

CASE 3036: Application of CURTIS
J. LITTLE for a pressure mainten-
ance project, San Juan County.

CASE No.

3036

Application,

TRANSCRIPTS,

Small Exhibits

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BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

APPLICATION OF CURTIS J. LITTLE
FOR AN ORDER AUTHORIZING THE
INJECTION OF WATER FOR PRESSURE
MAINTENANCE PURPOSES INTO THE
GALLUP (TOCITO) SANDSTONE FORMA-
TION UNDERLYING APPLICANT'S
NAVAJO INDIAN LEASE, SECTIONS
21, 22, 27 and 28, TOWNSHIP 32
NORTH, RANGE 17 WEST, NMPM, SAN
JUAN COUNTY, NEW MEXICO, WITHIN
THE MANY ROCKS GALLUP OIL POOL
AND FOR PROMULGATION OF SPECIAL
RULES GOVERNING THE OPERATION OF
SAID PROJECT.

CASE NO. 3036

APPLICATION

CURTIS J. LITTLE, whose address is 2929 Monte Vista Boulevard N. E., Albuquerque, New Mexico, holds the operating rights under that certain Navajo Tribal Oil and Gas Lease Contract No. 14-20-603-5012 as it pertains to all of Sections 21, 22, 27 and 28, Township 32 North, Range 17 West, NMPM, San Juan County, New Mexico and hereby makes application to the Oil Conservation Commission of the State of New Mexico for an Order authorizing the injection of water for pressure maintenance purposes into the Gallup (Tocito) Sandstone Formation underlying the above-described lands pursuant to Rule 701 of the Commission and establishing special rules governing the operation of said project, and in support of this application, Applicant shows:

I.

There is attached hereto, made a part hereof and marked Exhibit "A" a plat showing the above-described leasehold area, the location of all wells drilled thereon and all wells drilled within a radius of two miles from

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Date 4-17-64
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the proposed injection wells hereinafter identified. Said Exhibit "A" also shows the location of all wells which are producing from the Gallup (Tocito) Sandstone Formation and the ownership of the respective leasehold interests within a radius of two miles from the proposed injection wells.

II.

The presently existing well proposed as an injection well is the Navajo 3X-27 well located 625 feet from the South line and 2,000 feet from the East line of said Section 27. There is attached hereto and made a part hereof the log of said well, marked Exhibit "B." A diagrammatic sketch of said proposed injection well is attached hereto and marked Exhibit "C", which Exhibit shows casing program and related information.

III.

Applicant proposes to drill and complete two additional injection wells to be located in the SW/4 NW/4 of Section 27 and the NE/4 SE/4 of Section 28. Attached hereto and marked Exhibit "D" is a diagrammatic sketch of the proposed injection wells showing casing strings, setting intervals, quantities used and tops of cement, perforated or open-hole intervals, and type and location of packers.

IV.

Applicant proposes to inject water into the Gallup (Tocito) Sandstone Formation at intervals in the existing Navajo 3X-27 well ranging from 1 713 feet to 1,722 feet below the surface, such water to be injected at rates ranging from 100 to 200 barrels per day.

V.

Applicant will obtain the water for such injection from an abandoned well drilled by Texas Pacific Coal and Oil Company located in the NW/4 of said Section 28, which injection water will be produced from the Entrada (Jurassic) formation at a depth of approximately 3,500 feet below the surface.

VI.

Applicant has negotiated a lease line agreement with Skelly Oil Company, the operator of oil and gas leases immediately to the South of Applicant's lease boundary in said Sections 27 and 28. Applicant and Skelly Oil Company propose to institute pressure maintenance operations on a cooperative basis with each Operator continuing to operate their own leases.

VII.

The granting of this application will be in the interests of conservation of natural resources, the prevention of waste and the protection of correlative rights and will promote the greatest ultimate recovery of oil and gas from the formation to be injected. Applicant respectfully requests that his proposed pressure maintenance project be approved, that the lands described herein subject to Applicant's lease be designated as the project area and that an allowable formula be fixed therefor, and in connection therewith, Applicant recommends the adoption of special field rules governing said project in substantially the same form and content as those adopted by the Commission pursuant to the application of Skelly Oil Company as set forth in Order No. R-2664, Case No. 2994, Order dated March 13, 1964.

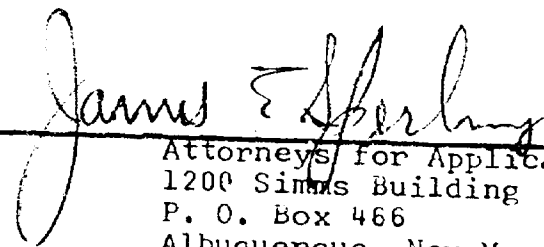
WHEREFORE, Applicant requests that this application be set for hearing at the next Examiner Hearing after due notice as required by law.

Respectfully submitted,

CURTIS J. LITTLE

BY MODRALL SEYMOUR SPERLING ROEHL & HARRIS

By



Attorneys for Applicant
1200 Simms Building
P. O. Box 466
Albuquerque, New Mexico

LAW OFFICES OF
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LELAND S. SEDBERRY, JR.
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JAMES P. SAUNDERS, JR.
JAMES A. BORLAND
JAMES A. PARKER

1964 APR 30 PM 9 11
JOHN F. SIMMS (1885-1954)

Case 3036

April 8, 1964

New Mexico Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico

Gentlemen:

Handed to you herewith is application of
Curtis J. Little for an Order authorizing the
injection of water for pressure maintenance
purposes in the Gallup Formation in the Many
Rocks Gallup Oil Pool. A copy of the applica-
tion has been furnished to the Office of the
State Engineer as required in Rule 701.

Very truly yours,

James E. Sperling
James E. Sperling

JES/sd

DOCKET MAILED

Date 4/17/64
[Signature]

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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

CASE No. 2994
Order No. R-2664

APPLICATION OF SKELLY OIL COMPANY
FOR A PRESSURE MAINTENANCE PROJECT,
SAN JUAN COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on
February 19, 1964, at Santa Fe, New Mexico, before Examiner
Elvis A. Utz.

NOW, on this 13th day of March, 1964, the Commission, a
quorum being present, 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 Commission has jurisdiction of this cause and the subject
matter thereof.
- (2) That the applicant, Skelly Oil Company, seeks authority
to institute a pressure maintenance project in the Many Rocks-
Gallup Oil Pool, San Juan County, New Mexico, by the injection of
water into the Gallup (Tocito) Sandstone formation underlying its
Navajo "P" and "M" Leases in Sections 25, 26, 34, 35, and 36,
Township 32 North, Range 17 West, NMPM, San Juan County, New
Mexico, initially through its Navajo "P" Well No. 6 located in
Unit P of said Section 35.
- (3) That the applicant seeks the promulgation of special
rules and regulations governing the proposed project similar to
the special rules and regulations governing the Many Rocks-Gallup
Pressure Maintenance Project No. 1 promulgated by Order No. R-2541.
- (4) That the proposed pressure maintenance project is in
the interest of conservation and should result in greater ultimate
recovery of oil, thereby preventing waste.
- (5) That the proposed special rules and regulations should
be adopted in order to prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Skelly Oil Company, is hereby authorized to institute a pressure maintenance project designated the Many Rocks-Gallup Pressure Maintenance Project No. 3 in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup (Tocito) Sandstone formation initially through its Navajo "P" Well No. 6 located in Unit P of Section 35, Township 32 North, Range 17 West, NMPM, San Juan County, New Mexico.

(2) That special rules and regulations governing the Many Rocks-Gallup Pressure Maintenance Project No. 3, San Juan County, New Mexico, are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE
MANY ROCKS-GALLUP PRESSURE MAINTENANCE PROJECT NO. 3

RULE 1. The project area of the Many Rocks-Gallup Pressure Maintenance Project No. 3, hereinafter referred to as the Project, shall comprise the following-described area:

SAN JUAN COUNTY, NEW MEXICO
TOWNSHIP 32 NORTH, RANGE 17 WEST, NMPM
Section 26: W/2 SW/4
Section 34: NE/4, NE/4 NW/4, and N/2 SE/4
Section 35: NW/4 and S/2

RULE 2. The allowable for the Project shall be the sum of the allowables of the several wells within the project area, including those wells which are shut-in, curtailed, or used as injection wells. Allowables for all wells shall be determined in a manner hereinafter prescribed.

RULE 3. Allowables for injection wells may be transferred to producing wells within the project area, as may the allowables for producing wells which, in the interest of more efficient operation of the Project, are shut-in or curtailed because of high gas-oil ratio, pressure regulation, control of pattern or sweep efficiencies, or to observe changes in pressures or changes in characteristics of reservoir liquids or progress of sweep.

RULE 4. The allowable assigned to any well which is shut-in or which is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production, shall in no event be greater than its ability to produce during the test prescribed by Rule 6, below, or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 5. The allowable assigned to any injection well on a 40-acre proration unit shall be top unit allowable for the pool.

RULE 6. The allowable assigned to any well which is shut-in or curtailed in accordance with Rule 3 shall be determined by a 24-hour test at a stabilized rate of production which shall be the final 24-hour period of a 72-hour test throughout which the well should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Rule 502 I (a) of the General Rules and Regulations and any limiting gas-oil ratio for the pool shall be waived during such tests. The project operator shall notify the Commission and all offset operators in writing of the exact time and date such tests are to be conducted. The Commission and representatives of the offset operators may witness the tests.

RULE 7. The allowable assigned to each producing well in the Project shall be equal to the well's ability to produce or to top unit allowable for the pool, whichever is less. Each producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the pool, except that any well or wells within the project area producing with a gas-oil ratio in excess of 2,000 cubic feet of gas per barrel of oil may be produced on a "net" gas-oil ratio basis, which net gas-oil ratio shall be determined by applying credit for daily average gas injected, if any, into the pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any well receiving gas injection credit shall be determined in accordance with the following formula:

$$A_{adj} = \frac{TUA \times F_a \times 2,000}{\frac{P_g - I_g}{P_o}}$$

where:

- A_{adj} = the well's daily adjusted allowable
- TUA = top unit allowable for the pool
- F_a = the well's acreage factor
- P_g = average daily volume of gas produced by the well during the preceding month, cubic feet
- I_g = the well's allocated share of the daily average gas injected during the preceding month, cubic feet
- P_o = average daily volume of oil produced by the well during the preceding month, barrels

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Order No. R-2664

In no event shall the amount of injected gas being credited to a well be such as to cause the net gas-oil ratio, $\frac{P_g - I_g}{P_o}$, to

be less than 2,000 cubic feet of gas per barrel of oil produced.

RULE 8. Credit for daily average net water injected into the pool through any injection well located within the project area may be converted to its gas equivalent and applied to any well producing with a gas-oil ratio in excess of two thousand cubic feet of gas per barrel of oil. Total credit for net water injected in the project area shall be the gas equivalent volume of the daily average net water injected during a one-month period. The daily average gas equivalent of net water injected shall be computed in accordance with the following formula:

$$E_g = (V_w \text{ inj} - V_w \text{ prod}) \times 5.61 \times \frac{P_a}{15.025} \times \frac{520^\circ}{T_r} \times \frac{1}{Z}$$

where:

- E_g = Average daily gas equivalent of net water injected, cubic feet
- $V_w \text{ inj}$ = Average daily volume of water injected, barrels
- $V_w \text{ prod}$ = Average daily volume of water produced, barrels
- 5.61 = Cubic foot equivalent of one barrel of water
- P_a = Average reservoir pressure at mid-point of the pay-zones of the pool in the project area, psig + 12.01, as determined from most recent survey
- 15.025 = Pressure base, psi
- 520° = Temperature base of 60°F expressed as absolute temperature
- T_r = Reservoir temperature of 92°F expressed as absolute temperature (552°R)
- Z = Compressibility factor from analysis of gas from the pool at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

Reservoir Pressure	Z	Reservoir Pressure	Z	Reservoir Pressure	Z
50	.9725	300	.8325	550	.6560
100	.9465	350	.8030	600	.6135
150	.9215	400	.7710	650	.5655
200	.8885	450	.7220	700	.5220
250	.8600	500	.6900	750	.4630
				800	.3935

RULE 9. Each month the project operator shall, within three days after the normal unit allowable for Northwest New Mexico has been established, submit to the Commission a Pressure Maintenance Project Operator's Report, on a form prescribed by the Commission, outlining thereon the data required, and requesting allowables for each of the several wells in the Project as well as the total Project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the Project.

RULE 10. The Commission shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for each well in the Project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to the Project and may be produced from the wells in the Project in any proportion.

RULE 11. The conversion of producing wells to injection, the drilling of additional wells for injection, and expansion of the project area shall be accomplished only after approval of the same by the Secretary-Director of the Commission. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional injection wells shall be filed in accordance with Commission Rule 701-B and shall be accompanied by a statement that all offset operators to the proposed injection well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed injection well if, within 15 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators and from the State Engineer.

Expansion of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

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CASE No. 2994
Order No. R-2664

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

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JACK M. CAMPBELL, Chairman

E. S. WALKER, Member

A. L. PORTER, Jr., Member & Secretary

S E A L

esr/

Case 3036

Reand 4-29-64

Rec. 4-20-64

1. Grant Curtis J. Little permission to waterflood an area in the Many Rocks Gallup Oil Pool to be known as the Many Rocks Gallup Pressure Maintenance Project # 5 consisting of, W/2 sec. 27, SW/4 sec. 27, E/2 E/2 sec. 28, 32N-17W. San Juan Co.
2. Grant permission to inject water into ~~32N-17W~~ his Navajo 3X-27 unit O 27-32N-17W thru 2 7/8" tubing with a packer set at approx 1700' in the 5" O D casing.

Also grant permission inject water into the following 2 wells which are to be drilled.

Little - Navajo 10-27 unit O 27-32-17
" " " 4-28 " I 28-32-17

2 7/8 casing to be set in these wells.

3. All 2 7/8 casing or tubing shall be plaster ~~coated~~ internally plastic coated if injection water proves to be at all corrosive.
4. Use R-2664 where necessary.

EDP

CASE 3034: Application of Shell Oil Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Langlie-Mattix Pool by the injection of water into the Queen and Grayburg formations through nine wells in Sections 14 and 23, Township 24 South, Range 37 East, Lea County, New Mexico.

CASE 3035: Application of Shell Oil Company for a non-standard gas proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 320-acre non-standard gas proration unit comprising the S/2 of Section 22, Township 21 South, Range 37 East, Tubb Gas Pool, Lea County, New Mexico, to be dedicated to its Turner Well No. 2, located in Unit L of said Section 22.

CASE 3036: Application of Curtis J. Little for a pressure maintenance project, San Juan, County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a pressure maintenance project in the Gallup formation underlying its Navajo Indian Lease in Sections 21, 22, 27 and 28, Township 32 North, Range 17 West, Many Rocks Gallup Oil Pool, San Juan County, New Mexico. Initial injection will be through three wells located in Units D and O of Section 27 and Unit I of Section 28. Applicant further seeks the promulgation of special rules governing the operation of said project.

DOCKET: EXAMINER HEARING - WEDNESDAY - APRIL 29, 1964

STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Elvis A. Utz, Examiner, or Daniel S. Nutter, Alternate Examiner:

CASE 3015 (Continued from the March 25, 1964 Examiner Hearing):

Application of Lone Star Producing Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its Atlantic State Well No. 1 located in Unit G of Section 30, Township 17 South, Range 36 East, Lea County, New Mexico, to produce oil from an undesignated San Andres Pool and from undesignated Abo Detritus through parallel strings of 2-3/8 inch tubing.

CASE 3024 (Continued from the April 8, 1964 Examiner Hearing):

Application of Deane H. Stoltz for approval of a non-standard unit, a dual completion, and commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of a non-standard 80-acre unit in the North Bagley-Wolfcamp Pool comprising the SW/4 NE/4 and NW/4 SE/4 of Section 22, Township 11 South, Range 33 East, Lea County, New Mexico, approval of the dual completion (conventional) of its Deane H. Stoltz State 262 Well No. 1, located in Unit G of said Section 22, to produce oil from the North Bagley-Wolfcamp Pool through 1 1/4-inch tubing and to produce oil from the North Bagley-Upper Pennsylvanian Pool through the casing-tubing annulus by means of a hydraulic pump and authority to commingle production from the North Bagley-Wolfcamp and North Bagley-Pennsylvanian Pools into a common tank battery, computing production from the North Bagley-Upper Pennsylvanian Pool by the subtraction method.

CASE 3016 (Continued from the March 25, 1964 Examiner Hearing):

Application of Texaco, Inc. for special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the establishment of special pool rules, including a provision for 80-acre proration units, for the Vacuum Upper-Pennsylvanian Pool in Sections 25 and 36, Township 17 South, Range 34 East, Lea County, New Mexico.

CASE 3031: Application of Continental Oil Company to revise the vertical limits of the Blinebry Oil Pool and Terry Blinebry Pool, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order extending the vertical limits of the Blinebry Oil Pool and Terry Blinebry Pool to encompass all of the Blinebry formation, Lea County, New Mexico.

CASE 3032: Application of Robert G. Hanagan for force-pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order force-pooling all mineral interests in the Indian Hills-Upper Pennsylvanian Gas Pool underlying all of Section 32, Township 21 South, Range 24 East, Eddy County, New Mexico.

CASE 3033: Application of Cherry Brothers and Cabot Corporation for the creation of a new oil pool and for special temporary pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new oil pool for Lower Wolfcamp production for its Austin State Well No. 1, located in Unit F of Section 19, Township 14 South, Range 36 East, Lea County, New Mexico, and for the establishment of temporary pool rules therefor, including a provision for 80-acre oil proration units.

DRAFT

JMD/esr

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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

CASE NO. 3036

Order No. R- 2541

APPLICATION OF CURTIS J. LITTLE
FOR A PRESSURE MAINTENANCE PROJ-
ECT, SAN JUAN COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on
April 29, 1964, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.
~~Examiner duly appointed by the Oil Conservation Commission of New~~
~~Mexico, hereinafter referred to as the "Commission," in accordance~~
~~with Rule 1214 of the Commission Rules and Regulations.~~

NOW, on this _____ day of May, 1964, the Commission,
a quorum being present, having considered the ~~application, the~~ testimony,
the record, ~~evidence adduced~~ 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 Commission has jurisdiction of this cause and the subject
matter thereof.

(2) That the applicant, Curtis J. Little, seeks authority to
institute a pressure maintenance project in the Many Rocks-Gallup
Oil Pool, San Juan County, New Mexico, by the injection of water
into the Gallup formation underlying ^{his} ~~its~~ Navajo Indian Lease in
Sections 21, 22, 27, and 28, Township 32 North, Range 17 West, NMPM,
San Juan County, New Mexico, ^{with initial injection} ~~initially~~ through three wells located
in Units D and O of Section 27 and Unit I of Section 28.

(3) That the applicant seeks the promulgation of special
rules and regulations governing the proposed project similar to
the special rules and regulations governing the Many Rocks-Gallup
Pressure Maintenance Project, ~~No. 1 promulgated by Order No. R-2541.~~

(4) That the proposed pressure maintenance project is in
the interest of conservation and should result in greater ultimate
recovery of oil, thereby preventing waste.

(5) That the proposed special rules and regulations should
be adopted in order to prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Curtis J. Little, is hereby authorized to institute a pressure maintenance project designated the Many Rocks-Gallup Pressure Maintenance Project No. 4 in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup formation initially through three wells ~~located~~ in Units D and O of Section 27 and Unit I of Section 28, Township 32 North, Range 17 West, NMPM, San Juan County, New Mexico.

(2) That special rules and regulations governing the Many Rocks-Gallup Pressure Maintenance Project No. ~~24~~ San Juan County, New Mexico, are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE
MANY ROCKS-GALLUP PRESSURE MAINTENANCE PROJECT NO. 4

RULE 1. The project area of the Many Rocks-Gallup Pressure Maintenance Project No. ~~24~~, hereinafter referred to as the Project, shall comprise the following-described area:

SAN JUAN COUNTY, NEW MEXICO
TOWNSHIP 32 NORTH, RANGE 17 WEST, NMPM
Section 26: ~~W/2 SW/4~~ 27: ~~W/2 and SE/4~~
Section 24: ~~NE/4, NE/4 NW/4, and N/2 SE/4~~
Section 25: ~~NW/4 and S/2~~ 28: ~~E/2 E/2~~

RULE 2. The allowable for the Project shall be the sum of the allowables of the several wells within the project area, including those wells which are shut-in, curtailed, or used as injection wells. Allowables for all wells shall be determined in a manner hereinafter prescribed.

RULE 3. Allowables for injection wells may be transferred to producing wells within the project area, as may the allowables for producing wells which, in the interest of more efficient operation of the Project, are shut-in or curtailed because of high gas-oil ratio, pressure regulation, control of pattern or sweep efficiencies, or to observe changes in pressures or changes in characteristics of reservoir liquids or progress of sweep.

RULE 4. The allowable assigned to any well which is shut-in or which is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production, shall in no event be greater than its ability to produce during the test prescribed by Rule 6, below, or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 5. The allowable assigned to any injection well on a 40-acre proration unit shall be top unit allowable for the pool.

RULE 6. The allowable assigned to any well which is shut-in or curtailed in accordance with Rule 3 shall be determined by a 24-hour test at a stabilized rate of production which shall be the final 24-hour period of a 72-hour test throughout which the well should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Rule 502 I (a) of the General Rules and Regulations and any limiting gas-oil ratio for the pool shall be waived during such tests. The project operator shall notify the Commission and all offset operators in writing of the exact time and date such tests are to be conducted. The Commission and representatives of the offset operators may witness the tests.

RULE 7. The allowable assigned to each producing well in the Project shall be equal to the well's ability to produce or to top unit allowable for the pool, whichever is less. Each producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the pool, except that any well or wells within the project area producing with a gas-oil ratio in excess of 2,000 cubic feet of gas per barrel of oil may be produced on a "net" gas-oil ratio basis, which net gas-oil ratio shall be determined by applying credit for daily average gas injected, if any, into the pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any well receiving gas injection credit shall be determined in accordance with the following formula:

$$A_{adj} = \frac{TUA \times F_a \times 2,000}{\frac{P_g - I_g}{P_o}}$$

where:

- A_{adj} = the well's daily adjusted allowable
- TUA = top unit allowable for the pool
- F_a = the well's acreage factor
- P_g = average daily volume of gas produced by the well during the preceding month, cubic feet
- I_g = the well's allocated share of the daily average gas injected during the preceding month, cubic feet
- P_o = average daily volume of oil produced by the well during the preceding month, barrels

CASE No. ~~XXXX~~ 3036
Order No. R-~~XXXX~~

In no event shall the amount of injected gas being credited to a well be such as to cause the net gas-oil ratio, $\frac{P_g - I_g}{P_o}$, to be less than 2,000 cubic feet of gas per barrel of oil produced.

RULE 8. Credit for daily average net water injected into the pool through any injection well located within the project area may be converted to its gas equivalent and applied to any well producing with a gas-oil ratio in excess of two thousand cubic feet of gas per barrel of oil. Total credit for net water injected in the project area shall be the gas equivalent volume of the daily average net water injected during a one-month period. The daily average gas equivalent of net water injected shall be computed in accordance with the following formula:

$$E_g = (V_w \text{ inj} - V_w \text{ prod}) \times 5.61 \times \frac{P_a}{15.025} \times \frac{520^\circ}{T_r} \times \frac{1}{Z}$$

where:

- E_g = Average daily gas equivalent of net water injected, cubic feet
- $V_w \text{ inj}$ = Average daily volume of water injected, barrels
- $V_w \text{ prod}$ = Average daily volume of water produced, barrels
- 5.61 = Cubic foot equivalent of one barrel of water
- P_a = Average reservoir pressure at mid-point of the pay-zones of the pool in the project area, psig + 12.01, as determined from most recent survey
- 15.025 = Pressure base, psi
- 520° = Temperature base of 60°F expressed as absolute temperature
- T_r = Reservoir temperature of 92°F expressed as absolute temperature (552°R)
- Z = Compressibility factor from analysis of gas from the pool at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

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CASE No. ~~2004~~ 3036

Order No. R-~~2664~~

Reservoir Pressure	Z	Reservoir Pressure	Z	Reservoir Pressure	Z
50	.9725	300	.8325	550	.6560
100	.9465	350	.8030	600	.6135
150	.9215	400	.7710	650	.5655
200	.8885	450	.7220	700	.5220
250	.8600	500	.6900	750	.4630
				800	.3935

RULE 9. Each month the project operator shall, within three days after the normal unit allowable for Northwest New Mexico has been established, submit to the Commission a Pressure Maintenance Project Operator's Report, on a form prescribed by the Commission, outlining thereon the data required, and requesting allowables for each of the several wells in the Project as well as the total Project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the Project.

RULE 10. The Commission shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for each well in the Project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to the Project and may be produced from the wells in the Project in any proportion.

RULE 11. The conversion of producing wells to injection, the drilling of additional wells for injection, and expansion of the project area shall be accomplished only after approval of the same by the Secretary-Director of the Commission. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional injection wells shall be filed in accordance with Commission Rule 701-B and shall be accompanied by a statement that all offset operators to the proposed injection well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed injection well if, within 15 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators and from the State Engineer.

Expansion of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

-6-

CASE No. ~~2994~~ 3036
Order No. R-~~2994~~

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

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JACK M. CAMPBELL, Chairman

E. S. WALKER, Member

A. L. PORTER, Jr., Member & Secretary

S E A L

esr/

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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

CASE No. 3036
Order No. R-2700

APPLICATION OF CURTIS J. LITTLE
FOR A PRESSURE MAINTENANCE PROJ-
ECT, SAN JUAN COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on April 29, 1964, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 8th day of May, 1964, the Commission, a quorum being present, 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 Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Curtis J. Little, seeks authority to institute a pressure maintenance project in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup formation underlying his Navajo Indian Lease in Sections 21, 22, 27, and 28, Township 32 North, Range 17 West, NMPM, San Juan County, New Mexico, with initial injection through three wells in Units D and O of Section 27 and Unit I of Section 28.

(3) That the applicant seeks the promulgation of special rules and regulations governing the proposed project similar to the special rules and regulations governing previous Many Rocks-Gallup Pressure Maintenance Projects.

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CASE No. 3036

Order No. R-2700

(4) That the proposed pressure maintenance project is in the interest of conservation and should result in greater ultimate recovery of oil, thereby preventing waste.

(5) That the proposed special rules and regulations should be adopted in order to prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Curtis J. Little, is hereby authorized to institute a pressure maintenance project designated the Many Rocks-Gallup Pressure Maintenance Project No. 4 in the Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water into the Gallup formation initially through three wells in Units D and O of Section 27 and Unit I of Section 28, Township 32 North, Range 17 West, NMPM, San Juan County, New Mexico.

(2) That special rules and regulations governing the Many Rocks-Gallup Pressure Maintenance Project No. 4, San Juan County, New Mexico, are hereby promulgated as follows:

**SPECIAL RULES AND REGULATIONS
FOR THE**

MANY ROCKS-GALLUP PRESSURE MAINTENANCE PROJECT NO. 4

RULE 1. The project area of the Many Rocks-Gallup Pressure Maintenance Project No. 4, hereinafter referred to as the Project, shall comprise the following-described area:

SAN JUAN COUNTY, NEW MEXICO
TOWNSHIP 32 NORTH, RANGE 17 WEST, NMPM
Section 27: W/2 and SE/4
Section 28: E/2 E/2

RULE 2. The allowable for the Project shall be the sum of the allowables of the several wells within the project area, including those wells which are shut-in, curtailed, or used as injection wells. Allowables for all wells shall be determined in a manner hereinafter prescribed.

RULE 3. Allowables for injection wells may be transferred to producing wells within the project area, as may the allowables for producing wells which, in the interest of more efficient operation of the Project, are shut-in or curtailed because of high gas-oil ratio, pressure regulation, control of pattern or sweep

-3-

CASE No. 3036
Order No. R-2700

efficiencies, or to observe changes in pressures or changes in characteristics of reservoir liquids or progress of sweep.

RULE 4. The allowable assigned to any well which is shut-in or which is curtailed in accordance with the provisions of Rule 3, which allowable is to be transferred to any well or wells in the project area for production, shall in no event be greater than its ability to produce during the test prescribed by Rule 6, below, or greater than the current top unit allowable for the pool during the month of transfer, whichever is less.

RULE 5. The allowable assigned to any injection well on a 40-acre proration unit shall be top unit allowable for the pool.

RULE 6. The allowable assigned to any well which is shut-in or curtailed in accordance with Rule 3 shall be determined by a 24-hour test at a stabilized rate of production which shall be the final 24-hour period of a 72-hour test throughout which the well should be produced in the same manner and at a constant rate. The daily tolerance limitation set forth in Rule 502 I (a) of the General Rules and Regulations and any limiting gas-oil ratio for the pool shall be waived during such tests. The project operator shall notify the Commission and all offset operators in writing of the exact time and date such tests are to be conducted. The Commission and representatives of the offset operators may witness the tests.

RULE 7. The allowable assigned to each producing well in the Project shall be equal to the well's ability to produce or to top unit allowable for the pool, whichever is less. Each producing well shall be subject to the limiting gas-oil ratio (2,000 to 1) for the pool, except that any well or wells within the project area producing with a gas-oil ratio in excess of 2,000 cubic feet of gas per barrel of oil may be produced on a "net" gas-oil ratio basis, which net gas-oil ratio shall be determined by applying credit for daily average gas injected, if any, into the pool within the project area to such high gas-oil ratio well. The daily adjusted oil allowable for any well receiving gas injection credit shall be determined in accordance with the following formula:

$$A_{adj} = \frac{TUA \times F_a \times 2,000}{\frac{P_g - I_g}{P_o}}$$

-4-

CASE No. 3036

Order No. R-2700

where:

A_{adj} = the well's daily adjusted allowable

TUA = top unit allowable for the pool

F_a = the well's acreage factor

P_g = average daily volume of gas produced by the well during the preceding month, cubic feet

I_g = the well's allocated share of the daily average gas injected during the preceding month, cubic feet

P_o = average daily volume of oil produced by the well during the preceding month, barrels

In no event shall the amount of injected gas being credited to a well be such as to cause the net gas-oil ratio, $\frac{P_g - I_g}{P_o}$, to

be less than 2,000 cubic feet of gas per barrel of oil produced.

RULE 8. Credit for daily average net water injected into the pool through any injection well located within the project area may be converted to its gas equivalent and applied to any well producing with a gas-oil ratio in excess of two thousand cubic feet of gas per barrel of oil. Total credit for net water injected in the project area shall be the gas equivalent volume of the daily average net water injected during a one-month period. The daily average gas equivalent of net water injected shall be computed in accordance with the following formula:

$$E_g = (V_{w \text{ inj}} - V_{w \text{ prod}}) \times 5.61 \times \frac{P_a}{15.025} \times \frac{520^\circ}{T_r} \times \frac{1}{Z}$$

where:

E_g = Average daily gas equivalent of net water injected, cubic feet

$V_{w \text{ inj}}$ = Average daily volume of water injected, barrels

-3-

CASE No. 3036

Order No. R-2700

- $V_w \text{ prod}$ = Average daily volume of water produced, barrels
- 5.61 = Cubic foot equivalent of one barrel of water
- P_a = Average reservoir pressure at mid-point of the pay-zones of the pool in the project area, psig + 12.01, as determined from most recent survey
- 15.025 = Pressure base, psi
- 520° = Temperature base of 60°F expressed as absolute temperature
- T_r = Reservoir temperature of 92°F expressed as absolute temperature (552°R)
- Z = Compressibility factor from analysis of gas from the pool at average reservoir pressure, P_a , interpolated from compressibility tabulation below:

Reservoir Pressure	Z	Reservoir Pressure	Z	Reservoir Pressure	Z
50	.9725	300	.8325	550	.6560
100	.9465	350	.8030	600	.6135
150	.9215	400	.7710	650	.5655
200	.8885	450	.7220	700	.5220
250	.8600	500	.6900	750	.4630
				800	.3935

RULE 9. Each month the project operator shall, within three days after the normal unit allowable for Northwest New Mexico has been established, submit to the Commission a Pressure Maintenance Project Operator's Report, on a form prescribed by the Commission, outlining thereon the data required, and requesting allowables for each of the several wells in the Project as well as the total Project allowable. The aforesaid Pressure Maintenance Project Operator's Report shall be filed in lieu of Form C-120 for the Project.

RULE 10. The Commission shall, upon review of the report and after any adjustments deemed necessary, calculate the allowable for

-6-

CASE No. 3036

Order No. R-2799

each well in the Project for the next succeeding month in accordance with these rules. The sum of the allowables so calculated shall be assigned to the Project and may be produced from the wells in the Project in any proportion.

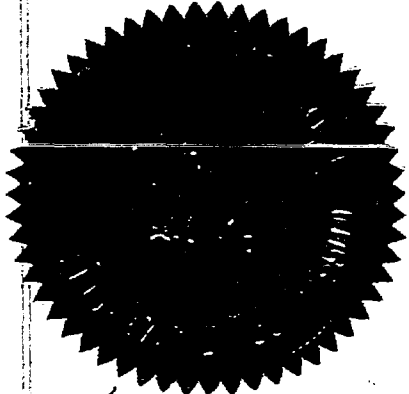
RULE 11. The conversion of producing wells to injection, the drilling of additional wells for injection, and expansion of the project area shall be accomplished only after approval of the same by the Secretary-Director of the Commission. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional injection wells shall be filed in accordance with Commission Rule 701-B and shall be accompanied by a statement that all offset operators to the proposed injection well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed injection well if, within 15 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators and from the State Engineer.

Expansion of the project area may be approved by the Secretary-Director of the Commission administratively when good cause is shown therefor.

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

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



STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M Campbell
JACK M. CAMPBELL, Chairman

S. Walker
S. WALKER, Member

A. L. Porter, Jr.
A. L. PORTER, Jr., Member & Secretary

esr/

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission



LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER

P. O. BOX 871
SANTA FE

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

May 8, 1964

Mr. James E. Sperling
Modrall, Seymour, Sperling, Roehl &
and Harris
Attorneys at Law
Suite 1200 - Simms Building
Albuquerque, New Mexico

Case No. 3036
Order No. R-2700
Applicant:
Curtis J. Little

Dear Sir:

Enclosed herewith are two copies of the above-referenced
Commission order recently entered in the subject case.

Very truly yours,

A. L. Porter, Jr.

A. L. PORTER, Jr.
Secretary-Director

ix/

Carbon copy of order also sent to:

Hobbs OCC x

Artesia OCC

Antec OCC x

OTHER

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

June 1, 1964

C
O
P
Y

Mr. Curtis J. Little
2929 Monte Vista Blvd., NE
Albuquerque, New Mexico

Dear Mr. Little:

Reference is made to your letter dated May 28, 1964, wherein you request authority to locate a water injection well for your Many Rocks-Gallup Pressure Maintenance Project No. 4 at a point 1360 feet from the North line and 260 feet from the West line of Section 27, Township 32 North, Range 17 West, Many Rocks-Gallup Pool, San Juan County, New Mexico. Commission Order No. R-2700 authorized the institution of this pressure maintenance project with initial injection through three wells located in Units D and O of said Section 27 and Unit I of Section 28, same township.

Inasmuch as you own all acreage offsetting the proposed water injection well, and the above-described location should result in a more efficient sweep of oil in this pressure maintenance project, it is hereby approved.

Very truly yours,

A. L. Porter, Jr.
Secretary-Director

ALP:DSN:sg

cc: Oil Conservation Commission (with enclosure) Aztec
Case File 3036

Mr. Porter:

Mr. Little is in
Farmington and he
is sending the enclosures
under separate cover
from Farmington.

Nellie Collins
Secretary

Curtis J. Little
CONSULTING GEOLOGIST
2929 MONTE VISTA BLVD., N.E.
TELEPHONE AM 8-8741
ALBUQUERQUE, NEW MEXICO

May 28, 1964

New Mexico Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico

Attention: Mr. A. L. Porter, Jr.

Dear Mr. Porter:

Permission is requested for Executive approval under Rule 11, R 2700, Case 3036, for a water injection well to be located 260' from the west line and 1360' from the north line of Section 27-T. 32 N., R. 17 W., San Juan County, New Mexico. The nearest lease line is 3920' to the south. Exception location is requested because, as illustrated on the enclosed isopach map of the lower Gallup sand, the orthodox location would probably miss the oil sand, or if encountered, the sand would probably be thin with low porosity and permeability thus prohibiting the recommended injection rate of a minimum 200 barrels of water per day. It is believed that this requested unorthodox location would encounter enough oil sand to permit a sweep southeastward to well 8-27 and northwestward to well 1-28 thereby resulting in the prevention of waste and obtaining the ultimate maximum recovery of secondary oil. I enclose survey plat of requested location.

Your early consideration of this request will be greatly appreciated.

Yours very truly,

Curtis J. Little
Curtis J. Little

CJL/nc

Cc: Mr. Emery Arnold
New Mexico Oil Conservation Commission
1000 Brazos Road
Aztec, New Mexico

May 28, 1964

New Mexico Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico

Attention: Mr. A. L. Porter, Jr.

Dear Mr. Porter:

Permission is requested for Executive approval under Rule 11, R 2700, Case 3036, for a water injection well to be located 260' from the west line and 1360' from the north line of Section 27-T. 32 N., R. 17 W., San Juan County, New Mexico. The nearest lease line is 3920' to the south. Exception location is requested because, as illustrated on the enclosed isopach map of the lower Gallup sand, the orthodox location would probably miss the oil sand, or if encountered, the sand would probably be thin with low porosity and permeability thus prohibiting the recommended injection rate of a minimum 200 barrels of water per day. It is believed that this requested unorthodox location would encounter enough oil sand to permit a sweep southeastward to well S-27 and northwestward to well 1-28 thereby resulting in the prevention of waste and obtaining the ultimate maximum recovery of secondary oil. I enclose survey plat of requested location.

Your early consideration of this request will be greatly appreciated.

Yours very truly,

Curtis J. Little
Curtis J. Little *nc*

CJL/nc

Cc: Mr. Emery Arnold
New Mexico Oil Conservation Commission
1000 Brazos Road
Aztec, New Mexico

Mr Pete Porter

Pete: These enclosures for letter mailed from Albuquerque today. I would greatly appreciate ^{it approved} a verbal collect phone call from you or your staff in order that we can rent the rig to work next week. I'm at the Town House Motel in Farmington - phone 325-4564.

Thank you very much

Curtis Little

MAIN OFFICE
1961 MAY 20 PM 12
MAY 20 PM 12

NEW MEXICO OIL CONSERVATION COMMISSION
Well Location and Acreage Dedication Plat

SECTION A.

Date _____

Operator CURTIS J. LITTLE Lease NAVAJO
Well No. 11-27 Unit Letter E Section 27 Township 32 NORTH Range 17 WEST NMPM
Located 1360 Feet From NORTH Line, 260 Feet From WEST Line
County SAN JUAN G. L. Elevation 5913 Dedicated Acreage _____ Acres
Name of Producing Formation _____ Pool _____

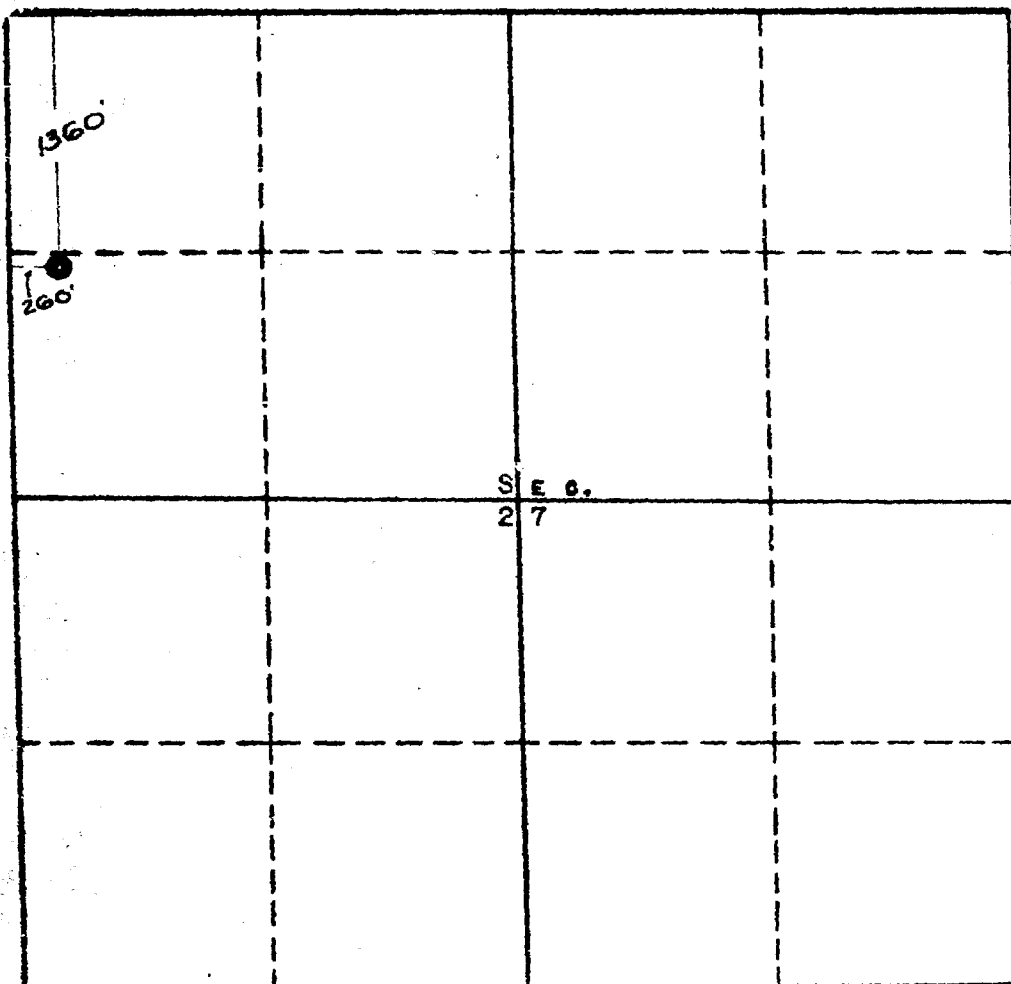
1. Is the Operator the only owner* in the dedicated acreage outlined on the plat below? Yes _____ No _____
2. If the answer to question One is "No," have the interests of all the owners been consolidated by communitization agreement or otherwise? Yes _____ No _____ If answer is "Yes," Type of Consolidation _____

3. If the answer to question Two is "No," list all the owners and their respective interests below:

OWNER

LAND DESCRIPTION

SECTION B.



This is to certify that the information in Section A above is true and complete to the best of my knowledge and belief.

(OPERATOR)

(REPRESENTATIVE)

(ADDRESS)

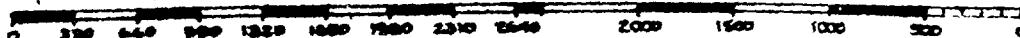
This is to certify that the well location shown on the plat in Section B was plotted from field notes of actual survey made by me or under my supervision and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed MAY 25, 1964

Four States Engineering Co.
FARMINGTON, NEW MEXICO

Ernest H. Cook
REGISTERED ENGINEER OR
LAND SURVEYOR

Certificate No. 3602



NEW MEXICO OIL CONSERVATION COMMISSION
Well Location and Acreage Dedication Plat

SECTION A.

Date _____

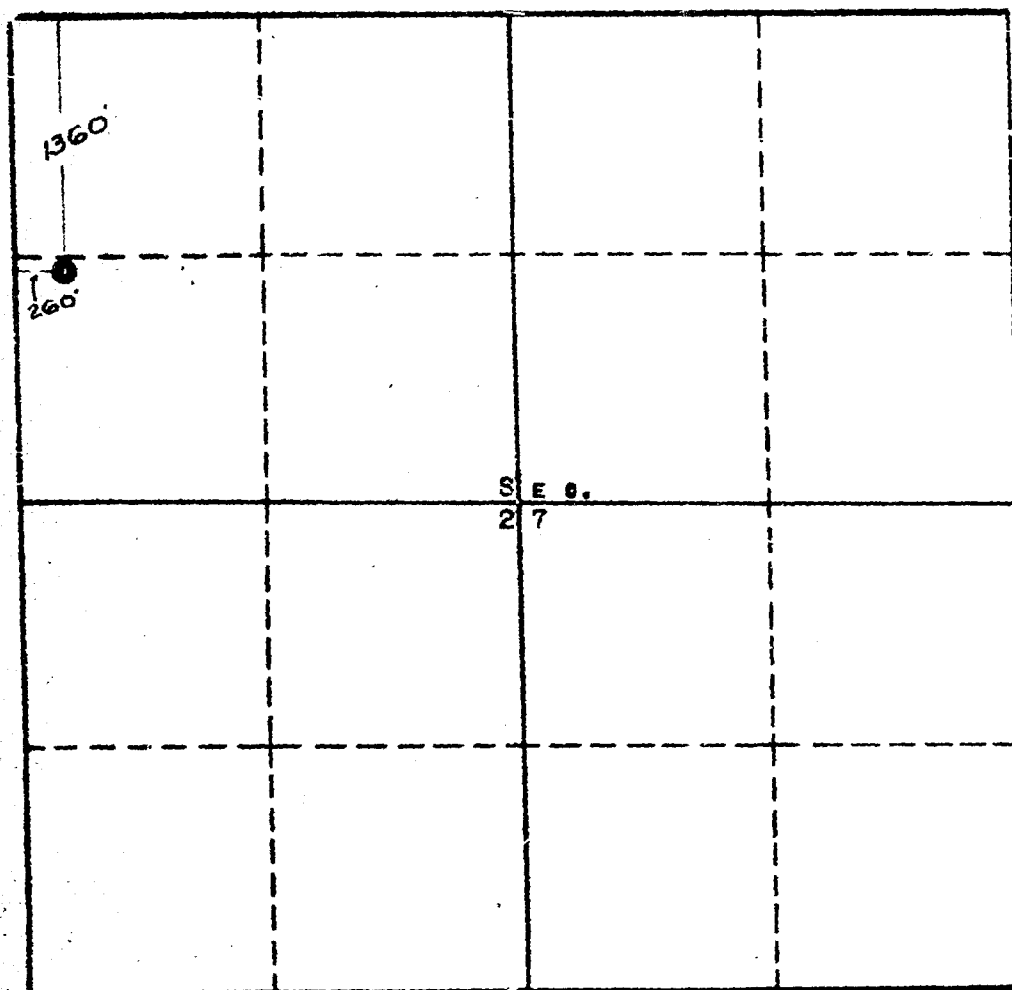
Operator CURTIS J. LITTLE Lease NAVAJO
Well No. 11-27 Unit Letter E Section 27 Township 32 NORTH Range 17 WEST NMPM
Located 1360 Feet From NORTH Line, 260 Feet From WEST Line
County SAN JUAN G. L. Elevation 5913 Dedicated Acreage _____ Acres
Name of Producing Formation _____ Pool _____

1. Is the Operator the only owner* in the dedicated acreage outlined on the plat below? Yes _____ No _____
2. If the answer to question One is "No," have the interests of all the owners been consolidated by communitization agreement or otherwise? Yes _____ No _____ If answer is "Yes," Type of Consolidation _____
3. If the answer to question Two is "No," list all the owners and their respective interests below:

OWNER

LAND DESCRIPTION

SECTION B.



This is to certify that the information in Section A above is true and complete to the best of my knowledge and belief.

(OPERATOR)

(REPRESENTATIVE)

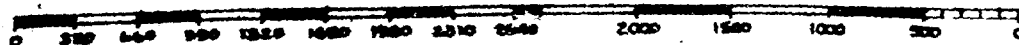
(ADDRESS)

This is to certify that the well location shown on the plat in Section B was plotted from field notes of actual surveys made by me or under my supervision and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed MAY 26, 1964
Four States Engineering Co.
FARMINGTON, NEW MEXICO

Carl V. Takshawk
REGISTERED ENGINEER OR
LAND SURVEYOR

Certificate No. 3602



NEW MEXICO OIL CONSERVATION COMMISSION
Well Location and Acreage Dedication Plot

SECTION A.

Date _____

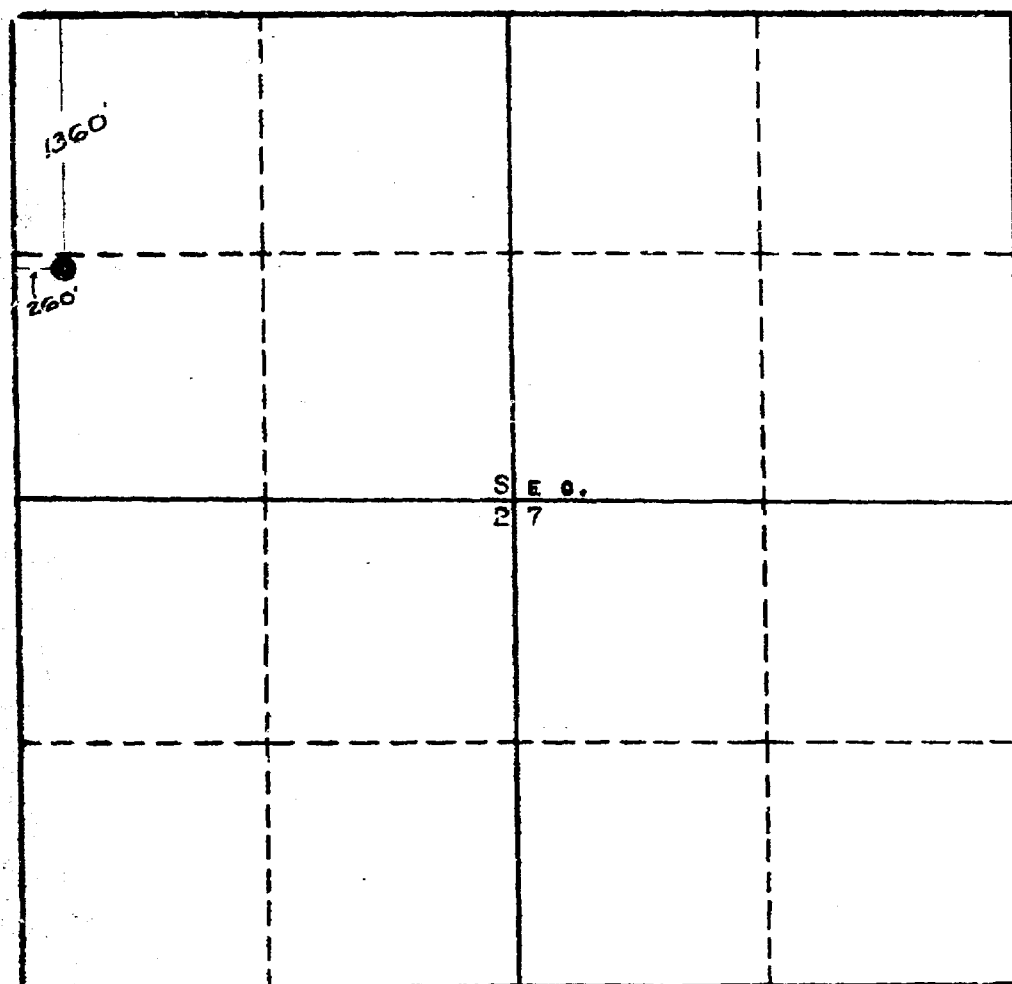
Operator CURTIS J. LITTLE Lease NAVajo
Well No. 11-27 Unit Letter E Section 27 Township 32 NORTH Range 17 WEST NMPM
Located 1360 Feet From NORTH Line, 260 Feet From WEST Line
County SAN JUAN G. L. Elevation 5913 Dedicated Acreage _____ Acres
Name of Producing Formation _____ Pool _____

1. Is the Operator the only owner* in the dedicated acreage outlined on the plat below? Yes _____ No _____
2. If the answer to question One is "No," have the interests of all the owners been consolidated by communitization agreement or otherwise? Yes _____ No _____ If answer is "Yes," Type of Consolidation _____
3. If the answer to question Two is "No," list all the owners and their respective interests below:

OWNER

LAND DESCRIPTION

SECTION B.



This is to certify that the information in Section A above is true and complete to the best of my knowledge and belief.

(OPERATOR)

(REPRESENTATIVE)

(ADDRESS)

This is to certify that the well location shown on the plat in Section B was plotted from field notes of actual survey made by me or under my supervision and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed MAY 26, 1964

Four States Engineering Co.
FARMINGTON, NEW MEXICO

Ernest V. Cook
REGISTERED ENGINEER OR
LAND SURVEYOR

Certificate No. 3602

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

APRIL 29, 1964

EXAMINER HEARING

IN THE MATTER OF: Application of Curtis J.
Little for a pressure maintenance project, San
Juan, County, New Mexico.

Case No. 3036

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: The Hearing will come to order. We will call
Case Number 3036.

MR. DURRETT: Application of Curtis J. Little for a
pressure maintenance project, San Juan, County, New Mexico.

MR. SPERLING: I am J. E. Sperling, Modreall, Seymour,
Sperling, Albuquerque, New Mexico, appearing on behalf of the

DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.
PHONE 325-1182

SANTA FE, N. M.
PHONE 983-3971

ALBUQUERQUE, N. M.
PHONE 243-6891



Applicant; and we have one witness.

MR. UTZ: Are there other appearances in this case? You may proceed.

MR. SPERLING: Before proceeding with the presentation of our case, Mr. Examiner, I would like to commend Mr. Nutter for his alertness in calling to our attention at the time of filing this Application an error. This is simply further evidence of the excellence of the Commission Staff and our confidence in the Commission Staff. We appreciate it.

(Whereupon, Applicant's Exhibits
Numbers 1 through 6 were marked
for identification.)

CURTIS J. LITTLE,

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

DIRECT EXAMINATION

BY MR. SPERLING:

Q Would you state your name, please?

A Curtis J. Little.

Q Have you testified on previous occasions before the Commission?

A I have.

Q Your qualifications are then a matter of record?

A Yes, sir.

Q Would you please tell us what is sought by the Application



in this Case?

A To establish a pressure maintenance program under my Navajo lease.

Q I understand that you are the operator and Applicant in this Case and the operator of the leasehold area on what has been marked as Exhibit One; is that correct?

A Yes, sir.

Q Would you explain what is purported on that Exhibit?

A Exhibit One, the project area is outlined in blue and encompasses Sections 22, 27 and 28 of 32 North, 17 West. It's in the northwestern end of the Many Rocks Gallup Field Oil Pool. We have shown the accurate location of all wells drilled in the project area; the elevations, total depths, both surface casing and production casing sizes and amounts, cement, calculated tops of perforations, fractures, treatments, initial potential, and the date thereof, and the cumulative production as of the first of this month.

Q Mr. Little, have you caused to be made a feasibility study by an independent engineering service company relating to this project?

A I have.

Q And who made that study?

A The reservoir engineer section of Core Laboratories Incorporated, out of Dallas, Texas.



Q What has been the cumulative production to date from the project area?

A About 150,000 barrels.

Q Now, would you please refer to what has been marked as Exhibit Two and tell us what that Exhibit shows?

A Exhibit Two is a Schlumberger Induction Gamma-Ray Log showing the Pay zones, the Gallup Tociito sandstone and one of the proposed injection wells, the perforations from 1713 to 1133.

Q Would you point out the location of the well, the log of which you have just referred to, by referring back to Exhibit Number One?

A It is in Unit O of the Southwest-Southeast Section 27.

Q And that is proposed as the presently drilled injection well?

A That's correct.

Q Now, while we are still looking at Exhibit Number One, would you point out the location of the other proposed injection wells?

A The proposed injection well Number 10-27 in the Northwest Northwest of Section 27, and proposed injection well Number 4-28, located in the Northeast Southeast of Section 28.

Q Now, these are the locations of injection wells that have been recommended by Core Laboratories in the course of their recent studies; is that correct?



A That's correct.

MR. UTZ: That was 2-28?

A 4-28 and 10-27, both of them are open circles with an arrow.

MR. UTZ: All right.

A They have not been drilled.

Q (By Mr. Sperling) So, so far as injection wells are concerned, you propose to complete one presently drilled well as an injection well and drill two additional injection wells; is that correct?

A To convert one pumping oil well to an injection well, which is 3-27-X, and complete as injection wells the other two.

Q Now, would you please refer to Exhibit Number Three, and tell us what that is?

A That is the proposed water injection methods for when we convert Navajo 3-X-27 from an oil producer to an injection well, to run tubing with a packer set directly above the perforated pay zone and inject water in that manner.

Q Now, I refer to Exhibit Number Four, which appears to be a proposed completion program for the wells which are to be drilled for purposes of water injection.

A This is our proposed casing program for the two injection wells Number 10-27 and 4-28, and it's a tubing completion using

DEARNLEY-MEIER REPORTING SERVICE, Inc.
ALBUQUERQUE, N. M.
PHONE 242-6691



2 and 7/8ths OD tubing to be set below and cemented, perforated and water injected into.

Q All right, sir. Now, would you please refer to what has been marked as Exhibit Number Five, and explain to us what that Exhibit is designed to show?

A Exhibit Number Five is an Isopach of Lower Gallup sand showing the Many Rock San Bar gas cap associated with it which will be further substantiated by a structure map to be introduced later. It shows the "zero" the "correction", the edges of the Many Rocks Sand and the zero limits of the horseshoe sand, which is another sand bar paralleling Many Rocks to the southwest, and northwestern portion which I believe has a terminology of the Mesa Gallup Oil Pool, both of which have an associated gas cap.

Q What does the red area indicate on Exhibit Number Five?

A That is a free gas cap that has been delineated by the wells which I have drilled. One well that T.P has drilled, Texas Pacific, and one well that the Murphy Corporation has drilled.

Q Then the reservoir mechanism in affect is an expanding gas cap in your opinion?

A An expanding gas cap and associated with that, a solution gas drive



DEARNLEY-MEIER REPORTING SERVICE, Inc.

ALBUQUERQUE, N. M.
PHONE 243-6691

Q Now, you made reference to a subsequent Exhibit. Perhaps we had better, in order to keep these in order, refer first to Exhibit Number Five, again tell us what that is designed to show.

A Exhibit Number Six is an Isopach Map showing oil sand with greater than nine and a half percent porosity as determined by core analysis, and/or porosity type logs throughout the Many Rocks Oil Pool, and in addition to the undesignated field which extends further on up in the northwestern area to the line.

Q Well, this again shows the delineation of the gas cap area, and the gas oil contact as established by the wells previously drilled to which you have referred, is that correct?

A That is right.

Q All right. Now, going on to the next Exhibit, I believe is Seven, I think this is the Exhibit that you referred to previously as one to be considered as a later date. Would you please explain what this is?

A This is a structure map on the Sanostee limestone which underlies the pay sand, the Gallup Sanostee Oil Sand by approximately 10 feet. That is a good structural datum that is traceable through the northwestern portion of the State of New Mexico. Its contours accurately localized the gas oil contract on the previous two Exhibits. You will note, that the



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associated high, as it goes through, commonly known in this area as the Blue Hill. Structural features causes gas to be accumulated on top of it where the low portion is Murphy's in the northwestern area, and lined with Little, Skelly and Humble. As we go off of the structural features, you leave the gas cap and get into pure oil.

Q Then, you feel that these last three Exhibits to which you have referred establish, without question, the existence of the gas cap and its accurate location as of this time, or at least as of the time of the drilling of the wells which you have referred to, as well as the structural position of the wells, which you propose to produce and which you proposed to inject?

A That's correct. Core Lab, the engineering department has come up with the recommendation to inject two wells at the gas-oil contact and the third well on an agreement worked out between himself and Skelly on a joint lease line agreement.

Q Would you point out the location of that well?

A That is the 3-27-X Well in the Southwest Southwest, Skelly has agreed to inject into there M-12 located just to the Southwest of my 3-27-X.

Q I take it from what you say, then, that there is in existence, a lease line agreement sofaras Skelly, the offset operator to the Southeast of the project area is concerned?

A Yes, sir, we have met and agreed in Skelly District level



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in Hobbs, the arrangement of injecting equal amounts of water in these two wells.

Q What is proposed as the injection rate for these two wells?

A Approximately two-hundred barrels per day per well.

Q I see. Now, would you point out to us in general the location of the similar pressure maintenance projects in the Many Rocks Field under authority previously granted by the Commission?

A Humble's project, in Sections One, Two, and Twelve, of 3117, was the first project to get underway and water has been going into the ground there for several months. The second application, and I am not sure where water is actually going in the ground as yet, was the Atlantic application in Sections 6, 7 and 8 on the map, and that goes on to the Southwest a couple of extra miles and the third application was by Skelly to inject in their P-6 in the Southeast quarter, Southeast quarter of Section 35, 3217.

Q Do you have at hand the order numbers which granted approval to these applications that you have referred to?

A Humble's Case was 2865. I do not have the "R" Number. Atlantic's Case was 2948, "R" Number 2622, Skelly's Case was 2994, "R" 2664.

Q I think you are still referring to Exhibit Six, here, you



can locate for us the proposed source well or water supply well for your project. Would you point that out, please?

A Its a deep basement test drilled to below 9,000 feet by Texas Pacific Coal and Oil in the Northwest Quarter Section 28, their 1-B Navajo drilled and plugged in 1960, there is 9 and 5/10ths inch casing set at 4200 feet and cement was circulated. We propose to reenter the abandoned well and perforate the water sand and make that a water supply well.

MR. UTZ: In what zone?

A Entrada.

MR. UTZ: Entrada.

A Now, an attempt will be made to do that. If it is unsuccessful, either the second choice, which would be the Jurassic Marrison, third choice would be the Jurassic Bluff.

Q What evidence or information do you have as to the presence of water in the zones that you have indicated?

A The Schlumberger log interpretation shows that all three sands contained water, water is presently being produced from the Jurassic Marrison by Humble and Atlantic, for their injection purposes.

Q Now, the Schlumberger log that you referred to, was run in the well, which you propose to convert?

A Yes, it was.

Q Were any fresh water zones encountered in the course of



drilling the wells, the producing wells within the project area?

A Not within the project area.

I have drilled 17 wells, 16 shown the 3-X well with the 3-27 was lost and the 29 hole, the 3-X-27 was drilled some 20 feet away. In all 17 wells we encountered no water in any amount, all of it was drilled with air to the pay sand.

Q Have you submitted to the office of the State Engineer the copies of the Exhibits and an explanation of what is proposed insofar as this project is concerned?

A I have.

Q You have discussed that with Mr. Irby?

A I have.

Q Has any objection been made?

A None. He has requested the chemical analysis of the water sample, the water out of water supply well, to be furnished him as soon as I obtain the sample.

Q When do you anticipate this will be forthcoming?

A In the next two or three weeks.

Q I believe you stated previously that the cumulative production to date has been something in excess of one hundred thousand barrels within the project area outlined?

What do you anticipate as the result of the institution of this pressure maintenance program?



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A An additional four hundred thousand barrels according to Core Laboratories. Without instituting pressure maintenance, they calculate that we will only recover an additional rimer before abandonment of the field.

Q What will be the result in your opinion if these wells continue to produce at their present rate having in mind the gascap area that you have already outlined for us?

A As the fluids are withdrawn, the gascap will expand and gas out the three wells that are nearest the gascap which are wells Number 1-28, 8-28 and 7-27, as the gascap expands.

Q What do you anticipate as the approximate length of time required to fill up after the initiation of the project?

A The Core Laboratories Engineering Section estimates at the injection rate of some six hundred barrels a day, two hundred barrels per day in each of the three wells it will take approximately one year before we will get a response.

Q Well, I assume from what you say, that with the present rate of production, this is a matter of some urgency in order to prevent the migration of the gascap into the oil area?

A That is true.

Q Your application, Mr. Little, has requested the adoption of special rules for this project. In the event that this is approved by the Commission, what are the rules that you propose?



A The identical rules that were given to Humble, Atlantic, and Skelly in their previous hearings.

Q As contained in orders to which you previously referred?

MR. PORTER: Was that in the Horseshoe?

A Many Rocks.

MR. PORTER: I mean, the other pressure maintenance was in the Many Rocks, too?

A I understand they also follow the rules that the Horseshoe pressure maintenance had.

MR. PORTER: Yes, sir. Thank you.

A That was Humble's testimony at their first Hearing.

Q (By Mr. Sperling) Do you have anything else to add, Mr. Little?

A No, I believe not.

MR. SPERLING: At this time, Mr. Examiner, I would like to offer Exhibits One through Six into evidence.

MR. UTZ: Without objection Exhibits One through Six will be entered into the record of this Case.

(Whereupon, Applicant's Exhibits Numbers One through Six were admitted into evidence.)

MR. SPERLING: That's all of the direct examination, Mr. Examiner.

CROSS EXAMINATION

BY MR. UTZ:



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Q Mr. Little, your wells that you intend to drill, I note on your Exhibit Four the top of the cement on the two and seven-eighths OD, would be eight hundred feet. The bottom of the cement on your five and a half surface will be 33 feet. Now, what lies in between 33 feet and eight hundred feet? Is there any potable water in that area?

A No, sir.

Q No producing oil or gas zones?

A No, sir.

Q Will this tubing be plastic coated?

A If the water is of quality that would rust of deteriorate the pipe.

Q Then, you don't have an analysis of that water to know whether --

A No, sir.

Q Will you have an analysis on that water before you complete these wells?

A Yes, sir.

Q And if it is corrosive, is it ever your intention to use plastic coating?

A Yes, sir.

Q How about your Number 327, how is that well completed?

A That will have 5 inch sets to 1805, calculated cement top is at 967 feet. One hundred percent calculation. The seven foot of sand was perforated with shots per foot and fractured. We plan



to run tubing in and set a packer directly above the perforations.

Q What size was your production string string again?

A Five inch.

Q And what size of tubing do you intend to run?

A Two and seven-eighths.

Q Two and seven eights. And you don't know whether that will be plastic coated until you have the water analysis?

A I might add this: I have tentatively worked out an agreement with Skelly rather than have me laying approximately two miles of line to inject water in this well, Skelly has agreed to furnish and inject water into this well for me at cost, and that will be Marrison water.

Q Marrison water, did you say?

A Skelly plans to drill a Marrison water well just a half a mile Southeast of this well, three-eights well.

Q Now, of course, you don't know what kind of water that is, yet?

A No, but with reference to a study of the log we can almost be certain that it would be identical to the Skelly and Atlantic's present water supply.

Q Was that corrosive water?

A No, sir.

Q It was relatively smooth?

A It's black sulphur water.



Q Sulphur water?

A But not salty.

Q I see.

A And to my knowledge, Humble and Atlantic are not running any particular type tubing, but I am not certain about that.

Q Now, your Number 3-27 Well, you intend to put any kind of a tubing gauge on the surface so you can detect any deterioration of the pressure?

A Yes, sir.

Q Your request for an Order 2624 will be adequate for you in all the details, even to the tables?

A Yes, sir.

Q All right, sir. Are there any other questions of the witness?

CROSS EXAMINATION

BY MR. DURRETT:

Q I have one question. Will you state the average production on your wells within the project area in the recent past? What are they making now?

A Today they are producing two hundred fifty barrels.

Q That is on the average?

A That is my lease total.

Q That is the total for the lease. What does that calculate out on a per well average, do you have any idea?



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A I have two wells that are making allowable, which are Wells Number Seven and Number Eight. The Number Two was the discovery well in the entire field, Many Rocks Gallup Oil Pool and it is now making 56 barrels per day, approximately. The other wells run anywhere from 15 to 20, 30 barrels a day.

Q Your lowest one is about 15?

A Yes, sir.

Q Thank you.

A We are getting extra decline in the last sixty days with an accompanying increase in Yor's.

MR. UTZ: You are not asking for increased allowance here, this is pressure maintenance program?

A Yes, sir.

MR. UTZ: Are there any other questions? The witness may be excused. Are there any other statements in this Case?

The case will be taken under advisement and the Hearing is adjourned.



STATE OF NEW MEXICO)
COUNTY OF BERNALILLO) ss.

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

Witness my hand and seal of office, this 29th day of June, 1964.

Charles Floyd Walker
NOTARY PUBLIC

My Commission Expires:
March 25, 1968.

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ALBUQUERQUE, N. M.
PHONE 243-6691

June 29 3036 64
Must. H.



I N D E XWITNESS

CURTIS J. LITTLE

Direct Examination by Mr. Little

Cross Examination by Mr. Utz

Cross Examination by Mr. Durrett

2

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16

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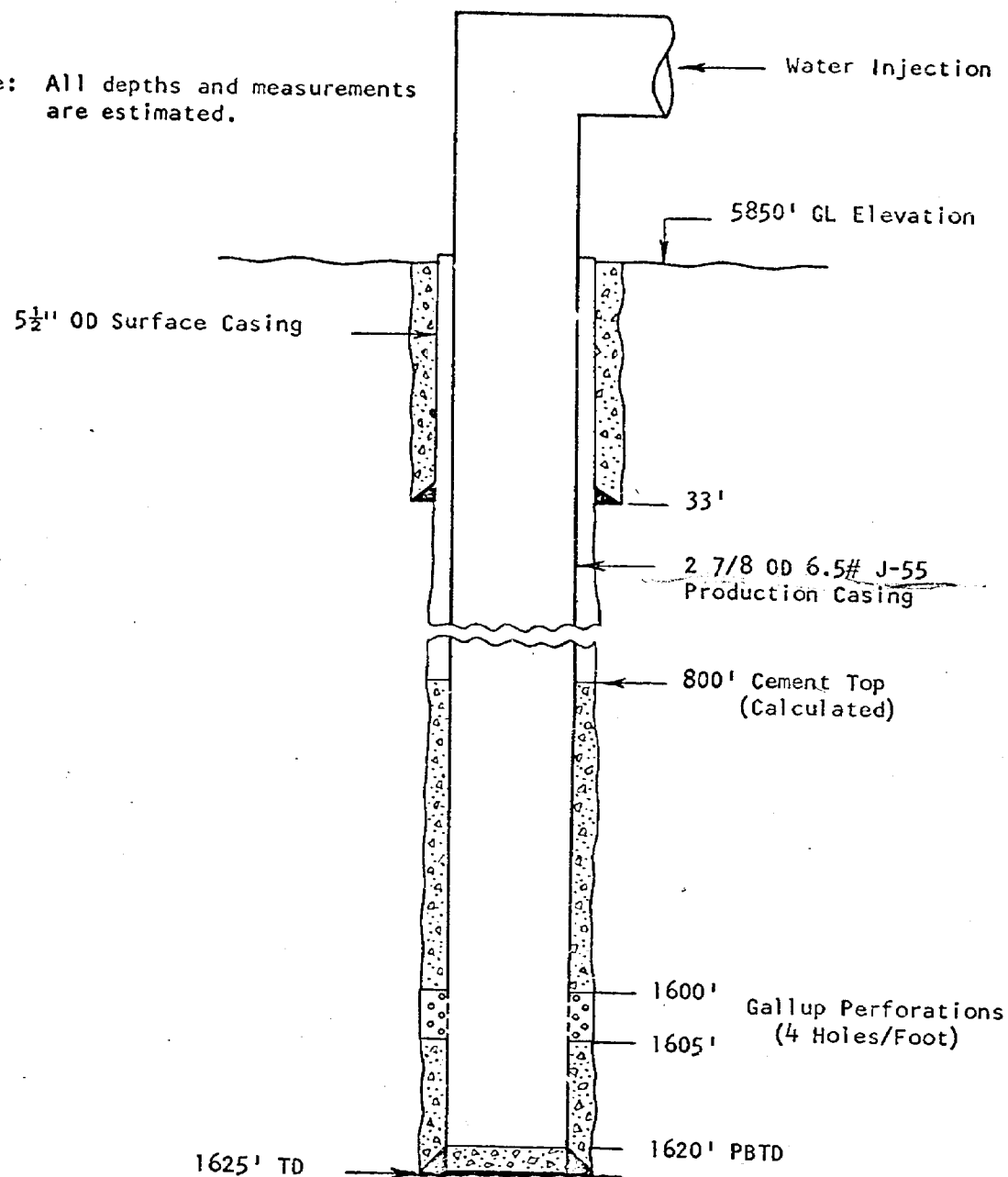
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PROPOSED WATER INJECTION METHOD

Curtis J. Little Pressure Maintenance Project
Navajo Lease - Wells Nos. 10-27 & 4-28
Many Rocks-Gallup Field, Sections 27 & 28-T32N-R17W
San Juan County, New Mexico

Note: All depths and measurements
are estimated.



BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
A. EXHIBIT NO. 4
CASE NO. 3036

EXHIBIT NUMBER D

PROPOSED WATER INJECTION METHOD

Curtis J. Little Pressure Maintenance Project
for Navajo 3X-27
Many Rocks-Gallup Field, Section 27-T32N-R17W
San Juan County, New Mexico

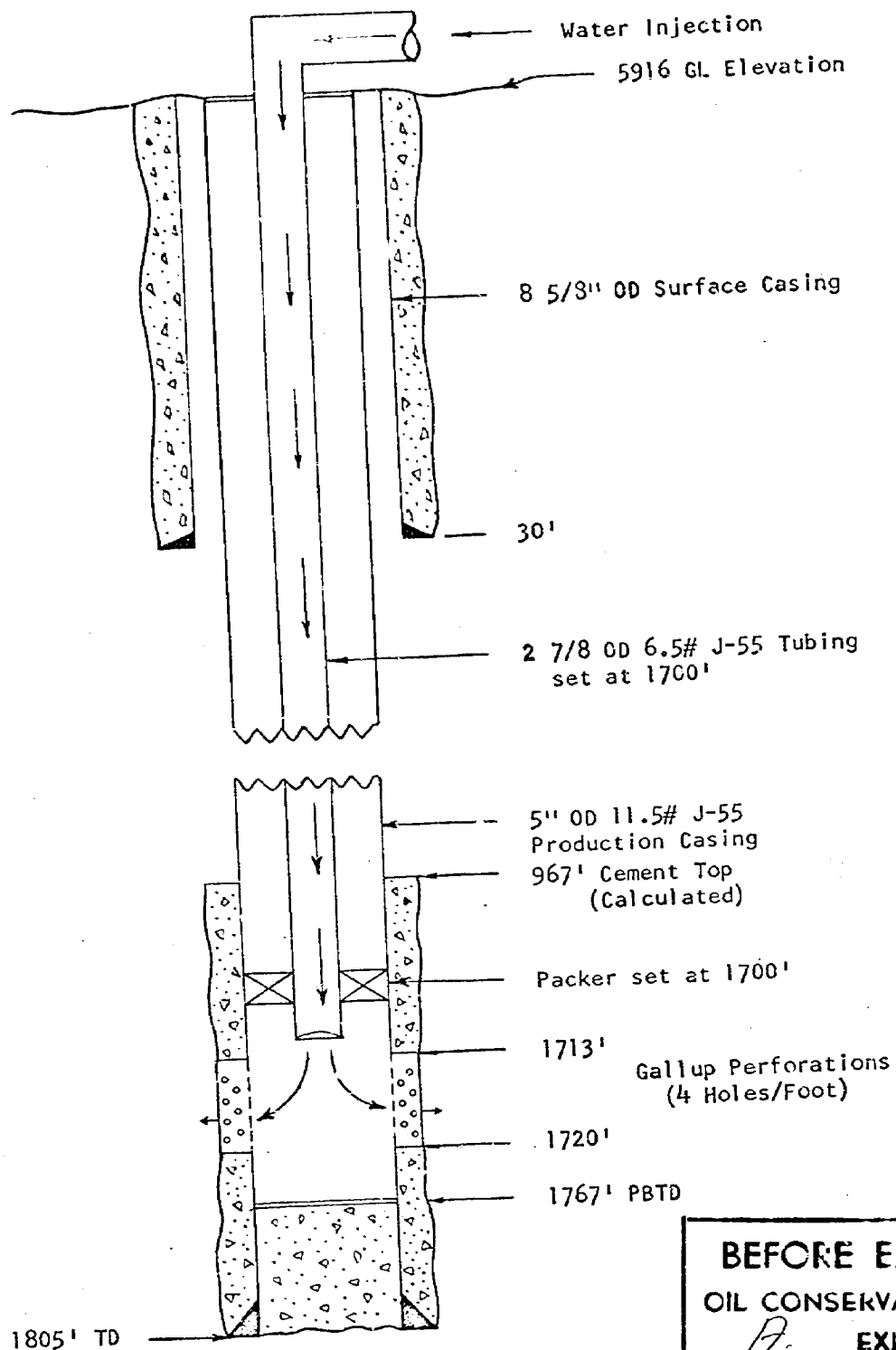
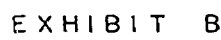


EXHIBIT NUMBER C

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
A. EXHIBIT NO. 3
CASE NO. 3036

• • •

[illegible]

-1713 TOP GALLUP(+4203)
-1720 BASE GALLUP
-1733 TOP SANOSTEE(+4183)

PERFORATIONS
4 SHOTS/ FOOT

PROPOSED WATER INJECTION METHOD

Curtis J. Little Pressure Maintenance Project
for Navajo 3X-27
Many Rocks-Gallup Field, Section 27-T32N-R17W
San Juan County, New Mexico

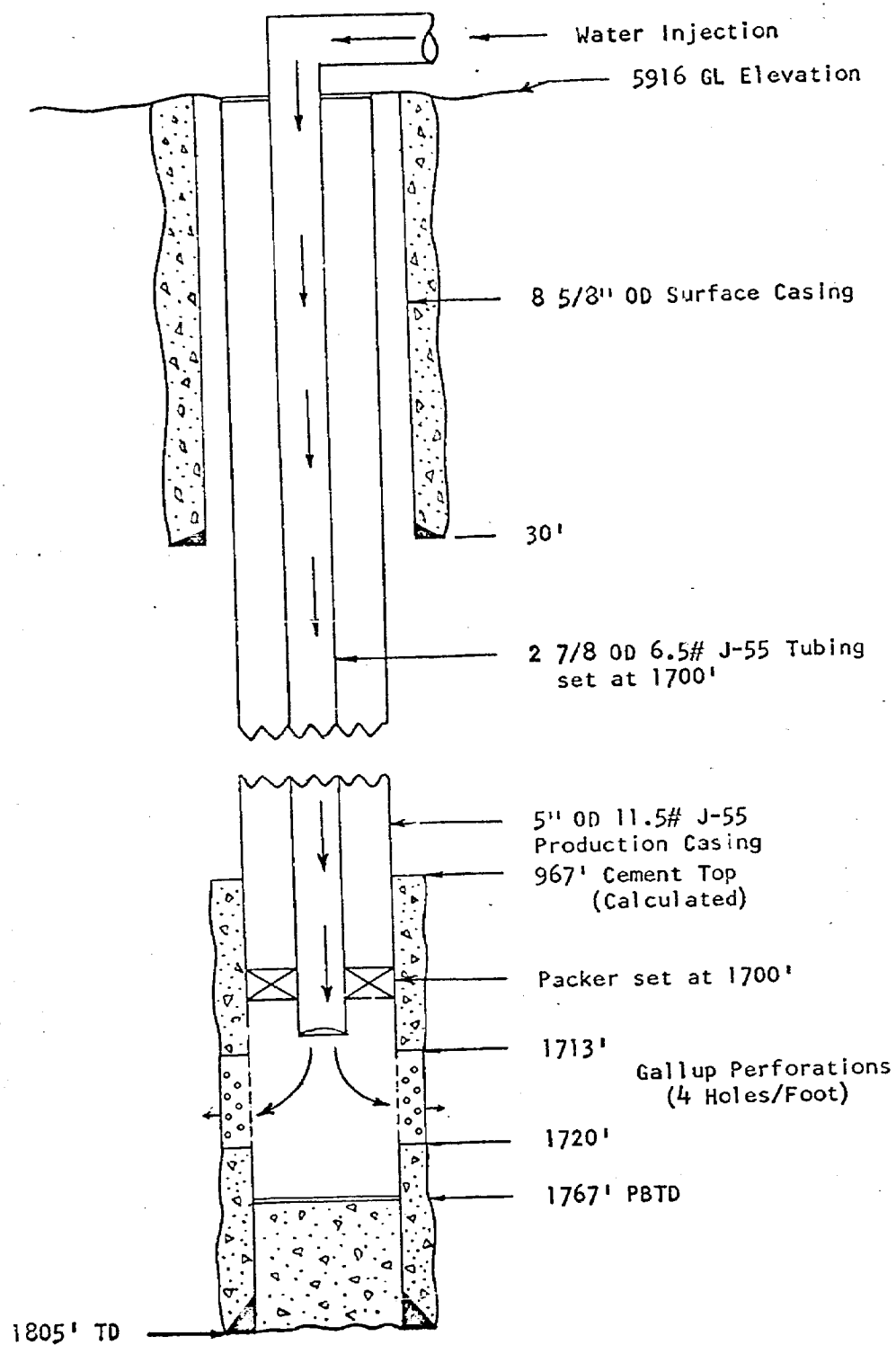


EXHIBIT NUMBER C

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PROPOSED WATER INJECTION METHOD

Curtis J. Little Pressure Maintenance Project
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San Juan County, New Mexico

Note: All depths and measurements
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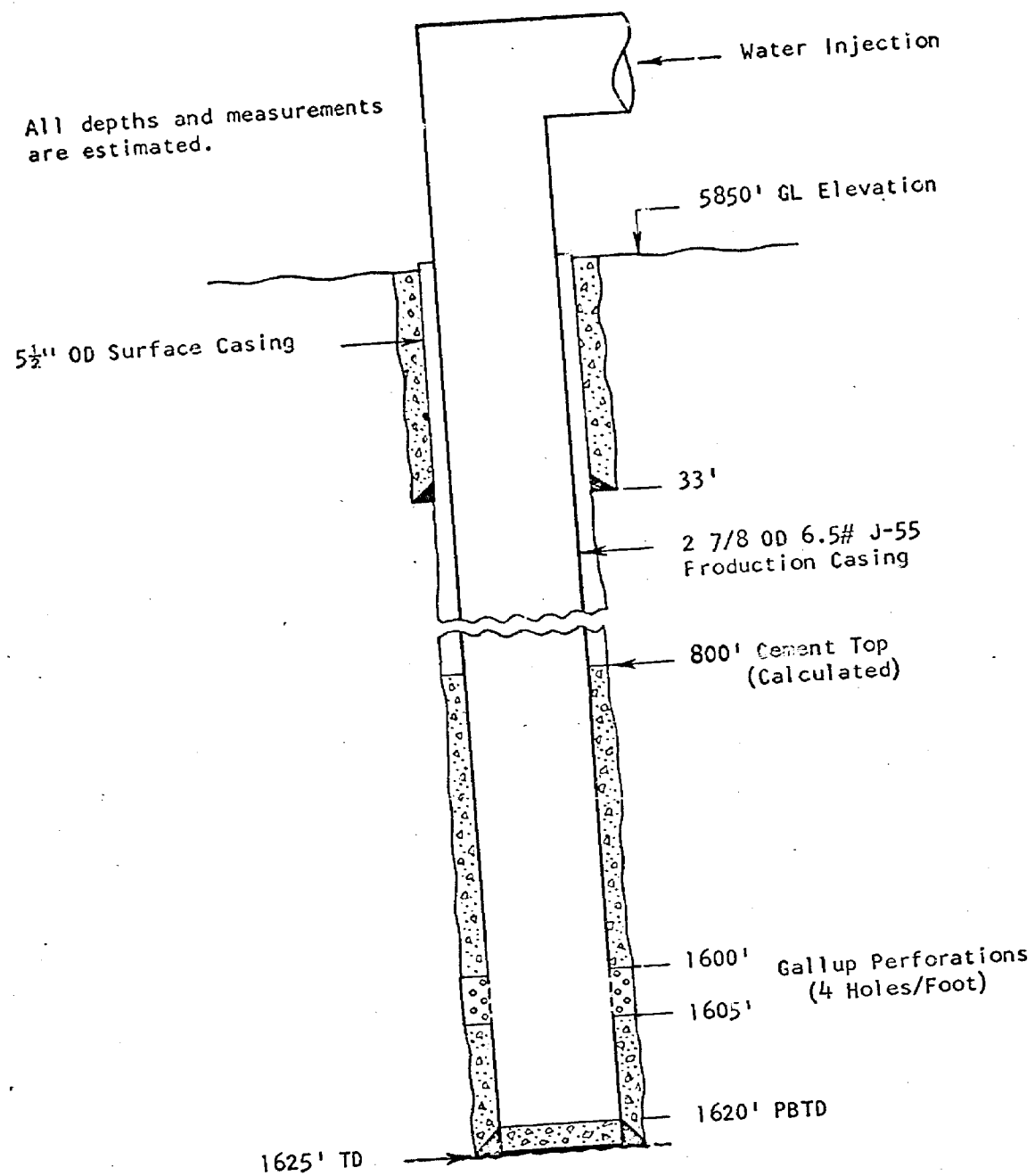


EXHIBIT NUMBER D

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