

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

April 26, 1967

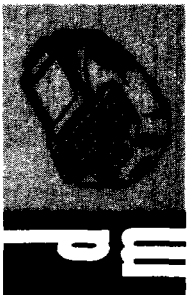
IN THE MATTER OF:)
)
)

Application of William A. and Edward)
R. Hudson for a waterflood expansion,)
Eddy County, New Mexico.)
)
)

Case 3566

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING



MR. NUTTER: Case 3566.

MR. HATCH: Case 3566, application of William A. and Edward R. Hudson for a water flood expansion, Eddy County, New Mexico.

MR. KELLAHIN: If the Commission please, Jason Kellahin of Santa Fe, representing the applicant. I have one witness I would like to have sworn, please.

(Witness sworn.)

MR. UTZ: Any other appearances? You may proceed.

MR. RALPH L. GRAY, called as a witness on behalf of the applicant, first having been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Ralph L. Gray.

Q Mr. Gray what business are you engaged in?

A Consulting engineering.

Q As a consulting engineer, have you been employed by William A. and Edward R. Hudson in connection with Case 3566?

A Yes, sir.

Q Briefly state what is proposed by the Applicant in this case?

A The Applicant proposes to expand the water flood

project which is currently being conducted on their Puckett 'A' lease. It is proposed to ultimately inject water into ten additional wells.

Q Does the Applicant also ask for administrative procedure for further expansion of this project?

A Yes, sir.

(Whereupon, Applicant's Exhibit Number 1 was marked for identification.)

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

A Exhibit Number 1 shows the present outline of the project area. That is designated by the cross-hatched symbol and it is marked "Project Area" on the map. It will be noted that the present project area includes the north half of the north half of Section 25 of 1731. This map also shows the present in-pit wells by the green coloring and the proposed expansion program, the proposed future injection wells and are indicated by the red marking on the map.

Q The map also shows the off-setting ownership, does it not?

A Yes, sir.

Q Is this expansion area off-set by a water injection program?

A Yes. Skelly Oil Company is currently engaged in

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expanding their water flood project directly to the west of the Hudson property and the Continental Oil Company on their MCA unit is currently expanding their water flood project adjacent to the east of the Hudson property.

Q Now, do you have lease line agreements with the two off-setting operators?

A I believe that the Hudsons have actually signed the agreement with Continental, if not, they are very close to signing it. Skelly Oil Company has submitted a proposed lease line agreement on the east side of the property and we have tentatively come to an agreement on what the program will be along this lease line.

Q You have no doubt but what the lease line agreement will be achieved by both the off-setting operators?

A Yes, sir, I'm sure.

(Whereupon, Applicant's Exhibit Number 2 was marked for identification.)

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

A Exhibit Number 2 has been prepared to show also the proposed injection wells. In addition, the wells on the Skelly property to the west, which we anticipate will be converted are indicated on this map by the red circles and the wells along the common Hudson-Continental boundary line are

also indicated by the red circles. These should conform with the programs that both companies have had applications on already.

Q What is the significance of the other information shown in the boxes under each well?

A This map also shows performance data for each of the producing wells and each of the injection wells on the Puckett 'A' lease.

Q Then, the figures in the boxes indicate the performance data on the wells, is that correct?

A Yes, sir, that's correct.

Q And, you have a further exhibit showing this, do you not, as to the project as a whole?

A Yes, sir.

(Whereupon, Applicant's Exhibit Number 3 was marked for identification.)

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

A Exhibit Number 3 shows daily average oil and water production for each of the Puckett 'B' wells for the month of March, 1967. The average oil production per well was 7.9 barrels of oil per day, so it can be seen that these wells are definitely in the stripper stage of depletion.

This exhibit also shows the cumulative oil

production for each of these wells as of January 1st, 1967.

Q Now, this is in the area in which you are going to expand the flood?

A Yes, part of these wells are actually included within the present area, but we are just merely showing the entire Puckett 'B' lease on this exhibit.

(Whereupon, Applicant's Exhibits 4 through 13 were marked for identification.)

Q Now, referring to a series of exhibits which have been marked Exhibits Numbers 4 through 13, would you identify those exhibits, please?

A Exhibits 4 through 13 are diagramatic sketches of the proposed water injection wells. I would like to make some specific comments in regard to the insertion of these wells.

Q In that connection, did you receive a copy of a letter directed to Mr. A. L. Porter, signed on behalf of the State Engineer by Mr. Frank Irby?

A Yes, I did.

Q In connection with your comments on the Exhibits Numbers 4 through 13, would you also cover the items which have been mentioned in that letter, please?

A In Mr. Irby's letter, the number one comment that he had was that there is no indication as to where the packers

will be set in any of the wells. We don't show specific depths at which the packers will be set. We don't know, frankly, at this time exactly where they will be set, but as an example, Exhibit Number 4 shows the diagrammatic sketch for the Puckett 'B' Number 2 well and the proposed program for converting this well to injection, provides for the cementing of the four and a half inch liner in this well, which will come up into the seven inch casing, which is the present production string and we indicate on the diagram that the packer will be set in the top part of the four and a half inch liner, so we feel that the purpose of the diagrammatic sketch is to show approximately the procedure that we plan to use rather than showing specific depths.

Q Now, actually there will be no pressure on that casing in that particular well, will there?

A No, sir, not in the casing in the Puckett 'B' Number Two well.

Q Or, in any of the other wells in which you are running a liner, is that correct?

A That is correct. Now, there are two types of wells in this area, the old type in which the production string was seven inch and it was set way above the present pays and there is approximately three to four hundred feet of open hole section. In that type of well, we propose to cement these

liners. The second type of well, we have, is in the newer wells, in which case the casing is usually five and a half and it was cemented to the bottom of the hole. In some of these cases we don't propose to use packers.

Q Now, would Exhibit Number 9 be an example of that type of well?

A Yes, sir, Exhibit Number 9 is a diagramatic sketch of the Puckett 'B' Number Twelve and this is one of these newer wells in which the five and a half casing is cemented to the bottom of the hole, and, we don't propose to use a packer in this well.

Q Now, is this a type of completion for an injection well that has been approved by this Commission in connection with your water flood project?

A Yes, sir, from the very initial hearing, this type of procedure has been approved by the Commission.

Q And that is one of the wells on which Mr. Irby commented, was it not, your Puckett 'B' Number Twelve?

A Yes. He had some other comments in his letter on the Puckett 'B' Number Twelve. He said the size of the production tracing was not given and the quantity of cement for either the casing strings and that was an oversight on our part. In typing these, well, that was left off and we have added that to Exhibit Number 9. So that, all of that

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information is now shown.

Q Would you go ahead with your comments in regard to the completions on these injection wells?

A First of all, I would like to refer back to Exhibit Number 2, momentarily, and call your attention to the Puckett 'B' Number 5, which is located in the Southeast Quarter of the Southwest Quarter of Section 24. We are asking for authorization to convert this well to a water injection well, although we do not propose to immediately do that. We will inject water into the two injection wells that are shown as the Puckett 'B' Twenty-three and 'B' Twenty-one, just north of this well and then, at such time as this area is watered out, and watered to the extent of coming down to this Puckett 'B' Number Five well, well, then, at that time, we will convert that to a water injection well.

I would like to also comment that some of the older wells which includes the Puckett 'B' Number Two, Five, Seven, Nine and Eleven, have never had any type of electrical log run and in converting these old wells to injection wells, we propose to run logs at that time. Therefore, we won't know exactly where the completion intervals in this type of well will be until we actually run the surveys. Also, in our agreements with both Skelly Oil Company and Continental Oil Company, in converting the wells along these lease lines

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in accordance with our agreements, it will be necessary that we coordinate our completion procedure with these other people. They will have to agree as to what intervals will be perforated and so forth, so we are requesting a certain amount of flexibility in granting this authorization, which I think is normal anyhow, but certainly we need the flexibility in converting these wells to the point where we can decide the depth at which some of these liners will be actually cemented at a later date. For example, we may want to cement the liners above some of these shot holes which are present in the lower portion of the hole, rather than setting them clear to the bottom.

So, specifically, we are requesting flexibility in the depth at which these liners will actually be set, the perforated intervals that we will actually complete for injection, the exact depth at which these packers will be set in the ~~cases~~ where packers are to be used and also, we are specifically requesting that we be authorized to dually inject water into some of these wells, if that is indicated to be the program that each of the operators agree to at a later date.

Q Now, referring to what has been marked as Exhibit Number 10, does that indicate a proposed completion for injection into two different zones?

A It is not intended to. The reason that a packer has been shown for this installation is that we don't propose to inject water for the time being into the Grayburg formation in this area. At the present time, the Grayburg is open through the perforations of 3542 to 91.

Q Now, that is a perforation that is presently in the well bore?

A Yes, sir, it is presently open and the purpose of a packer in this case is to isolate the Grayburg perforation so that we will inject water only into the San Andres formation.

Q But, as to some of the wells, you do propose to inject by dual injectors in more than one zone, is this correct?

A Yes, sir, what I have in mind there is that in our discussions with Continental and Skelly, they have indicated that in some of these areas along these common lease lines, that they would like to see us inject water into the Grayburg formation, as well as the San Andres, but at the present time, we are only injecting water into the San Andres formation on our property, but in order to satisfy these other people, we have agreed that we would be willing to inject water into the Grayburg in some of these line wells in order to fit into the program that exists on their properties. So,

in cases where we are going to be injecting into the Grayburg and the San Andres on our leases, it is likely that we would prefer to control the injection separately and in some cases we might want to run two strings of tubing. We are not certain right at the moment. I mean, these are things that have to be worked out with these other people, too.

Q Now, as to the manner in which the wells are actually completed, you will file the appropriate report with this Commission showing where the packer is set and how the wells are completed, will you not?

A Yes, sir.

Q Referring to what has been marked as Exhibit Number 12, which relates to the Puckett the Number 18 well where it says, "two and three-eighths inch tubing use packer if the Grayburg is perforated." What is the significance of that?

A Well, this is a well that will be involved in a lease line agreement with Skelly Oil Company. This is a compensating off-set for their Lea Number 3 well, located in Section 26, which is shown with the red circle on Exhibit 2 and in the event that Skelly Oil Company requests us to perforate the Grayburg in this well, then, in that event, we would want to use a packer to segregate the Grayburg from the San Andres, so that we would be able to inject water separately into the

two formations.

Q That is the type of well you were just discussing?

A Yes, sir, in this particular case on Exhibit 12 we would actually inject water down the casing, if the Grayburg were open and we would inject water down the tubing into the San Andres.

Q Now, on the Exhibit Number 13, pertaining to the Pucket 'B' Number 20 well, there again, you will inject without the use of a packer, is that correct?

A Yes, that is correct, because we don't anticipate that the Grayburg will be open in this well.

Q Now, you have been using this system in other portions of the Puckett water flood project, haven't you?

A Yes, sir.

Q Have you encountered any difficulty in injecting down tubing with no packer?

A No, sir, we haven't encountered any difficulty at all and as we have, I believe, testified in some of the previous hearings, we run monthly tests on these wells to check for any possible casing failure. We have connections on the **bradenheads** of all the injection wells and once a month we go around and open those up and test for any casing failure. In the event that we would have a failure, well then, it would be noticed in making these tests.

Q And have you encountered such a failure in the operation of this project?

A No, sir.

Q Does that complete your testimony as to the diagrammatic sketches of the wells?

A Yes, I believe so.

(Whereupon, Applicant's Exhibits 14 through 18 were marked for identification.)

Q Now, referring to the series of exhibits marked 14 through 18, would you state what those are?

A On a few of the later wells that have been drilled, we have run electric logs and Exhibits 14 through 18 show a portion of the logs in each of these wells. These logs show the top of the San Andres. They show the present perforations and in some cases, there are bridge plugs in the wells and these are indicated on these exhibits.

Q But, you have not indicated on these exhibits the manner in which they will be completed for injection purposes, have you?

A No, sir, primarily because we still have to get with Continental and Skelly on some of these cases --

Q You are still not sure as to how they will be completed, is that correct?

A Right.

(Whereupon, Applicant's Exhibit Number 19 was marked for identification.)

Q Now, referring to what has been marked as Exhibit Number 19, will you identify that exhibit, please?

A Exhibit 19 is a series of curves which show the performance of the Puckett 'A' water flood project to date. The oil production is indicated by the solid heavy line and is so labeled "oil production". It will be noted that this curve is still increasing and has increased steadily from the beginning of the flood. At the present time the Puckett 'A' lease is producing approximately 14,000 barrels of oil per month. Whereas, under primary operation, our production would be roughly a thousand barrels per month.

Q If it would follow the normal decline which has been indicated?

A Correct. Yes, sir. Then Exhibit 19 also shows the curves for water injected, gas-oil ratio, average well head pressure and water produced.

Q Now, does that indicate that this is a successful flood for the Puckett lease?

A Yes, sir, it does.

Q Do you anticipate that you will get the same type of results in the expanded area?

A We hope so.

Q Is there any reason to believe you wouldn't?

A No, sir.

Q Were Exhibits 1 through 19 inclusive prepared by you or under your supervision?

A Yes, sir.

MR. KELLAHIN: I offer in evidence Exhibits 1 through 19.

MR. UTZ: Without objection, Exhibits 1 through 19 will be entered into the record of this case.

(Whereupon, Exhibits 1 through 19 were admitted into evidence.)

MR. KELLAHIN: That's all we have on direct examination, Mr. Utz.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Gray, on these wells that you are not proposing to put packers in, do you propose to put anything in the annulus or are you just going to leave them open?

A These wells will be open in the annulus. We have two thoughts in mind. First of all, let me state that these wells have five and a half 'J' fifteen and a half pound casing, which have a minimum yield pressure of 4,810 pounds. They should withstand 4,810 pounds before any yield starts

taking place. So, we are operating well under a safety factor of two on these things with our pressures. The reason that we don't run packers in some of these wells, first of all, a packer is a potential troublemaker. You might run a packer in a hole and three or four years later try to pull it out of the hole and you can't pull it and we have run into those things before. So, we don't want to use them unless we need to.

And then, secondly, there are cases where we like to reverse circulate down the casing and out the tubing on some of these water wells to remove deposition material that has come into the well bore which tends to clog the well bore up. In other words, it is a means of cleaning out some of these wells to reverse them out. So, with a packer in the hole you can't do that.

So, between the two thoughts, we don't like to run packers unless we feel that they are actually necessary for some specific reason.

Q How old is the casing on these wells that you don't intend to put packers in?

A These wells were drilled, the first of them were drilled about, let's see, 1960. If you will refer to Exhibit Number 19, you will notice that the oil production had a jump in the last part of 1960 and this jump continued into

1961 and the reason for that jump was the fact that these wells were drilled at that time as new five spot wells. So, the oldest of these wells are approximately seven years and the newest about four or five years.

MR. UTZ: Is there any other questions of the witness?

MR. KELLAHIN: I overlooked something here.

RE-DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Gray, what is the source of your water for injection into these wells?

A We will use fresh Ogallala water, which is being purchased from the Double Eagle Water Company.

Q And, you have water available, is this correct?

A Yes, sir.

Q And, that is fresh water?

A Yes, sir.

Q What volume of water do you anticipate you will inject?

A We are presently injecting about 4,000 barrels a day. Under the expanded program, we anticipate that our requirement will be approximately 6,800 barrels per day.

MR. KELLAHIN: That is all of the questions I have.

MR. UTZ: Mr. Hatch?

MR. HATCH: I have a letter from the State Engineer that Mr. Kellahin has already mentioned.

RE-CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Gray, how about produced water? Is it your intent to reinject used water, produced water?

A Our program on produced water is that, at such time as the volume became significant, well, then, we would start using the produced water. We don't like to mix the two waters. We have found by experience that there are a lot of troublesome factors involved when you do mix the two waters. In some cases they are not compatible in the formation. It tends to cause plugging problems, mixing of the two waters greatly increases the operating costs, because of the corrosion, additional corrosion involved and it is our intention that when the volume of produced water becomes significant or large enough to consider, well, then, we will create two injection systems.

We will dedicate a part of our system to the use of salt water and we will handle salt water separately from the fresh water system.

Q How much water do you think you would have to produce before you can afford to do this?

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A Well, one of these pumps normally will pump, oh, somewhere between a thousand and two thousand barrels of water per day. I mean, that is kind of a wide range, but by and large that is a range that normally you run through one pump. At the present time, we are producing about a hundred and fifty barrels of water per day from the Puckett 'A' lease. Well, you can see that a hundred and fifty barrels is too small to consider to dedicate one pump to, so it should be up, I would say, close to a thousand barrels a day, in order to utilize our present equipment. Now, there may be special cases where, for example, if this order comes out that we can't dump that water into surface pits, well, naturally, we are going to look for some other way to handle it and what we hope is that maybe we can find some kind of small capacity, high pressure pump that maybe we can utilize on smaller volumes. But, right at the present time, we would hate to have to put this 150 barrels of formation water into our present system.

MR. UTZ: Are there any other questions? You may be excused.

(Witness excused.)

MR. UTZ: Statements? The case will be taken under advisement and the hearing is adjourned.

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In Witness whereof, I have affixed my hand and notarial seal this 15th day of June, 1967.

Jerry Pate
Notary Public

July 10, 1970

I do hereby certify that the foregoing is
a complete record of the proceedings in
the Examiner hearing of Case No. 3576,
heard by me on April 24, 1967.
_____, Examiner
New Mexico Oil Conservation Commission