BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
August 8, 1962

EXAMINER HEARING

IN THE MATTER OF: Application of Tenneco Oil Company for a waterflood project, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks permission to institute a waterflood project in the Cha Cha-Gallup Oil Pool in an area underlying Section 31, Township 29 North, Range 13 West, San Juan County, New Mexico, with injection of water into the Gallup formation at an approximate depth of 5500-5700 feet, said project to be governed by the provisions of Rule 701.	Case 2616

BEFORE: Mr. Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

MR. NUTTER: The hearing will come to order, please. We will take next Case 2616.

MR. FLINT: Application of Tenneco Oil Company for a waterflood project, San Juan County, New Mexico.

MR. MORRIS: If the Examiner please, I am Richard Morris of the firm of Seth, Montgomery, Federici & Andrews, Santa Fe, New Mexico, appearing on behalf of the applicant,

Tenneco Oil Company. We have one witness, Mr. Les Plumb.

(Witness sworn.)

(Whereupon, Applicant's Exhibits 1, 2 & 3 were marked for identification.)

L. B. PLUMB

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

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Plumb, will you please state your name and position for the record, please?

A L. B. Plumb. I'm District Production Superintendent for Tenneco Oil Company in Durango, Colorado.

Q Mr. Plumb, you have previously appeared before the Commission or its Examiners as an expert witness and had your qualifications accepted?

A Yes, I have.

Q Are you familiar with Tenneco's application in this case, Case 2616?

A Yes, I'm familiar with it.

Q Have you prepared several exhibits to substantiate your proposals in this application?

A Yes.

Q Referring to what has been marked as Exhibit No. 1, would you briefly describe the basic area that is depicted upon this plat and the location generally of other pressure maintenance projects in this area?

A Exhibit No. 1 encompasses Tenneco Oil Company's properties in the Cha Cha-Gallup Pool. It also shows the producing properties of other operators adjacent to Tenneco's properties in both the Cha Cha-Gallup Pool and the Totah-Gallup Pool. Tenneco's lease specifically consists of Section 31, 13 West, 29 North.

Q There are two pressure maintenance projects in this area that have already been approved by the Commission, are there not, one being designated the Northwest Cha Cha pressure maintenance project, another the Southeast Cha Cha pressure maintenance project?

A Yes, that is correct.

Q And the Northwest project lies immediately to the west and north of Section 31, which is shown as Tenneco's property here?

A Yes.

Q And that project is operated by Humble Oil and Refining Company?

A That's correct.

Q The area to the south and east of Tenneco's property

as shown here is the Southeast pressure maintenance project, which is operated by Pan American Petroleum Corporation?

A That's correct.

Q Referring to the Tenneco properties in Section 31, 29 North, 13 West, would you describe the lease ownership in that section?

A Tenneco is operator of all the leases in Section 31. The ownership is as follows: the East Half of Section 31 is a regular Half Section, the working interest is owned 7/8ths by Tenneco Oil Company, 1/8th by Big Chief Drilling Company of Oklahoma; the East Half of Section 31 is an irregular Half Section. There are two leases there, the B Oil Unit lease and the C Oil Unit lease. Elliott, Inc. of Roswell, New Mexico owns approximately eleven percent of each of those two leases, the remaining eight-nine percent is owned 7/8ths by Tenneco and 1/8th by Big Chief.

Q Elliott, Inc. owned the lots along the west side of this Section 31 which were communitized to form proration units in the Northwest Quarter and the Southwest Quarter of Section 31?

A That's correct.

Q All of the land in Section 31 is federal land; is that correct?

A Yes. It's all federal acreage.

Q Now, Mr. Plumb, what is Tenneco's proposal with respect to pressure maintenance operations in Section 31 and surrounding areas?

A We propose to inject water into two wells in Section 31, our Oil Unit B No. 1 and our Callow B No. 2.

Q Those wells shown circled in red on Exhibit No. 1?

A Correct. These wells will establish an acceptable cooperative pattern with the operators of the two units adjacent to us, the northwest unit and the southeast unit. We have had discussions with these operators and this pattern is mutually agreeable with all three of us.

Q Mr. Plumb, do you contemplate pressure maintenance operations just upon your lease in Section 31, or is it anticipated that any other acreage in this vicinity might be taken into an eventual unit to be formed?

A To the north of us in Section 30, 29 North, 13 West, Aztec Oil and Gas Company has a lease on which they have their Hagood Federal No. 29-G. We propose to form a unit including Tenneco's acreage and Aztec's acreage if they accept our proposal and choose to join our unit. That would include all of the leases in the Cha Cha-Gallup Pool in one waterflood unit or another.

Q Mr. Plumb, if I may summarize what you have just said

here, in Section 31 Oil Unit B Well No. 1 and your Callow B Well No. 2-B would be injection wells. The other three wells shown in Section 31 would be producing wells and if satisfactory arrangements can be worked out with Aztec Oil and Gas Company with respect to their Well No. 29-G to the north, that also would be a producing well?

A That is correct.

Q Do you have anything else you would like to point out on Exhibit No. 1 before we go to Exhibit No. 2?

A No, sir.

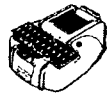
Q Referring to your Exhibit No. 2, does this exhibit show the casing and cementing program on the two proposed injection wells?

A Yes, it does.

Q Is there anything on this exhibit that you would particularly like to point out to the Examiner?

A I would like to point out that the amount of cement used in these wells is sufficient to cover an interval much greater than the Gallup sand, and that the perforated interval shows that the water to be injected here will be contained wholly within the Gallup sand interval.

Q Referring to Exhibit No. 3, Mr. Plumb, which is entitled "Actual and Predicted Primary Production Performance",



would you summarize the information shown there?

A Up through July 1, 1962, the line drawn here represents the actual lease performance of the five wells in Section 31, showing the monthly oil production. After 7-1-62, the line there is our prediction of the primary performance of the lease, which extends to a cumulative primary oil recovery of 173,000.

Q The sharp decline in monthly production shown in December, 1961 there was as a result of the No Flare order entered by the Commission?

A Yes, December 1, 1962 the No Flare order became effective. The production was sharply curtailed thereafter. During the first quarter of 1962 the gas compressor serving the casinghead gathering system on this lease had very faulty operation. It was down most of the time, which resulted in a much lower production during the months of February, March and April than normally would have been expected.

Q By the middle of 1962, then, most of the problems had been ironed out with respect to the gas gathering facility and your production leveled off?

A Yes, sir, it's reasonably satisfactory now, although takes in the field are still not quite rateable and some productive capacity is limited by the amount of gas that we can put through the compression system available to us.

Q Now, you've shown by means of your decline curve that the ultimate recovery from primary production would be anticipated to be in the neighborhood of 173,000 barrels from all five wells on your lease in Section 31, correct?

A That's correct.

Q Would you say that that is an unusually high or low recovery for five wells in this field?

A It will not be high for any five wells in this field drilled on the 80-acre well density pattern. The average recovery you can see will be approximately 35,000 barrels per well, which is barely an economic well considering the expense of drilling. The other wells in the area perform similarly and there is no reason to think that our wells are particularly better nor worse than any others.

Q Under your proposed pressured maintenance project in this area, what is the total ultimate recovery that you would expect from both primary and secondary means?

A Our reservoir engineering studies indicate that the secondary recovery will be approximately equal to the primary recovery, which will give us an estimated cumulative recovery both primary and secondary of 350,000 barrels.

Q Mr. Plumb, we have seen in the hearings that have been held before this Commission and its Examiners with respect

to the Northwest Cha Cha pressure maintenance project and the Southeast Cha Cha pressure maintenance project the need for pressure maintenance projects and some form of secondary recovery in the Cha Cha-Gallup Oil Pool. Are you of the opinion that the reservoir characteristics in this pool in this particular area where you are proposing a pressure maintenance project is similar to the area, and the wells are similar to the wells in the other portions of the pool already under pressure maintenance?

A Yes. The wells in Section 31, in the Gallup sand the reservoir is contiguous through this lease with the rest of the Cha Cha-Gallup reservoir, which includes the Southeast of the Northwest Cha Cha unit.

Q Your lease in question here and the wells thereon lie along the northeast flank of the Cha Cha-Gallup Pool?

A Yes.

Q It would be your conclusion that there is a definite need for pressure maintenance in this particular area and that without the institution of such a project, waste would occur?

A That's correct.

Q Do you have an opinion to express with respect to the efficiency of the drainage pattern that you are proposing on your lease here in question?

A With the pattern indicated here and the patterns

established by the Southeast Unit and the Northwest Unit, it appears that drainage of oil will be equitable in all directions from our lease here.

Q You feel that the pattern that you have proposed will inure to the benefit of your offset operators as well as to yourselves?

A Yes, we feel there will be no inequitable pushing of oil by water injection across lease lines. Each unit operating here will give compensatory injection, which will result in an equitable distribution of the oil to be derived from here.

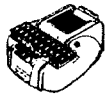
Q Mr. Plumb, what is the water source that you anticipate using for the water to be injected into the Gallup formation?

A We propose to use water taken from the alluvial sands of the San Juan River.

Q What is the rate of injection that you anticipate with respect to each of these two injection wells?

A It is not definitely established yet. We predict approximately 500 barrels per day. However, we do propose that we will maintain an equitable flood front advance with the injection wells of the two units offsetting us.

Q Mr. Plumb, when Tenneco applied to the Oil Conservation Commission for this hearing, was a copy of the application in the case furnished to the State Engineer showing the casing and



cementing programs on all five wells in Section 31?

A Yes, that was done.

Q And has Tenneco received any indication from the State Engineer of its disapproval of its application?

A No, sir, he acknowledged receipt of the application.

Q With respect to your proposal for rules governing your project area, is it your proposal that the rules governing your project be the same or similar to the rules governing the project operated by Humble to the northwest and by Pan American to the southeast?

A Yes. We would request the same type order as was issued in those two cases.

MR. MORRIS: If the Examiner please, the Southeast Cha Cha pressure maintenance project was authorized by Order No. R-2214, and the Northwest Cha Cha pressure maintenance project was authorized by Order No. R-2154. Insofar as I am able to tell, those orders are similar with respect to the rules that are promulgated for the government of the pressure maintenance projects and inasmuch as Tenneco's proposal today is part of the same pool and fills the niche between these two projects, Tenneco proposes and requests that similar rules be adopted governing the subject project.

Q (By Mr. Morris) Mr. Plumb, were Exhibits 1, 2 and 3

prepared under your direction?

A Yes, they were.

MR. MORRIS: At this time, Mr. Examiner, we offer Tenneco's Exhibits 1, 2 and 3 into evidence, and that completes the direct examination of Mr. Plumb.

MR. NUTTER: Tenneco's Exhibits 1 through 3 will be admitted in evidence.

(Whereupon, Applicant's Exhibits Nos. 1, 2 & 3 were admitted in evidence.)

MR. NUTTER: Are there any questions of Mr. Plumb?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Plumb, with your application you sent logs of these wells. I have been looking them over and I see that some of the wells appear to have two benches of the Gallup present in them?

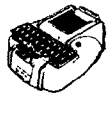
A Yes, they do.

Q Is the second bench present in the Callow No. 2 well?

A Not having the log in front of me, I cannot answer exactly, but I do not believe it is. Yes, that zone is present in our Callow B No. 2.

Q Well, is the perforated interval as shown on Exhibit No. 2 such that the lower bench will be flooded by that well?

A No, sir, it is not. The reason for that is as follows:



in attempting to complete this well as a producer, we perforated the two benches of the Gallup sand there and attempted to stimulate them separately using bridge plugs to separate the two zones. In attempting to break down the lower zone, we pumped on it with a pressure of 4200 psi and we are unable to establish a breakdown. We then pumped acid into it and at a pressure of somewhere close to 3,000 psi we broke down and established communication with the upper set of perforations. We were then convinced that the lower bench of the B sand was so impermeable that we could neither inject or get production from it, so we squeezed it off and completed the upper bench.

Q You calculate now that it would be futile to inject water into that zone?

A Yes, I feel very strongly it would be futile to do that.

MR. NUTTER: Are there any other questions of Mr. Plumb? Mr. Irby.

MR. IRBY: Frank Irby, State Engineer's Office. I didn't bring my file with me. Will you state whether or not injection is down the casing or through the tubing?

A Injection will be through the tubing.

MR. IRBY: Thank you, that's all.

MR. NUTTER: Any further questions? Mr. Plumb may be excused.

(Witness excused.)

MR. NUTTER: Do you have anything further, Mr. Morris?

MR. MORRIS: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case 2616? We'll take the case under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 1st day of September, 1962.

Ada Dearnley
Notary Public-Court Reporter

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. 2616 heard by me on Aug 8, 1962.

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