BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE NO. 1479

TRANSCRIPT OF HEARING

July 2, 1958

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BEFORE THE
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IN THE MATTER OF:

CASE NO.1479 Application of Aztec Oil and Gas Company for an oil-oil dual completion and for permission to commingle production from two separate pools. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its State BD-36 Well No. 1, located 1980 feet from the South and East lines of Section 36, Township 22 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from the Blinebry formation adjacent to the Blinebry Oil Pool and oil from the Drinkard Pool through parallel strings of 1½ inch tubing. The applicant further proposes to commingle the Blinebry and Drinkard production from said well in common storage.

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 1479.

MR. PAYNE: Application of Aztec Oil and Gas Company for an oil-oil dual completion and for permission to commingle production from two separate pools.

MR. DAVIS: Quilman Davis appearing on behalf of Aztec Oil and Gas Company, and we have one witness.

(Witness sworn)

PRENTICE WATTS,

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

DIRECT EXAMINATION

BY MR. DAVIS:

Q Will you please state your name?

A My name is Prentice Watts.

Q By whom are you employed, Mr. Watts?

A Aztec Oil and Gas Company.

Q Where are you located?

A In Hobbs, New Mexico.

Q In what capacity?

A I am district superintendent.

Q Mr. Watts, have you previously testified before the New Mexico Oil Conservation Commission? A Yes.

MR. DAVIS: Mr. Examiner, are the qualifications of this witness acceptable as an expert in the field of petroleum engineering?

MR. NUTTER: They are. Please proceed.

Q Mr. Watts, on what date did you file the notice of intention to drill the BD-36 No. 1 Well?

A Notice of intention to drill our State BD-36 No. 1 was filed March the 25th, 1958.

Q What did that notice of intention state the work proposed to be done?

A We intended to drill a well to the Drinkard and/or Tubb zones.

Q Mr. Watts, would you briefly explain the basis for filing that type of notice, intention to drill and very briefly state the projection of the well and what led you to that?

A First, I might explain that that well will be classified as a semi-wildcat in that it was at least half a mile from any existing production. Realizing that a 160-acre tract would be desirable in the event Tubb gas production was obtained, we through an operating agreement formed a pool unit with Amerada Petroleum Corporation and Western Oil Field, Incorporated, embracing the SE/4 of Section 36, Township 22 South, Range 37 East. Aztec owns 50 percent of this pool unit, Amerada 25 percent, and Western Oil Fields 25 percent.

Q We did that on the basis of a preliminary, thinking that if we did get a gas well we would like 160-acres assigned?

A Yes.

Q And not withstanding that, the parties still participated in this well?

A That's true. They would participate in any gas well -- oil or gas that was obtained in that tract. At the time of filing intention to drill, Form C-128 was also filed with the Commission in Hobbs indicating the type of consolidation as an operating agreement and listing the owners as I have described.

Q Now, Mr. Watts, after the well was drilled down to the total

depth contemplated in the Drinkard, what action did we then take?

A We -- first, we proceeded to drill the well to total depth and completed the well in the Drinkard zone. Then, we filed an application with the Commission requesting an oil and gas dual completion in the Blinebry zone and the Drinkard zone.

Q Where did you expect gas?

A We were expecting gas from the Blinebry formation, and of course, we knew we had oil in the Drinkard formation, or felt that we did, I should say. Now, this is contrary to our notice of intention to drill. However, upon examination of electric logs, gamma ray neutron logs, samples and drill stem tests, it was our opinion then that the Tubb zone was barren and would be nonproductive.

Q And then you followed with the application for dual completion in the Blinebry, thinking at that time that it would be a gas zone?

A That's correct.

Q Mr. Watts, will you please refer to what has been marked as Applicant's Exhibit No. 1 which the Commission has a copy of the location plat?

A Exhibit No. 1 is a plat indicating the location of Aztec State BD-36 No. 1. The crosshatched area in Section 36 is acreage owned by Aztec. This plat also indicates owners of mineral interests offsetting this well. In addition, it shows location and productive interval, or productive zone, I should say, of several wells in the immediate vicinity. You'll note from the plat there are no

wells closer than a half a mile to that well, to our BD-36 No. 1.

Q Mr. Watts, is the well in the northeast, northeast quarter of Section 26, which is designated as a gas well; from what zone is that producing?

A The well that you are referring to is Western Oil Field Gulf No. 1 producing from the Tubb Gas zone.

Q The other well in Section 26 in the northwest quarter of the northwest quarter which is also --

A Western Oil Field Shell State No. 1 producing oil from the Blinebry zone.

Q Mr. Watts, are you familiar with the application that Aztec has filed --

A Yes.

Q -- in this case? A Yes.

Q To the best of your knowledge and belief, are the facts stated therein true and correct?

A Yes. There is one point, I think, that should be clarified, on Page 2 of our application, Paragraph 3, --

Q Of the dual application?

A Yes. I am referring now to the application of Aztec for the dual completion. Please refer to Page 2, Paragraph 3 wherein we outlined the manner in which the well was completed in the Blinebry zone. Sub-paragraph A of Paragraph 3 states we perforated the five and a half casing in the interval 5,470 to 5,660, and Paragraph B states we set a Model D Packer below the perforations at

6,613. That point should be clarified. Actually, we set the packer prior to perforating. Sub-paragraph C of the same Paragraph indicates the IP of the Blinebry zone as reported to the Conservation Commission was 80 barrels of oil per twenty-four hours on a 16/64 inch shock with gas-oil ratio varying from 5,000 cubic feet of gas to 14,000 cubic feet; that is the point that needs clarifying. The variance in gas-oil ratio resulted from testing the well at different rates of flow and different methods of flow. One time, for one period of time, we tested the well through the casing, hoping to get a gas well, a ratio that would indicate that we had a gas well. Other times we were flowing the well through the tubing. However, the IP of 80 barrels of oil in twenty-four hours on a 16/64 inch choke resulted in a gas-oil ratio of approximately 9,000.

Q Mr. Watts, summarizing briefly the information you were giving to the Examiner about our progress in filing reports, and then our application for a dual, would you say that up until just recently we were not sure what type of well we had in the Blinebry or the Tubb, I mean, as we progressed, well, we learned more about it, but we were trying to anticipate what we would have had at that time?

A Yes, that's true. The Oil Commission administrative Order DC-596 which granted authority to proceed to dually complete the well in the Blinebry gas zone and the Drinkard oil zone was filed before we had fully decided the exact zones we would perforate. At the time of filing, we were certain that we would not test the

Tubb zone. However, we had not begun to perforate or to complete the Blinebry formation. We did not begin this work until May the 25th, I believe, and our administrative order was issued on May the 22nd.

Q In other words, after you received the administrative approval to complete in the Blinebry and the Drinkard, then you proceeded with that work, is that correct?

A That's true.

Q Mr. Watts, please refer to Applicant's Exhibit No. 2 and identify that Exhibit.

A Exhibit No. 2 is a schematic diagram of our proposed dual completion of the State BD-36 No. 1. This diagram indicates pertinent data of the well bore. It shows the location of the Blinebry perforations and Drinkard perforations, total depth of the well and our proposal of using two strings of 1.90 inch OD non upset J55 tubing. Now, this tubing is commonly called inch and a half tubing nominal size of inch and a half.

Q Mr. Watts, now refer to Applicant's Exhibit 3-A, 3-B and 3-C and identify those.

A Exhibits 3-A, B and C are logs run in the well. Exhibit 3-A is an induction and electric log. Exhibit 3-B is a microlog. Exhibit 3-C is a radio active or gamma ray neutron log.

Q Mr. Watts, have you shown anything on logs that are marked Exhibits A, B and C?

A These logs have indicated on them the perforations now

existing in the well. In addition, drill stem intervals are indicated on the logs.

Q Mr. Watts, were Applicant's Exhibits 1 and 2 prepared by you or under your supervision?

A Yes, they were.

Q Exhibit 3-A, B and C were prepared at your request and you personally marked the perforations and the drill stem tests on them?

A That's true. Well Services Company ran these logs, and I marked the perforations and the testing intervals.

Q Now, Mr. Watts, has this well, Aztec BD-36 State No. 1 Well been completed?

A Yes. It is now producing oil from the Blinebry zone with an allowable of 44 barrels a day. We completed the Drinkard zone and obtained an allowable of 54 barrels per day, I believe, and then proceeded -- that was in May -- and then we proceeded to complete the Blinebry zone and made a request to the Oil Conservation Commission to cancel our allowable from the Drinkard zone for the month of June so that we might continue producing the Blinebry zone. So, as the well now stands, we have allowables -- an allowable from only the Blinebry zone. The Drinkard zone is now effectively shut off with two packers. We have our Baker Model D producing packer, which I will go into later, set at 6,613 with tailpipe and closed circulating valve, and above that we have a Baker retrievable packer set. The purpose of this retrievable packer at the time was to

prevent any sand from falling down on top of our other packer during fracing operations of the Blinebry zone.

Q Where is it set, Mr. Watts?

A At approximately 5,650.

Q Mr. Watts, in other words, you proceeded to dually complete the well in accordance or pursuant to this administrative order?

A That's correct.

Q The only thing wrong is that instead of gas in the Blinebry we found an oil zone?

A That's correct. The Blinebry zone produced oil instead of gas as anticipated.

Q Do you have anything further that you would like to go into at this time about the manner of completion of the well?

A Are you referring to the dual completion?

Q Yes, sir.

A I can go into a little more detail. As I said, we perforated the Drinkard zone first, acidized it, tested it, and for a very short period of time, I might add, and proceeded to dually complete the well in accordance with Order DC 596. We set a Baker Model D production packer at 6,613. We then ran tailpipe through the packer as indicated on this sketch with a seating nipple.

Q Will you refer to that as an Exhibit?

A Exhibit No. 2 with the circulating valve closed. After inserting the tailpipe with its seal assembly in the packer, we tested the casing and the packer with 3,000 pounds per square inch

for thirty minutes, and there was no pressure drop indicated. That indicated a satisfactory packer seal as well as no casing leak. We then proceeded to perforate the Blinebry zone between the intervals 5,470 to 5616. I might add that it is not solid perforations. For the purposes of the record, we perforated 5470 to 5475; 5481 to 5495; 5510 to 5514; 5530 to 5592; 5602 to 5616, all with four jets per foot. We then acidized the well in three stages -- we then acidized the well with 10,000 gallons in three stages, which resulted in very small production. We then fractured the well with 15,000 gallons of acid frac material resulting in the IP of 80 barrels of oil in twenty-four hours through a 20/64 choke. I stand corrected. I have previously testified, and our application stated it was a 16/64 inch choke. However, it was a 20/64 inch choke. That is relatively minor, however.

Q That completes your perforations --

A That completes perforations, and a frac job. We then ran two-inch tubing, two and three-eighths inch OD upset tubing in the well and swabbed it in, and at that time it was tested and found that the well was productive of oil rather than gas. I might add that there are many gas wells in the Blinebry that do produce oil. However, this does not comply with the regulations of Rule T-610 which specifies gas wells in the Blinebry Pool should have a gas-oil ratio of at least 32,000 or gravity of 31 degrees API. This oil well has a ratio below that grade and the gravity of the oil is approximately 42 degrees API.

Q You don't anticipate any changes in the production characteristics here that might swing it over to a gas well?

A I doubt that. It might be producing in a month now, and there is no indication of that.

Q Mr. Watts, you referred to the fact that you ran two-inch tubing. What was the purpose of that?

A Well, we didn't know what we had after we fraced it to the tubing, so we ran the two-inch tubing in the hole in anticipation of using it later in the dual completion of a gas -- of gas production from the Blinebry and oil production from the Drinkard. That would have been nothing unusual to do that; that was very common practice.

Q In other words, two-inch is a stock item that you use?

A That's correct.

Q And you used that? A That's correct.

Q Mr. Watts, the tailpipe that you have below the packer, I believe that's one and a half? A Yes.

Q Would you explain to the Examiner why that was put on there?

A That was put on at the last minute. As a matter of fact, it delayed the dual completion in the Blinebry waiting for the tubing. In studying the log samples of the offset wells, if you want to call them offset wells, a mile away, we thought there was a possibility of oil in the Blinebry. For that reason we went ahead and ran two strings of inch and a half tubing through the packer. Actually, the packer

is set up for two-inch tubing. The seal assembly in the packer is two-inch; inch and a half would have been special order and delayed us further. So, we set the inch and a half tubing in the packer because if the well did turn out oil, we would not have to remove the two-inch tailpipe thereby commingling the two zones in the well bore during the operation. Further --

Q Excuse me. May I correct you? You said two-inch tailpipe.

A No, had we ran two-inch tailpipe we would have had to remove that pipe and replace it with inch and a half pipe below your tail packer. That would be expensive and require a fishing job, if you want to refer to it as fishing. Actually, the packer is designed to remove the tailpipe but it would have been more work, expensive, further, when you remove your tailpipe the two zones would be commingled within the casing and it is possible that the Drinkard zone would take the fluid -- whatever fluid we used in the well to kill it. It is possible that the Drinkard formation would take that fluid, that is, the hydrostatic head of the fluid in the casing would overcome the bottom hole pressure in the Drinkard, thus causing the fluid level in the casing to drop and the Blinebry zone could possibly blow out on us. Actually, we have experienced that in another dual completion when that procedure was followed. So it was a safety measure and to save time and money.

Q And actually, by installing the one and a half inch tailpipe with the two-inch tubing above the packer, if you had a gas well you are just as good as if you had two-inch?

A Yes. From the circulating valve up to the bottom packer would be approximately 230 feet of inch and a half tubing. That would in no way impair the flow efficiency of the Drinkard, if we did install two and three-eights inch tubing above the packer.

Q Mr. Watts, do you have any perforations depth or anything that you would like to give on the Drinkard --

A Yes.

Q -- so that we will be complete on perforations?

A Our Exhibit 2 indicates the perforations, but only the overall zones perforated. Actually, there were ten zones actually perforated in that Drinkard interval. Those zones are 6554 to 59; 6668 to 6690 -- pardon me, would you read back the first paragraph?

REPORTER: (Reading) "Those zones are 6554 to 59; 6668 to 6690."

A I am sorry, that's incorrect. The first interval is 6654 to 6659. The second, 6668 to 6690; the third 6696 to 6708; 6714 to 24, 6732 to 48; 6753 to 56; 6760 to 72; 6840 to 54; 6858 to 64; and 6868 to 6880.

Q Mr. Watts, is there any particular reason, particularly in the Blinebry, for the perforations through a rather long interval there, various parts of this interval?

A Yes. Upon examination of the logs, I think you may agree that some people wouldn't have set pipe in the well or even attempted to complete in the Blinebry. The microlog showed very little porosity, practically none; the samples gave little indication of

production; the drill stem test gave relatively little information toward possibility of production. The drill stem test in the Blinebry, for example --

Q While you are on that, would you just go into the test that you made and the results of it?

A All right. The drill stem test in the Blinebry zone was conducted over the interval 5480 to 5570; gas was -- the tool was opened one hour, gas reached the surface in twenty minutes, and the estimated volume was some 50 MCF per day; just a very weak show of gas. We recovered 120 feet of slightly oil and gas cut mud. Shutin pressure in thirty minutes was 886 pounds. So, that, as you can see, that was a very slim drill stem test to try to complete in. However, we felt that we should go ahead and try because the Drinkard zone was not too good in itself. Mr. Davis, did you want me to go into the other drill test?

Q I don't think the other drill stem test, but the final test that was made on the Blinebry and Drinkard?

A All right. The Drinkard zone, on the last day we tested that prior to pulling our tubing and setting our packer, it tested 35 barrels per day with a gas-oil ratio of approximately 3500.

Q To what?

A 35 cubic feet of gas per barrel of oil. That indicated that the well did drop off somewhat from the IP that we submitted, although the IP was an actual test after the recovery of load oil and some

acid water, after completing the Blinebry zone. I believe I have stated an IP of 80 barrels in twenty-four hours, However, the well now is producing 56 barrels per day through a 28/64 choke with a gas-oil ratio of 9100 cubic feet of gas per barrel, a flowing tubing pressure of 250 pounds.

Q What was that test?

A A current test is 56 barrels of oil per day.

Q That's which zone?

A Blinebry zone, with a gas-oil ratio of 9100. Did you get that?

Q What is the tubing pressure on the Drinkard?

A The flowing tubing pressure on the Drinkard was approximately 150 pounds.

Q Mr. Watts, in your opinion, are these two reservoirs separated behind the pipe?

A Yes, sir, they are effectively separated. Upon setting pipe, we cemented the five and a half inch casing with 425 sacks of cement. The top on the cement outside the casing was found at 3990, thus indicating solid cement between the two perforated intervals some thousand feet between the two intervals. So that effectively separates the two zones outside the casing. Inside the casing, I have previously testified that after setting our packer at 6613, we tested the casing and packer with 3,000 pounds per square inch pressure, thus indicating an effective shutoff.

Q Are all of the fresh water zones and other producing hori-

sons protected?

A Yes. We set eight and five-eighths inch casing at 2854 with 2,000 sacks of cement. The cement did not circulate to the surface. However, temperature survey indicated top of cement at 215 feet from the surface, which tied into our surface casing, thirteen and two-eighths casing set at 223 feet. The cement was circulated to the surface in cementing surface pipe.

Q Now, your producing string casing set in this well is what?

A Five and a half inch fourteen pound and fifteen and a half casing, J 55 seamless all new pipe.

Q Where are those two pipes set?

A Just a moment and I will give you the exact place. Five and a half fourteen pound casing was run to 5200 feet. Below 5200 feet was five and a half fifteen and a half pound casing.

Q Below?

A From 5200 to our casing point of 6972 was five and a half fifteen and a half pound casing.

Q That casing is, of course, all above the two producing zones that you are talking about, the Blinebry and Drinkard?

A The five and a half fifteen and a half pound casing is above the Blinebry zone.

Q Mr. Watts, you previously testified that a packer had been installed to effectively separate the two reservoirs. In your opinion, is this type installation that you have made in accordance

with good engineering practices and principals?

A Yes.

Q Is it one of the types of dual completion standardly used in the Lea County area?

A Yes, the Baker D Model production packer is commonly used. Many hundreds have been installed.

Q What is the exception of our dual completion over the normal completion of dual completion in Lea County?

A The only difference is the size of the tubing. Most of the dual completions use two-inch tubing; two-inch, two and three-eighths inch OD usually upset tubing or possibly two and seven-eighths inch tubing. There is very few -- there is only one installation of inch and a half tubing -- I say of only one installation that I know of; I don't know if it has been installed. However, Cabot Carbon Company in a previous case before the Commission was granted authority to install two strings of one and a half inch.

Q Why do you propose to use one and a half inch tubing in this well?

A As we have set five and a half inch tubing in the well, anything larger just wouldn't fit.

Q Well, you could use two and a sixteenth and one string of one and a half as the others, couldn't you?

A Yes, two and a sixteenth inch type CS Hydril tubing could be used in connection with one string of inch and a half API tubing. There is very little difference in the inside diameter of the two

types of tubing, but there is a great difference in costs. The drift diameter of inch and a half tubing is 1.516 inches. The drift diameter of two and one-sixteenth inch CS Hydril tubing is 1.656; so there is a relatively small difference. Now, I might point out that this two and a sixteenth tubing is commonly called inch and three-quarter tubing. However, the drift diameter does not vary a quarter of an inch. As to cost, the inch and a half tubing will cost approximately seventy-nine cents a foot. The two and a sixteenth Hydril tubing will cost approximately one dollar thirty-eight a foot.

Q You are talking about minimum string to the Blinebry is how many feet?

A The Blinebry would be some 6600 feet of tubing, the -- I am sorry. The Drinkard would be some 6600 feet of tubing, the Blinebry tubing would be set at approximately 5600.

Q If you ran that, would you run the two and a sixteenth to the Drinkard, or would it make any difference?

A It would make a little difference. The reason I say it would make a little difference, we are talking about wells of small capacity; 50, 60 barrels a day at the most, probably less. If we were considering production of several hundred barrels a day, possibly a larger sized tubing would be justified. However, at these small rates of flow, I think our friction will be negligible. It is even conceivable that the small rates of flow, that a smaller diameter tubing could result in more efficient flow. Now, I can

elaborate on that just a little bit. For example, when we were testing the Blinebry zone, I stated we tested it through the casing, that is, the annular space between the tubing and casing, and also through the tubing. While flowing that well through the casing at -- for short periods of time, we reached gas-oil ratios of 10,000, 12,000, 14,000. Upon flowing the well through the two-inch tubing, the more efficient method of flow was affected. Our gas-oil ratio dropped up to some 9,000.

MR. NUTTER: This doesn't work well for casing or annular flow, does it?

A It shows that there is a less efficient flow with your larger diameters. I realize there is a limit. Here we are speaking of small volumes, relatively high gas-oil ratios. There will be some slippage of the oil in your flow; hence, the greater velocity which will result from your smaller diameter tubing could result in a more efficient flow. I don't know whether it will or not, but indications are that it might.

Q In other words, Mr. Watts, what you are coming up, in your opinion, you wouldn't expect any material difference in the efficient flow rate with the use of --

A In this particular well, I see no difference, no appreciable difference.

Q Mr. Watts, is the crude in the Drinkard and the Blinebry sour or sweet?

A They are considered sweet crudes.

Q In both zones? A Yes.

Q Any corrosion problem anticipated?

A No. Our experience with Blinebry and Drinkard production in other areas -- we have seen no effects of corrosion from those two zones. I don't anticipate any.

Q Do you expect any paraffin trouble?

A Yes, I am sure there will be paraffin deposition in the tubing that will be combated in the usual manner, through scraping the wells, hot oil treatments, or paraffin solvent injections.

Q All of those will work just as good on one and a half inch string of --

A Oh, yes. As a matter of fact, your hot oil treatments could work very well, you will end up hot oiling two strings of tubing at once.

Q Mr. Watts, does your dual completion as it now stands possess any more possibility for leakage or communication of the reservoir than any other accepted method?

A No, I don't believe it would.

Q Will Aztec be willing to make packer leakage tests, separation tests and other tests required by the Commission to determine if there is any commingling or leakage --

A Yes, our dual completion will allow for any tests that the Commission may desire.

Q -- in accordance with any rules and regulations for making those packer leakage tests?

A Oh, yes, that's correct.

Q Mr. Watts, under the method which this well has been completed as a dual well, is it possible to make bottom hole pressure tests on each zone?

A Yes. We can use bottom hole pressure bomb.

Q Mr. Watts, now as the economics involved in this completion which we have made in accordance with a previous administrative order, which is not effective as to the gas oil-oil dual, which we are now seeking permission to produce two oil zones, what, in your opinion, would be saved by the dual completion, if it approved and permitted to produce the Drinkard and Blinebry as compared to the cost of drilling a twin well?

A We expect this dual completion, as outlined on our schematic diagram, to cost approximately $125,000. The cost of a Blinebry well alone would be approximately $9,000. The cost of a Drinkard well alone would be approximately $100,000. Thus, the cost of two wells would be $190,000, effecting a saving of some $65,000 by dually completing this well. However, I would like to point out one thing, if this application should be denied, it is quite probable that we would produce the Blinebry zone in this well as it now stands. The reason I say that, to complete it as a Drinkard well would entail killing the well, pulling our retrievable packer, squeeze cementing the Blinebry zone, possibly drilling out the production packer and putting the well back on production.

Q In the Drinkard zone?

A In the Drinkard zone. That would be an expensive operation. I don't have the figures of what it would cost, so it is quite possible that instead of producing the well as it now stands, we would possibly consider drilling another Drinkard well. I doubt if we would because $100,000 would be too much money for the type of production we can expect from the Drinkard. Assuming we would drill another Drinkard well, which I doubt, we would then have $220 invested on this acre tract instead of the $190,000 as I stated the two separate wells would cost. Thus, the savings in the dual completion is possibly a little more than $65,000, but obviously even the $65,000 is quite a saving.

Q Mr. Watts, in that connection, the other risk that would be involved in the Blinebry, -- we feel that paying the well out with return of small profit in the Blinebry is probably more certain than the Drinkard. Would we not be standing some risk if we seal the Blinebry at this point -- I mean, and drill a Blinebry oil well right next to it?

A There would be a certain risk, that's true. The Blinebry zone in this section is not too good.

Q Looking at the logs, you would be a little bit worried about it?

A We sure would. We would think about it twice. As a matter of fact, it is very difficult for one well or the other to pay out based on your estimated reserves. For example, the Drinkard zone, we could expect some 50,000 barrels recovery; the Blinebry zone,

well, 50 to 75,000, essentially the same. Let's use the -- a total there of the figures I said of 125,000 barrels from the two zones, assuming, after paying royalties and taxes we could expect a an income of some $300,000 plus gas sales; $335,000, for example, during the life of the wells, that would be some ten to fifteen years. As I previously stated, we could have either $190,000, or in this case, possibly $220,000 invested in that 40-acre tract. I have made no allowance for operating expenses, so at best we could expect a gross profit, if you want to call it that, of some $115,000 over -- spread over this ten to fifteen year period. That's not a very good return on the money, but that is going to start coming in slow after the first four or five years.

Q You don't recommend that Aztec drill wells like this in Lea County?

A No, we could buy war bonds and make more money.

Q Let's get back to one point. On these recoveries, those are just estimates that have been made. We have no assurance, and we are talking about a term of years that you would recovery, is that right?

A That's right. We have no production history on this well, so obviously, decline curves are not applicable.

Q Is there going to be any material difference in the price between the two gravity oils here?

A No. The Drinkard oil will have a gravity of 39 or 40 degrees API, the Blinebry 42 degrees API.

Q Now, Mr. Watts, let's consider for a moment our 1479 for permission to commingle the oil into a common tankage and installation of metering facilities. Would you briefly explain to the Commission what your proposal is there?

A Yes. We propose to commingle the oil produced from the two separate zones, that is, the Blinebry and Drinkard zone, into common tankage on this 40-acre tract. There is only one lease involved. It is State lease No. E 6143. We propose to measure production from the Drinkard zone through a dump type metering vessel, and thus flow it into the tanks. The Blinebry oil production would then be determined by gauging the total production into the tanks and subtracting therefrom the metered volume of the Drinkard zone. As an alternative, we could install two separate metering devices.

Q Is there any particular reason for installing your metering device?

A No reason. We decided to pick the Drinkard. One would be--would serve as well as the other.

Q What tankage do you now have installed?

A We have now two 300 barrel tanks installed.

Q Now, will you proceed?

A Yes. A tank battery for each zone would cost approximately forty-nine hundred and fifty dollars. That tank battery would consist of two tanks, a separator, pipe, valves and labor to install them.

Q For each zone?

A For each zone. Now, actually if we would build two tank batteries, the two would be in the same plot of ground, so we would effect some savings there. So I estimate two separate tank batteries would cost approximately $9,200. However, if we commingle the oil into the common tankage, we could probably get by on two tanks. One metering separator, dump type metering vessel, one separator, miscellaneous fittings and, of course, labor; the total cost of that installation would be approximately $6,100. Therefore, we would effect, oh, $3,300 savings. As an alternative, if two metering vessels were installed, the additional cost would only be some $150 to $200, which would be relatively negligible.

Q In other words, if the Commission felt that it was much more desirable to have separate metering devices, we wouldn't want to affect our entire application by that provision?

A No, the $150 is not much, but is $150, and we will save it if we can.

Q Now, Mr. Watts, it is your feeling at this time that there would be very little difference as to the measuring of the two zones by your proposal of one metering device and calculation of the others?

A No, I think there would be very little difference. If we were dealing in large volumes of oil, there would be some difference here. We are not talking about too much oil. Any single type battery installation, we usually accept the tank gauges as being correct or relatively correct. The metering separator will be

calibrated as often as necessary, and the metering error on the -- your chamber will be very small, depending on how accurately you calibrate the vessel. I can see nothing unusual about it or any chance for any loss or discrepancy.

Q What about skrinkage?

A Well, I am sure there would be some shrinkage in your tanks, but, generally, we are talking about small volumes of oil. Your shrinkage would be, oh, 1 percent, 2 percent, maybe. And then, too, in winter months, when you have shrinkage, you will have some expansion when you correct your oil to 60 degrees. So I think it would be relatively negligible. In any event, we would sell the oil on the basis of the tank gauges. The metering chamber would merely separate the oil and give us some record as to how much production is coming from the separators. I think if a very few months we will be dealing with wells that are marginal, will not make the total allowable, and I doubt if there would be much discrepancy or chance for great errors.

Q Then, Mr. Watts, in addition to some savings in operation by having a common tankage, the main item there is the savings and initial outlay of capital?

A That's true. I don't believe we would quibble over the two metering chambers. I would say the two metering chambers would involve a little more operational expenses; they are a little more touchy, require more care than a regular oil and gas separator of any size for that one well.

Q By the commingling, there will be no real penalty as far as the price for the oil?

A No.

Q What is the approximate difference there?

A We are talking about gravity difference of some two degrees; probably the difference between three dollars and six cents and three dollars and eight cents, and obviously your temperatures will vary your gravity, and it may be such that there -- the difference in price would be so negligible you could hardly find it, Now, if we were talking about oils of very different gravities, 32 and 45, or something like that, it would be something to consider.

Q Who is taking the oil from this lease?

A The battery is now tied into Texas-New Mexico pipeline system. The Texas Company is the purchaser.

Q Now, Mr. Watts, there will be some casing head gas from the Drinkard, is that correct?

A Yes, that's true.

Q And also some from the Blinebry?

A Yes.

Q Do you have a market for that gas?

A At present, we do not have a market. However, we are negotiating with Skelly Oil Company, at present, and they are running their survey to determine the feasibility of laying their line. I understand, to lay the line to that well, they will have to make some changes in their system, increase the size of pipe. However,

I feel that we will sell the gas.

Q In fact, it is pretty certain that there will be one market or another for the casing head gas?

A Yes, in a reasonable length of time.

Q Sixty or ninety days? A Yes.

Q Mr. Watts, do you have anything else that you would like to say about this case?

A For the purposes of the record, I do not believe I covered the OD's, the outside diameter of the tubing. Mr. Nutter, would you be interested in that, or have you had enough previous cases to know the outside diameter of two and a sixteenth inch and one and a half inch tubing.

MR. NUTTER: I would be interested in knowing if parallel strings of two and a sixteenth would fit in this size of casing and other optional strings that are available.

A The drift diameter of five and a half, fifteen and a half pound casing is 4.825 inches. The coupling diameter of inch and a half tubing is 2.20 inches. Thus, two strings of inch and a half tubing will allow clearance of some four-tenths of an inch. Two strings of two and a sixteenth inch Hydril tubing will -- I should say one string of two and a sixteenth has a coupling diameter of 2.33 inches. Two strings of two and a sixteenth inch CS Hydril tubing would allow some two-tenths of an inch, a little less than two-tenths of an inch clearance. That is a pretty snug fit. One string of inch and a half tubing and one string of two

and a sixteenth inch tubing would allow a clearance of .29 inches plus. Again, that's a pretty close fit. Also I might add I do not have the information available right now, but our circulating valve is slightly larger than the point. the 2.33 OD of the coupling. However, it is very slight and would probably work with the inch and a half tubing.

Q Mr. Watts, your recommendation is, of course, to make a feasible completion here, and one and a half, you believe, would work just as efficiently as a little larger tubing would, the two, one and a half inch, is that correct?

A Our proposal is for the two one and a half inch tubing, but for the efficiency of operation as well as cost. Obviously, the other would work, but our clearances are getting mighty slim, and there is just more chance for operational difficulties with the small clearances between the two strings of tubing, so my recommendation is the inch and a half tubing.

Q Then, if you have two strings of inch and a half tubing and you are required to put one or both of these zones on a bomb, would you encounter any difficulties there?

A No, not at all. We could bomb either zone through inch and a half tubing. Now, it would require the use of sucker rods because different size sucker rods would be required. However, using one and a sixteenth inch bore pump at the slow speed of twelve strokes a minute, we could move sixty-eight barrels, which would be well above the allowable. Incidently, I think

testimony before the Commission in previous cases in that general area, a mile or so away, is to the effect that it is the belief of some engineers that the Drinkard will flow to depletion. I don't know that, but we do know that the Drinkard wells could increase in gas-oil ratio, and it is quite likely and quite possible that the Drinkard zone would flow to depletion.

Q Mr. Watts, over a reasonable period of time here, what is the aggregate production that you would contemplate from the Blinebry and Drinkard?

A You mean cumulative recoverable oils?

Q No. You are talking about reserves there, we are talking about low production. The Blinebry will start off with the top allowable for a while --

A I think we can expect the Blinebry to drop off rather rapidly. I can refer to one well that is a mile away, a little over, and recently completed; the Cities Service State P No. 2. It didn't start as a top allowable well. I do not have the information as to the initial potential. However, the Drinkard zone is down now to -- the week ending June 8th it made 53 barrels. That's some 7 barrels a day. The well was completed July of last year, August of last year, so it has been one year on production. It is a very low capacity well. As a matter of fact, all Drinkard wells to the west of us. As I say, this well is a semi-wildcat, so it is rather difficult to compare these wells a mile -- a mile and a half away, but during the month of April, several wells to the east of us averaged approximately ten, twelve

barrels a day from the Drinkard zone.

Q Do you want to correct the record to show that you mean east?

A I am sorry. In all this testimony I was referring to the east.

Q East of the Aztec well? A Yes.

Q In other words, they are all small wells in that area?

A Yes.

MR. DAVIS: Mr. Examiner, I believe that concludes our testimony, and we would like to offer in evidence as Aztec Oil and Gas Company's Exhibits 1, 2, 3-A, 3-B and 3-C.

MR. NUTTER: Is there objection to the introduction of Aztec's Exhibits 1, 2 and 3-A through 3-C? If not, they will be received in evidence.

Are there any questions of the witness?

CROSS EXAMINATION

BY MR. NUTTER:

Q Now, Mr. Watts, you stated that the Cities Service Well which was completed on the Drinkard formation approximately a year ago, being their State P 2, was down to 53 barrels of oil per week?

A That was a recent test that I obtained from Cities Service.

Q Is that well flowing or pumping?

A Flowing, yes.

Q Are the several wells to the east of your well with the average of ten, twelve barrels of oil all flowing wells?

A To the best of my knowledge, they are.

Q Do you know of any pumping wells in the Drinkard Pool?

A Oh, yes, in the Drinkard Pool there are pumping wells, but in the immediate vicinity I don't know.

Q Are any of the wells in this area making any water?

A Yes, there is indi cation of water production from some of the wells. The well I referred to, Cities Service State P No. 2 reported 13 barrels of water in March. However, in April and May there is a -- In their C-115 form I later found out that they are making some 8 barrels of water a day.

Q So, in other words, that well is averaging 7 barrels of oil or a little less?

A And 8 barrels of water, yes. And it is still flowing, to the best of my knowledge.

Q How about your well, has it shown any water cut in the Drinkard?

A We did not produce it long enough to recover all of our acid water. Therefore, I don't know if it was making water, but we are assuming it was acid water.

Q I would like for you to go into the description of your sucker rod and your one-sixteenth pump. What is the diameter of --

A Inch and a quarter.

Q An inside diameter of inch and a half tubing?

A 1.5 The drift diameter is 1.516, and your slim hole or maximum coupling, as it is often referred to, is inch and a quarter OD.

Q So, you've got as tight a fit on the Baker Packer and the sucker ordinarily as you've got on the two strings of tubing?

A That's true.

Q That tubing isn't moving in the casing, is it, Mr. Watts?

A That's true.

Q Those sucker rods will be moving, won't they?

A That's true, although -- I am sorry, I do not have the OD's of it. For example, seven-eighths inch sucker rod couplings-- comparing seven-eighths inch rods in two-inch tubing, the clearance is not too great there either. I might add that it is quite common practice to use scraper rods in two-inch tubing and there is no clearance there.

Q Well, you anticipate paraffin problems and possibly the use of scrapers in the upper portion of the tubing?

A It is quite possible, so I think the clearance is more than ample there, the clearance between your sucker rod coupling and inside diameter of the tubing.

Q How about the Blinebry, does the Blinebry have a tendency to make water in this area?

A Yes, there are some wells in that area that do make a small amount of water, but, to the best of my knowledge, only a relatively small amount, one or two barrels a day.

Q What did you estimate that the pumping capacity of an inch and sixteenth inch pump at twelve strokes per minute would be?

A At twelve strokes per minute would be 68 barrels per day. Yes, that's correct.

Q Do you believe that it will ever be necessary to lift such fluid as 68 barrels a day from either of these two zones?

A I don't know. I doubt it, based on some of these other wells.

Q I am including water.

A Yes, I realize that. Just for comparison here, let me read April production, for example of -- rather than naming the wells, I will go down the list of the wells in this immediate area here. For example, here is one, the Cities Service Well, in April, 272 barrels of oil and approximately 300 barrels of water. Another well, 300 barrels of oil, 9 barrels of water. This is monthly production. A third well, 354 barrels of oil, 14 barrels of water; 130 barrels of oil, 46 barrels of water; 313 barrels of oil, 33 barrels of water, and so on. If you wish, I can give you the names of the wells, but I think that does indicate that the Drinkard zone to the east of us does not produce excessive amounts of water.

MR. PORTER: Apparently, it doesn't produce excessive amounts of oil either.

Q Mr. Watts, you stated that one of the reasons that you would hesitate to see this application denied, but authority given for the dual completion, was that you wouldn't have to go in there and kill that Blinebry zone in order to produce the Drinkard, is that correct?

A Well now, if the application is allowed, we would have to kill the Drinkard zone very definitely to pull the two-inch tubing and retrievable packer and install the inch and a half tubing. What I did say, if the application was denied, we would seriously consider producing this well as a Blinebry well instead of a Drinkard well. To produce it as a Drinkard well, it would be necessary to kill the Blinebry zone, pull the tubing, squeeze the Blinebry perforations, and then proceed to possibly drill the packer out. That would remain to be seen, and then complete the well as a Drinkard oil well. Is that what you were referring to?

Q Yes, sir. And I was wondering what you meant when you said that you had an idea that you were going to get oil from the well before you perforated the Blinebry.

A We suspected the probability of it. After we submitted our application for the oil and gas dual completion, I believe I stated actually we delayed setting the packer and perforating the well, waiting on the inch and a half tubing. We thought that it would be wise to put the inch and a half tubing in, in the event we did get oil. We didn't know what we were going to get --

Q What do you think the stabilized GOR in the Blinebry zone is?

A It would be around 9,000.

Q Has there been any change on the gravity of the fluid produced since you have had this well on production?

A The last test we had was 42.1 or 2 for the gravity, and

that was a recent one. Actually, the gravity did increase somewhat. When we first opened the well, the gravity was 40 to 41. However, we were -- we had load oil mixed in with that, a lower gravity load oil. So after producing a month, I feel that the 42 gravity is certainly representative.

Q You don't anticipate any marked change in the gravity --

A No, I don't.

Q -- of the oil? I believe that you mentioned that there would be a -- another difficulty encountered in running larger strings of pipe on account of the circulating valve being slightly in excess of the diameter of the couplings? A Yes.

Q Would this problem be eliminated by running the strings simultaneously?

A Oh, it could be. I much prefer to run the strings separately, though.

Q It is feasible to run the tubing strings simultaneously, however, isn't it?

A I am not sure. It is feasible to run small strings of tubing simultaneously, that is, two-inch and one-inch. I am not sure on the larger diameters, whether slips are available for that or not.

Q Inch and a half or two and a sixteenth?

A Yes. We would not plan to clamp the tubing together, so I doubt if it would be possible to run them simultaneously. When you run, for example, code tubing with two-inch tubing, it is

clamped to the body of the two-inch tubing. Hence, you can run two strings simultaneously.

Q You are not aware whether production tubing has been run simultaneously?

A No, I am not.

MR. NUTTER: Are there any questions of Mr. Watts? Mr. Utz.

QUESTIONS BY MR. UTZ:

Q Mr. Watts, did you state the bottom hole pressure of the Blinebry zone?

A No, I didn't. The bottom hole pressure of the Blinebry zone is 1701 pounds per square inch at a datum of minus 24 hundred. We did not take bottom hole pressure of the Drinkard zone.

Q Do you have that -- do you have any idea what that is?

A The only thing we can base it on is a drill stem test. We took an initial shut-in pressure on this drill stem test for thirty minutes, and the pressure was 639 pounds per square inch. Now, the chart indicated that the thirty minutes was not sufficient for the pressure to reach its maximum, so I would hesitate to guess the bottom hole pressure.

Q What is it for other wells in the area?

A Well, it varies considerably. Some of the wells that had been producing for several years, again, this mile and a half, two miles to the east, pressures were down in the vicinity of 900 pounds. There were some wells -- there is a well, I should say, I

am sorry, I can't recall it. The pressure was approximately 1600 pounds. Now, I am recalling that from memory. I do not know the actual pressure.

Q Do you have the gravity on the Drinkard zone?

A Yes. 39 to 40 degrees API.

MR. UTZ: That's all.

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

MR. DAVIS: I have just a couple.

MR. NUTTER: Mr. Davis.

REDIRECT EXAMINATION

BY MR. DAVIS:

Q Mr. Watts, on this question that Mr. Nutter asked you about movement of tubing, you didn't mean that this tubing is stationary, there is some movement?

A There is some movement. If you pump the well, you'll have some movement. You would have some movement with temperature surveys, relatively small movement, anyway.

Q Now, one other thing. This tailpipe that you put in this well, I want to be sure that I understood you. At the time that we made the application for administrative order, we thought at that time that the Blinebry zone would be productive of gas?

A That's right.

Q That was your opinion, along with the geologist and everybody else, if we had anything at all, is that correct?

A That is certainly correct.

Q Now then, there was a ten-day waiting period from the date that application was filed, and you continued to review the logs. Was there any consideration given to forget the Blinebry and go ahead and not even try it at that point?

A Yes, there was. The chances for production were remote, based on information obtained from the logs samples, and drilling time, but we proceeded to go ahead and do it anyway. I might add that one of the owners in there was really hesitant about setting pipe in the well at all.

Q Paying part of the cost of the well?

A Paying part of the cost of the well. They were hesitant about setting any casing.

Q Now then, after we received the administrative order to so-call dual it as a gas well in the Blinebry, you continued studying the logs and the information, and then it occurred to you that maybe there was still that possibility that we might have gas, oil or nothing, then you proceeded to run the tailpipe of one and one half inch?

A That's true. We talked it over with many people, and studied other wells in the vicinity. Just let me give one example of why we thought that. The Gulf Scarborough No. 3 located in Section 31, Township 22 South, Range 38 East, is a Blinebry gas well, dually completed, Drinkard Oil Blinebry Gas. The direct offset to this well to the east located in Section 32, Township 22 South, Range 38 East is the Cities Service State 2, Cities Service

"P" No. 2 which I referred to previously. It is an oil well in the Blinebry, dually completed in the Drinkard also. So there is one example of offset wells, one being oil and one being gas. In Section 29, The Texas Company has a Blinebry oil well; the second location to the west, the Gulf Vivian No. 4 is a Blinebry gas well. Some mile and a half south, the Gulf Pike No. 1 in Section 6, Township 23 South, Range 38 East is a Blinebry oil well. Of course, it is much lower than our well. So for those reasons that I pointed out there, we certainly felt that we could get oil.

Q In other words, with that remote possibility, you went ahead and decided to put the tailpipe in for the reason of savings, and the possibility that there might be some oil, and that there would be no change in your production of the -- or producing the Drinkard zone, whether you had gas or oil in the Blinebry --

A That's true. As I pointed out, the amount of inch and a half tailpipe would not hinder the flow efficiency of the Drinkard, in my opinion.

Q One other question on this drilling. You were talking about if the application is denied that we would have to drill a second Drinkard well. Let's be absolutely clear on that. What you are in effect saying is that if we do not obtain the approval, that in all probability, the people involved in the cost of this well would not be interested in drilling another well to the Drinkard?

A I doubt it.

Q They would prefer if we had to take one of the other

present wells to take the Blinebry production because the chance of it paying the well would be greater than the Drinkard well?

A That's correct.

Q It is very remote that you would take this well and make a Drinkard out of it, isn't that correct?

A That is true.

Q Therefore, if there was a twin well drilled in the future, it would be a Drinkard rather than a Blinebry?

A That is probably correct.

Q And the chances of drilling another Drinkard are very, very remote?

A That is certainly remote.

Q You wouldn't recommend it to management?

A No, sir.

MR. DAVIS: That's all.

MR. NUTTER: Are there any further questions of Mr. Watts? If not, he may be excused.

(Witness excused)

MR. NUTTER: Does anyone have anything they wish to offer in this case?

MR. BROSCHAT: I would like to make a statement in Case 1479. My name is R. E. Broschat. I am district engineer for Amerada Corporation at Monument, New Mexico. As has been stated before, Amerada has an interest in this well, and we would like to go on record as supporting fully Aztec' application, both with

respect to the proposed dual completion and also to the proposed commingling of the oil from the two zones.

That's all I have.

MR. NUTTER: Thank you, Mr. Broschat.

Does anyone else have anything they wish to offer in Case 1479? Mr. Payne.

MR. PAYNE: I would like to read a statement into the record submitted by Western Oil Fields, Incorporated: "Application of Aztec Oil & Gas Company for an oil-oil dual completion in the Blinebry and Drinkard Oil Pools and an Application for permission to commingle such production. Gentlemen: We are advised the above referenced applications have been set for examiner hearing under Case No. 1479 on July 2, 1958.

These applications pertain to State Well BD-36 No. 1 well in the NW/4 SE/4 Section 36-22S-37E in which we own a 25% of 7/8 working interest. Since we will not be able to have a representative at the hearing mentioned above, we are writing to say that we believe the requests for a dual oil completion and the commingling of the oil to be a reasonable and practical solution as well as to be in the best interest of conservation practices and do hereby respectfully request your approval.. WESTERN OIL FIELDS, INC. Signed R. M. Barnholt, Sr.

MR. NUTTER: Anything further in Case 1479?

MR. WATTS: Off the record just for a moment.

(Discussion off the record)

MR. NUTTER: If there is nothing further in Case 1479, we will take the case under advisement and take a fifteen-minute recess.

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 25th 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. 1479, heard by me on 7-2, 1958.

Examiner
New Mexico Oil Conservation Commission