BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE NO. 1502

TRANSCRIPT OF HEARING

SEPTEMBER 10, 1958

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BEFORE THE
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IN THE MATTER OF:

CASE 1502 Application of The Pure Oil Company for an order authorizing a salt water disposal well. Applicant, in the above-styled cause, seeks an order authorizing the disposal of salt water through its State Lea "E" No. 1 Well, located 1980 feet from the North and East lines of Section 21, Township 16 South, Range 34 East, Lea County, New Mexico. Said well is a producing oil well in the Kemnitz-Cisco Pool and the applicant proposes to inject salt water through the annulus between the 8 5/8" and 5 1/2" casing. The proposed injection zone is from 4,527 feet to 9,450 feet.

BEFORE:

Mr. Daniel S. Nutter, Examiner.

T R A N S C R I P T O F P R O C E E D I N G S

MR. NUTTER: The next case on the docket will be 1502.

MR. PAYNE: Application of The Pure Oil Company for an order authorizing a salt water disposal well.

MR. WELLS: I am H. C. Wells, here to represent the applicant. I will testify.

(Witness sworn)

HARRY C. WELLS,

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

DIRECT EXAMINATION

BY MR. PAYNE:

Q Will you please state your name and position?

A My name is Harry C. Wells. I am employed by The Pure Oil Company. My position is assistant chief division production engineer of the Texas producing division. I have not testified before the Commission before.

Q Would you give us a brief resume of your background experience, Mr. Wells?

A I attended Los Angeles State University, and graduated in 1950 with a Bachelor of Science degree in petroleum engineering. Upon graduation, I was employed by The Pure Oil Company, and have been with them ever since. I was located in Midland, Texas for a little over a year, supervising field operations in the Permian Basin and Southeastern New Mexico area, and I am now in the division office, assistant division engineer of the division which handles Southeast New Mexico.

MR. PAYNE: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, sir, they are.

Q Mr. Wells, are you familiar with the general matter contained in your application?

A Yes, sir, I am.

Q Proceed, please.

A The Pure Oil Company is owner and operator of the State Lea "E" lease which covers the E/2 of Section 21, Township 16 South,

Range 34 East, Lea County, New Mexico. Exhibit A shows the area of this lease and all wells within one half mile of the proposed disposal well. Pure State Lea "E" lease has two producing wells, the State "E" Lea No. 1, located 1980 feet south of the north line, and 1980 feet west of the east line of Section 21, is completed in the Kemnitz-Cisco Pool, and Well No. 2, located 1980 feet west of the east line, and 760 feet north of the south line of Section 21, is completed in the Kemnitz-Wolfcamp Pool. All other wells shown on Exhibit A are completed in the Kemnitz-Wolfcamp Pool with the exception of Tennessee Gas Transmission Company's State "B" No. 2, which is completed in the Kemnitz-Cisco Pool. Exhibit B is an application to dispose of salt water by injection into a porous formation not productive of oil or gas. I will review that application. The proposed injection well is the State Lea "E" No. 1 operated by The Pure Oil Company. The depth to the top of the injection zone is 4,527 feet. The depth to the base of the injection zone is 9,460 feet. I would like to point out that this differs from the application as submitted asking for this hearing by ten feet on the base, it said 9,450 on the previous application and 9,450 is correct and is based on the temperature survey run on this log rather than the drilling report which was received. Surface casing in this well consists of 11 3/4 inch OD set at 383 feet, and cemented with 650 sacks of cement. This cement was circulated to the surface. Intermediate casing consists of 8 5/8 inch OD casing set at 4,527 feet, and cemented with 2,000 sacks of cement. This cement

was circulated to the surface. The long string consists of 5 1/2 inch OD casing, set at 11,575, and cemented with 400 sacks of cement. This cement extended to the outside of the 5 1/2 inch casing to a depth of 9,460 feet as determined by temperature survey run on the well. The tubing string consists of 2 3/8 inch tubing; 11,322 feet with a packer, TIW packer set at 11,252 feet. Injection of salt water will be through the annulus, between the 8 5/8 inch and 5 1/2 inch casing. Injection will be through open hole. This well was not drilled for salt water disposal purposes. The perforated intervals are from 11,410 to 11,430, and 11,446 to 11,476. None of these perforations were squeezed off. The depth of the shallowest zone productive of oil or gas in this pool is approximately 10,000 feet. The deepest zone containing fresh water in this pool is approximately 370 feet. There are no other salt water disposal wells in this pool using this same zone for injection purposes. The approximate volume of salt water to be injected daily will be about 300 barrels per day. The system will be of a semi-close type. Injection will be by pump pressure of approximately 2,000 pounds per square inch. We do not think it will be necessary for the water to be filtered or chemically treated. And this well is so cased and completed that water can enter no other formation than the injection zone set out.

The water to be disposed of is produced from The Pure Oil Company's State Lea "E" Well No. 2, from the Wolfcamp formation.

Exhibit C shows the analysis of this water which was taken

on water recovered from a drill stem test in this well over the interval between 10,784 to 10,813 feet. It will be noted that the water contains 56,795 parts per million total developed solid. Therefore, this water is unfit for stock or irrigation uses. The proposed injection zone will include the San Andres, Glorietta, Clearfork, Tubb and Abo formations. To the best of our knowledge, none of these formations are productive of oil or gas.

Exhibit D is a statement by Mr. George E. Fisher, a geologist of The Pure Oil Company stating that there is no production from formations included in the proposed injection interval within a distance of two miles of the proposed disposal well. He further states that the injection interval below the base of the Triastic formation which occurs at a depth of 1,573 feet in Pure's State Lea "E" No. 1. None of the formations in the proposed injection interval contain fresh water. The San Andres formation, which is the uppermost of these exposed formations,was tested in Shell's Williams Unit No. 1 located 660 feet from the south line, and 1980 feet from the east line of Section 8, Township 16 South, Range 34 East. This well is approximately 9,400 feet northwest of Pure State Lea "E" Well No. 1. The interval tested was from 5,786 feet to 5,878 feet. Recovery on this drill stem test was 4,700 feet of water.

Exhibit E shows the analysis of this San Andres water. This analysis shows a total solid content of 95,901 parts per million.

Exhibits F. G, H, I and J are waivers from all offsetting operators, stating that they have no objection to our proposal to

dispose of salt water into the State Lea "E" No. 1 over the proposed injection interval.

Exhibit K is a similar waiver from the owner of the surface rights on our State Lea "E" lease.

Exhibit L is a casing cementing affidavit setting out the casing program on Pure State Lea "E" No. 1, which was executed by Mr. N. J. Littlejohn who personally supervised the setting of this casing. The Kemnitz Pool is not included in the latest list of the area subject to compulsory water disposal since water production is very limited in this pool. We do not feel that the water production on our State Lea "E" lease is a serious problem at this time. However,if salt water increases in Well No. 2, the problem may become more severe. Well No. 1, which is now flowing, will be placed on artificial list in the near future, and this well may also begin to produce salt water. For these reasons, we would like to have the disposal program set up and approved at such time that water production becomes excessive. It is our belief that the approval of this application will not cause waste or impair correlative rights. I would like to offer Exhibits A through L.

MR. NUTTER: Without objection Pure Oil Company's Exhibits A through L will be admitted in evidence.

A That's all I have.

MR. NUTTER: Does anyone have any questions of Mr. Wells?

MR. IRBY: May I see that Exhibit of the casing cementing program?

MR. PAYNE: This is a producing well, is it, Mr. Wells?

A Yes.

Q And you intend to dispose of the water above the producing horizon?

A Yes. The top of the injection zone is 2,000 feet or so above the producing zone. The bottom -- I am sorry -- bottom of the injection zone.

MR. NUTTER: Any questions of Mr. Wells?

QUESTIONS BY MR. NUTTER:

Q Mr. Wells, what is the nearest dry hole that has been drilled in the area of this proposed water injection well which would be adopted to a salt water disposal well?

A I do not know, Mr. Nutter. It's over a mile, I am sure. I don't recall the exact location of it, but I think it is too far to warrant laying lines to the well.

Q Do you think that any distance is too far to warrant laying a line when there is a possibility that if the water could somehow find its way from the annular spacing between the 8 5/8 and 5 1/2 in the producing zone and drown out the producing zone in this well, do you think that any reasonable distance is too far to avoid that?

A I think we will know immediately if that happens since this well is not producing any water of its own, and I feel that we could repair the damage to the casing or do a squeeze cementing operation, which would exclude the water without too much trouble.

Q What is the means of producing this well at the present time?

A This well is flowing at the present time.

Q You expect that it will be put on the pump in the near future?

A Yes, sir. The next hearing involves that.

Q What do you anticipate that you will use, a hydraulic type pump?

A Yes, Kobe.

Q Have any tests been made on the zone from 4,527 to 9,460 which will indicate that that zone will take water?

A Yes, sir. We pumped into the annulus -- that is what that pressure shown on the application reflects, to determine whether we could inject into the annulus. It is very tight, but it will take water.

Q Does this application indicating 2,000 PSI mean that you are going to have 2,000 PSI at the surface in order to put this water in?

A Yes, sir.

Q Have you made any calculations as to what the pressure might be at the top of the cement, which comes around the 5 1/2 inch pipe with a 2,000 pound pressure at the surface and head of salt water of 9,460 feet?

A It would be very high pressure. I didn't calculate.

Q There would be considerable pressure in that cement, how-

ever?

A Yes, indeed.

Q Do you know, Mr. Wells, whether this is in an area where there is fresh water in the Ogallala or one of the upper formations that are usually water -- fresh water bearing in Lea County?

A I do not know personally. I've shown a depth of fresh water down to 370 feet on the application, which reflects what was given to us by our district geologist out here, and I don't know whether he actually went into it or whether he looked at the casing programs on the surrounding wells.

Q How much water is presently being produced in this --

A The latest test is 270 barrels per day.

Q Is that rate of water production increasing?

A Yes, slightly. It's not going up rapidly.

Q Which well is the water being produced from?

A "E" 2.

Q The No. 2 Well in the Wolfcamp?

A Yes, sir.

Q How about other Wolfcamp wells in the area? Are they producing water?

A I think there are seven total wells in the Kemnitz-Wolfcamp which produce water, and this is by far the largest water producer. Most of them are something under ten barrels a day, and I think there is one that produces about thirty barrels a day.

Q Then, your well is producing approximately 270?

A Yes, sir.

Q What are the other operators doing with the produced water?

A I don't know. I am sure they are putting it in pits.

Q What are you doing with it at the present time?

A It is going into a pit.

Q Is it evaporating?

A Some of it.

Q The pit is not running over, is it?

A No.

MR. NUTTER: Anyone have any further questions of Mr. Wells?

REDIRECT EXAMINATION

BY MR. PAYNE:

Q Do you feel that you could determine immediately whether there was a leak?

A To the 5 1/2 inch casing?

Q Yes, sir.

A Yes, sir. We would know instantly because the well would start producing water, and it doesn't now.

Q It doesn't produce any water now at all?

A No.

MR. NUTTER: Is the No. 2 on a pump at the present time?

A Yes, it is on Kobe pump.

Q What could you attribute the need for having to put the No. 1 Well on the pump in the near future?

A The tubing pressure has been declining pretty rapidly, and it's down to 300 pounds now whereas it started at 1500 pounds or so over a year ago.

Q How many wells are completed in the Cisco formation in this area?

A I think there is just two or three. I don't know.

Q Are any of them producing any water, to your knowledge?

A No.

MR. NUTTER: Any further questions of Mr. Wells?

MR. IRBY: I have a few questions.

MR. NUTTER: Go ahead.

QUESTIONS BY MR. IRBY:

Q What is the Section, Township and Range of this well?

A Section 21, Township 16 South, Range 34 East.

Q How long would it take you to compute the pressure requested in Mr. Nutter's question?

A Very short time. It would be about 6700 pounds per square inch. On the casing, on the cement outside of the 5 1/2 inch casing.

QUESTIONS BY MR. NUTTER:

Q What is the interval of production in this No. 1 Well, Mr. Wells?

A The perforations are from 10,410 to 10,430, and -- I am sorry -- 11,410 to 11,430, and 11,446 to 11,476.

Q What is the interval of production from the Wolfcamp for-

mation in this neighborhood?

A I believe it's 10,700, approximately.

Q Is that an average for all of the Wolfcamp Wells in the neighborhood?

A I was taking the depth on our No. 2 Well.

Q Do you have the perforated interval in that well?

A 10,681 to 10,697.

Q And you have made no determination as to where any possible dry hole in the area might be located?

A No, I have not.

Q Has your Company given any authority to drilling a well for the purpose of disposing the salt water?

A Yes. In fact, we are still investigating that line because of the high pressure here, which we don't like particularly. I don't know the status of those investigations. The geologists are working on it at the present time.

MR. NUTTER: Any further questions of Mr. Wells? Mr. Fischer.

MR. FISCHER: I have some questions.

MR. NUTTER: You may proceed.

QUESTIONS BY MR. FISCHER:

Q I don't know if you said this. How many wells are in the Kemnitz-Cisco Pool?

A I think two or three. There is a very limited number.

Q Is one of them a Forest well? Does Forest have a well

in there?

A I don't know.

Q Do you know what type of drive this Cisco Pool is, drive mechanism?

A We have experienced a fairly rapid decline in pressure in our Well No. 1, and I feel that it will be solution gas drive.

Q Is there any water drive?

A No. At least, there is no water production.

Q Your Lea "E" 1 is flowing at the present time?

A Yes.

Q Is there a packer on it?

A Yes.

Q And if you pumped it, which I believe you said you anticipate having to pump it pretty soon, --

A Yes.

Q -- would you leave the packer on there?

A No, we would remove the packer.

Q And your estimated pump pressure to dispose of the water would be roughly 2,000 pounds?

A Yes.

Q Did you figure out the hypothetical pressure at that point?

A Yes. On the basis of the injection zone at a half a pound per foot, it would be roughly 4,700 pounds plus the 2,000.

Q Would you load the -- if it so happened that before

you put this well on the pump you left the packer on the tubing, would you load the hole above that packer if you thought that there might be a chance of pressure rupture in that casing above the cement?

A We would load the hole as always, behind packers, with oil probably or treated water.

Q What's the composition of that cement there behind the 5 1/2 casing at the top, in other words, the first cement that went down when you landed that 5 1/2 inch casing?

A The composition?

Q I mean does it have a lot of filler in it?

A It is four percent jell cement probably.

MR. FISCHER: I think that's all.

REDIRECT EXAMINATION

BY MR. PAYNE:

Q Could you estimate the reserves in this pool, Mr. Wells?

A No, sir, I couldn't.

Q Are either one of the two wells in the pool non-marginal, is your well non-marginal, your State "E" No. 1?

A Yes, it is non-marginal.

Q It is?

A Yes.

MR. PAYNE: That's all.

MR. NUTTER: Any further questions of Mr. Wells? If not, he may be excused.

(Witness excused)

MR. NUTTER: Does anyone have anything further they wish to offer in Case 1502? Let's take the case under advisement and take next Case 1503.

C E R T I F I C A T E

STATE OF NEW MEXICO)
:ss
COUNTY OF BERNALILLO)

I, J. A. TRUJILLO, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me in stentype and reduced to typewritten transcript by me and/or under my personal supervision, 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, the 24th day of Sept., 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

J. A. Trujillo
Notary Public

My Commission Expires:

October 5, 1960.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1502, heard by me on 9-10, 1958.

New Mexico Oil Conservation Commission, Examiner

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