

DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.
PHONE 325-1182

ALBUQUERQUE, N. M.
PHONE 243-6691

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
March 29, 1962

EXAMINER HEARING

IN THE MATTER OF:

Application of Humble Oil & Refining
Company for a dual completion, Lea
County, New Mexico. Applicant, in the
above-styled cause, seeks permission
to complete its D. H. Crockett Well No.
1, located in Unit C of Section 21,
Township 15 South, Range 26 East, Lea
County, New Mexico, as a dual comple-
tion (conventional) in the Caudill
Permo-Pennsylvanian and Caudill-
Devonian Pools with the production of
oil from the Devonian zone to be
through a string of 2 3/8-inch tubing
and the production of oil from the
Permo-Pennsylvanian zone to be through
a parallel string of 1 1/4-inch tubing.

CASE 2518

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

MR. UTZ: Case 2518.

MR. WHITFIELD: Application of Humble Oil & Refining
Company for a dual completion, Lea County, New Mexico.

MR. BRATTON: Mr. Examiner, Howard Bratton of Roswell
appearing on behalf of the applicant. I have two witnesses.

MR. UTZ: Any other appearances? You may proceed.



(Witnesses sworn.)

FORREST S. SPRY

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q Mr. Spry, would you state your full name, address and occupation?

A I'm Forrest S. Spry, reside at 2606 North Acres in Hobbs. I'm the district geologist for Humble Oil & Refining Company in Hobbs.

Q Have you previously testified before the Oil Conservation Commission?

A I have not.

Q Would you state very briefly your professional and educational background?

A I graduated from Texas Christian University in February, 1951 and I worked for Humble in March, 1951, did subsurface exploration work for Humble in Midland, was transferred to Roswell for seven months and then to Hobbs where I did production geological work, was transferred back to Midland doing production geologic work, and then transferred to Hobbs, a total of eleven years.

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Q Are you familiar with the Caudill Field in Lea County and the well in question in this application?

A Yes, sir.

MR. BRATTON: Are the witness's qualifications acceptable?

MR. UTZ: Yes, he's qualified.

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

Q Refer to Exhibit No. 1, Mr. Spry, and explain what that reflects.

A Exhibit No. 1 is an area at the South end of the Caudill Field showing both Wolfcamp and Devonian wells. The Wolfcamp wells are encircled dots, the Devonian wells are only dots. The well in Section 21 with the red encirclement is the subject well.

Q Now that is shown to be a Devonian producer at this time?

A Yes, sir.

Q And there are Wolfcamp producers to the east and west?

A Yes, sir.

Q And that is the well that Humble proposes to dually complete in the Devonian and in the Wolfcamp?

A Yes, sir.

(Whereupon, Exhibit No. 2 was marked for identification.)



Q Refer then to your Exhibit No. 2, Mr. Spry. That's a structure map of the Wolfcamp?

A Yes, sir, this is a structure map of the south end of the Caudill Field contoured on top of the Townsend-Wolfcamp pay. This exhibit also shows north-south line, the brown line of cross section, this cross section will be shown on another exhibit. The east-west line in red is also a line of cross section.

Q Now, the wells on those two lines of cross section are not all completed in the same formations, are they?

A No, sir.

Q What does it reflect with relation to the Wolfcamp?

A This shows, this plat is showing the south dip on the south end of the field on top of the Wolfcamp and on top of the Townsend zone in the Wolfcamp.

Q Let's go to your cross sections then, Mr. Spry.

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

Q Your first one is your north-south cross section, that's Exhibit No. 3?

A Yes, sir. On this cross section, coming down to the -- that is the fourth line on this cross section, the dashed line is the top of the Townsend zone, and in wells which the Townsend is completed in this is indicated on these particular wells on the



cross section. To the south below the break in the upper part of the cross section, below the upper part, is the Devonian cross section showing the south dip on top of the Devonian.

Q Now, this shows, as to Devonian, Mr. Spry, as to the No. 1 D. H. Crockett well, that's the one we're concerned with?

A Yes, sir.

Q That shows it's down at the south dip of the Devonian formation?

A Yes, sir. This is the south limit of production.

Q It's dipping to the north?

A Yes, sir. Dipping to the south.

Q Yes, excuse me, going up to the north?

A Yes, sir.

Q And the Crockett well is completed in the Devonian?

A Yes, sir.

Q It is not now completed in the Wolfcamp, is that correct?

A That's right, it is not.

Q Does this show the presence of the Wolfcamp in this well?

A Yes. This cross section shows correlation on top of the Townsend zone between all of these wells on the section. This correlation is apparent and the three wells on the right-hand side of the cross section, the southernmost wells were tested in the Townsend zone and, of course, two of these wells, the



farthest to the right, are dry holes.

(Whereupon, Applicant's Exhibit No. 4 was marked for identification.)

Q Refer to your Exhibit No. 4, Mr. Spry, that is your east-west cross section through the Columbian Carbon No. 1, the D. H. Crockett No. 1 and No. 2 wells, is that correct?

A Yes. The Columbian Carbon No. 1 Crockett is a Wolfcamp producer. The Humble No. 2 Crockett is a Wolfcamp producer. The No. 1 Crockett lying in between, as we have said, is producing only from the Devonian.

Q This cross section also indicates the presence of the Wolfcamp, the Townsend in this well?

A Yes, sir.

Q But it's continuous between these three wells?

A Yes.

Q Is there anything of significance about the Devonian cross section on this well?

A It shows the west and east dip on the Devonian and that our well, in relationship to these two wells, of course, is the high well of these two. It also points out that there should be production in the No. 1 Crockett since the two wells on the section offsetting to the west and east are productive in the Wolfcamp-Townsend zone.

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Q So that if dual completion is permitted, from a geological standpoint, this well should produce from the Wolfcamp formation?

A That's right.

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

A Yes, sir.

Q Is there anything else you care to comment on with relation to the testimony as to geological aspect of this?

A No, sir, I don't believe there is.

MR. BRATTON: We have no further questions of this witness at this time.

MR. UTZ: You want to wait and introduce all your exhibits at one time?

MR. BRATTON: Yes, I believe so.

MR. UTZ: Are there questions of the witness?

CROSS EXAMINATION

BY MR. UTZ:

Q This cross section on Exhibit No. 3, does it show the wells to be non-productive in the Townsend?

A No, sir, these wells shown on this cross section were not tried in the Townsend zone. There are wells immediately east of them on the City Service lease which are producing from



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the Townsend zone.

Q These wells are productive, they just are not perforated?

A Yes, sir, they have not been tried.

MR. UTZ: Any other questions? The witness may be excused.

(Witness excused.)

B. K. BEVILL

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q Mr. Bevill, will you state your full name and occupation?

A B. K. Bevill, Humble Oil & Refining Company, district production engineer, Hobbs, New Mexico.

Q Have you previously testified before this Commission?

A Yes, sir.

Q Are you familiar with the Caudill Field and the subject application, Mr. Bevill?

A Yes, sir.

Q Now, Mr. Bevill, refer back to what has been marked as Exhibit No. 1, if you would, please. First of all as to the Devonian Field, the Caudill-Devonian Field, what kind of a drive



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is that?

A It has a good water drive.

Q What is the drive mechanism in the Wolfcamp?

A Dissolved gas.

Q What size casing do we have in the Crockett No. 1 well?

A It's 5½" twenty-three pound.

Q What are we proposing in this application, Mr. Bevill?

A We are proposing to dual Crockett No. 1 with dual strings of tubing in the conventional manner. One string to be 2 3/8-inch O.D. to produce the Devonian and one string of inch and a quarter to produce the Wolfcamp.

Q Now, the Devonian is pumping, is that correct?

A The Devonian is pumping at the present.

Q The Wolfcamp would flow through the inch and a quarter?

A That's correct.

Q Now, as to the reasons why we're making an application for this dual completion, Mr. Bevill, let's examine the alternatives that we have here. First of all, we could continue to produce the Devonian and after it is exhausted come back up and complete and produce the Wolfcamp, is that correct?

A That's correct, we could.

Q Why is that not desirable?



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A Due to the nature of the Devonian reservoir being a strong water drive and our position on the structure, if we'd abandon the Devonian temporarily we would continue to be drained up structure.

Q In other words, if we abandon the Devonian and produce the Wolfcamp now, due to the fact that we're down dip on the Devonian, our Devonian oil would be gone before we could ever get back to it?

A That is correct.

Q Now, if we were to continue to produce the Devonian until it is exhausted and then complete in the Wolfcamp, what is the difficulty with that?

A We're suffering drainage too west of Cabot Carbon Company's Crockett No. 1.

Q That is completed in the Wolfcamp and now producing from the Wolfcamp?

A That is correct.

Q Now, third, we could drill a Wolfcamp well, what is the difficulty with that?

A The difficulty with that is it's uneconomical.

Q What terms, are we talking in terms of cost of drilling, completing and operating a separate Wolfcamp well here?

A Well, a Wolfcamp well in this pay is estimated to cost



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\$180,000.00, and that would be without troubles, and our reservoir people tell us that the most that we can expect from a new Wolfcamp completion here would be a maximum of approximately 100,000 barrels, which is an optimistic estimate.

Q Now, your \$180,000.00, is that without surface equipment?

A That's to drill and complete only.

Q That's without surface equipment, that's without operating costs?

A That is correct.

Q That's without your salt water disposal costs?

A That's correct.

Q Or would you get into that?

A That's correct.

Q So that actually a Wolfcamp well would not be economic under most optimistic circumstances?

A According to our estimates, it wouldn't even pay out.

Q So we come to the proposal which we're making here today and that is a dual completion?

A That's correct.

Q In this connection, Mr. Bevill, we previously made an application to dually complete this well in another matter, did we not?

A That is correct.



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Q And that was to continue to produce the Devonian through the present tubing or through larger tubing and to flow the Wolfcamp through the tubing casing annulus?

A That's correct.

Q And that suggestion was turned down by the Commission?

A Yes, sir.

Q So we're now suggesting two strings of tubing to pump the Devonian and flow the Wolfcamp through two sets of tubing?

A Yes, sir.

(Whereupon, Applicant's Exhibit No. 5 was marked for identification.)

Q Refer then to your Exhibit No. 5, Mr. Bevill. Explain what that is and what it shows.

A Exhibit No. 5 is just some general information that has a bearing to this particular case. The present status of D. H. Crockett No. 1 is producing from the Devonian through 2 7/8-inch O.D. tubing, actually it's 2 1/2-inch nominal. Its present rate is about 450 barrels of fluid per day, 90% water. It has a conventional 320 D pumping unit with the pump set at about 5,000 feet, it is pumping twelve 108-inch strokes per minute with a two-inch plunger.

The proposed dual completion, the Devonian-Wolfcamp, it is proposed to replace the 2 7/8-inch string, run 2 3/8 N-80



tubing with Hardy Griffin D. S. joint, using present surface equipment and a double displacement type subsurface pump which would have a capacity, using the present unit, of about 350 barrels per day.

The tubing is to be anchored in a non-retrievable packer set at 10,650 feet. The Wolfcamp string is an inch and a quarter N-80 tubing with Hardy Griffin D. S. joint landed in a dual string anchor at approximately 10,580 feet. The Wolfcamp saturation pressure is 3498 pounds. The Wolfcamp oil gravity is 42 degrees API. Subsurface pressure in the D. H. Crockett No. 2, which is an east offset to the subject well, its initial pressure was 3743 pounds, and the most recent pressure was 2882 pounds.

The gas-oil ratio history of Crockett No. 2, Wolfcamp, the initial was 1480 cubic feet per barrel and the present 1800 cubic feet per barrel.

Q In connection with this type of completion, Mr. Bevill, and particularly relating to this type of joint that you are proposing to use, is that something newly approved for use in your company?

A Yes, sir, that is a new joint, a high strength joint, with a minimum of outside diameter at the joint which makes it possible for this particular setup.

Q So, using this type of equipment now makes it possible



for you to go to these two strings of tubing in this size of casing?

A That is correct.

Q Is your inch and a quarter tubing in your Wolfcamp, is the capacity of that sufficient for your Wolfcamp production to flow your Wolfcamp production?

A Yes, sir, it would produce the top allowable limit without trouble.

(Whereupon, Applicant's Exhibit No. 6 was marked for identification.)

Q Let's go on over to the proposed schematic diagram, which is Exhibit No. 6, and explain it, Mr. Bevill.

A Exhibit No. 6 is a simple schematic diagram of how we propose to seat our down hole equipment. The string on the left-hand side is the 2 3/8-inch string which will be anchored in a non-retrievable packer at approximately 10,600 feet. We will have to pump this string using a double displacement type subsurface pump set at approximately 5,000 feet. The string on the right is the inch and a quarter non-upset tubing anchored in a dual string anchor through which we propose to produce the Wolfcamp.

Q Let's examine, Mr. Bevill, some of the possible problems or questions in connection with this type of equipment. Now, first of all as to the Wolfcamp, as I understand it, it is



adequate in size to produce the allowable, is that correct?

A Yes, sir.

Q Can you work in this size of tubing as far as workovers?

A Yes, sir, I've checked with the well servicing people at Hobbs and they have tools such as swabbing tools and paraffin tools to work inside this tubing.

Q How about the utilization of your reservoir energy, is there any question about efficient utilization of your reservoir energy in the Wolfcamp?

A We don't think so. Certainly the smaller tubing will have higher friction. However, this particular type of reservoir, which it's typical of the Townsend Field and the Kemnitz Field, has already shown indications of going in that direction as to high gas-oil ratios, we don't feel like that there will be any waste in energy.

Q You think you would have less slippage and therefore you'd have a full utilization of the reservoir energy?

A That's right.

Q Of course, you don't have the corrosion problem present that you had in your previous application because you are using tubing?

A Well, it's set up in a conventional manner. You can treat for corrosion or paraffin just as you do in any conventional

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dual completion.

Q So the only remaining problem is the question of artificial lift of the Wolfcamp?

A That is correct.

Q And it is a flowing formation at the moment?

A We expect it to be. We have no doubt that it will be a flowing well.

Q In connection with that, would you anticipate that the Devonian production would be through before you might need to artificially lift the Wolfcamp?

A Yes, sir. Exhibit No. 7 pretty well brings that out.

(Whereupon, Applicant's Exhibit No. 7 was marked for identification.)

Q Let's go to Exhibit No. 7, then, with relation to that problem, Mr. Bevill.

A These are curves plotted on production with the function of time. You will note the curve on the left is Humble's D. H. Crockett No. 1 in the Devonian. The trend of that curve has been pretty well established and we have extrapolated down to the economic limit which is 13 barrels of oil per day.

We think at the outside the remaining Devonian life is two and a quarter years under present conditions. The two curves on the right refer to the Wolfcamp Humble's D. H. Crockett No. 2,

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which at present has not started on decline. Therefore, it has no trend and the lower curve is Columbian Carbon's D. H. Crockett No. 1 which has started on the decline, and we've extrapolated those curves down to a bottom hole pressure of 550 pounds, or a daily rate of approximately 30 barrels per day. That is the pressure at which we expect artificial lift will probably have to take place.

Q First of all, where do you get that 550 pounds?

A Well, that's based on our experience in the Townsend and Kemnitz Pools. We have, practically all of our wells that are on artificial lift at Townsend did go on the pump at approximately 550 pounds bottom hole pressure. We have had several to go below that. We have had two wells at Townsend to deplete themselves flowing; actually after they stopped flowing we went to the expense of putting in artificial lift and we haven't gotten anything out of them.

Q So all indications are that the Devonian will be depleted before the Wolfcamp is down to a point where you need artificial lift?

A Yes, sir, that's what we are trying to explain in these particular curves.

Q And even if that were not the situation, if the Devonian should last six months beyond the time the Wolfcamp were to cease



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flowing, all it would mean would be that you couldn't produce the Wolfcamp during the six months, then you would come in and put in new, plug off the Devonian and put in new tubing and pump the Wolfcamp?

A As a single zone completion, yes, sir.

Q So that from the standpoint of artificial lift there's no problem about the inch and a quarter tubing?

A We don't think so at this time.

Q I might ask you, Mr. Bevill, what contributes to that 13 barrels of oil per day economic limit on the Devonian?

A Well, admittedly that's high. However, you have to take into consideration there's a large amount of water lifted from this well and it actually costs more money to lift water than it does oil, then after we get it on top of the ground we have to pay to get rid of it. Our salt water disposal expense alone for the past two years has been in excess of \$2,000.00.

Q Is that on this well alone?

A That's correct.

Q Is that installation of the equipment or just operating costs?

A That's just operating cost.

Q So, with these factors you have a higher barrel economic limit than you might in other circumstances?



A That is right. Actually this is based on 1960 and '61 cost experiences. Last year it was actually higher.

Q Mr. Bevill, from your analysis of this pool and this well, is the granting of this application necessary to protect Humble's correlative rights?

A As we see it, it's our only alternative at this particular time.

Q In your engineering estimate would the granting of this application result in waste?

A No, sir, over all we would certainly gain by being able to produce the two zones together at this time.

Q You mean over all in the protection of your correlative rights?

A That is correct.

Q There would be no waste of oil?

A No, sir. We would lose oil from the Devonian due to upstructure drainage due to not being able to lift as much fluid under the setup as we are now.

Q That oil would be recovered, it's not lost oil?

A It wouldn't be left in the reservoir, it would be recovered.

Q Do you have anything further to state in connection with this application, Mr. Bevill?



A No, sir.

Q Were Exhibits 5 through 7 prepared by you or under your supervision?

A Yes, sir.

MR. BRATTON: We would offer in evidence Humble's Exhibits 1 through 7 inclusive and we have nothing further at this time.

MR. UTZ: Without objection, Humble's Exhibits 1 through 7 will be entered into the record.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Bevill, was the 10,450 feet of inch and a quarter tubing amply long for that size tubing?

A Yes, it is.

Q You don't anticipate any problem?

A There will be problems, but I don't think there will be any that we can't cope with. This new joint is the only thing that makes it possible that we can go even this large as inch and a quarter with a two and three-eighths inch string to produce the Devonian through.

MR. UTZ: Are there other questions? The witness may be excused.

(Witness excused.)

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MR. UTZ: Any statements in this case? The case will be taken under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

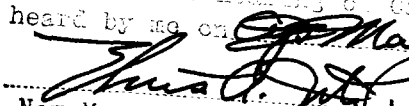
I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 3rd day of April, 1962.


Notary Public-Court Reporter

My commission expires:

June 19, 1963.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner's hearing of Case No. 2518, heard by me on May 28, 1962.

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

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