

CASE 3198: Application of TEXACO  
INC. for amendment of Order No.  
R-2758, San Juan County, N. M.

Dec 30 1970  
Clerk  
V. J. J.

CASE NO.

3198

Application,

TRANSCRIPTS,

SMALL Exhibits

ETC.

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. 3198  
Order No. R-2758-B

APPLICATION OF TEXACO INC.  
FOR AN AMENDMENT OF ORDER  
NO. R-2758, 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 January 27, 1965, at Santa Fe, New Mexico, before Examiner Elvis A. Utz and was continued to February 24, 1965.

NOW, on this 5th day of March, 1965, 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 by Orders Nos. R-2758 and R-2758-A, the Commission promulgated temporary Special Rules and Regulations for the Tociito Dome-Pennsylvanian "D" Oil Pool, establishing a 160-acre proportional factor of 2.77 for allowable purposes due to the possibility of premature water encroachment and resulting waste.

(3) That the applicant, Texaco Inc., seeks an amendment of Rules 6 and 8 of said Order No. R-2758 to establish a 160-acre proportional factor of 4.77 for said pool.

(4) That the applicant has established that a 160-acre proportional factor of 4.77 will not cause premature water encroachment.

(5) That a 160-acre proportional factor of 4.77 will prevent waste and protect correlative rights in the subject pool.

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CASE No. 3198

Order No. R-2758-B

**IT IS THEREFORE ORDERED:**

(1) That Rules 6 and 8 of the temporary Special Rules and Regulations for the Tocito Dome-Pennsylvanian "D" Oil Pool, promulgated by Orders Nos. R-2758 and R-2758-A, are hereby amended to read in their entirety as follows:

**"RULE 6.** A standard oil proration unit (158 through 162 acres) shall be assigned a 160-acre proportional factor of 4.77 for allowable purposes. The allowable assigned to a non-standard oil proration unit shall bear the same ratio to a standard oil proration unit allowable as the acreage in such non-standard unit bears to 160 acres.

**"RULE 8.** A standard gas proration unit (316 through 324 acres) shall be assigned an allowable in accordance with the following formula:

Normal unit allowable x 2000 x 4.77 x 2

The allowable assigned to a non-standard gas proration unit shall bear the same ratio to a standard gas proration unit allowable as the acreage in such non-standard unit bears to 320 acres."

(2) That this order shall be effective April 1, 1965.

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

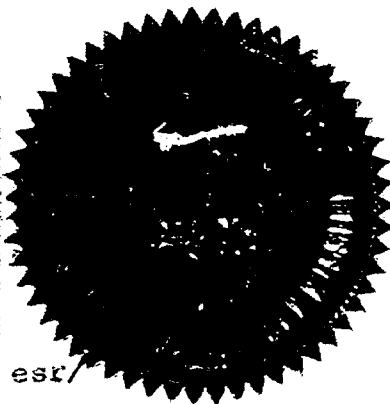
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

*Jack M. Campbell*  
JACK M. CAMPBELL, Chairman

*Guyton E. Hays*  
GUYTON E. HAYS, 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  
GUYTON B. HAYS  
MEMBER

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

P. O. BOX 2088  
SANTA FE

March 5, 1965

Mr. Booker Kelly  
Gilbert, White & Gilbert  
Attorneys at Law  
Post Office Box 787  
Santa Fe, New Mexico

Re: Case No. 3198  
Order No. R-2758-B  
Applicant:  
TEXACO INC.

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

ir/

Carbon copy of order also sent to:

Hobbs OCC x

Artesia OCC \_\_\_\_\_

Aztec OCC x

OTHER Mr. Russell Mann

Case 3198

Heard. 1-27-65

Rec. 2-2-65

1. Grant Texaco's request for a change in Rules. 6 & 8 of R-2756.
2. Or. place a provision factor of 2.77, Insert. 4.77 in both Rules.
3. Data was submitted at the hearing showing that there is little likelihood of a 4.77 factor the increased production watering out the oil wells.
4. Do whatever necessary if anything in regard to finding.  
(F).

Thurs. 2/2/65

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. 3073  
Order No. R-2758  
NOMENCLATURE

APPLICATION OF TEXACO INC. FOR THE  
CREATION OF A NEW OIL POOL AND FOR  
SPECIAL TEMPORARY POOL RULES, 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 July 1, 1964, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 3rd day of August, 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, Texaco Inc., seeks the creation of a new oil pool for Pennsylvanian production and the establishment of temporary pool rules, including a provision for 160-acre oil well spacing and a GOR limitation of 4000 to 1.

(3) That the applicant also seeks the establishment of an administrative procedure whereby interference tests could be conducted and allowables transferred.

(4) That a new oil pool for Pennsylvanian production should be created and designated the Tocito Dome-Pennsylvanian "D" Oil Pool; that said pool was discovered by the Texaco Inc. Navajo

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CASE No. 3073  
Order No. R-2758

Tribal AL Well No. 1 located in Unit H of Section 28, Township 26 North, Range 18 West, NMPM, San Juan County, New Mexico.

(5) That in order to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, temporary special rules and regulations providing for 160-acre oil well spacing and 320-acre gas well spacing should be promulgated for the Tocito Dome-Pennsylvanian "D" Oil Pool.

(6) That the temporary special rules and regulations should provide for limited well locations in order to assure orderly development of the pool and protect correlative rights.

(7) That the temporary special rules and regulations should provide for a limiting gas-oil ratio of 2000 to 1 and the classification of a well with a gas-oil ratio of 20,000 to 1, or more, as a gas well in order to allow each operator in the pool the opportunity to use his just and equitable share of the reservoir energy.

(8) That due to the possibility of premature water encroachment and resulting waste, the temporary special rules and regulations should establish an oil well factor of 2.77 for allowable purposes.

(9) That due to the possibility of premature water encroachment and resulting waste, the temporary special rules and regulations should establish the following formula for computing gas well allowables:

$$\text{Normal unit allowable} \times 2000 \times 2.77 \times 2$$

(10) That in order to prevent undue dissipation of the reservoir energy and waste of oil and gas, the temporary special rules and regulations should prohibit the flaring or venting of gas within a reasonable time after the issuance of this order.

(11) That the temporary special rules and regulations should be established for a one-year period in order to allow the operators in the subject pool to gather reservoir information to establish the area that can be efficiently and economically drained and developed by one well.



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CASE No. 3073  
Order No. R-2758

(12) That an administrative procedure should be established whereby the operators in the Tocito Dome-Pennsylvanian "D" Oil Pool would be permitted to conduct interference tests and to transfer allowables among producing wells on the same lease during the temporary one-year period in order to facilitate the gathering of information pertinent to reservoir characteristics.

(13) That this case should be reopened at an examiner hearing in July, 1965, at which time the operators in the subject pool should be prepared to appear and show cause why the Tocito Dome-Pennsylvanian "D" Oil Pool should not be developed on 40-acre oil well spacing and 160-acre gas well spacing.

IT IS THEREFORE ORDERED:

(1) That a new pool in San Juan County, New Mexico, classified as an oil pool for Pennsylvanian production, is hereby created and designated the Tocito Dome-Pennsylvanian "D" Oil Pool, consisting of the following-described area:

TOWNSHIP 26 NORTH, RANGE 18 WEST, NMPM

Section 17: S/2

Section 20: E/2

Section 21: SW/4

Section 28: N/2 and SE/4

(2) That temporary Special Rules and Regulations for the Tocito Dome-Pennsylvanian "D" Oil Pool are hereby promulgated, as follows:

SPECIAL RULES AND REGULATIONS  
FOR THE

TOCITO DOME-PENNSYLVANIAN "D" OIL POOL

RULE 1. Each well completed or recompleted in the Tocito Dome-Pennsylvanian "D" Oil Pool or in the Pennsylvanian formation within one mile of said pool, and not nearer to or within the limits of another designated Pennsylvanian pool, shall be spaced, drilled, operated, and produced in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2. Each oil well shall be located on a standard 160-acre unit comprising a governmental quarter section or on a non-standard unit consisting of less than 160 acres comprising a governmental quarter-quarter section or lot or governmental quarter-quarter sections or lots contiguous by common bordering sides and lying within a governmental quarter section.

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CASE No. 3073  
Order No. R-2758

RULE 3. Each gas well shall be located on a standard 320-acre unit comprising a governmental half section or on a non-standard unit consisting of less than 320 acres comprising a governmental quarter-quarter section or lot or governmental quarter-quarter sections or lots contiguous by common bordering sides and lying within a governmental half section.

RULE 4. All wells shall be located within 150 feet of the center of a governmental quarter-quarter section.

RULE 5. The Secretary-Director of the Commission may grant an exception to the requirements of Rule 4 without notice and hearing when an application has been filed for an unorthodox location necessitated by topographical conditions or the recompletion of a well previously drilled to another horizon. All operators offsetting the proposed unorthodox location shall be notified of the application by registered or certified mail, and the application shall state that such notice has been furnished. The Secretary-Director may approve the application upon receipt of written waivers from all offset operators or if no offset operator has entered an objection to the unorthodox location within 20 days after the Secretary-Director has received the application.

RULE 6. A standard oil proration unit (158 through 162 acres) shall be assigned a 160-acre proportional factor of 2.77 for allowable purposes. The allowable assigned to a non-standard oil proration unit shall bear the same ratio to a standard oil proration unit allowable as the acreage in such non-standard unit bears to 160 acres.

RULE 7. The limiting gas-oil ratio shall be 2000 cubic feet of gas for each barrel of oil produced; a well with a gas-oil ratio of 20,000 to 1, or more, shall be classified as a gas well.

RULE 8. A standard gas proration unit (316 through 324 acres) shall be assigned an allowable in accordance with the following formula:

$$\text{Normal unit allowable} \times 2000 \times 2.77 \times 2$$

The allowable assigned to a non-standard gas proration unit shall bear the same ratio to a standard gas proration unit allowable as the acreage in such non-standard unit bears to 320 acres.

RULE 9. No gas shall be flared or vented on or after November 1, 1964, provided however, that any well completed in the

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CASE No. 3073  
Order No. R-2758

subject pool after August 31, 1964, shall be given 60 days in which to make beneficial use of the produced casinghead gas.

IT IS FURTHER ORDERED:

(1) That any well presently drilling to or completed in the Pennsylvanian formation within the Tocito Dome-Pennsylvanian "D" Oil Pool or within one mile of said pool that will not comply with the well location requirements of Rule 4 is hereby granted an exception to the requirements of said rule. The operator shall notify the Aztec District Office of the Commission in writing of the name and location of the well on or before August 15, 1964.

(2) That the allowable provisions of this order shall be effective August 15, 1964; that any operator desiring to dedicate more than 40 acres to an oil well or more than 160 acres to a gas well presently drilling to or completed in the Tocito Dome-Pennsylvanian "D" Oil Pool shall file a new Form C-116 and a new Form C-128 with the Commission on or before August 15, 1964.

(3) That the Secretary-Director of the Commission is hereby authorized to approve interference tests and the transfer of allowables to wells on the same lease or, if in a unitized area, to wells in the same participating area, provided however, that any such authorization shall be limited to a period of six months, but may be renewed. No transfer well shall be permitted to receive, in addition to its own allowable, more than 50 per cent of one top unit allowable for the Tocito Dome-Pennsylvanian "D" Oil Pool.

To obtain administrative approval for interference tests and the transfer of allowable, the operator shall submit in triplicate a request for such authority describing in detail the proposed method of conducting such tests and transferring the allowable. The application shall be accompanied by a plat showing thereon all Pennsylvanian wells within a radius of two miles of the proposed shut-in well(s) and the transfer well(s). The plat shall also identify each lease or participating area as to ownership or operating rights. The application shall include evidence that all offset operators to the shut-in well(s) and the transfer well(s) have been furnished a complete copy of the application. It shall also be accompanied by Form C-116 for each shut-in well, showing the results of a pre-shut-in test to determine the amount of allowable to be transferred. The transferred allowable shall not exceed the volume of oil produced during the last 24 hours of a 72-hour period during which the well shall be produced at a constant rate.

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CASE No. 3073  
Order No. R-2758

The Commission and offset operators to both the shut-in well(s) and the transfer well(s) may witness such tests if they so desire and shall be notified of the tests at least 48 hours prior to the commencement thereof.

The Secretary-Director of the Commission may grant approval of the interference tests and transfer of allowable upon receipt of waivers from all offset operators or upon expiration of a 20-day waiting period, provided no offset operator has objected to the proposed test and transfer.

(4) That this case shall be reopened at an examiner hearing in July, 1965, at which time the operators in the subject pool may appear and show cause why the Tocito Dome-Pennsylvanian "D" Oil Pool should not be developed on 40-acre oil well spacing and 160-acre gas well spacing.

(5) 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/

DOCKET: EXAMINER HEARING - WEDNESDAY - FEBRUARY 24, 1965

9 A. M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM,  
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 2942: (Reopened and continued from the February 10, 1965 Examiner Hearing)  
In the matter of Case No. 2942 being reopened pursuant to the provisions of Order No. R-2645, which order established temporary 160-acre spacing and fixed well locations for the Simanola-Pennsylvanian Pool, Lea County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre spacing units.
- CASE 3195: (Continued from the January 27, 1965 Examiner Hearing)  
Application of H & M Oil Company, et al for a waterflood project, Eddy County, New Mexico. Applicants, H & M Oil Company, Kincaid & Watson, N. E. Salsich, Jr., and Kersey, seek authority to institute a waterflood project in the Square Lake Pool by the injection of water into the Grayburg and San Andres formations through six injection wells in Section 1, Township 17 South, Range 29 East, and one injection well in Section 6, Township 17 South, Range 30 East, Eddy County, New Mexico.
- CASE 3198: (Continued from the January 27, 1965 Examiner Hearing)  
Application of Texaco Inc. for an amendment of Order No. R-2758, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an amendment to Rules 6 and 8 of Order No. R-2758, which order promulgated special pool rules for the Toco Dome-Pennsylvanian "D" Pool, San Juan County, New Mexico. Applicant seeks a 160-acre proportional factor for said pool of 4.77 rather than a factor of 2.77 as previously established by the Commission.
- CASE 3210: Application of Monsanto Company for the creation of a new oil pool and for special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new oil pool for Upper Pennsylvanian production for its Monsanto-Hondo Well No. 1 located in Unit C of Section 31, Township 19 South, Range 25 East, Eddy County, New Mexico, and for the promulgation of special pool rules for said pool, including a provision for 160-acre spacing.
- CASE 3211: Application of Archie M. Speir for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the South Red Lake Grayburg Unit Area comprising 1442 acres, more or less, of State and Federal lands in Sections 35 and 36, Township 17 South, Range 27 East, and in Sections 1 and 2, Township 18 South, Range 27 East, Eddy County, New Mexico.
- CASE 3212: Application of Archie M. Speir for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Red Lake Pool by the injection of water into the Premier San-Grayburg formation through 18 injection wells in Sections 35 and 36, Township 17 South, Range 27 East, and in Sections 1 and 2, Township 18 South, Range 27 East, Eddy County, New Mexico.

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February 24, 1965 Examiner Hearing

CASE 3213: Application of International Oil & Gas Corporation for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Artesia Pool by the injection of water into the Grayburg and Queen formations through two injection wells in Sections 25 and 36, Township 17 South, Range 28 East, Eddy County, New Mexico.

BEFORE THE OIL CONSERVATION COMMISSION  
OF THE STATE OF NEW MEXICO

CASE No. 3073  
Order No. R-2758-A

APPLICATION OF TEXACO INC. FOR THE  
CREATION OF A NEW OIL POOL AND FOR  
SPECIAL TEMPORARY POOL RULES, SAN  
JUAN COUNTY, NEW MEXICO.

NUNC PRO TUNC ORDER

BY THE COMMISSION:

It appearing to the Commission that due to clerical error and omission Order No. R-2758 dated August 3, 1964, does not correctly state the intended order of the Commission,

IT IS THEREFORE ORDERED:

(1) That the Special Rules and Regulations for the Tocito Dome-Pennsylvanian "D" Oil Pool promulgated by Order No. R-2758 are hereby amended by addition of the following:

RULE 10. The Secretary-Director of the Commission may grant an exception to the requirements of Rule 9 without notice and hearing when an application has been filed setting forth the facts and circumstances justifying the exception and he determines such action is necessary to prevent waste or protect correlative rights.

(2) That this order shall be effective nunc pro tunc as of August 3, 1964.

DONE at Santa Fe, New Mexico, this 30th day of September, 1964.

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

*Jack M. Campbell*  
JACK M. CAMPBELL, Chairman

*E. S. Walker*  
E. S. WALKER, Member

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

S E A L

esr/

GILBERT, WHITE AND GILBERT  
ATTORNEYS AT LAW  
SANTA FE, NEW MEXICO

BEFORE THE OIL CONSERVATION  
COMMISSION OF THE STATE OF  
NEW MEXICO

IN THE MATTER OF THE APPLICATION OF )  
TEXACO INC. FOR AN ORDER INCREASING )  
THE 160 ACRE PROPORTIONAL FACTOR OF )  
2.77 TO A 160 ACRE PROPORTIONAL )  
FACTOR OF 4.77 FOR ALLOWABLE PURPOSES )  
IN THE TOCITO DOME-PENNSYLVANIAN "D" )  
OIL POOL, SAN JUAN COUNTY, NEW MEXICO )

APPLICATION

COMES NOW the Applicant, TEXACO INC., a Delaware corporation, duly  
authorized to do business in the State of New Mexico, and respectfully pre-  
sents this application to the Oil Conservation Commission of New Mexico, and  
in support of this application shows the following:

1. (A) The applicant is the operator of producing wells in the  
Tocito Dome-Pennsylvanian "D" oil pool.

(B) The Tocito Dome-Pennsylvanian "D" oil pool was created and  
designated by Order No. R-2758 dated August 3, 1964, by the Commission and  
covered the following lands:

Township 26 North, Range 18 West, NMPM

Section 17:  $S\frac{1}{2}$   
Section 20:  $E\frac{1}{2}$   
Section 21:  $SW\frac{1}{4}$   
Section 28:  $N\frac{1}{2}$  and  $SE\frac{1}{4}$

(C) The Order creating the Tocito Dome-Pennsylvanian "D" oil  
pool established 160 acre spacing units but did not allow the normal allowable  
for 160 acres, to-wit 4.77 because the Commission found in its Finding No. 8

"That due to the possibility of premature water en-  
croachment and resulting waste, the temporary special  
rules and regulations should establish an oil well  
factor of 2.77 for allowable purposes."

2. The Applicant alleges that since the date of the last hearing  
pertaining to the Tocito Dome-Pennsylvanian "D" oil pool, the production



GILBERT, WHITE AND GILBERT  
ATTORNEYS AT LAW  
SANTA FE, NEW MEXICO

1 history of Texaco's Navajo "AL" No. 1 and No. 2 wells does not indicate  
2 premature encroachment of water and resultant waste.

3 3. The Applicant desires a hearing before an examiner at a time  
4 and place to be set by the Commission.

5 4. The names and addresses of all interested parties known to the  
6 Applicant are:

7 Fletcher Oil Company  
8 24721 South Main  
9 Wilmington, California

10 Pan American Petroleum Corp.  
11 P. O. Box 480  
12 Farmington, New Mexico

DOCKET MAILED  
1-15-65

13 Sinclair Oil and Gas Company  
14 3010 Monte Vista N. E.  
15 Albuquerque, New Mexico

DOCKET MAILED

16 The Navajo Tribe of Indians  
17 Window Rock, Arizona

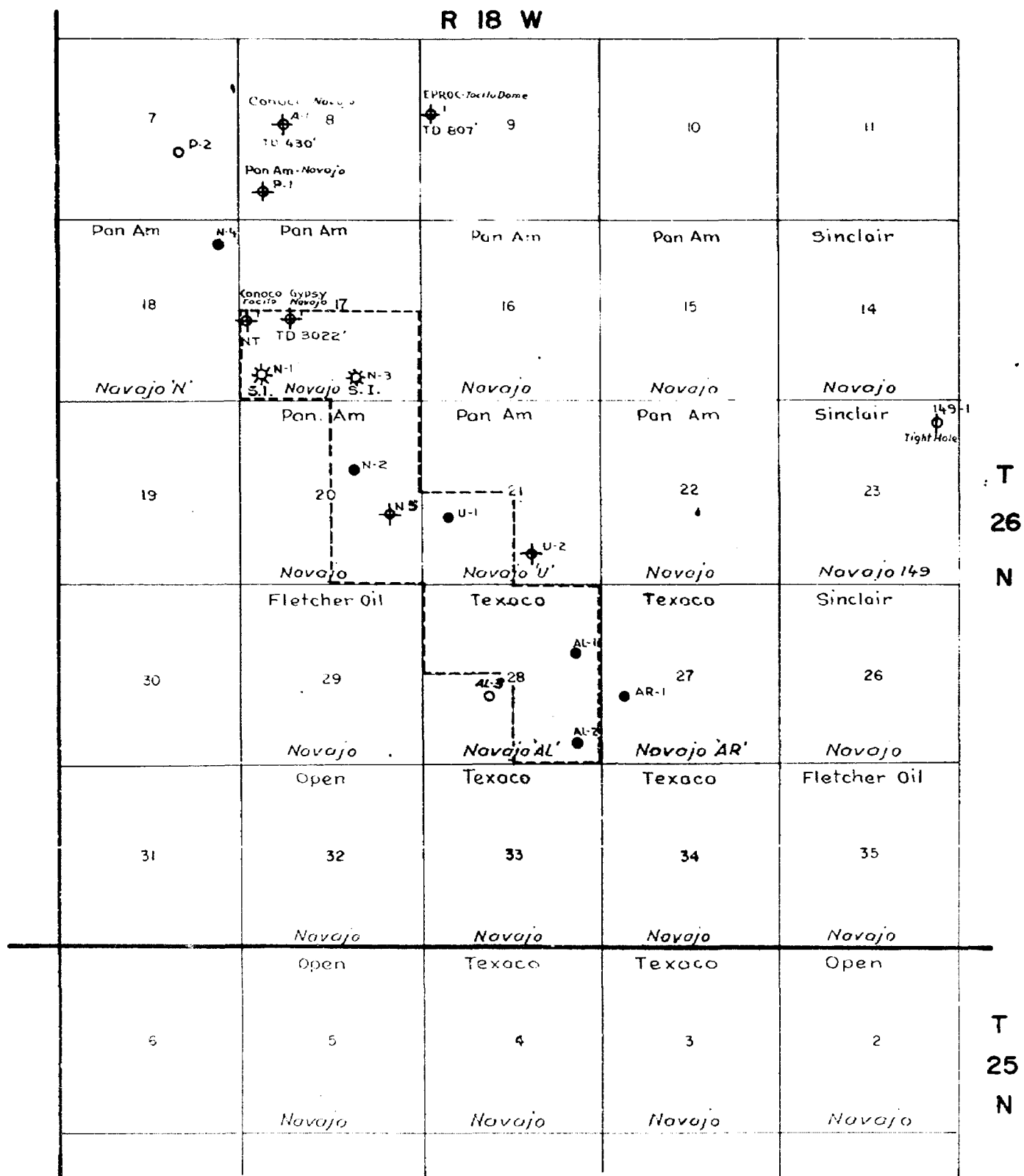
Date 2-13-65

18 WHEREFORE, Applicant requests this Commission enter its order in-  
19 creasing the 160 acre standard proration unit proportional factor of 2.77  
20 established by Rule 6 of Order No. R-2758 dated August 3, 1964, to a 160  
21 acre standard proration unit proportional factor of 4.77 for allowable pur-  
22 poses in the Tocito Dome-Pennsylvanian "D" Oil Pool, San Juan County, New  
23 Mexico.

24 TEXACO INC.

25 By W B Kell  
26 Its Attorneys

27 DOCKET MAILED  
28  
29



- OIL WELL, PARADOX-PENN. 'D'
- ✱ GAS WELL, " "
- ✦ DRY HOLE
- ⊕ DRILLING WELL
- LOCATION
- NT NOT TESTED

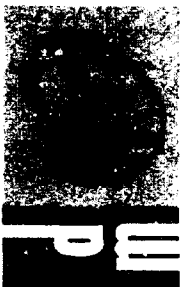
TEXACO Inc.  
 DENVER, COLORADO  
**TOCITO DOME PENNSYLVANIAN FIELD**  
 SAN JUAN COUNTY, NEW MEXICO  
 SCALE: 1" = 4000'  
 12-4-64

-----SPACED BY ORDER NO. R-2758

dearnley-meier reporting service, inc.

SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

1120 SIMMS BLDG. • P. O. BOX 1092 • PHONE 243-6691 • ALBUQUERQUE, NEW MEXICO



PAGE 1

BEFORE THE  
NEW MEXICO OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
February 24, 1965

EXAMINER      HEARING

IN THE MATTER OF:

APPLICATION OF TEXACO INC. FOR AN AMENDMENT  
OF ORDER NO. R-2758, SAN JUAN COUNTY, NEW  
MEXICO

Case No. 3198

BEFORE:

ELVIS A. UTZ

TRANSCRIPT OF HEARING

dearnley-meier

SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

1120 SIMAS BLDG. • P. O. BOX 1092 • PHONE 243-6691 • ALBUQUERQUE, NEW MEXICO

MR. UTZ: The hearing will come to order, please. We have first on the docket three cases which will be called for the purpose of appearances only. If someone doesn't appear to add something to the direct testimony, they will be taken under advisement. \* \* \* Case Number 3198.

MR. DURRETT: Application of Texaco Inc. for an amendment of Order No. R-2758, San Juan County, New Mexico.

MR. UTZ: Are there any additional appearances in this case? ... Let the record show that there were none. Those three cases will be taken under advisement.

\* \* \*

STATE OF NEW MEXICO )  
 ) ss  
COUNTY OF BERNALILLO )

I, ELIZABETH K. HALE, Notary Public and Court Reporter, hereby certify that proceedings in Case Number 3198 were taken by me in shorthand and transcribed by me, and that such proceedings are a true and accurate transcription to the best of my knowledge, skill and ability.

*Elizabeth K. Hale*  
Notary Public

My commission expires

May 23, 1968.

do hereby certify that the foregoing is  
complete record of the proceedings in  
a further hearing of Case No. 3198.  
by me on *Feb. 24*, 19*65*.

*Elizabeth K. Hale*, Examiner  
Mexico Oil Conservation Commission

Page No. \_\_\_\_\_

## CORE ANALYSIS RESULTS

Company	TEXACO, INC.	Formation	HERMOSA	File	RP-3-1956
Well	NAVAJO TRIBAL "AL" NO. 2	Core Type	DIA. CONV. 4"	Date Report	1-15-65
Field	TOCITO DOME	Drilling Fluid	WATER BASE	Analysts	HUFF
County	SAN JUAN	State	NEW MEXICO	Elev.	5764 KB
		Location	SE SE Sec 28	T26N	R18W

## Lithological Abbreviations

SAND TO SHALE 5H LINE-LM	COLOMITE-00L CHERT CM GYPSUM-GYP	ANHYDRITE-ANHY CONGLOMERATE-CONG FOSSILIFEROUS-FOSS	SANDY-SDY SHALY-SHY LIMY-LMY	FINE-FN MEDIUM-MED COARSE-CSA	CRYSTALLINE-ALN GRAIN-GRN GRANULAN-GRNL	BROWN-BRN GRAY-GY VUGGY-VGY	FRACTURED-FRAC LAMINATION-LAM STYLOLITIC-STY	SLIGHTLY-SL VERY-V/ WITH-W/
SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCS MAX. $K_a$	POROSITY PERCENT 200	RESIDUAL SATURATION PER CENT PORE		VERTICAL PERMEABILITY	SAMPLE DESCRIPTION AND REMARKS	
				OIL	TOTAL WATER			
6310-11		4.9	1.7			1.1		
6326-26.5		5.5	1.8			9.5		
6327.5-28	14	13				0.2		
6328-28.5	24	14				2.5		

BEFORE EXAMINER UTZ  
CIRCUIT COURT OF THE DISTRICT OF COLUMBIA  
EXHIBIT NO. 6  
CASE NO. 398

EXHIBIT "C"  
TEXACO INC.  
TOCITO DOME PENN "D" POOL  
VERTICAL AND HORIZONTAL  
PERMEABILITY MEASUREMENTS  
Date: 1-15-65

SERVICE NO. 8-A HORIZONTAL AND VERTICAL PERMEABILITY ONLY.

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**TOCITO DOME PENNSYLVANIAN "D" FIELD  
SAN JUAN COUNTY, NEW MEXICO  
WELL COMPLETION DATA**

OPERATOR & LEASE	WELL NO.	DEPTHS OF PERFORATED INTERVALS	ACID STIMULATION (gallons)	INITIAL PRODUCING RATE, DAILY *	SIZE TEST CHOKE *	TBG. PRES. * (psig)	CSG. PRES. * (psig)	REMARKS
Pan American Petroleum Corporation Navajo "N"	1	-541 to -559 & -487 to -504	3,000	10,558 MCF	3/4"	750	1520	
	2	-524 to -539	250	352 BO	9/64"	1650	1700	
	3	-499 to -511	250	5,120 MCF	5/16"	2437	2617	
	4	-516 to -526	2,250	251 BO	10/64"	1300	1950	
	5	Dry hole						
Navajo "P"	1	Dry hole	none	178 BO	11/64"	825	1225	58 BWPD
	2	-542 to -546	250	423 BO	12/64"	1650	1190	
	1	-527 to -545						
Navajo "U"	2	Dry hole						
TEXACO Inc. Navajo Tribe "AL"	1	-511 to -517, -520 to -526 &	250	430 BO	1/4"	1525	Packer	Produces from separate zone
	2	-530 to -538	none	99 BO	Pumping	-	-	8BWPD (Swab)
	3	-550 to -554	1,700	17 BO (Swab)	Pumping	-	-	Produces from separate zone
Navajo Tribe "AR"								
	1	-536 to -532 & -547 to -553	400	298 BO/13 hrs.	1/4"	1600	Packer	

\*Obtained from NMOC Form No. C-104.

**BEFORE EXAMINER UTZ**

CIL CORP. ENVIRONMENTAL COMPLIANCE

Exhibit No. 11

CASE NO. 3198

EXHIBIT "D"

PRODUCTION TEST - NAVAJO TRIBE "AR" NO. 1

EXHIBIT "E"

DATE OF TEST	OIL PRODUCTION		LOW PRESSURE		HIGH PRESSURE		TOTAL GAS		GAS-OIL RATIO		TUBING	
	BOPD		MCFD		MCFD		MCFD		CF/BBL.		PSIG	B S & W, %
1/14 - 1/15 1965	360		- -		- -		436		1,210		1,500	0.1
1/15 - 1/16 1965	318		83		279		362		1,138		1,500	0.1
1/16 - 1/17 1965	306		89		301		390		1,275		1,500	0.1
on 1/17 1965	Flowing BHP @ 6313 (-525) = 3115 PSI Flowing @ Rate of 398 BOPD											
	Four-hour Shut-in Bottom Hole Pressure = 3134 PSI											

$$\text{Productivity Index} = \frac{398}{3134 - 3115} = \frac{398}{19} = 20.9 \text{ Barrels per day per pound pressure differential.}$$

BEFORE EXAMINER UTZ  
 No. 3191

EXHIBIT "E"

DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325-1182

SANTA FE, N. M.  
PHONE 983-3971

ALBUQUERQUE, N. M.  
PHONE 243-6691

BEFORE THE  
NEW MEXICO OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
January 27, 1965

EXAMINER HEARING

IN THE MATTER OF:

APPLICATION OF TEXACO INC. FOR AN AMENDMENT  
OF ORDER NO. R-2758, SAN JUAN COUNTY, NEW  
MEXICO

Case No. 3198

BEFORE:

ELVIS A. UTZ

TRANSCRIPT OF HEARING





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MR. UTZ: Case Number 3198.

MR. DURRETT: Application of Texaco Inc. for an amendment of Order No. R-2758, San Juan County, New Mexico.

MR. KELLY: Booker Kelly of Gilbert, White & Gilbert, appearing on behalf of the applicant. I have one witness, and ask that he be sworn.

A. G. WALSH, the witness, thereupon was sworn.

MR. KELLY: I'd like to make a preliminary statement. As the Examiner recalls, this case or this pool was originally created after a hearing held in--I forget exactly when; I think about July. At that time 160-acre spacing was set up. However, the normal allowable was not allowed both for gas and oil wells, because the Commission found that there might be a water encroachment problem. When I prepared the application on behalf of Texaco, due to lack of communication the application was supposed to request both gas and oil regular allowable, and it didn't get in there. All our testimony is connected; one works for the other, to show both gas and oil. I'm wondering at this time if the Commission would be agreeable to either an amendment in the application or at least to let us put on testimony and then re-advertise. We would have to change--I think it's Rule 3--it would be 2,000 times 4 times 77 times 2.

MR. UTZ: We'll take this particular thing under

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consideration. Go ahead and put on your testimony and we'll make a later decision as to whether we need to re-advertise or not.

MR. KELLY: All right. Would you state your name, position and employer.

A I am A. G. Walsh, District Engineer for Texaco, Inc. in Farmington, New Mexico.

Q And you have previously testified in front of this Commission?

A Right.

Q What, briefly, does Texaco seek by this application?

A Texaco desires to have the proration for this field changed. At this time the proportional factor in effect for oil wells is 2.77. The same basic factor also applies for the associated gas wells, of 2.77. Actually since the gas wells are spaced on 320 acres and the oil wells on 160, the gas well factor is now 2.77 times 2,000 times 2. Texaco desires to have the basic proportional factor increased to 4.77.

Q Would you give the Examiner a little background on this. What was the specific finding or reason set out in the Commission's order that set up the 2.77 initially?

A Order R-2758 created 160-acre spacing for oil and 320 for gas. Findings numbered 8 and 9 read as follows:

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"Eight. Due to the possibility of premature water encroachment and resulting waste, temporary special rules and regulations should establish an oil factor of 2.77 as the allowable proportion." Rule 9 reads: "Due to the possibility of premature water encroachment and resulting waste, special temporary rules should establish the following formula for computing gas well allowables," and that formula reads, "Normal unit allowable times 2,000 times 2.77 times 2."

Q At the time of that hearing how many oil and gas wells were there on which you were able to give history and data?

A At that time, one gas well and one oil well, and one oil well in the completion process.

Q Referring to what has been marked Exhibit A, what is the present status of this pool, both as to gas and oil wells?

A At the present time there are two gas wells. There are six oil wells producing from the main pay zone and two oil wells which appear to be producing from a zone that is probably separate from the main zone. There are also two additional dry holes which have been drilled since the time of the last case.

Q What were the wells drilled at the time of the hearing?

A At the time of the last hearing the wells completed

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were Penn American Navajo N Number 1, which is in the southwest of the southwest of Section 17, and Texaco Navajo AL Number 1, which is in the southeast of the northeast of Section 28. At that time Texaco Navajo AL Number 2 was in the completion process. That well is located southeast southeast of Section 28.

Q While we're on Exhibit A, what is the status of Taxaco Navajo AL Number 2, located in the southeast of Section 28?

A The AL Number 2 is a producing oil well; however, it appears to be producing from a zone that is probably separate from the main pay that is productive in the Tocito Dome Penn field. Also the Texaco Navajo AL Number 3, which is in the northeast of the southwest of Section 28, is in the completion process from that same zone at the present time.

MR. UTZ: Which well was the later one?

A AL Number 3--it's in the northeast of the southwest of Section 28.

MR. KELLY: What conditions are generally accepted in the industry that must exist before you would have a problem of premature water encroachment?

A Several things would be conducive to premature water encroachment. One would be wells that are considered to be productive from a zone that is underlaid by water, as

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frequently occurs in massive sands and reefs. The second is that effective vertical permeability must exist. Dense strack material between the lower zones reduces effective permeability to nil. Core analyses yield data comparing vertical and horizontal permeability. Production test also yields and is a conscious reflection of the presence of both impermeable streaks and fractures, conditions conducive to premature and high drawdowns and bottom hole pressure, so that there is a large pressure differentiation existing between the water-bearing zone and the well bore. It is considered generally that a small pressure drawdown will tend to inhibit the possibility of premature water encroachment.

Q As to the first condition, Exhibits A and B reflect this. Would you explain them.

A Exhibit A is a structure map on the top of the main porosity zone in the Tooto Dome Pennsylvanian D pool. This map has been colored up to reflect the number of conditions existing in the field. If you will notice, there is an area shaded in blue. This is the area outside water contact. Immediately inside this is an area colored light red. In this area there is oil production, but it is underlaid by water. Immediately inside of this is an area colored green, and in this area in the pay section there is only oil present. The oil-water contact falls below the pay zone. Inside of the green

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ring is an orange ring, and in this area there is a gas column underlaid by oil. There is no water present. And the inside of this is a yellow area, and this is a gas zone only, in which only gas is present.

Q Based on this plan, what is the percentage of the total acreage that is underlaid by water?

A There is a total of 2,771 productive acres, based on this map. Of this area, only 1,300 acres or 47% is underlaid by water. The remaining 53% is not underlaid by water.

Q On Exhibit B you show the percentage in acre feet. Would you explain that to the Examiner.

A Exhibit B is a net pay isopach map of the main pay zone. This map has been colored to show that portion of the pay zone underlaid by water and that portion not underlaid by water. This is an isopach map and from it we were able to determine the total number of acre feet in the field, and also the number of acre feet underlaid by water and the total number not underlaid by water. We have calculated that there are 34,712 acre feet of hydrocarbon bearing pay in the field. Of this amount only 10,854 or approximately 31% is underlaid by water. The remaining 69% is not underlaid by water and would not be subject to water coning.

Q Then Exhibit B also shows that portion of the pool underlaid by water as getting out on the fringe of the pro-

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ductive strata?

A That is correct.

Q Just going back to Exhibit A for a moment, how does it--with your increased production data and in testing the wells, how does it match up with your first calculations when you only had one oil well, as far as the limits of the pool?

A Basically the well has turned out to look very similar to what we thought it would. The subsequent drilling proves there is a limited number of feet of pay. As you will note on the isopach map, net pay runs from a minimum of four feet in some wells to a maximum of 27 feet in one well. The average is probably somewhat less than 20 feet. Structure-wise, it has pretty well proven to look like what was shown in some of our exhibits at the first hearing.

Q Going to what has been marked Exhibit C, would you explain this to the Commission.

A Exhibit C is a special core analysis we had performed on some core samples taken from the Navajo Tribe AL Number 2. This well was completed as an oil well; however, it is producing from a zone that is a little separate from the main pay. The cores I have were taken from the main pay and are considered to be probably typical of the cores in this well. Permeability shown here is somewhat less than has been found in other wells in the field; however, it is believed that the

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results of this special analyses would be typical of cores from other wells. What we attempted to do here was to compare the vertical and horizontal permeability of the reservoir, and if you will notice, in three of the four samples the horizontal permeability is several times the vertical permeability, so it is concluded from this that any pressure draw-down within a well bore will result in a horizontal flow of liquids rather than a vertical flow.

Going on to Exhibit D, this gives you the production history for, I think, all the wells, both gas and oil. Exhibit D is a tabulation of completion information on all the wells that are presently producing from the field. From this it can be shown that all but one well completed in the main pay zone is capable of producing its allowable at a very high tubing pressure--in fact, I think this exhibit will show that all wells, with the exception of one possibly, would be able to produce the proposed increased allowable at a relatively high tubing pressure. Several of the potentials refer to the initial producing rate column. Number 1 had an initial producing rate of 10,558 MCF a day with a tubing pressure of 750 pounds. Number 2 made 362 barrels of oil; tubing pressure 1650. Number 3 made 5,120,000 with a tubing pressure of 3,477; and all the wells, with the exception of Navajo P Number 2 look like they are capable of producing the top allowable at a high



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tubing pressure.

Q Texaco actually did run production tests to see if some of the wells could product at the asked for allowable?

A That's correct, and these reflect in our Exhibit E. This is a special test which Texaco ran on the Navajo Tribe AR Number 1. This test was conducted with the idea in mind of producing the well as near the 4.77 allowable factor as possible. As you will notice from this test, the well produced the first day 360 barrels of oil; the next day 318; and the next day 306. During this time no water production was noted. I would like to comment that the well is perforated as deep as 553 feet under sea, which puts it very near the oil-water contact. At the time this test was run we also conducted a PI test, and if you will notice, the well was flowing at the rate of 398 barrels of oil per day and had a bottom hole flowing pressure of 3,115 PSI. Shut-in pressure at the time this PI was taken was 3,134 pounds and it was a draw-down of only 19 pounds in bottom hole pressure when producing 309 barrels per day. That gives us a 21.9 PI. We believe this is significant, in that it shows the capability of the wells to produce the allowable without a significant drop in bottom hole pressure.

Q The test well--the pay well is underlaid by water, is it not?

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A That is correct.

Q So if there was going to be a water problem, that would be likely to show it?

A That's true. This is the one we feel would be most likely to bring water in if high producing rates are going to bring it.

Q Let's assume we were back on 40-acre spacing. What would your withdrawal rate be?

A I have related the withdrawals to 160 acres. If the well was developed on 40 acres and was drilled up on 40 acres and given the standard proportional factor for 40 acres withdrawal on the 160 acre tract would be 496 and under the proposed 4.77 factor withdrawals would be 334 or only 67% of the withdrawal rate resulting from development on 40 acres. Under the present 2.77 factor withdrawals from the 160-acre tract would be 194 barrels per day or 39% of the allowable if the tract were developed on 40 acres.

Q In your opinion as an expert petroleum engineer, would a proportional factor of 4.77 with 160-acre spacing create waste or have a premature water encroachment?

A No, it would not.

Q Does the production history in the development of this pool substantiate Texaco's original position that the wells in this pool could drain 160 acres?

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A Yes, it does. All the evidence we have gathered to date indicates that the wells are capable of draining much in excess of 160 acres.

Q Were Exhibits A through E prepared by you or under your supervision?

A Yes.

MR. KELLY: I move for the introduction of Texaco's Exhibits A through E.

MR. UTZ: Without objection, Exhibits A through E will be entered into the record of this case.

MR. KELLY: I have no further questions of the witness at this time.

MR. UTZ: Mr. Walsh, how deep does AL Number 1 go? In other words, would it go deep enough to show that you actually did not have a water table under the area?

A Yes, sir. I don't have the exact TD, but it's somewhere in the range of 7,500 feet, and we perforated until the pay zone in the well.

Q In other words, you tested the hole down through the area where you say there is water?

A Yes.

Q And was that same thing true in Section 17 on either Pan American?

A Let me refer to Exhibit B, which gives the sub-sea

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depth to which Pan American has tested the wells. There M Number 1 was perforated from a minus 487 to a minus 504--that is in the main pay. That represents 17 feet, so that should pretty well cover the entire pay section in that well.

Q Their lowest perforation was minus 504?

A That is correct. Oil-water contact, according to our interpretation, is at minus 560.

Q So those perforations really would not show whether the water table came across or not? You're not out of your pay zone at approximately minus 504 in their well?

A I don't have the logs with me. However, this is--

Q I understand that, but I'm trying to determine how you determine that there was no water table underneath the area where you say there is oil only.

A The reason we make that statement is that we have pretty well established the oil-water contact at minus 560 feet under sea, and at minus 560 in the Pan American N Number 1 their pay does not exist at that point. It has come in at approximately 75 or 80 feet above that.

Q You're not actually saying you don't think there's no water; you're saying that the water table is considerably lower and not adjacent to the pay zone?

A I'm saying that in the main pay at the Navajo N-1 there is no water present.

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Q At any depth under the Pennsylvanian?

A Not under the Pennsylvanian zone. There may be some water present in the Mississippian in that location, but not in the Pennsylvanian D Section, no.

Q If there was any water below the Pennsylvanian D, do I understand your testimony to say there is enough impermeable zone underneath so that the water would not migrate vertically?

A In the case of this one well, if there were any water it would be sealed off by casing and cement. If you will refer to the map, down into Section 27 where the Texaco Navajo Oil Number 1 is located, this is a well in which we believe there is some water immediately below the Pennsylvanian section, and this well is perforated to a depth of minus 553, and we believe that at minus 560 oil-water contact exists, and it is very possible that there is water in the pay section below this well.

Q You made the statement, I believe, that your test as shown on Exhibit E would show that there was no tendency for water to cone, is that correct?

A Yes, sir. That was the purpose of the test, to actually run some field checks to see whether or not this would happen.

Q And those tests were run for approximately three

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days?

A That's correct.

Q And you produced a total of about 980 barrels of oil. Do you think that is enough production over a long enough period to prove whether or not a well will cone?

A Yes, sir, I think in the case of a well perforated as close to the oil-water contact as this well was perforated --I think that is an adequate test.

Q You made the statement that if the pool was developed on 40-acre tracts you would have substantially more production from each 160-acre tract. If that were true, the area of withdrawal would be more widely spread than it would be with one well with 160-acre allowable, would it not?

A There would be more wells in the field, yes, sir, although actually the area of withdrawal would still be the area of the field. The field is now developed with six oil wells, and if it were developed on 40-acre spacing we would have 24 wells. However, they would still be draining the field as outlined here.

Q The withdrawal sumps would be more evenly spread over the area?

A There would be four times as many, yes, sir.

Q Are these two dry holes--are you familiar enough with those dry holes to say why they were not produced? Is

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the permeability too low, or what?

A The two dry holes you refer to--there are three dry holes marked on the map, Pan American's P-1 southwest southwest of Section 8. This well tested water on top of the pay and we have it contoured right on the edge of the field. The Pan American N Number 5 in the northeast of the southeast of Section 20 tested water in the top of the pay. The Pan American Navajo U Number 2 in the southwest of the southeast of Section 21 tested water in the top of the pay. If you can look a little further down, Texaco Navajo AL Number 2, producing from a separate zone, also tested water from the top of the main pay zone; and the Texaco Navajo AL Number 3 tested water in the pay.

Q What zones are those two wells producing from?

A They are producing from a little stringer that apparently is not developed in the north end of the field. It immediately overlies the main pay zone.

Q You wouldn't consider it as being a part of the Pennsylvanian D pool?

A I think there is considerable evidence to indicate that it is a separate accumulation. If the Commission so desires, I brought some logs of those wells along and I would be glad to show them. I think they would indicate that the zones are separate. First, here are logs on the Navajo Tribe

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AL Number 2, which was the first well completed in that zone.

(The exhibit was thereupon marked Exhibit F.)

The main pay zone was perforated in this well at 6,363 to 6,339, or sub-sea depth 567 to 573, and this zone flowed nine to 10 barrels of salt water per hour. This zone was subsequently squeezed off and we perforated from 6,314 to 6,318, which is 550 to 554 sub-sea, and the well initially potentialed for 99 barrels of oil per day; no water. I will pass out now the logs of the Texaco Navajo Tribe AL Number 3. We perforated the very top of the main pay zone in this well from 6,322 to 6,329, or sub-sea 590 to 597 feet. After acidizing with 200 gallons this well flowed 56 barrels of acid and load water and 66 barrels of salt water in two hours. These were squeezed and sent back and perforated. The zone that is productive in the AL 2, and that is from 6,313 to 6,316, or sub-sea 581 to 584, after 1,700 gallons of acid this zone swabbed 17 barrels of oil plus eight barrels of water. The reason I think this zone is separate is the fact that we are making oil at a depth of 581 feet sub-sea, whereas in the main pay zone oil-water contact is pretty well established at 560 sub-sea, as is evident by drill stem test and production test. The AL 2 is upon pump. AL 3 has a test unit on it now, and the last report I had it was pumping 10 oil and six water.

Q How do pressures in this zone compare with the D



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zone?

A I am unable to state that--we do not have drill stem test data, and the wells have been on pump. We have not run any pressure build-up test on them.

Q Do you know anything about the oil analysis?

A The oils appear to be somewhat similar.

MR. UTZ: Are there any other questions of the witness?

MR. KELLY: If there are no other questions, I would like to move the introduction of the two logs. That would be Exhibits F and G.

MR. UTZ: Exhibits F and G will be entered into evidence.

MR. KELLY: I would also like to formally move that the application be amended to include the requested rule change of the original Rule 8 to read "a standard gas proration unit 316 to 324 acres shall be assigned an allowable in accordance with the following formula: Normal unit allowable times 2,000 times 4.77 times 2."

MR. UTZ: Is that being made at the request of Pan American?

MR. KELLY: I think Pan American joins in that.

MR. UTZ: I thought that might be, since they have the two gas wells. Are there any more questions? ... The

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witness is excused.

(The witness thereupon withdrew from the stand.)

MR. KELLY: I only have one witness, but I think Pan American has one.

MR. MANN: I am Russell Mann, with Atwell & Lone in Roswell, representing Pan American Corporation at this hearing. We are supporting Texaco's application for the two rule changes, and I have one witness, Mr. George Eaton.

GEORGE W. EATON, JR., the witness, having been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. MANN: Would you state your name, please.

A George W. Eaton, Jr.

Q Where do you live?

A I live in Farmington, New Mexico.

Q What is your occupation?

A I am senior engineer for Pan American Petroleum Corporation.

Q Have you previously testified before this Commission?

A I have.

Q And are your qualifications a matter of record before the Commission?

A Yes, sir.

MR. MANN: Is the Examiner familiar with Mr. Eaton's

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qualifications?

MR. UTZ: Yes, sir.

MR. MANN: Mr. Eaton, did you testify before this Commission on hearing on this particular field in July of 1964?

A Yes, sir, I did.

Q Are you familiar with the application of Texaco in Case Number 3198?

A I am.

Q Is this area in question under your jurisdiction with Pan American?

A Yes, sir, it is.

Q Have you brought with you today to this hearing some exhibits?

A Yes, sir, I have.

Q We have already marked Pan American Exhibits 1 to 4, I believe. Now, referring to Pan American Exhibit 1, Mr. Eaton, would you explain that to the Examiner, please.

A Yes, sir. If you will direct your attention over to this wall, I have placed Pan Am Exhibits 1 and 2 on the wall here because they are of such large size. Exhibit 1 is a map of a portion of San Juan County, New Mexico, showing the location of the Tociito Dome Pennsylvanian D Pool. On Exhibit 1 the limits as defined by either nomenclature on orders which

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have been already written or those that will soon be written, are shown outlined in green. The wells which are used to depict the cross-section which is our Exhibit Number 2 have been colored in red on Exhibit 1 and connected with a red line. That line is labeled A-A Prime and represents the trace of the cross-section which is Pan American's Exhibit 2.

Q Now, going to Pan American Exhibit 2, would you explain that to the Commission, please.

A Exhibit 2 is a cross-section running north-south through the Tocito Dome Pennsylvanian D Pool. It shows the primary continuity of the porosity zone in the Pennsylvanian D interval. The various colors which are shown on this cross-section depict the location of the water-oil contact of the oil zone and the gas-oil contact in the gas zone as it exists in the Pan American Navajo Tribal N Well Number 3. To construct this cross-section I have used the isopach logs on the wells in the Tocito Dome Pennsylvanian D Pool. I have identified the top of the porosity interval with a solid line, and the base of the porosity interval again with a solid line, beginning with the basal portion of the Pennsylvanian porosity zone or that portion of the Pennsylvanian D porosity zone which contains water. Please observe the right-hand portion of the cross-section which shows the porosity interval in the Texaco Navajo Tribal AL 2 to be below the oil-water contact. That

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portion of the porosity interval that is below the oil-water contact is colored blue. Immediately above that is an interval which is colored green. This is the oil zone. Moving over to the third well from the right hand there, that well is Pan American Navajo Tribal U Number 2, also a dry hole in the Pennsylvanian D porosity, shown because the entire zone lies below the oil-water contact and the water is contained in the entire porosity interval. Moving on up the structure to the Pan American Navajo Tribal N Number 3 well, you will notice the entire porosity interval now as moving up high enough sub-sea wise so that the entire porosity interval lies above the gas-oil contact. In other words, in this well there is no oil zone--it's all gas. Moving again on to the north, to the well on the extreme left-hand end, this well is Pan American Tribal P Number 2 well, a very recent completion. This well actually was not drilled deep enough to penetrate the entire Penn D porosity zone because it was quite evident that it was approaching the water-oil contact, and we were attempting to stay away from that water if we could. As drawn in, the water-oil contact in this well is shown, and I show it here as just a little vestige of blue area at the bottom of the Pennsylvanian D porosity zone. This well makes water, incidentally, and is one of the wells in the pool which is incapable of top allowable now. It is one of the wells that would not even

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help an increase in allowable rate. The other thing that is shown on this cross-section is the perforated intervals of the various wells in the main porosity zone, and in the case of the wells on the extreme right-hand end, the perforated interval of the Texaco AL Number 2 Well which was completed in a stringer approaches above the main porosity zone. Other than what I have depicted, I believe the only other thing shown by the cross-section is that what I have called the "Penn D porosity zone" is a correlative interval that can be mapped across this pool. As Mr. Walsh says, it isn't a consistent thickness as far as porosity is concerned, but it does--the porosity does occur at a correlative stratigraphic position in each well. Particularly, note here on the Pan American Navajo Tribal Number 4--the porosity is only about four feet thick in this well, whereas it is much thicker in wells to the south.

Q I refer you now to Pan American Exhibit 3. Would you explain that, please, and I believe you have some extra copies of that for the Examiner. All right, Mr. Eaton, would you go ahead and explain that.

A Yes, sir. Exhibit 3 is a graphical computation I have made of the pressure draw-down required to produce the estimated new gas allowable for the Navajo Tribal N Number 3 well. This is a gas well in the Tooto Dome Pennsylvanian

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pool. On a test conducted on this well the shut-in pressure was 2,680 PSI and the well was produced at a rate of 5,120,000 cubic feet per day with a flowing tubing pressure of 2,617 PSI. This is only a 63 PSI draw-down of 5,000,000 cubic feet per day rate. Using these data together with a slope of .75, I constructed this particular pressure curve to presume an estimate of what pressure would be required as a draw-down to produce 1,336 MCF, the allowable rate, based on 4.77 oil well factor. The results of this calculation show that flowing pressure at that rate would be 2,868 PSI or a pressure draw-down of only 12 PSI. This is almost an insignificant amount of pressure draw-down in this well.

Q All right. I hand you what has been marked for identification Pan American Exhibit 4, and ask you to explain what that is.

A On Exhibit 4 I have taken the core data from the Pan American Navajo Tribal U Number 1 well, which is an oil well, and have computed from those data the theoretical productivity index on that well. The results of this calculation show that productivity index as 15.3 barrels per day per PSI draw-down, which, when converted into draw-down required, is a production of 3.4 barrels per day, resulting in an estimated 22 PSI draw-down around the well for that rate. Again, this is a very small pressure draw-down to produce such a high

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volume of oil, and it illustrates the very good characteristics of the Pennsylvanian D porosity zone, sand or lime.

Q Do you have Exhibit 5 with you?

A Yes, sir. I don't know if I want to call this Exhibit 5 or not, but the Examiner may be interested to see what this Pennsylvanian D porosity zone actually looks like, and I have a sample of the core from the Navajo Tribal U Number 1. I want to let him examine this, at least, whether we call it an exhibit or not, for this is the finest looking limestone rock I have seen in an oil pool. I have seen water aquifers with characteristics this good, but not very much oil sand like this. This piece of rock here probably has a permeability on the order of one thousand-plus millidarcies.

MR. UTZ: How much section did you get in this particular well?

A I believe there were 11 feet of core that was recovered, from which I average the characteristics to come up with this average permeability of 600 millidarcies. One thing we found in coring this pay--this rock is so soft that if you get very much core in the barrel it tends to crush the new rock that is drilled, and just grinds it up, and you get very poor core recovery, so we have never got an entire core from any of these wells, although we have tried to core all of them. It's quite possible that we may have in each well ground up the



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very best part--we may never have recovered the very best part. I believe we estimate the actual thickness of the zone in this area to be about 17 feet, of which we have 11 feet of core recovery. Here is another slab of core from the same well, that is very similar to the one I just showed you. One thing which might be inferred from examination of these slabs of core is some confirmation of what the core analysis showed on Mr. Walsh's sample, which is the ability to flow in a horizontal direction, which would appear to be much greater in these particular pieces of core than in a vertical direction, although I realize visual examination of core is somewhat hazardous.

Q In your opinion, should the gas allowable increase proportionately with the oil allowable in this particular instance?

A Yes, sir. The purpose in setting up the rules initially to provide for a gas allowable based on oil allowable was to, as much as possible, keep the gas-oil contact in a static position. Therefore if the oil allowable is to be increased the gas withdrawal rate should be increased in the same proportion.

Q Were Exhibits 1 through 5 prepared by you or under your supervision?

A Yes, they were.

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MR. MANN: We move for the introduction of Pan American's Exhibits 1 through 5 in evidence at this time.

MR. UTZ: Without objection, Exhibits 1 through 5 are entered into the record.

MR. EATON: Except the cores.

MR. MANN: We will amend that to make it Exhibits 1 through 4.

MR. UTZ: You mean you want to take the cores home with you?

MR. EATON: No, sir. I didn't prepare the core-- I just want to make that plain. They are for illustrating purposes only--I thought it would be interesting to you to see what this reservoir rock actually looked like.

MR. UTZ: It is very interesting--but you don't take credit for having made them.

MR. MANN: (To witness) Based on these exhibits, do you have a recommendation as to whether or not the application of Texaco should be approved?

A It is my recommendation that the application be approved.

Q In your opinion would the granting of this application of Texaco prevent waste and protect correlative rights?

A Yes.

MR. MANN: I have no further questions.

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MR. UTZ: Is it your belief, Mr. Eaton, that by producing this well at the requested rate, there will be little likelihood of any of this water channeling up through permeable areas and start producing water prematurely?

A No, sir, I don't believe at the rates we're talking about and with the characteristics of this reservoir rock, that this is going to be a problem in this pool. In the first place, although this cross-section has been drawn out quite a bit horizontally, still and all, the vertical scale on it is only about 1/5 of the horizontal scale, the horizontal scale being that one inch equals 200 feet, so that moving from the Navajo Tribal U Number 1 well out to the nearest water is still something like 1,000 feet. In other words, from the well bore itself out to the point where water-oil contact intersects the base of the porosity zone is still something on the order of 900 to 1,000 feet away. We're talking about pressure draw-downs in this well at 334 barrels per day, a rate of only 20 to 25 PSI. I don't believe that that pressure would be felt 800 to 900 feet away prematurely.

Q You're going to have wells that would be a little closer to the water zone than that one, aren't you?

A We have one now that is closer to it; the Navajo Tribal P 2 has water in the bottom of that porosity zone that is in that well, but this increased allowable rate won't apply

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to that particular well--it won't make but about 50 barrels per day now. To answer your question specifically, I hope that we won't have any closer to the water.

Q If a well should cone water or draw water through channel, there isn't too much you can do about it after it happens, is there?

A If it's a true water cone, then that well will also be found to be rate-sensitive, and the cone can be depressed by adjusting the producing rate at that time.

MR. UTZ: Are there any further questions of Mr. Eaton?

MR. DURRETT: Could you, on Exhibit 1, show the location of your Pan American Navajo Tribe U Number 1?

A Yes, sir, it's the well in the northwest quarter of the southwest quarter of Section 21.

Q And when you were producing that at the high rate, or the rate that is requested, what was the draw-down PSI?

A This is the one I did the theoretical calculation on. We didn't actually produce the well to get an actual test on it--I did a theoretical calculation on it, showing 22 PSI.

Q In the Texaco AR Well Number 1 do you happen to recall what the actual PSI was when they were producing it? If you don't, to refresh your memory, it was 19.

A Yes, sir. I was very happy to see that test come in

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--I thought this gave some confirmation for my theoretical calculations.

MR. UTZ: Are there any other questions? ... The witness may be excused. Do you have any other testimony?

MR. MANN: No, sir, we have no other testimony at this time.

MR. UTZ: Are there any other statements to be made in this case? The case will be taken under advisement.

\* \* \*

STATE OF NEW MEXICO )  
COUNTY OF BERNALILLO ) ss

I, ELIZABETH K. HALE, Notary Public and Court Reporter, do hereby certify that the foregoing transcript in Case Number 3198 is a true and accurate record of proceedings to the best of my knowledge, skill and ability.

Witness my hand and seal of office this 2nd day of March, 1965.

*Elizabeth K. Hale*  
Notary Public and Court Reporter

My commission expires  
May 23, 1968.

I do hereby certify that the foregoing is  
a complete and correct transcript in  
the 2nd case of the above case 3198.  
dated at the 2nd day of March, 1965.  
*Elizabeth K. Hale*  
Notary Public and Court Reporter  
New Mexico All Countywide Commission