BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

Case No. 1532

TRANSCRIPT OF HEARING

October 22, 1958

DEARNLEY - MEIER & ASSOCIATES
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BEFORE THE
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IN THE MATTER OF:	
Application of Sunray Mid-Continent Oil Company for an order authorizing a salt water disposal well. Applicant, in the above-styled cause, seeks an order authorizing the disposal of produced salt water through its Hobbs "G" Well No. 1, located 1980 feet from the North and West lines of Section 36, Township 9 South, Range 33 East, Lea County, New Mexico. Applicant proposes to inject the produced salt water through the well bore into the Pennsylvanian formation in the interval from 9834 feet to 9865 feet.	Case 1532

Mabry Hall
Santa Fe, New Mexico

BEFORE:

Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

MR. UTZ: The next case on the docket will be Case 1532.

MR. PAYNE: Case 1532, "Application of Sunray Mid-Continent Oil Company for an order authorizing a salt water disposal well."

MR. WHITE: Mr. Payne, will you swear the witness in?

(Witness sworn in).

MR. WHITE: Let the record show that L. C. White of Gilbert, White and Gilbert of Santa Fe, New Mexico, is appearing on behalf of the applicant.

DONALD E. HALL

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

follows:

DIRECT EXAMINATION

BY MR. WHITE:

Q Mr. White, will you state your full name, please?

A Donald E. Hall.

Q By whom are you employed and in what capacity?

A I am employed by Sunray Mid-Continent Oil Company as a senior engineer.

Q Are you familiar with Sunray's present application?

A Yes, sir.

Q Have you previously testified before the Commission as an expert witness?

A Yes, sir.

MR. WHITE: Are the witness' qualifications acceptable?

MR. UTZ: They are. And pardon me a moment while I ask if there are other appearances in this case?

MR. MANKIN: Warren Mankin, Aztec Oil and Gas Company.

MR. UTZ: Continue.

Q (By Mr. White) Mr. Hall, I will ask you to refer to what has been marked as Exhibit A and will you state what it is and what it is intended to show?

A Exhibit A is an ownership plat showing Sunray Mid-Continent's leases and the offsetting operators' leases.

Q Does it show the location involved of the oil and gas wells on there?

A This exhibit was furnished with the application. It shows that Sunray Mid-Continent is the operator and co-owner of State "F" lease, consisting of the north half of Section 1, Township 10 South, Range 37 East, and of about 80 acres of Section 36, 9 South, 33 East. That 80 acres that we do not have is the north half--I mean the east half of the northwest quarter of Section 36.

Q Does it show the location of all the oil and gas wells within the area?

A Yes, it does.

Q Does it show the names of adjoining lessees and offsetting operators?

A Yes, it does.

Q Mr. Hall, these wells in this field are producing from what formations?

A They are producing from the Wolfcamp and the Pennsylvanian formations.

Q I will hand you here what has been marked as Exhibit B and ask you to state what it is and what it is intended to show?

A Exhibit B is a north-south cross section running from the north to the south of the Lane Wolfcamp and Lane Pennsylvanian Pools. It shows the top of the Wolfcamp, which is a correlation point, it shows the Wolfcamp pay interval, the interval that has porosity in the Wolfcamp. It does not show the oil-water contact in the Wolfcamp as it is too variable. It also shows, colored in red and blue, the Pennsylvanian pay interval and shows a correlation

point on top of the Pennsylvanian. It has an oil-water contact in the Penn zone of approximately a minus 5542. The blue indicates the approximate water zone and the red indicates the oil zone in the Pennsylvanian. There is approximately a hundred and thirty feet of separation between the two zones.

Q Will you point out which one is to be the proposed injection well?

A The one on the far north side is the Antweil Hobbs "G" Number 1.

Q That would be the one on the right, would it not?

A The one on the right, yes sir.

Q That --

A That cross section will show where the cross section goes through on the next exhibit.

MR. UTZ: What is the location of that well, would you state that for the record?

A That well is 1980 from the north line, 1980 from the west line of Section 36, Township 9 South, Range 33 East. That well was drilled by Skelly, farmed out to Antweil and we are in the process of acquiring that well now.

MR. UTZ: Thank you.

Q (By Mr. White) I will ask you to refer to what has been marked as Exhibit C and explain what that is and what it is intended to show?

A Exhibit C is a structural map contoured on top of the

Wolfcamp formation. I have shown in red the wells completed in the Wolfcamp and in blue the wells completed in the Penn, Pennsylvanian. The discovery well was Sunray Mid-Continent's State "F" Number 1. This map also shows where the cross section was taken, running from Humble's Well LD-A to A prime, ending up at the Antweil Hobbs "G" Number 1.

There have been ten Wolfcamp completions, ten of which--I mean seven of which are producing from the Wolfcamp. There are two Pennsylvanian completions. They are both operated by Sunray Mid-Continent. They are dual wells actually completed with Wolfcamp completions.

No one else has been able to find the Pennsylvanian productive from their wells. There have been two dry holes drilled in this field.

Q In other words, there are only two wells producing in the Penn zone and both of them are Sunray's?

A That is correct.

Q Will you explain your proposed salt water disposal program?

A We plan to gather the water produced from the Wolfcamp and dispose of it below the oil-water contact into the well, Antweil Hobbs "G" Number 1. This well was--Antweil attempted its completion in the Wolfcamp but it was not a commercial completion and they are ready to abandon it. We plan to squeeze off the present perforations in this well at 9681 to 9684.

Q How do you plan to re-complete the well?

A We will squeeze off these perforations, drill the cement to the bottom of the casing shoe, test the casing to at least one thousand pounds for thirty minutes, then drill out to the original total depth, which was 9865. The five and a half inch casing is set at 9841. We will then perforate from 9834 to 9841. Injection will be through the perforated interval of 9834 to 41 and the open hole interval from 9841 to 65.

Q In your opinion, will the casing program that you intend to adopt adequately protect any fresh water zones?

A Yes sir, there are presently thirteen and three eighths OD surface casing at 352 feet. It was cemented with 360 sacks of cement circulated to the surface. Its eight and five eighths OD intermediate casing is set at 4,029 feet. It was cemented with 2100 sacks and was cement circulated. The five and a half inch production casing is set at 9841. It's cemented with 340 sacks.

MR. UTZ: What is the top of the cement on that, sir?

A It was calculated at approximately 8,000 feet. There was no temperature survey run on the well.

Q (By Mr. White) In your opinion, will there be any danger of communication between the zones?

A No, sir.

Q Do you have a log of the intake well for examination by the Commission?

A Yes sir, we stated in our application that logs would be supplied at the time of hearing.

MR. UTZ: Do you want these marked as an exhibit?

MR. WHITE: I think they might as well be.

MR. UTZ: Which exhibit will that be?

REPORTER: Exhibit H.

Q (By Mr. White) Mr. Hall, how many barrels of salt water per day do you propose to inject into the Pennsylvanian zone?

A At present, we have four hundred barrels of salt water a day. We plan to inject into it--we expect that we would never exceed three thousand barrels of salt water a day.

Primarily it will be from the Wolfcamp formation. The Pennsylvanian formation will only produce a trace of water.

Q In your opinion, is the Pennsylvanian formation of sufficient porosity and permeability to accept this water, this amount of water?

A Yes sir, it is, and this well has good porosity. We are not able to locate the holes on any of the producing wells right now because the formation takes water on backing.

Q In your opinion, will the disposal of this water in this manner be in the interests of conservation?

A Yes, sir.

Q Is the water to be injected through the casing or through the tubing?

A We plan to set a packer above the injection interval

and run tubing, and some of the tubing will be in the perma-type packer.

Q Mr. Hall, I ask you to refer to what has been marked as Exhibit E and state what that is and what it is intended to show?

A Exhibit E is a structural map contoured on top of the Pennsylvanian. It is, as you see, it is similar--I take it back, we've got the structural maps mixed up here.

Q Here is one. I think this is the one you want.

MR. UTZ: Which one do you want, the Pennsylvanian?

MR. WHITE: Here is the Pennsylvanian.

A The Wolfcamp is the one I thought I had.

MR. WHITE: Here is the Wolfcamp, here is the Pennsylvanian.

MR. UTZ: You want the Wolfcamp exhibit now, don't you?

A I was intending for the Wolfcamp to be marked C.

MR. WHITE: Let's introduce both of these and explain both as we go along. Which one do you want first, do you want the Pennsylvanian first or the Wolfcamp?

A I was going to explain this, but --

MR. WHITE: That's the Wolfcamp, here is the Pennsylvanian.

MR. UTZ: Off the record.

(Discussion off the record).

MR. WHITE: Could we have the record show that the testimony he's given be applied to Exhibit C, not to Exhibit E?

MR. UTZ: Well, when you were testifying about Exhibit C,

you intended it to be the other exhibit all the time, so why can't we just change the exhibit numbers?

MR. WHITE: All right, that will be fine.

MR. UTZ: Where is the Wolfcamp exhibit, the official exhibit form?

A Here it is.

MR. WHITE: That would be C.

MR. UTZ: Wolfcamp will be Exhibit C and the Pennsylvanian will be Exhibit E, is that the way you want it?

A Yes, sir.

Q (By Mr. White) Mr. Hall, will you proceed and explain Exhibit E, please?

A Exhibit E is a structural map on top of the Pennsylvanian. Comparing it with Exhibit C, the Wolfcamp structural map, it is almost identical with the Wolfcamp structure. The same base map was used and the same wells were used to pick the tops off of them.

Q Mr. Hall, will you refer to what has been marked as Exhibit F and state what that is and what it is intended to show?

A Exhibit F is a productional curve showing the oil and water production plotted against time. In the Lane Wolfcamp Pool, it shows oil in a solid line, both cumulative oil and monthly oil, and it also shows cumulative water and monthly water production. As of September the 1st, 1958, the Lane Wolfcamp Pool produced a total of 728,418 barrels of oil, 696,384 barrels of

water. August production was 20,559 barrels of oil and 30,507 barrels of water.

Q Will you refer to what has been marked Exhibit G and explain it?

A Exhibit G is a similar curve on the Lane Pennsylvanian Pool plotting production against time. It shows cumulative production and monthly production. As of September the 1st, 1958, the Lane Penn Pool had produced 240,530 barrels of oil, 1,025 barrels of water. The August production was 5,322 barrels of oil, 150 barrels of water.

Q Will you refer to Exhibit H and state what that is and what it is intended to show?

A Exhibit H is a bottomhole pressure versus cumulative production curve. It shows the bottomhole pressure decline on both the Lane Wolfcamp and the Lane Penn Pools. I have indicated the low point on each reservoir. The Wolfcamp has a bubble point of 3388 pounds per square inch gauge. The Penn zone was a bubble point of 2525 pounds per square inch gauge.

This curve shows that the reservoir has very different performance histories. The Wolfcamp has a very active water drive and produces considerable water, where the Pennsylvanian apparently has very little water drive and we expect it only to produce a trace of water.

Q Mr. Hall, were all of the exhibits to which you have referred today excepting the electric log prepared under your

direction or supervision?

A Yes, sir.

MR. WHITE: At this time, we move for the admission of the exhibits.

MR. UTZ: Without objection, Exhibits A through I will be accepted.

Q (By Mr. White) Mr. Hall, in your opinion, will the Pennsylvanian zone be damaged in any way by the injection of this proposed salt water?

A No, the Pennsylvanain zone should not be damaged. The injection of salt water into the Penn should aid in recovery of oil from the Penn by establishing pressure maintenance or partial pressure maintenance of the Penn zone.

Q Has the applicant complied with the Commission's memorandum number 5-58 by sending a letter on the proposed salt water disposal program to the State Engineer together with the water analysis?

A Yes sir, a letter was sent to the office of the State Engineer; that letter is attached to our application. We also sent copies of the water analysis from both the Wolfcamp zone and the Penn zone.

MR. WHITE: That's all the questions we have of the witness.

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

MR. MANKIN: Yes, sir.

MR. UTZ: Mr. Mankin?

MR. MANKIN: Warren Mankin of Aztec Oil and Gas Company.

CROSS EXAMINATION

BY MR. MANKIN:

Q Mr. Hall, I believe that you indicated that the disposal well at the present time would take care of only the water produced by Sunray-Mid-Continent, is that correct?

A At this time, we propose to start out injecting our water, but it has adequate capacity for other water besides Sunray Mid-Continent.

Q I believe you indicated that the present water production of Sunray wells was approximately four hundred barrels per day?

A Four hundred barrels per day, yes.

Q You feel then that the capacity of this well that you propose will be adequate enough to take care of the water produced from the Wolfcamp formation from Aztec wells if necessary arrangements could be made in the future?

A Yes, sir.

MR. MANKIN: That's all.

A The present water production from the field is approximately a thousand barrels a day, I believe.

MR. WHITE: You anticipate other operators coming into the disposal program, do you not?

A We would be glad to have them join us in the salt water

disposal.

MR. UTZ: Any other questions of the witness?

MR. FISCHER: Yes, sir.

MR. UTZ: Mr. Fischer?

CROSS EXAMINATION

BY MR. FISCHER:

Q Mr. Hall, you plan to perforate the bottom seven feet of your pipe, is that right, in that particular well?

A From 9834 to 41, yes sir, seven feet, and also inject into the open hole. It so happened that the casing was set in the porosity interval, in the middle of the porosity in the Penn zone.

MR. UTZ: What's the interval of the open hole?

A The interval on that hole is from 9841 to 9865.

Q (By Mr. Fischer) When they tested this well, do you know if they got oil at the time they tested it?

A From the Wolfcamp?

Q Yes.

A They were pumping approximately ten barrels a day.

Q They were pumping --

A Yes.

Q They were pumping from the Wolfcamp?

A Yes sir, and there was water in the Penn. Drill stem testing indicated water in the Penn. Skelly took the drill stem tests and made available the drill stem tests to us.

Q Antweil Number 1 is down in the Penn, is that correct?

A I don't believe they ever perforated, tested the Penn.

Q I know they got some oil in the tests, but that was all Wolfcamp oil.

A Yes sir, they tested it for several months with the pumping unit on it and the test that we got was approximately ten barrels of oil and five hundred barrels of water a day. I don't believe that they got enough oil so that they could run a tank until they salvaged the tanks.

Q On your cross section here, as far as I can make out, there is no connection between this Pennsylvanian pay interval to the west, I guess, or the left side, and this blue colored interval on the right?

A I didn't understand the question.

Q There is no connection except for this part in here in red between this pay interval, Pennsylvanian pay interval there and this here, is that correct?

A Yes sir, it is the same producing zone. The red indicates the oil bearing formation and the blue the water bearing.

Q So actually your Pennsylvanian pay interval should be up in the red part?

A Yes sir, that's it. All color is Penn.

MR. FISCHER: All right, thank you.

CROSS EXAMINATION

BY MR. UTZ:

Q On your Antweil Hobbs "G" Number 1, what is the water-oil

contact?

A We have fixed an oil-water contact of approximately minus 5542. That is based on drill stem tests, production tests from the numerous wells.

Q And the top of the injection zone, what is the subsea datum on that?

A It is 5554.

Q Your injection is approximately twelve feet below the water-oil contact?

A I'm sorry, that was 5544, it's two feet.

Q 5544?

A Yes, sir.

Q 5542 is the top of it?

A That is approximately the contact.

Q Do you believe that injecting that close to the water-oil contact, there would be any danger of contaminating the oil zone?

A No sir, I believe that it will go into the water column. It will certainly lack a pressure maintenance in the Penn zone.

Q You don't feel that it will be better practice to inject a little lower in the contact column then?

A Well, there isn't a sufficient water column in the Pennsylvanian to inject into.

Q Did I understand you to say that you didn't believe that the water drive was effective in the Pennsylvanian?

A That is correct. It had produced considerable less volume per cent of its oil in place in the Wolfcamp and still had a very rapid bottomhole pressure decline.

Q The five and a half inch will have no cement from the 8,000 feet to 4,029 feet, which is about 3571 of open hole, is that correct?

A That is correct.

Q But you will set up a packer above the perforations in the five and a half inch?

A Yes sir, and inject down to it.

Q So that the casing will not be subjected to salt water?

A That is right.

Q Do you intend to use an inhibitor to protect the tubing string?

A We haven't fully designed the treatment program for the salt water that we inject. We will certainly use a stop tank to hold the water and expect to use filters and treat it if we feel it is necessary.

Q The tubing will be lined tubing?

A We do not feel that this water is very corrosive. I imagine that we will just depend on the inhibitor rather than lining the tubing.

Q If you should have leakage of salt water in the annular zone, how would you detect it?

A We would have a pressure gauge on the casing between

the tubing and the casing which would detect a leak.

MR. UTZ: Any other questions of the witness?

MR. FISCHER: Yes, sir.

CROSS EXAMINATION

BY MR. FISCHER:

Q Mr. Hall, you are going to inject down the tubing and I think that your water that you are going to put into it won't have any gravity?

A Yes sir, the bottomhole pressure is less than 2500 pounds per square inch in the Penn and we will have a head of approximately 9800 feet of water.

Q 4300 pounds, roughly?

A Roughly.

Q Do you know what the bottomhole pressure in the State "I" Number 2 is, the last bottomhole pressure for the State "I" Number 2?

A The State "I" Number 2 has gone to water. I probably have that bottomhole pressure.

Q It has gone completely to water, the State "I" Number 2 has gone completely to water?

A Yes, sir.

Q It has?

A Yes, sir. The bottomhole pressure on the Wolfcamp has been within just a few pounds on every pressure survey, so I believe if you will look at Exhibit H, you would get a good idea

as to just what the bottomhole pressure would be.

MR. UTZ: State "I" Number 2 is a Wolfcamp?

A Yes sir, a Wolfcamp.

MR. UTZ: And it has gone to water in the Wolfcamp?

A Gone to water in the Wolfcamp.

Q (By Mr. Fischer) Has it gone to water in the Penn?

A On the State "I" Number 2, we tried a Pennsylvanian completion and it did not have sufficient porosity to make a Pennsylvanian completion.

Q What's this State "I" Number 1 producing?

A The State "I" Number 1 was a dual completion in the Wolfcamp and in the Penn.

Q What is its production in the Penn, do you know approximately?

A We have just put that on the pump and it is a little irregular. I have its--in July, it was 1144 barrels of oil and in August it was 464 barrels of oil. We expect it to increase when we have the pump operating properly.

Q And actually there may not be trouble by passing any oil injection into the Hobbs "G" Number 1 until you get over to the vicinity of State "I" Number 1?

A There are only two wells producing from the Penn, State "I" Number 1 and State "F" Number 2.

MR. FISCHER: Thank you.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Hall, did you test the Pennsylvanian at the State "I" Number 2?

A Yes sir, we tested and perforated this interval, the interval I have shown here, at approximately 9800 feet and acidized it and still not able to get oil out of the zone.

Q Did you get any water?

A No, sir.

Q Just dry?

A It was dry. We feel like the structure to the west is pinching out along this line here. It's good porosity and permeability.

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

(No response).

MR. UTZ: If not, the witness may be excused.

(Witness excused).

MR. UTZ: Are there any other statements to be made in this case?

MR. MANKIN: Yes, sir.

MR. UTZ: Mr. Mankin?

MR. MANKIN: Warren Mankin representing Aztec Oil and Gas Company. Aztec is the operator of two wells in the Lane Wolfcamp Pool, which are owned jointly by Aztec and Delhit. These wells were both originally driven to the Pennsylvanian and were completed

only in the Wolfcamp. One well is flowing, one well is pumping. They are both making considerable quantities of water. In fact, the quantities of water are quite similar to the water being produced by all other Sunray wells. We are at the present time attempting to negotiate disposal of our water into this same well at some future date.

We concur in Sunray's application for converting this well into a salt water disposal well to take care of surface disposal in the Lane Wolfcamp and Pennsylvanian Pools.

MR. UTZ: Any other statements?

(No response).

MR. UTZ: If not, the case will be taken under advisement.

STATE OF NEW MEXICO)
: ss
COUNTY OF BERNALILLO)

I, JERRY MARTINEZ, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me in stenotype and reduced to typewritten transcript by me, and that the same is a true and correct record, to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this 24th day of October, 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Jerry Martinez
Notary Public

My Commission Expires:
January 24, 1962

I do hereby certify that the foregoing is
a complete record of the proceedings
in the Examiner hearing of Case No. 1532
heard by me on Oct 22, 1958.
Examiner
New Mexico Oil Conservation Commission