BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
June 5, 1963

EXAMINER HEARING

IN THE MATTER OF:
(Continued from the May 22, 1963 examiner hearing.)
Application of Texaco Inc. for a triple completion and for certain administrative procedures, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the triple completion (combination) of its State "L" Well No. 6 located in Unit B of Section 1, Township 18 South, Range 34 East, Lea County, New Mexico, to produce oil from the Vacuum Wolfcamp Pool and un undesignated Pennsylvanian Pool through parallel strings of 2 7/8 inch casing and from the Vacuum-Devonian Pool through 1½ inch tubing installed within 3½ inch casing, all casing strings to be cemented in a common well bore. Applicant further seeks a procedure whereby 1½ inch tubing for Devonian production in this field may be approved administratively. CASE 2826

IN THE MATTER OF:

Application of Texaco Inc. for a triple completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the triple completion (combination) of its State "O" Well No. 17 located in Unit N of Section 36, Township 17 South, Range 34 East, Vacuum Field, Lea County, New Mexico, to produce oil from the Wolfcamp and the Pennsylvanian formations through parallel strings of 2 7/8 inch casing and from the Devonian formation through 1½ inch tubing installed with 3½ inch casing, all casing strings to be cemented in a common well bore. CASE 2827

BEFORE: Elvis A. Utz, Examiner

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Application of Texaco Inc. for a triple completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the triple completion (combination) of its State "O" Well No. 17 located in Unit N of Section 36, Township 17 South, Range 34 East, Vacuum Field, Lea County, New Mexico, to produce oil from the Wolfcamp and the Pennsylvanian formations through parallel strings of 2 7/8 inch casing and from the Devonian formation through 1½ inch tubing installed with 3½ inch casing, all casing strings to be cemented in a common well bore. CASE 2827

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of Midland, Texas.

Q Have you previously testified before the New Mexico Oil Conservation Commission of New Mexico?

A Yes, I have.

Q As a Petroleum Engineer?

A Yes.

Q Are you familiar with the subject applications in Cases 2826 and 2827?

A Yes, I am.

Q Will you briefly state what Texaco is seeking by the applications?

A Case No. 2826, this is the application of Texaco for a triple completion in the Vacuum-Devonian, Vacuum-Wolfcamp reservoirs for our State of New Mexico "L" Well No. 6 and also administrative approval for an administrative procedure to complete the Devonian reservoirs in this field and this area through 1-1/2 inch tubing. With regard to Case 2827, it's the application of Texaco for a triple completion in the Devonian, Pennsylvanian and Wolfcamp reservoirs in the Vacuum area for our State of New Mexico "O" Well No. 17, and also approval to produce the Devonian reservoir through a string of 1-1/2 inch tubing.

Q Will you point out the locations of these wells, and in so doing, refer to Exhibit No. 1?

A Exhibit No. 1 is an ownership map showing the Texaco State of New Mexico "O" lease bordered in yellow, and the State of

New Mexico "L" lease bordered in yellow. Also shown on this map are three wells circled in red which are the wells involved with the three applications set for hearing today.

The application with regard to Well No. 14 has been dismissed, so we're only concerned with Well No. 17 located in the Southeast Quarter of the Southwest Quarter of Section 36, Township 17 South, Range 34 East; and the location of the State of New Mexico "L" Well No. 6 located in the Northwest Quarter of the Northeast Quarter of Section 1, Township 18 South, Range 34 East.

Q Mr. Black, what is the present status of these wells?

A At the present time Well No. 17 has reached total depth and we have begun production tests in the Devonian formation and perforated the other two zones. Well "L" No. 6 is now drilling at approximately 11,500 feet. We anticipate going to approximately 12,100 feet in this well.

Q Will you now refer to Exhibits 2 and 3 and explain the casing program and the proposed downhole equipment and the perforated intervals?

A Exhibit No. 2 is a diagrammatic sketch of the proposed triple completion installation for the State of New Mexico "L" Well No. 6. This is with regard to Case 2826. Texaco set 13-3/8 inch casing at 1510 feet and circulated cement to the surface. We set 9-5/8 inch casing at 4800 feet and cemented it, and the estimated top of the cement is at 1200 feet, up in the

13-3/8ths. We continued with an 8-3/4 inch hole and we plan to go to a depth of 12,150 feet. At that point we will run two strings of 2-7/8ths casing to produce the Wolfcamp and Pennsylvanian reservoirs. We will run one string of 3-1/2 inch casing and cement this with a total of 2200 sacks of cement. Cement will tie back into the intermediate casing. We will then perforate the Wolfcamp formation from approximately 9900 to 10,000 feet. We will perforate the Pennsylvanian formation from approximately 10,250 to 10,300 feet, and we will perforate the Devonian formation from approximately 11,800 to 11,820. At that point we will run a string of 1-1/2 inch tubing inside the 3-1/2 inch casing to produce the Devonian reservoir.

With regard to Exhibit No. 3, this is a diagrammatic sketch showing the proposed triple completion installation for the State of New Mexico "O" Well No. 17. This is with regard to Case No. 2827. We set 16-inch and 13-3/8 inch casing at 1612 feet, with the top 100 feet being 16-inch casing. We set 11-3/4 inch and 9-5/8 inch casing at 4750 feet, with the top 100 feet being 11-3/4 inch casing. We circulated cement to the surface on both the surface and intermediate casing strings. We continued with an 8-3/4 inch hole to a total depth of 12,082 feet. At that point we set two strings of 2-7/8 inch casing and one string of 3-1/2 inch casing and cemented with a total of 2700 sacks. The cement top as determined by a temperature survey was at 1625 feet back into the intermediate casing. We perforated the

Wolfcamp reservoir from 9962 to 9967, and 9992 to 10,004 feet. We perforated the Pennsylvanian from 10,117 to 10,122, and from 10,130 to 10,140. We perforated the Devonian from 11,980 to 11,990; and we have obtained production tests from the Devonian.

Q What are the crude characteristics of each zone?

A The crude characteristics for the Devonian, which would of course apply to both applications, is a 55.6 degree gravity crude. It's an intermediate sweet crude, has a gas-oil ratio of from 1800 to 1900 cubic feet per barrel. The bottom hole pressure is between 4700 and 4800 psi. This zone will flow initially.

The Wolfcamp is a 40.8 gravity crude. It's an intermediate sweet crude also. It has a gas-oil ratio of 1400 to 1500 cubic feet per barrel, and a bottom hole pressure of 3800 to 3900 psi. Also it will flow initially upon completion.

The Pennsylvanian formation is a 38.9 degree gravity crude, and again it's an intermediate sweet crude with a GOR of approximately 2500. The bottom hole pressure is between 2400 and 2500 psi, and we anticipate it will flow initially.

Q Mr. Black, do you anticipate any corrosion problems?

A We do not anticipate any corrosion problems in any of the three zones, due to the fact that they are intermediate sweet crude.

Q Do you anticipate any paraffin problems?

A With regard to the Wolfcamp and Pennsylvanian, we do

not anticipate any paraffin problems; however, in the Devonian, with our experience of other Devonian reservoirs in Southeast New Mexico, we do anticipate some mild paraffin problems.

Q What steps do you propose to take to take care of this condition?

A We have plasti-coated the upper three thousand feet of tubin in this zone.

Q Why do you propose to use an inch and a half tubing and 3-1/2 inch casing to produce the Devonian?

A The primary reason for this, of course, is an economic reason, and this will result in a savings of approximately $1600 per well for each well completed in this reservoir.

Q Have you made any studies or gathered any information to show that the Devonian can be efficiently produced through an inch and a half tubing?

A Yes, we have. We have recently completed two flowing tests and I would like at this point to refer to Exhibit No. 4, which is a data sheet listing the pertinent data with regard to these two flowing tests.

The test involving the State of New Mexico "O" Well No. 11, and referring again to Exhibit No. 1, this is a Devonian well located in the Southeast Quarter of the Northwest Quarter of Section 36, this well is completed in the Devonian reservoir with 4-1/2 inch casing and 2-3/8 inch tubing.

Going down this data sheet, the crude oil gravity is

55.6 degrees, and the estimated bubble point, based upon reservoir characteristics, not actually a fluid analysis, is 2,043 psi. We found that to conduct the test of this sort, we shut both wells in and then ran a bomb into both wells and then flowed these wells at approximately a top allowable rate. We found that the initial pressure at the mid-point of the casing perforations in Well No. 11 was 4488 psi. Now this would lead us to think that possibly this pressure, or this well had not completely built up to its static pressure in the 24 hours it was shut-in, because the initial pressure in this well was 4814 psi. We found the static pressure opposite the mid-point of the casing perforations in Well No. 17 at 4727 psi. The mid-point of the perforations in No. 11 is 12,102 feet or a minus 8,080 foot subsea. The mid-point of the perforations in No. 17 is at 11,985 feet, or at a minus 7977 foot subsea.

No. 11 was shut-in 24 hours prior to this pressure, and No. 17 was shut-in 48 hours prior to this pressure. The tubing pressure shut-in on No. 11 was 1673, and on No. 17 was 2101. The stabilized flowing pressure after 5-1/2 hours in No. 11 was 3829 psi, or a drop of 659 psi over the static bottom hole pressure as measured after 24 hours. The stabilized flowing pressure in the No. 17 with the inch and a half tubing was 4379 or a drop of 348 psi over the static pressure of 4727.

The stabilized tubing flowing pressure in No. 11 was 1,091 pounds; the stabilized tubing flowing pressure in No. 17

was 1742 pounds. This represents, in No. 11, a 2738 psi drop from the mid-point of the perforations to the tubing at the surface. In No. 17, it represented a 2637 psi drop from the mid-point of the perforations to the tubing at the surface.

No. 11 was flowing on an 8/64-inch choke at the surface. We do have a 10/64-inch bottom hole choke installed in this well. No. 17 was flowing on a 19/64-inch choke at the surface.

Now with regard to the average pressure drop through the tubing, in the No. 11 with the 2-3/8 inch tubing, it was .2265 psi per foot, and in the No. 17 with inch and a half tubing it was .2200 psi per foot. We believe that this substantiates the fact that this Devonian reservoir can be efficiently produced through 1-1/2 inch tubing, because the pressure drops in the 2-3/8ths and inch and a half were almost identical.

The No. 11 was flowing at the rate of 274 barrels of oil and 135 barrels of water per day. The No. 17 was flowing at the rate of 264 barrels of oil and no barrels of water. We had a P.I. of .6207 on No. 11 and a P. I. of .7586 on No. 17. The gas-oil ratios for these two wells during the period of this test was 1930 for the No. 11 and 1977 for the No. 17, which are almost identical.

With regard to the actual diameters of the casing and the tubing, in No. 11 we had a 4-1/2 inch O.D. casing, which has an I.D. of 4.0 inches; and 2.735-inch O.D. tubing, which has an I.D. of 1.995-inch. In No. 17 we had 3.5-inch O.D. casing, which

has an I.D. of 2.992 inches; and we had 1.9-inch O.D. tubing which has an I.D. of 1.61 inches.

With regard to the maximum volume of fluid we think we could lift through these two installations under artificial lift, under No. 11 it would be 1200 barrels a day and under No. 17 it would be 800 barrels of fluid per day.

Q Is this well in excess of your allowable?

A Yes, it is. Top allowable for the Devonian is 287 barrels.

Q What conclusions do you draw from these studies?

A We believe that these pressure tests and these flowing tests indicate that this Devonian reservoir can be efficiently produced through 1-1/2 inch I.D. tubing.

Q Except for the 1-1/2 inch tubing, is this a standard type tubing?

A Yes, it is. The rule states that no tubing less than 1.670 can be installed in a multiple completion, and the I.D. is 1.610.

Q Which is the reason for the hearing today.

MR. UTZ: What was that rule again?

A Rule 112-A.

Q (By Mr. White) Do you have a log for Well No. 17?

A Yes, this is an acousti-log of Well No. 17. It has the tops of the formation and the perforations marked, and as soon as we complete Well No. 6 we will submit a copy of the log

for that well, also.

Q Mr. Black, does Texaco also request that similar completions in the Devonian in the future be administratively approved?

A Yes, sir, we would request that an administrative procedure be set up or that similar completions in the Devonian where we use 1-1/2 inch tubing and 3-1/2 inch casing be approved administratively; and, of course, we would request that these administrative procedures be governed by those procedures set forth in Rule 112-A for multiple completions.

Q Does Texaco intend to make further drilling operation in the Devonian in this area?

A Yes, we have been pleased with the Devonian prospects and we anticipate drilling a number of wells.

Q Were these exhibits prepared by you or under your direction?

A Yes, they were.

MR. WHITE: At this time we offer Exhibits 1 through 5.

MR. UTZ: Without objection, Exhibits 1 through 5 will be entered into the record of these two cases.

(Whereupon, Applicant's Exhibits Nos. 1 through 5 received in evidence.)

MR. WHITE: That concludes our direct.

CROSS EXAMINATION

BY MR. UTZ:

Q Is it my understanding that you are here requesting a change in Rule 112-A?

A No, sir. We would not be requesting a change in Rule 112-A, we would only be requesting that 1-1/2 inch tubing installations be administratively approved for this Devonian reservoir, the Vacuum-Devonian reservoir, and only in this area. In other words, it would be other completions similar to these two that we presented here today.

Q Now in Case 2824 you are completing the Abo formation?

A Case 2824 was the application we dismissed. That was with regard to our No. 14 Well.

Q I have the wrong one.

A We were unable to complete in the Devonian in that well.

Q So in all respects except for the perforations, depths, these two triple completions are identical?

A They are identical except for the depth and possibly there is a slight variation in the casing program.

MR. UTZ: Are there other questions of the witness? If not, the witness will be excused.

(Witness excused.)

MR. UTZ: Are there any other statements in this case or these cases? The cases will be taken under advisement.

* * * *

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, 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 this 10th day of June, 1963.

Ada Dearnley
NOTARY PUBLIC

My Commission Expires:

June 19, 1963.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2826 & 27 heard by me on June 5, 1963.

, Examiner
New Mexico Oil Conservation Commission