BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
October 24, 1957

TRANSCRIPT OF HEARING

CASE NO. 1336

DEARNLEY - MEIER & ASSOCIATES
INCORPORATED
GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
3-6691 5-9546

BEFORE THE
OIL CONSERVATION COMMISSION
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IN THE MATTER OF: Application of Cities Service Oil Company for an order authorizing an oil-oil dual completion in the Blinebry Oil Pool and Drinkard Pool in Lea County, New Mexico.	CASE NO. 1336

BEFORE:

MR. DANIEL S. NUTTER, Examiner.

TRANSCRIPT OF HEARING

MR. NUTTER: The hearing will come to order, please. Next case on the docket will be case No. 1336.

MR. COOLEY: Case No. 1336. Application of Cities Service Oil Company for an order authorizing an oil-oil- dual completion in the Blinebry Oil Pool and Drinkard Pool in Lea County, New Mexico.

MR. WILLIAMS: My name is Emmett Williams appearing on behalf of the applicant. We have two witnesses, Mr. E. S. Motter and Mr. Harold Palmour. Mr. Motter will appear in behalf of the applicant and Mr. Palmour representing the manufacturer of certain equipment used in dualling will be available if there are any

questions on those items his company manufactures.

MR. COOLEY: Stand and be sworn at this time.

(Witnesses sworn)

E. S. MOTTER

having been first duly sworn, testifies as follows:

DIRECT EXAMINATION

BY MR. WILLIAMS:

Q Will you state your name, please?

A E. S. Motter.

Q By whom are you employed and in what capacity?

A I am employed with Cities Service Oil Company in Hobbs, New Mexico as District Petroleum Engineer.

Q Have you previously testified before the Examiner as an expert in matters such as the subject of this application?

A Yes, sir, but I better qualify that, I never appeared on a dual application, I appeared on other applications before the Examiner.

MR. WILLIAMS: If there are no objections we ask his qualifications as an expert in this matter be admitted?

MR. NUTTER: I believe Mr. Motter previously testified as an expert petroleum engineer and the testimony here is within that field.

Q Are you familiar with the application filed in this matter?

A Yes, sir.

Q Do you consider all the facts stated therein true and correct to the best of your knowledge?

A Yes, I do.

Q Was the well which is the subject of this application drilled under your supervision?

A It was.

Q Will you explain to the Examiner the purpose of this application?

A This application is to dually complete the Cities Service State "P" No. 2 well, located in Section 32, Township 22 South, Range 38 East, Lea County, New Mexico. We propose to dual complete the State "P" No. 2 with parallel tubing strings in order to produce oil from both the Blinebry and Drinkard Formations.

Q Will this proposed dual completion permit us to meet our offset obligations and protect correlative rights?

A Yes, it will.

Q I hand you Exhibit No. 1 and ask that you identify it, please?

A Exhibit No. 1 is a plat showing the location of the subject well, the State "P" No. 2, it has two circles around it's location, and the offset wells I might add since this plat was made up, there has been an additional Drinkard well drilled two locations east of the State "P" 2, by Gulf. I think they are in

process of completing that well right now.

MR. COOLEY: What's the location of that well?

A Gulf's well is two locations east of our State "P" No. 2.

MR. NUTTER: Would that well be in the northwest quarter of the southeast quarter of Section 32?

A That is correct.

Q Have tests been made that would indicate the State "P" No. 2 is oil productive in more than one zone?

A Yes. If you will refer to our Exhibit No. 2, this exhibit No. 2 is a radioactive log of the State "P" No. 2 showing the tops of different formations and the limits Blinebry and Drinkard zones from which we wish to complete the well.

Most recent test on the Drinkard was 73.1 barrels of oil, 3.3 barrels of water in 24 hours on 20/64 inch choke with a flowing tubing pressure of 175 pounds. Gravity of Drinkard oil is 37 degrees API and the gas-oil ratio is 2700 to 1.

The Blinebry zone on August 13, 1957, was drill stem tested from 5620 to 84 feet, recovery consisted of 200 feet of 39 degree gravity oil and 70 feet of drilling mud. Part of this zone was perforated and tested after casing was run, that's shown on our log where those perforations were made.

These perforations were from 5624 to 54 feet, and on an 8½ hour test, the well flowed 33.4 barrels of oil on a 20/64th choke with a flowing tubing pressure of 50 pounds. I might add

that gravity after we had set the casing and tested was about 41 degrees. The gas-oil ratio was 1340 to 1.

These tests, along with the fact that the Stanolind State "S" No. 3, the north offset, is producing oil from the Blinebry and our State "P" No. 1 had produced over 65,000 barrels of oil from the Drinkard before recompletion, establishes oil in both the Drinkard and Blinebry zones.

Q Are these two reservoirs separated in the subject well behind the pipe?

A Yes, five and a half inch casing was set at 7110 feet with 500 sacks cement with 4% gel and followed with 200 sacks of neat cement. The top of the cement by temperature survey was found to be 3235 feet.

Q In your opinion, do you feel that there is a possibility of communication or migration of fluids between the Drinkard and the Blinebry in the annulus between the casing and the well bore?

A No, I don't.

Q Will you describe the remainder of the casing program for this well other than the 5½ inch oil string you have just described?

A Yes, sir. 13 and 3/8 inch casing was set at 310 feet and cemented with 300 sacks of neat cement; 8 and 5/8 inch casing was set at 2895 feet and cemented with 941 sacks of 50-50 posmix followed with 200 sacks of neat.

Q Are all fresh water zones and other producing horizons protected?

A Yes, by circulating cement on the 8 and 5/8 inch casing and having cement behind the oil string to 3285 feet, I feel there is adequate protection for all zones of possible pay and also fresh water zones.

Q You propose to separate the Drinkard and Blinebry reservoirs inside the casing to produce them separately?

A Yes, by the use of a retainer production packer which is set at 6900 feet. Packers of this type have been approved for use in dual completions by the Commission previously.

Q I'll hand you Exhibit No. 3 and ask that you identify it.

A Exhibit No. 3 is a schematic diagram of the proposed dual completion. This diagram indicates the production packer at 6900 feet, which will separate the two zones.

The diagram further shows the means of dualling the well with the use of two strings of tubing. A two inch string of tubing from the packer to the well head is shown with a crossover landing assembly in the 2 inch string at approximately 5629 feet. A one inch tubing string will be run from the landing assembly up to the well head.

Production from the lower zone enters through perforations below the packer and will flow up the 2 inch tubing to the cross-over landing assembly where it will be transferred to the one inch

string and will flow through the one inch string to the surface.

The upper zone production will enter the 2 inch tubing string by means of standing valves on the crossover landing assembly and will continue up the 2 inch tubing string to the surface. By means of PSI wire line equipment, the two zones can either be crossed over in the landing assembly or the lower zone can be produced through 2 inch tubing to the surface. This feature will allow treating of the lower zone through the 2 inch tubing, swabbing of either zone through the 2 inch tubing or running of bottom hole pressures in the 2 inch tubing for either zone.

Q In your opinion, is this installation in accordance with good engineering practices and principals?

A Yes, and I might add in the past six months we have installed identical equipment in six wells in the Goldsmith Field in Ector County, Texas. Two of these wells are currently being pumped from both zones with two pumps on a single rod string.

Q You stated some of these wells are being pumped. Is the State "P" No. 2 to be equipped in that manner also?

A No, but we will run a seating nipple in the two inch tubing so that the Blinebry zone may be pumped if needed. We have checked the reservoir characteristics of the Drinkard formation in the immediate area and from the past performance of offset wells and we feel that the Drinkard zone will flow to depletion, until

the gas-oil ratio becomes so excessive it would be unprofitable to penalize allowable to flow the Drinkard zone.

Q I hand you Exhibit No. 4. Will you please identify this exhibit?

A Exhibit 4 is in actually two parts, Exhibit 4A and 4B. We are preparing or presenting these exhibits mainly to show the producing characteristics of the Drinkard formation.

Exhibit 4A is a graphical picture of our State "P" No. 1 which shows the monthly production in a solid line and the gas-oil ratios in a dotted line. I believe that we can see how the gas-oil ratio has actually increased or remained constant as the oil production went down. This well was recompleted in April of 1957. It had reached a point to where we thought it was no longer economical to produce from the Drinkard, and since it has been recompleted in the Blinebry and Tubbs gas zones.

Exhibit 4B is a production curve on Pan American's State "S" No. 3, the north offset to our well, and it again shows the high gas-oil ratios, and low production.

I don't know about Pan American, apparently they felt the same way. This well has also been recompleted in both the Tubbs and Blinebry.

Q Will the surface equipment be so designed and installed that the reservoir will be separately produced and the fluid separately tanked and gauged for absolutely no commingling?

A Yes, each producing zone will have its own separator and tank facilities.

Q Are you familiar with Orders R799, R894, R895, R974, R1001 and R1057, which allow oil-oil dual completions and the method they are using to produce those wells?

A Yes, I am.

Q Is the method proposed by Cities Service different than those?

A No, we are asking for dual completion by the use of parallel tubing strings and these have been granted by the Commission previously.

Q Is this dual technique recognized and accepted in general by the oil industry and other state regulatory bodies?

A Yes, it is.

Q Are you familiar with Order R977?

A Yes, sir. This was Pan American's application to dual complete their State "S" No. 3, the north offset to our State "P" No. 2, as an oil-gas dual from the Blinebry and Tubbs zones. This was accomplished with parallel tubing strings.

Q Do you think that corrosion would be a possible objection?

A No. We have produced the State "P" No. 1 for 11 years from the Drinkard and although the crude is slightly sour, we have had no indication of down hole corrosion. The Blinebry is also not

considered to be corrosive in this area.

Q Does this dual completion technique possess any more possibility for leakage or communication of reservoirs than any other accepted method?

A No, sir, it is identical with any other technique involving parallel strings of tubing in that one packer separates the two producing zones.

Q Will your company be willing to make packer leakage tests, separation tests or other tests which may be required by the Commission to determine if there is commingling?

A Yes, we certainly will.

Q Mr. Motter, I believe you stated previously that it is possible to take bottom hole pressures on either zone. For information of the Examiner, will you elaborate on this please?

A Yes, I will. If the Examiner will again refer to Exhibit No. 3, I will explain the procedure in taking bottom hole pressures from both zones. If you will notice, we have a PSI separation tool in place in the two inch tubing which is now prohibiting flow of the oil from the Drinkard through the two inch tubing. With this tool in place, it is possible to run a bottom hole pressure on the upper, or the Blinebry zone.

To obtain a bottom hole pressure on the Drinkard or the lower zone, it is necessary to retrieve with wire line tools the PSI blanking tool and then run a PSI Model CVE separation sleeve

by wire line. This separation sleeve seals off the Blinebry entry to the two inch tubing and opens the two inch tubing to the lower formation. The Drinkard or lower formation is then produced for a short time to insure that the column of oil in the tubing is from the lower formation clear to the surface; a bottom hole pressure on the lower formation may then be run.

To restore the well to flowing both zones up the parallel tubing strings, the tool that I previously mentioned is retrieved and the blanking tool is rerun.

We recognize the importance of bottom hole pressure data and our company, of course, watches reservoir performance quite eagerly for our own use, and the commissions, and so we will be most agreeable to pay for the necessary wire line services to obtain bottom hole pressures from both zones whenever the Commission or our company thinks is necessary.

Q Will you please explain to the Commission the method to be used in running packer leakage tests?

A Packer leakage tests will be made in the same conventional manner as for a gas-gas dual or a gas-oil dual. We believe there is sufficient difference in the producing characteristics of the two zones that no difficulty will arise in determining a packer leak. The bottom hole pressures, gas-oil ratios and gravities of the two formations are of such a difference that a packer leak will be quite evident.

Q Mr. Motter, as to economics, what will be saved by this dual if approved as compared to the cost of drilling a second well?

A The cost of dualling the State "P" No. 2 will be approximately $120,000.00, while the cost of two single completed wells to the Drinkard and to the Blinebry zones is estimated to be $185,000.00. This excludes all surface equipment above the well head.

Q If this application were not approved, how could correlative rights in this instance be protected?

A The only way we could protect correlative rights would be to drill an additional well on this same 40 acre tract.

Q Were Exhibits 1 through 4 prepared by you or under your supervision?

A Yes, they were.

MR. WILLIAMS: We ask the admission into the record of Exhibits 1 through 4.

MR. NUTTER: Without objection Cities Service Exhibits 1 through 4 will be admitted.

MR. WILLIAMS: That is all the questions we have of the witness.

MR. NUTTER: Anyone have any question of the witness? Mr. Utz.

BY MR. UTZ:

Q Do you have the bottom hole pressures for the Blinebry

and the Drinkard formations?

A Yes, I do have. These were ran while we were testing the well, The Drinkard formation, a datum of 7025 or subsea of minus 3652 was 2493 pounds.

On the Blinebry, datum of minus 2400 feet or at 5620. The bottom hole pressure -- let me clarify myself there; that is not at 5620, at a minus 2400 which is a common Blinebry datum in this field. 1936 pounds. I might add that on the Drinkard that was a 62 hour shut in and on the Blinebry it was 48 hour shut in.

And at the point in which we are able to run the bomb, the Drinkard bottom hole pressure was 5620, 2265 pounds. At that same point, the Blinebry was 1866. So we have got, looks like, a 199 pounds difference at the same point in the two inch tubing.

MR. UTZ: That's all I have.

MR. NUTTER: Any further questions of the witness?

BY MR. NUTTER:

Q Mr. Motter, you were going through those figures a little fast and I didn't get your complete testing data on the Blinebry formation. I think you said 33.4 barrels of oil, is that correct?

A Yes, that was in an eight and a half hour test of 20/64th choke. We just opened that zone up for a short time to make sure we actually had oil production there. And after finding that we did have, we shut it in and the well is now completed in

the Drinkard.

Q That make any water?

A No, it hasn't, didn't.

Q That's 41 gravity oil with a gas-oil ration of 1340?

A 1340, that is right.

Q How about your Drinkard zone?

A Well, it has a gravity of 37 degrees and gas-oil ratio there is 2700 to 1 which will give us a penalized allowable. The Drinkard is 2000 limit in that field and the Blinebry, of course, I think it was set out when Stanolind completed their well, and the oil is 6000 to 1, gas-oil ratio.

Q You mentioned a 175 pounds in your test regarding the Drinkard completion, what was that, flowing tubing?

A Flowing tubing pressure, that is right.

Q And how about the Blinebry, you have the flowing tubing pressure on that?

A Yes, 50 pounds. However, I would like to state that at 50 pounds is probably isn't, will not be the true flowing tubing pressure due to the fact that well, as you see, we just exploded such a small amount in there I doubt the formation would clean up at that time.

Q I am not clear in the differentiation in pressure we were talking about a moment ago. Now, the pressure minus 2400 for the Blenebry which has a common datum for that field as 1936 pounds --

A That is correct.

Q -- and the pressure at minus 3652 on the Drinkard was 2493?

A Well, Mr. Nutter, if you will refer to our Exhibit No. 3 it is impossible for us to run a bomb blow the PSI separation tool. And it is necessary to separate that pressure from that point on down for the Drinkard.

Q Well, by removal of the PSI separation tool you can run a bomb, can't you?

A No, by removal of that tool both -- well the upper zone is on that to both strings, it's necessary to run it straight through the Tubb, but it still seals off the Blinebry from the two inch tubing and it is impossible to pass a bomb through that, straight through the tubing.

Q All pressures on the Drinkard would be extrapolated from the location, from the point at which the PSI separation tool is set and what was the depth at which that tool was going to be set?

A It would be around 5620. I do have here the bottom hole pressure on drill stem test we ran in the Drinkard which would be in that formation.

Q What I would like is what the differentiation of pressure across the packer at 6900 feet would be. Can you calculate that differential?

A No, I haven't, but I would say it would probably be in the neighborhood of like this pressure up here where we have been able to set our tool, I would say the gravity of the fluid of the Blinebry from the perforations on down to the packer, I would say would give us at least 200 pounds differential across that packer.

Q Do you think a Model B production packer is capable of withstanding the 200 pound differential?

A I certainly do.

Q Has field experience proven that?

A Yes, we used that in extremely high pressure wells on the gulf and never had any trouble with them.

Q Now, Mr. Motter, you mentioned that this identical set up had recently been used by Cities Service in the Goldsmith Pool in Texas. Could you name a hook-up similar to this, including the use of 2 and 3/8ths tubing and 1 and 2/8ths tubing had been --

A Yes, and 5½ inch casing.

Q You also mentioned you didn't think that the Drinkard formation here would ever have to be pumped. Do those formations which are being produced through the one inch tubing in the Goldsmith Pool ever have to be pumped?

A Yes, I think, Mr. Nutter, I explained two of those wells we have are currently being produced with two zone pumps on a single rod string. Now, this is another set up I think our other witness can explain, if you would like to go into that. We did not

run the equipment. It's similar to what we have in the well. We need a vent string, of course, to vent the gas from the bottom zone up into the annulus of the upper zone, not the annulus, but into the tubing string which the bottom zone produces. But due to the producing characteristics of this particular field we did not run that equipment because we feel that if it at all follows the characteristics of our State "P" No. 1 and Stanolind's well, it will never be necessary to artificially lift that bottom zone.

Q You mentioned various orders of the Commission which have authorized dual completions. Did all of those dual completions utilize two strings of tubing?

A Yes, sir.

Q What size tubing has been authorized for use?

A Mr. Nutter, in looking those over, I believe there's only one order and right now I couldn't say which one it is that actually specifies the size of tubing. In that particular order it called for two strings of 2 and 3/8ths inch tubing and all the rest is specified parallel tubing string.

Q Do you think, what about this Order 977 you specifically mentioned, Pan American's order?

A Yes.

Q Did that specify any particular size of tubing?

A I don't believe it did, sir. In that particular set-up Pan-American has one string of tubing into, I believe it's a Model D

Baker Production packer producing gas from the Tubbs and their second tubing string is just extended in the annulus for production of oil up the Blinebry.

Q Are you aware of any dual completion in the State of New Mexico that use this parallel strings of tubing where one of the strings is one inch diameter?

A No, I don't believe I have been or do know of any at this time. I might point out that one reason we feel that we can produce this Drinkard through one inch, the only thing we thought that might give us any trouble was probably some parrafine in that one inch, and in checking my records on the State "P" No. 1 we found in, one time in eleven years did we have to go in and cut parrafine in that well. And if that were necessary in this well we could almost afford to go ahead and pull that one inch tubing string and steam it or clean it with hot oil, but since we have considered this I have talked to some wire line service companies and they tell me that it's possible to cut parrafine now in one inch tubing.

Q They have tools available?

A Yes, but we have never used it and I have never witnessed a job, but that's what they have told me.

Q You think parrafine problems will not exist in the one inch tubes?

A Not from what we found in the State "P" No. 1.

Q What about the flow characteristics of one inch tubing as

compared to two inch tubing?

A Well, I think actually as far as flow characteristics go I believe you would have probably less gas-oil ratio than you would through a larger tubing, say two inch.

Q Does the Drinkard formation have tendency toward high gas-oil ratio?

A Yes, it certainly did. On our Exhibit 4, I tried to point out where the high-gas-oil ratios is what has penalized the production in that particular field and this well that we are dualling has a 2700 to 1 gas-oil ratio at present. I believe that would give us a penalized allowable around 67 barrels down to 40 some.

Q How do you believe that the one inch tubing will act to maintain low gas-oil ratios in the well?

A Well, that's, there's, you will have less slippage, of course, less friction loss in one inch than two inch.

Q Less friction loss in one inch than two inch?

A I believe you would at the low rates at which we will flow those wells.

Q You believe the one inch tubing will act in the capacity of a bottom hole choke, you might say?

A Yes, you might put it that way.

Q Any operators used bottom hole chokes in the Drinkard Pool?

A Not to my knowledge, sir.

Q In the event the Drinkard formation reacts in such a manner it is necessary to pump it will you be able to pump that on formation?

A Yes, we can. It will be necessary to kill both zones and go in and pull this crossover assembly and install the particular type that would be needed to pump both zones so that one feature, both on their type of assembly, it will be necessary to vent the gas out of the Drinkard up above the pumps so we will not gas block the pumps that's one link under in there. We did not feel we needed this. At that time we would try that. We thought we would go along with the others and see how the zone responded.

Q You stated, where did you say the top of the cement would come?

A I believe it's 3225. 3235, pardon me. It's just about, looks like about 400 feet below the salt string.

Q How far above the top of the Blinebry is that?

A Well, let's see. The top of the Blinebry is at 5570 and that would be, oh, let's see, that would be what, about 3500 feet, 2500 feet. I might point out we have tested another pay in this well, the Glorietta, which is down here about 5000 feet, that has commercial pay in it too and we have it adequately protected.

MR. NUTTER: Anyone else have any questions of the witness? If not the witness may be excused.

(Witness Excused)

A I didn't point out but we do have a model of the cross-over assembly if you would like to take a look at it.

MR. NUTTER: Mr. Motter, I think your diagramatic sketch of the crossover assembly with the various components thereof pretty well explained the operation of it as did your testimony. And we don't need to go into any further testimony, and we can dispense with the testimony of your other witness, Mr. Williams. Anyone have anything further they wish to offer in Case 1336? If not, we will take the case under advisement. We did receive your exhibits didn't we?

MR. WILLIAMS: Yes.

MR. NUTTER: We'll take the case under advisement and proceed to Case 1300.

STATE OF NEW MEXICO)
: ss
COUNTY OF BERNALILLO)

I, MARIANNA MEIER, 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/or under my personal supervision; that same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this, the day of November, 1957, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Marianna Meier
NOTARY PUBLIC

My Commission Expires:

April 8, 1960.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1336, heard by me on 10-24, 1957.

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