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MR. NUTTER: Case 3592.

MR. HATCH: Case 3592, application of Ann Burnett Windfohr, doing business as Windfohr Oil Company for a water-flood project, Eddy County, New Mexico.

MR. WATSON: Good morning. I am Fred Watson, Watson and Watson, Artesia, New Mexico, attorneys for the Applicant and we have present, representing the Applicant, Mr. Ralph L. Gray, Consulting Engineer, Artesia, New Mexico, and also present, but not anticipating testifying, is Mr. John Rush Vann of the Fort Worth, Texas office of Windfohr Oil Company.

(Witness sworn.)

MR. WATSON: At the outset, on behalf of the Applicant, I would like to make a statement as to the unit which is being formed. The application, if granted, also would include a request for a unit allowable. The status of the unit is that the U. S. Geological Survey, which has jurisdiction over all these federal leases, has approved the designation of the unit area, has given tentative approval to the Unit Agreement. All interested parties have signed the Unit Agreement and the final form of the Unit Agreement has been submitted to Washington for final approval.

Mr. Ralph Gray has testified on a number of occasions before this Commission. Is the Commission satisfied

with his qualifications?

MR. NUTTER: Yes, sir, go ahead.

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

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. WATSON:

Q Mr. Gray, referring to what has been marked as Applicant's Exhibit 1, will you please identify that, sir.

A Exhibit Number 1 is a map of the area showing the surrounding sections. The purpose of this exhibit is just to show ownership within a two mile radius of the proposed water injection project. Most of the projects would be located in Section 13, 17, 30 so this map shows all of the surrounding leases.

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

Q And, you also prepared Exhibit Number 2?

A Yes, sir, Exhibit Number 2 is also a map. This shows the boundary of the proposed San Andres unit by the cross-hatched lines. Initially, it is a proposed to inject water into eight injection wells, which we will refer to as a pilot program. These injection wells are indicated by the

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red circles on the map, and the expanded project is indicated by the blue circles which show the injection wells at some time later when the project will be expanded.

You will note that we will convert some of the old producing wells to water injection wells, so the pattern for injection will be an eighty acre five spot plan.

Q In the initial program, you will convert how many wells?

A Actually, seven wells that are now producing will be converted to water injection wells and then, in addition, we will drill a new well, which will be located in the Northwest Quarter of the Northwest Quarter of Section 13, and this well will be called the Stevens "B" Well Number 3.

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

Q Will you describe your Exhibit Number 3, please?

A Exhibit Number 3 is a structural map, the contours are drawn on top of the red sand, or Queen formation. Actually, the Queen formation is somewhat higher than the formation which we propose to flood, which is the San Andres, but the structures of the two formations are very similar and this map will serve to show what the general structural conditions are. Structurally, this is a plunging anticline. There is a moderate dip in an easterly direction and then, in

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A few of the wells were shot, but most of them are acidized.

(Whereupon, Applicant's Exhibit Number 5 was marked for identification.)

Q Referring to what has been marked Exhibit Number 5, will you describe that one, please, sir?

A Exhibit Number 5 is a west-east cross-section through the proposed unit area. This exhibit has been prepared mainly to show the various formations that are present in this area. The top of the Queen formation is shown on the logs, the top of the Grayburg, the top of the Premier zone, which is the basal portion of the Grayburg, the top of the San Andres and top of the Lovington Sand.

Very few of the wells in this area have actually been logged. The Stevens "A" 2 log is shown on this cross-section and then, the well on the furthest right portion of this cross-section is over on the Sinclair acreage, which is east of the proposed flood unit.

(Whereupon, Applicant's Exhibit Number 6 was marked for identification.)

Q And, you have prepared an injection well diagram marked Exhibit 6?

A Yes, Exhibit 6 is a diagrammatic sketch of the proposed injection wells that will be converted. This diagram indicates that we will set four and one half liners

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a southerly direction, the structure drops off very rapidly. We have shown a cross-hatched line through the northern part of Sections 23 and 24, which we consider as the approximate oil-water contact in the San Andres formation, and everything that we flood, of course, will be above this contact.

(Whereupon, Applicant's Exhibit Number 4 was marked for identification.)

Q And, you have prepared a well log, have you?

A Yes.

Q Marked Exhibit Number 4?

A Yes, Exhibit Number 4 is a rather typical log of this area. This is a gamma ray neutron survey of a portion of the Stevens "A" Number 2 Well. The proposed unit will unitize the formation from the top of the San Andres formation down to a depth of 550 feet below the top of the San Andres and, this interval is indicated on this log by the cross-hatched lines. This interval represents the limits that will be unitized. Most of the pay that is encountered is in the lower portion of the unitized area and, on this particular log, for instance, from about 3270 down to about 3430, would represent the main pay portion. Most of the, in fact all of the old producing wells, the pipe was set above the top of the San Andres, some of the Grayburg formation is open, and these wells have several hundred feet of open-hole present.

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throughout the open hole in these wells. The wells will be logged and then we will perforate the zones of porosity and then tubing will be run with a packer which will be set in the upper portion of the four and a half inch liner, and this is for the purpose of protecting the old casing string. Injection will be down the tubing and below the packer.

This diagrammatic sketch applies to the seven producers that will be converted. Individual, specific depths are indicated on this diagram. In the case of the new well that will be drilled, the Stevens "B" Number 3 Well, we propose to set the casing to total depth, pays will be perforated, four and a half inch new J-55 pipe will be used and we probably will not use a packer in the new well. We will run tubing, injection will be down the tubing but without a packer, probably.

(Whereupon, Applicant's Exhibit Number 7 was marked for identification.)

Q Will you describe your Exhibit Number 7?

A Exhibit Number 7 shows the average daily oil and water production for each of the present producing wells in the proposed unit for the month of February, 1967. You will note that very few of these wells produce water at the present time, and, only in small quantities. The average oil production per well, per day, is only three barrels, so you can readily

see that these wells are in a stripper stage of depletion.

(Whereupon, Applicant's Exhibit Number 8 was marked for identification.)

Q Your Exhibit Number 8 is --

A Exhibit Number 8 is a tabulation showing the ultimate primary oil production for various segments of the proposed unit. Usually, these breakdowns are by batteries, that is the way these have been tabulated and the total estimated ultimate primary oil production for the entire unit area is 6,506,310 barrels of oil.

Q If the application is granted, what will be the source of water for the injection purposes?

A Water will be purchased from Yucca Water Company. The source of their water is the Ogallala formation. It will be fresh water.

Q What will be your estimated volumes to be injected?

A We estimate that these volumes will average four to five hundred barrels per well per day.

Q In your opinion, from the study you have made and exhibits you have prepared and the information thereon, will the requested program permit the recovery of oil which would not otherwise be recovered?

A Yes, sir, it will.

Q Were the exhibits Numbers 1 through 8 prepared

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directly by you or under your supervision?

A Yes, sir.

Q Information compiled by you?

A Yes.

MR. WATSON: The Applicant moves the introduction and admission into the record of Exhibits Numbers 1 through 8.

MR. NUTTER: Applicant's Exhibits 1 through 8 will be admitted in evidence.

(Whereupon, Applicant's Exhibits 1 through 8 were admitted in evidence.)

Q (By Mr. Watson) Now, under this project, the Applicant seeks immediate authority or authority as soon as possible to inject into eight wells, one to be drilled and seven to be converted as shown in red on your exhibit?

A Yes.

Q And, also seeks authority for expansion by administrative approval?

A Yes, sir.

Q As to the remainder of the wells shown in blue on the exhibit?

A Yes.

MR. WATSON: The Applicant rests.

MR. NUTTER: Are there any questions of the witness?

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CROSS EXAMINATIONBY MR. NUTTER:

Q Mr. Gray, referring here to your Exhibit Number 6, you show the oil string on each of these wells which has been drilled to be seven inch pipe, correct?

A That's correct, yes, sir.

Q And, this casing in each one of these wells has been set between twenty nine hundred and three thousand feet?

A Yes, sir.

Q Then, you have got several hundred feet of open hole below that --

A Yes, sir.

Q -- and the normal means of completion in this area?

A Yes, sir.

Q So, you are going to have to run a four and a half inch liner in there. How far back up into the seven inch pipe will that four and a half inch liner come, Mr. Gray?

A Oh, ordinarily, we will run about fifty feet above the base of the seven inch.

Q At least fifty feet?

A Well, close to, that if it was a few feet less than that, why we will --

Q About fifty feet. In other words, about a joint or

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a little over --

A About a joint and a half to two joints, usually.

Q Now, you show a packer being installed in the four and a half. Will the packer in each case be installed down in the four and a half inch liner between the top of the liner and casing shoe of the seven inch?

A Yes, sir.

Q In the overlapping area?

A Yes, sir.

Q Is it your proposal to treat this tubing in any manner before running it?

A Yes, we will coat the inside of the tubing with plastic.

Q Plastic coat it? Now, why won't you be running a packer in the new well which will be drilled?

A Well, we consider that the new four and a half casing has a minimum yield rating sufficiently strong to inject water without setting the packer. We will have a safety factor of approximately two.

Q The main reason for using the packer in these older wells is to keep the pressure off of that seven inch?

A Yes, sir.

Q What would you do with the annulus of the older wells, would you fill that annulus with inert fluid, or just

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water.

A It will be filled with water, fresh water.

Q Are all of these leases at the present time, owned by Windfohr Oil Company, all the leases that are going into the unit?

A All of the leases are operated by the Windfohr Oil Company. There are other interests included.

Q I see. Now, this is a Federal Unit Agreement and not subject to a hearing by the Oil Conservation Commission. How will we know when this has been approved by the U.S.G.S., so that a unit allowable could be assigned?

A Well, I'm sure that the operator will be willing to advise you at such time as the Unit Agreement has been approved.

Q A copy of the letter approving the Unit Agreement, or designation by the U.S.G.S. of approval will be furnished to the Commission?

A Yes, sir.

MR. WATSON: Yes, sir.

Q (By Mr. Nutter) Now, Mr. Gray, I notice that Mr. Irby, of the State Engineer's office on May the 5th wrote you a letter, noting several items and on May 9th you replied to him. Insofar as you know, has the State Engineer been satisfied as to the questions that they had?

A We presume that they are satisfied, because we

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haven't had any further correspondence from them.

MR. NUTTER: Are there any further questions of this witness? He may be excused.

(Witness excused.)

MR. WATSON: May I --

MR. NUTTER: Yes, sir, go ahead.

MR. WATSON: We do have a letter acknowledging, a copy of a letter acknowledging Mr. Gray's answer to the State Engineer and I think perhaps Mr. Porter received one.

MR. NUTTER: He acknowledges receipt of the letter without further comment.

MR. WATSON: It says, "Gratefully acknowledged, Yours very Truly," so, I think Mr. Porter also has one of those.

MR. NUTTER: We have a copy of that letter, yes, sir. Do you have anything further, Mr. Watson?

MR. WATSON: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case 3592. We will take the case under advisement.

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MR. NUTTER: We will now re-open Case 3592.

MR. FORD: My name is Clyde Ford. I represent Union Texas Petroleum. We own approximately thirty-one percent of the Grayburg-Jackson unit, San Andres unit, and we would like to support the Applicant in both the program and the agreement which he proposes.

MR. NUTTER: Thank you, Mr. Ford. We will close Case 3592 and resume with Case 3593.

