BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE NO. 1472

TRANSCRIPT OF HEARING

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June 11, 1958

BEFORE THE
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IN THE MATTER OF:

CASE NO. 1472 Application of Sunray Mid-Continent Oil Company for an oil-oil dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its State Land 15 Well No. 3, located 660 feet from the South line and 1980 feet from the East line of Section 16, Township 21 South, Range 37 East, Lea County, New Mexico, to permit the production of oil from the Drinkard Pool and oil from the Blinebry Oil Pool through parallel strings of tubing.

BEFORE:

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: Next case on the docket is Case 1472.

MR. PAYNE: Application of Sunray Mid-Continent Oil Company for an oil-oil dual completion.

MR. NUTTER: Would you proceed, please?

MR. LOAR: Swear the witness in, please.

(Witness sworn)

DONALD E. HALL,

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

DIRECT EXAMINATION

BY MR. LOAR:

Q State your name and company by whom you are employed.

A I am Donald E. Hall. I am employed by the Sunray Mid-Continent Oil Company as senior petroleum engineer for the Northwest Texas-New Mexico District.

Q Have you previously testified as a petroleum engineer before this Commission and had your qualifications accepted?

A Yes, sir, and they have been accepted.

MR. LOAR: Are they acceptable, Mr. Nutter, or otherwise I qill qualify him?

MR. NUTTER: Please proceed. His qualifications are acceptable.

Q This is the application of Sunray Mid-Continent Oil Company for an Order permitting the dual completion of State Land 15 Well No. 3 as an oil well in the Blinebry Pool, and as an oil well in the Drinkard Pool in Lea County, New Mexico to produce through dual strings of tubing. Are you familiar with this application?

A Yes, sir.

Q Have you prepared a plat of the area involved?

A Yes, sir.

Q Will you have that marked as Exhibit No. 1 and discuss the plat; the history of the well involved?

A Exhibit No. 1 is a plat of area around our State Land 15 lease, and shows wells on the plat which are producing from the

Blinebry and Drinkard Pools. Our State Land 15 lease is outlined in blue. The solid dots are Drinkard Wells. The wells circled in red are Blinebry gas wells. They are numerous dual completions which are signified by a solid dot, and the gas well insignia encircled in red. The State Land 15 No. 3 is located 660 feet from the South line, 1980 feet from the East line of Section 16, Township 21 South, Range 37 East. It was completed as an oil well in the Drinkard Pool June the 12th, 1947; total depth 6,660 feet, has been producing through perforations from 6,540 to 6,635. Thirteen and three-eighths inch OD casing was set at 215 feet, cemented 250 sacks cement. Eight and five-eighths inch OD casing set at 2,878 feet and cemented with 1600 sacks of cement. And five and a half inch OD casing was set at 6659, cemented with 500 sacks of cement.

Q Incidently, Mr. Hall, you have a calculated fill-up of the cement behind the five and a half inch?

A It's approximately 4,000 feet from the surface.

Q All right, --

A This Commission, by its administrative Order No. DC-67 issued February the 15th, 1954, authorized the gas-oil dual completion for Well No. 3, with the Drinkard zone producing through the tubing and the Blinebry zone of the Blinebry Gas Pool producing from the -- between the tubing and casing, the casing tubing analysis. This well dual completion was then completed March the 26th, 1954 with the Blinebry producing through perforations from 5,600 to 5,700 feet, and the Drinkard producing through perforations

6,540 to 6,635. A Baker Model D5R packer was set between the two zones at 6,470 with two and a half inch tubing set in the packer.

Q What is the current gas-oil ratio and the gravity of the Blinebry completion in Well No. 3 now?

A The Blinebry has a gas-oil ratio of 2,152 cubic feet per barrel on the last gas-oil ratio survey, and a gravity of 41 degrees API.

Q And what do the Blinebry Rules provide for the classification of oil and gas wells in this Pool?

A Rules Nos. 2 and 18 of Order No. R-610-B, special rules and regulations for the Blinebry Oil Pool and special rules and regulations for the Blinebry Gas Pool state that a well producing liquid hydrocarbons from the Blinebry zone with a gravity of less than 51 degrees API and with a producing gas liquid hydrocarbon ratios of less than 32,000 cubic feet per barrel should be classified as an oil well.

Q Does this well, then, meet the qualifications of an oil well?

A Yes, it meets the qualifications of an oil well and not a gas well.

Q All right, will you now have your Exhibit No. 2 marked and discuss it briefly?

A Exhibit No. 2 is a section of gamma ray neutron -- gamma ray neutron log of our State Land 15 Well No. 3. It shows the vertical limits of the Blinebry Pool, the vertical limits of the Drinkard

Pool, down to the total depth of this well, and also shows the vertical limits of the Tubb Pools which is in between the Blinebry and Drinkard Pools. Also on this log we show in a solid section the present Drinkard perforations and the present Blinebry perforations. I have crosshatched additional perforations which we intend to perforate at the time of workover, of the proposed workover of -- when we plan to run the two strings of tubing.

Q Incidently, do you believe that this additional perforated interval in the Blinebry will increase your productivity and possibly your gas-oil ratio?

A As these two sections have better permeability than where we are now perforating, I am sure they will increase our productivity. It is quite possible that they will also increase the gas, but I do not know for sure. I might add that other wells in the vicinity have perforated more or less the additional intervals I have crosshatched here.

Q And they are producing as --

A They are producing as gas wells.

Q Will you now have Exhibit No. 3 marked and discuss it?

A Exhibit 3 is a schematic drawing of the proposed two-string dual completion. It has five and a half inch fifteen and a half pound casing set at 6,659 feet, Baker Model D5R packer is at 6,470 feet. We propose to run two and a sixteenth inch Hydril CS tubing through the Baker packer; through the sixteenth inch Hydril we will produce the Drinkard zone. We also intend

to run one and a half inch regular tubing and set it at a depth of approximately 5,570 feet and produce the Drinkard. I mean, produce the Blinebry. Each zone will be produced through a separate string of tubing, through separate flow lines and into separate separators and storage tanks.

Q I believe you've also prepared an Exhibit No. 4 to show the clearances involved in this type of installation, haven't you?

A Yes, sir.

Q Will you please briefly discuss that Exhibit?

A Exhibit No. 4 is a full scale sectional drawing showing the clearance of two and a sixteenth Hydril tubing and inch and a half regular tubing in five and a half inch OD fifteen and a half pound casing. As shown on the diagram, the five and a half inch casing had an ID of 4.950 inches, a drift of 4.825 inches. The left, two and a sixteenth inch Hydril tubing has a maximum joint OD of 2.330 inches. It has an ID of 1.789 inches, and a drift of 1.656 inches. On the right, inch and a half regular tubing has a maximum joint OD 2.200 inches, and ID of 1.610 inches, a drift of 1.516 inches. Below the drawing I've shown both strings of tubing with specifications in a tabular form. The two and a sixteenth inch Hysril and the one and a half inch regular tubing would have a clearance with a drift of .295 inches, in the five and a half inch fifteen and half pound casing.

Q All right. Now, will you please comment on your proposed production and testing procedures, if this dual completion as pro-

posed, is granted?

A Since each zone is producing through separate strings of tubing to separate flow lines, separators and stock tanks, bottom hole pressures and gas-oil ratios and other production tests can be taken the same as on a single completion. The clearance in each string of tubing is sufficient to run bottom hole pressure recording gauges. A standard packer leakage test as required by the New Mexico Oil Conservation Commission can easily be taken. We plan to use the same packer as used on the -- that is in the well at present. There is such a difference in the well zone perforations and gravities that a leak permitting communication of the two zones would be readily evident. The Drinkard has a gravity of 37.4 degress API, the Blinebry, 41 degrees API. The flow, in this instance, will be at least as efficient in the inch and a half regular tubing and two and sixteenth inch Hydril tubing as in two and three-eighths inch OD tubing. This is primarily due to the slippage, or the dropping back of oil as the gas goes by, which would be increased in a larger size tubing because of the velocity, and the cross section of the area of the tubing is greater. There have been many instances that wells have ceased to flow through the annular space and yet resumed production when the flow is injected through the tubing. We realize that there is a greater friction through smaller tubing, but in the range of tubing we are planning to use and the depth and the rates of production, friction should not be a factor.

Industry does not question the flow efficienty of the two and three-eighths inch tubing to produce a relative high volume of fluid. In this instance we are talking about a relatively low volume of fluid. I believe the top allowable for a Blinebry oil well would be approximately 44 barrels a day, and through inch and a half tubing, which has an ID of approximately 80 percent of the two and three-eighths the range of liquid production contemplated here falls well within the range of the efficient production. Paraffin does accumulate somewhat in the Drinkard Wells. We have found it profitable to set up a schedule to cut paraffin three times a year. This paraffin is usually found from the surface to a depth of 300 to 700 feet below the surface. We do not believe paraffin to be a problem in the Blinebry wells. We have never experienced any trouble with Blinebry paraffin. I doubt if paraffin will be more of a problem in the smaller size tubing. Producing size tubing will increase the velocity and allow less time for cooling to occur, and also in the Drinkard tubing, which is Hydril tubing, it does not have recesses in which paraffin starts to accumulate. Paraffin cutting tools are available for cutting paraffin in both the two and a sixteenth inch Hydril [illegible] tubing and inch and a half regular tubing.

Q Now, then, Mr. Hall, will you discuss the type of reservoir that we have in the Drinkard and Blinebry?

A I have prepared Exhibits Nos. 5 and 6. Exhibit 5 is a data sheet showing production data on the wells in the immediate vicinity

of our lease. I have prepared it to use to show that our Drinkard production and the wells in the vicinity are more or less the same. The Drinkard Pool is a solution gas drive reservoir. It has an average gas-oil ratio of 11,800 cubic feet per barrel. The initial bottom hole pressure was 2660 PSIG. Present bottom hole pressure is approximately a thousand PSIG. There are now 378 flowing wells, 60 pumping wells, and 7 gas lift wells in the Drinkard.

MR. NUTTER: How many flowing wells, -- excuse me.

A 378.

MR. NUTTER: And 60 pumpers?

A 60 pumpers, 7 gas lifts. Most of the pumping wells are edge wells or in areas of low permeability. Our State Land 15 Well No. 3 is a flowing well and has a tubing pressure of 600 pounds. It had a gas-oil ratio of 7100 Cubic feet per barrel on the last GOR survey.

Exhibit No. 6 is a decline curve I have prepared showing average daily production rate versus cumulative production. This well has accumulated production of approximately 133,000 barrels of oil and no water, and is capable of making approximately 10 barrels of oil a day.

MR. NUTTER This is from the Drinkard?

A This is from the Drinkard, yes. Based on this decline curve, on our extrapolating from it, we predict that the maximum oil recovery from it will be less than 20,000 barrels more of oil before reaching its economic limit. We

believe that the history on this well and surrounding wells shows that the State Land 15 No. 3 Drinkard will flow to its economic limit.

Q Now, then, will you briefly discuss the Blinebry?

A I have also prepared a Blinebry gas pool production data sheet which shows the production statistics, latest GOR, gravity; shows which wells are duals and the number of acres assigned to each well, on all of the wells on the plat on Exhibit 1. The Blinebry reservoir is largely a gas condensate reservoir. It has 124 gas condensate wells. As of January the 1st, 1958, it has produced 365,085 barrels of liquids, 21,000,634 MCF of gas, --

Q Excuse me, --

A -- 21,000,634,000 MCF of gas with a pressure decline from approximately 2300 pounds per square inch, gauge, to approximately 2,060 PSIG.

MR. NUTTER: Mr. Hall, excuse me for interrupting. Are you referring to the Blinebry Gas Pool?

A The Blinebry Gas Pool.

Q Not the Blinebry Oil Pool.

A Yes. This does not have any oil wells in the production data.

Q And so these 124 gas condensate wells are classified as gas wells?

A Yes. I will get into the oil wells immediately. The Blinebry also has 13 flowing wells, and 7 pumping wells which are clas-

sified as oil wells. The pumping wells are all edge wells. There are several low gas-oil ratio wells in the midst of the pool which are surrounded by high gas-oil ratio wells.

Our State Land 15 No. 3 Blinebry is now producing against a line pressure of approximately 500 pounds per square inch gauge and producing through the tubing casing annalus. It loads up due to fluid slippage and is not capable of producing very easily into this line pressure. It is certainly capable of flowing against a low line pressure and will be even more efficient through tubing. We believe the productivity can be increased by perforating the additional sections I have shown on Exhibit 2, and this well should be a top allowable Blinebry oil pool well which should flow long after the Drinkard is economically depleted.

Q Do you believe that this well will flow -- this Blinebry completion will flow to depletion?

A I believe that it will flow close to depletion. It certainly will flow a long time longer than the Drinkard.

Q Will you please comment briefly concerning the feasibility of artificial lift if either of these zones should not flow to depletion?

A We believe that both zones will flow to depletion, but we can artifically lift either zone or both zones simultaneously if we have to. The Drinkard will have two and a sixteenths inch Hydril tubing. We -- in installing pumping equipment, we would probably use a slim hole three-quarter inch rod which has a

maximum box OD of one and one half inches. This rod can be purchased with a yield to withstand 17,600 pounds peak polish rod load and our load on this well would be considerable less than 13,000 pounds. There are a number of installations of this type presently being used. The Blinebry zone will have inch and a half regular tubing and we are advised that the Blinebry will flow to economic depletion. If it does not, and the Drinkard is still producing, which is doubtful, we can at that time run five-eighths inch slim hole rods in inch and a half tubing or install another additional string of two and a sixteenth inch Hydril tubing which will clear it. Two strings of two and a sixteenth inch Hydril tubing will clear the drift of five and a half inch fifteen and a half pound casing. We do not believe that the reservoir and well peformances justiy the additional expenses of installing a string of two and a sixteenth inch Hydril tubing for the Blinebry, since the Blinebry will flow far past the time the Drinkard has reached economic depletion.

Q Will you discuss briefly the reserves and economics involved concerning these two zones.

A I have estimated the cost of drilling and completing a Drinkard well to be approximately $85,000; the cost to drill a Blinebry well approximately $74,000. We cannot afford to drill a well to the Drinkard or Blinebry for a maximum recovery of 20,000 barrels of oil left in the Drinkard.

Q If this dual completion is not granted, will this State Land

15 lease be drained by offsetting wells?

A Yes, since we are offset in the Blinebry to the north, the east and the south, --

Q Do you believe that the approval of this application will be in the interest of the conservation and protect correlative rights?

A I do.

Q Has each of these Exhibits been prepared by you or under your supervision?

A Yes, sir, they have.

MR. KELLAHIN: We would like to offer Exhibits 1 through 7 at this time.

MR. NUTTER: Without objection, Sunray's Mid-Continent Exhibits 1 through 7 will be entered as evidence in this case.

MR. KELLAHIN: That's all I have, Mr. Nutter.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Hall, first of all,I want to say you covered this very thoroughly. You anticipated every question I had.

I noted from your Exhibits and you also stated that when you go into this well and work the Blinebry zone over you plan to open up additional sections both above and below the present perforated interval, is that correct?

A Yes. I believe if you study the log of -- the neutron curve shows that there is considerable porosity in both of these sections

I have marked, and the gamma ray curve shows that they are fairly clean sections.

Q Do you anticipate that the upper portion of the additional perforations will yield more gas after completion?

A Frankly, I don't know. I believe it is very possible since we have wells to the north, well, all of the wells shown immediately around our lease have considerable more gas than our well does.

Q And are they open in the entire section which you propose to have opened in your well after recompletion?

A Generally they are opened through about the same sections as I intend to have opened in this well, and in some cases they -- the porosity opens up a little different than it does in State Land 15 Well No. 3.

Q Now, referring to your Exhibit No. 1, your No. 3 Well is in the center and on a direct line with Amerada No. 4 and Hunt Weatherly No. 3?

A That is correct.

Q Now, I note from Exhibit No. 7, and both of those wells are Blinebry gas wells, correct?

A That is correct.

Q Now, I note from Exhibit No. 7 that Amerada State DA No. 4 is without doubt a Blinebry gas well, having a gravity of 61 and a GOR of 50,000 to 1 -- A That is right.

Q Do you have any information at all on the Hunt Weatherly

No. 3?

A The Hunt Weatherly No. 3. The well was not completed in time for this survey. We do not have any production figures. I believe a survey -- let's see, I am not sure when the next survey is, but I understand that it is a fairly gaseous well.

Q Have you seen any completion data on the well since it was completed?

A Yes, I looked through the files of that well.

Q And it is classified as a gas well?

A It is.

Q So there is a good probability, is there not, that upon re-completion of your Blinebry section your well will be classified as a gas well?

A I cannot readily understand why our well is -- has a low ratio right now.

Q You mentioned, I believe, that you could run slim hole pumping rods or slim string pump rods or something --

A Slim hole rods, yes, sir.

Q -- in this one and a half inch regular tubing?

A You can. It isn't a standard item of equipment, but from two different rod manufacturers their specifications show that you can run rods that have a maximum boxed diameter of one and three-eighths inches. Now, they would be rods that would have the strength of regular five-eighths rods.

Q Doesn't leave much room for fluid, does it?

A Well, I believe, considering the drift diameter of inch and a half regular tubing, which is slightly over one and a half inches, that it would be sufficient. Five-eighths rods have been used in wells that produce from 6,000 feet, and where they are not heavily loaded, they couldn't have very much fluid load.

Q Mr. Hall, is it objectionable at this time to run parallel strings of two and a sixteenth inch Hydril?

A We do not consider that the two and a sixteenth inch Hydril is necessary for the Blinebry to recover the additional oil from the Drinkard. We cannot afford to spend too much money before we plug off the Drinkard.

Q However, any investment in tubing strings is subject to a salvage value at the end of the operation of the well, is it not?

A Yes, sir, Hydril tubing, I don't know how readily that could be used, but it does cost over a dollar a foot, more than inch and a half regular tubing, which would be --

Q How does it compare in cost with the regular two inch tubing

A Well, regular two inch tubing, Ibelieve, runs about one dollar sixty-three to one dollar sixty-five cents. I am not sure, it is in that range. Two and a sixteenth Hydril, I believe, is about a dollar fifty-five, a dollar sixty, I am not sure; it is in that range. I am not sure just exactly what the cost is.

Q What portion of the pool is this in?

A This is in the north end of the pool. I think the closest well in the Terry-Blinebry Pool is approximately two and a half miles to the northeast.

Q You mentioned there were several wells that were classified as gas wells, but were on the pump, I believe. Is that correct?

A Not as gas wells; as oil wells.

Q I see. You also stated that most of these pump wells, however, are edge wells.

A That is correct.

Q Is your well so located that it could be considered as an edge well?

A No, sir. Most of the oil wells are producing -- that are producing from the Blinebry zone are to the south end of the field. There is one which Continental -- I have it circled in green; I believe it is Section 17, Continental Lockhart "A" No. 3 that is classified as an oil well. There is -- that one is on the pump, and the porosity lessens on the west side of this area. Just north of the map, I believe Humble has a flowing well that is classified as a Blinebry oil well.

Q You stated there were 124 gas condensate wells in this pool?

A I believe. Yes, that's right.

Q And those are all classified as gas wells?

A Yes, sir. There are 124 wells in the Blinebry gas --

Q And how many wells are classified as oil wells in the pool?

A Thirteen flowing wells and seven pumping wells.

Q So there is a total of just twenty wells that are classified as oil wells?

A That's right.

Q Has -- now, what has caused your well to be subject to reclassification as an oil well? Is it the change in the GOR, or a change in gravity?

A Both. The gravity is less than the field Rules require to be classified as a gas well, and so is the gas-oil ratio.

Q Has there been any trend established, any change in the GOR since its completion in 1954?

A I do not have that data with me. It has or should have been classified as an oil well some time previous to this date. I believe we have just finished taking a test on this well. I understand the gas-oil ratio was higher, but I do not have that data.

Q What was the original gravity in the Blinebry?

A I am sorry. I do not have that data. I could --

Q Had the well ever produced from the Blinebry prior to the time it was actually completed in that formation in 1954?

A No, sir.

Q So the only production history from the Blinebry has been since March, 1954, then?

A Yes.

Q I wonder if you could furnish us with a gravity by the period,--gravity as measured in this well from the time that it was completed in the Blinebry and also the gas-oil ratios to date?

A Okay. Yes. They take those twice a year, I believe.

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

MR. LOAR: I have one, Mr. Nutter.

Q (By Mr. Loar) Mr. Hall, is the substance of your testimony to the effect that the Drinkard and Blinebry will flow to depletion so that economics do not justify or you would not recommend on the basis of economics installing two and a sixteenth inch Hydril for the production of the Blinebry?

A Yes, sir.

MR. LOAR: That's all.

MR. NUTTER: Are there any further statements in this case? If there are no further statements in Case No. 1472, we will take the case under advisement and the hearing is adjourned.

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 stenotype 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 11th day of July 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Joseph 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. 1472 heard by me on 6-11, 1958.

....., Examiner
New Mexico Oil Conservation Commission