BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
July 24, 1968

EXAMINER HEARING

IN THE MATTER OF: Application of Tenneco Oil Company for a unit agreement, Eddy County, New Mexico.	Case No. 3812
Application of Tenneco Oil Company for a waterflood project, Eddy County, New Mexico.	Case No. 3813

BEFORE: Daniel S. Nutter
Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We'll call Case 3812.

MR. HATCH: Case 3812. Application of Tenneco Oil Company for a unit agreement, Eddy County, New Mexico.

MR. HINKLE: If the Examiner please, Clarence Hinkle of Hinkle, Bondurant and Christy appearing on behalf of Tenneco. We would like to also call Case 3813 and I'd like to move that these two cases be consolidated due to the fact that we have one witness and one set of exhibits for both cases.

MR. NUTTER: We'll call the next case, 3813.

MR. HATCH: Case 3813. Application of Tenneco Oil Company for a waterflood project, Eddy County, New Mexico.

MR. NUTTER: Case 3812 and Case 3813 will be consolidated for the purpose of testimony.

MR. HINKLE: Mr. Examiner, we have one set of exhibits under one cover, and I'd suggest that it be identified as Exhibit A because all the exhibits under the cover are identified from exhibits 1 through 16 so that we can refer to them.

MR. NUTTER: The brochure will be identified as Exhibit A and it relates to both cases, Mr. Hinkle?

MR. HINKLE: Yes.

(Whereupon, Applicants Exhibit A was marked for identification.)

MR. HINKLE: Were you sworn?

MR. LACEY: No.

MR. HINKLE: I'd like to have the witness sworn, please.

(Witness sworn.)

JOHN J. LACEY

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

DIRECT EXAMINATION

BY MR. HINKLE:

Q State your name.

A John J. Lacey.

Q By whom are you employed?

A By Tenneco Oil Company.

Q In what capacity?

A As District Reservoir Engineer in their Production Office in Midland, Texas.

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

A Yes, I have.

Q And your qualifications as a petroleum engineer are a matter of record with the Commission?

A Yes, they are.

Q Are you familiar with the applications of Tenneco Oil Company in Cases 3812 and 3813?

A Yes, I am.

Q What is Tenneco seeking to accomplish by its application in Case Number 3812?

A Tenneco Oil Company is seeking approval of the Southwest Henshaw (Premier) Unit Agreement in Case 3812.

Q And what is it seeking in Case Number 3813?

A Tenneco Oil Company is seeking approval of a waterflood project which would be co-extensive with the unit.

Q Are you familiar with this proposed unit area?

A Yes, I am.

Q Have you made a study of all the wells in the area?

A Yes, I have.

Q And of all the production history and information, generally?

A Yes, I have.

Q Have you prepared certain exhibits which you would like to present in this case?

A Yes, I have.

Q Refer to Exhibit Number 1 under Exhibit A and explain to the Commission what this is and what it shows.

A Exhibit Number 1 is a plat showing the location of the proposed Southwest Henshaw (Premier) Unit and the locations of the nearby producing wells within a two-mile radius of this unit boundary.

Q Does it also indicate the location of other unit areas in the general area?

A Yes, it does. The West Henshaw (Premier) Unit operated by Mobil, and to the immediate northeast of the Southwest Henshaw Unit, and East High Lonesome Penrose Sand Unit operated by General American Oil Company immediately to the west of the proposed unit.

Q Does it show the ownership of all the leasehold interests in the area?

A Yes, it does.

Q Does it also show the formations from which the various wells are producing?

A Yes, it does. It shows all the wells in the zone from which they are currently producing.

Q What are the character of the lands within the proposed unit area, that is, whether it is Federal, State or private land?

A All of the lands within the proposed unit area are Federal land.

Q Has this area heretofore been designated by the United States Geological Survey as an area logical for unitization?

A Yes, it has.

Q Are you familiar with the proposed form of unit agreement, copies of which have been filed with the application?

A Yes, I am.

Q Is this form in substantially the same form as other unit agreements having the general purpose of secondary recovery that have heretofore been approved by the Oil Conservation Commission?

A Yes, it is.

Q Has this form been approved by the U. S. G. S.?

A Yes, they have. We've obtained preliminary approvals.

Q Who is designated in the unit agreement as the unit operator?

A Tenneco Oil Company has been designated as the operator for the unit.

Q Is this unit agreement, does it cover all formations from the surface on down, or is it limited to a particular formation?

A No. This unit agreement only covers the Premier Sand vertical limits which are described in Article II, Section 6.

Q That is the definition of --

A Of the Premier Sand to be unitized.

Q And that would be the only zone that is unitized in

the area.

A Right.

Q How many working interest owners are there within the unit area?

A Within the unit area, there are only three working interest owners.

Q Who are they?

A Tenneco Oil Company, Mobil Oil Corporation and General American Oil Company.

Q Has Tenneco extended an invitation to Mobil and General American to join in the unit to commit the acreage to the unit?

A Yes. Yes, we have.

Q Have they agreed to commit their interest to the unit?

A Mobil Oil Company has agreed to commit their acreage to the unit; however, General American has indicated that they do not wish to commit their acreage, but would cooperate with the unit.

Q How much acreage does General American have?

A General American has approximately 400 acres within the unit outlined.

Q What's the total acreage within the unit area?

A 1,740, I believe.

Q You said that General American had indicated their cooperation. What do you mean by that?

A Well, in previous discussions with General American, they have indicated that if the unit is formed and the water-flood projects approved, that they would convert some of their producing wells to water injection and work out a cooperative agreement with the unit.

Q Now, what is the status of the commitment of the overriding royalties and production payments of Mobil and Tenneco, that is, on their leases as far as commitment to the unit is concerned?

A At the present time, Tenneco has approximately half of its overriding royalty interest committed and we anticipate that we will obtain complete sign-up of all the production payment interest and overriding interest in both Tenneco and Mobil's acreage.

Q Does this unit agreement contain a participation formula?

A Yes, it does.

Q What is it based on?

A The formula is based on 80% acre feet and 20% cumulative production.

Q Has this been agreed to by Mobil?

A Yes, it has.

Q In your opinion, will this unit be in the interest of protection of correlative rights of all of the leaseowners?

A Yes, it will.

Q As well as the owners of the override and production payments?

A Yes, it will.

Q What is the status of the wells that are within the unit area? Are they stripper wells or in primary production or what?

A At the present time, I think there's several wells that are shut in and all of the -- the wells that are producing in the unit area are at a very low stripper stage, a barrel a day or so.

Q Now, refer to Exhibit Number 2 under Exhibit A and explain what this is and what it shows.

A Exhibit Number 2 of Exhibit A is a plat showing the boundaries of the unit and an isopac of the net pay of the Premier Sand to be waterflooded and the location of the proposed injection wells and it also shows the location of two future injection wells that would be converted by General American.

Q How many injection wells are there all together?

A Tenneco is asking for the approval of a total of seven, converting seven presently producing wells to water injection and the approval of two wells that are presently

plugged and abandoned which we wish to re-enter and convert the water there.

Q Does this indicate the location of General American's acreage and the injection wells that would be on its acreage through the cooperative agreement?

A Yes, it does.

Q Now, refer to Exhibit Number 3 and explain what this shows.

A Exhibit Number 3 of Exhibit A is a pertinent data sheet relative to the proposed unit and waterflood project showing our estimates of secondary oil to be recovered, our source of water which will be purchased from Double Eagle Corporation, and the original -- our estimate of original oil in place and primary recovery which has been unusually low.

Q Also shows the amount you expect to recover on the secondary recovery?

A Yes, it does.

Q And the porosity and permeability and water saturations?

A Porosity and permeability and water saturations, yes, it does.

Q You have your average pay thickness.

A Thickness.

MR. HINKLE: Mr. Examiner, I might state this, that

Exhibits 4 through 19 are diagrammatic sketches of the proposed injection wells and following each diagrammatic sketch is an electrical log of the wells. I'm going to ask the witness to refer to these exhibits, 4 through 19, and explain them, pointing out the differences that are involved in the different injection wells.

A All right. Exhibits 4 through 19 are diagrammatic sketches of the wells that we propose to convert to injection and the subsurface installation we plan to employ. Generally, all of the wells were originally completed of two general categories. They were either open hole completions or with production casing strings set through the pay and perforated. In every case, we plan to install tubing and packer and inject the water down the tubing and down the packer into the pay zone and although it doesn't show on the diagrammatic sketches, we plan to load the annulus sizing of the casing with some type of corrosion inhibited fluid. There were two wells for which we had no logs available.

Q Why was that?

A These two wells are Mobil Oil Company's Federal D-2 and Federal D-8. They were not available in their files nor were they available from commercial reproduction companies.

Q Are these wells located on properties which were

acquired by Mobil?

A Yes, they were. Mobil's properties within the proposed unit were acquired in their purchase of John H. Trigg properties.

Q And there were no logs available to these wells so far as you were able to --

A Right. We've been unable to obtain any logs on them.

Q How did you get the information through which the diagrammatic sketches were made of these two wells?

A The diagrammatic sketches are based on our well files and the well files that we obtained from Mobil Oil Corporation.

Q Anything else that you would like to comment on with respect to any of these exhibits?

A Well, two of the proposed injection wells, as I previously stated, are presently plugged and abandoned. One is the Mobil Oil Company's Federal D-2 which does not now have production casing in it, and the other well is the Tenneco Oil Company's Haggerty Federal Number 4 which does have a production string in it, casing string. We plan to re-enter.

Q Two wells will be re-entered?

A Yes, they will, and converted.

Q And re-converted?

A Recompleted or converted.

Q Now, into what formation do you propose to inject the

water in these injection wells?

A We propose to inject the water and confine it to the Premier Sand or the zone.

Q That's the Henshaw-Grayburg Pool?

A The West Hen -- I believe it's that --

Q The West Henshaw?

A I believe it is. The leases are now included in the West Henshaw.

Q Now, your application and I believe your testimony also shows that you would like to have the Order of approval show that you may obtain administrative approval of additional injection wells. What do you contemplate by this?

A Our plans are once the unit and the project is in operation and we obtain favorable response from a water injection, there is a portion in the center part of this unit that is undeveloped and we plan to drill new injection wells and possibly new producing wells, in which case we would like to be able to obtain administrative approval to complete any new well to convert to injection.

Q Is Tenneco seeking a project allowable for this waterflood project?

A Yes. We would like to obtain a project allowable for all of the acreage that is committed to the unit.

Q And that's in accordance with Rule 71-F of the

Commission?

A Yes.

Q Now, would that project allowable include the acreage of General American?

A If General American does not commit its acreage to the unit, it would not include their acreage.

Q In other words, it would only include the acreage, the working interests, which is committed to the unit?

A Yes, it would. It would be Mobil and Tenneco.

Q Now, if this unit agreement is approved and you go ahead with the waterflood project, in your opinion, would it be in the interest of conservation and the prevention of waste?

A Yes, it would.

Q And it would tend to promote the greatest ultimate recovery of the unitized substances?

A Yes, it would.

MR. HINKLE: We'd like to offer Exhibit A in evidence.

MR. NUTTER: Applicant's Exhibit A will be admitted in evidence.

(Whereupon, Applicant's Exhibit A was admitted in evidence.)

MR. HINKLE: That's all of the direct testimony.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Lacey, first of all, talking about this project allowable since that was about the last thing you were discussing. If General American's acreage remains uncommitted, of course, they would have to stand on their own when they put their flood in?

A Yes.

Q Now, let's see just what we have here. Would you refer to Exhibit 2 in your Exhibit A?

A Yes.

Q Up here in Section 7, it appears we would have three developed forty-acre tracts. In Section 18, we would have one, two, three, four, five, six.

A Right.

Q Section 19, we would have one. Section 8, you have one injection well there on the Mobil lease, correct?

A Right.

Q And Section 17, you would have one, two, three, four, is that correct?

A Right. This is correct.

Q So it appears that you have about fifteen forty-acre tracts in your project area.

A That are presently developed and we --

Q Nine of those would be injection wells and six of them would be producers.

A Yes, producers. And like I mentioned previously, we anticipate some additional development.

Q Evidently, that thin spot there in the Mobil dry hole in the northwest northwest of 17 discouraged development up in that area.

A Yes, it did.

Q Now, on your next page, where you mentioned that the required injection volume will be five and a half million barrels --

A Yes.

Q -- is this total water that will be injected over the life of the flood or is this the volume of the new water that will be required?

A This is the total volume of water that would be required. We anticipate that once we obtain response in some produced water that we would reinject it.

Q So the 750,000 barrels is the fill-up water or the initial water that's required?

A Right. I would anticipate that our make-up water would be, maybe, slightly more than that.

Q Now, actually, by comparison with some of the other floods, this anticipated secondary recovery is relatively low. Why would that be, in this case, Mr. Lacey? I mean -- Well, I beg your pardon. I beg your pardon. I was thinking that the 4.9 million was the cumulative production. That was the original oil in place.

A No. Our estimate of secondary recovery is substantially larger than what has been produced by primary.

Q I was comparing 900,000 to 4,900,000. I should compare 900,000 to 400,000.

A Yes. We feel that because of the lack of development in the center portion of this unit, that it's probably been pressure depleted, but oil was left behind.

Q Now, with respect to your schematic diagrams, I notice that the distance there on the first well from the packer down to the casing shoe is forty-four feet. On the next well, it's 48 feet, and so forth. It never exceeds 50 feet except in the case of one well, that is, 59, and I presume that you more or less follow this same pattern on the one well that doesn't have the casing in it at the present time.

A Yes. Yes, we would, Mr. Examiner.

Q I notice here on the exhibit, that is, Exhibit 16, that you show the packer to be set at 2680 and that the top

of the pay would be 2730, so your perforations would be approximately fifty feet below the packer or you'd set the packer approximately fifty feet above the uppermost perforation when this perforation is made.

A Yes.

Q And the annulus will be loaded. Do you plan to use cement or plastic coated tubing?

A I don't know exactly what we will use. I would anticipate that we would probably use cement lined or plastic coated.

Q Now, the annulus then can be either left open or equipped with a pressure gauge to detect leakage in the tubing or packer.

A Yes.

Q Some of these wells don't have any surface pipe in them, is this correct?

A Yes, some. I believe some of these wells are cable tools, were drilled with cable tools and I think some casing was set and pulled. We acquired, the Tenneco Oil Company properties were acquired from Leonard Oil Company and some cases or well records are not very clear, very complete.

Q Most of the wells have from four to 500 feet of surface pipe. However, this Haggerty Number 11, which is an old Leonard well, has no surface pipe. The Haggerty Number 12, an old

Leonard well, has no surface pipe. I guess those are the only two.

A Yes.

Q You don't know the top of the cement on those long strand --

A Well, like I stated previously, Mr. Examiner, we've calculated a theoretical top of cement. However, the well files that we acquired did not have temperature surveys run and there was no record of any actual measured --

Q The only way to do it would be to calculate the theoretical fill-up and that's using an actual fill-up without any safety factor.

A Now, this is a hundred percent fill factor.

Q Hundred percent fill factor.

A We wouldn't know what to use. But in all probability, the actual top would be somewhat lower than --

Q This is maximum theoretical fill-up?

A Right.

Q We may want to discuss these two wells with you prior to the conversion for water injection. There may be something that will be considered necessary on these two wells.

A Right.

MR. HINKLE: All right.

MR. NUTTER: Are there any other questions of

Mr. Lacey?

MR. HINKLE: I might ask Mr. Lacey another question here.

REDIRECT EXAMINATION

BY MR. HINKLE:

Q You testified that there was a possibility that you would drill additional wells and for production as well as injection in the event you got a good response from the water-flood project, those wells that are being drilled at the undrilled locations toward the center of the unit area.

If you should do this, would you anticipate that the recovery, of secondary recovery would be larger than you anticipated on Exhibit 3?

A No. The recovery estimates shown on exhibit, on the pertinent data sheet have included in them that possibility, these additional injection and producing wells to be drilled.

MR. HINKLE: That's all.

MR. NUTTER: That's based on the per acre feet of pay that you have indicated in here?

MR. LACEY: Yes, sir.

MR. NUTTER: Are there any other questions of the witness? He may be excused. Do you have anything further, Mr. Hinkle?

MR. HINKLE: No, that's all we have in these cases.

MR. NUTTER: Have you offered Exhibit A in these cases?

MR. HINKLE: I believe I did.

MR. NUTTER: Okay. Does anyone have anything they wish to offer in Case 3812 or 3813? We'll take the cases under advisement.

I N D E X

E X H I B I T

Number	Marked for Identification	Received in Evidence
Applicant's Exhibit A	2	14

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

I, CHARLOTTE MACIAS, 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 13th day of September, 1968.

Notary Public

My Commission Expires:

February 10, 1971.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3812-3813 heard by me on 7-24, 1968.

, Examiner
New Mexico Oil Conservation Commission