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

May 27, 1964

EXAMINER HEARING

IN THE MATTER OF:

Application of Frank Darden for a water-
flood, Eddy County, New Mexico. Applicant,
in the above-styled cause, seeks authority
to institute a waterflood project in the
Artesia Pool in his Cowtown Unit Area, by
the injection of water into the Grayburg
formation through two injection wells in
Sections 13 and 24, Township 18 South,
Range 28 East, Eddy County, New Mexico.

Case No. 3060

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING



MR. UTZ: We will call next Case 3060.

MR. DURRETT: Application of Frank Darden for a water-flood, Eddy County, New Mexico.

MR. MORRIS: Mr. Examiner, please let the record show my appearance as in the preceding case. Mr. Darden will be the witness in this case, and let the record also show that he has been previously sworn.

At the outset of this case I would like to move that this case be readvertised in order to include authority for Mr. Darden to inject water into the San Andres zone as well as into the Grayburg, to which formation the advertisement is presently limited. The Artesia Pool has as its vertical limits the Queen, Grayburg and San Andres formations, and perhaps the advertisement would be broad enough to cover our request, but to avoid any possible conflict, we would move that the case be readvertised.

We would request, however, that since Mr. Darden is present, that he be permitted to present his case both as to the Grayburg and San Andres formations at this time. We have the further complication in this case that up to this time we have not been able to furnish the Office of the State Engineer with the information that he desires concerning this case. Since the case has to be readvertised, assuming that our motion in that respect will be granted, we would request that we be allowed to go ahead and

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present our case today and present to Mr. Irby copies of our exhibits in support of our case, and then if the State Engineer's office has any further question or any objection to our proposal we can either work it out with that office informally or Mr. Darden can be present when this case is brought up upon recall or readvertisement. If that procedure is suitable with the Examiner, we are ready to proceed at this time.

MR. UTZ: Off the record.

(Whereupon, a discussion was held off the record.)

MR. UTZ: Case 3060 will be advertised for the July 1st hearing to include the San Andres as well as the Grayburg formation for injection in the Artesia Pool, and you may give your testimony that you have available at the present time with the stipulation that Mr. Darden will be present at the July 1st hearing for any cross examination if the matter isn't settled satisfactorily before then.

MR. MORRIS: Fine.

FRANK DARDEN

called as a witness, having been previously duly sworn on oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Darden, what is it that you seek by your application



in Case 3060?

A We seek authority to institute a waterflood project in the Artesia Pool in the proposed Cowntown Unit Area by the injection of water into the Grayburg and San Andres formations through two injection wells in Sections 13 and 24, Township 18 South, Range 28 East, Eddy County, New Mexico.

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

Q Referring now, Mr. Darden, to what has been marked as Exhibit 1 in this case, would you state what it is and what it shows?

A Yes, sir. Exhibit 1 shows the outline of the Cowntown Unit in Sections 13 and 24, 18 South, 28 East, Eddy County, New Mexico, with the location of the producing wells thereon. It also shows the present active water injection wells operated by Waterflood Associates and International Oil and Gas Corporation in Section 14. The active injection wells are designated by circles with a solid line between the circles.

The proposed injection pattern for the Cowntown Unit is marked by a dashed line showing the proposed injection wells thereon.

Q Mr. Darden, you've got a few proposed injection wells that lie outside of the Cowntown Unit Area. Are these tentative



locations for those wells?

A That is correct.

Q And the only two that we are concerned with here today are those two wells lying within the Cowtown Unit Area?

A That's right.

Q I gather from looking at this plat that your proposed waterflood would be an extension of the pattern in existence on the Waterflood Associates' properties to the west of your unit?

A That is correct.

Q Would you identify the two injection wells within the Cowtown Unit Area and give their location by footage, if you have that available?

A Yes, sir. The Ohio State Well No. 1, which is located 660 feet from the South line and 1980 feet from the West line of Section 13, Township 13 South, Range 28 East, and the Magnolia State Well No. 2, located 1650 feet from the North line and 330 feet from the West line of Section 24, Township 13 South, Range 28 East.

Q Refer now, Mr. Darden, to your Exhibit No. 2 and state what it is and what it shows.

MR. UTZ: The operator's name on those two wells would be Darden, would it not?

A Yes, sir. Exhibit No. 2 is a cross section which shows



the geologic correlation and mechanical condition of certain wells in the area of the Cowntown Unit, including the two proposed injection wells. It shows one of the currently active injection wells of Waterflood Associates, their State 14 No. 3, and shows the correlation of the productive zone from that well to the Magnolia State No. 2 well, the Brown No. 2 well, the Ohio State No. 1 well, all within the proposed Cowntown Unit, and the Frank Darden Travis No. 1 well, which will be outside the unit area.

Q This cross section also shows the various productive horizons in this area, does it not?

A Yes, sir.

Q Would you describe those and how they appear in these various wells shown on your cross section?

A All of the wells in the Cowntown Unit are completed in the Jackson zone of the San Andres, and several of them are completed in zones off the Grayburg.

As can be seen from Exhibit No. 2, the Premier zone appears to be a continuous zone of productivity extending from the present waterflood in Section 1 onto the proposed unit. There are other zones in the Grayburg above the Premier zone which have been opened in various wells, but may not necessarily have enough continuity for effective waterflooding. There are no wells, to my knowledge, on the Waterflood Associates' leases that are completed in the



San Andres. However, it is my understanding that International Oil and Gas has two wells, their No. 1-25 and No. 1-29, located in the East Half of the Northeast Quarter of Section 23, Township 18 South, 28 East, that are completed in zones of the San Andres as well as the Grayburg.

Q Does your cross section also show the physical installation of your two proposed injection wells at the present time, and also show how they might be modified for injection purposes?

A Yes, sir. It shows the position of the casing seat and the size of casing in each of these wells, and shows the zone which is presently open in both wells. The Magnolia State No. 2 is completed in the Jackson zone as an open hole completion, and through perforated casing in the Premier zone. The Ohio State No. 1 is completed at this time only in the open hole Jackson section. However, since the preparation of this cross section, we have run a gamma ray-neutron log in the Ohio State No. 1 and have found that the Premier zone indicates sufficient porosity so that we intend to perforate it in the near future.

Q How much open hole do you have in each of these two wells below the shoe of the casing?

A The Magnolia State No. 2 has 5 1/2" casing set at 2867 feet. The total depth is at 2903 feet, so we have 36 feet of open hole in that well. The Ohio State No. 1 has 5 1/2" casing set at



2896 feet, and the total depth of the well is 2950 feet, so we have 54 feet of open hole in this well.

Q As to the producing wells within your proposed project area, Mr. Darden, are those wells all presently open to both the Grayburg and San Andres formations?

A No, sir, they are not. However, we are planning to run gamma ray-neutron logs in the wells which have not been opened in the Grayburg zone, and where the neutron log indicates sufficient porosity we intend to open them by perforating the casing.

Q In other words, where practicable, both the Grayburg and San Andres formations will be opened in all of your producing wells?

A Yes, sir.

Q As well as in these two injection wells?

A Yes, sir.

Q Do you have some information to present to the Examiner concerning the production history of the wells in this area and the present status of these wells from a production standpoint?

A Presently the wells in the Cowtown Unit are producing an average of three barrels per well per day. To January 1st, 1964, these leases had produced a total of 216,377 barrels.

Q Based upon the present status of these wells, Mr. Darden, would you say that this area is ripe for waterflooding?



A Yes, sir.

Q And that these wells are properly to be considered strip-per production?

A Yes, sir.

Q What is your proposal for the injection of water into these two proposed injection wells?

A Well, we intend to first test the casing in each of these injection wells to be sure that it is ample protection against any communication with zones other than the productive zones we intend to flood, and then we intend to inject down the casing into both Grayburg and San Andres zones simultaneously. As the flood progresses we will make periodic surveys as to the efficiency of injection into the respective zones. If we should find that one zone is not taking economic volumes of injection water, we may find it necessary to go to dual injection, utilizing a higher injection pressure for one zone than for the other.

Q At this time there's no way to tell whether that possibility will become a reality or not, is there?

A No, sir, there isn't, because to my knowledge there has been no flood in the Jackson zone of the San Andres to this time.

Q What pressures do you anticipate for your injection, Mr. Darden?

A Well, we would expect the wells to take water initially



at essentially no pressure, but that after reaching fill-up we would anticipate a maximum injection pressure of 2,000 pounds per square inch.

Q At what rate would you expect to inject water into each of these wells?

A We are hopeful that we will be able to achieve injection rates of approximately 500 barrels per well per day.

Q Do you have any estimate of the total amount of water required for your project?

A I would estimate somewhere in the neighborhood of a million and a half barrels of water.

Q What will be your source of water?

A We will probably purchase water from the Caprock Water Company, who is delivering water to the offsetting waterflood project at this time.

Q Mr. Darden, in your opinion will your proposed installation adequately protect fresh water zones in the area, if any, and other productive zones?

A Yes, sir.

Q Do you know whether there are any fresh water zones in this area?

A No, sir, I do not. I know that from the general area the presence of any continuous fresh water horizon is very doubtful.



We made an extensive search for a shallow water supply when I was with Newmont Oil Company prior to forming the Yucca Water Company, which necessitated the building of approximately twenty-six miles of pipeline in order to get water to Loco Hills, and at that time we were not able to find any source of water in the area which appeared to have sufficient continuity or productivity to be useful as a source of water.

Q That was in this general area?

A Yes, sir.

Q What negotiations have you had, Mr. Darden, with your offset operators concerning your proposed waterflood project?

A We have had informal conversation concerning the feasibility of leaseline cooperation and the continuation of the pattern which has been established by Waterflood Associates and International Oil and Gas Corporation.

Q Have you received any objection from your offset operators to this proposal?

A No, sir.

Q Do you have an opinion concerning the effectiveness of your proposal in the protection of the correlative rights of all involved?

A We believe that this pattern that we're proposing will protect correlative rights adequately.



Q What benefits do you expect to derive from this project?

A We expect the waterflood development of this property to generate a volume of secondary oil approximately equivalent to the volume which has been produced by primary operations, that is in the order of 200,000 barrels.

Q Were Exhibits 1 and 2 prepared by you or under your direction?

A Yes, sir.

MR. MORRIS: We offer 1 and 2 into evidence at this time.

MR. UTZ: Without objection, Exhibits 1 and 2 will be entered into the record.

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

MR. MORRIS: That's all I have of Mr. Darden at this point.

CROSS EXAMINATION

BY MR. UTZ:

Q How old are the two wells that you propose to inject water into?

A The Ohio State well was completed in June of 1948. The Magnolia State No. 2 was completed in March of 1956.

Q Do you know whether or not the casing that was put in



these wells was new at the time the well was completed?

A All of the information we have indicates it was new casing.

Q Would it be your intention to pressure test this casing before injecting?

A Yes, sir.

Q To what pressures?

A Two thousand pounds.

Q If it didn't hold two thousand pounds?

A Then we would inject with tubing below a packer.

Q In the event you have to two-stage, not two-stage, but dually inject, is it your opinion that this casing will be in good enough shape to withstand such pressures that you may have to inject with?

A Well, we'll determine that by pressure testing it, and in the event it should not be, we would then be required to go to two strings of tubing with two packers.

Q Ordinarily a well completed in 1948 wouldn't be expected to have casing in too good a shape, would it?

A Well, there's much more likelihood that we'll have to use tubing on that one than on the other one, yes, sir.

MR. UTZ: Any other questions of the witness?

MR. IRBY: Yes, sir.



MR. UTZ: Mr. Irby.

BY MR. IRBY:

Q You said that the information you have indicates that this casing was new when it was installed, Mr. Darden. What is that information?

A That's the reports in the well records which we were given when we purchased the wells from their previous operator.

Q They stated that it is new casing?

A I believe that that was written on the drilling reports. There was no invoice in the well record, so all we have to go on is what was written on the driller's report there.

Q You say you believe that it's on there. When you reappear on July 1st I'll expect a definite answer on this question.

A Fine. I'll be sure and look it up.

Q Now, you said that in this general area when you were with Newmont that you made a search for water with which to conduct a flood in this area and you didn't find sufficient water production to take care of the flood, is that correct?

A That's correct.

Q Did you find any water at all?

A Yes, sir.

Q In sufficient quantities to take care of livestock and domestic water?



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A Well, it's obviously not enough to take care of domestic water because all of the camps along the highway there have bought water at ten cents a barrel from Caprock Water Company for many years. There is an occasional windmill in the area and there's an occasional cow in the area, but it's a very arid region if you are familiar with it.

Q I'm not able to visualize exactly where this is in a general location, say, with respect to some settlement along the highway or so many miles east of Artesia or just off the Caprock, or something like this. Could you give me a picture like that?

A Are you familiar with the potash road that turns south from the John Trigg camp on the highway going east from Artesia to the town of Loco Hills?

Q Well, I don't know where the John Trigg camp is. I, of course, have been across from Artesia.

A I think it's about fifteen miles east of Artesia.

Q Then you would turn south?

A Turn south, and I'm just talking from memory here.

Q That's good enough.

A An areal map, but I would say that you would drive approximately six miles in a southeasterly direction on the potash highway and then you turn back to the west to these leases.

Q Any appreciable distance west?



A Well, approximately three miles. If you are familiar with the Waterflood Associates waterflood project in Section 14, we're immediately east of that.

Q You said you'd probably get your water from Caprock. If you don't get it there, where do you expect to get it, or do you know?

A There is a possibility that there might be sufficient water on the property at shallow depth to supply two or three injection wells. The reason is there's a possibility, we understand, that Waterflood Associates recently drilled a water well offsetting our property, but that that water well was completed very rapidly in its production rate, so at this point that is the reason I say we probably will purchase water from Caprock Water Company.

Q On your Exhibit 2 I didn't get down this formation that's near the surface up here in which the Brown No. 2, the Ohio No. 1 and the Travis No. 1 seem to penetrate.

A Well, this is actually not too near the surface. As you notice, it's about 2350 feet from the surface. This doesn't go all the way, this cross section is not to scale to the surface.

Q These are depths from land surface?

A Yes, sir. These are well depths which are shown on the map.



Q To make it clear, I am speaking of the upper zone which might be considered a pay zone.

A Yes, sir.

Q Which one is that?

A That is, well, it has various designations, it has been called Metex by some of the offset operators, but it didn't correlate with Metex from previous areas that I have worked in, so I refer to it as an Upper Grayburg zone. As you can see, this is a zone which is not continuous. It is not present in the Waterflood Associates State 14 No. 8, for example, but is present in our Brown No. 2, and we know now it is not present in our Ohio State No. 1 now that we have a gamma ray-neutron on it.

Q It isn't?

A It isn't. We thought it would be, but when we ran the log we found it is not. It is present, I believe, on the Harvey Yates well which offsets us to the east, which would be the Roger Harris Travis No. 1, Yates Harris Travis No. 1.

Q It's your intention to open these to any zone that appears productive from your gamma ray-neutron logs?

A Yes.

Q And I guess this goes to some of the questions that Mr. Utz asked about dual completion on these. I presume that you will not inject with the same pressure at each zone that you'll have to



have or you expect --

A We don't know. At this point we can't say they are injecting simultaneously into various zones in the offsetting section. So we will start that way and then if our performance indicates this isn't getting, effectively flooding it, why then we'll take measures to institute dual injection.

Q It isn't my intention to embarrass you any more than I have to, Mr. Darden.

A Go right ahead.

Q Are you familiar with Rule 701 of the Commission rules?

A Well, I've been exposed to it from time to time. I will admit, however, that I have never operated a waterflood project under Rule 701. If you'll recall, all of the Newmont Oil Company projects were instituted prior to the promulgating of Rule 701 and therefore, I may be a little less familiar with it than some other operators would be.

Q I don't want to dig you a lot about this, but I would like to say that before I could withdraw objection to the granting of this application under Case 3060, I would have to have the information required by Rule 701.

A We'll be happy to furnish it to you.

MR. IRBY: Thank you. That's all I have.

BY MR. UTZ:



Q Mr. Darden, which of these zones is San Andres and which the Grayburg?

A The Lovington and Jackson zones are San Andres and the -- actually the base of the Premier zone correlates with the top of the San Andres. So anything below the base of the Premier is classified within the San Andres formation.

Q The Grayburg would be the upper zone shown on your cross section?

A Yes, sir.

MR. UTZ: Any other questions of the witness?

MR. DURRETT: I have a question, please.

MR. UTZ: Mr. Durrett.

BY MR. DURRETT:

Q Mr. Darden, referring to your Exhibit 1, which is the plat, the International Oil and Gas Well No. 1-25, which is located in the Northeast of the Northeast of Section 23, that is just a proposed injection well?

A That is correct.

Q Is that well completed in the same zones that your wells are in?

A It is my understanding that it is. I have been in conversation with Mr. Appledorf of International Oil and Gas concerning the completion of that well, and he has promised to send me



the complete data as to where the well is completed, but it's my understanding from telephone conversation with him that it is completed in the same zones which we have the offsetting well completed in.

Q When do they propose to put this well on or apply to make it an injection well?

A I don't know. This pattern is at this time tentative, and I think it's going to be, the actual date of putting the wells on injection will hinge to a great degree, I'm sure, on the performance from the initial area.

Q Do you think that the International Oil and Gas Well No. 1-29, which is in the Southeast of the Northeast, should receive a response from your Magnolia No. 2?

A Yes, sir.

Q That would probably indicate that they would desire pretty soon thereafter to start the International Oil and Gas 1-25 on injection?

A I would say that we will put the wells on simultaneously. Of course, this involves a leasehold cooperation agreement between at least the three operators here along this line.

Q You are negotiating that at this time?

A Yes, sir.

MR. UTZ: Any other questions?



MR. MORRIS: One more question.

REDIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Darden, you said a minute ago that you never had the pleasure of operating a flood under Rule 701, but do you propose to operate this flood under the allowable provisions of that rule?

A Yes, sir.

MR. MORRIS: That's all.

MR. UTZ: Any other questions? The witness may be excused.

(Witness excused.)

MR. UTZ: Any statements in this case?

MR. MORRIS: Yes, sir. I would like to make one statement for the record that we will be in correspondence with the State Engineer's Office concerning what further requirements of information that might be desired, and we will do our best to furnish that information to avoid having to burden the Commission with a second hearing on this matter.

MR. UTZ: The case will be continued until the July 1st hearing.

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BEFORE THE
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Santa Fe, New Mexico
July 1, 1964

EXAMINER HEARING

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IN THE MATTER OF: (Reopened)

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flood project, Eddy County, New Mexico.
Applicant, in the above-styled cause,
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project in the Artesia Pool in his Cowtown
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and 24, Township 18 South, Range 28 East,
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Case No. 3060

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING



MR. UTZ: The next case will be 3060.

MR. DURRETT: Application of Frank Darden for a water-flood project, Eddy County, New Mexico.

MR. MORRIS: May it please the Examiner, I am Richard Morris of Seth, Montgomery, Federici and Andrews, Santa Fe, New Mexico, appearing for Mr. Frank Darden in this case. The Examiner will recall that this case was considered at the Examiner Hearing on May 27, at which time the application and the advertisement in the case pertained only to injection of water into the Grayburg formation. However, testimony was offered at that time concerning Mr. Darden's plans to inject into the San Andres formation as well as the Grayburg formation with the understanding that the case would be readvertised to cover the additional formation, and that the testimony offered at the May 27th hearing would be offered in support of the application as readvertised.

Accordingly, at this time I offer into evidence and ask that the Commission consider the record and all exhibits offered at the May 27th hearing of Case 3060.

One further word of explanation would be in order. At the May 27th hearing Mr. Frank Irby of the Office of the State Engineer offered some objections to the granting or consideration by the Commission of this application, inasmuch as he had not been furnished all of the information that he desired. Since that

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time we have furnished Mr. Irby with that information. I had a conference with him this morning prior to the hearing. Mr. Irby will submit, I understand, later, a letter to the effect that he will have no objection to this proposal so long as he or his office is notified in sufficient time so that an official from his office can be present when the casing in the two injection wells are pressure tested. Mr. Darden has no objection to that requirement being incorporated either in the order or in a Commission letter accompanying the order. I believe with that understanding we will have resolved all of our difficulties with the State Engineer's Office.

With that background I move that the Commission consider the previous testimony and exhibits in support of the application as presently advertised.

MR. UTZ: Is there any objection to the Commission considering the testimony in the previous record? The case will be taken under advisement.

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