

BEFORE THE

NEW MEXICO OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

May 7, 1969

EXAMINER HEARING

OFFICE 000
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IN THE MATTER OF:)

Application of Kersey and)
Company for a waterflood)
project, Eddy County,)
New Mexico.)

Case 4123

Application of Continental)
Oil Company for a waterflood)
project, Eddy County, New)
Mexico.)

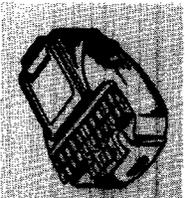
Case 4125

Application of C. O. Fulton)
for a waterflood project,)
Eddy County, New Mexico.)

Case 4128

BEFORE: DANIEL S. NUTTER, Examiner

TRANSCRIPT OF HEARING



MR. HATCH: Case 4123, application of Kersey and Company for a waterflood project, Eddy County, New Mexico.

Case 4125, application of Continental Oil Company for a waterflood project, Eddy County, New Mexico.

Case 4128, application of C. O. Fulton for a waterflood project, Eddy County, New Mexico.

MR. KELLAHIN: Jason Kellahin, Kellahin & Fox, Santa Fe, appearing for the Applicant in each of the cases, which we request to be consolidated.

MR. NUTTER: They will be consolidated for purposes of testimony.

(Thereupon, Continental's Exhibits 1 through 5 were marked for identification.)

LARRY KOPCHEK

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q State your name, please?

A Larry Kopchek.

Q By whom are you employed?

A Petroleum Engineer with Continental Oil Company.

Q Where are you located?

A Hobbs, New Mexico

Q Have you ever testified before the Oil Conservation Commission, and made your qualifications as a matter of record?

A Yes, sir.

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

MR. NUTTER: Yes, they are.

Q Mr. Kopchek, are you familiar with the applications before the Commission at the present time, including the application of Continental Oil Company in Case 4125?

A Yes, sir. Case No. 4125 is the application of Continental Oil Company for authority to install a waterflood project on its Donohue Heard and Levers "B" Leases in the Forest Pool, Eddy County, New Mexico.

Q Referring to what has been marked as Exhibit 1, would you describe the information shown on that exhibit?

A Exhibit 1 is a plat showing the leases in the Forest Pool area and in an area two miles in each direction from the proposed injection wells. Lease ownership and

location and identification of wells are shown in the usual manner. The pool from which each well is producing is shown by a letter symbol and the Cave and Square Lake pools are outlined in color. The Donohue lease is shown to consist of the W/2 SE/4 Section 34, the S/2 SE/4 Section 27, and the SE/4 NW/4 Section 35. The Heard Lease is shown to consist of the SW/4 and the SW/4 SE/4 Section 35. The Levers "B" Lease is shown to consist of the NE/4, the E/2 NW/4, the SW/4, and E/2 SE/4 of Section 34, and the W/2 NW/4 Section 35. The injection wells are shown by the red triangle inscribed around the wells. There is in progress at this time a cooperative waterflood project in the Square Lake Pool immediately to the east of the proposed project in the Forest Pool and the General American Nunlee Well No. 5 in the SE/4 NE/4 Section 35 is shown to be an injection well in this project. To the SW of the Forest Pool, and shown by the dashed line, is the Cave Pool waterflood project which has been under way for several years. We have entered negotiations with Fulton and Kersey to the south of the Forest Pool for cooperative waterflooding in the Square Lake Pool in conjunction with our waterflood in the Forest Pool. Their applications for authority to convert their wells for injection are included

on this same docket in Cases Nos. 4123 and 4128.

Q Referring to what has been marked as Exhibit No. 2, would you describe what is shown on that exhibit?

A Exhibit No. 2 is a tabulation of the proposed injection wells for the Forest waterflood project and shows from left to right the designation of the well and its location, the total depth, or plug back depth, the size, setting depth and cement used for the surface casing, the size, setting depth and cement used for the production casing and the producing interval open in the well and whether it is through perforations or open hole. Exhibits 2-1 through 2-10 are schematic diagrams for each of the wells listed on Exhibit 2 and showing schematically the same information. These exhibits also show the proposed procedure for equipping the well for injection.

Q In other words, there are ten wells which will be converted to water injection?

A That's correct.

Q Is the completion going to be such that the injection will be down the tubing under a packer?

A Yes.

Q How will the wells be equipped for injection?

A The wells will be equipped with packers and

cement lined tubing.

Q Will you fill the casing tubing annulus?

A We have no plans on that. The packer should isolate it.

Q And is this the same type of completion you used in the Cave Pool, or do you know?

A In some cases. I am not really sure, but I think there maybe a couple going down the casing there.

Q Referring to what has been marked as Exhibit No. 3, would you identify that exhibit?

A Exhibit No. 3 is a map showing the structural configurations of the top of the Premier Sand with a contour interval of 10 feet. As shown, the structure in the Forest Pool is on a small nose of low relief on an eastward plunging slope. Actually, the structure has little or no effect on the accumulation of oil in this area. The porosity appears to be a depositional feature which runs in a fairly broad band, which is almost perpendicular to the structure. This band includes the Cave Pool to the southwest and a portion of the Square Lake Pool to the East-Northeast.

Q Referring to what has been marked Exhibit No. 4, would you identify that exhibit?

A Exhibit No. 4 is a typical log of the Forest

Pool section. Actually, this log is from a well which is classified as the Square Lake Pool, but is the nearest well which shows the desired information. The well is the General American Nunlee Well No. 3, located in the NW/4 SE/4 Section 35. The proposed injection wells in the Forest Pool were not logged below the casing seat and consequently do not show the interval which we consider pertinent to this matter. The log shows the top of the Grayburg at 2246 feet, the top the Premier at 2557, the top of the San Andres at 2580 feet, and the top of the Lovington Sand at 2669.

Our information indicates that the production in the Forest Pool is coming from the Premier member of the Grayburg formation and the Lovington Sand in the San Andres Formation.

Q What is the pay interval in the Cave Pool which you mentioned was being waterflooded to the southwest of the Forest Pool.

A The Cave Pool produces entirely from the Premier Sand, which is Grayburg in age.

Q What is the pay zone in the Square Lake Pool which you mentioned?

A Our information indicates that the Square Lake

Pool produces from both the Grayburg and San Andres, probably the same members that we have in the Forest Pool, and also indicates that the Metex and Loco Hills members are productive in some areas of the pool.

Q Referring to what has been marked as Exhibit No. 5, would you identify that exhibit?

A Exhibit No. 5 is a tabulation of reservoir data for the Forest Pool. As you can see, actual reservoir data is extremely limited and it was necessary to use empirical relationships using the Cave Pool Unit Waterflood performance as a guideline in order to make a prediction of waterflood performance.

Q Would you give a brief history of the Forest Pool?

A The Forest Pool was discovered by the Forest E. Levers No. 1-B Levers located in the SE/4 NE/4 Section 34, T16S, R29E, which was completed December 30, 1945. The first commercial producer was the Levers "B" No. 2 which was completed February 28, 1946. Development continued at a rather slow rate through September, 1950, at which time 19 wells had been completed. The last well to be completed, the Heard No. 7, was completed on December 28, 1959. All completions except this last one were open hole and all wells were shot upon completion except three. The Levers

"B" No. 8 and the Heard No. 2 were completed natural and the Heard No. 7 was sand fraced. At the present time there are 14 wells shown as producing and five are shut in. During February 1969 production from the pool totaled 179 barrels, or 6.4 barrels per day, which is less than 1/2 barrel per day per well average.

Q In your opinion, can additional oil be recovered from the Forest Pool by waterflooding, which would not be recovered by primary means?

A As you can see, the economic life of the pool by primary means is at an end. It is estimated that we can recover an additional 630,800 barrels of oil by waterflooding as proposed in this application.

Q At what rates do you expect to inject water in this project?

A It is anticipated that maximum initial water rates will be 350 barrels per day per well. After a short time it is expected that the water rates will stabilize at a maximum of approximately 200 barrels per well per day. This would be a total of a maximum of 3500 barrels per day initially levelling off to a maximum of 2,000 barrels per day.

Q What is the source of this water?

A We are negotiating a contract with Double Eagle Corporation to supply us with Ogallala water, which is fresh water.

Q Is that water compatible with the formation water?

A This water is being used in our Cave Pool waterflood and in many other waterflood projects in this area and there has been no problem of compatibility to my knowledge.

Q Will this waterflood project be conducted on a cooperative lease basis?

A We are in the process of forming an all-federal unit in the Forest Pool. All of these wells are located on federal land. We have had our preliminary discussion with the U.S.G.S. and outlined our plans to them. We anticipate that the unit agreement will be forwarded to them for designation of unit area and preliminary approval in the very near future. We hope that this unit can be effective by December 1, 1969.

Q Do you have plans to expand this waterflood in the future?

A Our present plans involve the conversion of two additional wells, the Donohue No. 1, located in Unit P of Section 27, and the General American Nunlee No. 3, located

in Unit J of Section 35, provided that we can make satisfactory arrangements with General American for use of the well.

Q In view of the possibility of these additional injection wells, is it your recommendation that the order provide for administrative approval of additional wells?

A Yes, this is my recommendation in order to avoid the expense and administrative burden on the Commission of conducting additional hearings.

Q In your opinion, will the granting of this application result in the prevention of waste and protect correlative rights?

A The conformation of the leases and location of wells is such that correlative rights should be protected even in the event the unit is not effected. We do expect the unit to become effective, however, and this should protect all correlative rights. Certainly waste is being prevented in that additional oil will be recovered which could not otherwise be produced.

Q What allowable do you anticipate for this project?

A There are twenty 40-acre tracts in the project area, each with one well, except for one tract which has two wells. Based on the minimum waterflood allowable of

42 barrels per day, as provided under rule 107-E, a minimum waterflood allowable of 854 barrels per day would be anticipated. Under the current allowables a higher allowable would be available. Based on a normal unit allowable of 60 barrels per day well, the project allowable would be 1220 barrels of oil per day.

Q Were Exhibits 1, 2 through 2-10, and 4 through 5 prepared by you or under your supervision?

A Yes.

MR. KELLAHIN: At this time, I will offer in evidence Exhibits 1 through 5, inclusive, including Exhibits 2 and through 2-10.

MR. NUTTER: Exhibits 1 through 5 will be admitted in evidence.

(Thereupon, Applicant's Exhibits 1 through 5 were admitted in evidence.)

MR. KELLAHIN: That is all I have on direct examination.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Kopchek, when you mentioned the projected allowable of 854 barrels, you are assuming that the unit would be formed and the leases consolidated?

A That's correct.

Q Otherwise, until that time, each lease, you understand, would stand on its own?

A Yes, sir.

Q And have individual allowables assigned to them. Now, this well up here in P of 27 is not the subject of the application at the present time, is that correct?

A Correct.

Q So your application is for the ten wells that you have shown with red triangles in Sections 34 and 35, all of which have been drilled with the exception of the Donohue well in Unit F of 35?

A That's correct.

Q All of these other wells have been drilled, and according to your Exhibits 2, 2 through 2-9, will be equipped with cement lined tubing set in a packer?

A Yes, sir.

Q Now, this annulus can be loaded with some sort of inert fluid, and equipped with a pressure gauge at the surface?

A Yes, it can.

Q Is it your proposal to inject down the casing in this new well that is going to be drilled? Exhibit No. 2-10 doesn't indicate any tubing or packer, or anything in

that one.

A It is my understanding that this well will be a slimhole completion, and we will inject down that casing.

Q In other words, you are going to run 3 1/2 inch casing in there?

A Yes.

Q Do you propose to cement it with 400 sacks? Will that be sufficient cement to circulate on that?

A I do not know whether it will circulate. It should go back to the surface casing, though.

Q The Commission's requirement in this particular Case to require that the cement come back into the surface pipe would not be unreasonable?

A It will come into the surface pipe.

Q And your cumulative oil production from this pool to date has been 505,000 barrels, and you are estimating 630,800 barrels for secondary recovery?

A That's correct.

Q Which is a little more than one to one?

A Yes, about 1.25.

MR. NUTTER: Any further questions of Mr. Kopchek? The witness may be excused.

(Thereupon Exhibits 1, 2 and 3 in Case No. 4123, and Exhibits 1, 2 and 3 in Case No. 4128, were marked for identification.)

VICTOR T. LYON,

called as a witness by the Applicant Kersey and Company,
having been first duly sworn, was examined and testified
as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q State your name, please?

A Victor T. Lyon.

Q By whom are you employed?

A I am employed by Continental Oil Company as
Conservation Coordinator in the Hobbs Division Office.

Q Are you a petroleum engineer?

A Yes, sir.

Q Have you testified before the Oil Conservation
Commission, and made your qualifications a matter of
record?

A Yes, sir.

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

MR. NUTTER: Yes, they are.

Q Mr. Lyons, you heard the testimony of Mr. Kopchek
in this consolidated case, in which he stated that
Continental Oil had negotiated with Kersey and Company, and with

C. O. Fulton for cooperative waterflood projects in connection with Continental's waterflood project in the Forest Pool, is that correct?

A Yes, sir.

Q Are you familiar with the proposed waterflood project by Kersey and Company?

A Yes, sir.

Q What does Kersey and Company propose in their application?

A Kersey and Company proposes to convert the Kersey and Company Dublin No. 3, located 330 feet from the north line and 1650 feet from the east line, Section 3, Township 17 South, Range 29 East.

Q Referring to what has been marked as Exhibit No. 1 in Case 4123, would you identify that exhibit?

A This is a letter from Mr. Kersey wherein he outlines to the Commission his proposal to conduct a cooperative waterflood by converting the well which I just described.

Q And Exhibit No. 2 in Case 4123, would you identify that exhibit?

A This is a copy or a schematic diagram showing the method of completion of the well. It shows 8 5/8 casing set at 408 feet with 50 sacks. It does not indicate whether

the cement is circulated, and I do not know whether this is the case or not.

It shows 7 inch casing set at 2,460 with 100 sacks; and 2 3/8 inch cement lined casing to be set at 2,400 feet on a tension packer at that depth.

The production has come from the openhole interval between the 7 inch casing at 2,460 and the total depth of 2,537, and this will be the injection interval.

Q Mr. Kersey proposes to use a cement-lined tubing?

A Yes, sir. And he informs me that he will fill the annular space above the packer with an inert fluid.

Q And is this a conventional type of completion used in waterflood projects in this area?

A Yes, it is.

Q Referring to what has been marked as Exhibit No. 3 in Case 4123, would you identify that exhibit?

A Exhibit No. 3 is a plat showing Mr. Kersey's Dublin lease outlined in red, as to the waterflood portion of it. I believe that the lease consists of twenty acres described as the west half of the northeast quarter, and the northwest quarter of the southeast quarter of Section 3, Township 17 South, Range 29 East.

Q Would an injection well located as proposed by Mr. Kersey fit into the injection pattern proposed by

Continental Oil Company in the Forest Pool?

A Yes, sir. We have designed and have at least tentatively agreed upon an 80-acre five-spot pattern which goes across the common boundary and should treat all parties equitably.

Q And you propose the same rates of injection as proposed in the Forest Pool?

A Yes, sir.

Q What will the source of water be?

A Continental Oil Company will pressure the water at its injection plants, and will furnish pressured water to both Mr. Kersey and to Mr. Fulton.

Q It will be water from the same source as that used by Continental in its Forest Pool flood?

A That's correct. Initially, it will be 100 percent Ogallala water furnished by Double Eagle Corporation. As water is produced in the area, it will be included in our injection well.

Q It will be reinjected?

A Yes.

Q Referring to Exhibit No. 1 in Case 4128, the Application of C. O. Fulton, would you identify that exhibit?

A Yes, sir, Exhibit No. 1 in Case 4128 is a letter from Mr. Kersey explaining to the Commission what is proposed by Mr. Fulton. Mr. Kersey and Mr. Fulton have collaborated on this project, and Mr. Kersey is handling these matters for Mr. Fulton.

Q Now, Mr. Fulton will convert three of his wells to water injection under his proposal, is that correct?

A Yes. These are his C. O. Fulton State No. 2 located 330 feet from the north line, 990 feet from the west line of Section 3; and his No. 3-A State, located 1,650 feet from the north line, 990 feet from the east line of Section 3; and his State No. 1 located 660 feet from the north line and 660 feet from the west line of Section 2; all in Township 17 South, Range 29 East.

Q Now, referring to what has been marked as Exhibit No. 2 in Case 4128, would you identify that exhibit?

A Exhibit No. 2, I hope these are all in the same order, would be one that I have here as a plat showing Mr. Fulton's leases which are cooperating in this cooperative flood. It consists of the northwest quarter of the northwest quarter, which is, I believe, listed in the Commission's records as the Gulf State B lease; his Dublin Federal, which is the northeast quarter of the northwest quarter of Section 3; his Dublin lease, which consists of the east half of the northeast quarter, and the

northeast quarter of the southeast quarter of Section 3; and his Gulf State A, which is described as the northwest quarter of the northwest quarter of Section 2; these leases are outlined in red, and the injection wells are shown circled in red.

Q Are the injection wells so located that they will fit into the injection pattern offsetting the Fulton wells in the Kersey application and in the Continental Oil Company application?

A Yes, sir, these wells are spotted on a normal 80-acre five-spot pattern.

Q Referring to what has been marked as Exhibit No. 3 in Case 4128, would you identify that exhibit?

A Exhibit No. 3 is a drawing showing schematically the three injection wells, showing the size and depth, and cement used in setting the surface casing; the size, depth, and cement used in setting the production casing, the depth of the tubing, the depth of the packer, the openhole interval into which water will be injected. All of these are equipped with a tension packer, and the casing tubing annulus above the packer will be filled with an inert fluid.

Q Will a cement-lined tubing be used for injection purposes?

A That's correct.

Q What volume of water will be injected?

A Approximately 200 barrels of water per day.

Q Will the source of the water be the same furnished by the Continental Oil Company?

A Yes, sir.

Q You heard the testimony as to the state of completion by the Forest Pool. Would the same apply to the Kersey and the Fulton leases?

A Yes, sir. I believe there are two of Mr. Fulton's wells that are still producing, and they produce approximately one barrel per day per well.

Q Is the reservoir substantially depleted on primary recovery?

A Yes, sir.

Q Will the approval of this application by the Commission for water injection in this formation result in an increased recovery of oil that would not otherwise be recovered?

A Yes, it will.

Q Will any waste occur as a result of this?

A In my opinion, there will be no waste as a result of this waterflooding.

Q Are the correlative rights of the owners in the area protected, in your opinion?

A In my opinion, they are.

Q For the record, would this area be included in the proposed Continental Unit, or --

A No, it is not.

Q It would be an offsetting flood to the proposed Continental Unit?

A That's correct.

Q And you would have an agreement with them in that connection?

A Yes, sir, we do have an agreement which is being proposed, setting out the obligations of each of the parties, providing for a water source, and providing for the disposal of water for recirculation and into the waterflood project.

I might also mention that we have under discussion with another operator in this same area, McCreary and Franklin, the possibility of their entering into this waterflood project, also, and they did not have their material ready at this time, so that all of it could be presented at the same time.

Q Have you examined the Exhibits 1, 2, and 3 in Cases 4123 and 4128?

A Yes, sir.

Q In your opinion, do those Exhibits correctly reflect the information to which you have testified?

A I have not had occasion to verify the information shown on those with the official records, and I just accepted them.

Q You believe them to be correct?

A Yes, sir, I have no reason to doubt that they are correct.

MR. KELLAHIN: At this time, I offer in evidence Exhibits 1, 2, and 3 in Case 4123, and Exhibits 1, 2, and 3 in Case 4128.

MR. NUTTER: Exhibits 1, 2, and 3 in Case 4123, and Exhibits 1, 2, and 3 in Case 4128 are hereby admitted in evidence.

(Thereupon, Applicant's Exhibits 1, 2, and 3 in Case 4123, and Exhibits 1, 2 and 3 in Case 4128 were admitted in evidence.)

MR. KELLAHIN: That is all.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Lyon, the nomenclature of the leases as shown on Continental's Exhibit No. 1, as compared with the

nomenclature for the names of the leases on Mr. Fulton's application doesn't quite jibe. Now, if we look at the map, we see that the 40-acre lease in Section 2 is called the Gulf A, and the 40-acre lease in the northwest of the northwest of Section 3 is called the Gulf B?

A Right.

Q Now, the application calls this the State No. 1 and No. 2 well. And then the other well is identified on the application as the State 3-A, but the map calls it the Dublin lease. Do you know if these are separate leases?

A The Gulf A and Gulf B are part of the same basic lease. The Dublin or State A, as he refers to it, I believe is a separate lease from these two.

Q So Mr. Fulton is going to have one lease there with two injection wells on it, and no producers?

A That's correct.

Q And then he will have a waterflood project area consisting of three 40's on his Dublin lease?

A That's correct. Incidentally, I have discussed this with Mr. Bill Barrow this morning, and he indicated that at least at this time he had no objection to this arrangement.

Q And Mr. Kersey then will have one 80-acre project,

80 acres for his waterflood project?

A That's correct.

Q So there wouldn't be any allowable on the Gulf A and Gulf B, and the allowable ~~would be~~ 126 barrels on the other project, the Dublin?

A Yes.

Q Now, you mentioned that these annular spaces would be filled with inert fluid. They can be equipped with a gauge, also?

A Yes, sir.

MR. NUTTER: Any further questions?

CROSS EXAMINATION

BY MR. LONG:

Q I take it from this exhibit that these actually come from what we call Line Lease Agreements, aren't they?

A Sir?

Q Aren't these generally classified in the category with what we call a Line Lease Agreement?

A I don't know if there is an existing agreement.

Q That is in effect what you are doing between this proposed Federal Unit and the State Wells?

A Yes, sir.

Q Then if that be true, don't you eventually draw up a line lease agreement?

A Yes, sir, there will be an agreement.

Q Wouldn't two State wells receive a proportionate share of returns on the lease line there?

A I don't believe, if I understand your question correctly, that this lease line agreement will be in the nature of a unit agreement.

Q No, it isn't, it is between the unit and the outside, or between two units.

A It is for the purpose of protecting the correlative rights of participating parties. There will be Federal wells pushing oil to State leases, and there will be State wells pushing oil to Federal leases.

Q There will be an agreement to that effect?

A Yes.

MR. NUTTER: Any further questions? The witness may be excused. Do you have anything further in these Cases?

MR. KELLAHIN: No.

MR. NUTTER: Does anyone have anything they wish to offer in Cases 4123, 4125, and 4128? We will take the Cases under advisement.

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