BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
March 10, 1965

EXAMINER HEARING

IN THE MATTER OF:

APPLICATION OF CARTER FOUNDATION PRODUCTION COMPANY FOR A WATERFLOOD PROJECT, LEA COUNTY, NEW MEXICO

Case No. 3214

BEFORE:

ELVIS A. UTZ

TRANSCRIPT OF HEARING

MR. UTZ: Case 3214.

MR. DURRETT: Application of Carter Foundation Production Company for a waterflood project, Lea County, New Mexico.

MR. McKENNA: My name is Tom McKenna, with McKenna & Sommer, Santa Fe, appearing on behalf of the applicant; and I have one witness, Mr. Ven O. White.

* * *

V E N O. W H I T E, the witness, having been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. McKENNA:

Q What is your full name?

A Ven O. White.

Q By whom are you employed?

A Employed by Robert D. Fitting & Associates in Midland.

Q What are they--what do they do?

A We are a firm of consulting engineers, doing engineer work for Carter Foundation Production Company.

Q And you are employed at Midland?

A Yes.

Q What position do you have with Mr. Fitting & Associates?

A I am classified as a reservoir engineer.

Q Have you testified before this Commission in the past?

A No, I have not.

Q Would you give the Examiner and Commissioners a brief rundown of your education and experience.

A I graduated from the University of Houston in 1962 with a B.S. in Petroleum Engineering. I worked for Atlantic Refining Company in Midland for two years, in the reservoir department. I was with Forrest Oil Corporation for six years in Midland, in the secondary recovery department, and have been with Mr. Fitting for almost five years.

MR. McKENNA: Mr. Examiner, I ask if the qualifications of the witness meet the approval of the Commission.

MR. UTZ: Yes, sir.

MR. McKENNA: Mr. White, are you familiar with this application and the subject matter thereof?

A Yes, I am.

Q Can you briefly explain to the Examiner and the Commissioners the purpose of Case Number 3214, and this application by Carter Foundation Production Company.

A The application is made for permission to inject water into the Simpson Formation in two wells on the Carter Foundation Production Company Hill Lease located in Section 34

of Township 23 South, Range 37 East. The production from the Simpson wells on this particular lease is averaging less than seven barrels per well per day, and all wells are on gas lift.

Q Mr. White, have you prepared some exhibits or have exhibits been prepared under your direction in this case, with this application?

A Yes, they have.

Q I hand you what has been identified as Exhibits 1 through 5. Are these the ones that have been prepared by you or under your supervision?

A They are.

Q Would you explain those to the Commission, please, Mr. White.

A There are two plans in the exhibit that were not furnished with the application--a structure map and an isopach map. Exhibit 1 is an area map showing all wells in the vicinity of the subject lease that are producing or have been producing. Exhibit 1, the areal map, shows all wells that are producing or have produced, and the formations from which these have produced oil or gas. Exhibit 2 is a structure map on a marker at the top of the McKee Sand which indicates a north-south trending anticline with production being limited on the east by what appears to be a fault. Exhibit 3 is an isopachous map of the McKee Sands themselves. Production to

the north and west of the subject lease is limited by an absence of sand, so that the structure does not necessarily control the limits of the production--it is limited by the sand development itself. The lease to the north of Carter's Hill lease was produced by Gulf but has been abandoned for approximately a year, or there has been no production from it in the past year. We would like to get permission to inject water into the wells Number 2M and 3MD in an attempt to re-pressure the Simpson formation under this particular lease. It isn't a waterflood as such because we're not going to make any attempt to make a pattern flood. What it will be is more of a pressure maintenance operation.

Q How many wells do you have on the lease?

A Six wells have produced from the Simpson formation on this lease. There are five producing at the present time.

Q Now, Mr. White, if you would take a look at your Exhibits 4 and 5 which are diagramatic sketches, and explain in detail how the proposed project will work.

A We propose to run tubing on packers in the wells, set above the perforations in the McKee Sands, and inject water into them in the manner shown on the schematic diagram here.

Q Would you go into a little more detail, Mr. White. Is there anything in addition that you want to say about the proposed project, and how you plan to put it into effect?

A The source of water that we plan to use is produced Ellenburger water from the Hill lease. The McKee Sand itself is very consolidated, fine grain sand and does contain considerable clays that are readily hydrated by fresh water. We had to find a source of water that was saline in an attempt to prevent hydration of the clays in the sand itself, and the Ellenburger water was the only source we could find. We have run Reda pumps in to the Ellenburger wells and are recovering oil from the Ellenburger that would not be recovered had we not been able to find a use for the water, so the project will serve a two-fold purpose in getting additional oil recovery from the field. We will get additional oil from the Ellenburger by being able to produce it for a source of water for the McKee, and hope to increase reservoir pressure in the McKee formation and in the Simpson formation itself, in order to stimulate production in the presently producing well.

MR. PORTER: Do you expect to carry the Ellenburger to a lower economic limit?

A Yes. At the time we ran a pump in the west well there was only one Ellenburger well producing--it was making 20 to 25 barrels of oil per day and about 125 of water. We do have two wells producing now, averaging between 200 and 250 barrels of oil per day.

MR. McKENNA: What has been the past production on

these wells? How much have you recovered?

A The lease has recovered 467,000 barrels.

MR. PORTER: Is that from the Simpson?

A Yes, sir.

MR. McKENNA: And how much do you estimate you will recover by virtue of the secondary program for which you are asking approval today?

A If the program is successful we should be able to match the primary recovery--at least, volume calculations indicate that there should be on the order of 15,000,000 barrels in the McKee in original oil in place in the formation. The total production from the area of the field that we are interested in has been 531,000 barrels. That does include oil produced by the Atlantic Refining Company on the Goins lease, so the recovery from the McKee hasn't been but from three to five% of the original pile. If we can match primary recovery it will be a successful operation, but the chances of exceeding primary if the project works, is very good.

Q So you would say on the basis of the feasibility study, that you have a reasonable expectation of one-to-one recovery?

A Yes.

Q Do you have any idea or do you have an estimate of the flood life of the program?

A I would say the life of the program would be a minimum of ten years.

Q Assuming that approval was given for injection, do you have any idea when you might get some response?

A We should get an indication of response in our Well Number 3M, or 3 EM, it is. It is drilled on the same proration unit the 2M will be injecting into. I think there's not but about 100 feet between the two wells, and we should be able to pick up an indication of stimulation very rapidly, although it will probably take from a year to a year and a half to get maximum stimulation from the area.

Q So it would be your estimate that the peak of the program should be a year to a year and a half?

A Yes.

Q Would it be your opinion, based upon past production, geology and current status of production, that this is a favorable program--that it will work?

A Yes, I believe it will work.

Q Do you have an opinion as to whether or not this would be in keeping with principles of conservation and economics of the oil business?

A I certainly do. There will be much additional oil recovered that would be otherwise left in the ground and wasted if the program isn't put in, in both the Ellenburger

and the Simpson formations.

Q Do you see any injuries to any correlative rights that may occur under this program?

A No, none at all.

Q Is there anything else you wish to tell the Commission concerning the proposed program? Do you wish to make any further reference to your exhibits or any further reference to your plan for the project?

A No, I feel it has been pretty well covered. If there are any questions, I would be glad to answer them for the Commission.

Q What is the formation which is immediately above the Simpson? Is that the Devonian?

A The next producing is the Devonian.

Q Do you think there is any possibility of injury to this formation by virtue of the proposed program?

A No, sir.

Q Do you feel there is any possibility of injury to any formations which might lie below the proposed project?

A No.

MR. McKENNA: Mr. Examiner, are there any questions of the witness?

MR. UTZ: Do you want to offer your exhibits in evidence?

MR. McKENNA: I will offer Exhibits 1 through 5, inclusive.

MR. UTZ: Without objection, Exhibits 1 through 5 are entered into the record of this case.

CROSS-EXAMINATION

BY MR. UTZ:

Q What size tubing do you intend to install in these injection wells?

A I have 2½-inch tubing for one well, and 2-inch for the second.

Q Which is which?

A The 3ND should have the 2½-inch.

Q Will this tubing be internally plastic coated?

A We do have 2½-inch tubing, plastic coated; the two-inch isn't at this time. For pilot injection purposes we felt we could use bare tubing until we established the pattern of injection that we would be able to maintain. The production history of the Ellenburger itself hasn't indicated that the water is excessively corrosive. I mean, it's a brine water; it's very heavy and as far as being corrosive, we observed no appreciable amount of difficulty with it. We felt that we could use the two-inch tubing bare just for the pilot operation.

Q How long do you anticipate the pilot operation will

take?

A Not in excess of a year.

Q How many Ellenburger wells do you have that you were going to use produced water from?

A We have two.

Q The 1E and the 2E?

A Yes, sir.

MR. UTZ: Are there other questions of the witness?

MR. PORTER: I have one or two. When were these wells drilled?

A In the late forties and early fifties. The first production from the McKee was in 1952.

Q And there were no multiple completions at that time?

A No duals, no, sir.

Q You had wells drilled to the Ellenburger and others to the Simpson. Judging from your cumulative production for the Carter wells of 467,000, how many wells does that represent?

A That represents six wells.

Q I assume that probably some of those wells haven't paid out?

A Some of the wells have produced from various horizons. The 3MD well was drilled to the Ellenburger and was wet in the Ellenburger, and then completed in the McKee and abandoned in 1958 in the McKee, and produced from the Devonian

for a short period of time.

Q You say the primary recovery is only about five per cent?

A It appears to be in the neighborhood of five per cent.

Q Why do you think it was so low? A real tight formation, lack of reservoir energy, or--

A It was a solution gas drive. The solution gas was rather low, and actually production of the McKee itself has been most difficult--it's very unconsolidated sand and it's nearly impossible to put them on pump, and we found that gas life is about the only feasible way to produce them.

MR. IRBY: Frank Irby, State Engineer's Office. Mr. White, you said the anticipated life of the project was a minimum of ten years. What is your maximum estimate?

A If the recovery exceeds the primary recovery by a factor of two or three, I would say the time would be multiplied in the same manner--I would say twenty to thirty years, if we could keep it going that long.

Q You don't anticipate that the secondary will exceed the primary by more than a factor of three, then?

A Actually there's no way of telling. Using a factor of three is almost unheard of. A one-to-one is more or less a rule of thumb that has been followed for years. When I was with Forrest we evaluated a number of fluids that we had

operating and average anticipated recovery from sixty to seventy different fluids averaged one-to-one, and some of them were as low as only 50% of primary. Some of them were in excess of primary, but those were the exception rather than the rule. The one-to-one is just an average.

Q In your best professional judgment would the factor exceed three?

A I don't believe it would; no, sir.

Q Thank you. Now, you stated that the pilot operation would probably be in excess of one year. How much in excess of one year?

A As far as the pilot operation itself is concerned, I think it could be terminated by the end of a year. I think our maximum stimulation could be obtained in a year to a year and a half, but by the end of a year we should be able to tell whether or not the project will be successful.

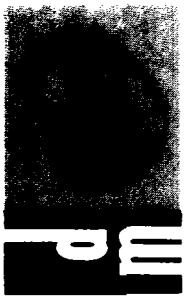
Q Now, you said you intended to use this bare tubing in the well where you have the two-inch tubing?

A Yes, sir.

Q --Until the end of the pilot. Now, at the end of the pilot what do you propose to do about the tubing?

A If the program is continued the tubing will be lined.

Q How old is this tubing now, and what condition is it in?



A I would say it is approximately ten years old--ten to twelve years old, and is in good shape.

MR. IRBY: Thank you.

REDIRECT EXAMINATION

BY MR. McKENNA:

Q You have reached your conclusion as to the coating based upon economic factors, is that correct--is that part of the--

A That's part of the reason.

Q What would you estimate it would cost to coat the tubing in the well which is not coated at this time?

A It would run three to four thousand dollars.

Q However, your opinion, and the way you intend to proceed, is also predicated upon engineering viewpoints and feasibility studies you have made as to the project, is that correct?

A That's right.

MR. McKENNA: No further questions.

RECROSS-EXAMINATION

BY MR. DURRETT:

Q I have a question. Mr. White, you stated on direct, I believe, that the average production per well was approximately seven barrels per day?

A Yes, sir.

Q What is the best well making?

A We have a test unit in operation at the present time, testing all the wells before the program is started, and about three weeks ago we got a 22-barrel test from one well.

Q Which one was that?

A That was the Number 1, I believe--Number 1M. Now, it was re-tested again last week for 14 barrels. The production has increased somewhat after we ran a Reda pump in one of the Ellenburger wells, because we have additional gas available for lift. That has been one problem we have been having to contend with.

Q Which well is the Reda pump in?

A The 1E and the 2E, we plan to use as the source wells.

Q Those are the two source wells for water, is that correct?

A Yes.

Q I'm having a little trouble with the plat, as far as reading it. You will put on the 2M and 3MD?

A Yes, sir.

Q --Which will be your production wells. You initially will expect a response in the 3E, is that correct?

A Yes, sir.

Q And then where will be your other production wells in that area?

A The 1M and 4M are--they should receive stimulation before the 5M. The 5M is quite far removed from the injection.

Q That 3E--you expect it to water out fairly early, don't you?

A Yes.

Q And then just continue flooding on toward the direction of the 5M, is that your plan?

A Yes, it is.

Q And you do anticipate putting on additional wells after they receive a response, if your project looks like it's going to be successful?

A If we can maintain pressure--stimulate pressure in the formation with these two wells sufficiently, it wouldn't require any additional injection wells. We are not attempting a pattern flood; it's more of a re-pressuring attempt.

Q Your thinking is that these probably will be the only two injection wells?

A It's quite possible.

Q One other question. Do you have or have you conducted a water analysis on water that will come out of your producers?

A Yes. We have furnished Mr. Irby with a copy of it.

MR. DURRETT: Does the Commission have a copy of it?

MR. IRBY: I don't think so.

MR. DURRETT: Could you send us one of those?

MR. WHITE: Yes.

MR. McKENNA: Have you furnished the Commission also with logs on these wells?

MR. WHITE: Logs on the two proposed injection wells have been furnished.

MR. McKENNA: Furnished to the Commission?

MR. WHITE: Yes.

MR. UTZ: Are there other questions? ... The witness may be excused. Are there any other statements in this case? The case will be taken under advisement.

* * *

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ELIZABETH K. HALE, Notary Public and Court Reporter, do hereby certify that the proceedings in the foregoing case were taken and transcribed by me, and that the foregoing is a true and correct transcript of proceedings to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF, my hand and seal of office this 21st day of March, 1965.

Notary Public

My commission expires

May 23, 1968.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3214, heard by me on March 22, 1965.

New Mexico Oil Conservation Commission