

BEFORE THE  
NEW MEXICO OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
February 10, 1965

EXAMINER HEARING

-----  
IN THE MATTER OF: )

Case Number 2764 being reopened pursuant )  
to the provisions of Order No. R-2439, )  
which order established temporary 640 )  
acre spacing units for the West Jal- )  
Strawn Gas Pool, Lea County, New )  
Mexico, for a period of two years. )

Case No. 2764  
(reopened)

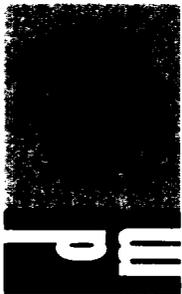
-----  
BEFORE: DANIEL S. NUTTER, Examiner  
ELVIS A. UTZ: Alternate Examiner

TRANSCRIPT OF HEARING

dearnley-meier

SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

1120 SIMMS BLDG. • P. O. BOX 1092 • PHONE 243-6691 • ALBUQUERQUE, NEW MEXICO



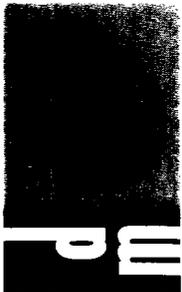
MR. UTZ: Call Case Number 2764.

MR. DURRETT: In the matter of Case Number 2764 being reopened pursuant to the provisions of Order No. R-2439, which order established temporary 640 acre spacing units for the West Jal-Strawn Gas Pool, Lea County, New Mexico for a period of two years.

We have a letter from George W. Selinger for Skelly Oil Company, requesting that this case be continued to the March 10 Examiner Hearing.

MR. UTZ: The case will be continued to that date.

\* \* \*





BEFORE THE  
NEW MEXICO OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico

March 10, 1965

EXAMINER HEARING

-----  
IN THE MATTER OF: )

CASE NO. 2764 BEING REOPENED PURSUANT TO THE )  
PROVISIONS OF ORDER NO. R-2439, WHICH ORDER )  
ESTABLISHED TEMPORARY 640-ACRE SPACING UNITS )  
FOR THE WEST JAL-STRAWN GAS POOL, LEA COUNTY, )  
NEW MEXICO, FOR A PERIOD OF TWO YEARS )

Case No. 2764

-----  
BEFORE :

ELVIS A. UTZ

TRANSCRIPT OF HEARING

**DEARNLEY-MEIER REPORTING SERVICE, Inc.**

FARRINGTON, N. M.  
PHONE 325-1182

SANTA FE, N. M.  
PHONE 983-3971

ALBUQUERQUE, N. M.  
PHONE 243 6691



MR. UTZ: Case Number 2764.

MR. DURRETT: In the matter of Case Number 2764 being reopened pursuant to the provisions of Order Number R-2439.

MR. KELLY: Booker Kelly of Gilbert, White & Gilbert, appearing on behalf of Skelly. I have one witness, and ask that he be sworn.

J A Y T. C O X, the witness, having been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLY:

Q Would you state your name, employer and position, please.

A Name, Jay T. Cox; I am District Reservoir Engineer for Skelly Oil Company, Hobbs, New Mexico.

MR. UTZ: Are there other appearances in this case?  
... You may proceed.

MR. KELLY: Have you previously testified before the New Mexico Oil Conservation Commission?

A No.

Q Would you give the Examiner a brief resume of your educational and professional experience, and experience as related to the Strawn Pool?

A I am a graduate of Oklahoma State University in



1956. I received my B. S. Degree in mechanical engineering with petroleum option. I was employed as Reservoir Engineer by Core Laboratories, Incorporated for five years. I have been with Skelly since last July in the classification of District Reservoir Engineer.

Q You have had actual experience in Lea County?

A Yes, I have.

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

MR. UTZ: Yes, sir, they are.

MR. KELLY: Now, would you state briefly what Skelly's position in this case is.

A Skelly is requesting adoption of the temporary rules to permanent rules for the Strawn Gas Pool.

Q In other words, you want a continuation of the 640-acre spacing?

A Yes.

Q At the time the original hearing was held, what was the general spacing down there?

A Spacing at the time of the original hearing was for 160 acre spacing. Since that time this pool has--not particularly this pool, but reservoirs in this depth, have been granted 320-acre spacing. We are requesting 640-acre spacing for our Strawn Gas Pool.

Q Referring to what has been marked Exhibit 1, would you explain that to the Examiner.

A Yes. As a matter of review, following the structure map on the lower portion of the exhibit, the West Jal Strawn Gas Pool was discovered by the Skelly Oil Company, West Jal Unit Well Number 1 located in Section 20. This is Unit H in Township 25 South, R 36 East, Lea County. Three additional wells have been drilled in the West Jal area with Skelly's Well Number B-1 being located in Section 17, Unit J, being the only other well successfully completed in the Strawn gas reservoir. The location of these four wells may be noted on Exhibit 1, the structure map. Skelly's Well Number 1-A, located in Section 21, Unit K, tested the Strawn gas zone and no commercial quantities of oil or gas were found in this interval. The well was ultimately completed in the Delaware Sand as an oil well in October, 1963. In April, 1964 the West Jal 1-18 Well Number 1, Section 18, Unit 5, drilled by G. C. Parker and Skelly Oil Company to a depth of 12,950 feet, was plugged and abandoned after testing operations indicated no commercial quantities of oil or gas.

The Strawn gas reservoir of the West Jal area is shown on the attached exhibit. The map is contoured on top of the Strawn Formation and shows an asymmetrical anticline faulted on the east flank. As demonstrated in the cross section, the

dearnley-meier

SPECIALIZING IN DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

1120 SIMMS BLDG. • P. O. BOX 1092 • PHONE 243-6691 • ALBUQUERQUE, NEW MEXICO



fault is an effective seal and limits the reservoir to the east. Physical limits to the north, west and south are by structural closure. Sun Oil Company drilled to a depth of 14,933 feet in Section 26 and plugged and abandoned the well. Sinclair has a well in Section 4 which tested the Strawn, and as may be noted on the structure map, an effective pay of zero feet is indicated. Further limitation of the reservoir is caused by the lack of porosity development. These zones of porosity should be interconnected by fracturing accomplished when the faulting occurred. A cross-sectional map drawn through the four wells is presented as Exhibit 1 for clarification of the geology in the West Jal area. Also on the structure map itself is the net pay of Strawn formation for each well. Average properties have been determined for the reservoir; porosity is 8%, permeability 27 millidarcies and connate water saturation is determined to be 32%.

Q Is it Skelly's position that, based on the information they have now, the limits of the pool are pretty well defined?

A Yes.

MR. KELLY: Going on to Exhibit--first, Mr. Examiner, we have logs available, gamma ray and electric logs and microlog. Would you like to have them? This is for the B-1 well.



MR. UTZ: It's the logs as you have shown on this exhibit?

MR. KELLY: This shows the pay zone?

WITNESS: Yes, the cross-section shows the pay zone. The electric logs would just be additional data.

MR. UTZ: Whatever you want--this is good enough as far as I am concerned.

MR. KELLY: Mr. Cox, going to what has been marked Exhibit 3, would you go through that for the Examiner. . . 3 and 4 together.

A Skelly Oil Company's West Jal Unit Number B-1 well was completed in the Strawn gas reservoir on June 27, 1964. Pertinent data for this well are given on Exhibits 2, 3 and 4. Exhibit 2 is an electric log which we offered to the Commission. Exhibits 3 and 4 are the calculation sheet and a plat of results for the multipoint back pressure test conducted June 16 through June 26, 1964. The calculated absolute open flow potential for the B-1 well was 11,200 MCF of gas per day.

Q On Exhibits 5, 6 and 7, which again are pressure information and production history you have plotted, would you briefly explain the information you have gathered there for the Examiner.

A Yes. Production and pressure data for the West Jal Unit Number 1 and B-1 wells are presented in Exhibits 5 and 6,

dearnley-meier

SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

1120 SIMMS BLDG. • P. O. BOX 1092 • PHONE 243-6691 • ALBUQUERQUE, NEW MEXICO

and Exhibit 7 is a graphic illustration of these data. Exhibit 5 is the production data for two wells. Given on the top of the table is data for the West Jal Number 1. The first column is the date the company noted the Unit 1 well first produced, in May of 1963. Gas production is given monthly in MSCF and cumulative also in MSCF. Condensation is also given monthly and cumulatively. Total production of the Unit 1 well to January 1, 1965 has been 1,360,384 MSCF of gas. A total of 28,661 barrels of condensate have been produced from this well. In the lower portion of the table similar data is given for the B-1 well. The company noted first production reported in May of 1964. There is a period, July, August, September and October, when no production was taken from the well--we were awaiting pipeline connection. Total production from this to January 1, 1965 has been 258,469 MSCF of gas and 3,945 barrels of condensate. Exhibit 6 is a tabulation of pressure performance for both wells. The first column shows the month, day and year of the pressure measurements. The next column is hours of shut-in time. The next column is dead weight test pressure which we measured at well-head, given in PSIG. The next column is bottom hole pressure at datum of minus 837 feet. The next column is tubing pressure which increases to bottom hole pressure given in the previous column. Exhibit 7 is a plot of these data. The top curve is static bottom hole



pressure at the minus 8,713 feet subsea--these pressures are given in PSIG. Pressures presented on this plot are bottom hole pressures and are not surface pressures which have been extrapolated down--they represent strictly bottom pressure measurement. Given above the pressure points are the number of hours the well was shut in. The red curves are for the West Jal Unit Well Number 1. The yellow curves are for the West Jal Well B-1. In the lower portion of the graph we have monthly production given in MMSCF as a bar graph. It can be seen that starting in the month of May, our West Jal Unit Well Number 1 was put on production. It can be seen also on the bar graph that the West Jal Unit Well Number 1 started production in the month of May, 1964. Also shown on this exhibit is a plot of the cumulative gas production in MMSCF. The scale for this is on the right-hand side of the curve.

Q You have made a calculation of reserves for this reservoir, have you not?

A Yes.

Q --As shown on Skelly's Exhibit 8?

A Before we get into the reserves, I would like to discuss the initial reservoir pressures in each well.

Q All right.

A The original reservoir pressure measured by Amerada bottom hole in the West Jal Unit Number 1 well was found to

be 7,763 PSIG at the datum of minus 8,713 feet. The first pressure measurement in the B-1 well on June 9, 1964 was taken by a dead weight test instrument at well head after there had been withdrawals of approximately 17,000,000 CF of wet gas. Surface pressure of 6088 PSIG referred to the reservoir datum is 7,629 PSIG. Extrapolation of the 7629 PSIG pressure to initial well conditions--to get back to an original pressure for the well, I used average pressure drop per MMSCF of gas production, which is a value of .53 PSI for MMSCF, and have determined an estimated original pressure for the B-1 well of 7,638 PSIG. Comparison of the original pressures in the two West Jal Unit wells indicates the B-1 pressure to have been 125 PSI lower than the original pressure measured in the Number 1 well.

Now I would like to discuss the reserves which I calculated for the West Jal Strawn. Reserves were determined by extrapolation of the P over Z versus cumulative wet gas production curve. Gas reserves calculated by this method were 31,100 MMSCF. Recoverable gas reserves to an abandonment pressure of 1,000 PSIG were 27,400 MMSCF of gas. An arithmetic average of the two wells' pressure was used to establish reservoir pressure performance. Total withdrawals from the reservoir to January 1, 1965 have been approximately 1,619 MMSCF of gas and 32,600 barrels of condensate.

Calculations for the reserves are shown on Exhibit 8.

Q What is your opinion as to the life of this reservoir?

A The life of this reservoir will be approximately twenty years.

Q And this corresponds with the contract you have with El Paso?

A Yes.

Q Now, going to Exhibit 9, you have calculated the effect of bottom hole pressures on one well?

A Yes. Evidence of pressure interference between the two West Jal wells is indicated by the apparent initial pressure in the B-1 well being lower than the original pressure measured in the Number 1 well. Further evidence of drainage was observed during the months of July through October 1964. Exhibit 9 shows the shut-in well-head pressure for the B-1 well--that is on the top portion of the curve. This is in PSIG. Also shown on the top of the curve is cumulative shut-in time for each of the surface pressure measurements. On the bottom portion is the daily production rate in MMSCF per day of production taken from the Number 1 well. We noted that for withdrawals from the Number 1 well, while the B-1 well was shut-in there was a surface pressure drop. Shut-in press-

ure dropped in the B-1 well 8 PSI and an additional 15 PSI during the Well Number 1 flow periods of July 8th to July 17th and July 23rd to August 3rd. The largest pressure drop in the B-1 well of 62 PSI was noted between the sustained flow period of the Number 1 well from August 6th to August 31st. A slight increase in pressure was observed at the cumulative shut-in hours of 1589, 1613, and 1634; however, this increase was only 3 PSI and is considered to be insignificant. The Unit Well Number 1 produced intermittently from September 9th to October 27th during which time a pressure drop of 55 PSI was observed in the B-1 well. During the period from July 6th to October 27th, the West Jal Unit Number 1 well produced approximately 405 MMSCF of gas and 9,000 barrels of condensate, while the shut-in pressure in the B-1 well dropped a total of 142 PSI.

Q The pressure you are using for the B-1 well was surface pressure?

A Yes.

Q Do you feel that there will be any difference between surface and bottom hole pressure?

A In my opinion, in a well shut-in for the number of hours the B-1 was, surface pressure should represent static bottom hole pressure.

Q In your opinion, this is almost a classic situation of pressure interference?

A Yes.

Q Would it also be your opinion that the wells in this pool are capable of draining in excess of 640 acres?

A Yes.

Q You have prepared some economic figures that are shown on Exhibit 10, pages 1, 2 and 3. Would you go through this for the Examiner.

A Economics of the West Jal Strawn Pool are shown as Exhibit 10, of which there are three pages. Page 1 is basic economics. Column 1 is the year; Columns 2 and 3 are annual gross production with the second column being gas in MMSCF, and the third column is condensate in barrels. The next four columns were used to calculate gross working interest income. The first of these four columns are price per MCF for the gas. This is actually gross working interest value of the gas. The next column shows the dollar value for the gas; the next column is gross working interest income for the condensate, for which a value of \$2.33 per gross working interest a barrel was used. The next column is total of the condensate and gas income. The total for this gross working interest income is \$5,031,000. The next column represents production taxes, a value of .01 dollars per MSCF and .17 dollars per barrel for condensate. The last column is gross working interest income after production taxes.

dearnley-meier

SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

1120 SIMMS BLDG. • P. O. BOX 1092 • PHONE 243-6691 • ALBUQUERQUE, NEW MEXICO



Page 2 shows economics for the 640-acre spacing. The first column is year; the second column is gross working interest income after production taxes and is a duplication of the last column given on page 1. The next column is direct operating expenses. A value of \$350.00 per month per well for two wells was used in this calculation. The next column is operating income, which is the gross working interest income after taxes less direct operating expenses. The next column is capital expenditures. In this column we have the initial expenditure of \$1,517,800 which represents our West Jal Unit Number 1 well. In the year 1964 we have an expenditure of \$373,600, which represents expenditure for the B-1 well. The next column is cash flow in dollars. The last column is discounted cash flow and cash flow was discounted at 6% per annum. The discounted cash flow value for the life of this reservoir will be \$629,500.

Q That is on 640-acre spacing?

A Yes.

Q You have not added in any of the cost of the dry holes, of course?

A No, they were not included.

Q Go on.

A On page 3 are the economics for 320-acre spacing. Column 1 is the year; Column 2 the gross working interest

income after production taxes, which is carried over from page 1. Direct operating expenses in this case were \$350.00 per well per month, and four wells were included. Capital expenditures for the first year representing Unit Number 1 well for the year 1964, represents the B-1 well; for 1965 there is a capital expenditure of \$747,100, which represents the two additional wells which would be drilled in the event 320-acre spacing was required. This value for these two additional wells was based on cost of the B-1 well. It can be seen that the cost of our Number 1 well greatly exceeded the cost of the B-1 well. Loss of circulation problems were encountered during drilling operations and the cost of that well was quite high. The next column is cash flow; the last column is discounted cash flow, again discounted at 6% per annum. It can be seen from the total that the discounted cash flow for the life of this reservoir would be a negative \$55,500.

Q You are presently having all of your gas purchased --strike that. You can produce a lot more gas than is being purchased now, is that correct? Are the wells capable of it?

A The wells are capable of producing more gas.

Q And so the result of going back to 320-acre spacing would be to drill two more wells to produce what is now being produced through these two wells?

A Yes.

Q In your opinion, could this pool be economically developed on 320-acre spacing?

A No.

Q Do you have anything else you would like to add?

A I might say this--that no additional reserves were included in the 320-acre spacing, in that the total reserves, or recoverable reserves, are 27,400 MSCF of gas, and additional wells will not increase the reserves in this reservoir. A faster return of our investment by 320-acre spacing would not be possible because gas sales are restricted on the basis of reserves rather than number of wells.

Q Were Exhibits 1 and 3 through 10 prepared by you or under your supervision?

A Yes.

MR. KELLY: I move the introduction of Exhibits 1 and 3 through 10.

MR. UTZ: It would be through 10C, wouldn't it?

MR. KELLY: Yes.

MR. UTZ: The Exhibits 1 and 3 through 10C will be accepted in the record of this case.

MR. KELLY: I have no further questions at this time.

CROSS-EXAMINATION

BY MR. UTZ:

Q Mr. Cox, we have heard from time to time considerable testimony on direct operating costs for operating gas wells. Your figure of \$350.00 per month seems extremely high compared to other testimony. Can you justify that?

A This value of \$350.00 per well per month was taken from the actual cost of this well--actual operating cost assigned to this well.

Q Why are costs so high on this type of gas well? It wouldn't be the depth, would it? Does that include supervisory costs?

A Yes.

Q And overhead?

A Yes, this does include overhead cost.

Q Does the fact that this well produces substantial quantities of condensate increase the cost?

A Yes. Operating costs are high in that special equipment for the high-pressure wells were required.

Q It might be well to go into some detail as to how you arrive at this \$350.00 figure--what the actual charges are.

MR. KELLY: Mr. Cox, do you face increased operating expenses due to this surface equipment for your condensate on these wells?

A Would you re-state the question.

Q I said, do you face additional operating expenses

in these wells because of your measuring equipment and surface equipment for your condensate?

A Yes, our operating expenses would be high due to the surface facilities and the storage facilities for the condensate.

Q And you actually have to have additional employees for guaging and working the surface equipment too?

A Yes.

Q Do you feel that that would explain the higher figure of \$350.00?

A Yes, it certainly would.

MR. UTZ: Do you know of your own knowledge how much it costs Skelly to operate the oil well?

A No, I don't.

Q Do you know whether it would be close to this figure or not?

A I'm sure the cost for operating an oil well would not be this high, in that normally pressures and the equipment used for the production of oil do not require high pressure capacities, so therefore the cost of operating would be less. One reason why surface facilities for these gas condensate wells is so expensive is due to the fact that they are high pressure gas wells.

MR. PORTER: Would you say these are rather isolated

dearnley-meier

SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

1120 SIMMS BLDG. • P. O. BOX 1092 • PHONE 243-6691 • ALBUQUERQUE, NEW MEXICO

wells?

A Yes, they are.

Q How many wells do you have here?

A We have two gas condensate wells and one producing oil well.

MR. SELINGER: It necessitates special pumping.

MR. PORTER: Two gas wells and an oil well?

MR. SELINGER: Yes.

MR. PORTER: Do you know whether--you probably have a switcher assigned to these wells. Do you know whether or not he handles other wells?

MR. SELINGER: No, he does not--he just handles these. It's an isolated operation.

MR. PORTER: In other words, this requires the full time services of one man?

MR. SELINGER: Yes.

MR. PORTER: Plus probably some other services?

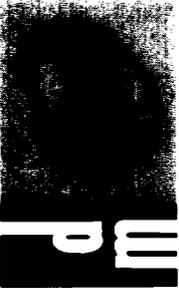
MR. SELINGER: Yes.

MR. PORTER: That's all the questions I have.

MR. UTZ: I believe you said this 27,400,000 MMCF was for the whole pool?

A Yes, sir, they are our recoverable reserves for the pool.

Q Do you have any idea how much acreage these reserves



represent?

A This is dependent upon your net feet of section. With reference back to our Exhibit 1, it will be noted that we have an effective 37 feet of pay in our B-1 well in our West Jal Unit, and we have 96 feet of pay for an average thickness of roughly 50 feet, and using rock properties of porosity and water saturation, the areal extent under which these reserves would lie would be in the range of perhaps 640 to 1200 acres. These were--I have calculated these one time, to get a general idea of what the areal extent of the reservoir would be, and in my opinion these reserves for this net feet would not cover more than 1200 acres.

Q Since you have two completed wells, you actually have 1,280 acres dedicated to the acreage?

A Yes.

Q Some of that acreage would certainly be dry, would it not?

A Possibly. In our opinion, porosity and permeability in the reservoir decreases off away from the top of the structure. This can be seen by the fact that the 118 Number 1 well drilled by Parker and Skelly was a dry hole. On the Sinclair well which is also off the main portion of the structure, there is zero feet of net pay. The same is true for the Sun well in Section 26--zero effective feet of pay; so we feel that the

dearnley-meier

SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

1120 SIMMS BLDG. • P. O. BOX 1092 • PHONE 243-6691 • ALBUQUERQUE, NEW MEXICO



main development of porosity and permeability is at the highermost portion of the structure.

Q Since this is a non-prorated gas pool would it make any difference whether 340 or 620 acres was dedicated to the pool? The contract is on a reserve basis, is it not?

A Yes. As far as this reservoir is concerned, no; however, Skelly Oil Company would not be interested in dropping this additional acreage, in that although we have no immediate plans for additional development in the area, it is conceivable that we may have future plans for development, and wish to retain these leases.

Q Both of these wells are capable of producing the volume of gas your contract allows?

A Yes.

MR. UTZ: Are there any other questions of this witness?

MR. KELLY: I might point out that it would certainly be disadvantageous to the royalty owners if 320 were allocated to these wells, because the other 320 would be just left out.

MR. UTZ: You would have fewer participating royalty owners?

MR. KELLY: Yes.

MR. UTZ: And the royalty is diversified?

dearnley-meier

SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

1120 SIMMS BLDG. • P. O. BOX 1092 • PHONE 243-6691 • ALBUQUERQUE, NEW MEXICO

