EXAMINER HEARING
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 8, 1958

IN THE MATTER OF: Case No. 1365

TRANSCRIPT OF PROCEEDINGS

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IN THE MATTER OF:

Application of Cabot Carbon Company for an oil-oil dual completion in the King-Devonian Pool and King-Wolfcamp Pool in Lea County, New Mexico. Applicant, in the above-styled cause seeks an order authorizing the dual completion of its H. L. Lowe "B" Well No. 1, located 467 feet from the South line and 850 feet from the East line of Section 26, Township 13 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from both the King-Devonian Pool and King-Wolfcamp Pool through parallel strings of 1½ inch tubing. Case 1365

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF PROCEEDINGS

MR. NUTTER: We will take up next Case 1365.

MR. COOLEY: Case 1365: Application of Cabot Carbon Company for an oil-oil dual completion in the King-Devonian Pool and King-Wolfcamp Pool in Lea County, New Mexico.

MR. CHRISTY: S. B. Christy of Hervey, Dow and Hinkle, for the Applicant, Cabot Carbon Company. Mr. Examiner, we have one slight amendment in the application, in paragraph No. 2, line two, strike the word "then". The application in paragraph 2 is that further drilling was after the cement, and it should be it was drilled.

The offset owners to this application are Atlantic, Forrest,

and Gulf. We have given them notice. We have registered return receipts from them of November 25th and 26th. We have one witness in connection with the application.

(Witness sworn.)

JOE M. DANIEL

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

DIRECT EXAMINATION

By MR. CHRISTY:

Q Would you please state your name and address and occupation?

A I am Joe M. Daniel, Jr., of Pampa, Texas, and I am employed by the Cabot Carbon Company in the capacity of senior petroleum engineer.

Q Have you previously testified before the New Mexico Oil Conservation Commission?

A No, sir.

Q Will you please tell us what forms of higher education and learning you have in the field of petroleum engineering?

A I am a graduate of the University of Texas, finishing in January, 1949, with the degree in Petroleum Engineering.

Q What have you done since then in connection with petroleum engineering work, Mr. Daniels?

A I was employed by The Texas Company from February, 1949, to August the 15th, 1957, with the following capacities: First, I was a roustabout engineer at Jal, New Mexico, for one year; following

that, I was a field engineer at Jal, New Mexico, for one year. My duties as a field engineer were to prepare workover requests and assist in performing the workovers, maintaining production and cost records, and assisting in drilling and completing oil wells. I was then made a reservoir engineer at Midland, Texas, where I stayed two years. There I prepared basic reservoir studies, prepared secondary recovery project reports, and recommended production practices based on reservoir performance. I was then transferred to Pampa, Texas, and made District Reservoir Engineer, in which I spent three years. There I prepared annual reserve reports, made property evaluations, supervised in an engineering capacity six secondary recovery projects, and performed radioactive and electrical log interpretations, and assisted in determining completion methods and intervals. Also helped set up a program to obtain adequate reservoir data in all new areas of development, and I recommended all field development wells for the drilling of oil field development wells. Then I was transferred to El Campo, Texas, where I had the title of Assistant District Engineer. I spent two years there, and while there I assisted in supervising nine field engineers and five reservoir engineers; prepared casing and mud programs for all wells drilled in that district; assisted in preparing completion practices, handled all Texas Railroad Commission work concerning gas wells, designed small compressor stations, gathering systems, and gas handling equipment. Also handled all special engineering projects that arose in the district, such as automation of tank

batteries and directional drilling.

Q Have you ever testified before any other regulatory bodies?

A Yes, sir.

Q Which one?

A The Oklahoma Oil Conservation Commission.

Q Are you familiar with application 1365 before the New Mexico Oil Conservation Commission?

A Yes, sir.

Q Are you familiar with the area involved in that application and the wells and their drilling and producing history?

A Yes, sir.

MR. CHRISTY: Does the Commission have any questions concerning the witness's qualifications?

MR. BUTTER: No, the witness is qualified as an expert.

Q Will you please explain to the Examiner the purpose of application 1365?

A The application is to dually complete Cabot Carbon Company H. L. Lowe "B" Well No. 1, located 467 feet from the south line, 850 feet from the east line of Section 26, Township 13 South, Range 37 East, Lea County, New Mexico. It is located in the King Pool. We propose to perforate the five and a half inch casing opposite the Lower Wolfcamp formation from 10,220 feet to 10,234 feet and conduct productivity tests through straddle packers. If not productive, the interval will then be squeezed off. We then propose to test the Lower Wolfcamp formation from 10,178 feet to 10,185 feet by

perforating the five and a half inch casing and conducting productivity tests through straddle packers. If these intervals are productive, we propose to set a temporary bridging plug at approximately 10,300 feet to separate the Devonian and Wolfcamp formations in the well bore. The Wolfcamp interval will be produced until the equipment for dual completion can be obtained. After arrival of the dual completion equipment, we propose to set a packer at approximately 10,300 feet and 10,100 feet and produce each zone through one and a half inch tubing.

Q Have you conducted tests on this well?

A Yes.

Q Would you please explain the manner of completion of the well and the tests taken and your results?

A The subject well had five and a half inch casing set at 12,320 feet, and cemented with 700 sacks. The top of the cement was 8995 as determined by temperature survey. The well was drilled to a total depth of 12,437 feet, and later plugged back to 12,310 feet. The casing was perforated from 12,277 feet to 12,307 feet. The well was potentialed. The subject well was placed on production from the Devonian reservoir on August 12, 1957. On the initial potential test taken August 9, 1957, the well flowed 312 barrels of 47 degree A.P.I. corrected gravity oil in 12 hours on a half-inch choke. On a drill stem test taken June 26, 1957, in the Lower Wolfcamp formation from 10,115 feet to 10,191 feet, the tubing was opened for 100 minutes with gas to the surface in 7 minutes

and oil to the surface in 55 minutes. The well flowed 23 barrels of oil in 30 minutes, reversed out all oil and gas recovered below the circulating sub 300 feet of salty sulphur water. The initial flowing pressure was 1,010 psi. The final flowing pressure was 3160 psi and the thirty-minute shut-in pressure was 3920 psi.

Q Will this proposed dual completion permit you to offset present production on adjacent land and protect the correlative rights of the owners in the area?

A Yes, sir.

(Applicant's Exhibit No. 1 marked for identification.)

Q I hand you what has been marked Applicant's Exhibit 1 and ask you if you will please identify it.

A Exhibit 1 is a plat showing the location of our H. L. Lowe "B" Well No. 1 and further shows the offset wells and offset operator owners.

Q The tests which you have made on the well indicated that the well is susceptible of production of oil in more than one zone?

A Yes. The Devonian was proven productive on completion. It had an initial potential of 312 barrels of oil in 12 hours. Since it is a one well lease, each day has been a test; a recent test on its production was 259 barrels of oil in 24 hours with a GOR of 7870 on an 11/64 choke, and has a tubing pressure of 600 psi. The Devonian has a bottom hole pressure of 4653 psi and produces 47 gravity oil. Cumulative production has amounted to

5,000 barrels. Chill drilling the well, a porous Wolfcamp zone was noted which was equivalent to the Wolfcamp producing interval in the offset well, the Forrest Oil Company's Lowe No. 1. A drill stem test was conducted and the results have previously been given in this testimony. The electric log run on the subject well showed that the oil from the drill stem test came from an interval at 10,178 feet to 10,185 feet. Also the log showed a porous zone from 10,220 feet to 10,234 feet. The Forrest Oil Company's well is currently producing 500 barrels of oil per month or 17 barrels per day, and has a cumulative oil recovery of 178,000 barrels. The oil gravity in the Forrest Lowe well is 38 degree A.P.I. oil.

(Applicant's Exhibit No. 2 marked for identification.)

Q I hand you what has been marked as Applicant's Exhibit No. 2 and ask you to please identify it and explain it.

A Exhibit 2 is a diagrammatic sketch showing the proposed mechanical completion of the well in question. We propose to set a lower packer at approximately 10,300 feet. It will be a Brown Type RS-1 packer. Below this packer we will have 1900 feet of tailpipe. This tailpipe will be two-inch non-upset tubing. Above this lower packer will be approximately 200 feet of two-inch external upset tubing and the tubing, this 200 feet of E.U.E. tubing tubing will be externally wrapped with fiberglass. This will serve as an abrasive protection should the perforations in the Wolfcamp have any cutting action on our tubing. The upper packer will be

set at approximately 10,100 feet and it will be a Brown type DS-3 packer. Above the upper packer we will run approximately 10,100 feet of inch and a half tubing with high drill CS couplings. This inch and a half tubing will be internally coated with plastic for paraffine control. This will permit the Devonian production to be produced through one string. The second string of tubing will then be run to produce the Wolfcamp interval. It also will be inch and a half tubing with high drill CS couplings and internally coated with plastic for paraffine control.

The second string that will be run, that will produce the Wolfcamp formation, will have a landing nipple immediately above the upper packer and immediately above the landing nipple will be a circulating valve. This will permit us to change the fluid in the annulus above the upper packer.

Initially we propose to fill this annulus with salt water. When either of these zones require artificial lift, we can displace the salt water out of the annulus above the upper packer and run flow valves, gas lift valves in either or both strings and lift either zone or both with gas, using the annulus as the supply for the gas lift valves, and we can obtain our gas for the gas lift from our gasoline plant located in the King Field.

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

A No, sir.

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

A Yes, sir. We have intermediate casing set at 4615 feet and cement was circulated to the surface and we used 450 sacks of cement in this operation. Therefore I feel that all producing zones and fresh water zones are protected behind the casing in this well.

Q In your opinion, is the proposed dual completion installation in accordance with good engineering practices and principles?

A Yes, sir.

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

A Yes, sir, with the exception we propose to use inch and a half tubing.

Q Why do you propose to use inch and a half instead of two inch?

A Two strings of inch and a half tubing are the largest size tubing that we can run in five and a half inch casing.

Q But your technique is standard?

A Yes, sir.

Q Has this type of dual operation proven successful in actual field tests in the area?

A Yes.

Q Will the surface equipment be so designed and installed

that the reservoirswill be separately produced and their fluid separately tanked and gauged for absolutely no commingling?

A Yes, sir. Each producing zone will have its own separator and storage facilities. In other words, we will have a twin tank-battery installation.

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

A Yes, sir. In the last three years over two thousand dual completions of this type have been performed in the industry.

Q Do you feel that corrosion would be a possible objection to your proposed manner of dual completion?

A No, sir, we have observed no evidence of corrosion in this field.

Q Is this sour or sweet crude?

A It is sweet.

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

A No.

Q Will Cabot Carbon 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, sir.

Q Under this proposed method of dualling, is it possible to

make bottomhole pressures on each separate zone and if so, explain how?

A Yes, sir. If you will refer back to Exhibit 2, you can see that the Devonian production will come through the long string of tubing and there will be no restriction in that tubing, and we will be able to run a bottomhole pressure bomb to the bottom of the two inch non-upset tubing below the second packer or lower packer which will be approximately 12,200 feet. So we will be able to get almost to the perforations in the Devonian, and in the Wolfcamp we will be able to run a bottomhole pressure bomb to within five or ten feet above the upper packer located at 10,100 feet.

Q Will you please explain to the Examiner the proposed method to be used in running these packer leakage tests you agreed to take?

A We will run the official five-day packer leakage tests which consists of using pressure recording device on the surface that has been calibrated with a dead-weight tester. The first day both zones will be shut-in. The second day one zone will be produced and at the end of the second day that zone will be shut-in and both zones will remain shut-in for an additional twenty-four hours. On the fourth day, the zone that has not been produced will be opened and produced for twenty-four hours. After this twenty-four hour test on the second zone, both zones will be shut-in for an additional twenty-four hours. By the pressure recorded at the surface, any leakage can be detected. In addition, we will have a daily check on possible leakage in that we will have two tank-

batteries and the difference in gravity of the two zones is approximately 9 degrees.

Q As to the economics involved, what would be saved by this dual completion if it is approved, as compared to the cost of drilling a twin well?

A Well, it is estimated that it would amount to a saving of some $117,000.

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

A Only by drilling an additional well on the same forty-acre tract, which we do believe to be uneconomically feasible under the known facts.

Q Do you have an electric log on this well?

A Yes, sir, I do.

(Applicant's Exhibit No. 3 marked for identification.)

Q I hand you what has been marked Applicant's Exhibit 3 and ask you if that is the electric log on the well in question?

A Yes, it is.

Q Were the three exhibits which you have testified about and identified made by you or under your supervision?

A Yes, sir, except the electric log, which is run by a service company.

MR. CHRISTY: We offer in evidence Applicant's Exhibits 1, 2, and 3.

MR. NUTTER: Without objections, Cabot's Exhibits 1, 2, and 3 will be admitted.

MR. CHRISTY: We have no further questions from this witness.

MR. NUTTER: Does anyone have a question of Mr. Daniel? Mr. Porter.

CROSS EXAMINATION

By MR. PORTER:

Q Mr. Daniel, do you know what the initial production tests on the Forrest Oil Company well, the offset that you referred to, were?

A Yes, sir, I believe it was 384 barrels.

Q 384 barrels?

A 384 barrels per day on half-inch choke.

Q Do you remember when that well was completed?

A It was completed in October, 1951.

Q In the Wolfcamp pay?

A Yes, sir, from an interval of 10,126 feet to 10,136 feet.

Q Do you know what the present productivity of that well is?

A Yes, sir, it is making approximately 17 barrels a day by artificial lift.

Q 17 barrels a day by artificial lift?

A Yes, sir.

Q It looks like an allowable reduction is in order. The proration schedule shows the latest test to be 119 barrels. Of course, I don't have the date of that test.

A We contacted Forrest Oil Company, and that is the data that they gave us.

Q Well, our production records will give us the information we need on that.

MR. PORTER: That's all I have at this time.

MR. NUTTER: Any further questions? Mr. Cooley.

By MR. COOLEY:

Q Mr. Daniel, would you consider that the well which Mr. Porter just question you about, the Forrest No. 1 --

A Yes.

Q -- to have been economically successful? Do you have the cumulative production on the well?

A It is 178,000 barrels.

Q Is that sufficient production to pay out the well?

A Well, it appears that this well was drilled to test the Devonian and it was drilled to approximately 13,142 feet. I would say that it's right at the break-even stage right now.

Q Had the well been drilled to the Wolfcamp formation only as a Wolfcamp test, rather than a Devonian test, it would have already paid out?

A I would say it would have.

Q What is it then that makes you feel that your immediate offset on the subject lease would not be an economic success in the Wolfcamp formation?

A Well, we have two zones that we desire to perforate, one

of which was from 10,220 feet to 10,234 feet and this zone has not been tested. We are not sure that it will be all productive. The other zone is only from 10,178 feet to 10,185 feet, is only seven feet thick, and we do not feel that seven feet of net pay would justify spending approximately $175,000.00 to drill a well.

Q Are both the zones to which you just referred open in the Forrest well?

A No, sir.

Q Which zone is not open?

A It would be equivalent to the upper zone.

Q The one which has not been tested?

A Which has been tested by a drill stem test.

Q How do the pay thickness's compare between your well and the Forrest well?

A They have approximately thirty-five feet of net pay in their well, even though they have only perforated ten feet. We have seven feet of net pay.

MR. COOLEY: That's all the questions I have. Thank you.

MR. NUTTER: Any further questions? Mr.Utz.

By MR. UTZ:

Q Mr. Daniel, what weight casing have you run in this well?

A Our long string, we had N-80 new pipe, and we had three weights, the heaviest was 23 pounds, and we used some 20 and some 17.

Q Where was the heaviest, up at the top?

A The heaviest was on the top. We had 871 feet of 23 pound pipe on top.

Q How much of each weight did you have?

A Then we had 1550 feet of 20 pound, then we had 7709 feet of 17 pound, and then we used 2170 feet of 20 pound on the bottom.

Q Now I believe you stated that it would be impossible for you to run two-inch tubing joint with high drill. What was the reason for your making that statement?

A Well, the drift diameter of five and a half inch casing weighing 23 pounds per foot is 4.545 inches. That is the drift diameter, and inch and a half tubing with high drill CS coupling has a joint O.D. of 2.113. That would give us a minimum clearance of .319 inches inside the casing.

Q Would there be enough clearance to run two and a sixteenth high drill in your 17 pound casing?

A Just a second, I would have to look it up. I believe we checked into it and it would not, but I do not know the O.D. of a two-inch tubing joint with high drill. If I have a high drill book here, I can probably find it. Two and one-sixteenth inch will have a joint O.D. of 2.330.

MR. NUTTER: What type of tubing is that?

A This is two and a-sixteenth inch tubing with a high drill C.S. coupling. That is the O.D. of the joint.

Q What is the I.D. of the 17 pound?

A The 17 pound? I do not have anything here that will give

me the I.D. Yes, I do have it, 17, the drift diameter is 4.767 inches. That is the drift I.D. of 17 pounds.

Q Then you would have a clearance of the difference between 767 and 660, is that correct, at .107 clearance on two and one-sixteenth O.D. high drill inside the five and a half inch 17 pound?

A I haven't checked it, but that sounds reasonable.

Q It is pretty close fit?

A Yes, sir, it certainly is.

Q Would you say that with that close a fit you could run two and a sixteenth O.D. in five and a half inch 17 pound at any depth?

A No, I wouldn't, but see, we have 23 pounds and 23 pound pipe, and that is our restriction on this case. Since that is on top, we have to go through that; therefore we had to decide on inch and a half tubing.

Q Would it be possible, Mr. Daniel, for you to run two and a sixteenth inch string to the Devonian and one and a half to the Wolfcamp?

A Well, I would have to do a little addition here to see. We felt like that using two strings of the same size it would permit each zone to have the same friction loss being produced up through the tubing. There will not be a lot of difference in the allowable, currently the Devonian has an allowable of 250 barrels a day and the Wolfcamp should have an allowable of 173 barrels a day. We feel like that inch and a half tubing, we can produce both zones through inch and a half tubing without excessive friction loss.

Q Well, you are going to have a different friction loss, anyway, because of the length of the flow stringers?

A That is true.

Q As a matter of fact, you will have 2177 feet more in the Devonian flow string?

A It will be two-inch tubing.

Q Up to 10,100?

A Yes, sir.

Q You are still going to have some friction loss in the two-inch, am I right?

A Yes, sir, but it does not amount to very much.

Q Mr. Daniel, have you made any study as to how efficiently you can pump the inch and one-half high drill strings at this depth?

A No, not pump, because if artificial lifting is required we will use gas lift, and so I have not done any study on pumping efficiency.

Q Do you feel that by using gas lift you can recover as much oil as by pumping?

A Yes, sir.

Q You have the gas available?

A We have the gas available as we have a gasoline plant located in the King Field.

MR. NUTTER: Mr. Porter.

By MR. PORTER:

Q Mr. Daniel, in this test information that you got from

Forrest, you probably gave the gas-oil ratio. I don't recall what it was.

A No, sir, I didn't. I believe it was 300 to 1.

Q The gas-oil ratio in the Wolfcamp --

A (Interrupting) Yes, from the Forrest well.

Q It has never been excessive?

A No, sir.

MR. UTZ: One other question.

By MR. UTZ:

Q Have you had any experience, Mr. Daniel, with pumping one and a half inch high drill tubing?

A No, sir, not pumping.

Q So you have no idea of how efficiently you can pump it at any depth?

A No, sir, I have not.

MR. NUTTER: Any further questions?

By MR. NUTTER:

Q Mr. Daniel, I missed it when you gave the top of the cement on your five and a half inch pipe.

A 8995 feet.

Q 8995, that is about 9,000 feet?

A Yes, sir.

Q So the top of the cement is well above the top of the Wolfcamp, isn't it?

A Yes, sir.

Q Referring to your Exhibit No. 1 there, Mr. Daniel, would you tell me which of those wells on that exhibit are completed in the Wolfcamp formation?

A There is only one well.

Q The Forrest well is the only Wolfcamp?

A Yes, sir, it is the only Wolfcamp well.

Q Everything else shown there is completed in the Devonian?

A In the Devonian, yes, sir.

Q How many wells does Cabot Carbon have in the pool?

A Let's see, I believe eleven wells, and we are drilling.

Q All completed in the Devonian?

A Yes, sir.

Q What size casing is in those wells?

A Five and a half.

Q What size tubing have you run?

A Two-inch.

Q I also missed your bottomhole pressure in the Devonian.

A The Devonian bottomhole pressure taken on November 4, 1957, was 4653 pounds, at a datum of minus 600.

Q What is the bottomhole pressure in the Wolfcamp formation?

A From the drill stem test, 30-minute shut-in pressure, 3920 pounds was recorded.

Q 3920?

A Yes, sir.

Q What does Forrest Oil report for their bottomhole in their

well?

A I do not know.

Q What is the gravity of the oil in the Wolfcamp?

A 38.

Q As compared to --

A (Interrupting) To 47 in the Devonian. That is 9 degrees.

Q You don't anticipate any problem as far as corrosion is concerned?

A No, sir, we have observed no corrosion.

Q Is the oil in both of these wells sweet oil?

A Yes, sir.

Q Do the oils in either zones contain paraffine?

A Yes, sir. I know that the Devonian contains -- we have had some paraffine problems.

Q Have you met those problems by plastic coating the tubing?

A We have not plastic coated any of our two-inch tubing, but using inch and a half on this well, we will plastic coat it, internally plastic coat it.

Q Mr. Daniel, in the use of gas lift, would there be some external valve on the tubing that would have to fit into the casing as well as the two strings --

A (Interrupting) We would have to pull our tubing strings and install our gas lift valve.

Q Do those take up much space as far as the tubing, casing annulus is concerned?

A I have some information on that. I do not have O.D. of the gas lift mantle but this circular here says that you can run wire line retrievable gas lift valves inside of five and a half inch casing on inch and a half tubing, but it does not tell you the O.D.

Q It doesn't tell you that you can run those if you have another string of inch and a half in the hole, does it?

A Yes, sir. It says permits running two strings of tubing equipped with wire line retrieving gas lift valves inside five and a half inch O.D. casing, and it's a type, this brand here, Garrett is the type SS-1 for inch and a half tubing, so it is possible, and we plan on doing it if necessary to run gas lift valves.

Q You don't know if those gas lift valves will fit in the annulus if you have a string of inch and a half and a string of two and one-sixteenth CS joint tubing?

A No, sir, I don't believe that you could run it then.

Q Mr. Daniel, have you ever run or seen run inch and a half tubing to a depth of 10,134 feet, and then support two one-inch tubing below that?

A Yes, sir, I have. There are several cases on the Gulf Coast and the lower packer will support that 1900 feet of tailpipe below the lower packer. We only have to have something like 6,000 pounds pressure of the tubing and 6,000 pounds compression to hold the packers in place.

Q While we are on these packers, is that Brown DS-3 a permanent

type packer?

A No, sir, it is a type that can be retrieved. It has a hydraulic hold-down feature; as soon as you relieve the tension, the weight of the tubing on it, it will release.

Q How about the Brown RS-1?

A The RS-1, it is a stringer-type packer which permits you to retrieve your tubing, the tailpipe, and will leave the outer shell of the packer seated, but you can go in with a retrieving sub and recover the outside portion of that packer. So it is not a permanent type. It is recoverable.

Q Isn't this something new, to be using recoverable packers in this type of dual completion?

A No, sir. There have been quite a few of them used this technique.

Q You know of any in the State of New Mexico?

A No, I don't.

Q I think the use of a retrievable packer in a dual completion in New Mexico is rather unique. Now, you stated that there have been 2,000 duals of this type in the past three years. Do you mean using inch and a half strings?

A That and seven inch. I don't have a breakdown on that, but using this type of recoverable lower packer and retrievable lower and upper packer is what I am referring to. I have an article here that was presented to the American Society of Mechanical Engineers telling about this type, and it states, this paper was given at one

of their meetings in Oklahoma City on September 22nd, September 25, 1957; it was accepted by that society and it tells that this type of technique has been used in the industry only three years, yet some 2,000 wells have been dually completed using this type.

Q But some percentage of those were with seven inch casing?

A Yes, sir, they were.

Q And probably two strings of two-inch tubing?

A Yes, sir, but I do not have a breakdown.

Q How would you gas lift the Devonian formation, if necessary?

A We would have to gas lift it from above the upper packer.

Q You would be assuming that the fluid level would stand above the upper packer?

A Yes, sir, but with 4650 pounds bottomhole pressure, it may be somewhat less than that later on, but it will, certainly should raise the fluid high enough above 10,100 feet or approximately 2200 feet above that.

Q You would have to have a column of --

A (Interrupting) Yes, 2200 feet or more in the Devonian, in order to gas lift it.

Q Approximately what pressure would be required to support a column of fluid 2200 feet?

A About 11 to 1200 pounds bottomhole pressure. That is a column of salt water, if oil, it would be somewhat less.

Q Mr. Daniel, you stated that all your eleven wells in the King-Devonian Pool are completed with two-inch tubing. Why did you

use two-inch tubing in those wells? Wouldn't one and a half inch tubing be cheaper?

A Possibly, but we buy our equipment and tubular goods and two-inch is standard for our operations in most cases, and we have not carried any inch and a half tubing in stock in our stock. Inch and a half would be cheaper, we hadn't thought about it, considered it.

Q Would there be any more friction loss in inch and a half string than two-inch?

A Oh, there would possibly be some. I made some calculations. Using two-inch tubing for flowing approximately 270 barrels of oil a day with a GOR of 1200, I figured that the friction loss using two-inch tubing, and this would be about 10,000 feet of two-inch tubing, there would be approximately six pounds friction loss; while using inch and a half tubing that was internally coated with plastic, our friction loss would amount to only 15 pounds in 10,000 feet; so that is very little difference.

Q You think that the difference in friction loss is negligible?

A Yes.

Q But it is standard practice to use two-inch tubing strings?

A Yes, sir.

Q Mr. Daniel, I wonder if you could find out for us and send the information in as to the clearance that's available for use of two and one-sixteenth inch CS joint high drill tubing, and one and a half inch string of CS joint tubing with the gas lift valves?

A All right.

Q If that is at all possible.

A Yes, sir, I will.

Q Also the amount of clearance that is available for running the gas lift valves with the two parallel strings of inch and a half.

A All right.

MR. NUTTER: Mr. Porter.

By MR. PORTER:

Q I believe you testified that your company owns eleven wells in the pool?

A Yes, sir. I just counted them on the plat there.

Q Did drill stem tests indicate the presence of the Wolfcamp in the other wells or any other wells?

A No, sir, there seems to be no porosity development in the wells south of the Lowe well, that's the subject of this application.

Q In other words, it would be apparent now that the Wolfcamp would be limited to these two northernmost wells?

A Yes.

Q The one owned by you and one by Forrest Oil Corporation?

A Yes, sir.

MR. PORTER: Thank you.

MR. NUTTER: Any further questions? Mr. Utz.

By MR. UTZ:

Q Mr. Daniel, when you projected this well, was it intended to dually complete it, or was this something that came up after you

had set up the well?

A This was after the well was completed that we decided that we would like to dual complete it.

Q Is that why you ran five and a half inch?

A Yes, sir, because originally we had not planned on making a dual out of it.

Q Had you planned on making a dual of it before you drilled it, would you have run seven inch?

A Possibly, yes, sir.

MR. NUTTER: Well, you knew that Wolfcamp development was there, and had taken a drill stem test before you ran your pipe, though?

A Yes, sir, but it was only seven feet thick and we didn't at the time realize that we may want to produce that zone, and they went ahead and set five and a half and then after a study was made, it was decided that it would possibly be desirable to dual complete it.

Q When was Forrest Oil Company's Wolfcamp well completed?

A In the latter part of 1951.

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

MR. CHRISTY: Mr. Examiner.

MR. NUTTER: Mr. Christy.

MR. CHRISTY: A question was asked a few minutes ago by Mr. Cooley. The Forrest well was the subject of extended litigation, which I happened to be in. It was drilled to the Devonian

salt water, in the Devonian back up in the Wolfcamp. During that litigation, we had a number of figures. It is my remembrance that that well will pay out, on that well alone, in about 1958. However, the lease itself won't pay out until about 1980, the whole lease under that well.

MR. COOLEY: Thank you.

MR. CHRISTY: One other thing, Mr. Daniel, would you recount those wells? Are you including these two Kerr-McGee wells? Don't count those, now.

A Eleven.

MR. CHRISTY: Thank you.

MR. NUTTER: Is that No. 4 well down there completed?

MR. CHRISTY: It is not completed.

A It is not completed.

MR. CHRISTY: That is a correction in the record. There are only ten completed wells.

A There are ten wells and one being drilled.

MR. NUTTER: If no further questions of Mr. Daniel, he may be excused.

(Witness excused.)

MR. CHRISTY: We have nothing else in support of the application.

MR. NUTTER: Does anyone else have anything else they wish to offer in Case 1365? If nothing further, we will take the case under advisement.

C E R T I F I C A T E

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, 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 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 17th day of February, 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Ada Dearnley
NOTARY PUBLIC

My commission expires:

June 19, 1959.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1365 heard by me on 1-8, 1958.

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