

BEFORE THE  
NEW MEXICO OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
July 10, 1974

EXAMINER HEARING

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IN THE MATTER OF: )

Application of Anadarko Production )  
Company, General American Oil Company ) CASE  
of Texas and Shenandoah Oil Corporation ) 5268  
for four waterflood projects, Eddy )  
County, New Mexico. )  
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BEFORE: Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the New Mexico Oil Conservation Commission: Thomas Derryberry, Esq.  
Legal Counsel for the Commission  
State Land Office Building  
Santa Fe, New Mexico

For the Applicants: Thomas W. Kellahin, Esq.  
KELLAHIN & FOX  
500 Don Gaspar  
Santa Fe, New Mexico

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E X H I B I T S

Marked

Admitted

Applicants' Exhibits 1 through 6 - 9

MR. NUTTER: The Hearing will come to order, please.  
We will call the next Case, Number 5268.

MR. DERRYBERRY: Case 5268, application of  
Anadarko Production Company, General American Oil Company of  
Texas and Shenandoah Oil Corporation for four waterflood  
projects, Eddy County, New Mexico.

MR. KELLAHIN: Tom Kellahin of Kellahin and Fox,  
appearing on behalf of the Applicants and I have one witness  
to be sworn.

(Whereupon, the witness was sworn.)

DANIEL G. KERNAGHAN

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you please state your name, by whom you are  
employed, and in what capacity?

A My name is Dan Kernaghan, I am employed by  
Anadarko Production Company as Division Evaluation Engineer.

Q And, you are appearing in this case representing  
not only Anadarko Production Company, but General American  
Oil Company of Texas and Shenandoah Oil Corporation?

A That is correct.

Q Have you previously testified before this Commission and had your qualifications as an expert made a matter of record?

A Yes, I have.

Q Are you familiar with the facts surrounding this proposed cooperative waterflood project?

A Yes.

MR. KELLAHIN: Are the witness's qualifications acceptable?

MR. NUTTER: Yes, they are.

BY MR. KELLAHIN:

Q Mr. Kernaghan, would you please refer to what has been marked as Applicant Exhibit No. 1, identify it and state briefly what the applicants are seeking.

A Okay, this Exhibit 1 is a plat showing the four projects, the total area is outlined in red and colored in yellow, and the four individual projects are shown as Roman numerals one, two, three and four. The plat also shows the surrounding area and the wells in that area. We are asking for permission to initiate waterflood projects using the injection well shown in red on these leases. It will be a cooperative project between Anadarko, General American and Shenandoah. This ties into an existing project

on the north half of Section 15, which is Anadarko's Federal R Lease, expansion of which is anticipated, but can be handled by administrative procedure.

Q This is a lease waterflood as opposed to a water-flood instituted in connection with a unit agreement?

A That is correct. The area to the north was largely developed on this same basis and we are continuing the same pattern as exists in the Square Lake Field.

Q Please refer to what has been marked as Exhibit Number 2 and identify it?

A Exhibit Number 2 is a similar plat showing the proposed injection wells in somewhat more detail, it gives a little clearer picture of the offsetting well.

Q Please refer to Exhibit 3 and summarize for us the production data.

A Okay, Exhibit 3 is production data from inception on all of the wells within the four projects. From the total area we have produced some 360 thousand barrels of oil since 1971 when the first well was completed. This amounts to 16,400 barrels per producing well. The wells are currently producing slightly less than 8 barrels per day per well. These wells are relatively new, they were completed in the — Grayburg and/or San Andres using large initial fracture

treatments. The wells came in typically somewhere between 50 and 100 barrels a day and declined very, very rapidly during the first year and are continuing to decline.

Q Please refer to what has been marked as Exhibit 4 and identify it?

A Exhibit 4 is the productive sections of the logs on the injection wells in the area, 10 injection wells. This shows the existing or proposed completion intervals in these wells.

Q Please refer to what has been marked at Exhibit 5 and identify it?

A Exhibit 5 is the diagrammatic sketch of the completion of the 10 enjection wells . We anticipate injecting somewhere around 300 barrels a day of a fresh and/or produced water mixture into these wells at approximately 2,000 pounds surface pressure. We are presently commingling the purchased fresh water and the produced water, but we intend to separate these in the near future. The same plant serving our leases in the Square Lake Field will serve this project.

Q What are your rates, or anticipated rates of injection?

A About 300 barrels a day.

Q Will this be under pressure or gravity?

A No, it will be under pressure.

Q What do you anticipate to be the life of this injection project?

A Approximately 7 years.

Q Please refer to what has been marked as Exhibit 6 and identify it?

A Exhibit 6 is the water contract with Double Eagle for the purchased water, stating that the water will consist exclusively of Ogallala water.

Q Are you aware of what the volume is of produced water now?

A It is somewhere in the neighborhood of several thousand barrels a day, but like I say, the same plant is serving -- the produced water from these leases is commingled with the produced water from our projects to the north and the same plant serves them all, so from the total area it is around several thousand barrels a day, two or three thousand, four thousand, or in that neighborhood. It warrants setting a separate pump for it. These leases themselves make somewhere in the neighborhood of 10 or 15 percent water.

Q Are you requesting administrative procedure whereby you may modify or expand the existing project, including the drilling of additional injection wells and/or producing wells

and the conversion of existing wells to injection, both orthodox locations and unorthodox locations without Notice of Hearing?

A Yes, we are.

Q Will this proposed waterflood project result in the recovery of oil that otherwise would not be recovered?

A Yes, it will.

Q Will the proposed waterflood project adversely affect the correlative rights of others?

A Not to our knowledge, no, it won't.

Q Were Exhibits 1 through 6 and their inclusive parts prepared by you directly or under your direction and supervision?

A Yes, they were.

Q In your opinion, Mr. Kernaghan, has production declined to such a point that you would recommend the instituting of the secondary recovery by waterflood at this point?

A Yes, it has, and we feel that now is the time to institute this waterflood. The indicated permeability of the Grayburg and San Andres through this area is less than that in the older surrounding areas as evidenced by the low productivity and natural completions through here. The



initial bottom-hole pressures when we started indicated that the area had lost somewhere in the neighborhood of one-third to 40 percent of its original pressure. We feel that this probably contributed to the low primary recovery and that waterflooding will in this case be more beneficial than it would be on wells of similar primary recovery had it encountered an original pressure.

Q In your opinion, then, can these proposed leases be successfully and economically waterflooded?

A Yes, they can.

MR. KELLAHIN: We move the introduction of Applicants' Exhibits 1 through 6.

MR. NUTTER: Applicants' Exhibits 1 through 6 will be admitted into evidence.

(Whereupon, Applicants' Exhibits 1 through 6 were admitted into evidence.)

MR. KELLAHIN: That concludes our direct examination.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Kernaghan, we have four waterflood projects here with three different operators involved, will each operator continue to operate his own leases?

A Yes, they will.

Q Now, this is a relatively new area insofar as development is concerned, where was the original development here?

A Anadarko's Well 1"A", Loco Hills Federal 1 "A" in location M of Section 15 --

Q (Interrupting) Section 10, I believe.

A Section 10, I'm sorry, was the first well of the recent development. That well was drilled and completed with a small treatment and was relatively unsuccessful and was re-entered something less than a year later and given a large fracture treatment which proved to be sufficiently successful that it instituted the development of the remainder of that lease and the surrounding leases.

Q Now the development in the Grayburg-Jackson Pool prior to that time was to the southwest, wasn't it?

A Yes, to the south and southwest.

Q Are there waterflood operations being conducted to the south and southwest at the present time?

A Yes, Anadarko had the Grayburg-Jackson unit which flooded the Premier and I believe the Metex zone also.

Q Could you indicate to us where the injection wells are that off set these proposed injection wells?

A That particular project did not off set these proposed injection wells. Windfohr Oil Company's Grayburg-Jackson-San Andres unit off sets Shenandoah's lease, but is flooding the Jackson zone of the San Andres. Now, General American will possibly put some water into the Jackson zone. Our wells don't go that deep. Shenandoah does not intend to at the present time.

Q Then you mentioned a waterflood project in the Square Lake to the north, but there is no direct waterflooding going on off setting this acreage, is there?

A Location "B" of Section 10 is a water injection well.

Q Is that Number 7?

A Yes, our Federal R Number 7. The entire section to the north of that, Section 3 is under flood. Section 2 is Anadarko's Burnham Grayburg-San Andres unit on which water injection started here just a few months ago. In the township to the north, Sections 33, 34, 35, 36, 27, 26, all contain water injection wells, so it is rather complete up through that area, but the nearest injection well in the comparable zone is Well Number 7, is our 7.

Q So as of right now it is not a direct off set to the existing project?

A That's right, in a correlative zone.

MR. NUTTER: Are there any other questions of Mr. Kernaghan? You may be excused.

Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 5268?

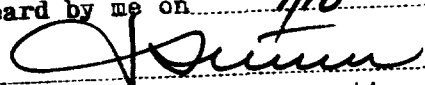
We will take the Case under advisement.

STATE OF NEW MEXICO )  
 ) SS.  
COUNTY OF SANTA FE )

I, RICHARD L. NYE, Court Reporter, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me, and the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

  
RICHARD L. NYE, Court Reporter

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 5268, heard by me on 7/10, 19 74.

  
\_\_\_\_\_, Examiner  
New Mexico Oil Conservation Commission