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BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
November 8, 1962

IN THE MATTER OF: Application of Socony Mobil Oil Company for a quadruple Completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to complete its State Bridges Well No. 95 located in Unit P of Section 26, Township 17 South, Range 34 East, Lea County, New Mexico, as a quadruple completion (conventional) to produce oil from the Abo, Wolfcamp, Pennsylvanian and Devonian formations through parallel strings of tubing.	CASE NO. 2688

BEFORE:

Daniel S. Nutter, Examiner.

TRANSCRIPT OF PROCEEDINGS

MR. NUTTER: The hearing will come to order, please. We will take the next case, 2688.

MR. DURETTE: Case 2688. Application of Socony Mobil Oil Company for a quadrupe Completion, Lea County, New Mexico.

MR. SPERLING: Jim Sperling, appearing for Socony Mobil Oil Company. We have three witnesses, Mr. Examiner, in this case.

(Witnesses sworn.)

MR. SPERLING: Mr. Examiner, here are the officially marked exhibits, and we have prepared other copies.

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E A R L S C H M I D T, a Witness, called by the Applicant, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. SPERLING:

Q Would you state your name, please, your place of residence, by whom you are employed, and in what capacity?

A My name is Earl Schmidt, . Roswell, New Mexico; employed as a junior exploration geologist with Mobil Oil Company.

Q Have you previously testified before this Commission, Mr. Schmidt?

A No, sir, I haven't.

Q Would you give us a resume of your educational and the experience background in your profession?

A I have a Bachelor of Science degree in Geology from Michigan State University in 1954; a Master of Science degree in Geology from Michigan State University in 1958. I have been employed with Mobil Oil Company since 1958, both in New Mexico and in Liberia. Presently again in New Mexico.

Q In the course of your employment, have you had occasion to become familiar with the geological characteristics in the area of Mobil Oil Company's State Bridges area in the Lea County district?

A Yes, sir.

Q I want to refer you to what has been marked for identification as Mobil Oil Company's Exhibit Number 1, and ask you to

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explain what that plat portrays, and generally the information contained thereon, that is pertinent to this hearing?

A It shows the location of the Mobil Oil,Socony Mobil Oil State Bridges Number 95 in SE/$\frac{1}{4}$ of Section 26 on the plat, which is in the Vacuum field, the San Andres Grayburg Vacuum Field, Lea County, New Mexico.

Q The well with which we are concerned in this application is the well indicated in red on the plat?

A Yes, sir.

Q A number of other wells are shown on the plat; I assume from your previous answer that these wells are producing from the Vacuum, or in the Vacuum Field, is that correct?

A Right, they are all San Andres wells, or formations above the San Andres.

Q The well that has been indicated in red is a new well, as I understand?

A Yes, sir.

Q I want to call your attention now to what has been marked as Exhibit 2 in this case, and ask you to explain what it is, and what its purpose is with relation to this hearing?

A The cross section has been prepared through the Socony Mobil State Bridges Number 95. A well in the Kemnitz, a well in the Anderson Ranch Wolfcamp Field. The oldest test was Anderson Aztec which is dry. The datum which is used is the Abo, it is not a structural cross-section. Here is the line of the

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section (indicating); these are townships (indicating). The distances represented here are large; we have almost three township separations between this end of the cross-section and the other end. This large area was included on the cross-section to show that the units we have perforated, and the units that Mobil believes are unique and geologically separate or correlative units, and can be established as such in any future wells.

Mobil has perforated and tested to date, four zones in this well that we wish to produce in this quadruple completion. I believe this cross-section, further testimony will prove they are separate zones. The Devonian perforations here from 12,070 feet to 12,105 feet, I believe are in what has been accepted in New Mexico as the Devonian. It is under the Woodford shale, and the main wells are producing from that to date. The correlation was not carried to the rest of the wells, because I didn't believe there was any question on the Devonian as being a separate and correlative formation.

In ascending order, the next perforations are from 11,112 to 11,122. They are in what I would at least call the Lower Pennsylvanian. They may be Morrow definitely Lower Pennsylvanian but below the Atoka in conformity. They are separated from the Devonian perforation by the Mississippian and Woodford shale. They are in a sandstone which is different in unique lithology as compared to any of the other perforated intervals.

MR. NUTTER: That's the little tiny red area?

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A Yes, that's a 6-foot sand. We used ten feet of perforation so we would be sure of getting it. Going up the hole, I might add further here in the testimony, that we believe there no upper Pennsylvanian exists, otherwise the Cisco Canyon or strong Pennsylvanian beds exist in the whole. The next perforated interval from 9,518, these are the over-all intervals, from the top of the bottom to the smaller units to 9,986, are in the Permian Wolfcamp. I'll discuss these two zones together because of their proximity, and I think that this discussion lies on future separation of zones.

The next are the Abo, 9,070 to 9,199. The lithology changes course here between a dolomite and a chalky-limestone. The top of the Wolfcamp may be more familiar to some people, and is called the Permo Penn. The Wolfcamp has been used on published cross-sections. It is a correlative electro log top, and a sample log top over the distances, at least the distances used on this cross-section, which gets us quite a ways out of the Vacuum Field. The Kenmitz and the Anderson, rather Wolfcamp producing zones are indicated here. They have been classified, I believe, as Wolfcamp.

This line (indicating) on the cross-section was used to show the correlative nature of the lower dolomite unit in the Abo, to these wells. The Abo reef well was presented to show that we are not in the Abo reef, we are in a back reef position, and as such this is not an Abo reef zone. I believe that's about what I have to say from this exhibit.

Q I assume from your testimony, Mr. Schmidt, that the zones in which this particular well has been completed, are not producing zones in the immediate area of the well, is that correct?

A That is true. There is no deep production within the limits of the plat at least presented as Exhibit 1. These are all San Andres wells which would be way above the top of the Glorieta.

Q Then the cross-section that you have presented illustrates that the zones which are open in the State Bridges 95 Well are producing from recognized and established classified formations recognized by the Commission, is that correct?

A Yes, sir.

Q Do you have anything else to add so far as the cross-section is concerned?

A No, sir, I don't.

Q Exhibit 3 in this hearing is the Electro-log of the Bridges 95 Well, a copy of which the Examiner has. I understand that's the only copy, but that is the same log as is shown on the cross-section, is that correct?

A Yes, sir.

Q And from which you have been testifying?

A Yes, sir.

Q You feel then that the intervals that you have shown on the cross-section, constitute separate reservoirs and sources of supply so far as oil production is concerned in this area?

A Yes, sir, I believe that.

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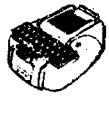

MR. SPERLING: I think that's all I have of this witness.

MR. NUTTER: Does anyone have any question of Mr. Schmidt?

(No response.)

CROSS-EXAMINATION

BY MR. NUTTER:

Q Mr. Schmidt, where on the log of the Number 95 would you pick the top of the Pennsylvanian?

A As I referred to earlier, we will stand at the top of the Pennsylvanian as marked is the top of the Atoka there. No upper Pennsylvanian beds exist in the well.

Q Would it be your contention then that the Wolfcamp goes from the point that you have marked at the top of the Wolfcamp at approximately 9472, or something like that -- Correction, 9247--

A 9247.

Q --down through the entire column to the top of the Atoka?

A Yes, sir. If I can add to this -- The lithology in which we are completed does not, there is a lithology change here, the change from the Wolfcamp deposition, the company believes, I believe, but what we are speaking of is in this portion of the Wolfcamp, we feel that the Permo Wolfcamp deposition extends to the top of the Atoka.

Q You have a definite break just below 10,000 feet?

A Yes, we go from a carbonate limestone, limestone unit, to shales and limestones.

Q But you believe that these are Wolfcamp shales?

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A I'm not making a formation top out of this, that's true. This is open to controversy, but this is true, I think, throughoug New Mexico as to where the top of the Pennsylvanian, the bottom of the Permian exists.

Q Is the little interval from 11,112 to 122, the only interval in the Pennsylvanian which is productive in this well?

A Yes, sir.

Q Do you believe that you have an Abo reef present in this well at all?

A No, sir.

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

(No response.)

MR. NUTTER: He may be excused.

*****

J A C K D. H I L L, a Witness, called by the Applicant, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. SPERLING:

Q Would you state your name, please, your place of residence, by whom you are employed, and in what capacity?

A My name is Jack D. Hill, Hobbs, New Mexico. I am employed by Mobil Oil Company as a junior production engineer.

Q Have you testified before the Commission previously?

A No, sir.

Q Will you give us a resume of your educational background,

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and your experience background?

A I received a B.S. in Geological engineering from the University of Oklahoma in January, 1958; since that time, I have been employed by Mobil Oil Company in both Domestic and Foreign operations. I spent two years as a completion foreman in Venezuela, and one year as completion foreman and pump station supervisor. My last year has been spend in Domestic operations as a drilling engineer.

Q In connection with those duties for Mobil Oil Company, has it been within your responsibility to supervise and make recommendations concerning completion methods employed in Mobil Oil Company's State Bridges Number 95 in Lea County?

A Yes, sir, it has.

Q I want to refer you now to Exhibit marked 4, Mr. Hill, and have you explain the information contained thereon in such detail as is necessary to make it clear.

A Yes, sir. Mobil State Bridges 95 Well was spudded on the 8th of May, 1962, as a wildcat well. The well was drilled to the total depth of 13,816 feet, with three strings of casing set; the first being 13 and 3/8th set at 358 feet, and cemented with 350 sacks of cement, cement circulated; waiting on cement time was 30 hours, and casing pressure tested in accordance with Commission rules. The next string, intermediate, was 9 and 5/8ths, set at a depth of 4400 feet; cement was circulated on this string, total amount used was 3600 sacks; the string was tested in accordance

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with Commission rules. The production string is 7-inch, set at T.D.; it was cemented in two stages with a stamping device at 11,335; the first stage was cemented with 535 sacks of cement, and this stage circulated; the second stage was cemented through the staging tool with 2215 sacks of cement, this stage also circulated. Four zones are presently open in this well with three permanent packers used to give separation between these zones. A Baker Model "D" Packer has been set on a wire line at 12,020 feet. A Baker Model "F" Packer is set at 10,032 feet, it was also a wire line packer. And a Baker Model "FA" was set on a wire line at 9485 feet.

The well is equipped with four strings of 2-inch O.D. Buttress Tubing, which has an internal diameter of 1.670 inches. Three of these strings are landed at 9,485, or slightly above the fourth string, and goes to the Baker Model "D" Packer at 12,020 feet. All of these packers are designed to withstand a pressure differential far greater than any expected in this well. The Baker was tested by the Baker Company to withstand 10,000 pounds pressure differential in either direction.

The Abo string, the short string, is landed open-ended at a depth of 9,078 feet. The Wolfcamp tubing has been latched into a Baker triple-flow tube at 9,485. The Pennsylvanian tubing is also latched into the Baker triple-flow tube at this depth. Between the upper two packers, the "FA" packer and the "F" packer, the Pennsylvanian flows through the anulus of the 2-inch O.D. special

clearance Buttress string and a three and a half inch high drill annular zone. The Devonian flows through the 2-inch tubing which has been set to the bottom packer; this installation was designed and installed in accordance with sound engineering practices and principles, and will definitely prevent communication between the four zones of production.

Q What pressure information do you have with reference to these producing zones?

A The well is presently being completed, and we have not yet run bottom-hole pressures of these zones. The only pressure information available at this time are open-hole drill stem tests. We have pressures on the Abo, the Wolfcamp, and the Devonian. The Pennsylvanian was not tested in the open-hole, and we have no pressures available. The Abo pressure showed a final shut-in pressure on an open-hole DST of 3,205 PSI; the Wolfcamp, 6,024 PSI; and the Devonian, 4,860 PSI.

Q Is this completion in accordance with engineering practices and procedures that has been employed by Mobil in their similar installations?

A In the Hobbs producing district, we do not have another conventional quadruple completion, but it is very similar to completions of this type in the United States.

Q Do you have anything else you would like to add, so far as your diagram is concerned, Exhibit 4?

A Yes, sir; the well has been equipped with all necessary

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surface connections for conducting packer leakage tests.

Q Anything else?

A No, sir, that's all.

MR. SPERLING: That's all I have at this time, Mr. Examiner.

MR. NUTTER: Any questions of Mr. Hill?

(No response.)

CROSS-EXAMINATION

BY MR. NUTTER:

Q Mr. Hill, would you repeat again the 13 and 3/8ths setting depth?

A Yes, sir; 358 feet.

Q That was circulated?

A Yes, sir.

Q And your 9 and 5/8ths is at 4400, and was cemented with how much?

A Cemented with 3600 sacks, 3,600 sacks.

Q And the top?

A It was circulated also.

Q Now, let's see, your two-stage 7-inch T.D.V. tool was where?

A 11,335 feet. I might add that this was what Halliburton calls a "DC" Packer Tool. At the time that you open the DC Tool to circulate it, to circulate the second stage, the packer opens in the formation and remains set.

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Q Your first stage then circulated?

A Yes, sir, it did.

Q How about the second stage?

A It also circulated.

Q Now, the Abo tubing string is set at what depth, again?

A 9,078 feet.

Q The Pennsylvanian perforations are at 11,112 to 122; how far through the Model "F" Packer does the three and a half inch High Drill Tubing come?

A One joint.

Q One joint.

A Approximately 31 feet.

Q So there's approximately a thousand feet then of casing flow between those two packers, and one joint of tubing flow?

A No, sir. Are you speaking between the type "F" packer and the type "FA" packer?

Q No, between the Pennsylvanian perforation at 11,100, and the tailpipe of the three and a half, which would be at approximately 10,100.

A Yes, sir, that is true.

Q There would be a thousand feet of casing flow before it entered the one and a half inch tubing, is that right?

A Yes, sir, that is true.

Q And the Model "FA" Packer is set just a short distance above the Wolfcamp perforation then?

A That's right. 32 feet above the top of the Wolfcamp perforations.

Q All three of these packers are permanent type packers?

A That is correct.

Q It will be possible to take packer leakage tests between the zones separated by each of the packers?

A Yes, sir.

MR. NUTTER: Are there any further questions of Mr. Hill? He may be excused.

*****

J. C. G O R D O N, J R., a Witness, called by the Applicant, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. SPERLING:

Q Will you state your name, please, place of residence, occupation, and by whom employed?

A J. C. Gordon, Senior Production Engineer for Mobil Oil Company, Hobbs, New Mexico.

Q Have you previously testified before the Commission?

A Yes, sir, I have.

Q In addition, Mr. Gordon, I understand that you are a registered professional engineer in New Mexico?

A Yes, sir, I am registered in New Mexico, Number 3408.

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Q How long have you been employed by Mobil?

A Twelve years.

Q Have you had occasion in the course of your employment with Mobil, to make a study of the reservoir characteristics which have been encountered in the respective zones which have been completed in the State Bridges 95 Mobil Well in Lea County?

A Yes, sir, I have.

Q What do you find those characteristics to be?

A On the basis of our present test information, production testing of the zones in this well and correlative zones in other wells in New Mexico, we believe now that all four zones of this completion, this well will be produced by means of solution gas.

Q Do you anticipate any lift problems so far as producing these respective zones are concerned?

A At the present time, we believe there is a possibility that all four zones in this well will produce to completion by means of solution gas.

Q Do you anticipate,in view of the type of completion that has been used, the procedures used in this well, that you have any particular mechanical problems from the standpoin of producing these zones?

A No, sir. At the present time we do not foresee any mechanical problems in the future. In the event that we have what we might call the normal amount of troubles, I believe we will have the normal amount of difficulties with this type of

quadruple completion.

Q Have you made a study of the properties of the oil which is produced from these respective zones?

A Yes, sir, we have run analyses on the Abo and Wolfcamp oils in order to assure ourselves of the differences that might be found between them. At the present time, the outstanding differences are the gravity which has approximately three points of difference, with the Abo oil being approximately 38 degrees API, and the Wolfcamp oil being approximately 41 degrees API; and the pore points of the respective crudes being a Minus 54 degrees Fahrenheit pore point on the Abo oil, and Minus 40 degrees Fahrenheit pore point on the Wolfcamp oil.

Q These crude properties might become important, in view of the comparatively small vertical separation as between the Abo and the Wolfcamp formations, is that right?

A Yes, sir, and also in view of the slight amount of pressure differential that exists between the two formations on our present information, and we believe that the gravity and pore points create additional detecting points for possible packer leakage.

Q Do you have anything you would like to add, so far as these reservoir characteristics are concerned?

A No, sir. At the present time, with only one completion in each one of the four reservoirs, we don't feel capable of saying anything more.

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MR. SPERLING: That's all I have of this witness, Mr. Examiner.

CROSS-EXAMINATION

BY MR. NUTTER:

Q Mr. Gordon, you expect that all four zones will flow to completion; but what would you do if they didn't?

A The small size here of the 2-inch O.D. Buttress tubing does present a problem. We expect to be able to produce these, all four zones by means of sucker rod pumping, with the pump set as low as possible.

Q You can use a rod and tubing pump in this 1.67 I.D. tubing?

A Yes, sir.

Q You stated that you thought all four would be solution gas drive mechanisms?

A Yes, sir.

Q What did the perforations in the Devonian from 12,162 to 164 indicate?

A I believe on this that we tested water.

Q But the Devonian at this time anyway would appear to be solution gas?

A Yes, sir. We base this on our present production tests, which are indicating a higher Gor than is normally observed on other Devonian reservoirs where they have subsequently developed active water drives.

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Q What is the Gor in the Devonian?

A Our latest test is 4780 to 1.

Q Do you have Gors on the other zones?

A Yes, sir. On the Abo, our latest test has a Gor of 1716 to 1; on the Wolfcamp our latest Gor test is 1347 to 1. And the Pennsylvanian, we have not as yet made an accurate flowing test of this completion.

Q We have got the gravity on the Abo and Wolfcamp; what is the gravity on the Pennsylvania, have you determined that yet?

A No.

Q How about the Devonian?

A The Devonian has been tested at approximately 49.50 degrees API.

MR. NUTTER: Are there any other questions of Mr. Gordon?

(No response.)

MR. NUTTER: He may be excused.

MR. SPERLING: At this time, Mr. Examiner, we would like to offer Exhibits 1 through 4 in this case.

MR. NUTTER: Mobil's Exhibits 1 through 4 will be admitted in evidence. Do you have any further witnesses?

MR. SPERLING: No, sir, that's all.

MR. NUTTER: Do you have anything further you wish to offer?

MR. SPERLING: No.

MR. NUTTER: Anyone have anything further they wish to

offer in Case 2688?

(No response.)

MR. NUTTER: We will take the case 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 20th day of November, 1962.

Ada Dearnley
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 hearing of Case No. 2688 heard by me on 11-8, 1962.

, Examiner
New Mexico Oil Conservation Commission

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I N D E X

E X H I B I T S

NUMBER	EXHIBIT	MARKED	OFFERED	ADMITTED
Soc.Mobil #1	Plat	3	19	19
Soc.Mobil #2	Cross-Section	4	19	19
Soc.Mobil #3	Electro-Log	7	19	19
Soc.Mobil #4	Diagram	10	19	19