

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
June 22, 1960

EXAMINER HEARING

IN THE MATTER OF:)

Application of Continental Oil Company)
for a waterflood project. Applicant, in)
the above-styled cause, seeks an order)
authorizing it to institute a waterflood)
project in the Skaggs Pool on its South-)
east Monument Unit by the injection of)
water into the Grayburg formation through)
six wells located in Sections 19, 24, and)
30, Township 20 South, Ranges 37 and 38)
East, Lea County, New Mexico.)

Case 1990

BEFORE: Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

MR. PAYNE: Application of Continental Oil Company for a
waterflood project.

MR. KELLAHIN: Jason Kellahin, Kellahin & Fox, Santa Fe,
representing the applicant. We will have one witness, Mr. Queen.

(Witness sworn.)

(Whereupon, Continental's
Exhibits 1 through 7 were
marked for identification.)

JOHN A. QUEEN

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



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DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, Mr. Queen?

A John A. Queen.

Q By whom are you employed and in what position?

A Continental Oil Company, Division Engineer, New Mexico Division.

Q Have you previously testified before this Commission as a petroleum engineer and had your qualifications accepted?

A Yes, sir, I have.

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

MR. NUTTER: Yes, they are.

Q Are you familiar with the application before the Commission in Case 1990?

A Yes, sir, I am.

Q Would you state briefly what's proposed in this application?

A This is the application of Continental Oil Company for permission to institute a pilot waterflood project in the Southeast Monument Unit in the Skaggs Pool under the provisions of 701 of the Commission Rules and Regulations.

Q Now, in your capacity as Division Engineer for Continental Oil Company, have you made a study, or has a study been made under

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your direction, of the Skaggs Pool?

A Yes, sir, it has.

Q As a result of this study have you concluded that water flooding is feasible in the Skaggs Pool?

A Yes, sir, we have.

Q Now, in what part of the Skaggs Pool do you propose to start water flooding?

A Our Exhibit 1, which we have previously passed out, is the location plat of the Skaggs Pool area, all wells completed in the Skaggs Pool are circled in green and the project area as defined by Rule 701 is outlined in red and the proposed injection wells are circled in blue.

As you will note, the Southeast corner of the Southeast corner of Section 19 is shown in a dotted red line. We propose to drill a producing well at that location after the pilot flood is in operation. Therefore, it would be included in the project area, being a direct East offset to one of the proposed injection wells.

We propose to convert the Southeast Monument Unit Permian No. 14 located in the Northeast Quarter, Southeast Quarter Section 24, 20 South, 37 East; the Southeast Monument Unit, Permian No. 18, located in the Northeast Quarter, Southwest Quarter of Section 19, 20, 38; the Southeast Monument Unit, Permian No. 20 located in the Southwest Quarter,



Southwest Quarter Section 19, 20, 38; the Southeast Monument Unit, Permian No. 21, located in the Southwest Quarter, Southeast Quarter of Section 19, 20, 38 and the Southeast Monument Unit, Permian No. 23, located in the Northeast Quarter, Northwest Quarter of Section 30, 20, 38; in the Southeast Monument Unit, Permian 28, located in the Southwest Quarter, Northwest Quarter of Section 19, 20, 38.

These wells to be converted to water injection wells. The heavy black lines on Exhibit 1 indicates the boundary of the Southeast Monument Unit which Continental Oil Company operates.

Q That pattern will result in a double five-spot injection pattern, won't it?

A That is correct.

Q For what reason do you prefer to use a double pattern rather than a single five-spot for the initial project area?

A This would be a matter of economics, in the choice of a double five-spot we have a chance to evaluate any one failure and not allow it to condemn the whole project. It would also allow us to place this flood into a more rapid stage of expansion once the pilot flood is proven to be productive.

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

A The Skaggs Pool was discovered in March, 1937, by Continental, Southeast Monument Unit, Permian No. 14, formerly called the Skaggs "A" 24 No. 1, located 1980 feet from the South and 660 feet from the East lines of Section 24, 20, 37, Lea County,



New Mexico. This well was completed in the Grayburg formation at a total depth of 3900 feet for an IP flowing of 504 barrels of oil per day.

Two additional wells, the Southeast Monument Unit, Permian No. 15 and 16, were completed during 1937. Production from these wells declined rather rapidly and due to the low price of crude, seventy-five cents per barrel in 1937, additional development was discontinued and further development of the pool was not resumed until 1949. The pool now has a total of 78 producing wells.

Q Do you have any information on the bottom hole pressures?

A If I may refer to what has been marked as Exhibit No. 2. Exhibit No. 2 is a reservoir performance curve of the Skaggs Pool. The principal drive mechanism of the Skaggs Pool is a solution gas drive and Exhibit 2 shows the characteristic curve of a solution gas drive reservoir.

This can be pointed out in several matters. For one example, as noted on Exhibit 2, the water production for the entire Skaggs Pool is presently approximately 100 barrels of oil per day.

Q You mean water, do you not?

A Water production. Did I say oil? The water production is presently between 100 and 200 barrels per day.

This Exhibit 2 further shows that the gas production has declined considerably since the early part of 1959 and is presently producing approximately 5.5 MCF per day. Let me correct this,



5.5 MMCF per day. A further example of proof that this is a solution gas drive reservoir is the bottom hole pressure which is plotted on Exhibit No. 2; as is noted, since 1952 this bottom hole pressure has shown a steady decline. The gas-oil ratio has reached approximately 7500 average gas-oil ratio and has declined since early 1959.

From theory we know the gas-oil ratio will continue to decline and that very little additional oil will be recovered from this point on. Due to the method this pool was developed, the Southern part is in a more advanced stage of depletion than the Northern part.

If I may refer to Exhibit 3. This exhibit is a curve showing the performance of Continental's average Skaggs Pool well. In other words, these are the wells in the Southeast Monument Unit area. The curve exhibits the same shape as the reservoir wide curve, but illustrates a more advanced stage of depletion. For instance, in March, 1960, the average Skaggs Pool well produced 11.6 barrels of oil per day while the average Continental produced slightly less than 10 barrels of oil per day. The average pool bottom hole pressure was 476 PSI while the average pressure in Southeast Monument Unit was 443 PSI for December, some 33 PSI less than the average for the Northern part of the pool during this same survey.

Q What was the original bottom hole pressure in this pool?

A The highest bottom hole pressure measured in the Skaggs Pool was 1542 PSI at the subsea datum of minus 250 feet. The crude was

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undersaturated at the initial bottom hole pressure. The solution gas-oil ratio at the bubble point pressure of 1300 PSI and bottom hole pressure of 86 degrees Fahrenheit was 586 cubic feet per barrel. The gravity of the produced crude is in the range of 36 to 35 degrees API.

Q What is the reservoir formation here?

A If I may refer to what has been marked, tentatively marked Exhibit 4, this is a structure map of the Skaggs Pool, contoured on top of the Grayburg formation. The Skaggs Pool is a monocline on the East flank of the Monument high with a porosity pinchout updip. The production is from the lower Penrose and Grayburg formations. The gross productive interval is approximately 150 feet thick and consists of sand, sandy dolomite and fine to medium crystalline dolomite with zones of pinpoint to vuggy porosity. The average porosity, as determined from core analysis, was 6.5% with permeabilities in the range from five to ten millidarcys. The irreducible water saturation is estimated at 30%.

Using these formation characteristics, the initial oil in place in the Skaggs Pool has been volumetrically estimated at 28,602,000 barrels of oil.

MR. NUTTER: That's total oil in place originally?

A Total oil in place originally. This is considered to be a maximum feet. The primary recovery is estimated at 6,834,000 barrels, or approximately 23.9% of the initial oil in place.

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Q What is the cumulative production for the reservoir, Mr. Queen?

A The cumulative production from the reservoir to 4-1-60 is 4,832,121 barrels of oil, which represents some 71% of the estimated recovery by primary means. The bottom hole pressure has decreased from the highest measured pressure of 1542 PSI to 476 PSI as of December, 1959 survey. The estimated abandonment pressure is approximately 250 PSI, which means that the reservoir pressure is approximately 75% depleted.

Q What is the average per well capacity in the Skaggs Pool?

A 11.6 barrels per day. The average well capacity in the project area is approximately ten barrels per day. This fact, together with the decline in reservoir pressure in the smallest percentage of remaining primary recovery to be obtained, clearly indicates that the pool and project area are in an advanced stage of depletion and the stripper type of production.

Q You say that the pool is in an advanced stage of depletion and stripper type production. Would you summarize the facts that lead you to believe this is a stripper operation as of today?

A Yes, sir. As I have previously testified, the pool is approximately 75% depleted under maximum estimates. The gas-oil ratio has reached a maximum figure as shown on Exhibits 2 and 3. It is now declining, which shows to me is an advanced stage of

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depletion for a solution gas drive reservoir. The average well production is less than ten barrels of oil per day in the project area and in the Southeast Monument Unit area; however, 26 of 41 wells, which is 63% of the producing wells in the Southeast Monument Unit area, are producing considerably less than ten barrels of oil per day.

There are presently four shut-in wells in the Southeast Monument Unit area and there are five wells producing at their economic limit at the present time. These wells are being maintained on production merely because of the proposed water flood. These figures indicate to me that this is in an advanced stage of depletion and classified as a stripper stage of depletion.

Q Will the project be a pattern flood?

A Yes, sir. It will be an 80-acre five-spot flood. The pilot area will consist of six input wells and two producing wells as shown in Exhibit 1.

Q Will water be injected in sufficient quantities and under sufficient pressure to stimulate production from other wells in the area?

A Yes, sir. We propose to inject approximately 3,000 barrels of water per day through the six wells at anticipated pressure of 2,000 PSI. This is approximately 500 barrels per well.

Q I understand that you expect to have to inject the water under pressure?

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A That is correct. The permeability and porosity of this formation indicates to us it will be necessary to use pressure to inject sufficient quantities of water to effect movement of oil from the reservoir.

Q Where do you propose to get your water for this flood?

A We propose to use the produced water from the Cass Pool located 12,000 feet West of the Skaggs Pool for the pilot water-flood. If the flood is expanded we will supplement this water from the San Andres formation. This is our present plans for the expansion. The amount of water required could of course change this during the expansion.

Q Will the supply of water from the Cass Pool be sufficient for the initial stages of the project?

A Yes, sir, it will.

Q At the present time you have no indication or idea that fresh water will be used in the flood?

A No, sir, we have made no plans for ever using fresh water at this time.

Q How do you propose to complete your injection wells?

A Exhibits No. 5 and 6, which have been previously passed out, are copies of logs from the proposed injection wells, and Exhibit 6 is a schematic drawing showing the actual casing programs and the proposed methods of completion.

Exhibit 6 shows the wells completed with liners. However,



prior to running those liners we plan to run an injectivity profile. If this profile indicates that all zones are taking water in fairly equal amounts, the liners will not be run. If the injectivity profile shows on the other hand that one or two zones are taking most of the water, we then plan to run a liner to aid in controlling the amount of water injected into the various zones. Injection in all wells will be under a packer set on tubing.

Q Now, how long do you anticipate it will be before a response is obtained?

A We estimate that fillup in the pilot area will be achieved in approximately 14 months and that the response of the producing wells will occur in approximately 12 months.

Q What is the present producing rate of the proposed injection wells and their cumulative production?

A During April, 1960 the average daily production rate of the proposed injection wells was as follows: Southeast Monument Unit, Permian No. 14, 7 barrels per day; Southeast Monument Unit, Permian No. 18, 7 barrels per day; Southeast Monument Unit, Permian No. 20, 4 barrels per day; Southeast Monument Unit, Permian No. 21, 10 barrels per day; Southeast Monument Unit, Permian No. 23, 24 barrels per day; Southeast Monument Unit, Permian No. 28, 20 barrels per day.

The cumulative production from these wells as previously listed are as follows: 157,883 barrels, 62,653 barrels,

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61,744 barrels, 110,314 barrels, 65,311 barrels, and for the last Southeast Monument Unit, Permian No. 28, 108,740 barrels of oil as of May 1st, 1960.

Q If waterflooding is instituted, what is your estimate of the additional recovery to be obtained?

A We estimate under waterflooding, that approximately 26% of additional oil of the initial oil in place will be recovered.

MR. NUTTER: What was that figure? A 26%.

MR. NUTTER: Of the original oil in place?

A Of the initial oil in place, yes, sir.

Q Then, in your opinion, the injection of the water in the Skaggs Pool will result in the recovery of oil which otherwise would not be produced, thereby preventing underground waste?

A Yes, it will.

Q In the event the flood is expanded, what steps will be taken to protect correlative rights?

A The two offset operators to our acreage, Amerada and Texaco, Inc., we have contacted both these operators with regard to the proposed flood and they have indicated they would honor a cooperative lease line agreement for the five-spot pattern.

Exhibit 7 A and B are a copy of the letters from these operators setting forth this position.

Q Then it would not endanger correlative rights?

A No, it will not.

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Q Will it result in the production of otherwise unrecoverable oil?

A Yes, it will.

Q As I understand your application, it is filed under the provisions of Rule 701?

A Yes, it is.

Q You are not asking for anything in addition to or different from the provisions of Rule 701, is that correct?

A No, sir, we are not.

Q Were Exhibits 1 through 7 prepared by you or under your direction and supervision?

A Yes, sir, they were.

MR. KELLAHIN: At this time we would like to introduce Exhibits 1 through 7.

MR. NUTTER: Continental's Exhibits 1 through 7 will be entered.

MR. KELLAHIN: That's all the questions I have.

MR. NUTTER: I would like to compliment Mr. Queen on a very well-prepared case, Mr. Queen. Anyone have any questions?

MR. PAYNE: Yes.

MR. NUTTER: Mr. Payne.

CROSS EXAMINATION

BY MR. PAYNE:

Q What are the figures by each well in the project area,

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what do they indicate?

A We would like to apologize for the map we submitted to you. We tried to find one that did not have all the small figures on it and we were unable to do so and did not have time to prepare a new one. Those figures are the number of the well. Some of them have one number and another number immediately under them. They're the same and they are merely put in there to show more clearly the number of the well.

Q I see, then, that's not the producing rate of the well?

A No, that's merely the number of the well to be more clearly seen.

Q In the event that your injectivity tests show that in Continental's opinion you don't need to install liners, injection would then be through the casing?

A No, sir, through tubing with packers set near the shoe of the casing.

Q Oh, I see, it would be through tubing?

A Yes, sir.

Q Would that be plastic-coated tubing?

A Not in the beginning. We propose, of course, to run coupon surveys to determine whether an inhibition program will be necessary. We recognize the advantages of the plastic-coated lining. We have not formulated our plans as to what will be necessary as regards corrosion.

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The Cass Pool water is not extremely corrosive at all. The San Andres, which we now propose to use and expand, is not considered to be corrosive. So, therefore, it is possible by treating the water with a small amount of inhibitors we will save considerable money by plastic-coating. We will do, however, what is necessary to protect our equipment in the well bore from an economic standpoint and protection of other formations.

Q The water that you are going to use, the Cass Pool, that's the water that caused your wells in the Cass Pool to be shut down for a period of time?

A I believe they were shut down for a matter of a few hours.

Q The water is now being carried a considerable distance and disposed of on the surface?

A Yes.

Q So this application will take care of a dual purpose?

A Yes, it will.

Q You feel that in view of the producing rate in the wells in the Southeast Monument Unit this is more practical to classify it as a waterflood project than a pressure maintenance project?

A Yes, if I may expand on that for a second. This pool has long since been produced below its bubble point pressure, of which we have lost all advantages of this, cost-wise, which is normally why you risk a pressure formation or perform pressure maintenance. This in no way could be classified as a pressure

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maintenance since the pressure is almost at the economic limit.

In our area there are five wells presently at the economic limit, four shut down wells and in the next two or three years approximately 30% of our wells will reach their economic limit. This oil that we are now producing has little value because of the high operating cost and low rate of production. Pressure maintenance to me is a pressure that will maintain the reservoir pressure such so that you will have an advantage of recovery and of viscosity, and also formation volume factor is involved in this, in the loss of oil.

Q Now, is there more than one producing zone in the Grayburg? Did I understand you to say that your injectivity tests were going to be to determine which zones of water were going in?

A The Grayburg is lenticular, it is not, the top from the bottom is not a common producing horizon. It has a gross thickness of 150 feet. The net pay varies from this point down to zero at the edge of the pool.

Q What Continental hopes to accomplish is to flood the entire Grayburg?

A That is correct, in that the entire Grayburg is one time or one zone individual, it depends on the various injection pressures that will be required to put them in different ones. There are very few fields which have more than one individual zone that are flooded exactly at the same time, at the same rate, so they are

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all depleted at the same time. This is almost, in my opinion, impossible if there are several zones involved.

Q There are considerable producing formations below the Grayburg in this area?

A That is correct.

Q Do you feel that they're separated well enough from the Grayburg so that there'll be no loss of water into those zones?

A Very definitely.

MR. PAYNE: Thank you.

BY MR. NUTTER:

Q Are the various intervals in the Grayburg which you expect to perforate in the event that you install liners, are they correlative from one well to the other?

A Well, not exactly throughout the entire field from one well to another well, we feel like, yes, sir, we can correlate the zones. There are certain zones that appear to be productive, I should say certain intervals that appear to be productive across the entire Grayburg formation. I could not testify as to whether they're all or not, the chances they are all or not. It would not be necessary that they be productive across the entire field subject to a successful waterflood. They must be productive in more than one well.

Q Is there any evidence of vertical communication from one zone to the other in this pool?



A I have none. I would not say that there is absolutely none. I believe that basically, for economical drainage, that each zone must be flooded separately for maximum sweep efficiency and maximum recovery of oil.

Q Is it your own personal expectation that you will find it necessary to install the liners?

A The problem in installing the liners multiplies when we considered that these wells have been shot. If we set liners we will have a large amount of casing around the different pay intervals

This means that we must penetrate the cement sheath with some kind of method. We have run one or two calipers and we have found hole diameters in excess of 36 inches. About all we can say is that we hope we don't have to run them. We can tell you no way we can perforate them yet.

Q If you run the liners, how will they be cemented, will they have a cement sheath coming up all the way around?

A Yes, they would have no value if they didn't. They would be a full cement-controlled liner.

Q In the event that you don't run the liners, the injection would be through the wells as they're shown on Exhibit 6 in their present condition, with the exception that you would install a packer?

A That is correct.

Q I would like to check these figures for sure. What is

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the average daily oil rate of production in the pilot area?

A In the pilot area? I don't believe I calculated that.

Q You had two figures, one for the reservoir and one --

A One for the Southeast Monument Unit area.

Q What is your Southeast Monument Unit daily production?

A Approximately 10 barrels a day. By the way, I did have it for the pilot area. 12 barrels per day. This was for April, 1960.

Q 12 barrels for the pilot area, 10 for the Southeast Monument Unit area?

A This 10 also includes this 12 barrels, the Southeast Monument Unit includes the total area.

Q And 11.6 for the pool as a whole?

A For the entire pool. I did not come up with a figure for the Northern half which could be 13 or 14 barrels a day, I don't know.

Q You have letters of agreement from Amerada and Texas Company. Are those the only two operators that offset the Southeast Monument Unit area?

A In the Grayburg formation, yes, sir.

Q Mr. Queen, you don't know what the GOR limit for this pool is?

A 2,000 to 1.

Q Statewide, 2,000 to 1? A Yes, sir.

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Q Rule 701 is silent in what happens in the event you have a high GOR in the waterflood. I presume it would be subject to the limitation. Do you encounter any difficulties in that regard in this pool?

A I believe if a GOR of 2,000 to 1 for the pilot is calculated, two thousand times the allowable rate, that our gas production will be less than that. We have some relatively high GOR's, but you must understand we have a low production, so, therefore, we are producing very little gas. We do not anticipate that we'll have any restriction on this from united project allowable. Let me leave out the ~~units~~ from the project allowable, in the project as shown at 2,000 GOR.

Q Mr. Queen, do you feel that some of the wells individually might have a problem insofar as their allowable is concerned with the possibility they may be penalized on account of a high GOR?

A Mr. Nutter, I understand that under a project area you have an allowable for that project area and not for an individual well.

Q Well, the project area is the sum of the individual well allowables?

A That is correct.

Q And it's limited by a maximum of 42?

A That is correct.

Q Which may be transferred?

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A That is correct. On this basis, as I have previously stated, that on the basis of 42 barrels per well within a project allowable and a 2,000 to 1 gas-oil ratio, we do not anticipate that we'll even approach this amount of gas.

Q Do you have some wells individually that produce with a GOR of more than 2,000 to 1?

A Yes, sir. Within the wells that will be in the project area.

Q In the project area?

A Yes, sir. For example, Well No. 23 is not a good one, Well No. 20 is producing at a GOR of 9,000 to 1, approximately.

MR. PAYNE: That will be an injection well though?

A That will be an injection well.

MR. PAYNE: Do you have any producing wells?

A Well No. 15 is producing at a GOR of 13,000 to 1.

Q You would expect ~~after~~ response and fillup for the GOR to go down?

A We don't expect a large increase in gas, so a large increase in oil will create it to go down. After considering the fact that we would have a project allowable, and assuming this would be handled in the way the present GOR controls are on any given well in the field, we can see where we would not be penalized since we would take the allowable and multiply by 2,000, we would be allowed to produce this amount of gas.

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MR. PAYNE: The difficulty is in computing the project allowable, you add the sum of the allowables for the wells in the project area. You still compute the individual well allowable and add them up in arriving at the project allowable so that unless you get credit for high GOR well you might well run into a problem not only as to the individual well allowable but the total allowable?

A When would the Commission consider they would change the injection wells? For example, Well No. 14 is producing 7 barrels on test. I think it produced 4 barrels for the month. At what time would you propose that you would increase the allowable in the project area?

MR. PAYNE: That well would have a 42 barrel allowable when the project is started.

MR. NUTTER: Regardless of the GOR.

A That would also be multiplied by 2,000 to 1 to determine how much gas would be produced in the project area. If this is true, this is the basis we have estimated this and on this basis we will not exceed our gas-oil ratio.

Q (By Mr. Nutter) You are assuming the maximum of the 2,000 to 1 for the six injection wells and figure that would cover you?

A Yes, sir. If, for a short time before we did get a fill-up that we do run slightly over, which if the GOR would start on an



incline and instead of continuing to decline we would possibly be restricted. At the present time we see no problem if we have interpreted the allowable granted to an injection well. It was our understanding that it would be started as soon as we started injecting, on this basis.

In the first place we are not going to be able to produce a whole lot of oil because these wells do not produce a lot of oil, and we do not consider that we will produce our allowable even combined with what we have. When our calculations were put to this, our problems were minimized.

MR. NUTTER: I trust that they are. Does anyone have any further questions of Mr. Queen?

BY MR. PAYNE:

Q You expect a response in about a year?

A Yes, sir.

Q How soon would you expect to be producing your project allowable? That would be some time longer, would it not?

A Yes, sir, it certainly would be. I have made no calculation, but for some estimate it would probably be about twenty-five months.

Q Now, by that time would you anticipate that any of your producing wells would have a gas-oil ratio in excess of 2,000 to 1?

A I would not estimate that they would have.

MR. PAYNE: Thank you.

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BY MR. NUTTER:

Q There are approximately twenty-one 40-acre units in the project area, Mr. Queen?

A I counted them but it slipped my mind right now. I would like to count them again. There are twenty-four with the one proposed well to be drilled in the Southeast Southeast of Section 19, would make twenty-five.

Q That is a firm plan to drill the additional well?

A Yes, sir. We do not propose to plan a well Southeast of Well 21. This is downsip on structure and we do not anticipate that we would recover sufficient additional oil to justify the drilling.

Q So under the present Rule 701 you would have approximately 1,008 barrels allowable for the project?

A I believe that's correct.

Q And 1,050 when the twenty-fifth well is drilled?

A Yes, sir.

MR. NUTTER: Any further questions of Mr. Queen? He may be excused.

(Witness excused.)

MR. IRBY: I would like to ask one question.

MR. NUTTER: Yes, sir, Mr. Irby.

MR. IRBY: Frank Irby, State Engineer's Office.

Further Examination of Mr. Queen

BY MR. IRBY:

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Q How much water is being produced in the Cass Pool?

A Approximately 3400 barrels per day.

Q What is your anticipated rate of injection on your pilot project?

A The initial plans were set up at 500 barrels per well per day. However, we propose to inject all we can in these wells for maximum injectivity. Our amount of water will be controlled by the water available and by the injection pressure.

Q If my mental arithmetic is correct, you anticipate the use of all the Cass Pool water immediately on approval of this application?

A As soon as the equipment is installed?

Q Yes.

A Yes, sir, we do. Even though I think we testified that it would be 3,000, or 500 barrels per day, but this is the original plan figured as far as the entire field. We plan to use all of the Cass Pool water if we can inject it under pressure of 2,000 PSI. We feel it would be sufficient since we have made a calculation of all the break. So we would be able to inject essentially enough under that pressure.

MR. IRBY: Thank you.

MR. NUTTER: Any further questions? Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: Nothing further.

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MR. NUTTER: Does anyone have anything further for Case 1990? We will take the case under advisement and take next Case 1991.

STATE OF NEW MEXICO)
 : SS
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

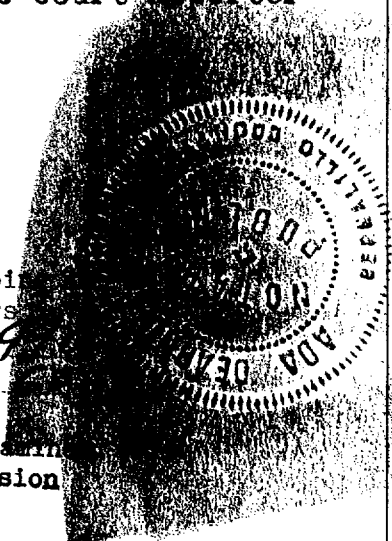
IN WITNESS WHEREOF I have affixed my hand and notarial seal this 25th day of June, 1960.

Ada Dearnley
Notary Public-Court Reporter

My commission expires:

June 19, 1963.

I do hereby certify that the foregoing is a complete record of the proceedings at the Examiner hearing of Case No. 1990 heard by me on 6/22, 1960.
Ada Dearnley, Examiner
New Mexico Oil Conservation Commission



DEARNLEY-MEIER REPORTING SERVICE, Inc.

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ALBUQUERQUE, NEW MEXICO

