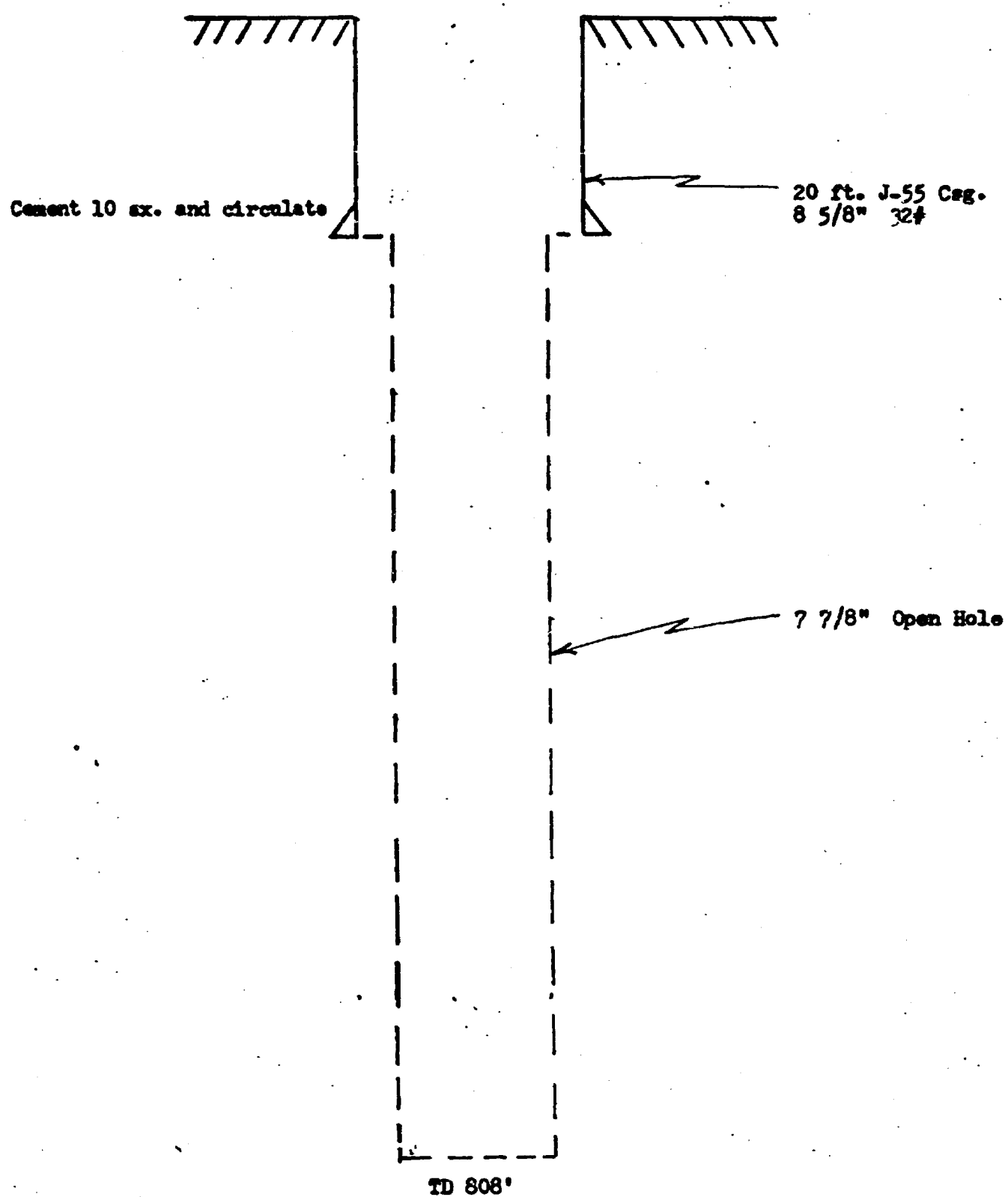
WELL TO BE PLUGGED

Public Lands Exploration Co., Inc.

O'Connell No. 3 Well

Location: 500' FNL & 660' FWL

Section 14, T-11-N, R-25-E



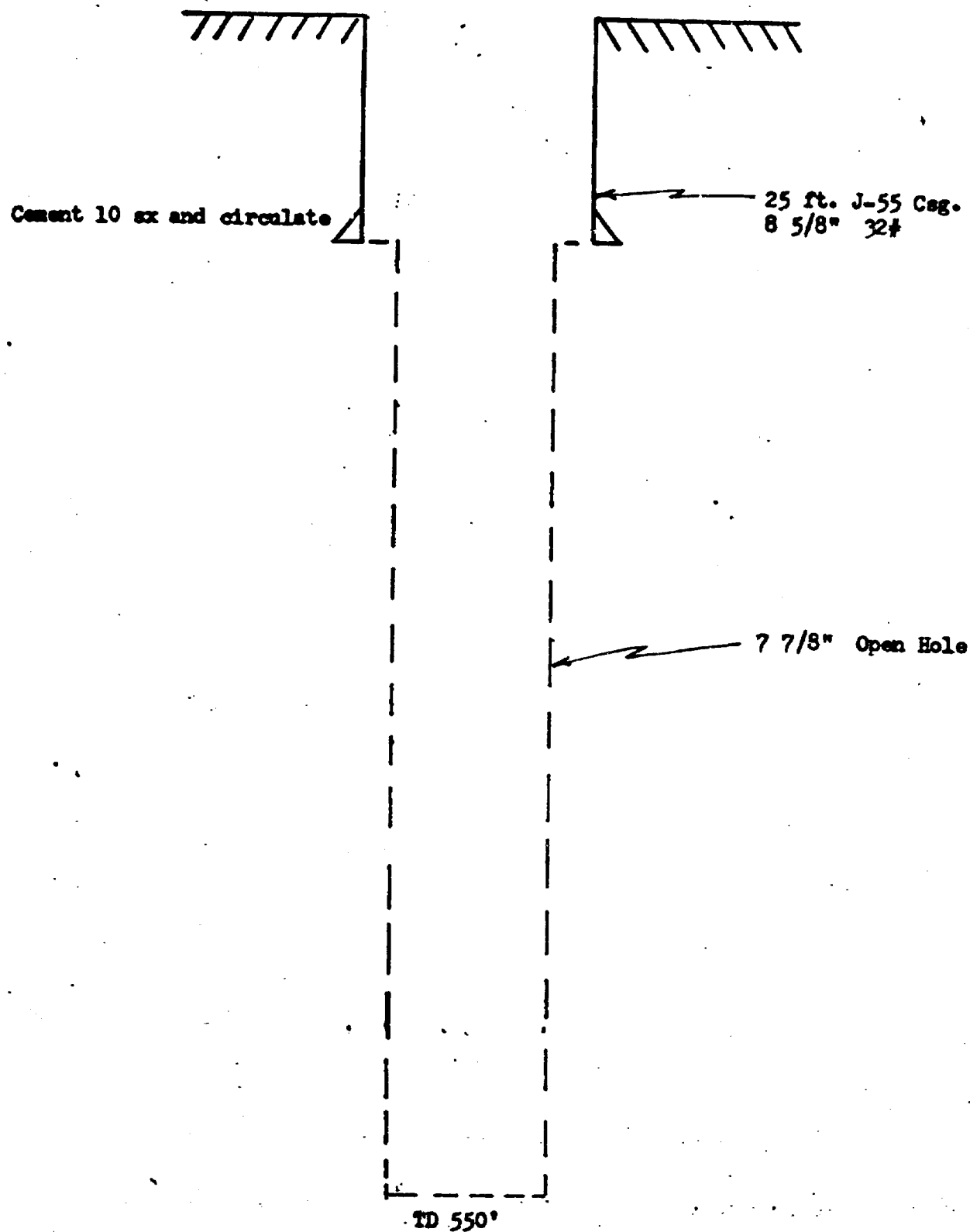
PROBABLE PRODUCER

Public Lands Exploration Co., Inc.

O'Connell No. 5 Well

Location: 330' FSL & 1650' FEL

Section 10, T-11-N, R-25-E



INJECTION WELL

Public Lands Exploration Co., Inc.

State No. 11 Well

Location: 353 FNL & 672 FEL

Section 15, T-11-N, R-25-E

511

Cement 16 sx. and circulate

39 ft. J-55 Csg.
8 5/8" 24#

Inhibited Water

390 ft. 2 3/8" J-55 Tbg.

380 ft. Packer
Baker Model HB-1
Single Grip

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION

EXHIBIT NO. 5A

CASE NO. 7048

Submitted by Applicant

Hearing Date 10/15/80

409 ft.

Perforations

460 ft.

Cement 150 sx. and circulate

510 ft. K-55 Csg.
4 1/2" 10.5#

TD 510'

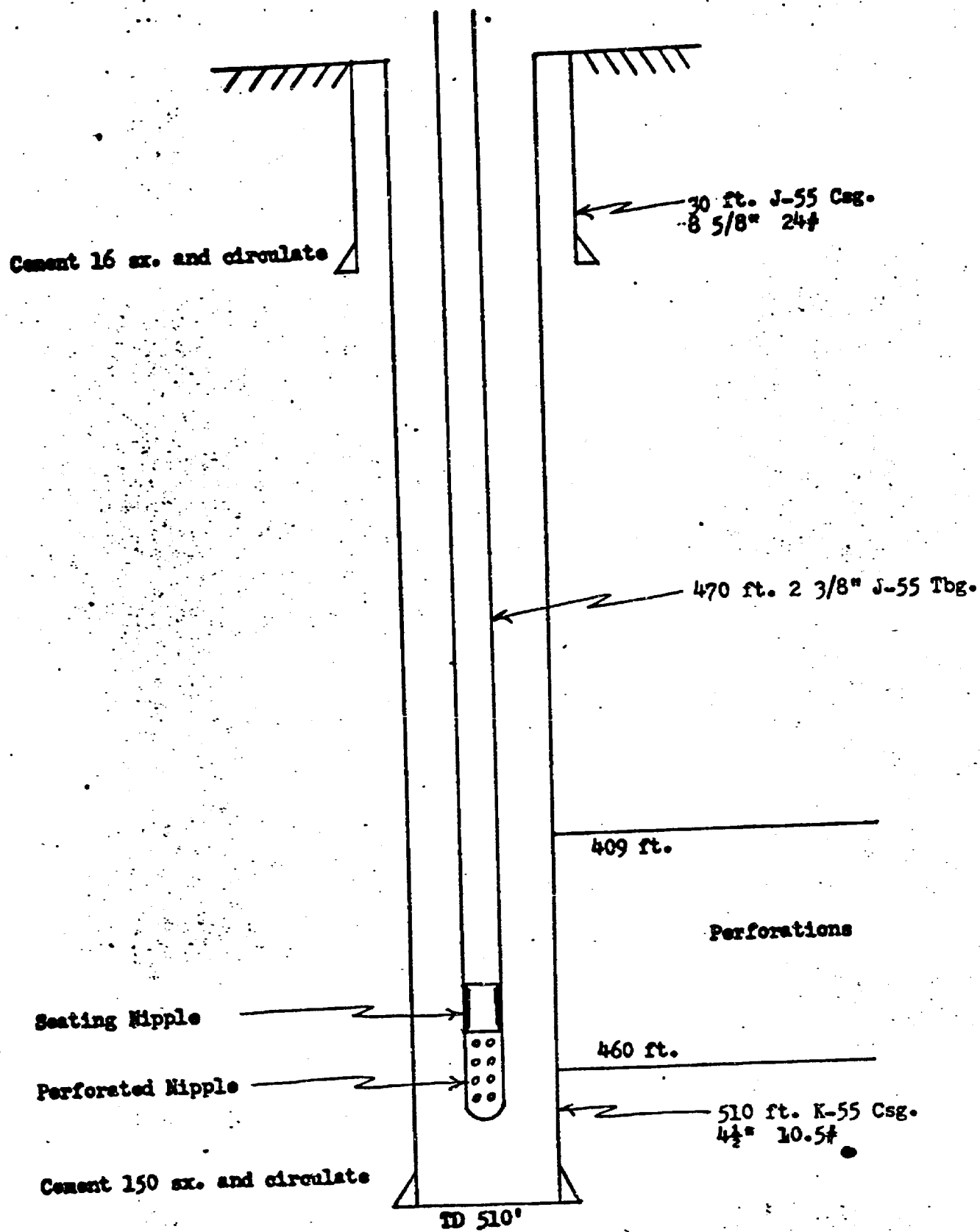
PROPOSED PRODUCER

Public Lands Exploration Co., Inc.

State No. 10 Well

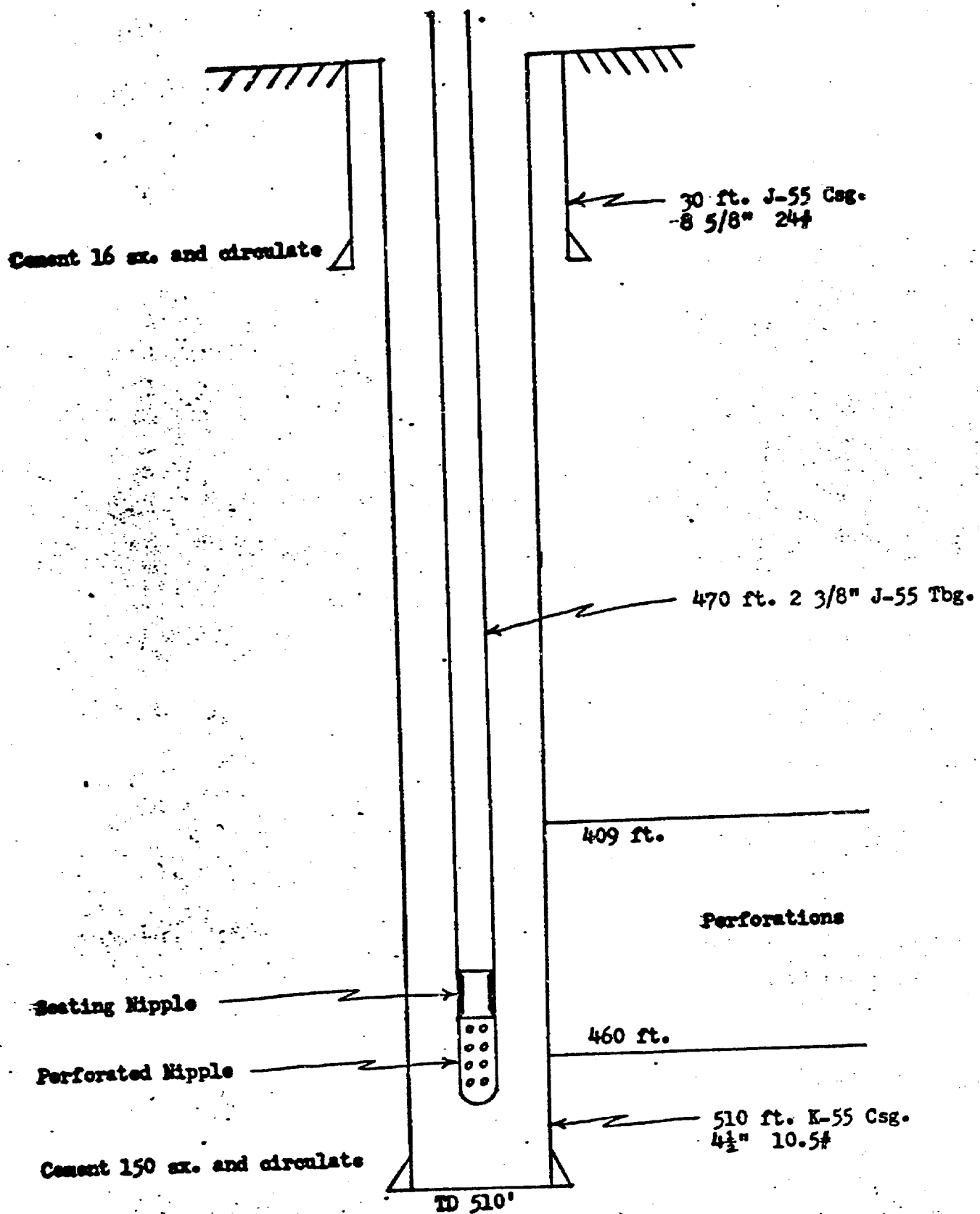
Location: 353 FNL & 672 FEL

Section 15, T-11-N, R-25-E



PROPOSED PRODUCER

Public Lands Exploration Co., Inc.
State No. 12 Well
Location: 519 FNL & 832 FEL
Section 15, T-11-N, R-25-E



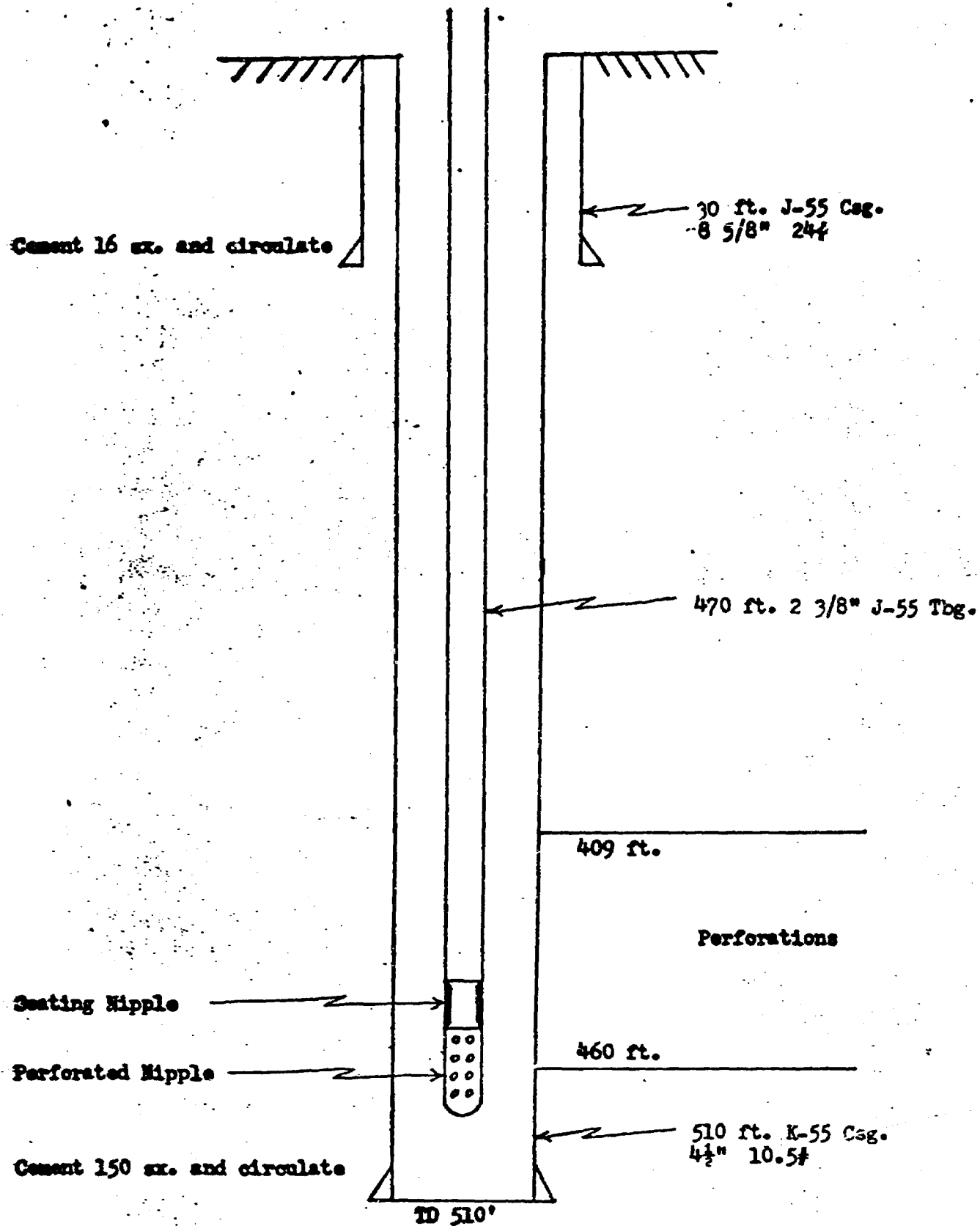
RE-ENTRY

Public Lands Exploration Co., Inc.

State No. 13 Well

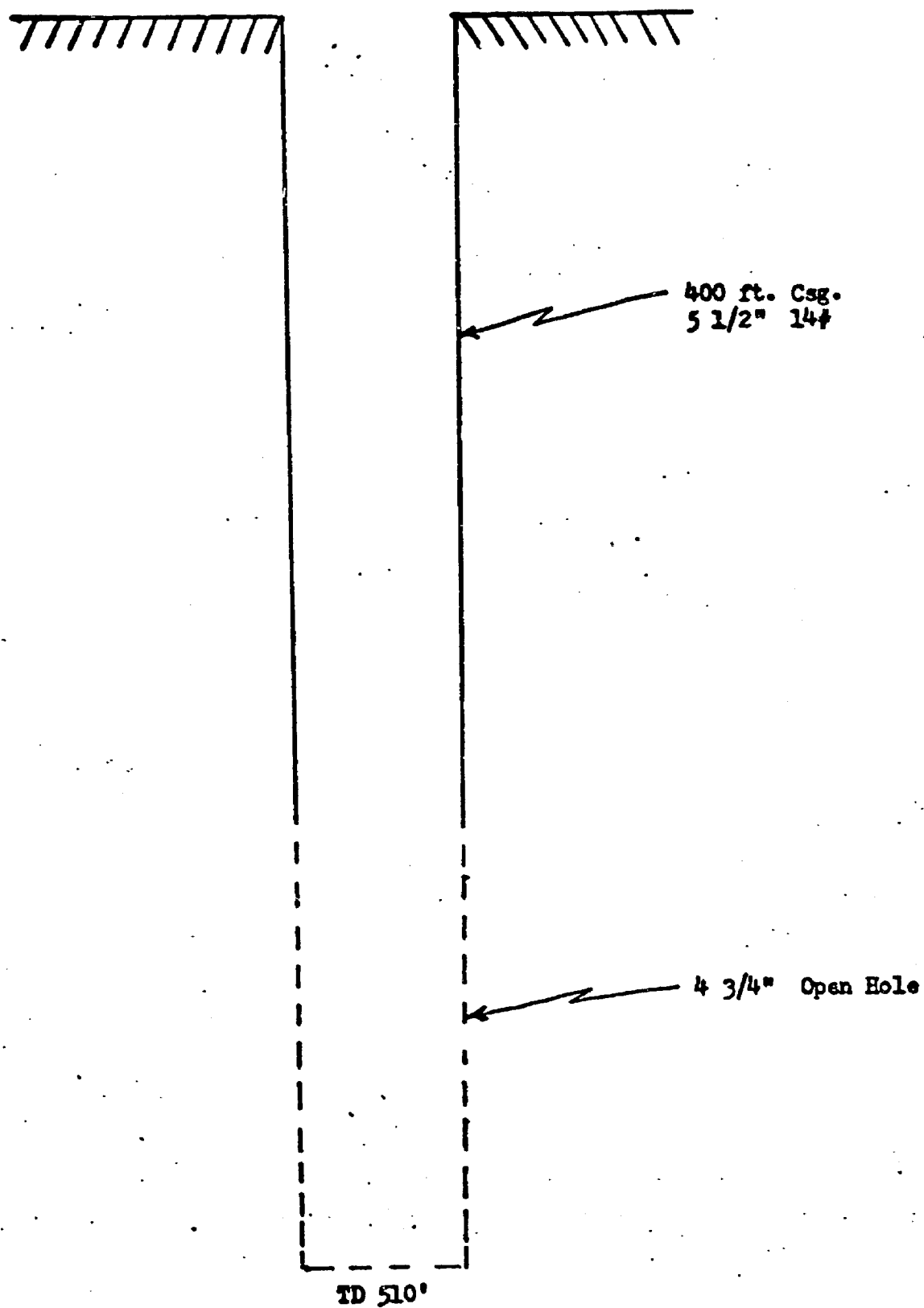
Location: 519 FNL & 506 FEL

Section 15, T-11-N, R-25-E



RE-ENTRY PRODUCER
Public Lands Exploration Co., Inc.
State #14 Well

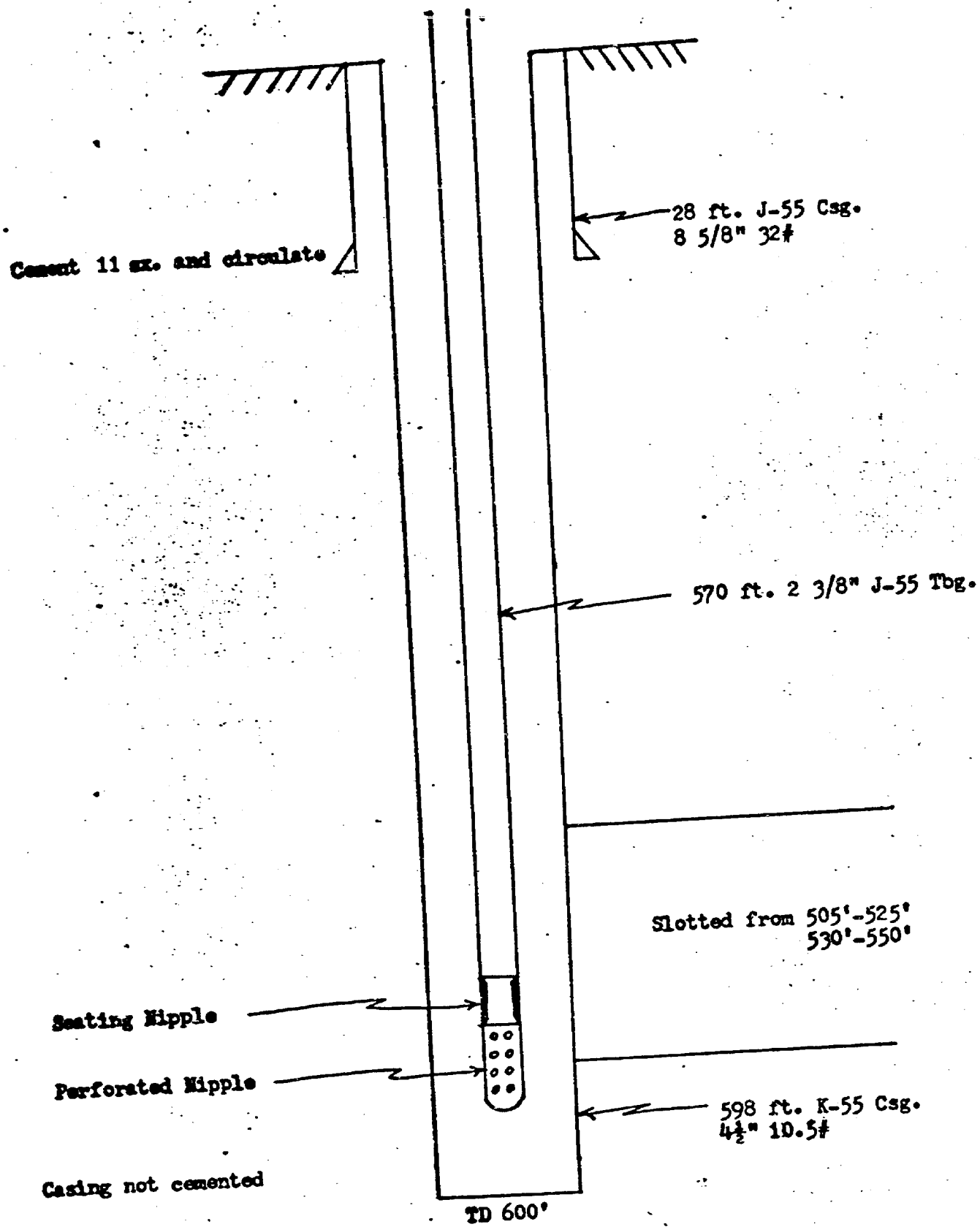
Location: 679 FNL & 672 FEL
Section 15, T-11-N, R-25-E



WATER SOURCE WELL

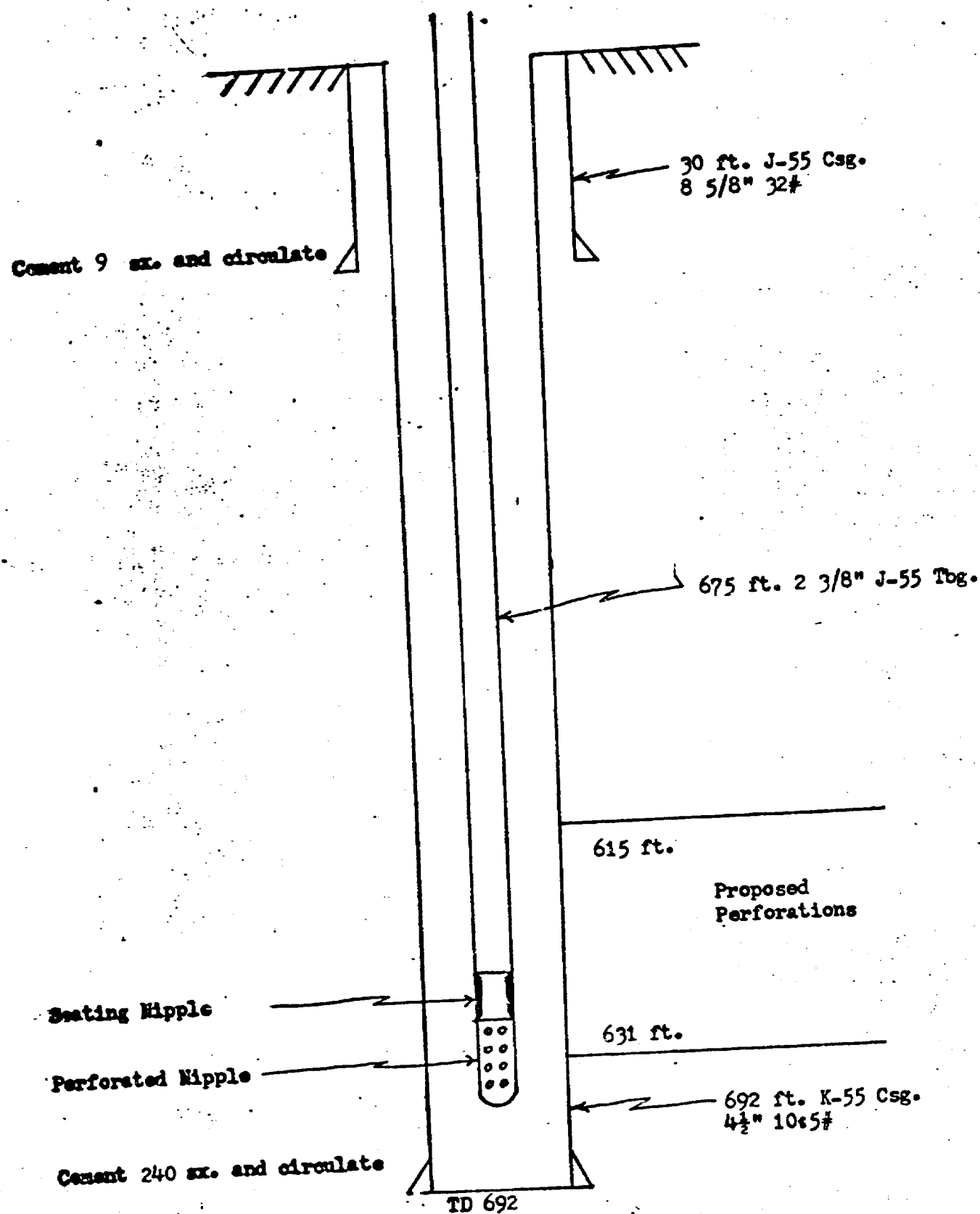
Public Lands Exploration Co., Inc.
State No. 4 Well

Location: 1650 FNL & 500 FEL
Section 15, T-11-N, R-25-E



WATER SOURCE WELL

Public Lands Exploration Co., Inc.
Roberts No. 1 Well
Location: 330 FSL & 500 FEL
Section 10, T-11-N, R-25-E



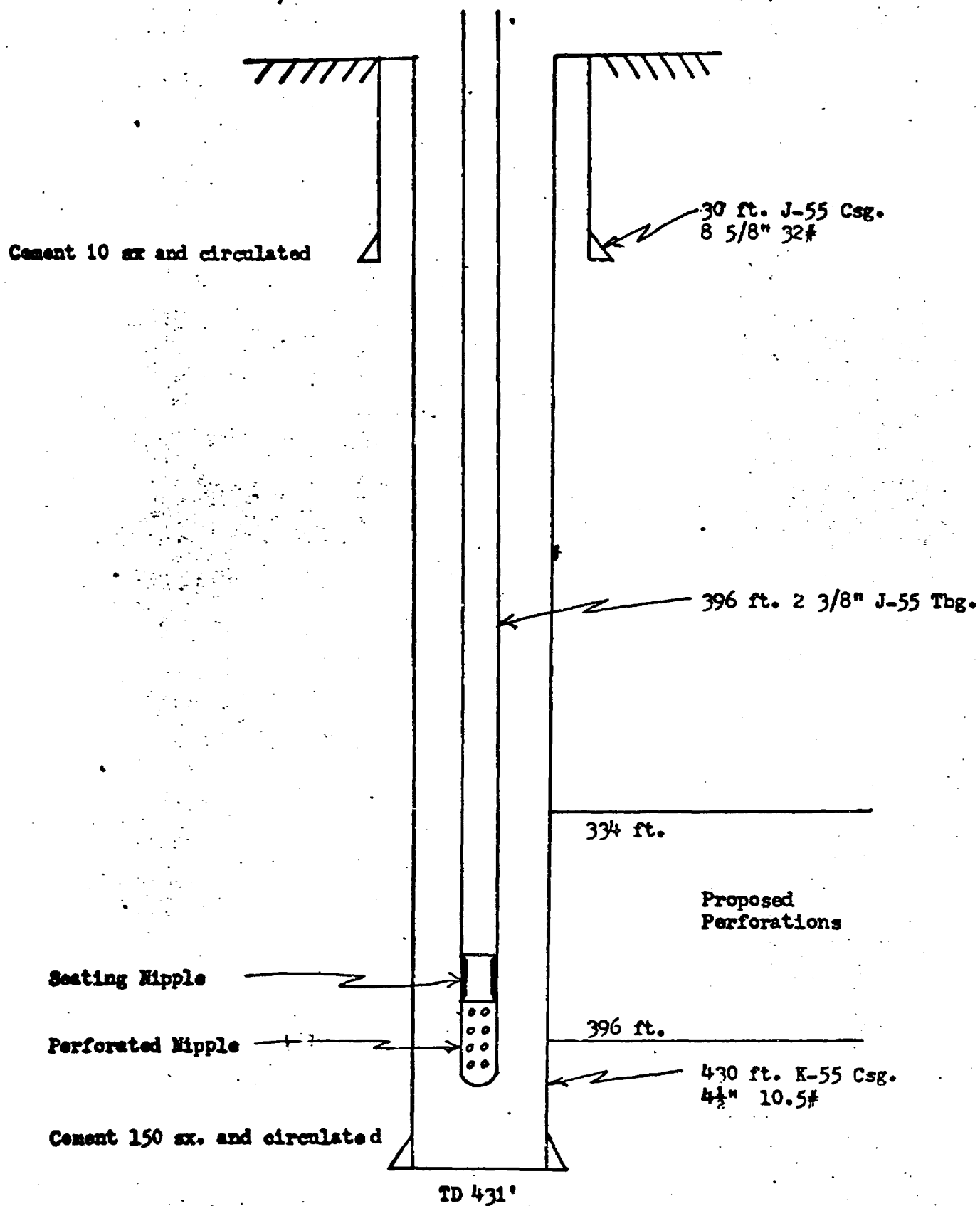
PRODUCER

Public Lands Exploration Co., Inc.

State No. 3 Well

Location: 500' FNL & 2310' FWL

Section 15, T-11-N, R-25-E



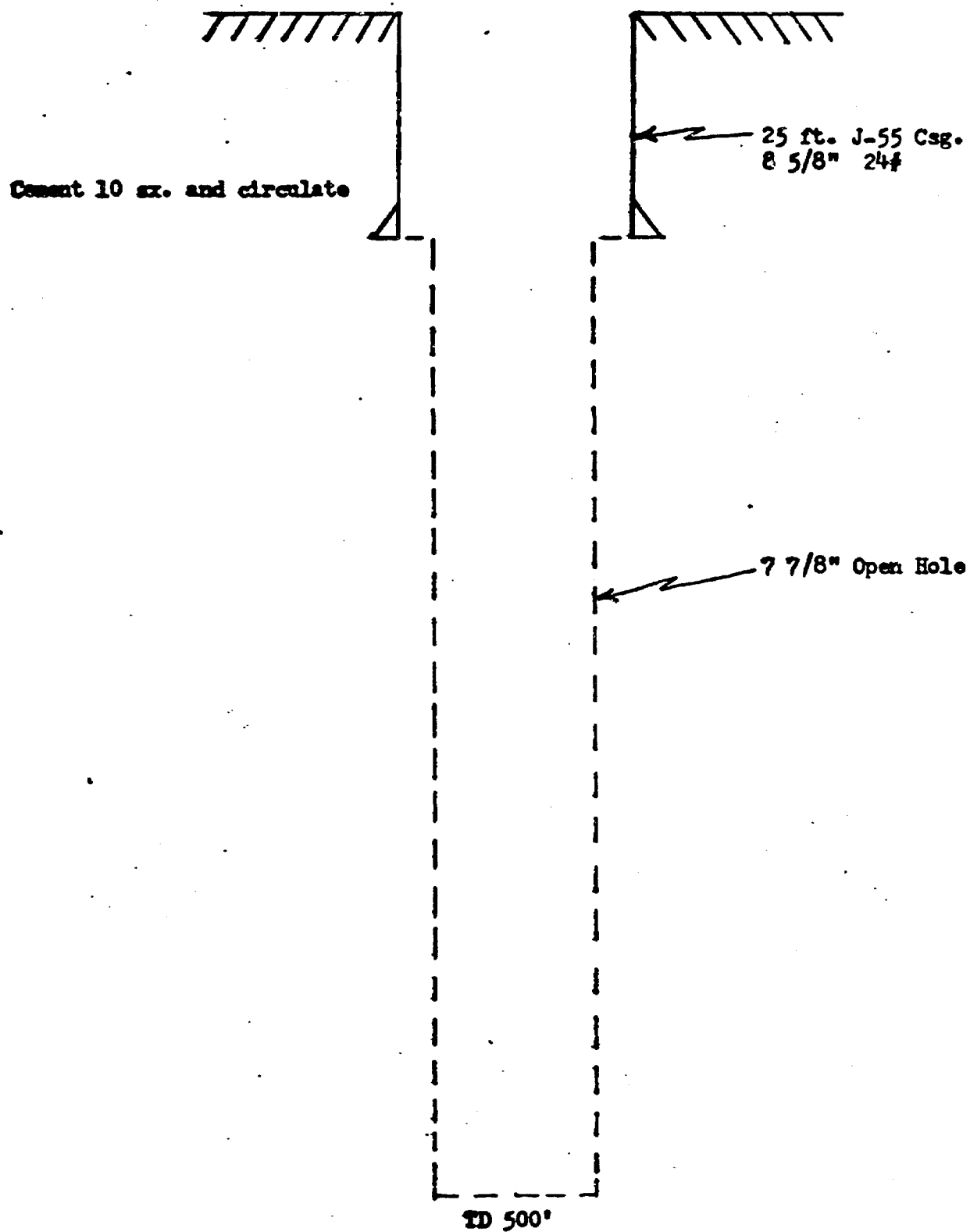
PROBABLE PRODUCER

Public Lands Exploration Co., Inc.

State No. 8 Well

Location: 1650 FNL & 990 FEL

Section 15, T-11-N, R-25-E



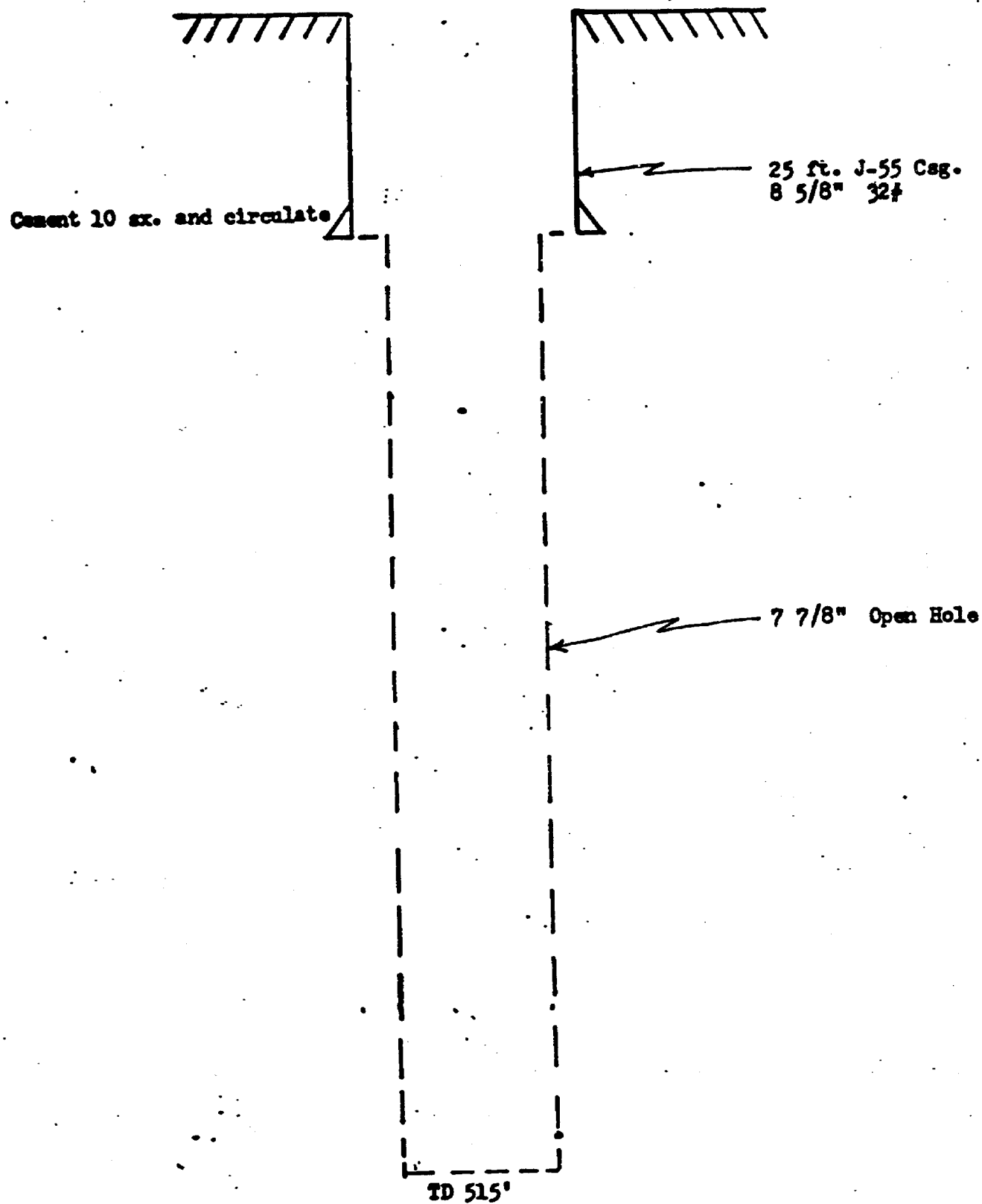
PROBABLE PRODUCER

Public Lands Exploration Co., Inc.

O'Connell No. 1 Well

Location: 330' FSL & 2310' FWL

Section 10, T-11-N, R-25-E



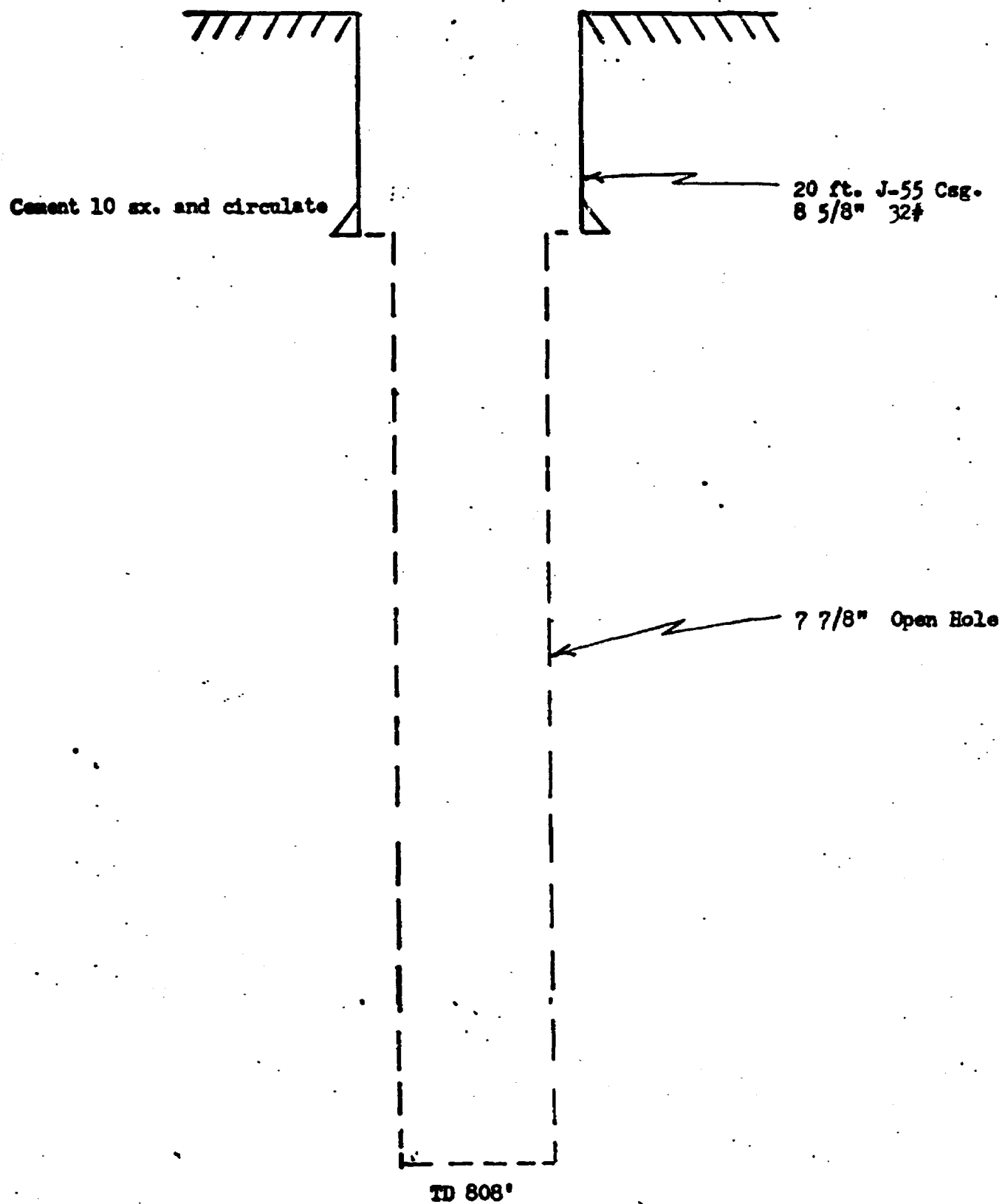
WELL TO BE PLUGGED

Public Lands Exploration Co., Inc.

O'Connell No. 3 Well

Location: 500' FNL & 660' FWL

Section 14, T-11-N, R-25-E



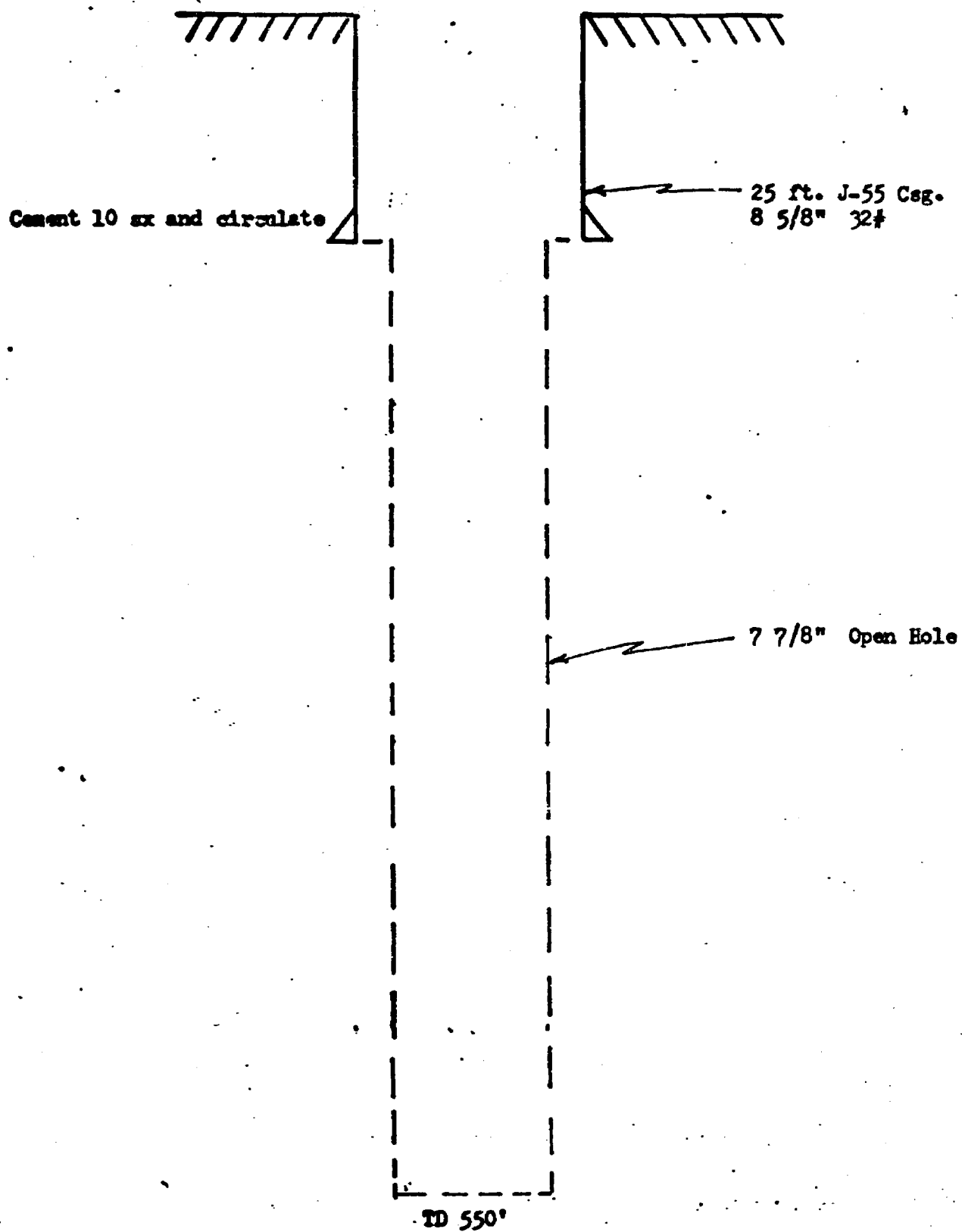
PROBABLE PRODUCER

Public Lands Exploration Co., Inc.

O'Connell No. 5 Well

Location: 330' FSL & 1650' FEL

Section 10, T-11-N, R-25-E



[illegible]

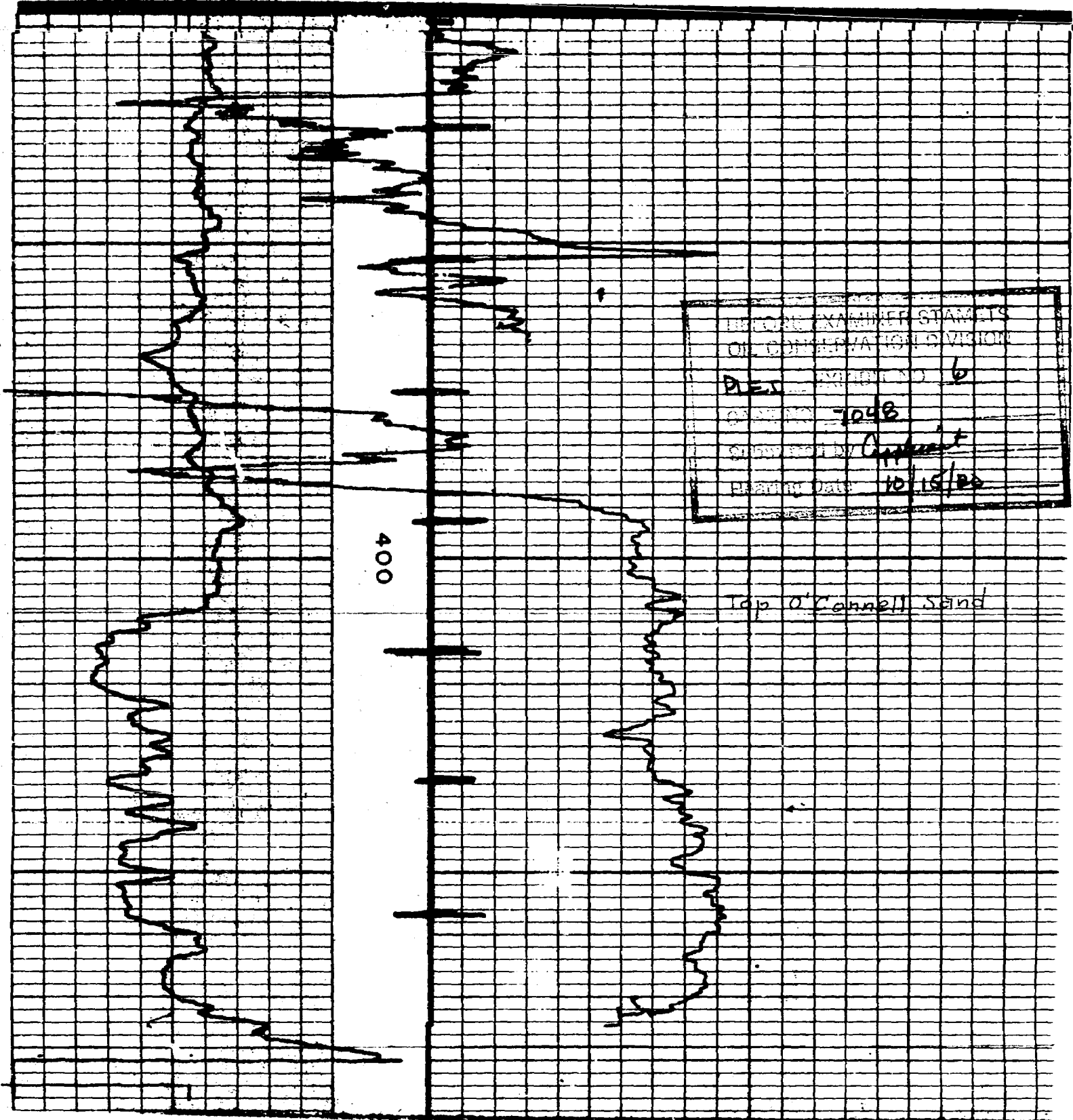
FOLD HERE !														
Remarks: _____										Equipment Used				
CN RUN ON SINGLE CONDUCTOR PCM SYSTEM										Series No.	2413	1309	2306	
										Run No.	ONE			
										S.O.				
										Tool No.	37678	41753		
										Elec. No.	37678	41753		
										Panel No.	29318	29318		
Gamma Ray					Equipment Data					Compensated Neutron				
Run No.	ONE				Run No.	ONE								
Tool Model No.	1309				Log Type	N/TN								
Diam.	3 5/8				Tool Model No.	2413								
Detect. Model No.	D7G2				Serial No.	37678								
Type	SCINT				Diam.	3 5/8								
Length	12"				Detect. Model SS	D6N3								
Dist. to N. Source	7'				Detect. Model LS	D6N3								
Computer Data					Source Model No.					S17S20				
					Serial No.					39278				
					Type					AM BE				
Logging Data														
General				Compensated Neutron							Gamma Ray			
Run No.	Depths		Speed Ft./Min.	T.C.		Sens.		Porosity			T.C. Sec.	Sens. Settings	Zero Div. L or R	API G.R. Units/Div.
	From	To		SS	LS	SS	LS	Zero	Units/Div	Scale				
1	SURF.	484	30	2	2	150	144	R-15	2	30-0	2	309	0	12.5

GAMMA RAY & CALIPER	DEPTH	POROSITY %
12.5 API/CD API UNITS		

0 125
HOLE SIZE - INCHES
6 16

5" = 100'
LR
SURF.

COMPENSATED NEUTRON POROSITY
LIMESTONE
30% 20% 10% 0%



HALLIBURTON DIVISION LABORATORY

HALLIBURTON SERVICES

MIDLAND DIVISION

HOBBS, NEW MEXICO 88240

LABORATORY WATER ANALYSIS

No. W80-603

To Public Lands Exploration CompanyDate 6-6-80

ATTN: Mr. Charles Joy

702 Hermosa Drive

Artesia, New Mexico

This report is the property of Halliburton Company and neither it nor any part thereof nor a copy thereof is to be published or disclosed without first securing the express written approval of laboratory management; it may however, be used in the course of regular business operations by any person or concern and employees thereof receiving such report from Halliburton Company.

Submitted by _____ Date Rec. _____

Well No. As Marked Depth _____ Formation _____

County _____ Field _____ Source _____

	State #3	State #4	Samedan State #1
Resistivity	1.90 @ 74°F.	2.78 @ 74°F.	4.21 @ 74°F.
Specific Gravity	1.004	1.003	1.002
pH	9.0	8.6	8.2
Calcium (Ca)	200	150	100 *MPL
Magnesium (Mg)	60	30	30
Chlorides (Cl)	700	300	150
Sulfates (SO ₄)	1,400	1,050	900
Bicarbonates (HCO ₃)	1,600	2,450	3,650
Soluble Iron (Fe)	Nil	Nil	Nil

Remarks:

BEFORE EXAMINER ST-15
OIL CONSERVATION DIVISION

PLEI EXHIBIT NO. 7CASE NO. 7048Submitted by ApplicantHearing Date 10/15/80

*Milligrams per liter

Respectfully submitted,

Analyst: Brewer

cc:

HALLIBURTON COMPANY

By W. L. Brewer

CHEMIST

NOTICE

THIS REPORT IS LIMITED TO THE DESCRIBED SAMPLE TESTED. ANY USER OF THIS REPORT AGREES THAT HALLIBURTON SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE, WHETHER IT BE TO ACT OR OMISSION, RESULTING FROM SUCH REPORT OR ITS USE.

PLEI 8

7048

Asphalt

10/15/80

RESERVOIR DATA

Project: O'Connell Ranch Field

Location: Guadalupe County, New Mexico

Producing Formation: Santa Rosa Formation of Triassic Age

Reservoir Properties

Depth 350 ft. to 500 ft. Type of Reservoir Rock Sandstone
Average Porosity 20% (18 - 23%) Permeability Range 100 md to 500 md
Net Thickness ~40 (20 - 50) ft. Gross Thickness ~60 (30 - 80) ft.
Dykstra-Parsons Variation NA Relative Perm Data Attached? No
Bottom Hole Temperature ~ 75 °F Initial Gas Solubility SCF
Bottom Water? Possible Gas Cap Present? No Edge Water? No
Reservoir Pressure: Initial Low psi Bubble Point NA psi

Saturation Data

Original Oil Saturation ≅ 775 B/AF ≅ 50 %Vp
Connate (Irreducible) Water Saturation 12 %Vp

Fluid Data

Type of Crude Very Viscous, Asphaltic

Oil Gravity 15 - 17 °API

Original Oil Formation Volume Factor Very Little Shrinkage

Reservoir Oil Viscosity: Temp., °F	Viscosity, Cp
70	6006
100	1440
150	247
220	45.5
250	29.2

Connate Water Viscosity ~0.95 Cp @ 75 °F

Type of Connate Water: Fresh

COST OF SURFACE INSTALLATION

<u>Item</u>	<u>Cost</u>
Stock Tank, 210 bbls - three tanks	\$ 7,200.00
Heater Treater, 4' x 20' - one	\$ 6,500.00
Steam Generator, filter and softener	\$44,000.00
Valve, connections and fittings	\$ 2,000.00
Line Pipe 2" - 1,000 ft	\$ 1,890.00
Line Pipe 3" - 200 ft	\$ 782.00
Access road and Right-of-way - 6-1/3 miles	\$11,000.00
Labor for installation	\$ 3,000.00
Miscellaneous	\$ 7,600.00
State Sales Tax	\$ 3,359.00
	<hr/>
TOTAL	\$87,331.00

BEFORE EXAMINER STAMETS OIL CONSERVATION DIVISION	
PLET	EXHIBIT NO. <u>9</u>
CASE NO. <u>7048</u>	
Submitted by <u>Applicant</u>	
Hearing Date <u>10/15/80</u>	

COST OF PRODUCING WELLS

<u>Item</u>	<u>Expenses per Well</u>
Drilling Cost	\$18,100.00
Casing 4-1/2"	\$ 2,982.00
Surface Damage	\$ 250.00
Build location and roads	\$ 750.00
Coring	\$ 3,401.00
Cement (Shoe and Float)	\$ 3,000.00
Water	No Charge
Casing Crew	\$ 140.00
Geologist	\$ 800.00
Engineer	\$ 2,500.00
Connections and Fittings	\$ 91.00
Well Head	\$ 405.00
Surveyor	\$ 122.00
Legal Cost	\$ 220.00
Logging	\$ 1,255.00
Perforating	\$ 2,713.00
Tubing 2-3/8"	\$ 2,127.00
Sucker Rods	\$ 862.00
Down Hole Pump	\$ 627.00
Stuffing Box	\$ 135.00
Polish Rod and Liner	\$ 140.00
Pump Jack and Weights	\$ 2,260.00
Engine FM 118	\$ 2,500.00
Miscellaneous	\$ 4,500.00
State Sales Tax	\$ 1,995.00
TOTAL	\$51,875.00

Producing Well Costs: 3 wells @ \$51,875.00

\$155,625.00

RE-ENTRY WELL COSTS

<u>Item</u>	<u>Expenses per Well</u>
Drilling Cost	\$ 5,150.00
Casing 4-1/2"	\$ 2,982.00
Cement (Shoe and Float)	\$ 3,000.00
Water	No Charge
Casing Crew	\$ 140.00
Engineer	\$ 900.00
Connections and Fittings	\$ 191.00
Well Head	\$ 405.00
Logging	\$ 1,255.00
Perforating	\$ 2,793.00
Tubing 2-3/8"	\$ 2,127.00
Sucker Rod	\$ 862.00
Down Hole Pump	\$ 627.00
Stuffing Box	\$ 135.00
Polish Rod and Liner	\$ 140.00
Pump Jack and Weights	\$ 2,260.00
Engine FM 118	\$ 2,500.00
Miscellaneous	\$ 2,500.00
State Sales Tax	\$ 1,119.00
TOTAL	\$29,086.00

Re-entry Well Costs: 2 wells @ \$29,086.00

\$58,172.00

COST OF STEAM INJECTION WELL

<u>Item</u>	<u>Expenses per Well</u>
Drilling Cost	\$18,100.00
Casing 4-1/2"	\$ 2,982.00
Surface Damage	\$ 250.00
Build Location and Roads	\$ 750.00
Coring	\$ 3,401.00
Cement (Shoe and Float)	\$ 3,000.00
Water	No Charge
Casing Crew	\$ 140.00
Geologist	\$ 800.00
Engineer	\$ 2,500.00
Connections and Fittings	\$ 191.00
Well Head	\$ 405.00
Surveyor	\$ 122.00
Leagal Cost	\$ 220.00
Logginh	\$ 1,255.00
Perforating	\$ 2,713.00
Tubing 2-3/8"	\$ 2,127.00
Packer (2" x 4-1/2")	\$ 3,165.00
Expansion Joint	\$ 2,215.00
Miscellaneous	\$ 4,400.00
State Sales Tax	\$ 1,949.00
<hr/>	
TOTAL	\$50,685.00

Injection Well Costs: 1 well @ \$50,685.00

\$50,685.00

Special Laboratory Core Analyses: 10,099.00 plus tax

\$10,503.00

\$61,188.00

COST OF WATER SUPPLY WELL

<u>Item</u>	<u>Expense per Well</u>
Drilling Cost	\$10,087.00
Casing 4-1/2"	\$ 2,954.00
Surface Damage	\$ 250.00
Build Location and Roads	\$ 1,740.00
Coring	\$ 2,177.00
Water	No Charge
Casing Crew	\$ 225.00
Geologist	\$ 217.00
Engineer	\$ 2,552.00
Connections and Fittings	\$ 152.00
Well Head	\$ 405.00
Surveyor	\$ 387.00
Legal Cost	\$ 220.00
Logging	\$ 1,104.00
Tubing 2-3/8"	\$ 2,127.00
Down Hole Pump	\$ 627.00
Stuffing Box	\$ 135.00
Polish Rod and Liner	\$ 140.00
Pump Jack and Weights	\$ 2,260.00
Engine FM 118	\$ 2,500.00
Miscellaneous	\$ 3,000.00
State Sales Tax	\$ 1,330.00
	<hr/>
TOTAL	\$34,589.00

Water Well Costs: 1 well @ \$34,589.00

\$34,589.00

OPERATING COSTS

<u>Item</u>		<u>Costs</u> <u>(10 months)</u>
Labor		
Principal Investigator	\$ 4,000.00	
Field Supervision	\$30,000.00	
Consultants (including travel)	\$10,000.00	
Field Labor	\$ 9,875.00	
		\$ 53,875.00
Fringe Benefits		
Average 17% of Labor (Excluding Consultants)		\$ 7,459.00
Transportation of Equipment		\$ 2,000.00
Travel to Project Site		\$ 495.00
Fuel Costs		
Steam Generator	\$73,165.00	
Heater Treator	\$ 6,500.00	
Pumping Units	\$ 7,200.00	
		\$ 86,865.00
Chemical Costs		
Steam Generator	\$ 4,660.00	
Demulsifiers	\$ 3,000.00	
		\$ 7,660.00
Workover Expenses		\$ 12,000.00
Pump Repairs		\$ 6,000.00
Miscellaneous		\$ 16,900.00
State Sales Tax		\$ 7,490.00
Computer Charges for Simulations		\$ 5,000.00
		<hr/>
		\$205,744.00

SUMMARY OF PROJECT COSTS

Producing Wells		
3 New Wells	\$155,625.00	
2 Re-entry Wells	\$ 58,172.00	
		\$213,797.00
Steam Injection Well		\$ 61,188.00
Water Supply Well		\$ 34,589.00
Surface Installation		\$ 87,331.00
Operating Costs		\$205,744.00
		<hr/>
	TOTAL PROJECT COSTS	\$602,649.00

GENERAL DISCUSSION

The O'Connell Ranch field is located in Guadalupe County approximately nine miles North of the town of Newkirk, New Mexico. Oil production will be from the upper sand in the Santa Rosa formation (Triassic age). This sand is informally referred to as the O'Connell sand and is found at an average depth of 400 feet. O'Connell structure is located on North flank of Newkirk anticline and dips Northward across pilot area. Lateral limits of oil saturation are controlled primarily by permeability development and formation pinch out. (See attached map)

Core analysis indicates formation contains a very viscous crude oil with little or no gas saturation. Production tests indicate no natural water drive and very little gravity drainage. These conditions leave the reservoir without a driving mechanism. Oil will not flow to the producing wells until a driving mechanism is developed. Public Lands Exploration Co., Inc. plans to initiate an enhanced steam recovery pilot in the O'Connell field.

Public Lands has drilled 16 wells in the field. Six were dry holes, two were completed as water wells and eight as producers.

PILOT AREA

Proposed pilot will consist of 1.22 acres located in Northeast corner of Section 15, T-11-N, R-25-E, Guadalupe County, New Mexico. Pilot area is outlined on enclosed maps. Pilot area presently has one producer and two plugged and abandoned wells. Plans are to complete an inverted five spot injection pattern by drilling two producers and one injection well. Both plugged and abandoned wells located in pilot area will be re-entered and completed as producers. For complete information see attached schematics.

PROJECT OBJECTIVES

Primary objective of field test is to determine the feasibility of using steam to recover the very viscous crude from the O'Connell Ranch field in Guadalupe County, New Mexico. At reservoir temperature of approximately 75°F, viscosity of the crude is almost 6,000 centipoises. Reduction in viscosity to around 27 centipoises can be achieved if oil temperature can be raised to approximately 260°F. It is planned to inject 275°F steam per day to increase oil temperature. Anticipated injection rate is 150 barrels of steam per day at 285 psig.

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION

PLE I EXHIBIT NO. 10

CASE NO. 7048

Submitted by Applicant

Hearing Date 10/15/80

WATER SOURCE

Plans are to use potable water from the number two sandstone found approximately 40 feet below the O'Connell sandstone. Public Lands Roberts No. 1 and State No. 2 wells are completed in this sandstone referred to as the Monsimer sandstone. When these wells were drilled they averaged in excess of one barrel of water per minute. Water reserves are estimated at approximately 14,000 barrels per acre based on an average porosity of 20%, formation thickness of 20 feet and a recovery factor of 75%.

RESERVOIR DATA

Oil inplace under pilot area is estimated at 38,000 barrels based on average porosity of 20%, average pay thickness of 20 feet and average oil saturation of 50%. It is estimated steam injection will recover approximately 18,000 barrels or 50% of inplace oil. For details see attached reservoir data table.

SURFACE INSTALLATION

Surface installation will include three 210 barrel stock tanks, heater treater, a portable steam generator equipped with filters and water softeners and fresh water storage tank.

ECONOMICS

Total cost of pilot is estimated at \$396,905 and future ten months operating cost at \$205,744. Total deficit over this period is estimated at \$387,821.

Dockets Nos. 34-80 and 35-80 are tentatively set for October 29 and November 12, 1980. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - WEDNESDAY - OCTOBER 15, 1980

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:

- ALLOWABLE: (1) Consideration of the allowable production of gas for November, 1980, from fifteen prorated pools in Lea, Eddy, and Chaves Counties, New Mexico.
- (2) Consideration of the allowable production of gas for November, 1980, from four prorated pools in San Juan, Rio Arriba, and Sandoval Counties, New Mexico.
- CASE 7044: Application of Harvey E. Yates Company for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Travis Penn Unit Area, comprising 400 acres, more or less, of State and Federal lands in Township 18 South, Range 28 East.
- CASE 7045: Application of Texas Oil & Gas Corp. for downhole commingling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Atoka and Upper Morrow production in the wellbore of its Superior Federal Com. Well No. 1 located in Unit C of Section 8, Township 20 South, Range 29 East.
- CASE 7046: Application of Cotton Petroleum Corporation for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Chacra and Pictured Cliffs production in the wellbores of wells in the South Blanco-Pictured Cliffs Pool located in Sections 1, 2, 3, 4, 9, 10, 11, 13, 23, and 24, Township 24 North, Range 4 West.
- CASE 7047: Application of Nucorp Energy Inc. for a special gas-oil ratio limitation, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a special gas-oil ratio limitation of 10,000 to one, retroactive to April 18, 1980, for the East Caprock-Pennsylvanian Pool.
- CASE 7033: (Continued from October 1, 1980, Examiner Hearing)
- Application of Adams Exploration Inc. for three non-standard proration units, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of three 80-acre non-standard proration units in the Vada-Pennsylvanian Pool, comprising the following acreage: SE/4 NE/4 and NE/4 SE/4 of Section 12, N/2 NE/4 of Section 12, and S/2 SE/4 of Section 2, all in Township 9 South, Range 34 East.
- CASE 7048: Application of Public Lands Exploration, Inc. for a pilot steam enhanced oil recovery project, Guadalupe County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a pilot steam enhanced oil recovery project in the Santa Rosa formation by re-entering 2 wells and drilling 3 wells, all located in Unit A of Section 15, Township 11 North, Range 25 East.
- CASE 7036: (Continued from October 1, 1980, Examiner Hearing)
- Application of J. Gregory Merriam for compulsory pooling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Pictured Cliffs formation underlying the SE/4 of Section 34, Township 25 North, Range 6 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 7049: Application of J. Gregory Merriam for compulsory pooling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Pictured Cliffs formation underlying the SW/4 of Section 35, Township 25 North, Range 6 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 7050: Application of Maddox Energy Corporation 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 23, Township 24 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 7051: Application of Petro Lewis Corporation for downhole commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Blinebry and Drinkard production in the wellbore of its L. G. Warlick "B" Well No. 2 located in Unit G of Section 19, Township 21 South, Range 37 East.

CASE 7052: Application of Gulf Oil Corporation for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Pennsylvanian formation underlying the S/2 of Section 36, Township 18 South, Range 31 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 7024: (Continued from September 17, 1980, 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 Pennsylvanian formation underlying the E/2 of Section 35, Township 18 South, Range 29 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 7038: (Continued from October 1, 1980, Examiner Hearing)

Application of Natura Energy Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the San Andres formation underlying the NE/4 NE/4 of Section 6, Township 19 South, Range 39 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 7053: Application of Amax Chemical Corporation for the amendment of Order No. R-111-A, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-111-A to extend the boundaries of the Potash-Oil Area to include the SE/4 NE/4 and NE/4 SE/4 of Section 24, Township 19 South, Range 29 East, and the S/2 NW/4 of Section 19, Township 19 South, Range 30 East.

CASE 7054: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating, abolishing, and extending the vertical and horizontal limits of certain pools in Chaves, Eddy, Lea, and Roosevelt Counties, New Mexico:

(a) CREATE a new pool in Chaves County, New Mexico, classified as a gas pool for Abo production and designated as the East Bitter Lakes-Abo Gas Pool. The discovery well is Boyd Operating Company Blakemore Federal Well No. 1 located in Unit D of Section 20, Township 9 South, Range 26 East, NMPM. Said pool would comprise:

TOWNSHIP 9 SOUTH, RANGE 26 EAST, NMPM
Section 20: NW/4

(b) CREATE a new pool in Chaves County, New Mexico, classified as a gas pool for Wolfcamp production and designated as the East Bitter Lakes-Wolfcamp Gas Pool. The discovery well is Boyd Operating Company Blakemore Federal Well No. 1 located in Unit D of Section 20, Township 9 South, Range 26 East, NMPM. Said pool would comprise:

TOWNSHIP 9 SOUTH, RANGE 26 EAST, NMPM
Section 20: W/2

(c) CREATE a new pool in Chaves County, New Mexico, classified as an oil pool for Fusselman production and designated as the South Elkins-Fusselman Pool. The discovery well is Enserch Exploration, Inc. J. G. O'Brien Well No. 1 located in Unit E of Section 31, Township 7 South, Range 29 East, NMPM. Said pool would comprise:

TOWNSHIP 7 SOUTH, RANGE 29 EAST, NMPM
Section 31: NW/4

(d) ABOLISH the Cary-San Andres Pool in Lea County, New Mexico, described as:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
Section 17: NW/4

- (e) EXTEND the Anderson Ranch-Wolfcamp Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 16 SOUTH, RANGE 32 EAST, NMPM
Section 3: Lots 9, 10, 15 and 16

- (f) EXTEND the Angell Ranch Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 27 EAST, NMPM
Section 13: S/2

- (g) EXTEND the Blinebry Oil and Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 38 EAST, NMPM
Section 29: SW/4

- (h) EXTEND the Boyd-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 24 EAST, NMPM
Section 13: N/2

TOWNSHIP 19 SOUTH, RANGE 25 EAST, NMPM
Section 1: W/2
Section 14: N/2

- (i) EXTEND the Brown Queen-Grayburg Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 10 SOUTH, RANGE 26 EAST, NMPM
Section 25: SE/4 SW/4 and S/2 SE/4

- (j) EXTEND the Buffalo Valley-Pennsylvanian Gas Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 14 SOUTH, RANGE 27 EAST, NMPM
Section 25: N/2

- (k) EXTEND the Burton Flat-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 28 EAST, NMPM
Section 17: S/2
Section 20: N/2

- (l) EXTEND the vertical limits of the Comanche Stateline Tansill-Yates Pool in Lea County, New Mexico, to include the Seven Rivers formation and redesignate said pool as the Comanche Stateline Tansill-Yates-Seven Rivers Pool, and extend the horizontal limits of said pool to include therein:

TOWNSHIP 26 SOUTH, RANGE 36 EAST, NMPM
Section 27: W/2 NW/4

- (m) EXTEND the Indian Flats-Delaware Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 28 EAST, NMPM
Section 2: S/2 NE/4

- (n) EXTEND the Jenkins-San Andres Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 9 SOUTH, RANGE 35 EAST, NMPM
Section 32: NW/4

- (o) EXTEND the L E Ranch-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 10 SOUTH, RANGE 28 EAST, NMPM
Section 29: N/2 NW/4
Section 30: N/2 NE/4

- (p) EXTEND the Malaga-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM
Section 15: N/2

- (q) EXTEND the South Millman-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 28 EAST, NMPM
Section 8: All

- (r) EXTEND the West Osado-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 35 EAST, NMPM
Section 14: W/2
Section 23: All

- (s) EXTEND the Penasco Draw-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 25 EAST, NMPM
Section 6: W/2

- (t) EXTEND the Penasco Draw San Andres-Yeso Associated Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 24 EAST, NMPM
Section 1: W/2 NW/4 and NW/4 SW/4
Section 13: NW/4 NW/4
Section 14: NE/4 NE/4

- (u) EXTEND the South Peterson-Pennsylvanian Pool in Roosevelt County, New Mexico, to include therein:

TOWNSHIP 6 SOUTH, RANGE 33 EAST, NMPM
Section 2: Lots 1 and 2

- (v) EXTEND the Rabbit Flats-Qusen Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 10 SOUTH, RANGE 27 EAST, NMPM
Section 30: SE/4 SE/4

- (w) EXTEND the Railroad Mountain-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 28 EAST, NMPM
Section 11: W/2 SW/4
Section 14: NW/4 NW/4

- (x) EXTEND the Richard Knob Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 24 EAST, NMPM
Section 36: E/2

- (y) EXTEND the Shugart Yates-Seven Rivers-Queen-Grayburg Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 31 EAST, NMPM
Section 2: S/2 S/2

- (z) EXTEND the Twin Lakes-San Andres Associated Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 28 EAST, NMPM
Section 26: SE/4 SE/4
Section 35: E/2 NE/4 and NE/4 SE/4

- (aa) EXTEND the Wantz-Abo Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
Section 3: SE/4

Memo

From

FLORENE DAVIDSON
ADMINISTRATIVE SECRETARY

To Called in by George
Scott

Oct. 24, 1980 622-5891

Public Lands Exploration Inc.
Pilot Steam Enhanced ^{Oil} Recovery
Project

Unit A 15-T11N-R25E
Guadalupe County

Re-enter 2 wells and drill
3 wells

Santa Rosa formation

OIL CONSERVATION COMMISSION-SANTA FE

PHONE OFF. (505) 622-5891

George L. Scott

CONSULTING GEOLOGIST
SUITE 510, PETROLEUM BLDG.
ROSWELL, NEW MEXICO 88201

PHONE RES. (505) 622-5627

October 13, 1980

Oil Conservation Division
Attn: Florene Davidson
PO Box 2088
Santa Fe, NM 87501

Re: Case 7048

Dear Ms. Davidson:

Enclosed are copies of exhibits to be used in the Hearing on Case #7048. Please give these to the Examiner.

I will have extra copies of the Exhibits with me on Wednesday.

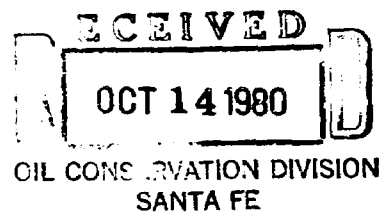
Sincerely,

George L. Scott

George L. Scott

GLS:ss

Enclosures



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
15 October 1980

EXAMINER HEARING

IN THE MATTER OF:

Application of Public Lands Explor-
ation, Inc., for a pilot steam en-
hanced oil recovery project, Guada-
lupe County, New Mexico.

CASE
7048

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation
Division:

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 & BLACK P. A.
Jefferson Place
Santa Fe, New Mexico 87501

SALLY W. BOYD, C.S.R.

Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

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GEORGE SCOTT

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CHARLES JOY

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E X H I B I T S

Applicant Exhibit One, Map 5

Applicant Exhibit Two, Plat 6

Applicant Exhibit Three, Cross Section 6

Applicant Exhibit Four, Map 7

Applicant Exhibit Five, Map 13

Applicant Exhibit Five-A, Schematics 16

Applicant Exhibit Six, Log 21

Applicant Exhibit Seven, Analysis 23

Applicant Exhibit Eight, Reservoir Data 24

Applicant Exhibit Nine, Cost Sheet 25

Applicant Exhibit Ten, Discussion 26

SALLY W. BOYD, C.S.R.

Rt. 1 Box 193-B

Santa Fe, New Mexico 87501

Phone (505) 455-7409

1 MR. STAMETS: We'll call the last case
2 today, Case 7048.

3 MR. PADILLA: Application of Public Lands
4 Exploration, Inc., for a pilot steam enhanced oil recovery
5 project, Guadalupe County, New Mexico.

6 MR. STAMETS: Call for appearances in this
7 case.

8 MR. CARR: Mr. Examiner, my name is William
9 F. Carr, Campbel and Black, P.A., Santa Fe, appearing on behalf
10 of the applicant, Public Lands Exploration, Inc. I have two
11 witnesses who need to be sworn.

12 MR. STAMETS: I'd like to have them both
13 stand and be sworn at this time, please.

14
15 (Witnesses sworn.)

16
17 MR. CARR: At this time I'd call George
18 Scott.

19
20 GEORGE SCOTT
21 being called as a witness and having been duly sworn upon his
22 oath, testified as follows, to-wit:

23
24 DIRECT EXAMINATION

25 BY MR. CARR:

SALLY W. BOYD, C.S.R.

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Santa Fe, New Mexico 87501
Phone (505) 455-7409

SALLY W. BOYD, C.S.R.

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1 Q Will you state your name and place of
2 residence?

3 A My name is George Scott. I live in Roswell,
4 New Mexico.

5 Q Mr. Scott, by whom are you employed and
6 in what capacity?

7 A I'm a consulting geologist in Roswell,
8 and I've been retained by Public Lands Exploration to look
9 after their interest from the geological point of view in
10 this venture.

11 Q Have you previously testified before this
12 Commission, had your credentials accepted and made a matter
13 of record?

14 A I have.

15 Q And you were qualified as a petroleum
16 geologist?

17 A Yes.

18 Q Are you familiar with the application
19 filed in this case?

20 A Yes.

21 Q And are you familiar with the general
22 area which is involved in this case?

23 A Yes, I am.

24 MR. CARR: Are the witness' qualifications
25 acceptable?

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1 MR. STAMETS: They are.

2 Q Mr. Scott, will you briefly state what
3 Public Lands Exploration, Inc., seeks with this application?

4 A The application is for the purpose of
5 instituting a pilot steam enhanced oil recovery project.

6 Q And whereabouts is this project located?

7 A The pilot will be in the northeast quarter
8 of the northeast quarter of Section 15 of Township 11 North,
9 Range 25 East, Guadalupe County, New Mexico.

10 Q Will you please refer to what has been
11 marked for identification as Applicant's Exhibit Number One
12 and --

13 A Yes.

14 Q -- explain to the Examiner what it is and
15 what it shows?

16 A All right. In this Exhibit Number One,
17 which is a topographic map of portions of two USGS sheets,
18 the road net in the area is shown. The area is located north
19 of the Village of Newkirk about nine miles, and you proceed
20 northward on State Highway 129, turn west on the dirt road
21 that is shown on the map, and go south to the -- to the field
22 area. Those roads are on there.

23 Also the wells that PLEI have drilled
24 in the area are shown and the immediate road net in the field
25 area is shown thereon.

1 The topography of the area is shown
2 thereon. The topography of the area is shown by the topographic
3 contours on this map.

4 Q Will you now refer to Applicant's Exhibit
5 Number Two and review this for Mr. Stamets?

6 A All right. This is -- map here is simply
7 a well base. It will be useful for general orientation. We
8 have other maps that are more specific as to our pilot ven-
9 ture.

10 Once again, our steam pilot project will
11 be in the northeast quarter of the northeast quarter of Sec-
12 tion 15 in the vicinity of two Humble strat tests and the
13 PLEI No. 1 State, shown there in the northeast northeast. A
14 line of cross section is shown, also, here in red, and this
15 will be useful in orienting you on the stratigraphy and the
16 zone that we plan to -- to flood.

17 Q Will you now refer to your Exhibit Number
18 Three, which is your cross section, and review the data con-
19 tained thereon?

20 A All right. The line of section is shown
21 on the preceding exhibit. Our steam flood venture will be in
22 very close proximity to Humble core test No. 1-15, or I be-
23 lieve they refer to it as 15-1 State. This cross section was
24 made from Humble logs that were obtained from the OCD a num-
25 ber of years after they had drilled these.

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Phone (505) 455-7409

1 The surface topography of the area is
2 shown on the cross section. The different formations are
3 labeled. The Chinle formation, the Santa Rosa formation,
4 the Artesia group, and the top of the San Andres formation.

5 Now there are two sands within the Santa
6 Rosa formation that we are very interested in, the O'Connell
7 Sand is our principal zone of interest. This is the zone we
8 plan to flood with steam.

9 The Monsimer Sand, which is a lower sand
10 of the Santa Rosa, is water-bearing and it will serve as our
11 water supply zone for the steam flood.

12 Q In your opinion is the formation in this
13 area such that you can successfully institute the enhanced
14 recovery project that you are proposing?

15 A Yes.

16 Q Do you have anything further to present
17 in regard to Exhibit Number Three?

18 A No, I don't think so. The correlations
19 are fairly straightforward here as far as between these core
20 tests are concerned.

21 Q Will you now refer to Applicant's Exhibit
22 Number Four and review this for the Examiner?

23 A This Exhibit Number Four is a map of Sec-
24 tion 15 and the adjoining sections. It's on a larger scale
25 and here we're able to show the proposed steam injection well

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1 and four producing wells and an observation well. These will
2 be further discussed by still another exhibit on a still larger
3 scale, and I believe Mr. Joy will elaborate on that.

4 The outline of the productive sands, the
5 limits of the productive sand, are shown on this map by a
6 dashed line, and we also show the structural contours on top
7 of the O'Connell Sand, our pay objective.

8 May I state that the O'Connell Sand is an
9 informal term that we are using to denote this upper sand of
10 the Santa Rosa, and Monsimer Sand, the water-bearing sand, is
11 also an informal designation that we are using.

12 I believe that the rest of the information
13 about this map is explained in the -- in the explanation sec-
14 tion here at the bottom of it. We do show here a number of
15 wells which we think are capable of producing in an expanded
16 flood, and they're shown by a separate type of circle here.

17 Q Mr. Scott, is Public Lands Exploration,
18 Inc., the operator of all lands within the project area?

19 A Yes, they are.

20 Q Were Exhibits One through Four prepared
21 by you or under your direction and supervision?

22 A Yes, they were.

23 MR. CARR: At this time, Mr. Stamets, we
24 would offer into evidence Applicant's Exhibits One through
25 Four.

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1 MR. STAMETS: These exhibits will be ad-
2 mitted.

3 MR. CARR: I have nothing further of this
4 witness on direct.

5
6 CROSS EXAMINATION

7 BY MR. STAMETS:

8 Q Mr. Scott, have you done any work in the
9 area to determine the source of the water in the area, other
10 than the Monsimer Sand? Are there any shallower zones in the
11 area utilized by ranchers for windmill water?

12 A Yes, there is. There's a -- there's
13 surficial ground water at approximately 30 to 40 feet, as I
14 recall, in the area, and there is at least one windmill in
15 Section 15, over in the northwest quarter of Section 15, and
16 we have been very concerned about that shallow water and we've
17 had numerous dicussions with the ranchowner about protecting
18 it, and I believe our casing program has been adequate, our
19 surface casing in these wells has been adequate to protect
20 it.

21 The zone we'll be getting our water from
22 is 400 feet down and we see no connection between the shallow
23 ground water that -- at 25 or 30 feet and the sand down there
24 about 400, 420 feet, the Monsimer Sand, that we'll be utilizing.
25 It is fresh water, the Monsimer -- we've had water analyzed

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1 in the -- from the Monsimer Sand, and it's very fresh water,
2 and I think Mr. Joy will be prepared to -- to discuss those
3 water analyses.

4 Q Is it -- is there a zone above the
5 O'Connell sand which you would consider to be essentially
6 impermeable as far as the percolation of ground water in the
7 area, or is it possible that you could have perched water
8 tables anywhere above the O'Connell Sand?

9 A Well, I think our -- we're drilling with
10 air up here; all of our work has been done with air drilling,
11 air on this drilling, and so we've had a pretty good handle
12 on where water has been encountered, and we do, in a number
13 of these wells, see some evidence of perched water. Usually
14 it's a very limited amount, though. We usually see our --
15 our water from these perched zones decrease in volume rather
16 rapidly.

17 The Chinle shale is a thick red and green
18 shale unit for the most part, a very dense, tight shale. We
19 have no evidence that water has moved downward through ex-
20 tensive fracturing. That is a possibility but we have no
21 evidence to indicate that.

22 Q Chinle shale would be -- well, it looks
23 like it varies. On the Humble core test No. 6-12-15, it
24 would appear as though that's a very thick shale section, al-
25 most from the surface down to the O'Connell Sand.

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1 A That is correct. Now there are some
2 siltstone beds in here. I think the sonic log on that well
3 will show you some of the siltstone beds there, but they're
4 thin. It's mainly -- mainly a shale section.

5 Q Then moving to the east on the cross sec-
6 tion, core test 6-11-13, it would appear as though there's
7 a couple hundred feet of shale immediately above the O'Connell
8 Sand.

9 A Yes, more than that. That's predominately
10 a shale section up to about 200 feet from the surface.

11 Q Okay.

12 A Now, there are some sand stringers in that
13 interval, of course, but it's predominately a shale section.

14 Q And what about the -- what's the nature
15 of the zone between the O'Connell and the Monsimer?

16 A That is a shale section. It's a -- usu-
17 ally it's a red shale; sometimes it's greenish, but it's a
18 shale unit.

19 Q Would the applicant in this case need to
20 exercise caution to make certain that either through comple-
21 tion techniques or because of using excessive pressure, he
22 try and avoid fracturing the zone or causing communication
23 between the two zones?

24 A Yes. Yes, this is something that we have
25 considered and thought about and will be watching very much.

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1 Yes. It will call for some really good casing programs,
2 cementing programs. We're aware of this.

3 MR. STAMETS: Are there any other ques-
4 tions of this witness? He may be excused.

5 One more question.

6 Q Are any of the wells on Exhibit Number
7 Three going to be in the pilot project?

8 A Let's see. Oh, Exhibit Three is the
9 cross section.

10 Q Right.

11 A Yes, there will be. Core test Number
12 15-1 will be a re-entry well and will be converted into a
13 producer.

14 Q Okay, that's all.

15 MR. STAMETS: The witness may be excused.

16 MR. CARR: At this time I would call Mr.
17 Chuck Joy.

18

19

CHARLES JOY

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

22

23

DIRECT EXAMINATION

24

BY MR. CARR:

25

Q Will you state your name and place of

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1 residence?

2 A. Charles Joy, Artesia, New Mexico.

3 Q. By whom are you employed and in what capa-
4 city?

5 A. I've been retained by Public Lands Explor-
6 ation Company to look after the development of the area we're
7 discussing here and look after the drilling and completion of
8 these wells.

9 Q. Have you previously testified before this
10 Commission, had your credentials accepted and made a matter
11 of record?

12 A. Yes, I have.

13 Q. Were you qualified at that time as a pet-
14 roleum engineer?

15 A. Yes, I was.

16 Q. Are you familiar with the application in
17 this case?

18 A. Yes, I am.

19 Q. Are you familiar with the subject area?

20 A. Yes, I am.

21 MR. CARR: Are the witness' qualifications
22 acceptable?

23 MR. STAMETS: They are.

24 Q. Will you please refer to what has been
25 marked for identification as Applicant's Exhibit Number Five

1 and review this for the Examiner?

2 A This map shows the area which we plan to
3 initiate a pilot flood in, in the northeast quarter of the
4 northeast quarter of Section 15. At the present time there
5 are two strat tests drilled in the area, the Humble 15-1 and
6 6-14-15.

7 We plan to re-enter these two wells and
8 make producing wells out of them.

9 We also will drill three additional wells,
10 the No. 11 will be the injection well, and Nos. 10 and 12 will
11 be producing wells. This we have set up as an inverted 5-spot
12 and we will inject steam in No. 11 Well.

13 Q Does this plat also show your water supply
14 wells?

15 A Yes, it does. On the north in Section 10
16 you'll see a No. 1 Well and that's the Roberts No. 1. We
17 drilled that well through the O'Connell Sand and to the bot-
18 tom of the Monsimer Sand. I set 4-1/2 inch casing and circu-
19 lated cement from the bottom to the surface on this well, and
20 we plan to perforate this in the Monsimer Sand later and make
21 a water source well out of it.

22 We also have drilled the No. 4 State Well,
23 which is located in the southeast quarter of Section 15, and
24 this well we drilled down and we also -- it was dry in the
25 O'Connell Sand and we drilled on through the Monsimer Sand,

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1 and I ran casing in this well but it was not cemented and I
2 left it hanging and it slotted and I checked with the State
3 Engineer and they permitted us to go ahead and develop this
4 into a water well, and this will be our water source well for
5 the pilot area at this time.

6 Q Mr. Joy, are the wells which you are hope-
7 ful will be producing wells in the project area capable of
8 only marginal production absent enhanced recovery methods?

9 A These wells will not flow at the present
10 time and we -- core analysis indicated the formation contained
11 a very viscous crude oil with little or no gas saturation, and
12 production tests indicate no natural water drive and very
13 low gravity drainage, and these conditions leave the reservoir
14 without a driving mechanism. Consequently, there is no way
15 of recovering the oil unless we initiate an enhanced recovery
16 project whereby we can develop a driving -- artificial driving
17 mechanism, which we plan to do by injecting steam at appro-
18 ximately 275 degrees temperature and at a pressure of 285 psig.

19 We also plan to inject approximately 150
20 barrels of water per day -- that will be steam, rather, to
21 clarify that.

22 Q Now, Mr. Joy --

23 MR. STAMETS: I wish -- I'd like to get
24 that clarified now.

25 A That's a 150 barrels --

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1 MR. STAMETS: Of Water per day, as steam?

2 A Right, as steam.

3 MR. STAMETS: Okay, so the 285 pressure
4 will be what it takes, 155 barrels of water per day -- thank
5 you, Mr. Joy.

6 Q Now, Mr. Joy, is it fair to summarize
7 your testimony that -- to be that absent approval of and insti-
8 tution of this enhanced recovery -- let me restate that.
9 That by approving this application oil will be recovered that
10 would otherwise be left in the ground?

11 A That's correct.

12 Q Will you now refer to what has been marked
13 as Applicant's Exhibit Number Five-A, which is your schematic
14 drawing --

15 A Right.

16 Q -- and review the data contained thereon
17 for Mr. Stamets?

18 A This is a schematic of each individual
19 well within a half mile radius of the pilot area, and I'll
20 go through these and take a look at it.

21 The first well is the State No. 11, which
22 will be the injection well, and we plan to run 39 feet of J-55
23 8-5/8ths inch 24 pound casing at the surface and cement with
24 16 sacks and circulate. Then I'll drill down to 510 feet and
25 set 510 feet of K-55 casing and that will be 4-1/2 inch 10-1/2

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1 pound casing and plan to cement with 150 sacks and circulate
2 cement to the surface.

3 By the way, I will clarify this, we are
4 using Class H, because this is what they are using in Bakers-
5 field, California at the present time in their thermal in-
6 jection projects.

7 The second one would be -- well, and this
8 also, let me clarify this, we will run and inject through
9 tubing. We'll set a packer at approximately 380 feet and run
10 a Baker Model HB Single Grip Packer. Now this is a high temp-
11 erature element packer and it also will be equipped with an
12 expansion joint internally, and then in the annulus we plan
13 to inject inhibited water and load the annulus with inhibited
14 water from the top of the packer back to the surface to pro-
15 tect the well from corrosion.

16 Then on the proposed producers we will
17 drill the State No. 10 Well, and there's a schematic of it
18 on the next page, and I think it's more or less self-explana-
19 tory there. We will run tubing and I show the seating nipple
20 and perforated nipple, and we plan to drill it to approximately
21 510 feet, also, and all these completions that we -- that I
22 have drilled out there, I have circulated cement from TD back
23 to the surface on the oil string.

24 MR. STAMETS: Have you had any loss of
25 circulation problems on them?

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1 A Very little. We have encountered, really,
2 no lost circulation at all.

3 MR. STAMETS: All of these have circulated
4 well with 150 sacks?

5 A We've had a few of them drop back about
6 10 or 20 feet, which we've gone back in later and filled up
7 back to the surface.

8 There's a small gravel up there close to
9 the surface around 30 feet, which we feel like if we don't
10 get all the way through the surface casing, why, it does take
11 the -- will permit cement to enter into it, flow back into it.

12 Then the No. 12 Well is the second well
13 we plan to drill in the pilot area and complete. This public --
14 then the State No. 13 Well, this will be a re-entry. This
15 well was originally drilled by Humble Oil Corporation and it
16 was a strat test. We have very little information on it and
17 as far as we know there's no casing in the well whatsoever.
18 There are some cement plugs. But we plan on cleaning it out
19 and running surface casing and a long string, oil string, to
20 510 feet.

21 Then we have another re-entry, which was
22 the -- originally was drilled by Humble and it's the 6-14-15
23 Well, and there's very little information on this well. I
24 checked the OCD records this morning and could find very little
25 on it. We do know that it has 400 feet of 5-1/2 inch 14 pound

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1 casing in it.

2 We plan to clean this well out and drill
3 a 4-3/4 inch hole down to 510 feet and complete this as an
4 open hole producer. We will probably -- we will probably
5 have to run a bond log to see if this casing has been cemented,
6 and if not, we'll have to cement the casing in this well.

7 MR. STAMETS: That 400 feet would put you
8 right at the top of the --

9 A Right.

10 MR. STAMETS: -- O'Connell Sand.

11 A Correct.

12 MR. STAMETS: Okay.

13 A Then the State No. 4 Well was our water
14 source well and I discussed that earlier, and this casing is
15 hanging in the well, and we will put this on production first.

16 And the second well was the one we are
17 retaining for a water source well in case we expand the flood
18 and if the pilot looks feasibly economical to go ahead, we
19 will need additional water later on in the life of this en-
20 hanced recovery. And we will perforate that. We have casing
21 set in all the way through the Monsimer Sand.

22 Q And you're talking about the Roberts No.
23 1, is that correct?

24 A Right, this is the Roberts No. 1, I'm
25 sorry, I didn't point that out.

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1 Then the other producer will be the State
2 No. 3, and that's west of our pilot area, and this well has
3 already been completed and this is a schematic of the comple-
4 tion and we did circulate cement on it.

5 Then the State No. 8 Well, which is south
6 of the pilot area there, we anticipate completing this well
7 and make a producer out of it later, but at this time we have
8 surface casing in it and we have the well capped. We drilled
9 it to 500 feet, and it's a 7-7/8ths inch open hole down to
10 500 feet.

11 Likewise, the O'Connell No. 1 Well, we're
12 holding it for possible producer at a later date, and we will
13 run casing in these wells later on if we elect to go forward
14 with the flood, or with the enhanced recovery project.

15 The O'Connell No. 3, we're also -- will
16 plug this well. We drilled it and it was a dry hole, and we
17 will file a C-103 shortly whereby we can get permission to
18 plug this well.

19 And then the O'Connell No. 5, this is
20 another probable producer. Now these wells I'm stating are
21 probable producers, it just depends on the economics of our --
22 and the type of results we obtain from the pilot area.

23 Q Now, Mr. Joy, you have schematics here
24 of all wells within a half mile radius of the proposed in-
25 jection well?

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1 A All but one well and that was a Humble
2 strat test 6-12-15, and there's no records even in the OCD's
3 files on this well.

4 Q Does that well appear on --

5 A It appears on --

6 Q -- Exhibit Number Four?

7 A Let's see, I believe it's on Four, right.

8 That's correct.

9 MR. STAMETS: What's the location of that
10 well on Exhibit Four?

11 A Oh, it's in the south -- let's see, that
12 would be -- northeast of the northwest. It would be --

13 MR. STAMETS: The one that says +4195?

14 A Right. Right under it is the 6-12-15 on
15 that well.

16 MR. STAMETS: Okay.

17 Q Now on these schematics, well schematics,
18 have you included all data required by the Oil Conservation
19 Division Memo 377?

20 A I believe I have.

21 Q Will you now refer to what has been marked
22 for identification as Applicant's Exhibit Number Six and ex-
23 plain to Mr. Stamets what this is?

24 A This is a log on our State No. 1 Well that
25 we drilled, which would be approximately 103 feet east south-

1 east of the proposed injection well, and I've marked this to
2 show the interval that we will be injecting steam into, and
3 the No. 11 Well should be fairly close on depth with this
4 well. It looks like that the top of the O'Connell Sand will
5 be approximately 409 feet and the bottom is 479 feet.

6 Q And this well is also spotted on Applicant's
7 Exhibit Number Five?

8 A Yes, it is. It's the State No. 1 Well and
9 it's on --

10 Q Exhibit Five.

11 A -- Exhibit Five.

12 Q This exhibit also confirms the cross
13 section which was previously offered by Mr. Scott?

14 A Yes, it does.

15 Q I believe you stated that you'll be in-
16 jecting 150 barrels of steam.

17 A That is true.

18 Q At what depth are you going to be injecting
19 this?

20 A It will be at approximately 409 feet down
21 to 479 feet, in that interval.

22 Q And I believe you stated that it would be
23 injected at a pressure of approximately 285 pounds.

24 A That is correct.

25 Q Do you believe that this presents any

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1 danger of fracturing the formation?

2 A. No, I don't, and we've taken extreme pre-
3 cautions to eliminate any possible channeling back by -- in
4 any of these wells from TD back to the surface.

5 Q. Now, Mr. Joy, you're going to be injecting
6 what would be characterized as fresh water?

7 A. Yes.

8 Q. Will you please refer to what has been
9 marked for identification as Applicant's Exhibit Number Seven --

10 A. In fact, this is extremely potable water
11 and this is an analysis that Halliburton has run for us on our
12 State No. 3 Well, State No. 4 Well, and Samadan State No. 1
13 Well, and we obtained these samples when we were drilling
14 these wells in, and we've been drilling with air so they should
15 be uncontaminated samples. And we can go through this, and
16 the calcium in most of these, the highest we have is 200 parts
17 per million, which is in the No. 3. The magnesium maximum
18 there is 60; chlorides, 700; sulfates 1400; bicarbonate, 1600;
19 and siron (sic) is nil.

20 MR. STAMETS: These analyses out of the
21 O'Connell or out of the Monsimer?

22 A. These are out of the O'Connell. No,
23 these came out of the Monsimer Sand when we drilled in.

24 We've drilled all these wells into the
25 Monsimer Sand to test the top.

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1 Q. Mr. Joy, will you now refer to Exhibit
2 Number Eight and review this for Mr. Stamets?

3 A. This is the reservoir data for the
4 O'Connell Sand. The reservoirs properties, the average depth
5 from 350 to 500 feet, and it's a sandstone formation. The
6 average porosity is approximately 20 percent. The permeability
7 ranges from 100 to 500 millidarcies. The net pay thickness
8 is approximately 40 feet. The gross thickness is -- averages
9 about 60 feet. And the bottom hole temperature is approxi-
10 mately 75 degrees. And there's no gas cap and no water, just
11 a small percentage of water in the O'Connell Sand. In fact,
12 I doubt that it would produce any. And the reservoir pressure
13 is very low. In fact, nearly nil. And the original oil
14 saturation is estimated at 775 barrels per acre feet, and
15 50 percent pore volume saturation, and the connate irreducible
16 water saturation is 12 percent at pore volume, and it's a
17 very viscous and asphaltic crude, and oil gravities range
18 from about 15 to 17 degrees API, and there's very little gas
19 in the area. Consequently, we'll have no shrinkage factor.
20 The formation volume factor would be 1.

21 And by adding heat we can reduce the vis-
22 cosity in this reservoir, and we had these analyses run, and
23 if you'll look at the bottom at this reservoir data sheet,
24 we've got the reservoir viscosities and at 70 degrees the
25 viscosity is 6006 centipoise. At 100 degrees Fahrenheit it

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1 would be 1440; at 150 degrees it's 247; at 220 degrees it's
2 45.5; and 250 degrees it's down to 29.2 centipoise.

3 And the type of water is fresh. And the
4 connate water viscosity is close to .95 centipoise at 75 de-
5 grees.

6 Q Mr. Joy, will you now refer to Applicant's
7 Exhibit Number Nine and explain this to the Examiner?

8 A Well, this is the total cost of the in-
9 stallation out there, and I've gone through and figured out
10 the -- an itemized individual cost of surface installation
11 and producing wells and the re-entries and the source water
12 well, and then I've summarized it on the end.

13 And on the first page, the cost for the
14 surface installation for this pilot probably will run approxi-
15 mately \$86,331, and I've itemized the items up above there.

16 The re-entry costs on those wells, cost
17 of producing wells, those new producing wells, will average
18 us, and this is fully equipped with pump jacks and all, \$51,875
19 each, and the re-entries will cost us approximately \$29,086.
20 That's for each well.

21 The cost of the steam injection well will
22 run approximately \$50,685.

23 And the cost of the water supply well will
24 be \$34,589.

25 And then the operating costs for ten months

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1 will be approximately \$205,744, and if you'll note up at the
2 top, it takes extreme energy to convert this water to steam
3 and it's costly, and then also the steam generator is fairly
4 expensive there.

5 The last page is a summary of costs --
6 costs of producing wells and the two re-entries and the steam
7 injection well and the water supply well and the surface in-
8 stallation and operating cost.

9 And the cost over the next ten months will
10 be \$602,649.

11 And we --

12 Q Mr. Joy --

13 A Go ahead.

14 Q Mr. Joy, will you refer to Applicant's
15 Exhibit Ten and identify this for the Examiner?

16 A All right, this is a general discussion I
17 worked up and it gives more or less, gives the field location
18 and where it's located in the State of New Mexico, and the
19 average depth of the formation, which is the O'Connell Sand,
20 and the structure.

21 And then I discussed the -- in here some
22 as to that there was no drive available in the reservoir; that
23 solution gas was gone; very low gravity drainage; and that we
24 would have to create an artificial drive in order to recover
25 this oil.

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1 And then we went into -- I discussed the
2 pilot area already, and the area. And by the way, this pilot
3 will be 230.56 feet on the side, which gives us 1.22 acres in-
4 side.

5 And the primary objective of the field
6 test is to determine the feasibility of using steam to recover
7 the very viscous crude from the O'Connell Ranch Field in
8 Guadalupe County, New Mexico.

9 Our reservoir temperature is approximately
10 75 degrees, and I'll just repeat this, the viscosity of the
11 crude is almost 6000 centipoise. Reduction in viscosity
12 around 27 centipoise can be achieved if oil temperatures can
13 be raised to approximately 260 degrees Fahrenheit.

14 And it is planned to inject 275 degree
15 steam per day to increase oil temperatures, and anticipated
16 injection rate is 150 barrels of steam per day at 285 psig.

17 And we went over this, then, and also I
18 discussed the water source in here and the formation where we
19 will be obtaining our water from, which is the Monsimer Sand-
20 stone, and I also worked out the reserves. Approximately
21 14,000 barrels of water per acre, and that was based on an
22 average porosity of 20 percent; formation thickness at 20
23 feet; and the recovery factor of 75 percent.

24 And I discussed reservoir data. The oil
25 in place under the pilot is estimated at 38,000 barrels, based

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1 on average porosity of 20 percent, average pay thickness of
2 20 feet, and average oil saturation of 50 percent, and it is
3 estimated steam injection will recover approximately 18,000
4 barrels, or 50 percent of in-place oil.

5 And then I had that data sheet that we
6 discussed a few minutes ago. And then I went in and just
7 itemized more or less what would be required for the surface
8 installation in order to conduct enhanced recovery flood in
9 this area.

10 And then the total economics -- the total
11 cost of the flood is estimated \$396,905, and future ten months
12 operating cost is \$205,744, which this makes a total deficit
13 over this period is estimated at \$387,821.

14 Q Mr. Joy, as you proceed with this project
15 you will file all forms required by the Oil Conservation Divi-
16 sion?

17 A Yes, I will.

18 Q Do you request an administrative procedure
19 be established in this order whereby the project can be ex-
20 panded from time to time without the requirement of further
21 hearing?

22 A Yes, I do.

23 Q In your opinion will granting this appli-
24 cation be in the interest of conservation, the prevention of
25 waste, and the protection of correlative rights?

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1 A Yes, it will, and this will be the first
2 flood, and let me discuss two more -- something else along
3 this line.

4 I've read some articles where they esti-
5 mate there might be up to 500-million barrels of oil in through
6 this area which could be recovered, which would sure help the
7 State income, both from taxes and royalty under the State
8 property.

9 Q Were Exhibits Five, Five-A, Six through
10 Ten prepared by you?

11 A Yes, they were.

12 MR. CARR: At this time, Mr. Examiner, I
13 would offer into evidence Applicant's Exhibits Five, Five-A,
14 Six, Seven, Eight, Nine, and Ten.

15 MR. STAMETS: These exhibits will be
16 admitted.

17 MR. CARR: I have nothing further of this
18 witness on direct.

19
20 CROSS EXAMINATION

21 BY MR. STAMETS:

22 Q Mr. Joy, I believe you indicated you were
23 going to load the annulus in the steam injection well, is
24 that correct?

25 A Yes.

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1 Q Would it be more -- would you get better
2 utilization of your steam if you did not have that water in
3 there?

4 A Oh, I think after we get it heated up it
5 will maintain it, because water's not too good a conductor
6 of heat. I think we could go ahead, and if not, why, I could
7 discuss it with the Commission at that time.

8 I do -- I did find out, though, that --
9 from Getty in California, they're planning on insulating all
10 their lines, injection lines, tubing and all, to eliminate the
11 excess heat loss under the present energy crisis. And this
12 we may want to do instead of loading it with inhibited; we
13 may want to go in there and put some type of -- coat that
14 tubing with some type of insulation.

15 Q If the annulus wasn't loaded, would you
16 leave the valve open at the surface in order to detect any
17 leakage of the tubing packer?

18 A Yes, I would.

19 Q Okay. And I presume, based on what you've
20 said here, that you estimate that it will take about ten
21 months to evaluate --

22 A Right.

23 Q -- this project. What will you do with
24 any produced water during this pilot phase?

25 A Well, if we produce any, we could put it

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1 in pits there; it's fresh water; all of it's fresh. It's
2 highly potable.

3 Q Is it possible it may not be fresh after
4 it runs through the formation?

5 A Oh, I doubt that because the -- we've got
6 the analysis, and I would have to run -- oh, I don't have that.
7 I had an analysis from -- water from the O'Connell, and it's
8 fresh water. From the core analysis they stated it was fresh.
9 Type of connate water, fresh. This we got from core analysis;
10 it's fresh water.

11 Q You'd be able to report the volume and --

12 A Right.

13 Q -- some sort of a periodic analysis on --

14 A Right.

15 Q -- the produced water.

16 A On the water. Well, this flood is going
17 to require considerable monitoring, more than what an ordinary
18 waterflood would.

19 Q One thing that I might suggest, Mr. Joy,
20 since this is a pilot project we don't have any -- I don't
21 believe we've got any steam projects operating in the state
22 at this time. You might like to suggest to the Division
23 the form and content of monthly reports on the pilot project.

24 A All right.

25 Q And I note you've asked for administrative

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1 procedure for expansion but I don't see that was provided for
2 in the -- in the application, and I would imagine before we
3 had an expansion of this project we would like to have a little
4 bit of public discussion on the --

5 A. All right.

6 Q. -- results of the pilot project.

7 MR. STAMETS: Are there any other questions
8 of Mr. Joy at this time? Mr. Ulvog?

9
10 QUESTIONS BY MR. ULVOG:

11 Q. There have been a number of wells drilled
12 in the vicinity, not in the immediate area of your proposed
13 pilot flood but at a distance not too great; for instance,
14 over east of the highway, for example. There have been other
15 operators that have drilled wells there, test wells, and strat
16 tests, and so on, over the years, Bruce Wilbanks, Paul Haskins,
17 in addition to the Humble wells, and so on. Have you looked
18 into the possibility of any of those other wells not in the
19 immediate vicinity of the project but within a few miles
20 around there, to see that they have been plugged out properly,
21 and so on? After all, with respect to core tests, we don't
22 really have much control over them, as you've already found out.
23 What I'm thinking about, is there a possibility that we're
24 going to have leakage and maybe contamination from other wells
25 that have not been properly plugged. Is that a possibility?

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1 A Well, it is a possibility, but I think it
2 would be rather slight at this time, since we're only going
3 to be injecting 150 barrels a day and this sand is approxi-
4 mately 40 feet thick. It would take tremendous volumes of
5 fluid unless we had a breakthrough, and I think we'll catch
6 that in this small pattern immediately, and this is one of the
7 reasons we wanted to initiate a pilot instead of going into
8 full-fledged flood.

9 Q But you would take a harder look --

10 A Right.

11 Q -- at other wells --

12 A We'd go along.

13 Q -- before it goes beyond the pilot stage,
14 then?

15 A Oh, definitely. Definitely.

16 MR. STAMETS: Any other questions of Mr.
17 Joy? Mr. Ramey.

18
19 QUESTIONS BY MR. RAMEY:

20 Q Mr. Joy, these three water analyses, are
21 those out of the O'Connell or --

22 A Those come out of the Monsimer, the Mon-
23 simer. Now there's probably, I don't know, we may have
24 had a load of water from the O'Connell but there's no indi-
25 cation that there's any water in the O'Connell that will flow.

1 The water from the core analysis is 12 percent and that's all
2 they've been able to get or find when we -- we've cored every
3 well.

4 Well, now, clarify that. There's been two
5 wells we didn't. There's one well we did not core in and
6 several we did not have analyzed because there's no oil satu-
7 ration in them. There's one dry hole, that O'Connell No. 3
8 was a dry hole and we did not core.

9 Q Now when you run this water through your
10 boiler aren't you going to have a scaling problem?

11 A The generator will have filters and soften-
12 ers both installed ahead of the generator, right. We're
13 going to have --

14 Q You'll remove most of this stuff?

15 A Right. We'll have two filters ahead and --

16 Q What will you with this --

17 A Pardon me?

18 Q What will you do with your -- the stuff
19 you remove here?

20 A Softeners?

21 Q Softeners?

22 A Well, we'd have to -- if we get quite a
23 bit in I guess we'll have to put it into pits out there and
24 the thing is, as Mr. Scott pointed out, when we've been
25 drilling these wells, some of them have no fresh water above

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1 the Monsimer. I've run into several wells where we have not
2 had any water. Then we'll encounter some small stringers else-
3 where and you will.

4 Q You wouldn't anticipate putting it in a
5 pit that would endanger any --

6 A Well, I wouldn't think because it's going
7 to be --

8 Q -- any shallow fresh water?

9 A Well, I wouldn't think because there's no
10 fresh water there around this well here. We didn't -- we
11 didn't encounter any fresh water in that No. 1, I don't be-
12 lieve, as I recall.

13 MR. SCOTT: I don't recall in the No. 1.

14 A We'll have to check files but I don't think
15 there's any fresh water in that area right there. As we move
16 south we've got some areas that have, oh, we might have got
17 up to 15, 20 gallons per minute.

18 But we can check with you on the softeners.
19 We can always truck it out elsewhere if we have to. If we
20 can't make a pit out there, we can --

21 Q It may be appropriate.

22 A Well, I just think, I mean because there's
23 pits around in the area out there, probably.

24 Q What is the depth of the fresh water
25 there? I notice you've got, in some of your wells you have

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1 39 feet of surface pipe and 30 feet in others.

2 A Well, like I said, we have encountered
3 very little water. We have encountered one or two at about --
4 some small zones at around 40 feet, and then we had one, I
5 think, at 100 and something, about 105 feet, --

6 Q What's the depth of the water at the wind-
7 mill that's nearby?

8 A Oh, those, somewhere around -- about 30-
9 some to 40 feet, and then that -- I don't know if that other
10 one is completed yet, but 100 to 105 feet in that area. If
11 not I'll have to check on it.

12 I think most of them are right in that
13 area. It seems like there's just small sand lenses throughout
14 the area and that's where you're getting your water from.
15 It's not homogeneous and not continuous, those upper water
16 sands.

17 Q I'm wondering if it wouldn't be more ap-
18 propriate to set maybe 50 feet of surface pipe instead of
19 30 feet of surface?

20 A Oh, I mean, you could, but most of them
21 we don't even encounter any water, Mr. Ramey, and it's very
22 low, most of it.

23 Q Well, that makes it more valuable when it
24 is there.

25 A Well, I -- that's true, but the thing is

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1 we've -- I'm cementing these all the way from TD to surface.

2 Q There's no danger for any water --

3 A No, that was the reason that I elected to
4 circulate cement on these when I initiated the drilling pro-
5 gram out there for Public Lands Exploration Company.

6 Q I just don't know that I would want to
7 call your water from Monsimer Sand as being potable or not,
8 with 1600 bicarbonates and 1400 sulfates, 700 chlorides.

9 A Well, we'll be taking those out when we
10 re-inject.

11 MR. RAMEY: That's all.

12 MR. STAMETS: Any other questions of the
13 witness? He may be excused.

14 Anything further in this case?

15 MR. CARR: Nothing further.

16 MR. STAMETS: The case will be taken under
17 advisement and the hearing is adjourned.

18

19 (Hearing concluded.)

20

21

22

23

24

25

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C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREPY 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 C.S.R.

SALLY W. BOYD, C.S.R.

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I do hereby certify that the foregoing is a true and correct copy of the original as filed in the file of the Oil Conservation Division.

10-15-80
Richard L. Hammett
Oil Conservation Division

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
15 October 1980

EXAMINER HEARING

IN THE MATTER OF:

Application of Public Lands Explor-
ation, Inc., for a pilot steam en-
hanced oil recovery project, Guada-
lupe Courty, New Mexico.

CASE
7048

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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MR. STAMETS: We'll call the last case today, Case 7048.

MR. PADILLA: Application of Public Lands Exploration, Inc., for a pilot steam enhanced oil recovery project, Guadalupe County, New Mexico.

MR. STAMETS: Call for appearances in this case.

MR. CARR: Mr. Examiner, my name is William F. Carr, Campbel and Black, P.A., Santa Fe, appearing on behalf of the applicant, Public Lands Exploration, Inc. I have two witnesses who need to be sworn.

MR. STAMETS: I'd like to have them both stand and be sworn at this time, please.

(Witnesses sworn.)

MR. CARR: At this time I'd call George Scott.

GEORGE SCOTT
being called as a witness and having been 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 George Scott. I live in Roswell, New Mexico.

Q Mr. Scott, by whom are you employed and in what capacity?

A I'm a consulting geologist in Roswell, and I've been retained by Public Lands Exploration to look after their interest from the geological point of view in this venture.

Q Have you previously testified before this Commission, had your credentials accepted and made a matter of record?

A I have.

Q And you were qualified as a petroleum geologist?

A Yes.

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

A Yes.

Q And are you familiar with the general area which is involved in this case?

A Yes, I am.

MR. CARR: Are the witness' qualifications acceptable?

MR. STAMETS: They are.

Q Mr. Scott, will you briefly state what Public Lands Exploration, Inc., seeks with this application?

A The application is for the purpose of instituting a pilot steam enhanced oil recovery project.

Q And whereabouts is this project located?

A The pilot will be in the northeast quarter of the northeast quarter of Section 15 of Township 11 North, Range 25 East, Guadalupe County, New Mexico.

Q Will you please refer to what has been marked for identification as Applicant's Exhibit Number One and --

A Yes.

Q -- explain to the Examiner what it is and what it shows?

A All right. In this Exhibit Number One, which is a topographic map of portions of two USGS sheets, the road net in the area is shown. The area is located north of the Village of Newkirk about nine miles, and you proceed northward on State Highway 129, turn west on the dirt road that is shown on the map, and go south to the -- to the field area. Those roads are on there.

Also the wells that PLEI have drilled in the area are shown and the immediate road net in the field area is shown thereon.

The topography of the area is shown thereon. The topography of the area is shown by the topographic contours on this map.

Q Will you now refer to Applicant's Exhibit Number Two and review this for Mr. Stamets?

A All right. This is -- map here is simply a well base. It will be useful for general orientation. We have other maps that are more specific as to our pilot venture.

Once again, our steam pilot project will be in the northeast quarter of the northeast quarter of Section 15 in the vicinity of two Humble strat tests and the PLEI No. 1 State, shown there in the northeast northeast. A line of cross section is shown, also, here in red, and this will be useful in orienting you on the stratigraphy and the zone that we plan to -- to flood.

Q Will you now refer to your Exhibit Number Three, which is your cross section, and review the data contained thereon?

A All right. The line of section is shown on the preceding exhibit. Our steam flood venture will be in very close proximity to Humble core test No. 1-15, or I believe they refer to it as 15-1 State. This cross section was made from Humble logs that were obtained from the OCD a number of years after they had drilled these.

The surface topography of the area is shown on the cross section. The different formations are labeled. The Chinle formation, the Santa Rosa formation, the Artesia group, and the top of the San Andres formation.

Now there are two sands within the Santa Rosa formation that we are very interested in, the O'Connell Sand is our principal zone of interest. This is the zone we plan to flood with steam.

The Monsimer Sand, which is a lower sand of the Santa Rosa, is water-bearing and it will serve as our water supply zone for the steam flood.

Q In your opinion is the formation in this area such that you can successfully institute the enhanced recovery project that you are proposing?

A Yes.

Q Do you have anything further to present in regard to Exhibit Number Three?

A No, I don't think so. The correlations are fairly straightforward here as far as between these core tests are concerned.

Q Will you now refer to Applicant's Exhibit Number Four and review this for the Examiner?

A This Exhibit Number Four is a map of Section 15 and the adjoining sections. It's on a larger scale and here we're able to show the proposed steam injection well

and four producing wells and an observation well. These will be further discussed by still another exhibit on a still larger scale, and I believe Mr. Joy will elaborate on that.

The outline of the productive sands, the limits of the productive sand, are shown on this map by a dashed line, and we also show the structural contours on top of the O'Connell Sand, our pay objective.

May I state that the O'Connell Sand is an informal term that we are using to denote this upper sand of the Santa Rosa, and Monsimer Sand, the water-bearing sand, is also an informal designation that we are using.

I believe that the rest of the information about this map is explained in the -- in the explanation section here at the bottom of it. We do show here a number of wells which we think are capable of producing in an expanded flood, and they're shown by a separate type of circle here.

Q Mr. Scott, is Public Lands Exploration, Inc., the operator of all lands within the project area?

A Yes, they are.

Q Were Exhibits One through Four prepared by you or under your direction and supervision?

A Yes, they were.

MR. CARR: At this time, Mr. Stamets, we would offer into evidence Applicant's Exhibits One through Four.

MR. STAMETS: These exhibits will be admitted.

MR. CARR: I have nothing further of this witness on direct.

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Scott, have you done any work in the area to determine the source of the water in the area, other than the Monsimer Sand? Are there any shallower zones in the area utilized by ranchers for windmill water?

A Yes, there is. There's a -- there's surficial ground water at approximately 30 to 40 feet, as I recall, in the area, and there is at least one windmill in Section 15, over in the northwest quarter of Section 15, and we have been very concerned about that shallow water and we've had numerous discussions with the ranchowner about protecting it, and I believe our casing program has been adequate, our surface casing in these wells has been adequate to protect it.

The zone we'll be getting our water from is 400 feet down and we see no connection between the shallow ground water that -- at 25 or 30 feet and the sand down there about 400, 420 feet, the Monsimer Sand, that we'll be utilizing. It is fresh water, the Monsimer -- we've had water analyzed

in the -- from the Monsimer Sand, and it's very fresh water, and I think Mr. Joy will be prepared to -- to discuss those water analyses.

Q Is it -- is there a zone above the O'Connell sand which you would consider to be essentially impermeable as far as the percolation of ground water in the area, or is it possible that you could have perched water tables anywhere above the O'Connell Sand?

A Well, I think our -- we're drilling with air up here; all of our work has been done with air drilling, air on this drilling, and so we've had a pretty good handle on where water has been encountered, and we do, in a number of these wells, see some evidence of perched water. Usually it's a very limited amount, though. We usually see our -- our water from these perched zones decrease in volume rather rapidly.

The Chinle shale is a thick red and green shale unit for the most part, a very dense, tight shale. We have no evidence that water has moved downward through extensive fracturing. That is a possibility but we have no evidence to indicate that.

Q Chinle shale would be -- well, it looks like it varies. On the Humble core test No. 6-12-15, it would appear as though that's a very thick shale section, almost from the surface down to the O'Connell Sand.

A. That is correct. Now there are some siltstone beds in here. I think the sonic log on that well will show you some of the siltstone beds there, but they're thin. It's mainly -- mainly a shale section.

Q. Then moving to the east on the cross section, core test 6-11-13, it would appear as though there's a couple hundred feet of shale immediately above the O'Connell Sand.

A. Yes, more than that. That's predominately a shale section up to about 200 feet from the surface.

Q. Okay.

A. Now, there are some sand stringers in that interval, of course, but it's predominately a shale section.

Q. And what about the -- what's the nature of the zone between the O'Connell and the Monsimer?

A. That is a shale section. It's a -- usually it's a red shale; sometimes it's greenish, but it's a shale unit.

Q. Would the applicant in this case need to exercise caution to make certain that either through completion techniques or because of using excessive pressure, he try and avoid fracturing the zone or causing communication between the two zones?

A. Yes. Yes, this is something that we have considered and thought about and will be watching very much.

Yes. It will call for some really good casing programs, cementing programs. We're aware of this.

MR. STAMETS: Are there any other questions of this witness? He may be excused.

One more question.

Q Are any of the wells on Exhibit Number Three going to be in the pilot project?

A Let's see. Oh, Exhibit Three is the cross section.

Q Right.

A Yes, there will be. Core test Number 15-1 will be a re-entry well and will be converted into a producer.

Q Okay, that's all.

MR. STAMETS: The witness may be excused.

MR. CARR: At this time I would call Mr. Chuck Joy.

CHARLES JOY

being called as a witness and having been 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. Charles Joy, Artesia, New Mexico.

Q. By whom are you employed and in what capacity?

A. I've been retained by Public Lands Exploration Company to look after the development of the area we're discussing here and look after the drilling and completion of these wells.

Q. Have you previously testified before this Commission, had your credentials accepted and made a matter of record?

A. Yes, I have.

Q. Were you qualified at that time as a petroleum engineer?

A. Yes, I was.

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

A. Yes, I am.

Q. Are you familiar with the subject area?

A. Yes, I am.

MR. CARR: Are the witness' qualifications acceptable?

MR. STAMETS: They are.

Q. Will you please refer to what has been marked for identification as Applicant's Exhibit Number Five

and review this for the Examiner?

A. This map shows the area which we plan to initiate a pilot flood in, in the northeast quarter of the northeast quarter of Section 15. At the present time there are two strat tests drilled in the area, the Hubble 15-1 and 6-14-15.

We plan to re-enter these two wells and make producing wells out of them.

We also will drill three additional wells, the No. 11 will be the injection well, and Nos. 10 and 12 will be producing wells. This we have set up as an inverted 5-spot and we will inject steam in No. 11 Well.

Q Does this plat also show your water supply wells?

A Yes, it does. On the north in Section 10 you'll see a No. 1 Well and that's the Roberts No. 1. We drilled that well through the O'Connell Sand and to the bottom of the Monsimer Sand. I set 4-1/2 inch casing and circulated cement from the bottom to the surface on this well, and we plan to perforate this in the Monsimer Sand later and make a water source well out of it.

We also have drilled the No. 4 State Well, which is located in the southeast quarter of Section 15, and this well we drilled down and we also -- it was dry in the O'Connell Sand and we drilled on through the Monsimer Sand,

and I ran casing in this well but it was not cemented and I left it hanging and it slotted and I checked with the State Engineer and they permitted us to go ahead and develop this into a water well, and this will be our water source well for the pilot area at this time.

Q Mr. Joy, are the wells which you are hopeful will be producing wells in the project area capable of only marginal production absent enhanced recovery methods?

A These wells will not flow at the present time and we -- core analysis indicated the formation contained a very viscous crude oil with little or no gas saturation, and production tests indicate no natural water drive and very low gravity drainage, and these conditions leave the reservoir without a driving mechanism. Consequently, there is no way of recovering the oil unless we initiate an enhanced recovery project whereby we can develop a driving -- artificial driving mechanism, which we plan to do by injecting steam at approximately 275 degrees temperature and at a pressure of 285 psig.

We also plan to inject approximately 150 barrels of water per day -- that will be steam, rather, to clarify that.

Q Now, Mr. Joy --

MR. STAMETS: I wish -- I'd like to get that clarified now.

A That's a 150 barrels --

MR. STAMETS: Of water per day, as steam?

A Right, as steam.

MR. STAMETS: Okay, so the 285 pressure will be what it takes, 155 barrels of water per day -- thank you, Mr. Joy.

Q Now, Mr. Joy, is it fair to summarize your testimony that -- to be that absent approval of and institution of this enhanced recovery -- let me restate that. That by approving this application oil will be recovered that would otherwise be left in the ground?

A That's correct.

Q Will you now refer to what has been marked as Applicant's Exhibit Number Five-A, which is your schematic drawing --

A Right.

Q -- and review the data contained thereon for Mr. Stamets?

A This is a schematic of each individual well within a half mile radius of the pilot area, and I'll go through these and take a look at it.

The first well is the State No. 11, which will be the injection well, and we plan to run 39 feet of J-55 8-5/8ths inch 24 pound casing at the surface and cement with 16 sacks and circulate. Then I'll drill down to 510 feet and set 510 feet of K-55 casing and that will be 4-1/2 inch 10-1/2

pound casing and plan to cement with 150 sacks and circulate cement to the surface.

By the way, I will clarify this, we are using Class II, because this is what they are using in Bakersfield, California at the present time in their thermal injection projects.

The second one would be -- well, and this also, let me clarify this, we will run and inject through tubing. We'll set a packer at approximately 380 feet and run a Baker Model HB Single Grip Packer. Now this is a high temperature element packer and it also will be equipped with an expansion joint internally, and then in the annulus we plan to inject inhibited water and load the annulus with inhibited water from the top of the packer back to the surface to protect the well from corrosion.

Then on the proposed producers we will drill the State No. 10 Well, and there's a schematic of it on the next page, and I think it's more or less self-explanatory there. We will run tubing and I show the seating nipple and perforated nipple, and we plan to drill it to approximately 510 feet, also, and all these completions that we -- that I have drilled out there, I have circulated cement from TD back to the surface on the oil string.

MR. STAMETS: Have you had any loss of circulation problems on them?

A Very little. We have encountered, really, no lost circulation at all.

MR. STAMETS: All of these have circulated well with 150 sacks?

A We've had a few of them drop back about 10 or 20 feet, which we've gone back in later and filled up back to the surface.

There's a small gravel up there close to the surface around 30 feet, which we feel like if we don't get all the way through the surface casing, why, it does take the -- will permit cement to enter into it, flow back into it.

Then the No. 12 Well is the second well we plan to drill in the pilot area and complete. This public -- then the State No. 13 Well, this will be a re-entry. This well was originally drilled by Humble Oil Corporation and it was a strat test. We have very little information on it and as far as we know there's no casing in the well whatsoever. There are some cement plugs. But we plan on cleaning it out and running surface casing and a long string, oil string, to 510 feet.

Then we have another re-entry, which was the -- originally was drilled by Humble and it's the 6-14-15 Well, and there's very little information on this well. I checked the OCD records this morning and could find very little on it. We do know that it has 400 feet of 5-1/2 inch 14 pound

casing in it.

We plan to clean this well out and drill a 4-3/4 inch hole down to 510 feet and complete this as an open hole producer. We will probably -- we will probably have to run a bond log to see if this casing has been cemented, and if not, we'll have to cement the casing in this well.

MR. STAMETS: That 400 feet would put you right at the top of the --

A Right.

MR. STAMETS: -- O'Connell Sand.

A Correct.

MR. STAMETS: Okay.

A Then the State No. 4 Well was our water source well and I discussed that earlier, and this casing is hanging in the well, and we will put this on production first.

And the second well was the one we are retaining for a water source well in case we expand the flood and if the pilot looks feasibly economical to go ahead, we will need additional water later on in the life of this enhanced recovery. And we will perforate that. We have casing set in all the way through the Monsimer Sand.

Q And you're talking about the Roberts No. 1, is that correct?

A Right, this is the Roberts No. 1, I'm sorry, I didn't point that out.

Then the other producer will be the State No. 3, and that's west of our pilot area, and this well has already been completed and this is a schematic of the completion and we did circulate cement on it.

Then the State No. 3 Well, which is south of the pilot area there, we anticipate completing this well and make a producer out of it later, but at this time we have surface casing in it and we have the well capped. We drilled it to 500 feet, and it's a 7-7/8ths inch open hole down to 500 feet.

Likewise, the O'Connell No. 1 Well, we're holding it for possible producer at a later date, and we will run casing in these wells later on if we elect to go forward with the flood, or with the enhanced recovery project.

The O'Connell No. 3, we're also -- will plug this well. We drilled it and it was a dry hole, and we will file a C-103 shortly whereby we can get permission to plug this well.

And then the O'Connell No. 5, this is another probable producer. Now these wells I'm stating are probable producers, it just depends on the economics of our -- and the type of results we obtain from the pilot area.

Q Now, Mr. Joy, you have schematics here of all wells within a half mile radius of the proposed injection well?

A All but one well and that was a Humble strat test 6-12-15, and there's no records even in the OCD's files on this well.

Q Does that well appear on --

A It appears on --

Q --- Exhibit Number Four?

A Let's see, I believe it's on Four, right.
That's correct.

MR. STAMETS: What's the location of that well on Exhibit Four?

A Oh, it's in the south -- let's see, that would be -- northeast of the northwest. It would be --

MR. STAMETS: The one that says +4195?

A Right. Right under it is the 6-12-15 on that well.

MR. STAMETS: Okay.

Q Now on these schematics, well schematics, have you included all data required by the Oil Conservation Division Memo 377?

A I believe I have.

Q Will you now refer to what has been marked for identification as Applicant's Exhibit Number Six and explain to Mr. Stamets what this is?

A This is a log on our State No. 1 Well that we drilled, which would be approximately 103 feet east south-

east of the proposed injection well, and I've marked this to show the interval that we will be injecting steam into, and the No. 11 Well should be fairly close on depth with this well. It looks like that the top of the O'Connell Sand will be approximately 409 feet and the bottom is 479 feet.

Q And this well is also spotted on Applicant's Exhibit Number Five?

A Yes, it is. It's the State No. 1 Well and it's on --

Q Exhibit Five.

A -- Exhibit Five.

Q This exhibit also confirms the cross section which was previously offered by Mr. Scott?

A Yes, it does.

Q I believe you stated that you'll be injecting 150 barrels of steam.

A That is true.

Q At what depth are you going to be injecting this?

A It will be at approximately 409 feet down to 479 feet, in that interval.

Q And I believe you stated that it would be injected at a pressure of approximately 285 pounds.

A That is correct.

Q Do you believe that this presents any

danger of fracturing the formation?

B. No, I don't, and I've taken extreme precautions to eliminate any possible channeling back by -- in any of these wells from TD back to the surface.

C. Now, Mr. Joy, you're going to be injecting what would be characterized as fresh water?

A. Yes.

C. Will you please refer to what has been marked for identification as Applicant's Exhibit Number Seven --

A. In fact, this is extremely potable water and this is an analysis that Halliburton has run for us on our State No. 3 Well, State No. 4 Well, and Canadian State No. 1 Well, and we obtained these samples when we were drilling these wells in, and we've been drilling with air so they should be uncontaminated samples. And we can go through this, and the calcium in most of these, the highest we have is 200 parts per million, which is in the No. 3. The magnesium maximum there is 60; chlorides, 700; sulfates 1400; bicarbonate, 1600; and iron (sic) is nil.

MR. STAMETS: These analyses out of the O'Connell or out of the Monsimer?

A. These are out of the O'Connell. No, these came out of the Monsimer Sand when we drilled in.

We've drilled all these wells into the Monsimer Sand to test the top.

Q Mr. Joy, will you now refer to Exhibit Number Eight and review this for Mr. Staratz?

A This is the reservoir data for the O'Connell Sand. The reservoir properties, the average depth from 350 to 500 feet, and it's a sandstone formation. The average porosity is approximately 20 percent. The permeability ranges from 100 to 500 millidarcies. The net pay thickness is approximately 40 feet. The gross thickness is -- averages about 60 feet. And the bottom hole temperature is approximately 75 degrees. And there's no gas cap and no water, just a small percentage of water in the O'Connell Sand. In fact, I doubt that it would produce any. And the reservoir pressure is very low. In fact, nearly nil. And the original oil saturation is estimated at 775 barrels per acre feet, and 50 percent pore volume saturation, and the connate irreducible water saturation is 12 percent at pore volume, and it's a very viscous and asphaltic crude, and oil gravities range from about 15 to 17 degrees API, and there's very little gas in the area. Consequently, we'll have no shrinkage factor. The formation volume factor would be 1.

And by adding heat we can reduce the viscosity in this reservoir, and we had these analyses run, and if you'll look at the bottom at this reservoir data sheet, we've got the reservoir viscosities and at 70 degrees the viscosity is 6006 centipoise. At 100 degrees Fahrenheit it

would be 1440; at 150 degrees it's 247; at 220 degrees it's 45.5; and 250 degrees it's down to 29.2 centipoise.

And the type of water is fresh. And the connate water viscosity is close to .25 centipoise at 75 degrees.

Q Mr. Joy, will you now refer to Applicant's Exhibit Number Nine and explain this to the Examiner?

A Well, this is the total cost of the installation out there, and I've gone through and figured out the -- an itemized individual cost of surface installation and producing wells and the re-entries and the source water well, and then I've summarized it on the end.

And on the first page, the cost for the surface installation for this pilot probably will run approximately \$86,331, and I've itemized the items up above there.

The re-entry costs on those wells, cost of producing wells, those new producing wells, will average us, and this is fully equipped with pump jacks and all, \$51,875 each, and the re-entries will cost us approximately \$29,086. That's for each well.

The cost of the steam injection well will run approximately \$50,685.

And the cost of the water supply well will be \$34,589.

And then the operating costs for ten months

will be approximately \$205,744, and if you'll note up at the top, it takes extreme energy to convert this water to steam and it's costly, and then also the steam generator is fairly expensive there.

The last page is a summary of costs -- costs of producing wells and the two re-entries and the steam injection well and the water supply well and the surface installation and operating cost.

And the cost over the next ten months will be \$602,649.

And we --

Q Mr. Joy --

A Go ahead.

Q Mr. Joy, will you refer to Applicant's Exhibit Ten and identify this for the Examiner?

A All right, this is a general discussion I worked up and it gives more or less, gives the field location and where it's located in the State of New Mexico, and the average depth of the formation, which is the O'Connell Sand, and the structure.

And then I discussed the -- in here some as to that there was no drive available in the reservoir; that solution gas was gone; very low gravity drainage; and that we would have to create an artificial drive in order to recover this oil.

And then we went into -- I discussed the pilot area already, and the area. And by the way, this pilot will be 230.56 feet on the side, which gives us 1.22 acres inside.

And the primary objective of the field test is to determine the feasibility of using steam to recover the very viscous crude from the O'Connell Ranch Field in Guadalupe County, New Mexico.

Our reservoir temperature is approximately 75 degrees, and I'll just repeat this, the viscosity of the crude is almost 6000 centipoise. Reduction in viscosity around 27 centipoise can be achieved if oil temperatures can be raised to approximately 260 degrees Fahrenheit.

And it is planned to inject 275 degree steam per day to increase oil temperatures, and anticipated injection rate is 150 barrels of steam per day at 285 psig.

And we went over this, then, and also I discussed the water source in here and the formation where we will be obtaining our water from, which is the Monsimer Sandstone, and I also worked out the reserves. Approximately 14,000 barrels of water per acre, and that was based on an average porosity of 20 percent; formation thickness at 20 feet; and the recovery factor of 75 percent.

And I discussed reservoir data. The oil in place under the pilot is estimated at 38,000 barrels, based

on average porosity of 20 percent, average pay thickness of 20 feet, and average oil saturation of 50 percent, and it is estimated steam injection will recover approximately 12,000 barrels, or 50 percent of in-place oil.

And then I had that data sheet that we discussed a few minutes ago. And then I went in and just itemized more or less what would be required for the surface installation in order to conduct enhanced recovery flood in this area.

And then the total economics -- the total cost of the flood is estimated \$396,905, and future ten months operating cost is \$205,744, which this makes a total deficit over this period is estimated at \$387,821.

Q Mr. Joy, as you proceed with this project you will file all forms required by the Oil Conservation Division?

A Yes, I will.

Q Do you request an administrative procedure be established in this order whereby the project can be expanded from time to time without the requirement of further hearing?

A Yes, I do.

Q In your opinion will granting this application be in the interest of conservation, the prevention of waste, and the protection of correlative rights?

A Yes, it will, and this will be the first flood, and let me discuss two more -- something else along this line.

I've read some articles where they estimate there might be up to 500-million barrels of oil in through this area which could be recovered, which would sure help the State income, both from taxes and royalty under the State property.

Q Were Exhibits Five, Five-A, Six through Ten prepared by you?

A Yes, they were.

MR. CARR: At this time, Mr. Examiner, I would offer into evidence Applicant's Exhibits Five, Five-A, Six, Seven, Eight, Nine, and Ten.

MR. STAMETS: These exhibits will be admitted.

MR. CARR: I have nothing further of this witness on direct.

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Joy, I believe you indicated you were going to load the annulus in the steam injection well, is that correct?

A Yes.

Q Would it be more -- would you get better utilization of your steam if you did not have that water in there?

A Oh, I think after we get it heated up it will maintain it, because water's not too good a conductor of heat. I think we could go ahead, and if not, why, I could discuss it with the Commission at that time.

I do -- I did find out, though, that -- from Getty in California, they're planning on insulating all their lines, injection lines, tubing and all, to eliminate the excess heat loss under the present energy crisis. And this we may want to do instead of loading it with inhibited: we may want to go in there and put some type of -- coat that tubing with some type of insulation.

Q If the annulus wasn't loaded, would you leave the valve open at the surface in order to detect any leakage of the tubing packer?

A Yes, I would.

Q Okay. And I presume, based on what you've said here, that you estimate that it will take about ten months to evaluate --

A Right.

Q -- this project. What will you do with any produced water during this pilot phase?

A Well, if we produce any, we could put it

in pits there; it's fresh water; all of it's fresh. It's highly potable.

Q Is it possible it may not be fresh after it runs through the formation?

A Oh, I doubt that because the -- we've got the analysis, and I would have to run -- oh, I don't have that. I had an analysis from -- water from the O'Connell, and it's fresh water. From the core analysis they stated it was fresh. Type of connate water, fresh. This we got from core analysis; it's fresh water.

Q You'd be able to report the volume and --

A Right.

Q -- some sort of a periodic analysis on --

A Right.

Q -- the produced water.

A On the water. Well, this flood is going to require considerable monitoring, more than what an ordinary waterflood would.

Q One thing that I might suggest, Mr. Joy, since this is a pilot project we don't have any -- I don't believe we've got any steam projects operating in the state at this time. You might like to suggest to the Division the form and content of monthly reports on the pilot project.

A All right.

Q And I note you've asked for administrative

procedure for expansion but I don't see that was provided for in the -- in the application, and I would imagine before we had an expansion of this project we would like to have a little bit of public discussion on the --

A. All right.

Q -- results of the pilot project.

MR. STAMETS: Are there any other questions of Mr. Joy at this time? Mr. Ulvog?

QUESTIONS BY MR. ULVOG:

Q There have been a number of wells drilled in the vicinity, not in the immediate area of your proposed pilot flood but at a distance not too great; for instance, over east of the highway, for example. There have been other operators that have drilled wells there, test wells, and strat tests, and so on, over the years, Bruce Wilbanks, Paul Haskins, in addition to the Humble wells, and so on. Have you looked into the possibility of any of these other wells not in the immediate vicinity of the project but within a few miles around there, to see that they have been plugged out properly, and so on? After all, with respect to core tests, we don't really have much control over them, as you've already found out. What I'm thinking about, is there a possibility that we're going to have leakage and maybe contamination from other wells that have not been properly plugged. Is that a possibility?

A. Well, it is a possibility, but I think it would be rather slight at this time, since we're only going to be injecting 150 barrels a day and this sand is approximately 40 feet thick. It would take tremendous volumes of fluid unless we had a breakthrough, and I think we'll catch that in this small pattern immediately, and this is one of the reasons we wanted to initiate a pilot instead of going into full-fledged flood.

Q. But you would take a harder look --

A. Right.

Q. -- at other wells --

A. We'd go along.

Q. -- before it goes beyond the pilot stage, then?

A. Oh, definitely. Definitely.

MR. STAMETS: Any other questions of Mr. Joy? Mr. Ramey.

QUESTIONS BY MR. RAMEY:

Q. Mr. Joy, these three water analyses, are those out of the O'Connell or --

A. Those come out of the Monsimer, the Monsimer. Now there's probably, I don't know, we may have had a load of water from the O'Connell but there's no indication that there's any water in the O'Connell that will flow.

The water from the core analysis is 12 percent and that's all they've been able to get or find when we -- we've cored every well.

Well, now, clarify that. There's been two wells we didn't. There's one well we did not core in and several we did not have analyzed because there's no oil saturation in them. There's one dry hole, that O'Connell No. 3 was a dry hole and we did not core.

Q Now when you run this water through your boiler aren't you going to have a scaling problem?

A The generator will have filters and softeners both installed ahead of the generator, right. We're going to have --

Q You'll remove most of this stuff?

A Right. We'll have two filters ahead and --

Q What will you with this --

A Pardon me?

Q What will you do with your -- the stuff you remove here?

A Softeners?

Q Softeners?

A Well, we'd have to -- if we get quite a bit in I guess we'll have to put it into pits out there and the thing is, as Mr. Scott pointed out, when we've been drilling these wells, some of them have no fresh water above

the Monsiner. I've run into several wells where we have not had any water. Then we'll encounter some small stringers elsewhere and you will.

Q You wouldn't anticipate putting it in a pit that would endanger any --

A Well, I wouldn't think because it's going to be --

Q -- any shallow fresh water?

A Well, I wouldn't think because there's no fresh water there around this well here. We didn't -- we didn't encounter any fresh water in that No. 1, I don't believe, as I recall.

MR. SCOTT: I don't recall in the No. 1.

A We'll have to check files but I don't think there's any fresh water in that area right there. As we move south we've got some areas that have, oh, we might have got up to 15, 20 gallons per minute.

But we can check with you on the softeners. We can always truck it out elsewhere if we have to. If we can't make a pit out there, we can --

Q It may be appropriate.

A Well, I just think, I mean because there's pits around in the area out there, probably.

Q What is the depth of the fresh water there? I notice you've got, in some of your wells you have

39 feet of surface pipe and 30 feet in others.

A. Well, like I said, we have encountered very little water. We have encountered one or two at about -- some small zones at around 70 feet, and then we had one, I think, at 100 and something, about 105 feet, --

Q. That's the depth of the water at the windmill that's nearby?

A. Oh, those, somewhere around -- about 30- some to 40 feet, and then that -- I don't know if that other one is completed yet, but 100 to 105 feet in that area. If not I'll have to check on it.

I think most of them are right in that area. It seems like there's just small sand lenses throughout the area and that's where you're getting your water from. It's not homogeneous and not continuous, those upper water sands.

Q. I'm wondering if it wouldn't be more appropriate to set maybe 50 feet of surface pipe instead of 30 feet of surface?

A. Oh, I mean, you could, but most of them we don't even encounter any water, Mr. Ramey, and it's very low, most of it.

Q. Well, that makes it more valuable when it is there.

A. Well, I -- that's true, but the thing is

we've -- I'm cementing them all the way from TD to surface.

Q There's no danger for any water --

A No, that was the reason that I elected to circulate cement on these when I initiated the drilling program out there for Public Lands Exploration Company.

Q I just don't know that I would want to call your water from Mondak Sand as being potable or not, with 1600 bicarbonates and 1400 sulfates, 700 chlorides.

A Well, we'll be taking those out when we re-inject.

MR. DIXIE: That's all.

MR. STAMETS: Any other questions of the witness? He may be excused.

Anything further in this case?

MR. CARR: Nothing further.

MR. STAMETS: The case will be taken under advisement and the hearing is adjourned.

(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 Conserva-
tion 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, C.S.R.

Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

I do hereby certify that the foregoing is
a true and correct copy of the transcript in
the hearing held before the _____
Board on _____, 19____.

_____, Examiner
Oil Conservation Division

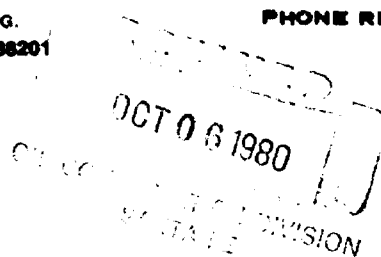
George L. Scott

PHONE OFF. (505) 622-5691

CONSULTING GEOLOGIST
SUITE 510, PETROLEUM BLDG.
ROSWELL, NEW MEXICO 88201

October 4, 1980

PHONE RES. (505) 622-5627



Oil Conservation Division
Attn: Florene Davidson
PO Box 2088
Santa Fe, New Mexico 87501

Re: Pilot Steam Enhanced Oil Re-
covery Project
Guadalupe Co., New Mexico

Dear Ms. Davidson:

On behalf of Public Lands Exploration, Inc. (PLEI), 4835 LBJ Freeway, Suite 635, Dallas, TX, 75234, I request a Docket date of October 15, 1980 to get approval of a Pilot Steam Enhanced Oil Recovery (EOR) project.

The project will be located in the NE/4 NE/4 of Section 15-T11N-R25E. PLEI desires to drill and complete three wells as producers, re-enter and complete an old well as a producer, and re-enter and complete an old well as an observation well. An existing, previously drilled well will be used as a steam injection well. The steam will be injected into sandstones of the Santa Rosa formation of Triassic age.

Sincerely,

George L. Scott

GLS:ss

cc: Paul Creson, President, PLEI
Dave Martin, PRRC, Socorro, NM
Charles Joy, Artesia, NM

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. 7048
Order No. R-6504

APPLICATION OF PUBLIC LANDS
EXPLORATION, INC. FOR A PILOT
STEAM ENHANCED OIL RECOVERY
PROJECT, GUADALUPE COUNTY, NEW
MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on October 15, 1980,
at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 6th day of November, 1980, 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, Public Lands Exploration, Inc.
seeks authority to institute a pilot steam enhanced oil recovery
project on its State Lease, Undesignated Santa Rosa Pool, by
the injection of approximately 155 barrels of water as steam
into the "O'Connell Sand" zone of the Santa Rosa formation
through its State Well No. 11 located approximately 519 feet
from the North line and 672 feet from the East line in Unit A
of Section 15, Township 11 North, Range 25 East, NMPM, Guadalupe
County, New Mexico.

(3) That the wells in the project area are incapable of
commercial production due to the low viscosity of the oil found
in the pay sand and the lack of any significant natural drive
mechanism.

(4) That the proposed enhanced recovery project may result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(5) That the operator should take all steps necessary to ensure that the injected fluid enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface from injection, production, or plugged and abandoned wells.

(6) That the applicant shall take such steps as may be necessary to ensure that the operation of the steam injection project does not contaminate surface or subsurface waters or damage nearby properties.

(7) That the injection wells or injection pressurization system should be so equipped as to limit injection pressure at the wellhead to no more than 320 psi, but the Division Director should have authority to increase said pressure limitation, should circumstances warrant.

(8) That the applicant proposes to drill and complete two new wells (Nos. 10 and 12) as producers, recompleate two existing wells (Nos. 13 and 14) as producers, and to operate one observation well (No. 1), all located, respectively, within the NE/4 NE/4 of said Section 15 as follows:

State Lease Well No.	Location
10	353 feet from the North line and 672 feet from the East line
12	519 feet from the North line and 832 feet from the East line
13	519 feet from the North line and 506 feet from the East line
14	679 feet from the North line and 672 feet from the East line
1	540 feet from the North line and 560 feet from the East line

(9) That the applicant should submit monthly reports of injection volumes, pressures, temperatures and production in a form acceptable to the Division.

(10) That the subject application should be approved and the project should be governed by the provisions of this order and of Rules 701, 702, and 703 of the Division Rules and Regulations.

IT IS THEREFORE ORDERED:

(1) That the applicant, Public Lands Exploration, Inc., is hereby authorized to institute a pilot steam enhanced recovery project on its State Lease, Undesignated Santa Rosa Pool, by the injection of water into the "O'Connell Sand" zone of the Santa Rosa formation through its State Well No. 11 located approximately 519 feet from the North line and 672 feet from the East line of Section 15, Township 11 North, Range 25 East, NMPM, Guadalupe County, New Mexico.

(2) That injection into said well shall be through internally coated tubing, set in a packer at approximately 380 feet; that the casing-tubing annulus of each injection well shall, at the option of the applicant, be loaded with an inert fluid and shall be equipped with an approved pressure gauge or attention-attracting leak detection device.

(3) That the operator shall immediately notify the supervisor of the Division's Santa Fe District 4 office of the failure of the tubing or packer in the injection well, the leakage of water or oil from or around any producing well, or the leakage of water or oil from any plugged and abandoned well within the project area and shall take such timely steps as may be necessary or required to correct such failure or leakage.

(4) That the injection well herein authorized and/or the injection pressurization system shall be so equipped as to limit injection pressure at the wellhead to no more than 320 psi, provided however, the Division Director may authorize a higher surface injection pressure upon satisfactory showing that such pressure will not result in fracturing of the confining strata.

(5) That the applicant is further authorized to drill and complete two new wells as producers, recomplete two existing wells as producers, and to operate one observation well, all located, respectively, within the NE/4 NE/4 of said Section 15 as follows:

State Lease Well No.	Location
10	353 feet from the North line and 672 feet from the East line
12	519 feet from the North line and 832 feet from the East line
13	519 feet from the North line and 506 feet from the East line

-4-

Case No. 7048
Order No. R-6504

State Lease Well No.	Location
14	679 feet from the North line and 672 feet from the East line
1	540 feet from the North line and 560 feet from the East line

(6) That the subject project is hereby designated the Public Lands Exploration, Inc. Santa Rosa Enhanced Recovery Project and shall be governed by the provisions of Rules 701, 702, and 703 of the Division Rules and Regulations.

(7) That the applicant shall operate said project in such a manner as to ensure against contamination of surface or sub-surface waters or damage to nearby properties.

(8) That monthly progress reports of the project herein authorized shall be submitted to the Division in a form acceptable to the Division.

(9) 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.

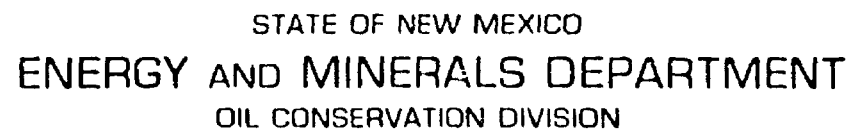


SEAL

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

Joe D. Ramey
JOE D. RAMEY
Director

fd/

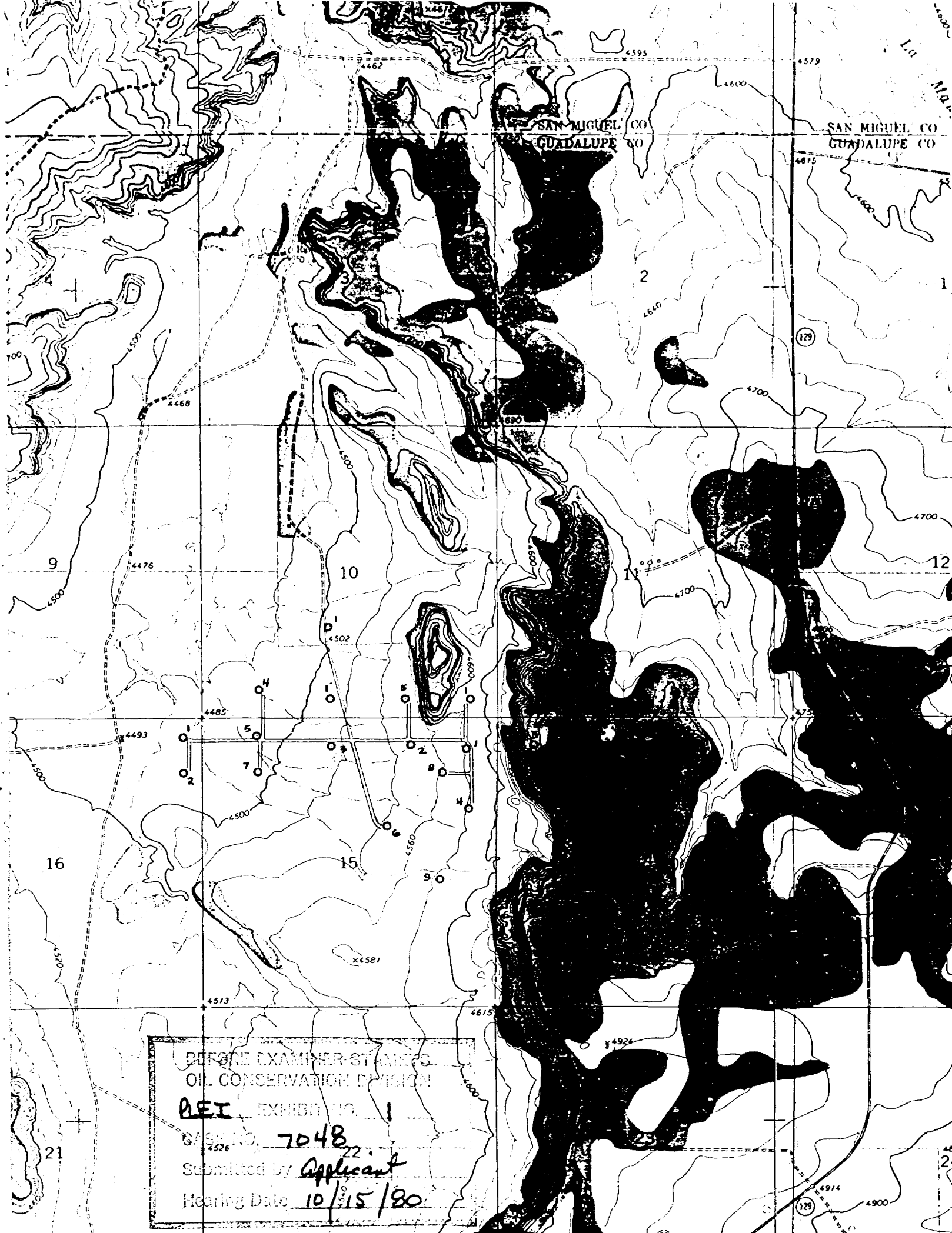


POST OFFICE BOX 2098
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Public Lands Exploration, Inc.

JOE D. RAMEY
Director

Other _____



TYPE MAP	Topographic		
AREA	Portions of USGS Neafus Ranch, N. & Ortega Tank Maps		
HORIZON	Contoured on surface topography		
C.I.	20 feet	SCALE	1:24,000 (1" = 2000')
COUNTY	Guadalupe	STATE	New Mexico
DATE	October, 1980	Map shows wells drilled by PLEI.	

Public Lands Exploration Co., Inc.
State No. 11 Well
Location: 353 FNL & 672 FEL
Section 15, T-11-N, R-25-E

Cement 16 ex. and circulate

39 ft. J-55 Csg.
8 5/8" 24#

Inhibited Water

390 ft. 2 3/8" J-55 Tbg.

380 ft. Packer
Baker Model HB-1
Single Grip

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION

EXHIBIT NO. 5A

CASE NO. 7048

Submitted by Applicant

Hearing Date 10/15/80

409 ft.

Perforations

460 ft.

Cement 150 ex. and circulate

510 ft. K-55 Csg.
4 1/2" 10.5#

TD 510'

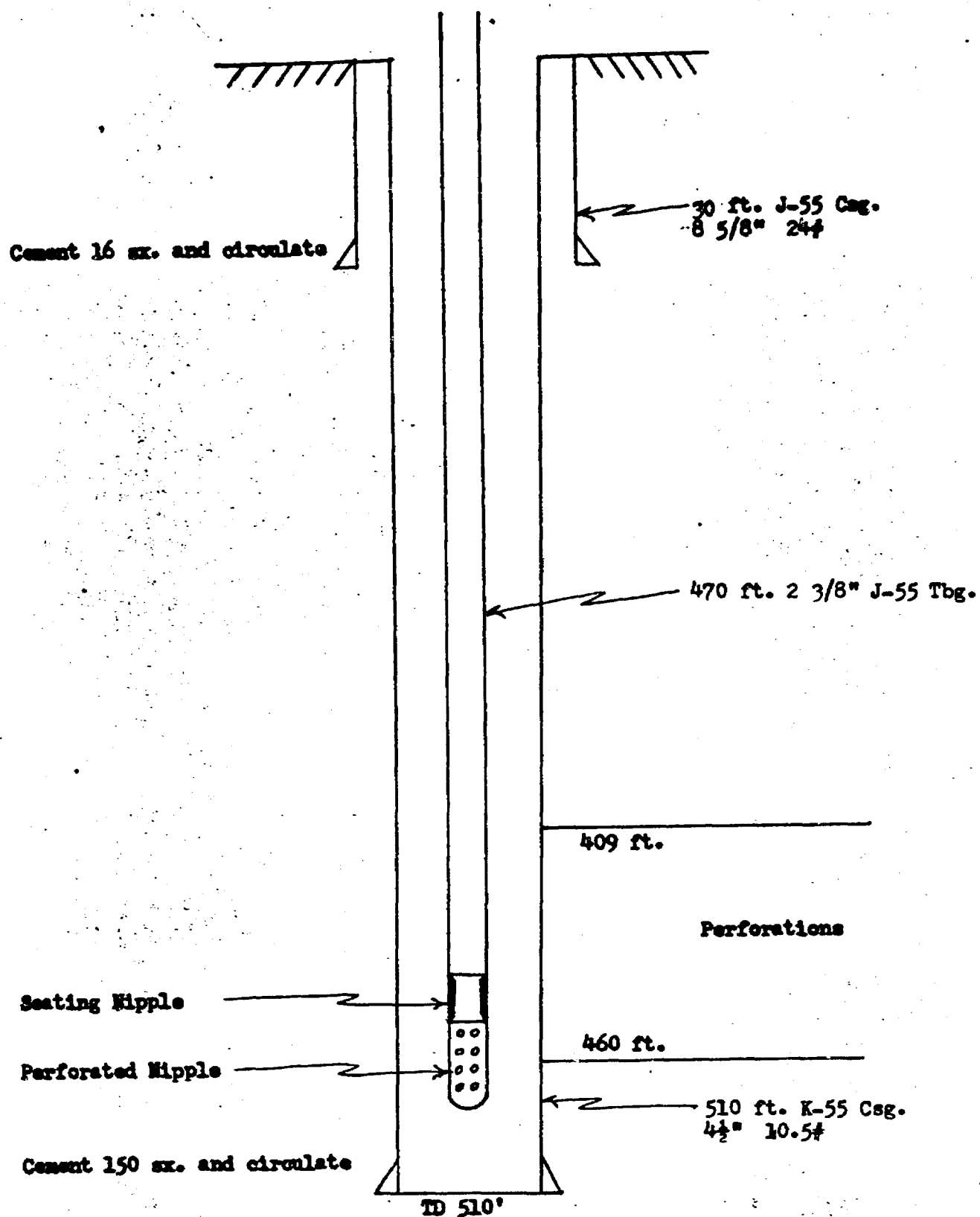
PROPOSED PRODUCER

Public Lands Exploration Co., Inc.

State No. 10 Well

Location: 353 FNL & 672 FEL

Section 15, T-11-N, R-25-E



PROPOSED PRODUCER

Public Lands Exploration Co., Inc.

State No. 12 Well

Location: 519 FNL & 832 FEL

Section 15, T-11-N, R-25-E

Cement 16 ex. and circulate

30 ft. J-55 Csg.
8 5/8" 24#

470 ft. 2 3/8" J-55 Tbg.

409 ft.

Perforations

Seating Nipple

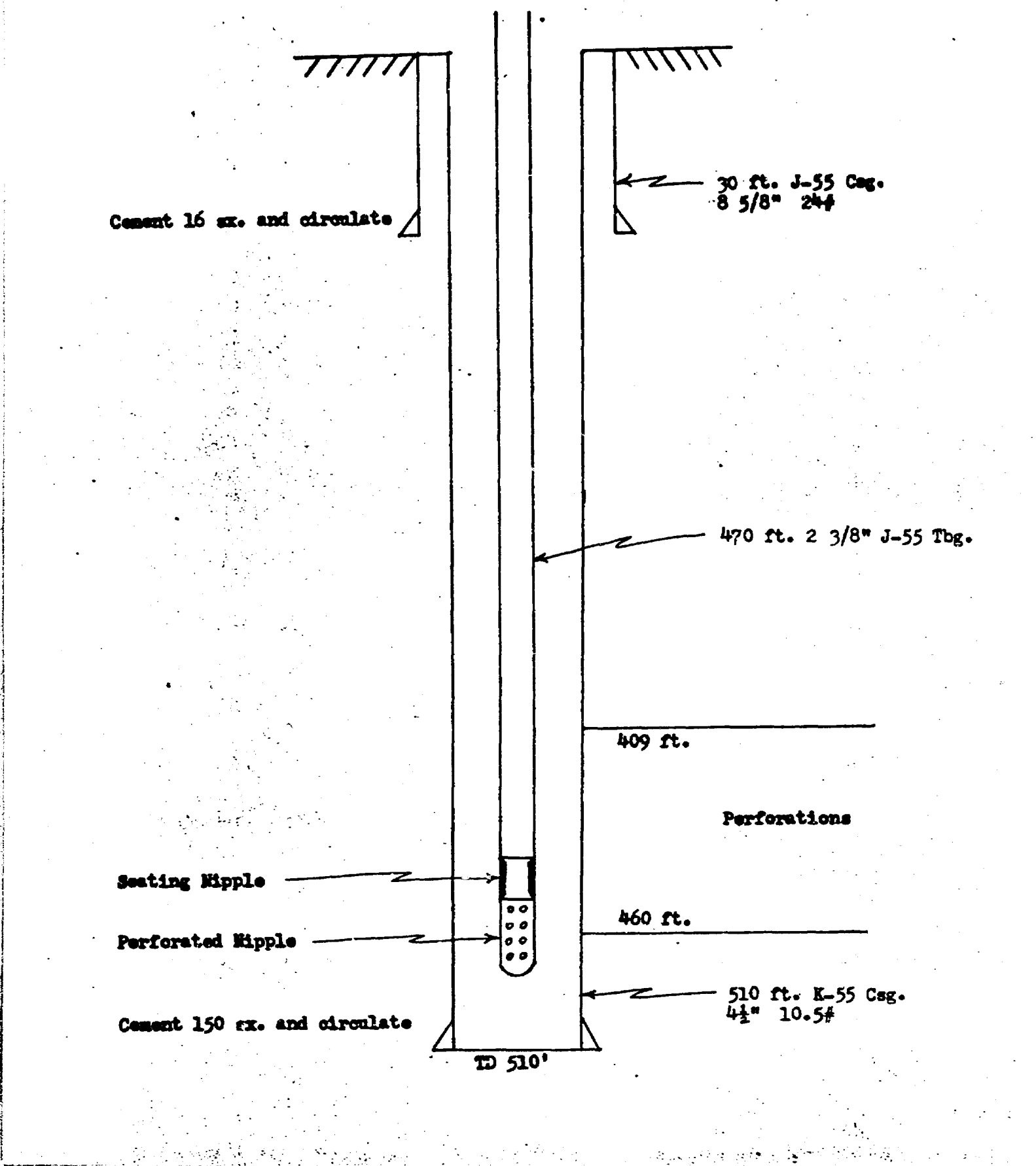
Perforated Nipple

460 ft.

Cement 150 ex. and circulate

510 ft. K-55 Csg.
4 1/2" 10.5#

TD 510'



RE-ENTRY

Public Lands Exploration Co., Inc.

State No. 13 Well

Location: 519 FNL & 506 FEL

Section 15, T-11-N, R-25-E

Cement 16 sx. and circulate

30 ft. J-55 Csg.
8 5/8" 244

470 ft. 2 3/8" J-55 Tbg.

409 ft.

Perforations

Seating Nipple

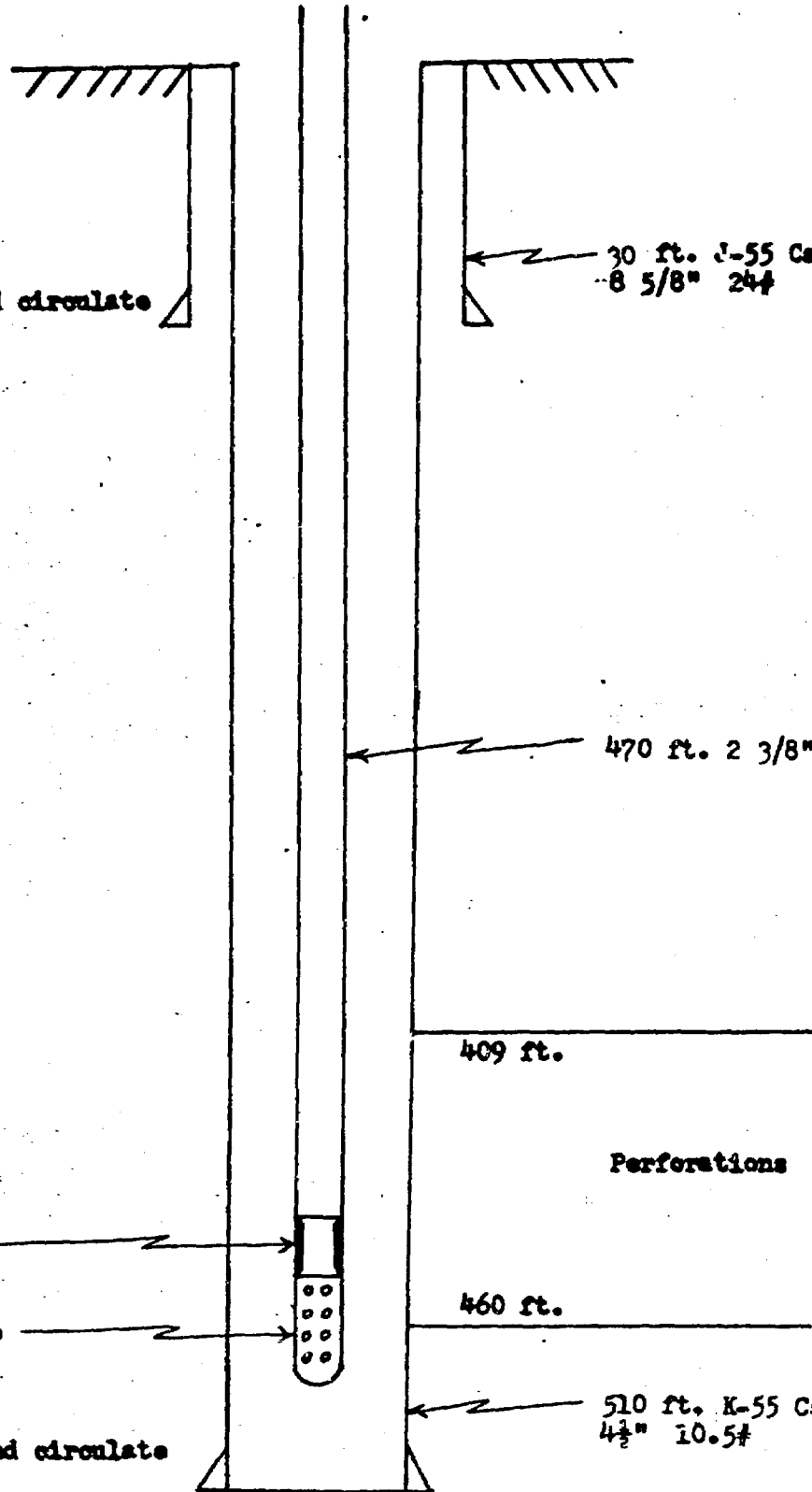
Perforated Nipple

460 ft.

Cement 150 sx. and circulate

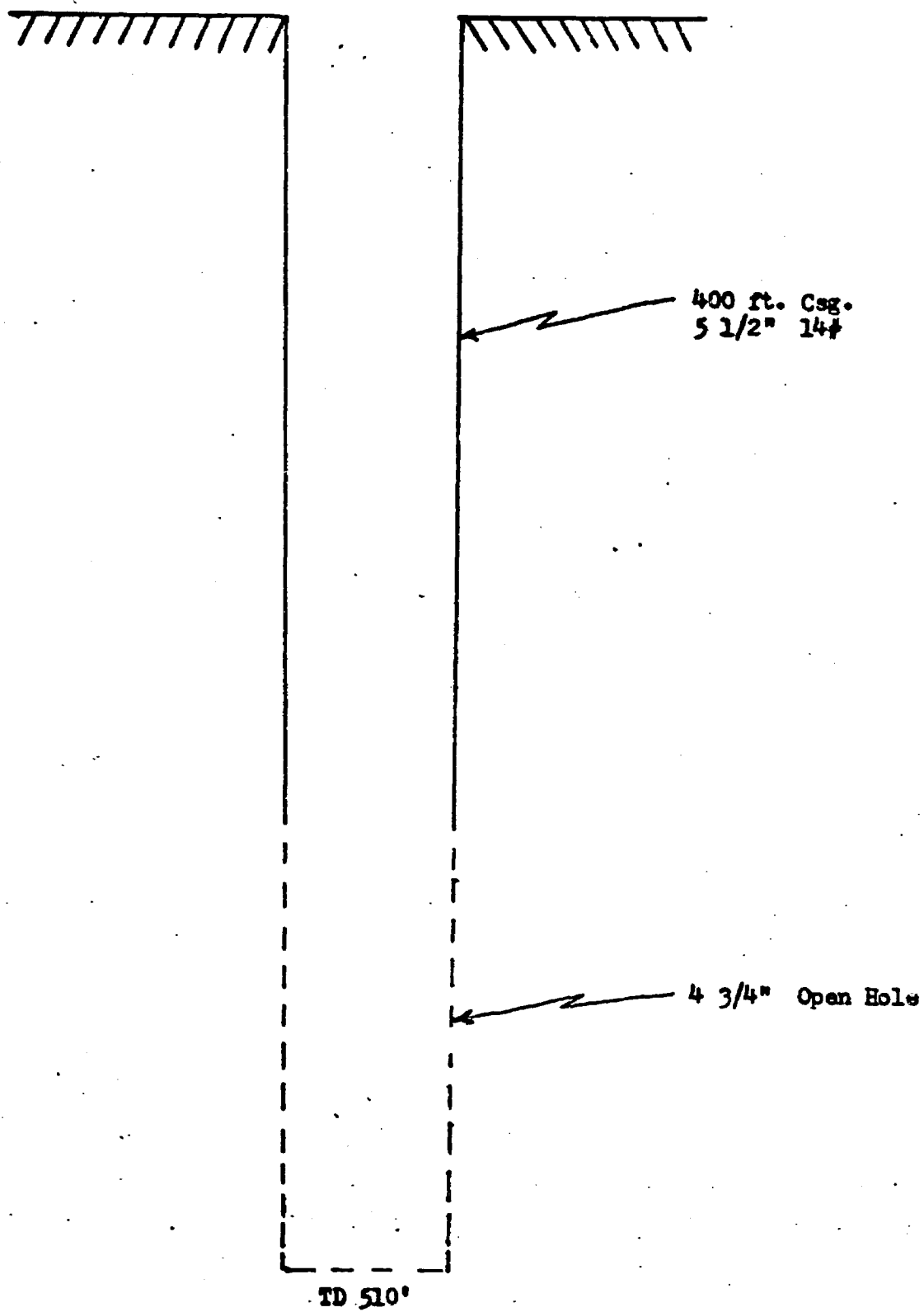
510 ft. K-55 Csg.
4 1/2" 10.5#

TD 510'



Public Lands Exploration Co., Inc.
State #14 Well

Location: 679 FNL & 672 FEL
Section 15, T-11-N, R-25-E



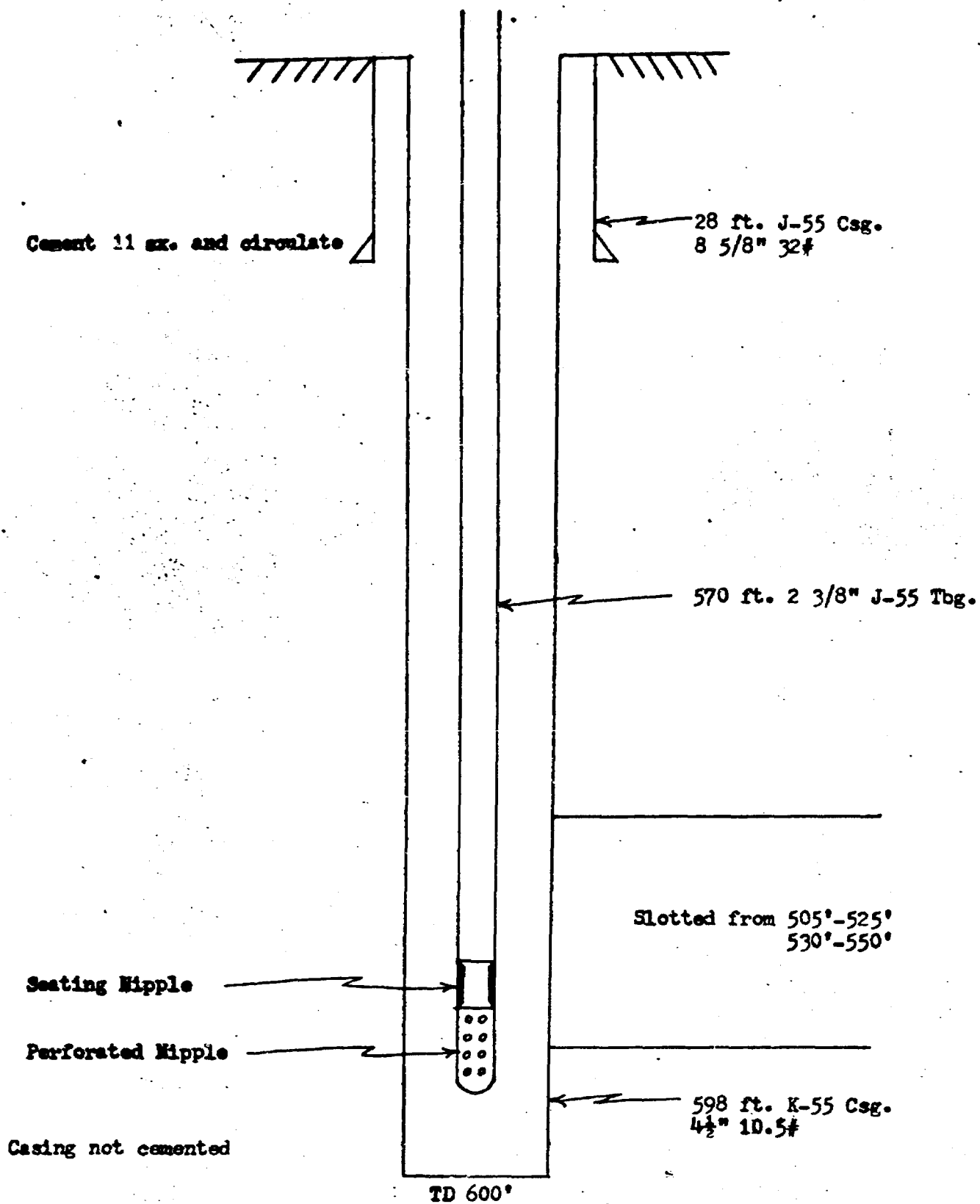
WATER SOURCE WELL

Public Lands Exploration Co., Inc.

State No. 4 Well

Location: 1650 FNL & 500 FEL

Section 15, T-11-N, R-25-E



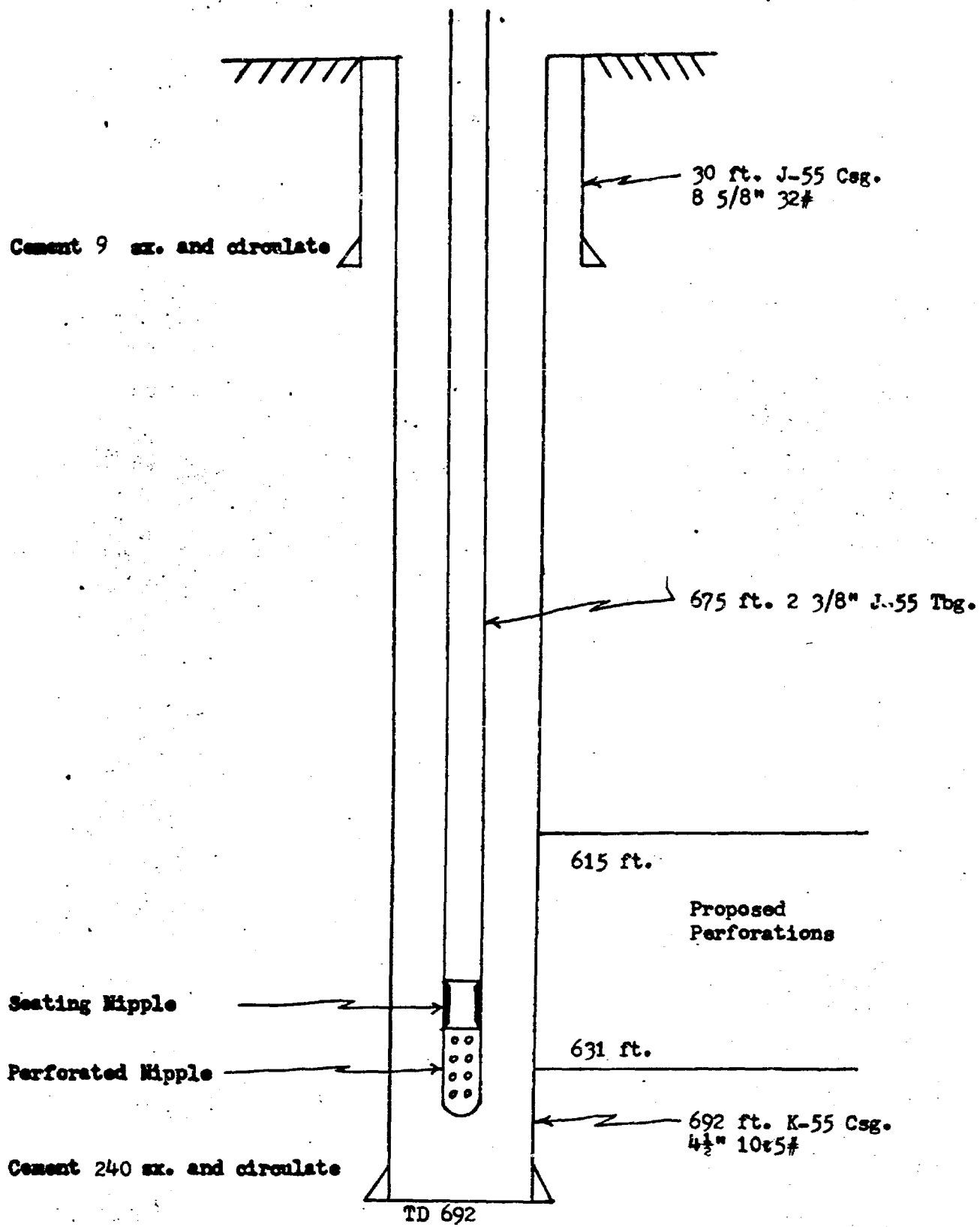
WATER SOURCE WELL

Public Lands Exploration Co., Inc.

Roberts No. 1 Well

Location: 330 FSL & 500 FEL

Section 10, T-11-N, R-25-E



PRODUCER

Public Lands Exploration Co., Inc.

State No. 3 Well

Location: 500' FNL & 2310' FWL

Section 15, T-11-N, R-25-E

Cement 10 sx and circulated

30 ft. J-55 Csg.
8 5/8" 32#

396 ft. 2 3/8" J-55 Tbg.

334 ft.

Proposed
Perforations

Seating Nipple

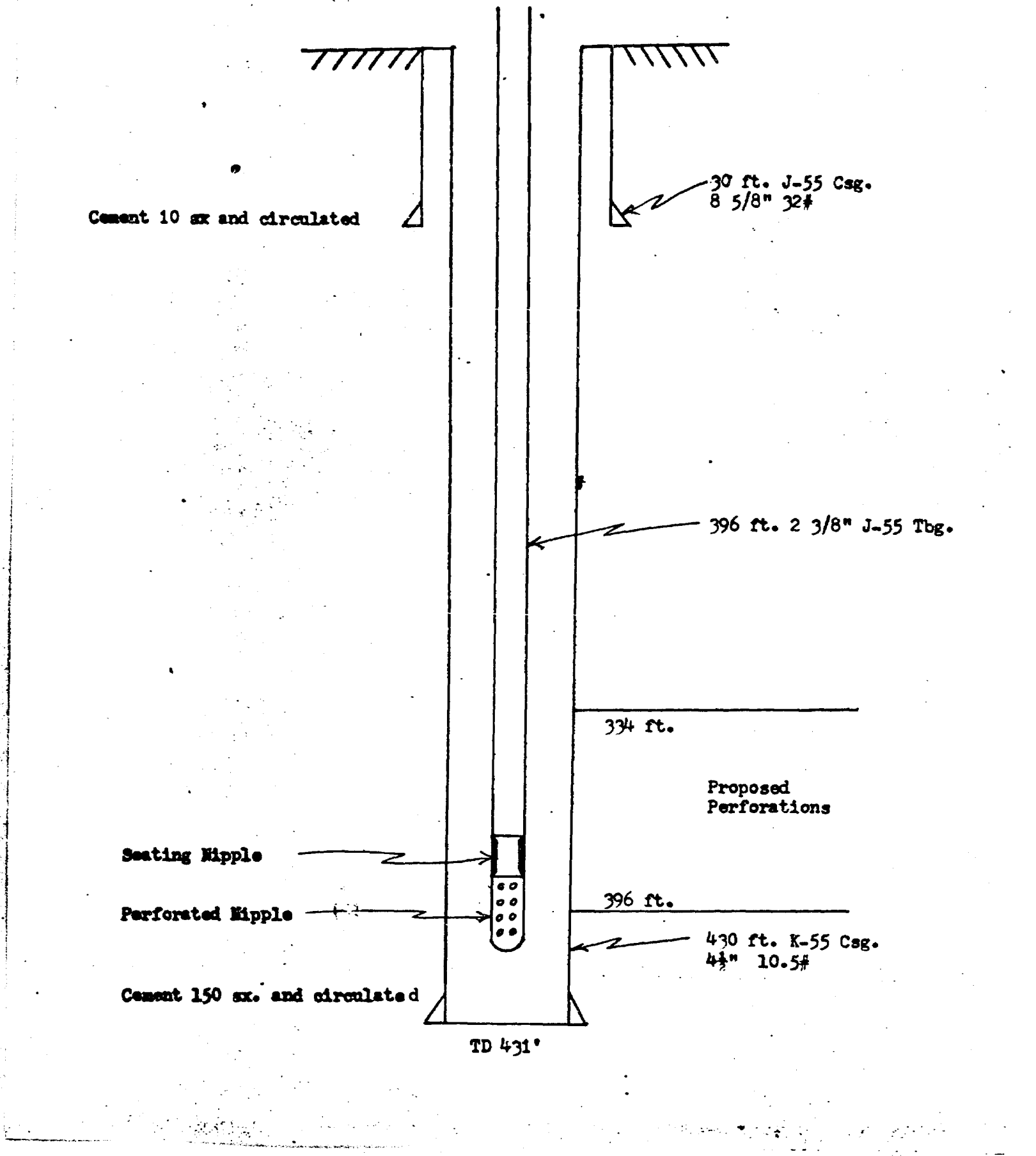
Perforated Nipple

396 ft.

430 ft. K-55 Csg.
4 1/2" 10.5#

Cement 150 sx. and circulated

TD 431'



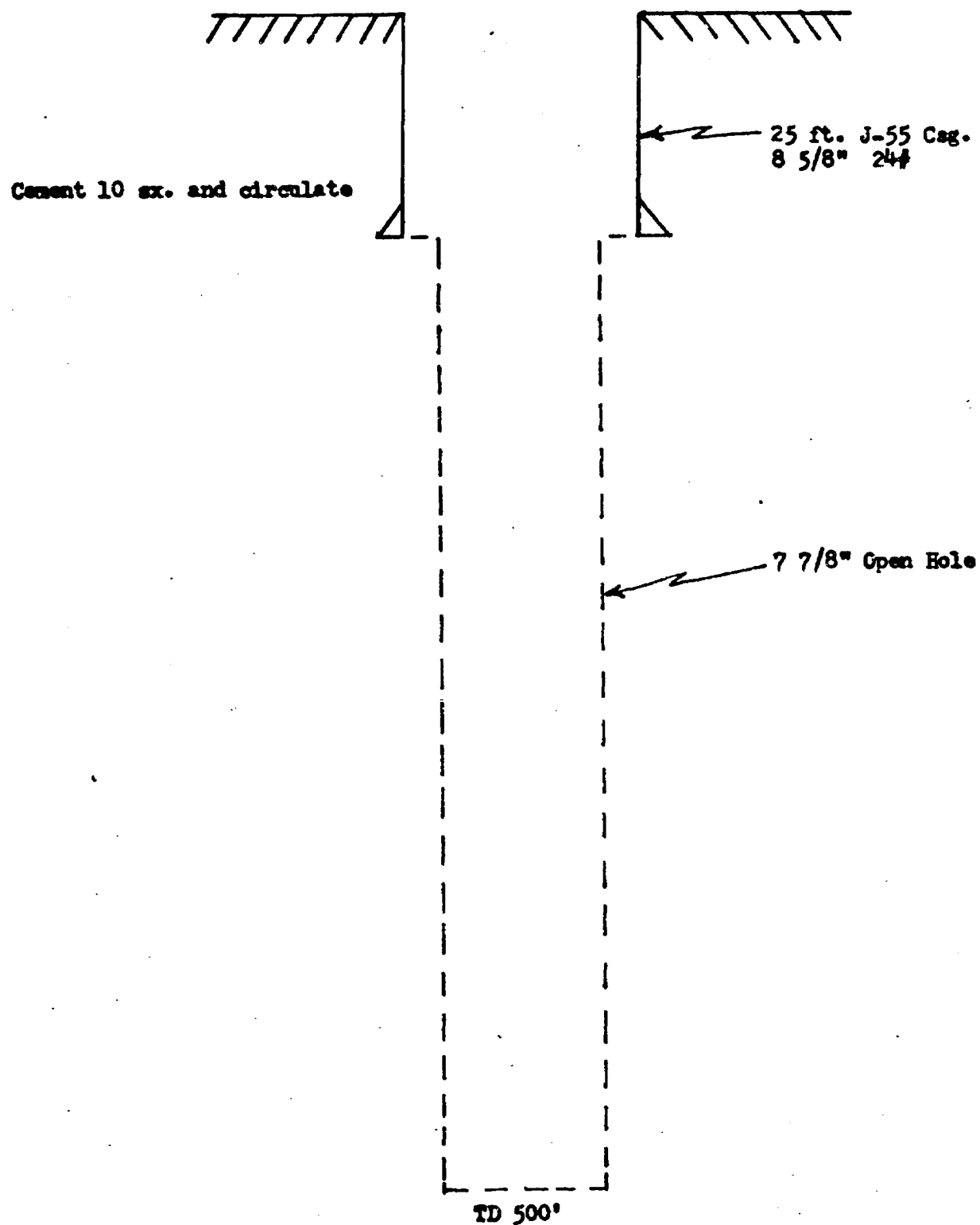
PROBABLE PRODUCER

Public Lands Exploration Co., Inc.

State No. 8 Well

Location: 1650 FNL & 990 FEL

Section 15, T-11-N, R-25-E



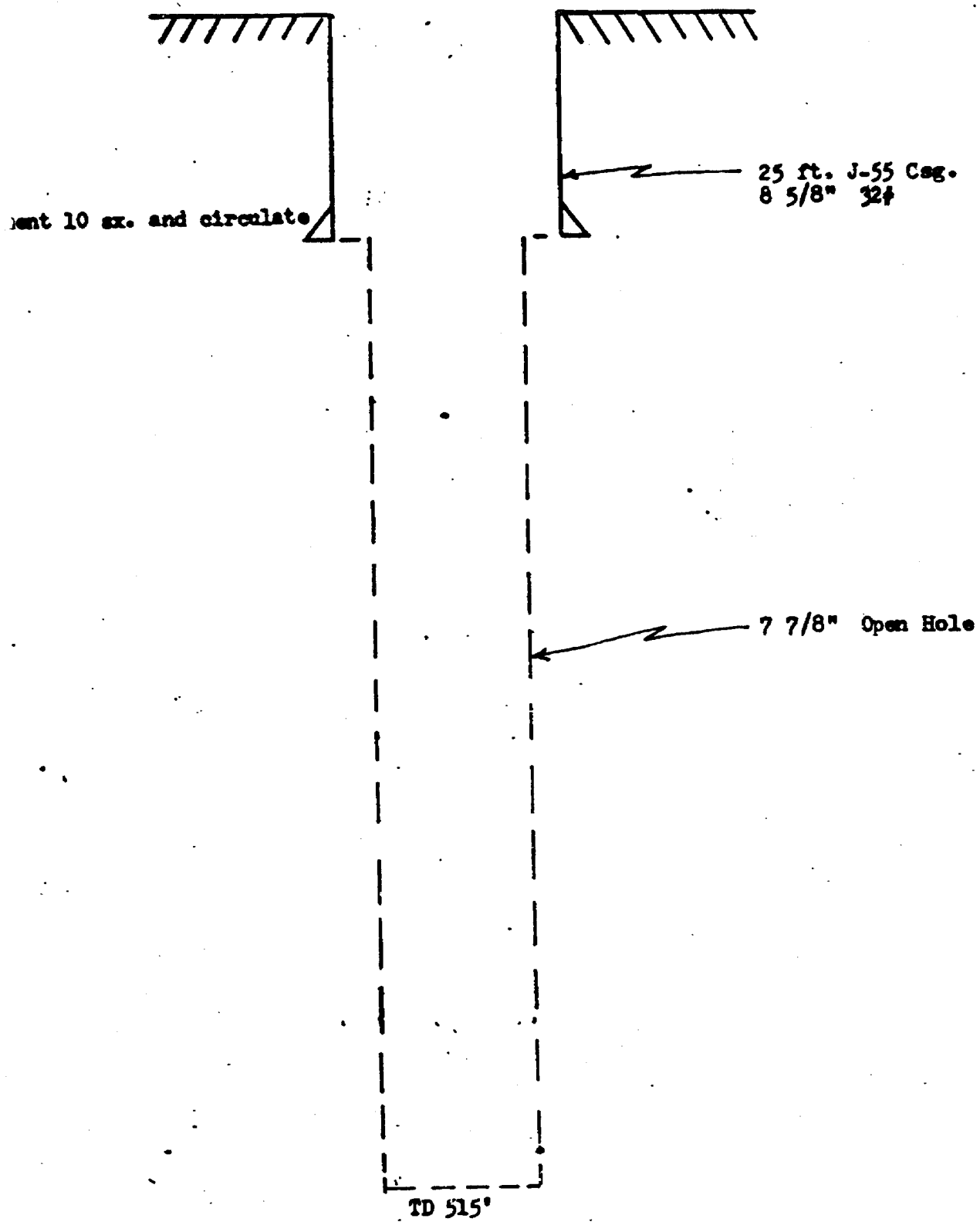
PROBABLE PRODUCER

Public Lands Exploration Co., Inc.

O'Connell No. 1 Well

Location: 330' FSL & 2310' FWL

Section 10, T-11-N, R-25-E



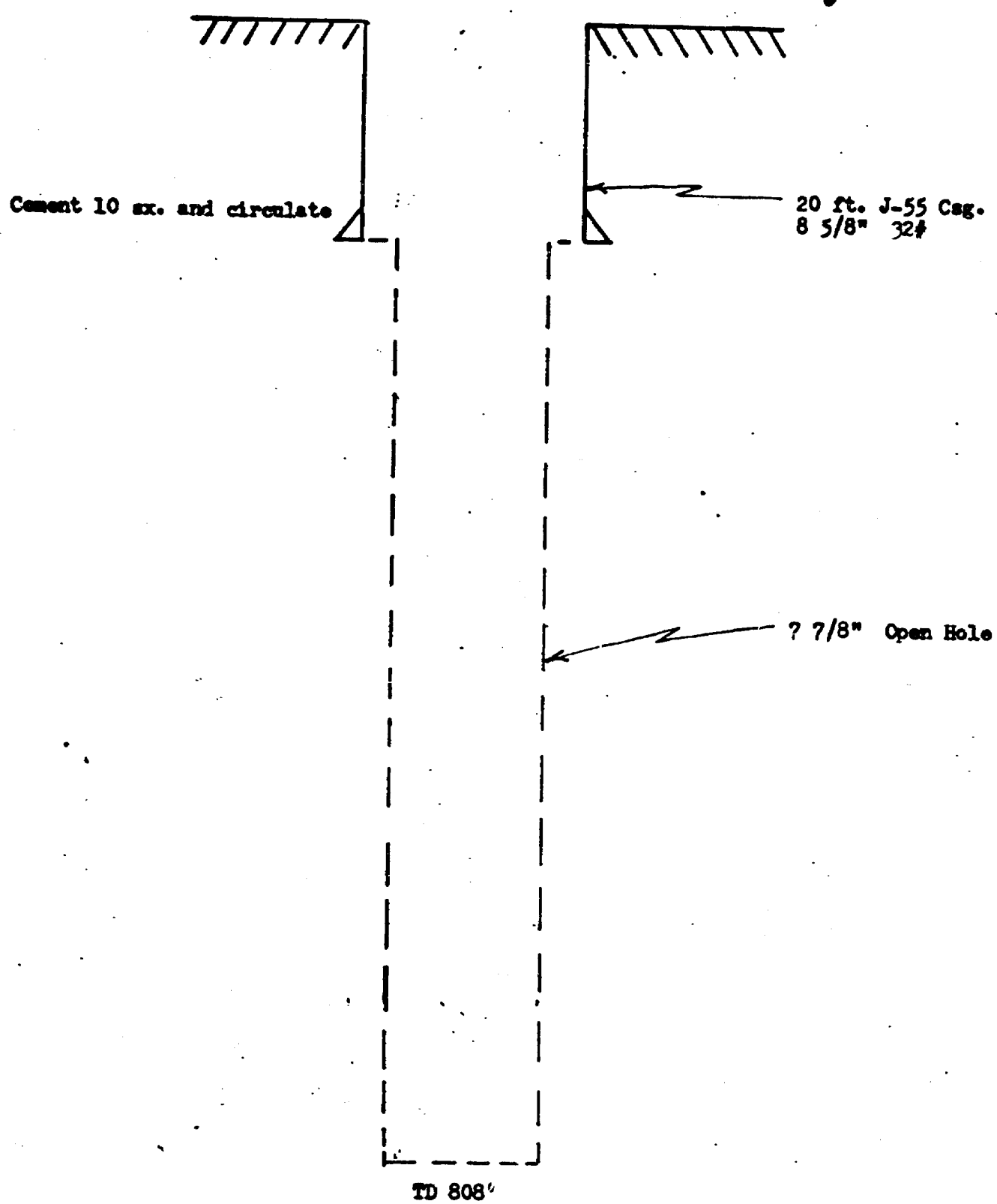
WELL TO BE PLUGGED

Public Lands Exploration Co., Inc.

O'Connell No. 3 Well

Location: 500' FNL & 660' FNL

Section 14, T-11-N, R-25-E



PROBABLE PRODUCER

Public Lands Exploration Co., Inc.

O'Connell No. 5 Well

Location: 330' FSL & 1650' FEL

Section 10, T-11-N, R-25-E

Cement 10 sx and circulate

25 ft. J-55 Csg.
8 5/8" 32#

7 7/8" Open Hole

TD 550'

HALLIBURTON DIVISION LABORATORY

HALLIBURTON SERVICES

MIDLAND DIVISION

HOBBS, NEW MEXICO 88240

LABORATORY WATER ANALYSIS

No. W80-603

To Public Lands Exploration CompanyDate 6-6-80ATTN: Mr. Charles Joy702 Hermosa DriveArtesia, New Mexico

This report is the property of Halliburton Company and neither it nor any part thereof nor a copy thereof is to be published or disclosed without first securing the express written approval of laboratory management; it may however, be used in the course of regular business operations by any person or concern and employees thereof receiving such report from Halliburton Company.

Submitted by _____ Date Rec. _____

Well No. As Marked Depth _____ Formation _____

County _____ Field _____ Source _____

	State #3	State #4	Samedan State #1
Resistivity	1.90 @ 74°F.	2.78 @ 74°F.	4.21 @ 74°F.
Specific Gravity	1.004	1.003	1.002
pH	9.0	8.6	8.2
Calcium (Ca)	200	150	100 *MPL
Magnesium (Mg)	60	30	30
Chlorides (Cl)	700	300	150
Sulfates (SO ₄)	1,400	1,050	900
Bicarbonates (HCO ₃)	1,600	2,450	3,650
Soluble Iron (Fe)	Nil	Nil	Nil

Remarks:

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISIONPLE I EXHIBIT NO. 7CASE NO. 7048Submitted by ApplicantHearing Date 10/15/80

*Milligrams per liter

*Monsieur
Samples*

Respectfully submitted,

Analyst: Brewer

cc:

HALLIBURTON COMPANY

By W. L. Brewer

CHEMIST

NOTICE

THIS REPORT IS LIMITED TO THE DESCRIBED SAMPLE TESTED. ANY USER OF THIS REPORT AGREES THAT HALLIBURTON SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE, WHETHER IT BE TO ACT OR OMISSION, RESULTING FROM SUCH REPORT OR ITS USE.

REI EXHIBIT NO. 8

CASE NO. 7048

Submitted by Applicant

Hearing Date 10/15/80

RESERVOIR DATA

Project: O'Connell Ranch Field

Location: Guadalupe County, New Mexico

Producing Formation: Santa Rosa Formation of Triassic Age

Reservoir Properties

Depth 350 ft. to 500 ft. Type of Reservoir Rock Sandstone

Average Porosity 20% (18 - 23%) Permeability Range 100 md to 500 md

Net Thickness ~40 (20 - 50) ft. Gross Thickness ~60 (30 - 80) ft.

Dykstra-Parsons Variation NA Relative Perm Data Attached? No

Bottom Hole Temperature ~ 75 °F Initial Gas Solubility SCF
STB

Bottom Water? Possible Gas Cap Present? No Edge Water? No

Reservoir Pressure: Initial Low psi Bubble Point NA psi

Saturation Data

Original Oil Saturation ≅ 775 B/AP ≅ 50 %Vp

Connate (Irreducible) Water Saturation 12 %Vp

Fluid Data

Type of Crude Very Viscous, Asphaltic

Oil Gravity 15 - 17 °API

Original Oil Formation Volume Factor Very Little Shrinkage

Reservoir Oil Viscosity: Temp., °F	Viscosity, Cp
70	6006
100	1440
150	247
220	45.5
250	29.2

Connate Water Viscosity ~0.95 Cp @ 75 °F

Type of Connate Water: Fresh

COST OF SURFACE INSTALLATION

<u>Item</u>	<u>Cost</u>
Stock Tank, 210 bbls - three tanks	\$ 7,200.00
Heater Treater, 4' x 20' - one	\$ 6,500.00
Steam Generator, filter and softener	\$44,000.00
Valve, connections and fittings	\$ 2,000.00
Line Pipe 2" - 1,000 ft	\$ 1,890.00
Line Pipe 3" - 200 ft	\$ 782.00
Access road and Right-away - 6-1/3 miles	\$11,000.00
Labor for installation	\$ 3,000.00
Miscellaneous	\$ 7,600.00
State Sales Tax	\$ 3,359.00
<hr/>	
TOTAL	\$87,331.00

BEFORE EXAMINER STAMETS	
OIL CONSERVATION DIVISION	
PER EXHIBIT NO.	1
CASE NO.	7048
Submitted by	Applicant
Hearing Date	10/15/80

COST OF PRODUCING WELLS

<u>Item</u>	<u>Expenses per Well</u>
Drilling Cost	\$18,100.00
Casing 4-1/2"	\$ 2,982.00
Surface Damage	\$ 250.00
Build location and roads	\$ 750.00
Coring	\$ 3,401.00
Cement (Shoe and Float)	\$ 3,000.00
Water	No Charge
Casing Crew	\$ 140.00
Geologist	\$ 800.00
Engineer	\$ 2,500.00
Connections and Fittings	\$ 91.00
Well Head	\$ 405.00
Surveyor	\$ 122.00
Legal Cost	\$ 220.00
Logging	\$ 1,255.00
Perforating	\$ 2,713.00
Tubing 2-3/8"	\$ 2,127.00
Sucker Rods	\$ 862.00
Down Hole Pump	\$ 627.00
Stuffing Box	\$ 135.00
Polish Rod and Liner	\$ 140.00
Pump Jack and Weights	\$ 2,260.00
Engine FM 118	\$ 2,500.00
Miscellaneous	\$ 4,500.00
State Sales Tax	\$ 1,995.00
<hr/>	
TOTAL	\$51,875.00

Producing Well Costs: 3 wells @ \$51,875.00

\$155,625.00

RE-ENTRY WELL COSTS

<u>Item</u>	<u>Expenses per Well</u>
Drilling Cost	\$ 5,150.00
Casing 4-1/2"	\$ 2,982.00
Cement (Shoe and Float)	\$ 3,000.00
Water	No Charge
Casing Crew	\$ 140.00
Engineer	\$ 900.00
Connections and Fittings	\$ 191.00
Well Head	\$ 405.00
Logging	\$ 1,255.00
Perforating	\$ 2,793.00
Tubing 2-3/8"	\$ 2,127.00
Sucker Rod	\$ 862.00
Down Hole Pump	\$ 627.00
Stuffing Box	\$ 135.00
Polish Rod and Liner	\$ 140.00
Pump Jack and Weights	\$ 2,260.00
Engine FM 118	\$ 2,500.00
Miscellaneous	\$ 2,500.00
State Sales Tax	\$ 1,119.00
 TOTAL	 \$29,086.00

Re-entry Well Costs: 2 wells @ \$29,086.00

\$58,172.00

COST OF STEAM INJECTION WELL

<u>Item</u>	<u>Expenses per Well</u>
Drilling Cost	\$18,100.00
Casing 4-1/2"	\$ 2,982.00
Surface Damage	\$ 250.00
Build Location and Roads	\$ 750.00
Coring	\$ 3,401.00
Cement (Shoe and Float)	\$ 3,000.00
Water	No Charge
Casing Crew	\$ 140.00
Geologist	\$ 800.00
Engineer	\$ 2,500.00
Connections and Fittings	\$ 191.00
Well Head	\$ 405.00
Surveyor	\$ 122.00
Leagal Cost	\$ 220.00
Logginh	\$ 1,255.00
Perforating	\$ 2,713.00
Tubing 2-3/8"	\$ 2,127.00
Packer (2" x 4-1/2")	\$ 3,165.00
Expansion Joint	\$ 2,215.00
Miscellaneous	\$ 4,400.00
State Sales Tax	\$ 1,949.00
	=====
TOTAL	\$50,685.00

Injection Well Costs: 1 well @ \$50,685.00

\$50,685.00

Special Laboratory Core Analyses: 10,099.00 plus tax

\$10,503.00

\$61,188.00

COST OF WATER SUPPLY WELL

<u>Item</u>	<u>Expense per Well</u>
Drilling Cost	\$10,087.00
Casing 4-1/2"	\$ 2,954.00
Surface Damage	\$ 250.00
Build Location and Roads	\$ 1,740.00
Coring	\$ 2,177.00
Water	No Charge
Casing Crew	\$ 225.00
Geologist	\$ 217.00
Engineer	\$ 2,552.00
Connections and Fittings	\$ 152.00
Well Head	\$ 405.00
Surveyor	\$ 387.00
Legal Cost	\$ 220.00
Logging	\$ 1,104.00
Tubing 2-3/8"	\$ 2,127.00
Down Hole Pump	\$ 627.00
Stuffing Box	\$ 135.00
Polish Rod and Liner	\$ 140.00
Pump Jack and Weights	\$ 2,260.00
Engine FM 118	\$ 2,500.00
Miscellaneous	\$ 3,000.00
State Sales Tax	\$ 1,330.00
	=====
TOTAL	\$34,589.00

Water Well Costs: 1 well @ \$34,589.00

\$34,589.00

OPERATING COSTS

<u>Item</u>		<u>Costs</u> <u>(10 months)</u>
Labor		
Principal Investigator	\$ 4,000.00	
Field Supervision	\$30,000.00	
Consultants (including travel)	\$10,000.00	
Field Labor	\$ 9,875.00	
		\$ 53,875.00
Fringe Benefits		
Average 17% of Labor (Excluding Consultants)		\$ 7,459.00
Transportation of Equipment		\$ 2,000.00
Travel to Project Site		\$ 495.00
Fuel Costs		
Steam Generator	\$73,165.00	
Heater Treator	\$ 6,500.00	
Pumping Units	\$ 7,200.00	
	\$	\$ 86,865.00
Chemical Costs		
Steam Generator	\$ 4,660.00	
Demulsifiers	\$ 3,000.00	
		\$ 7,660.00
Workover Expenses		\$ 12,000.00
Pump Repairs		\$ 6,000.00
Miscellaneous		\$ 16,900.00
State Sales Tax		\$ 7,490.00
Computer Charges for Simulations		\$ 5,000.00
		<hr/>
		\$205,744.00

SUMMARY OF PROJECT COSTS

Producing Wells		
3 New Wells	\$155,625.00	
2 Re-entry Wells	\$ 58,172.00	
		\$213,797.00
Steam Injection Well		\$ 61,188.00
Water Supply Well		\$ 34,589.00
Surface Installation		\$ 87,331.00
Operating Costs		\$205,744.00
		<hr/>
	TOTAL PROJECT COSTS	\$602,649.00

GENERAL DISCUSSION

The O'Connell Ranch field is located in Guadalupe County approximately nine miles North of the town of Newkirk, New Mexico. Oil production will be from the upper sand in the Santa Rosa formation (Triassic age). This sand is informally referred to as the O'Connell sand and is found at an average depth of 400 feet. O'Connell structure is located on North flank of Newkirk anticline and dips Northward across pilot area. Lateral limits of oil saturation are controlled primarily by permeability development and formation pinch out. (See attached map)

Core analysis indicates formation contains a very viscous crude oil with little or no gas saturation. Production tests indicate no natural water drive and very little gravity drainage. These conditions leave the reservoir without a driving mechanism. Oil will not flow to the producing wells until a driving mechanism is developed. Public Lands Exploration Co., Inc. plans to initiate an enhanced steam recovery pilot in the O'Connell field.

Public Lands has drilled 16 wells in the field. Six were dry holes, two were completed as water wells and eight as producers.

PILOT AREA

Proposed pilot will consist of 1.22 acres located in Northeast corner of Section 15, T-11-N, R-25-E, Guadalupe County, New Mexico. Pilot area is outlined on enclosed maps. Pilot area presently has one producer and two plugged and abandoned wells. Plans are to complete an inverted five spot injection pattern by drilling two producers and one injection well. Both plugged and abandoned wells located in pilot area will be re-entered and completed as producers. For complete information see attached schematics.

PROJECT OBJECTIVES

Primary objective of field test is to determine the feasibility of using steam to recover the very viscous crude from the O'Connell Ranch field in Guadalupe County, New Mexico. At reservoir temperature of approximately 75°F, viscosity of the crude is almost 6,000 centipoises. Reduction in viscosity to around 27 centipoises can be achieved if oil temperature can be raised to approximately 260°F. It is planned to inject 275°F steam per day to increase oil temperature. Anticipated injection rate is 150 barrels of steam per day at 285 psig.

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION

PLEI EXHIBIT NO. 10

CASE NO. 7048

Submitted by Applicant

Hearing Date 10/15/80

WATER SOURCE

Plans are to use potable water from the number two sandstone found approximately 40 feet below the O'Connell sandstone. Public lands Roberts No. 1 and State No. 2 wells are completed in this sandstone referred to as the Monsimer sandstone. When these wells were drilled they averaged in excess of one barrel of water per minute. Water reserves are estimated at approximately 14,000 barrels per acre based on an average porosity of 20%, formation thickness of 20 feet and a recovery factor of 75%.

RESERVOIR DATA

Oil inplace under pilot area is estimated at 38,000 barrels based on average porosity of 20%, average pay thickness of 20 feet and average oil saturation of 50%. It is estimated steam injection will recover approximately 18,000 barrels or 50% of inplace oil. For details see attached reservoir data table.

SURFACE INSTALLATION

Surface installation will include three 210 barrel stock tanks, heater treater, a portable steam generator equipped with filters and water softeners and fresh water storage tank.

ECONOMICS

Total cost of pilot is estimated at \$396,905 and future ten months operating cost at \$205,744. Total deficit over this period is estimated at \$387,821.

DRAFT

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. 7048

Order No. R-6504

APPLICATION OF PUBLIC LANDS
EXPLORATION, INC. FOR A PILOT
STEAM ENHANCED OIL RECOVERY
PROJECT, GUADALUPE COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on October 15,
19 80, at Santa Fe, New Mexico, before Examiner RLS.

NOW, on this _____ day of _____, 19____, 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, Public Lands Exploration Co., Inc.,
seeks authority to institute a waterflood project on its
State Lease, Undesignated Santa Rosa
Pool, by the injection of approximately 155 barrels of water as steam
into the "O'Connell Sand" 2042
formation through its State Well No 11 located in Unit 17 of
one injection wells in Sections 15
Township 11 North, Range 25 East, NMPM, Guadalupe
County, New Mexico.

(3) That the wells in the project area are in incapable of
commercial production due to the low viscosity of the oil found
state of depletion and should properly be classified as
is the pay sand and the lack of any significant natural drive
"stripper" wells. mechanism.

(4) That the proposed enhanced recovery may
waterflood project should result
in the recovery of otherwise unrecoverable oil, thereby preventing
waste.

(6) That the applicant shall take such steps as may be necessary to ensure that the operation of the steam injection project does not contaminate surface or subsurface waters or damage nearby properties

(5) That the operator should take all steps necessary to ensure that the injected ~~water~~ ^{fluid} enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface from injection, production, or plugged and abandoned wells.

(6) (7) That the injection wells or injection pressurization system should be so equipped as to limit injection pressure at the wellhead to no more than 320 psi, but the Division Director should have authority to increase said pressure limitation, should circumstances warrant.

(8) That the applicant proposes to drill and complete two new wells ^(Nos. 10 and 12) and recomplate two existing wells ^(Nos. 13 and 14) and to operate one observation well ^(No. 1), all located within the NE 1/4 NE 1/4 of ~~Section 15~~ ^{Section 16}, ~~and~~ ^{and to operate} said Section 15 as follows:

State Lease	Well No	Location
	10	353 feet from the North line and 672 feet from the East line
	12	519 " " " " 832 " " " "
	13	519 " " " " 506 " " " "
	14	679 " " " " 672 " " " "
	1	540 " " " " 560 " " " "

(9) That the applicant should submit monthly reports of injection volumes, pressures, temperatures and production ⁱⁿ a form ~~to be approved~~ acceptable to the Division.

(10) That the subject application should be approved and the project should be governed by the provisions ^{of this order and} of Rules 701, 702, and 703 of the Division Rules and Regulations.

(1) That the applicant, Public Lands Exploration Co., Inc.
^{pilot steam enhanced recovery}
 is hereby authorized to institute a waterflood project on its

State Lease Lease, Undesignated Santa Rosa Pool,

by the injection of water into the "O'Connell Sand" zone of the
^{its State Well No 11 located @ 3 1/2 miles from the North line and 6 1/2 feet from}
 formation through the following described wells in Township

*Santa Rosa
The East line*

of Section 15, Township
11 North, Range 25 East, NMPM, Sandoval County,

New Mexico

approximately

(2) That injection into ~~each~~ said wells shall be
 through internally coated tubing, set in a packer ^{at approximately} ~~which shall be~~
~~located as near as practicable to the uppermost perforation;~~
^{380 feet}
 that the casing-tubing annulus of each injection well shall be ^{at the option of the} ~~be~~ applicant,
^{shall be}
 loaded with an inert fluid and equipped with an approved pressure
 gauge or attention-attracting leak detection device.

(3) That the operator shall immediately notify the
 supervisor of the Division's Santa Fe District ⁴ ~~district~~ office of the
 failure of the tubing or packer in ~~any of said~~ injection wells,

the leakage of water or oil from around any producing well, or
 the leakage of water or oil from any plugged and abandoned well
 within the project area and shall take such timely steps as
 may be necessary or required to correct such failure or leakage.

(4) That the injection wells herein authorized and/or the
 injection pressurization system shall be so equipped as to limit
 injection pressure at the wellhead to no more than 320 psi,
 provided however, the Division Director may authorize a higher
 surface injection pressure upon satisfactory showing that such
 pressure will not result in fracturing of the confining strata.

(7) That the applicant ^{is further authorized} ~~propose~~ to drill and complete two new wells ~~as~~ ^{as} producers, recomplete two existing wells ^{as producers} ~~and~~ ^{and} ~~one~~ ^{one} observation well all located ^{within} the NE 1/4 NE 1/4 of ~~Section 15~~ ^{Section 15} said Section 15 as follows:

State Lease	Well No.	Location
10	353	feet from the North line and 672 feet from the East line,
12	519	" " " " " 832 " " " " "
13	519	" " " " " 506 " " " " "
14	679	" " " " " 672 " " " " and
1	540	560

(6) That the subject ~~waterflood~~ project is hereby designated the Public Lands Exploration Co. Santa Rosa Enhanced Recovery Waterflood Project and shall be governed by the provisions of Rules 701, 702, and 703 of the Division Rules and Regulations.

(7) That monthly progress reports of the ~~waterflood~~ project herein authorized shall be submitted to the Division in a form acceptable to the Division ~~in accordance with Rules 704 and 1120 of the Division Rules and Regulations.~~

(8) 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.

(7) That the applicant shall operate said project in such a manner as to ensure against contamination of surface or sub surface waters or damage to nearby properties