

BEFORE THE
Oil Conservation Commission
SANTA FE, NEW MEXICO
July 18, 1956

IN THE MATTER OF:

CASE NO. 1103

TRANSCRIPT OF PROCEEDINGS

DEARNLEY-MEIER AND ASSOCIATES
COURT REPORTERS
605 SIMMS BUILDING
TELEPHONE 3-6691
ALBUQUERQUE, NEW MEXICO

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
July 18, 1956

Application of Cities Service Oil Company for an order granting permission to dually complete a well in the Devonian formation, Dean-Devonian Pool, and the Pennsylvanian formation, Dean-Pennsylvanian Pool, Lea County, New Mexico, in compliance with Paragraph 2 (2) of Order R-799.

Applicant, in the above-styled cause, seeks an order granting permission to dually complete its State "AW" No. 2 Well located 1980 feet from the South and East lines of Section 35, Township 15 South, Range 36 East, Lea County, New Mexico; the requested dual completion is for the production of oil from the Pennsylvania formation of the Dean-Pennsylvanian Pool and oil from the Devonian formation of the Dean-Devonian Pool; applicant proposes to run only one string of tubing rather than parallel strings as required in Paragraph 2 of Order R-799.

Case
No. 1103

BEFORE: Honorable John F. Simms
Mr. E. S. (Johnny) Walker
Mr. A. L. Porter, Jr.

TRANSCRIPT OF HEARING

MR. PORTER: We will take up next, Case No. 1103.

(Mr. Gurley, Attorney for the Oil Commission then read the title of the within case.)

MR. HALL: Clarence E. Hinkle of Roswell, New Mexico, and Alfred O. Hall of Bartlesville, Oklahoma, appearing for the applicant. We have one witness.

GOVERNOR SIMMS: Are there any other appearances to be made at this time in this case? (No other appearances.)

(The witness was then sworn by Mr. Walker.)

JOHN LEE ALBRIGHT,

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

DIRECT EXAMINATION

BY MR. HALL:

Q Would you state your name, please?

A John Lee Albright.

Q By whom are you employed and in what capacity?

A I am employed by Cities Service Oil Company as special staff engineer.

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

A Yes, sir.

Q If there is no objection, we would ask that his qualifications as an expert in this matter be admitted.

GOVERNOR SIMMS: The Commission considers him qualified. Go ahead.

Q Are you familiar with the application filed in this matter, Mr. Albright?

A Yes, sir.

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

A Yes, sir.

Q Before your transfer to Bartlesville, what was your position with the company?

A I was district engineer at Hobbs, New Mexico.

Q And the well which is the subject of this application was

drilled under your supervision, is that correct?

A Yes, sir.

Q What is your opinion of the purpose and subject of this application?

A This application is to dually complete the Cities Service State AW No. 2 well located in Section 35, Township 15 South, Range 36 East, Lea County, New Mexico. We propose to dually complete this State AW No. 2 in the following manner: To equip the well with one string of tubing to produce the Devonian formation through tubing from perforated intervals 13,626 to 13,650; to produce the Pennsylvanian formation through tubing casing annulus from perforated intervals from 11,480 to 11,800.

Q And this proposed completion will permit us to meet our offset obligations, and prevent reservoir waste by increasing the ultimate recovery and protecting our correlative rights?

A Yes, sir.

Q I hand you what has been marked Exhibit 1 and ask you to identify it, please.

A Exhibit 1 is a plat of the Dean-Devonian and Dean-Pennsylvanian Area in Lea County, New Mexico. The purpose of it is to indicate the location of the proposed dual completion. The limits of the Dean-Devonian pool are indicated by red lines; the limits of the Dean-Pennsylvanian by a green line. The proposed dual completion is circled in red. I might add that after preparation of this plat, Sinclair's State No. 396, wells 2 and 3, have been completed dually. The Humble State AP #1 has also been completed. I understood from the testimony in the previous case

case that the Magnolia State K1 has also been completed.

Q Is this State AW #2 well or lease located within the areas delineated as both the Dean-Devonian and Dean-Pennsylvanian Pools?

A Yes, sir.

Q And you have just mentioned the two wells which have been approved for dual completion in this area?

A Yes, sir; that is the Sinclair State 396, well No. 2 and No. 3.

Q In addition to this application of ours, do you know of any additional pending applications for contemplated dual completions in this area?

A I don't know of any others in this immediate area. I understand that Sunray Mid-Continent has an application for the Lane Ranch area.

Q What is the surface location of the State AW No. 2 well?

A It is located 1980 feet from the south line, 1980 feet from the east line of Section 35, Township 15 south, Range 36 East in Lea County, New Mexico.

Q Why was this well selected for dual completion rather than the No. 1 well on this lease?

A Because we didn't have any indication of production intervals above the Devonian Formation in State AW No. 1.

Q Would you give the completion data on the subject well?

A Yes, sir; we have already noted the location of State AW No. 2. This well was spudded January 26, 1956. The casing program included 13-3/8" casing at 368 feet; 8-5/8" casing at 4919 feet, 5 1/2" casing at 13,657 feet. The initial potential is 916 barrels of oil per day, 55.3° gravity flowing through 32/64" choke,

flowing tube pressure 175, G.O.R. 125, Devonian perforations 13,626 to 13,650.

Q Were any tests made in this subject well that would indicate whether or not the Wolfcamp and Pennsylvanian formations would be productive of oil and gas?

A Yes, sir.

Q Would you describe the nature and results of that testing?

A Yes, sir. We have prepared Exhibit No. 2 which includes our logs from the subject well. It is a gamma ray neutron electric survey and the micro log. On the gamma ray neutron log, we have indicated drill stem tests and the results, plus the completion information of the Devonian interval, and I would like to summarize the drill stem test data. At 10,382 to 10,411 the Wolfcamp formation flowed 4.12 barrels of oil on one well on drill stem testing. I will just summarize this information, the complete data is on the log. From 10,600 to 10,673 the recovery was 31.65 barrels of oil flowing in two hours from that interval.

MR. PORTER: What formation do you identify that at?

A We identify the 10,600 zone as the Lower Wolfcamp; from 11,489 to 11,588 the Strawn No. 58 had a flow stem test of 88 barrels in 3 hours. Those three tests indicated possible productive horizons during the drilling of the AW No. 2.

Q In your opinion do the Devonian and Pennsylvanian formations in the Dean field constitute separate competent sources of supply?

A Yes, sir.

Q Are these two reservoirs separated in the bore hole of the

subject well behind the pipe?

A Yes, sir.

Q Would you describe the casing program for this well and the manner in which it was cemented?

A Yes, sir. 13-3/8" was set at 368 feet with 350 sacks of cement. The cement was circulated 8-5/8" and casing was set at 4919 with 2,550 sacks of cement and the cement circulated. 5 1/2" casing was set at 15,657 feet with a casing collar at 10,678. The first lower station was cemented with 400 sacks of cement, the second through a casing collar at 10,678 cemented with 1650 sacks of cement. The top of the cement indicated by temperature survey was 9950.

Q In your opinion, then, do you feel there is any possibility of communication or migration of fluids between the Devonian and Pennsylvanian reservoirs in the annulus between the casing and the bore hole?

A No, sir.

Q And are all the fresh water zones and other possible producing horizons also adequately protected?

A Yes, sir, by circulating cement on intermediate strings, by bringing cement to the 9950 interval I feel there is adequate protection of the intervals.

Q Do you propose to separate the Devonian and Pennsylvanian reservoirs inside the casing so as to produce them separately?

A Yes, sir, by use of a retainer production packer set at approximately 12,500 feet; this retainer production packer is the same kind that has been used in other cases of this nature, and

the kind that was approved for use in the dual completion applications of Sinclair Oil Company that resulted in Order R-799.

Q I hand you Exhibits marked 3, 4 and 5 and ask that you identify these exhibits.

A Exhibit 3 is a schematic diagram of the dual completion as we have proposed it. It indicates production packer at approximately 12,500 feet. We have a side door choke above the production packer in the single tubing string. It indicates the flow of Devonian oil through the tubing and the flow of Pennsylvanian oil through the tubing casing annulus. Exhibits 4 and 5 are schematic drawings of the type of equipment we propose to install in this dual completion; I believe that the members of this Commission are familiar with this equipment as they have been used previously in gas-oil duals. We have entered these drawings as exhibits primarily to show what we can do with the equipment, and also the limitations of the equipment. In dually completing this well, we propose to run this Otis side door choke and landing nipple indicated on Exhibit 4 one joint above the retainer production packer. As indicated on Exhibit 4, with this side door choke and landing nipple in place, the upper zone is restricted to the casing tubing annulus, while the lower zone is restricted to the tubing. With this equipment in place, we can acidize the lower zone to determine the bottom hole pressure of the lower zone and swab the lower zone. Exhibit 5 indicates an Otis removable Separation Tool. I might add that the side door choke and the removable separation tool, this equipment can be installed and removed from this landing nipple which can be done by the use of the oil line

equipment. It does not necessitate pulling the tubing to change the tubing; as we have indicated, with the Otis removable tool in place, the lower zone is blanked off at this landing nipple and the upper zone is admitted to the tubing. With the Otis removable tool in place, we can acidize the upper zone, determine the bottom hole pressure of the upper zone, and swab in the upper zone.

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

A Yes, sir.

Q Will the surface connections be so designed and installed that the two reservoirs will be separately produced and their fluids separately gauged and tanked so that there will be absolutely no commingling of them?

A Yes, sir.

Q And it will be possible to test the production from each reservoir separately?

A Yes, sir.

Q Are you familiar with Order R-799 handed down by the Commission in the Sinclair Oil and Gas Company dual completion application, which permits completion in the Devonian and Pennsylvanian reservoirs, and the method they are using to produce those wells?

A Yes, sir.

Q Will the lower zone of our subject well be produced in identically the same manner and by the same identical type of equipment as that approved by Order R-799.

A Yes, sir; to produce the lower zone we will have the same kind of packer with the same size tubing set at approximately the same depth.

Q Then the only difference between the situation in the Sinclair wells and the application as we propose it is that we propose to produce the Pennsylvanian in the annulus and casing, rather than run a separate string of casing in that annulus?

A Yes, sir.

Q From an engineering standpoint, do you see any material objection to this type of procedure?

A No, I don't think there would be any material objection. We have just heard testimony in the previous case regarding these formations. I would like to repeat some of that, possibly, to say how it would apply to this case. We believe that the Pennsylvanian formation will produce with a very high gas-oil ratio because it has a very high gas-in-solution content. I believe that the gas-oil ratio will increase rapidly; I believe it is likely that the Pennsylvanian reservoir will flow to depletion. Now, this type of reservoir where we have a high gas-in-solution, and where the bottom hole pressure is already below the gas saturation point, and where we already have indication of a rapid increase, this type of reservoir would be more suitable than any other common type for production through the tubing-casing annulus.

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

A No, sir, I don't believe it would. We have had previous testimony regarding these reservoirs; Cities Service has very little information regarding these reservoirs because we don't have the Pennsylvanian completion data. It has been testified before that the hydrogen sulphide content in the gas in the

Pennsylvanian reservoir is only .5 grains per 100 cubic feet. From that indication, even though we do believe that we will have a high GAS-OIL ratio, we don't believe that will be a serious corrosion problem.

Q What effect do you think this proposed method of completion would have upon the producing gas-oil ratio as compared to producing the well through tubing?

A I believe that we could generally say that producing a well through the casing-tubing annulus would result in a higher gas-oil ratio. Our company experience in other areas has been that it is hard to determine a numerical figure as to the increase in gas-oil ratio. It has been our experience that when a zone is depleted, possibly to where it sometimes won't flow through the annulus, it is sometimes possible to cross it over and then it will flow through the tubing stringer. We believe from the predicted reservoir performance and from the indications that the reservoir is producing in the manner in which it was predicted, that we will have relatively high gas-oil ratios, and in a case like this a slight increase in the gas-oil ratio by producing through the annulus would certainly have less effect than in some reservoirs where we had a lower gas-in-solution and different reservoir characteristics.

Q Do you believe there will be any appreciable reservoir waste because of the loss of this reservoir energy?

A I don't believe there would be a material waste in the reservoir by producing it through the tubing-casing annulus.

Q What effect do you believe this type of completion and

production would have on the flowing life of the well?

A If this reservoir continues to behave like the indications are, it is likely that it will flow to depletion.

Q In producing this Pennsylvanian zone through the annulus, is it your opinion that any small amount of waste that would be incurred would be far less than the economic waste that would be incurred if an additional well had to be drilled?

A Yes, sir.

Q Do you know of any companies who throughout the scope of their operations have confined themselves strictly to dual completions?

A Not to my knowledge.

Q Is this proposed dual completion, in your opinion, feasible and practical?

A Yes, sir.

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

A Yes, sir.

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

A No, sir, it is identical with any other technique involved in dual tubing completions.

Q Has the type of equipment you propose to install been tested and proven by years of actual use by your company and many others in their operations?

A Yes, sir.

Q And as far as you know, have any of these installations caused any commingling of fluids from separate reservoirs?

A Not an abnormal amount. We have made separation tests to determine if there is any commingling, and normally we would have no difficulty in maintaining separation of these reservoirs.

Q And the upper zones in these cases have been produced satisfactorily?

A Yes, sir.

Q Is it possible to take bottom hole pressure tests of either zone in a practical and accurate manner without excessive trouble and expense?

A Yes, sir. I would like to elaborate on the bottom hole pressure tests in cases like this. For the lower zone, of course, there would be no difficulty in obtaining satisfactory bottom hole pressures; that would be done in the same manner that it would for any single completion or for other types of dual completions where the tubing string produces at a lower interval. We have recognized the improvements of the bottom hole pressure data for reservoir performance. We are anxious to determine that information for our own information and for the information of the Conservation Commission, if it sees fit, as to this reservoir. I would like to suggest that approval of this dual completion be made contingent upon the obtaining of adequate reservoir information from this upper zone. We had no adequate reservoir information of bottom hole pressures obtained with bottom hole bombs in a conventional manner upon completion of a well of this nature, and as frequently thereafter as deemed necessary by the Conservation

Commission---we would recommend that this information be obtained at least annually thereafter. Unless we run into some reservoir difficulties, we believe that we can secure this information at very little additional cost over normal bottom hole pressure measurements. We would estimate that we can secure this bottom hole information for possibly an additional \$200.00 per determination. And we would certainly be willing to do this higher line work in order to maintain the reservoir information.

Q Now, with regard to Packer leakage tests, how would those be made?

A We would make packer leakage tests in the conventional manner, possibly in the same manner as we do for gas-oil dual completions at the present time. We believe that ^{the} different producing and reservoir characteristics of these two zones are sufficiently different so that we will not have any difficulty in determining packer leakage. By this, I mean by the characteristics, the gravity, the gas-oil ratio, and information of that nature.

Q If remedial work would have to be done, could the work-overs be made in an effective manner?

A Yes, sir.

Q Would these work-overs be easier in an installation of the manner we propose, rather than where two strings of tubing are installed?

A Yes, sir, they definitely would be easier.

Q Would the time that the two reservoirs would be in communication by work-overs be reduced by having only one string of tubing in the casing?

A It is likely that it would be reduced.

Q You are familiar with the various types of dually completing a well that have proven to be successful, that are in common usage, are you not?

A Yes, sir.

Q Will you state to the Commission the reason that caused you to decide the method proposed here is most feasible and practical under the circumstances existing in this well?

A We are virtually limited to this type of completion in this well as we drilled and completed it, because of the 5½" casing in the well.

Q It would not be possible to run two strings of tubing in that size of hole?

A It would not be possible to run two parallel strings in that size casing that would permit conventional operation.

Q You are familiar with Order R-799, are you not?

A Yes, sir.

Q Do you have paragraph 2-B of that order before you?

A Yes, sir.

MR. HALL: We ask that that paragraph be made a part of the record by reference, rather than by reading it.

MR. PORTER: That will be acceptable to the Commission.

Q What is your interpretation of that paragraph?

A Well, of course, Paragraph 2_B provides that dual completions will be approved in the Dean-Pennsylvanian and Dean-Devonian pools, and it provides that the application for such hearings shall be submitted in triplicate and shall include an exhibit showing the

location of all the wells and a diagrammatic sketch of the proposed dual completion, and that it shall set forth all material facts, and common sources of supply involved, and the manner and method of the completion proposed.

Q Then what is your interpretation of the paragraph?

A Well, of course that paragraph is the paragraph that resulted in our hearing here today. The paragraph after this provides for administrative approval where certain conditions are met. We can't meet those conditions so it was necessary that we apply for this hearing.

Q Were there any other factors that influenced you in your selection of this proposed method?

A Yes, sir; the experience of our company in dual completions was a determining factor.

Q I hand you what we have marked as Exhibit 6, and ask that you identify that exhibit?

A Exhibit 6 is a tabulation of Cities Service casing-tubing dual completions. This is a tabulation of some typical completions in the West Texas area; it is by no means a complete list. It does not include any other areas of Texas, Oklahoma or Louisiana. This is just to give some indication of the experience our company has had with dual completions of this nature in the Dollarhide Field in Andrews County, Texas. We are producing 22 dual completions in this manner at the present time. As the tabulation indicates, we have interests in dual completions of this nature in pools similar depth-wise to the application for which we are asking, where we have completed from zones 10,400 to 13,200.

Q Does this Dollarhide Field you have just mentioned extend into New Mexico?

A The Dollarhide extends into New Mexico from Texas. The leases I referred to join New Mexico.

Q Would you please state, regarding the mechanical features of this installation, how the equipment failures would be detected?

A Equipment failures could be detected fairly easily because of the differences in the reservoir fluids, the gravity of the Devonian oil is fifty-five degrees, it produces with very little gas-oil ratio. The gravity of the Pennsylvanian is forty-four degrees, it produces with a high gas-oil ratio. We believe with this difference in reservoir fluids we would have no difficulty in determining any co-mingling of these reservoir fluids.

Q As you have explained previously, the Packer installation of this proposed method and that of the dual string of tubing is the same, would the methods of detection of recovery be the same in both cases?

A That's right.

Q Now, with regards to the economics of dual completions, with specific reference to the two pools that we have discussed, and the situation of your company as an operator in them, have you made studies of the reserves underlying the State "AW" lease?

A Yes, sir, I have made studies of the Pennsylvanian and the Wolfcamp reserves.

Q What data was available to you at the time you made this study?

A Core analysis, well logs, reservoir data presented in Sinclair's previous case regarding the Pennsylvanian formation.

Q I hand you what we have marked as Exhibit 7, and ask you to identify it.

A This is the core analysis report for the Cities Service State "AW" No. 2, Pennsylvania Strawn section. We cored this interval subject well; this is a core analysis. As indicated on the analysis, the productive interval of this section was twelve feet. The average permeability was 0.3 to 8.5 millidarcies, averaging only 3.0 millidarcies. The average porosity was 7.6 per cent, and the average water saturation was 30.7 per cent. Core Laboratories, Inc. assumed an oil gravity in oil-gas solution and made their calculations on the recovery. We corrected those calculations on the basis of the bottom hole sample obtained by Sinclair on the Pennsylvanian interval.

Q Now, from this exhibit which is marked No. 8, would you state what your estimate would be of the Pennsylvanian reserves of this lease?

A As indicated on Exhibit 8, we estimate the Pennsylvanian reserves to be 1165 barrels per acre or a total of 46,600 barrels. I might add on this that the porosity as indicated in the previous testimony varies quite a bit. It was high, but it was what was present in our well. We have thirty-three feet of net productive feet that does not include the zone previously referred to as the lower Pennsylvanian. That is included in Exhibit 8 in the Wolfcamp. We used the formation volume factor of 8.5 and a connate water percentage of 30.7 as determined by the core analysis.

Q What do you estimate the Wolfcamp reserves to be in this Exhibit?

A From examination of the well logs, from the drill stem

tests data, it appeared to us that these intervals, productive intervals, were very similar and we used the same estimates as to porosity, connate water and formation volume factor. We indicate 777 barrels of oil reserve per acre or a total of 31,080 barrels.

Q In addition to the reserve estimates, have you made estimates as to development costs?

A Yes, sir.

Q Now, testifying from the Exhibit marked 9, what do you estimate the cost to be to drill and equip a well to the Pennsylvanian formation?

A The cost to drill and equip a single completion well to the Pennsylvanian formation at 11,800 feet would cost an estimated total of \$213,814.00.

Q Now, testifying from the Exhibit which has been marked No. 10, what do you estimate the cost to be to drill and equip a Pennsylvanian-Wolfcamp dual well?

A We have estimated the cost to drill and equip a dual well to the Pennsylvanian-Wolfcamp formation at \$275,709.00.

Q Now, testifying from what has been marked Exhibit 11, what do you estimate the cost to be to drill and complete the subject well as proposed?

A We estimate that to dually complete the Pennsylvanian zone in the State "AW" 2, well, it will cost \$23,709.00.

Q Now, testifying from what has been marked as Exhibit 12, would you discuss the economics of the development with these cost estimates?

A Yes, sir. Exhibit 12 indicates the State "AW" development proposal for these reservoirs. The first proposal is to drill

a Wolfcamp-Pennsylvanian dual. We estimate a gross oil recovery to be 77,680 barrels after operating tax and expense our net earnings would total \$139,906.00 since our development expense, as indicated in the previous Exhibit would be \$275,709.00, it would result in a loss of \$135,803.00. We have made our estimates assuming that the Wolfcamp-Pennsylvanian zones would be combined, since that was the previous case, and it is of interest to us. As indicated on proposal No. 2, to drill a single well to the combined reservoirs would result in a net loss of \$67,111.00. The third proposal is to dually complete the State "AW" No. 2 as proposed. We are estimating a gross oil recovery of 46,600 barrels and net earnings of \$64,772.00 after development expenses. Proposal No. 4 is just an estimate on dually completing the State "AW" No. 2 as proposed to the combined Wolfcamp-Pennsylvanian zones.

Q Now, did your company consider the drilling of a well to the Pennsylvanian-Wolfcamp formation prior to this dual application?

A Yes, sir, on May 22nd we made application to the New Mexico Commission to dually complete a well in the Wolfcamp and Pennsylvanian formations when more data was available, particularly well logs that indicated the productive thickness on reservoir estimates corrected to those figures, we found, as indicated on Exhibit 12 there would be a drilling loss of \$135,803.00.

Q And your company decided not to drill the subject well?

A Yes, sir, we cancelled the drilling of that well.

Q In your opinion would granting of that application be an aid in the protection of correlative rights?

A Yes, sir.

Q Is there any other way that correlative rights in this

instance can be protected?

A Only by drilling an additional well.

Q By that you mean that the oil under the State "AW" lease would be drained off to other wells, is that correct?

A That's correct.

Q If this application were denied, would it be your recommendation that a Pennsylvanian well be drilled to meet the offset obligations?

A No, sir, as indicated on Exhibit 12, we can't justify the drilling of a well to those reservoirs.

Q Then in your opinion a dual completion as proposed is the only way this marginal zone can be economically produced and the correlative rights protected?

A Yes, sir

Q What is your opinion as to the ultimate recovery of the State "AW" 2 well dually completed as proposed as compared to the ultimate recovery of it as a single Devonian completion with a twin well completed in the Pennsylvanian?

A In my estimation there would be very little material difference in the total recovery of this well dually completed and this well plus an additional well drilled to the Pennsylvanian zone.

Q Then you do not believe drilling a twin well is necessary?

A No, sir.

Q Do you believe that reservoir waste will occur if the Pennsylvanian **underlying the State "AW" 2 lease is not developed?**

A I think waste will occur in that there is oil there which could be recovered ultimately.

Q And it would not be produced if the application is not granted?

A Yes, sir.

Q It would just stay in the ground, is that correct?

A Yes, sir.

Q Does the opening of a marginal zone for production increase the ultimate recovery of a field?

A It certainly would in this case.

Q If the stringers as described here is not produced entirely efficiently would ultimate recovery for the reservoir still be increased?

A Yes, sir.

Q Now if this application is granted will all Commission requirements as to testing and producing of this well be complied with as well as other relevant rules and regulations?

A Yes, sir

Q Do you feel that this method of dually completing oil wells should be adopted throughout the state of New Mexico?

A Not necessarily.

Q Then why do you believe that permission should be granted to dually complete this well in the proposed manner if you would not recommend it for all the reservoirs throughout the state?

A First because of the producing characteristics of the reservoirs involved. Second, because, as we have indicated before, we have supported Sinclair's application because we didn't believe that these reservoirs would be economical to produce by themselves. We didn't anticipate such a restrictive order, and third, because we have shown that it is not economically possible to develop the

Pennsylvanian reservoir in any other manner.

Q This subject well, what was the status of it when the Order R799 was issued?

A When we received notification ~~of~~ Order 799, we were drilling below 13,000.

Q At that time it was not possible to change the drilling program to permit installation of a dual string?

A No, sir, we didn't feel that it was possible to change the complete drilling and casing program at that late date.

Q Isn't it true that a good part of the casing was already set and cemented at that time?

A Yes, sir, we had 8-5/8 inch set at ~~4900 feet~~ cemented to the surface; that in itself would hardly permit running seven inch casing .

Q Exhibits numbered 1 to 12, except the one prepared by Core Laboratories, which is Exhibit 7, were prepared by you or under your supervision, is that correct?

A Yes, sir

MR. HALL: We ask the admission into the record of Exhibits 1 to 12.

MR. PORTER: Without objection they will be admitted.

MR. HALL: That is all the questions we have.

BY MR. NUTTER:

Q Mr. Albright, is it possible to run a bottom hole pressure bomb through that Otis side door choke and landing nipple?

A You can't run it through, you can run the bomb immediately above it. In a case like that we encounter the problem frequently where possibly you have an obstruction in the tubing but where

we can run a bottom hole bomb to 12,400 feet we would use a gradient that we had in the well bore in the tubing and calculate the bottom hole pressure that additional thousand feet or so.

Q In other words, any pressure you would be able to obtain would be calculated bottom hole pressure?

A With this installation it would. I might add that if we thought it necessary, which we don't believe it is, we can get a side door choke that will perform the same functions that we have discussed here, that is, for your two-inch opening, the type now being used in permanent-type completion. We just didn't believe it was necessary in this case, but it is possible to get that type of equipment.

Q I see. What type of drive is this Pennsylvanian reservoir?

A From the information I have seen from the production characteristics, I would say it is a gas in solution drive. I have information that was presented by, taken from the transcript of the Sinclair hearing in February on this, they indicated that from the Pennsylvanian zone that the original bottom hole pressure was 4,008, that the saturation pressure was 3,859, that the gas in solution in cubic feet per barrel was 3,234. From that data added to the production data to date, I would say it is a solution in gas drive.

Q Then we could expect to get a lot of gas with the oil in that case?

A Yes, sir.

Q Mr. Albright, as a column of oil moves up the tubing or casing, what is the propelling agent to move that gas or oil up the pipe?

A In reservoirs of this type, more or less, gas-in-solution reservoirs, you would more or less expect your gas coming out of solution to be the propelling agent.

Q Could this gas be coming out of solution in the pipe?

A The conditions I spoke of would, of course, be indicated where you were producing it at lower than gas saturation pressure. If you had left the gas saturation pressure as it has been for a few months, that wouldn't be the case, no.

Q As the oil moved up in the pipe and got towards the surface, some of it would come out, would it not?

Q Yes, sir. I would like to say in regard to the theoretical concepts of flow through an annular space, that it is difficult in the first place to estimate performance in a reservoir like this, particularly where you have multi-phase flow. Just as an indication of what our company has done, I certainly wouldn't say we would do it in this reservoir because the reservoir history isn't far enough along to predict it, but for instance in the Dollarhide zone, we have produced vertically six million barrels of oil through tubing casing annulus, which saved us actually drilling twenty-two wells and the gas-oil ratios after that much production were still in the neighborhood of two thousand. It certainly wouldn't indicate that we are getting very much gas coming out of solution induced by the tubing-casing flow.

Q If gas is the propelling agent, or if gas coming out of the flow is the propelling agent and driving the oil up the pipe, would some of the gas possibly slip through the oil and come on out?

A Slippage is a factor in tubing casing flow and in tubing

flow, yes.

Q I wasn't referring to any particular type of mechanical setup right now, I was just speaking of generalities.

A It is a factor in flowing wells, yes, sir.

Q Would the amount of slippage be governed to some extent by the flow velocity through the pipe?

A Normally I think you would say that it would, that would be indicated where you are flowing through the annulus, you would have a lower velocity. We have indicated that we think we will have a higher gas-oil ratio in tubing casing annulus.

Q The size of the tubing determining then the velocity that the oil is moving ~~would~~ also have a governing influence on it, would it not?

A The velocity the oil was moving?

Q The size of the tubing would govern the velocity, the velocity has a bearing on it?

A Yes.

Q How about the gas-oil ratios, would they have any bearing on it?

A If it had a bearing on slippage it would naturally result in an increased gas-oil ratio.

Q And if you had ^{more} ~~an oil~~ gas-oil ratio you would have more slippage?

A I think that is the same thing we were saying.

Q What size tubing do you plan to use in this installation, two inch?

A Two inch, yes, sir.

Q Do you have any idea what the inside cross-sectional area of two inch tubing would be?

A I can calculate it for you pretty quick. I might ask you, Mr. Nutter, if that is given in any literature you have there. This information can be found in about any standard reference book.

Q I have a book over here and I do have a figure on it. I have the Haliburton book here.

A I think your Haliburton book would give it to you right off. Now this is two inch upset tubing --

Q (Interrupting) Yes, the cross section, oh, of that pipe would be approximately what, the inner area?

A I thought you said you had a Haliburton book there.

Q It doesn't give the area.

A I would say that would be about 3.12 square inches.

Q In the case of tubing casing annular flow, the cross-sectional diameter of $5\frac{1}{2}$ inch 23-pound pipe, which is the heaviest pipe in the hole, the cross-sectional area of that is 17.12 square inches, the outside cross-sectional area of your two inch tubing is 4.43 square inches. The annulus then would have an area of the difference of those two, which would be 12.69 inches square, would that be correct if the areas are right?

A If the areas are right, that would be correct.

Q While the cross-sectional area of the inside of the two inch tubing would be 3.12 inches square I believe you said.

A Was it, okay.

Q In other words you have four times as much area in that annular space as you would within the tubing, is that right?

A That's right.

Q Therefore, it would follow that the velocity would be one-fourth as much in the annular space?

A That's right

Q Would it also follow that the slippage would be four times as much?

A I don't think I would be qualified to say, you know we're still doing a lot of work on the characteristics of flowing wells, we have numerous flowing wells, I believe you have had experience with them that sometime the bottom hole pressure and the fluid gradient, they shouldn't flow but they certainly do.

Q That is friction loss. Well, it pretty well is established though, isn't it, that you have more slippage in a large diameter tube than in a small diameter tube?

A Certainly.

Q And in a large diameter tube it would take, if you have more slippage, it would take more gas to produce a given volume of oil, isn't that right?

A From our experience with dual completions I wouldn't say that in all cases, no.

Q I mean where you have more slippage it would take more gas to produce a certain quantity of oil?

A I wouldn't say that based on our experience, not on our calculations, that is the difference.

Q Well, how can you produce as much oil if you have more slippage? My question was in the case where you have more slippage that it would take more gas to produce a given volume of oil because more gas would be slipping by and leaving the oil during that time, isn't that right?

A That is correct, sure.

Q So that a large diameter tube or a large casing where you have more slippage, it would take more gas to produce a given volume of oil, isn't that right?

A Normally it would, yes, certainly. We testified to that effect previously

Q Mr. Albright, do you know the date of the drill stem tests that were made in the Wolfcamp and Strawn zones?

A I don't have that date, I would estimate it possibly May 1st, probably, within a few days of May 1st.

Q What was the date the casing was run and cemented in that well?

A I don't have that information, I believe I have the completion date, the date the well was completed. We have some additional data here, - - - (The witness was handed a paper by Mr. Hall, his attorney)

A - - - this information indicates that on April 1st we were drilling at 11,407 feet. From that report I would say possibly that drill stem test, we drove the formation test probably about April 3rd, drilled into the Devonian on May 21st, put in the casing, perforated, acidized, and flowed the official potential on May 31st.

Q We have a C-103 file for Cities Service which states that the 5½ inch pipe was run and set from May 22nd to May 24th, 1956. I imagine that is probably the approximate date, and for the sake of the record I would like the record to show that Order R799 covering dual completions in the Dean-Pennsylvanian Pool was signed by the Commission and became effective on April 27, 1956. Mr. Al-

bright, another question I wanted to ask you, you said your casing program had already been defined at that time, that you were running 8 5/8?

A That's right.

Q Why weren't you running a seven inch through that 8 5/8 intermediate string?

A I don't think it's feasible to run it normally. Normally you would run a 9 5/8 intermediate stringer. To run a seven inch at all would require you to get a special seven inch flush joint pipe because a normal seven inch casing, with your normal casing couplings, would not perm it sufficient clearance to run them.

Q On this flush joint seven inch pipe, can you run two strings inside that?

A Certainly.

Q Two strings of two inch tubing?

A Yes, sir.

Q Another thing, I think in your closing remarks on direct examination you said you didn't expect the order that came out on Deam case to be as restrictive as it was. What were you referring to there?

A Well, particularly **in requiring** parallel strings in all cases and not making any provision for completed wells or for drilling done prior to the effective date of that order.

Q Well, I don't think that the application that was made and advertised mentioned anything in regard to exceptions, wells already drilled, or wells that were being drilled, I mean, the basis of the whole thing was dual completion, was it not?

A That was the proposed method, certainly.

Q One last question, do you know of any dual completion methods of the type you propose for the production of oil from both zones?

A I don't know of any from both zones; I think probably in the last stages of life of this reservoir it will be producing as much at a high gas-oil ratio as some of them are producing at a low gas-oil ratio in Lea County.

Q On your Exhibit 6, Mr. Albright--

A Yes?

Q Your "remarks" on the dual completions in the Dollarhide Pool mention that six of the Clearfork wells crossed over to flow through tubing. Were they originally completed in the annulus?

A Yes, sir.

Q And they no longer flow through it and are switched over, is that right?

A That's right. The producing characteristics are different from the one we're speaking of, however; they stopped flowing through the annulus and it was necessary to switch them over.

Q And in the Emma Ellenburger Pool, I note that all the Devonian zones are crossed over to flow through tubing. Was the original construction such that they flowed through the ^{annulus} Devonian?

A No, I believe they were crossed over on completion, that was a relatively recent drill. Another purpose of this exhibit was to indicate the other corrections we have made after completion of a well in this manner. I might say that we are not restricted to forever flowing the upper zone through the annulus and the lower zone through the tubing. There are any number of possible courses of action we can take that have to be based on the

performances of these two reservoirs. I will say this, if within a very short time, possibly before the gas-oil ratio gets very high, should the Pennsylvanian zone stop flowing, we still had a strong Devonian zone with no water production, it would certainly be possible to cross it over and flow the Devonian through the annulus and the Pennsylvanian through the tubing. All right, some other things possible to do in such a case would be, first, we could pump either zone through the tubing should it be necessary. We haven't entered any exhibits on it and I didn't intend to enter any exhibits, but a great deal of progress is being made now on pumping dual zones. In the west Texas area alone, inquiries made to vendors of these dual pumps indicated there are over eighty dual wells being pumped in west Texas by means of single tubing string.

Q Pumping both zones?

A Both zones.

Q What kind are they, are they rod pumps or what?

A They are rod pumps, yes, sir.

Q Those wells are not as deep as this Pennsylvanian well, are they?

A As deep --

Q As deep as the Pennsylvanian Pool here?

A Just a minute, I have some information regarding that, I might summarize this information: These pumps were Emsco DB two-zone pumps, fluid pack two-zone pumps, and of the wells we have information on, the lowest, the depth of the lowest interval, on both zones, was 9,000 feet.

MR. NUTTER: I believe that's all I have.

(Recess.)

MR. PORTER: The meeting will come to order and we'll continue with Case 1103.

BY MR. MANKIN:

Q Mr. Albright, did you or some representative of Cities Service attend a hearing on February 15th in case 1116?

A No, sir.

Q Is Cities Service aware of the dual completions being proposed in that case?

A Yes, sir.

Q Did Cities Service attend the prior meetings prior to February 15th which were held by the operators?

A I'm not aware of any meetings held by the operators prior to that time.

Q Cities Service was apprised of the recommendation that Sinclair was to make for dual string completions, was it not?

A Not other than the regular offset operators notification.

Q And wasn't that done in January?

A I don't have the exact date, I presume it was, the hearing was in February.

Q I believe this 8 5/8 intermediate casing you said was set about February 12th?

A That sounds about right. It takes twelve to sixteen days.

Q And Cities Service went ahead and set 8 5/8 inch not paying any particular attention to what might be decided in this situation?

A No, sir, that is not correct. Whenever we started the drilling of State "AW" No. 2, whenever we worked out the program for drilling of that well, the information we had available at that

time did not indicate to us that it was worthwhile at that time to change our complete well program to provide for this dual completion. I would like you to remember this, on the State "AW" No. 1 we had no indication of productive formation between the Devonian-Sinclair had applied for an oil dual, permission had never been granted in New Mexico for an oil-oil dual. Considering the fact that permission had never been granted, and considering the fact-- I don't have the figure offhand -- but it would be reasonable at least that there would be \$30,000.00 additional expense in drilling a bigger hole and a bigger casing schedule. If we had the same information at our disposal now, I would recommend the same thing I did at that time. I would like to comment on another question asked awhile ago, whether the seven inch casing would go through the 8 5/8 intermediate string. I answered at that time that I believed it would. I still think there is no doubt but what the seven inch flush joint pipe would go through the 8 5/8 inch, but a limiting factor would be your 7 7/8 inch drilled hole and I don't think it is technically feasible to consider running a string of seven inch casing 13,600 feet inside of 7 7/8 inch drilled hole.

Q What you ~~were~~ saying is that even though you did run a seven inch flush joint pipe in the casing, you would have difficulty in -- let's put it this way: You would not run a seven inch, you would have to have a smaller diameter in order to get through the hole.

A I am saying that it would go through the pipe, but the chances are that it wouldn't go through the hole. The drill hole was from 13,626 to 13,657. I might add, to drill that hole took from February 12th to May 21st, so the majority of the time was

spent in drilling that interval, the first part goes pretty fast.

Q It could have been reamed down, could it not?

A It's possible it could be; at the time we didn't think it feasible to do that. At the time we completed that well our first thought was to drill dual completion to the Wolfcamp-Pennsylvanian on the basis of flowing drill stem tests. It was after completion of that well, after the complete data was available, that we reached the conclusion we couldn't profitably drill it.

Q Well, when was the well projected, was it projected after the dual completion?

A No, it wasn't. We would have had no justification in projecting this well as a dual completion at that time.

Q Do you intend to open the Wolfcamp with the Pennsylvanian in this dual completion you have proposed?

A That strictly depends on the outcome of the previous case. We have shown on our exhibits the results of opening one zone or the other. As indicated on the exhibits, it would be profitable to us to open only the Wolfcamp-Pennsylvanian zone. If the previous case was rejected, it doesn't affect our case, as we would still like to finish the well in the Devonian-Pennsylvanian area.

Q Has your application indicated -- it did not indicate opening the Wolfcamp at that time?

A No.

Q If this other application is granted, do you desire to do so?

A Yes, we would desire to increase any formation that would help increase the recovery and help pay for this dual completion.

Q You mentioned in your testimony that well No. 3 was

cancelled?

A Yes, sir

Q Has that been done with the approval of the State regulatory body?

A I couldn't say on that, I left Hobbs pretty shortly after that and I don't know if they cancelled it or not.

Q What kind of casing is in well No. 1?

A The same kind of casing.

Q You indicated that you felt the Pennsylvanian would flow to completion?

A I think there's a good possibility that it will, based on the reservoir information that has been presented.

Q Is the Pennsylvanian formation presently producing below the bubble point?

A I believe in the previous case testimony was that it was. We don't have testimony on the Pennsylvanian, that is from the previous testimony.

Q Your Exhibit H which indicated the recoverable reserves from the Wolfcamp indicated 777 barrels per acre. I believe in the prior case you indicated it was just about half of that?

A I would like to invite your attention on that to the fact that on the Pennsylvanian I couldn't include what Sinclair -- it is included in the Wolfcamp. We have twenty-two productive feet in the Wolfcamp, and we call that the lower Wolfcamp.

Q So, actually, your zone is proximately twice as thick as is indicated in Sinclair's net pay?

A No.

Q I believe they indicated eleven feet?

A If we ~~subtract~~ the eleven feet of the upper Pennsylvanian we come out with the same

Q It is comparable then?

A Yes, sir.

Q Returning again to the tools which you propose to use in this well, which are Exhibits 4 and 5, in Exhibit 4, which is with the Otis side door choke and landing nipple in place, that is a plumbing[?] installation, is it not?

A The landing nipple is part of your tubing string, inasmuch as your tubing string is permanent, it is. The choke is a wire line tool, you can run it through the pool by means of wire line equipment.

Q So for bottom hole pressures of the Devonian zone, that would have to be calculated because it isn't a full opening choke, is that right?

A That's right. As indicated to Mr. Nutter previously, in a great many cases we find it necessary to calculate bottom hole pressures from Cities Service data tests for that pool. If the Commission thought it was necessary that we run a bottom hole test into the Devonian zone, I would suggest that we change to a full opening side door choke. There are many of them which we don't consider practical, and you can also separate it similar to our separation tool in that you can blank off the lower zone and bring your upper zone into the tubing.

Q So this equipment has not as yet been installed in the well?

A Certainly not.

Q So that it could be changed if it were deemed necessary?

A Yes, sir.

Q You indicate a gravity on the Devonian of approximately fifty-five degrees?

A Those are gravities obtained on the test of our well.

Q Didn't I understand the gravity on the Pennsylvanian was about -- was that forty-three?

A I believe I testified it was forty-four.

Q Do you have any indication of the differential there might be on the packer on this type of dual completion?

A Yes, sir, I would say the differential would be similar to the same differential you would have on any other type of dual completion similar to the ones approved. We had a flowing bottom hole pressure on the State "AW" No. 2 on July 3rd, if I can locate that here -- this was on the completion information -- the flowing bottom hole pressures of the Devonian, July 3rd, 1956, flowing at 435 barrels per day with a flow of 255, gas-oil ratio, 453, the gas on pressure was 4775. From the previous testimony, the bottom hole test on the Pennsylvanian was, I believe, given at 3620. Probably really, you would have a, we could say 3200-pound bottom hole pressure on the Pennsylvanian and give you a 1500-pound differential. Packers are built to sustain considerably more pressure than that, we have had considerable more pressure on the packers.

Q What type packer do you propose to use?

A A packer retainer production packer, the same type used in the Devonian area.

BY MR. ROSS MADOLE:

~~MR. MADOLE:~~ Mr. Ross Madole appearing for Magnolia

Petroleum Company.

Q Mr. Albright, I hand you the application of Sinclair in Case No. 1016 out of which Order 799 arose. I refer you to the fact that the application, if you will note on the front of it, was filed with the Commission on January 23rd, was it not?

A Yes, sir.

Q Isn't there shown on the application that a copy of the same was served on the offset operators?

A I don't see a mailing list of the offset operators.

Q Will you refer to the Affidavit?

MR. HALL: If the Commission please, we will admit that we got copies of this application, but as the witness has testified, they were offset locations and for other reasons, but that being the main one, we made this project as a single completion project. At that time we didn't even think we would get anything in the Pennsylvanian in this zone.

MR. MADOLE: We don't want you testifying now, just let the witness tell us about that.

A I will repeat what I testified awhile ago.

Q I am asking you if you got copies of that application?

A I notice on this that it says "any waiver of" --

Q (Interrupting) Just read that one there (indicating portion on a piece of paper which was handed to the witness).

A It says that he mailed copies of this application to all parties.

Q And your counsel has said that you had notice of this application at the time it was filed?

A Certainly.

Q Now, you have stated that you have had a lot of experience in dual completions in the Dollarhide field and quoted figures in connection with it. Have you experienced any packer failures in the Dollarhide field?

A Yes, we have had failures in the Dollarhide field.

Q Out of twenty-two wells how many failures have you had?

A I don't have the information on that.

Q Well, can you give me an approximation on it?

A I wouldn't have an approximation.

Q Well, would you say one, two, three?

A I think I should explain what the normal procedure is --

Q (Interrupting) Your counsel will give me your explanation, will you just answer my question as to whether it was one, two, three or how many failures?

MR. HALL: If the Commission please, he said that he doesn't know.

MR. PORTER: That's true, if he can't answer, he can't answer.

A I can't answer that question.

Q You have placed in the record here evidence of economics involved in this case. You have testified that had you changed your casing program anticipating the possibility of this Order 799 that it would cost about thirty thousand dollars more?

A I don't believe I submitted any exhibit to that effect, but I think that would be fairly close. I testified also that on the information we had at that time I wouldn't recommend projecting it as a dual completion.

Q Well, you did say that it would cost you thirty thousand

dollars more, didn't you?

A That is a rough estimate, yes, sir.

Q All right, had you changed your casing program and come in under Order 799, how much additional expense would be involved in running the additional string of tubing?

A I think that just for an additional string of tubing, something to that effect would probably have been twenty thousand dollars, just for an additional string of tubing.

Q Then you would have about twenty thousand dollars and thirty thousand dollars, in other words, for about fifty thousand dollars you could have placed this well in a position of complying with Order No. 799?

A For an additional fifty thousand dollars we could have completed that well probably in this other manner, assuming that we had any productive formations above the Devonian, and assuming the New Mexico Conservation Commission approved that dual application.

Q And for an additional fifty thousand dollars you could have brought it within the scope of Order 799, is that right?

A Yes, sir, we could if we had been able -- I believe you indicated that this was mailed January 23rd to all parties appearing of record. If we could have made a complete economic study and a complete study of the reservoirs between January 23rd -- I don't know when we received this -- it was mailed January 23rd -- and January 26th when this well was started, I think, I would say right now, possibly we would have arrived at the same conclusion that we did.

Q I'm not questioning your judgment, hind sight is always

better than foresight, I'm just trying to get the facts, and the fact remains that for about fifty thousand dollars you could have gotten this well, for about fifty thousand dollars additional, you could have complied with the Order.

MR. HALL: As shown by the record, the Order wasn't handed down until April, 1956.

MR. MADOLE: I am assuming that.

MR. HALL: Please state your question in that language.

Q The fact remains that for an additional fifty thousand dollars you could have developed it and complied with provisions of Order 799.

A I will repeat my answer that if we had had time to make a complete study between the time we received the Order which was mailed on January 23rd, between that time and January 26th possibly.

Q Then these two wells that you have completed dually, you completed under Order 799, didn't you?

A Sir?

Q Didn't you state that you completed wells No. 2 and 3 as dual completions?

A I believe Sinclair has.

Q I thought you said you had?

A No, sir

MR. MADOLE: I have no further questions.

MR. PORTER: Does anyone else have a question of Mr. Albright?

BY MR. NUTTER:

Q Mr. Albright, I think you mentioned awhile ago that an extra string of tubing would cost about twenty thousand dollars.

is that correct?

A I will repeat, that is a rough estimate based on the two inch Hydrill tubing. I believe if you refer to the exhibit that gives the detailed well estimate on the dual completion, I could give you a better figure on that.

(Witness produced Exhibit).

We have 10,400 feet of two inch Hydrill at \$13,312.00. If an extra string were added it would cost a little over thirteen thousand, the acquisition would probably cost an additional three to four thousand dollars and that would make it in the range of sixteen to eighteen thousand dollars.

Q A while ago we went into slippage pretty thoroughly, Mr. Albright -- now I want to get back to something else. How about friction traction on the side of the pipe, does that cause any energy loss?

A Yes

Q To save time, will you accept what I have here for figures -- I have for the inner circumference of $5\frac{1}{2}$ inch pipe 14.7 inches, would that be about right?

A That sounds about right -- just a minute, one four -- what?

Q Yes, sir.

A The inside diameter would be five inch, pi over fifteen inches --

Q I think I was using a 23-pound pipe and it's a little less.

A Well, maybe so

Q I have a figure of 14.7. I've also got an outside circumference for two inch pipe, that is 7.47 inches, would that be about right?

A That sounds about right.

Q So that the total of the two, in other words the circumferences of the pipe that are enclosing the annular space would be 22.17 inches. Comparing that with the circumference on the inside of the 2 3/8 inch, which is 6.29 inches, and you will see that the annular space has approximately three and a half times the area to create friction throughout as the inside of the 2 3/8 inch tubing?

A That is probably correct, yes, sir.

Q So that you probably have considerably more energy loss due to traction?

A That's right. In addition to the calculations you have mentioned on friction losses, there are a number of ways to dually complete a well of this nature, and some of them are definitely not advisable because of friction losses. Probably the most commonly known would be your concentric strings, most operators prefer not to complete one that way.

Q Tubing casing annular flow is through concentric strings, isn't it?

A I was referring to one and a half inch tubing string, or inside a two or two and a half inch string, something of that nature.

MR. NUTTER: That's all.

BY MR. HALL:

Q I believe you testified, Mr. Albright, that you and your company have quite a lot of experience with dual completions in other areas?

A Yes, sir, when I was district engineer in Hobbs, New Mexico

the area we took care of included portions of Andrews, Gaines, and Terry County, Texas, in the area I worked in Hobbs we had numerous dual completions in the Texas portion of that area.

Q And your experience in the type of reservoir we are discussing in this matter was generally good, is that correct?

A I couldn't say I had any experience in a reservoir with these particular characteristics.

Q But you've had experience with these general characteristics?

A Yes, sir.

Q And that experience is generally good, isn't it?

A Yes, sir.

Q Now, with regard to the questions relative to the running of seven inch casing inside 8 5/8 inch, you testified that it would take a certain type of pipe to go down in there -- Hydrill casing, is that the trade name for it?

A Yes, sir.

Q Was that type of casing readily available to you at the time this change would have had to have been made?

A I couldn't testify as to the effect of that.

Q Running a chance of repeating your testimony, you did testify that at the time this well was projected you had no indication or any -- no indications that this hole would be productive in the Pennsylvanian formation, is that correct?

A That is correct. We knew at that time that it was erratic, we knew that it was very erratic and that we didn't have anything in the offset web.

Q For that reason you recommended a single completion hole?

A Yes, sir.

Q And at that time, at the time that the application of Sinclair was filed, you had no way of knowing what the action of this Commission would be, did you?

A No, sir. We knew they had never approved an oil-oil completion.

MR. HALL: That's all.

BY MR. MADOLE:

Q Upon the suggestion of Mr. Hall, you said that your experience generally was good with dual completions. On what do you base that if you don't know what headaches you had with reference to packer failures and so on?

A You asked me how many we had in all that time, my experience was just in two years, in my experience we had two cases of co-mingling out of twenty-two wells. I would like to state this: in completions of this type you have two main places where you can get co-mingling of fluids, the first is in the packing of your retainer production packer, and the second is in the packing of your side door choke. In some cases we would pull the side door choke, regress it, put it back in the hole, and that would isolate the intervals again, and in some cases it was necessary to pull the tubing and drain the tubing landing nipple.

Q That is kind of like closing the door after the cow is stolen, isn't it?

A I don't think you would have co-mingling for an extended period of time and no more than you would in gas-oil, dual completions.

A I'm not talking about that, I'm just talking about this one

here today.

A We have numerous cases with gas-oil completions, I believe it was stated in R799 that co-mingling was an inherent danger in dual completions, but it said that they believed the way this well was to be completed and these zones separated that it was likely that it would be satisfactory to the Commission. We plan to separate the zones in the same identical manner.

MR. MADOLE: We appreciate your speech, Mr. Albright.

MR. ALBRIGHT: Thank you.

MR. PORTER: Any more questions? If not, the witness may be excused. Does anyone have a statement in this case?

MR. NUTTER: At the time of the hearing on February 15th Sinclair, relative to the dual completion case in the Dean-Devonian and Pennsylvanian fields, Sinclair Oil and Gas Company State Lease 758 No. 1 in the northwest quarter of the northwest quarter of Section 16, Range 36 East and Magnolia's State No. 1 in the northwest quarter of Section 5, Township 16 South, Range 37 East had both been completed as Pennsylvanian producers. The Cities Service AW No. 2 in Section 35 is on a true line between these two wells.

MR. MADOLE: I wish to make a brief statement to the effect that where economically feasible we are still in favor of twin wells where in situations such as Sinclair presented in 1016, we reluctantly refrain from protesting, but we think one month after this order comes down, R799, if you break it down further and eliminate the stringing, then dual completions in New Mexico are on a rampage.

MR. TOMLINSON: W. P. Tomlinson of Atlantic Refining Company. I would like to state that we concur with Cities Service and respectfully urge that the New Mexico Oil Conservation Commission

approve the application of the Cities Service Oil Company for an order granting permission to dually complete their State "AW" No. 2 well in the Devonian formation, Dean-Devonian Pool and the Pennsylvanian formation, Dean-Pennsylvanian Pool, by utilizing a single string of tubing and conventional packer separation of the two producing intervals. We have used this method of dual completion successfully in other areas and feel that it affords adequate assurance of separation of the two zones being produced.

MR. PORTER: Thank you, Mr. Tomlinson.

MR. HINKLE: Mr. Clarence Hinkle on behalf of Cities Service. We, of course, realize that the Commission has been reluctant for a long, long time to approve oil-oil dual completions and that they finally approved the Sinclair application on April 27th in their order R799 and that you possibly did so and took into consideration the great improvements that have been made in dual completions in the new techniques, as well as the new technical appliances which make dual completions a lot safer. In this particular case, Cities Service was caught in a situation where they projected a well before this order came out, even though they may have known of the application of Sinclair. They, of course, didn't know what the outcome of the Commission might be, due to the fact that the Conservation Commission had never approved an application of that kind before. Then too, they had an offset well which failed to get any production in this upper zone, so naturally they went ahead and drilled ^{on} the most economic basis, and at the time the order came out they had already set their casing at 4919 feet, which had been cemented, and the testimony correctly shows that it was not practical or feasible to run a seven and a half inch

string or casing, and too, they would have had to have reamed the hole out, and even if they could have gotten the string to fit in there, it probably would not have been available except on special order, so the well would have been shut down for a long time and would be just about as expensive as drilling a new well, probably. The testimony also shows in this case that the upper reservoirs are of such a character that probably would not be economically possible, if this application is refused, to drill another well and, consequently, ~~correlative~~^{rights} will be violated, they will be unable to meet their offset obligations due under the leases, and further, the testimony shows the techniques and equipment that can be now used are such that practically everything can be accomplished with this equipment that can be accomplished by running two parallel tubing strings. They can get all bottom hole tests necessary and make tests to show that there is no communication between the zones, and also, the testimony shows that techniques are developed to such an extent that it may even be possible to pump both the upper and lower zones, which has not been possible before in this kind of dual completion. I think Cities Service would be -- I am sure they would be glad to have any safeguards inserted in this order which might protect the Commission and all rights concerned by making tests at reasonable intervals to show that communication is not taking place or that an unusually high oil-gas ratio is not being had or producing through the annulus. If this is not permitted, as I say, ~~there~~ will be an economic waste in that the oil under the particular lease will not be produced. Assuming there might be some possible waste connected with this kind of dual completion, certainly there would not be as much as there would be leaving the

oil in the ground, so it would seem to be far better to make an exception in this case -- probably an exception should have been raised in the prior order, probably no one thought of it, everyone who was in the process of drilling wells at the time the order was issued, all this is is a request for an exception to that order. As far as I know this is the only well in this area in this category and it's the only exception the Commission would have to make, and in the further drilling of this area, the operators can take into account that they have to drill large enough holes as provided in the Sinclair order No. 799.

MR. PORTER: Does anyone else have anything further in this case? If not, the case will be taken under advisement, and the hearing recessed until nine o'clock tomorrow morning.

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C E R T I F I C A T E

STATE OF NEW MEXICO }
COUNTY OF SANTA FE } ss.

I, DOROTHY B. MYERS, a Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the Oil Conservation Commission of the State of New Mexico, was reported by me in shorthand and reduced to typewritten transcript by me or under my supervision, and that the same is a true and complete record of said proceedings, to the best of my knowledge, skill and ability.

WITNESS my hand and seal this 9th day of August, 1956.



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