



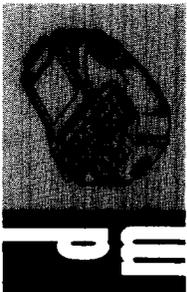
MR. UTZ: Case Number 3195.

MR. DURRETT: Application of H&M Oil Company, et al, for a waterflood project, Eddy County, New Mexico.

MR. RUSSELL: John F. Russell, Roswell, New Mexico, appearing on behalf of the applicant in Case Number 3195. I have one witness, Mr. Hogan.

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

MR. RUSSELL: Mr. Examiner, at the outset I would like to make a statement in connection with this case. When the original application was filed the plat which accompanied it did not, in my opinion, cover the two-mile area to the east and west, and I advised the Commission that new plats would be furnished prior to the hearing, and I advised Mr. Hogan by letter back in January--January 7th, I believe, of the necessity; but Mr. Hogan unfortunately has not been in his office from about 20 December until this Monday, and it was impossible for him to--he did not get the letter and it was impossible for us to comply, but we would like to state that we will furnish such additional plat as the Examiner feels is necessary for this hearing. Likewise, since Monday it has developed that it has been possible to add in the application an additional injection well, but the notice only covered six, and it will probably be necessary to re-advertise to include all



seven wells, but we would like, if there is no objection, to proceed at this time with the evidence, and then the case to be re-advertised in the absence of objection; to be taken under advisement at the next Examiner hearing.

MR. UTZ: As far as the plat is concerned, the plat that is submitted here as Exhibit A will be satisfactory. Insofar as the seventh well is concerned, which is the Salsich Root Federal Number 7, is it?

MR. RUSSELL: Number 1.

MR. UTZ: Had you thought of requesting administrative approval for extension of waterflood for that well?

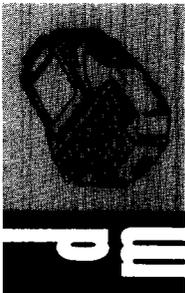
MR. RUSSELL: We felt that whichever way the Commission felt would be most satisfactory to handle it, would be agreeable to us.

MR. UTZ: It doesn't make too much difference to us--one way we would have to run an ad; the other way you would have to wait so many days before we can give you approval on the seventh well. If you're in a hurry--either way it would be about the same length of time.

MR. RUSSELL: May we proceed with the evidence and then advise you in the next day or two which method we prefer? Thank you.

\* \* \*

S A M W. H O G A N, the witness, having been duly



sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. RUSSELL:

Q Please state your name and occupation.

A Sam W. Hogan, Fort Worth, Texas. I am self-employed.

Q In what capacity?

A Consulting engineer.

Q Have you previously qualified to give testimony before this Commission?

A No, I have not.

Q Will you give a brief resume of your educational background and practical experience in the field as a petroleum engineer or consulting engineer.

A I graduated from the University of Oklahoma in 1933 with a degree in mechanical engineering, with the petroleum engineering background. I have practical work for companies until 1954 as an engineer, production superintendent, drilling operation, completion of oil wells, management of property.

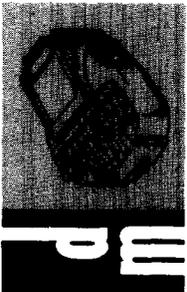
Q And you have had experience in waterflood field?

A Yes.

Q Are you familiar with the joint application filed in Case Number 3195?

A Yes, sir.

Q And did you prepare or were the exhibits you are



using prepared under your direction?

A Yes.

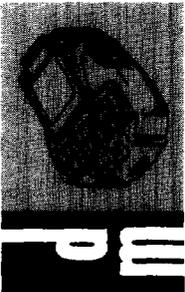
Q Referring to what has been marked Exhibit A, will you explain what that portrays, locate the area which you propose to flood and generally explain what that exhibit shows.

A The exhibit shows the floods that are in the process now, that have been installed and are in operation in flood in Section 36 to the north and the three 40-acre tracts on the north and west portion of the Section 1 are under the Nealy-Salsic flood. Sections 31 and the north half of Section 6 on the plat are under flood by Texaco. The area outlined in Section 1 in 17 South, 29 East and in the southwest 80 acres of Section 6, 17 South, 30 East, is the area that we propose to inject water into on a cooperative basis. The wells circled are the proposed injection wells with the double circle around the injection well. It will be a five-spot pattern. We will continue on the same pattern that has been established by the other two floods in the area.

Q Is H&M to be the operator on various leases, or is each to operate his own lease?

A Each operator will operate his own lease. This is a cooperative line agreement flood project.

Q Have there been any lease line agreements or pooling arrangements made in connection with the flood?



A Agreements are verbal at this time. The agreements are in the process of being drawn.

Q But you have reached accord on them?

A Yes.

Q With reference to the producing wells within the area you propose to flood, what is the average production of oil per day per well at this time?

A It's less than three barrels per day on the Bedding Field leases and a barrel and a half to two barrels per day on the Root lease.

Q What is the approximate maximum production of the highest well?

A I would estimate that three barrels would be the highest.

Q And in your opinion this area is in an advanced state of depletion?

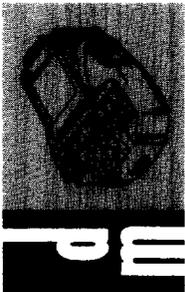
A Yes.

Q And do you feel that granting the application for flood of this area will recover oil which is otherwise not recoverable, and prevent waste?

A That is correct.

Q Now, into what formations do you plan to inject water within this area?

A We plan to inject into the Grayburg zone and into the



San Andres zones. There are several producing sections in the Grayburg that are capable of producing oil and we would like-- those are called the Local Hills, the Metex and the Premier, and also the Lovington of the San Andres.

Q What will be the source of your water?

A We are negotiating at the present time with two sources of commercial water--Yucca Water Company and the Caprock Water Company.

Q Water from the Yucca Water Company is fresh water, is it not?

A Yes.

Q And as to Caprock, do you know whether you will be obtaining from their Caprock operation on the Caprock, which is fresh water, or Red Hills, which is somewhat brackish?

A It is my understanding that the source at the present time is from the Red Hills--Red Lake, it is, I believe.

Q At what rate do you anticipate injecting water into this project?

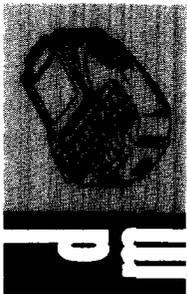
A We're anticipating a maximum of three to four hundred barrels per day per well.

Q Will that be injected under pressure?

A Yes.

Q Do you know what approximate pressure?

A Approximately 1,800 pounds.



Q Now, referring you to Exhibit B, I ask you to explain what that exhibit portrays.

A This is a schematic drawing of the proposed injection wells. We have shown on this the surface pipe setting, casing, production string casing setting, amount of cement-- both strings of casing have been cemented; with the perforated zones that are open at this time in these wells. We have also shown a proposed packer setting in case of leaks on the casing. What we would like to do is inject water down the casing, but in case of a leak developing or showing up we would run a packer in and set it above the injection zones on tubing in the manner we are showing on this plan.

Q Now, will you please identify the seventh well, which was not initially included in your application.

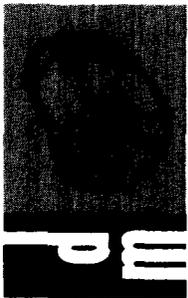
A The seventh well is what is now known as the Nealy Salsich Root Number 1; sometimes called Root Federal Wilson Number 1, which is in Section 6 in the southeast quarter.

MR. UTZ: What do you choose to call it? In other words, what is your C-110 file--what does that file on that well show?

A This information was furnished me by Mr. Salsich, and I presume I will have to call it the Root Number 1.

MR. UTZ: Salsich Root Number 1?

A Salsich Root Number 1.

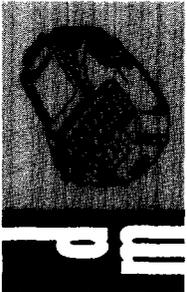


MR. RUSSELL: This Exhibit B--you have a note at the bottom of it which states, "Tubing and packer settings are tentative and depend upon pressure tests of casing." Is it your intent to either take pressure tests in these wells prior to injection, or do you intend to inject through tubing and packer?

A Well, our feeling was that the casing is in good condition, has been fractured through and subjected to high fraction pressure; that for that reason it should be properly tested, and we would propose to inject down the casing without testing. In case a leak would develop then we would immediately take remedial steps to shut off any leak. That would be easily determined by loss of pressure on any injection well, and we feel that we can adequately keep up with our injection, as to where injected water was going, by that method.

Q Assuming that you would discover a drop in pressure in one of these wells, what would be your remedial action at that point?

A We would have a choice of going in there and finding the leak by use of one of the well-known or accepted practices of setting the packer and testing the casing to find the leak, to remedy the leak by either squeezing or running tubing or packer and setting it below the leak, and immediately above the injection zones, which would isolate the water from going



into the area where the leak developed.

Q In the event that such a situation should develop, would you notify the office of the State Engineer and the Oil Conservation Commission what has happened, and what remedial steps you are taking?

A Yes, we would do that.

Q Now, are you aware of any fresh water zones in this area?

A No, I am not aware of any in that area. Zones of fresh water are very, very scattered, where you find any production at all of water, and we feel that surface casing has been set through to protect any known fresh water zones, or what could be classed as fresh water zones.

Q Surface casing has been set in all wells?

A Yes.

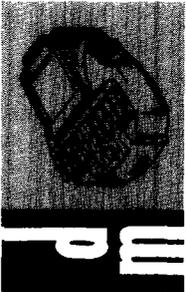
Q And in your opinion that would prevent contamination of any fresh water zones ther were encountered?

A Yes.

Q You have previously conferred with Mr. Irby in connection with your completion program, have you not?

A Yes, I have.

Q And he, as a result of that, has raised certain questions with respect to your exhibits and cement tops, is that not true?



A Yes.

Q As to Root 1, he has asked what are the cement tops surrounding the 8-5/8 inch casing and the 5½-inch casing. Can you answer that at this time?

A According to our records on the 8-5/8, cement was circulated to surface. There is no log available on the 5½-inch, but from our experience in the field and the number of sacks of cement that were used, we would estimate 2,000, minimum.

Q What was the grade and condition of the casing when it was installed in December 1959?

A Fourteen-pound casing, and it was new.

MR. UTZ: That's 2,000 feet. Is that from the bottom, or up to?

A Up to.

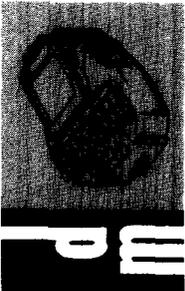
MR. UTZ: In other words, the top is at 2,000?

A Yes.

MR. RUSSELL: Has the Root Number 3--as to that, what are the cement tops on the 8-5/8 and 5½?

A The records indicate that the cement on the 8-5/8 was circulated. No log or temperature survey was run on the 5½--again, we would estimate the top to be at 2,000.

Q What was the grade and condition of the casing when it was installed in 1958?



A 15½-pound casing, and it was new.

Q And as to the Bedding Field Number 1, is the 8-5/8 inch casing set at 446 or 466?

A The correct setting depth is 446.

Q And it is in error in both exhibits, B and C?

A Only in Exhibit C.

Q And what are the cement tops again, on the 8-5/8 inch and the 5½-inch?

A The records indicate that the 8-5/8 inch cement was circulated. Temperature survey available on the 5½-inch indicates the top of the cement to be at 1765.

Q And what was the condition of the casing when it was installed in April 1959?

A Fourteen-pound, new.

Q As to Bedding Field Number 2, is the 8-5/8 inch set at 442 or 422?

A It is set at 422, as shown on Exhibit C. The sketch was in error--a transposition of figures.

Q What are the cement tops surrounding the 8-5/8 and the 5½-inch in this well?

The temperature survey available indicates the top at 2105 feet on the 5½-inch casing and that the cement was circulated on the 8-5/8 inch casing string.

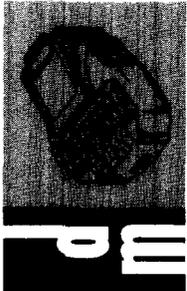
Q And what was the age condition of that in 1959, when

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it was installed?

A It was  $5\frac{1}{2}$ -inch, 17-pound casing, new.

Q Kincaid & Watson, Wright Federal Number 4--what are the cement tops around the  $8\text{-}5/8$  and the  $4\frac{1}{2}$ -inch casing?

A I have no factual information on that well. That information wasn't furnished to me by Kincaid & Watson. I would assume, though, that the  $5\text{-}5/8$  was circulated, as all these wells were, and the  $4\frac{1}{2}$  should be adequately protected because of the fact that they were perforating it in the area of 2,500 feet under surface, so that would be a sufficient amount not to cover 200 to 400 feet above that. That would be purely an assumption.

Q Do you know the completion date of the well or the grade and condition of the casing when it was installed?

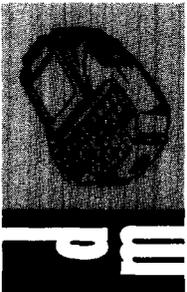
A I do not. I cannot answer that question at this time.

Q Will you make an effort to get that from Kincaid & Watson, and furnish it to the State Engineer?

A Yes.

Q Going to the Nealy Salsich Root Federal Number 5, Mr. Irby asked when tests are conducted and the packer set at such depth between the  $7/8$  inch casing, will the liner be adequately tested below the top of the liner.

A I think I can start answering that question in this



manner. Our information is that the well was drilled originally and 7-inch casing was set at 2,500 feet. The well was later deepened to 3,435 feet and a 4½-inch liner was run and set and cemented. The bottom of the liner was at 3,430 feet and the top of that 7-inch liner was at 2,434. The liner was then cemented with 100 sacks and circulated over the top of the liner, so that the liner is cemented from top to bottom. Therefore the well has been perforated and fractured since that time, and I would see no reason for running an additional test on that liner at this time.

Q What are the cement tops surrounding the 10-3/4 and the 7-inch casing and the 4½-inch liner, if you know?

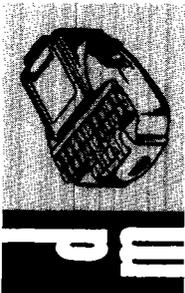
A On the 10-3/4 the cement was circulated and on the 4½ the cement was circulated. On the 7-inch casing, it was cemented with 100 sacks at 2,500 feet, and I would estimate that it had at least five to 600 feet of cement behind it at that depth.

Q Do you know the completion date of the well?

A The work-over was completed 10/4/63.

Q And what was the grade and condition of the casing that was installed?

A It was new, and I don't know the grade of it. The 4½-inch was probably 9½-pound pipe, though--that's the common weight of it.



Q Your diagram shows a  $4\frac{1}{2}$ -inch liner at 3,430 and your Exhibit C shows a total depth of 3,435 feet. Is there five feet of open hole not shown on the diagram?

A No, the pipe was swung off the bottom by five feet and cemented, but there's a shoe on it and there's no open hole.

Q I believe you previously said that each of the owners will operate his own particular lease?

A That is correct, yes, sir.

Q Referring to your Exhibit C, what does that reflect?

A Exhibit C is the completion information on the six proposed injection wells and shows the dates of completion, setting and surface pipe, amount of cement,  $5\frac{1}{2}$ -inch casing, setting depth, amount of cement used and perforated zones.

Q You don't have that information at this time for Well Number 7, do you?

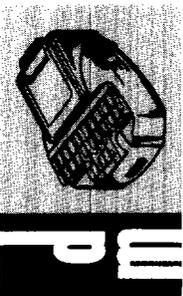
A The only information I have on Well Number 7 at this time would be as shown on the schematic diagram, which shows the setting depth of the surface pipe, the production string, and its completion method of open hole to a total depth of 2,780 feet.

Q And you will furnish to the State Engineer and the Commission the additional well information as soon as you can obtain it?

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A Yes, I will.

Q Now, referring you--

MR. UTZ: Just a moment. You call it Well Number 7. I believe the exhibit shows Well Number 1.

MR. RUSSELL: The seventh well is what I meant to say --Well Number 1. I refer you to Exhibit D and ask you what that exhibit reflects.

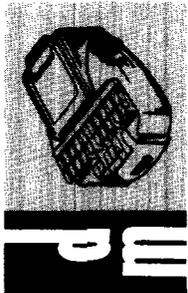
A Exhibit D is a cross-section across Section 1. It also includes one well in Section 2, but it shows the relative depths of the Grayburg and the San Andres producing zones. This was presented to show that the zones are continuous zones across the section and in the area, and the feasibility of injecting water into these various zones for recovery of secondary oil. On this cross-section we are showing are the Root Federal Number 3 and Root Federal Number 1, and the Bedding Field Number 1, which are three of the proposed injection wells.

MR. RUSSELL: At this time I would like to offer Applicant's Exhibits A through D, inclusive.

MR. UTZ: Without objection, Exhibits A through D will be accepted into the record.

MR. RUSSELL: I have no further questions of the witness at this time.

MR. UTZ: Are there other questions of the witness?



MR. IRBY: Yes, sir. Frank Irby, State Engineer's Office. Mr. Hogan, as I understood your testimony, you do not propose to make any casing test prior to injecting water, is this correct?

A That is correct, yes.

Q And further, you don't propose to make any test of the seal between the casing and the liner--the 7-inch casing and the liner, in the Salsich Root Federal Number 5?

A Isn't that the Root Number 1--Salsich Number 1 in Section 6--Number 50?

Q Number 5.

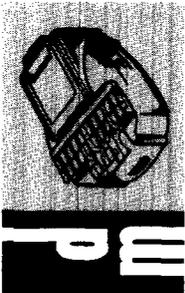
A No, we--I think under normal procedures we would not do it, because the zone has been perforated and fractured and there have been no leaks.

Q At what date?

A In 1963. 100 sacks of cement were used and the cement, according to the records I have, was circulated between the liner and the casing and it was pressure tested before it was fractured, which is the normal procedure--to pressure test that liner and casing before it was fractured; and then it was fractured.

Q What was the extent of the pressure test in 1963?

A I don't have that pressure test information available at this time.



Q You couldn't tell me whether it exceeds the anticipated injection pressure of 1,800 PSI?

A I would say that it did, because the fractured pressures in this area are 3,000 pounds and over, and if you're fracturing down the casing, which they have done on all these wells, you're exposing that casing to that type of pressure, which is 3,000 to 3,500 pounds hydraulic pressure.

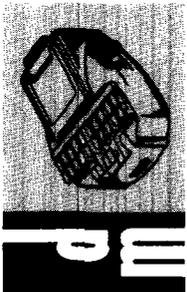
Q Mr. Hogan, you made reference in discussion of this application with me, and certainly when you and Mr. Dalton were in my office I had no idea you intended to inject into the wells without first performing a casing test in excess of the anticipated injection pressure, and I don't feel that the State Engineer can fail to object unless recent pressure tests are submitted and found adequate. This is to me something very unusual--I don't recall ever having had an applicant come before the Commission and request that he be permitted to inject water or any fluid without first having tested the casing; and for these reasons I must state to the Examiner that the State Engineer objects to the granting of this application until such time as tests are performed to prove the adequacy of the casing program to a point in excess of the anticipated injection pressure, or submission of recent tests which would reveal the same information.

MR. UTZ: In other words, your recommendation is that

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the casing be tested at something in excess of 1,800 pounds at the surface?

MR. IRBY: That is correct, Mr. Examiner.

MR. UTZ: Your objection will be noted and taken into consideration.

MR. HOGAN: Mr. Irby, would a pressure of 2,000 pounds be sufficient on that?

MR. IRBY: I would leave this to the judgment of the Examiner.

MR. HOGAN: That would be 2,000 pounds in excess of--

MR. UTZ: At surface.

MR. HOGAN: At surface.

MR. IRBY: I have a little curiosity, Mr. Examiner-- he spoke of historical tests of 3,000 to 3,500, and this arouses my curiosity when he goes back to 2,000 at this point. However, as I stated previously, I will leave this to the judgment of the Examiner.

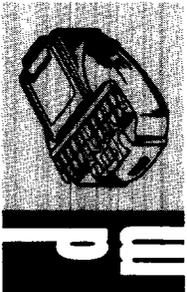
MR. UTZ: I believe a 2,000 pound test at surface pressure, plus hydrostatic head, has been in the past the usual test for casing in these areas in Eddy County. Are there any further questions? ... The witness may be excused. Are there other statements to be made in this case? ... The case will be taken under advisement.

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BEFORE THE  
NEW MEXICO OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
February 24, 1965

EXAMINER HEARING

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IN THE MATTER OF: )

APPLICATION OF H & M OIL COMPANY, ET AL )

FOR A WATERFLOOD PROJECT, EDDY COUNTY, )

NEW MEXICO )

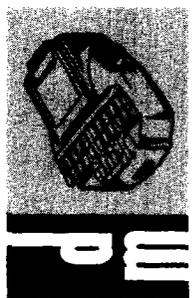
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Case No. 3195

BEFORE:

ELVIS A. UTZ

TRANSCRIPT OF HEARING



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MR. UTZ: The hearing will come to order, please. We have first on the docket three cases which will be called for the purpose of appearances only. If someone doesn't appear to add something to the direct testimony, they will be taken under advisement. \* \* \* Case Number 3195.

MR. DURRETT: Application of H&M Oil Company, et al for a waterflood project, Eddy County, New Mexico.

MR. UTZ: Are there appearances in this case? ...  
 Let the record show that there were none.

\* \* \*

STATE OF NEW MEXICO     )  
   ) ss  
 COUNTY OF BERNALILLO   )

I, ELIZABETH K. HALE, Notary Public and Court Reporter, hereby certify that proceedings in Case Number 3195 were taken by me in shorthand and transcribed by me, and that such proceedings are a true and accurate reflection of proceedings to the best of my knowledge, skill and ability.

*Elizabeth K. Hale*  
 \_\_\_\_\_  
 Notary Public

My commission expires  
 May 23, 1968.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3185, heard by me on Feb. 24, 1965.

*Elizabeth K. Hale*  
 \_\_\_\_\_, Examiner  
 New Mexico Oil Conservation Commission

