BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
CONFERENCE ROOM, STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO

July 25, 1973

EXAMINER HEARING

IN THE MATTER OF:	
Application of Anadarko Production Company for a waterflood project, Eddy, County, New Mexico.	Case No. 5032

BEFORE: Richard L. Stamets,
Examiner.

TRANSCRIPT OF HEARING

MR. STAMETS: The hearing will come to order, please. We will call next Case 5032: Application of Anadarko Production Company for a waterflood project, Eddy County, New Mexico.

MR. KELLAHIN: Tom Kellahin, of Kellahin and Fox, Santa Fe, appearing on behalf of the Applicant, Anadarko Production Company. I have one witness to be sworn.

MR. STAMETS: Are there any other appearances in this case?

(No response)

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DANIEL KERNAGHAN,

was called as a witness, and after being duly sworn according to law, testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A Daniel Kernaghan, and I am employed by Anadarko Production Company as a division evaluation engineer.

Q Have you previously testified before the Commission?

A No.

Q Will you state briefly your educational and employment background?

A I graduated from the Colorado School of Mines with a

degree in petroleum engineering in 1957. Since that time, I have worked as a petroleum engineer for Atlantic Refining Company, Sinclair Oil Company, and Anadarko.

Q Are you familiar with the Burnham Grayburg-San Andres unit?

A Yes.

Q Have you made a study of the feasibility of a waterflood project for this unit?

A Yes, sir.

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

MR. STAMETS: Yes.

Q (By Mr. Kellahin) Will you state briefly what Anadarko seeks by way of this application?

A Anadarko seeks authority to institute a waterflood project in its Burnham GSA Unit Area by the injection of water into the Grayburg-San Andres formation through six wells in Section 2, Township 17 South, Range 30 East, Square Lake Pool, Eddy County, New Mexico.

These six wells are colored-- circled and colored in red on Exhibit One. Our unit is outlined in green on this exhibit. This is one hundred percent Anadarko working interest, and all State acreage.

Q This is New Mexico State land?

A Yes.

Q Will you please refer to what has been marked as Applicant's Exhibit Two and identify it, please, and state what information it contains?

A This is a map of the area that shows a little clearer the surrounding injection projects than does Exhibit One. The injection wells are marked with a circle and an arrow. You can see that we are bounded on the west by Anadarko's Federal "KK" Project and further to the west by our Federal "Q" and Federal "JJ". We are bounded in the southwest by our Federal "R".

All of these are approved projects, and are active at this time. Immediately to the north is an abandoned hole on the J. C. Thompson lease.

Q Of your six proposed injection wells, are these all former production wells?

A Yes.

Q What formation are they producing from?

A From the Grayburg and San Andres.

Q What is your proposed injection formation?

A The Grayburg and Lovington zones.

Q Will you please refer to what has been marked as Applicant's Exhibit Three-A through Three-F, and let's take Three-A first, and will you describe in general terms what information this exhibit contains?

A These exhibits contain the current or proposed completions

of our injection wells.

Q Are all these schematics identical?

A No, they are not. They vary somewhat from well to well. In five of the six cases, there is a liner running essentially through the zones perforated.

Q Do all of the schematics reflect the perforations that presently exist in each well?

A Yes.

Q Is the data contained on each schematic indicative of the proposed manner in which each particular injection well will be completed?

A Yes.

Q Does each schematic show the size of the tubing and the setting depth and the amount of cement to be used?

A Yes.

Q Do all the schematics indicate a pressure gauge at the surface?

A They do.

Q Do all the schematics show the setting for the packer and the depth for the packer?

A They show either the current setting or how they will be set.

Q And will all of the annulus of each injection well be filled with inert liquid?

A Yes.

Q Do you intend to use coated tubing or plastic-lined tubing?

A No, we don't. This plan is also serving the other projects to the west, and we are inhibiting this water.

Q Will the means of protection from corrosion be adequate in the offsetting waterflood projects?

A Yes. If this runs into problems, we will take alternate steps.

Q In the event you discover some problems with your casing, what, in that event, do you intend to do?

A We will run plastic-coated tubing. It is the general practice in most of our flood projects to use plastic-coated tubing.

Q Will you please refer to what has been marked as Applicant's Exhibit Four-A through Four-F and identify what this exhibit is?

A These are sections of the logs of the injection wells showing the pay intervals and the area above.

Q The perforations are not on the logs?

A No, they are not on the logs. They are schematics. The zones are identified in a general fashion on the logs, the pay zones.

Q What has been the primary recovery for the unit area up to this time?

A About 640,000 barrels.

Q What do you anticipate will be the secondary recovery by way of waterflood?
A About 500,000 barrels.
Q Let's refer now to Exhibits Five-A through Five-J. On these, have you supplied some production data for the unit?
A Exhibits Five-A through Five-J are graphs of the wells or the groups of wells within the unit. The exhibits contain production history, yearly production since inception.
Q What is your current rate of production on each of your proposed injection wells?
A The current rate of production from each of the injection wells?
Q Yes, sir.
A Do you want the total?
Q Yes.
A One-one is making about 4 barrels a day. One-three is making about 15. Two-two is shut in, and is completed as an injection well already. Four-one is making about 5 barrels a day. Five-one is shut in, and is currently completed as an injection well. Four-two is shut in. These wells have all been recently stimulated and field work has been completed with the exception of running the injection tubing into the three wells that are

producing. But all of the wells have had liner work done on them, and they have been stimulated and cleaned out,and production is up considerably from what it was last year.

Q In your opinion, Mr. Kernaghan, has production declined to such a point that your recommendation would be the institution of secondary recovery by waterflood?

A Yes, it is. Most of the wells are shut in, and the majority of them were shut in prior to the time we did this work.

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

A Yes.

Q Would waterflood adversely affect the correlative rights of others?

A No, I don't believe it will. We have been negotiating for cooperation along our lease lines, and we are close to that point.

Q Please refer to Exhibit Six, and identify this, please.

A Exhibit Six is our water contract with Double Eagle covering the water supply for the project.

Q What is your anticipated volume of injected water?

A About 2,400 barrels, or 400 barrels a day per well.

Q Do you anticipate injecting the water under pressure?

A Yes, under 1800 to 200 pounds of pressure.

Q What do you anticipate the life of this particular project will be?

A The life of this project will be approximately eight to ten years.

Q Do you anticipate the re-injection of any produced water?

A Yes, we do. We are currently commingling the produced water and injecting a mixture.

Q Were Exhibits One through Six either prepared by you directly or compiled under your direction and supervision?

A Yes, they were.

MR. KELLAHIN: We move for the introduction of Applicant's Exhibits One through Six, and all their parts.

MR. STAMETS: Without objection, Applicant's Exhibits One through Six will be admitted into evidence.

(Whereupon Applicant's Exhibits One through Six were admitted in evidence.)

MR. KELLAHIN: I have no further questions on direct examination.

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CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Kernaghan, is it your opinion that all of the injection wells will be sufficiently cased and cemented to adequately protect the formations from the 1800 to 200 pound injection pressure?

A Yes, sir. I feel that we have gone to quite a bit of pains here to get them protected. We even pulled the liner on one well and replaced it with a longer liner at considerable expense.

All the wells have the new liner within them,with the exception of one well that had casing all the way into the Lovington anyway.

Q Have you personally been to the oil field in this area and inspected any of Anadarko's installations in the area?

A I've been there, but I'm not an authority on that.

Q So you couldn't tell me whether Anadarko is using pressure gauges on injection wells, and whether these pressure gauges are working?

A No, sir.

Q You have had experience with pressure gauges on injection wells for a long period of time, have you not?

A Yes, sir.

Q In your experience, have you found that these gauges continue to operate satisfactorily over long periods of time?

A Not if they are left on the well.

Q Does Anadarko use a pressure gauge that is portable?

A It is my understanding that we do. This would be, I feel, a generally accepted practice of good operations.

Q Do you know how often Anadarko's policy is for their pumpers to take pressure on the annulur space in these wells?
A No, I don't.
Q Would you furnish that information to the Examiner?
A Yes, I will. Would a letter from our superintendent be satisfactory?
Q Yes. In your opinion, is there a more foolproof, easy-to-see, attention-attracting method of determining leakage in the annulur space?
A If the well heads are above ground, if the head is visible, the space can be left open through a nipple, and water flow would show up in that manner.
Q Would such a flow be a tremendous volume in a short period of time, or would you expect just a slow leakage to occur?
A I would anticipate significant volume.
Q So you would be pumping out quite a volume of water?
A Yes, although the wells are visited every day.
Q So there would be problems in leaving the annulur space open as well?
A In some cases, there would be.
Q Do you suppose there would be any reasonable way to rig a well so that if a leak occurred in the annulur space that injection would be shut off to that well?

A I don't think it would be an insurmountable task to require a valve of some sort that would be actuated by pressure at the surface. However, I am not an authority on the expense of such a device.

Q You you have any information to furnish the Commission along that line, it would be certainly appreciated at the same time you supply the information on your actual field policy.

A Yes, we will be glad to do that.

Q I understand from your testimony that there is a central plant you intend to use that is already in operation?

A That's right.

MR. STAMETS: Are there any questions of this witness?

(No response)

MR. STAMETS: If not, the witness may be excused.

(Witness excused.)

MR. STAMETS: Do you have anything further to offer in this case?

MR. KELLAHIN: Nothing further.

MR. STAMETS: Are there any other appearances or any statements in Case 5032?

(No response)

MR. STAMETS: The case will be taken under advisement.

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STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, RICHARD E. McCORMICK, a Certified Shorthand Reporter, 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.

Richard E. McCormick
CERTIFIED SHORTHAND REPORTER

I do certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 5032 heard by me on July 25, 1973.
Richard L. Stamets

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