BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

November 29, 1961

EXAMINER HEARING

IN THE MATTER OF:
Application of Water Flood Associates, Inc., for a waterflood project in the Maljamar and Robinson Pools, Lea County, New Mexico. Applicant, in the above-styled cause, seeks permission to institute a waterflood project in the Maljamar and Robinson Pools in portions of Sections 5, 6 and 7, all in Township 17 South, Range 32 East, Lea County, New Mexico.

CASE NO. 2441

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

EXAMINER NUTTER: We will call Case No. 2441.

MR. WHITFIELD: Application of Water Flood Associates, Inc., for a waterflood project in the Maljamar and Robinson Pools, Lea County, New Mexico.

MR. KELLAHIN: Jason Kellahin, Kellahin & Fox of Santa Fe, representing the Applicant. We'll have one witness.

Incidentally, the advertising in this case appears in the name of Water Flood Associated, Inc. It should be Water Flood Associates, Inc.

(Witness sworn.)

H. C. PORTER,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Will you state your name, please?

A Harold Porter.

Q By whom are you employed and in what position?

A I am an engineer employed by Water Flood Associates, Inc., Ft. Worth, Texas, home office.

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

A Yes, sir.

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

EXAMINER NUTTER: Yes, sir.

Q (by Mr. Kellahin) Mr. Porter, are you familiar with the application of Water Flood Associates, Inc., in Case No. 2441?

A Yes, sir. I have made a study of the area itself.

Q Before we get into that, have you prepared a plat showing the area involved?

A Yes, sir, I have an area plat.

Q Is that the plat which has been marked as Applicant's

Exhibit A?

A Yes, sir.

Q Would you go ahead, please, sir?

A With reference to the brochure marked Exhibit B, the application is for a waterflood permit in the North Maljamar and Robinson Pools of Lea County. The location of the lease involved is an appendix. It is the Mitchell 1 and 2 lease, the Mitchell 3 and 4, and the Mitchell 5 and 6 lease in Sections 5, 6, and 7, Township 17 South, Range 32 East. The Mitchell 5-6 lease is carried in the Robinson Pool. The other leases are carried in the North Maljamar Pool. However, they are the same geologic zones being produced.

Q The intervals are identical in your opinion?

A Yes, sir, they are.

EXAMINER NUTTER: The area which was designated as the North Maljamar Pool has been abolished by Commission Order R-1907. That was done recently, April of 1961.

Q (by Mr. Kellahin) The project area includes how many acres?

A There are 280 acres involved, of which five are producing oil wells, two are plugged and abandoned and one dry hole.

Q Now, what is the geology of the area you're dealing with, Mr. Porter?

A The zones are commonly referred to by the USGS as

zones 5, 6, 7, and 8. However, zone 7 is not productive, is not significant in the area. Zones 5, 6 and 8 are the productive zones. Zones 5 and 6 are Grayburg formations. Zone 7 is San Andres lime and zone 8 is the Lovington sand found about 120 feet into the San Andres formation.

Q It is a part of the defined limits of the Maljamar and Robinson pools, is that correct?

A Yes.

Q The Lovington as well as Grayburg?

A Yes, that's correct.

Q What is this, a stratographic trap?

A Yes, it's an elongated stratographic trap. Permeability is controlled on all sides. The limits of production are shown in Exhibit 6, which is a map. As you can notice, I have drawn a line in there showing the limits of production. We have dry holes to the east,south, and to the west, except in the area of 5 and 6. They are not offset by any dry holes or production.

Q With reference to the well in the Southwest of the Southwest of Section -- what section is that on that area map north of 6?

A Section 31. With reference to that well, I have left it out of the limits of production for the reason it has been drilled recently and has made on the order of 7,000 barrels of oil total and is now producing at a very low rate, less than

one barrel per day, so it is really not a commercial well.

EXAMINER NUTTER: That would be the No. 1 well in the Southeast of the Southeast of Section 31?

THE WITNESS: Yes, sir.

Q (by Mr. Kellahin) Is that the well belonging to Water Flood Associates?

A McGrath and Smith. However, all those wells, one, two, and three, have produced very little oil.

Exhibit 10 shows the cumulative production which is one, 7,000 barrels; two, 5,000; three, 2,000; and they're all well down in production. So, they're really not what you might call part of this productive area.

Q Would you refer to Exhibit No. 3 attached to Exhibit B and disucss the information, the completion data on those wells.

Q These wells were all drilled by cable tools. The surface casing was set into the salt section through the Eocene Series and the surface casing was cemented with 50 sacks in each instance. The long string was set above the pay section and they were all cemented with 100 sacks of cement. The general practice was to drill the pay zone and simulate production by shooting with nitroglycerine.

Exhibit 3 of Exhibit D shows the casing data, TDs and general well completion data.

Exhibit 4 shows the IPs, present producing rates, cumulative recovery and the stimulations that were given on the

wells.

Q Now, this area has been on primary production for some time?

A Yes, sir. The Mitchell No. 1 was drilled in March, 1927 and was the discovery well. It potentialled for a hundred barrels a day. This well produced on the order of 160,000 barrels. Additional development did not occur in this area until 1940, when No. 2 was drilled and then the other wells were drilled up through 1953. Completion dates are shown in Appendix 3. The five producing wells have produced 311,596 barrels of oil.

Q Production generally has declined, has it not?

A Yes, sir.

Q What is the average now?

A The average production now is less than two barrels a day per well.

Q Is that an economical well?

A These wells are nearing their depleted primary state. They're nearing their economic limits.

Q Are you producing any quantities of water?

A No, sir. One well makes a very, very little water but not enough to mention. I would say less than a tenth of a barrel per day.

Q What about the gas-oil ratio?

A The GORs were 50 to 1.

Q In your opinion, are the wells completed to the point that secondary recovery is indicated?

A Yes, sir, they are.

Q How do you propose to inject water in this area, Mr. Porter?

A We would like to inject into Well No. 2 at the location of Section 6 and Well 5 at the location of Section 5. The nature of the reservoir in the elongated shape of the reservoir makes it impossible to have a five-spot or other normal water-flood pattern. It's felt that by the use of these two injection wells and the possible conversion of the wells later, that an efficient sweep of the reservoir may be made by flooding against the pinch-out and permeability.

Q Is that the permeability that you refer to as the limit of production on your Exhibit 6?

A Yes, sir.

Q Will that pattern of flood have any adverse effect on offset operations?

A No, sir, it will not. The only offset operators that we have here are Continental Oil Company in Section 5, 6, and 7 and these wells have not been drilled if there is production there on the north. Now, down to the south of the productive area, that area is defined by dry holes.

Q There are no areas immediately offsetting this to the south, then, are there?

A There's no proven area.

Q There are no producing wells?

A No, sir.

Q Do you have any reservoir data available?

A These wells were drilled with cable tools. There are no electric logs, no radioactive logs run. There have been no cores taken. The cable tool sample analyses have shown these wells to be zones 5, 6, 7 and 8 in the Grayburg-San Andres formation.

I have no data as to net pay thickness, porosity, or permeability, absolutely none available.

Q Do you have any estimate of the net pay?

A I have used some rules of thumb that show that the average net pay thickness should be on the order of 18 feet.

Q On what do you base that, Mr. Porter?

A Well, sir, I base it on the primary recovery of 366,000 barrels, or thereabouts, using a 200-acre productive area. As a rule of thumb, that says that you can recover 100 barrels per acre foot for 40-acre spacing, which gives us roughly 18 feet. This is probably more than is there. That's the best way I can determine it.

Q Have you made any estimate of the recoveries to be expected on secondary recovery?

A Yes, sir. Again using a rule of thumb, 1.5 times the primary recovery, I have come up with a recoverable of oil of

480,000 barrels. This is based on the fact that it is now predicted that the Caprock Queen flood will produce 1.4 times as much secondary oil as it did primary oil.

Q What kind of reservoir was this initially, volumetric?

A Yes, sir. There is no high GOR and no water. From all available evidence, the drive is of the solution gas type, volumetric reservoir.

Q Do you have any secondary gas cap present now?

A There is no evidence of any secondary gas cap.

Q What do you anticipate will be injected in the water injection program, what volume?

A We anticipate an initial injection of 500 barrels per day per well with this being reduced later as we get response. The maximum pressure would be 2,000 pounds per square inch. Withdrawal rates are controlled by proration, and it will be necessary to lower the injection volumes.

Q Do you anticipate that the reservoir will take that volume of water?

A Yes, I think it will, to start with. I base this on the Roberts waterflood, which is approximately three miles to the east. These wells took only on the order of 400 to 500 barrels per day initially. Also, in the Square Lake area, where both these pools I mentioned are flooding the same zones in open hole.

Q Do you have about the same pressures at the well head?

A Yes, sir. We have 2100 pounds in the Roberts field right now.

Q What is the estimated life of this project?

A It's estimated to take on the order of ten years to recover this oil.

Q You have already covered the volume of oil you anticipate you will recover. Will it be possible for you to operate this project within the allowable provisions as presently set up by the Commission rules governing secondary recovery?

A Yes, sir. We are applying subject to Rule 701.

Q Is water available for the purpose of this project?

A Yes, sir. The Caprock Water Company and the Yucca Water Company have both agreed to sell water to us for this project from their commercial water lines which transport water from the shallow Lea County Basin down through the oil field to the Loco Hills area.

Q Their letters are attached to Exhibit B as Exhibits 5A, and 6A, is that correct?

A Yes, sir.

Q Have you made any contract with either one of these companies as yet?

A No, sir. We are negotiating with them to buy water they have offered to sell.

Q What casing program do you have on the injection wells?

A Well No. 2 has 8 5/8-inch service pipe set at 812 feet

and cemented with 50 sacks of cement with seven-inch pipe set at 3495 feet cemented with 100 sacks of cement. No. 5 has 8 5/8-inch casing, surface casing set at 905 feet cemented with 50 sacks and a long string of 5 1/2-inch casing set at 3890 feet cemented with 100 sacks. I have calculated the tops of the cement for each individual well and shown it as Exhibit 5. Well No. 1 was drilled in 1927. I have no cement records of that well. I don't know how much was used. It is not now making any water so it's assumed that the well will be all right for production. It's been producing since 1927. Any fresh water which might be present in the area is protected in the injection wells by two strings of casings, two cement jobs. It is anticipated that the wells will be injected initially down the casings without tubing in the wells.

Q Will you inject these wells open hole or are these wells perforated?

A It will be open hole injection, as shown in the completion record.

Q Were Exhibits A and B prepared by you or under your supervision?

A Yes, sir, they were.

MR. KELLIHAN: I'd like to offer Exhibits A and B.

EXAMINER NUTTER: Water Flood Associates' Exhibits A and B will be admitted in evidence.

Q (by Mr. Kellahin) Do you have anything further to add,

Mr. Porter?

A We will be injecting into zones 5, 6 and 8. These zones are the same zones which are being waterflooded successfully in the Robinson pool and also in the Square Lake pool. The completions are the same in these pools as in this one. The Robinson production has increased since the first injection to 12,000 barrels a month. The Square Lake zone has increased from 300 barrels a month to 10,000 barrels per month.

MR. KELLAHIN: That's all we have.

EXAMINER NUTTER: Are there any questions of Mr. Porter?

CROSS EXAMINATION

BY EXAMINER NUTTER:

Q You will inject 500 barrels per day per well, is that correct?

A Yes, sir.

Q And then later you will reduce the rate of injection. You didn't specify as to any particular volume.

A No, sir. It is anticipated that we will not be able to get that much water in due to fill-up, lower permeabilities, and also our withdrawals.

Q Injection will be by pressure only?

A Yes.

Q Up to a maximum of 2,000 pounds?

A Yes, sir. There haven't been any wells at all drilled on the east side of this productive area north of the abandoned

location on the Continental Mitchell A lease.

Q That is shown as an abandoned location, is that correct?

A That is a dry hole.

Q Was that well actually dry?

A Yes, and also Well No. 4 over in Section 6 is a dry hole. Those are dry holes. Wells 3 and 7 are plugged and abandoned wells. They never have made any oil to speak of. They were plugged and abandoned very soon after they were drilled. However, casing was set and they did produce a slight amount of oil.

Q How do you actually know the existence of permeability and porosity around the northern part of the productive limits when only one well has actually been drilled, that being in the Southeast of Section 31?

A Well, there is a dry hole north of the Hudson No. 1 well, the Aztec well there. That is a dry hole. As I said, this is the McGrath-Smith Well No. 1 which has been very poor. It has not been economical. It has only produced 7,000 barrels of oil.

Q When was it completed?

A I don't have the date but it was within the last two or three years. I don't have it with me. The producing rate has fallen off to on the order of one barrel a day. We have applied to Continental for a farm-out of those 80-acre tracts in five and six and they have indicated to us that we will get a

farm-out on these at which time we will attempt to further define the field.

Q Where abouts is that now?

A The two 80s offsetting Wells 5 and 6, the 80 to the west and the 80 acres to the east.

Q Zones 5 and 6 are in the Grayburg formation?

A Yes.

Q Eight is the Lovington sand in the San Andres?

A Yes.

Q What name did you use for zone 7?

A Zone 7 is the permeable zone in the San Andres lime which does produce in some of this Malmajar- Square Lake area.

Q You have no specific name for that?

A No, sir.

Q Now, your 18 feet of net pay thickness was based on a primary recovery of 311,000 barrels with a rule of thumb of 200 barrels per acre foot?

A One hundred.

Q Two hundred productive acres?

A Yes. I just ran that out roughly. It could be -- I think that's too much. I don't have any data to prove it. It probably is not significant, anyhow.

Q Both of these water companies that you have contacted relative to furnishing the water for the flood will be able to furnish water in sufficient quantities to finish this flood out?

A Yes, sir. They have indicated that they have water rights and enough line capacity for sufficient water for the flood.

Q It is your anticipation that you will contract with one or the other or both?

A One or the other, yes, sir.

EXAMINER NUTTER: Are there any further questions of Mr. Porter?

THE WITNESS: I would like to state also here that I have discussed this informally with the USGS office at Artesia and they have given verbal approval. I have made formal application and they have told me informally that it will be approved.

Q (by Examiner Nutter) Is it your anticipation to attempt to produce the 3A which is plugged and abandoned and also the Number 7 which is plugged and abandoned?

A No, not at the present time. Based upon the results of the flood, these wells will later be applied for -- permission will be applied for to either produce them or inject into them.

Q Both of them do have a production string of casing in them?

A No, sir. The wells have been plugged and abandoned.

Q Was the casing pulled?

A Yes, sir, and plugged with cement.

Q If you decide to use them as producing wells or injection wells, you will case them?

A Yes, sir.

EXAMINER NUTTER: Are there any further questions of Mr. Porter?

He may be excused.

(Witness excused.)

EXAMINER NUTTER: Does anyone have anything further they wish to offer?

The case will be taken under advisement.

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STATE OF NEW MEXICO)
) ss.
COUNTY OF SAN JUAN)

I, THOMAS F. HORNE, NOTARY PUBLIC in and for the County of San Juan, State of New Mexico, do hereby certify that the foregoing and attached transcript of hearing was reported by me in stenotype and that the same was reduced to typewritten transcript under my personal supervision and contains a true and correct record of said proceedings, to the best of my knowledge, skill and ability.

Thomas F. Horne
NOTARY PUBLIC

My Commission Expires:

October 2, 1965

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2441, heard by me on 11/29, 1961.

, Examiner
New Mexico Oil Conservation Commission