BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
December 6, 1962

EXAMINER HEARING

IN THE MATTER OF:

Application of Shell Oil Company for the establishment of special rules and regulations, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the establishment of special rules and regulations in the Custer-Ellenburger Gas Pool, Township 24 South, Range 36 East, Lea County, New Mexico, including a provision establishing 320-acre spacing units in said pool. CASE 2715

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We will call Case 2715.

MR. DURRETT: Application of Shell Oil Company for the establishment of special rules and regulations, Lea County, New Mexico.

MR. MORRIS: Mr. Examiner, I'm Richard Morris of Seth, Montgomery, Federici and Andrews, Santa Fe, New Mexico, appearing on behalf of Shell Oil Company in this case. We will have one witness.

(Witness sworn.)

(Whereupon, Applicant's Exhibits Nos. 1 through 7 marked for identification.)

DANA STOKES

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

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Stokes, please state your name and position.

A My name is Dana Stokes. I am employed by Shell Oil Company as a Senior Reservoir Engineer in their Roswell office.

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

A Yes, I have.

Q What does Shell Oil Company seek by the application in Case 2715?

A We're making application for an order establishing field rules for the Custer-Ellenburger Gas Pool. These rules are to include 320-acre standard drilling units.

Q Have you prepared a plat of the area of this pool which has been marked as Exhibit 1 in this case?

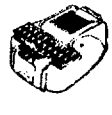
A Yes. Exhibit 1 is a plat of the Custer area. It shows the Jalmat Deep Unit outlined by hashers, and it shows our structural interpretation at Yates level. This unit was put together for the purpose of drilling an exploratory well based on the shallow structure that was present there. We drilled the well and found that the shallow structure did reflect the deeper structure, and obtained production in the Ellenburger. When we finished drilling

the well, we ran a dip meter survey. This dip meter survey indicated that the structure at Ellenburger level had shifted somewhat to the east of the structure shown on our plat here. With the one well control, we are not able to present a structure on the Ellenburger.

Q Referring to what has been marked as Exhibit No. 2, Mr. Stokes, would you explain what's shown on that exhibit?

A Exhibit 2 shows a completion and reservoir data for State B-36 No. 1, which is the only well in the pool. This well was drilled during the middle part of 1960. It was drilled to total depth at 12,966 feet. We ran several drillstem tests in the Ellenburger zone during the drilling of this well, and established a water level at approximately 12,890 feet. We cemented 5-1/2 inch casing at 12,965 feet and perforated the Ellenburger from 12,730 to 12,860 feet. After acidizing with 6,670 gallons of acid, the well was potentialed for 61.5 million cubic feet and 530 barrels of condensate per day.

This is based on the test data that is shown on this Exhibit 2. We also show the reservoir properties for this well. These properties were determined from electrical log analysis and pressure buildup data. We determined porosity and the net feet of pay from sonic logs and neutron logs. The water saturation of 35 percent was determined from the induction log and we used the slope of pressure buildup curves that are shown on Exhibit 3 to calculate the permeability of 6.3 millidarcys.



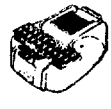
Q Referring to that Exhibit No. 3, would you explain that in some detail, Mr. Stokes?

A Yes. At the top of Exhibit 3 are shown the test data for the bottom hole pressure measurements that have been run in this well. Our one on the initial completion showed an initial pressure of 5560 pounds. That on the graph is shown as curve number one. This curve is a plot of the pressure points versus dimension, with shutin time, which is determined by dividing the cumulative recovery at the time this well was shut in by the rate immediately prior to shutin. The pressure is plotted, the over delta, the plus one, and the delta; it is the length of time shut in.

I have noted on this curve the hours of shutin time that correspond to the various points. This curve has then been extrapolated to infinity shutin time, which gives the original reservoir pressure. The slope of this curve is related to permeability and to producing rate to the viscosity of the oil or gas, as the case may be. Since we know the producing rate and the viscosity and the expansion factor we can then calculate the permeability.

Each succeeding curve then shows the data for various pressure tests. You'll note that on each test, the pressure has declined somewhat until on this test number four, after production of a little over a billion cubic feet of gas, the pressure has dropped approximately 313 pounds.

Q Referring now to what has been marked Exhibit No. 4,



will you explain that?

A On Exhibit 4 is shown the results of the material balance calculations, using the pressure data from Exhibit 3. The three points shown on this graph reflect calculations made of cumulative recoveries of 581 million cubic feet, 837 million, and a billion 48. In each case, the material balance calculation showed the original gas in place to be approximately 29.1 billion cubic feet.

MR. NUTTER: What is the point of the production at the first point?

A That was 500.85 million. These data are also shown on Exhibit 2 at the top of the chart, or Exhibit 3, rather. This calculation of original gas in place indicates that the reservoir is being produced by gas expansion, since if there had been any water encroachment into the reservoir, it would have been reflected by an increased calculation of gas in place at each point. The calculations did not show this.

Now, we've assumed that the pay thickness in the State B-36 No. 1, which is 100 feet, represents average thickness throughout this reservoir, and on that basis, the amount of gas in place would be underlying 778 acres. The reservoir is quite small.

Q (By Mr. Morris) Do you have any information available, Mr. Stokes, concerning the area which you believe this one well to be draining in this pool?

A Well, I have Exhibit No. 5, which is a plot of pressure

divided by "Z" factor, for the actual performance of this well and for the calculated performance if the well were draining only 320 acres or 160 acres. As you can see, the actual well performance shows considerably less pressure decline than would have been expected if the well were draining only 320 acres. This is a plot of "P" over "Z" so the difference of 250 pounds roughly would actually be, say, in the order of 280 pounds multiplied by the "Z" factor. If the well were draining only 160 acres, the pressure drop should have been even more significant.

I believe that the calculations shown here prove that the well is capable of draining the entire reservoir, and is certainly draining in excess of 320 acres.

Q Have you prepared as an exhibit an analysis of the economics in this reservoir on 160 and 320-acre spacing?

A Yes. Exhibit 6 presents our economic analysis of the profit that would be obtained from wells drilled on 160 and 320 acre spacing. Under item number one at the top of this exhibit, we show the cost and income data with a gas price of $160 per million cubic feet. Liquid gas ratio of the life of four barrels per million, the value of the condensate per million cubic feet then being $10.92, for a total value of a million cubic feet of gas at $170.92. The deduction for royalty, production, taxes and overhead amounts to $39.54, leaving a net of $131.38 per million cubic feet.

Our well cost on State B-36 No. 1 was $326,000. I have

calculated reserves for 160 and 320-acre spacing, based on volumetric data shown on Exhibit 2. Assuming a 71 percent recovery efficiency, which is equivalent to an abandonment pressure of 1500 pounds, on that basis the reserves for 160 acres would be 4,250,000 or 4,250,000 million cubic feet. This would be depleted over the life of thirteen years and would yield an income of $558,000, and with direct operating costs deducted of $23,000, deducted from that, you would have a profit of $209,000. This profit discounted at six percent would amount to $48,000 and would give a profit to investment ratio of only 14.7 percent, or .147 discounted at six percent.

On 320 acres we would have 8,500,000,000 reserves. It would deplete over the same life because of the difference in allowable. Our income would then be $1,116,000 with a direct operating cost of $23,000, return of profit of $767,000. This profit discounted at six percent would be $439,000 and would give us a profit to investment ratio of 1.35 or 135 percent. We feel that this exhibit shows that 160-acre spacing would not be economically justifiable.

Q Mr. Stokes, what conclusions can you draw from the information that you have presented to the Examiner with respect to the ability of one well to efficiently drain a given number of acres?

A Well, it's my opinion that the data we've presented here shows that a well will effectively drain more than 320 acres.

Based on the information we have, development on any spacing less than 320 would not be economically justified.

Q Are you prepared to recommend to the Commission and to the Examiner some proposed field rules for the Custer-Ellenburger Pool?

A Yes. We have a set of proposed field rules listed as Exhibit 7. These rules are standard rules for 320-acre gas units, with the exception of a provision for administrative approval of non-standard units.

Q Exactly in what way is your proposal for approval of non-standard units exceptional?

A Well, it provides for non-standard units that cross section lines. I believe that's the only difference in these field rules and the standard set of field rules.

Q Referring to that Exhibit 7, is the provision that you are referring to to be found under Rule 2, Subparagraph B, subparagraph (1)?

A Yes, that's correct.

Q And would you read that provision?

A That provision (1) there, "The non-standard unit consists of contiguous quarter-quarter sections or lots."

Q In a normal or standard provision for administrative approval, how would that particular provision read?

A That would read, "lying within a single governmental section."

Q If I understand the way these rules would work, Mr. Stokes, under Rule 2, a standard section would be 320 acres, would be a half section, being all within a single governmental section?

A Yes, that's correct.

Q Then administrative approval could be obtained under your proposed rules for a non-standard unit which might or might not cross a section line?

A That's correct.

Q And your rules include the standard provisions for giving notice to all offset operators and operators within any section within which the non-standard unit would lie, and would give them the opportunity to object to the formation of the proposed non-standard unit?

A Yes, that's correct.

Q If any such offset operator or operator within either section should object to the formation of the proposed unit, what would happen at that point?

A We would have to schedule a hearing to attempt to obtain our non-standard unit through normal channels.

Q So the effect of the proposed rules would be merely to afford to any operator the right to establish a non-standard unit which might cross a section line if, but only if, no objection were received to the proposed unit?

A That's correct.

Q If, under your proposal, units should be established

which might cross section lines, would orderly development of the pool in any way be disrupted?

A No, I don't believe so. I think the small size of this reservoir -- because of the small size of this reservoir these rules would actually promote orderly development.

Q Would you amplify upon that answer, Mr. Stokes? Just in what way do you believe that your proposed rules would promote orderly development?

A Well, this is a very small reservoir and it trends in a northwest-southeast direction so that the productive limits do not lie within a single governmental section. I believe that in order to put together a proration unit consisting of 320 acres in a single section, it would result in the inclusion of quite a bit of unproductive acreage. This would cause delay in getting a well drilled, I believe, because no one with the productive acreage would be too interested in including non-productive acreage within the standard unit.

Q In your opinion, Mr. Stokes, what will be the effect of the granting of this application, including the rules that you have proposed?

A Well, in my opinion, the granting of this application will prevent waste in the form of unnecessary drilling, and will protect correlative rights through inclusion of a maximum possible amount of productive acreage in each drilling unit, or gas proration unit.

Q Do you have anything further that you wish to add to your testimony at this time?

A No, that's all.

Q Were Exhibits 1 through 7 prepared by you or under your direction?

A Yes, they were.

MR. MORRIS: We move the introduction of Shell's Exhibits 1 through 7, and that concludes the direct examination of Mr. Stokes.

MR. NUTTER: Shell's Exhibits 1 through 7 will be admitted in evidence.

(Whereupon, Applicant's Exhibits 1 through 7 admitted in evidence.)

MR. NUTTER: Does anyone have any questions of Mr. Stokes?

MR. DURRETT: Yes, sir, I have a question.

CROSS EXAMINATION

BY MR. DURRETT:

Q Mr. Stokes, referring to your Exhibit No. 7 which is the proposed field rules, specifically Rule 2-B (4), the last paragraph on the page, requires a 20-day waiting period before granting a non-standard proration unit.

A Yes, sir.

Q Would you have any objection to a 30-day period, if the Commission would determine that this was more desirable?

A No, sir.

MR. DURRETT: That's all I have.

BY MR. NUTTER:

Q Is the Jalmat Deep Unit still in existence?

A Yes. It is an operating unit; all of the partners in this unit participated in the drilling of the first well and share in its production.

Q So that in effect the participating area for this B-36 No. 1 is the limit of the unit?

A So far as the operation is concerned; it is not unitized as to royalty.

Q I see. Now presuming that the Commission adopts the 320-acre spacing that you've asked for here for proration units, and also this opportunity to obtain a non-standard unit crossing a section line, how would the acreage be dedicated to the B-36 No. 1?

A B-36 No. 1 would be in a standard unit, being the North Half of Section 36.

Q It would be the standard unit?

A Yes, sir.

Q Is it anticipated by the operators of the Jalmat Deep Unit that a second well will be drilled here?

A Well, certainly not under present conditions where we have 160-acre allowable. If we are successful in obtaining 320-acre spacing, we will then have to evaluate whether or not we can drill another well within the unit, or we would certainly drill to meet competitive locations outside the unit area.

Q There wouldn't be another 320-acre unit left in the unit area, however, would there?

A No, sir. It would require pooling.

Q Of unitized acreage with non unitized acreage?

A Yes.

Q When was the well actually connected, Mr. Stokes?

A July, 1960.

Q What's the cumulative production to date?

A The last production I have on it is that October figure of a billion, 48 million.

Q That was October of 1962?

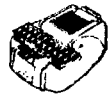
A Yes, sir.

Q Now your 13-year depletion that you figured for your computation of reserves and profit, is that based on the rate of production that the well has had from July of 1960 to October of '62?

A No, sir. If this well had to drain the entire reservoir and were to produce at the rate it's produced since completion, it would take 64 years to deplete it. This 13-year life is based on full development either on 160-acre spacing or 320, as the case may be, and on an allowable of 897,000 cubic feet per day for 160-acre spacing, and twice that for 320. This is our contract basis.

Q What was that exact amount of acreage that you said you computed?

A 778.



Q So the 13-year depletion would be based not on this one well but on full development?

A Full development, yes, sir.

Q Of 778 acres?

A Yes, sir.

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

(Witness excused.)

MR. NUTTER: Do you have anything further, Mr. Morris?

MR. MORRIS: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case 2715? Mr. Black.

MR. BLACK: C. R. Black, Texaco Inc. Texaco owns 10.5 percent of the Jalmat Deep Unit. We had been advised by Shell of the proposed rules and had an opportunity to study the rules. We are in agreement with their proposals and urge that the Commission adopt the rules as proposed by Shell.

MR. NUTTER: Thank you.

MR. DURRETT: May the Examiner please, I have several pieces of correspondence in the Commission's official file which I would like to read into the record at this time.

First is a telegram from Humble Oil and Refining Company which reads as follows: "In reference to Case 2715 scheduled for hearing on December 6, 1962, Humble Oil and Refining Company as a participant in the Jalmat Deep Unit endorses Shell Oil Company's

proposed rules for 320-acre spacing in the Custer-Ellenburger Gas Pool, Lea County, New Mexico." That's signed R. R. McCarty by Henry E. Meadows.

Also have a telegram from Cities Service Petroleum Company which reads as follows: "Cities Service Petroleum Company recommends approval of special rules for the Custer-Ellenburger Gas Pool, Lea County, New Mexico, proposed by Shell Oil Company in Case 2715." That is signed D. D. Bodie.

I also have a letter from Mobil Oil Company received on December 6th, which reads as follows: "Socony Mobil Oil Company, Inc., as owner of a portion of the working interest of the Jalmat Deep Unit, concurs with the field rules proposed by Shell Oil Company for the Custer-Elllenburger Gas Pool in Case 2715." That letter is signed by Glenn W. Barb.

MR. NUTTER: Anything further? We will take the case under advisement.

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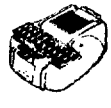

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me, and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this 17th day of December, 1962, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Ada Dearnley
NOTARY PUBLIC

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. 2715, heard by me on December 6, 62.

Examiner
New Mexico Oil Conservation Commission

BEFORE THE

NEW MEXICO OIL CONSERVATION COMMISSION

Santa Fe, New Mexico
January 6, 1965

EXAMINER HEARING

IN THE MATTER OF:

IN THE MATTER OF CASE NUMBER 2715 BEING RE-OPENED PURSUANT TO THE PROVISIONS OF ORDER NUMBER R-2401, WHICH ORDER ESTABLISHED TEMPORARY 320-ACRE GAS PRORATION UNITS FOR THE CUSTER-ELLENBURGER POOL, LEA COUNTY, NEW MEXICO, FOR A PERIOD OF TWO YEARS

Case No. 2715
(Reopened)

BEFORE:

DANIEL S. NUTTER

TRANSCRIPT OF HEARING

MR. NUTTER: The hearing will come to order. We will call the next case, Case Number 2715.

MR. DURRETT: In the matter of Case Number 2715 being reopened pursuant to the provisions of Order Number R-2401.

MR. BUEHL: Mr. Examiner, I am Sumner Buehl of Seth, Montgomery, Federici & Andrews, representing Shell Oil Company. Shell's position in this is that they would like an extension for an indefinite period of time with the 320-acre spacing, in light of the recent amendment to Rule 104, since the Custer-Ellenburger Pool is lower than Pennsylvanian age. If there is no opposition to continuance of the 320-acre spacing we will leave it at that; otherwise, we have testimony, if the Commission is interested.

MR. NUTTER: Is there an objection to taking Case Number 2715 under advisement, with the recommendation that this commercial pool be developed on 320-acre spacing? ... If not, we will take the case under advisement.

* * *

MR. NUTTER: I would like to re-open the last case and make a notation that we received a telegram from Iris Goldston in the estate of L. W. Goldston, supporting the extension of the 320-acre spacing; a telegram from Texaco, Inc., concurring with Shell Oil Company; a telegram from Phillips Petroleum Company in favor of indefinite extension of the 320-