BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
October 23, 1968

EXAMINER HEARING

IN THE MATTER OF:

Application of Continental Oil Company for a waterflood project, Lea County, New Mexico. Case No. 3903

BEFORE: Daniel Nutter, Examiner.

TRANSCRIPT OF HEARING

MR. NUTTER: The hearing will come to order, please. The next case will be Case 3903.

MR. HATCH: Case 3903. Application of Continental Oil for a waterflood project, Lea County, New Mexico.

MR. KELLAHIN: Jason Kellahin appearing for the applicant. We have as our witness Mr. V. T. Lyon who has previously been sworn.

MR. NUTTER: The record will show Mr. Lyon is still under oath.

(Whereupon, Applicant's Exhibits 1 through 9 were marked for identification.)

DIRECT EXAMINATION

BY MR. KALLAHIN:

Q Mr. Lyon, are you familiar with the application of Continental Oil in Case 3903?

A Yes, sir.

Q What is proposed by Continental Oil Company in this case?

A Case 3903 is the application of Continental Oil Company for amendment of Order No. R-3486 to authorize two additional injection wells for the pilot waterflood in the El Mar Pool by converting into water injection its Payne Wells Numbers 11 and 12.

Q Now, referring to what has been marked as Exhibit Number 1, would you identify that exhibit?

A Exhibit Number 1 is a location plat showing the El Mar Pool so far as it lies in New Mexico. It shows the Payne federal lease outlined in red which is described as lots 1, 2, 3 and 4 of Section 35, Township 26 South, Range 32 East and the south half and north half -- excuse me, the south half and south half of the north half of Section 30 and all of partial Section 31 in Township 26 South, Range 33 East, Lea County, New Mexico. It shows the two proposed additional injection wells circled in red. These are the Payne Wells Numbers 11 and 12. Number 11 is located 660 feet from the south line and 1650 feet from the west line of Section 30 and Number 12 is located 1934 feet from the north line and 2090 feet from the west line of Section 31.

MR. NUTTER: Two thousand and what, please?

THE WITNESS: Two thousand and ninety. It also shows the location and ownership of wells in radius of two miles from these wells.

Q (By Mr. Kellahin): Now, do you presently have a waterflood project under way on this property?

A No, we do not have a waterflood in operation at this time.

Q Do you have one authorized?

A We have authorization to inject water into our Wilder Wells Numbers 24 and 27, which are located in Section 26, Township 26 South, Range 32 East.

Q And the wells you are proposing in this application will be in addition to those wells, is that correct?

A Yes, sir.

Q Now, referring to what has been marked as Exhibit Number 2, would you identify that exhibit?

A Exhibit Number 2 is a copy of the form "C" 108 showing pertinent information for our Payne Well Number 11. It is shown to be located in Unit "N" of Section 30, Township 26 South, Range 33 East. Seven and five-eighths inch surface casing was set at three hundred thirty feet and cemented with one hundred seventy-five sacks of cement and the cement was circulated to the surface. Four and a half inch casing was set at four thousand seven hundred eighty-six feet with six hundred fifty sacks of cement, the top of the cement by temperature survey is at fourteen hundred ten feet. We propose to inject water through two and three-eighths inch plastic or cement lined tubing to be set in a packer at four thousand six hundred fifty feet. We propose to inject water into the Delaware sand in the interval forty six seventy-five to eighty-one, forty seven

forty-nine to fifty-one and forty seven fifty-five to sixty-five.

Q Now, referring to what has been marked as Exhibit Number 3, would you identify that exhibit?

A Exhibit Number 3 is the form "C" 108 for the Payne Well Number 12 which is in Unit "F" of Section 31, Township 26 South, Range 33 East. It shows that seven and five-eighths inch casing was set at three hundred thirty-two feet with one hundred seventy-five sacks of cement circulated to the surface. Four and a half inch casing was set four thousand seven hundred seventy-seven feet, cemented with nine hundred seventy-five sacks of cement and this was also circulated to the surface. We propose to inject through cement or plastic lined tubing two and three-eighths inch at four thousand six hundred fifty feet where it will be set in a packer at that depth. We propose to inject into the Delaware formation forty seven thirty-three to forty, forty six sixty-six to seventy-one, and forty six eighty-five to ninety-four.

Q Now, referring to what has been marked as Exhibit Numbers 4 and 5, would you discuss those two exhibits?

A Exhibits 4 and 5 are schematic diagrams showing essentially the same information which I described and read

from Exhibits two and three respectively.

Q Now, in the completion of these two wells for injection purposes, will you use an inert fluid between the casing tubing annulus?

A Yes, we will.

Q Will you have the casing tubing open at the surface or use a pressure gauge?

A Yes.

Q Which would you prefer to propose?

A We will install the pressure gauge.

Q On each well?

A Yes, sir.

Q Now, referring to what has been marked as Exhibit Number 6, would you identify that exhibit?

A Exhibit Number 6 is a copy of a part of the radio activity log on Payne Number 11. It shows the top of the Delaware line referred to as the La Mar at four thousand six hundred thirty-four feet. The top of the Delaware sand at four thousand six hundred seventy-four and the perforations four thousand six hundred seventy-five to eighty-one, four thousand seven hundred forty-nine to fifty-one, four thousand seven hundred fifty-five to sixty-five.

Q Now, would you give the same information from

Exhibit Number 7?

A Yes, sir. Exhibit Number 7 is the radio activity log of Payne Number 12 and it shows the top of the Delaware formation at four thousand six hundred eighteen, the top of the Delaware sand at four thousand six hundred fifty-eight, the perforations, four thousand six hundred sixty-six to seventy-one, four thousand six hundred eighty-five to ninety-four, four thousand seven hundred thirty-three to forty.

Q What is the present status of these two wells? Are they temporarily abandoned or producing?

A At the present time, I believe these wells are producing.

Q Now, are the intervals in which you are proposing to inject open in the other wells in the area?

A The producing formation in the El Mar Delaware Pool is primarily the Ramsey Sand which is the upper sand body between the -- I'm referring to Exhibit 6 -- between the point marked top of Delaware sand to the shale body which occurs at about four thousand seven hundred twenty-eight; the sand body below this shale break occurring at approximately four thousand seven hundred fifty-eight is called the Olds, o-l-d-s, sand and primarily the production

comes from the ramsey or the upper sand, but there is some spotty production from the olds member that is not consistent.

Q You will be injection into the perforations as shown on Exhibits 6 and 7, though, is that correct?

A Yes, sir.

Q Now, what is the source of the injection water?

A The water to be injected is that produced on our Wilder and Payne and Bradley leases and probably from the other leases from other operators in the El Mar Pool.

Q It will be produced water from these other leases?

A Yes, sir.

Q What volumes of water do you anticipate injection?

A We expect to inject between one hundred fifty and three hundred barrels per day in each well.

Q Now, do you have an analysis of the water to be injected?

A Yes, sir. Exhibit Number 8 is a copy of the analysis of the water which was sampled at our tank battery in the El Mar Pool. All three of the leases which I mentioned produced into this battery.

Q Now, is this the same water that you propose to inject into your Wilders Numbers 24 and 27 wells?

A Yes, it is.

Q Is it a potable water?

A No, it is not potable.

Q Is it comparable to the water found in the formation in which you propose to inject it?

A Yes, sir, it should be identical.

Q It is from the same formation, is it not?

A Yes, sir.

Q Has Continental Oil Company made an engineering study of the feasibility of waterflooding in the El Mar Pool?

A We have been in the process of making an engineering study and this study is completed with the exception that we have not yet determined definitely what our injection pattern will be, but we have formed engineering committees and working interests owners committees preparatory to unitization efforts.

Q Now, are the Payne Wells Numbers 11 and 12 property located for a waterflood pattern?

A Yes, sir. These wells, I think, are ideally located for pilot flood purposes and will be readily adaptable to a full-scale flood.

Q Now, I believe you said they were currently producing. At what rates are they producing?

A The two wells?

Q Yes, sir.

A Well Number 11 is producing at a rate of 2.7 barrels per day; Number 12 is producing at 6.3 barrels per day.

Q Now, are these wells practically at a stripper stage then?

A Yes, this is nearing the economic limits.

Q Since the water to be injected is produced from the same formation would there be any question of compatibility?

A There should not be. We don't anticipate any compatibility problems.

Q This is set up as a pilot waterflood project, is it not?

A Yes, sir.

Q It will also serve the purpose of salt water disposal to comply with the provision of Order Number R-3321, will it not?

A Yes, this is true. We are initiating the injection of water probably at least a year in advance of what we would have, had Order R-3321 not been entered.

Q Now, have you had any experience in flooding with the Delaware sand, Mr. Lyon?

A There is very limited experience in the flooding of the Delaware. I think it has been considered a good prospect for many years, but there are problems of waterflooding in the reservoir because the sand is rather loosely consolidated and it appears to exhibit unusual characteristics as to receptiveness of the produced water.

Q Do you anticipate you will learn anything from the pilot flood in connection with the feasibility of a large-scale flood in the area?

A We expect to learn a great deal from injecting into the formation. For one thing, how much water we can inject. If we have permeability data as to air and our injection experience will enable us to fit this into water permeability.

Q Now, Order Number R-3486 authorizing the injection of water into Continental's Wilders Wells Number 24 and 27, would you discuss the relationship of those wells with the proposed injection in this case?

A If you will refer to Exhibit Number 9 which is a structure map, on top of the Delaware limestone, that's the El Mar which I mentioned, you will note that Payne Numbers 11 and 12, which are circled in red, are on the down dip limits of the production. The previously authorized

wells, Wilder 24 and 27 are at the up dip limits of production. Just to the west of the Wilder Wells there is a permeability pinch out which limits production of the dip and is the trapping mechanism in this reservoir. At this point the permeability is extremely limited and so -- not only do the wells have limited injection capacity, but there is a difference in the situation as compared to the wells at the down dip structure. The Payne 11 and 12 are located near the oil-water transition zone. The permeability seems to be very good, but the production is limited by the appearance of water. Consequently, we have two wildly divergent situations in which to inject which will give us a much broader data to evaluate feasibility of waterflooding.

Q In addition to determining the feasibility of waterflooding, will the proposed wells give you a sufficient capacity for salt water disposal of produced water and disposal?

A We feel quite sure that they will.

Q Does Continental intend to use the wells authorized by Order R-3486 as well as those included in the application today?

A We may not. Initially, this is something that we will have to determine as we gain experience in the area.

Obviously, the wells to the east, the wells involved in this application, have the greater injection capacity and we will probably inject into those wells initially and perhaps at a later date, probably at a later date, we will inject also into the up dip wells.

Q Then you want to retain your authority to inject in the Wilder Wells, is that correct?

A Yes, sir. We would like to have as much flexibility as possible in injecting the wells.

Q Now, would you give a brief history of the El Mar Pool?

A The New Mexico portion of the El Mar Pool was discovered on March 10, 1959, by the Hill and Meeker, which is now the current County Land Company, State 36, Number 1 in Lea County, New Mexico. Subsequently, fifty-nine producers and two dry holes were drilled in New Mexico. At present, there are fifty-five producers in the New Mexico end of the Pool. The Pool limits are considered to be well defined and development is completed. Production is from the Ramsey and Olds sand members of the Bell Canyon, Delaware mountain groups formation. The sand occurs at an average depth of four hundred fifty feet. Well completion procedures in general were to perforate four and a half inch

production casings acidized to two hundred fifty to five hundred gallons of acid and fracture treatment two thousand to five thousand gallons of lease crude containing one pound of sand per gallon.

Q Now, what's the current daily average production of this pool?

A During the month of July, 1968 the pool averaged five hundred eleven barrels of oil per day and two hundred twenty-seven barrels of water per day, twenty-two hundred and forty-seven mcf of gas per day for an average gas-oil ratio of four thousand three hundred ninety-six cubic feet per barrel. This is an average of 9.2 barrels of oil per day per producing well.

Q Do these producing rates indicate that the reservoir is at an advanced stage of completion?

A It has not reached economic limits and is still producing commercial quantities but it is nearing the stripper stage.

Q Now, in the event this waterflood project is approved what would the allowable be according to your calculations?

A There are four direct and two diagonal off set wells to the injection wells creating an eight well project

area. Based on the minimum waterflood allowable of forty two barrels per day, a minimum waterflood unit allowable of three hundred thirty-six barrels a day would be anticipated. Under the current allowable of fifty-eight barrels per day, the unit or the project allowable would be four hundred sixty-four barrels per day.

Q Are all of the diagonal and direct off set wells presently producing?

A I believe they are.

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

A Yes, sir.

Q Do you anticipate that it would result in production of oil that would not otherwise be recovered?

A Yes, sir, we do.

Q Are exhibits one through nine prepared by you or under your supervision?

A Yes, sir, they were.

MR. KELLAHIN: At this time, I would like to offer in evidence Exhibits one through nine.

MR. NUTTER: Applicant's Exhibits one through nine will be admitted.

MR. KELLAHIN: That's all I have on direct examination, Mr. Nutter.

MR. NUTTER: Does anyone have any questions of the witness?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Lyon, wells numbers 9 and 12 are on partial tracts, aren't they; that wouldn't be a full forty acres there, would it?

A No, those are not full forty acre tracts and I'm sorry I don't have the acreage allocated to them.

Q The allowable would be decreased somewhat then just for acreage correction in determining the project allowable, I believe.

A That's true. I don't whether they are larger or smaller than forty acres.

Q Well, I believe they are smaller. Seven and ten are full forties I believe and then those are fractional lots down there at the state line.

A Right, I believe you are right.

MR. NUTTER: Are there any other question of Mr. Lyon? He may be excused. Do you have anything further Mr. Kellahin?

MR. KELLAHIN: That's all.

MR. NUTTER: Does anyone have anything they wish to offer in Case 3903? The case will be taken under advisement.

(Witness excused.)

STATE OF NEW MEXICO )
)ss
COUNTY OF BERNALILLO )

I, GLENDA BURKS, Court Reporter in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me; and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

Glenda Burks
COURT REPORTER

I do hereby certify that the foregoing ... of the proceedings ... Case No. 3903 ... heard by me on 10/23 ..., 1968

... Examiner
New Mexico Oil Conservation Commission