

BEFORE THE  
OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
June 1, 1960

EXAMINER HEARING

-----  
IN THE MATTER OF: )

Application of C. T. Robertson for an order )  
authorizing a water flood project. Appli- )  
cant, in the above-styled cause, seeks an )  
order authorizing him to institute a water )  
flood project in the Coyote-Queen Pool, )  
Chaves County, New Mexico, by the injec- )  
tion of water into the Queen formation )  
through six wells located in Sections 11 )  
and 14, Township 11 South, Range 27 East. )

Case 1974

-----  
BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: Case 1974.

MR. PAYNE: Application of C. T. Robertson for an order  
authorizing a water flood project.

MR. HINKLE: Clarence Hinkle. I would like to enter an  
appearance in the case for Mr. C. T. Robertson, Hervey, Dow and  
Hinkle, Roswell. We have one witness, Mr. Bob Prentice, whom we  
would like to have sworn.

(Witness sworn.)

MR. UTZ: Are there other appearances in this case?  
You may proceed.

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BOB PRENTICE

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

DIRECT EXAMINATION

BY MR. HINKLE:

Q Your name is Bob Prentice? A That is correct.

Q Where do you live? A Abilene, Texas.

Q What is your profession?

A I am an independent consulting petroleum engineer.

Q Are you a graduate petroleum engineer?

A Yes, sir, University of Pittsburgh.

Q Are you also a graduate geologist?

A That's right.

Q Where from?

A College of Wooster, Wooster, Ohio.

Q What year did you graduate?

A 1942.

Q What year did you graduate as petroleum engineer?

A 1947.

Q Have you practiced your profession since that time?

A That's right.

Q What companies have you been with?

A The Interstate Refining Corporation in Bradford, Pennsylvania, Stanolind Oil and Gas Company, Tulsa, Oklahoma, Russell

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Engineering Consulting Firm in Abilene, Texas.

Q Have you made a study of any fields in New Mexico for water flood purposes?

A I have been involved in studies of the Brown Field, which is North of the Coyote-Queen Pool and in the High Lonesome Pool East of Artesia.

Q Have you been employed by Mr. Robertson to make a study of the Coyote-Queen area?

A That's right.

Q And his leases that are involved there?

A Yes, sir.

Q Are you familiar with the application that has been filed by Mr. Robertson in this case?

A I am.

Q What kind of a study have you made of Mr. Robertson's leases out in the Coyote-Queen area?

A Well, we have surveyed Mr. Robertson's leases to determine the pattern that could be used in a pilot flood for installation of this pilot flood to try to increase the recovery from this particular pool.

Q Did you prepare and file with the application a plat showing the leases involved?

A I did, sir.

Q I believe that was filed as Exhibit 1 or A. Do you have

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that same exhibit before you?

A I do.

Q Has that been marked as Exhibit No. 1?

A Yes.

Q Will you refer to it and explain to the Commission what it is, what it shows?

A This Exhibit No. 1 is a map of the area in which Mr. C. T. Robertson owns some leases. These leases are outlined in red, the offset leases and operators are indicated on this plat. The wells circled in red are the proposed pilot injection wells.

Q Does this show all the wells that have been drilled in the area and surrounding these leases?

A Yes, sir.

Q What is the description of your proposed project area?

A The proposed project area is that area enclosed by the red lines on this Exhibit 1.

Q By legal description, what would that be as far as the actual description is concerned? This is in Township 11 South, Range 27 East, is it not?

A That's right. The Honolulu State Lease would be in the Northwest Quarter of Section 14, the Honolulu State B Lease, and the Magnolia Honolulu State Lease would be in the East Half of Section 11, Range 27 East, Township 11 South.

Q Is that all of the East Half or does it omit the



Northeast of the Northeast Quarter, Section 11?

A That's right. The Northwest of the Northeast Quarter is the Eide de Kalb State Lease. The remaining 40 acre tract is the Magnolia State Lease which would be the Northeast of the Northeast of the West Half of Section 11, Range 27 East, Township 11 South.

MR. UTZ: Did you say Northeast Northeast?

A Of the West Half.

MR. UTZ: The Magnolia is the Northeast Northwest, isn't it?

Q You are speaking now of the Eide de Kalb?

A Right.

Q That would be the Northeast of the Northwest of Section 11?

A Yes.

Q All right now, Section 14, is that the Northwest Quarter of Section 14?

A Yes, sir.

Q Do you know whether or not Mr. Robertson owns the oil and gas leases covering this entire area that you have described?

A To the best of my knowledge, he does.

Q Is this State land or Federal land?

A State land.

Q It is all State land? A Yes, sir.

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Q Do you know whether or not the royalty interests are uniform under the area?

A Yes, sir, as far as I know.

Q As far as the State is concerned, you know that?

A Yes, sir.

Q As far as any overriding royalties are concerned, do you know whether they're uniform if there are any?

A I think probably Mr. Robertson ought to testify to that.

MR. HINKLE: I don't think it's too material.

Q I believe you stated that Exhibit 1 shows the injection wells?

A The proposed injection wells, yes, sir.

Q There are six of those? A Right.

Q Two of them in Section 11 and four in Section 14?

A Right.

Q What is the character of the production in this area at the present time?

A All of these wells are now in the stripper stage of production and the average daily production per well is down between four and five barrels.

Q Have you prepared a plat or isopach plat which shows the sand thickness of the area?

A Yes, sir, I have.

MR. HINKLE: That has been identified as Mr. Robertson's



Exhibit No. 2.

(Whereupon Mr. Robertson's Exhibit No. 2 was marked for identification.)

Q Referring to Exhibit No. 2, will you explain to the Commission what this shows?

A This is an isopach or sand thickness map based on the net oil sand found underneath the leases shown in the area.

Q That's the Queen sand you are talking about?

A That's the Queen sand. Mr. Robertson's leases are shown again outlined in red.

Q What is the approximate depth of the Queen sand in the area?

A It will come in between 950 and 1,000 feet.

Q What is the approximate thickness of the sand underlying the Robertson leases?

A Thirty feet.

Q That's the average?

A Yes, sir.

Q Is there anything else, any further comment you would like to make with respect to Exhibit No. 2?

A I don't believe so.

Q Have you filed with the application logs of the proposed injection wells?

A Yes, sir, however, at the time we filed those, filed our application, we were short two logs.

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Q Which wells were they?

A We were short the Honolulu State No. 2 and the Honolulu State B No. 1.

Q You have logs of those wells at the present time?

A I have a gamma log of the State No. 2 well, and a core graph of the State --

Q Will you have the gamma log identified as Exhibit No. 3?

A Do you want the other one as No. 4?

Q What did you state that was?

A This is a core graph of the sand in the State B No. 1.

Q Is there a log of that well, to your knowledge?

A I don't believe there is a log or gamma log available.

Q This is the best evidence you have of the formation involved here?

A That's right.

MR. HINKLE: Have that identified as Exhibit 4.

(Marked Mr. Robertson's Exhibit No. 4, for identification.)

Q Do you have any further comments with respect to the proposed injection wells and logs of the wells?

A These injection wells will be completed by setting, or have been completed by setting 4½" casing through the pay zone, perforating opposite the pay section. The wells were cemented by circulating cement back up to the surface.

Q Has that been true of all the wells that have been drilled on these leases?





A That's right.

Q They have all been completed by setting 4½" casing and cement clear to the top?

A And perforating the pay zones.

Q Have all these wells been fracked?

A Yes, sir.

Q Why have you selected the wells as you have, that is two wells in Section 11 and four wells in Section 14, to constitute the pilot?

A The pattern that we're showing here is a 40 acre pattern which is rather wide. One of the main purposes of this pilot is to determine the injectivity into the Queen sand. To utilize the wells that we already have to hold down the additional development that might be required, we are starting out with a pattern that's a 40 acre pattern. The area in Section 14, of course, constitutes one five spot. The area in Section 11, we have two injection wells which will be utilized to test injectivity and then will be offset by producing wells. But the big problem we face right now is trying to find out how much water we can get in the ground into this particular formation.

Q And by using the wells that you have designated, you can utilize the present wells without drilling additional wells?

A That's right.

Q In order to test it out? A That's right.



Q Where do you propose to get your water supply for injection purposes?

A We're getting water supply from two fresh water wells drilled by Whaley Company on their A Lease and they will furnish --

Q Does that adjoin this lease?

A It's an offset to these leases.

MR. IRBY: What company was that water from?

A The Whaley Company. They have water supply available that will give us as much as a thousand barrels a day.

Q If the water supply is not available or you can not secure an adequate supply from the Whaley Company, do you anticipate drilling additional wells?

A We are going to drill additional wells on our own leases, or that is Mr. Robertson's leases.

Q To what formation?

A To the shallow Yates formation, which is supplying the fresh water.

Q That lies at approximately what depth?

A 120 to 150 feet.

Q Are you convinced that fresh water will work in this particular case?

A We intend to start this project with fresh water. There has been some discussion as to whether fresh water or salt water would be the best type to use in this reservoir. We're going to



start with fresh water. However, we do know that Devonian water may be made available from the Chisum Pool to the East and that is a salt water formation, and in the event we find that fresh water is detrimental to the reservoir, we will be in a position during the pilot to switch over to salt water.

Q Do you know whether or not you have complied with the Commission memorandum 558 dated January 1st, 1958 for sending a copy of your water analysis to the State Engineer?

A Yes, sir, we have.

MR. HINKLE: I'm not sure whether a copy of the analysis was filed with the application or not.

MR. UTZ: I don't believe it was.

MR. HINKLE: We would like to have identified at this time as Exhibit No. 5 a copy of the water analysis.

(Marked Mr. Robertson's Exhibit No. 5, for identification.)

Q Referring to Exhibit No. 5, is that the water analysis which was sent to the State Engineer?

A Yes, sir, it is.

Q Do you have any recommendations to make to the Commission with respect to the establishment of a project allowable?

A Well, sir, we would like to suggest or recommend that the area shown outlined in red on our various exhibits be set up for, as an administrative unit and that the present allowable regulations



that are applicable to this type of a project be granted for this particular area.

Q In other words, you are not asking for exception to the existing Commission rules with respect to the project?

A No, sir, we are not.

Q Do you intend to expand the project, the pilot, in the event it does prove to be successful?

A We do intend to expand it to encompass as much of the area outlined in red as practicable.

Q That would entail the designation of additional injection wells?

A Yes, sir.

Q And perhaps the drilling of some additional wells or producing wells?

A Well, it will require drilling of both.

Q Is it your intention to expand it or would like to expand it administratively after this is designated as a project area?

A Yes, sir.

Q In the event the proposed water flood project is successful, in your opinion would it be in the interest of conservation and prevention of waste?

A Yes, sir.

Q In your opinion, if successful, would it cause the greatest ultimate recovery of oil from the area?

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A Yes, sir, certainly would.

Q Were all of these exhibits prepared by you or under your direction?

A Yes, sir, they were.

MR. HINKLE: We would like to offer in evidence Mr. Robertson's Exhibits 1 through 5.

MR. UTZ: Without objection, Exhibits 1 through 5 will be entered into the record.

MR. HINKLE: That's all we have.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Prentice, where did you say you were going to get your water?

A From the Whaley Company A Lease.

Q Do they have one water well there?

A They have two water wells, shallow water wells that have been completed in the area which they have agreed to utilize to furnish water to this particular pilot.

Q What's the location of those wells?

MR. ROBERTSON: I know the approximate location.

MR. UTZ: Well, is it in the 40?

MR. ROBERTSON: Yes, one is in the Southeast 40 of the Whaley Company Lease.

MR. HINKLE: We believe the location is in the



Southeast of Section 10, that is 11, 27.

MR. UTZ: That's one well. Both wells are in that quarter?

MR. ROBERTSON: The other well would be in the middle of the South Half of the North 80.

Q Of which section? A Section 10.

Q The location is what, the South Half of the North 80?

MR. HINKLE: It would be in the North Half of the Southeast Quarter of Section 10.

MR. UTZ: I see.

Q If you can't use fresh water, where did you say you intended to get your Devonian salt water?

A From the Chisum Pool which is out there to the East.

Q How far away is that?

A You'll note the Devonian wells are indicated by a symbol.

MR. HINKLE: That's on Exhibit 1?

A On all the exhibits.

Q That is in Section 13? A Section 13.

Q Actually it would seem that your response from your Nos. 1 and 3 injection wells would take quite a while. Would I be correct in that assumption?

A That's right, unless we go ahead and drill the producing well location shown as an offset directly South of those two wells.

Q Actually, you probably would get more information out



of those by just checking the injectivity of the formation?

A That's right.

Q You do intend, do you not, in Section 14, the Northwest Quarter, to actually use that as a pilot flood?

A Yes, sir.

MR. UTZ: Any other questions of the witness?

MR. PAYNE: Yes, sir.

BY MR. PAYNE:

Q Mr. Prentice, the Hanson, ~~Waters~~ and Williamson water flood is in this area, isn't it?

A I believe it is to the Southwest.

Q Do you have any information as to the success or failure of that particular project?

A I have no information on it, sir.

Q If you expand your project, all your expansion is going to be within the area outlined in red?

A That's correct.

Q Now, are you going to inject through your 4½" casing?

A In this pilot we are going to try it through the casing and we are also going to try it as a dual program underneath a packer and on top of the packer down the annulus. I think your Exhibit No. 4, the core graph, will indicate three zones, the lower zone having a higher permeability, and we are thinking in terms of setting a packer between those, the second and the third



zone, and injecting into the tighter formations through the annulus and underneath the packer through the looser formations to try to stabilize the flood.

Q You are going to inject into the entire Queen formation?

A Yes, sir.

Q Are those old wells?

A No, sir, not relatively speaking. They were drilled within the last year.

Q So you do feel that you should pressure test the casing? Was new casing used in the wells?

A Yes, sir, they have all been fracked and no evidence of any splits in the pipe.

Q And the cement was circulated?

A Yes, sir.

Q Do you think it might be advantageous to actually treat this as two separate pilot water floods rather than one, inasmuch as there's actually not much relationship between your proposed injection wells in Section 11 and those in Section 14?

A Well, if the Commission would wish to do it that way we certainly would have no objection. I think it's a matter of trying to set it up now so that we can expand it as an administrative unit on down the road.

Q Do you have any idea of the ultimate recovery that you expect from this water flood operation?





A You are referring to the pilot area or the whole?

Q Actually the whole red outline, assuming the pilot area proves relatively successful.

A I would say that you are thinking in terms of something in excess of a million barrels.

Q I believe you testified you had something to do with some studies in the Brown Pool, is that right?

A That's correct.

Q That's a rather similar reservoir, isn't it?

A Very similar.

Q Do you know how Mr. Brown has fared in his water flood project in that pool?

A I am on retainer to Mr. Brown and handled that particular flood. Our feeling to date is that we're quite encouraged with what has transpired inspite of some difficulties.

Q You are still in the process of some fillup though, is that right?

A Yes, sir. Although we have established stimulation.

Q You believe that your proposed plan of injection here will adequately protect all the fresh waters above the producing zone?

A Yes, sir.

Q That being the Yates, are there any other shallow fresh waters in the area other than the Yates?



A Not to my knowledge.

Q You don't feel it is necessary as a safety feature to inject through tubing?

A No, sir.

Q What are your injection pressures going to be, do you have any idea?

A The anticipated injection pressure would be 540 pounds surface pressure, the very maximum that I can envision would be around 700.

Q What are the depths of these wells, Mr. Prentice?

A They'll come in from 950 to 1,000.

Q You propose to inject in the neighborhood of 100 barrels per day per well?

A That's right.

MR. PAYNE: Thank you. That's all.

MR. HINKLE: One other question.

REDIRECT EXAMINATION

BY MR. HINKLE:

Q Mr. Prentice, do you know whether or not notice was given to all the offset operators in connection with the application that was filed?

A Yes, sir.

Q Did you have any objection or protest or indication of cooperation from them?



A I have heard from all of the offset operators either verbally or in writing that they have no objection to the proposed pilot program.

Q Do they indicate that they would cooperate?

A They indicated they would cooperate on a lease line program.

MR. HINKLE: That's all.

RECROSS EXAMINATION

BY MR. UTZ:

Q In the event you used Devonian salt water as injection fluid, would you still propose to inject through the casing?

A The analysis that we have in the Devonian water, I think you have that down there, indicates that it would not be excessively corrosive, which is what we are concerned about. It does have a high CO<sub>2</sub> content, but it is not high in H<sub>2</sub>S.

Q You don't think it should be treated?

A Very definitely it would be treated, but I think that the treated water would be of such a nature that we could inject down the annulus if we wanted to. Now, as I said, in the pilot we're going to try this split injection program. We may find it's not necessary at all, in that case if we had to we could move our packer up the hole and inject underneath the packer, if we ran into the problem of excessive corrosion in the annulus.

MR. UTZ: Any other questions?



REDIRECT EXAMINATION

BY MR. HINKLE:

Q I believe you stated that in all these wells they are cemented clear to the top?

A Yes.

Q If the salt water was injected and did have corrosive properties and did corrode the casing, it would still be cemented?

MR. UTZ: How much pressure will your 4½" casing stand?

A I haven't any information.

MR. UTZ: It won't stand very much, not the type of well you cement oil wells with.

A We both agree that it will be better than not to have the casing corrode though.

Q You expect to treat the water?

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

Q Is this 4½" casing the only casing in the hole?

A Yes, Sir.

Q No surface casing?

A That's correct.

MR. IRBY: The State Engineer would recommend that the applicant be denied the privilege of injecting salt water through the casing as appears to be the proposal here as an alternative. We would offer no objection to the injection of the water from the Whaley Lease being injected in the manner set forth by the witness.

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We feel that the fresh waters that are in this area will be placed under a threat of contamination unless the injection program or casing program is modified in the event that the Devonian water is used for injection. We so recommend to the Commission that that be their decision.

REDIRECT EXAMINATION

BY MR. PAYNE:

Q You have no particular reason to believe, Mr. Prentice, that salt water would be superior to fresh water in this project at the present?

A No, sir, I do not.

Q In fact, generally speaking fresh water is generally more satisfactory, isn't it?

A I can't answer that with a yes or not. In this particular formation in the Queen, which is part of its cementing material, the matrix is salt. We feel that the fresh water would be more advantageous than salt water. In other words, as a choice I would rather use fresh water than salt water in the reservoir.

Q Do you know what Mr. Hanson is using in his project?

A It's my understanding that they are using salt water, but I don't know.

MR. ROBERTSON: I'm familiar with that if you would like me to answer the question.

MR. PAYNE: Go ahead.



MR. ROBERTSON: To your first question about Hanson, they have not started the injection. They anticipate starting it in the month of June. They have ordered their equipment. They have entered an old Cobb well and are producing water producing water from the Glorietta and the Devonian both, and they intend to inject that as salt water as a pilot into two wells. That is my understanding of the Hanson. They should possibly by the first of July start their injection program.

MR. PAYNE: Thank you.

MR. UTZ: Mr. Irby, would the State Engineer look with favor on the injection of salt water through the tubing in 4½" casing?

MR. IRBY: We would have no objection providing the packer on this tubing is set below the fresh water zone.

MR. UTZ: What do you anticipate your injection volumes to be, Mr. Prentice?

A Approximately 100 barrels per day per well.

MR. UTZ: You could get that through 2-3/8 all right?

A Yes, sir, roughly, per foot of sand.

MR. UTZ: Any other questions? If not, the witness may be excused.

(Witness excused.)

MR. UTZ: Any other statements to be made in this case?

~~The case will be taken under advisement, and take a ten minute recess.~~



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 7th 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 in the Examiner hearing of Case No. 1974 heard by me on *June 1* 19*60*.  
*Paul H. [Signature]* Examiner  
 New Mexico Oil Conservation Commission

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